Stormwater Annual Report

Submitted to

Oregon Department of Environmental Quality

November 2025

Clean Water Services

STORMWATER ANNUAL REPORT

Submitted to:

Oregon Department of Environmental Quality

Submitted by:

Clean Water Services

Co-implementers:

Clean Water Services, Washington County, and the cities of Banks, Beaverton, Cornelius, Durham, Forest Grove, Hillsboro, King City, North Plains, Sherwood, Tigard, and Tualatin

Submitted in accordance with the requirements of National Pollutant Discharge Elimination System (NPDES) Watershed-Based Waste Discharge Permit Numbers 101141, 101142, 101143, 101144, and MS4 File Number 108014 issued on December 8, 2022, and effective January 1, 2023.

November 1, 2025

Permit Holder Information

PERMITTEE: Clean Water Services
2550 SW Hillsboro Highway
Hillsboro, OR 97123

CONTACT: Caroline Lobdell
General Counsel & Chief Compliance Officer
503.681.3600

Clean Water Services

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM ANNUAL REPORT

November 2025

Clean Water Services hereby submits this NPDES Municipal Separate Storm Sewer System Annual Report in accordance with NPDES Permit Numbers 101141, 101142, 101143, 101144, and MS4 File Number 108014. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for the gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Rick Shanley
Interim Chief Executive Officer/General Manager

This page intentionally blank.

Executive Summary

This stormwater annual report includes a summary of the activities and accomplishments performed under the Clean Water Services (CWS) Stormwater Management Plan (SWMP). The SWMP was incorporated into CWS' watershed-based NPDES permit (Permit) issued April 22, 2016. Implementation of the SWMP and the Permit, which was reissued December 8, 2022, and took effect January 1, 2023, constitute the Maximum Extent Practicable (MEP) requirement that CWS must meet in reducing the discharge of pollutants from the Municipal Separate Storm Sewer System (MS4). This report covers the period from June 30, 2024, to July 1, 2025, and meets the reporting requirements of the 2023 Permit relating to CWS' MS4.

CWS and its 12 co-implementers are committed to continuing the efforts and programs that are in place to ensure compliance with the requirements of the SWMP and the Permit. Each Best Management Practice (BMP) fact sheet in this annual report includes the program elements, goals, and tracking measures contained in the SWMP.

A FEW HIGHLIGHTS OF THIS YEAR'S ACTIVITIES AND ACCOMPLISHMENTS

- Performed 25,709 erosion control inspections.
- Swept 40,423 miles of streets, removing more than 7,712 cubic yards of material.
- Inspected and maintained 2,217 vegetated stormwater treatment facilities.
- Responded to 65 reported illicit discharges.
- Performed compliance inspections at 16 of 74 industrial stormwater 1200-Z permit facilities, conducted 58 site verifications at facilities with No Exposure Certifications (NECs), and identified 49 sites to be evaluated for an NEC.
- Presented the Tualatin River Rangers program to 1,921 elementary school students at 31 schools. Provided virtual program materials that were developed during distance learning to more than 500 teachers.
- Marked 136 storm drains with "Dump No Waste, Drains to Stream." City of Hillsboro staff installed an additional 425 storm drain markers.
- Managed the planning, design, or construction for three water quality facility retrofits in Hillsboro and Sherwood.
- Completed retrofitting 82 catch basins with water quality sumps to improve water quality.
- Completed annual dry weather inspection of 55 priority outfalls for illicit discharges.

Annual Report

INTRODUCTION

In February 2004, DEQ issued CWS a watershed-based NPDES permit, which was reissued as modified on July 27, 2005. The Permit integrated and consolidated the MS4 requirements with the four CWS municipal wastewater treatment NPDES discharge permits in the watershed. The Permit was renewed on December 8, 2022, and took effect on January 1, 2023. CWS submitted an updated SWMP to DEQ by April 1, 2024, to reflect new requirements in the 2023 Permit; DEQ has not yet approved that SWMP. CWS will continue to operate under the previous SWMP that was approved by DEQ with the 2023 Permit until the 2024 SWMP is approved.

Each BMP fact sheet includes the program elements, goals, and tracking measures from the SWMP. In addition to CWS, the co-implementers of the SWMP are Washington County and the cities of Banks, Beaverton, Cornelius, Durham, Forest Grove, Hillsboro, King City, North Plains, Sherwood, Tigard, and Tualatin. Together, these parties implement the applicable provisions of the SWMP. Figure 1 shows the CWS MS4 boundary.

ANNUAL REPORT REQUIREMENTS

As required by Schedule B, section 16, of the 2023 Permit, CWS must submit an annual report of its MS4 activities for the period July 1 through June 30 to DEQ by November 1 of each year. This annual report documents the CWS and co-implementers' stormwater management activities from July 1, 2024, to June 30, 2025. The Permit specifies the information that the annual report must contain. The required elements and the activities that were conducted to satisfy each element are described below. In addition, the Total Maximum Daily Load (TMDL) Annual Report, which contains information on water quality conditions relative to the Tualatin Basin TMDLs, is included as Appendix D.

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

The SWMP contains eight categories of BMPs that CWS and co-implementers employ to implement the MS4 program. A summary of each BMP category is listed below. Complete descriptions, including goals and tracking measures that document the status of implementation, are included in the BMP fact sheets in Appendix A.

a. Illicit Discharge Detection and Elimination. CWS and co-implementers implement an Illicit Discharge Detection and Elimination (IDDE) program to prevent, detect, and eliminate illicit discharges to the MS4. The IDDE program includes an ordinance prohibiting illicit discharges, a written enforcement response plan, a dry-weather field screening program, an information tracking system, and spill prevention and response actions. The IDDE program covers community complaints, accidental and intentional discharges of wastes to the MS4, sanitary-to-storm cross connections, and unauthorized discharges from industrial facilities and construction sites.

b. Industrial and Commercial Facilities. CWS administers the industrial stormwater program (1200-Z NPDES general permit) under a Memorandum of Agreement with DEQ for the entire MS4 service area. In implementing this BMP category, CWS identifies

facilities that require an industrial stormwater permit, reviews permit application materials such as a stormwater pollution control plan, conducts inspections, reviews discharge monitoring reports, solicits voluntary compliance from permittees on low-risk issues, and escalates enforcement to DEQ for compliance cases that require formal enforcement. CWS also inspects and tracks facilities that apply for a No Exposure Certification and responds to site-specific information that may indicate that an industrial or commercial facility may have the potential to contribute a significant pollutant load to the MS4.

c. Construction Site Runoff Control. CWS and co-implementers carry out a construction site stormwater program that includes permitting, education, outreach, inspection, and enforcement. CWS or city staff review erosion prevention and sediment control plans to ensure that appropriate BMPs are included and perform regular site inspections to confirm that the BMPs and other measures are being implemented. Inspectors follow an escalating enforcement response procedure to bring sites into compliance. CWS provides annual training to inspectors.

d. Education and Outreach. CWS and co-implementers employ a public education and outreach program that informs and educates the public, business and industry representatives, and government staff about the causes of stormwater pollution, the effects on local streams and rivers, and the need for stormwater management. These BMP elements encourage appropriate behaviors to protect water quality, reduce discharges of pollutants from the MS4, and promote the health of the Tualatin River watershed. CWS and co-implementers train their employees involved in MS4-related activities such as illicit discharge response, construction site inspection, and water quality facility design.

e. Public Involvement and Participation. CWS provides opportunities for the public to effectively participate in the development, implementation, and modification of CWS' stormwater management program. The Clean Water Services Advisory Commission meets regularly to provide input from stakeholders on CWS policies and programs. CWS and co-implementers provide many options for public engagement, such as web-based portals and social media, to contact staff regarding complaints or to learn more about stormwater programs.

f. Post-Construction Site Runoff and Retrofit Programs. CWS and co-implementers carry out a program to control the quality and quantity of stormwater runoff from developed sites. Through its *Design and Construction Standards*, CWS imposes requirements on development projects to treat stormwater runoff and control flow. CWS' retrofit program addresses stormwater runoff from previously developed sites.

g. Pollution Prevention for Municipal Operations. CWS and co-implementers reduce the discharge of pollutants to the MS4 from municipal operations by sweeping urban streets, implementing an integrated pest management program, managing their municipal yards, limiting infiltration from the sanitary sewers, controlling releases from firefighting training activities, and retrofitting outfalls and catch basins to remove pollutants.

h. Stormwater Management Facilities Operations and Maintenance Activities. CWS and co-implementers carry out a comprehensive operation and maintenance program that

includes catch basin and water quality manhole cleaning, vegetated and proprietary water quality facility maintenance, and private water quality facility inspection.

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

Throughout fiscal year 2024-2025, CWS staff met to review the 2023-24 Stormwater Annual Report. Staff identified the following issues and proposed changes:

- In 2023-24, CWS did not fully document how many copies of the *Gardening with Native Plants* brochure were distributed. The goal was 500 (Education and Outreach BMP, Goal 2.b). The brochure is usually distributed in mailings to new customers, in response to email and phone requests, and at public events. The Communications & Community Engagement group coordinated with other CWS groups and external partners to distribute the brochures to the public, but tracking measures were not adjusted. The brochure also was available as a download from the CWS website, but downloads were not included in the total reported. For the 2024-25 reporting year, the tracking of Native Plant poster distribution was adjusted, and more than the goal of 500 brochures were distributed.
- During the 2023-24 reporting period, the City of Tigard's sweeping contractor fell shy of sweeping its streets 12 times during the year. CWS requested a summary of how the City plans to address this shortfall going forward. The City of Tigard reached out to its sweeping contractor to express the importance of sweeping all curbed streets in Tigard each month and monitored the progress toward that goal. The City also included language in its sweeping contract requiring the contractor to notify the City by the 20th of each month on their progress toward meeting the sweeping goal and included monetary penalties for not meeting the goal. The City reached an agreement with another company to complete the sweeping if the primary sweeping contractor notifies the City that it will not meet the goal for the month. As a result of these efforts, for the 2024-25 reporting period, the City met the street sweeping frequency goal.
- CWS and City of Tigard did not meet the annual maintenance frequency of 95% for catch basins in the 2023-24 reporting period as a result of significant staffing shortages and increased time for fleet vendors to repair mechanical breakdowns of fleet vehicles and perform routine maintenance. The City of Tigard hired additional staff, purchased additional fleet vehicles, and shared resources internally to anticipate staffing and vehicle needs. As a result of these efforts, the City was able to meet the 95% maintenance frequency for catch basins during the 2024-25 reporting period. CWS developed a compliance and staffing plan to manage staffing shortages and tactics to counter the additional vehicle downtime. CWS has also approved the purchase of a new vactor truck, which is expected to be delivered by early FY 2026-27. In the meantime, CWS will continue to maximize the use of approved budget and existing staff and equipment to meet performance standards.
- CWS discussed trends in zinc, copper, and *E. coli* in stormwater. Any trends need to be understood as part of an adaptive management approach, which may require

changes to sampling. The Permit requires documentation of follow-up strategies for investigating elevated levels of parameters in stormwater that show the potential to cause or contribute to an exceedance of water quality standards. CWS discussed its strategic approach to respond to stormwater values that appear relatively elevated in the absence of concurrent ambient monitoring, including short-term IDDE or water quality investigations, or long-term programmatic changes. CWS' Environmental Services staff members perform source control investigations, and Communications & Community Engagement staff conduct targeted outreach in sub-watersheds noted as having elevated contaminate levels. CWS staff have conducted local source identification inspections and are continuing the inspections when monitoring results indicate elevated contaminant levels. Documentation of CWS' follow-up strategies for parameters with elevated concentrations are included in Appendix B.

The issues identified above were addressed within the scope of existing BMPs and therefore did not require revising the BMPs in the SWMP.

CWS submitted an updated SWMP to DEQ by April 1, 2024, to reflect new Permit requirements as required by the 2023 Permit. DEQ has not yet approved the updated SWMP. Until DEQ approves the updated SWMP, CWS will continue to implement the SWMP that was approved when the 2023 Permit was issued. CWS will be working collaboratively with co-implementers on a second, more comprehensive review and update of the SWMP to incorporate adaptive management elements and adjust metrics and tracking measures to better reflect the scope and scale of the stormwater program.

3. Any proposed changes to SWMP program elements that are designed to reduce TMDL pollutants to the MEP.

CWS submitted an updated SWMP to DEQ by April 1, 2024, as required by the 2023 Permit. The updated SWMP was only a minor update to ensure metrics met the 2023 Permit requirements; there are no proposed changes to the SWMP program elements that are designed to reduce the discharge of TMDL pollutants. CWS will be working with the co-implementers to evaluate the goals and tracking measures during an adaptive management update of the SWMP over the next several years.

4. A summary of total stormwater program expenditures and funding sources over the reporting fiscal year, and those anticipated in the next fiscal year.

For FY 2025 (July 1, 2024 – June 30, 2025), CWS and the co-implementers have estimated total expenditures of $110.2 million for stormwater and related watershed operations and capital project investments. CWS and the co-implementers have estimated total stormwater funding sources of $192.6 million for this period, including beginning balance, operating reserves, and capital reserves. Available funding exceeds expenditures in part to maintain operating reserves. The expenditures and funding amounts are based on budget estimates and preliminary data because final auditable actuals were not available by the due date for this report. Final actuals can be made available on request at a later date.

For FY 2026 (July 1, 2025 – June 30, 2026), it is estimated that CWS and the co-implementers will have expenditures of $89.9 million for stormwater and related

watershed operations and capital project investments. It is estimated that CWS and the co-implementers will have stormwater funding sources of $211.8 million for this period, including beginning balance, operating reserves, and capital reserves.

5. A summary of monitoring program results, including monitoring data that are accumulated throughout the reporting year and any assessments or evaluations conducted.

CWS conducted stormwater and ambient monitoring and data analysis as described below.

Stormwater Monitoring

The Permit requires land-use-based stormwater monitoring at five locations at least three times per year. CWS sampled five land-use-based monitoring sites during multiple storm events between July 1, 2024 – June 30, 2025. The following parameters were analyzed per the requirements of Table B26 in the 2023 Permit.

- Temperature
- Specific conductance
- Turbidity
- *E. coli*
- Hardness
- Total organic carbon
- Total suspended solids
- Total phosphorus as P
- Ortho-phosphorus as P
- Ammonia (as N)
- Nitrite + nitrate as N
- Copper
- Lead
- Zinc
- Mercury

Pesticide monitoring was conducted during fiscal year 2023-24 and was included in the 2023 Stormwater Annual Report.

The metals were analyzed as total recoverable and dissolved. The sample dates, data, and other relevant information on stormwater monitoring are presented in Appendix B.

Ambient Monitoring

CWS conducted ambient monitoring in the Tualatin Basin at the minimum 15 sites on the Tualatin River and tributaries, as required by Table B24 in the 2023 Permit. Due to ongoing safety improvements, CWS used alternative sites when needed while still maintaining the minimum number of monitoring sites required by the Permit. Sampling at the Scoggins Creek tributary was stopped in 2025 due to issues with access availability. CWS is in the process of finding a new site to replace Scoggins Creek.

The Tualatin River was sampled at the following sites, located at the given river mile (RM):

- Boones Ferry Road (RM 8.7)
- Jurgens Park (RM 10.6)
- Rood Bridge Road (RM 39.1)
- Golf Course Road (RM 52.8)
- Hwy 210 Bridge (Scholls) (RM 27.1)
- Hwy 219 Bridge (RM 45.0)
- Fernhill Road (RM 56.9)

The following tributaries were sampled:

Scoggins Creek	McKay Creek	Chicken Creek
Gales Creek	Rock Creek (two sites)	Beaverton Creek
Dairy Creek	Dawson Creek	Fanno Creek

Samples from the sites were analyzed for the following parameters to meet the requirements of Table B24 in the 2023 Permit:

Dissolved oxygen	Phosphorus as P	pH
Orthophosphorus as P	Temperature	Ammonia as N
Specific conductance	Nitrite + Nitrate as N	Turbidity
Copper	*E. coli*	Lead
Hardness	Zinc	Total organic carbon
Mercury	Total suspended solids	

The metals were analyzed as total recoverable and dissolved. Each site was monitored for non-metal parameters between eight and 30 times between July 2024 and June 2025; copper, lead, and zinc were monitored at least quarterly, and mercury was monitored twice yearly. All sites were monitored three or more times each in the wet and dry seasons.

A description of the ambient monitoring activities and statistical summaries of the data are in Appendices B and C. Ambient monitoring data conform to DEQ's Electronic Data Delivery format and will be submitted in the MS4 Grab Sample Submission Excel workbook version 1.06 through the "Phase I MS4 Monitoring Data Submission – 2022" website.

TMDL Assessment

Appendix D presents information about the pollutants regulated under a Tualatin subbasin TMDL — phosphorus, chlorophyll a, dissolved oxygen, temperature, bacteria, and mercury. Appendix D also provides general information on Tualatin River mainstem and tributary conditions during 2024.

6. Any proposed modifications to the monitoring plan that are necessary to ensure that adequate data and information are collected to conduct stormwater program assessments.

CWS is not proposing any modifications to the Stormwater Monitoring Plan.

7. A summary describing the number and nature of enforcement actions, inspections, and public education programs, including, but not limited to, the results of ongoing field screening and follow-up activities related to illicit discharges.

In implementing the MS4 program, CWS and co-implementers undertake a range of enforcement actions, conduct numerous inspections, and provide a variety of public education programs. These actions are part of programs for construction site stormwater, industrial stormwater, and public education.

Construction Site Stormwater

To ensure compliance with erosion control permits and rules, CWS and co-implementers issued 384 Deficiency Notices and 51 Stop Work Orders to operators of site

developments, single lot developments, and unpermitted sites during the reporting year. For each Deficiency Notice and Stop Work Order issued, direct and immediate corrective actions were taken by the operator and no civil citations were issued. These enforcement actions were taken as a result of 2,370 initial inspections, 20,708 regular inspections, and 2,655 final inspections of construction sites. In addition, 886 wet-weather notices were sent to developers, contractors, engineers, and owners before the wet-weather period in fall 2024. Details on these actions are included in the BMP Fact Sheet: Construction Site Runoff Control, in Appendix A.

Industrial Stormwater

CWS uses technical and compliance assistance to achieve voluntary compliance. When noncompliance cannot be resolved through voluntary means, CWS refers violations of the 1200-Z and unpermitted sites to DEQ for formal enforcement action. CWS follows DEQ's *Enforcement Guidance for Field Staff* to evaluate compliance issues and select appropriate responses. During the reporting year, CWS continued implementing an accepted change to the SWMP that allows prioritizing annual compliance inspections. Public education elements are incorporated into the Industrial Stormwater program by providing technical assistance to permittees as needed.

CWS inspected 16 of the 74 facilities permitted under the 1200-Z industrial stormwater general permit over the reporting year and referred four cases to DEQ for formal enforcement.

Commercial Stormwater

EcoBiz Program

CWS' support of the EcoBiz program is being replaced with a robust internal commercial stormwater program. CWS is supporting businesses in Washington County who request EcoBiz recertification, but is not actively involved in engaging new certifications. There are 27 EcoBiz-certified facilities within the CWS service district, including 25 auto repair and body shops and two landscaping companies. This fiscal year, CWS re-certified one landscaping business, two automotive businesses, and one local government fleet.

CWS Commercial Stormwater Program

CWS is conducting a full-scale, data-driven investigation into emerging contaminants within its jurisdiction. To understand potential sources of PFAS from commercial entities into CWS' stormwater conveyance system, CWS is routinely sampling commercial sectors with high PFAS discharge potential, as identified in a literature review documented in Appendix A of CWS' Industrial and Commercial Facilities Stormwater Strategy. Priority sectors for stormwater sampling include the automotive, autobody, landscaping, carpet cleaning, and aviation sectors. Sampling of these sectors began in January 2025.

To best prepare commercial entities for potential regulation and to mitigate the sources of PFAS entering CWS' stormwater conveyance system, CWS is developing outreach materials for distribution to commercial and industrial businesses. The first phase of outreach materials was finalized in June 2025. These outreach materials provide businesses with a high-level introduction to PFAS, including where PFAS can be found, the importance of mitigation, and opportunities for mitigation.

Private Water Quality Facilities Management Program

CWS and co-implementers carry out the Private Water Quality Facilities Management program under the CWS SWMP. The program includes inspection of all facilities maintained by private property owners, including residential, commercial, industrial, 1200-Z, industrial facilities with No Exposure Certifications, and facilities with wash water permits.

CWS and co-implementer inspectors rate water quality facilities on a scale of 1 (excellent) through 5 (very poor). Facilities rated 1 through 3 are considered to require continued routine maintenance; facilities rated 4 and 5 are considered to require increased maintenance or work beyond maintenance. When the inspection is complete, the inspector provides the owner with the results of the inspection, including a description of suggested improvements for facilities that require increased maintenance or other work. CWS or a co-implementer then contacts the owners of those facilities to determine whether the work has been done. The goal is to ensure that the facilities are maintained and operated appropriately. CWS and co-implementers have a performance standard to inspect 25% of the private water quality facilities within their respective areas of responsibility each year. During this reporting year, CWS and co-implementers exceeded the performance standard, inspecting 1,314 private water quality facilities, or 34% of the total. Details on the program are included in BMP Fact Sheet: Stormwater Management Facilities Operations and Maintenance Activities in Appendix A.

Public Education

CWS and co-implementers provided public education programs and materials to foster water quality protection, including the *Gardening with Native Plants* poster and the Tualatin River Rangers program. CWS' programs and materials teach proper disposal of hazardous wastes, water-friendly and chemical-free gardening and car washing, pet waste cleanup, and riparian protection. In addition, CWS provided storm drain markers to volunteers to deter illicit discharges and published information about littering, illegal dumping, and water quality on its website, in the *Clean Water Connection* electronic newsletter and city newsletters. Additional information regarding CWS' public education activities is included in the BMP Fact Sheet: Education and Outreach in Appendix A.

CWS continued to promote a slow-release fertilizer, Clean Water Grow®, for retail purchase as a stream-friendly alternative to fast-release fertilizers. The fertilizer contains phosphorus recovered at the CWS' water resource recovery facilities.

Ongoing Field Screening of Illicit Discharges

CWS follows the protocol outlined in the *Illicit Discharge Detection and Elimination Program Description* in inspecting stormwater outfalls for illicit discharges during dry weather. All inspections are performed by CWS Field Operations, generally in July, August, and September when groundwater levels are lowest. Inspectors make visual observations, noting flow, turbidity, oil sheen, trash, and other indicators of non-stormwater discharges. If observations suggest the presence of an illicit discharge and the source is unknown, staff from CWS Environmental Services investigate further. This year, Field Operations inspected 55 stormwater outfalls and found no suspected illicit discharges. Of the 55 outfalls, 34 were dry. There were no physical indicators at the 15 that had base groundwater flow, so they were not deemed to be illicit discharges.

8. A summary, as it relates to MS4 discharges, describing land use changes, Urban Growth Boundary (UGB) expansion, and land annexations.

During this reporting period, Metro approved a request from the City of Sherwood to expand the UGB. This expansion encompasses the area known as Sherwood West, which is generally to the west of Highway 99W, south of Scholls-Sherwood Road, north of Chapman Road, and east of Eastview Road. During the next reporting year, the City of Sherwood will begin several years of more detailed planning for the expansion area, including, among other things, utility needs and locations, stormwater management, and land-use planning. The current UGB is included in Figure 1 of the Executive Summary and Figure E-2, Clean Water Services MS4 Boundary with Urban Reserves and UGB Expansion, in Appendix E.

Seventeen annexations, totaling over 738 acres, were made to CWS' service area during the reporting period. There were no de-annexations. These are detailed in Appendix E, Table E-2, Details of Clean Water Services Annexations, and shown in Figure E-3, Clean Water Services FY 2024-25 Annexations, in Appendix E. These annexations allowed properties to be served by urban sanitary sewer and stormwater drainage systems.

9. A summary, as related to MS4 discharges, describing concept planning or other activities conducted in preparation of UGB expansion or land annexation, if anticipated for the following year.

During the reporting year, several cities continued their local planning efforts. The City of Beaverton completed the Cooper Mountain Comprehensive Land Use and Master Plans. The City of Tigard initiated comprehensive planning for the River Terrace South and West areas during this reporting year and is expected to complete the planning in FY 2025-26. King City continues to permit development activities in Kingston Terrace while CWS completed a regional stormwater concept plan to help provide a framework for regional stormwater management.

Details of planning activities related to expansion activities are included in Table E-1, Co-Implementer Long-Range Planning Activities for Expansion Areas, and Figure E-2, Clean Water Services MS4 Boundary with Urban Reserves and UGB Expansion, in Appendix E.

10. A summary of the new development/redevelopment projects and related stormwater management activities that occurred within the MS4 jurisdictional area during the reporting year. The number of new post-construction permits issued and an estimate of the total new and replaced impervious surface area related to development projects that commenced during the reporting year must also be included.

Development and redevelopment projects in CWS' jurisdiction are subject to CWS' *Design and Construction Standards,* which impose requirements for permitting, stormwater conveyance system design and construction, erosion prevention, sediment control and pollutant discharge during construction, and post-construction stormwater runoff treatment and flow control. Development continued throughout CWS' service area, with several large residential subdivisions and other major construction projects underway. Stormwater management activities related to development and redevelopment

projects included review and approval of development plans (including erosion control and post-construction), inspection during construction of stormwater treatment and flow management facilities and conveyance systems, and inspection of runoff control during construction. Details on these activities can be found in the BMP fact sheets on Construction Site Runoff Control and Post-Construction Site Runoff and Retrofit Programs in Appendix A. Table AR-1 provides the number of construction permits issued during the reporting year that included requirements for post-construction stormwater management approaches and an estimate of the impervious area that was permitted for addition or replacement.

Table AR-1: Post-construction Permits and Impervious Area Added and Replaced

Jurisdiction	*New Post-Construction Permits Issued*	*New Impervious Area, Acres*	*Replaced Impervious Area, Acres*
Clean Water Services	90	17.24	6.81
Beaverton	9	35	44.8
Cornelius	5	17.13	0.46
Forest Grove	11	3.8	1.1
Hillsboro	33	38.4	1.7
Sherwood	10	65.28	1.55
Tigard	5	2.5	2.2
Tualatin	3	0.2	0.1
TOTAL	**166**	**179.55**	**58.72**

11. Status or results, or both, of any public education program effectiveness evaluation conducted during the reporting year and summary of how the results were or will be used for adaptive management.

CWS generally conducts a residential Customer Awareness and Satisfaction survey every other year to track service-area customer expectations, values, and CWS performance against those values. The last survey was conducted in 2025, and CWS is analyzing the results. Relevant results and potential adaptive management will be reported in BMP Fact Sheet: Education and Outreach in Appendix A once analysis is complete.

CWS applied the Logic Model to the Tualatin River Rangers program this year. In-person River Ranger presentations continued for the 2024-25 school year, and CWS continued to provide virtual resources produced during distance learning. Detailed results of the Logic Model application and the potential for using those results in adaptive management are included in the BMP Fact Sheet: Education and Outreach in Appendix A.

ADDITIONAL REPORTING REQUIREMENT

The 2020 SWMP includes language requiring CWS to include a summary report of the status of the retrofit program in each annual report. On April 22, 2019, CWS submitted its Stormwater Retrofit Program Plan. As required by the 2023 Permit, CWS will submit an update of the Stormwater Retrofit Program Plan to DEQ as part of the Stormwater Annual Report by November 1, 2025. CWS continues to implement the retrofit program, following identified priorities to guide project selection. As described in the BMP Fact Sheet: Pollution Prevention for Municipal Operations, in Appendix A, zero outfall retrofit projects were completed. The City

of Hillsboro has one retrofit project in the design phase and one project under construction. To date, five outfall retrofits have been completed during the 2023 Permit term (January 1, 2023, through November 30, 2027). In addition, CWS and co-implementers retrofitted or reconstructed 82 catch basins for water quality in fiscal year 2024-25. To date, 306 catch basins have been retrofitted during the 2023 Permit term.

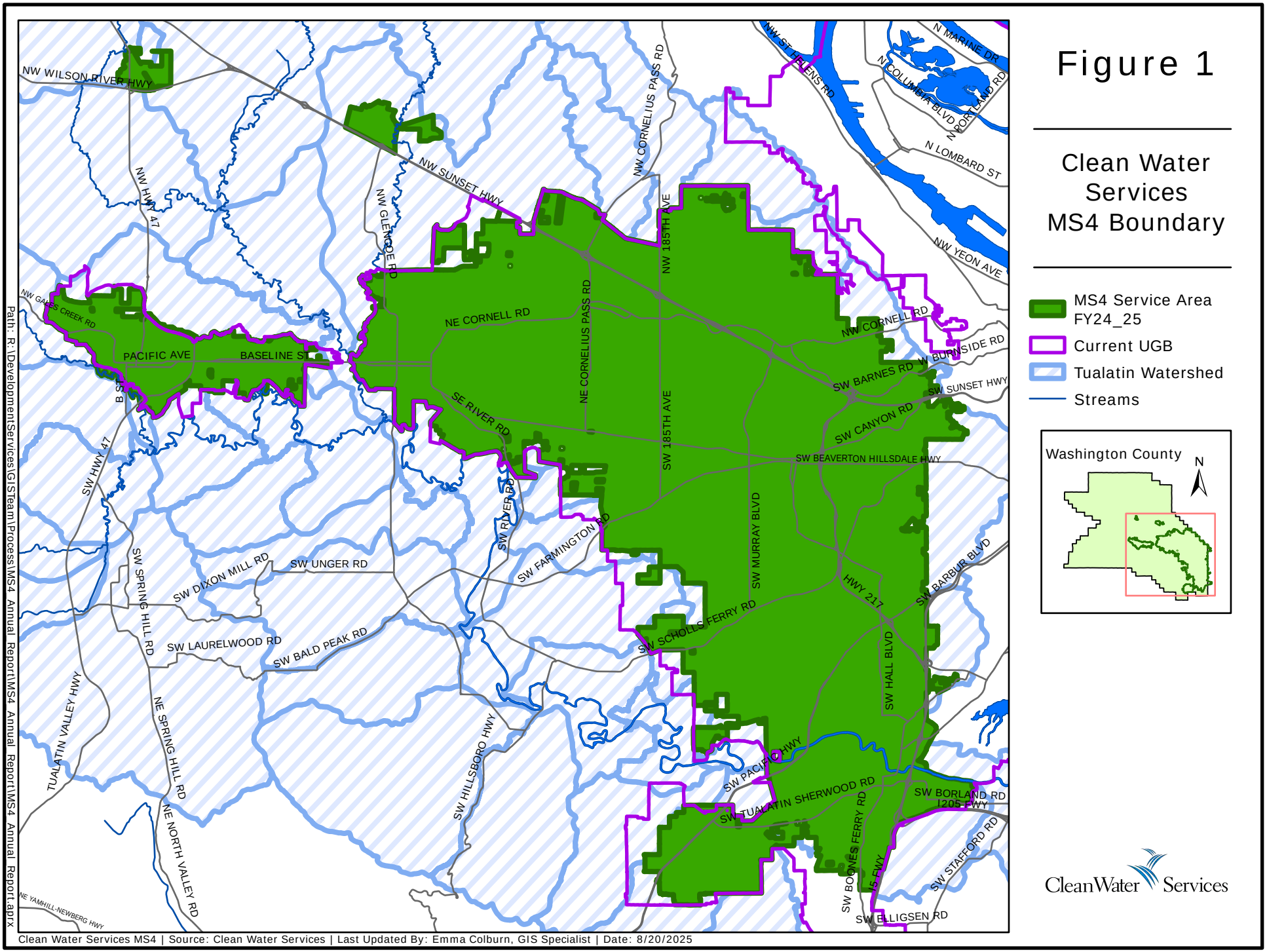


Figure 1
Clean Water Services MS4 Boundary
MS4 Service Area FY24_25
Current UGB
Tualatin Watershed
Streams
Washington County
N
NW WILSON RIVER HWY
NW SUNSET HWY
NW CORNELIUS PASS RD
NW GLENCOE RD
NW HWY 47
NW 185TH AVE
NW ST HELENS RD
N MARINE DR
N COLUMBIA BLVD
N PORTLAND RD
N LOMBARD ST
NW YEON AVE
NW GALES CREEK RD
PACIFIC AVE
BASELINE ST
B ST
NE CORNELL RD
NE CORNELIUS PASS RD
SE RIVER RD
NW CORNELL RD
NW BURNSIDE RD
SW BARNES RD
SW SUNSET HWY
SW CANYON RD
SW BEAVERTON HILLSDALE HWY
SW HWY 47
SW 185TH AVE
SW MURRAY BLVD
SW RIVER RD
SW FARMINGTON RD
SW BARBUR BLVD
HWY 217
SW DIXON MILL RD
SW UNGER RD
SW SPRING HILL RD
SW LAUREL WOOD RD
SW BALD PEAK RD
SW SCHOLLS FERRY RD
SW HALL BLVD
TUALATIN VALLEY HWY
NE SPRING HILL RD
NE NORTH VALLEY RD
SW HILLSBORO HWY
SW PACIFIC HWY
SW TUALATIN SHERWOOD RD
SW BORLAND RD
I205 FWY
SW BOONES FERRY RD
I5 FWY
SW STAFFORD RD
SW ELLIGSEN RD
NE YAMHILL-NEWBERG HWY
Clean Water Services
Path: R:\DevelopmentServices\GISTeam\Process\MS4 Annual Report\MS4 Annual Report\MS4 Annual Report.aprx
Clean Water Services MS4 | Source: Clean Water Services | Last Updated By: Emma Colburn, GIS Specialist | Date: 8/20/2025

This page intentionally blank.

Appendix A: BMP Fact Sheets

This page intentionally blank.

BMP Fact Sheet: Illicit Discharge Detection and Elimination

INTRODUCTION

The CWS Illicit Discharge Detection and Elimination (IDDE) program includes activities to prevent, detect, characterize, trace, and eliminate unpermitted discharges of pollutants to the MS4. These activities include inspecting permitted industrial facilities and construction sites, making observations during routine maintenance of MS4 facilities, annually inspecting dry weather outfalls, facilitating public reporting of spills and illicit discharges, and taking action to eliminate reported illicit discharges.

MEASURABLE GOALS AND TRACKING MEASURES

1. Illicit Discharges, Including Sanitary Cross Connections and Accidental Spills

a. Goal: Respond to reports of illicit discharges. Abate identified illicit discharges.

- Tracking measure: Annual number of illicit discharges reported to CWS/co-implementers by the public and illicit discharges identified through routine MS4 work.
- Tracking measure: Annual number of CWS/co-implementer field investigations and other follow-up actions in response to reports.
- Tracking measure: Number of ongoing illicit discharges identified and number abated by the CWS/co-implementers.
- Tracking measure: Number of cross connections identified and number abated.

These tracking measures are reported in Table IDDE-1a(1) and Table IDDE-1a(2). Data from the six sanitary-to-storm cross connections are included in both tables. Most of the illicit discharges were one-time events, including accidental spills and illegal disposal, rather than continuous or recurring discharges. In addition to the discharges reported in the tables, CWS and co-implementers had eight sanitary sewer overflows (SSOs) during the reporting year; two reached the MS4. Response to these SSOs was consistent with CWS' *Sanitary Sewer Overflow Response Plan* and the Permit requirements for telephone and written reporting to DEQ. The discharges reported in Table IDDE-1a(1) do not include those at construction sites.

Table IDDE-1a(1): Illicit Discharge (ID) Reports and Response					
Jurisdiction	*IDs Reported by the Public*	*IDs Identified During Routine MS4 Work or Referred by Other Agencies*	*Field Investigation or Other Response Actions*	*Recurring or Continuous IDs Found*	*Recurring or Continuous IDs Abated*
CWS	20	2	21	0	0
Beaverton	5	2	6	0	0
Cornelius	0	0	1	0	0
Forest Grove	0	0	1	0	0
Hillsboro	6	9	15	0	0
Sherwood	0	0	0	0	0
Tigard	6	5	11	1	1
Tualatin	2	2	7	0	0
Total	**39**	**20**	**62**	**1**	**1**

Table IDDE-1a(2): Cross Connections Found and Abated		
Jurisdiction	*Cross Connections Found*	*Cross Connections Abated*
CWS	0	0
Beaverton	0	0
Cornelius	1	1
Forest Grove	0	0
Hillsboro	2	2
Sherwood	1	1
Tigard	2	2
Tualatin	0	0
Total	**6**	**6**

b. **Goal:** Take enforcement actions according to the CWS IDDE program in response to illicit discharges.

- Tracking measure: Number and type of enforcement actions taken to abate illicit discharges.

Table IDDE-1b: Illicit Discharge Enforcement Actions	
Type of Enforcement Action	*Number*
Education (includes informal direction to cease a discharge)	29
Warning letter	9
Abatement order	1
Referral to Code Enforcement	4
Referral to DEQ	4
Referral to county health department	0
Referral to CWS (by a city)	13[1]

[1] CWS also receives referrals for illicit discharge investigations by DEQ.

In some cases where no individual enforcement action can be taken because the responsible party is not identified (such as unobserved disposal to a catch basin), educational materials on proper waste discharge are distributed in the neighborhood. No enforcement action is taken in cases of accidental spills that are not due to negligence. Some incidents required multiple types of enforcement actions.

2. Dry Weather Field Screening

a. **Goal:** Conduct annual dry weather illicit discharge inspections at 55 identified priority locations.

- Tracking measure: Number of priority locations inspected annually.

b. **Goal:** Conduct investigations of suspected illicit discharges. Abate illicit discharges identified through dry weather screening.

- Tracking measure: Number of suspected illicit discharges identified through dry weather screening and follow-up investigations conducted.
- Tracking measure: Number of illicit discharges confirmed and abated through dry weather screening.

Table IDDE-2: Dry Weather Field Screening	
Action	*Number*
Priority locations inspected	55
Suspected illicit discharges identified	2
Follow-up investigations	2
Illicit discharges confirmed	2
Illicit discharges abated	2

c. **Goal:** Annually review and maintain a map of priority locations for dry weather field screening.

- Tracking measure: Changes, and rationale for changes, to priority locations.

CWS continues to inspect priority outfall locations at least once per five-year permit cycle. In 2024, CWS revised the criteria applied to determine priority locations for dry weather outfall inspections in accordance with the 2022 Permit. Previously, the focus had been on significant outfalls. As of 2024, the criteria were updated to focus on multiple priorities. First were areas where less than 50 percent of the catchment area receives treatment from water quality manholes or water quality facilities. Generally, areas that do not include stormwater treatment are areas containing older infrastructure. The land use type and drainage area size associated with the stormwater discharged from the outfall were additional factors included in the selection process for the priority outfalls. Industrial and commercial land uses are of the highest concern for the discharge of industrial contamination into the MS4. Priority is given to outfalls serving an industrial or commercial drainage area equal to or greater than three acres. Land-use areas zoned as residential and mixed-use areas that are equal to or greater than 10 acres will also be prioritized for inspection. This prioritization process generated 275 outfall locations to be inspected once every five-year permit cycle; a list is maintained in the CWS GIS database. During the summer of 2024, CWS continued to work through the list of priority outfalls. More information regarding the dry weather outfall inspection prioritization can be found in CWS' *IDDE Program Description* document.

3. Annual Training

a. **Goal:** Provide annual training for all co-implementer staff who clean and inspect MS4 components where signs of illicit discharges and connections could be observed. The training will cover identification of illicit discharges and connections and proper responses for reporting and responding to them.

- Tracking measure: Number of co-implementer staff attending annual training.

CWS provided training in illicit discharge recognition, response, and reporting as part of the annual wet weather training for CWS and co-implementer staff members involved in various aspects of stormwater management. In 2025, the recorded training was offered on demand online. Over 150 staff from CWS and the co-implementers watched the training.

RELATIONSHIP TO TMDLs

Bacteria: This BMP will reduce the human-related sources of bacteria by identifying and removing any cross-connections or other illicit discharges of bacteria-contaminated water into the MS4.

Phosphorus: This BMP will reduce the discharge of organic matter into the MS4, which will result in the reduction of phosphorus.

Settleable Volatile Solids: This BMP will reduce the discharge of organic matter into the MS4 and into the streams directly, which will result in the reduction of sediment oxygen demand.

Mercury: This BMP will reduce the number of illicit discharges that may contain sources of mercury contamination from the MS4 system. This BMP includes accidental and intentional discharges of wastes to the MS4, sanitary-to-storm cross connections, and discharges from industrial facilities and construction sites.

RELATED DOCUMENTS

- IDDE Program Description (2024)
- CWS Sanitary Sewer Overflow Response Plan (2010)

This page intentionally blank.

BMP Fact Sheet: Industrial and Commercial Facilities

INTRODUCTION

The purpose of this BMP category is to reduce the discharge of pollutants from the MS4 by regulating select industrial and commercial facilities that discharge to the MS4. CWS' industrial stormwater program operates under a Memorandum of Agreement with DEQ to regulate facilities requiring the 1200-Z stormwater general permit. This BMP is accomplished by identifying facilities subject to industrial permitting requirements, reviewing permit applications and stormwater pollution control plans, conducting inspections, reviewing discharge monitoring data, providing technical assistance, and coordinating with DEQ on enforcement matters. In addition, CWS responds to site-specific information on commercial and industrial facilities that may discharge a significant pollutant load to the MS4.

MEASURABLE GOALS AND TRACKING MEASURES

1.a. **Goal:** Identify industrial facilities that need a 1200-Z stormwater general permit.

- Tracking measure: Number of newly permitted 1200-Z facilities in the service area.

  CWS is phasing out the Sewer Use Information Card system to survey its service area for new 1200-Z facilities and is now primarily using a New Industrial Users Questionnaire form on CWS' public website. There were 69 1200-Z permitted facilities at the end of the reporting year. Two new facilities obtained a 1200-Z permit during the reporting year.

  CWS also responds to site-specific information regarding the discharge of pollutants from industrial and commercial sites.

b.(1) **Goal:** Conduct all of the 1200-Z facility inspections scheduled for the reporting year in the service area.

- Tracking measure: Number of 1200-Z permitted facility inspections scheduled for the reporting year; number of scheduled 1200-Z facility inspections conducted during the reporting year.

  CWS inspected 16 of 74 unique facilities this year, exceeding the target of inspecting 20 percent of permitted facilities each year, regardless of risk or priority. This total included three facilities identified through the use of a prioritization matrix as having a relatively higher risk of discharges of pollutants or compliance issues. Three of the 16 facilities triggered Tier II at the time of this report.

b.(2) **Goal:** Inspect 20 percent of 1200-Z permitted facilities annually during permit administrative extension.

- Tracking measure: Total number of 1200-Z permitted facilities; number inspected.

  DEQ reissued the 1200-Z permit effective July 1, 2021. In the first four years of the new permit term, CWS inspected 75 percent of the current 1200-Z permitted facilities. CWS inspected 16 of 74 1200-Z permitted facilities this reporting year, exceeding the target of inspecting 20 percent. CWS will report compliance with achieving the goal of inspecting all 1200-Z permitted facilities at least once in the permit term in the 2025-26 Stormwater Annual Report.

c. **Goal:** Provide technical assistance if requested by owner/operator of a facility.

- Tracking measure: Number of technical assistance inspections performed in response to owner/operator requests.

  CWS did not receive any requests to perform technical assistance at a 1200-Z permitted site this reporting year.

d. **Goal:** Issue "No Exposure" certifications to facilities that meet DEQ qualifying criteria.

- Tracking measure: Number of "No Exposure" certifications issued.

  No Exposure Certifications (NECs) are issued to facilities that would otherwise require a 1200-Z permit but are requesting conditional exclusion by demonstrating that stormwater is not exposed to pollutants from industrial processes at the facility.

  - Total NECs in service area 167
  - NECs reissued (five-year issuance period).....58
  - NEC reissuance denied 2
  - Newly issued NECs 9
  - Identified sites to be evaluated for a NEC 49
  - Former 1200-Z facilities that converted to NEC 2

e. **Goal:** Review monitoring reports from all 1200-Z facilities.

- Tracking measure: Number of monitoring reports submitted and number reviewed.

  The 1200-Z permit that DEQ reissued July 1, 2021, requires quarterly monitoring reporting. CWS received and reviewed 279 quarterly Discharge Monitoring Reports for the 2024-25 reporting year. CWS reviewed all reports submitted by permittees. Ten permittees failed to submit reports on time. Eight of the 10 permittees received warning letters, and the other two were forwarded to DEQ for formal enforcement.

f. **Goal:** Identify facilities subject to section 313 of SARA Title III and not already covered by 1200-Z or other stormwater discharge permit and determine their potential to contribute a substantial pollutant loading to the MS4.

- Tracking measure: Number of unpermitted facilities identified through the annual review of the toxic release inventory (TRI).
- Tracking measure: Number of unpermitted facilities identified through the TRI review that were inspected, number determined to have potential to discharge a substantial pollutant loading, action taken.

  The most recent TRI data available are from the 2023 reporting year. CWS reviewed the TRI on August 22, 2025. Of the facilities listed in Washington County, 34 industries are located within the CWS MS4 service area. Three of the sites on the list were identified as needing to be evaluated for potential stormwater discharges. Of the remaining 31 industries, 12 have 1200-Z permits, two have 1200-A permits, 16 have No Exposure Certifications, and one is a state Superfund site under DEQ oversight.

g. **Goal:** Reduce pollutants in stormwater discharges from facilities other than those with SIC codes requiring 1200-Z general permit coverage.

- Tracking measure: Number of facilities (other than those with 1200-Z-qualifying SIC codes) in our MS4 service area where site-specific information leads to a facility inspection, number of facilities determined to be contributing a significant pollutant load to the MS4, action taken.

  CWS inspected one facility that does not have a qualifying SIC code for a 1200-Z permit. The facility is listed in the Toxic Release Inventory. The facility collects stormwater in a lined pond and pumps the pond directly into the adjacent wetlands. Sample results for the pond discharge provided by the industry exceed the benchmark in the 1200-Z permit for total zinc. CWS will refer the industry to DEQ for a permit.

RELATIONSHIP TO TMDLs

Implementing this BMP and the 1200-Z permitting program reduces the potential discharge of all of the TMDL parameters.

RELATED DOCUMENTS

- Memorandum of Agreement with DEQ to implement the 1200-Z program (2009)

This page intentionally blank.

BMP Fact Sheet: Construction Site Runoff Control

INTRODUCTION

This BMP category requires the use of erosion prevention and sediment control BMPs and the prevention or control of the discharge of construction-related nonstormwater waste to reduce the discharge of pollutants to the MS4 from construction activities. CWS acts as DEQ's agent for the administration of the 1200-CN and 1200-C general permits and implements its own local program.

MEASURABLE GOALS AND TRACKING MEASURES

1. Erosion Prevention and Sediment Control (EPSC) Inspection and Enforcement

a. Goal: Conduct initial, regular, and final inspections for all active site development projects.

- Tracking measure: Annual number of site development inspections – initial, regular, and final.

Table CSRC-1a: Annual Number of Site Development Inspections

Jurisdiction	*Initial Inspections*	*Regular Inspections*	*Final Inspections*	*Total Inspections*
Clean Water Services	42	2,044	37	2,123
Beaverton	16	1,525	21	1,562
Cornelius	8	419	4	431
Forest Grove	11	588	8	607
Hillsboro	36	2,362	60	2,458
Sherwood	8	910	5	923
Tigard	27	981	35	1,019
Tualatin	6	423	10	439
Total	**154**	**9,252**	**180**	**9,562**

b. **Goal:** Conduct initial, regular, and final inspections for all active single lot construction sites.

- Tracking measure: Annual number of single lot construction inspections – initial, regular, and final.

Table CSRC-1b: Annual Number of Single Lot Construction Inspections

Jurisdiction	*Initial Inspections*	*Regular Inspections*	*Final Inspections*	*Total Inspections*
Clean Water Services	541	3,917	606	5,064
Beaverton	451	1,590	472	2,513
Cornelius	101	324	92	517
Forest Grove	167	485	128	780
Hillsboro	524	2,459	586	3,569
Sherwood	33	418	45	496
Tigard	247	1,654	381	2,282
Tualatin	152	609	165	926
Total	**2,216**	**11,456**	**2,475**	**16,147**

c. **Goal:** Implement an escalating enforcement system, which may include written warnings (e.g., Deficiency Notices or similar action), Stop Work Orders, and Civil Citations.

- Tracking measure: Annual number of enforcement actions – written warnings (e.g., Deficiency Notices or similar action), Stop Work Orders, and Civil Citations.

Table CSRC-1c: Annual Number of Enforcement Actions

Jurisdiction	*Deficiency Notices*	*Stop Work Orders*	*Civil Citations*
Site Development			
Clean Water Services	49	5	0
Beaverton	3	4	0
Cornelius	0	0	0
Forest Grove	5	1	0
Hillsboro	4	0	0
Sherwood	38	6	0
Tigard	44	4	0
Tualatin	2	0	0
Subtotal Site Development	**145**	**20**	**0**
Single Lot			
Clean Water Services	74	26	0
Beaverton	30	2	0
Cornelius	0	1	0
Forest Grove	9	0	0
Hillsboro	0	0	0
Sherwood	17	0	0
Tigard	101	2	0
Tualatin	8	0	0
Subtotal Single Lot	**239**	**31**	**0**
Total Enforcement Actions	**384**	**51**	**0**

2. Training and Outreach

a. **Goal:** Provide annual inspector training on erosion control techniques and enforcement measures for continuing education. Except for inspectors who have active EPSC certification that includes a continuing education requirement, require all erosion control inspectors to attend annual training on erosion control techniques.

- Tracking measure: Number of noncertified inspectors and number attending annual EPSC training.
- Tracking measure: Number of inspectors with active EPSC certification.

Table CSRC-2a: EPSC Training for Inspectors

Jurisdiction	*Noncertified Inspectors*	*Noncertified Inspectors Attending EPSC Training*	*Certified Inspectors**
Clean Water Services	0	0	8
Beaverton	0	0	5
Cornelius	0	0	1
Forest Grove	6	6	1
Hillsboro	1	1	4
Sherwood	0	0	1
Tigard**	0	0	1
Tualatin**	0	0	0
Total	**7**	**7**	**21**

Note: Certified inspectors have professional training requirements and do not require annual EPSC training.
* The number of inspectors in this column is the number at the beginning of the reporting year.
** Clean Water Services performs erosion control inspections in Tigard and Tualatin; therefore, those cities' inspectors are not required to attend training.

- Tracking measure: List of annual training sessions conducted and participating agencies.

  Annual erosion control training was held June 3, 2025; 28 people from CWS and co-implementers attended. Some inspectors attended who were interested in a refresher class on the CWS local erosion control regulation; others were required to attend because they didn't have a certification.

b. **Goal:** Provide annual notification of wet-weather requirements to active site development (i.e., not single family home construction) permit holders.

- Tracking measure: Number of site development permits active at the time when wet-weather notices are issued; annual number of wet-weather notices issued.

As shown in Table CSRC-2b, CWS and co-implementers notify multiple parties associated with each active site development permit (owner, developer, engineer, contractors). Each co-implementer determines which parties to notify, resulting in different numbers of notices being sent per site.

Table CSRC-2b: Annual Number of Wet-Weather Notices Issued

Jurisdiction	*Active Site Development Permits*	*Wet-Weather Notices Issued*
Clean Water Services / Washington County	70	145
Beaverton	49	98
Cornelius	5	10
Forest Grove	13	26
Hillsboro	77	329
Sherwood	17	110
Tigard	34	68
Tualatin	39	100
Total	**304**	**886**

RELATIONSHIP TO TMDLs

Phosphorus: CWS' Construction Site Runoff Control program was established under the Tualatin Basin Rule (OAR 340-041-0345(4)) to meet the phosphorus allocations in the 1988 Tualatin TMDL.

Settleable Volatile Solids: Erosion prevention and sediment control BMPs significantly reduce the discharge of organic matter associated with soil erosion. Organic matter can result in increased sediment oxygen demand in the receiving waters.

Mercury: Erosion prevention and sediment control BMPs can significantly reduce the discharge of sediments or spills that could transport sources of mercury contamination into receiving waters.

RELATED DOCUMENTS

- Design and Construction Standards for Sanitary Sewer and Surface Water Management, Chapter 6 (2019)
- Erosion Prevention and Sediment Control Planning and Design Manual (2020)
- Construction Site Runoff Inspection Guidance (2023)

This page intentionally blank.

BMP Fact Sheet: Education and Outreach

INTRODUCTION

The purpose of the Education and Outreach BMP category is to inform and educate the public, businesses, industries, and government about the causes of stormwater pollution, the effects on local streams and rivers, and to promote stream-healthy behavior. These BMPs encourage behavior change and participation that will reduce the discharge of pollutants from the MS4.

MEASURABLE GOALS AND TRACKING MEASURES

1. Education and Outreach Strategy

a. **Goal:** Following the CWS *Strategic Communications Plan,* educate the public on stormwater quality issues including the impacts of stormwater discharges and the actions the public can take to reduce pollutants in stormwater, the proper use and disposal of pesticides, and information for reporting illicit discharges. CWS will publish 12 monthly electronic newsletters per year and place inserts in customer bills five times per year covering one or more of these topics.

- Tracking measure: Summarize activities and participation on an annual basis, including the number of electronic newsletters published and billing inserts mailed during the year.

  CWS emailed and mailed six messages to 66,620 customers with their customer bill during the reporting year. These messages focused on watershed protection and enhancement, proper disposal practices, and reporting information for illicit discharges and water quality impacts. CWS sent 12 monthly *Clean Water Connection* e-newsletters to 3,792 subscribers. The e-newsletters contained articles on watershed protection and enhancement, proper disposal practices, and reporting information for illicit discharges and water quality impacts.

b. **Goal:** Following the CWS *Strategic Communications Plan,* carry out campaigns designed to change the behavior of the intended audience relevant to reducing stormwater pollution.

- Tracking measure: Annually track outreach campaigns being conducted and the intended audiences and behaviors targeted through those campaigns.

  The Regional Coalition for Clean Rivers and Streams (Coalition) continued its work – initiated in the late 1990s – of providing coordinated messaging about water health and residential behaviors linked to stormwater pollution from across the Portland metropolitan region in Washington, Multnomah, and Clackamas counties.

  The Coalition focuses its efforts to improve watershed health by changing household behaviors to reduce polluted runoff and connecting people with their local waterways. The Coalition focuses on changing behaviors from residential sources linked to stormwater pollution prevention. Information and messages used by the Coalition are intended to reach those making purchasing and management decisions about yard care, pets, and auto maintenance activities – some of the most likely sources of stormwater pollution from residents. Coalition activities address a range of surface water contaminants, including nutrients and toxics from fast-releasing synthetic

fertilizers and pesticides applied to yards and lawns, pollutant loads from car washing soaps, metals, and other toxics from vehicles, E. coli from pet waste, turbidity from eroded soils, and other contaminants from illicit discharges.

The Coalition implemented a social media content strategy to boost awareness and increase followers that included seasonal content mixes, shared events, original social media posts incorporating key messages, and encouraging partners to share posts. The Coalition shared 153 posts on Facebook and 108 posts on Instagram during the reporting year. Total followers increased significantly on both platforms; Facebook rose from 331 to 3,036 while Instagram rose from 109 to 1,178.

The Coalition encouraged youth in the tri-county area to participate in the Honoring Our Rivers Student Anthology hosted by Clearing Magazine. The Honoring Our Rivers Student Anthology of Art and Creative Writing program is an annual student art and poetry program that celebrates pacific northwest rivers and watersheds. The Coalition has been promoting the students' work since the 2022-2023 Fiscal Year and continues to conduct in-kind social media outreach, as well as paid ads, about the program to catalyze participation.

2. Pesticides/Herbicides/Fertilizers

a. **Goal:** Educate the public on the use of alternatives to pesticides, herbicides, and fertilizers through the annual public awareness campaign.

- Tracking measure: Summarize awareness campaign activities and participation regarding the use of alternatives to pesticides, herbicides, and fertilizers on an annual basis.

  CWS' outreach campaign included the following elements:

  - Website, cleanwatergrow.com, promoting the use of Clean Water Grow®, a stream-friendly slow-release fertilizer.
  - Donations to local fundraisers and gardening clubs.
  - Web and social media sharing GROW photos, gardening tips, and information on its positive environmental impact.
  - Retailer support including product displays, social media marketing, and the sale of products at four regional retail locations.
  - Environmental industry and civic promotion through customer billing inserts and newsletters.

b. **Goal:** Educate the public on the use of native plants by distributing 500 copies of the *Gardening with Native Plants* brochure.

- Tracking measure: Summarize outreach efforts and participation regarding the use of native plants on an annual basis, including the number of *Gardening with Native Plants* brochures distributed.

  CWS mailed 107 copies of the *Gardening with Native Plants* brochure to new customers and in response to email and phone requests. CWS provided 400 brochures to community groups and partners for distribution at events and workshops. CWS also distributed 200 brochures at in-person community events and at the Fernhill Visitor Station. The brochure is also available as a download from the CWS website.

  CWS distributed messages to 66,260 customers with their customer bills and *Clean Water Connection* e-newsletters to 3,792 subscribers throughout the reporting year and conducted public education programs including the Tualatin River Rangers program. These programs and materials teach watershed protection and enhancement, proper disposal practices, and reporting information for illicit discharges and water quality impacts, including the use of native plants.

3. Effectiveness Evaluation and Adaptive Management

a. **Goal:** Assess and improve the effectiveness of CWS' *Strategic Communications Plan* by collecting data on program effectiveness, analyzing the data to determine the effectiveness of CWS' educational and behavioral change efforts, identifying programmatic changes to improve outcomes, and implementing those improvements. Conduct a customer survey every two years. Annually use the Logic Model (or other appropriate process) to evaluate the effectiveness of at least one program in CWS' *Strategic Communications Plan.* Identify and implement needed revisions.

- Tracking measure: Report on status of biennial customer survey and the application of the Logic Model.
- Tracking measure: Track changes made to the public education program as a result of customer surveys and the Logic Model.

  Customer Awareness and Satisfaction Survey: Note that there is a typo in this tracking measure in the 2020 SWMP; the word "biannual" should be "biennial," every two years. The biennial survey examines the demographics of the service district; customer expectations, needs, and values; and how CWS performs against those values to help CWS understand its community and create more effective and inclusive messaging, education, and outreach strategies. The survey was conducted in the fall of 2025. In preparation, CWS conducted three focus groups with 25 participants from around the service district to update customer values, which are used as a benchmark in each survey.

Application of the Logic Model: This year, CWS applied the Logic Model to its River Rangers program. CWS delivered in-person River Ranger presentations during the 2024-25 school year and continued to provide virtual resources produced during distance learning. CWS continued to collect pre- and post-instruction student evaluations for the River Rangers program to better understand if students learn new information from the presentation and are inspired to make changes to support a healthy watershed. A summary of the process, results, and steps for adaptive management is below.

River Rangers, Classroom Program	
Evaluation	• Pre-instruction evaluation • Post-instruction evaluation
Notes	In-person River Ranger presentations continued in the 2024-25 school year. Virtual River Ranger program materials developed during distance learning (lesson plan, video presentations, and extension lessons) were shared with 500+ teachers via the virtual Children's Clean Water Festival website and email outreach.
Results	1,921 students from 31 schools participated in in-person River Ranger classroom presentations. 1,187 students took the pre-assessment before the presentation, while 642 students took the post-assessment after the presentation. Awareness of the Tualatin River and storm drains flowing to the river improved by 75% and 32%, respectively, after presentations. Knowledge before presentations was relatively low, and repetition of key concepts remains important to long-term understanding.
Recommendations for adaptive management	• Continue to utilize digital content developed during distance learning as pre/post-lesson extension. • Continue to email teacher the day before the presentation and the day of the presentation to remind of pre- and post-assessment. • Continue to focus content on the Tualatin River and the fact that storm drains lead to the Tualatin River. • Seek additional opportunities to engage students who have participated in River Rangers in other field and classroom programs to reinforce key concepts. • Seek additional opportunities to extend messages and concepts through student participation in partner-delivered education programming.

Adaptive Management Plan			
Step	*Description*	*Capacity Needed*	*Time Frame*
1	Review River Ranger assessment results to meet learning goals	Staff – 1 hour	Summer 2025
2	Adapt River Ranger program content as necessary	Staff – 3 hours	Summer/Fall 2025
3	Refine teacher communication	Staff – 1 hour	Fall 2025
4	Collect student assessment and teacher program evaluation	Staff – 10 hours	2024-25 school year
5	Review results, adapt program	Staff – 4 hours	Annually

4. Employee Training

a. **Goal:** Conduct training for CWS and co-implementer employees associated with stormwater management.

b. **Goal:** Include training in recognition and reporting of illicit discharges.

c. **Goal:** Conduct annual training session for CWS and co-implementer personnel on water quality facility design.

- Tracking measure: List of annual training sessions on stormwater management, recognizing and reporting illicit discharges, and design of water quality facilities, participating agencies, and number of staff attending training sessions.

  CWS provided training in illicit discharge recognition, response, and reporting as part of the annual wet weather training for CWS and co-implementer staff members involved in various aspects of stormwater management. In 2025, online training was offered on demand. Over 150 staff from CWS and the co-implementers watched the training.

  On May 29, 2025, CWS held a training on inspection, assessment, and proper maintenance of water quality facilities; 11 CWS and co-implementer staff members attended. On June 10, 2025, 16 CWS and co-implementer staff members participated in a training on the design of stormwater management facilities.

5. Education Regarding Illicit Discharges

a. **Goal:** Ensure that CWS and co-implementer websites facilitate public reporting of illicit discharges and water quality problems.

- Tracking measure: Summarize annual progress on developing user-friendly web-based methods for facilitating public reporting of illicit discharges and water quality problems.

  The "Report a Problem" page on the CWS website had 1,107 unique views. CWS and other co-implementers' websites facilitate public reporting of illicit discharges by providing telephone numbers and email addresses for the public to use to report illicit discharges. Below is a list of reporting mechanisms on each co-implementer city's website.

  Beaverton
  - Report a Problem (on homepage as major link under "How Do I…" menu header)
  - A number of questions on their FAQs point to the number to call

  Hillsboro
  - Contact Us – Sewer and Streets (link within Public Works section)
  - "How Do I…" link on all pages can be used
  - "Report a Stormwater System concern" link on storm sewer page

  Tigard
  - Public Works Service Request (link on Public Works page)

Tualatin

- Contact information on sidebar of Public Works and Contact Us pages
- Contact information on "Sewer Maintenance" page

Cornelius

- Public Works page provides contact number – "Report a Problem" button links back to same page.
- Email form for reporting concerns

Forest Grove

- Report a Concern page
- Public Works contact information

Banks

- Contact Us/Report a Complaint form
- Public Works emergency contact on sidebar

Durham

- Contact information link on homepage

Sherwood

- Public Works contact info on Public Works page
- Submit a concern under "Online Services"

North Plains

- Report a Problem linked on Public Works page and Streets and Drainage page
- Contact info on Public Works page

King City

- Citizen Problem Reporter
- Contact info on Public Works page

b. **Goal:** Use a variety of outreach tools (i.e., print, electronic, and other media) to promote proper disposal of oil, household hazardous waste, litter, and yard debris in billing inserts, print and electronic newsletters, and websites.

- Tracking measure: Summarize outreach related to disposal activities on an annual basis.

  CWS sent billing inserts to 66,260 customers every other month. Messages included tips on proper disposal of oil, household hazardous waste, litter, and yard debris.

  CWS sent *Clean Water Connection* e-newsletters to 3,792 subscribers each month. Each issue contained articles on proper disposal of oil, household hazardous waste, litter, and yard debris.

  CWS' website gets an average of 27,000 views from approximately 10,100 unique visitors per month and contains information on proper disposal of oil, household hazardous waste, litter, and yard debris.

c. **Goal:** Conduct the storm drain marking program and distribute educational door hangers regarding the proper disposal of yard debris and toxic materials.

- Tracking measure: Number of drains marked and door hangers distributed.

  Thirteen volunteers worked with CWS staff to place 136 storm drain markers and 400 door hangers in Hillsboro, Aloha, and Beaverton. City of Hillsboro staff installed an additional 425 storm drain markers.

RELATIONSHIP TO TMDLS

Phosphorus: Public education regarding how to use products containing phosphorus is critical to the overall reduction in phosphorus in the watershed.

Bacteria: Public education about pet waste management and feeding waterfowl, such as ducks and geese, and other wildlife is important to reducing the concentration of bacteria in stormwater discharges. CWS' strategy to reduce bacteria is greatly dependent on this BMP.

Settleable Volatile Solids: Public education and awareness activities are very important to reducing the loading of settleable volatile solids from the MS4. These include education about the proper use of landscaping materials, leaf disposal, etc.

Mercury: This BMP is used to inform and educate the public, business, and industry representatives, and government staff about the proper use, control, disposal, and impacts of mercury use to limit discharges to the MS4 system.

RELATED DOCUMENTS

- Strategic Communications Plan (Clean Water Services, 2015)

This page intentionally blank.

BMP Fact Sheet: Public Involvement and Participation

INTRODUCTION

The purpose of this BMP category is to provide the public the opportunity to participate in the development, implementation, and modification of the MS4 program. In place of measurable goals and tracking measures for this BMP, the annual report describes CWS' public involvement activities during the reporting year.

CWS uses a documented stakeholder engagement process (STEP) to ensure that CWS project and policy decisions are made with appropriate input from stakeholders. STEP is required for complex or controversial projects and policy decisions. Including stakeholders throughout the decision-making process builds credibility and saves CWS resources. Supervisors are responsible for ensuring appropriate staff members are trained to use STEP and that it is used as required.

PUBLIC INVOLVEMENT DURING THE REPORTING YEAR

CWS posted its 2024 Stormwater Annual Report to its public website. CWS also has a stormwater webpage on its public website that includes descriptions of CWS' stormwater programs and links to important stormwater program documents.

CWS receives input and guidance on its policies and programs from the Washington County Board of Commissioners, serving as the CWS Board of Directors (Board). Staff also provides in-depth updates and education to the Board in periodic training sessions. In FY 2024-25, staff shared information about the regulatory compliance strategy and intergovernmental agreements (IGAs) with Washington County and the partner cities in the CWS service area.

In 2021, CWS initiated discussions with the co-implementers to update the IGAs to better reflect CWS and the co-implementers' roles and responsibilities in the operation and maintenance of the public sanitary sewer and stormwater system. The IGAs describe new relationships between CWS and the co-implementers, with certain co-implementers taking on more responsibility to implement some programs, and CWS providing oversight and technical assistance when needed and ensuring permit compliance. In FY 2024-25, CWS completed the update of the Beaverton and Cornelius IGAs and made progress on the IGAs with Washington County and the City of Tualatin. CWS updated its IGA with Hillsboro in FY 2023-24.

CWS presented information about its stormwater program to attendees of CWS Essentials events — educational events for newly elected and experienced leaders from any of the 12 co-implementer cities, the County, and special districts within the CWS service district, as well as city managers and senior staff. CWS also discussed the stormwater program in the context of how CWS addresses contaminants with the Tualatin Riverkeepers, an important Tualatin River Watershed advocacy group, during an annual meeting.

CWS receives public input on its policies and programs from the Clean Water Services Advisory Commission (CWAC), which holds monthly meetings that are open to the public. The Board appoints the 15 members of the commission to represent neighborhood, business, development, environmental, and agricultural interests. In FY 2024-25, staff shared information about rainfall,

flooding, and stormwater. The regulatory compliance strategy and Climate Action Roadmap strategies and actions continue to be of interest to the public. CWAC members and Tualatin River Watershed partners like Tualatin Riverkeepers and the Tualatin Soil and Water Conservation District ask how they can work with CWS to adaptively manage the stormwater program, including evaluating sites included in the stormwater monitoring program, enhancing the commercial stormwater program to include targeting pollutants of emerging concern such as PFAS and 6PPD-quinone, and implementing stream restoration actions in conjunction with upland controls for stormwater management at select sites.

BMP Fact Sheet: Post-Construction Site Runoff and Retrofit Programs

INTRODUCTION

The purpose of this BMP category is to reduce the discharge of pollutants from the MS4 by developing and applying appropriate design and construction standards for development and by constructing capital improvements in previously developed areas.

MEASURABLE GOALS AND TRACKING MEASURES

1. Development Services

a. **Goal:** Implement Design and Construction Standards that require water quality facilities to be built as part of new development and redevelopment with a goal to provide treatment for 100 percent of impervious areas from new and redevelopment areas (that meet impervious area thresholds) with the exception of the fee-in-lieu projects.

- Tracking measure: New development area (in acres) added annually within the service area.
- Tracking measure: New redevelopment area (in acres) added annually within the service area.
- Tracking measure: New development area (in acres) added annually with structural controls within the service area.
- Tracking measure: New redevelopment area (in acres) added annually with structural controls within the service area.

Table PCSRR-1a(1): Developed and Redeveloped* Area Added with Structural Controls

Jurisdiction	*Developed and Redeveloped Area Added (acres)*	*Developed and Redeveloped Area Added with Structural Controls (acres)*
Clean Water Services	98.2	95.4**
Beaverton	79.8	53.6**
Cornelius	16.5	16.5
Forest Grove	23.1	22.5**
Hillsboro	180.5	179.8**
Sherwood	43.7	41.2**
Tigard	41.0	41.0
Tualatin	31.6	31.6
TOTAL	**514.4**	**481.6****

* CWS' Design and Construction Standards do not distinguish between development and redevelopment projects, so they are not tracked separately.

** The difference between area added and area with structural controls represent fee-in-lieu.

- Tracking measure: Percentage of the service area served by structural controls.
- Tracking measure: Percentage of all areas developed or redeveloped annually that is served by structural controls.

Table PCSRR-1a(2): Structural Controls	
Service area, in acres*	80,716
Total area served by structural controls, in acres	29,732
Percentage of service area* served by structural controls	37%
Developed and redeveloped area added annually, in acres	514
Percentage of developed and redeveloped areas added annually served by structural controls	94%**

* The total MS4 area, which includes undeveloped areas.

** Areas added that were not served by structural controls met treatment requirements through payment of a fee-in-lieu.

The "Total Area Served by Structural Controls" above represents the acreage served by public and private structural controls (i.e., water quality facilities). There are over 5,500 public and private water quality facilities in the CWS service area. To conduct the Waste Load Allocation Attainment Assessment and TMDL Pollutant Load Evaluation, it was necessary to have data regarding the attributes of the water quality facilities (location, type, and acreage served). These data were available for many water quality facilities and were used in conducting the waste load allocation attainment assessment. However, because of the age of the CWS structural control program, which began in 1991 and predates the MS4 program, and the number of jurisdictions that administer it, comprehensive data regarding water quality facilities in the service area is not available.

CWS continues to work with the co-implementers to improve the quality of the data associated with water quality facilities. Additionally, CWS implements a program to inspect private water quality facilities to ensure they are operated and maintained properly. As part of this program, CWS gathers data including location, type, and acreage served by the private water quality facility. CWS anticipates that the future waste load allocation attainment assessments will include improved water quality facilities data and will provide a better assessment of the scope of structural controls implemented in the service area and their effectiveness.

- Tracking measure: Track all structural controls implemented annually by location, type, and drainage area served.

  The co-implementers track structural controls that are implemented through development, redevelopment, and retrofits using GIS or other mapping systems that record the location, type, and area treated by structural controls.

2. Low Impact Development Approaches (LIDA)

a. **Goal:** Prioritize the use of LIDA through implementation of D&C Standards.

- Tracking measure: Annual number of LIDA facilities implemented and the type of facility.

Table PCSRR-2a(1): LIDA Sites

Jurisdiction	*Type of Controls*	*Number of LIDA Sites*
Clean Water Services	Extended dry basin, vegetated swale, LIDA swale, rain garden, flow-through planter	11
Beaverton	Extended dry basin, infiltration planter, flow-through planter, LIDA swale	4
Cornelius	Vegetated swale, rain garden	5
Forest Grove	Extended dry basin, vegetated swale, flow-through planter, filter strip, rain garden	11
Hillsboro	Extended dry basin, vegetated filter strip, green roof, vegetated swale, LIDA swale, infiltration planter, flow-through planter, constructed water quality wetland	10
Sherwood	Extended dry basin, vegetated swale	3
Tigard	Extended dry basin, vegetated swale, flow-through planter, rain garden	6
Tualatin	Extended dry basin, vegetated swale, flow-through planter, infiltration planter, infiltration trench	7
Total LIDA Sites Added		**57**

b. **Goal:** Provide technical assistance through the LIDA Guidance Manual.

- Tracking measure: Provide the LIDA Guidance Manual on the District's public website.

  The 2021 Low Impact Development Approaches Handbook is available on the District's public website.

RELATIONSHIP TO TMDLs

Phosphorus: The CWS Design and Construction Standards for water quality facilities are designed for phosphorus removal from 100 percent of the impervious area from newly constructed impervious surfaces that meet the thresholds for requiring treatment.

Settleable Volatile Solids: Structural controls can reduce the discharge of settleable volatile solids through various detention and retention processes.

Mercury: The CWS Design and Construction Standards designed for phosphorus calculations depend on TSS removal, which will influence the transport and removal of mercury.

RELATED DOCUMENTS

- Design and Construction Standards for Sanitary Sewer and Surface Water Management (2019)
- Low Impact Development Approaches Handbook (2021)

BMP Fact Sheet: Pollution Prevention for Municipal Operations

INTRODUCTION

The purpose of this BMP category is to reduce the discharge of pollutants to the MS4 from a variety of municipal operations, including, but not limited to, parks and open spaces, fleet and building maintenance facilities, transportation systems, and firefighting training facilities.

MEASURABLE GOALS AND TRACKING MEASURES

1. Street Sweeping

a. Goal: Sweep public curbed streets 12 times per year.

- Tracking measure: Curbed street miles swept and total number of curbed street miles; and amount of material collected.

Table PPMO-1: Street Sweeping

Jurisdiction	*Curbed Street Miles*	*Curbed Street Miles Swept*	*Amount of Material Collected, Cubic Yards*
Clean Water Services	953	11,436	1,985
Beaverton	454	5,448	606
Cornelius	85	1,016	180
Forest Grove	137	1,567 [1]	884
Hillsboro	515	6,180	542
Sherwood	120	1,465	130
Tigard	313	3,756	1,934
Tualatin	159	1,908	1,451
Total	**2,736**	**32,776**	**7,712**

[1] The City of Forest Grove's sweeper broke down during the last quarter of the 2024-25 fiscal year, so it fell short of meeting the maintenance frequency for street sweeping.

2. Integrated Pest Management (IPM)

a. **Goal:** Conduct one annual training session related to the CWS Integrated Pest Management program.

- Tracking measure: Report date of IPM training

  CWS provided in-person training on the CWS Integrated Pest Management program as outlined in Table PPMO-2a.

Table PPMO-2a: IPM Training				
Date	*Location*	*Attendees*	*Audience*	*Type*
6/26/2025	CWS Field Operations	17	CWS staff	Early Detection and Rapid Response/Pesticide Training
Total		**17**		

b. **Goal:** All pesticide applicators employed by co-implementers in positions potentially impacting the MS4 will be licensed as required.

- Tracking measure: Report number of state-licensed applicators employed by each co-implementer. See Table PPMO-2b.

Table PPMO-2b: Licensed Pesticide Applicators	
Jurisdiction	*Number of State-Licensed Applicators Employed*
Clean Water Services [1]	8
Beaverton	13
Cornelius	3
Forest Grove	10
Hillsboro	25
Sherwood	8
Tigard	8
Tualatin	10
Washington County	0
Total	**85**

[1] Clean Water Services also uses contractors for pesticide application

c. **Goal:** Keep the CWS IPM program current by annually evaluating pesticides and surfactants for efficacy and potential ecological effects and evaluating pests and pest control measures.

- Tracking measure: Documentation of annual evaluation.

In Fiscal Year 2024-25, CWS reviewed new herbicides, surfactants, and other adjuvants in use by CWS or CWS contractors and made the following changes to the Integrated Pest Management Plan :

Changes to Table Appendix A: Invasives, Table 1

- Update Knapweed to Spotted knapweed and diffuse knapweed Centaurea spp.
- Remove Yellow archangel Lamiastrum galeobdolon
- Update Policeman's helmet impatiens glandulifera to EDRR species. Remove "increasingly common"

Additions to Table 3: Invasive Insects.

- Spotted lanternfly (*Lycorma delicatula*) – WQF, RA, WQSA – High priority EDRR. Destructive to nurseries, vineyards, and fruit orchards. Primary host species is tree of heaven.
- Add one abbreviation to key: EDRR = early detection and rapid response.

Updates to Table 4: Priority EDRR Plants for the Tualatin Basin and Clean Water Services:

- Add two abbreviations to key: 4-County CWMA = 4-County Cooperative Weed Management Area. EDRR = early detection and rapid response.

Additions to Appendix D: Approved Products List

Product Type	*Active ingredient(s)*	*Example Product Names*	*Approved Use*	*Approved Locations*
Pre-emergent	Flumioxazin	SureGuard	Preemergence herbicide for control of selected grass and broadleaf weeds	SA, VC, WQ, SR, DL
Selective herbicide	Imazapic	Panoramic 2SL, Plateau	Selective herbicide for post emergence weed control	SA, VC, WQ, SR, DL

The Integrated Pest Management Plan is located on the CWS public website at cleanwaterservices.org/documents/.

Annual Pest Review: CWS reviews its pest lists every year to identify new noxious weeds, insect pests, or other organisms that pose a threat to the watershed's health. In 2025, one plant pest was added to the CWS Invasive Insects table in the Integrated Pest Management Plan as noted above.

Annual Pesticide Review: As part of the annual review, CWS updates new pesticides using information supplied by CWS staff, other partner organizations engaged in similar activities, and contracted professional applicators. As mentioned above, CWS updated its Integrated Pest Management Plan in 2025.

3. Stormwater Management at Municipal Facilities

a. Goal: Inspect municipal facilities that store wastes as required in their SWPCPs.

- Tracking measure: Number of facility inspections performed.

  There are no municipal facilities in the CWS service area dedicated to the treatment, storage, or transport of municipal wastes; the treatment, storage, and transport of municipal waste from residential, commercial, and industrial sources is handled by private contractors. Solid wastes generated during the maintenance of public facilities such as parks and open spaces may be temporarily stored at municipal yards managed by co-implementers. These yards have Stormwater Pollution Control Plans that include BMPs to reduce the discharge of pollutants in stormwater.

  Because there are no municipal facilities in the CWS service area that treat, store, or transport municipal wastes, there is no need to develop a strategy to manage their stormwater. The incidental, temporary storage of wastes at municipal yards is subject to existing Stormwater Pollution Control Plans.

4. Outfall Retrofits

a. Goal: Continue to implement the District's Retrofit Plan.

- Tracking measure: Identify the number of outfall retrofit projects in planning, design, construction, or completed; the phase of each project during the year; and the treatment BMP used, including locations and area treated by the retrofit.

Table PPMO-5a(1): Outfall Retrofit Projects, Details [1]

Project Name	*Treatment BMP Used*	*Project Stage*	*Area Treated With Retrofit, Acre [2,3]*
Hillsboro: 2 Outfall Retrofit Projects			
Shute Road Multiuse Trail	Swale	Construction	0
Minter Bridge Storm Sewer Regional Water Quality Facility and Outfall	Extended dry pond	Design	0
Sherwood: 1 Outfall Retrofit Project			
Gleneagle Stormwater Treatment Facility	Vegetated swale	Construction	0
Total area treated by retrofits in 2024-25, acres: 0			

[1] Clean Water Services, Beaverton, Forest Grove, Tigard, and Tualatin did not work on any outfall retrofit projects this year.

[2] "Area treated" represents the area treated after the retrofit, including the area previously treated and new.

[3] A "0" in this column indicates projects in planning, design, or construction phases and not complete at the end of the reporting year. Area treated will be added in future reports when the project is complete.

Table PPMO-5a(2): Outfall Retrofit Projects, Summary	
Total area treated with retrofits in 2024-2025, acres	0
Total retrofit projects in process in 2024-2025	3
Total retrofit projects completed in 2024-2025	0
Total cumulative retrofit projects completed during permit term [1]	5

[1] The current permit term is Jan. 1, 2023, through Nov. 30, 2027. Totals for 2022-23 cover the stormwater year July 1, 2022, through June 30, 2023, which includes six months outside the permit term.

5. Catch Basin Retrofits

a. **Goal:** Retrofit or reconstruct 75 existing catch basins annually between May 31, 2021 and the issuance of the new permit to include improvements for water quality.

- Tracking measure: Number of existing catch basins that were retrofitted or reconstructed to include improvements for water quality during the year and cumulatively during the permit term.

Table PPMO-6a(1): Catch Basins Retrofitted or Reconstructed for Water Quality	
Jurisdiction	*Catch Basins Retrofitted*
Clean Water Services	25
Beaverton	30
Cornelius	4
Forest Grove	0
Hillsboro	13
Sherwood	7
Tigard	3
Tualatin	0
Total 2024-2025	82
Total 2025-2026	-
Total 2026-2027	-
Total 2022-2023	110
Total 2023-2024	**114**
Total cumulative retrofitted catch basins during permit term[1]	**306**

[1] The current permit term is Jan. 1, 2023, through Nov. 30, 2027. Totals for 2022-23 cover the stormwater year July 1, 2022, through June 30, 2023, which includes six months outside the permit term.

In addition to the outfall and catch basin retrofits listed above, several water quality manholes were also retrofitted this year, as shown in Table PPMO-6a(2).

Table PPMO-6a(2): Water Quality Manholes Retrofitted or Reconstructed for Water Quality		
Jurisdiction	*Manholes Retrofitted*	Area Treated With Retrofit, Acres
Clean Water Services	0	0
Beaverton	0	0
Cornelius	1	2.2
Forest Grove	0	0
Hillsboro	0	0
Sherwood	0	0
Tigard	0	0
Tualatin	13	113.9
Total 2023-2024	**14**	**116.1**

6. Winter Operations and Maintenance Program

a. Goal: Limit impacts to water quality to the degree practicable from winter operations and maintenance activities of public roadways.

- Tracking measure: Materials used, number of winter weather events where winter maintenance materials are used, quantities, and general location of each material used in relation to distance (e.g., pounds per mile), and any other actions taken to protect waters of the state for areas where that data is available or becomes available during the permit term.

Table PPMO-7: Winter Operations and Maintenance				
Jurisdiction	*Winter Weather Events* [1]	*Sand (Tons)*	*Magnesium Chloride (Gallons)*	*Salt (Pounds)*
Clean Water Services [2]	N/A	N/A	N/A	N/A
Beaverton	1	150	500	0
Cornelius	0	0	0	0
Forest Grove	1	13	480	0
Hillsboro	1	25	4,706	0
Sherwood	3	21	1,600	0
Tigard	1	36	3,500	0
Tualatin	7	14	3,500	0
Washington County	21	574	20,237	0
Total	**35**	**833**	**34,523**	**0**

[1] Number of winter storms where co-implementers chose to apply winter weather maintenance materials to public roadways.

[2] CWS is not responsible for maintaining public roadways. No tracking measures to report.

Co-implementers take additional precautions to protect waters of the state by applying best management practices for routine road maintenance, sweeping before winter storms, sweeping soon after winter storms where sand is applied, and not applying magnesium chloride to wet roads or when rain is forecasted.

RELATIONSHIP TO TMDLS

Phosphorus: Street sweeping, outfall retrofits, and catch basin retrofits remove phosphorus-bearing sediments.

Bacteria: Addressing discharges from municipal yards through Stormwater Pollution Control Plans reduces the discharge of bacteria from these sites.

Settleable Volatile Solids: Street sweeping, outfall retrofit, and catch basin retrofits will reduce the discharge of settleable volatile solids.

Mercury: The CWS Design and Construction Standards designed for phosphorus calculations depend on TSS removal, which will influence the transport and removal of mercury.

RELATED DOCUMENTS

- Sanitary Sewer and Surface Water Management Work Programs, Performance Standards, Priorities, and Policies (R&O 07-46 and as amended by RO 08-21, RO 09-21, RO 10-13, RO 11-7, RO 17-6, and RO 18-11) (2018)
- Integrated Pest Management Plan (2025)

This page intentionally blank.

BMP Fact Sheet: Stormwater Management Facilities Operations and Maintenance Activities

INTRODUCTION

The purpose of this BMP category is to reduce the discharge of pollutants from the MS4 by implementing appropriate operations and maintenance practices for both public and private stormwater management facilities.

MEASURABLE GOALS AND TRACKING MEASURES

1. Public Water Quality Facility Inspections and Maintenance

a. **Goal:** Inspect, assess and document the condition of all vegetated water quality facilities to identify necessary maintenance activities at least twice per year, once during the winter and once during the growing season. Assess whether the vegetated facility requires routine or non-routine maintenance. If non-routine maintenance is required, describe the maintenance activities necessary to address conditions/issues. For any vegetated facility with non-routine maintenance activities identified, develop a plan and schedule to perform those activities.

- Tracking measure: Number of public water quality facilities; number of public water quality facilities assessed for maintenance needs; number found to need non-routine maintenance.

  CWS and co-implementers assessed their public vegetated water quality facilities for maintenance needs during the reporting year, as documented in Table O&M-1b.

Table O&M-1b: Assessment of Public Vegetated Water Quality Facilities

Jurisdiction	*Public Water Quality Facilities*	*Public Water Quality Facility Assessments*[1]	*Public Water Quality Facilities Needing Non-routine Maintenance*
Clean Water Services	1,086	1,118	15
Beaverton	224	224	8
Cornelius	33	33	2
Forest Grove	41	41	0
Hillsboro	376	1,086	38
Sherwood	133	134	12
Tigard	218	235	0
Tualatin	102	99	28
Washington County	4	4	0
Total	**2,217**	**2,974**	**103**

[1] Assessments above the number of facilities indicate multiple visits to the same facility.

b. **Goal:** Inspect annually and maintain all public proprietary water quality facilities per manufacturer's specifications to ensure functionality.

- Tracking measure: Total number of public proprietary water quality facility maintenance visits and the total number of public proprietary water quality facilities within the service area.

  Data on the tracking measure for Goal 1.b are in Table O&M-1.

Goal: Replace filters in public proprietary filter treatment systems as needed.

- Tracking measure: Number of systems renewed.

  Data on the tracking measure for the goal above are in Table O&M-1.

c. **Goal:** Clean all public water quality manholes twice per year.

- Tracking measure: Number of public water quality manholes cleaned; and total number of public water quality manholes within the service area.

  Data on the tracking measure for Goal 1.c are in Table O&M-1. With one exception, all co-implementers met or exceeded the annual cleaning target of twice per year.

  City of Sherwood cleaned its water quality manholes at a rate of 1.9 per year due to equipment breakdown issues. The City will ensure all water quality manholes are scheduled for maintenance next year.

d. **Goal:** Clean 95 percent of public sumped catch basins per year.

- Tracking measure: Number of sumped catch basins cleaned; and total number of sumped catch basins within the service area.

  Data on the tracking measure for Goal 1.d are in Table O&M-1; some of the totals reflect multiple visits to the same facility. All co-implementers except CWS met the annual cleaning target.

  CWS cleaned 76 percent of the sumped catch basins this year, short of the 95 percent goal, because of staffing and equipment issues.

  CWS has budgeted for a new vactor truck which is scheduled to be delivered in FY26 which should help ensure the sumped catch basin cleaning goal is met in the future.

2. Private Structural Water Quality Facility Maintenance

a. **Goal:** Annually inspect 25 percent of privately maintained structural water quality facilities to ensure system functionality.

- Tracking measure: Total number of facilities and number of facilities inspected.

Table O&M-2a: Inspection of Private Water Quality Facilities (PWQFs)

Jurisdiction	*Number of PWQFs in Service Area*[1]	*Number of PWQF Inspections*	*Percent of PWQFs Inspected*
CWS Service Delivery Planning	1,142	313	27%
CWS Environmental Services	63	19	30%
Beaverton	652	176	27%
Cornelius	83	28	34%
Forest Grove	115	32	28%
Hillsboro	870	423	49%
Sherwood	138	131	96%
Tigard	342	88	26%
Tualatin	490	123	25%
Total	**3,705**	**1,551**	**42%**

[1] Number is the inventory at the beginning of the reporting year, July 1, 2024.

b. **Goal:** Conduct annual training for CWS and co-implementer inspection staff on proper water quality facility maintenance:

- Tracking measure: Training sessions conducted and staff/co-implementer attendance.

  On May 29, 2025, CWS held a training on inspection, assessment, and proper maintenance of water quality facilities; 11 CWS and co-implementer staff members attended. On June 10, 2025, 16 CWS and co-implementer staff members participated in a training on the design of stormwater management facilities.

RELATIONSHIP TO TMDLs

Phosphorus: The CWS Design and Construction Standards are developed to remove phosphorus. Efficiency is contingent on maintaining the constructed systems to operate as designed.

Bacteria: Through appropriate maintenance and inspection of the sanitary and storm sewer systems, cross connections, and other illicit sources of bacterial contamination will be identified and corrected. This will result in lower bacteria concentrations in stormwater.

Settleable Volatile Solids: Adequate maintenance of the stormwater system will reduce the discharge of settleable volatile solids that accumulate in the system.

Mercury: The Willamette Basin mercury TMDL determined that air deposition (wet and dry) was a predominant source of mercury in the basin and that mercury likely is transported with suspended solids. These BMPs are designed to capture and retain suspended solids and will therefore act to limit mercury transport.

RELATED DOCUMENTS

- Private Water Quality Facilities Management Program (referenced in CWS' 2020 Stormwater Management Plan)
- Performance Standards (2018)

Table O&M-1
Public Water Quality Facility Inspections and Maintenance Tracking Measures - FY 2024-25

Activity	Units	Frequency Standard	CWS		Beaverton		Cornelius		Forest Grove		Hillsboro		Sherwood		Tigard		Tualatin		Washington County		Total	
			Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production	Inventory	Production
1. Public Proprietary Water Quality Facility Maintenance																						
A. Proprietary facility maintenance visits	Visits	1x per year	6	6	135	135	0	0	18	19	48	49	7	7	77	77	9	9	7	16	307	318
B. Filter cartridge replacement	Cartridges replaced	As needed		0		620		0		11		15		3		45		9		9		712
2. Public Water Quality Manhole Cleaning																						
A. Manholes cleaned	Each	2x Per Year	999	2,013	424	866	36	72	81	162	309	620	101	198	120	254	90	186	0	0	2,160	4,371
3. Sumped Catch Basin Cleaning																						
A. Sumped catch basins cleaned	Each	95% Per Year	10,661	8,093	3,864	3,889	922	922	1,594	1,594	7,788	7,788	2,002	2,009	2,753	2,753	1,398	1,374	0	0	30,982	28,422

Appendix B: Stormwater Monitoring Data

This appendix describes the activities of the Clean Water Services (CWS) stormwater monitoring program and presents the results of these activities. The CWS watershed-based NPDES permit requires land-use-based stormwater monitoring at five locations at least three times per year during characteristic storm events. CWS reviews stormwater data within one month of the data becoming available in CWS' data repository. Since January 1, 2023, when the reissued permit became effective, CWS also reviews the stormwater monitoring data for the potential to cause or contribute to a water quality exceedance in the receiving water body within five days of becoming aware of the data.

Stormwater Sampling Requirements

CWS' five stormwater sampling sites are presented in Table B-1 and in Figure B-1. The sampling procedures are consistent with CWS' updated Stormwater Monitoring Plan submitted with the NPDES permit renewal application and approved with the reissued permit on December 8, 2022. The Stormwater Monitoring Plan was updated in May 2023 to include new elements from the reissued permit. One goal of the Stormwater Monitoring Plan is to obtain complete sample sets with results from all analytes at all five sites for each storm event. If the storm event results were incomplete, CWS took additional samples from individual sites or subsets of analytes from all five sites. In addition, data from monitoring at MS4 sites as part of special projects that met reporting criteria are included here. CWS' Water Quality Laboratory and Environmental Services staff obtained and analyzed at least three samples from each sampling location listed in Table B-1.

Table B-1: NPDES Stormwater Sampling Sites

Station Name	*Station ID*	*Catchment Area (Acres)*	*Subbasin*	*Major Land Use*
MS4 at 209th	7301001	37	Cross Creek	High density
MS4 at Paddington	7301004	22	Bronson Creek	Post-1990 residential
MS4 at 39th Loop	7301005	15	Rock Creek	Industrial
MS4 at Amberglen	7301006	198	Rock Creek	Residential/commercial
MS4 at Maple	7301007	70	Jackson Bottom	Pre-1990 residential

Figure B-1: Map of Five Stormwater Sampling Sites

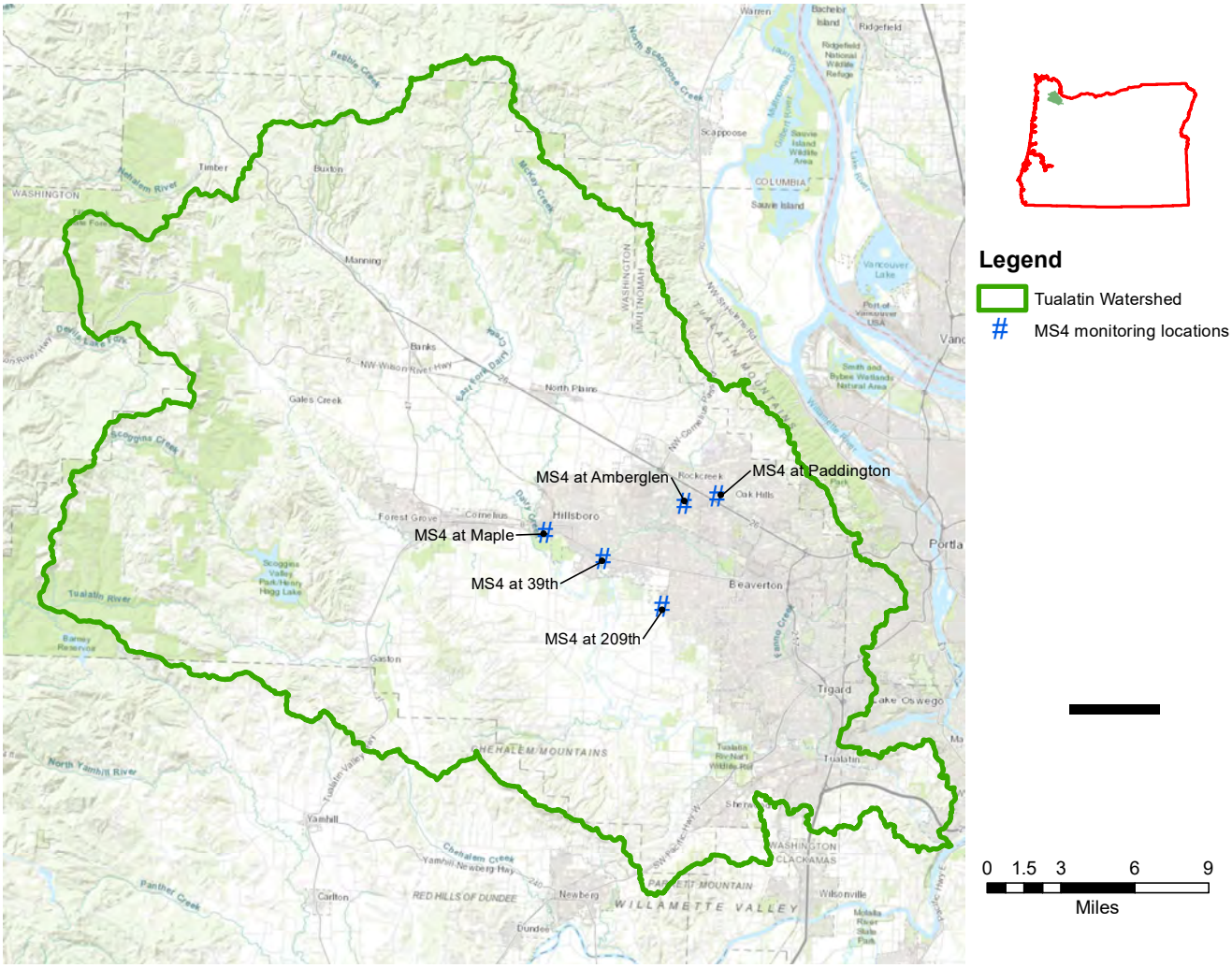


Table B-2 displays the analysis name, sample type, unit, Method Reporting Limit (MRL), and analytical method reference for samples collected and analyzed under the stormwater monitoring program.

Table B-2: Method Reporting Limits and Laboratory Methods for Stormwater Samples

Analysis Name	*Sample Type*	*Unit*	*MRL*	*Method Reference**
Ammonia-N, Dissolved	Composite	mg/L	0.010	SM 4500-NH3 G
Conductivity, Field	Field	µS/cm	1	SM 2510 B
Copper, Dissolved	Composite	µg/L	0.4	EPA 200.8
Copper, Total Recoverable	Composite	µg/L	0.4	EPA 200.8
E. coli, Most Probable Number	Grab	MPN/100 mL	1	SM 9223 B
Hardness, Total	Composite	mg/L	0.50	EPA 200.8
Lead, Dissolved	Composite	µg/L	0.1	EPA 200.8
Lead, Total Recoverable	Composite	µg/L	0.1	EPA 200.8
Mercury by Purge & Trap, Dissolved	Grab	ng/L	0.2	EPA 1631E
Mercury by Purge & Trap, Total	Grab	ng/L	0.2	EPA 1631E
Nitrate/Nitrite-N, Dissolved	Composite	mg/L	0.02	EPA 300.0
Organic Carbon, Total Non-purgeable	Composite	mg/L	0.5	SM 5310 B
Ortho-Phosphate-P, Dissolved	Composite	mg/L	0.005	SM 4500-P F
Temperature	Field	°C	0.1	SM 2550 B
Total Phosphorus-P	Composite	mg/L	0.025	EPA 365.1
Total Suspended Solids	Grab	mg/L	0.5	SM 2540 D
Total Suspended Solids	Composite	mg/L	0.5	SM 2540 D
Turbidity, Field	Field	FNU	0.1	SM 2130 B
Zinc, Dissolved	Composite	µg/L	2.5	EPA 200.8
Zinc, Total Recoverable	Composite	µg/L	2.5	EPA 200.8

* SM = Standard Methods

The stormwater monitoring period begins July 1 and ends June 30 of the following year. Rainfall data is collected and used to determine the storm magnitude in 24 hours and rainfall in the antecedent period of 12 hours. When the permit was renewed in December 2022, the antecedent dry period requirement changed from 24 hours to 12 hours, when possible. An antecedent dry period has less than 0.1 inches of precipitation. CWS uses a flow-weighted composite method for stormwater event sampling. The TSS samples were taken as composite samples in the previous permit. The permit requires TSS samples to be taken concurrently with mercury samples, as grab samples; therefore, CWS now takes composite and grab TSS samples.

Stormwater Monitoring Results

For the current reporting period, July 1, 2024, through June 30, 2025, six storm events were monitored at CWS' MS4 monitoring sites for the pollutants listed in Table B-2. Table B-3 displays a summary of rainfall data collected at two regional rain gauges, which corresponds to the sampling events at the MS4 monitoring sites.

Table B-3: Rainfall Data Summary

Sample Date(s)	*Rainfall Preceding 12 Hours (Inches)*	*Storm Magnitude (Inches in 24 hours)*	*Rain Gauge*
10/4/24	0.0	0.33	Bureau of Reclamation, AgriMet FOGO (Forest Grove)
10/30/24	0.0	0.53	Bureau of Reclamation, AgriMet FOGO (Forest Grove)
1/31/25	0.0	0.91	Bureau of Reclamation, AgriMet FOGO (Forest Grove)
2/18/25-2/19/25	0.0	0.32	Bureau of Reclamation, AgriMet FOGO (Forest Grove)
3/11/25-3/12/25	0.03	0.69	Bureau of Reclamation, AgriMet FOGO (Forest Grove)
3/20/25	0.0	1.09	USGS Bonny Slope BSD (Portland)

Table B-4 explains the qualifier codes used to describe the stormwater monitoring data.

Table B-4: Qualifier Codes and Description

Qualifier/Flag	*Description*
<	Less than the specified value (generally the Method Reporting Limit)
>	Greater than the specified value (generally the Method Reporting Limit)
E	Qualitatively estimated value due to *minor* suspected sampling or analytical anomalies
Q	Questionable value due to suspected significant sampling or analytical anomalies

Stormwater monitoring data for this reporting period are presented in Tables B-5 through B-9. The samples from the locations listed in Table B-1 were analyzed for the water quality parameters listed in Table B-2.

Table B-5: Stormwater Monitoring Data: MS4 at 209th (7301001)

Analyte	*Unit*	*Sample Date*			
		10/30/24	*1/31/25*	*2/18/25-2/19/25*	*3/12/25*
Ammonia-N, Dissolved	mg/L	0.14	0.092	0.027	0.049
Conductivity, Field	µS/cm	106.2	22.9	97	18.3
Copper, Dissolved	µg/L	2.55	3.99	1.97	3
Copper, Total Recoverable	µg/L	5.14	6.24	2.57	3.88
E. coli, Most Probable Number	MPN/100 mL	78	54	115	291
Hardness, Total	mg/L	23.1	10.9	17.2	14.2
Lead, Dissolved	µg/L	0.102	<0.102	<0.102	<0.102
Lead, Total Recoverable	µg/L	0.778	0.288	<0.102	0.219
Mercury by Purge & Trap, Dissolved	ng/L	2.25	2.02	1.89	2.39
Mercury by Purge & Trap, Total	ng/L	1.64	1.73	1.45	2.44
Nitrate/Nitrite-N, Dissolved	mg/L	0.145	0.114	0.214	0.119
Organic Carbon, Total Non-purgeable	mg/L	7.13	4.12	2.71	4.02
Orthophosphate-P, Dissolved	mg/L	0.055	0.031	0.011	0.01
Temperature	°C	10.943	9.428	11.255	8.771
Total Phosphorus-P	mg/L	0.063	0.079	0.029	0.041
Total Suspended Solids[1]	mg/L	16	16.4	2	6.8
Total Suspended Solids[2]	mg/L	7.2	0.8	<0.5	2.33
Turbidity, Field	FNU	4.59	1.79	3.17	2.14
Zinc, Dissolved	µg/L	25876	1168	148	1213
Zinc, Total Recoverable	µg/L	25900	1257	163	1279

1. Total Suspended Solids are collected via a 24-hour flow-weighted composite sampler.
2. Total Suspended Solids are collected via grab sampling paired with the mercury grab samples.

Table B-6: Stormwater Monitoring Data: MS4 at Paddington (7301004)

Analyte	*Unit*	*Sample Date*		
		1/31/25	*2/18/25-2/19/25*	*3/20/25*
Ammonia-N, Dissolved	mg/L	0.054	0.029	0.026
Conductivity, Field	µS/cm	25.8	164.2	168.5
Copper, Dissolved	µg/L	11.9	6.81	2.59
Copper, Total Recoverable	µg/L	19.4	9.35	10.7
E. coli, Most Probable Number	MPN/100 mL	118	3	40
Hardness, Total	mg/L	21.7	31.3	54.9
Lead, Dissolved	µg/L	0.102	<0.102	<0.102
Lead, Total Recoverable	µg/L	0.329	0.119	<0.102
Mercury by Purge & Trap, Dissolved	ng/L	1.82	1.5	0.842
Mercury by Purge & Trap, Total	ng/L	0.974	0.998	0.672
Nitrate/Nitrite-N, Dissolved	mg/L	0.028	0.611	1.2
Organic Carbon, Total Non-purgeable	mg/L	2.97	1.92	2.4
Orthophosphate-P, Dissolved	mg/L	0.033	0.027	0.042
Temperature	°C	8.652	11.107	11.661
Total Phosphorus-P	mg/L	0.077	0.046	0.062
Total Suspended Solids[1]	mg/L	19.6	4.4	1
Total Suspended Solids[2]	mg/L	10.4	<0.5	<0.5
Turbidity, Field	FNU	5.25	3.89	0.92
Zinc, Dissolved	µg/L	1131	65.4	54
Zinc, Total Recoverable	µg/L	1224	73.9	56.5

1. Total Suspended Solids are collected via a 24-hour flow-weighted composite sampler.
2. Total Suspended Solids are collected via grab sampling paired with the mercury grab samples.

Table B-7: Stormwater Monitoring Data: MS4 at 39th Loop (7301005)

Analyte	*Unit*	*Sample Date*				
		10/4/24	*10/30/24*	*1/31/25*	*2/18/25-2/19/25*	*3/11/25-3/12/25*
Ammonia-N, Dissolved	mg/L	0.569	0.036	0.086	0.09	0.239
Conductivity, Field	µS/cm	5.5	9	8.2	15.9	10.3
Copper, Dissolved	µg/L	4.52	5.27	4.66	4.01	3.68
Copper, Total Recoverable	µg/L	8.77	7.24	6.42	5.36	5.96
E. coli, Most Probable Number	MPN/100 mL	10	21400	<1	5	<1
Hardness, Total	mg/L	9.82	2.17	3.12	2.63	2.61
Lead, Dissolved	µg/L	<0.102	<0.102	0.817	0.334	0.215
Lead, Total Recoverable	µg/L	1.32	0.461	1.62	0.613	0.821
Mercury by Purge & Trap, Dissolved	ng/L	4.93	2.16	1.83	2.69	1.41
Mercury by Purge & Trap, Total	ng/L	3.45	1.81	1.23	2.47	1.36
Nitrate/Nitrite-N, Dissolved	mg/L	0.88	0.116	0.074	0.161	0.17
Organic Carbon, Total Non-purgeable	mg/L	5.88	1.82	1.83	1.32	1.49
Orthophosphate-P, Dissolved	mg/L	0.047	0.026	0.025	0.013	0.035
Temperature	°C	10.209	11.379	9.326	9.052	9.821
Total Phosphorus-P	mg/L	0.173	0.034	0.054	0.03	0.075
Total Suspended Solids[1]	mg/L	28.4	2.8	5.2	0.8	7.2
Total Suspended Solids[2]	mg/L	86.8	10.4	10	2	1
Turbidity, Field	FNU	19.87	6.34	8.02	5.09	3.84
Zinc, Dissolved	µg/L	700	93.8	182	114	155
Zinc, Total Recoverable	µg/L	763	101	192	130	177

1. Total Suspended Solids are collected via a 24-hour flow-weighted composite sampler.
2. Total Suspended Solids are collected via grab sampling paired with the mercury grab samples.

Table B-8: Stormwater Monitoring Data: MS4 at Maple (7301007)

Analyte	*Unit*	*Sample Date*			
		10/30/24	*1/31/25*	*2/18/25-2/19/25*	*3/12/25*
Ammonia-N, Dissolved	mg/L	0.068	0.704	0.989	0.618
Conductivity, Field	µS/cm	26	96.5	60.5	22.9
Copper, Dissolved	µg/L	3.08	4.34	8.56	5.5
Copper, Total Recoverable	µg/L	6.99	12.1	26.5	10.7
E. coli, Most Probable Number	MPN/100 mL	3590	2880	272	1120
Hardness, Total	mg/L	9.86	25.5	40.3	16
Lead, Dissolved	µg/L	<0.102	0.107	<0.102	0.171
Lead, Total Recoverable	µg/L	1.61	3.83	4.86	1.63
Mercury by Purge & Trap, Dissolved	ng/L	2.01	2.14	1.87	2.21
Mercury by Purge & Trap, Total	ng/L	2.15	1.68	1.61	1.32
Nitrate/Nitrite-N, Dissolved	mg/L	0.218	0.316	0.448	0.268
Organic Carbon, Total Non-purgeable	mg/L	4.65	5.71	12.9	8.51
Orthophosphate-P, Dissolved	mg/L	0.366	0.043	0.008	0.032
Temperature	°C	10.846	8.583	9.308	8.607
Total Phosphorus-P	mg/L	0.088	0.193	0.049	0.209
Total Suspended Solids[1]	mg/L	30.4	54.4	83	22.4
Total Suspended Solids[2]	mg/L	34.4	16	24.4	87.3
Turbidity, Field	FNU	34.17	9.98	30.68	51.42
Zinc, Dissolved	µg/L	118	186	378	191
Zinc, Total Recoverable	µg/L	164	272	579	234

1. Total Suspended Solids are collected via a 24-hour flow-weighted composite sampler.
2. Total Suspended Solids are collected via grab sampling paired with the mercury grab samples.

Table B-9: Stormwater Monitoring Data: MS4 at Amberglen (7301006)

Analyte	*Unit*	*Sample Date*			
		10/30/24	*1/31/25*	*2/18/25-2/19/25*	*3/11/25-3/12/25*
Ammonia-N, Dissolved	mg/L	0.302	0.229	0.057	0.122
Conductivity, Field	µS/cm	311.9	96.8	581	207.2
Copper, Dissolved	µg/L	4.56	4.81	3.59	4.04
Copper, Total Recoverable	µg/L	8.39	11.7	5.9	9.48
E. coli, Most Probable Number	MPN/100 mL	3	548	120	178
Hardness, Total	mg/L	24	36.5	84.4	27.9
Lead, Dissolved	µg/L	0.251	<0.102	<0.102	<0.102
Lead, Total Recoverable	µg/L	1.37	1.92	0.714	1.51
Mercury by Purge & Trap, Dissolved	ng/L	2.54	1.77	1.59	1.39
Mercury by Purge & Trap, Total	ng/L	1.44	1.13	0.936	0.86
Nitrate/Nitrite-N, Dissolved	mg/L	0.207	0.163	0.273	0.178
Organic Carbon, Total Non-purgeable	mg/L	6.59	4.04	2.84	3.48
Orthophosphate-P, Dissolved	mg/L	0.036	0.032	0.02	0.027
Temperature	°C	11.524	8.866	10.122	10.317
Total Phosphorus-P	mg/L	0.07	0.158	0.064	0.129
Total Suspended Solids[1]	mg/L	32.8	52.8	17.6	44.4
Total Suspended Solids[2]	mg/L	13.2	27.6	<0.5	3.67
Turbidity, Field	FNU	10.31	19.76	4.82	5.66
Zinc, Dissolved	µg/L	34526	104	78.3	51.7
Zinc, Total Recoverable	µg/L	34620	192	102	109

1. Total Suspended Solids are collected via a 24-hour flow-weighted composite sampler.
2. Total Suspended Solids are collected via grab sampling paired with the mercury grab samples.

Discussion of Stormwater Monitoring Results

CWS staff followed internal cause and contribute assessment protocols to promptly review the MS4 data. There were no MS4 samples that showed reasonable potential to cause or contribute to a water quality standard exceedance.

During the 2024-2025 monitoring period, zinc concentrations during stormwater sampling events generally decreased from previous years with the exception of two outlier events that are discussed in more detail below. The maximum total zinc concentration in 2022-2023 was 7,143 ug/L; in 2023-2024 the maximum total zinc concentration was 2,068 ug/L; in 2024-2025 the maximum total zinc concentration outliers were 34,620 ug/L and 25,900 ug/L, the next highest total zinc concentration was 1,279 ug/L.

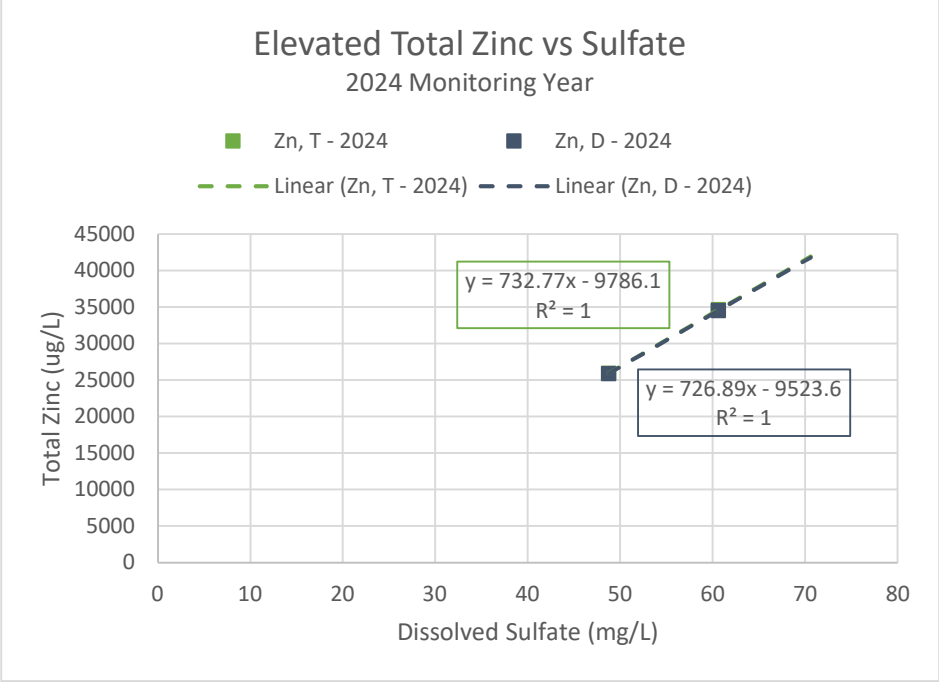
Zinc and Sulfate Elevated Results

During the Oct. 30, 2024, sampling event, the zinc results for the 209th and Amberglen locations were elevated. Table B-10 summarizes the results for dissolved sulfate, dissolved zinc, and total zinc. Figure B-3 shows the correlation of dissolved sulfate and total zinc. These results represent the highest sulfate and zinc results recorded during the 2024-2025 monitoring period.

Table B-10: Elevated Sulfate and Zinc Results

Location	*Date*	*Sulfate, Dissolved (mg/L)*	*Zinc, Dissolved (ug/L)*	*Zinc, Total (ug/L)*	*Percent Dissolved Zinc*
MS4 @ 209th	10/30/24	48.7	25876	25900	99.9%
MS4 @ Amberglen	10/30/24	60.6	34526	34620	99.7%

Figure B-2: Total Zinc and Sulfate at MS4 Sampling Locations

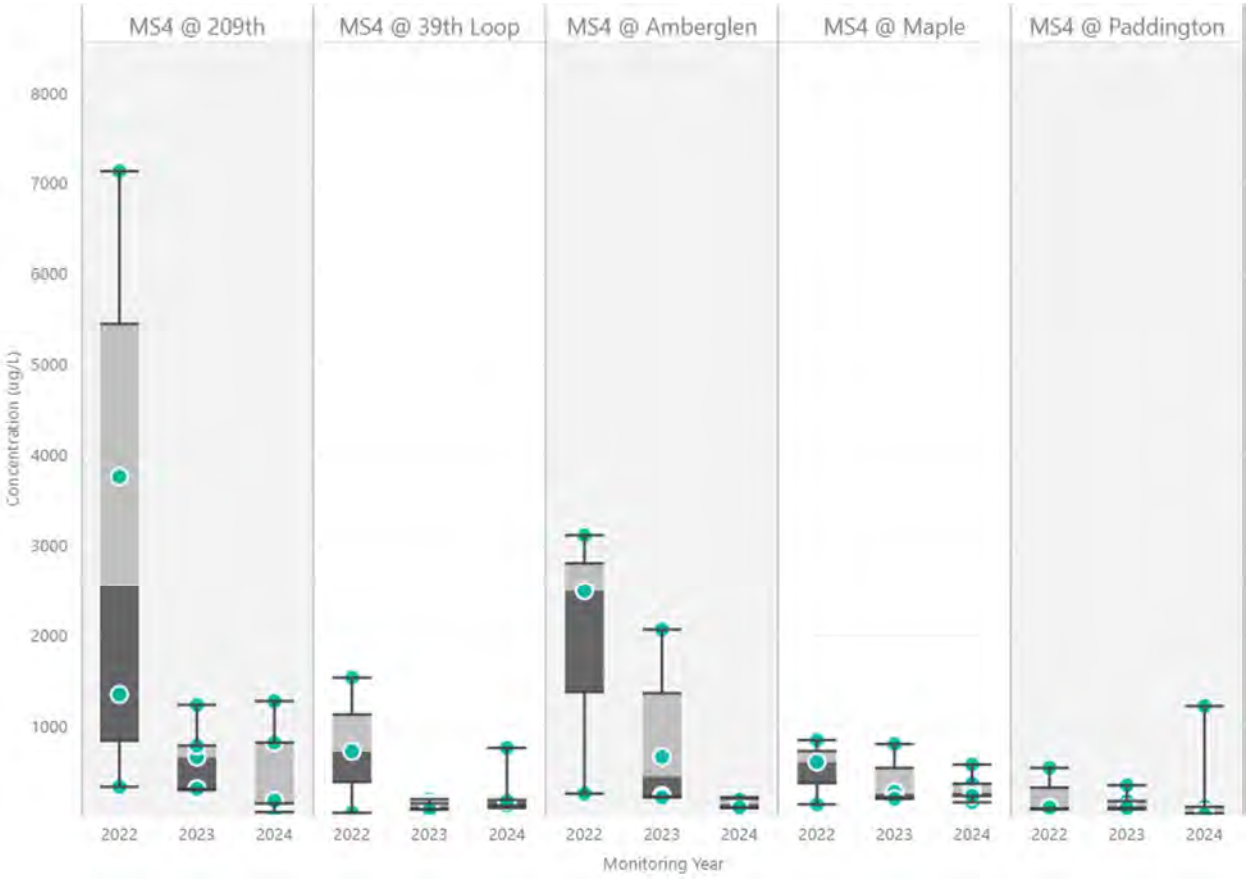


Zinc and Sulfate Results

After removing the outliers discussed above, the rest of the results are discussed in this section.

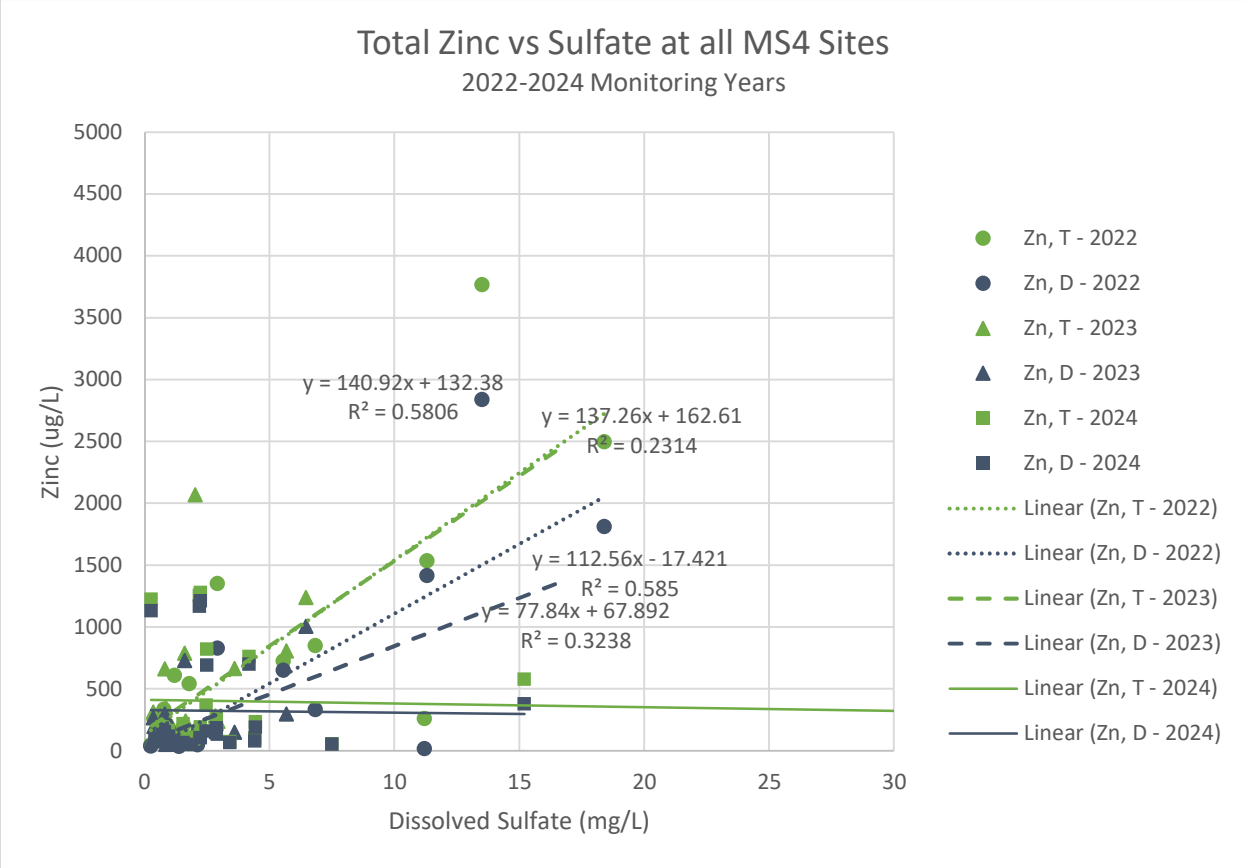
Figure B-3 shows the reduction of zinc across MS4 sampling locations during the 2022, 2023, and 2024 monitoring periods.

Figure B-3: Total Zinc at MS4 Sampling Locations



The dissolved sulfate and zinc sampling results are plotted in Figure B-4 below. The correlations between concentrations of dissolved sulfate with both total and dissolved zinc have decreased since last year.

Figure B-4: Correlation Between Dissolved Sulfate and Zinc



CWS' Environmental Services staff performed an investigation in the Amberglen sample site subwatershed in response to an elevated sample result for zinc. The investigation identified active construction sites, however, no obvious sources of zinc were identified. In the 209th subwatershed, CWS staff members are performing public outreach and are collecting sulfate samples to correlate with the dissolved zinc samples. CWS will continue to provide outreach and education this year.

The overall decreases in total and dissolved zinc and the weakening correlations with dissolved sulfate likely reflect the CWS outreach and education actions over the past years; however, there may be other sources of zinc that have not yet been identified. CWS is doing additional work to better determine the zinc and sulfate sources in urban residential areas. Figures B-5 through B-7 show the sulfate and zinc concentrations by land-use area for the 2022, 2023, and 2024 monitoring years.

Figure B-5: 2022 Concentrations by Land-Use Area

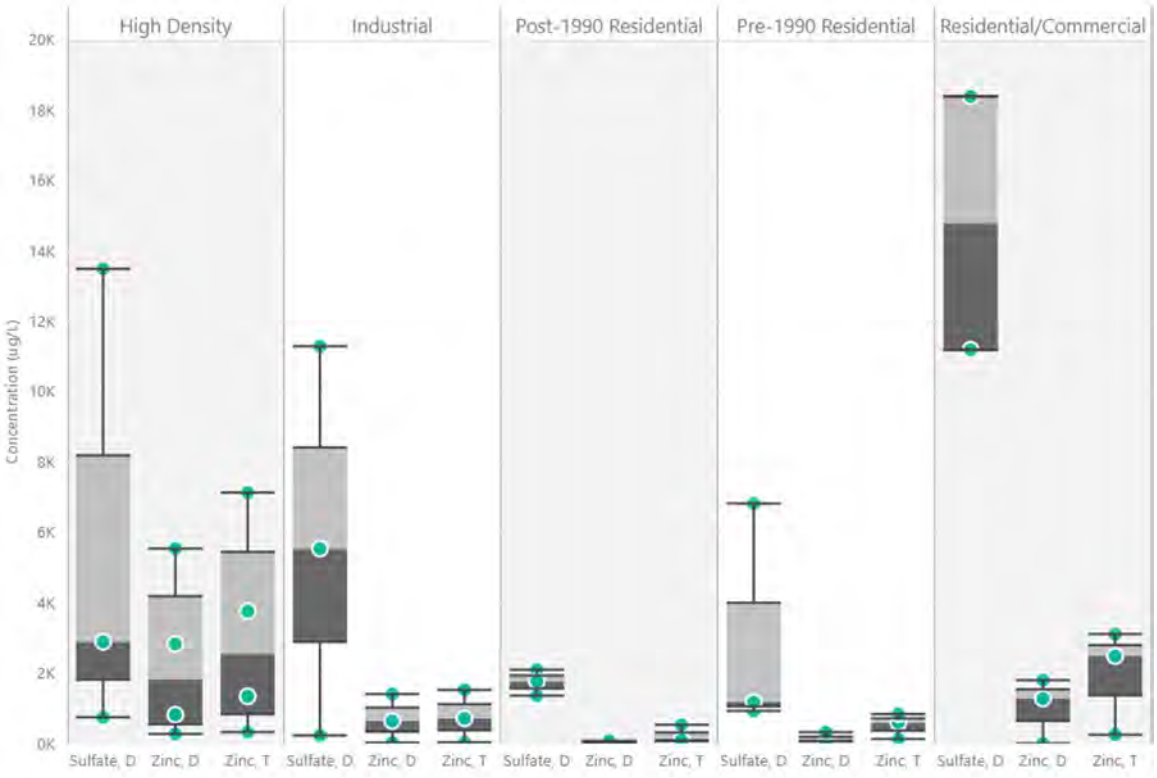


Figure B-6: 2023 Concentrations by Land-Use Area

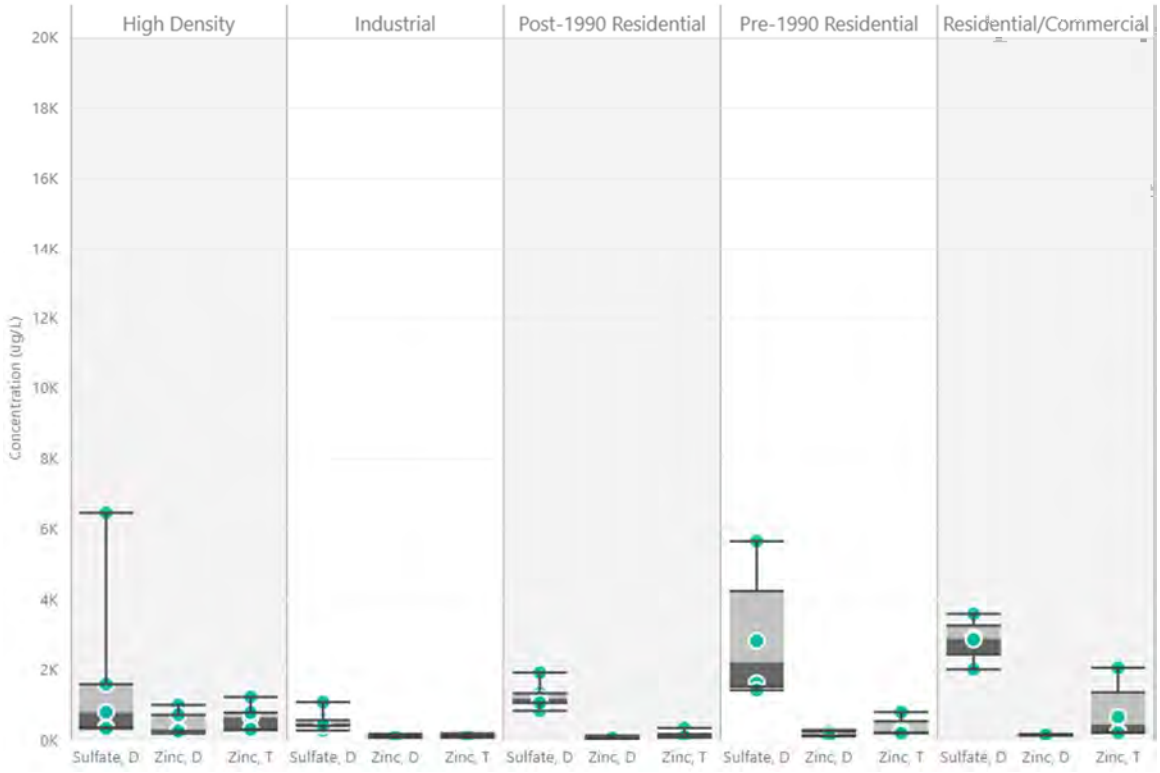
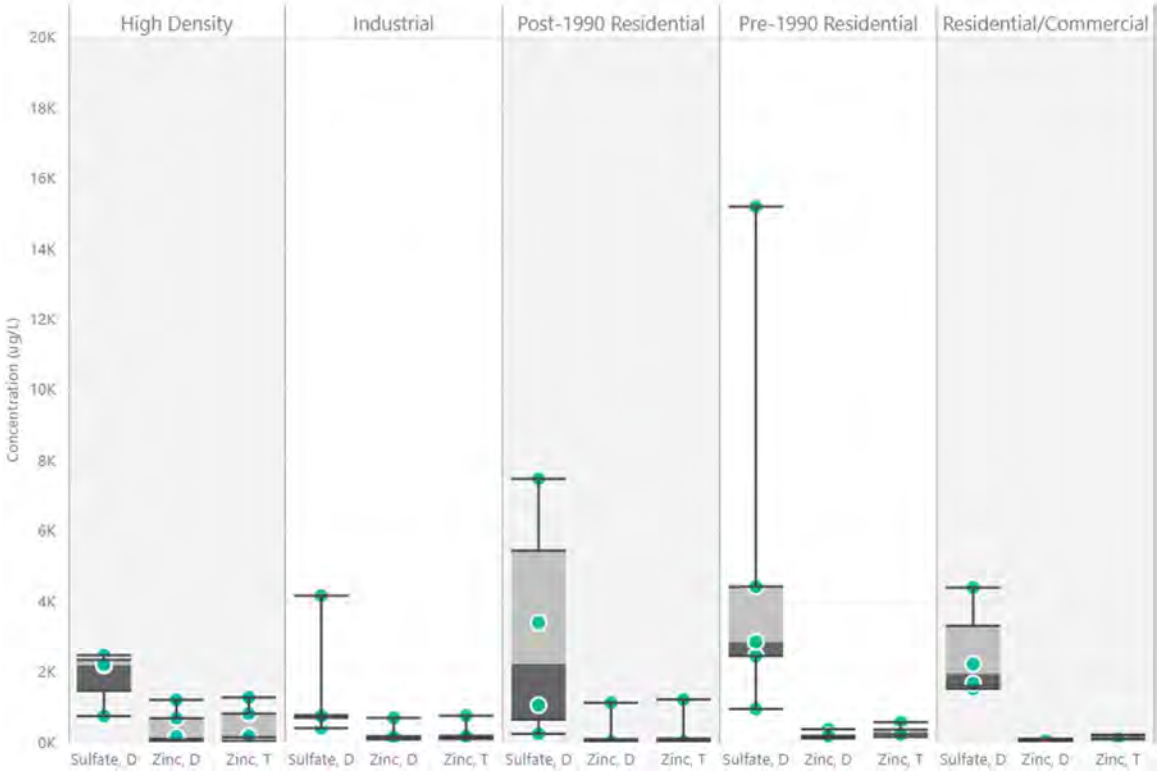


Figure B-7: 2024 Concentrations by Land-Use Area

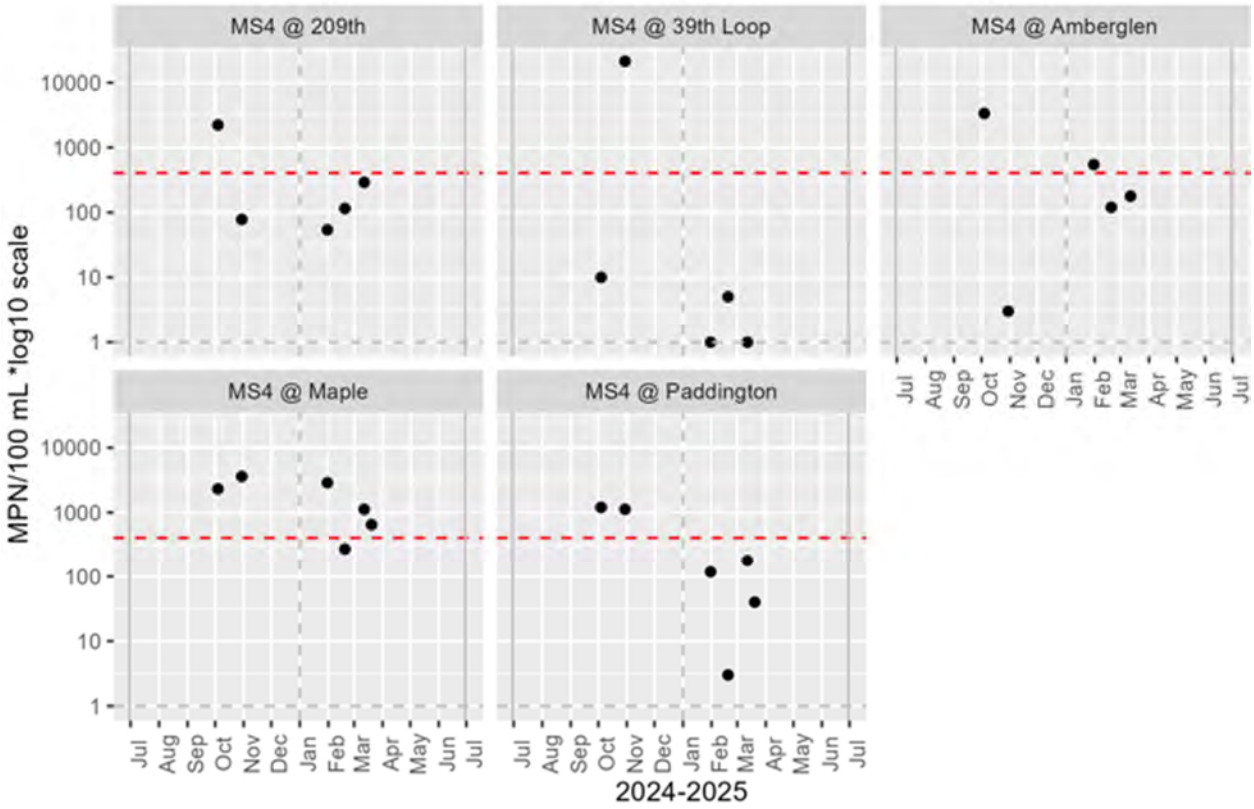


E.coli Results

At four of the five MS4 monitoring sites, CWS observed concentrations of *E. coli* greater than the water quality standard of 406 MPN/100 mL (red line in Figure B-8). In addition to collecting data according to the Stormwater Monitoring Plan, CWS is conducting a Microbial Source Tracking (MST) study using the protocol outlined in The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches (Griffith, et al. 2013). The monitoring protocol calls for escalating sampling intensity. CWS will continue the MST study in the 2025-2026 stormwater year.

In addition to the MST study, CWS' Environmental Services staff performed an investigation for *E.coli* within the 39th loop sample site subwatershed due to an elevated sample result for *E.coli,* which is unusual for that sample site. The investigation revealed a new industry within the subwatershed that could contribute *E.coli* pollution to stormwater, but no conclusive proof of the origin of the elevated *E.coli* result was found. Staff inspected the new industry and instructed them to install BMPs. No additional elevated *E.coli* results were reported within the subwatershed during the remainder of the reporting year.

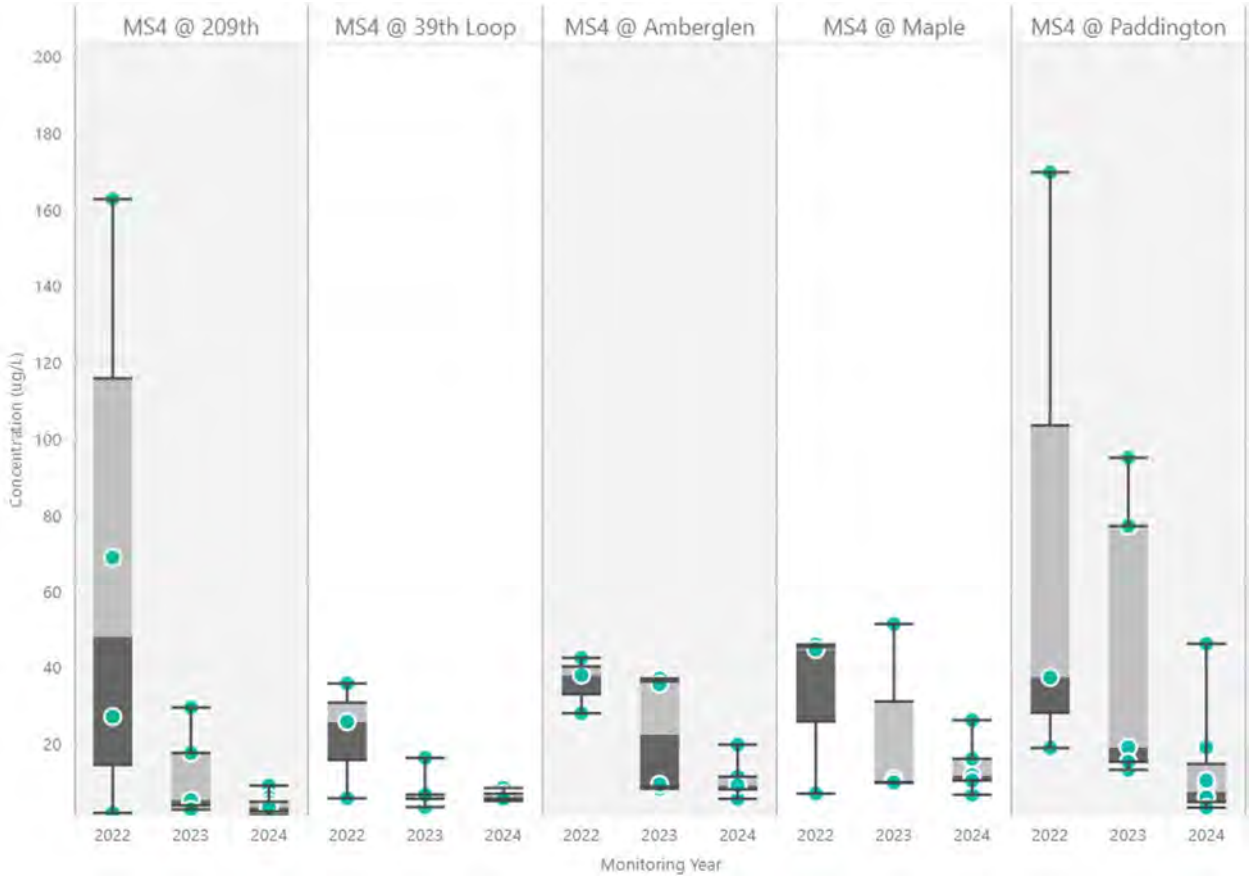
Figure B-8: E. coli at MS4 Sampling Locations



Copper Results

During the current monitoring period, concentrations of copper during stormwater sampling events decreased from previous years. The maximum total concentration of copper in 2022 was 170 ug/L, the 2023 maximum concentration was 95.4 ug/L, and the 2024 maximum concentration was 46.5 ug/L. The box plots in Figure B-8 show the reduction of copper across MS4 sampling locations in the 2022, 2023, and 2024 monitoring periods.

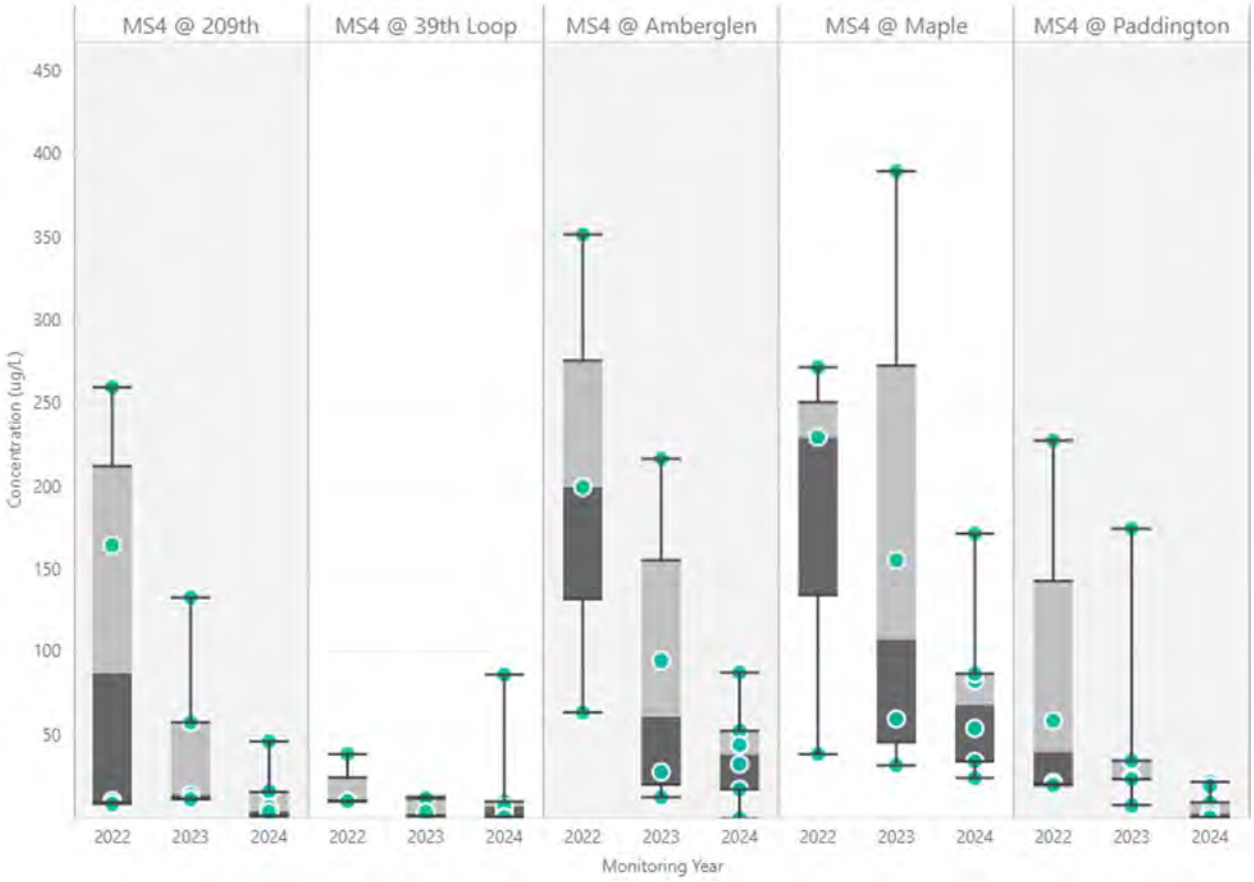
Figure B-9: Total Copper at MS4 Sampling Locations



TSS Results

During the current monitoring period, concentrations of TSS during stormwater sampling events decreased from previous years. The maximum total concentration of TSS in 2022 was 352 mg/L, the 2023 maximum concentration was 390 mg/L, and the 2024 maximum concentration was 172 mg/L. The box plots in Figure B-9 show the reduction of TSS across MS4 sampling locations in the 2022, 2023, and 2024 monitoring periods.

Figure B-10: TSS at MS4 Sampling Locations



Summary

The intermittent nature of stormwater discharges, the size of the drainage area, the land uses they encompass, the diffuse nature of potential sources, the voluntary outreach-based approach in dealing with unregulated residential and commercial sources, and resource limitations make it difficult to identify specific sources and management actions. Despite these challenges, CWS saw improvements in stormwater runoff water quality last year.

Figure B-11: Moss Control Social Media Outreach

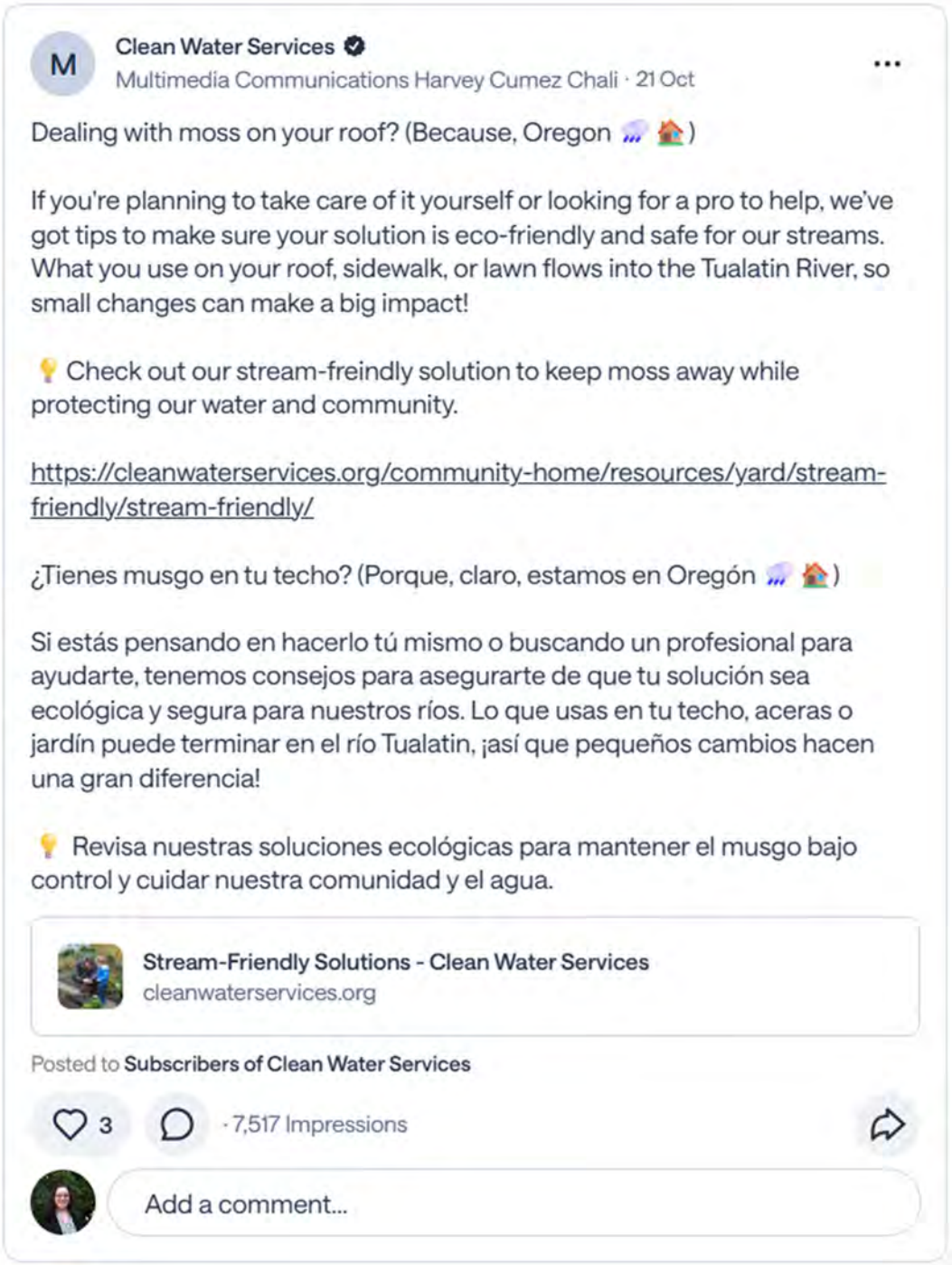


Figure B-12: Moss Control Social Media Outreach

This page intentionally blank.

Appendix C: Ambient Monitoring Program

This appendix provides an overview of the ambient monitoring plan and the data specifically required by Table B-1 of the CWS watershed-based NPDES permit. Table B-1 of the Permit requires annual reporting on ambient monitoring that CWS conducts at 15 locations, including the upper and lower portions of the Tualatin River and its tributaries. CWS collects samples at 17 monitoring locations to ensure compliance with this requirement. The sites used during this period are summarized in Table C.1.

Discrete samples are collected and analyzed by the CWS Water Quality Laboratory. In addition, CWS funds the collection of continuous flow and temperature data for many of the ambient sites with continuous monitors. CWS also participates in a cooperative study with the United States Geological Survey (USGS). As part of the study, the USGS collects continuous water quality monitoring data at selected sites in the Tualatin River and its tributaries. Data from these monitoring programs are used to identify trends, calibrate and verify models, and assess the effectiveness of co-implementers' activities.

SAMPLING

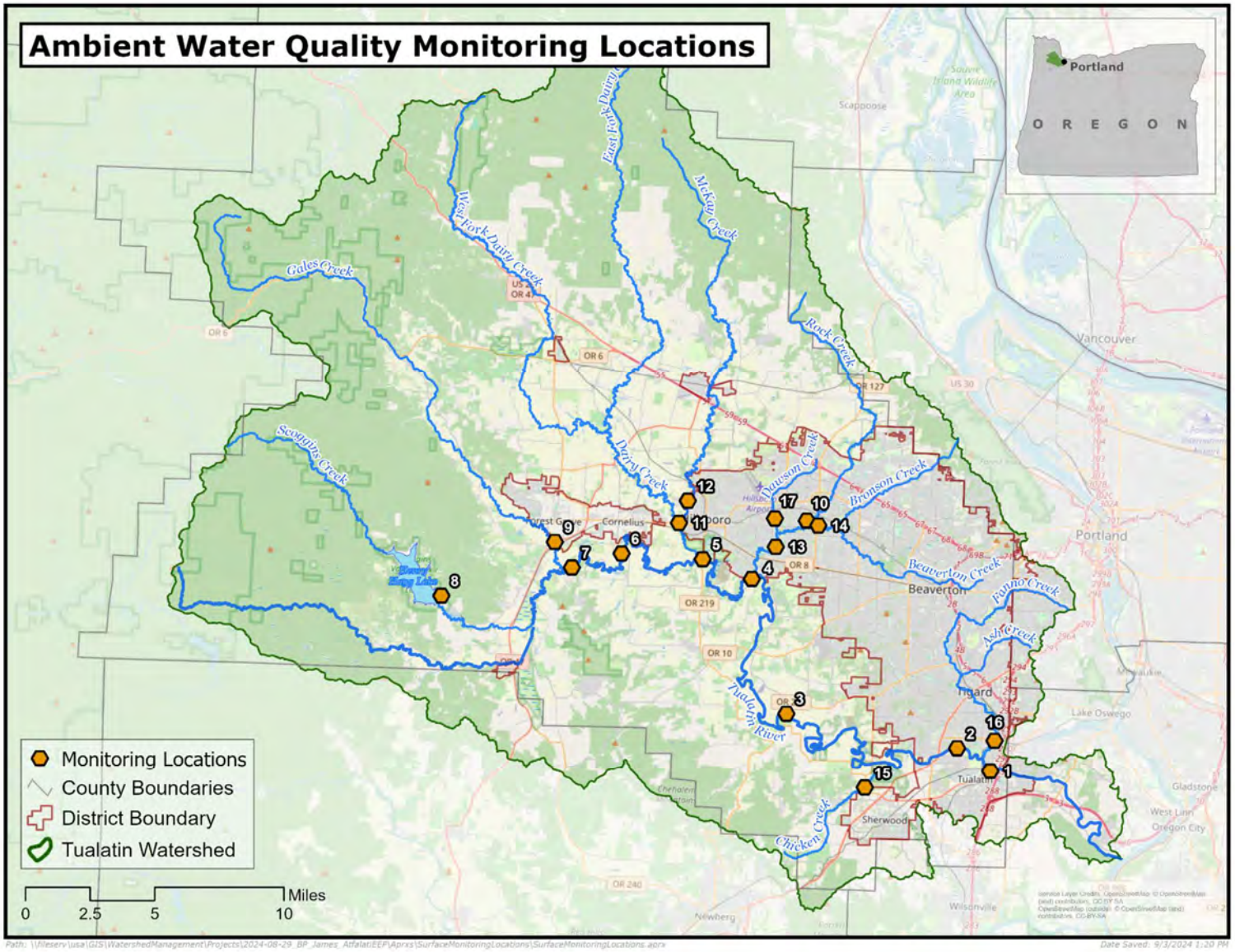
Monitoring and sample analysis are conducted in accordance with the CWS Stormwater Monitoring Plan and Quality Assurance/Quality Control Program Document. Table C-1 presents the monitoring locations that were sampled in accordance with Permit requirements. Monitoring categories reflect the type of tributary monitoring station. Figure C-1 is a map displaying the ambient water quality monitoring locations. This map indicates the monitoring sites with symbols and associated map identification numbers that are included in Table C-1 to allow the reader to associate the monitoring table station name and location code with locations on the map.

Table C-1: Monitoring Sites

Tualatin River Station Name	*Map ID*	*LOCCOD*	*Tributary Station Name*	*Map ID*	*LOCCOD*	*Category*
Boones Ferry Road	1	3701087	Scoggins Creek below Hagg Lake	8	3805050	Source Water
Jurgens Park	2	3701106	Gales Creek at New Hwy 47	9	3810015	Mouth
Hwy 210 Bridge (Scholls)	3	3701271	Rock Creek at Quatama	10	3820047	Mouth
Rood Bridge Road	4	3701391	Dairy Creek at Hwy 8	11	3815021	Mouth
Hwy 219 Bridge[1]	5	3701450	McKay Creek at Padgett	12	3816010	Boundary
Golf Course Road	6	3701528	Rock Creek at Brookwood	13	3820022	Mouth
Fern Hill Road[2]	7	3701569	Beaverton Creek near Orenco	14	3821012	Urban
			Chicken Creek at Scholls-Sherwood	15	3835020	Mouth
			Fanno Creek at Durham Road	16	3840012	Mouth
			Dawson Creek at Brookwood	17	3850006	Urban

[1] Field parameters are obtained from the USGS continuous gauge at the time and date most similar to the grab sample.
[2] Alternate site for this location is the Tualatin River at the Springhill Water Plant, at river mile 58.0.

Figure C-1: Ambient Monitoring Locations



PARAMETERS

Table C-2 displays a summary of the routine monitoring parameters. These are the parameters specified by Permit Table B-24.

Table C-2: Water Quality Parameters	
Field	*Method Reporting Limits*
Dissolved Oxygen	-- mg/L
pH	-- S.U.
Temperature	-- °C
Conductivity	-- µS/cm
Turbidity	-- FNU
Conventional/Nutrients	
E. coli	1 MPN/100 mL
Hardness	0.5 mg/L
Total Organic Carbon (NPOC)	0.25 mg/L
Total Suspended Solids	0.5 mg/L
Total Phosphorus	0.025 mg/L
Soluble Ortho-Phosphorus	0.005 mg/L
Ammonia-Nitrogen	0.01 mg/L
Nitrite + Nitrate Nitrogen	0.01 mg/L
Metals (Total and Dissolved)	
Copper, dissolved	0.406 µg/L
Copper, total	0.406 µg/L
Lead, dissolved	0.1015 µg/L
Lead, total	0.1015 µg/L
Zinc, dissolved	2.5375 µg/L
Zinc, total	2.5375 µg/L
Mercury, dissolved	0.2 ng/L
Mercury, total	0.2 ng/L

RESULTS

The qualifier codes were described in Table B-4 in Appendix B.

Tables C-3 to C-19 present summary statistics of the ambient monitoring data from 17 monitoring sites for July 1, 2024, to June 30, 2025. CWS is including the monitoring results at two additional ambient monitoring sites (Tualatin River at Golf Course Road and Rock Creek at Quatama). These sites were monitored for the full complement of water quality parameters specified in the Permit. All sites were sampled three or more times between May 1 – October 31 and three or more times between November 1 – April 30, quarterly for metals, and semiannually for mercury.

The monitoring site located at the Tualatin River at Highway 219 Bridge was not used for watershed monitoring when the Hillsboro WRRF was not directly discharging to the Tualatin River. The backup site at Tualatin River at Golf Course Road was used in its place.

Sampling at the Scoggins Creek tributary was stopped in 2025 due to issues with access availability. CWS is in the process of finding a new site to replace Scoggins Creek.

Tables C-3 to C-19 display the minimum, median, maximum, and selected percentiles of the data. The MRL values were used in the calculation of summary statistics for cases where the result was less than the MRL (nondetects). For example, if the result was <2, the value 2 was used in the statistical calculations.

Table C-3: Ambient Monitoring Data Statistical Summary for Tualatin River at Boones Ferry Road									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	27	0.016	0.0524	0.0715	0.111	0.1425	0.2788	0.407
Conductivity, Field	µS/cm	26	96	113.1	147.275	218.05	270.65	278.85	293.8
Copper, Dissolved	µg/L	7	0.813	0.9432	1.09	1.17	1.22	1.34	1.46
Copper, Total Recoverable	µg/L	9	1.41	1.434	1.6	1.79	1.93	2.094	2.71
Dissolved Oxygen	mg/L	26	5.67	6.135	6.6025	8.145	9.84	10.645	11.26
E. coli, Most Probable Number	MPN/100 mL	24	13	16	20	26	42.5	69	199
Hardness, Total	mg/L	20	34.8	39.67	48.1	63.3	68.1	70.6	77.4
Lead, Dissolved	µg/L	7	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	7	0.12	0.144	0.1615	0.221	0.306	0.3664	0.388
Mercury by Purge & Trap, Dissolved	ng/L	2	0.364	0.3923	0.43475	0.5055	0.57625	0.6187	0.647
Mercury by Purge & Trap, Total	ng/L	2	0.837	0.8663	0.91025	0.9835	1.05675	1.1007	1.13
Nitrate/Nitrite-N, Dissolved	mg/L	24	1.04	1.343	1.63	2.11	3.4575	3.751	4.07
Organic Carbon, Total Non-purgeable	mg/L	24	1.68	1.872	2.195	2.75	2.9075	3.237	4.62
Orthophosphate-P, Dissolved	mg/L	24	0.036	0.0373	0.04175	0.0485	0.08675	0.108	0.223
pH, Field	S.U.	26	6.9	7.015	7.0525	7.1	7.12	7.15	7.2
Temperature	°C	26	4.881	6.2605	8.5405	15.5195	18.698	21.2255	23.888
Total Phosphorus-P	mg/L	24	0.07	0.0749	0.086	0.102	0.15275	0.1725	0.295
Total Suspended Solids	mg/L	23	2	3.28	3.8	5.6	9.7	15.04	18.8
Turbidity, Field	NTU	26	2.21	2.95	3.955	5.25	9.04	15.165	18.15
Zinc, Dissolved	µg/L	7	2.98	3.046	3.195	6.42	6.65	7.07	7.49
Zinc, Total Recoverable	µg/L	7	5.22	5.832	7.28	8.54	8.965	9.578	9.92

Table C-4: Ambient Monitoring Data Statistical Summary for Tualatin River at Jurgens Park									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	26	0.013	0.0425	0.059	0.0765	0.1265	0.247	0.314
Conductivity, Field	µS/cm	26	91.3	106.05	136.7	192	239.325	254.95	272.4
Copper, Dissolved	µg/L	7	0.818	0.911	1.0165	1.12	1.275	1.388	1.4
Copper, Total Recoverable	µg/L	9	1.4	1.416	1.51	1.62	1.87	2.11	2.83
Dissolved Oxygen	mg/L	26	5.52	6.02	6.3425	7.995	9.835	10.645	11.31
E. coli, Most Probable Number	MPN/100 mL	24	11	16.6	27.5	30	44.25	61.3	77
Hardness, Total	mg/L	20	33.2	38.25	46.15	60.6	63.125	65.07	76.8
Lead, Dissolved	µg/L	7	0.102	0.102	0.102	0.102	0.102	0.1036	0.106
Lead, Total Recoverable	µg/L	7	0.102	0.1254	0.148	0.156	0.279	0.3304	0.376
Mercury by Purge & Trap, Dissolved	ng/L	2	0.329	0.3664	0.4225	0.516	0.6095	0.6656	0.703
Mercury by Purge & Trap, Total	ng/L	2	0.652	0.7008	0.774	0.896	1.018	1.0912	1.14
Nitrate/Nitrite-N, Dissolved	mg/L	24	0.85	1.137	1.43	2.05	2.805	2.951	3.09
Organic Carbon, Total Non-purgeable	mg/L	24	1.63	1.693	2.055	2.525	2.805	3.094	4.17
Orthophosphate-P, Dissolved	mg/L	24	0.03	0.036	0.038	0.042	0.048	0.0611	0.252
pH, Field	S.U.	26	6.8	6.91	7.01	7.085	7.1475	7.17	7.24
Temperature	°C	26	4.52	5.951	8.48225	15.161	18.68425	21.0835	24.178
Total Phosphorus-P	mg/L	24	0.071	0.0746	0.08175	0.091	0.10225	0.1198	0.316
Total Suspended Solids	mg/L	23	0.5	2.8	3.6	5.2	7.93	13.76	19.6
Turbidity, Field	NTU	26	1.97	3.02	3.69	5.835	8.6775	14.6	17.42
Zinc, Dissolved	µg/L	7	2.54	2.6	2.81	3.26	4.23	5.354	5.99
Zinc, Total Recoverable	µg/L	7	3.61	4.09	4.71	5.2	6.325	7.32	7.89

Table C-5: Ambient Monitoring Data Statistical Summary for Tualatin River at Highway 210 Bridge (Scholls)									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	21	0.055	0.064	0.074	0.128	0.237	0.267	0.415
Conductivity, Field	µS/cm	21	92.2	106.6	136.6	195.5	246.4	253.6	272
Copper, Dissolved	µg/L	4	0.979	1.0273	1.09975	1.15	1.2225	1.335	1.41
Copper, Total Recoverable	µg/L	10	1.5	1.509	1.565	1.615	1.745	1.811	2
Dissolved Oxygen	mg/L	21	6.79	7.38	7.9	8.52	10.31	11.22	11.44
E. coli, Most Probable Number	MPN/100 mL	20	20	23.9	31.5	58	76	107.4	131
Hardness, Total	mg/L	10	33.4	54.91	57.9	59.2	62.45	63.99	65.7
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	9	0.116	0.148	0.159	0.179	0.191	0.206	0.254
Mercury by Purge & Trap, Dissolved	ng/L	2	0.371	0.3806	0.395	0.419	0.443	0.4574	0.467
Mercury by Purge & Trap, Total	ng/L	2	0.808	0.8168	0.83	0.852	0.874	0.8872	0.896
Nitrate/Nitrite-N, Dissolved	mg/L	21	0.952	1.25	1.49	1.71	2.66	3.27	3.83
Organic Carbon, Total Non-purgeable	mg/L	21	1.57	1.64	1.85	2.53	2.67	3.11	4.51
Orthophosphate-P, Dissolved	mg/L	21	0.032	0.035	0.042	0.043	0.055	0.06	0.119
pH, Field	S.U.	21	6.69	6.89	6.95	7.07	7.15	7.17	7.3
Temperature	°C	21	4.444	5.605	7.841	11.309	17.259	19.701	21.76
Total Phosphorus-P	mg/L	21	0.07	0.079	0.083	0.091	0.108	0.135	0.2
Total Suspended Solids	mg/L	21	4.4	6	7.6	9	12	18	23.2
Turbidity, Field	NTU	21	3.54	4.7	5.13	8.81	12.09	14.96	17.2
Zinc, Dissolved	µg/L	4	2.83	3.682	4.96	5.93	6.495	7.044	7.41
Zinc, Total Recoverable	µg/L	9	5.11	6.462	7.4	8.28	8.82	10.26	10.5

Table C-6: Ambient Monitoring Data Statistical Summary for Tualatin River at Rood Bridge Road									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	29	0.01	0.01	0.017	0.021	0.026	0.0294	0.044
Conductivity, Field	µS/cm	28	79	87.23	89.65	98.05	105.225	114.15	136.5
Copper, Dissolved	µg/L	7	0.802	0.8218	0.8595	0.898	0.916	0.9738	1.05
Copper, Total Recoverable	µg/L	9	1.34	1.388	1.48	1.61	1.81	2.17	2.69
Dissolved Oxygen	mg/L	28	8.34	8.53	8.8375	9.03	9.9	11.028	11.55
E. coli, Most Probable Number	MPN/100 mL	24	16	41.3	51.25	74	109.25	155.5	261
Hardness, Total	mg/L	21	29.8	32	34	36.2	40.5	43.2	56
Lead, Dissolved	µg/L	7	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	8	0.118	0.1327	0.13975	0.185	0.2535	0.2856	0.308
Mercury by Purge & Trap, Dissolved	ng/L	2	0.312	0.3272	0.35	0.388	0.426	0.4488	0.464
Mercury by Purge & Trap, Total	ng/L	2	0.937	0.9463	0.96025	0.9835	1.00675	1.0207	1.03
Nitrate/Nitrite-N, Dissolved	mg/L	25	0.059	0.0716	0.103	0.593	1.09	1.314	1.67
Organic Carbon, Total Non-purgeable	mg/L	24	1.22	1.39	1.4075	1.61	1.915	2.123	3.22
Orthophosphate-P, Dissolved	mg/L	24	0.016	0.0183	0.02075	0.027	0.031	0.0406	0.055
pH, Field	S.U.	28	6.66	6.893	7.0125	7.185	7.38	7.415	7.46
Temperature	°C	28	3.851	5.544	8.5515	13.4735	15.17825	16.6692	18.475
Total Phosphorus-P	mg/L	25	0.052	0.055	0.059	0.067	0.085	0.0966	0.109
Total Suspended Solids	mg/L	23	4	5.8	7.4	8.8	13.2	18.24	34
Turbidity, Field	NTU	28	3.73	4.877	5.5825	6.6	11.8475	15.503	21.44
Zinc, Dissolved	µg/L	7	2.54	2.54	2.54	2.54	3.64	13.524	26.7
Zinc, Total Recoverable	µg/L	8	3.18	3.299	3.5075	4.09	4.7775	14.538	36.7

Table C-7: Ambient Monitoring Data Statistical Summary for Tualatin River at Hwy 219 Bridge									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	8	0.01	0.0114	0.01275	0.017	0.023	0.0266	0.028
Conductivity, Field	µS/cm	8	75	79.2	82.5	97	102	102.9	105
Copper, Dissolved	µg/L	7	0.686	0.6866	0.762	0.864	1.102	1.268	1.34
Copper, Total Recoverable	µg/L	7	1.4	1.412	1.515	1.82	2.05	2.568	3.21
Dissolved Oxygen	mg/L	8	8.7	9.4	9.775	10.35	11.05	11.62	11.9
E. coli, Most Probable Number	MPN/100 mL	7	20	24.8	31.5	38	94.5	146.8	172
Hardness, Total	mg/L	7	29.9	30.38	31.75	36.6	39.15	40.84	42.1
Lead, Dissolved	µg/L	7	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	7	0.183	0.189	0.207	0.245	0.488	0.7094	0.713
Mercury by Purge & Trap, Dissolved	ng/L	1	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Mercury by Purge & Trap, Total	ng/L	1	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Nitrate/Nitrite-N, Dissolved	mg/L	8	0.04	0.3277	0.6205	0.7965	1.1	1.223	1.3
Organic Carbon, Total Non-purgeable	mg/L	7	1.29	1.32	1.34	1.64	2.025	2.526	3.06
Orthophosphate-P, Dissolved	mg/L	7	0.016	0.016	0.018	0.025	0.032	0.0394	0.043
pH, Field	S.U.	8	6.9	6.9	6.975	7.05	7.2	7.26	7.4
Temperature	°C	8	4.5	4.57	6.925	8.4	10.4	14.54	15.8
Total Phosphorus-P	mg/L	8	0.049	0.0546	0.05925	0.0675	0.0855	0.1212	0.138
Total Suspended Solids	mg/L	7	4	5.68	7.6	11	14.6	24.56	36.8
Turbidity, Field	NTU	8	5	7.94	10.925	11.8	13.275	16.71	20
Zinc, Dissolved	µg/L	7	2.54	2.54	2.54	2.54	2.655	2.842	2.95
Zinc, Total Recoverable	µg/L	7	3.02	3.152	3.465	4.58	6.24	7.624	9.58

Table C-8: Ambient Monitoring Data Statistical Summary for Tualatin River at Golf Course Road									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	21	0.01	0.01	0.01	0.011	0.013	0.016	0.045
Conductivity, Field	µS/cm	21	72.6	74.6	80.3	84.7	92.6	99.8	115.9
Copper, Dissolved	µg/L	4	0.743	0.7538	0.77	0.814	0.86475	0.8931	0.912
Copper, Total Recoverable	µg/L	4	1.29	1.311	1.3425	1.415	1.585	1.792	1.93
Dissolved Oxygen	mg/L	21	8.66	9.34	9.64	9.83	10.65	11.53	11.74
E. coli, Most Probable Number	MPN/100 mL	21	12	20	32	99	153	214	411
Hardness, Total	mg/L	4	28	28.33	28.825	29.8	33.425	38.69	42.2
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.102	0.102	0.102	0.102	0.1175	0.1454	0.164
Mercury by Purge & Trap, Dissolved	ng/L	2	0.254	0.2645	0.28025	0.3065	0.33275	0.3485	0.359
Mercury by Purge & Trap, Total	ng/L	2	0.545	0.5629	0.58975	0.6345	0.67925	0.7061	0.724
Nitrate/Nitrite-N, Dissolved	mg/L	21	0.01	0.044	0.076	0.324	0.527	0.678	0.763
Organic Carbon, Total Non-purgeable	mg/L	21	0.873	0.921	1.07	1.21	1.34	2.05	2.2
Orthophosphate-P, Dissolved	mg/L	21	0.006	0.009	0.009	0.014	0.019	0.024	0.038
pH, Field	S.U.	21	6.68	6.99	7.07	7.27	7.42	7.45	7.49
Temperature	°C	21	4.264	4.852	7.698	9.811	13.892	14.529	16.649
Total Phosphorus-P	mg/L	21	0.026	0.028	0.031	0.049	0.066	0.076	0.1
Total Suspended Solids	mg/L	21	2.8	4.2	5.2	10	15.6	25	36.4
Turbidity, Field	NTU	20	2.99	4.124	4.7375	8.545	11.7575	15.642	22.36
Zinc, Dissolved	µg/L	4	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Zinc, Total Recoverable	µg/L	4	2.54	2.564	2.6	2.87	3.205	3.358	3.46

Table C-9: Ambient Monitoring Data Statistical Summary for Tualatin River at Fern Hill Road									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	27	0.01	0.01	0.01	0.01	0.013	0.0188	0.02
Conductivity, Field	µS/cm	28	67.5	68.94	73.125	78.65	92.4325	96.411	102.5
Copper, Dissolved	µg/L	13	0.615	0.68	0.706	0.796	0.87	0.9184	1.64
Copper, Total Recoverable	µg/L	14	1.22	1.247	1.385	1.645	2.79	3.19	3.66
Dissolved Oxygen	mg/L	27	7.62	9.134	9.615	9.94	10.635	11.436	11.85
E. coli, Most Probable Number	MPN/100 mL	23	19	23	26	88	116.5	189.2	308
Hardness, Total	mg/L	21	26.6	26.9	27.9	30.8	35.8	39.9	41.6
Lead, Dissolved	µg/L	13	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	13	0.102	0.102	0.102	0.153	0.201	0.2728	0.509
Mercury by Purge & Trap, Dissolved	ng/L	2	0.263	0.2708	0.2825	0.302	0.3215	0.3332	0.341
Mercury by Purge & Trap, Total	ng/L	2	0.638	0.6481	0.66325	0.6885	0.71375	0.7289	0.739
Nitrate/Nitrite-N, Dissolved	mg/L	24	0.01	0.0288	0.0635	0.13	0.4155	0.4891	0.647
Organic Carbon, Total Non-purgeable	mg/L	24	0.871	0.9138	0.9975	1.06	1.41	2.095	2.55
Orthophosphate-P, Dissolved	mg/L	23	0.005	0.006	0.0065	0.01	0.016	0.0224	0.034
pH, Field	S.U.	28	6.72	7.052	7.1275	7.215	7.3775	7.4	7.4
Temperature	°C	28	3.928	6.2145	8.043	11.6875	12.95175	13.8674	16.538
Total Phosphorus-P	mg/L	24	0.025	0.025	0.025	0.045	0.0665	0.0901	0.102
Total Suspended Solids	mg/L	23	2	4.12	5.4	6.9	15.4	20.48	42.8
Turbidity, Field	NTU	26	2.08	3.11	3.61	4.365	9.625	14.315	26.22
Zinc, Dissolved	µg/L	13	2.54	2.54	2.54	2.54	2.54	2.54	2.77
Zinc, Total Recoverable	µg/L	13	2.54	2.54	2.6	3.17	4.14	6.34	6.83

Table C-10: Ambient Monitoring Data Statistical Summary for Scoggins Creek below Hagg Lake									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	18	0.01	0.01	0.01	0.01	0.0115	0.0223	0.032
Conductivity, Field	µS/cm	18	60.7	60.8	61.175	63.3	67.475	69.23	71.8
Copper, Dissolved	µg/L	3	0.479	0.498	0.5265	0.574	0.78	0.9036	0.986
Copper, Total Recoverable	µg/L	3	0.63	0.6452	0.668	0.706	1.128	1.3812	1.55
Dissolved Oxygen	mg/L	18	10.26	10.517	11.21	12.03	12.7	13.462	13.71
E. coli, Most Probable Number	MPN/100 mL	18	1	1	1	1	2.75	4.3	11
Hardness, Total	mg/L	3	23.3	23.42	23.6	23.9	25.1	25.82	26.3
Lead, Dissolved	µg/L	3	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	3	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Mercury by Purge & Trap, Dissolved	ng/L	1	0.214	0.214	0.214	0.214	0.214	0.214	0.214
Mercury by Purge & Trap, Total	ng/L	1	0.498	0.498	0.498	0.498	0.498	0.498	0.498
Nitrate/Nitrite-N, Dissolved	mg/L	18	0.01	0.0251	0.0475	0.103	0.145	0.1546	0.16
Organic Carbon, Total Non-purgeable	mg/L	18	0.807	0.8318	0.87125	0.9445	1.12	1.205	1.28
Orthophosphate-P, Dissolved	mg/L	18	0.005	0.005	0.005	0.005	0.005	0.005	0.006
pH, Field	S.U.	18	6.49	6.528	6.71	7.145	7.3275	7.363	7.54
Temperature	°C	18	5.638	5.9339	7.07175	8.4895	11.6	15.0675	17.35
Total Phosphorus-P	mg/L	18	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Total Suspended Solids	mg/L	18	0.5	0.5	0.675	1.6	2	2.92	3.79
Turbidity, Field	NTU	18	1.7	1.735	1.9175	2.85	3.65	4.229	4.61
Zinc, Dissolved	µg/L	3	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Zinc, Total Recoverable	µg/L	3	2.54	2.54	2.54	2.54	2.54	2.54	2.54

Table C-11: Ambient Monitoring Data Statistical Summary for Gales Creek at New Highway 47									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	20	0.01	0.01	0.01	0.0105	0.0165	0.0209	0.034
Conductivity, Field	µS/cm	20	56.2	75.88	84.6	105.8	139.75	143.91	146
Copper, Dissolved	µg/L	4	0.439	0.4687	0.51325	0.6365	0.757	0.7966	0.823
Copper, Total Recoverable	µg/L	4	1.03	1.081	1.1575	1.57	2.0075	2.129	2.21
Dissolved Oxygen	mg/L	20	6.96	7.844	8.19	9.995	11.155	12.193	12.6
E. coli, Most Probable Number	MPN/100 mL	20	11	17.7	24.5	106.5	230.25	387	488
Hardness, Total	mg/L	4	30.5	35	41.75	48	51.475	53.23	54.4
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.102	0.102	0.102	0.102	0.1235	0.1622	0.188
Mercury by Purge & Trap, Dissolved	ng/L	2	0.295	0.2988	0.3045	0.314	0.3235	0.3292	0.333
Mercury by Purge & Trap, Total	ng/L	2	0.427	0.44	0.4595	0.492	0.5245	0.544	0.557
Nitrate/Nitrite-N, Dissolved	mg/L	20	0.025	0.0416	0.06275	0.188	0.3455	0.429	0.5
Organic Carbon, Total Non-purgeable	mg/L	20	0.486	0.5677	0.631	1.115	1.235	2.147	3.49
Orthophosphate-P, Dissolved	mg/L	20	0.014	0.014	0.0155	0.0205	0.02525	0.0272	0.029
pH, Field	S.U.	20	6.84	7.022	7.12	7.26	7.3575	7.392	7.45
Temperature	°C	20	3.102	4.1793	7.45925	10.8085	16.6775	19.5231	23.124
Total Phosphorus-P	mg/L	20	0.033	0.0349	0.03875	0.044	0.0535	0.0798	0.256
Total Suspended Solids	mg/L	20	2	2.36	3	6.365	12.7	36.88	126
Turbidity, Field	NTU	20	1.88	1.967	2.4375	3.905	7.35	17.275	76.84
Zinc, Dissolved	µg/L	4	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Zinc, Total Recoverable	µg/L	4	2.54	2.54	2.54	2.54	2.6625	2.883	3.03

Table C-12: Ambient Monitoring Data Statistical Summary for Rock Creek at Quatama									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	19	0.01	0.018	0.0285	0.029	0.05	0.0604	0.073
Conductivity, Field	µS/cm	19	92.9	116.46	131.7	183.5	264.25	336.32	344.7
Copper, Dissolved	µg/L	4	0.698	0.7385	0.79925	0.9145	1.0195	1.0618	1.09
Copper, Total Recoverable	µg/L	4	0.834	0.9198	1.0485	1.17	1.295	1.43	1.52
Dissolved Oxygen	mg/L	19	3.51	3.676	4.045	8.79	10.435	11.736	12.93
E. coli, Most Probable Number	MPN/100 mL	19	16	21.8	28.5	91	274.5	472.2	1200
Hardness, Total	mg/L	4	45.5	57.86	76.4	98.35	119.5	136.6	148
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.102	0.1083	0.11775	0.1275	0.16575	0.2265	0.267
Mercury by Purge & Trap, Dissolved	ng/L	2	0.411	0.4397	0.48275	0.5545	0.62625	0.6693	0.698
Mercury by Purge & Trap, Total	ng/L	2	0.713	0.7557	0.81975	0.9265	1.03325	1.0973	1.14
Nitrate/Nitrite-N, Dissolved	mg/L	19	0.054	0.128	0.151	0.2	0.9365	1.004	1.22
Organic Carbon, Total Non-purgeable	mg/L	19	2.42	2.702	2.965	4.78	5.49	6.988	8.9
Orthophosphate-P, Dissolved	mg/L	19	0.022	0.0248	0.0295	0.063	0.084	0.0894	0.11
pH, Field	S.U.	19	6.77	6.998	7.205	7.31	7.36	7.436	7.48
Temperature	°C	19	2.125	3.7382	8.4495	10.393	16.46	17.9088	21.211
Total Phosphorus-P	mg/L	19	0.074	0.0768	0.0805	0.154	0.1845	0.194	0.204
Total Suspended Solids	mg/L	19	2.4	2.88	3.4	4.67	6.915	19.12	36
Turbidity, Field	NTU	19	3.71	4.054	5.035	6.48	9.435	17.7	40.77
Zinc, Dissolved	µg/L	4	3.19	3.475	3.9025	4.38	4.625	4.634	4.64
Zinc, Total Recoverable	µg/L	4	5	5.105	5.2625	6.47	7.685	7.856	7.97

Table C-13: Ambient Monitoring Data Statistical Summary for Dairy Creek at Highway 8									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	22	0.011	0.016	0.01975	0.028	0.0345	0.0417	0.054
Conductivity, Field	µS/cm	22	76.9	85.68	95	103	115.1	127.49	141.3
Copper, Dissolved	µg/L	4	0.513	0.5277	0.54975	0.614	0.7015	0.7654	0.808
Copper, Total Recoverable	µg/L	4	0.642	0.6861	0.75225	0.8335	0.9	0.9396	0.966
Dissolved Oxygen	mg/L	22	6.52	7.057	7.5425	8.885	9.5925	11.383	11.79
E. coli, Most Probable Number	MPN/100 mL	21	20	33	49	91	121	219	687
Hardness, Total	mg/L	4	28.1	31.7	37.1	41.5	46.9	54.1	58.9
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.102	0.102	0.102	0.126	0.1705	0.2074	0.232
Mercury by Purge & Trap, Dissolved	ng/L	2	0.504	0.5089	0.51625	0.5285	0.54075	0.5481	0.553
Mercury by Purge & Trap, Total	ng/L	2	0.94	0.942	0.945	0.95	0.955	0.958	0.96
Nitrate/Nitrite-N, Dissolved	mg/L	22	0.134	0.2563	0.359	0.531	1.4275	1.723	2.72
Organic Carbon, Total Non-purgeable	mg/L	22	1.38	1.485	1.585	2.25	2.9075	3.247	4.48
Orthophosphate-P, Dissolved	mg/L	22	0.011	0.018	0.0215	0.042	0.05375	0.0649	0.07
pH, Field	S.U.	22	6.39	6.6	6.8725	6.935	7.04	7.18	7.24
Temperature	°C	22	3.076	4.7323	8.7755	12.2505	15.6425	18.1466	21.329
Total Phosphorus-P	mg/L	22	0.058	0.0645	0.073	0.091	0.11075	0.1238	0.179
Total Suspended Solids	mg/L	21	1.2	3.6	4	6	16.7	18	35
Turbidity, Field	NTU	22	3.21	3.858	4.2625	7.25	10.0725	12.971	44.12
Zinc, Dissolved	µg/L	4	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Zinc, Total Recoverable	µg/L	4	2.54	2.621	2.7425	2.915	3.1525	3.391	3.55

Table C-14: Ambient Monitoring Data Statistical Summary for McKay Creek at Padgett									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	20	0.01	0.0128	0.015	0.0215	0.0305	0.0376	0.051
Conductivity, Field	µS/cm	20	91.8	107.08	120.725	141.8	154.725	158.83	191.1
Copper, Dissolved	µg/L	4	0.406	0.4228	0.448	0.4945	0.5345	0.548	0.557
Copper, Total Recoverable	µg/L	4	0.457	0.4939	0.54925	0.625	0.67625	0.6875	0.695
Dissolved Oxygen	mg/L	20	4.94	6.098	6.495	8.51	10.095	11.914	12.35
E. coli, Most Probable Number	MPN/100 mL	20	15	25.9	52.25	162	291	431.2	921
Hardness, Total	mg/L	4	37.4	44.78	55.85	63.4	67.45	72.22	75.4
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.102	0.102	0.102	0.102	0.103	0.1048	0.106
Mercury by Purge & Trap, Dissolved	ng/L	2	0.576	0.5797	0.58525	0.5945	0.60375	0.6093	0.613
Mercury by Purge & Trap, Total	ng/L	2	0.738	0.7504	0.769	0.8	0.831	0.8496	0.862
Nitrate/Nitrite-N, Dissolved	mg/L	19	0.094	0.1096	0.1555	0.699	1.89	2.208	2.6
Organic Carbon, Total Non-purgeable	mg/L	20	1.27	1.28	1.4325	2.895	3.1975	4.161	4.76
Orthophosphate-P, Dissolved	mg/L	20	0.018	0.02	0.0225	0.051	0.06075	0.0711	0.077
pH, Field	S.U.	20	6.75	6.946	7.075	7.195	7.28	7.315	7.4
Temperature	°C	20	2.558	3.918	8.029	11.2535	16.07575	18.4915	21.841
Total Phosphorus-P	mg/L	20	0.044	0.046	0.05175	0.111	0.128	0.1471	0.226
Total Suspended Solids	mg/L	20	0.5	1.573	2.3	3.4	4.9	7.48	46
Turbidity, Field	NTU	20	2.93	3.37	3.6575	4.325	5.7575	8.074	59.52
Zinc, Dissolved	µg/L	4	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Zinc, Total Recoverable	µg/L	4	2.54	2.54	2.54	2.645	2.755	2.764	2.77

Table C-15: Ambient Monitoring Data Statistical Summary for Rock Creek at Brookwood									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	16	0.01	0.0195	0.02825	0.0355	0.04275	0.054	0.084
Conductivity, Field	µS/cm	16	94.3	126.5	168.8	208.2	267.9	305.85	330.3
Copper, Dissolved	µg/L	4	1.25	1.259	1.2725	1.45	1.745	1.97	2.12
Copper, Total Recoverable	µg/L	4	1.81	1.87	1.96	2.08	2.1625	2.185	2.2
Dissolved Oxygen	mg/L	16	4.91	5.715	6.105	8.755	10.0925	11.08	11.86
E. coli, Most Probable Number	MPN/100 mL	16	48	57.5	79.5	148	205	376	613
Hardness, Total	mg/L	4	63.3	71.4	83.55	95.15	105.5	115.4	122
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.32	0.3353	0.35825	0.4015	0.44025	0.4551	0.465
Mercury by Purge & Trap, Dissolved	ng/L	2	0.372	0.4039	0.45175	0.5315	0.61125	0.6591	0.691
Mercury by Purge & Trap, Total	ng/L	2	0.964	1.0306	1.1305	1.297	1.4635	1.5634	1.63
Nitrate/Nitrite-N, Dissolved	mg/L	16	0.086	0.1925	0.226	0.3845	0.75675	0.8595	1.09
Organic Carbon, Total Non-purgeable	mg/L	16	2.53	2.73	3.0325	3.955	5.145	5.485	6.05
Orthophosphate-P, Dissolved	mg/L	16	0.031	0.036	0.04225	0.0715	0.13075	0.1565	0.17
pH, Field	S.U.	16	6.79	7.02	7.315	7.41	7.4825	7.575	7.61
Temperature	°C	16	3.066	5.735	8.8325	12.158	16.87675	18.9095	22.111
Total Phosphorus-P	mg/L	16	0.099	0.1035	0.1085	0.1635	0.22575	0.245	0.248
Total Suspended Solids	mg/L	16	2	4.9	6.2	8.2	13.3	16.5	19.2
Turbidity, Field	NTU	16	4.91	5.1	5.68	9.015	10.2375	14.075	26.93
Zinc, Dissolved	µg/L	4	2.54	3.047	3.8075	4.375	5.8075	8.125	9.67
Zinc, Total Recoverable	µg/L	4	8.53	8.602	8.71	9.985	12.45	14.7	16.2

Table C-16: Ambient Monitoring Data Statistical Summary for Beaverton Creek near Orenco									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	19	0.01	0.0138	0.033	0.039	0.05	0.0598	0.124
Conductivity, Field	µS/cm	19	86.9	97.74	187.25	209.7	234.15	277	283.5
Copper, Dissolved	µg/L	4	1.46	1.484	1.52	1.65	1.775	1.802	1.82
Copper, Total Recoverable	µg/L	4	2.19	2.223	2.2725	2.355	2.4325	2.473	2.5
Dissolved Oxygen	mg/L	19	4.79	5.034	5.53	8.84	9.91	11.51	12.77
E. coli, Most Probable Number	MPN/100 mL	19	20	53	97	236	452	866	1200
Hardness, Total	mg/L	4	73.2	76.65	81.825	85.25	92.35	104.14	112
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.109	0.12075	0.1293	0.135
Lead, Total Recoverable	µg/L	4	0.485	0.4925	0.50375	0.515	0.5345	0.5606	0.578
Mercury by Purge & Trap, Dissolved	ng/L	2	0.374	0.395	0.4265	0.479	0.5315	0.563	0.584
Mercury by Purge & Trap, Total	ng/L	2	1.27	1.281	1.2975	1.325	1.3525	1.369	1.38
Nitrate/Nitrite-N, Dissolved	mg/L	19	0.093	0.2058	0.2125	0.331	0.7165	0.8516	1.02
Organic Carbon, Total Non-purgeable	mg/L	19	2.31	2.798	3.02	3.84	5.69	5.94	8.44
Orthophosphate-P, Dissolved	mg/L	19	0.03	0.0378	0.0445	0.082	0.1355	0.1592	0.186
pH, Field	S.U.	19	6.83	7.07	7.38	7.44	7.525	7.552	7.63
Temperature	°C	19	2.148	3.9934	9.116	10.862	17.5875	19.3178	22.982
Total Phosphorus-P	mg/L	19	0.105	0.1124	0.119	0.163	0.249	0.2758	0.285
Total Suspended Solids	mg/L	19	3.6	4.72	5.6	7.2	10.7	16.56	54.8
Turbidity, Field	NTU	19	5.42	6.168	6.765	8.78	10.985	17.094	23.79
Zinc, Dissolved	µg/L	4	4.18	4.201	4.2325	5.01	7.8275	11.531	14
Zinc, Total Recoverable	µg/L	4	8.52	9.174	10.155	10.85	14.225	20.03	23.9

Table C-17: Ambient Monitoring Data Statistical Summary for Chicken Creek at Scholls-Sherwood									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	16	0.01	0.017	0.01975	0.034	0.04725	0.05	0.052
Conductivity, Field	µS/cm	16	73.8	75.9	81.25	98.05	134.45	164.2	169.6
Copper, Dissolved	µg/L	4	0.415	0.4306	0.454	0.4965	0.6045	0.7458	0.84
Copper, Total Recoverable	µg/L	4	0.639	0.6534	0.675	0.7705	0.9255	1.0542	1.14
Dissolved Oxygen	mg/L	16	5.94	6.425	7.4175	9.53	10.6525	11.68	12.68
E. coli, Most Probable Number	MPN/100 mL	16	24	31	36.75	164.5	264	555	2420
Hardness, Total	mg/L	4	25.8	33.54	45.15	56.25	63.475	68.11	71.2
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.14	0.1445	0.15125	0.276	0.4085	0.4292	0.443
Mercury by Purge & Trap, Dissolved	ng/L	2	0.587	0.5908	0.5965	0.606	0.6155	0.6212	0.625
Mercury by Purge & Trap, Total	ng/L	2	1.62	1.685	1.7825	1.945	2.1075	2.205	2.27
Nitrate/Nitrite-N, Dissolved	mg/L	16	0.247	0.406	0.47025	1.08	1.325	1.59	1.74
Organic Carbon, Total Non-purgeable	mg/L	16	0.853	0.9615	1.055	1.88	2.7425	2.87	6
Orthophosphate-P, Dissolved	mg/L	16	0.012	0.013	0.014	0.0255	0.03175	0.043	0.063
pH, Field	S.U.	16	6.49	6.75	6.8175	7.06	7.1875	7.245	7.31
Temperature	°C	16	2.854	3.8905	8.286	9.3945	13.80175	16.5115	19.637
Total Phosphorus-P	mg/L	16	0.049	0.053	0.06025	0.088	0.1335	0.1705	0.369
Total Suspended Solids	mg/L	16	0.5	1.6	5	9	22.2	33.2	138
Turbidity, Field	NTU	16	5.78	6.155	7.0825	9.615	10.2625	19.755	45.72
Zinc, Dissolved	µg/L	4	2.54	2.54	2.54	2.54	2.765	3.17	3.44
Zinc, Total Recoverable	µg/L	4	5.95	6.283	6.7825	8.155	10.3625	12.365	13.7

Table C-18: Ambient Monitoring Data Statistical Summary for Fanno Creek at Durham									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	20	0.01	0.0318	0.03375	0.043	0.04725	0.0661	0.099
Conductivity, Field	µS/cm	20	107.8	147.69	176.5	228.4	460.575	767.2	785
Copper, Dissolved	µg/L	4	0.863	1.0181	1.25075	1.45	1.615	1.786	1.9
Copper, Total Recoverable	µg/L	4	0.996	1.1802	1.4565	1.935	2.2675	2.281	2.29
Dissolved Oxygen	mg/L	20	6.62	6.827	7.5225	10.31	10.9025	11.607	12.37
E. coli, Most Probable Number	MPN/100 mL	20	30	62.9	84.25	179	326.5	389.4	770
Hardness, Total	mg/L	4	67.3	71.14	76.9	99.55	154.75	219.1	262
Lead, Dissolved	µg/L	4	0.102	0.102	0.102	0.102	0.10825	0.1195	0.127
Lead, Total Recoverable	µg/L	4	0.117	0.144	0.1845	0.3455	0.514	0.568	0.604
Mercury by Purge & Trap, Dissolved	ng/L	2	0.275	0.3353	0.42575	0.5765	0.72725	0.8177	0.878
Mercury by Purge & Trap, Total	ng/L	2	0.515	0.6175	0.77125	1.0275	1.28375	1.4375	1.54
Nitrate/Nitrite-N, Dissolved	mg/L	25	0.139	0.2232	0.313	0.373	0.656	0.8478	1.01
Organic Carbon, Total Non-purgeable	mg/L	20	2.26	2.578	2.925	3.63	4.02	4.855	6.96
Orthophosphate-P, Dissolved	mg/L	20	0.018	0.0267	0.032	0.0395	0.04575	0.0592	0.068
pH, Field	S.U.	20	7.09	7.146	7.2125	7.365	7.4625	7.521	7.94
Temperature	°C	20	3.478	4.7621	8.311	10.1285	17.28125	20.0025	23.214
Total Phosphorus-P	mg/L	20	0.081	0.0898	0.09775	0.102	0.1155	0.1267	0.181
Total Suspended Solids	mg/L	20	1.2	1.6	3.2	5	8.5	14.92	61.6
Turbidity, Field	NTU	20	2.48	2.947	3.1325	8.565	12.17	14.358	29.18
Zinc, Dissolved	µg/L	4	2.54	3.344	4.55	6.95	10.635	14.154	16.5
Zinc, Total Recoverable	µg/L	4	5.71	5.713	5.7175	9.86	17.2	22.96	26.8

Table C-19: Ambient Monitoring Data Statistical Summary for Dawson Creek at Brookwood									
Analysis Name	*Unit*	*n*	*MIN*	*10th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*90th Percentile*	*MAX*
Ammonia-N, Dissolved	mg/L	19	0.01	0.0178	0.025	0.037	0.0555	0.0764	0.088
Conductivity, Field	µS/cm	19	119.4	150.84	282.8	309.8	354.1	460.44	627
Copper, Dissolved	µg/L	3	0.598	0.6014	0.6065	0.615	0.7025	0.755	0.79
Copper, Total Recoverable	µg/L	4	0.801	0.8301	0.87375	0.9055	0.93475	0.9739	1
Dissolved Oxygen	mg/L	19	4.71	4.762	5.575	9.04	10.255	10.84	12.17
E. coli, Most Probable Number	MPN/100 mL	19	24	45.6	75.5	158	290.5	396.6	548
Hardness, Total	mg/L	4	117	123.9	134.25	142	149.5	159.4	166
Lead, Dissolved	µg/L	3	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Lead, Total Recoverable	µg/L	4	0.11	0.1175	0.12875	0.164	0.1955	0.2	0.203
Mercury by Purge & Trap, Dissolved	ng/L	2	0.221	0.2223	0.22425	0.2275	0.23075	0.2327	0.234
Mercury by Purge & Trap, Total	ng/L	2	0.424	0.4387	0.46075	0.4975	0.53425	0.5563	0.571
Nitrate/Nitrite-N, Dissolved	mg/L	17	0.056	0.1036	0.111	0.214	0.576	0.6718	1.02
Organic Carbon, Total Non-purgeable	mg/L	19	1.79	1.888	2.16	3.1	4.32	4.91	5.52
Orthophosphate-P, Dissolved	mg/L	19	0.039	0.0408	0.0475	0.063	0.086	0.0968	0.12
pH, Field	S.U.	19	7.17	7.298	7.355	7.4	7.56	7.65	7.83
Temperature	°C	19	3.656	5.0614	9.1495	11.818	18.477	19.5896	23.192
Total Phosphorus-P	mg/L	19	0.088	0.092	0.0965	0.14	0.1545	0.1844	0.209
Total Suspended Solids	mg/L	19	0.5	2.24	2.6	3.6	5.165	7.76	11.2
Turbidity, Field	NTU	19	2.2	2.99	3.405	3.71	5.245	7.436	11.49
Zinc, Dissolved	µg/L	3	3.45	3.772	4.255	5.06	6.385	7.18	7.71
Zinc, Total Recoverable	µg/L	4	6.58	6.733	6.9625	7.65	9.1575	10.863	12

Appendix D: Water Quality Status Report

This appendix presents information and data about the pollutants regulated under a Tualatin subbasin Total Maximum Daily Load (TMDL). The August 2001 TMDL modified previous TMDLs for phosphorus and ammonia and added new TMDLs for temperature, bacteria, and volatile solids (to address sediment oxygen demand impacts on dissolved oxygen in the tributaries). A TMDL update in August 2012 includes phosphorus and ammonia allocations for all four of CWS' water resource recovery facilities. The Willamette Basin Mercury TMDL was approved in February 2021.

The TMDL parameters include:

- Total phosphorus target concentrations designed to limit nuisance algal growth and achieve the instream pH criterion.
- Ammonia allocations designed to achieve the dissolved oxygen criterion in the Tualatin River.
- Settleable volatile solids allocations designed to achieve the dissolved oxygen criterion in the Tualatin River and its tributaries.
- Temperature and bacteria allocations designed to achieve ambient water quality standards in the basin.
- Mercury allocations designed to meet criteria for human health throughout the Willamette Basin, including the Tualatin subbasin.

This summary provides general information on the Tualatin River mainstem and tributary conditions during 2024. This information does not assess compliance with permit conditions or TMDL requirements. Compliance is addressed through a separate mechanism, which, for the NPDES permit, includes monthly discharge monitoring reports. Different statistics and reporting periods are used to report for permit compliance than are used for this annual summary.

The primary monitoring period for most of the Tualatin subbasin TMDLs is the dry season, May 1 to October 31. For ammonia, the monitoring period is May 1 to November 15. For bacteria, the monitoring period is the entire year. Mercury data is collected throughout the year. This report covers the 2024 monitoring year.

Total Phosphorus TMDL

The phosphorus TMDL was developed to protect the beneficial uses of aesthetics, indicated by chlorophyll a, and aquatic life, indicated by pH. The 2001 Tualatin TMDL established river and tributary loading capacities for total phosphorus expressed as concentrations (mg/L). Table D-1 shows the loading capacities and the data for the key sites for the most recent monitoring year, as well as other monitoring years selected from the period the TMDLs have been in effect.

Table D-1: History of Total Phosphorus Summer Medians (mg/L) May 1 – October 31						
Location	*2001 TMDL Loading Capacity*	*1990*	*2000*	*2010*	*2015*	*2024*
Tualatin River at Weiss Bridge	**0.10**	0.22	0.08	0.09	0.08	0.07
Tualatin River at Stafford Road	**0.10**	0.23	0.08	0.10	0.09	0.07
Tualatin River at Boones Ferry Road	**0.11**	0.23	0.08	0.10	0.09	0.08
Tualatin River at Hwy 210 Bridge	**0.10**	0.15	0.08	0.10	0.08	0.08
Tualatin River at Rood Bridge Road	**0.09**	0.10	0.06	0.08	0.06	0.06
Tualatin River at Hwy 219 Bridge	**0.04**	-	0.05	0.07	0.06	0.08
Tualatin River at Golf Course Road	**0.04**	0.05	0.03	0.04	0.03	0.03
Tualatin River at Cherry Grove	**0.04**	-	< 0.025	< 0.025	< 0.025	<0.025
Scoggins Creek at Old Hwy 47[1]	**0.04**	0.43	< 0.025	< 0.025	< 0.025	<0.025
Gales Creek at New Hwy 47	**0.04**	0.06	0.04	0.04	0.05	0.04
Dairy Creek at Hwy 8	**0.09**	0.13	0.11	0.11	0.12	0.11
Rock Creek at Brookwood	**0.19**	-	-	0.16	0.22	0.22
Chicken Cr on Scholls-Sherwood	**0.14**	0.23	0.11	0.11	0.11	0.12
Fanno Creek at Durham Road	**0.13**	0.15	0.15	0.13	0.16	0.10

[1] Monitoring location changed to Scoggins below Hagg Lake in 2013. Access at this site ended in early 2025; CWS is reviewing replacement sites.

Since 1988, the Tualatin River has had a phosphorus TMDL for the mainstem Tualatin River and its tributaries. Total phosphorus has the potential to impact beneficial uses in the reservoir-like section of the river, where nuisance algal growth historically occurred and elevated pH levels were observed. CWS upgraded its water resource recovery facilities and has used a combination of biological phosphorus removal and alum (aluminum sulfate) addition in the tertiary process to meet the phosphorus wasteload allocations in the TMDL for more than two decades.

Since the development of the original TMDL in 1988, the river has changed dramatically in terms of operations, flows, and water quality. Water quality modeling suggests that the Tualatin River is not as sensitive to phosphorus inputs as it once was, in part because of the reduced residence time of water in the lower river than when the TMDL wasteload allocations were originally established. Reduced residence time is due to higher flows from managed flows, increased water resource recovery facility flows, and flashboards no longer being used on the lower river diversion dam that would increase the depth of the lower river.

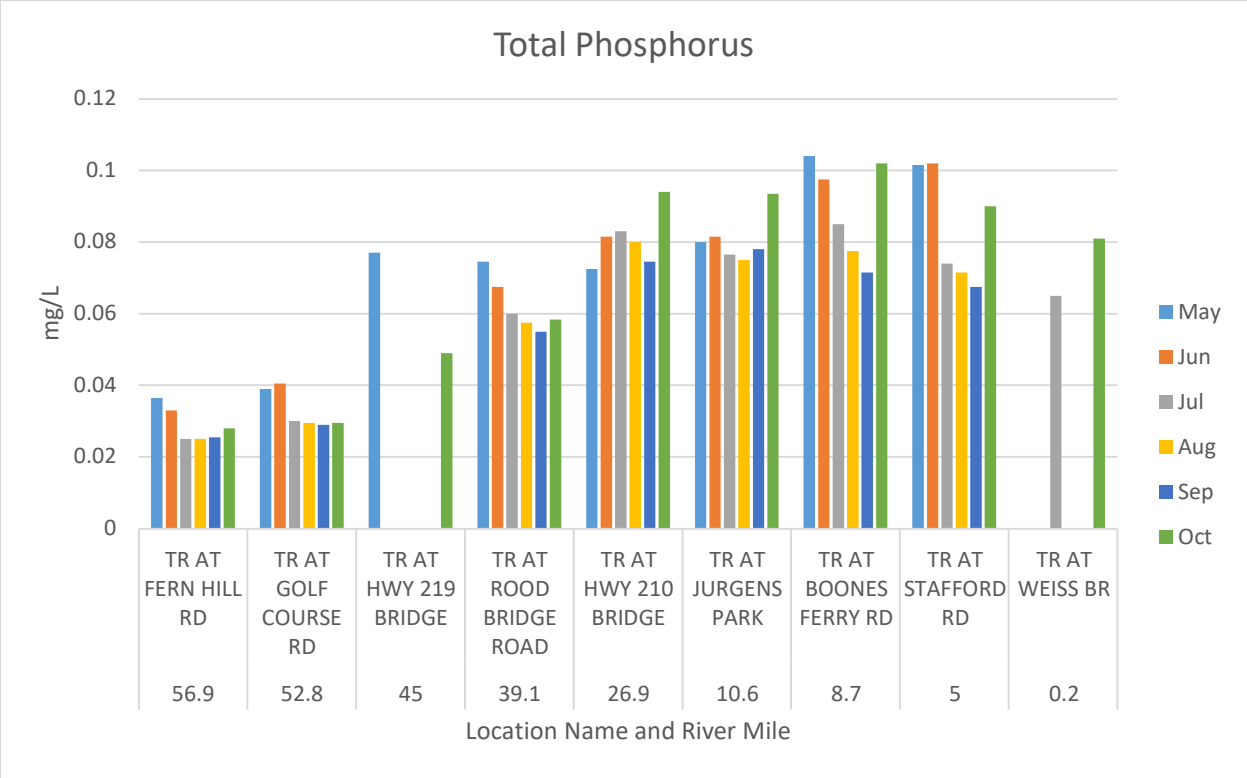
CWS entered into an agreement with Oregon DEQ to study the effectiveness of biological processes in removing phosphorus at the water resource recovery facilities while balancing and optimizing the use of alum and the effects of the higher phosphorus concentrations in the Tualatin River. Results indicate that the water resource recovery facilities can effectively reduce total phosphorus using biological processes with no or little additional alum in the tertiary

process without negatively impacting water quality in the river. CWS is continuing the study in the 2025 reporting year. (DEQ has recently promulgated a new aluminum aquatic life toxicity standard in Oregon that will make it uncertain if it is practicable to continue to use alum in the tertiary process at current application rates.)

In previous years, CWS has compiled and reviewed the chlorophyll A data from the USGS station on the Tualatin River at the Oswego Diversion Dam. During the summer of 2024, the USGS station only recorded chlorophyll fluorescence. In place of the chlorophyll A data from USGS, CWS reviewed chlorophyll A data from other monitoring stations on the Tualatin River managed by CWS.

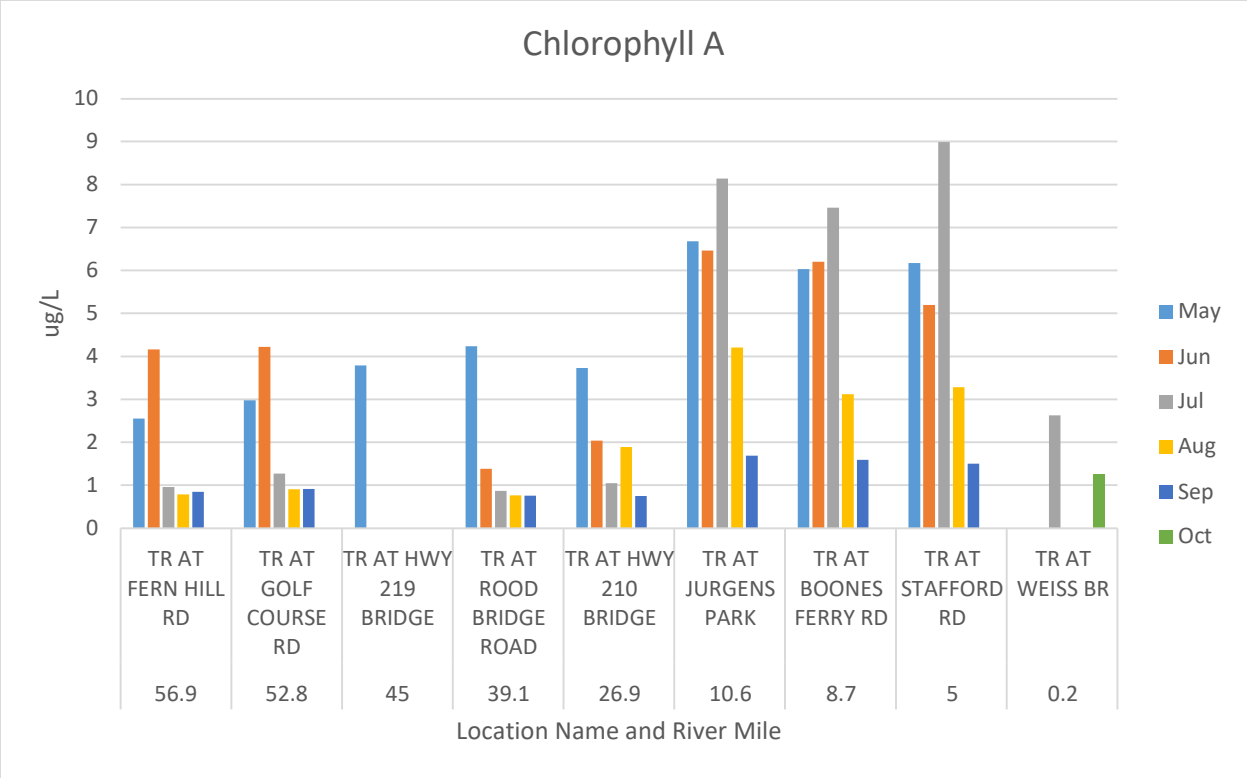
In 2024, total phosphorus was measured in the Tualatin River by CWS. Results ranged from 0.025 mg/L to 0.131 mg/L. Figure D-1 graphs the average total phosphorus concentrations by month at monitoring locations in the Tualatin River from May 1 to Oct. 31, 2024.

Figure D-1: Average Total Phosphorus Concentrations in the Tualatin River



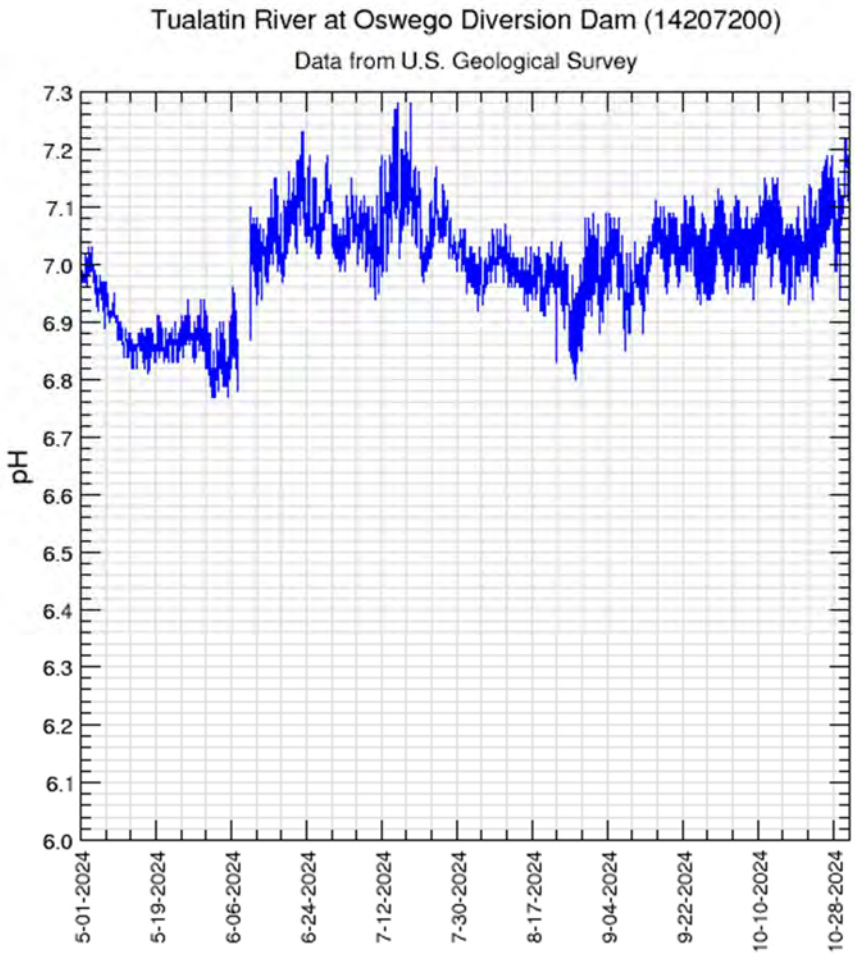
In 2024, chlorophyll A was measured in the Tualatin River by CWS. Results ranged from 0.552 ug/L to 8.99 ug/L. Figure D-2 graphs the average chlorophyll A concentrations by month at monitoring locations in the Tualatin River from May 1 to Oct. 31, 2024.

Figure D-2: Average Chlorophyll A Concentrations in the Tualatin River



In 2024, pH was measured in the Tualatin River by USGS at the Oswego Diversion Dam. Results ranged from 6.8 SUs to 7.3 SUs. Figure D-3 graphs the pH concentrations in the Tualatin River at the Oswego Diversion Dam from May 1 to Oct. 31, 2024.

Figure D-3: pH Concentrations in the Tualatin River at the Oswego Diversion Dam



Dissolved Oxygen TMDL

The ammonia TMDL is designed to achieve the dissolved oxygen criteria in the reservoir-like section of the Tualatin River, in part by ensuring that discharges from CWS' water resource recovery facilities do not measurably reduce dissolved oxygen due to ammonia discharge. The TMDL allows higher loads of ammonia in the spring and early summer when river conditions are favorable for the assimilation of ammonia, and lower ammonia loads in the fall when sediment oxygen demand consumes more oxygen, leaving less assimilative capacity.

The reservoir-like section of the Tualatin River is designated a cold water habitat and has the following dissolved oxygen criteria:

- Grab samples: > 6.5 mg/L

- Continuous monitoring:
    - 30-day average of daily means > 6.5 mg/L
    - 7-day average of daily minimums > 5.0 mg/L
    - Daily minimum > 4.0 mg/L

CWS and the USGS are partners in a study where the USGS maintains continuous monitoring stations throughout the Tualatin Basin. Two of these stations are in the reservoir section of the river:

1) Near Scholls (river mile 24.5), downstream of the Rock Creek Water Resource Recovery Facility (river mile 37.7).
2) At the Oswego Diversion Dam (river mile 3.4), downstream of the Durham Water Resource Recovery Facility (river mile 9.2).

Graphs of the dissolved oxygen concentrations at these two locations are presented in Figure D-4 (RM 24.5) and Figure D-5 (RM 3.4). Dissolved oxygen levels decreased slightly over the summery period but generally stayed about 6.0 mg/L throughout the summer, which is a little higher than typical at the Oswego Diversion Dam.

Figure D-4

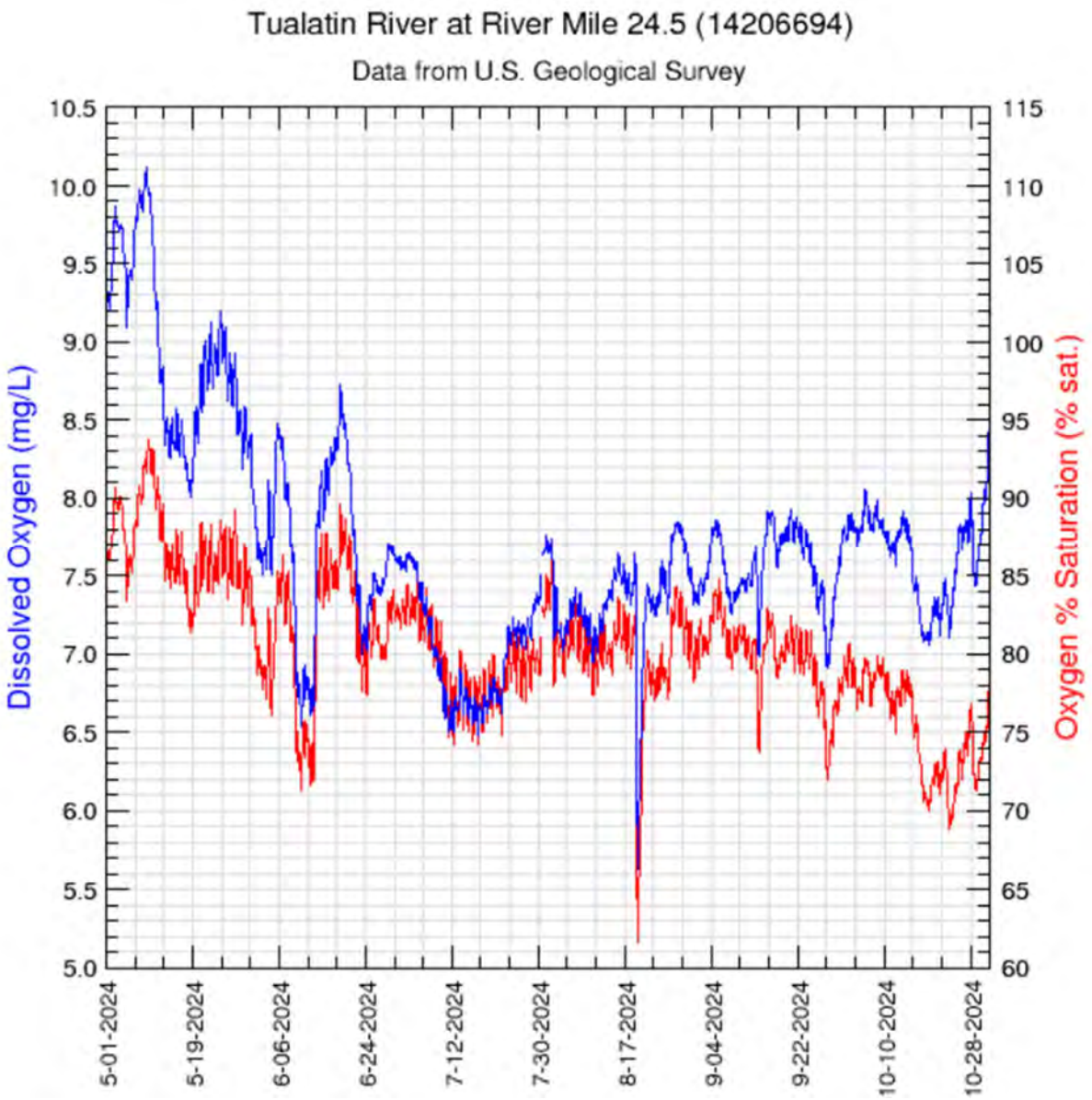
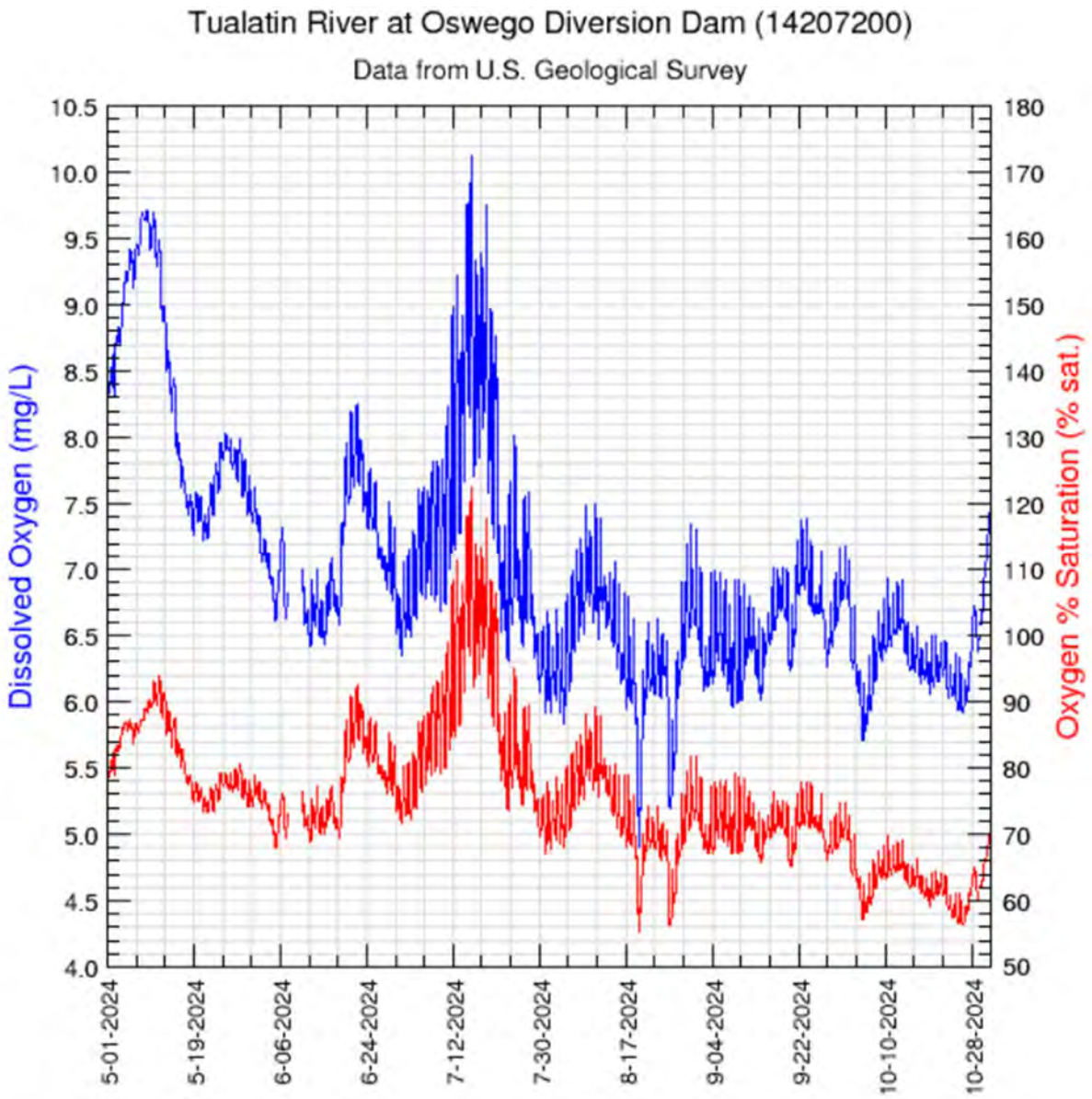

Tualatin River at River Mile 24.5 (14206694)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
115
110
105
100
95
90
85
80
75
70
65
60
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

Figure D-5


Tualatin River at Oswego Diversion Dam (14207200)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
180
170
160
150
140
130
120
110
100
90
80
70
60
50
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

Tributary Dissolved Oxygen TMDL

The 2001 Tualatin TMDL contained requirements for reductions in settleable volatile solids loads to reduce tributary sediment oxygen demand and achieve dissolved oxygen criteria in the tributaries. Figures D-6 to D-9 show the summer dissolved oxygen levels in the tributaries. Some stream segments in the Tualatin Basin are subject to the cold water habitat dissolved oxygen criteria given above, and some are subject to the following cold water habitat dissolved oxygen criteria:

- Grab samples: > 8.0 mg/L
- Continuous monitoring:
  - 30-day average of daily means > 8.0 mg/L
  - 7-day average of daily minimums > 6.5 mg/L
  - Daily minimum > 6.0 mg/L

Note that Fish and Aquatic Life Uses were updated in Oregon Administrative Rules in December 2023.

Figure D-6

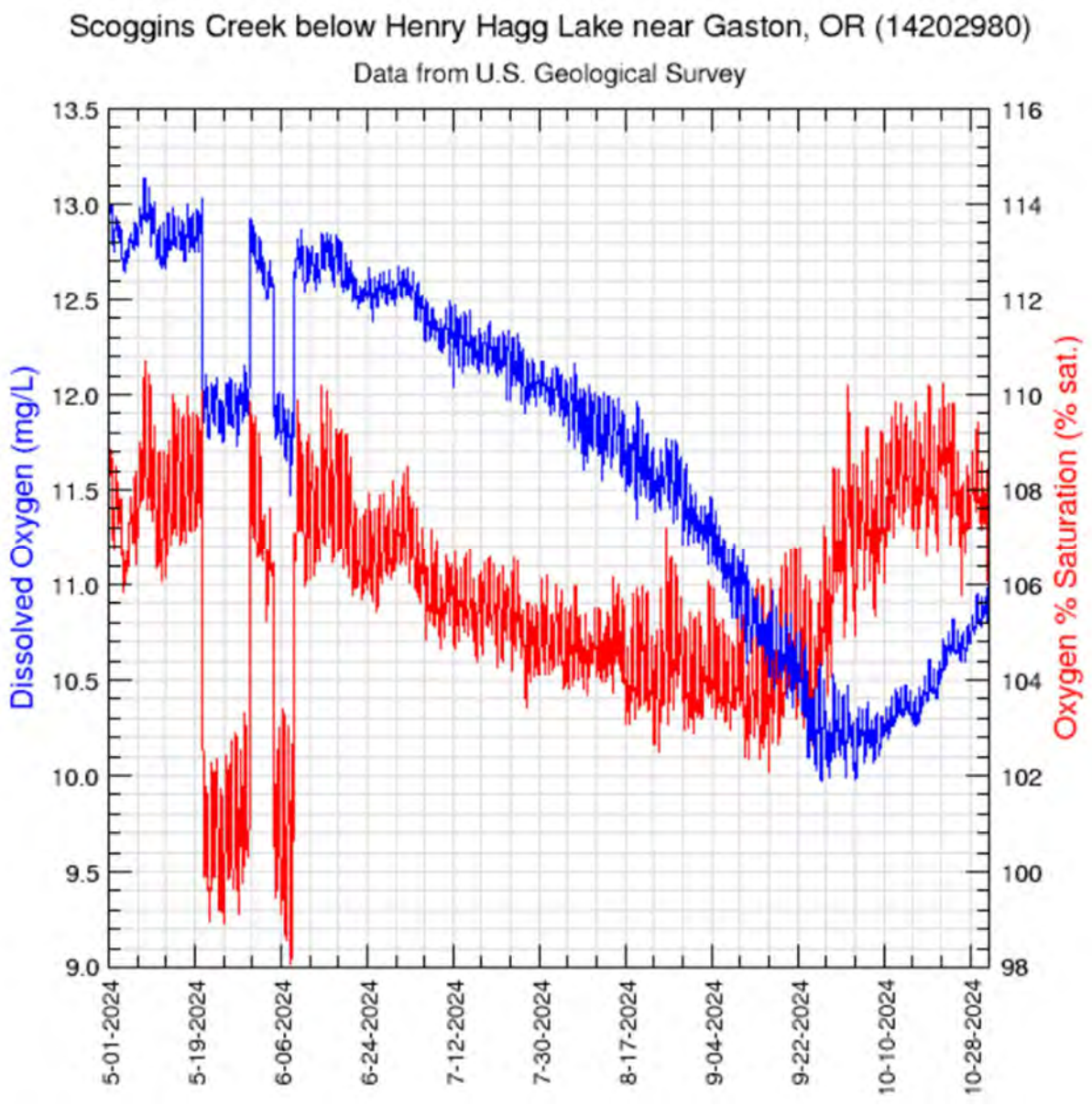

Scoggins Creek below Henry Hagg Lake near Gaston, OR (14202980)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
116
114
112
110
108
106
104
102
100
98
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

Figure D-7

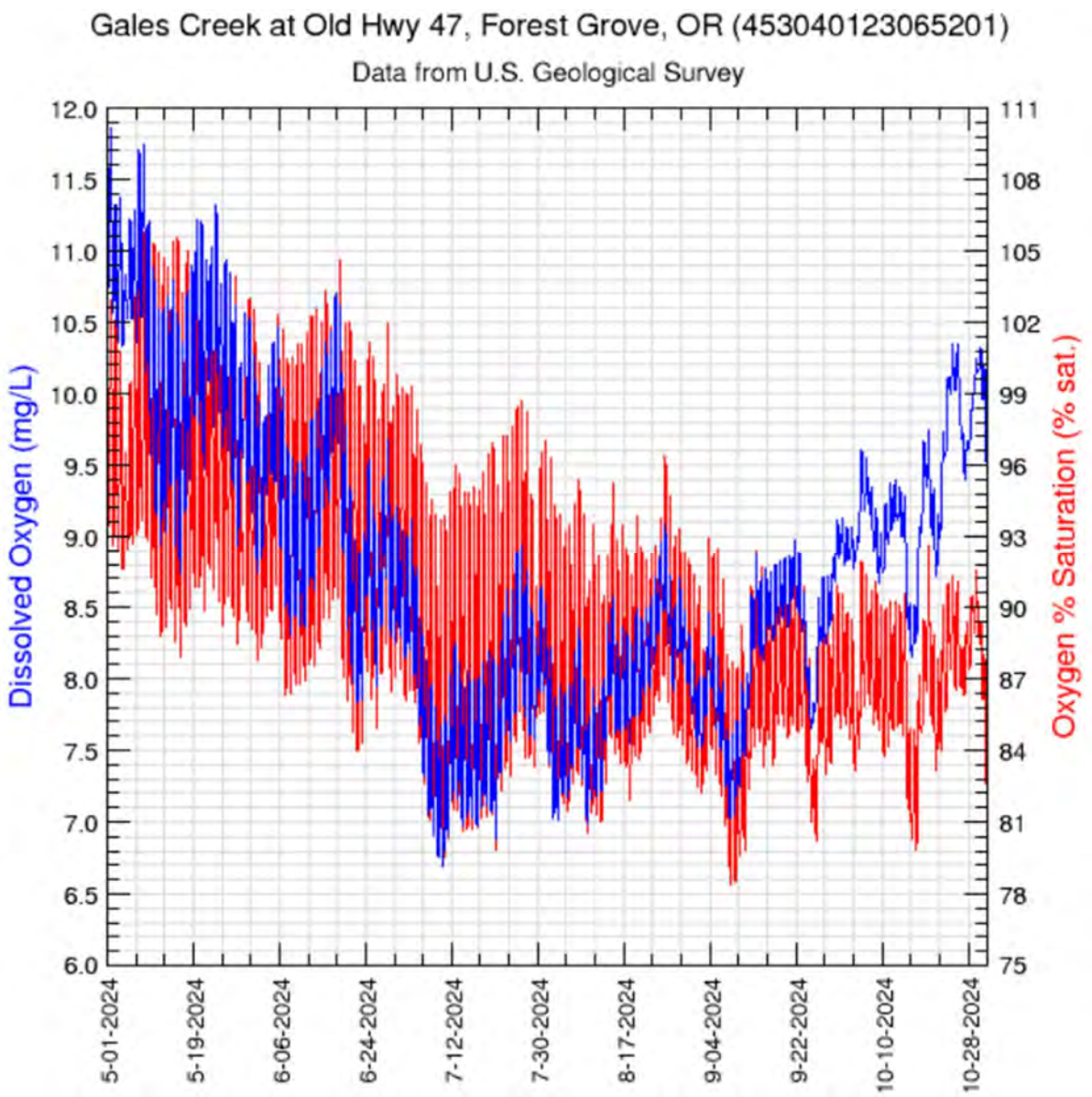

Gales Creek at Old Hwy 47, Forest Grove, OR (453040123065201)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
111
108
105
102
99
96
93
90
87
84
81
78
75
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

Figure D-8

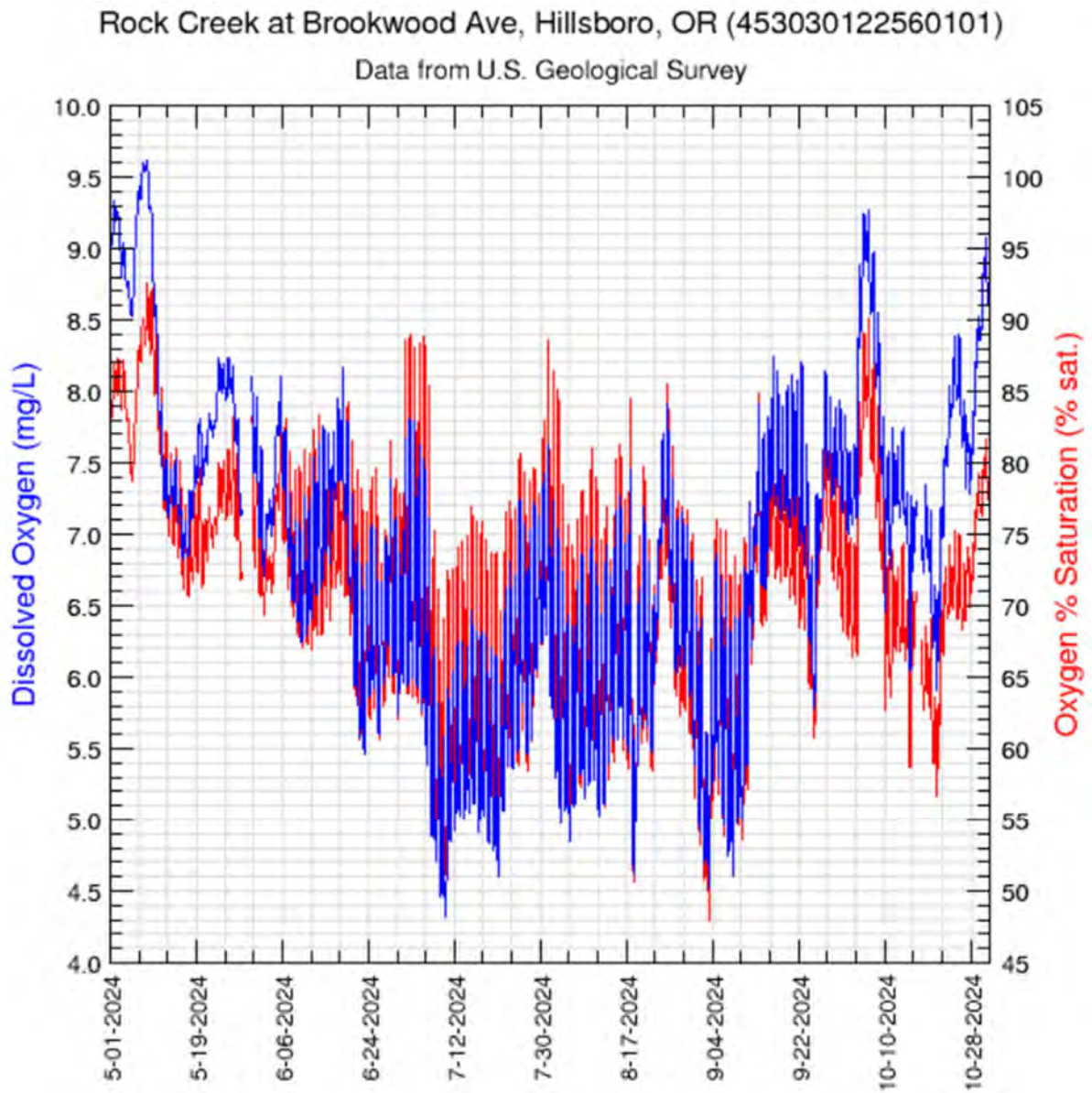
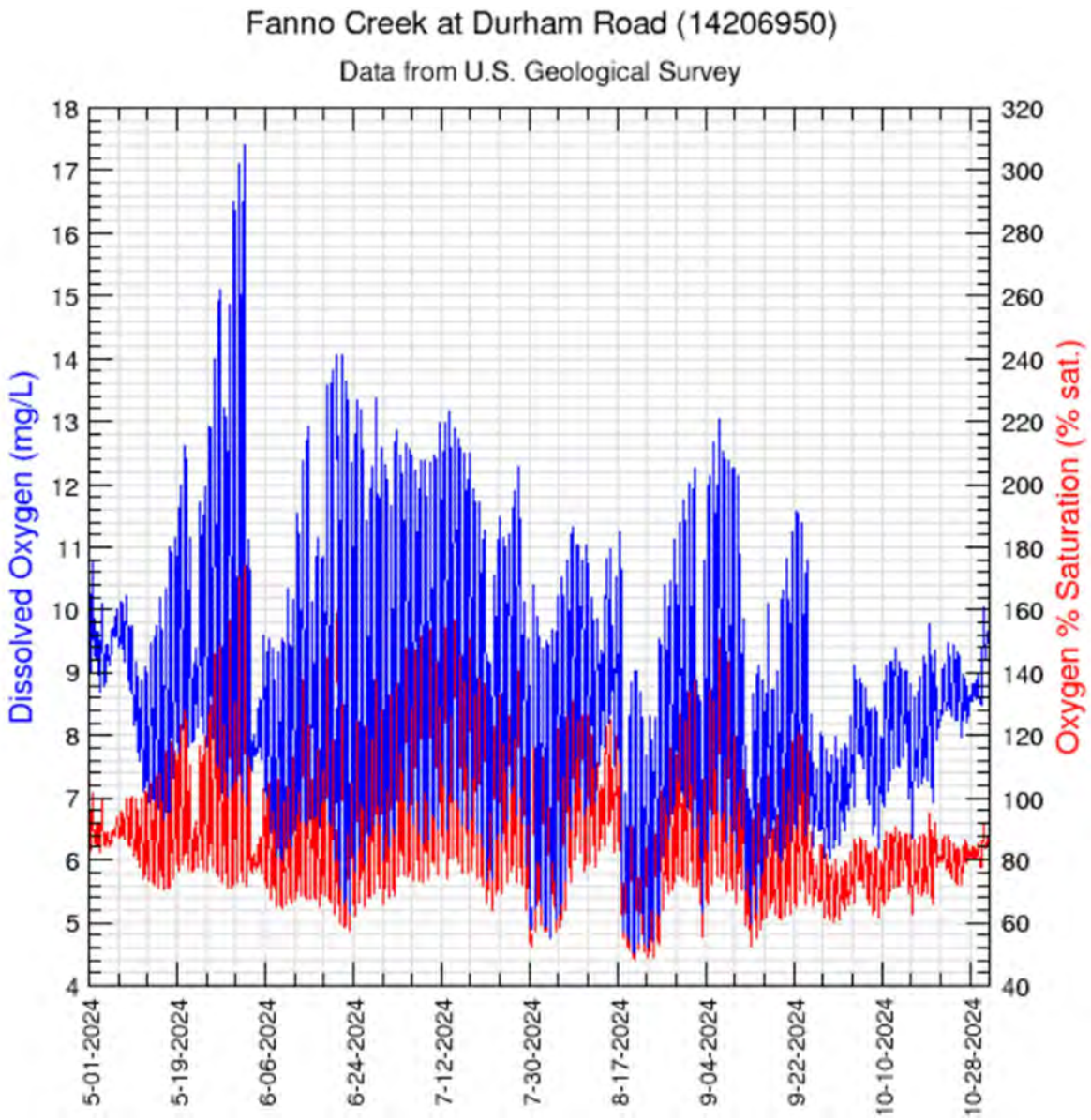

Rock Creek at Brookwood Ave, Hillsboro, OR (453030122560101)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
105
100
95
90
85
80
75
70
65
60
55
50
45
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

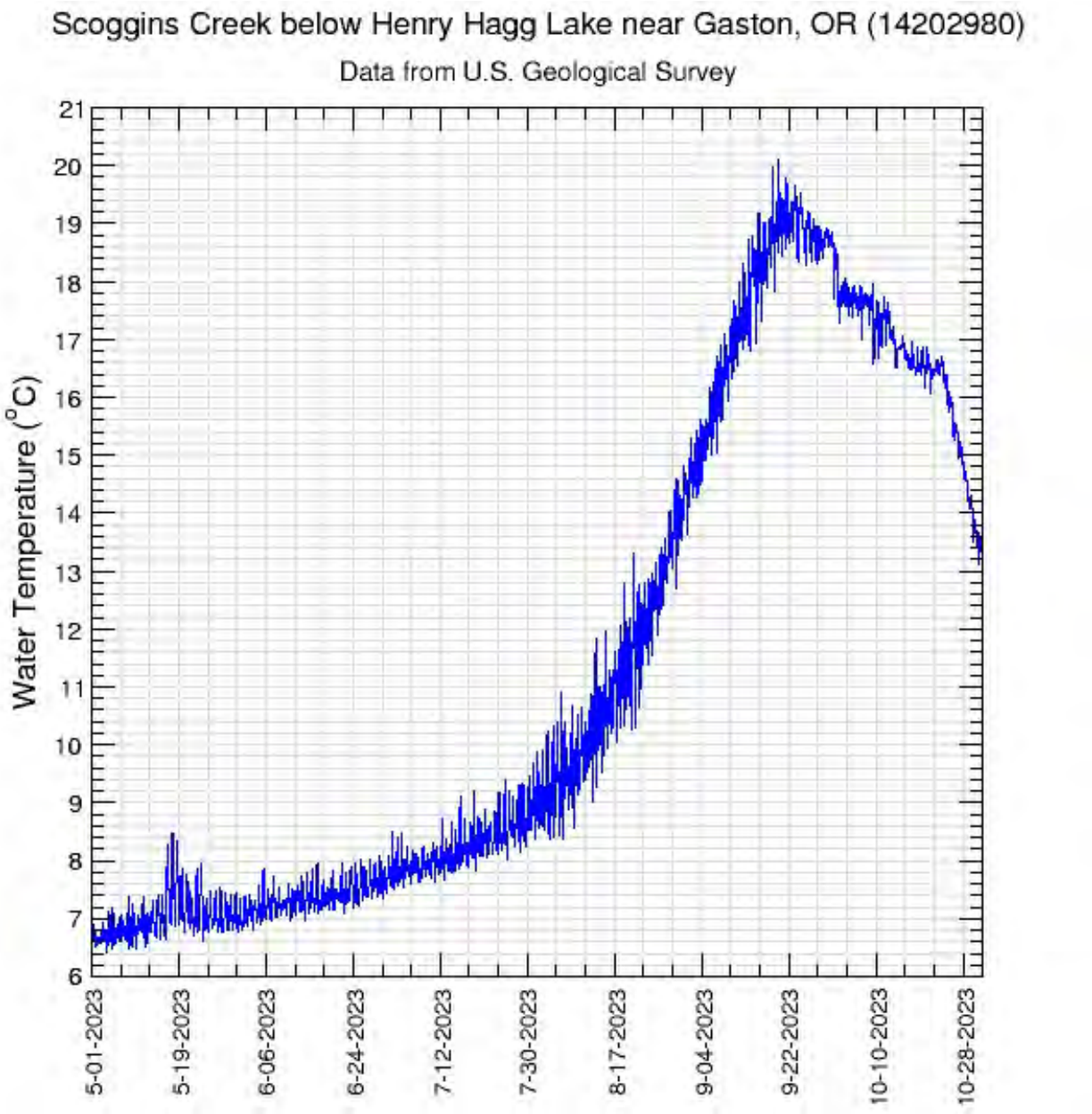
Figure D-9


Fanno Creek at Durham Road (14206950)
Data from U.S. Geological Survey
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
5-01-2024
5-19-2024
6-06-2024
6-24-2024
7-12-2024
7-30-2024
8-17-2024
9-04-2024
9-22-2024
10-10-2024
10-28-2024

Temperature TMDL

The temperature TMDL applies to both the mainstem and the tributaries. The TMDL is based on percent effective shade with the environmental goal of meeting the water quality temperature criteria. Most of the Tualatin Basin is subject to the salmonid fish rearing beneficial use, which has the criterion of 18 degrees C throughout the year. The temperature TMDL was developed as a basin-scale TMDL in response to the water quality-limited status of selected tributaries and the lower mainstem of the river, as indicated by the data from the Farmington Road gauging station. There are sites and times in the upper Tualatin Basin where the applicable beneficial use is salmonid spawning, which has a criterion of 13 degrees C. Figures D-10 to D-15 display graphs of summer temperatures at selected sites with continuous monitors.

Figure D-10



**Note: As seen in previous reporting years, the water temperature at Scoggins Creek slowly increases during the summer months and then drops off in the early fall. Hagg Lake reservoir reaches its full capacity between May andJune, depending on the water year. Stored water is released from Hagg Lake from the bottom of the reservoir. During the summer, as water is discharged from the reservoir, the temperature of the reservoir increases until the lake turnover effect occurs when colder, denser water at the bottom of the reservoir mixes with the warmer, lighter water at the surface of the reservoir. The temperature graph above depicts the annual pattern. Although the water temperature increases during the summer, the overall peak temperature of Scoggins Creek is 4-6 degrees C cooler than other locations monitored along the Tualatin River, as shown in the following charts.

Figure D-11

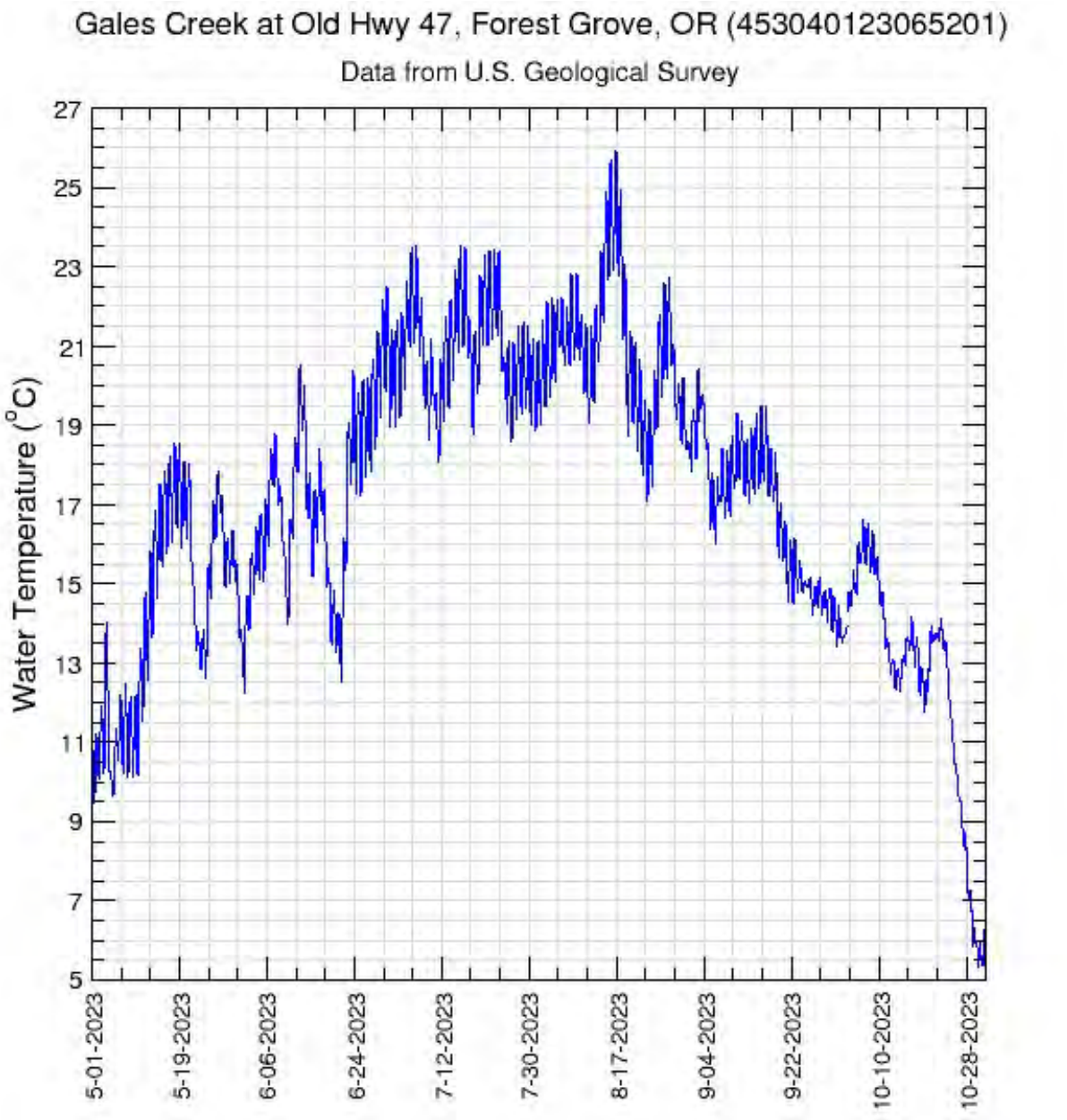

Gales Creek at Old Hwy 47, Forest Grove, OR (453040123065201)
Data from U.S. Geological Survey
Water Temperature (°C)
27
25
23
21
19
17
15
13
11
9
7
5
5-01-2023
5-19-2023
6-06-2023
6-24-2023
7-12-2023
7-30-2023
8-17-2023
9-04-2023
9-22-2023
10-10-2023
10-28-2023

Figure D-12

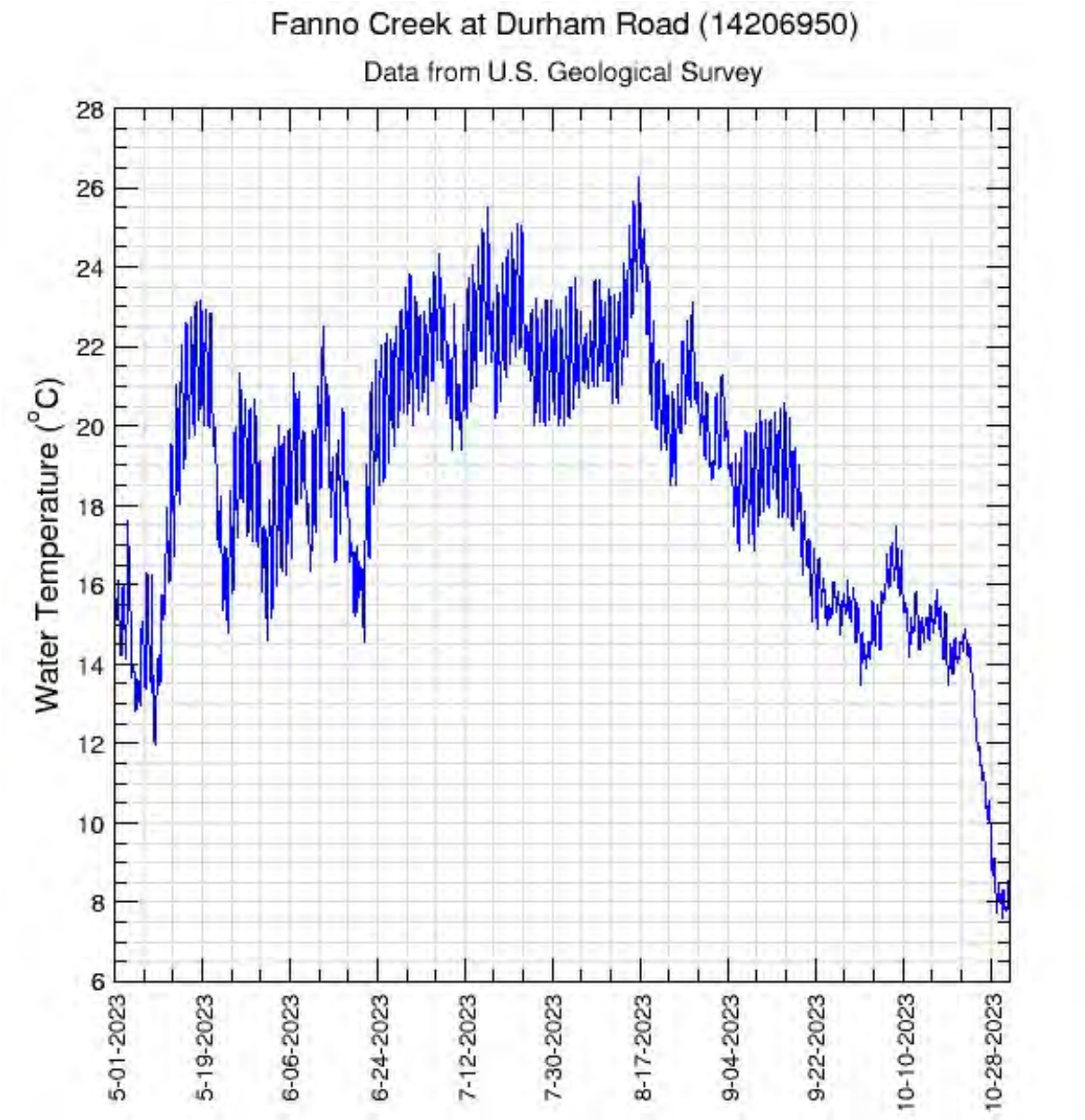

Fanno Creek at Durham Road (14206950)
Data from U.S. Geological Survey
Water Temperature (°C)
28
26
24
22
20
18
16
14
12
10
8
6
5-01-2023
5-19-2023
6-06-2023
6-24-2023
7-12-2023
7-30-2023
8-17-2023
9-04-2023
9-22-2023
10-10-2023
10-28-2023

Figure D-13

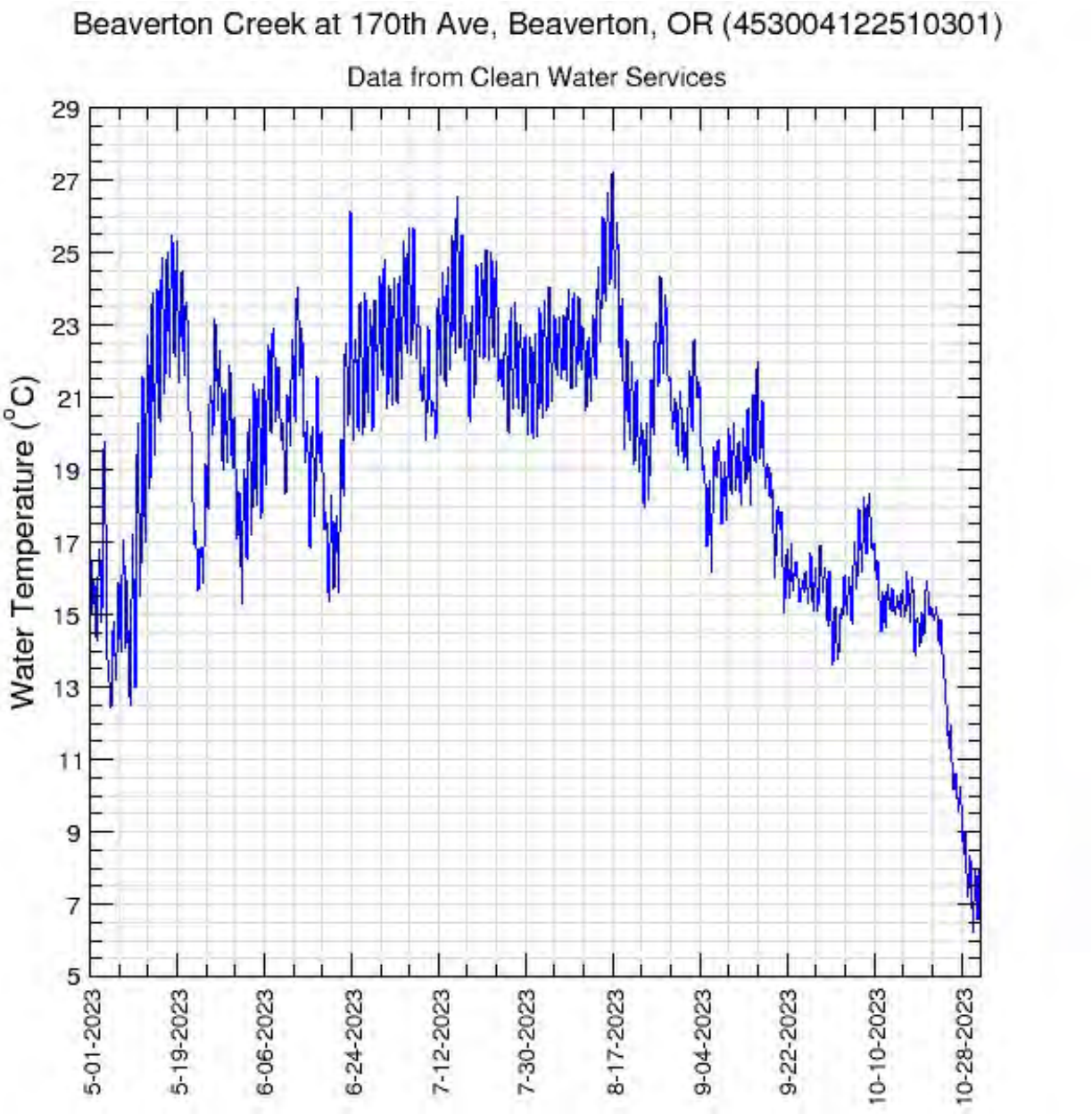

Beaverton Creek at 170th Ave, Beaverton, OR (453004122510301)
Data from Clean Water Services
Water Temperature (°C)
29
27
25
23
21
19
17
15
13
11
9
7
5
5-01-2023
5-19-2023
6-06-2023
6-24-2023
7-12-2023
7-30-2023
8-17-2023
9-04-2023
9-22-2023
10-10-2023
10-28-2023

Figure D-14

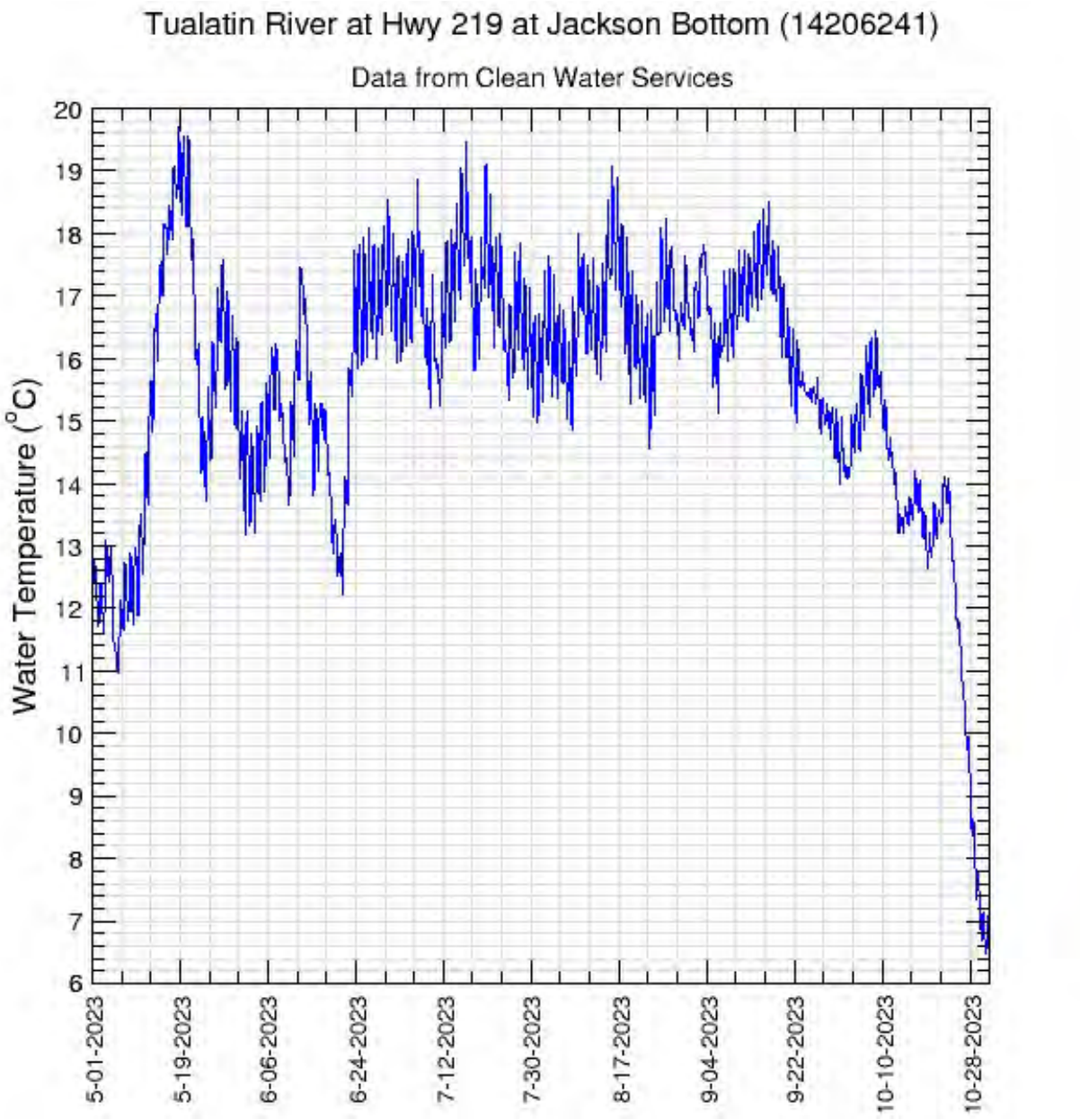
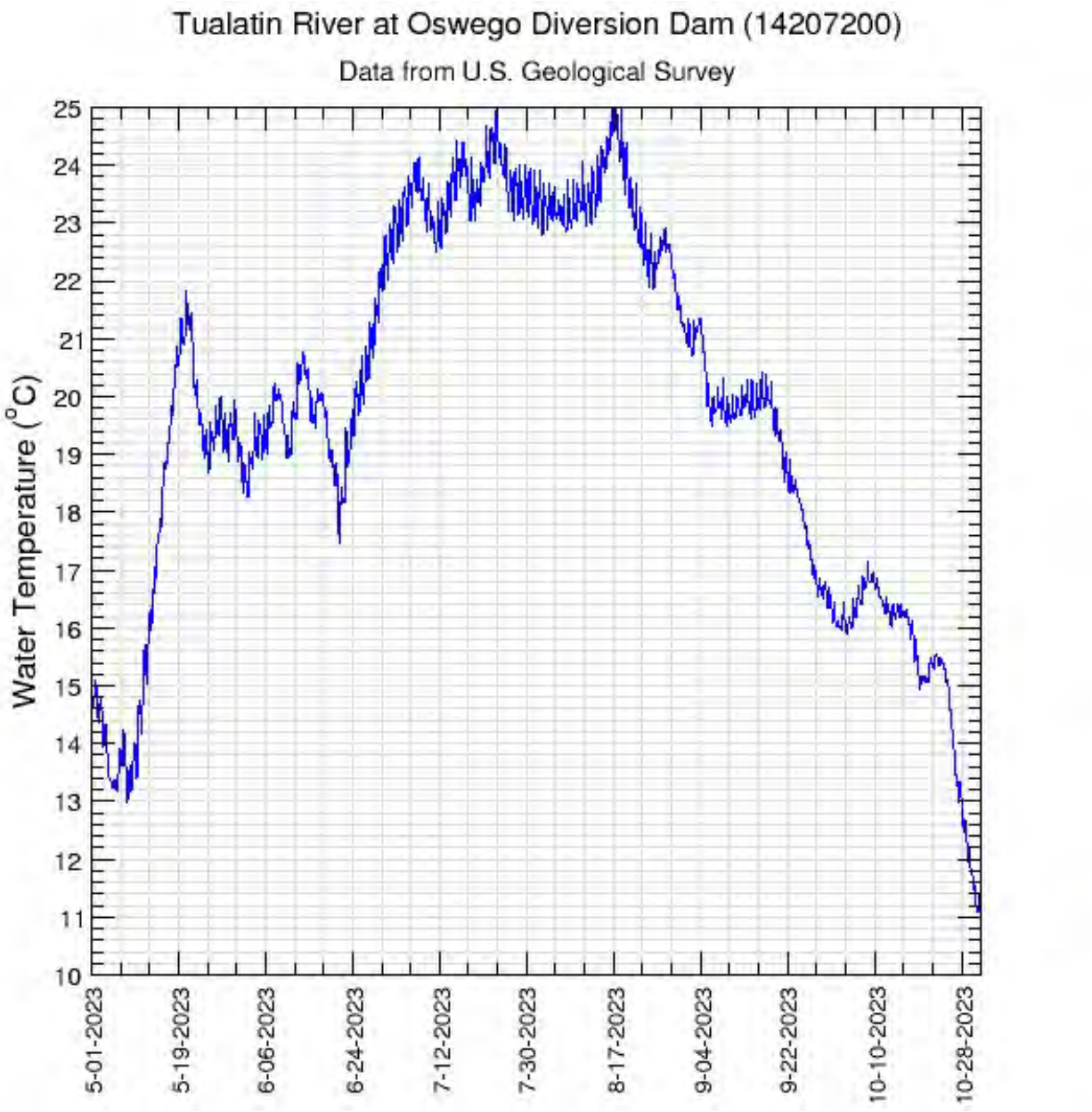

Tualatin River at Hwy 219 at Jackson Bottom (14206241)
Data from Clean Water Services
Water Temperature (°C)
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5-01-2023
5-19-2023
6-06-2023
6-24-2023
7-12-2023
7-30-2023
8-17-2023
9-04-2023
9-22-2023
10-10-2023
10-28-2023

Figure D-15


Tualatin River at Oswego Diversion Dam (14207200)
Data from U.S. Geological Survey
Water Temperature (°C)
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
5-01-2023
5-19-2023
6-06-2023
6-24-2023
7-12-2023
7-30-2023
8-17-2023
9-04-2023
9-22-2023
10-10-2023
10-28-2023

Bacteria TMDL

The bacteria TMDL is designed to protect the most sensitive designated use of water contact recreation. This TMDL applies to both the Tualatin River and its tributaries. Unlike the other TMDLs on the Tualatin, it has both a summer and a winter component. The bacteria test used is Standard Methods 9223B (Most Probable Number/100 m/L).

CWS conducts several activities to reduce the bacteria levels in the Tualatin River and its tributaries. At CWS' water resource recovery facilities, the effluent is disinfected before discharge to the river. To reduce the amount of bacteria entering streams via stormwater, CWS employs BMPs designed to help prevent contamination of stormwater by bacteria and other pollutants. These BMPs include addressing and preventing illicit discharges such as cross connections; implementing proper operations and maintenance by detecting cross connections and preventing overflows; and public education and outreach, including education to prevent bacterial contamination from pet and wildlife waste.

CWS has implemented a robust monitoring program to track the concentration of bacteria in the Tualatin River and its tributaries. In addition to collecting data according to the Stormwater Monitoring Plan, CWS is conducting a Microbial Source Tracking (MST) study using the protocol outlined in The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches (Griffith, et al. 2013). The monitoring protocol calls for escalating sampling intensity. Figure D-16 displays the data from monitoring locations on the river and on the major tributaries near their confluences with the river.

Figure D-16: E.coli Concentrations in Ambient Monitoring Sites

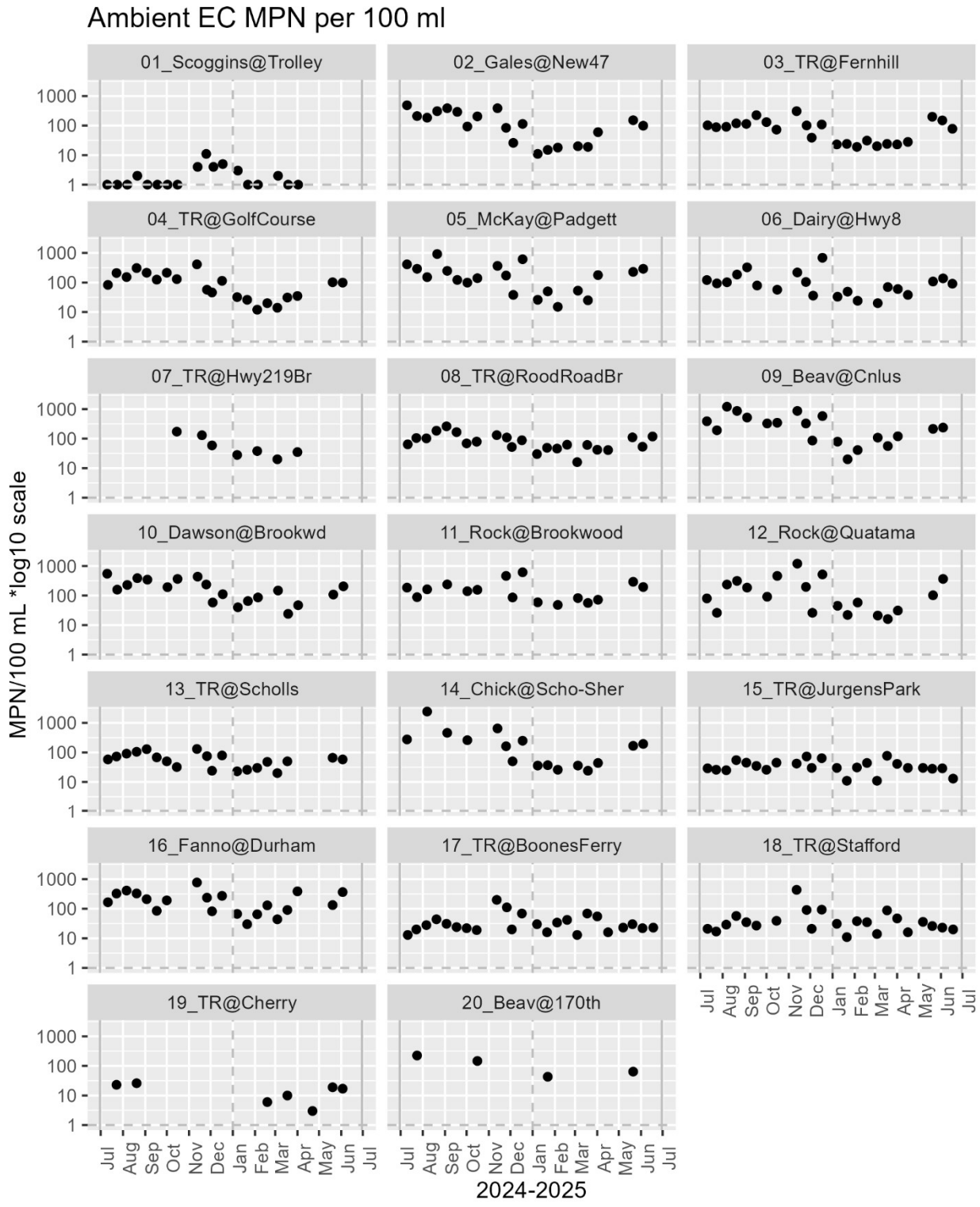


Table D-2 presents monitoring locations in the Tualatin River and the corresponding river miles.

Table D-2: Tualatin Basin Sample Locations		
ID	*Location*	*River Mile**
01	Scoggins Creek below Hagg Lake at Trolley	
02	Gales Creek at New Highway 47	
03	Tualatin River at Fernhill Road	56.9
04	Tualatin River at Golf Course Road	52.8
05	McKay Creek at Padgett Road	
06	Dairy Creek at Highway 8	
07	Tualatin River at Hwy 219 Bridge	45.0
08	Tualatin River at Rood Bridge Road	39.1
09	Beaverton Creek at Cornelius near Orenco	
10	Dawson Creek at Brookwood	
11	Rock Creek at Brookwood	
12	Rock Creek at Quatama	
13	Tualatin River at Hwy 210 Bridge	27.1
14	Chicken Creek on Scholls-Sherwood	
15	Tualatin River at Jurgens Park	10.6
16	Fanno Creek at Durham	
17	Tualatin River at Boones Ferry Road	8.7
18	Tualatin River at Stafford Road	5.0
19	Tualatin River at Cherry Grove	80.0
20	Beaverton Creek at 170th Avenue	

*River miles are shown for the Tualatin River only

Willamette Basin Mercury TMDL Annual Report (Schedule D.14.c.iii)

This annual report documents the continued implementation of BMPs and other actions that CWS is implementing to decrease sediment as a surrogate for mercury.

On February 4, 2021, the EPA issued a Willamette Basin mercury TMDL, which notes that the primary source of mercury in the basin is from atmospheric deposition. The mercury in the air originates from national and global sources. Once it's deposited on the landscape, the major pathways to streams are erosion of sediment-bound mercury and surface runoff. The TMDL notes that management practices on various land uses (forestry, agriculture, and urban) influence the amount of mercury that reaches streams and rivers in the Willamette Basin.

The TMDL includes measures that are to be undertaken by point source discharges and nonpoint sources to reduce mercury levels. TMDL provisions for point source discharges will be implemented through the NPDES permit. On March 3, 2021, DEQ notified Designated Management Agencies (DMAs), including CWS and the cities in Washington County, of their obligations under the TMDL. DMAs were required to submit a TMDL implementation plan by September 3, 2022. CWS developed and submitted the Willamette Basin Mercury TMDL Implementation Plan on behalf of itself and the co-implementers in 2022. The Willamette Basin Mercury TMDL Implementation Plan is a single, comprehensive TMDL implementation plan and includes the cities as co-implementers. The scope of the TMDL implementation plan includes the work being done in the MS4 program and in natural areas in the Tualatin River watershed. The TMDL implementation plan is discussed further in the Willamette Basin Mercury TMDL: Mercury Minimization Assessment, submitted separately alongside the 2024 Stormwater Annual Report.

CWS has a history of implementing mercury reduction activities dating to the early 2000s. More recently, CWS developed a Mercury Minimization Plan (MMP) in 2015 and updated it in 2021. The MMP identifies programs and activities that CWS implements to reduce the levels of mercury conveyed to the water resource recovery facilities. Key elements of CWS' MMP include screening significant industrial users for mercury; requiring specific industrial users to develop mercury minimization plans; implementing a dental amalgam program to control mercury discharges from dental offices; and targeting outreach to medical establishments, schools, and commercial laboratories. Actions taken to implement the MMP are documented in the CWS Pretreatment Annual Report.

CWS and the co-implementers conduct a comprehensive stormwater management program in urban Washington County. The best management practices implemented by CWS and the co-implementers are effective in reducing sediment discharges to receiving streams. Since the major pathway of mercury delivery to streams is through erosion of sediment-bound mercury and surface runoff, these best management practices are also effective at reducing mercury discharges. Best management practices and programs that are effective at reducing sediment discharges — and thereby mercury — include the illicit discharge detection and elimination program, industrial and commercial facilities stormwater programs, construction site runoff control, public education and outreach, post-construction site runoff and retrofit programs, pollution prevention for municipal operations, and stormwater management facilities operation and maintenance activities. Actions taken to implement these best management practices and programs are documented in this Stormwater Annual Report.

CWS implements an extensive mercury monitoring program. Figure D-17 presents total mercury at five MS4 sampling sites based on data from 2017-2024. Figure D-16 presents total mercury at 16 ambient sampling sites based on data from 2017-2024. The elevated February 2017 total mercury result at the Gales Creek ambient sampling location coincided with a winter storm, resulting in high streamflows and correlated with an elevated TSS concentration at that site. CWS has instituted paired sampling for total and dissolved mercury with total suspended solids. Mercury and TSS data from the stormwater and ambient monitoring sites are submitted electronically with the Stormwater Annual Report.

Figure D-17: Total Mercury Concentrations at MS4 Sampling Locations

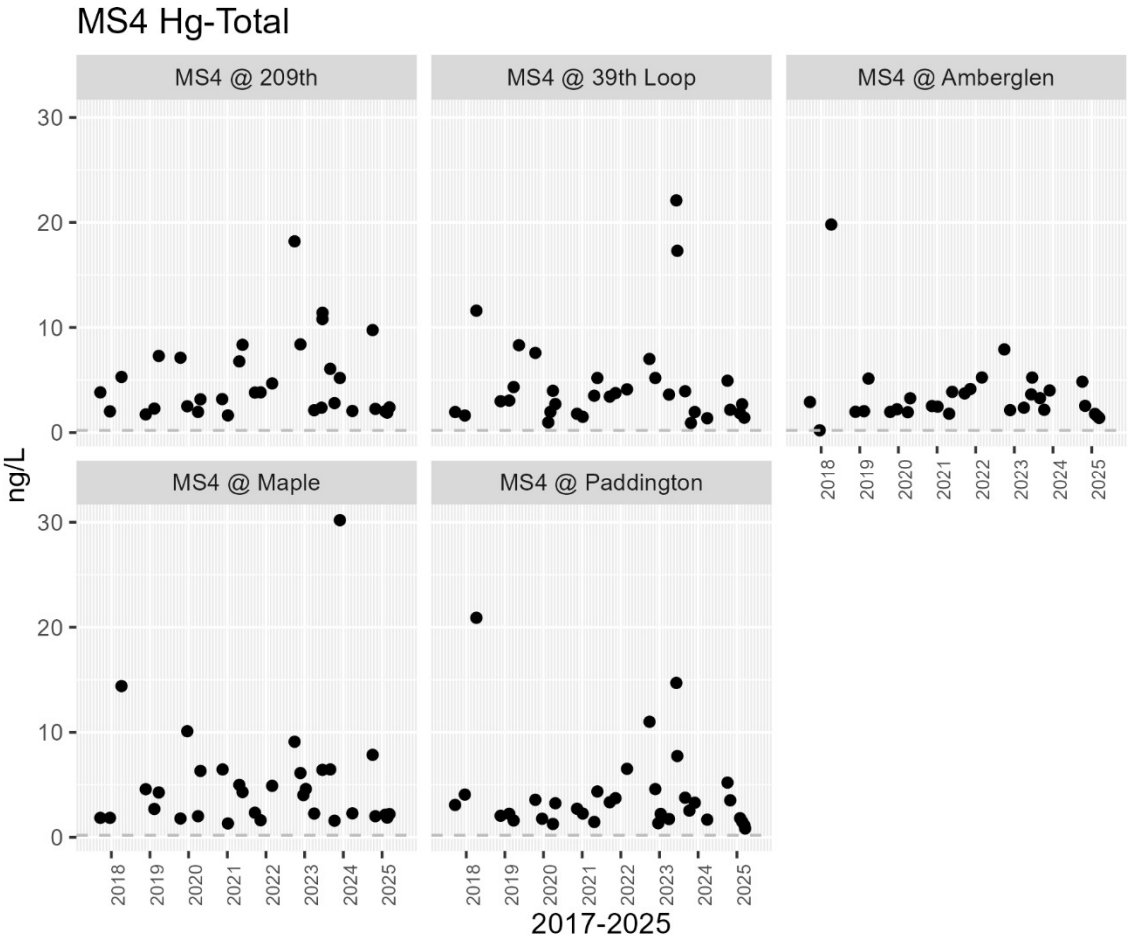
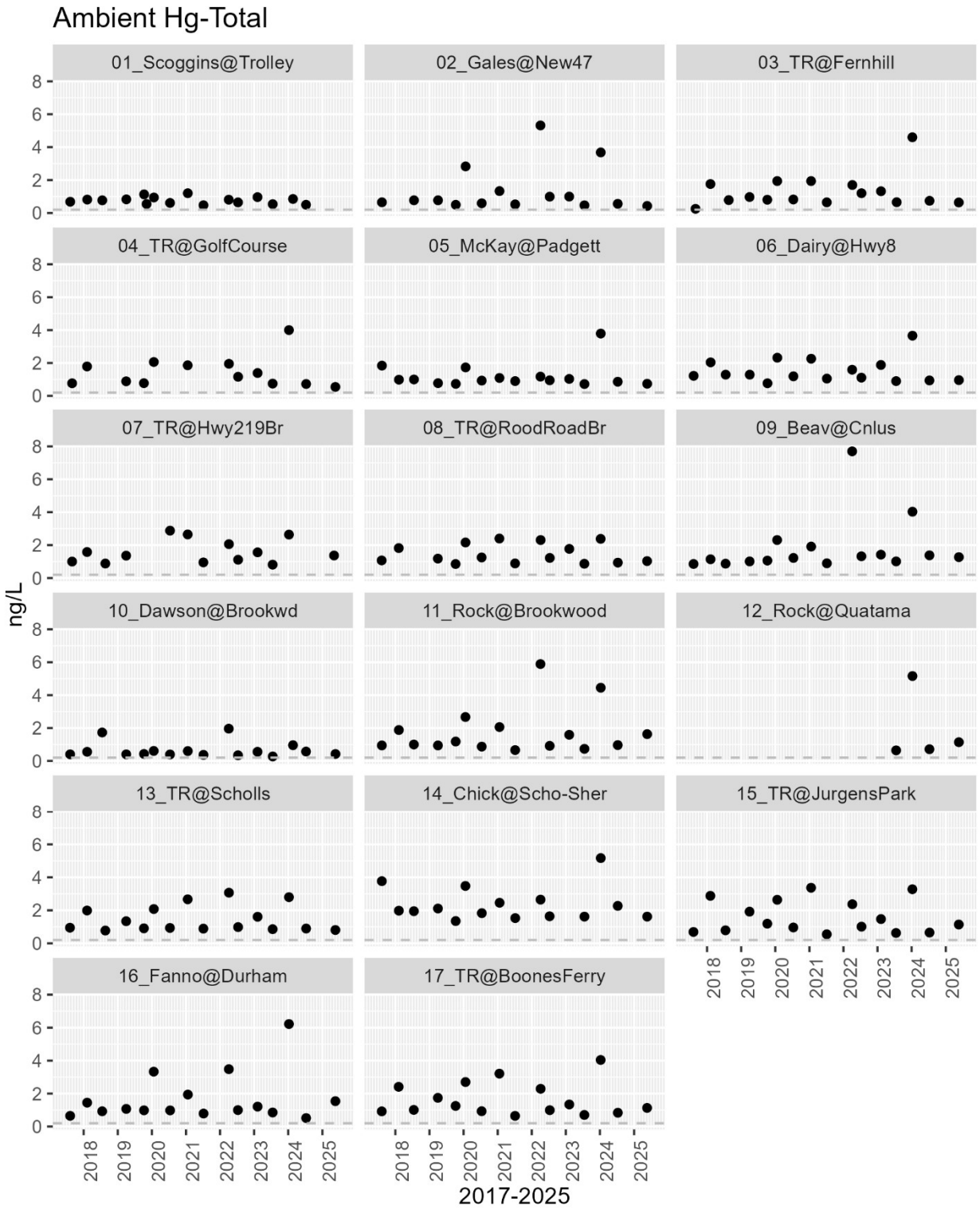


Figure D-18: Total Mercury Concentrations at Ambient Sampling Locations



Appendix E: Planning and Land Use Changes

CWS is responsible for providing sanitary sewer service and stormwater management throughout urban Washington County. CWS meets these responsibilities by, among other things, reviewing and issuing permits for construction and modification of, or connection to, the public sanitary and stormwater management systems and for erosion control.

The co-implementers are responsible for adopting local land use regulations that implement statewide planning and land use goals to protect water quality and fish and wildlife habitat. Land use planning is also the responsibility of Metro, an elected regional government serving more than 1.5 million residents in Clackamas, Multnomah, and Washington counties. By working in partnership with Metro, Clackamas, Multnomah, and Washington counties, CWS can anticipate where growth may or may not occur under existing plans. CWS and the co-implementers coordinate their water quality, quantity, and habitat management efforts via intergovernmental agreements and day-to-day cooperation. CWS is currently working with the co-implementers to update the intergovernmental agreements by November 1, 2026.

Work on several ongoing concept plans aimed at planning development patterns was either continued or completed as noted in Table E-1. Table E-1 also highlights subbasin plans either completed or in development intended to address stormwater from a regional and/or alternate approach. Figure E-1 shows CWS' service area with the applicable zoning.

Table E-1: Co-Implementer Long-Range Land Use & Subbasin Planning Activities

Lead Co-Implementer	*Referenced Plan*	*Status*	*Plan Type / UGB Status*
Sherwood	Sherwood West	▪ The concept plan was completed and accepted by Metro. ▪ Continued planning is on hold pending the results of an appeal to Metro's decision, but is anticipated to begin before the end of 2025. ▪ CWS has been engaged with the City of Sherwood about supporting its desire to incorporate subbasin planning into its comprehensive planning.	▪ Concept / Inside UGB
Tigard	River Terrace South and West	▪ The city has been carrying out planning activities during the reporting period. ▪ CWS continues to provide planning support for sanitary sewer and stormwater for the area. ▪ The plan will be completed and adopted in FY 2025-26.	▪ Comprehensive / Inside UGB
Beaverton	Downtown Beaverton Subbasin Strategy	▪ The city is challenged to fit traditional stormwater management controls into a densely urbanized redevelopment area and is looking to provide alternate approaches for managing stormwater. ▪ The plan is being prepared as part of a larger urban renewal effort. ▪ The plan will recommend a mix of engineered and nonengineered approaches to stormwater management, such as reducing existing impervious surface.	▪ Subbasin plan

Clean Water Services	South Bull Mountain Regional Stormwater Concept Plan	▪ CWS worked closely with the cities of Tigard and King City, as well as Metro and Washington County, to address stormwater from a regional perspective. ▪ This plan supported both Tigard and King City in their urban expansion planning. ▪ The plan was completed in June 2025 and the teams are preparing for implementation.	▪ Subbasin plan

No other significant land use changes or expansion of the Urban Growth Boundary occurred during this reporting period. Figure E-2 shows CWS' service area with urban reserves. Figure E-3 shows properties annexed to CWS and deannexed in Fiscal Year 2024-2025.

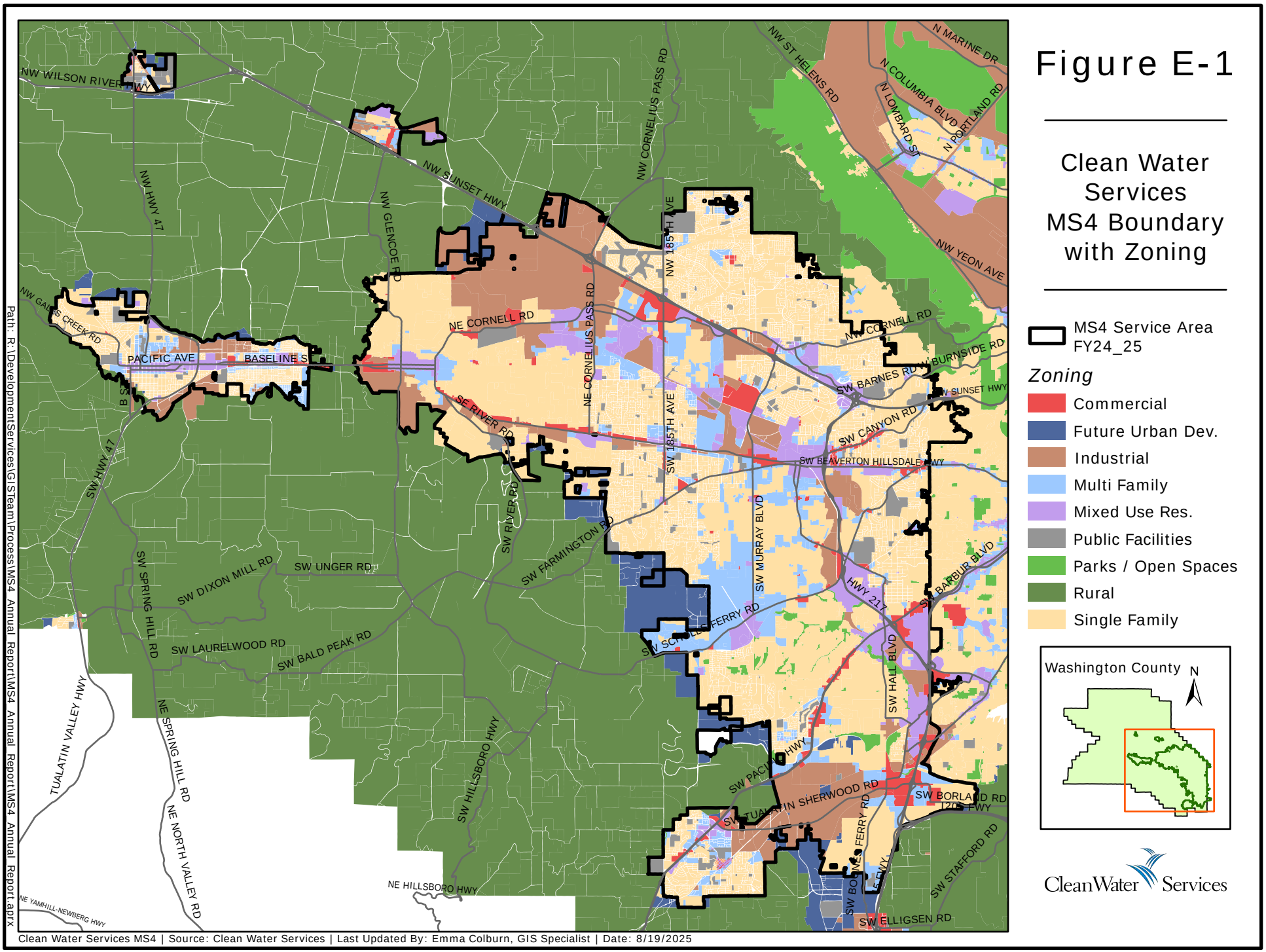
A number of areas were annexed to the CWS service area from within the Urban Growth Boundary. These are now able to be served by the urban sanitary sewer and stormwater management system. Details are provided in Table E-2 and in Figure E-3.

Table E-2: Details of Clean Water Services Annexations

Metro Proposal Number	*Location*	*Annexation Date*	*Area Annexed, acres*
WA1124	The property is located generally north of NE Evergreen Road, south of NW Meek Road, east of Jackson School Road, and west of NW 273rd Avenue.	7/30/2024	129.70
WA1324	One property is located generally north of NE Evergreen Road, west of NW 278 Avenue, and east of NW 273rd Avenue. The second property is located generally north of NE Evergreen Road and just east of Jackson School Road.	7/31/2024	116.80
WA1824	The right-of-way segment is located north of Evergreen Road and south of NW Meek Road.	11/6/2024	1.15
WA1924	The properties are located north of SW Brookman Road, south of SW Cobble Court, and east of SW Robin Hood Place.	11/6/2024	20.70
WA2024	The properties are located east of Port of Tillamook Bay Railroad, west of NW Aerts Road, and south of NW Banks Road.	11/6/2024	210.00
WA2124	The property is located south of SW Gassner Road, east of SW Miller Hill Road, and west of SW 190th Avenue.	11/6/2024	0.46
WA2324	The property is located north of NE Pubols Street, south of NW West Union Road, east of NW Helvetia Road, and west of NE Century Boulevard.	11/6/2024	5.52
WA2524	The properties are located north of Rosa Road, south of SE Oakhurst Street, east of SW River Road, and west of SE Brookwood Avenue.	11/6/2024	134.91
WA2724	The properties are located north of NE Pubols Street, south of NW West Union Road, east of NW Helvetia Road, and west of NE Century Boulevard. This includes the right-of-way on West Union Road.	11/6/2024	13.64

WA3224	The property is west of SE 345th Avenue, north of SW Cook Street, south of S Quartz Drive.	11/19/2024	7.60
WA3424	The properties are located north of NE Evergreen Road, south of NW Meek Road, east of NW Jackson School Road, and west of NW 273rd Avenue.	12/17/2024	4.47
WA0125	The properties are located north of SW Beef Bend Road, east of SW Roy Rogers Road, and west of SW 150th Avenue.	1/7/2025	18.08
WA0325	The property is located north of NE Schaaf Street, south of NE Pubols Street, east of NW Helvetia Road, and west of NE Century Boulevard.	1/23/2025	6.94
WA0525	The properties are located south and east of SW Oregon Street, north of SW Industry Lane, and west of SW 124th Avenue.	2/11/2025	38.63
WA0925	The properties are located north of SE McInnis Street, south of SE Kinnaman Street, west of SE Cornelius Pass Road, and east of SE Century Boulevard.	3/26/2025	18.40
WA1125	The properties are located north of SE Corsica Street, south of SE 234th Avenue, east of SE Brookwood Avenue, and west of SE Century Boulevard.	3/26/2025	10.11
WA1425	The properties are located on the northeast corner of N 10th Avenue and Council Creek.	5/9/2025	1.82
Total			**738.93**

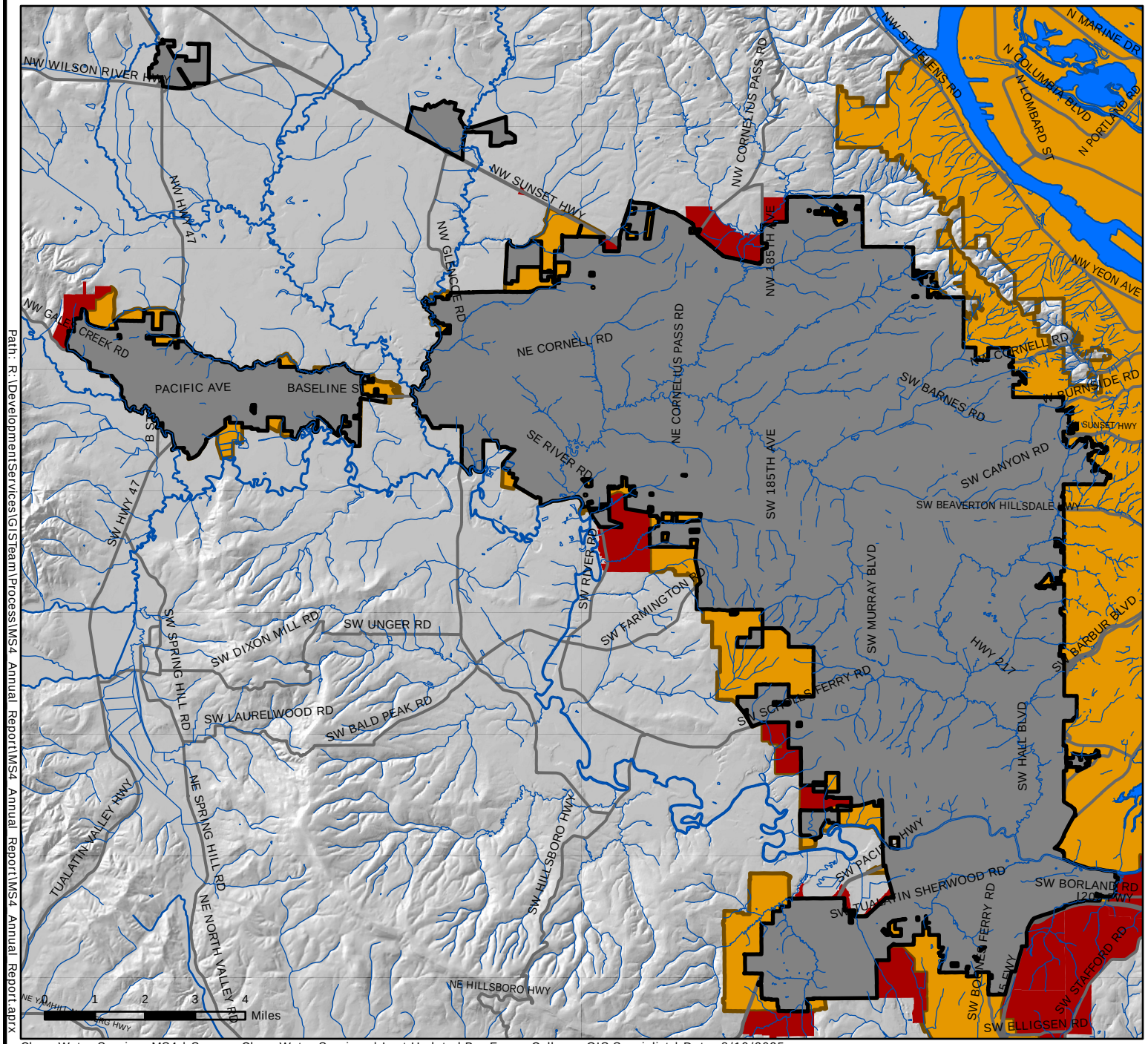
In Fiscal Year 2024-2025, there were no deannexations from the CWS service area. Details are provided in Figure E-3.



Path: R:\DevelopmentServices\GISTeam\Process\MS4 Annual Report\MS4 Annual Report\MS4 Annual Report.aprx

Clean Water Services MS4 | Source: Clean Water Services | Last Updated By: Emma Colburn, GIS Specialist | Date: 8/19/2025

This page intentionally blank.



Path: R:\DevelopmentServices\GISTeam\Process\MS4_Annual_Report\MS4_Annual_Report\MS4_Annual_Report.aprx

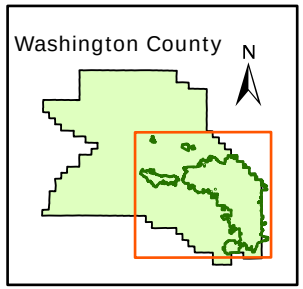
Clean Water Services MS4 | Source: Clean Water Services | Last Updated By: Emma Colburn, GIS Specialist | Date: 8/19/2025

Figure E-2

Clean Water Services MS4 Boundary Urban Reserves UGB Expansion

- Urban Reserves
- Current UGB End of Reporting Period
- MS4 Service Area FY24_25

Note: Areas that are not within the CWS MS4 Service boundary but are within the UGB boundary are areas yet to be annexed into CWS Service area.



Clean Water Services

This page intentionally blank.

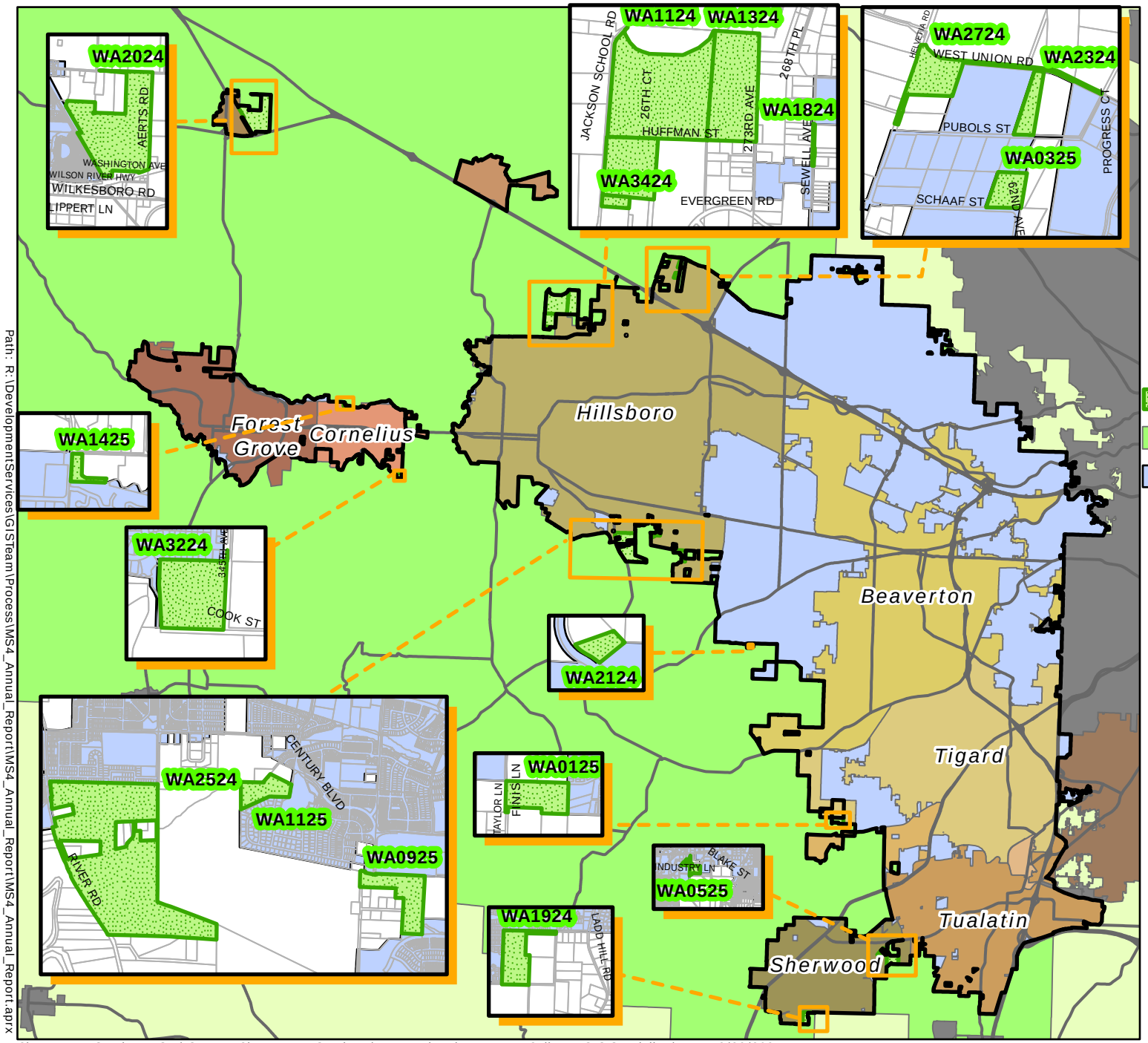
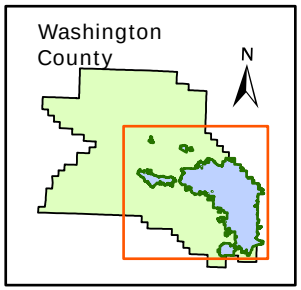


Figure E-3

Clean Water Services FY 24-25 Annexations (738.925 acres)

- CWS Annexations FY24-25
- Unincorporated
- CWS MS4 Service Area



Clean Water Services

Path: R:\DevelopmentServices\GISTeam\Process\MS4_Annual_Report\MS4_Annual_Report\MS4_Annual_Report.aprx

Clean Water Services MS4 | Source: Clean Water Services | Last Updated By: Emma Colburn, GIS Specialist | Date: 8/28/2025

This page intentionally blank.