

Nov 1, 2023

Christine Svetkovich
Northwest Region Watersheds Manager
DEQ Northwest Region
700 NE Multnomah St. Suite 600
Portland, OR 97232-4100

Dear Christine Svetkovich:

As a Willamette Basin Designated Management Agency (DMA) with pollutant load allocations to achieve the overall health goals as stated in the Willamette Basin Water Quality Management Plan (WQMP), the City of Gresham is pleased to submit its updated Total Maximum Daily Load (TMDL) Plan document that includes Implementation Plans (IP) for the Columbia Slough, Willamette River and Sandy River basins which are impacted by the urban activities conducted by the City and its residents and businesses.

The enclosed plan has been reviewed and adaptively managed with updated information that follows the city's available staffing and budgeting with regard to program implementation that supports the ongoing goals to reduce stream temperature, bacteria, and mercury over time.

Updates to the Plan include:

- Extending the reporting time frames thru the next 5-year period -although we note that the City's Stormwater Management Plan and Monitoring Plan and Benchmarks analysis permit renewal package is due in March 2026, prior to the TMDL five-year period of FY 27-28.
- Adding to Section II: NP-4 Houselessness Impacts to Water and Natural Areas
- Update to Section III (Temperature and Mercury) to reflect the City's 2023-2028 Temperature TMDL Implementation Plan

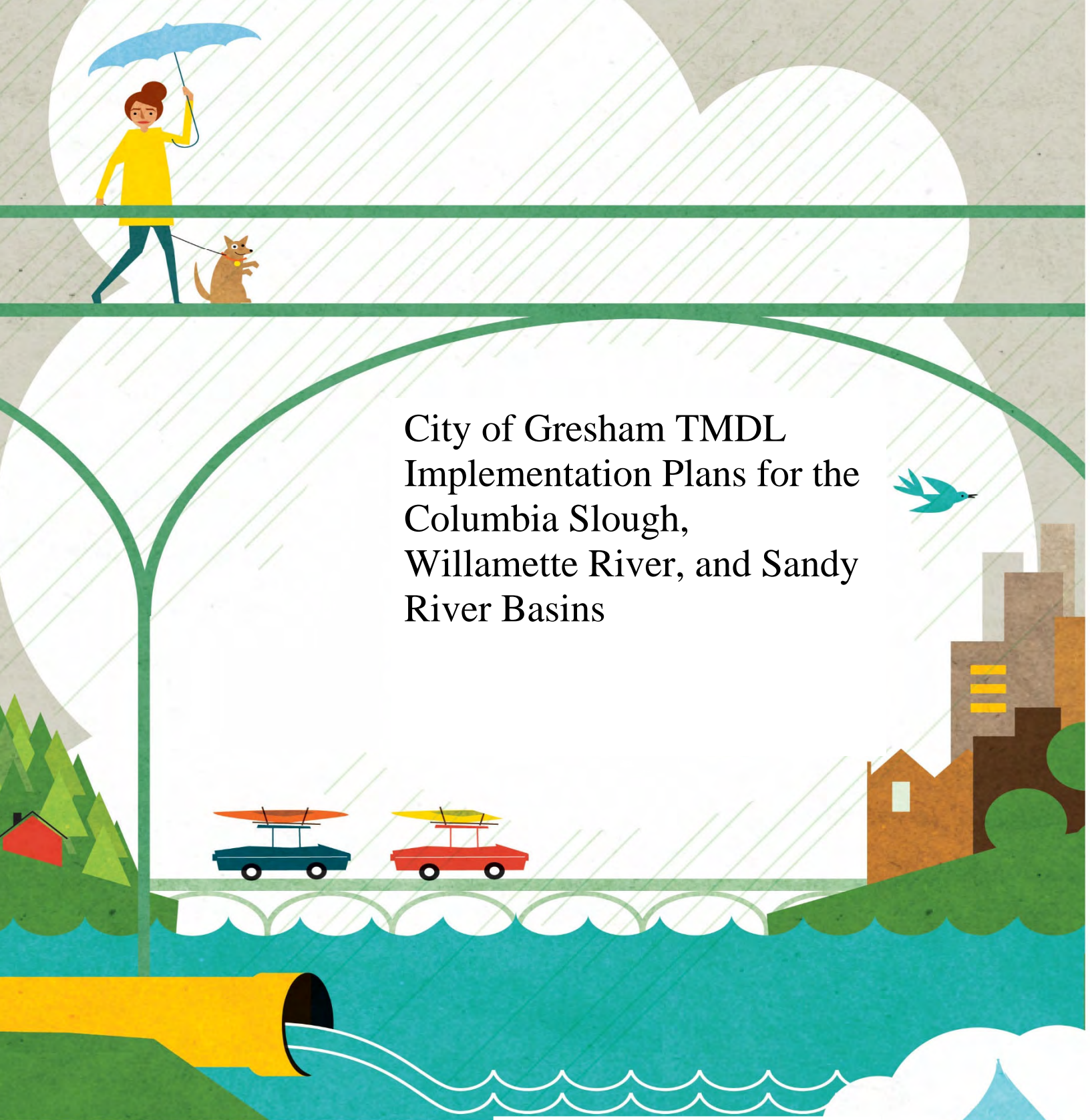
As you know, the mercury update was submitted for review last September and is still under review by DEQ. We look forward to receiving DEQ feedback on the City of Gresham's efforts to reduce urban impacts to streams to the maximum extent practicable.

Sincerely,



Steve Fancher, Assistance City Manager &
Department of Environmental Services Director
Steve.Fancher@GreshamOregon.gov

Cc: Torrey Lindbo, Water Resources Science & Policy Manager
Kathy Majidi, Natural Resources Program Manager
Andrea Matzke, Lower Willamette Basin TMDL Coordinator



City of Gresham TMDL
Implementation Plans for the
Columbia Slough,
Willamette River, and Sandy
River Basins

CITY OF
GRESHAM

Submitted March 2008
Mercury Update August 2022
5 Year Update Nov 2023

Watershed Division
Dept. of Environmental Services



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SECTION I: OVERVIEW

BACKGROUND

Reason for Overview and TMDL Implementation Plans

The Department of Environmental Quality (DEQ) has set Total Maximum Daily Loads (TMDLs) for several water bodies located in watersheds that are wholly or partly within the City of Gresham to limit the total amount of specific pollutants that may be discharged to a given waterbody. Under Oregon law,² TMDLs must include a Water Quality Management Plan (WQMP) that identifies how the TMDLs will be implemented. Management strategies identified in a WQMP must be implemented through water quality permits for those sources subject to permits, and through sector-specific or source-specific implementation plans for other sources.

This document outlines Gresham's compliance plans for the Columbia Slough, Willamette River, and Sandy River TMDLs. (See **Table 1.**) The city's permits, Stormwater Management Plan (SMP) document, Environmental Monitoring Plan (EMP) and other associated documents to reduce TMDL pollutants are implementation plans and are on the city's website: **GreshamOregon.gov** and are included in the Stormwater Plan section of the **Water Resources Division pages**.

The City of Gresham has jurisdiction over both DEQ-permitted and non-permitted activities. The City's responsibilities include compliance with DEQ permits for discharge of stormwater and wastewater, as well as oversight of incidental discharges and thermal warming associated with land uses approved by the City.

Figure 1. shows the watersheds within Gresham's boundaries, plus the Columbia River. The watersheds drainage areas include the Columbia Slough; Fairview, Kelly/Beaver, and Johnson Creeks. City stormwater drains to all these waterbodies, whereas the wastewater treatment plant discharges treated sanitary wastewater to the Columbia River. The shaded areas on the map drain to groundwater via underground injection wells (UICs), rather than discharging to surface waters and are regulated under the City's WPCF permit available on GreshamOregon.gov.

The NPDES MS4 permit area for Gresham includes the incorporated areas (the city limits) of the City of Gresham except the portions of the City's stormwater system that drain to Underground Injection Control (UIC) systems. UICs drain to groundwater and are subject to a Water Pollution Control Facility (WPCF) permit. The Best Management Practices (BMPs) described within this TMDL Implementation Plan are applied throughout the entire City's urban services boundary.

² Oregon Administrative Rules,
Chapter 340, Division 42

Figure 1. Watersheds within Gresham

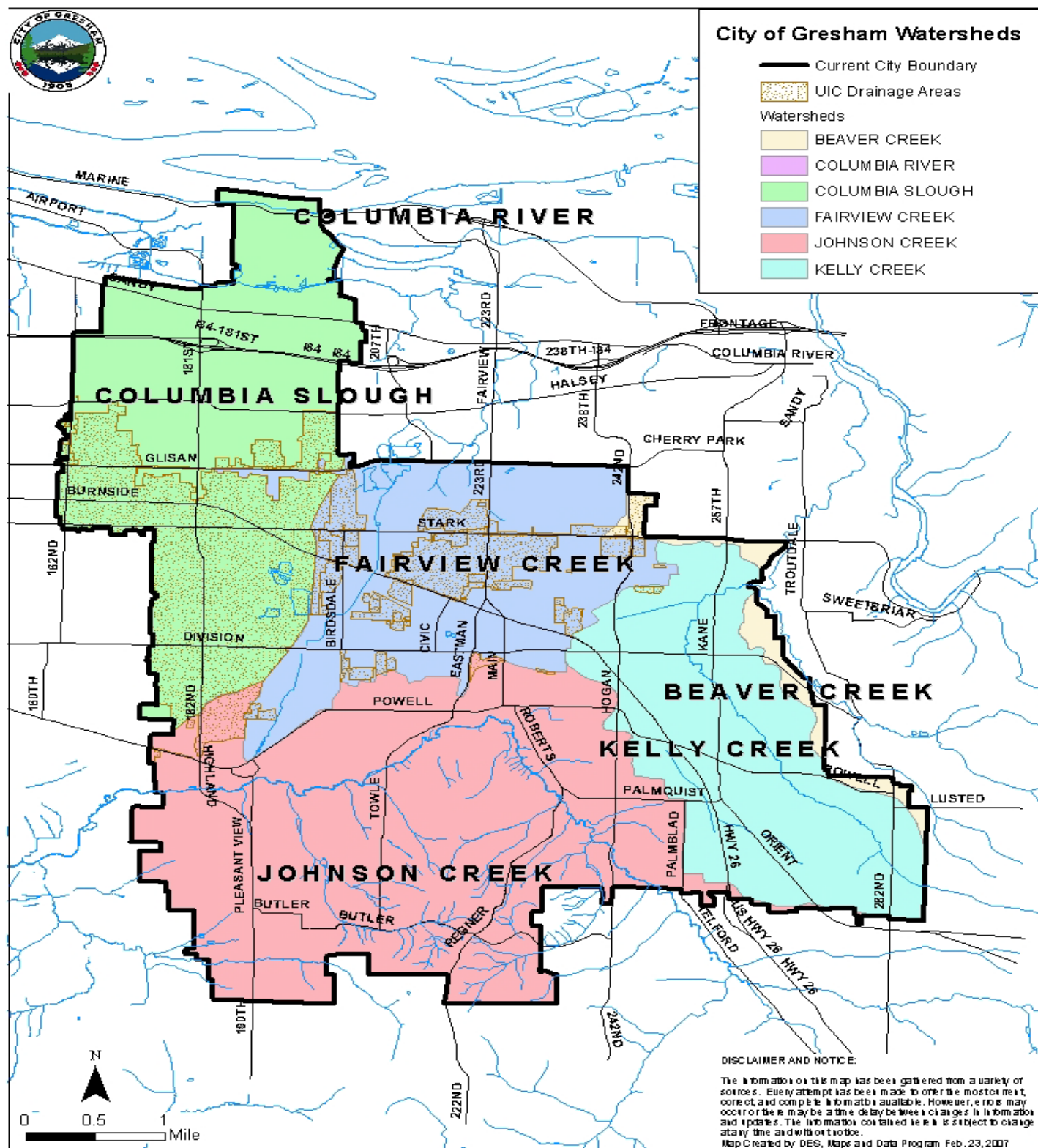


Table 1. Watersheds and TMDL Pollutants

Basin Name	Sub-basin(s)	TMDL Pollutants relevant to Gresham	Year TMDL Set	Reduction Goal
Columbia River	Lower Columbia	Dioxin*	1991	.54 mg/day (max loading for Willamette)
Willamette River	Lower Willamette	Mercury, bacteria, temperature	2006, Updated 2019(WQMP)/2021(TMDL)	97% (stormwater) 97% (nonpoint)
	Columbia Slough and Fairview Creek	DDT, DDE, dieldrin, dioxin, PCBs, lead, phosphorus, bacteria, dissolved oxygen, pH, chlorophyll a;	1998	
	Columbia Slough and Fairview Creek	Temperature	2006	No anthropogenic warming
	Fairview Creek	Bacteria	2006	66%
	Johnson Creek & tributaries	DDT, dieldrin, bacteria, temperature	2006	78% (bact) 77% (DDT stormwater) 94% DDT nonpoint) no anthropogenic warming (temp)
Sandy River	Kelly, Burlingame, and Beaver Creeks	Bacteria, temperature	2005	86% (bact) no anthropogenic warming (temp)
A portion of Columbia Slough	NA (drains to groundwater ~2,250 acres)	NA (Underground Injection Control permit #112110 and wellhead protection requirements apply)	NA	

*A dioxin TMDL was set by EPA for the lower Columbia River. Wastewater treatment plants and stormwater are discussed in that TMDL, but due to lack of data, loads from these sources are considered part of the reserve capacity, and no specific allocation was made.

City of Gresham Jurisdiction and Organization

Typical urban activities that the City oversees to evaluate and reduce impacts to surface waters include but are not limited to monitoring streams and stormwater, development, system maintenance & repair, sanitary waste collection and treatment, solid waste recycling and disposal, erosion prevention & sediment control, business inspections, management/restoration of public land and public outreach (for private land). These activities are under the jurisdiction of different Departments and Divisions within the City. **Figures 2 and 3** show the organization of the City and the Department of Environmental Services (DES), respectively and lists some of the major duties in each DES group.

OVERVIEW SCOPE AND SUMMARY OF IMPLEMENTATION PLANS

This overview addresses discharges of pollutants that come from both “point” and “nonpoint” sources. Point sources enter surface waters via a pipe or other conveyance, whereas nonpoint sources (NPS) discharge to surface waters directly or through overland flow (not via pipes or other conveyances). The City has obtained point source permits from DEQ under the National Pollutant Discharge Elimination System (NPDES) for its discharges to surface waters from its wastewater treatment plant outfall (#102523) and from over 1,000 stormwater outfalls that enter Gresham’s streams (#101315) and holds a nonpoint source 1200Z stormwater permit for the property at the wastewater treatment plant.

Figure 2:

City of Gresham Functional Organizational Chart

Current as of June 2023

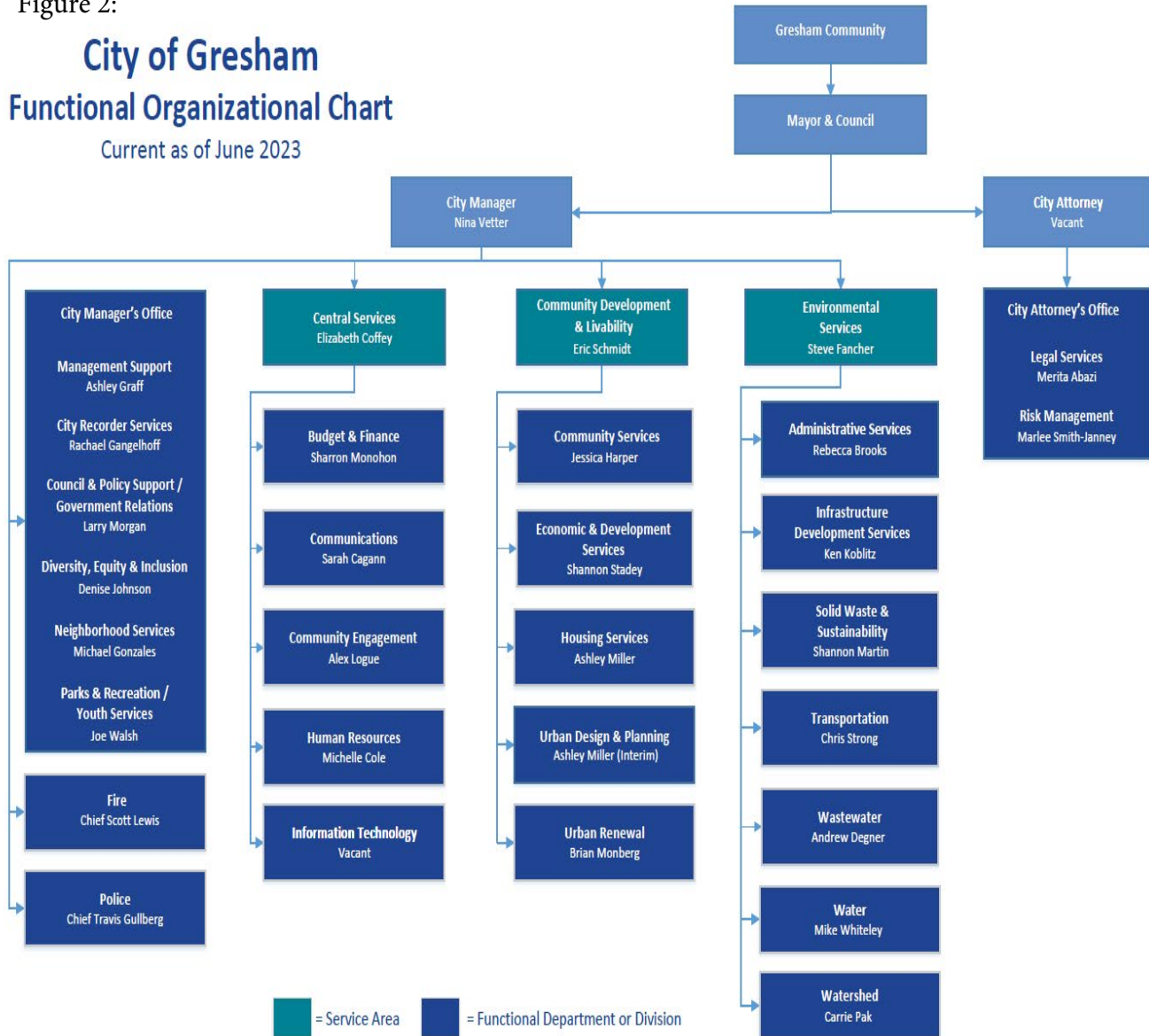


Figure 3. Department of Environmental Services Organizational Chart

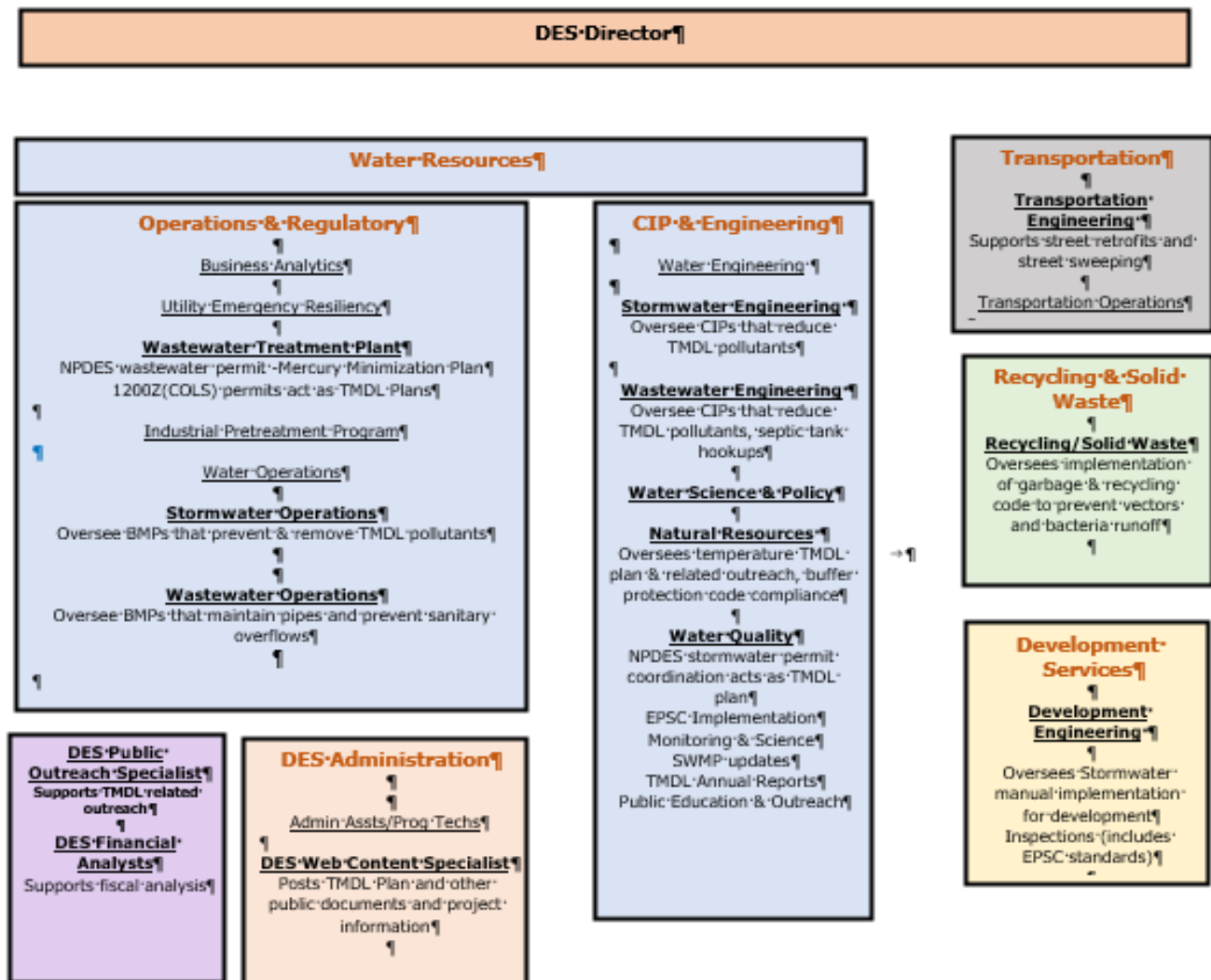


Table 2. summarizes the City’s various implementation plans for its watersheds and relates them to a comprehensive list of pollutant sources that have potential to affect the quality of surface waters.

Not included in this TMDL package are other regulatory programs that have indirect benefits for TMDL reduction, including mercury, also available at GreshamOregon.gov:

- WPCF Permit for Underground Injection Controls (UICs) to protect groundwater
- Columbia South Shore & Cascade Well Field Wellhead Protection practices
- Expansion of the Cascade Well Field Wellhead Protection Area (See Figure 4. Gresham’s Groundwater Protection Areas –update to nomenclature).
- City’s Commute Trip/Teleworking Policy, and Air Contaminant Discharge Permit for the cogeneration facility associated with the Wastewater Treatment Plant

Table 2. Discharge Sources and Relevant TMDL Implementation Plan

Pollutant Source or Transport Mechanism	TMDL Parameters of Interest*	Implementation Plan & Lead Dept(s) or Division(s)
Treated and untreated (if there is an upset) sanitary waste discharged from the City's Wastewater Treatment Plant or collection system	<i>Bacteria, phosphorus, pH, dissolved oxygen, dioxin, mercury</i>	City's NPDES Wastewater Treatment Plant permit (DES Wastewater Services Division)
Mercury discharges from wastewater (entering Columbia River)	<i>Mercury</i>	City's Mercury Minimization Plan (req. by WWTP permit)
Untreated sanitary waste discharged from private system backups or failing septic tanks	<i>Bacteria, phosphorus/nutrients, pH, dissolved oxygen, dioxin, mercury</i>	Nonpoint Source TMDL Implementation Bacteria Plan (DES Wastewater Services Division)
Stormwater runoff from the Wastewater Treatment Plant	<i>Bacteria, phosphorus/nutrients, pH, dissolved oxygen, mercury</i>	1200Z NPDES Permit (DES Wastewater Services Division)
Stormwater runoff and illicit discharges that enter the City's stormwater system (City outfalls to local surface waters)	<i>Bacteria, phosphorus/nutrients, pH, dissolved oxygen, dioxin, DDT, DDE, dieldrin, lead, mercury, PAHs, PCBs</i>	City's NPDES MS4 Permit, SMP, Environmental Monitoring Plan (DES Water Science & Policy)
Stormwater runoff and illicit discharges that do not enter the City's stormwater system, but are directly discharged to surface waters (e.g., fertilizer and pesticides, animal feces, dumping)	<i>Bacteria, phosphorus, pH, dissolved oxygen, dioxin, DDT, DDE, dieldrin, lead, mercury, PAHs, PCBs</i>	City's NPDES MS4 Permit and associated documents** (DES Water Science & Policy)
Atmospheric dry deposition into surface waters	Mercury, lead, PAHs	City's Commute Trip-Teleworking Policy (Office of the City Manager)
	None known	City's Cogeneration Facility Air Contaminant Discharge Permit (DES Wastewater Services Division)-controls SO ₂ , NO _x , CO, VOCs
Contaminated groundwater inflow (known and unknown sites of spills and leaks; excess fertilizers and pesticides)	<i>PAHs, PCBs, lead, phosphorus, DDT, DDE, dieldrin</i>	City's NPDES MS4 Permit and associated documents (DES Water Science & Policy) City's Well field Wellhead Protection Program (DES Water Science & Policy) City's Underground Injection Control Program (DES Water Science & Policy)
Solar radiation (lack of shade)	<i>Temperature, chlorophyll a (dissolved oxygen, pH***)</i>	City's Temperatures TMDL Implementation Plan (DES Water Science & Policy)
Solar radiation (in-line City-owned ponds)	<i>Temperature, chlorophyll a (dissolved oxygen, pH***)</i>	City's Temperatures TMDL Implementation Plan (DES Water Science & Policy)

*TMDL parameters that may be affected by the discharge are listed. Pollutants that are prevented or reduced through implementation of the plan(s) listed in the right-hand column are shown in italics.

**The City stormwater system is defined in code to include surface waters and the public drainage infrastructure. The City's programs outlined in the SMP document are applied to surface and groundwater areas and private non-point source activities, as applicable.

***TMDL parameters shown in parentheses are indirectly affected by stream temperature.

A map of Multnomah County, Oregon, illustrating three distinct regions: Cascade (light blue), Cascade Expansion (light green), and Columbia South Shore (yellow). The map includes major roads such as NE Marine Dr, NE Sandy Blvd, NE Halsey St, NE Glisan St, SE Stark St, NW Burnside Rd, NW Division St, W Powell Blvd, E Powell Blvd, NE Hogan Dr, NE Kane Dr, SE 162nd Ave, SE 182nd Ave, SE 190th Dr, SW Towle Ave, SW Butler Rd, SE Degner Rd, SE 223rd Ave, SE 282nd Ave, and I-5 (labeled as 184 FWY). The Columbia River is shown at the top, and the Historic Columbia River Hwy is on the right. A legend in the top right corner identifies the colored regions. A scale bar at the bottom left indicates distances from 0 to 2 miles, and a north arrow is also present. Blue dots are scattered across the map, representing specific locations or points of interest. Dashed black lines outline various smaller areas within the larger regions. The map is labeled with "Multnomah Co." and "Clackamas Co." at the bottom.

Table 3. outlines the main practices conducted under the NPDES wastewater and stormwater permits and covers the six minimum measures as described in the Water Quality Management Plan (WQMP)³ and has been updated for consistency with the City’s July 1, 2022 updated Stormwater Management Plan (SMP) document and the Environmental Monitoring Plan⁴. Both of the City’s permits require annual reports which provide information on the treatment plant’s stormwater, industrial pretreatment, and biosolids management programs, as well as the SMP implementation progress, including additional activities conducted for TMDL compliance. Both of these permits and implementation plans are available on the City’s website at greshamoregon.gov.

Table 3. also summarizes Discharges from nonpoint sources are not covered by DEQ permits because they flow directly to streams without entering the public stormwater system, as well as temperature which is not a pollutant associated with stormwater because stormwater occurs during the colder weather season. As such, additional actions that will be taken are described in **Sections II and III** for the bacteria and temperature TMDLs.

³ Final Revised Willamette Basin Mercury Total Maximum Daily Load Nov. 22, 2019. Accessed from Oregon.gov/deq/wq/Documents/willHGtmdlwqmpF.pdf

⁴ Both documents approved by DEQ on August 23, 2022. Email from Pablo Martos.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	Table 3. Summary of Commitments for 5 Year TMDL Plan																										
2	Best Management Practice or Activity	Commitment	Performance Measure	Milestones	Adaptive Management	Nutrient Related*	Bacteria	Temperature	DDT/DDE	Dieldrin	Dioxin	PAHs	Mercury	Lead	PCBs	Johnson Creek	Fairview Creek	Columbia Slough	Sandy River	Columbia River	NPDES-MS4	Nonpoint Source	UIC (drywells)	NPDES-WWTP	Limit 10	Goal 5/Title 13	
3	Key to Pollutant Symbols: An empty circle means the level of effect is unknown, but some effect is likely. A star means the BMP has significant effect if widely and fully implemented (not always the case). A diamond indicates a BMP that has a lesser effect. Blank indicates that the BMP has little direct effect on that pollutant. These designations are based on professional judgment only, based mainly on the ability of the BMP to prevent solids from entering, or to remove solids from stormwater For pollutants like nutrients that are transported as both dissolved and by sediment, a diamond is used. Program Commitments that have no symbols are integral to other activities that have symbols, or are not expected to have significant effects on the listed pollutants.																										
4	This table has been updated to reflect the mercury TMDL update and the updated Stormwater MS4 Stormwater Management Plan (SWMP) document which has been approved in August 2022 and expires 2026. This section is a summary, more detail can be found in the SWMP. Adaptive management will be reported with each MS4 Annual Report and TMDL Annual report or 5 year TMDL report, as applicable.																										
5	Checkmarks in the Watershed column indicate that the BMP is conducted in that basin.																										
6	An "X" in the Regulatory Program columns indicates that the City's compliance efforts for the identified program include that BMP.																										
7	"Nonpoint Source" refers here to the temperature plan and private sector/residential bacteria contributions not addressed completely by the MS4 Stormwater Management Plan																										
8	COMPLY WITH MUNICIPAL SEPARATE STORMWATER SEWER SYSTEM (MS4) NPDES PERMIT																										
9	See complete SWMP for full details on: GreshamOregon.gov																										
10	Stormwater O&M Program Pipe Cleaning Storm Drain Cleaning Stormwater Facility Maintenance Grey Infrastructure Maint. UIC Cleaning	Implement O&M activities to prevent or remove sediment and associated pollutants	• Miles cleaned/yr. • Volume of debris removed/yr.	Annual reporting -ongoing and submitted with the MS4 report; Report total miles cleaned and total debris removed, total facilities cleaned and total debris removed, total grey infrastructure cleaned and debris removed for the 5 year TMDL report.	FY 23-24 thru FY 27-28	♦	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
11	Stormwater Manual for Development & Erosion Prevent & Sediment Control Standards	Implement the Development Standards to prevent or reduce pollutants via filtration, plant uptake, degradation, ad-ab-sorption and others.	Track development, treatment type and acres treated.	Annual reporting -ongoing and submitted with the MS4 report; Report the total development acres treated for the 5 year TMDL report.	FY 23-24 thru FY 27-28	*	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
12	Good Housekeeping at City O&M Facility	Train staff on procedures and best practices related to management of dirt, debris, drips, spills, and waste related to daily operations of the City's equipment and spoils from work activities.	*At least annual cleaning of catch basins *Summary of activities and protocols	Annual reporting--ongoing and submitted with the MS4 report. Report adaptive management changes to protocols in 5 year TMDL report.	FY 23-24 thru FY 27-28	*	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
13	Erosion Prevention & Sediment Control Program	Implement EPSC inspections to keep sediment from moving onsite, control spills, ensure cleanups, prevent illegal dumping and disturbance of protected buffers for trees or riparian areas.	Track inspections and document corrections needed and compliance.	Annual reporting--ongoing and submitted with the MS4 report. Total numbers inspected and compliance actions conducted for the 5 year TMDL report.	FY 23-24 thru FY 27-28	♦	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
13	Private Stormwater Facility Program & Private Stormdrain Cleaning Program (SCAP)	Ensure private facilities are cleaned and maintained on a schedule that is based on best practices	Track private facilities by type, and summarize inspection results Report total businesses cleaning catch basins annually via program work and total drains cleaned. Estimate debris removal.	Annual reporting-ongoing and submitted with the MS4 report; Summarize private facility totals and observations of maintenance frequencies needed for pollutant removal success for the 5 year TMDL report	FY 23-24 thru FY 27-28	◆	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
14	Transportation Division O&M program	Implement O&M activities to prevent or remove sediment and associated pollutants	• Lane miles swept • Follow water protection O&M procedures per ODOT standards	Annual reporting-ongoing and submitted with MS4 report. Report any program changes in the 5 year TMDL report.	FY 23-24 thru FY 27-28	◆	*		*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
15		Plan stormwater treatment for new road development	Type of stormwater treatment added and acres of area treated																								
16	Water Quality Retrofits and Capital Improvement Projects	Implement capital and retrofit projects for stormwater and natural resources to prevent or remove pollutants, address temperature, and improve stream resiliency and function	• Track the number, type, watershed location and total drainage area of CIPs or retrofits constructed for water quality and natural resources	Annual reporting-ongoing; evaluate project master lists and funding projections for each updated stormwater management plan, or as otherwise required by DEQ	FY 23-24 thru FY 27-28	◆	◆	◆	*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X		X				
17	Business Screening & Inspection Program	Implement program to include businesses with high potential to contribute stormwater pollution, including mercury.	• Annually screen and add new businesses, report suspected 1200Z needed permits to DEQ Inspection goal is 100-200/yr.	Annual reporting-ongoing and submitted with the MS4 report. Total numbers inspected and enforcements conducted for the 5 year TMDL report. Assess auto wrecking yard's handling of mercury in vehicles	FY 23-24 thru FY 27-28	○			*	*	*	*	*	*	*	✓	✓	✓	✓	✓	X	X	X				
18	Integrated Pest Management Program	Implement a plan with procedures that prevent or reduce impacts to surface water from public land, sports fields, parks and right of way management.	Ensure staff are trained on procedures. At least every two years, discuss chemicals, products and approaches to land management to adaptively manage as needed for best probable outcomes. Avoid products with mercury.	Annual reporting-ongoing; evaluate and update the IPM Plan for each updated stormwater management plan. Goal: Consider ways to monitor or evaluate practices or products used to aid adaptive management as resources allow.	FY 23-24 thru FY 27-28	◆						○				✓	✓	✓	✓	✓	X		X				
19	Illicit Discharge/Illicit Connection/Spill Response Program	Implement an illicit discharge and spill response & dry weather screening program to prevent or reduce impacts to surface water from pollutants, including private wastewater system backups	Document illicit discharge dry weather screening procedures and spill response procedures, conduct field investigations, track and respond to illicit connections/dumping/spills and document outcomes for activities	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	◆	◆				○	◆	◆	◆	◆	✓	✓	✓	✓	✓	X		X				
20	Solid Waste & Recycling Program	Implement programs for the public and businesses that reduce impacts to stormwater from nonhazardous, hazardous waste & recycling storage and disposal.	• Report quantities of hazardous materials disposed/yr.	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	◆				*	◆	*	◆	◆	◆	✓	✓	✓	✓	✓	X		X				
21	Educate Residents	Continue to educate residents regarding their personal contributions to stormwater pollutant sources that impact surface and groundwater and the benefit of trees in the urban canopy.	• Track programs/messages delivered, type of communication piece and where appropriate, number of people affected.	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	○	*	○			○	○	◆	○	○	✓	✓	✓	✓	✓	X	X	X				
22	Educate Businesses	Continue to educate businesses regarding their contributions to stormwater pollutant sources that impact surface and groundwater and the benefit of trees in the urban canopy.	• Track programs/messages delivered, type of communication piece and where appropriate, number of businesses affected.	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	◆	◆				○	◆	◆	◆	◆	✓	✓	✓	✓	✓	X		X				

Table 3 (Summary of Commitments), page 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
23	COMPLY with WASTEWATER TREATMENT PLANT NPDES PERMIT																										
24	WWTP O&M and Monitoring	Implement procedures to ensure proper function of WWTP to prevent overflows and to meet effluent limits	Train staff, implement procedures, and report upsets and monitoring exceedances for required parameters	WWTP staff are responsible for annual reporting to DEQ, sewer upsets and updating its SOPs to comply with its permit.	FY 23-24 thru FY 27-28	*	*					♦	♦	*	♦	♦				✓					X		
25	Mercury Minimization Plan	Implement the plan to prevent or reduce the introduction of mercury into surface waters that oversees industrial effluent, dental amalgam, drug takeback, hazardous waste outreach, and Green Biz Program.	Report on plan implementation	WWTP staff are responsible for annual reporting to DEQ, sewer upsets and updating its SOPs to comply with its permit.	FY 23-24 thru FY 27-28									*						✓					X		
26	Wastewater O&M and CIP Program	Implement O&M procedures and capital projects to prevent inflow and infiltration and clogs leading the introduction of sanitary waste into surface waters	Track work conducted and capital projects annually	Stormwater staff report maintenance and capital project results to prevent the introduction of sanitary waste into surface waters.	FY 23-24 thru FY 27-28	♦	♦	♦				♦	♦	♦	♦	♦	✓	✓	✓	✓	X	X		X			
27	STORMWATER PERMIT (1200-Z) FOR WASTEWATER																										
28	Implement BMPs and Monitoring	Prevent or reduce impacts to surface water from WWTP activities and landscape management	Train staff on required procedures and conduct monitoring and reporting	Reporting as defined by the WWTP permit--ongoing implementation	FY 23-24 thru FY 27-28	*	*					♦	♦	♦	♦	♦				✓					X		
29	NONPOINT SOURCE TMDL IMPLEMENTATION PLANS																										
30	Private Sanitary Waste Systems																										
31	NPB-1 Mid-County Sewerage Project	Report the connection of the final two hold out homes	Report as progress happens	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	○	○							○			✓	✓	✓	✓			X				
32	NPB-2 Development Code Implementation	Ensure that new and redevelopment connect to the public sanitary system.	Number of new connections to the City system	Annual reporting-ongoing; evaluate frequency and adjustments needed for each updated stormwater management plan	FY 23-24 thru FY 27-28	*	*							○			✓	✓	✓	✓	✓	X					
33	NPB-3 Utility Billing Survey	Ensure that failing onsite systems are replaced and/or connect to the City's wastewater pipe if available per code.	Number of onsite properties that connect to public system	List of properties with potential septic tanks QA/QC list and evaluate education options. Report progress annually. Aspirational goal: send letters to all suspected septic tank owners with best maintenance	FY 23-24 thru FY 27-28	*	*							○			✓	✓	✓	✓	✓	X					
34	NPB-4 Houselessness Impacts to Water and Natural Areas	Address environmental impacts from camping conducted by the unhoused community, as resources allow	Report procedures /programs to aid the unhoused community. Report partner/volunteer efforts to conduct cleanups & restoration to mitigate impacts.	Annual reporting-ongoing	FY 23-24 thru FY 27-28	○	○	○				○		○			✓	✓	✓	✓	✓	X					

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
35	Temperature Management																										
	NPT-1 Natural Resource CIP Implementation	Pursue implementation of floodplain, wetland, and riparian projects with an identified temperature benefit, based upon the Natural Resource Plan and available Capital Improvement Program funding	Report benefits by watershed and 1+ scale in stream feet or riparian acreage (restoration, improvements, acquisition, easements 2> annual project costs 3>shade class affected (if applicable)	Annual reporting-ongoing	FY 23-24 thru FY 27-28			*			○		○				✓	✓	✓	✓			X				X
36	NPT-2 Riparian Planting	Work with community, volunteers, and private landowners to install ecosystem potential vegetation within target shade buffer areas	*1) City-wide Assessment: overall riparian condition periodically assessed through City-wide Natural Resources Master Plan, Watershed Master Plans, and 10-year shade analysis updates. 2) Active restoration sites chosen based on: survival at existing planting sites (extending work at sites not meeting minimum 55% survival criteria) and selection of new sites based on Natural Resources Master Plan prioritized sites and/or partnership opportunities. 3) Annual Report on implementation progress by watershed and acreage of project, total annual budget, #stems planted, statement of existing shade classification, and partners/volunteers involved. 4) Adaptive management strategies for overall restoration approach included in each TMDL Implementation Plan.	Complete site survey per standard management protocol (See Milestones in NPT-3, below) to assess site conditions and refine restoration plans. Annually review available budget to inform arrangements with partners/contractors/volunteers for implementation of site improvements. Annually implement site prep/planting/maintenance/monitoring/noxious weed treatment with record keeping for annual statistics reporting to DEQ (as outlined under item 3 for NPT-2 Performance Measures).	FY 23-24 thru FY 27-28			*		◆		◆				✓	✓	✓	✓			X	X				X
37	NPT-3 Monitoring and Reporting	Annually report on implementation of projects; every 5 years report on density, species, and survival statistics; every 10 years provide an analysis of change in shade conditions.	Report by Watershed: Annually: acreage of sites in preparation/planting/maintenance/monitoring phases; linear feet of stream banks of sites in preparation/planting/maintenance/monitoring phases; # of stems planted and annual survivability (via available planting area); annual budgetary expenses; & partner/volunteer involvement (hours per site). Every 5 years: Non-repeating projects like the forest health assessment findings will be reported using acreage to denote the extent of areas declining or improving."	Report by Watershed: Annually: Ongoing tracking of project metrics in geodatabase (implementation starting 2024). Annual reporting-ongoing. Annually or as needed based on management status: assess & document project site success, available planting area, & additional invasive plant removal needs. Every 5 years: 360-degree photography of project sites to document conditions and assess progress (implementation starting 2024). Photos to be taken on a 5-year interval with submeter photo location tracking, as resources allow. Every 10 years: Improvements to shade classification in each basin as resources allow.	FY 23-24 thru FY 27-28			*				○				✓	✓	✓	✓			X	X				X
38	NPT-4 Code & Overlay Reporting	Annually report on Development Code implementation (Urban Dev & Planning Dept), especially the Natural Resource Overlay (NRO) and other related ordinances to preserve riparian canopy and minimize soil disturbance.	Annually 1) Updates to Gresham Comp Plan Vol 1 and 2 and Vol 3 Development Code related to protections for riparian areas, improving shade conditions, and prevention of Hg discharge 2) #land use applications issued for projects with NRO 3) enforcement actions related to riparian areas	New BMP to be reported in next TMDL annual report	FY 23-24 thru FY 27-28			*				*				✓	✓	✓	✓			X	X				X
39																											

Table 3 (Summary of Commitments), page 4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
40	NPT-5 Public Involvement	Provide the TMDL IP, annual report, permits, SWMP and SMP for public review and comment. Comments can be submitted using the posted staff email addresses associated with the documents. Notify watershed partners of the posted documents to encourage their involvement and feedback. Post on social media platforms with a brief explanation of what the document is and with links to the documents meant for review.	Provide a public comment period, review of comments and consideration in further development of said plans	Upon permit renewal submittal, and TMDL IP approval, annual report and all approved documents, post on website for public access. Use social media platforms to send notification of the documents posting with a link to where the documents are on the city website	FY 23-24 thru FY 27-28												✓	✓	✓	✓	✓	X	X				

Fiscal Analysis

The program staffing and operating budgets described in this document related to Table 3. total about \$8.5M annually. The majority of the funding (45%) supports the O&M staff, equipment, and operating fund for stormwater activities and street sweeping. The Stormwater utility has a Capital Improvements budget that fluctuates by year but on average is about \$1.5M annually; that amount must be allocated between competing prioritized projects as developed by the Engineering, O&M, Water Quality, and Natural Resources Programs. In 2021, City Council approved a stormwater utility rate package with planned increases each year thru 2027. As of January 1, 2022, the rate per 2,500 sq ft of impervious area paid by the public is \$14.86 and will increase to \$16.26 in 2023, \$17.80 in 2024, \$19.48 in 2025, \$21.32 in 2026, and \$23.34 in 2027. Overall, the City's financial modeling shows that much of the new revenue will be needed just to cover the cost of inflation, so is not likely to result in significant enhancements to operating or CIP budgets.

Appendix A includes the Water Quality Management Plan Measures and **Appendix B** includes the TMDL Wasteload Attainment Assessment and **Appendix C** includes the Mercury Minimization Assessment.

OVERVIEW OF MANAGEMENT STRATEGIES

Oregon Administrative Rule (OAR 340-042-0080(3)(a)(A)&(B)) requires that a TMDL Implementation Plan:

- (A) Identify the management strategies the DMA or other responsible person will use to achieve load allocations and reduce pollutant loading;
- (B) Provide a timeline for implementing management strategies and a schedule for completing measurable milestones;
- (C) Provide for performance monitoring with a plan for periodic review and revision of the implementation plan;
- (D) To the extent required by ORS 197.180 and OAR chapter 340, division 18, provide evidence of compliance with applicable statewide land use requirements; and
- (E) Provide any other analyses or information specified in the WQMP.

Each of the City's TMDL Implementation Plans include the required elements. This Overview provides a summary of those elements, as described below, and in **Appendix A**:

Requirements A, B, and C (management strategies, timeline/milestones, and performance monitoring):

The City's Permit Renewal Submittal in 2015 included the 2014 TMDL Pollutant Load Reduction Evaluation (**Appendix B**) and the 2015 TMDL Pollutant Load Benchmarks and Annual Stormwater Pollutant Load Estimate. The model suggested that with regard to reduction of toxics in the Columbia Slough, for bacteria in Fairview Creek and for DDT in Johnson Creek, the waste load allocation has been potentially achieved. For other pollutants, the WLA model shows that it has not likely been met at that time. The City's MS4 Stormwater Permit requires these analyses to be updated and submitted with its next Permit Renewal Application due 180 days prior to permit expiration on Sept. 30, 2026. However, due to lack of sufficient data generated by that time, the Permit states that "...mercury benchmarks are not applicable in the first permit cycle after the TMDL is finalized." Further, "Submittal of paired mercury and total suspended solids monitoring data in the appropriate DEQ data submission template" is required. But that, "Given the lack of sufficient mercury data, pollutant load reduction evaluations, benchmarks, and waste load allocation attainment analyses for mercury will not be required in this permit cycle¹." As exemplified by **Table 3**. Plans to be updated and evaluated on a 5-year basis.

In response to the 2011 DEQ Mercury Monitoring Order, the City of Gresham conducted low-level mercury monitoring for two years. However, the data did not yield environmentally relevant mercury levels for dissolved mercury because the detection limits were not low enough and the monitoring was discontinued with DEQ approval. The city has continued to sample for total recoverable mercury. The August 2022 approved Environmental Monitoring Plan includes mercury sampling for instream, stormwater and Stormwater facilities (called BMP sampling), and the City is pairing all Hg sampling with TSS sampling and will be using a lab with a lower method detection level.

Requirement D (land use compatibility):

A land use compatibility statement (LUCS) was provided as part of the application for the NPDES permits. No requirement exists in Oregon Administrative Rule that a Nonpoint Source TMDL Implementation Plan include a LUCS. However, a general compatibility assessment is included below that addresses all the TMDL-related activities and discharges under the City's jurisdiction. The assessment was conducted by the City's long-range planner, who also provided the formal Land Use Compatibility Statement for the NPDES Stormwater permit.

Findings: Gresham's Comprehensive Plan has five volumes and complies with Statewide Planning Goals, per LCDC (1980s). Most recently, in 2003, an update of the Comprehensive Plan was approved by LCDC through the state periodic review process. The TMDL Implementation Plans are consistent with the City's acknowledged Comprehensive Plan to the extent required by law.

Comprehensive Plan Volume 2, Chapter 10 contains subsections that describe the City's responsibilities related to federal and state environmental regulations, including the TMDLs for

¹ Page 37, City of Gresham and Fairview MS4 Stormwater Phase I Individual Permit. GreshamOregon.gov

its waterbodies. These chapters and subsections support the general goals, policies and action measures are written to establish a baseline for protecting the quality of Gresham's ground and surface water. Chapter 10.232 covers Water Resources Quality and action measure #6 directs the City "to prepare and implement TMDL implementation plans for applicable water bodies". Chapter 10.235 covers Thermal Pollution and the City's responsibility for a Temperature TMDL Implementation Plan.

Other subsections describe other actions the city has included in its TMDL Implementation Plans, such as using low impact development practices for handling stormwater runoff, maintaining, and cleaning the stormwater system to maximize its efficiency and to meet regulatory requirements, educating the public about the need to protect water quality and enhancing/restoring/acquiring riparian areas and wetlands.

The TMDL Implementation Plans are also compatible with Volume 3 of the Comprehensive Plan Section 5.0700 Natural Resource Overlay which requires new development to be set back a certain distance, ranging from 35 to 200 ft., from a stream or wetland depending on the stream orders (1-5) and designation of a resource area or high value resource area. The City's SWMP document and Temperature TMDL Plan outline annual public land management strategies and other programs that support these objectives.

Conclusion: Gresham's acknowledged Comprehensive Plan has provisions that are relevant to the TMDL Implementation Plans. Based on the above findings, it is found that the TMDL plans are compatible with these provisions.

Requirement E (Additional requirements in Appendix A: WQMPs):

The TMDLs include requirements that are specific to a given waterbody and to Gresham. These requirements are listed in **Appendix A**. For each requirement, a note is provided that indicates the Implementation Plan in which it is addressed.

PROGRAM PRIORITIES

The City of Gresham will continue to prioritize its emphasis on the implementation of both its NPDES permits for the health of its area waterbodies, as well as its nonpoint source IP for temperature and mercury.

Stormwater (Water Quality)

The stormwater program focuses on the implementation of its Stormwater Manual to ensure that infiltration of runoff is conducted to the maximum extent practicable and what cannot be infiltrated is treated primarily with vegetated facilities and secondarily with other methods as needed. Infiltration is a priority because most pollutants of concern for local waterways are

attenuated in the soil or plant root uptake, and many are broken down by microbial activity. Further, the City has a Capital Improvement Program (CIP) that funds stormwater improvements and retrofits that help provide treatment for impervious areas that were installed prior to the stormwater program's existence. The stormwater program also focuses on proactive erosion prevention and sediment control for development and the removal of sediment from streets, catch basins, and other stormwater appurtenances. The business inspection and technical assistance program and public education & outreach play a key role in driving safe behaviors related to the management of pollutant sources such as hazardous materials, outdoor storage of metals and care for outdoor landscaping and proper disposal of garbage, recycling, and pet waste. Lastly, the Environmental Monitoring Program evaluate pollutants in the stream, in stormwater, as well as the performance of BMPs. Furthermore, dry weather screening is conducted annually to look for illicit discharges or cross connections from wastewater. All of these activities combined help control metals, toxics, nutrients, and bacteria to the maximum extent practicable.

Natural Resources

The Natural Resources Program continues to focus on increasing forest cover of priority riparian areas, wetland enhancement and protection, and habitat improvements for protected wildlife. As part of these efforts, program staff implement related education and outreach including partnership development with community-based organizations and schools, volunteer-based restoration events, and provision of technical assistance to private landowners interested in riparian area enhancement. Natural Resources and Water Quality programs both partner with City of Fairview (via IGA) to fund Portland Audubon and Columbia Land Trust's Backyard Habitat Certification Program to promote native plants and wildlife support at homes, schools, and other properties. The on-the-ground nonpoint source IP strategies implemented under these stream temperature and habitat improvement management strategies also help prevent or control erosion, which is important for stream health, aquatic wildlife, and the reduction of in-stream mercury.

Wastewater

Wastewater continues to plan for future maintenance and expansion of the wastewater treatment plant to meet the demands of a growing population and ensure proper function and compliance with its effluent limits, as well as delivering its Operations & Maintenance program to ensure that a portion of its pipes are replaced or repaired annually in order to prevent and reduce the potential for infiltration & inflow and clogging that could lead to contamination of stormwater or surface water with untreated sanitary waste. Wastewater also works with the county sanitarian to ensure that, when remaining septic tanks fail, homes are connected to the city system. Lastly, wastewater and stormwater partner to deliver a restaurant inspection

program to prevent grease backups that could result in sanitary overflows and to ensure proper management of outdoor grease disposal to reduce vectors and stormwater pollution.

SECTION II:

BACTERIA IMPLEMENTATION PLAN FOR PRIVATE SECTOR SANITARY WASTE

INTRODUCTION

The Department of Environmental Quality (DEQ) has set Total Maximum Daily Loads (TMDLs) for bacteria that affect all of the City's watersheds. The bacterium that serves as the basis for freshwater bacteria TMDLs is *Escherichia coli* (*E. coli*), which is an indicator of contamination by human or animal waste. Only certain forms of *E. coli* are harmful to humans and these come from humans themselves and other warm blooded animals and most cases of *E. coli* gastroenteritis in humans comes from food borne contamination (e.g., improper handwashing, undercooked ground beef, etc.) rather than water recreation. An exception includes waterways where mollusks that may be eaten raw are harvested, which does not include anywhere in the Portland-Gresham Metro region.

However, monitoring for *E. coli* is a cost effective way to assess water cleanliness and serves as a proxy for other pathogens that come from wildlife such as cryptosporidium and giardia. Various water borne pathogens may cause infections of the eyes, ears, skin, and gastroenteric systems of those who engage in water-contact recreation, although very few are life threatening and irritations are commonly mild.¹ Furthermore, humans can also be exposed to these same sorts of illnesses when recreating in chlorinated pools, hot tubs, and water parks.

SCOPE OF THE PROBLEM

E. coli levels exceed DEQ standards in all the City's streams from which samples have been taken. Exceedances occur during both rainy and dry weather, which indicates that waste from pets and wildlife, and sources of human waste are all potential contributors to the problem².

However, because *E. coli* is a proxy for other potential viruses like giardia, cryptosporidium which come from wildlife, rivers and streams should generally be assumed to have these viruses. Gresham's streams are not used for recreation like swimming or boating because they are too small. So, human illness can easily be avoided by not drinking from streams, not allowing stream water to get on cuts or wounds, and washing off one's skin after wading, playing, or otherwise contacting the water.

All this taken into consideration, the City has the ability to examine opportunities to reduce human waste sources from privately owned septic tanks by ensuring they connect to the City's

¹ Drinking water is assumed to experience chlorination and often filtration prior to use, so the water quality standard and TMDL focus on protection of recreationists.

² Limited DNA studies conducted with the Johnson Creek Watershed Council revealed mostly bird and dog DNA and did not indicate human waste as a significant source.

wastewater system when they fail and when the wastewater pipe is within 300 feet of their property. The City has relatively few residents or businesses with private sanitary systems³. The City also receives few reports of failed systems or sewage spills from plugged private pipes, so private, nonpoint sources of bacteria from human waste are likely to be a small contributor to bacteria exceedances.

Impacts from the unhoused community

The housing crisis in the Portland-Metro Region has resulted in unprecedented numbers of residents having to live outside. As of May 2023, the total estimate for the chronically unhoused in Multnomah County is approximately 2,610⁴. Much ire, stereotyping and blame for potential impacts to our waterways by the housed community. However, staff's empirical experience with the unhoused camps living on sidewalks and in green strips or green spaces is that they generally create methods to manage and bury their biological waste. City of Gresham and Multnomah County staff recently examined bacteria data upstream and downstream of camps near waterways to look for spikes in bacteria counts and did not find any⁵.

Historically, the Multnomah County Point-in-Time Counts, Gresham's population of people living unsheltered outside swelled from about 19 in 2007 to almost 200 in 2015 and back to just over 100 households in 2019. In 2016, the City hired a person dedicated to helping the homeless find living situations through a variety of resources, which likely contributed to the decline to 75 in 2017⁶. Currently, the City has added three additional staff to create a Homeless Services Team. The City, in partnership with other agencies and watershed council community events continues to clean up camps and provide sanitation and resources in an effort to lessen impacts to the environment from houselessness. Thus far, we have not observed direct riparian buffer impacts/erosion from the unhoused residents, so we do not feel there is a connection to aiding the entry of mercury into waterways from this nonpoint source.

We have added a commitment to monitor and continue resource assistance and cleanup work with the houseless community in **Table 3**, but thus far do not have corroborating data that the unhoused community are altering the risk from Gresham stream contact to skin and note that on the whole, most recreation is near streams, but not generally in the stream.

³ The City is working towards a more accurate dataset over time, but the narrowed figure is less than 350 of over 25,000 wastewater accounts.

⁴ <https://www.multco.us/multnomah-county/news/news-release-chronic-homelessness-number-falls-across-tri-county-region-2023> Accessed on October 15, 2023.

⁵ Holzer, Katie and Roy Iwai. "What does water quality data tell us about houselessness and the environment." <https://www.theintertwine.org/outside-voice/what-does-water-quality-data-tell-us-about-houselessness-and-environment>. Accessed on August 24th, 2022.

⁶ 2017 saw an overall decrease in counts of the unhoused across all areas, down from a peak of 4,655 in 2009 to 4,177 in 2017. Portland State University, "2017 Point in Time Count." https://static1.squarespace.com/static/566631e8c21b864679fff4de/t/59ee2e7a5ffd207c6e7b41a0/1508781707710/PSU+2017+Point-In-Time_FINAL_%28Interactive%29+%281%29+%281%29.pdf Accessed on August 24, 2022.

Table 1 summarizes potential sources of bacteria, and lists the relevant TMDL implementation plan that addresses each source. **This Nonpoint Source TMDL Implementation Plan addresses only bacteria associated with discharges that originate from private sanitary sources⁷.**

Table 1. Bacteria Sources and Permit/Plan that Addresses Reduction

Potential Sources of E. coli	Plan that Addresses the Source
Treated sewage from the wastewater treatment plant	National Pollutant Discharge Elimination System (NPDES) permit for wastewater treatment plant
Untreated sewage from overflows from the wastewater treatment plant or the public collection system	
Stormwater contaminated by contact with feces from wildlife or human wastes at the wastewater treatment plant	NPDES 1200Z permit for stormwater from wastewater treatment plant
Untreated sewage from failures or spills from private systems (onsite systems—e.g. cesspools & septic systems; or blocked private pipes)	Nonpoint Source TMDL Implementation Plan, Bacteria Implementation Plan for Private Sector Sanitary Waste
Stormwater contaminated by contact with pet and wildlife feces	NPDES municipal stormwater permit
Stormwater contaminated by illicit dumping such as from recreational vehicles, or from cross connections with sanitary sewer	
Direct discharge of human or animal wastes into streams ⁸	

RELEVANT REQUIREMENTS

The TMDLs for each of the major watersheds within Gresham have slightly different requirements related to bacteria reductions associated with either nonpoint sources or onsite systems. The relevant requirements are listed below.⁹

- For the Upper Slough, the 1998 Columbia Slough TMDL requires sanitary surveys of septic systems and removal of direct discharges of human waste. It also requires a bacteria management plan.

⁷ The City's Stormwater MS4 Program addresses dog waste sources with the public education program.

⁸ The NPDES municipal stormwater permit does not require the City to address this source, but the activities conducted for stormwater also discourage this type of discharge.

⁹ The Columbia River TMDL does not include bacteria, so is not described here.

- The TMDL for the Sandy Basin requires an 86 percent reduction in bacteria loads for Beaver Creek, and encourages bacteria source tracking as a useful way to focus management efforts.
- The Willamette TMDL requires 78 and 66 percent reductions for Johnson Creek and Fairview Creek, respectively. It also recommends further monitoring to identify bacteria sources, once reasonable steps to reduce bacteria levels have been taken. Neither the Sandy nor Willamette TMDLs specifically address private systems.

MANAGEMENT STRATEGIES

The City has already taken the most effective steps to reduce bacteria from private sanitary systems. Foremost among these steps are the City's efforts related to onsite systems.

To address the risk of bacteria from onsite systems, the City has made significant efforts. These include:

1. Participation in the mid-County sewerage project ordered by DEQ: That project required that any onsite systems within a designated area in Multnomah County be phased out and connected to municipal collection and treatment systems during the period between 1984 and 2005. The City participated fully in the project, and successfully oversaw conversion of approximately 8,000 systems within the requisite timeframe. Two remaining holdouts are subject to enforcement action, but require council approval.
2. Requiring that new and re-development connect to the public collection and treatment system: The re-development requirement will eventually address most or all of the private systems located in areas that are now rural—but will experience conversion to denser development. Approximately 25 onsite systems currently exist outside the mid-County area. All of these are on large lots that are expected to redevelop over time.

Prohibition of new onsite systems, if the public system is nearby: The City allows existing onsite systems to continue in use until they fail. At that time, The Multnomah County Sanitarian consults with the City regarding connection options to the public system. Generally the city's pipe must be within 300 feet or less and must be able to be gravity fed unless a pump system already exists.

3. Onsite survey required by the 1998 Columbia Slough TMDL: To meet this requirement, the City has identified the properties citywide that have onsite systems by comparing property addresses that pay stormwater fees with those paying wastewater fees. Those that pay the former, but not the latter, are presumed to have onsite systems.¹⁰ Because the Columbia Slough watershed includes a predominance of commercial and industrial land uses, there are relatively few onsite systems. If an onsite system were to fail, the

¹⁰ To ensure the accuracy of the survey, it would be necessary to conduct smoke or dye testing throughout the basin. This would catch properties that have onsite systems but pay wastewater fees; as well as properties that are connected to City sewer but pay no sanitary sewer fees. Resources are not currently available to conduct such testing.

responsible party would either contact the County sanitarian to request a new onsite permit, which would be denied and referred to the City for connection to the public system if available; or neighbors could report the failing system to government officials, who would enforce health and environmental codes with the same end result.

To address the risk of bacteria entering surface waters from private pipes that connect to the public system, the following applies:

4. City code prohibits endangerment of public health and the environment. This Implementation Plan addresses only situations that could lead to entry of human waste into surface waters—not those which constitute only a public health risk. If a plumbing problem occurs and sewage spills onto the ground, the City’s first step is to direct the responsible party (RP) to correct the problem. If no responsible party can be found, or the RP declines to act within an acceptable timeframe, the City can fix the problem and seek compensation from the responsible party. Private sewage spills have been a rare occurrence, with only one or two reports every few years. Private spills are reported in the City’s Annual Stormwater Report.

RESPONSIBLE PARTIES

Staff in several Departments within the City (and at the City of Portland) have responsibility to ensure implementation of the management strategies:

- The Wastewater Services Division, oversaw implementation of the mid-County sewerage project, and has primary responsibility for locating onsite systems and ensuring they have access to the public sanitary system.
- The Building Division, and Development Engineering & Inspection share responsibility to ensure that new and re-development connects to the public sanitary sewer system.
- The Multnomah County Sanitarian ensures that failed onsite systems are not replaced with new private systems, by directing applicants who apply for permits for replacement systems to the City to connect to the public system, where it is available.
- The Water Resource Division staff coordinate to ensure that private plumbing blockages do not result in the flow of human wastes into surface waters by directing responsible parties, ensuring code compliance, and CCTVing connections to the city’s system to check for blockages.

FUNDING & PRIORITIZATION OF PROJECTS

The management strategies are all addressed while conducting City business and do not require designated funding.

As stated previously, the potential for entry of significant bacterial loads associated with human waste into surface waters due to failure of private systems is not high, given the relatively few remaining onsite systems within the City and the rare failures of private plumbing that would

affect surface waters. The City believes that its current level of effort is adequate to address bacteria from private sector sanitary waste.

TIMELINE AND MONITORING OF PROGRESS

Table 2 shows the timeline over which the City's management measures will be implemented. It also lists the types of data that will be collected and reported to track the level of implementation of the management strategies, and any milestones to be met. Data collection will be accomplished by Water Resources staff. .

REPORTING, MONITORING OF WATER QUALITY, AND ADAPTIVE MANAGEMENT STRATEGY

Staff expect to report on implementation of the management measures using the Performance and Effectiveness Measures listed in **Table 1**. Performance Measures will be reported annually, and Effectiveness Measures will be included in five-year reviews of the effectiveness of the Nonpoint Source Implementation Plan.

Annual reports will be spreadsheet based on **Table 3** within the City of Gresham's "Overview of TMDL Implementation Plans" document.

Five-year reviews will include the relevant annual report, plus an evaluation of the status of the waterbodies with respect to bacteria based on available data, and an assessment of whether different or additional efforts are needed.

Once the City has taken all reasonable steps to reduce bacteria levels from the sources under its jurisdiction, it will evaluate whether bacteria source testing is needed to better focus any additional efforts, if resources allow.

SECTION III:

Part A: Temperature

BACKGROUND:

Oregon DEQ issued temperature reduction plans for the Sandy Basin in 2005 and the Willamette Basin in 2006. The City of Gresham has jurisdiction over waterways draining to both basins and has therefore been assigned a Designated Management Agency role with responsibility for addressing elevated stream temperatures within its current city limits. As such, the City submitted an initial Temperature TMDL Implementation Plan in 2007 based on a GIS model that identified riparian areas which would be targeted for natural resource improvements. A first amendment to that plan was submitted to DEQ in 2008, detailing the management strategies the City would follow to improve stream and riparian conditions. These materials are included in this report as **Appendix B**. The City's 2014 and 2018 five-year updates to the Temperature TMDL Implementation Plans outlined several adaptive management strategies changes the City implemented through the from 2014-2023, including:

1. **Use of fast-growing pioneer tree species to gain faster shade benefits.** Besides the black cottonwood (which is challenging to site in many urban settings due to the likelihood of large limb drop onto structures, cars, and pedestrian access areas), those species on DEQ's Ecosystem Potential Vegetation list are generally slow growing and these species would benefit from some on-site shade in their juvenile stages. As such, as noted in the 2014 update staff began integrating into planting regimes those smaller deciduous species best suited to thrive following site clearing of invasive monocultures of reed canarygrass, Himalayan blackberry, English ivy, or English holly.

Fast initial growth and nitrogen fixing capabilities of the plant suite chosen as "first phase restoration plantings" improve site conditions for a second phase of planting that emphasizes the slower growing conifers on the DEQ Ecosystem Potential Vegetation list. This strategy seeks to accelerate realization of shade cast on the stream surface as well in treatment areas. This adaptive management strategy is ongoing.

2. **Updated reporting strategies.** Gresham has refined reporting shade classification efforts and, with the annual report submitted November 1, 2021, submitted to DEQ a LiDAR data-based 10-year shade comparison that demonstrated stream shade improvements in shade deficient areas. During the 2018-2023 IP cycle, Gresham consulted with DEQ to update its annual Nonpoint Source TMDL reporting matrix. Newly added were additional specifics on anticipated annual progress forward, achievements, and adaptive management strategies to be used by the City for implementation of four Temperature TMDL management strategies. 2023-2028 reporting will build off of that format to report on progress under the below-listed continuing Management Strategies.

MANAGEMENT STRATEGIES FOR 2023-2028

NPT 1: Natural Resources Capital Improvement Projects (CIPs) Implementation:

The Natural Resources CIP funding is nested within the Watershed (Stormwater utility) CIP budget. Watershed CIP funding has been largely obligated for the last six years on infrastructure improvements required as part of a City-wide local road improvement project, ensuring that stormwater infrastructure is repaired concurrent with road improvements. Emergency infrastructure and slope repairs were necessary investments in the last few years. For example, in 2022-23, the majority of Natural Resources CIP was invested in the emergency stabilization of a riparian zone landslide area immediately adjacent to Kelly Creek. Barring similar emergency response needs, within the 2023-2028 Implementation Plan window, Natural Resources funding within the Watershed CIP will be directed to:

1. **Supporting resource protection rule and code updates.**

The City identifies stream- and wetland-adjacent areas for protection and implements protection standards for these areas through implementation of natural resource inventories and administration of environmental overlay development codes. Gresham currently has a Floodplain overlay code adopted in 2019 and a Natural Resources Overlay code (for buffers around streams and wetlands), adopted in late 2020 and in effect since January 2021. These overlays are intended to protect and conserve natural resources, including water quality and fish and wildlife habitat. Recent state and federal changes in resource protection directives and rules require Gresham to again update these important overlays. Updates to the Floodplain and Natural Resources Overlays began in late 2023 and will continue to become effective in 2025. Additional details are provided under NPT 4, below.

The City also anticipates working with DSL in advance of, and as part of, their Rule 85 updates which are slated to start in Summer 2024. Inadequate compensatory mitigation strategies exist for urban areas, and new strategies to respond to the needs of development, while ensuring no local loss of wetland function (and corresponding stream water quality or habitat function) is lost. Gresham's priority goal for this partnership work is identification of stream and wetland mitigation opportunities as close to the proposed impact sites as possible. By finding opportunities to mitigate close to unavoidable impacts, hydrologic functions will be less likely to be lost to mitigation banks outside the 5th field HUC scale.

2. **Updating Gresham's Natural Resources Master Plan.**

An update to Gresham's 2010 Natural Resources Master Plan was drafted in 2020. This included new Capital Improvement Projects, simplified shade buffer targets, updates to mapping to reflect new simplified riparian buffer corridors, and updated ranking criteria. 2023-28 progress will include:

- a. Update of Stormwater "System Development Charges" (fees collected when new development occurs in the city), to be used to fund a portion of new infrastructure, including green infrastructure, land acquisitions, riparian easement acquisitions, and stream, floodplain, and wetland mitigation. This will increase Gresham's access to high value riparian and stream areas and allow for implementation of riparian and waterway improvements on private land, where easement rights have been negotiated. This work started in late 2023 and will be presented to City Council by early 2025.
- b. With a recent Watershed Division reorganization, the program has newly gained a

Division Manager and new engineering staff, greatly increasing in-house experience in development support and infrastructure implementation in a manner considerate of stream and floodplain needs. In late 2023, the City completed a new stream susceptibility risk analysis that provides a three-tier ranking of susceptibility to erosive forces. This new data set will continue to be refined in early 2024, and by Summer 2024 will be newly integrated in the Natural Resources Master Plan ranking criteria. The Master Plan's concept plan for each project will be updated to include explicit opportunities for both stormwater retrofit opportunities and stream resiliency elements, informed by Gresham's retrofit and hydromodification plan updates as submitted to DEQ in November 2023.

- c. The City will present a fully updated Natural Resources Master Plan for City Council approval in late 2024/early 2025.
3. The Watershed Engineering Program and the Natural Resources Program will collaborate on the development of a **"Kelley Creek Regional Master Plan"** -- a stream reach master plan for Gresham's portion of Kelley Creek that unites the multiple goals of improving floodplain function, fish passage, and riparian forest cover, and water quality while providing successful stormwater management strategies that work well for developers and City operations staff. The project date for this window is 2024-2026. More explicit project stage dates will be provided in the annual TMDL report in November 2024.
4. **Land Acquisition & Easements:** Previously planned System Development Charge updates for the Stormwater utility were placed on hold by City Management in the last few years with a transition to new city management and subsequent city-wide strategic planning. Watershed anticipates development of a new SDC methodology in 2024 and anticipates City Council approval in 2025. This will inform Watershed CIP budget availability for land acquisition or conservation easement agreement development. These efforts will build on the successes of the previous IP plan; in the 2018-2023 IP period, new language was added to the Environmental Overlay codes to require privately owned riparian corridors be either donated to the City or protected with a natural resource easement (with riparian improvement rights provided to the city) as part of the development process. As development moves forward, these easements and holdings will enable the City to conduct restoration activities on additional stream reaches in order to improve stream shade and reduce negative influences on stream function, including hydromodification. Within one year of the City accepting a stewardship role for newly acquired parcels or newly constructed conservation easements, the City will assess riparian conditions and restoration opportunities. Assessments will include, percentage of each shade class, based on the most recent available analysis, and linear feet of stream. Data presented here will demonstrate Gresham's efforts in developing natural resource and open channel easements as part of the private development process in order to gain access for riparian improvements and stream bank improvements on private riparian tracts.

NPT 2: Riparian Planting and Management Implementation:_____

The City's ongoing riparian tree planting efforts will continue, utilizing existing strategies that include:

Target restoration site improvements

- Site selection based on the Natural Resources Master Plan (NRMP) prioritization model
- Restoration Plan developed based on site conditions and overall NRMP and TMDL goals
 - Noxious Weed Plan (annually reporting acreage treated)
- Planting Implementation (annually reporting acreage and linear feet) Photo Monitoring Point Establishment

Additional land management activities

- Noxious Weed Management beyond restoration sites (annually reporting on acreage treated)
- Management of inhouse native plant nursery operations
 - Focus is on hard-to-find native plants we see as locally significant
 - Provide a source of native plants to city residents and volunteers for their streamside property or open space
 - Provide a source for native plants for volunteer events held by the city
 - Informational resource to school programs

Through 2023-2028, the City intends to maintain the same level of planting and land management as within the 2018-2023 IP period and will annually report resulting benefits by watershed, including:

1. acreage of project
2. total annual budget
3. number of stems planted
4. statement of existing shade classifications within project sites
5. partners/volunteers involved

NPT-3: Monitoring and Reporting for the 2023-2028 Implementation Plan:_____

The late 2023 addition of a Natural Resources Data Analyst position will enable Gresham to better convey progress on restoration implementation, and articulate investment levels per watershed.

Reporting will continue to include those metrics shown under NPT-1, NPT-2, and NPT-3, as well as:

Every 5 years: stems installed; partners/volunteers involved

Every 10 years: change in shade classification conditions; and metrics related to implementation of Natural Resources Master Plan.

NPT-4: Code & Overlay Updates/Reporting_____

In the 2023-2028 IP Timeframe, City Planning and Environmental Services staff will coordinate on environmental overlay updates.

The Floodplain Overlay will be updated to reflect Endangered Species Act considerations as the designated state (DLCD) and federal (FEMA) agencies provide direction. The City recently has been told to expect renewed regulatory momentum from these agencies starting in 2023 and finishing in 2025. Implementation of these updates has been held up, due to vacillating federal policy

directions and funding levels , since April 2016. The City has no control of the implementation schedule but is prepared to direct local resources to the effort as timelines to state and/or federal mandates are passed along to City management.

The Natural Resources Overlay update will incorporate clarifications to wetland protection language, including that language that references Oregon Administrative Rules (OARs) related to wetlands and their impact on water quality of streams on the 303(d) list. Due to recent research and challenges with the inherent connection between DEQ's TMDL program and Department of State Land's (DSL's) wetland mapping program, Gresham expects to play a role in supporting DSL rule improvement that is considerate of the need for ongoing Clear & Objective language to facilitate development while adequately protecting those wetland resources that are critical to progress on improving stream water quality. This effort will run parallel with the Floodplain Code updates mentioned above, during the 2023-2025 window.

Reporting:

1. Any updates to the Comp Plan (Volumes 1-3) relevant to environmental regulations will be reported annually.
2. Land use applications issued within the Natural Resources Overlay will be reported, including acreage impacted and mitigated
3. Relevant enforcement action summaries

ADDITIONAL OBSERVATIONS:

1. Gresham's experience over the last 6 years that regional progress towards stream shading goals also would be enhanced if we could better ensure that the various vegetation management agencies are all considering our stream shade goals and vegetation needs. A multitude of mature trees along the banks of Johnson Creek were removed along the Springwater Trail, when a local power company was required to clear vegetation from under its power lines as part of their FERC relicensing requirements. The City had previously worked with PGE to develop a list of suitable, shorter tree species to plant under the power lines, those previously approved species were required to be removed due to the federal requirements the utility company faced. If Gresham and other stakeholders could have a coordinated regional approach, such as developing a plan with even shorter preferred species, better future outcomes may be realized to minimize loss of existing stream cover. **Gresham supports the concept of a DEQ led effort to convene utility corridor managers, drainage districts, and affected DMAs to collaboratively brainstorm planting strategies that may better reflect the shared concerns of all parties involved.**
2. A significant decline in forest health has occurred regionally due to increasing summer temperatures and decreasing precipitation during the growing season. These climate affected forest stands are potentially negatively impacting stream shade and stream bank stability. Regionally, restoration experts are analyzing these trends and incorporating their findings in their planting plans. Increasing the diversity of tree species utilized is the primary strategy recommended at this point. It is important to note that the Willamette and Sandy Basin Water Quality Management Plans require the planting of 5 "Ecosystem Potential Vegetation" species. DEQ and their partners at EPA will need to anticipate that DMAs will be utilizing a much wider planting palette in the coming years in order to increase the forest's climate resiliency in the future. The City's next 5-year update will contain more analysis on this issue, as we are just in the beginning stages. **If DEQ is privy to similar discussions by other DMAs and wishes to bring restoration partners together for discussions on future planting palettes, Gresham would be**

interested in participating.

Gresham looks forward to continued collaboration with DEQ and other stakeholders within the Lower Willamette and Sandy watersheds on the above initiatives as we seek to demonstrate progress addressing the anthropogenic sources of stream warming identified by DEQ in their development of the Water Quality Management Plans for these watersheds as described in **Appendix A**.

Part B: Mercury

Mercury TMDL Overview

Oregon DEQ has listed the City of Gresham as a “Designated Management Agency” under the 2019 Final Revised Willamette Basin Mercury Total Maximum Daily Load. This TMDL specifies the maximum amount of mercury that the Willamette River can receive and still meet water quality standards. A TMDL allocates pollutant loadings among point and nonpoint sources, background levels, reserves for future growth, and a margin of safety. Point sources are typically defined as those sources that enter surface waters through a pipe or other discrete conveyance system while nonpoint sources are those that enter surface waters through diffuse methods such as surface runoff. According to this Willamette Basin TMDL, mercury contributions to Gresham’s surface waters are primarily from a combination of local, regional, and global atmospheric deposition sources. Atmospheric deposition of mercury contaminates soils far from the mercury generating source, such as coal-fired power plants. To minimize the amount of mercury reaching waterways, implementation of measures that reduce potential for soil particles to reach waterways becomes necessary. All of the surface waters within Gresham’s Johnson Creek and Fairview Creek basins flow to the Willamette River, thus investments the City makes to minimize point and nonpoint sources of mercury reaching waterways within these basins are important contributions to the overall regional effort to reduce mercury levels in the Willamette River.

This section of the City of Gresham’s TMDL Implementation Plan presents those specific management strategies that Gresham is taking to address nonpoint sources of mercury release into area waters. Measures addressing additional responsibilities Gresham has under the 2019 Mercury TMDL for the Willamette River are included in the “Overview of Management Strategies” in Section I of this document, and in Appendix A (“Water Quality Management Plan Measures for City of Gresham”).

The Management Strategies developed by Gresham to respond to the Temperature TMDLs (as listed in Part A of Section III of this document) detail the investments Gresham is making to reduce anthropogenic sources of stream warming, to decrease local stream temperatures, and to slow hydromodification of streams throughout the City. TMDL parameters sometimes overlap between watersheds, and past implementation planning by Gresham for the Temperature TMDLs for the Lower Willamette and the Sandy Rivers, starting in 2007, were streamlined into a single comprehensive document. Those same measures developed for those Temperature TMDLs also describe investment options a jurisdiction can make to curtail nonpoint release of mercury to area waters by reducing the potential for direct discharge of mercury via runoff and by reducing the potential for erosion to reach waterbodies. Thus, the management strategies in Part A of Section III of this document describe the measures Gresham will be taking to address the Willamette Mercury TMDL. Those actions are summarized below, and a more detailed explanation for each can be reviewed in Part A.

Management Strategies

Strategy 1 (“NPT-1”):

Implementation of Natural Resources Capital Improvement Projects (CIPs)

Natural Resources CIPs can include on-the-ground investments in large-scale restoration; wetland enhancements; improvements to the structure and function of urbanized streams and floodplains; slope and streambank stabilization to prevent hydromodification and mass slumps of soil into wetlands or waterways; and creation of local mitigation options so that any unavoidable impacts to water resources are mitigated locally, preserving water quality and habitat functions within the affected local watersheds. The CIPs can also include master planning, and large-scale overhauls of the development code sections impacting wetlands, waterways, and riparian areas.

For the TMDL Implementation Plan period of 2018-2023, Gresham’s CIP investments in these areas includes:

- 1) A large-scale update of Gresham Community Development Code including:
 - a. Updated resource area mapping to better identify and buffer water resource areas (wetlands, waterways, and riparian areas)
 - b. A multi-year effort to conduct a complete re-do of the City’s riparian buffers, resulting in simplified 35’-200’ wide buffers around sensitive resource areas.
 - c. Development of an Environmental Technical Guidance Manual that can be used by homeowners (existing development), developers (new development) and staff to ensure proper interpretation of Gresham’s overlay standards as they apply to widely varying field conditions
 - d. Introduction of new standards within the overlay areas that no more than 500 square feet of ground disturbance can be conducted within a land use permit, and that no newly bared soils are permitted in these areas during wet weather.
 - e. An update to Gresham’s Comprehensive Plan to ensure the City’s guiding goals and policies support full implementation of measures proposed to address the City’s obligations under the Clean Water Act, the Endangered Species Act, Oregon Removal/Fill laws, and related state and federal regulations that protect water quality, habitat, and the functions of wetlands, streams, and floodplains.
- 2) An updated Natural Resources Master Plan
This project provides for the long-term planning for implementation of three types of on-the-ground projects, all designed to protect local resources, water quality, habitat, and native species.
 1. Environmental Improvement Projects: these projects range in cost from \$400,000 to almost \$9,000,000 and seek to implement prioritized improvements where stream and wetland functions are degraded. These projects seek to provide the highest value in terms of returns of ecological gain for the investment made, and focus on realizing improved stream function, improved water quality, and improved habitat. Examples are restoring a stream ravine that was filled in the 1950s with a local landfill, creation of a wetland complex where old gravel quarries left a degraded stream channel moving through warm quarry ponds, and restoration of a complex stream reach where a critical habitat stream has been constrained by roadways, recreational trails, and housing, forcing the stream to become downcut and fully separated from its once functional floodplain.
 2. Environmental Mitigation Projects: these projects look at ways to optimize mitigation investment in a manner that ensures no overall or temporal loss of wetland, stream, or floodplain function. To ensure that Gresham doesn’t lose sensitive resources when unavoidable impacts to wetlands or waterways happens with infrastructure

improvements or repairs, these projects provide prioritized land acquisition and investments that will meet state and federal resource agency requirements for mitigation while also ensuring local investment in the local resources that must stay local in order for the City to demonstrate progress in water quality improvements. Allowing the export of wetland function to a wetland mitigation bank in a different 4th Field HUC watershed diminishes local habitat, biodiversity, infiltration, bank storage, and the related ability of hyporheic flows to attenuate warmer summer stream flows.

3. Environmental Risk Reduction Projects: these projects stem from field and data surveys conducted to find and prioritize areas at-risk of catastrophic failure events such as mass slumping, landslides, forest die-off, and stream head-cuts. These projects are currently being prioritized based on urgency and consequence of failure, with those consequences being impacts to public safety, water quality, infrastructure, and aquatic species.

Strategy 2 (“NPT-2”):

Implementation of Riparian Restoration

Progress under this management strategy includes increasing vegetated riparian cover adjacent to streams to provide stream shade, erosion control, control of aggressive invasive weed species that limit biodiversity, soil health, and habitat function. Very often, monocultures of weeds such as Himalayan blackberry take over a stream reach resulting in bare soils under the stands of blackberry vines, and diminished soil stability, particularly on slopes and stream banks. (In the case of blackberry, as an example, the heavy weight of mature plants puts a strain on stream bank soil structure that is not mitigated by the plant’s quite simple root system. With heavy biomass above ground and little root support below ground, stream bank widening, and mass slumping can more easily occur in the areas overtaken by invasives).

Additional riparian health activities are conducted under this strategy, notably with an increased focus on resolving riparian encroachments on both public and private lands. Dumping of yard debris, garbage, soils, and substantial amounts of illegal fill in the undeveloped riparian areas around area waterways leads to increased risk of landslides, slumping, tree failures, wildland fires, and erosion reaching the creek. A 2022 effort in this area is addressing the report of an individual importing between 225-450 (i.e., up to 45 dump trucks worth) of soil and dumping it in a public open space adjacent to Chastain Creek. City staff investigated the report and began working with the state District Attorney for Environmental Crimes in order to collect restitution to remove the fill and restore the area. The City is increasing efforts to prosecute illegal fill violations to collect restitution funds as opposed to having to redirect City funding away from planned and prioritized riparian restoration efforts. These efforts have staff addressing those large illegal, uncompacted fill violations that could be reasonably expected to cause releases of soils and related contaminants to area streams. Implementation of this measure is supporting City efforts to reduce erosion of soils to waterways, in keeping with the Mercury TMDL obligations.

Strategy 3 (“NPT-3”):

Monitoring and Reporting

This management measure was developed to ensure routine City evaluation of what restoration strategies were proving successful, how City management strategies were supporting Temperature TMDL goals, and to inform Natural Resource Master Planning (in terms of informing project prioritization). In 2018 the City introduced field site surveys to assess stream, streambank, and surrounding steep slope areas to ascertain which areas are most at risk for becoming mobile and releasing large amounts of sediment to area streams. We are working on formalizing those survey methods to be repeated every 10 years in order to assess changes in stability indicators and to inform an updated prioritization for investment in projects to prevent headcuts, landslides, and other types of mass failure.

Strategy 4 (“NPT-4”):

Implementation of Overlay Code Provisions

With the recent (2019) re-do of City standards that protect sensitive resources (the Natural Resources Overlay, the Floodplain Overlay, and the Hillside and Geologic Risk Overlay), additional tools were developed to find synergies between the City’s land use permit approval process and the City’s efforts to improve local water quality and the function of area wetlands and waterways. Specifically, a new mitigation tool was introduced so that proposed development projects with insufficient space for mitigation plantings would now pay money into an in-lieu fund that will be used by the City’s Natural Resources Program to increase progress on the City’s riparian restoration goals. The Overlay Code update also resulted in the creation of a living document: the Gresham Environmental Technical Guidance Manual that is intended to ensure all users of the overlay code are interpreting the standards similarly. The Manual is intended to reduce conflicts related to code interpretation by homeowners or developers operating in close proximity to protected resources.

Timeline for Implementation of Strategies and Performance Monitoring

As the management strategies for mercury are being implemented through management strategies developed initially as part of the City’s Temperature TMDL Implementation Plan, the timeline for implementation of measures that meet both strategies is the same. Implementation of Measures and Performance Monitoring obligations are included on the reporting table found at the end of this section. This was originally provided to DEQ for the annual Temperature TMDL reporting and has been modified through the addition of the NPT-4 management strategy that provides DEQ with progress reporting on the land use advancements being made by Gresham to better protect area water quality.

Compatibility of Measures with Statewide Land Use Requirements

The City implements state land use planning goals 5, 6, and 7, as well as Metro’s Title 3 and 13 requirements through a series of protective overlays in Gresham Community Development Code: The Natural Resources Overlay (which places protective buffers around waterways and wetlands), the Hillside Geologic Risk Overlay (which limits development and vegetation alteration on steep slopes), and the Floodplain Overlay (which, in part, prevents new encroachments into the floodplain of a given waterway, which in turn limits vegetation changes and some types of soil disturbing activities). These overlay standards are applied to both newly proposed and existing development. These overlays were all updated between 2016 and 2019, with additional refinements ongoing. The City’s associated Comprehensive Plan language was updated in late 2019, concurrent with presenting the new overlays for City Council approval. Volume 2 of the Comprehensive Plan (Policies and Summary), Article 10, Summary of Findings, Policies, and Implementation Strategies, Section 10.230 Environmental Quality, Subsection 10.232 Water Resources Quality was updated to reflect the City’s responsibilities to meeting the mercury TMDL in addition to existing TMDL parameters addressed in this document, and relates the overlay update effort to the City’s responsibilities in contributing to improvements in regional water quality. The Water Resources Quality subsection of Volume 2 of the City’s Comprehensive Plan lists policies, goals, and action items that support Gresham’s implementation of the management strategies listed in this section, stating in part that the City will:

- Plan and implement programs to protect and restore the water quality functions of wetlands, stream corridors and other riparian areas such as:
 - Acquisition of property and conservation easements;
 - Stream restoration and wildlife habitat enhancement projects;
 - Erosion control/prevention including protection of hillsides and stream banks from actions that cause hydromodification, erosion, and landslides;

- Re-vegetation/Restoration of stream and wetland area buffers;
- Provision of wetland and stream mitigation options within the affected watersheds that Gresham is working to protect.
- Maintain an accurate inventory of stream corridors and their respective environmental conditions as a basis from which to restore their contribution to water quality.
- Require new development to comply with all land use regulations and other standards necessary to effectively manage surface water quality and quantity according to the City's obligation under the Clean Water Act.
- Ensure, through coordination with the Oregon Department of Environmental Quality, that existing and future land uses with the potential for water discharges comply with state and federal water quality standards.
- Establish and maintain water quality plans, regulations and standards consistent with federal, state and Metro laws and rules as necessary to protect surface and groundwater quality and quantity.
- Protect the water quality, conveyance, storage functions and associated environmental values of streams, wetlands, 100-year floodplains and other natural drainage-ways and water bodies.
- Protect, and where practicable, restore water quality and the physical and biological integrity of the area's system of wetlands, rivers and streams and associated environmental values, including natural vegetation buffers and fish and wildlife habitats supporting water quality, water quantity, and habitat protections.
- Encourage and support the water quality protective development strategies development of drainage systems that preserve or mitigate loss of the natural hydrologic cycle functions related to pollutant removal, bank storage, groundwater support, flow attenuation, velocity reduction and sediment reduction. as a means to store, treat and convey surface water run-off.
- Require that surface water treatment and management of run-off quantities occur on-site for development projects that require development permit approval.
- Continue to implement measures to protect water quality necessary to sustain viable habitat for fish species, particularly those listed by the National Marine Fisheries Service as threatened or endangered.
- Enforce all regulations and standards to protect streamside vegetation, wetlands, waterways, riparian buffers and other natural resource areas that contribute to water quality, groundwater protection, and flood attenuation consistent with Goal 5 and Metro Title 3, and habitat and resource protection consistent with Metro Title 13 requirements. This includes the need to maintain water temperatures required for viable fish habitat.
- Continue to update the Comprehensive Plan in consideration of the most current federal water quality regulations, as implemented by US Environmental Protection Agency and Oregon Department of Water Quality to ensure implementation of those measures that protect water quality—including maximizing bank storage, groundwater recharge, attenuation of erosive stream flow, minimization of hydromodification and slope failure, moderation of diurnal temperature fluctuations adjacent to wetlands and waterways, and capture of sediments and pollutant sources—as informed by current regulatory obligations under the Clean Water Act.

The City is required to update its TMDL Implementation Plan on a 5-year cycle, with an anticipated update due to DEQ in 2023. With that update, feedback from DEQ and results of Gresham's performance measures evaluation will be used in proposing minor or major changes to this plan, with the limitation being that the changes proposed will be at least as protective of water quality as what is reflected in this plan being submitted in September 2022. The updated TMDL Implementation Plan will be developed for the implementation period of 2024 to 2028.

APPENDIX A: WATER QUALITY MANAGEMENT PLAN MEASURES FOR CITY OF GRESHAM

INTRODUCTION

Water Quality Management Plans (WQMPs), found in Chapter 14 of the Willamette Basin TMDL, and Chapter 6 of the Sandy Basin TMDL, include a number of requirements that are specific to Gresham or to individual waters or pollutants relevant to Gresham. Those specific requirements are excerpted here.¹ Requirements that are repeated in several different places or with slightly different wording are listed only once. Wasteload and load allocations, and requirements that are listed in OAR 340-042 as major elements of an implementation plan are summarized in Section I. Overview. For each of the specific requirements, or set of requirements listed below, the relevant TMDL Implementation Plans that address the requirement(s) are noted.

COLUMBIA SLOUGH (1998 TMDL)

Background

The Columbia Slough TMDL was adopted in 1998 after years of modeling and discussion. It was among the early TMDLs adopted by DEQ, and the mechanism by which many of the requirements in the TMDL were to be implemented was Memoranda of Agreements between DEQ and local governments. The agreements were to detail the steps and timelines to be followed to implement the management measures. An agreement between DEQ and Gresham was never created, although Gresham did sign an agreement with the City of Portland to conduct the required water quality sampling.

With the adoption of the TMDL rules in OAR 340-042, it became clear that NPDES permits are the implementing mechanism for the point source component of TMDLs, and implementation plans would be created for nonpoint sources like bacteria and temperature.

The hydrology of the Columbia Slough is complicated, and the TMDL divided the Slough into five reaches. Management measures required in the WQMP are tied to specific reaches, which are indicated in the TMDL by a number. **The numbers relevant to Gresham are Reach 3, which is the Upper Slough, and Reach 5, which is Fairview Creek.** Reach numbers are shown in the excerpts below in parentheses to indicate the reach(es) within Gresham to which each requirement applies.

¹ Although the text is not shown in quotes, the requirements are drawn verbatim from the TMDLs.

Dissolved Oxygen (Biological Oxygen Demand (BOD₅))

Requirements:

The DMAs will conduct monitoring of stormwater BOD₅ loads and the instream response to those loads. Previous monitoring under the MS4 permits has measured BOD₅ levels from urban runoff that do not correlate with the few instream BOD₅ samples taken during storm events. The discrepancy between loads and instream concentration is likely due to processes such as deposition and decay during the transport to the receiving water. The monitoring data was used to calibrate a dynamic water quality model to simulate the Slough's response to storm water and deicing fluid. The DMA WLA will not be included as an effluent limit. Achievement of the WLA will be through implementation of BMPs. Municipal discharges will be required to implement BMPs and demonstrate that the BMPs achieve the WLAs established. Previous monitoring used continuous hydrolabs to characterize DO, temperature, conductivity, and pH of the system. The DMAs are required to:

- Provide DEQ with a description of the program designed to reduce BOD₅ loads to the Slough. (3,5)
- Implement a program of BMPs that will reduce overall BOD₅ load to achieve the DMA WLAs. (3,5)
- Implement coordinated monitoring to define storm water loads to the Slough and the influence of storm water BOD₅ on receiving water quality. (3)
- Implement monitoring to demonstrate compliance with BOD₅ WLA targets. Instream monitoring includes grab samples of BOD₅ and DO (3)
- Relevant Implementation Plan: NPDES Stormwater Permit and associated documents

Eutrophication (pH and nutrients)

Requirements:

- Identify at least three representative sites for the Lower (Reach 1), Middle (Reach 2) and Upper (Reach 3) Slough for long-term monitoring of water quality in the slough to determine the effectiveness of the implementation strategy
- Identify a representative site in Fairview Lake (Reach 4) and Fairview Creek (Reach 5) to characterize water quality in these waterbodies and determine effectiveness of control strategies. Water quality parameters will include DO, pH, temperature, chlorophyll *a*, dissolved ortho phosphate, total phosphate, and bacteria
- Maintain the grab samples of pH, dissolved ortho-phosphate, chlorophyll *a*, DO and temperature (3)
- Identify BMPs in MS4 permits which may reduce contributions of phosphate via stormwater (3,5)
- Include PO₄ in assessment of BMP effectiveness by measurement of influent and effluent dissolved orthophosphate concentrations and total phosphate concentrations (3,5)

- Relevant Implementation Plan: NPDES Stormwater Permit and associated documents

Bacteria

Requirements and Relevant Plans:

- *Requirement:* Sanitary surveys of septic systems, removal of direct discharges of human waste to the Slough (3)

Relevant Plan: Nonpoint Source Implementation Plan—Volume II: Bacteria Implementation Plan for Private Sector Sanitary Waste

- *Requirement:* Detect and eliminate illicit discharges to the Slough (3,5)
- *Relevant Plan:* NPDES Stormwater Permit and associated documents
- *Requirement:* Establish adequate monitoring to demonstrate compliance with *E. coli* criteria, including measuring *E. coli* concentrations and distributions (3,5)
- *Relevant Plan:* NPDES Stormwater Permit and associated documents
- *Requirement:* Implement BMPs to control anthropogenic sources of bacteria in stormwater (3,5)

Relevant Plans: NPDES MS4 Stormwater and Wastewater Treatment Plant 1200Z Permits

Toxics—Lead

Requirements:

- Conduct instream dry and storm event monitoring for total lead, dissolved lead, and hardness. Conduct lead analysis using detection levels which are lower than the water quality chronic criterion. (3)
- Conduct monitoring at outfalls to Slough, outfalls selected based on land uses known to have high lead levels or other metals (3)
- Identify and implement BMPs in the municipal NPDES permits that will be effective in controlling lead stormwater inputs (3,5)
- Monitor to determine effectiveness of BMPs to remove total and dissolved lead from stormwater (3)
- Estimate the load reduction of lead achieved for stormwater at the end of Phase I (3)
- Estimate effectiveness of BMPs to remove TSS (3,5)
- Relevant Plan: NPDES Stormwater Permit and associated documents

Toxics—Organics

Requirements:

- Identify and implement BMPs as listed in the municipal NPDES permits, for erosion control based on limited data suggesting stormwater sediment as a current source of organics (3,5)
- Monitor the effectiveness of BMPs at TSS removal (3)
- Estimate the load reduction of TSS achieved for stormwater at the end of Phase I (3)

Relevant Plan: NPDES Stormwater Permit and associated documents

SANDY RIVER (2005 TMDL)

Background

The Sandy TMDL post-dates the adoption of OAR 340-042, which identifies the mechanism for TMDL implementation by responsible parties as a permit or a nonpoint source implementation plan. The implementation requirements in the Sandy TMDL are therefore different in focus from those in the 1998 Columbia Slough TMDL. The Sandy requirements are comparatively general: they presume that responsible parties will identify the management practices and monitoring that are needed to meet goals articulated in the TMDL. The Sandy TMDL focuses on listing the topics that must be addressed in an implementation plan, and on the objectives of the plan which are instrumental to meeting the TMDL goals. The topics are both broader and deeper in scope than the list of management strategies provided in OAR 340-042.

Required Elements:

Contents of a Plan:

Requirements: ODEQ expects that identified responsible participants will develop, submit to ODEQ, and implement plans that will achieve the load allocations within 18 months of TMDL adoption. These activities will be accomplished by the responsible participants in accordance with the Schedule in Section 6.6 of this WQMP. The DMA specific water quality implementation plans must address the following items:

Proposed management measures tied to attainment of the load allocations and/or established surrogates of the TMDLs, such as vegetative system potential or percent reductions.

- Timeline for implementation.
- Timeline for attainment of load allocations.
- Identification of responsible participants demonstrating who is responsible for implementing the various measures.
- Reasonable assurance of implementation.

- Monitoring and evaluation, including identification of participants responsible for implementation of monitoring, and a plan and schedule for revision of implementation plan.
- Public involvement.
- Maintenance effort over time.
- Discussion of cost and funding.
- Citation of legal authority under which the implementation will be conducted.

Relevant Plans: The City's MS4 Stormwater permit and associated documents, and the Temperature and Bacteria TMDL Plans include the information required by the Sandy TMDL. The Wastewater permits are not relevant to the Sandy Basin, as the permitted discharges outfall to the Columbia River or Columbia Slough.

Monitoring:

Requirements: Monitoring and evaluation has two basic components: 1) implementation of DMA specific implementation plans identified in this document, and 2) monitoring of physical, chemical, and biological parameters for water quality and specific management measures. This information will provide information on progress being made toward achieving TMDL allocations and achieving water quality standards.

The objectives of this monitoring effort are to demonstrate long-term recovery, better understand natural variability, track implementation of projects and BMPs, and track effectiveness of TMDL implementation. This monitoring and feedback mechanism is a major component of the "reasonable assurance of implementation" for the Sandy Basin TMDL WQMP.

This WQMP and the DMA-specific Implementation Plans will be tracked by accounting for the numbers, types, and locations of projects, BMPs, educational activities, or other actions taken to improve or protect water quality. The mechanism for tracking DMA implementation efforts will be annual reports to be submitted to ODEQ.

The City of Gresham monitors two instream locations in Kelly Creek and an additional two in Beaver Creek through an agreement with Multnomah County. The monitoring is described in the Environmental Monitoring Plan and covers all the TMDL constituents.

Relevant Plans: The NPDES Stormwater Permit and associated documents, and the Temperature and Bacteria TMDL Plans identify monitoring adequate to meet the monitoring requirements. The only water quality monitoring that is needed in addition to that currently described in the Stormwater Monitoring Plan is for temperature (with a focus on shade as a proxy for temperature).

Adaptive Management:

- *Requirement:* Each DMA will also monitor and document its progress in implementing its plan and this information will be provided to ODEQ.

Relevant Plans: Each of the City's implementation plans describe monitoring and reporting.

- *Requirement:* DMAs will develop benchmarks for attainment of TMDL surrogates, which can then be used to measure progress.

Relevant Plans: The NPDES Stormwater permit and associated documents include benchmarks for the Columbia Slough basin (except temperature). See **Appendix B**. No benchmarks are required for the individual Wastewater permit since there is no relevant TMDL for the Columbia River. The 1200Z permit for stormwater from the Wastewater Treatment Plant includes pollutant limit benchmarks that if exceeded, corrective actions will be required by DEQ. The Temperature and Bacteria TMDL Plans include information relevant to milestones either developed or under development for activities that have discrete steps leading to completion.

- *Requirement:* Where the Implementation Plans or management techniques are found to be inadequate, DMAs will revise the components of their Implementation Plan to address these deficiencies.

Relevant Plans: Each of the City's implementation plans allows for a process to modify practices should the existing commitments/activities prove inadequate.

Funding:

Requirement: Designated Management Agencies will be expected to provide a fiscal analysis of the resources needed to develop, execute, and maintain the programs described in their Implementation Plans. The purpose of this element is to describe estimated costs and demonstrate there is sufficient funding available to begin implementation of the WQMP. Another purpose is to identify potential future funding sources for project implementation.

Relevant Plans: The NPDES Stormwater Permit and associated documents describe the fiscal resources available for the main Stormwater BMPs. The Wastewater permits are already being implemented through existing resources. The Temperature and Bacteria TMDL Plans include an evaluation of resources necessary to realize the commitments.

WILLAMETTE RIVER AND TRIBUTARIES (2006 TMDL Updated for EPA 2021 Mercury TMDL)

Background:

Like the TMDL for the Sandy Basin, the Willamette TMDL post-dates the adoption of OAR 340-042, and therefore presumes that the mechanism for TMDL implementation is either a DEQ permit or a nonpoint source plan. The specific requirements listed in the Willamette TMDL regarding the topics to be addressed by the implementation plans are slightly different from those listed in the Sandy TMDL. The table below shows the topics that are required to be addressed in an implementation plan by the two TMDLs.

Required Management Measures:	Sandy Basin	Willamette TMDL
Identification of management strategies	X	X
Identification of Responsible Parties	X	
Timeline for Implementation of strategies & schedule for completing milestones	X	X
Timeline for attainment of load allocations, including benchmarks for attainment	X	X
Track Implementation of Commitments	X	X
Submittal of Annual Reports to DEQ	X	
Adaptive Management	X	X
Compliance with applicable statewide land use requirements	X	X
Include effectiveness evaluations every five years		X
Reasonable Assurance of Implementation	X	
Monitoring of physical, chemical, and biological parameters to ensure water quality goals are being met and demonstrate long-term recovery	X	X
Monitor to better understand natural variability	X	X
Characterize Mercury levels in stormwater		X
Address Runoff from nonpoint sources not covered under an NPDES permit	X	X
Public Involvement	X	
Maintenance Effort over Time	X	
Discussion of Cost and Funding	X	X
Citation of Legal Authority	X	X

Grey shading indicates requirements that match or elaborate on those listed in OAR 340-042-0080. Requirements that closely match the OAR are addressed in the “Overview of Management Strategies” in Section I. rather than in Appendix A.

Summary of Requirements and Identification of Relevant Management Plans:

The exact wording of the requirements in the Sandy and Willamette TMDLs is not identical for a given management measure, but it is reasonable to assume that the intent is the same, given the similar goals of the TMDLs. In the interest of efficiency, the analysis below addresses only measures that are required in the Willamette TMDL, which are not included in the Sandy TMDL.

Five-Year Effectiveness Reviews:

Requirement: For point sources of pollution, ODEQ will issue permits that include specific discharge limitations and compliance schedules that ensure water quality standards are met or will be attained within a reasonable timeline. Permits are reviewed and renewed on a 5-year cycle.

For nonpoint source pollution, sector-or source-specific TMDL implementation plans will include specific management strategies and timelines. DMAs will be expected to prepare an annual report and undertake an evaluation of the effectiveness of their plans every five years to gauge progress toward attaining water quality standards.

Relevant Plans: The City's NPDES permits all require renewal applications each five years. The renewal requirements constitute the five-year review required in the TMDL. The Nonpoint Source TMDL Implementation Plan includes commitments for the requisite five-year effectiveness reviews.

Mercury:

Requirements: Permitted municipal storm water dischargers (MS4 Phase 1 and 2 permittees): Intent: Ensure MS4 communities are addressing mercury through implementation of their MS4 permit. DEQ also required MS4 Phase I permittees to collect data on mercury levels in urban storm water runoff in order to characterize these sources so they may be appropriately considered in the 2011 update of the mercury TMDL. Update Willamette Basin IP to ensure that all appropriate strategies are included to aid mercury reduction in waterbodies.

History

Because the 2006 TMDL did not establish source-specific WLAs for mercury, mercury was not considered to be a TMDL pollutant under the Phase-I MS4 permit provisions of the time. However, mercury was a 303(d) listed pollutant in the Willamette Basin and was therefore subject to requirements found in Schedule D of the MS4 permit of the time. Therefore, the City qualitatively reviewed the pollutants that were listed in the 2002 303(d) report that are relevant to MS4 storm water sources, including mercury. The review and summary objectives were as follows:

- Determine whether there is a reasonable likelihood for storm water from the MS4 to add or contribute to water quality degradation of receiving waters through the discharge of mercury. Provide the rationale for the conclusion, including the results of an evaluation².
- If the discharges from the MS4 are a contributor for mercury, determine and describe the relationship between mercury and the MS4 discharges.

² Included as Appendix B.

- Determine whether the BMPs in the existing Storm Water Management Plan (SWMP) document are effective to address mercury. If not, describe how the plan could be adapted to address mercury. A summary of the rationale for this determination must also be included in the report³.
- If sufficient information is not available to make the determinations required above, the co-permittee must compile the additional pertinent information necessary to adequately complete these determinations⁴.

In September 2006, EPA approved DEQ's mercury TMDL for the entire Willamette Basin. DEQ developed the TMDL to meet a mercury target in place at the time. Northwest Environmental Advocates filed a lawsuit in 2012, which argued the validity of the mercury TMDL and EPA's approval of the TMDL. In April 2017, the US District Court issued a ruling requiring EPA to revise the TMDL by April 2019 and allowed the 2006 TMDL to remain in effect.

The City of Gresham and other stakeholders joined an advisory committee in 2017 to provide input regarding the sources, contributions, and modeling for the updated TMDL. During this time, there was a collective acknowledgement that the largest source of mercury is atmospheric deposition at a global scale making it difficult for any Oregon stakeholder to significantly reduce sources of mercury compared to the overall total. Nonetheless, Stormwater and Wastewater permittees will be charged with significant reductions in mercury over time.

In February 2021, EPA released the revised TMDL and the DEQ 2019 WQMP came into effect. As such Gresham became a Designated Management Agency (DMA) and has updated this plan for DEQ review and approval for the deadline of Sept. 3, 2022. This update does not include addressing mercury from the City's Wastewater Treatment Plant because it has its own separate set of requirements and timeframes from DEQ.

Since 2004, the City of Gresham has sampled for total mercury in all of its monitoring program areas, i.e., instream, stormwater, and stormwater facility performance sampling, using a lab with a method detection limit of 2 ng/L. Additionally, in response to DEQ's 2011 Mercury Monitoring Order, the City of Gresham conducted low-level monitoring for total and dissolved phases of mercury and methyl mercury in stormwater at 8 locations in 2011-2013. The method detection limits were 0.5 ng/L for total and dissolved mercury and 0.05 ng/L for total and dissolved methyl mercury. With each consecutive SWMP, the city will continue to focus on controlling sediment-laden runoff to the maximum extent practicable in an effort to reduce mercury movement to our waterways. The August 2022 approved Environmental Monitoring Plan includes the use of a laboratory process with a method reporting limit of .00005 µ/L for instream and stormwater sampling and .002 µ/L for stormwater treatment facility performance evaluation sampling.

³ Included as Appendix C.

⁴ Continued sampling for mercury in the current Environmental Monitoring Plan will accomplish this goal.

Overall, there are a number of ways in which the City's work is helping reduce mercury that include some additional information and links here beyond the Table 3 Summary of Commitments.

- The Stormwater Management and Monitoring Plan and associated annual reports which describe street sweeping and other sediment removal maintenance activities conducted year round
- The Stormwater Management Manual for new and redevelopment requiring infiltration and vegetated facilities as first priority which limits mercury deposition runoff and captures sediment
- The Erosion Control and Sediment Prevent Manual that applies to all public and private construction to control sediment
- Development code that requires Habitat Conservation Areas to be preserved or mitigated for preservation of stream condition and function related to temperature and bank stability and include native plant requirements
- City Fleet policy choices (purchase of Toyota hybrids for fuel efficiency and no mercury switches) and maintenance practices
- Undertaking of a Citywide Climate Action Plan development (planned for completion in 2023)
- City use of solar power for City Hall and the Wastewater Treatment Plant
- City promotion of solar power incentive outreach to residents
- Promotion of staff carpooling, use of public transit, and work at home schedules
- Offering hazardous waste collection for the public and pharmaceutical take back events
- Creating new affordable housing units in Gresham to decrease populations of those living outside
- The Wastewater Treatment Plant air quality, NPDES, and 1200Z permit.
- The Mercury Minimization Plan required to control sources from Industry, especially Dentistry for the Wastewater Treatment Plant discharge protection
- The Industrial Pretreatment Program: <https://greshamoregon.gov/Water-Resources/> [Wastewater tab]
- Stormwater Business Pollution Prevention program: <https://greshamoregon.gov/Pollution-Prevention-Program/> which includes inspection of businesses most likely to contribute mercury, as well as technical assistance to a variety of businesses
- Restoration and enhancement of public land that helps capture, slow, treat, and infiltrate water via natural forest ecosystem resiliency, and bank stabilization: <https://greshamoregon.gov/Natural-Resources/>

Relevant Plan: The City's MS4 Stormwater Permit, SWMP document, and Environmental Monitoring Plan.

Appendix C

Mercury Minimization Assessment¹

City of Gresham

May 2022

Permit Requirement:

Schedule D.3.b. Willamette Basin Mercury TMDL

Each co-permittee is responsible for the applicable WLAs included in the Total Maximum Daily Load (TMDL) for Mercury in the Willamette Basin and the implementation requirements associated Water Quality Management Plan issued by EPA on December 30, 2019 and reissued with modification on February 4, 2021. These requirements include:

- i. Develop and submit a mercury minimization assessment with the annual report due November 1, 2022, that documents the current actions, such as BMPs implemented, that reduce the amount of solids discharged into and from the permitted MS4 system (similar to the actions currently required in Schedule A). If the assessment indicates that mercury and sediment reducing BMPs are fully incorporated into the SWMP Document, a report documenting the results as such is sufficient.*
- ii. Continued implementation of the BMPs and other actions described in the mercury minimization assessment that are effective for mercury reduction, along with documentation of implementation in each subsequent annual report.*

Mercury in the aquatic food chain is significant risk to humans because it magnifies in fish tissue as it moves up the food chain and is a widely distributed problem throughout North America. In the Willamette basin, a TMDL was developed for mercury in order to develop fish consumption advisories.

According to the U.S. Environmental Protection Agency, the primary source of mercury in our waterways is atmospheric deposition from the burning of fossil fuels. Other significant sources include volcanic eruptions, wildfires, mining, industrial metal, and concrete production. The City's stormwater monitoring measures total mercury which acts as a proxy for Hg²⁺ which can react with organic compounds in the water and/or historically deposited sediment that is holding mercury and then potentially converted to methylmercury (MeHg) by organisms and sunlight. Lower oxygen levels in freshwater contribute to the conversion.

Stormwater runoff is the primary pathway by which aerially deposited mercury in the urban environment reaches aquatic systems via public and private pipes and overland flows. The City's BMPs within its SWMP such as, soil stabilization projects, erosion control program, sediment removal activities, and use of green infrastructure, lowers levels of total mercury in stormwater, which reduces the potential mercury that could be converted to MeHg.

The goal of stormwater BMPs is to reduce the load of mercury to receiving waters. BMPs that infiltrate and prevent sediment movement reduce the mercury load in absolute terms, thereby

¹ Submitted as part of the City's updated Stormwater Management Plan document and approved in August 2022.

reducing the potential for methylation in the environment (streams and wetlands). Mercury binds strongly to sulfur-containing organic ligands such as weathered plant material so that mercury that reaches biologically active soils tends to be well-sequestered (i.e., less bioavailable for methylation). Therefore, other than infiltration devices, sediment-trapping BMPs are most effective for reducing mercury loads.

The City's SWMP focuses on preventing the movement of sediment and the removal of accumulated sediment prior to entering streams. In particular, stormwater facilities will help sequester mercury in upland soil or subsurface environments. Structural stormwater BMPs that are most effective at reducing mercury loads include the following characteristics:

- Prioritize retention. When retention is not feasible, prioritize extended detention to maximize the contact time for dissolved mercury to adsorb to particulates.
- Trap sediment (particularly fine sediment) for alternative disposal.
- Reduce flow volumes to allow mercury to incorporate into the soil matrix
- Aerobic conditions that limit methylation.
- Design avoids the remobilization of sediment and mercury.

In addition, non-structural BMPs (Education & Outreach & Waste Disposal Oversight) is also important to reduce hazards to humans from mercury vapor and to water from releases to the air or ground from breaks and spills.

Examples of programs already in use include amalgam collection requirements for dentists, proper recycling, or disposal of mercury switches in automobiles, home thermostats, fluorescent lights, thermometers, and pharmaceuticals.

Effectiveness of stormwater BMPs in reducing mercury loads has not been quantified adequately enough to calculate pollutant load reduction benchmarks. Therefore, Gresham's revised monitoring plan has included mercury in the suite of parameters for analysis to inform future local knowledge regarding the levels and sources of mercury in stormwater and the removal efficiency by structural stormwater controls. The results of this monitoring, as well as evaluations of non-structural BMPs, will be used to re-evaluate the SWMP with respect to mercury for the next permit term. BMPs that Gresham currently implements that can be effective at reducing mercury loads include:

- Conduct public education and communications
- Encourage LID practices
- Illicit discharge detection and elimination
- Maintain public streets by sweeping, other activities
- Business inspection program
- Reduce/limit sanitary sewer discharges and/or infiltration into the storm system

- Maintain the MS4 system
- Promote construction-phase erosion and sediment control
- Implement public education programs to promote improved stormwater quality
- Require stormwater treatment for new and redeveloped areas
- Implement stormwater retrofit projects that target areas with highest pollutant loads (e.g., arterial streets)
- Inspect and maintain stormwater facilities to remove accumulated sediment and vegetation
- Respond to citizen complaints about erosion

The overall SWMP Plan approach and BMP activities review regarding the prevention and control of mercury lead the City to find that there are no new technologies or programs or BMPs to add at this time.