

CITY OF SALEM, OREGON

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) MUNICIPAL SEPARATE STORM SEWER SYSTEM
(MS4) PERMIT**

(Permit Number 101513, File Number 108919)

**ANNUAL REPORT
FY 2019-20**

October 26, 2020

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Mark Bechtel, AICP, Operations Division Manager

Date

**Prepared by
City of Salem Public Works Department**



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LIST OF ACRONYMS

ACWA	Association of Clean Water Agencies
APWA	American Public Works Association
BMP	Best Management Practice
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
COE	U.S. Army Corps of Engineers
CON	Construction-related BMPs
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
EPSC	Erosion Prevention and Sediment Control
ES	Environmental Services (City of Salem)
FEMA	Federal Emergency Management Act
GIS	Geographic Information System
IDEP	Illicit Discharge Elimination Program
IGA	Inter-governmental Agreement
ILL	Illicit discharge-related BMPs
IND	Industrial-related BMPs
MEP	Maximum Extent Practicable
mg/L	Milligrams per liter
MOA	Memorandum of Agreement
MS4	Municipal Separate Storm Sewer System
MWOG	Mid-Willamette Valley Outreach Group
ODA	Oregon Department of Agriculture
ODOT	Oregon Department of Transportation
PSFA	Private Stormwater Facility Agreement
ppm	Parts per million
RC	Residential and commercial area-related BMPs
SDC	System Development Charge
SKAPAC	Salem/Keizer Area Planning Advisory Committee
SRC	Salem Revised Code
SSORP	Sanitary Sewer Overflow Response Plan
SWMP	Stormwater Management Plan
TMDL	Total Maximum Daily Load

1 INTRODUCTION

1.1 Permit Background

In 1990, the United States Environmental Protection Agency (EPA) published its Phase I regulations governing stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) program of the Clean Water Act. In Oregon, the EPA has delegated the permitting of NPDES municipal separate storm sewer system (MS4) discharges to the Oregon Department of Environmental Quality (DEQ).

Under the EPA's initial Phase I implementation of the program, municipalities having a population greater than 100,000 were required to obtain an NPDES MS4 permit. The City of Salem (City) passed that threshold with the 1990 Census and was included in the program by the DEQ, with the Oregon Department of Transportation (ODOT) originally designated as a co-permittee with Salem.

The regulations established a two-part application process for obtaining a NPDES Permit to discharge municipal stormwater to "waters of the state." The City submitted the Part 1 NPDES stormwater permit application in April 1994. The supplemental Part 2 application and associated Stormwater Management Plan (SWMP) were subsequently finalized and submitted to DEQ in July 1996. DEQ issued the City's initial NPDES MS4 permit in December 1997, with an expiration date of September 2002.

An application for permit renewal was submitted to the DEQ in April 2002, and the City's second MS4 permit was issued in March 2004. The next permit renewal application was submitted to the DEQ in 2008. This application included a revised SWMP (2008 SWMP) that was developed in part using the EPA document *Municipal Separate Storm Sewer System Program Evaluation Guidance* (January 2008). Following permit negotiations, the 2008 SWMP was further revised and submitted to the DEQ on August 13, 2010.

The City's renewed (third) MS4 permit was issued on December 30, 2010. Consistent with requirements of Schedule D.6 of the renewed MS4 permit, the City resubmitted the SWMP (revised 2010 SWMP) to DEQ on March 17, 2011. The EPA conducted an inspection of the City's MS4 program from July 31, 2012, through August 2, 2012, to assess compliance with the NPDES MS4 permit. The results of the audit were released during the FY 2013-14 reporting period and indicated that the City was deficient in meeting its construction site runoff control requirements. An EPA Administrative Compliance Order by Consent (Consent Order) was issued for the City to: 1) develop and document its construction site plan review procedures; 2) develop and document inspection procedures for construction sites; and 3) submit a separate report of all construction site inspections annually through the expiration of the current MS4 permit. The City remedied the deficiencies in its construction site erosion control program within 90 days of the Consent Order, submitted its first annual construction site inspection report on November 1, 2013, and continues to meet the requirements of the NPDES MS4 permit and the EPA Consent Order.

The City's current permit had an expiration date of December 29, 2015. A renewal application was submitted in December 2015 (per the conditions listed under Schedule F, Section A.4) and the DEQ has confirmed (in a letter dated March 1, 2016) that the permit has been administratively extended. The DEQ has started the process for permit renewal for all Phase I MS4 permits, and the City submitted comments on a draft applicant review of their permit on June 26, 2020.

1.2 Purpose and Scope

The MS4 permit area is defined as the area included within the city limits (encompassing 47 square miles), as exhibited in Figure 1. This is the area for which the City has responsibility for implementing its stormwater management program. Land use within the permit area is exhibited in Figure 2.

This NPDES MS4 Annual Report summarizes stormwater-related activities listed in the 2010 SWMP that were completed during the period of July 1, 2019, through June 30, 2020, to address the requirements of the City's current MS4 permit. The information presented in this report is based on the requirements listed in Schedule B.5 of the MS4 Permit (see Table 1).

Table 1. Annual Reporting Requirements for the MS4 Permit		
Permit Section	Reporting Requirement	Location in Annual Report
B(5)(a)	The status of implementing the stormwater management program and each SWMP program element, including progress in meeting the measurable goals identified in the SWMP.	Section 2
B(5)(b)	Status or results, or both, of any public education program effectiveness evaluation conducted during the reporting year and a summary of how the results were or will be used for adaptive management.	Section 2 (RC 5-1)
B(5)(c)	A summary of the adaptive management process implementation during the reporting year, including any proposed changes to the stormwater management program (e.g., new BMPs) identified through implementation of the adaptive management process.	Section 1.3
B(5)(d)	Any proposed changes to SWMP program elements that are designed to reduce TMDL pollutants.	Section 1.3
B(5)(e)	A summary of total stormwater program expenditures and funding sources over the reporting fiscal year, and those anticipated in the next fiscal year.	Section 3
B(5)(f)	A summary of monitoring program results, including monitoring data that are accumulated throughout the reporting year and/or assessments or evaluations.	Section 2 (MON 1-1, 1-2, and 1-3), Appendix A
B(5)(g)	Any proposed modifications to the monitoring plan that are necessary to ensure that adequate data and information are collected to conduct stormwater program assessments.	Appendix A
B(5)(h)	A summary describing the number and nature of enforcement actions, inspections, and public education programs, including results of ongoing field screening and follow-up activities related to illicit discharges.	Section 2 (ILL 2-4)
B(5)(i)	An overview, as related to MS4 discharges, of concept planning, land use changes and new development activities that occurred within the Urban Growth Boundary (UGB) expansion areas during the reporting year, and those forecast for the following year including the number of new post-construction permits issued, and the estimate of the total new or replaced impervious surface area related to new development and redevelopment projects commenced during the reporting year.	Section 5
B(5)(j)	Results of ongoing field screening and follow-up activities related to illicit discharges.	Section 2 (ILL 2-4), Appendix A

1.3 Adaptive Management

The stormwater management program that is described in the City's current SWMP is the result of adaptively managing (e.g., implementing, evaluating, and adjusting) the program since first being issued an MS4 permit in 1997. The history of this adaptive management approach may be found in Section 2 of the City's "National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit Renewal (September 2, 2008)," and describes how the current DEQ-approved SWMP meets the "maximum extent practicable" requirement. By adaptively managing its stormwater management program, the City continues to reduce the discharge of pollutants from its stormwater system.

Consistent with Schedule D.4 of the MS4 permit, City staff submitted an "Adaptive Management Approach" to DEQ on October 24, 2011, that will continue to be adhered to through expiration of the MS4 permit. This approach involves both an annual review of BMP activities and collected data, as well as a comprehensive assessment of BMP activities in preparation for MS4 permit renewal.

Per the Adaptive Management Approach, a series of 12 meetings were held with staff across the City in reporting year (FY 2014-15) to review BMP activities completed over the permit term, information received through the annual adaptive management process, and to complete a comprehensive assessment of BMP activities listed in the 2010 SWMP. Information collected through this assessment informed the proposed SWMP modifications that were submitted to DEQ as part of the MS4 Permit Renewal Package in December 2015. The proposed revisions were posted on the City's website for an open public comment period prior to submittal to DEQ.

In preparation of this annual report and as described in the Adaptive Management Approach, City staff were again asked to consider if changes in BMP activities were anticipated or proposed in the next fiscal year (FY 2019-20). Staff completed the documents for their individual BMP activity. Currently no proposed changes to the SWMP that reduce TMDL pollutants were made.

Figure 1. Permit Area Map

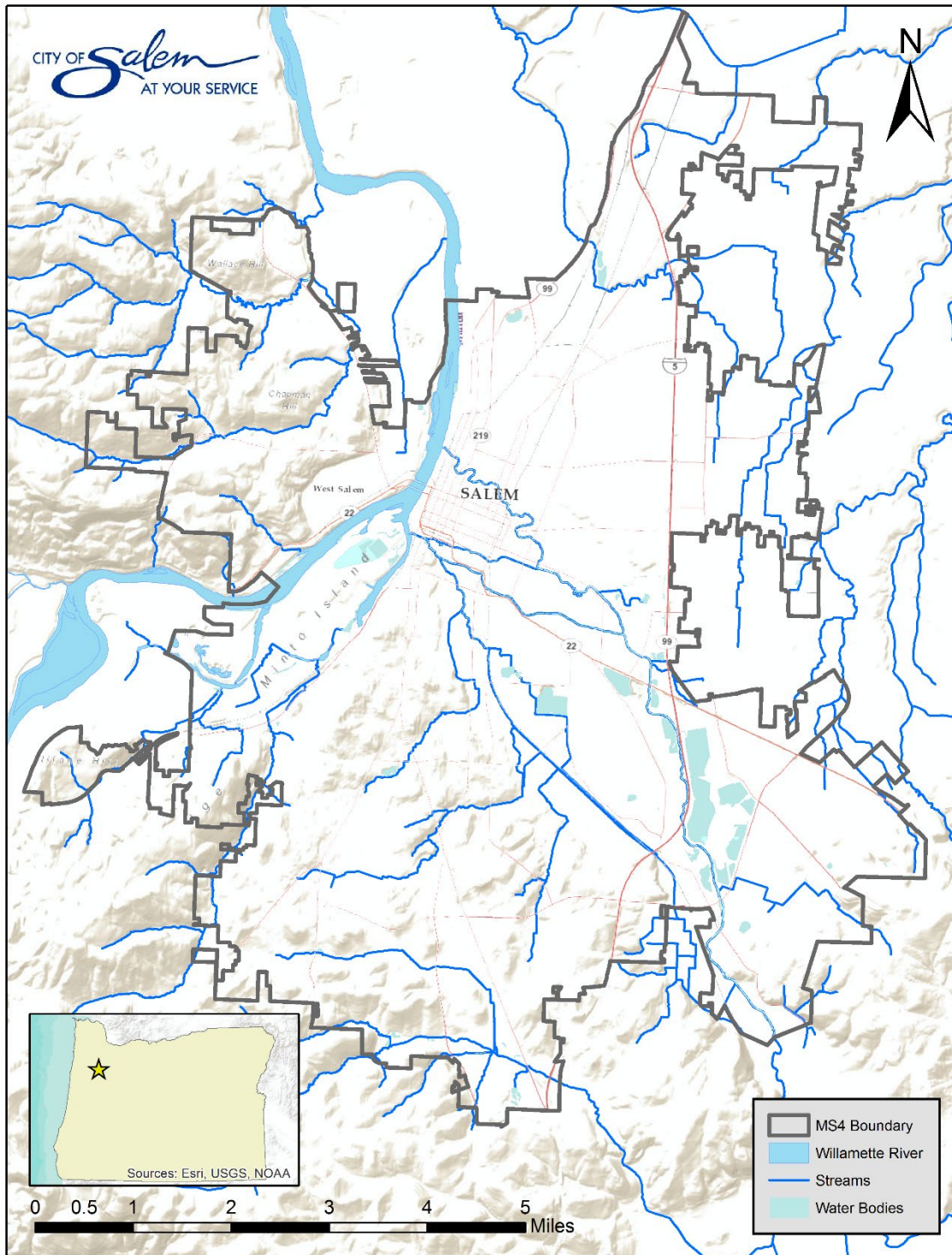
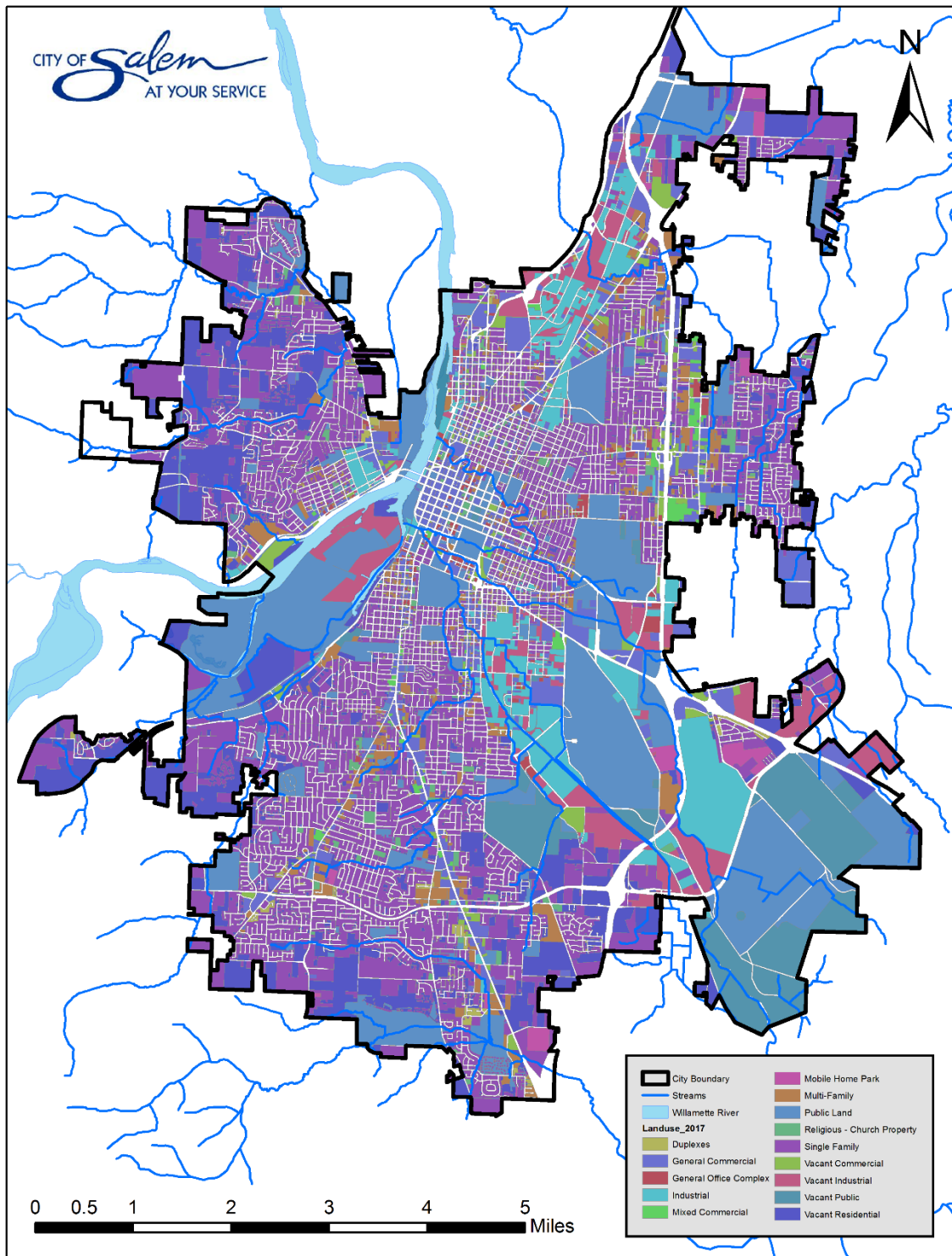


Figure 2. Land Use



2 STATUS OF THE STORMWATER MANAGEMENT PLAN

The primary objective of the SWMP is to provide an outline of City activities that will satisfy the NPDES Phase I stormwater regulatory requirements (the MS4 permit) [40 CFR 122.26(d)(2)(iv)]. The intent of the regulations is to allow each permittee the opportunity to design a stormwater management program tailored to suit the individual and unique needs and conditions of the permit area and reduce the discharge of pollutants from the stormwater sewer system to the maximum extent practicable.

The status of BMP activities listed in the 2010 SWMP is discussed in this section of the Annual Report. BMPs within the SWMP have been categorized into five types:

1. Structural and source controls for residential and commercial areas (RC);
2. A program for the control of illicit discharges and improper disposal into the storm drainage system (ILL);
3. A program to monitor and control pollutants from industrial facilities, hazardous waste treatment, storage and disposal facilities, and municipal landfills (IND);
4. A program to implement and maintain structural and non-structural BMPs to reduce pollutants from construction sites (CON); and
5. A program to conduct water quality monitoring activities within the MS4 drainage system and City waterways (MON).

Each BMP identified in the 2010 SWMP is discussed in this report with the following information:

- A table describing BMP tasks, associated measurable goals, and tracking measures as stated in the 2010 SWMP.
- A summary of activities completed during FY 2019-2020 (July 1, 2019 through June 30, 2020) that demonstrates progress toward meeting the measurable goals and tracking measures.

Table 2. RC1—Planning

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 1-1: Provide City-wide Master Planning for stormwater to address both water quality and water quantity. As part of master planning efforts, continue to evaluate new detention and water quality opportunities within the Urban Growth Boundary (UGB), and consider sites in upstream areas that may affect Salem, and in downstream areas that may be affected by runoff from Salem.	Maintain Master Plan and complete next update within the MS4 permit cycle.	Track schedule for updating Master Plan. Report on Master Plan update actions.	In progress: A Stormwater Master Plan has been drafted and is scheduled for a public hearing before City Council on September 28, 2020 . The draft plan carries forward analysis conducted for the 2000 Stormwater Master Plan and contains updated basin plans for Battle Creek, Mill Creek, and Pringle Creek. Hydraulic and hydrologic modeling has been completed for all three basins. Recommended facilities and cost estimates are included in the plan. An extensive public outreach has been completed with generally positive feedback to the draft plan. Staff anticipates that City Council will approve an ordinance adopting the plan by the end of October 2020.
RC 1-2: Develop and maintain watershed management plans by developing a prioritized schedule and implementing watershed management plans based on available funding. Develop the Pilot Pringle Creek Watershed Management Plan as a model for the City’s other prioritized urban watersheds. Identify capital improvement needs and potential “early action” activities and projects to ensure that the plan has a strong implementation component.	Complete a hydromodification study and retrofit plan by November 1, 2014. Incorporate recommendations and early action items of watershed management plans with completion of hydromodification study and retrofit plan. Develop strategy for completing future watershed management plans by November 1, 2014.	Report on completion of hydromodification study. Report on completion of retrofit plan. Track implementation actions of Pringle Creek Watershed Management Plan. Report on strategy for completing future watershed management plans.	Completed: The Hydromodification Assessment and Stormwater Retrofit Plan were completed and submitted to DEQ on October 28, 2014. Ongoing: During the reporting period 2019/2020, City staff utilized the stormwater retrofit prioritization tool (completed in 2017/2018) when preparing the annual Capital Improvement Plan (CIP). City Council adopted the CIP in June 2020, which includes a total of approximately \$3.05 M for stormwater-related projects, of which \$198,730 is allocated specifically for implementing the Stormwater Retrofit Plan. Two retrofit projects were completed as noted in RC 1-7.
RC 1-3: City staff will continue to update the official “waterways” map for use by City staff in applying various regulations and standards. As studies are performed that warrant the revision of the designated waterways, including ground truthing, that information will be incorporated into the update process.	Compile database of maps and waterways references. Complete field ground-truthing by end of FY 2011-12. Update map by end of FY 2012-13.	Track completion of ground-truthing and map updates.	Completed: All waterway layers were previously consolidated into one "channels" feature layer in SDE (Spatial Database Engine) as part of the Stormwater utilities migration from Hansen to Infor Public Sector (IPS). This consolidated layer is the master data set for all waterways. Ongoing: Regular maintenance is performed, and any updates have been applied to the Channels data.
RC 1-4: City staff will meet a minimum of once per year to discuss coordination of efforts relating to stormwater. Topics may include the following, as they are applicable: grant funding, outreach, program review, annual report, monitoring, sharing of data, adaptive management, review/update of documents and programs, training needs, documentation of protocols, coordination of databases, involvement of inspections, maintenance, and operations in plan review and program development, checklists, effective Erosion Prevention and Sediment Control Program including enforcement, strategizing/addressing hotspots, plan review, stormwater BMPs, and development of written enforcement strategy. Provide factsheets/manuals to new City employees to inform them about the City’s efforts for pollution prevention. At least annual trainings will be provided to specified City employees involved in MS4-related activities regarding the permit, including its intentions and their responsibilities in relation to the MS4 permit. Feedback for improving processes will be encouraged and brought to the coordination meeting(s). Training needs will be determined by City staff meeting mentioned above. Consider adding stormwater pollution prevention training as an action item of the FY 2011-12 Environmental Action Plan that addresses pollution prevention on a city-wide level.	Conduct annual formal coordination meetings for stormwater, more often if necessary. Conduct annual training of employees involved in MS4-related positions, more often if necessary.	Prepare an annual meeting summary. Track changes made to the implementation of the stormwater program based on coordination discussions. Track major items of coordination. Track training attendance. Share and document training suggestions for MS4 implementation changes.	Ongoing: Throughout the 2019/20 reporting year, City stormwater staff met with staff from a variety of workgroups to prepare for the annual report and discuss permit renewal. Staff also met with Association of Clean Water Agencies (ACWA) members and DEQ staff numerous times during the spring to discuss clarifications for the proposed new MS4 permit. These coordination meetings included but were not limited to the following MS4 related efforts: public education and outreach, operations and maintenance, planning and development, and monitoring. Ongoing: A natural resources group meets quarterly to discuss policies, projects, and programs. This group focuses on habitat restoration, which includes tree planting with Friends of Trees, streamside restoration in parks, creating pollinator gardens, reviewing an oak savannah management plan and MOU, and the treatment of the invasive plant, Ludwigia, in Minto Slough. Suggested changes to the code, that were mostly administrative, include tree hearings, street tree list, and reference to ISA standards. The City also continued the tree removal project on Shelton Ditch to help reduce erosion issues from the banks caving in when trees fall. Trees will be replanted where possible, and bank stabilization projects are being considered. The Climate Action Plan planning process was introduced to group. A subgroup continues to work on the development of an Integrated Pest Management Plan. Ongoing: City of Salem Public Works continued working on APWA accreditation. As part of this process, many policies, plans, and projects related to stormwater have been reviewed and formally documented. Ongoing: Staff continued to participate in Oregon Association of Clean Water Agencies (ACWA) Stormwater subcommittees this last year (see RC1 Task 8). Attended: City staff attended the May 2019 Stormwater Summit in Eugene and the July 2018 Stormwater Summer Conference in Bend. Ongoing: City staff attends the City of Keizer’s Stormwater Advisory Committee, which meets monthly. Ongoing: All employees that are involved in MS4-related activities watch the rain check video for pollution prevention at municipal operations on an annual basis.
RC 1-5: Coordinate with other agencies such as NGOs, private environmental groups, and watershed councils.	Develop a list of contacts and identify issues of coordination.	Document any MOAs.	Ongoing: All coordination activities below are occurring on an ongoing basis. Clean Rivers Coalition: Roy IWAI, Water Resources Specialist, roy.iwai@multco.us The Clean Rivers Coalition is a group of agencies and non-profit organizations building a statewide Healthy Waters campaign. Public Works staff continued to serve on the steering committee. Staff attends regular meetings. Items of coordination included the following:

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
			<p>* Phase II of the project, which involves the development of a two focus groups and a public survey to provide baseline information. Focus groups were conducted in northern and southern Oregon. Information was compiled and provided to the CRC. BRINK, the consultant for the campaign, developed a playbook that includes an introduction, behavior change approach, research summary, communications plan, and creative assets.</p> <p>* Developing a scope of work to begin the Phase III of the campaign: developing a brand identity.</p> <p>* Writing, submitting, and receiving a toxics reduction grant from the EPA.</p> <p>***</p> <p>Friends of Trees: Logan Luvray, Green Space Manager, LoganL@friendsoftrees.org The City of Salem contracted with FOT again this year to assist with riparian and upland tree plantings. The group hosted one crew lead training event and five of seven events. One public tree planning event and the mulching event were cancelled due to COVID-19. A total of 511 volunteers provided 1,847 hours to the events to plant a total of 4,650 plants of which 204 were large-stock trees, 176 were small-stock trees, and 4,270 were small-stock native shrubs or ferns.</p> <p>***</p> <p>Mid-Willamette Outreach Group: Staff attends monthly meetings to coordinate issues and events.</p> <p>* On January 27, 2020, the Mid-Willamette Outreach Group (MWOG) hosted their ninth annual Erosion Control and Stormwater Management Summit (Summit). The event had 149 registered attendees.</p> <p>* Due to COVID-19, the group hosted an online Water Festival for one class instead of providing the traditional field trip experience for students.</p> <p>***</p> <p>Salem Environmental Education: Jon Yoder, President, joyoder@wildblue.net Staff sits on the board and attends regular board meetings that provides overall direction for the organization. Youth education staff provides eSTEM afterschool activities in coordination with SEE once a month for three different schools between October and May. This year, staff also participated in an outdoor school day at Minto-Brown Park and was scheduled to provide three more outdoor school experiences at the park, but they were cancelled due to COVID-19. The group continues to plan outdoor school for when restrictions are lifted.</p>
RC 1-6: The City will work with Marion and Polk Counties and the City of Keizer to coordinate stormwater management programs and activities within the greater Salem-Keizer Urban Growth Boundary. Coordination may include the establishment of appropriate intergovernmental agreements (IGAs) regarding potential uniform stormwater design standards, operations and maintenance activities, and public education and involvement efforts within the UGB.	Review and update the October 2000 SKAPAC Stormwater Management Agreement by the end of the permit term to reflect each jurisdiction's respective MS4 Permit and SWMP.	Report on significant coordination activities or programs. Report on completion of SKAPAC Agreement and other IGAs.	<p>Ongoing: Staff from the City of Salem, City of Keizer, and Marion County made a collective decision during reporting year 2013-14 that the existing SKAPAC Agreement adequately addresses any concerns the jurisdictions may have regarding potential development activities in identified Stormwater Agreement Areas. No updates to the agreement are presently necessary. SKAPAC participants will continue to meet if needed to review public or private development projects that may impact the agreement. City of Salem staff attend the monthly Stormwater Advisory Committee with staff from City of Keizer and Marion County.</p> <p>Ongoing: Stormwater staff continued to work with Marion County, the Marion Soil and Water Conservation District, the City of Keizer, the City of Albany, and the City of Corvallis through the Mid-Willamette Valley Outreach Group (MWOG) to coordinate outreach pertaining to Erosion Prevention and Sediment Control and Low Impact Development practices (see RC 1-5 and CON 1). There were no new IGAs developed during this reporting period.</p>
RC 1-7: Evaluate existing detention facilities and potential new detention sites for potential conjunctive uses (as water quality facilities and for retrofitting opportunities). Continue to perform facility site searches to locate ponds, wetlands, vegetated swales, and other water quality facilities as existing water quantity and quality facilities are evaluated and potential new sites are identified. Coordinate with RC1-1 and RC1-2.	Complete a retrofit plan before end of year four of the MS4 permit cycle. Develop a strategy to identify and prioritize potential retrofit projects by November 1, 2013. Identify a minimum annual budget for stormwater retrofit projects as part of the retrofit strategy by November 1, 2014.	Report on available budget and completion of retrofit project efforts.	<p>Completed: The Stormwater Retrofit Plan was completed and submitted to the DEQ on October 28, 2014.</p> <p>Ongoing: During the previous reporting period for FY 2017/2018, a prioritization tool was refined and went into use for ranking potential retrofits so they could be placed into the City's Capital Improvement Program (CIP). Each year, \$100,000 is budgeted for completion of a retrofit project out of the CIP. Additional money is allocated within the Stormwater Program budget for small-scale retrofit projects that can be done in-house or that cost less than \$45,000.</p> <p>Completed: During reporting year 2019/2020, two retrofit projects were completed using funds from Engineering and Stormwater budgets. One was the creation of a rain garden at Marion Street NE and</p>

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
			15th Street NE in a dead end cul-de-sac where there was no treatment before, just several catch basins. The second was the retrofit of ditches along Brown Road NE into swales with mechanical treatment as well.
RC 1-8: The City will continue to be an active member of the Oregon Association of Clean Water Agencies (ORACWA). The City will use this medium to obtain copies of materials that have been produced by others. City staff will stay current on latest available educational and technical guidance materials.	Attend a minimum of one stormwater-related workshop or conference annually. Attend groundwater-related workshops and conferences as funds allow. Make information obtained at these events available to other City staff.	Report on City participation with ORACWA events.	Ongoing: Public Works staff continued to actively participate in Oregon Association of Clean Water Agencies through attendance at regularly scheduled meetings for the Stormwater, Pretreatment, and Water Quality Committees. Staff have also engaged with the Willamette River Mercury TMDL process, and the MS4 phase 1 permit renewal efforts. Staff attended the annual Stormwater Summit in May that was held in Eugene and the Annual Conference that was held in Bend in July. Ongoing: Information acquired through ACWA meetings/events is routinely passed on to other City staff, and as much as possible staff that don't normally attend meetings are included on meetings that have information relevant to them.

Table 3. RC2—Capital Improvements

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 2-1: Implement stormwater projects (including stormwater conveyance, quantity, quality, and stream/habitat improvement) based on priorities established under the Capital Improvement Program (CIP) and the Stormwater Master Plan consistent with available funding.	Include a funding line item for CIPs in proposed stormwater budget. Review and prioritize CIPs and budget annually. Implement CIPs based on prioritization and available funding.	Track number and description of projects completed. Report updated CIP list annually.	Planned: We did not have any completed stormwater projects in the reporting year 2019-2020. The following projects are either in construction or will be for fiscal and reporting year 2020-2021: <div><div>1.</div><div>Cedar Way Stormwater Improvements</div></div> <div><div>2.</div><div>Airport Stormwater Improvements and Curb Realignment</div></div> <div><div>3.</div><div>Salem Police Station Stormwater Improvements</div></div> Updated: the 5-year Capital Improvement Project list (2019-2023) was updated through 2023 and the project value for the 5-year horizon equals \$12,806,900.
RC 2-2: Continue to coordinate capital improvement projects with the Water Resources Section to integrate multiple resource agency permitting needs. The review is intended to identify integrated opportunities and permitting needs to meet water quality-related requirements.	Review and integrate multiple resource agency permitting needs, including MS4 permit requirements, into 100 percent of CIP projects.	Track number of projects reviewed. Track number of projects permitted.	Reviewed: The above projects were reviewed and permitting for current construction (FY 2019-20) and construction in FY 2020-21.
RC 2-3: The City continues to acquire physical access-easements for public and private stormwater facilities. This is done by identifying existing facilities for which easements, rights-of-way, or permit-of-entry agreements are needed for stormwater facilities; and developing a plan for acquiring the same, given current funding limitations.	Within one year of completion of the hydromodification study and retrofit plan, prioritize easement acquisitions for stormwater facilities. Following prioritization, identify funding source(s) for inclusion in budget.	Report on easement acquisition and prioritization process.	Completed: The Retrofit Plan and Hydromodification Assessment that were submitted to the DEQ by the November 1, 2014, deadline identified prioritized areas for stormwater improvement projects. Prioritization: The Stormwater Master Plan update specifies projects to be constructed, many of which may require acquisition of easements. As needed, easement acquisitions will be prioritized and pursued as projects are funded. Easement acquisition costs will be factored in and budgeted for along with all other associated project costs.

Table 4. RC3—Update of Stormwater Design Standards

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 3-1: Continue to encourage the use of structural BMPs for stormwater quality improvement and flood peak reduction opportunities. Develop stormwater quality design and associated maintenance standards for new and redevelopment. Continue to evaluate opportunities to provide incentives for alternative stormwater management practices, including Low Impact Development (LID). Maintain and update the Stormwater Management Design Standards after they are developed.	<p>Develop incentives for LID and other stormwater quantity and quality management practices.</p> <p>Develop updated stormwater design standards to include structural stormwater quality BMPs.</p> <p>Maintain Stormwater Management Design Standards and update as needed.</p>	<p>Document revisions made to Stormwater Management Design Standards.</p> <p>Document the development of any incentives for implementation of LID techniques.</p>	Completed: Incentives for Low Impact Development (LID) have been incorporated into Salem's Stormwater Utility in the form of credits that allow the impervious surface-based portion of the utility fee to be reduced based on the presence of stormwater quality and quantity facilities on the ratepayer's property. The first phase of the Stormwater Utility fee was implemented in January 2013 and the utility was fully implemented January 1, 2016. Stormwater Design Standards were approved as Administrative Rules completed in late 2013 and have been effective since January 1, 2014. The new standards are consistent with stormwater regulations and include design criteria for green stormwater infrastructure.
RC 3-2: Continue to implement process to identify and remove barriers for implementing LID techniques. Update the Stormwater Management Design Standards and associated Salem Revised Code (SRC) provisions as appropriate.	<p>Within three years of implementing the revised stormwater design standards, review and, as appropriate, modify design standards and SRC to minimize barriers to implementation of LID techniques.</p>	<p>Document the review of design standards and SRC to minimize barriers to implementation of LID techniques.</p>	Completed: Barriers to implementing Low Impact Development techniques have been identified and modified through Ordinance 34-13, which was adopted by Salem City Council on November 4, 2013. Updating the Stormwater Management Design Standards related to LID techniques was completed in late 2013 and new standards became effective on January 1, 2014 (see RC3-1).
RC 3-3: City staff is implementing the Water Quality Development Standards set forth by SRC Chapter 141 for all development requiring a Willamette Greenway Permit.	<p>Implement Water Quality Development Standards in Willamette Greenway.</p>	<p>Track number of Willamette Greenway Permits issued, and description of water quality measures employed.</p> <p>Track number of new facilities constructed.</p>	<p>* Willamette Greenway permits are processed as either conditional uses or as administrative conditional uses, depending on their location. Greenway permits are tracked through AMANDA, the City's permit tracking system. Requirements from SRC 71 (Stormwater Code) and associated Design Standards for use in the Greenway are incorporated as appropriate.</p> <p>Issued: One Willamette Greenway permit was issued. The permit was a Class 1 Willamette Greenway Permit for the installation of an electronic display wall sign within the Willamette Greenway Boundary. The wall sign was mounted to an existing building and did not impact vegetation, wildlife habitat, or natural topography along the riverbank. The existing riparian buffer within Wallace Marine Park was located approximately 300-feet from the subject property and no stormwater impacts were created, so no mitigation measures were proposed or conditioned.</p> <p>Constructed: No new facilities were constructed.</p>
RC 3-4: Continue to review all residential, commercial, and industrial plans submitted for City-issued building permits for compliance with the City's Stormwater Management Design Standards. Conduct inspections of completed projects prior to the City's acceptance of those projects and project close-out to ensure work was done in accordance with approved plans. Maintain database of plans reviewed and final inspections conducted. See IND1-Task 2 for standards specific to industrial facilities.	<p>Review all residential, commercial, and industrial plans submitted for City-issued permits for compliance with the City's Stormwater Management Design Standards and associated SRC provisions.</p> <p>Conduct inspections once construction is completed to ensure work was done in accordance with approved plans.</p>	<p>Maintain database of plans reviewed and final inspections conducted.</p>	Ongoing: All residential, commercial, and industrial plans submitted for City-issued permits are reviewed by Public Works staff for compliance with Stormwater Design Standards. Construction of stormwater-related facilities are inspected by Plumbing Inspectors within Community Development and/or Public Works to ensure that work was done in accordance with approved plans. All plan reviews and inspections are tracked in AMANDA, the City's permit tracking database.

Table 5. RC4—Operations and Maintenance

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 4-1: Continue with the existing street sweeping schedule for all areas, maintaining the record of observations, quantity, and quality of material collected in the daily log books. Collect and compile this information for making recommendations for modified methods, schedules, and for NPDES MS4 permit annual reporting and overall program evaluation.	<p>Review street sweeping program annually for effectiveness and any necessary revisions to sweeping schedule.</p> <p>Continue sweeping City streets on four zone schedule, sweeping heaviest zone eight times per year and lightest zone two to three times per year.</p> <p>Continue sweeping City-owned parking lots as needed.</p>	<p>Record quantity of material collected during sweeping operations.</p> <p>Record number of curb-miles of streets swept.</p> <p>Track and report changes made to sweeping schedule, if any.</p>	<p>Ongoing: The City continued to utilize two regenerative air sweepers during this reporting year to sweep residential and collector streets that have been categorized as having High, Medium, or Light debris accumulation. The Heavy debris accumulation zone contains 19 routes and is swept 13 times per year. The Medium debris accumulation zone contains 15 routes and is swept 8 times per year. The Light debris accumulation zone contains 8 routes and is swept 6 times a year. A fourth zone that encompasses the Central Business District (CBD) and Capitol Mall is swept at night on a weekly basis. Heavy debris areas within the CBD are also swept three times per week during summer and twice per week in fall through spring. Arterial streets are swept at night, approximately every four weeks. A third machine is operated during peak leaf season or when one of the other machines is broken down. Two operators sweep residential and collector streets during the day and two operators sweep arterial streets during the night. City-owned parking lots are swept on an as-needed basis. The City does not sweep any commercial parking lots.</p> <p>Stats: During this reporting year the City swept a total of 14,485 miles, collected approximately 1,800 tons of street sweeping debris, and removed approximately 4,500 cubic yards of leaves.</p>
RC 4-2: The City will continue to perform de-icing operations in a way that minimizes stormwater pollution such as conducting annual inspections and training to ensure proper operation of the de-icing chemical storage facility, utilization of the expanded covered storage areas for de-icing materials, maintaining proper function of sediment traps and catch basins in the storage yard, and coordinating de-icing activities with Airport Operations and their 1200-Z permit. The City is also looking for ways to improve current operations by investigating and evaluating potential cost-effective recycling opportunities for used de-icing sand material.	<p>Continue current de-icing operations to prevent stormwater pollution.</p> <p>Investigate potential cost-effective recycling opportunities for de-icing sand material.</p>	<p>Document review of recycling opportunities.</p> <p>Document dates of activities for annual inspections and training.</p> <p>Document de-icing quantities applied annually.</p>	<p>Ongoing: We enjoyed a fairly mild winter this past year and subsequently only experienced 15 responses to light snow and/or ice, none of which included plowing or sanding. We applied 18,356 gallons of Freezgard Zero liquid deicer (magnesium chloride based) for the entire season; therefore, no sanding rock recovery was required. Our quantities of deicer materials utilized during snow and ice season are maintained in our Units of Accomplishment database annually.</p> <p>Trained: Annual training for snow and ice operators occurred on October 25, 2019. Our annual equipment inspection and set up for snow and ice season began in September 2019 with Epoke Sanders and concluded on November 15, 2019.</p>
RC 4-3: Continue to review and update the O&M practices and activity schedules defined in the Drainage Program Evaluation Notebook (DPEN) (including updating GIS database). Utilize Hansen IMS data to develop and refine work programs. This review will serve as a basis for budgeting and allocating resources; scheduling work; and reporting on and evaluating the performance and costs for the overall O&M program and specific activities.	<p>Update DPEN and IMS database activities and schedules.</p> <p>Create line items in budget for specific O&M activities.</p> <p>Review and update O&M practices and activity schedules every three years.</p>	<p>Track revisions made to O&M practices and activity schedules.</p>	<p>Ongoing: DPEN is no longer used; IPS is the database that provides work orders and scheduling. During FY 2019-20 Stormwater worked on numerous repair and relay projects that had potential of failure. These areas were identified through TV inspection and focused on root cutting and additional line cleaning to minimize local street flooding.</p> <p>Budgeted: Each year, O&M staff develop a budget that includes many tasks such as ditch cleaning, TV inspections of stormwater pipes, vacuum excavations, catch basin cleaning, and transient camp cleanup. For FY 2019-20, the adopted budget that includes personal services, material and services, and capital outlay was \$3,979,590.</p> <p>Updating: Stormwater O&M practices, policies, and procedures continued review for the American Public Works Association’s accreditation process.</p>
RC 4-4: Continue to improve the O&M training program and activities especially with regards to safety and protection of water quality.	<p>Conduct O&M safety meetings twice per month.</p> <p>Attend ACWA committee meetings and workshops as scheduled.</p> <p>Conduct weekly tailgate meetings with Operations crews.</p>	<p>Document reviews and modifications to the O&M training program.</p> <p>Record O&M training activities completed.</p> <p>Document ACWA meetings and workshops attended.</p>	<p>Trained: Staff completed National Association for Sewer Services Companies (NASSCO) training to comply with the national TV inspection codes. Staff continued education on stormwater and safety related topics. Tailgate meetings with updates on safety and related topics were held weekly.</p>
RC 4-5: Integrated Pest Management (IPM) Program: Salem Parks Operations Division will continue their program for careful monitoring and management of pesticides, herbicides and fertilizers, and will provide public information. Review and refine	<p>Review and refine IPM Program during the MS4 permit cycle.</p> <p>routine inspections of storage facilities for proper storage of materials and chemicals.</p>	<p>Document revisions made to IPM Program.</p> <p>Document inspections of storage facilities.</p>	<p>Under development: Representatives from Stormwater Operations, Parks Operations and Parks Planning Divisions continued in their work as a task force to update the City's Integrated Pest Management Policy and Plan. The goal of this group is to create a policy manual for the City and an operations guidance manual for Public Works employees involved in making pest management decisions. A survey of City pesticide use was conducted to gauge current pest management</p>

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
the IPM Program during the permit cycle, ensuring proper handling and storage of pesticides, herbicides, and fertilizers.			activities. The task force has reviewed multiple IPM manuals and policies from similar organizations and has narrowed down what to include in both the policy manual and the operations guidance manual. Work has begun on developing an outline of both documents. Ongoing: The shops complex has a safety committee that monitors quarterly inspections of the facility. Email notifications are sent quarterly to remind staff to perform inspections and the date of inspection is documented in the safety committee meeting minutes.
RC 4-6: Continue the storm sewer cleaning and TV inspection program, concentrating on known areas of localized flooding complaints (this alerts the City to locations of debris build-up and minimizes erosion potential) and persistent operation and maintenance problems, and looking for potential illicit discharges and seepage from sanitary sewers, see ILL2. Also focus on significant industrial/commercial areas where potential illicit discharges may be of concern.	Concentrate storm sewer cleaning and TV inspection on areas with historical problems and high potential for illicit discharges. Inspect 120,000 LF of conveyance system annually.	Track number of inspections; identify areas with persistent O&M problems. Track number of cross-connections found. Track length of conveyance system cleaned and inspected.	Ongoing: Inspections were completed through TV inspections. This year’s findings totals: <ul style="list-style-type: none">86,362 linear feet were inspected.No cross-connections were found.Cleaned 154,569 linear feet.
RC 4-7: Continue supporting annual Stream Cleaning Program. More than one half of the stream miles in the City of Salem are inspected annually by walking each stream segment. Using summer interns the City inspects the riparian areas and streams, picks up litter and garbage, inspects for illicit discharges (ILL2), addresses potential conveyance concerns, and evaluates areas for stream restoration.	Walk 50 percent of the waterways within the City each year for stream cleanup and enhancement. Complete one stream restoration project each year.	Track length of waterways walked each year. Document stream restoration projects completed each year. Document the amount of litter and garbage removed each year.	Ongoing: This year’s stream crew consisted of 8 interns and 1 lead, known as the Environmental Aide. The crew cleaned 60.85 miles of the nearly 90 miles of streams in Salem, removing 5,546 pounds of trash, 152 debris jams, and 64 cubic yards of green debris. The streams that were cleaned and inspected were located within 7 different watersheds: Battle Creek, Pringle Creek, Croisan Creek, Mill Creek, Little Pudding River, Claggett Creek, and Glenn/Gibson Creek. The crew did one small restoration planting project along Goldcrest Brook within the floodplain after invasive species were removed.
RC 4-8: Continue to regularly inspect and maintain public structural stormwater control facilities. Coordinate with RC4 Task 9.	Regularly inspect all public detention and water quality facilities.	Track number of public facilities inspected and maintained. Track amount of sediment and debris removed from all facilities.	Ongoing: Five hundred publicly-owned stormwater facilities were inspected, using ESRI Collector app and Survey123, 46 work orders were needed for detention basins and flow control structures, and 61 work orders were created for water quality and manufactured treatment technology. These inspections were conducted by Stormwater Quality staff. Ongoing: Stormwater Operations and Maintenance staff tracked sediment and debris removal in the City’s asset management database, IPS. The crews removed 903 cubic feet of sediment and debris during this reporting year.
RC 4-9: Develop and implement a long-term maintenance strategy for public and private stormwater control facilities. This strategy will identify procedures and/or priorities for inventorying, mapping, inspecting, and maintaining facilities.	Document and implement a long-term maintenance strategy for public and private stormwater control facilities during the MS4 permit cycle.	Track number of private facilities located, mapped, and inspected. Track progress toward developing a facility long-term maintenance strategy.	Ongoing: Nine hundred and nine privately owned stormwater facilities were inspected, and 32 work orders were needed for private detention, flow control, water quality, and manufactured treatment facilities. Updating: The City has a Stormwater Facility Inventory, Inspection and Maintenance Program document that was created in January 2013 that describes what the City does. This year, staff have put a lot of focus on dialing in inspections and creating long-term maintenance strategies and plans for all publicly maintained facilities. As time is available, large natural areas or mitigation sites will have a more complex maintenance plan created for each.
RC 4-10: Ditch maintenance is performed to assure adequate conveyance, and consists of two components: 1) Ditch Cleaning – Cleaning consists of removal of sediment in the bottom of roadside ditches only as needed for proper conveyance, with limited vegetation disturbance and the use of straw wattles to reduce sedimentation and erosion within the ditch; and 2) Ditch Mowing – Mowing is typically conducted by inmate crews using hand-held equipment. Vegetation cutting facilitates conveyance and reduces the risk of potential fires in summer months.	Regularly inspect and maintain 100 percent of City ditches using appropriate water quality BMPs.	Track length of ditch maintenance performed (cleaning and mowing). Track amount of sediment and debris removed	Ongoing: Continued yearly inspections of all roadside drainage ditches during mowing process. Visual inspections determine whether ditches need cleaning. Straw wattles are placed periodically in cleaned ditches for erosion prevention. Drainage ditches are mowed twice yearly to reduce fire risk in summer and flooding risk during the winter. <ul style="list-style-type: none">145,895 linear feet of mowing occurred, and 102,419 linear feet of ditches were cleaned. The amount of sediment and natural debris removed was just over 1,352 cubic yards.
RC 4-11: Public catch basins are cleaned on a regular basis with a Vactor truck. During catch basin cleaning activities, inspections are	Clean and inspect 75 percent of catch basins annually.	Track the number and percent of catch basins cleaned annually.	Ongoing: Staff cleaned at total of 18,041 catch basins between October 29, 2019 and June 30, 2020 and has met the goal of 75 percent.

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
done and repairs are scheduled if needed.	Periodically analyze the material removed from the catch basins.	Report on any analysis of removed material.	Between October 29, 2019, to and including June 30, 2020, 16.13 cubic yards of sediment/debris were removed from these structures.
RC 4-12: Continue to refine the maintenance program for public and private stormwater detention and water quality facilities. The City maintains an informational packet outlining ownership and maintenance responsibilities and compliance assurance procedures to encourage owners of private detention and water quality systems to perform maintenance. Coordinate with RC 4 Task 9.	<p>Maintain informational package for ownership maintenance responsibilities for detention and water quality facilities.</p> <p>Implement maintenance activities and requirements identified in long-term maintenance strategy (RC4 Task 9).</p>	<p>Track number of information packets distributed regarding private stormwater control facilities.</p> <p>Track maintenance requirements of long-term maintenance strategy.</p>	<p>As needed: The City provides informational packets and letters to private residents as needed. All new private stormwater facilities that are being constructed have a Private Stormwater Facility Agreement (PSFA) that is part of the recorded property deed. Twenty-five new PSFAs were recorded.</p> <p>Ongoing: For public facilities, City staff track maintenance requirements for each facility and are in the process of developing more thorough maintenance plans and schedules.</p>

Table 6. RC5—Public Education and Participation

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
RC 5-1: Develop and implement a public outreach and education strategy with goals, objectives, identified target audiences, partners, identified target contaminants, and messaging. Conduct a public education program effectiveness evaluation of outreach procedures/efforts. Adjust the program based on the results in year five. (See Table A.1 – Public Outreach Program Matrix, June 2008).	<p>Create two public education campaigns from the Public Outreach Program Matrix.</p> <p>Support outreach and educational activities for other divisions.</p> <p>Conduct an effectiveness evaluation of the outreach program before the end of year four of the MS4 permit cycle.</p>	<p>Document public outreach and involvement activities for two (2) education campaigns.</p> <p>Document outreach activities for other divisions.</p> <p>Document the results of the effectiveness evaluation and subsequent changes to the outreach procedures/efforts.</p>	<p>Ongoing: Two social marketing campaigns are in various stages of development. Target audience research was conducted via a direct mail survey for the Social Marketing Proposal Targeting Stormwater Pollutant: Toxins. The proposal targeting plastic pollution is in draft form. Outreach for the Clean Streams Initiative and campaigns was done at 21 outreach events with total attendance of 9,427. Community outreach events were limited this fiscal year due to cancellation of events and stay-at-home orders due to COVID-19.</p> <p>Ongoing: Outreach and support of other divisions included promotion of the Mayor's Monarch Pledge to provide pesticide reduction information in coordination with the Parks Planning and Natural Resources Section, the Fall Leaf Haul for nutrient and composting information, and promotion of fats, oils, and grease messaging for Environmental Services to help reduce sewer spills.</p> <p>Completed: The effectiveness evaluation was completed and submitted to DEQ prior to November 1, 2014.</p>
RC 5-2: Coordinate activities of various groups within the Public Works Department and other City departments' assigned responsibility for public outreach and citizen contacts on stormwater matters.	Quarterly meetings of various groups assigned responsibility for public outreach and citizen contacts on stormwater matters.	Document quarterly meetings and outcomes.	<p>Ongoing: City staff meet to discuss stormwater-related projects, programs, and messaging and include the following:</p> <p>Fall Leaf Haul and Fall seasonal messaging:</p> <p>Staff coordinated with street sweeping crews to provide messaging regarding keeping leaves out of the storm drains and to promote the Fall Leaf Haul. Outcome: water bill inserts and promotion on social media and radio. Cross promoted with City communications team.</p> <p>Annual Streamside Mailer:</p> <p>Staff met to discuss content for the annual streamside mailer. Outcome: the annual streamside mailer was sent to streamside residents in June 2020. The topics for this year's mailer were reinstating the free tree program, requesting stream access for the stream crew, reporting illegal dumping, learning about the Clean Streams Initiative, flood risk and mitigation, and streamside erosion.</p> <p>Ludwigia treatment in the Willamette Slough:</p> <p>Staff from the City of Salem and Willamette Riverkeeper met multiple times in the summer of 2019 and spring/summer of 2020 to discuss and coordinate outreach for the treatment of Ludwigia in the Willamette Slough. Outcome: Developed and implemented a communications strategy regarding the habitat improvement project. Staff began outreach in June ahead of the scheduled July 2020 treatments. Staff cross promoted with the City communications team.</p> <p>Court Street/Marion Street residential rain garden:</p>

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
			<p>Staff met multiple times in winter and spring 2020 to coordinate the development of the Marion Street rain garden. Meetings with neighbors along Court Street as well as with Engineering staff led to the proposed alternate location at Marion and 13th Streets. This location was submitted to the City by the Friends of Mill Creek. Letters were sent to the neighbors regarding the project. In June 2020, the rain garden was being installed.</p> <p>City Communications Team:</p> <p>Staff attends regular City communication team meetings and has provided a calendar of stormwater-related topics to the citywide group to assist with communicating messages throughout the year.</p>
RC 5-3: Increase the use of community partnerships to carry out outreach goals.	Develop one new partnership per year to carry out outreach goals.	Document partnerships and outcomes of partnership activities.	<p>Completed: This year, we partnered with Marion County and many organizations in Salem to plan an Earth Day event in Salem to be held Saturday, April 18. The City had coordinated several booths to help share our messages. In addition, the City planned an Earth Day movie night featuring the documentary, <i>Keep the Hives Alive</i>, for Wednesday, April 22. We invited several partner organizations to come share their information regarding pollinators, pesticides, and best practices. Due to stay-at-home orders to help prevent the spread of COVID-19, both events were cancelled. Instead, the group shifted the Earth Day theme of “Make Every Day Earth Day” to an online platform highlighting different activities or challenges that people could do daily throughout the month of April.</p>
RC 5-4: Investigate the use of a stormwater utility to provide an adequate funding base to support expanded public outreach (see RC6-2).	Develop a yearly public education budget. Document public education and outreach needs in the Stormwater Utility Implementation Plan.	Document public education budget and expenditures. Document Utility implementation plan showing public education and outreach needs.	<p>Budgeted: The items budgeted for in FY 2019-20 to conduct outreach, education, and projects including personnel costs, materials, and services total \$442,250.</p>

Table 7. RC6—Stormwater Management Program Financing

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
RC 6-1: In conjunction with the updated Stormwater Master Plan (RC1-1), review and update the Stormwater System Development Charge (SDC) methodology to address both stormwater quantity and quality.	Adopt updated Stormwater SDC methodology by the end of the MS4 permit cycle.	Report on update to Stormwater SDC methodology.	Adopted: A review and update of the Stormwater System Development Charge (SDC) methodology was conducted independent of the Stormwater Master Plan. A committee consisting of two City Councilors and representatives of the development community, home builders, and residents met regularly in 2017 and 2018. The committee recommended to Council that major amendments to the Stormwater SDC methodology should be postponed until after completion of the Stormwater Master Plan. City Council adopted the SDC methodology update on February 25, 2019, under resolution 2019-7.
RC 6-2: Implement a new stormwater utility capable of generating stormwater fees historically paid for by water and/or sewer utility customers. The new utility will include incentives to encourage users to implement alternative stormwater management practices such as LID.	Adopt new stormwater utility by the end of the MS4 permit cycle.	Report on adoption of new stormwater utility.	Adopted: The Stormwater Utility was adopted by Salem City Council in December 2010 and the first of four annual phases implementing the stormwater fee took place in January 2013. The stormwater fee is now fully implemented. The fee structure includes credits that provide for reductions in the impervious surface-based portion of the utility fee for ratepayers who have stormwater treatment and/or flow control facilities on their property. Generally, the credit is higher for facilities that are categorized as green stormwater infrastructure than for more traditional stormwater facilities.
RC 6-3: Identify and pursue grant opportunities for stormwater quality projects, including potential retrofit and LID project opportunities.	Pursue grant opportunities as staff resources allow.	Track number of grants applied for each year. Track number of grants received each year.	Researched: Seven grants were identified as relevant to the City’s work. These include areas of stormwater management, green infrastructure, habitat, and environmental education. The City did not apply for nor receive any grants for stormwater quality projects this fiscal year.

Table 8. RC7—Maintain and Update GIS System

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 7-1: Continue maintenance of the GIS database and Hansen IMS database. These ongoing updates will also reflect completion of any stormwater Master Plan capital improvement projects, new facilities added to the system, potential “hot-spots” for illicit discharges, refinement of data for the existing system, updated information on wetlands, perennial streams, waterways, and floodplain/floodway designations, and information updated on a periodic basis for the City’s Urban Growth Boundary. The GIS database will be accessible by City departments for review purposes.	Continue performing database updates annually. Create record of GIS maintenance activities.	Record maintenance / updates made to database.	Update as needed. All stormwater layers are consolidated in the Spatial Database Engine (SDE) and updated as required. All edits are tracked internally in the database with who last updated and created an asset and corresponding dates. In addition, a log of incoming plan sets is maintained by Technical Services that are entered into GIS. Since GIS and IPS are now synced, tracking one system is required rather than both. The Stormwater GIS data has been made available to City departments via multiple sources including Salem Maps Online, GeoPlanIT and the GeoWorks web mapping applications.
RC 7-2: Integrate the information in GIS and IMS. The City plans to integrate the data from both the GIS and Hansen IMS databases so that information in the Hansen IMS database can be visualized using the GIS system.	Create an action plan for how the GIS and IMS system will be integrated and updated. Implement action plan to integrate GIS and IMS.	Track completion of action plan items. Track implementation status of database integration.	Completed. All pertinent stormwater GIS layers were consolidated into feature layers in SDE (Spatial Database Engine) as part of the Stormwater utility’s migration from Hansen to Infor Public Sector (IPS). SDE and IPS assets are fully synchronized.

Table 9. RC8—City Stormwater Grant Program

Task Description	Measurable Goals	Tracking Measures	FY 2019-20 Activities
RC 8-1: Expand matching grant program for watershed protection and preservation to allow for funding of stormwater-related activities, such as promoting water-wise landscaping, reduction of stormwater discharges, restoring riparian areas, stormwater quantity reduction, stormwater quality/treatment, etc.	Continue to fund \$50,000 grant program. Expand matching grant program for watershed protection. Promote the grant program in conjunction with RC5 outreach activities.	Maintain a list of grant awards tracking funding and projects.	Ongoing. The City of Salem provided \$50,000 for the grant program in FY 2019-20. Six grants were awarded for \$45,434.00, but only two came to fruition for a total of \$8,038 spent. One was to Ms. Henderson at West Salem High School for Salmon Watch, an environmental education field trip, and the other was for to the North Santiam Watershed Council to help with council operations. Two grants were rolled over into FY 2020-21 (one due to COVID-19 and the other due to a matching grant funding request). The first is a streamside erosion control project and the second is a habitat assessment project along the Willamette River. Two grants were cancelled. The grant awarded to a class at Brush College for a Discovery Hike Field Trip was cancelled due to COVID-19 and the grant was a Creek Walk project to help with trash and homelessness was cancelled due to the applicant moving out of state. Ongoing. The grant provides for watershed protection projects. Ongoing. Due to the amount of grant funding requested in FY 2019-20, the grant was not significantly promoted.

Table 10. RC9—Legal/Ordinances

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
RC 9-1: In process of revising the Stormwater Management Design Standards (RC 3 Task 1) and developing a stormwater-dedicated chapter to the SRC (RC 9 Task 3), coordinate with Community Development’s effort to adopt a Unified Development Code (UDC). It is envisioned that the stormwater dedicated SRC would be integrated into the UDC framework.	Adopt the UDC and integrate stormwater-related revisions to the SRC by the end of the MS4 permit cycle.	Report on progress for adoption of UDC and integration of stormwater related SRC.	Completed. City staff incorporated selected chapters of the Salem Revised Code (SRC) into a single, Unified Development Code (UDC). Led by the Community Development Department, the effort involved grouping related sections and subsections of existing chapters of the SRC into the more cohesive UDC format. The new Unified Development Code went into effect May 14, 2015.
RC 9-2: Continue to enforce the SRC and review and revise it as necessary to reflect the updated Stormwater Management Design Standards that principally focus on requirements associated with on-site water quality facilities for new development or redevelopment (RC3).	Revise SRC (as needed).	Track any MS4 stormwater pertinent revisions made to the SRC.	Ongoing. Salem Revised Code (SRC) Chapter 20J (Administrative Rule Making and Contested Case Procedures) contains provisions for enforcement proceedings and civil penalties. Subsections in SRC Chapter 70 (Utilities General) were adopted by City Council in December 2012 that clarify inspection procedures for enforcing the Utility Code and establishes operation and maintenance requirements for owners/operators of private stormwater facilities.
RC 9-3: Develop a new SRC chapter dedicated solely to stormwater management. It is currently envisioned that this will be done after the City’s renewed MS4 Permit is issued, and in conjunction with implementation of the new stormwater utility and updated Stormwater SDC Methodology (RC6) and the updated Stormwater Master Plan (RC1).	Adopt the new SRC chapter for stormwater by the end of the MS4 permit cycle.	Report on adoption of the new SRC chapter for stormwater, and processes/milestones en route to formal adoption of the SRC revisions.	Adopted. A new chapter of the Salem Revised Code (SRC) specific to stormwater was adopted in December 2013 and became effective January 1, 2014. An update to City’s Public Works Design Standards was completed in December 2013 and became effective January 1, 2014.

Table 11. ILL1—Spill Prevention and Response Program

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
ILL 1-1: Continue to review and refine the existing spill prevention and emergency response program to protect ground and surface water quality. New activities will be proposed and implemented as appropriate, and coordination and cooperation among other relevant agencies and ODOT will be maintained and improved. This review will be coordinated with the deicing activities of Airport Operations and their 1200-Z permit, and possibly the Oregon Air National Guard.	Continue to implement the spill prevention and emergency response program and review and revise as needed.	Document refinements to cleanup procedures for vehicular accidents and structural fires.	Ongoing. Salem Fire continues to respond to emergencies related to vehicular crashes, structural fires, and hazardous materials incidents utilizing Salem Fire Standard Operation Guideline (SOG) Tactical Guideline #4.16 – Minor Spill Response. This Tactical Guideline provides guidance on Best Management Practices (BMP) for preventing discharge into storm drains. Salem Fire will continue to respond to any spill or leak of deicing material at the Salem Airport. Salem Fire continues to use Standard Operation Guideline (SOG) #2.6.3 – Live Fire Training, to incorporate best management practices related to the prevention and/or control of materials related to firefighter training. This guideline includes site surveys and procedures to eliminate runoff/discharge from firefighter training exercises into storm drain systems.
ILL 1-2: Continue to coordinate timely responses to, and clean-up of emergency response sites and structural fires among Fire, Building and Safety, Development Services, and Environmental Services staff. The Fire Department has the lead role for response at emergency response and structural fire sites and all major vehicular accidents. Environmental Services (ES) staff will provide assistance when requested by the on-scene incident commander. One of the ES responsibilities is to make sure that the cleanup activities are conducted in an environmentally sensitive manner.	Develop a review schedule with a checklist for the spill response plan.	Track the number and category of spill events responded to, including an estimate of the amount of spilled materials collected and any associated enforcement actions.	Ongoing. Salem Fire continues to respond to hazardous/chemical spills as requested by our emergency dispatch center. If spills and/or leaks are beyond our capability or exceed the amount of equipment carried on our response vehicles, the Fire Department incident commander will request assistance from Salem Environmental Services. For FY 2019-20: * Chemical leaks or spills = 32 * Vehicle accidents =625 * Fuel or oil spills =169
ILL 1-3: Continue to conduct daily City vehicle and equipment inspections for leaks and repairs as needed. Staff will review current procedures on an ongoing basis and implement improvements as necessary.	Continue to implement the daily equipment inspection program.	Report revisions to the daily inspection program.	Ongoing. City staff continued to conduct daily inspections of City vehicles and equipment in FY 2019-20. These inspections are documented on weekly inspection sheets that are routinely submitted to Section Supervisors. Per City policy, if a leak/repair is identified, the vehicle/equipment is promptly turned into Fleet Services for repairs.
ILL 1-4: Develop an updated Operations Pollution Prevention Plan; incorporating new/expanded/relocated Operations-oriented facilities.	Update Operations Pollution Prevention Plan by the end of the MS4 permit cycle. Implement updated Operations Prevention Plan upon completion.	Track progress toward updating Operations Pollution Prevention Plan. Track implementation of Operations Pollution Prevention Plan.	Ongoing: Stormwater Staff continue to implement the Operations Pollution Prevention Plan, which includes training that is provided to all new employees and monthly inspections of the Shops complex using an electronic field data collection form and a smartphone or tablet. Ongoing. Staff will make revisions and updates to the Operations Pollution Prevention Plan as needed to address any changes or new technologies. Completed: The new and improved recycling center located in the East Yard of the Shops Complex was completed this reporting year. It has additional bins for electronics, PVC, and plastics recycling, clear signage and procedures for what can be recycled and where, and a rotating schedule for each workgroup to keep the area clean, and a form to fill out when cleaning has been done. A shed with cleaning supplies has been added, and the entire recycling center had a cover installed to provide further protection from creating stormwater pollution.

Table 12. ILL2—Illicit Discharge Elimination Program

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
ILL 2-1: Continue to respond to reports of unusual discharges or suspicious water quality conditions within the stormwater system and urban streams. Where able, identify sources/causes and implement appropriate corrective actions. Utilize database to document associated activities.	<p>Respond to reports of illicit discharges and suspicious water quality conditions.</p> <p>Maintain database to document unusual/suspicious discharges, sources found, and corrective actions taken.</p>	Track calls and mitigation actions taken in database.	<p>Ongoing: Environmental Services continues to provide staff to respond, 24/7, to reports of unusual discharges or suspicious water quality conditions. Staff responded to 343 water quality-related responses. All responses and corrective measures are tracked in the database. A summary of enforcement actions and inspections is provided in Section 4 of this report.</p> <p>There were three violations during this reporting period.</p>
ILL 2-2: Environmental Services staff will continue inspections of the City’s wastewater users, through the pretreatment program, verifying the proper handling and disposal of both wastewater and stormwater.	<p>Inspect City’s wastewater users for proper management of wastewater and stormwater.</p>	Track number of inspections and associated findings.	<p>Ongoing. During the reporting year Environmental Services staff continued to inspect wastewater users for proper handling and disposal of wastewater and stormwater. Staff completed the following inspections and business contacts during the reporting year:</p> <p>* Business Inspections = 380</p> <p>* New Businesses Identified = 32</p>
ILL 2-3: Work with Wastewater Collection Services to identify and correct cross-connections between the sanitary sewer and stormwater systems.	<p>Review stormwater and ambient stream monitoring data to identify possible cross-connection discharges into the stormwater system.</p> <p>Maintain communications with Wastewater Collections and other City staff to identify any system cross connection problems.</p>	Document number of cross-connections identified, and corrective actions taken.	<p>Ongoing. Wastewater Collections provides smoke testing and dye inspection of lines to identify cross connections. No cross-connections were identified during the reporting year.</p>
ILL 2-4: Develop and update a storm sewer outfall dry weather inspection and monitoring prioritization plan.	<p>Prioritize outfalls for storm sewer outfall inspection and monitoring and inspect annually.</p> <p>Coordinate prioritization process with ILL 2 Task 5.</p>	<p>Document review of outfall monitoring plan.</p> <p>Document priorities established for monitoring and inspection.</p> <p>Track dry weather inspections conducted and results of inspection.</p>	<p>Ongoing. The Rain Year (RY) 2019/2020 dry weather outfall screening effort included a total of 58 outfall inspections (outfall structures or the first available upstream manhole), 46 of which had observable flow.</p> <p>* Of the 46 flowing outfalls, 41 were tested for the presence of chlorine, 14 of which tested positive, and 25 received analytical sampling. A total of 7 pipesheds were investigated based on these outfall inspections, which resulted in the reporting of 3 water leaks, one of which was a leak at a private residence, to the Water Department. One water leak was observed in RY 2018/2019 but has not been located despite leak detection efforts by water crews.</p> <p>* Of the 58 outfalls inspected, 33 were identified in the City of Salem’s Dry Weather Outfall and Illicit Discharge Screening Plan. The additional outfalls were inspected based upon Stream Crew reports of dry-weather flow and 2 are outfalls that have been added for annual inspection based upon reports of dry weather flow. One of these outfalls has been characterized as being predominantly comprised of groundwater with minor contribution of municipal water sources that have yet to be located. One was determined to be a municipal water leak that has since been repaired. Two outfalls listed in the City of Salem’s Dry Weather Outfall and Illicit Discharge Screening Plan are no longer inspected; outfall D48486207 was determined to be a culvert structure above an existing priority outfall and D42456216 requires confined space entry to sample. For further information on the results of the inspections refer to Appendix 1.</p> <p>Ongoing: In RY 2018/2019, a custom mobile GIS application was deployed for Stream Crew interns to document physical inspections of flowing outfalls and illicit discharges. In RY 2019/2020, interns were provided Hach test strips for determining the presence of free and total chlorine in the field during their observations. Interns use the mobile application to photograph and record physical characteristics of outfall flow and to photo-document chlorine test strip results. Outfall inspections recorded using this application and screening capability have increased the number of outfall inspections performed and will be used to prioritize future outfalls for annual inspection. While interns are instructed to visually inspect all outfalls encountered during their 60 miles of stream inspections, only outfalls with dry weather flow are recorded at this time. Due to the increased reporting from this new workflow, the number of outfalls reported exceeded staff capacity for follow-up investigations. While the presence of chlorine was detected during some of the inspections, physical characteristics did not indicate contribution from the sanitary sewer system or illicit dumping.</p>

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
			Groundwater with some contribution of municipal water is thought to compromise flow in these outfalls and follow-up investigation is still needed.
ILL 2-5: Identify and map contaminated sites in the GIS system. With input from other City departments, identify a list of areas where there either has been a substantial spill or there is the potential for a spill or illicit discharge. These areas are identified based on activities on site, history of problems, or specific industry, for example. These areas will be mapped in the GIS system for use across City departments.	Continue to identify and map contaminated sites in the GIS system.	Track number of contaminated sites added to the GIS system.	Updated. The City of Salem Geoworks is linked to the Oregon Department of Environmental Quality Facility Profiler database which adds new sites to the GIS mapping system used throughout the City. A variety of sources/activities can lead to site contamination (leaks from storage tanks and process lines, releases during loading or off-loading activities, or discharges during accidents or emergencies).

Table 13. ILL3—Illegal Dumping Control Program

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
ILL 3-1: Continue to sponsor the Adopt-a-Street Program. The program is an effective way to get residents involved in keeping the community’s streets clean and consequently preventing trash and debris from entering the storm drainage system.	Continue to support the Adopt-a-Street Program.	Record the miles of adopted streets, number of participating groups, and volume of litter collected through the Adopt-a-Street Program.	<p>Ongoing: This has been a unique year for the Adopt a Street Program. With restrictions on group size, stay-at-home orders, and so many people working from home, most groups have not been as active as they usually are. This has resulted in about half the amount of garbage that is usually picked up in spite of an increase in the number of groups adopting streets. We presently only have two streets available for adoption and eleven that are pending.</p> <p>* Miles of adoptable streets: 112.55 * Miles of streets adopted (including pending): 109.85 * Number of groups: 100 * Number of volunteers: 1,874 * Number of pounds collected in 2019: 9,793</p> <p>Completed: One of the goals that was accomplished last year that has created a spike in interest is, our new Online Application in conjunction with our interactive map. This has made it much easier for people to apply to the program, and eleven new applications were received within two months of the online application becoming available.</p>
ILL 3-2: Continue to provide the 24-hour Public Works Dispatch Reporting Center to receive and respond to calls regarding illegal dumping and other environmental complaints/problems and responses thereto. Continue to advertise hotline on City website, utility bill inserts, business cards, public brochures, and consumer confidence reports. As circumstances warrant, publicly report illicit discharges through use of various media outlets.	<p>Continue to operate the 24-hour Public Works Dispatch Reporting Center.</p> <p>Assign reports to appropriate City staff for action, including actions taken under ILL2-1.</p>	<p>Record number and types of reported illegal dumping incidents.</p> <p>Track media outreach when a discharge warrants.</p>	<p>Ongoing. Environmental Services provides staff to respond, 24/7, to reports of illegal dumping and environmental complaints received through both the Public Works Dispatch Center and 911 Dispatch Center. Stormwater provides public education and outreach to inform the public of environmental issues. Actions taken when responding to calls includes the completion of “Service Requests,” a computerized record of calls received, and actions taken. This database is in the Public Works Dispatch Center. Staff responded to 343 incidents during this reporting period.</p>
ILL 3-3: Continue to support the Adopt-a-Stream program, which involves teachers and students in gathering water quality data from streams, thereby providing water resource education to students through experience. The City supports the program by facilitating projects and providing technical assistance and resources.	Continue to support the Adopt-A-Stream Program.	Maintain a descriptive list of adopt a stream program projects, objectives, outcomes upon completion, and number of participants.	<p>Cancelled. Due to COVID-19 restrictions, all Adopt-A-Stream events were cancelled for the fiscal year. This includes five scheduled classes/field trips, one pollinator presentation and garden setup, and one extended (all school level) Water World event. extension activity.</p>
ILL 3-4: Continue to support Marion County in their efforts to provide convenient alternatives for legal disposal of household hazardous wastes and other recyclable materials.	Continue to support Marion County in providing alternatives for household hazardous waste disposal.	Document frequency and type of support activities.	<p>Ongoing: Outreach support of Marion County's Waste Less program was provided by including the information in the virtual Public Works Day event map that was posted online and promoted via social media platforms. Waste reduction, the Marion County recycling guide, reducing food waste, and how to recycle or compost waste, were topics of social media posts on the Clean Streams Facebook page: 11 posts resulted in 53 reactions and 15 shares. Reducing waste and disposing of waste properly was included in the December 2019 and May 2020 issues of the Clean Streams e-newsletter, Stream Currents. Handouts on what materials can be recycled, composted, or should go in the trash were taken to 4 community outreach events with a total attendance of 710.</p>

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
ILL 3-5: Continue to support the annual yard debris cleanup effort.	Support the annual yard debris cleanup effort.	Record amount of debris cleaned up and level of participation.	<p>Conducted: Two Leaf Haul Events were held during 2019:</p> <p>November 16:</p> <ul style="list-style-type: none"> * Amount of leaves collected = 300 cubic yards * Number of volunteers at site = 0 * Number of volunteer hours = 0 <p>December 8:</p> <ul style="list-style-type: none"> * Amount of leaves collected = 350 cubic yards * Number of volunteers at site (including drivers) = 21 * Number of volunteer hours (including drivers) = 114 <p>TOTALS</p> <ul style="list-style-type: none"> * Amount of leaves collected = 650 cubic yards * Number of volunteers (including drivers) = 21 * Number of volunteer hours (including drivers) = 114 <p>Approximately 10 volunteers picked up 305 bags of leaves from the homes of 15 senior citizens.</p>

Table 14. IND1—Industrial Stormwater Discharge Program

<u>Task Description</u>	<u>Measurable Goals</u>	<u>Tracking Measures</u>	<u>FY 2019-2020 Activities</u>
IND 1-1: Environmental Services will inspect stormwater systems while conducting inspections of City-permitted industrial wastewater users, and work with DEQ to coordinate the permitting and compliance processes for industrial users in the Salem area, including DEQ-issued 1200-Z permitted sources, underground storage tank (UST) removal, and site remediation permits issued by DEQ for sources/sites within the City. Coordination options include receiving information on proposed 1200-Z permits, commenting on proposed permits, and meeting periodically with DEQ on coordination efforts.	<p>Inspect stormwater systems while conducting inspections of City-permitted wastewater users.</p> <p>Develop process to coordinate with DEQ on industrial permits within the City.</p>	<p>Track coordination efforts with DEQ.</p> <p>Include stormwater observations as appropriate on inspection reports and follow-up actions.</p>	<p>Ongoing: Environmental Services continues to inspect area stormwater systems as part of facility inspections performed under the industrial pretreatment program. Inspection records are maintained in the Environmental Services database. Salem is not a permitting agent for DEQ’s 1200-Z program but has been developing a process (consistent with the MS4 permit) to notify DEQ when a site in Salem is undergoing development which may be subject to State permitting. Environmental Services notified the facility owner or contact person by letter. Regional staff for the DEQ Western Region were contacted by email with a scanned copy of the letter that was sent to the facility. Refer to ILL2 Task 2 for a total of facility inspections, and IND1 Task 2 for a total of facility plans reviewed.</p>
IND 1-2: During plan review, review industrial facilities for the potential of requiring pretreatment of stormwater prior to discharge based on the industrial activities of the specific facility. Conduct inspections of industrial facilities requiring stormwater pretreatment to ensure structural controls have been built according to approved plans.	<p>Review industrial plans as necessary for additional stormwater treatment.</p> <p>Conduct inspections once construction is completed to ensure work was done in accordance with approved plans.</p>	Maintain database of plans reviewed and final inspections conducted.	<p>Ongoing: Environmental Services continued to participate in the plan review and inspection processes to help ensure appropriate treatment is included during construction, or remodel, of industrial sites. All plans reviewed and inspections completed are tracked in the Environmental Services database and the AMANDA database. Staff reviewed 32 industrial and commercial plans during the reporting year.</p>
IND 1-3: Surveys are sent to applicable business classes (restaurants, metal finishers/platers, radiator shops, dry cleaners, printing shops, photo processors, etc.) as part of the pretreatment business survey database, part of the industrial pretreatment program for wastewater. Customers will be surveyed on major on-site activities to identify potential locations for public education, future sampling, and tracking down illicit discharges. Illicit stormwater discharges from these business groups are address in ILL2.	<p>Send surveys to new customers as accounts are opened.</p> <p>Enter survey results into database – on-going as surveys are returned.</p>	<p>Track number of surveys sent out.</p> <p>Track number of surveys returned and entered into database.</p> <p>Track targeted public education activities for specific industries.</p>	<p>Ongoing: Environmental Services continues to send or deliver surveys to newly identified targeted businesses. Businesses failing to return the survey were visited by an inspector to obtain the necessary information.</p> <p>Number of grease surveys sent: 10 Number of grease surveys returned: 5 Number of dental surveys sent: 93 Number of dental surveys returned: 86</p>
IND 1-4: Continue the semi-annual Technical Bulletin for the City’s industrial users and produce other materials for these users. This activity is principally associated with the City’s wastewater Pretreatment Program but will be used as a vehicle to address stormwater related issues as well.	Produce two technical bulletins for industrial users each year.	Track published technical materials prepared for industrial users each year.	<p>Continued: Targeted and individualized (email and/or direct phone call) communication with permitted industrial users continued during FY 2019-20 in order to better ensure compliance with pretreatment and stormwater regulations. This form of communication has proven more effective than continued production of technical bulletins.</p>

Table 15. CON1—Construction Site Control Program

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
CON 1-1: Continue implementation of the Erosion Prevention and Sediment Control program for developments that meet or exceed the threshold indicated in SRC Chapter 75, which includes the submission of erosion prevention and sediment control plans with structural and non-structural BMPs. Review program experiences annually and implement improvements as appropriate including Code amendments if needed.	Implement SRC 75. Conduct annual program reviews. Implement appropriate improvements and/or Code amendments. Perform plan reviews for erosion control requirements.	Track number of erosion control plans reviewed for compliance with SRC 75.	Continued: SRC 75 continues to be used as the basis for plan review, inspection procedures, and enforcement. Completed: An annual internal program review was completed. Reviewed: Twenty-six Capitol Improvement and 235 Development ESPC plans were reviewed by City staff. In addition, 514 single family applications were reviewed.
CON 1-2: Continue to train and educate City staff and private contractors about stormwater pollution at construction sites, with an emphasis on prevention and control BMPs. Provide notice to construction site operators concerning where education and training to meet erosion and sediment control requirements can be obtained.	Provide annual erosion control training to City staff and private contractors.	Track education and training programs conducted and number of staff/public trained.	Conducted: Provided training for regional area agency personnel, contractors, engineers, and design consultants at the annual Mid-Willamette Erosion Control and Stormwater Management Summit training on January 27, 2020. See RC 1-5. Ongoing: Continued outreach to Home Builders, Contractors, and Material Suppliers concerning standard construction specifications and standard drawing updates. Maintained: All inspectors maintain a Certified Erosion and Sediment Control Lead (CESCL) certificate, per DEQ requirement.
CON 1-3: Document and streamline site plan review, inspection, and enforcement procedures for the construction site runoff control program.	Complete documentation of site plan review, inspection, and enforcement procedures before the end of year four of the MS4 permit cycle.	Track completion of documented procedures.	Ongoing: Use of Survey 123 software to preform field inspections and document record keeping that streamlined these processes. Ongoing: Site plan review procedures and checklists are in place and actively used. Staff continues to update the checklists as procedures change. Ongoing: Inspection procedures and reports are in place and actively being followed by Public Works Inspectors. Training and accountability on inspection documentation details and photo integration is ongoing. Ongoing: Enforcement procedures are adopted and implemented when appropriate. Training on procedures and practices is ongoing.
CON 1-4: Continue to review and update the Erosion Prevention and Sediment Control Technical Guidance Handbook.	Update Technical Guidance Handbook before the end of year four of the MS4 permit cycle.	Track updates made to the Technical Guidance Handbook.	No change. There was no change from previous year cycle report. City Design Standard, Standard Construction Specifications, and Standard Drawings for erosion prevention and sediment control have been implemented and continue to be followed for all design and construction activities. These three items have systematically replaced the need for the Technical Guidance Handbook.
CON 1-5: Continue to coordinate with the City’s 1200-CA Permit for City construction projects subject to its program.	Requirements for 1200-CA compliance incorporated into City construction plans, specifications, and contract documents. Make erosion prevention and sediment control a key agenda item at all pre-construction conferences. Include inspection of all site erosion prevention and sediment control measures as part of City projects.	Track renewal of 1200-CA permit.	No change: There was no change from previous year cycle report. * 1200 CA Permits are included in City contract documents. * 1200 CA Permit and EPSC enforcement is key discussion point at pre-construction conferences. * Inspector inspects all City 1200 CA permitted projects. * Implemented Survey 123 software to track and record erosion control 1200CA inspections.

Table 16. MON1—Monitoring

Task Description	Measurable Goals	Tracking Measures	FY 2019-2020 Activities
MON 1-1: Continue to install and maintain flow and water quality monitoring stations in City waterways to support selection of capital improvement projects, update the hydrologic-hydraulic computer model, and help direct policies to protect the health of these water bodies. The actual rate of installation and the total number of stations will be based on the maintenance requirements of the stations, available funding, and coordination with urban watershed assessments/plans.	<p>Install additional monitoring stations.</p> <p>Monitor the station alarms in conjunction with the illicit discharge control program (ILL2, Task 1).</p> <p>Follow up on potential hotspots or problem areas as may be identified through data analyses.</p>	<p>Track number of additional monitoring stations implemented.</p>	<p>No change: No new monitoring stations were installed during FY 2019-20.</p> <p>Ongoing: Progress has been made in updating station alarm functionality. Hardware and program changes were made to integrate with the SCADA alarm interface located at the Public Works Department's dispatch center. In the field, additional screens and cones were installed on selected deployment pipe tees in an attempt to reduce erroneous water quality alarms. An analysis of the past year of data has shown an overall reduction of erroneous data spikes at each station that received new screens and cones.</p> <p>Ongoing: No hotspot or problem areas were identified using the continuous instream monitoring stations this year. Any calls received from the public with concerns about water quality were given to Environmental Services to follow up on, and data was analyzed to see if any noticeable changes occurred. Several pollution concerns were reported by Stormwater staff to Environmental Services staff, found during site visits and field observations, and then followed up upon.</p>
MON 1-2: Continue the urban stream and Willamette River water quality sampling program, with emphasis on reviewing and evaluating sampling data to prioritize investigations and improvement/maintenance projects. This sampling augments the monitoring plan included in the City's 2008 NPDES MS4 Permit Renewal application.	<p>Update database for collected data.</p> <p>Review collected data for purposes of trending and benchmarking by the end of the permit term.</p> <p>Follow-up on potential hotspots or problem areas as may be identified by the data review.</p>	<p>Document findings regarding trends.</p>	<p>Ongoing: An Excel database was created this year for the Monthly Instream Sampling Program. Containing all data from 2001 thru present, the Excel database allows for fast data analysis, reporting, and formatting data for import into Aquarius.</p> <p>Ongoing: Data are verified at least twice, once before it is entered into the database, and again on a yearly basis when all data goes under a thorough review before being included in the annual report. The City will continue to update and compute trends analyses as needed.</p> <p>Ongoing: Every year staff produce an Appendix of Monitoring Data that is included in the Annual Report submission. This summarizes the data for the year and documents any water quality exceedances. This provides a visual comparison of stream health from year to year and helps staff target where issues may be occurring. No hot spots were identified during FY 2019-20 based on a review of data.</p>
MON 1-3: Continue to implement all components (MS4 outfall, instream, pesticide, and macro-invertebrate) of the City's "Surface Water and Stormwater Monitoring Plan."	<p>Implement the City's Stormwater Monitoring Plan, including MS4 outfall, instream, pesticide, and macro-invertebrate monitoring components.</p>	<p>Provide summary statistics for sampling results from each wet-weather season.</p> <p>Track any modifications to the monitoring plan.</p>	<p>Ongoing: The City continues to collect data as part of the monitoring requirements listed in Table B-1 of the City's NPDES MS4 permit. Because the permit was administratively extended, the City will continue to implement its "Surface Water and Stormwater Monitoring Plan" and report all results as part of the Annual Report. No changes or modifications were made to that monitoring plan. Appendix A contains summary statistics for all sampling that was conducted during FY 2019-20.</p> <p>The City began brainstorming possible modifications to the monitoring plan based on anticipated changes in the upcoming fourth MS4 NPDES Permit. Potential changes are related to mercury sampling and potential BMP sampling in place of MS4 In Pipe sampling.</p>

3 PROGRAM EXPENDITURES AND FUNDING SOURCES

Stormwater-related program costs in Salem were historically funded through wastewater rates comprised of a water consumption (flow) component and a fixed user charge. In December 2010, Salem City Council approved the adoption of a separate stormwater service charge or utility. Implementation of the stormwater utility was initiated on January 1, 2013 and completed over a period of four rate cycles.

The stormwater utility was developed to provide an equitable way of paying for Salem's stormwater programs by more accurately and fairly linking the stormwater impacts of the ratepayer's property to the rate paid by each ratepayer. The stormwater service charge is based on each property's impervious surface and an assessment of stormwater programmatic costs that are shared equally among all ratepayers. Additionally, properties that take steps to reduce their impervious surface areas, or that have onsite facilities that reduce stormwater impacts, have an opportunity to reduce their stormwater service charge. There currently is no mechanism for residential ratepayers to reduce their stormwater service charge.

Table 17 provides a summary of the total stormwater program budgeted per result area for the reporting year (FY 2019-20). The items denoted with # were not calculated into the FY 2020-21 budget. The FY 2020-21 budget of \$8,063,800 is based on costs of the Environmental Services, Stormwater Quality, and Stormwater Operations and Maintenance Sections for personnel, materials & services, and capital outlay.

Operational Task/Result Area	FY 19-20 Budgeted Items
Chemical Handling and Disposal	\$ 103,656
Code Compliance—PW#	\$ 120,833
Environmental Compliance for Outside Departments/Agencies	\$ 337,536
Environmental Monitoring	\$ 1,355,721
Floodplain Management and Regulatory Compliance#	\$ 406,161
Flow Monitoring	\$ 244,183
Green Stormwater Infrastructure Maintenance	\$ 394,259
Mapping and Data Management#	\$ 255,657
Natural Areas Management	\$ 404,289
Natural Resources Education and Outreach	\$ 455,673
Operational and Technology Transfers—Infrastructure	\$ 232,230
Public Works Dispatch#	\$ 171,521
Storm Sewer Pipe Cleaning	\$ 674,645
Stormwater Construction#	\$ 7,158,670
Stormwater Facility Inspections	\$ 220,163
Stormwater Open Channel System Maintenance	\$ 2,132,527
Stormwater Pipe Inspection	\$ 697,619
Stormwater Pipe Maintenance	\$ 1,155,191
Stormwater Quality Monitoring	\$ 207,101
Utility Billing and Customer Service#	\$ 634,575
Stormwater Infrastructure Planning#	\$ 1,223,186
Hazardous Materials/Emergency Management; Street Sweeping Services#	\$ 982,680
Debt Service—Stormwater Utility#	\$ 494,924
Total	\$ 20,063,001

4 ENFORCEMENT ACTIONS, INSPECTIONS, AND PUBLIC EDUCATION

Environmental Services staff responded to 343 water-quality-related incidences during the reporting and reported three violations during this reporting period. Actions taken related to these violations are shown in the chart below.

Erosion control and 1200-CA Permit requirements are an integral part of all City-issued construction plans and specifications. The City of Salem continues to coordinate efforts with Department of Environmental Quality (DEQ) staff regarding 1200-C permitted sites. The ESPC Annual Report for FY 2019-20 indicates that 6,048 erosion-control-related inspections were conducted by Public Works Inspectors on 869 projects. The report also indicates that there were 224 enforcement actions, all of which have been corrected.

Name	Date	Violation	Action Taken	Discharge	SRC
Divine Distillery	07-16-2019	Illicit Discharge Violation	Citation	No containment	71.050
Willamette Graystone	06-17-2020	DEQ 1200Z Stormwater Violation	Civil Penalty DEQ	Monitoring	N/A DEQ
Sparkle & Clean Janitorial	08-30-2019	Prohibited Discharge to the Storm Sewer	Citation	Floor Cleaning Water	71.050

5 PLANNING, LAND USE CHANGES, AND DEVELOPMENT

The City of Salem Public Works Department Stormwater Management Design Standards (Design Standards) were revised in FY 2013-14 to reflect the post-construction requirements presented in the MS4 Permit. Before these updates were adopted via the City's relatively new administrative rule process, a new stand-alone stormwater chapter (SRC 71) was developed and approved. This new stormwater dedicated chapter was adopted by City Council in December 2013. SRC 71 and the updated Design Standards became effective on January 1, 2014. The Design Standards will continue to be revised as new information becomes available.

5.1 Planning

Salem is engaged in a comprehensive plan update called *Our Salem*; the updated comprehensive plan will guide development in the Salem area. *Our Salem* is a multi-year project consisting of three phases. The first phase of the project focused on examining the existing conditions of the city and evaluated how Salem could grow under current policies. It resulted in a report card that evaluates whether we are heading in the right direction given current policies. It also resulted in a greenhouse gas (GHG) inventory. The second phase—underway now—focuses on community-wide visioning. It will result in a vision for future growth and development in the Salem area. The vision, which will include goals and maps, will lay the foundation for the final phase of the *Our Salem* project, the update to the Salem Area Comprehensive Plan. More information can be found at <https://www.cityofsalem.net/our-salem>.

5.2 Land Use Changes

Seven annexations became effective from July 1, 2019 through June 30, 2020.

Location and Description	Number of Acres
4700 Block Lancaster Drive NE	5.8 acres
4980 Center Street NE	4.22 acres
1235 Hoffman Road NE	0.555 acres
SE Corner Kuebler Boulevard SE and 36th Avenue SE	4.94 acres
1096 Hoffman Road NE	1.06 acres
4400-4600 blocks of Hazelgreen Road NE	45.26 acres
4696 Center Street NE and 592 Hile Lane NE	5.04 acres

Total Acres	66.875
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5.3 New Development

The City of Salem has continued to see a steady stream of new projects at all phases of development. During the FY 2019-20 reporting period completed projects resulted in approximately 53 acres of new impervious surface area related to development projects in Salem. The list below includes development projects and their status between for the reporting year.

Commercial/Industrial Development			
	Address	Description	Status
Memory Care Facility	1805 Waln Drive SE	68-unit memory care facility	Complete
Northwest Rehabilitation Associates	245 Patterson Street NW	9,900-square foot medical	Complete
Petco	831 Lancaster Drive NE/3811 Center Street NE	13,200 square foot retail	Complete
Vehicle storage for auto dealership	700 Auto Group Avenue NE	Vehicle storage lot	Complete
Court Street	245 Court Street NE	5-story Mixed Use Building	Complete
Industrial Park	1745 Oxford Street SE	96,000 sq. ft. building and 26,200 sq. ft. building	Complete
Commercial Shell Building	3994 Portland Road NE	Retail commercial building with drive-through	Complete
Office Building	2332 Saginaw Street S	New 2,400 SF Office Building	Complete
Carmax	395 Lancaster Drive SE	7,480 sq. ft. building	Complete
Marion County Juvenile	2970 Center Street NE	20,460 square foot building	Complete
Church addition	4227 Lone Oak Road SE	17,000 square feet	Complete
R&J Partners	3055 Industrial Way NE	Parking lot and vehicle use area	Complete
Reuse of Former Sanyo Building	5475 Gaffin Road SE	Expansion of vehicle storage area for package delivery use	Complete
Commercial/Industrial Development			
	Address	Description	Status
City of Salem Police Facility	333 Division Street NE	Approx. 104,000 square-foot new police facility	Near Completion

Food manufacturing	0 Rose Garden Street NE	Quesederia	Near Completion
Mini-storage	2535 Salem Dallas Highway NW	38,000 square feet	Near Completion
Roofing Company Building	4910 Turner Road SE	12,000 square foot building and 3,800 buildings	Near Completion
Gensco	3790 Fairview Industrial Drive SE	Warehouse 54,445 sq ft, parking and loading	Under Construction
Marietta	3311-3325 Marietta Street SE	Integrated phased development, five new buildings	Under Construction
River Bend Mixed-Use	1200 Block of River Bend Road NW	Two new retail buildings, approximately 11,250 square feet	Under Construction
Oxford Industrial	1850 Oxford Street	18,460 square feet buildings, 9,777 parking	Under Construction
North Salem High School	765 14th Street NE	61,674 square foot addition	Under Construction
Vehicle storage	1885 Fisher Road NE	Auto inventory storage lot	Under Construction
Hotel	390 Hawthorne Avenue SE	82-room hotel	Under Construction
YMCA	220 Cottage Street NE	5,223 sq. ft YMCA and parking area	Under Construction
Turner Road - Roofing Contractor	4910 Turner Road SE	Construction Services Company and retail space	Under Construction
Robins Lane Self Service Storage	215 Robins Lane SE	245 self-service units	Under Construction
Credit union/office building	465 Division Street NE	Three story building, parking lot improvements	Under Construction
Subaru	920 Auto Group Avenue NE	75,000 sf auto dealer, sales lot, parking lot, a 2,100 sf car wash, 1,200 sf pavilion	Under Construction
Union Gospel Mission Men's Shelter Relocation	777 Commercial Street NE	Relocation of UGM Men's shelter with maximum capacity of 300 overnight occupants	Under Construction
McKay High School	2440 Lancaster Drive NE	Approximately 95,000 sf of building additions, renovations,	Under Construction

		and site improvements.	
South Salem High School	1910 Church Street SE	Addition to school, two new parking areas, and ped paths (215,915 impervious surface, plus 25,088 modulars)	Under Construction
Liake Plaza - Mixed Use	4700 Block of Liberty Road S	Future mixed use project. 26 dwelling units and 10,716 square feet of retail/office	Under Construction
Chang Tuh expansion	1965 Claxter Road NE	22,600 sf expansion of existing Chang Tuh food processing facility	Under Construction
Multi-Family Residential			
	Address	Description	Status
Portland Road	2500 Block of Rose Garden Street NE	180-Units	Complete
May's Landing	23rd and Mission Streets SE	96-Units	Complete
Captial Manor	1955 Salem Dallas Highway NW	Demolition of existing dwellings, zone change, construction of multi-family	Near Completion
Orchard Heights Apartments	1800-2000 Block of Linwood Street NW	312-Units	Near Completion
River Bend Apartments	1200 Block of River Bend Road NW	48-Units	Near Completion
The Grove at Fairview	2250 Strong Road SE	180-Units	Under Construction
Claxter Court	4265 Claxter Court NE	102-Units	Under Construction
Silverton at Lansing	3010 Silverton Road NE	96-Units	Under Construction
Nishioka Building	260 State Street	New 148-unit studio/microunit apartment/mixed-use building	Under Construction
Boone Ridge Retirement Community	2950 Boone Road SE	142-unit independent retirement facility	Under Construction
Subdivisions			
	Address	Description	Status

Whispering Heights	2960 Michigan City Lane NW	110-Lot Phased Subdivision	Phase 1 and 2 recorded, Dwellings Under Construction
Liberty Road Subdivision	4333 Liberty Road	5-Lots	Complete
9th Court Addition	5320 Sunnyside Road SE	11-Lots	Complete, houses under construction
Illah Forest	3800 Block of Illah Hill Road S	11-Lots	Complete, houses under construction
Rainier Ridge	197 Rainier Drive SE	34-Lots	Complete, houses under construction
Dogwood Heights	3700 and 3800 Blocks of Dogwood Drive S	46-Lots	Phase 1 recorded, Under Construction
Devin Estates	6179 Devin Road SE	86-Lots	Under Construction
Quail Estates	5500 Block Skyline Road	22 Lots	Under Construction
Springwood Estates	600 Block Mildred Lane	48-Lots	Under Construction
Wren Heights	575 Salem Heights Avenue ??	34-Lots	Under Construction
Grantham Crest	6719 Devon Avenue SE	82-Lots	Under Construction
Legacy Heights	2250 Old Strong Road SE	73-lot single-family residential phased subdivision together with common space and 5 large lots within the Village Center area of the Fairview Refinement Plan II refinement plan	Under Construction

City of Salem
National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4)

Summary of Water Quality Data
For Reporting Year 2019/2020

Prepared by:
City Salem Public Works Department
Stormwater Services
Stormwater Monitoring Staff

November 1, 2020

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1.0 Introduction

This document provides all monitoring data collected for the reporting year (RY) of July 1, 2019, to June 30, 2020 (RY 2019/2020), in accordance with the City of Salem's NPDES MS4 permit requirements listed in Schedule B(5)(f)&(g). A background narrative for each monitoring element for which data were collected and a brief summary of results for RY 2019/2020 is provided below, and all collected data are provided in the attached tables and figures.

2.0 Monitoring Elements

Specific details for each monitoring element can be found in the City's *Stormwater and Surface Water Monitoring Plan*. Progress toward meeting the monitoring requirements defined in Table B-1 of the City's MS4 Permit are summarized in Table 1. Monitoring site locations are described in Table 2 and denoted in Figure 1, and the parameters analyzed for each monitoring element are listed in Table 3.

2.1 Monthly Instream Monitoring

Sampling of designated urban streams for the Monthly Instream¹ monitoring element is conducted on a predetermined monthly schedule at 24 different locations. This monitoring element includes the collection of grab samples and field measurements on 11 of Salem's MS4 stormwater runoff receiving streams and the Willamette River. Ten of these streams are paired with upstream (at or near where the stream enters the City's jurisdiction) and downstream (at or near where the stream exits the City's jurisdiction or enters a receiving stream) site locations. The 11th stream, the West Fork Little Pudding River, only has a downstream site location, because the West Fork Little Pudding River starts in the greater Salem area and runs dry during the summer months. The Willamette River has three sites located upstream, mid-way, and downstream of city limits.

The general location of all sites are provided in Table 2 and Figure 1.

A general suite of water quality parameters are collected for each site, with additional water quality parameters analyzed for the sites within the Pringle Creek Watershed (PRI1, PRI5, CLA1, and CLA10), West Fork Little Pudding River (LPW1), and the Willamette River (WR1, WR5, and WR10).

Water quality parameters collected include:

- Temperature
- Turbidity
- Specific Conductivity
- pH
- Dissolved Oxygen (DO)
- Nitrate + Nitrite as Nitrogen (NO₃+NO₂-N)
- *Escherichia coli* (*E. coli*)
- Biochemical Oxygen Demand (BOD_{stream})

¹ Identified as "Urban Streams monitoring" in the City of Salem Stormwater Management Plan 2010.

- Zinc -total recoverable and dissolved (CLA1, CLA10, PRI1, PRI5 only)
- Copper -total recoverable and dissolved (CLA1, CLA10, PRI1, PRI5 only)
- Lead -total recoverable and dissolved (CLA1, CLA10, PRI1, PRI5 only)
- Hardness (CLA1, CLA10, PRI1, PRI5 only)
- Total Suspended Solids (TSS) (LPW1, WR1, WR5, WR10 only)
- Alkalinity (WR1, WR5, WR10 only)
- Ammonia (WR1, WR5, WR10 only)
- Total Phosphorus (TP) (WR1, WR5, WR10 only)
- Total Solids (TS) (WR1, WR5, WR10 only)
- Total Dissolved Solids (TDS) (WR1, WR5, WR10 only)

Data for this monitoring element are provided in Tables 5 through 8, and Figures 2 and 3.

This year, two sampling events were missed: December 2019 because staff were preparing for expected flooding, and March 2020 because of uncertainty around safety with COVID-19.

Sampling was split into two days during April and May 2020 so that only two staff were needed and could take separate vehicles. Some general observations from this reporting period compared to the last reporting period include:

- **E. coli** – there were three less exceedances this year compared to last year, however there were less samples overall, with no sampling occurring in December 2019 or March 2020.
- **Dissolved Oxygen** – 24 of 24 sampling sites returned dissolved oxygen medians which were lower than the previous year, however sampling did not occur in December 2019 or March 2020, which likely heavily biases the median low.
- **Copper** – there was one Total Cu and one Dissolved Cu exceedance for the 2019/2020 reporting year compared to zero in 2018/2019.
- **Lead** – there were no Lead exceedances for the 2019/2020 reporting year, no change from 2018/2019.
- **Zinc** – there were no Zinc exceedances for the 2019/2020 reporting year, no change from 2018/2019.
- **Nitrate and Nitrite** – Eight sampling sites had median values higher than last year.
- **BOD** – 17 sampling sites saw higher monthly median values than last year.
- **Specific Conductivity** – For the second consecutive year, 70 percent of results were higher than the previous year.
- **pH** – 11 sites had higher pH medians than last year.
- **Turbidity** – 11 of 24 monitoring sites reported higher turbidity medians than last year
- **Rainfall** – 2019/2020 saw much more precipitation than last year, with 7 out of 10 sampling days having measurable rainfall in the preceding 24 hours compared to 2 of 12 from last year. Note: Two sampling events with preceding rainfall occurred in April and May 2020, when the sampling route was split between two sampling days due to staffing shortages related to COVID-19. In both cases, one day saw preceding rain, while the other day saw dry conditions. Consequently, two of the seven “rainy” sampling days only affected half of the sampling sites.

2.2 Continuous Instream Monitoring

The City maintains a network of Continuous Instream water quality monitoring stations and stream gauging stations on seven different urban streams within the city. There are currently ten

water quality and stream gauging stations and four established stream gauge-only stations (SHE3, PRI4, WAL3, and LPW1) within city limits. Figure 1 identifies the location of each of the existing stations.

The monitoring stations for this monitoring element are positioned in an upstream/downstream configuration. The upstream stations are adjacent to where the stream enters the City and the downstream stations are either above the confluence with another stream or where the stream exits the City's jurisdictional boundary.

Continuous data collected includes:

- Turbidity
- Specific Conductivity
- Temperature
- pH
- DO
- Stage

All data are recorded in 15-minute intervals. All continuous statistical data summaries presented in the various tables and figures were computed using grade A and/or grade B data.

Qualifications for what constitutes grade A and grade B data are provided in Table 9, and monthly medians for collected data are summarized in Table 10. Plots of continuous data are provided in Figures 4 through 6. There were no significant changes in data trends or exceedances from last year.

The Continuous Instream monitoring element incorporates an alarm system that supports the City's Illicit Discharge Detection and Elimination (IDDE) program. The alarm system is used to record, notify, and prompt investigation of water quality abnormalities that may be indicative of illicit discharges. It serves as an important tool to aid in the elimination of periodic illicit discharges, helps to prioritize dry weather outfall screening activities (see section 2.6), and serves as an outreach/education opportunity for residents.

2.3 Instream Storm Monitoring

Instream Storm refers to the monitoring of MS4 receiving streams during defined storm events. Sampling occurs at three sites in the Pringle Creek Watershed (continuous instream monitoring sites PRI12, PRI3, and CLK1). Data collected are used to increase understanding of receiving waters within the Pringle Creek Watershed and help guide Salem's stormwater management strategies in watersheds throughout the city. This monitoring element was initiated this permit cycle and is expected to continue beyond the current MS4 permit; ultimately providing a dataset for long-term trending and spatial analyses.

Sampling consists of flow weighted composite samples, grab samples, and field measurements. Parameters include:

- *E. coli*
- Dissolved Oxygen
- pH
- Temperature

- Specific Conductivity
- Copper (Total Recoverable and Dissolved)
- Zinc (Total Recoverable and Dissolved)
- Lead (Total Recoverable and Dissolved)
- Hardness
- Ammonia Nitrogen (NH₃)
- NO₃+NO₂-N
- Ortho Phosphorus
- Total Phosphorus (TP)
- BOD_{stream}
- TSS

Data for this monitoring element are provided in Table 11. For reporting year 2019/2020, staff captured three storm events.

2.4 Stormwater Monitoring

The City has collected water quality samples from a number of sites throughout the piped MS4 system since 1995. Three monitoring sites are identified in the current monitoring plan, one each for residential, commercial, and industrial land use. The commercial and industrial sites are new sites for this permit cycle, but the residential site had been sampled previously during the last MS4 Permit and continued to be sampled through this permit cycle. Data from this monitoring element will be aggregated with previous data collected from similar land use types. The aggregated datasets will be used to characterize Salem's MS4 stormwater runoff pollutant concentrations by land use and compare them with the ACWA characterized land use concentrations.

Data for this monitoring element are provided in Table 12. For reporting year 2019/2020, staff captured two storm events.

2.5 Pesticide Monitoring

No samples for the pesticide monitoring element were collected for RY 2019/2020.

2.6 Priority Dry Weather Outfall/Manhole Screening

The RY 2019/2020 dry weather outfall screening effort included a total of 58 outfall inspections (outfall structures or the first available upstream manhole), 46 of which had observable flow. Of the 46 flowing outfalls, 14 of the 46 tested for the presence of chlorine tested positive, and 25 received analytical sampling. A total of 7 pipesheds were investigated based on these outfall inspections, which resulted in the reporting of 3 water leaks, one of which was a leak at a private residence, to the Water Distribution Section. One water leak was observed in RY 2018/2019 but has not been located despite leak detection efforts by the Water Distribution Section. Of the 58 outfalls inspected, 33 were identified in the City of Salem's Dry Weather Outfall and Illicit Discharge Screening Plan. The additional outfalls were inspected based upon Stream Crew reports of dry-weather flow and two are outfalls that have been added for annual inspection based upon reports of dry weather flow. One of these outfalls has been characterized as being

predominantly comprised of groundwater with minor contribution of municipal water sources that have yet to be located. One was determined to be a municipal water leak that has since been repaired. Two outfalls listed in the City of Salem's Dry Weather Outfall and Illicit Discharge Screening Plan are no longer inspected, outfall D48486207, which was determined to be a culvert structure above an existing priority outfall and D42456216, which requires confined space entry to sample. For further information on the results of the inspections refer to **Attachment A**.

In RY 2018/2019, a custom mobile GIS application was deployed for Stream Crew interns to document physical inspections of flowing outfalls and illicit discharges. In RY 2019/2020, interns were provided Hach test strips for determining the presence of free and total chlorine in the field during their observations. Interns use the mobile application to photograph and record physical characteristics of outfall flow and to photo-document chlorine test strip results. Outfall inspections recorded using this application and screening capability have increased the number of outfall inspections performed and will be used to prioritize future outfalls for annual inspection. While interns are instructed to visually inspect all outfalls encountered during their 60 miles of stream inspections, only outfalls with dry weather flow are recorded at this time. Due to the increased reporting from this new workflow, the number of outfalls reported exceeded staff capacity for follow-up investigations. While the presence of chlorine was detected during some of the inspections, physical characteristics did not indicate contribution from the sanitary sewer system or illicit dumping. Groundwater with some contribution of municipal water is thought to compromise flow in these outfalls and follow-up investigation is still needed.

Additional training and is needed for Stream Crew interns to ensure completeness of screening inspections and that chlorine test strips are carried during every stream inspection. The use of stream inspection interns is anticipated to further increase the number of outfall screenings and improved software capabilities and data model designs will be needed to manage, prioritize, investigate, and document screening activities and reporting metrics in a less resource intensive manner. Planned improvements include the use of webhooks to generate real-time email notifications that notify full-time staff when chlorine is detected by interns and/or when physical characteristics indicate a possible illicit discharge. Coordination with other sections to provide investigative resources such as Leak Detection, pipeshed investigation, and TV inspection continues to make gains, but needs continued attention. Additional staff training in field analytical and investigative methods will also provide a greater capacity to perform and respond to outfall screening activities.

The use of ArcGIS Online, Survey123, and Collector for ArcGIS have been critical technologies for increasing the scope and reach of this BMP. The City's enterprise investment in this GIS technology has reduced barriers for acquisition. However, implementation of this technology has required extensive staff effort to configure, deploy, and maintain the applications and reporting dashboards for this program. While this staff time is ultimately expected to improve the overall performance of this BMP, the initial investment of staff time comes at a cost to field screening and investigative efforts. The use of this application and workflow also increase the number of outfall screenings requiring follow-up investigation by full-time staff, which further stretches staff thin for this BMP. Adjustment of staff resources will need time to adapt to this new workflow.

Improvements that could be made to this BMP include the following:

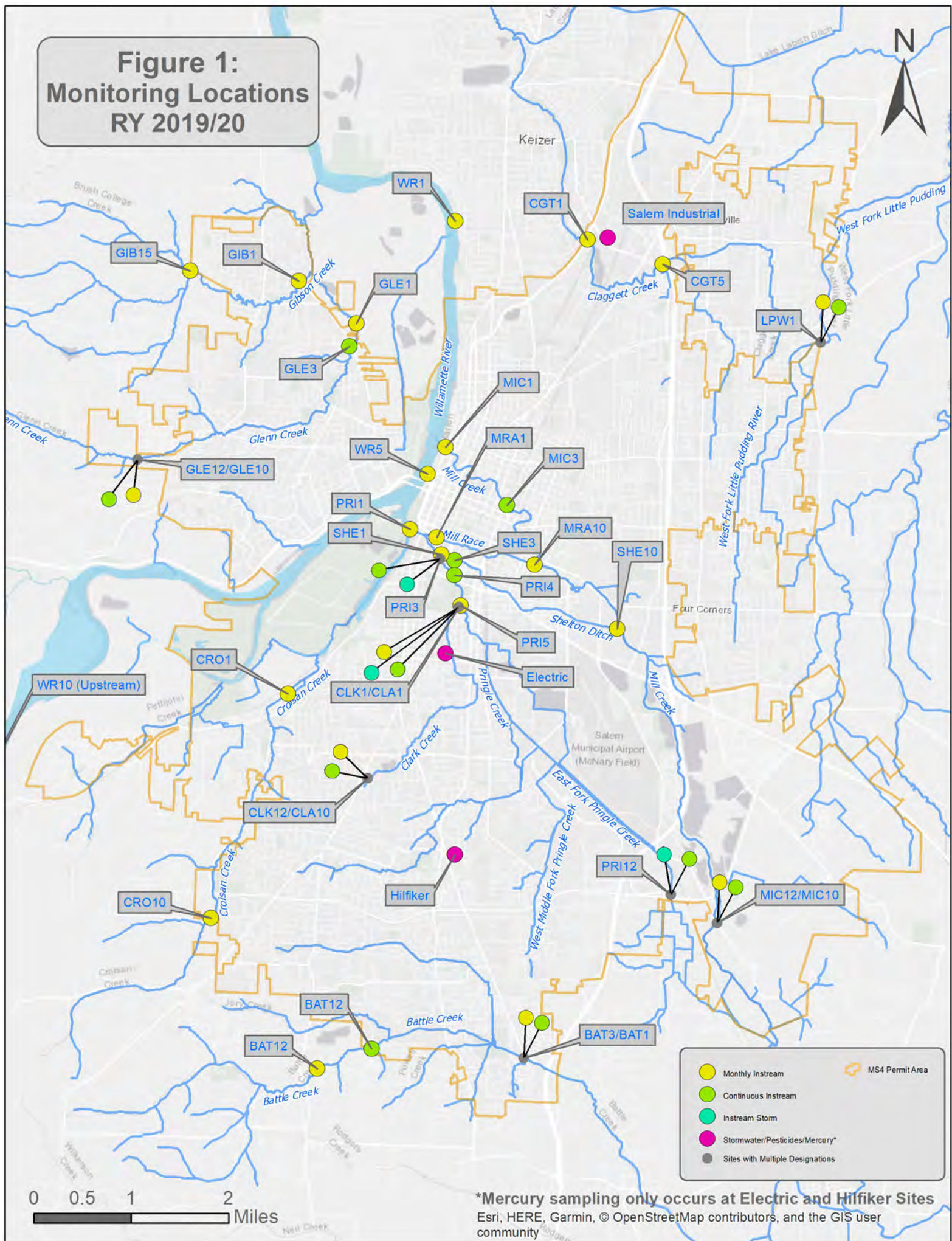
- Targeted outreach using areas defined by the same data inputs as used for the GIS process for prioritizing outfalls for inspection.
- Changing the field screening pollutant parameter action level for total chlorine from 0.0 (Any Presence) to 0.05 mg/L would limit the number of laboratory analyses and pipeshed investigations required by the current plan. Currently, low level detections of total chlorine, either due to naturally occurring chloramines, method interference, or small water leaks in pipes conveying mostly ground water result in time-consuming pipeshed investigations or additional analytical sampling when total chlorine results are relatively low and no other field parameter thresholds have been exceeded. In such circumstances, isolating the source of such small amounts of chlorine is very difficult and time consuming. Allowing for a slightly higher action level for total chlorine and the ability of the investigator to exercise discretion based on the totality of circumstances as well as previous year's analytical results before prompting a pipeshed investigation would allow more time for investigators to inspect more outfalls each year and to spend more time investigating higher priority outfalls.
- Additional analytical discretion may also provide for a more efficient use of investigative resources in instances where delivery of laboratory samples limits time available for source tracking. Visual source tracking in conjunction with basic field analyses has proven to be a much more effective tool for identifying sources of dry weather flow than laboratory analysis of water chemistry.

Data for this monitoring element are provided as Attachment A at the end of this document.

3.0 Conclusion

The City continues to meet all monitoring requirements of its administratively extended MS4 Permit. Cumulatively, data collected throughout this MS4 Permit cycle will be used to meet monitoring objectives identified in the City's monitoring plan, while also supporting data analyses.

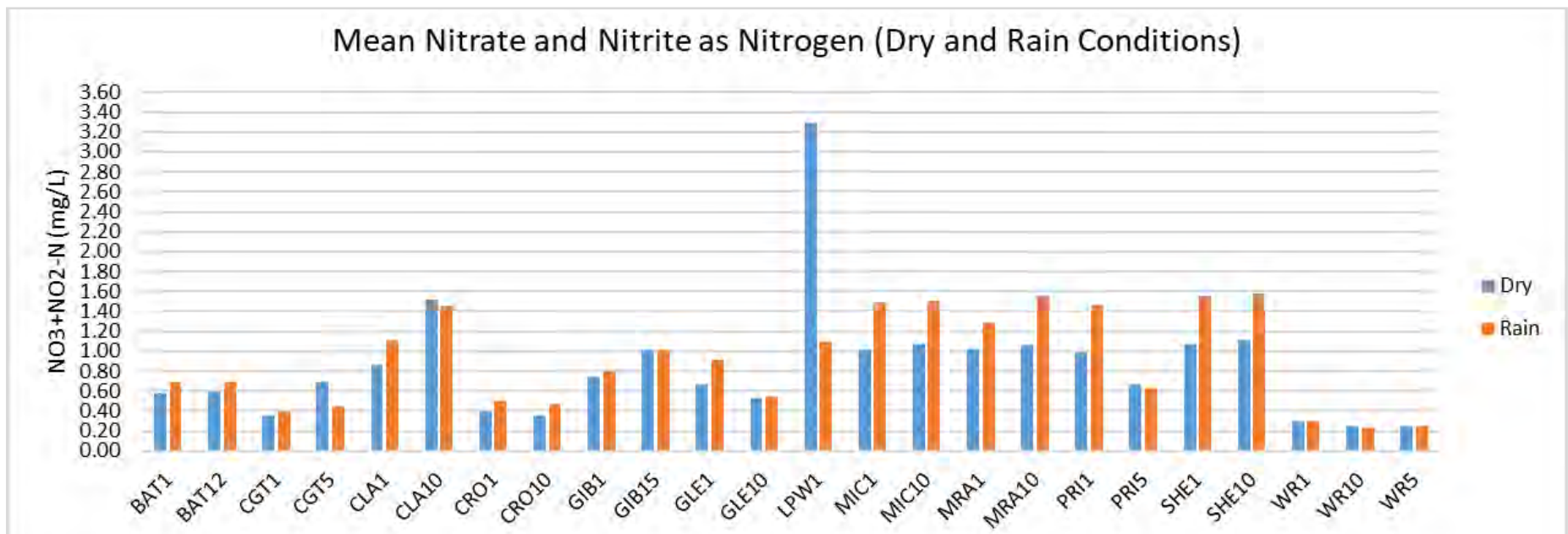
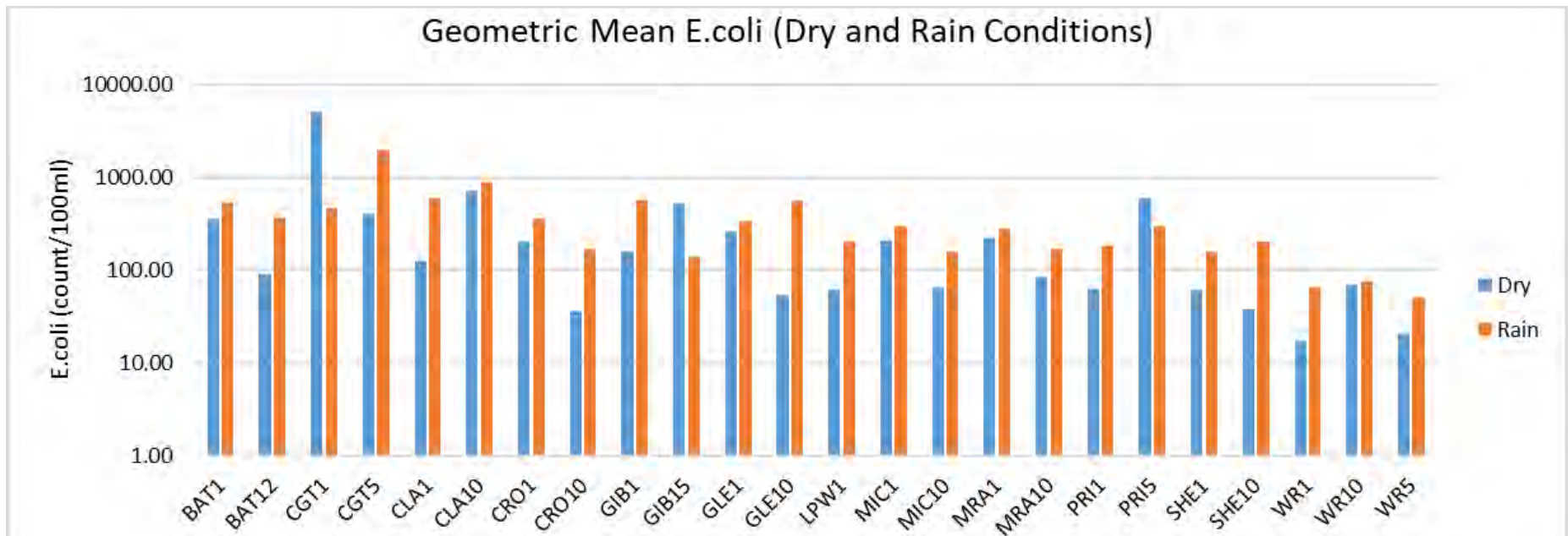
**Figure 1:
Monitoring Locations
RY 2019/20**



*Mercury sampling only occurs at Electric and Hilfiker Sites
Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

Figure 2

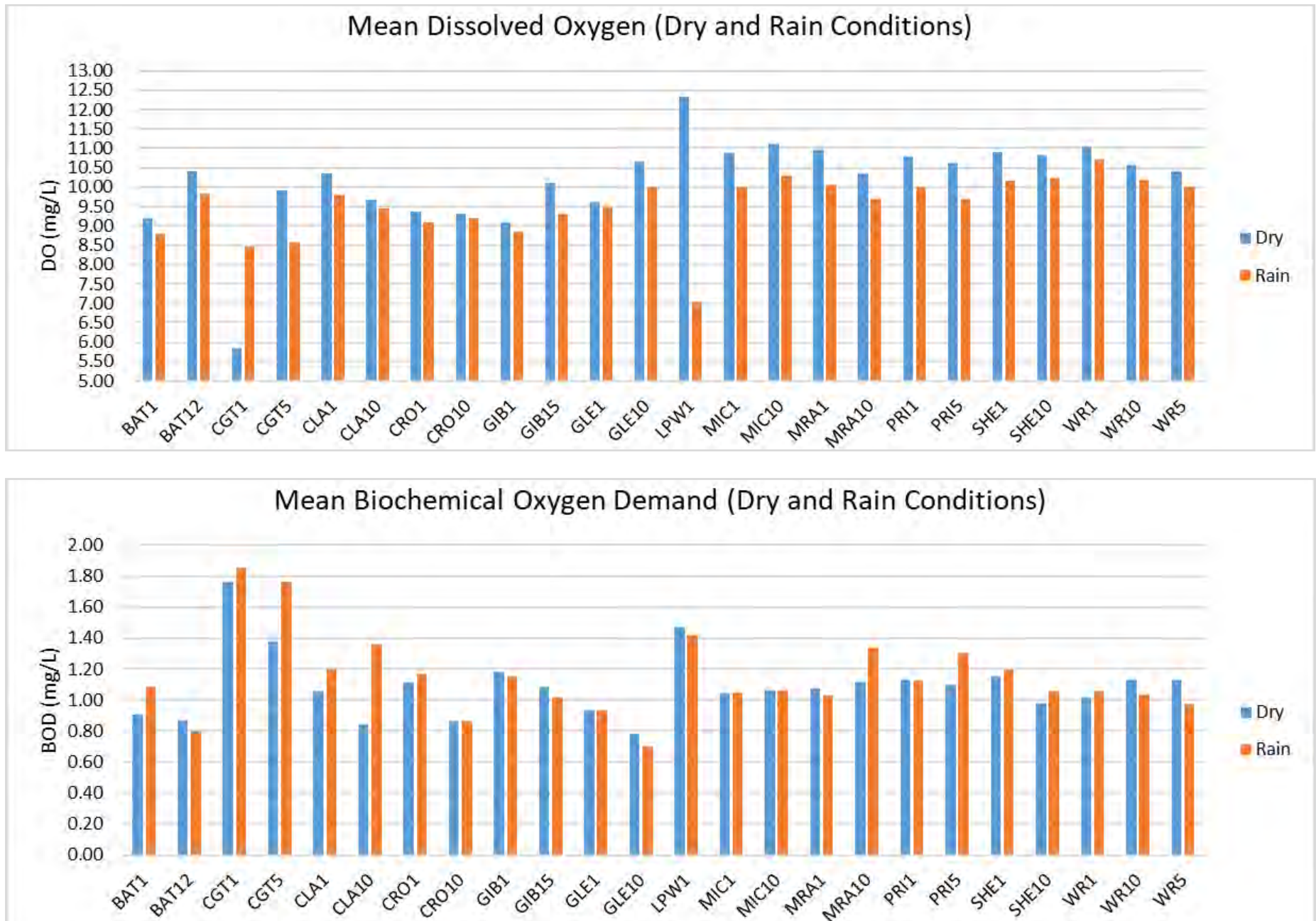
Monthly Instream Mean Value Comparison for Dry and Rain Conditions (Reporting Year 2019/2020)



Dry conditions defined as less than 0.05 inches of rainfall in the 24 hours prior to sample collection; rain conditions defined as greater than or equal to 0.05 inches of rainfall in the 24 hours prior to sample collection.

Figure 2

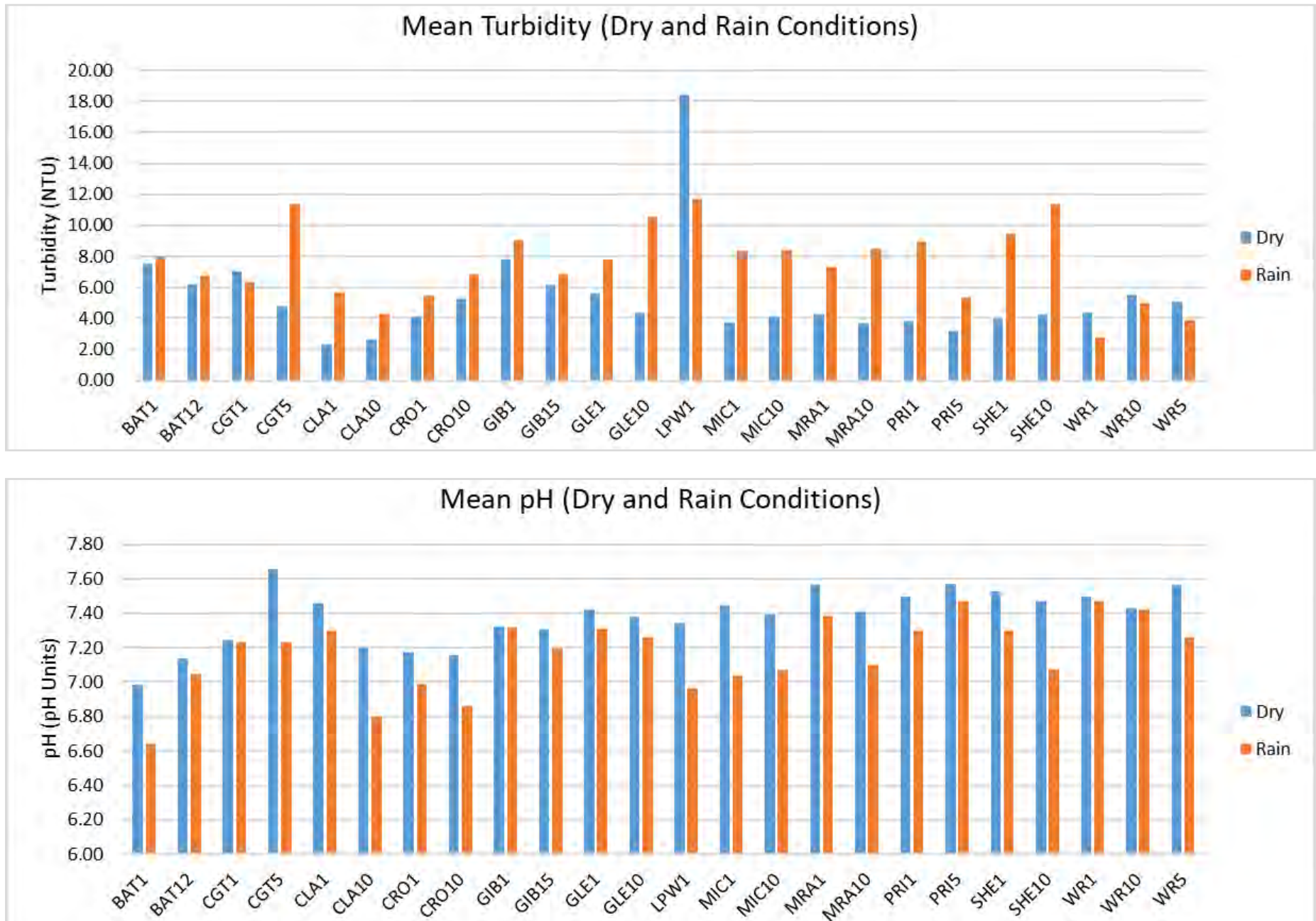
Monthly Instream Mean Value Comparison for Dry and Rain Conditions (Reporting Year 2019/2020)



Dry conditions defined as less than 0.05 inches of rainfall in the 24 hours prior to sample collection; rain conditions defined as greater than or equal to 0.05 inches of rainfall in the 24 hours prior to sample collection.

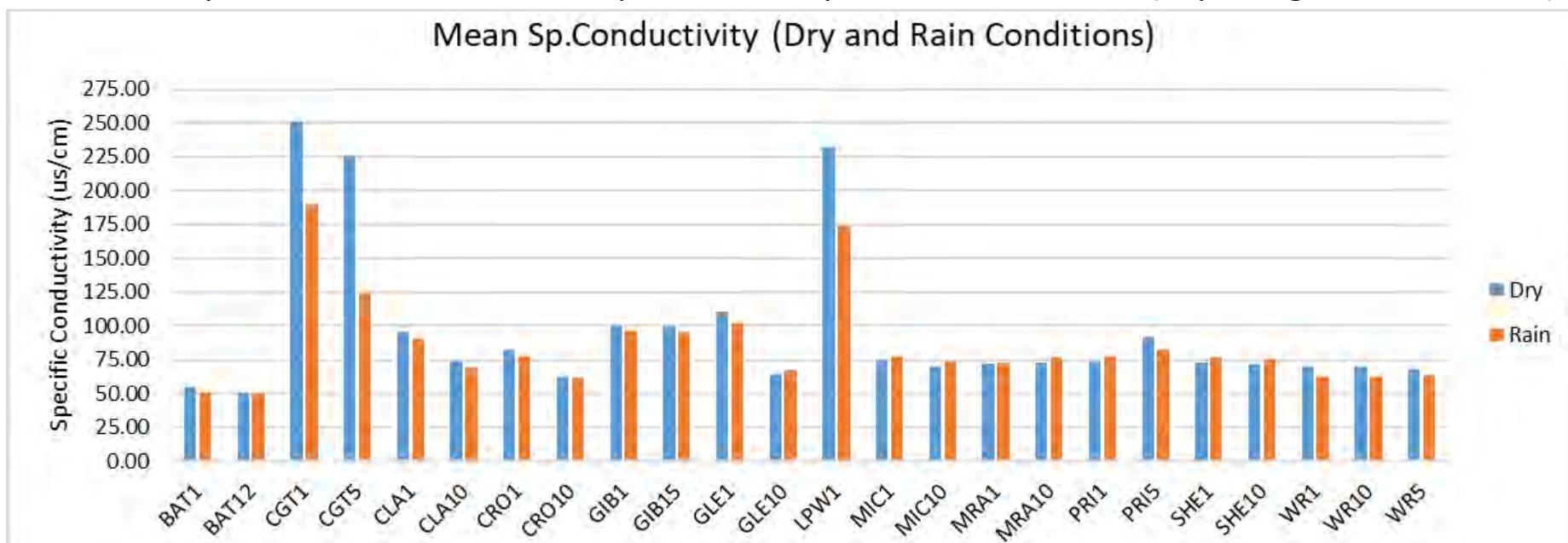
Figure 2

Monthly Instream Mean Value Comparison for Dry and Rain Conditions (Reporting Year 2019/2020)



Dry conditions defined as less than 0.05 inches of rainfall in the 24 hours prior to sample collection; rain conditions defined as greater than or equal to 0.05 inches of rainfall in the 24 hours prior to sample collection.

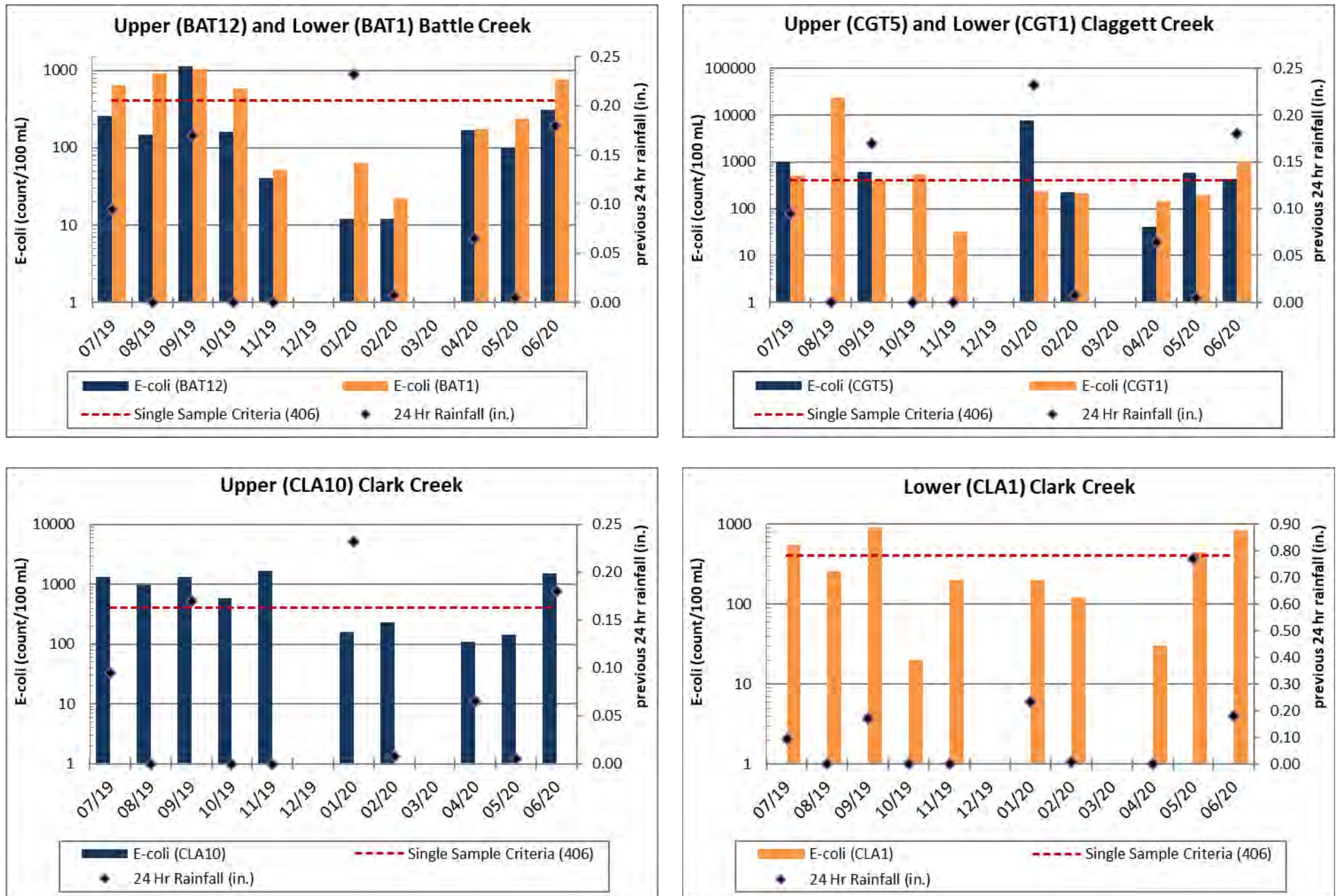
Figure 2
Monthly Instream Mean Value Comparison for Dry and Rain Conditions (Reporting Year 2019/2020)



Dry conditions defined as less than 0.05 inches of rainfall in the 24 hours prior to sample collection; rain conditions defined as greater than or equal to 0.05 inches of rainfall in the 24 hours prior to sample collection.

Figure 3

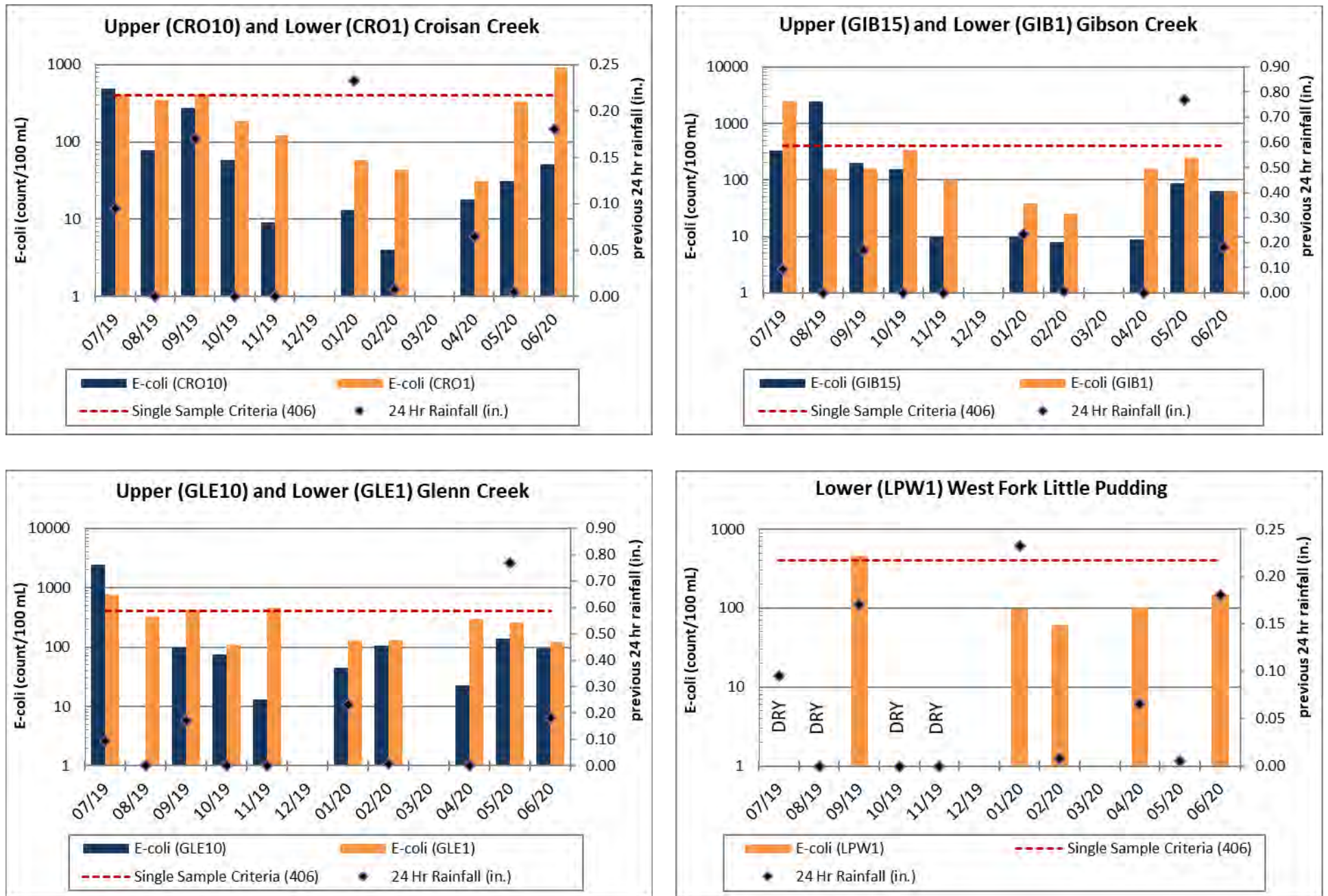
Monthly Instream E. Coli Upstream / Downstream Site Comparison (Reporting Year 2019/2020)



If 24 hour rainfall depth prior to sample collection differed between upstream and downstream sites, the average rainfall of the two sites was used.

Figure 3

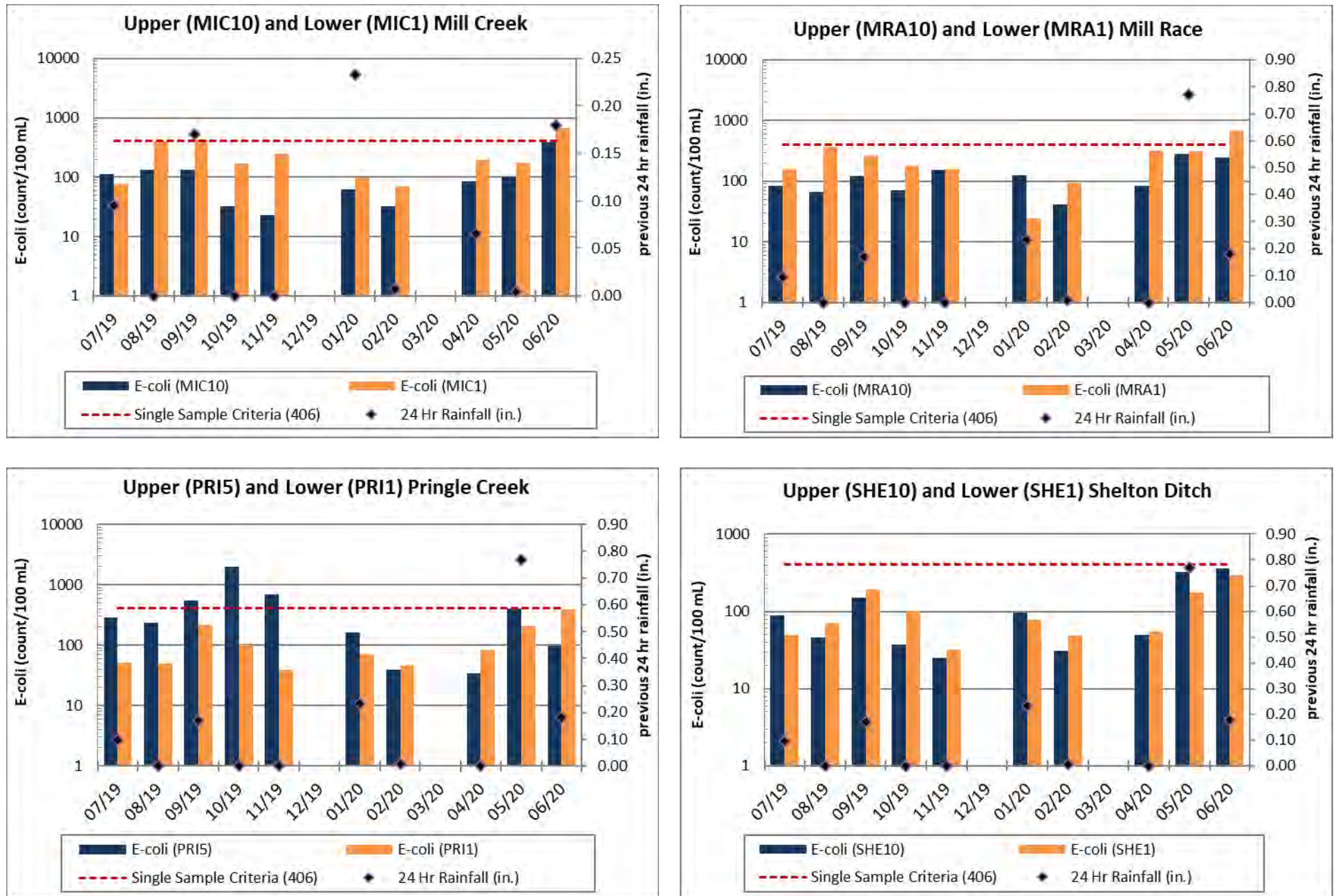
Monthly Instream E. Coli Upstream / Downstream Site Comparison (Reporting Year 2019/2020)



If 24 hour rainfall depth prior to sample collection differed between upstream and downstream sites, the average rainfall of the two sites was used.

Figure 3

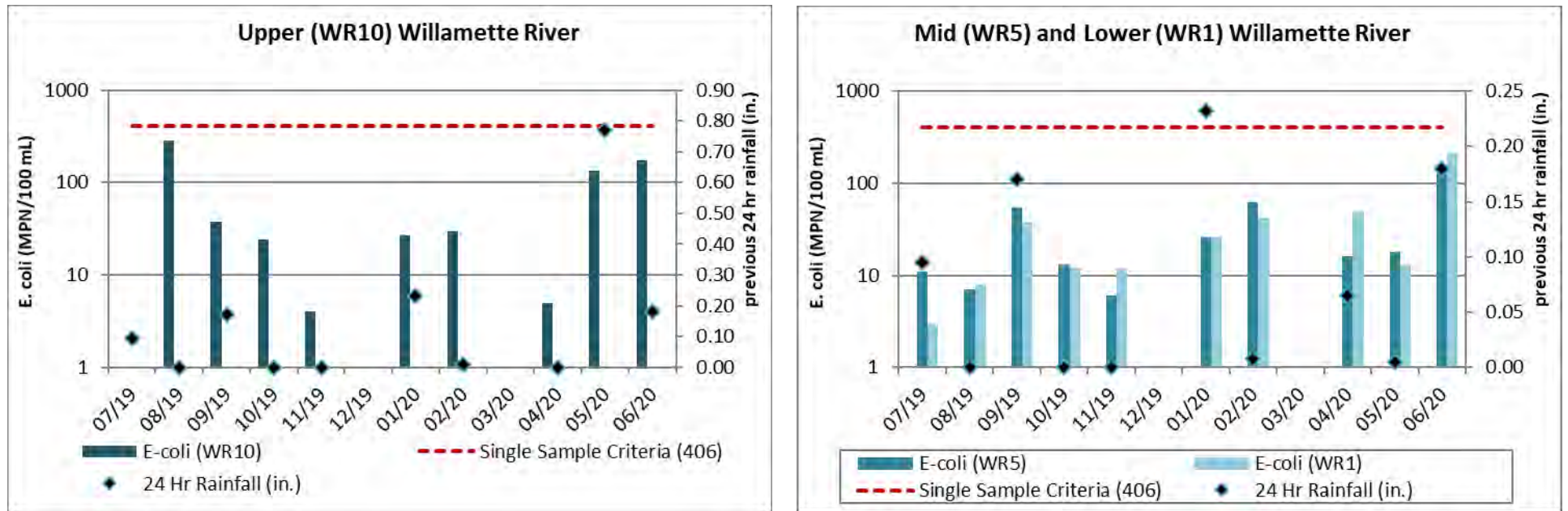
Monthly Instream E. Coli Upstream / Downstream Site Comparison (Reporting Year 2019/2020)



If 24 hour rainfall depth prior to sample collection differed between upstream and downstream sites, the average rainfall of the two sites was used.

Figure 3

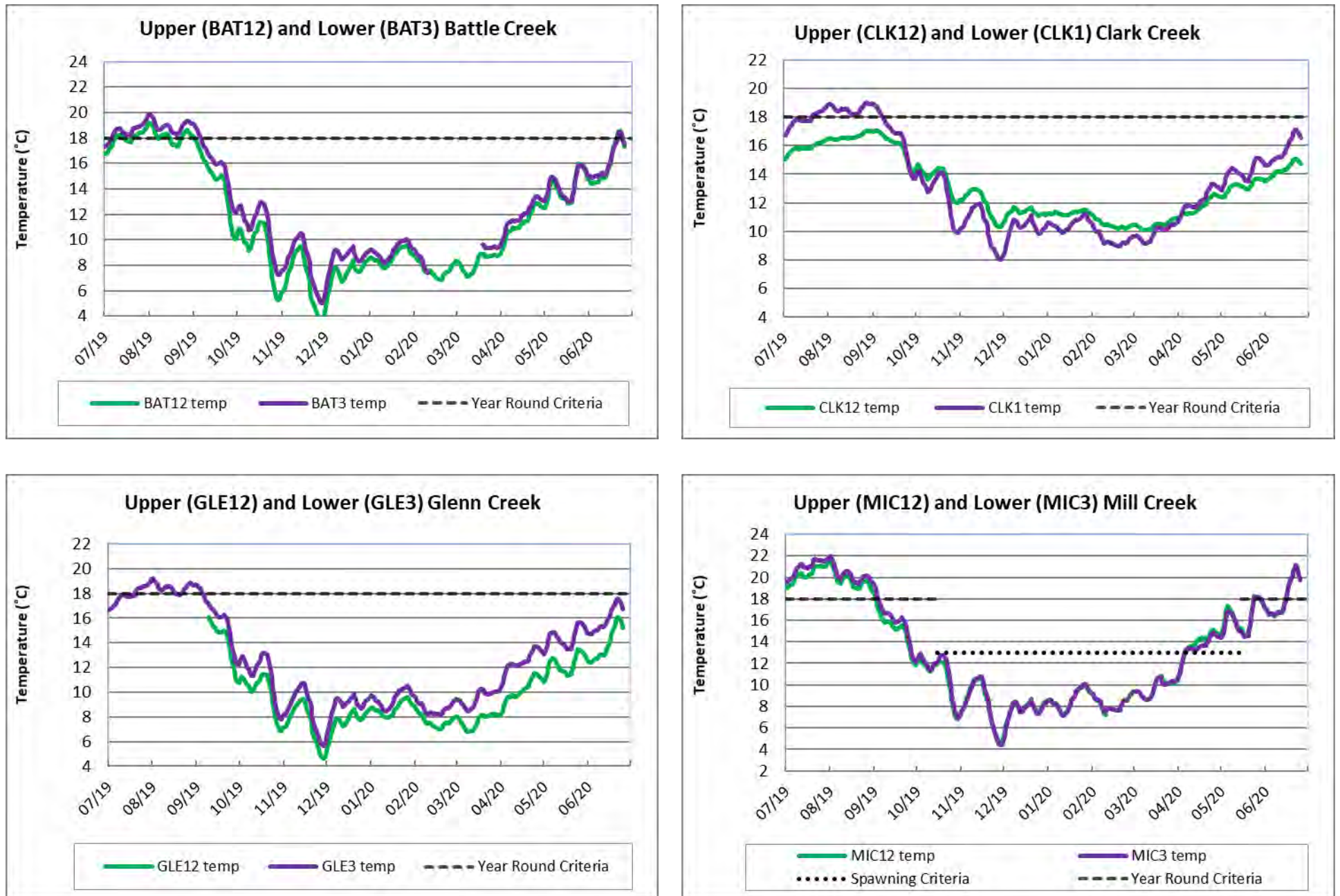
Monthly Instream E. Coli Upstream / Downstream Site Comparison (Reporting Year 2019/2020)



If 24 hour rainfall depth prior to sample collection differed between upstream and downstream sites, the average rainfall of the two sites was used.

Figure 4

Continuous Instream Temperature 7-Day Moving Average Maximum (Reporting Year 2019/2020)

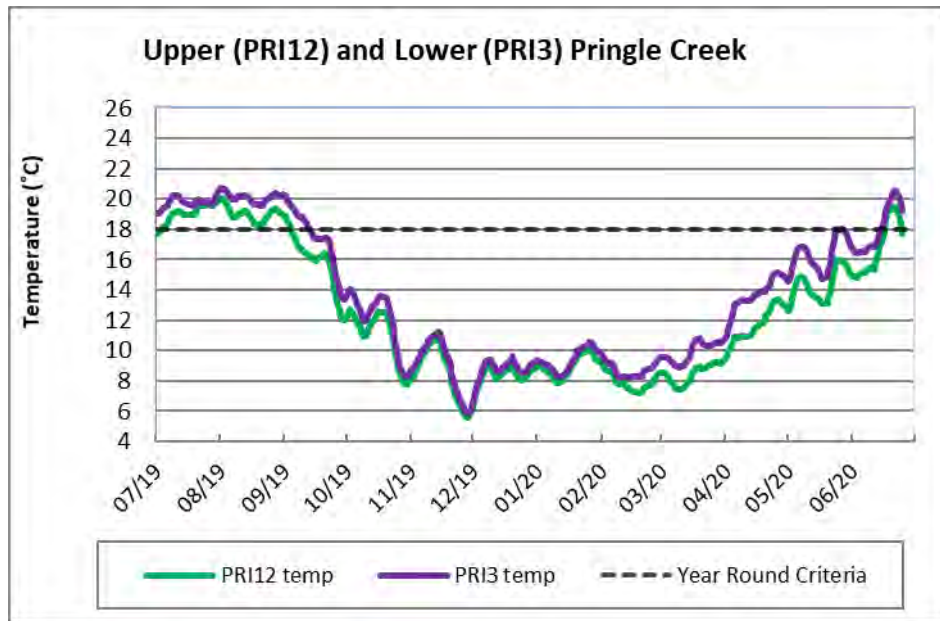


Presented temperature data consists of A grade data with greater than 80% of data points collected per day. Temperature criteria is defined in OAR 340--04100028 and OAR 340-0340, Tables 340A & B.

- Spawning Minimum Criteria for applicable streams may not exceed 7-day average maximum of 13 degrees C.
- Year Round Minimum Criteria may not exceed 7-day average maximum of 18 degrees C.

Figure 4

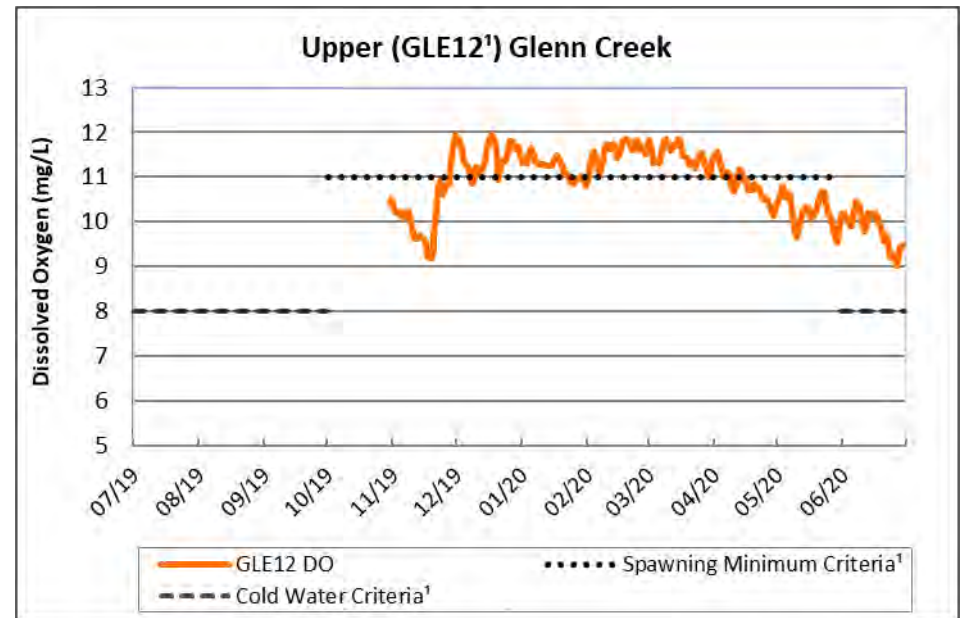
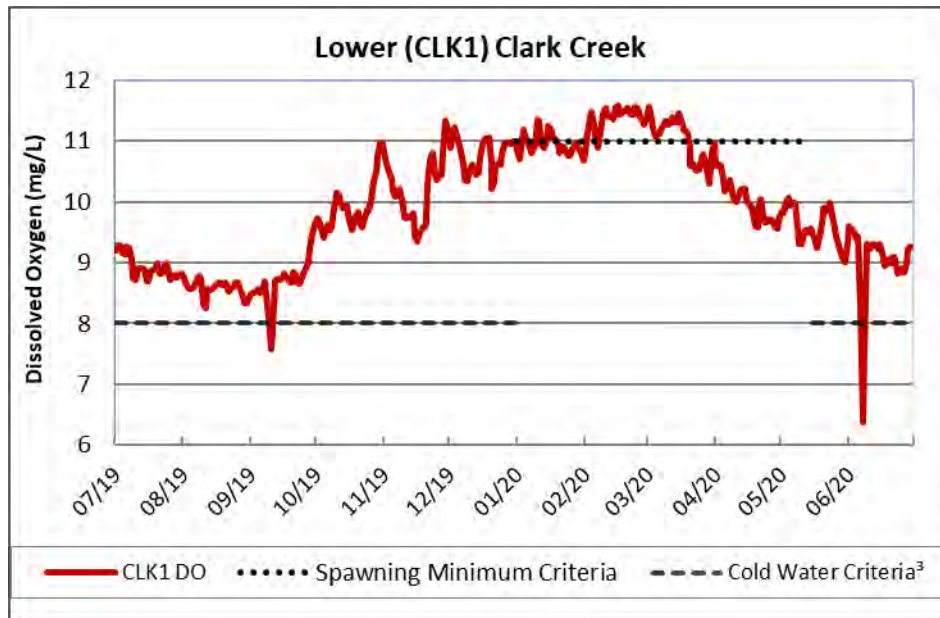
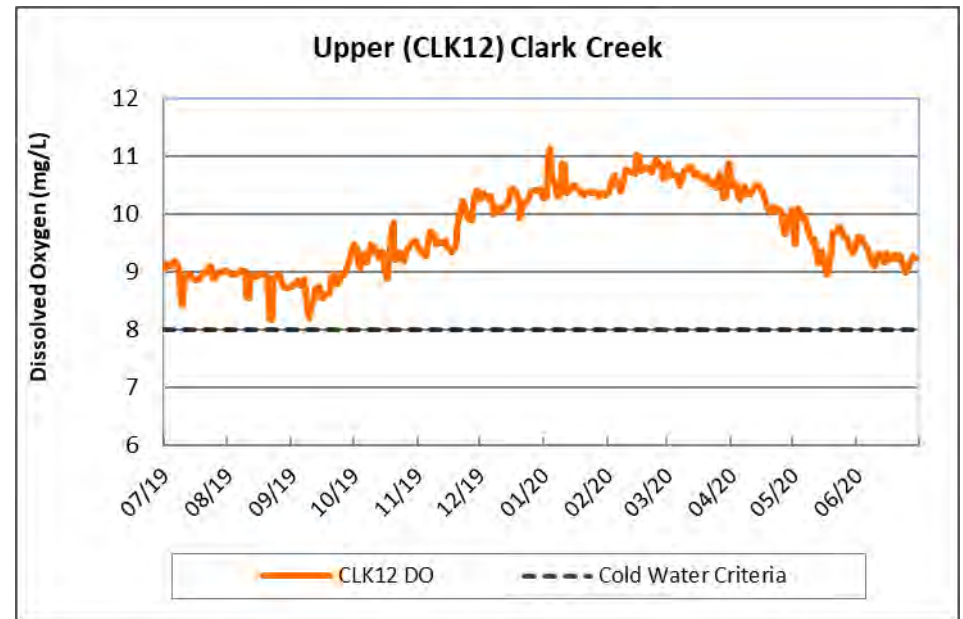
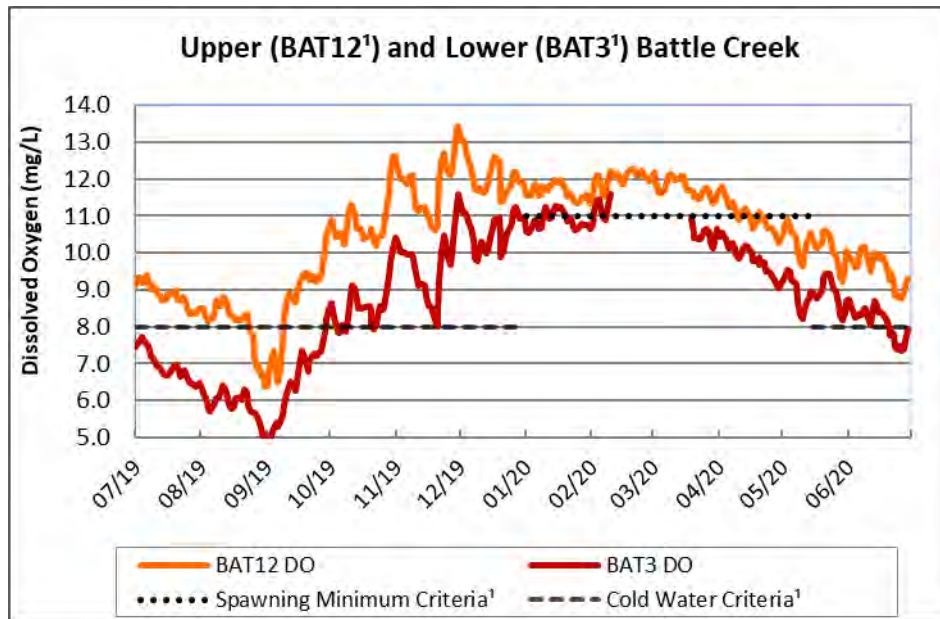
Continuous Instream Temperature 7-Day Moving Average Maximum (Reporting Year 2019/2020)



Presented temperature data consists of A grade data with greater than 80% of data points collected per day. Temperature criteria is defined in OAR 340--04100028 and OAR 340-0340, Tables 340A & B.

- Spawning Minimum Criteria for applicable streams may not exceed 7-day average maximum of 13 degrees C.
- Year Round Minimum Criteria may not exceed 7-day average maximum of 18 degrees C.

Figure 5
Continuous Instream Dissolved Oxygen Daily Mean (Reporting Year 2019/2020)

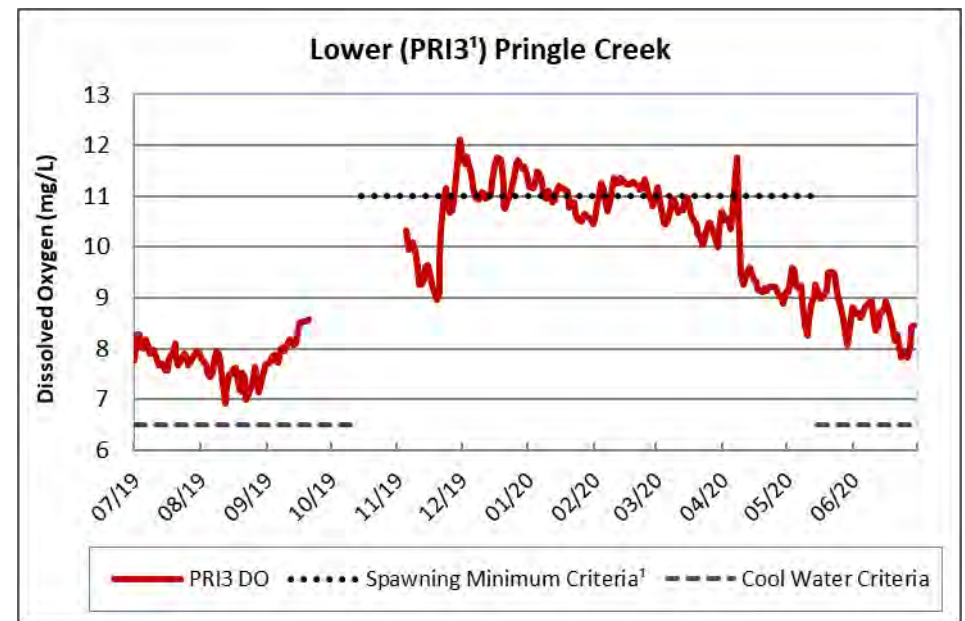
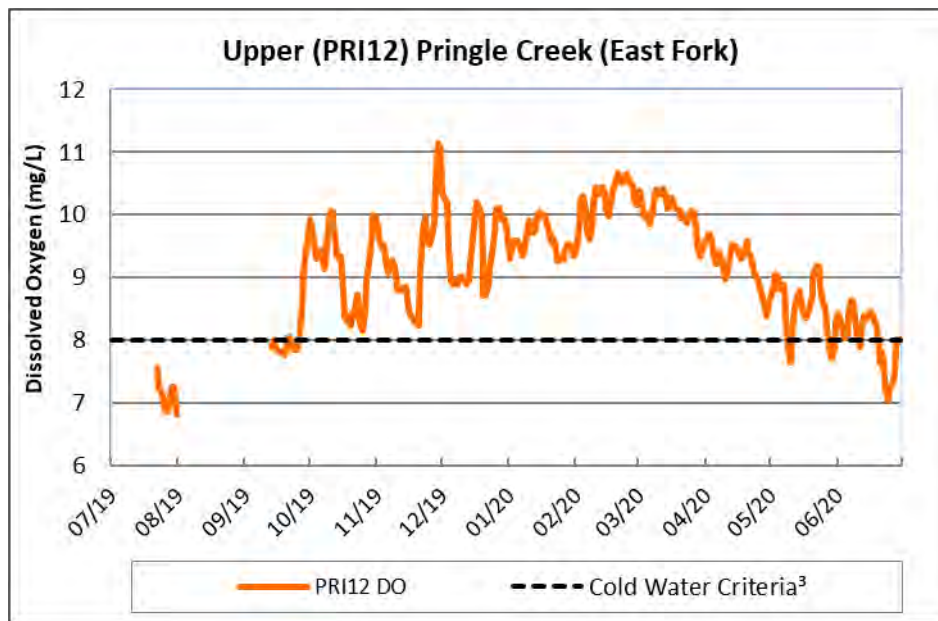
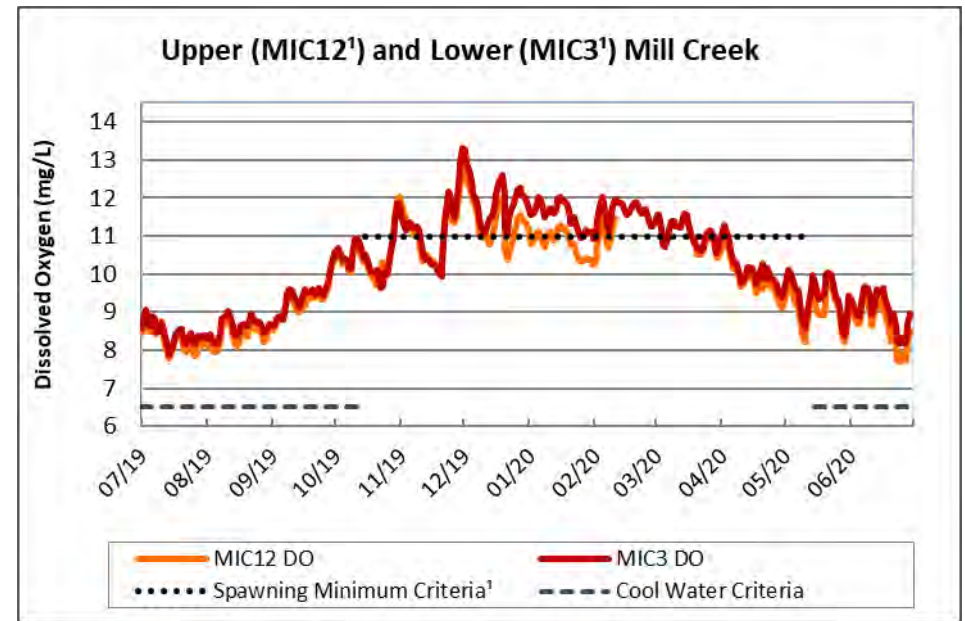
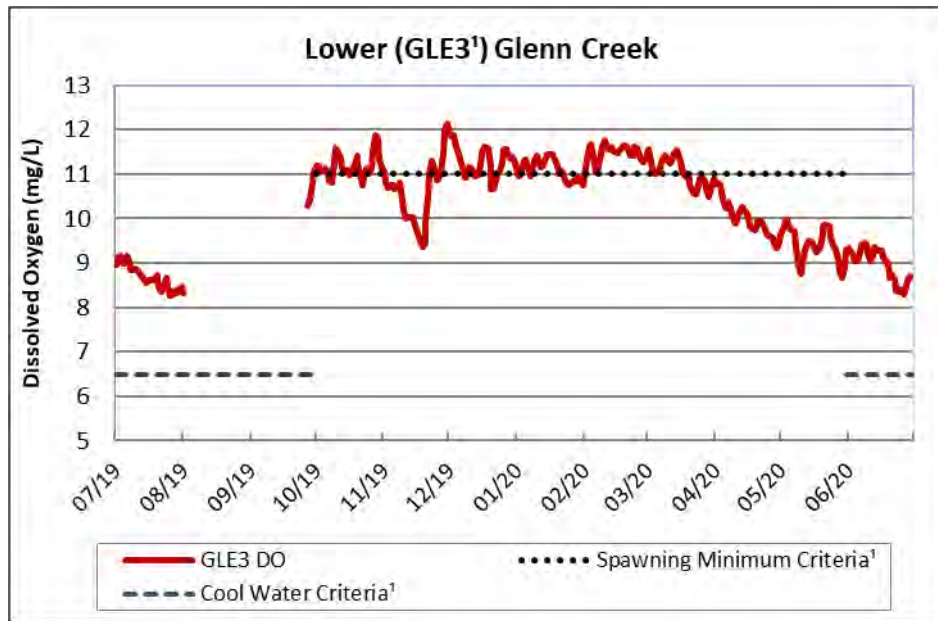


Presented DO data consists of A and B grade data with greater than or equal to 80% of data points collected per day. DO Criteria as defined in OAR 340-041-0016 and OAR 340-0340, Tables 340 A & B.

- Spawning Minimum Criteria for applicable streams may not be less than 11 mg/L.
- Oregon Cold Water Criteria for applicable streams may not be less than 8 mg/L.

¹ Oregon's 2012 Integrated Report Section 303(d) listed.

Figure 5
Continuous Instream Dissolved Oxygen Daily Mean (Reporting Year 2019/2020)

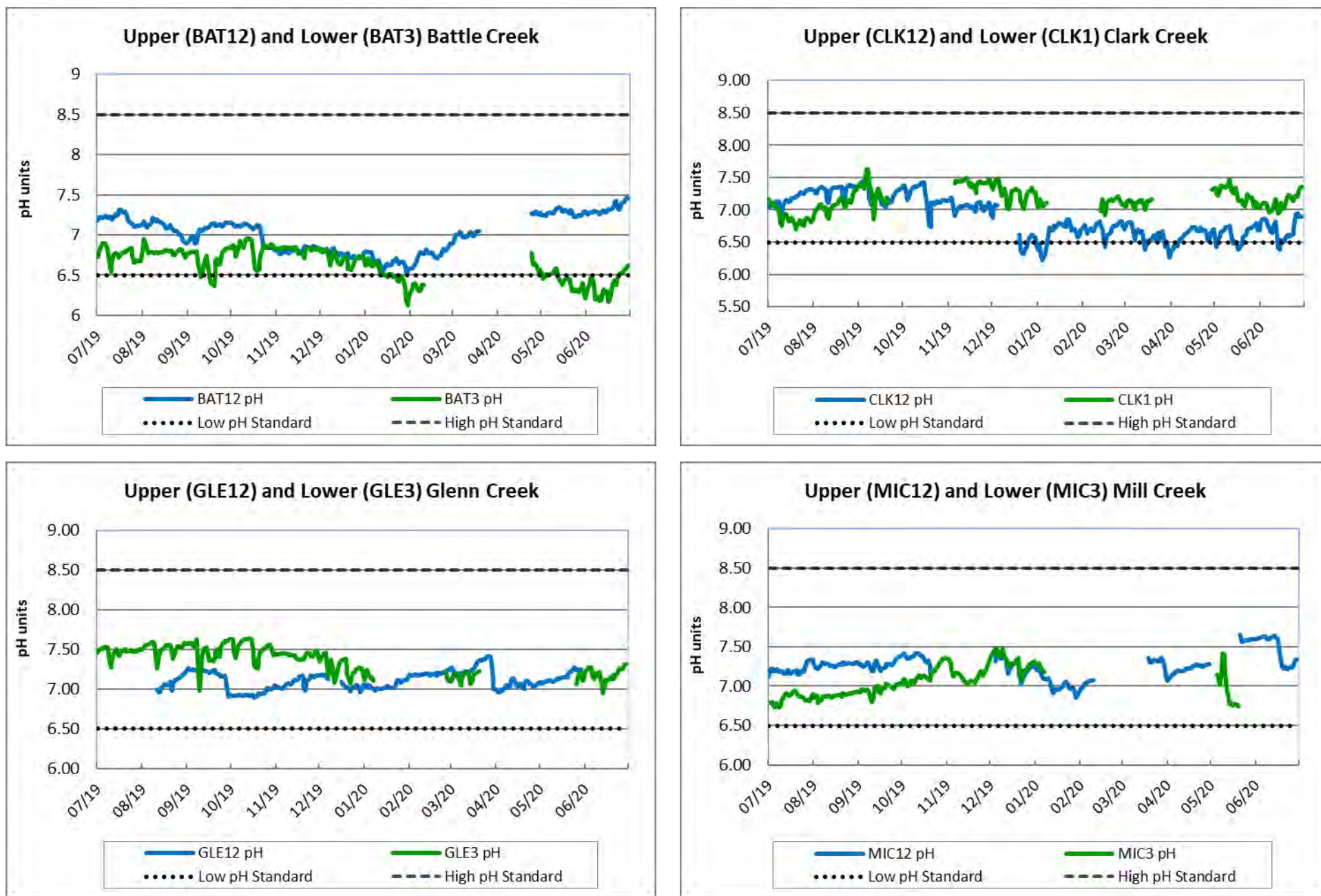


Presented DO data consists of A and B grade data with greater than or equal to 80% of data points collected per day. DO Criteria as defined in OAR 340-041-0016 and OAR 340-0340, Tables 340 A & B.

- Spawning Minimum Criteria for applicable streams may not be less than 11 mg/L.
- Oregon Cold Water Criteria for applicable streams may not be less than 8 mg/L.

¹ Oregon's 2012 Integrated Report Section 303(d) listed.

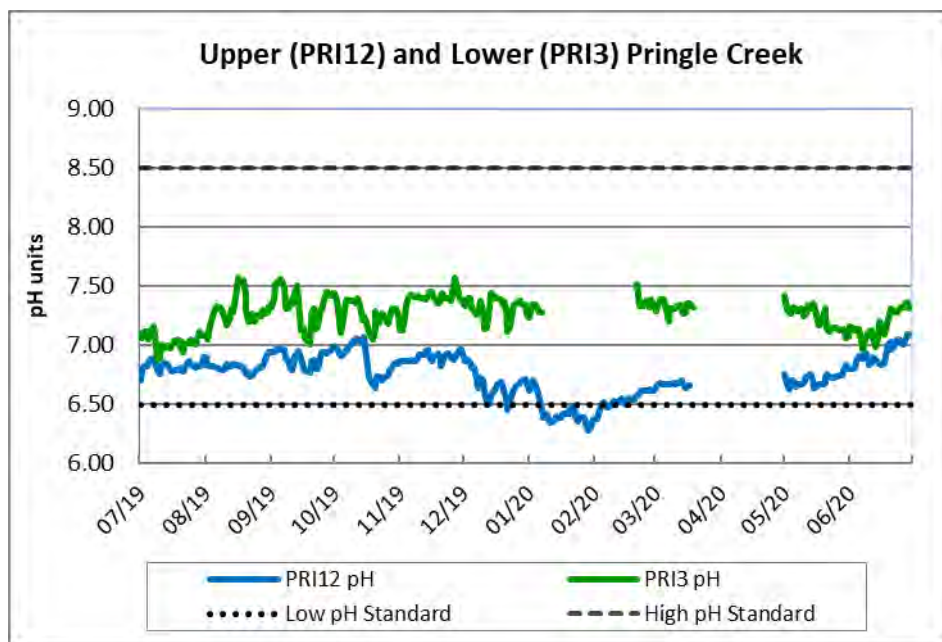
Figure 6
Continuous Instream pH Daily Mean (Reporting Year 2019/2020)



Presented pH data consist of A and B grade data with greater than or equal to 80% of data points collected per day.

As defined in OAR 341-041-0035 Water Quality Standards for the Willamette Basin, pH should not fall outside the ranges of 6.5 to 8.5 pH units.

Figure 6
Continuous Instream pH Daily Mean (Reporting Year 2019/2020)



Presented pH data consist of A and B grade data with greater than or equal to 80% of data points collected per day.

As defined in OAR 341-041-0035 Water Quality Standards for the Willamette Basin, pH should not fall outside the ranges of 6.5 to 8.5 pH units.

Figure 7
Total Rainfall by Month Across Salem (Reporting Year 2019/2020)

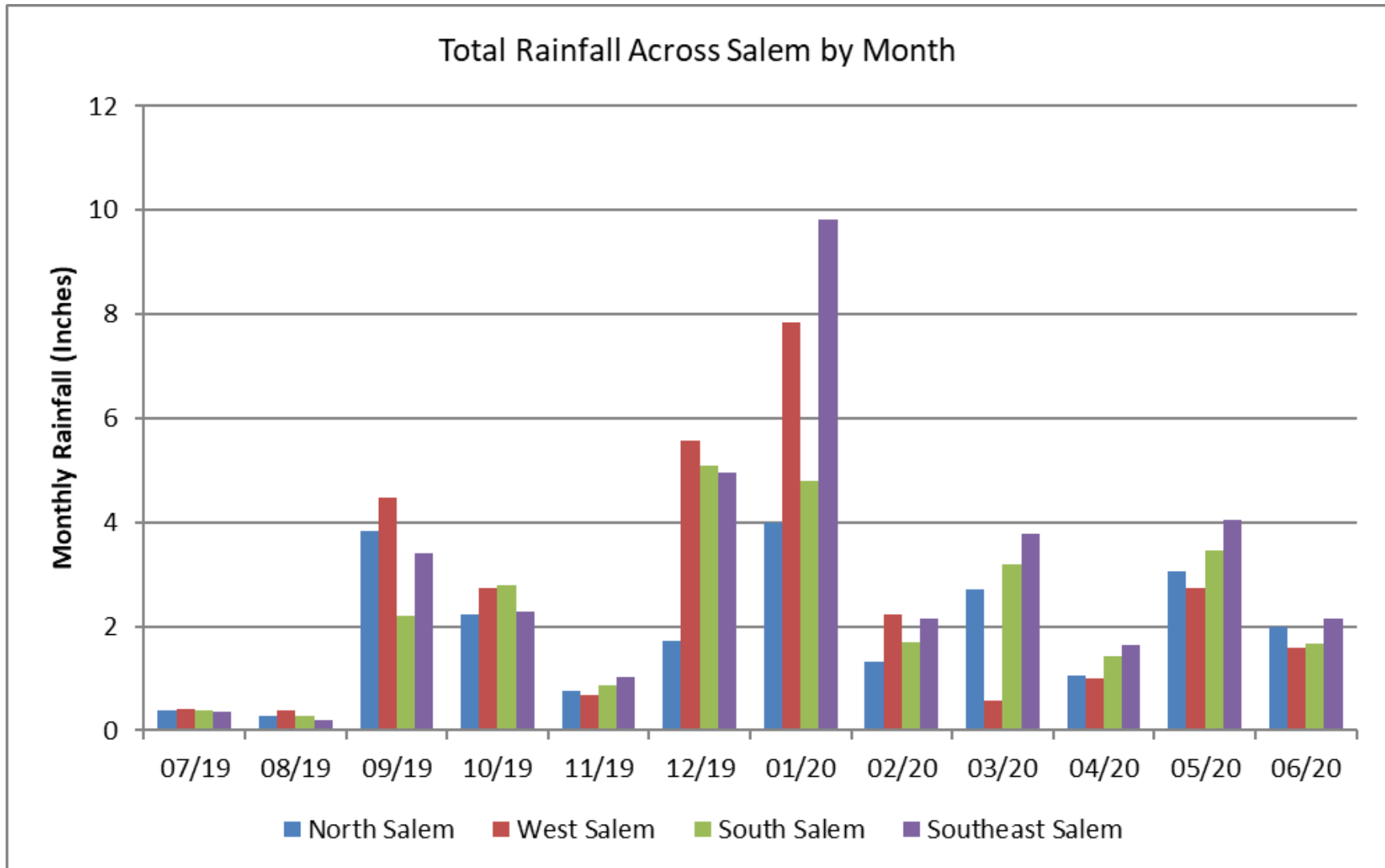


Table 1.
Completion of Table B-1 Environmental Monitoring Elements

Monitoring Type	# of sites	Total "Events" Needed	2011 / 2012	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017	2017 / 2018	2018 / 2019	2019 / 2020
Monthly Instream	21	48 / site	12 ¹	12 ¹	12 ¹	12 ¹	12 ¹	12 ¹	12 ¹	12 ¹	10 ³
Continuous Instream	10	On going	NA	NA	NA	NA	NA	NA	NA	NA	NA
Instream Storm	3	25 / site	6	6	5	4	4	1	2	5	3
Stormwater (MS4)	3	15 / site	4	4	4	1	2	1	0	4	2
Pesticides	3	4 / site	1	2	0	1	0	0	1	0	0
Mercury	2	2 / site / year	2	1	1	COMPLETE ²					
Macroinvertebrates	3	2 / site	1	1	0	0	0	0	1	0	0

¹ Due to no flow or access issues, several of the sites had less than 12 data collection events; however, all sites are on track to meet the minimum permit requirements.

² Following Table B-1 Special Condition #6 of the City's NPDES MS4 permit, the City requested and received approval from Department to eliminate the mercury and methyl mercury monitoring requirement after completing the required two years of monitoring.

³ Due to staffing issues related to COVID19 and flood threat, only 10 data collection events occurred.

Table 2.
Site Locations for Each Monitoring Element

Monthly Instream	
Site ID	Site Location
BAT 1	Commercial St SE
BAT 12	Rees Hill Rd SE
CGT 1	Mainline Dr NE
CGT 5	Hawthorne St NE @ Hyacinth St NE
CLA 1	Bush Park
CLA 10	Ewald St SE
CRO 1	Courthouse Athletic Club
CRO 10	Ballantyne Rd S
GIB 1	Wallace Rd NW
GIB 15	Brush College Rd NW
GLE 1	River Bend Rd NW
GLE 10	Hidden Valley Dr NW
LPW 1	Cordon Rd NE
MIC 1	Front St Bridge
MIC 10	Turner Rd SE
MRA 1	High St SE
MRA 10	Mill Race Park
PRI 1	Riverfront Park
PRI 5	Bush Park
SHE 1	Church St SE
SHE 10	State Printing Office
WR1	Sunset Park (Keizer)
WR5	Union St. Railroad Bridge
WR10	Halls Ferry Road (Independence)

Continuous Instream	
Site ID	Site Location
BAT3	Commercial St SE
BAT12	Lone Oak Rd SE
CLK1 ¹	Bush Park
CLK12	Ewald St SE
GLE3	Wallace Rd NW
GLE12	Hidden Valley Dr NW
LPW1 ²	Cordon Rd
MIC3	North Salem High School
MIC12	Turner Rd SE
PRI3 ¹	Pringle Park
PRI4 ²	Salem Hospital Footbridge
PRI12 ¹	Trelstad Ave SE
SHE3 ²	Winter St. Bridge
WAL3 ²	Wiltsey Rd SE

Stormwater / Pesticides / Mercury	
Site Id	Site Location
Electric ³	Electric St. SE and Summer St. SE
Hilfiker ³	Hilfiker Ln. SE and Commercial St. SE
Salem Industrial	Salem Industrial Dr. NE and Hyacinth St. NE

¹ Instream Storm sampling done at these sites. ² Stage-only gauging station. ³ Mercury monitoring conducted at these sites.

BAT = Battle Creek, CGT = Claggett Creek, CLA / CLK = Clark Creek, CRO = Croisan Creek, GIB = Gibson Creek, GLE = Glenn Creek, MIC = Mill Creek, MRA = Mill Race, PRI = Pringle Creek, SHE = Shelton Ditch, LPW = West Fork Little Pudding River, WR = Willamette River

Table 3.
Parameters for Each Monitoring Element

Parameter	Units	Monitoring Element			
		Instream Storm	Stormwater	Monthly Instream	Continuous Instream
Alkalinity	mg/L			x¹	
Biological Oxygen Demand (BOD _{stream})	mg/L	x		x	
Biological Oxygen Demand (BOD _{5day})	mg/L		x		
Specific Conductivity (Sp. Cond)	µS/cm	x	x	x	x
Copper (Total Recoverable and Dissolved)	mg/L	x	x	x²	
Dissolved Oxygen (DO)	mg/L	x	x	x	x
<i>E. coli</i>	MPN/100 mL	x	x	x	
Hardness	mg/L	x	x	x²	
Lead (Total Recoverable and Dissolved)	mg/L	x	x	x²	
Ammonia Nitrogen (NH ₃ -N)	mg/L	x	x	x¹	
Nitrate and Nitrite (NO ₃ -NO ₂)	mg/L	x	x	x	
pH	S.U.	x	x	x	x
Total Dissolved Solids (TDS)	mg/L			x¹	
Temperature	°C	x	x	x	x
Total Phosphorus (TP)	mg/L	x	x	x¹	
Ortho Phosphorus	mg/L	x	x		
Total Solids (TS)	mg/L			x¹	
Total Suspended Solids (TSS)	mg/L	x	x	x^{1, 3}	
Turbidity	NTU			x	x
Zinc (Total Recoverable and Dissolved)	mg/L	x	x	x²	

¹ Willamette River sites only (WR1, WR5, and WR10).

² Pringle Creek Watershed sites only (PRI1, PRI5, CLA1, and CLA10).

³ West Fork of Little Pudding River site only (LPW 1).

Table 4.
Water Quality Criteria for Monitored Streams

Parameter	Season	Criteria	Applicable Waterbody
Dissolved Oxygen	January 1-May 15	Spawning: Not less than 11.0 mg/L or 95% saturation	Battle Creek*, Claggett Creek*, Clark Creek* ³ , Croisan Creek*, Glenn Creek*, West Fork Little Pudding River*
	October 1- May 31	Spawning: Not less than 11.0 mg/L or 95% saturation	Gibson Creek* [□]
	October 15 - May 15	Spawning: Not less than 11.0 mg/L or 95% saturation	Mill Creek*, Pringle Creek* ¹ , Shelton Ditch*, Willamette River* ⁵
	Year Around (Non-spawning)	Cold water: Not less than 8.0 mg/L or 90% saturation	Battle Creek*, Croisan Creek*, Clark Creek, Glenn Creek* ⁴ , Pringle Creek ²
		Cool water: Not less than 6.5 mg/L	Claggett Creek*, Glenn Creek*, Mill Creek, Pringle Creek ¹ , Shelton Ditch, West Fork Little Pudding River, Willamette River* ⁶
pH	Year Around	Must be within the range of 6.5 to 8.5 pH units	All Monitoring Streams
Temperature	October 15 - May 15	Salmon and steelhead spawning: 13°C 7-day average maximum	Mill Creek, Shelton Ditch
	October 1- May 31	Salmon and steelhead spawning: 13°C 7-day average maximum	Gibson Creek [□]
	Year Around (Non-spawning)	Salmon and trout rearing and migration: 18°C 7-day average maximum	
			All Monitoring Streams
E. coli	Fall-Winter-Spring	30 day log mean of 126 E. coli organisms per 100 ml (or) no single sample > 406 organisms per 100 ml	All Monitoring Streams
	Summer	30 day log mean of 126 E. coli organisms per 100 ml (or) no single sample > 406 organisms per 100 ml	All Monitoring Streams
Biological Criteria	Year Around	Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.	Claggett Creek*, Clark Creek* ³ , Croisan Creek*, Glenn Creek*, Pringle Creek Trib*, Willamette River*
Copper	Year Around	Freshwater Acute and Chronic Criteria: 18 and 12 µg/L respectively with values calculated for a hardness of 100 mg/L	Pringle Creek*
Lead	Year Around	Freshwater Acute and Chronic Criteria: 82 and 3.2 µg/L respectively with values calculated for a hardness of 100 mg/L	Pringle Creek*, Willamette River*
Zinc	Year Around	Freshwater Acute and Chronic Criteria: 120 and 110 µg/L respectively with values calculated for a hardness of 100 mg/L	Pringle Creek*

Note: All waterbodies in this table are included under the Willamette Basin or Molalla-Pudding Subbasin TMDL for Temperature and E. coli.

* Oregon's 2012 Integrated Report Section 303(d) listed.

¹ Applies to Pringle Creek from river mile 0 to 2.6.

³ Applies to Clark Creek from river mile 0 to 1.9.

⁵ Applies to Willamette River from river mile 54.8 to 186.5

□ Gibson Creek is referred as Gibson Gulch in Oregon's 2012 Integrated Report.

² Applies to Pringle Creek from river mile 2.6 to 6.2.

⁴ Applies to Glenn Creek from river mile 4.1 to 7.

⁶ Applies to Willamette River from river mile 50.6 to 186.5

Table 5.
Median Values for Monthly Instream Sites (RY 2019/20)

Site ID	Number of Samples	Temperature (C)	DO (mg/L)	Sp. Cond (µS/cm)	Turbidity (NTUs)	pH (S.U.)	E. Coli (MPN/100 mL)	NO ₃ -NO ₂ (mg/L)	BOD _{stream} (mg/L)
BAT1	10	13.0	9.1	52.1	7.3	6.8	408.5	0.53	0.94
BAT12	10	12.7	10.4	47.6	5.4	7.2	154.5	0.36	0.86
CGT1	10	16.4	8.1	220.3	6.9	7.3	316.5	0.21	1.70
CGT5	7	14.8	8.3	166.4	9.7	7.4	586.0	0.25	1.55
CLA1	10	12.5	10.1	96.2	3.0	7.4	230.0	0.89	1.04
CLA10	10	13.4	9.4	72.2	2.4	6.9	775.0	1.47	0.93
CRO1	10	12.3	9.6	81.2	4.9	7.1	256.5	0.30	1.16
CRO10	10	11.8	9.5	61.0	5.3	7.0	41.5	0.23	0.85
GIB1	10	12.6	8.8	102.2	8.4	7.3	154.5	0.54	1.19
GIB15	10	12.3	9.8	99.5	6.8	7.3	75.5	0.89	1.04
GLE1	10	12.3	9.5	106.5	6.8	7.4	275.5	0.69	0.86
GLE10	9	10.4	10.3	66.9	5.4	7.3	96.0	0.42	0.71
LPW1	5	14.4	6.6	202.7	10.2	7.1	101.0	0.32	1.47
MIC1	10	14.2	9.9	73.7	4.1	7.4	187.5	0.74	1.07
MIC10	10	13.5	10.5	69.1	5.8	7.3	93.0	0.77	1.05
MRA1	10	13.5	10.5	69.2	6.2	7.5	220.0	0.58	1.06
MRA10	10	13.4	9.8	76.5	5.4	7.2	101.5	0.81	1.27
PRI1	10	13.4	10.3	78.5	6.0	7.4	76.0	0.84	1.12
PRI5	10	13.8	10.4	89.5	3.5	7.5	260.5	0.45	1.22
SHE1	10	13.2	10.5	75.1	5.7	7.4	74.0	0.86	1.21
SHE10	10	13.1	10.4	75.2	6.7	7.3	69.0	0.88	1.06
WR1	10	14.5	11.2	65.7	2.7	7.4	19.5	0.19	0.98
WR10	10	13.6	10.5	67.9	5.1	7.4	28.5	0.17	1.04
WR5	10	14.0	9.9	65.7	3.0	7.4	17.0	0.16	1.03

Table 6.
Number of Water Quality Criteria Exceedances for Monthly Instream Sites (RY 2019/20)

Site ID	Number of Samples	Dissolved Oxygen	pH	E. Coli ⁵			Copper ⁶		Lead ⁶		Zinc ⁶	
				Total #	Dry ²	Rain ³	Total	Dissolved	Total	Dissolved	Total	Dissolved
BAT 1	10	5	1	5	2	3						
BAT 12	10	2	1	1	0	1						
CGT 1	10	5	0	3	1	2						
CGT 5 ⁴	7	2	0	5	1	4						
CLA 1	10	1	0	4	0	4	0	0	0	0	0	0
CLA 10	10	0	0	5	2	3	1	1	0	0	0	0
CRO 1	10	4	0	3	0	3						
CRO 10	10	5	0	1	0	1						
GIB 1	10	4	0	1	0	1						
GIB 15	10	5	0	1	1	0						
GLE 1	10	1	0	3	1	2						
GLE 10 ⁴	9	1	0	1	0	1						
LPW 1 ⁴	5	4	1	2	1	1						
MIC 1	10	2	1	2	0	2						
MIC 10	10	1	1	0	0	0						
MRA 1	10	NA	0	1	0	1						
MRA 10	10	NA	0	0	0	0						
PRI 1	10	1	0	0	0	0	0	0	0	0	0	0
PRI 5	10	3	0	4	2	2	0	0	0	0	0	0
SHE 1	10	1	0	0	0	0						
SHE 10	10	2	0	0	0	0						
WR1	10	0	0	0	0	0						
WR5	10	3	0	0	0	0						
WR10	10	2	0	0	0	0						

Note: Copper, lead, and zinc collected at Pringle Creek Watershed sites only (PRI1, PRI5, CLA1, and CLA10).

NA = Not available (No dissolved oxygen water quality criteria associated with this waterbody).

¹ No year-round dissolved oxygen water quality criteria associated with this waterbody

³ Rain is ≥ 0.05 inches of rainfall in previous 24 hours.

⁵ Single sample criterion of > 406 organisms per 100 mL used.

² Dry is < 0.05 inches of rainfall in previous 24 hours.

⁴ Unable to sample all 12 due to lack of flow/too high of flow.

⁶ Exceedences calculated based on hardness concentration for each event.

Table 7.
Monthly Instream Data - Battlecreek (RY 2019/20)

Site Name:		BAT1							
Site Description:		Commercial St							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 10:55	17.3	6.88	55.7	8.69	6.48	649	0.294	1.39	0.095
8/20/2019 10:50	16.8	7.1	61.3	11.5	6.8	921	0.244	1.17	0.000
9/17/2019 11:18	14.5	7.39	58	12.1	6.85	1046	0.593	1.21	0.170
10/15/2019 11:25	9.8	9.25	58.2	7.65	7.08	579	0.327	0.82	0.000
11/14/2019 11:10	9.5	9.17	57.5	6.7	7.56	51	0.261	0.9	0.000
1/22/2020 11:40	8.9	10.73	47.4	6.2	6.51	64	1.363	0.68	0.233
2/18/2020 11:37	7.3	11.53	48.1	4.8	6.7	22	1.434	0.93	0.008
4/28/2020 10:35	12.5	10.03	47.1	5.7	6.79	172	0.736	0.95	0.065
5/26/2020 11:15	13.9	9	48.5	7.1	6.79	238	0.618	0.72	0.005
6/16/2020 10:45	13.5	8.94	47.1	7.4	6.58	763	0.473	1.2	0.180
Median	13.00	9.09	52.10	7.25	6.79	409	0.53	0.94	

Site Name:		BAT12							
Site Description:		Rees Hill Rd.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 10:25	17.6	8.59	55.3	10.7	7.06	260	0.227	0.86	0.095
8/20/2019 10:35	14.8	8.77	61.9	10.2	6.8	147	0.263	1.09	0.000
9/17/2019 11:00	13.8	9.03	62.9	10.8	7.18	1120	0.369	1.07	0.170
10/15/2019 11:10	9.3	11.05	52.4	8.08	7.23	162	0.206	0.76	0.000
11/14/2019 10:55	8.8	10.7	49.9	6.59	7.7	41	0.219	0.92	0.000
1/22/2020 11:15	8.4	10.83	45.2	4.3	6.43	12	1.693	0.72	0.233
2/18/2020 11:15	6.8	11.57	44.6	3	6.68	12	1.64	0.97	0.008
4/28/2020 10:15	12.1	10.62	42.3	3.6	7.26	167	0.822	0.52	0.065
5/26/2020 11:00	13.6	9.97	43.1	3.3	7.28	99	0.607	0.61	0.005
6/16/2020 10:20	13.2	10.15	44.2	4.3	7.3	313	0.359	0.85	0.180
Median	12.65	10.39	47.55	5.45	7.21	154.5	0.36	0.86	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Claggett Creek (RY 2019/20)

Site Name:		CGT1							
Site Description:		Mainline Dr S							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 13:10	23.2	9.26	231.6	3.07	7.41	512	0.093	1.99	0.095
8/20/2019 12:21	21.4	0.71	319.9	8.28	7.11	>24196	< 0.050		0.000
9/17/2019 13:05	16.9	7.19	153.2	6.72	7.07	402	0.145	1.76	0.170
10/15/2019 13:05	13.8	7.33	243.5	4.96	6.96	529	0.067	1.48	0.000
11/14/2019 13:00	10.9	4.8	254.3	4	7.25	31	0.219	2.42	0.000
1/22/2020 13:15	8.4	10.16	184.2	9.1	6.89	231	1.195	1.36	0.233
2/18/2020 13:30	8.7	10.59	211	8.9	7.48	216	0.95	1.61	0.008
4/28/2020 12:20	16.3	7.56	212.6	5.9	7.43	146	0.305	1.7	0.065
5/26/2020 13:05	18.2	NA	229.6	8.9	7.43	197	0.196	1.54	0.005
6/16/2020 12:10	16.5	8.06	167.6	7.1	7.36	1017	0.217	2.44	0.180
Median	16.40	7.56	221.10	6.91	7.31	231	0.22	1.70	

Site Name:		CGT5							
Site Description:		Hawthorne Ave							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 12:52	19	7.57	172.3	13.5	7.29	988	0.087	2.07	0.095
8/20/2019 12:05	No Flow								0.000
9/17/2019 12:50	15.1	8.22	9.68	9.65	7.15	627	0.249	1.5	0.170
10/15/2019 12:50	No Flow								0.000
11/14/2019 12:55	No Flow								0.000
1/22/2020 13:00	8.9	10.37	155.3	10.9	6.83	7701	1.359	1.55	0.233
2/18/2020 13:20	8	12.45	188.3	4.8	7.8	228	1.187	1.48	0.008
4/28/2020 12:05	14.8	8.33	166.4	5.6	7.55	41	0.159	1.66	0.065
5/26/2020 12:42	16.2	7.37	263.2	4.8	7.51	586	0.185	1.27	0.005
6/16/2020 11:50	14.8	8.39	116.6	17	7.35	441	0.376	2.02	0.180
Median	14.80	8.33	166.40	9.65	7.35	668	0.25	1.55	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Clark Creek (RY 2019/20)

Site Name: CLA1									
Site Description: Bush Park									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:45	17.3	9.08	96.1	2.56	7.37	548	0.744	1.03	0.095
8/20/2019 9:45	17.3	9.06	96.3	3.33	7.36	259	0.597	1.12	0.000
9/17/2019 10:10	16.3	9.15	84.3	12.3	7.39	910	0.838	1.94	0.170
10/15/2019 10:25	11.7	10.48	87.2	2.48	7.52	20	0.612	0.77	0.000
11/14/2019 10:10	11.1	10.2	101.7	1.4	7.52	199	0.541	1.04	0.000
1/22/2020 10:45	10.1	11	86.6	6.2	7.34	201	1.401	1.04	0.233
2/18/2020 10:45	8.6	11.49	97.7	2.9	7.46	121	1.625	1.52	0.008
4/21/2020 11:00	11.6	10.60	96.6	1.5	7.44	30	0.944	0.84	0.000
5/19/2020 9:35	13.3	10.09	98	4.1	7.47	441	1.485	0.87	0.770
6/16/2020 10:20	14.2	9.74	88.1	3.1	6.94	839	1.08	1.13	0.180
Median	12.50	10.15	96.20	3.00	7.42	366	0.89	1.04	

Site Name: CLA1							
Site Description: Bush Park							
Collection Date/Time	Total Cop- per (mg/L)	Dissolved Copper (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/ L)	Total Zinc (mg/L)	Dissolved Zinc (mg/L)	Hardness
7/16/2019 9:45	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0079	0.0067	30
8/20/2019 9:45	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0067	0.0073	30
9/17/2019 10:10	0.0038	0.0032	< 0.0005	< 0.0005	0.0193	0.0137	25
10/15/2019 10:25	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0047	0.0043	26
11/14/2019 10:10	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0059	0.0052	33
1/22/2020 10:45	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.02	0.0175	26
2/18/2020 10:45	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0142	0.0119	29
4/21/2020 11:00	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0113	0.0111	30
5/19/2020 9:35	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0132	0.0115	32
6/16/2020 10:20	0.0027	0.0025	< 0.0010	< 0.0005	0.0192	0.0171	28
Median	NA	NA	NA	NA	0.0123	0.0113	30

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

NA= Medians not calculated for copper and lead due to the large number of censored values.

Table 7.
Monthly Instream Data - Clark Creek (RY 2019/20)

Site Name: CLA10									
Site Description: Ewald Ave									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:30	15.6	9.17	75	2.04	6.81	1333	1.542	0.94	0.095
8/20/2019 9:40	16.1	9.13	76	5.3	7.13	959	1.319	1.13	0.000
9/17/2019 10:00	15.5	8.5	56.8	2.28	7.09	1314	0.872	2.96	0.170
10/15/2019 9:55	13.3	9.72	72.4	2.41	7.38	591	1.416	0.7	0.000
11/14/2019 9:45	12.4	9.51	72	1.78	7.86	1664	1.295	0.84	0.000
1/22/2020 10:15	10.8	10.29	69.8	7.3	6.54	158	1.87	1.07	0.233
2/18/2020 10:20	10.2	10.73	74.5	1.4	6.82	233	2.031	0.92	0.008
4/28/2020 9:15	12.3	10.05	72	2.9	6.88	110	1.651	0.7	0.065
5/26/2020 10:00	13.5	9.26	72.4	2.3	6.8	146	1.517	0.64	0.005
6/16/2020 9:25	13.9	9.17	70.6	7.1	6.67	1539	1.342	1.11	0.180
Median	13.40	9.39	72.20	2.36	6.85	775	1.47	0.93	

Site Name: CLA10							
Site Description: Ewald Ave							
Collection Date/Time	Total Cop-per (mg/L)	Dissolved Copper (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/L)	Total Zinc (mg/L)	Dissolved Zinc (mg/L)	Hardness
7/16/2019 9:30	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0068	0.0067	21
8/20/2019 9:40	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.007	0.007	21
9/17/2019 10:00	0.0062	0.0042	0.0007	< 0.0005	0.023	0.0142	17
10/15/2019 9:55	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0051	0.005	20
11/14/2019 9:45	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0052	0.0048	20
1/22/2020 10:15	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0158	0.0128	21
2/18/2020 10:20	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.013	0.0139	20
4/28/2020 9:15	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0242	0.0229	19
5/26/2020 10:00	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0123	0.011	22
6/16/2020 9:25	0.0029	< 0.0025	0.0006	< 0.0005	0.0207	0.0142	21
Median	NA	NA	NA	NA	0.0127	0.0119	20.50

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

NA= Medians not calculated for copper and lead due to the large number of censored values.

Table 7.
Monthly Instream Data - Croisan Creek (RY 2019/20)

Site Name: CRO1 Site Description: River Rd S									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:50	16.8	7.35	89.8	4.8	7	411	0.306	1.25	0.095
8/20/2019 10:00	17.3	5.11	102.1	5.4	7.13	345	0.19	1.24	0.000
9/17/2019 10:25	14.1	7.18	92.5	6.72	6.99	411	0.415	1.24	0.170
10/15/2019 10:25	8.3	10.5	91.8	3.89	7.12	187	0.231	1.05	0.000
11/14/2019 10:02	8.3	9.75	86.1	2.48	7.32	122	0.158	1.05	0.000
1/22/2020 10:30	8.5	11.34	62.6	5.8	6.54	58	1.179	1.16	0.233
2/18/2020 10:45	6.4	12.23	62	5	7.22	44	1.106	1.31	0.008
4/28/2020 9:30	11.6	10.18	68.4	4.7	7.23	31	0.347	1.02	0.065
5/26/2020 10:25	13.1	9.29	72	3.6	7.1	326	0.3	0.89	0.005
6/16/2020 9:45	13	9.42	76.2	5.4	7.18	908	0.283	1.16	0.180
Median	12.30	9.59	81.15	4.90	7.13	257	0.30	1.16	

Site Name: CRO10 Site Description: Ballantyne Rd.									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 10:10	16.5	7.75	70.2	8.8	6.94	488	0.287	0.98	0.095
8/20/2019 10:18	16.4	6.51	77	7.63	7.11	79	0.085	0.98	0.000
9/17/2019 10:45	14.2	7.66	79.1	11.1	7.05	272	0.201	1.31	0.170
10/15/2019 10:45	10.1	9.5	69.6	6.1	7.08	58	0.176	0.82	0.000
11/14/2019 10:30	8.5	10.05	64.6	4.46	7.46	9	0.164	0.88	0.000
1/22/2020 10:50	8.3	10.99	49.6	4.3	6.62	13	1.248	0.78	0.233
2/18/2020 11:00	6.7	11.65	48.2	3.6	7.37	4	1.147	1.17	0.008
4/28/2020 9:45	11.2	10.17	50.1	3.9	6.93	18	0.369	0.68	0.065
5/26/2020 10:40	12.8	8.88	53	4.6	6.77	31	0.238	0.47	0.005
6/16/2020 10:00	12.4	9.43	57.4	5.9	6.75	52	0.217	0.56	0.180
Median	11.80	9.47	61.00	5.25	7.00	42	0.23	0.85	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Gibson Creek (RY 2019/20)

Site Name: GIB1 Site Description: Wallace Rd.									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 11:05	18.3	7.43	104.7	6.22	7.47	2420	0.352	1.29	0.095
8/20/2019 10:40	18.8	6.04	114.2	9.5	7.14	155	0.301	1.4	0.000
9/17/2019 11:15	15.5	7.22	106.7	11.1	7.2	160	0.514	1.22	0.170
10/15/2019 12:05	9.8	8.63	107.2	6.67	7.37	344	0.386	0.84	0.000
11/14/2019 11:28	9.5	8.6	108.7	11.4	7.3	101	0.422	1.02	0.000
1/22/2020 11:50	8.8	11.23	78.6	8.1	7.31	38	1.773	0.98	0.233
2/18/2020 12:05	6.5	11.95	81.9	6.4	7.44	25	1.69	1.47	0.008
4/21/2020 12:30	12.2	10.17	87.1	4.9	7.36	154	0.91	1.17	0.000
5/19/2020 10:25	12.9	9.36	94.3	11.1	7.32	248	0.761	1.21	0.770
6/16/2020 11:20	14.3	9.01	99.7	8.6	7.29	63	0.573	1.07	0.180
Median	12.55	8.82	102.20	8.35	7.32	154.5	0.54	1.19	

Site Name: GIB15 Site Description: Brush College Rd.									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 11:25	18.8	8.1	105.1	6.14	7.36	326	0.616	0.99	0.095
8/20/2019 11:05	17.3	8.39	113.9	7.45	7.31	>2420	0.252	1.02	0.000
9/17/2019 11:30	14.9	8.43	111.6	5.7	7.29	201	0.459	1.06	0.170
10/15/2019 12:20	9.5	10.41	106.8	7.39	7.49	156	0.631	1.05	0.000
11/14/2019 11:40	8.3	9.94	108.5	3.33	7.26	10	0.852	0.9	0.000
1/22/2020 12:00	8.9	10.97	77.5	10.1	7	10	1.883	1.41	0.233
2/18/2020 12:15	7.2	11.45	82.1	7.5	7.21	8	1.886	1.23	0.008
4/21/2020 12:51	11.8	10.4	85.7	5.2	7.26	9	1.414	1.23	0.000
5/19/2020 10:40	12.8	9.7	90.6	8.1	7.23	88	1.153	0.88	0.770
6/16/2020 11:30	14.1	9.41	93.8	4.1	7.08	63	0.92	0.74	0.180
Median	12.30	9.82	99.45	6.77	7.26	345	0.89	1.04	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Glenn Creek (RY 2019/20)

Site Name:		GLE1							
Site Description:		River Bend Rd.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 10:45	17.3	7.94	117.7	10.3	7.37	770	0.522	1.45	0.095
8/20/2019 10:30	16.8	7.84	128.9	7.49	7.31	326	0.495	0.96	0.000
9/17/2019 10:48	15.4	8.83	106.9	7.37	7.33	435	0.662	0.9	0.170
10/15/2019 11:50	10.1	8.3	117.6	6.96	7.43	109	0.43	0.77	0.000
11/14/2019 11:12	9.6	9.52	119.8	3.6	7.45	461	0.27	0.91	0.000
1/22/2020 11:40	9.3	11.1	83.2	6.6	7.23	128	1.543	0.68	0.233
2/18/2020 11:50	7.2	11.81	89.6	5.7	7.42	128	1.444	1.25	0.008
4/21/2020 12:10	11.8	10.55	96.1	4.4	7.51	291	0.713	0.76	0.000
5/19/2020 10:13	12.8	9.95	95.7	9.2	7.42	260	0.928	0.81	0.770
6/16/2020 11:00	13.8	9.54	106.1	5.4	7.22	120	0.878	0.81	0.180
Median	12.30	9.53	106.50	6.78	7.40	276	0.69	0.86	

Site Name:		GLE10							
Site Description:		Hidden Valley Dr.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 11:40	16.4	8.97	75.5	5.43	7.25	>2420	0.275	0.96	0.095
8/20/2019 11:15	No Flow								0.000
9/17/2019 12:00	14.4	8.85	71.4	2.49	7.32	99	0.078	0.56	0.170
10/15/2019 12:35	10.4	10.21	74.4	1.87	7.48	74	0.108	0.71	0.000
11/14/2019 12:00	8.6	10.02	70.5	1.39	7.23	13	0.159	0.87	0.000
1/22/2020 12:15	8.6	11.35	54.9	13.8	7.1	45	1.404	0.69	0.233
2/18/2020 12:25	7.6	11.6	56	10.1	7.32	105	1.235	1	0.008
4/21/2020 13:06	10.4	10.76	57.1	4	7.48	23	0.623	0.55	0.000
5/19/2020 11:05	11.5	10.46	65.6	21.1	7.34	140	0.554	0.71	0.770
6/16/2020 11:50	13.6	10.33	66.9	9.8	7.31	96	0.424	0.57	0.180
Median	10.40	10.33	66.90	5.43	7.32	85	0.42	0.71	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - West Fork Little Pudding River (RY 2019/20)

Site Name: LPW1										
Site Description: Cordon Rd.										
Collection Date/ Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/ cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/ L)	BOD (mg/ L)	Rainfall previous 24 hrs	TSS
7/16/2019 12:00	No Flow								0.095	
8/20/2019 11:58	No Flow								0.000	
9/17/2019 12:01	15.2	5.56	84.1	10.2	7.08	461	0.121	1.62	0.170	6.20
10/15/2019 9:25	No Flow								0.000	
11/14/2019 12:45	No Flow								0.000	
1/22/2020 12:20	8.6	10.17	202.7	20.3	6.49	96	3.721	1.03	0.233	37.30
2/18/2020 13:00	7.6	12.34	232.8	18.4	7.34	61	3.296	1.47	0.008	30.90
4/28/2020 11:45	14.4	6.55	251.6	7.5	7.28	101	0.32	1.78	0.065	5.40
5/26/2020 12:00	No Flow								0.005	
6/16/2020 11:30	14.4	5.83	155.8	8.7	7	148	0.206	1.25	0.180	6.20
Median	14.40	6.55	202.70	10.20	7.08	101	0.32	1.47		6.2

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Mill Creek (RY 2019/20)

Site Name:		MIC1							
Site Description:		Front St.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 8:40	19	8.86	61.4	3.88	6.88	78	0.392	1.15	0.095
8/20/2019 8:50	18.3	9.11	50	3.94	7.26	397	0.112	1.14	0.000
9/17/2019 9:07	14.1	9.76	66.5	6.72	6.93	435	0.651	0.92	0.170
10/15/2019 9:00	10.4	11.15	58.6	2.42	6.88	167	0.145	0.79	0.000
11/14/2019 9:01	9.8	10.94	88.1	1.65	8.02	248	0.385	1.1	0.000
1/22/2020 9:40	8	11.67	111.1	16.5	6.4	99	3.794	1.07	0.233
2/18/2020 9:40	6.6	12.27	105.5	6.6	7.49	70	3.589	1.32	0.008
4/28/2020 8:45	14.3	9.93	73.6	4.1	7.54	197	1.008	1.06	0.065
5/26/2020 9:15	15	NA	73.7	4	7.59	178	0.827	0.86	0.005
6/16/2020 8:35	14.4	9.83	77.2	10.6	7.44	683	1.589	1.03	0.180

Median	14.20	9.93	73.65	4.05	7.35	187.5	0.74	1.07	
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Site Name:		MIC10							
Site Description:		Turner Rd							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 11:30	18.3	9.51	56.2	5.97	7.04	114	0.395	1.33	0.095
8/20/2019 11:35	17.7	9.84	53.9	5.13	7.04	135	0.2	1.63	0.000
9/17/2019 11:40	13.6	9.93	60.9	7.68	7.06	135	0.595	1.16	0.170
10/15/2019 11:50	10.2	11.84	54.7	2.25	7.32	32	0.158	0.75	0.000
11/14/2019 12:25	10.4	11.88	74.5	2.58	7.88	23	0.436	0.92	0.000
1/22/2020 12:00	8	11.03	109.1	13.6	6.39	63	3.974	0.72	0.233
2/18/2020 12:06	6.6	12.13	98.7	5.9	7.26	33	3.652	1.22	0.008
4/28/2020 11:00	13.3	10.7	69.2	5.6	7.51	84	0.969	1	0.065
5/26/2020 11:35	14.6	9.9	68.9	4.6	7.46	102	0.945	0.79	0.005
6/16/2020 11:10	13.8	10.27	75.1	9.1	7.35	388	1.609	1.09	0.180

Median	13.45	10.49	69.05	5.75	7.29	93	0.77	1.05	
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Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Mill Race (RY 2019/20)

Site Name:		MRA1							
Site Description:		High St.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:20	19.4	9.1	57.6	6.22	7.42	156	0.374	1.31	0.095
8/20/2019 9:30	18.7	9.29	47.7	6.26	7.42	365	0.099	1.19	0.000
9/17/2019 9:45	14.7	9.99	63.1	12.3	7.38	261	0.559	1.06	0.170
10/15/2019 10:00	10.4	11.1	56.6	2.94	7.58	179	0.129	0.84	0.000
11/14/2019 9:45	9.6	11.21	77.6	2.63	7.52	156	0.37	1.07	0.000
1/22/2020 10:10	7.7	11.48	106.2	8.2	7.22	24	3.692	0.78	0.233
2/18/2020 10:20	6.5	12.39	102	7	7.59	93	3.51	1.21	0.008
4/21/2020 10:33	13.3	10.79	77.7	2.7	7.71	326	1.036	1.06	0.000
5/19/2020 9:25	13.7	10.26	75.3	6.3	7.53	308	1.191	1.04	0.770
6/16/2020 9:35	14.2	9.36	62	3.6	7.38	663	0.61	0.95	0.180

Median	13.50	10.53	69.20	6.24	7.47	220	0.58	1.06	
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Site Name:		MRA10							
Site Description:		19th St.							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO₃-NO₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 8:50	19.2	8.49	58.4	4.41	7.18	83	0.451	1.32	0.095
8/20/2019 8:55	18.4	8.91	47.9	3.71	7.28	67	0.081	1.25	0.000
9/17/2019 9:10	14.5	9.49	62.3	6.32	7.06	120	0.544	1.15	0.170
10/15/2019 9:20	10.3	10.63	56.3	2.13	7.41	70	0.129	0.92	0.000
11/14/2019 9:00	9.5	10.2	78.1	1.97	7.47	155	0.414	0.97	0.000
1/22/2020 9:40	7.9	11.5	110.1	15.5	7.1	124	3.838	1.55	0.233
2/18/2020 9:50	6.4	12.12	102.1	7.1	7.44	41	3.632	1.29	0.008
4/21/2020 10:00	13.4	9.85	80.5	3.5	7.45	83	1.067	1.16	0.000
5/19/2020 8:45	13.3	9.77	76.9	8.3	7.09	276	1.167	1.34	0.770
6/16/2020 8:50	14.3	9.26	76.1	7.9	7.09	246	1.788	1.31	0.180

Median	13.35	9.81	76.50	5.37	7.23	101.5	0.81	1.27	
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Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Pringle Creek (RY 2019/20)

Site Name: PRI1									
Site Description: Waterfront Park									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:05	19.2	8.49	58.4	4.41	7.18	52	0.396	1.38	0.095
8/20/2019 9:15	18.5	9.24	50.9	3.14	7.28	49	0.073	1.19	0.000
9/17/2019 9:30	14.9	9.8	63.4	7.63	7.35	219	0.579	1.05	0.170
10/15/2019 9:40	10.5	11.03	58.3	2.23	7.51	101	0.135	1	0.000
11/14/2019 9:16	9.6	11.02	78.1	1.79	7.53	39	0.331	1.27	0.000
1/22/2020 9:55	8.1	11.63	107.3	14.1	7.18	71	3.716	0.89	0.233
2/18/2020 10:05	6.6	12.16	101.6	8.1	7.52	46	3.321	1.26	0.008
4/21/2020 10:15	13.5	10.48	80.1	3.9	7.64	81	1.095	0.95	0.000
5/19/2020 9:00	13.3	10.11	79.9	8.5	7.45	205	1.093	1.24	0.770
6/16/2020 9:10	14.4	10.01	78.9	10.3	7.35	388	1.578	1.05	0.180
Median	13.40	10.30	78.50	6.02	7.40	76	0.84	1.12	

Site Name: PRI1							
Site Description: Waterfront Park							
Collection Date/Time	Total Cop-per (mg/L)	Dissolved Copper (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/L)	Total Zinc (mg/L)	Dissolved Zinc (mg/L)	Hardness
7/16/2019 9:05	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	21
8/20/2019 9:15	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	17
9/17/2019 9:30	0.0025	< 0.0025	< 0.0005	< 0.0005	0.0042	< 0.0025	24
10/15/2019 9:40	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	21
11/14/2019 9:16	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	28
1/22/2020 9:55	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0048	0.0031	36
2/18/2020 10:05	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	35
4/21/2020 10:15	< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	29
5/19/2020 9:00	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0044	< 0.0025	28
6/16/2020 9:10	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.004	< 0.0025	30
Median	NA	NA	NA	NA	NA	NA	28

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

NA= Medians not calculated for copper and lead due to the large number of censored values.

Table 7.
Monthly Instream Data - Pringle Creek (RY 2019/20)

Site Name: PRI5									
Site Description: Bush Park									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:50	19.7	8.41	86.7	3.28	7.47	285	0.281	1.33	0.095
8/20/2019 9:55	19.3	8.5	93	3.11	7.44	236	0.26	1.19	0.000
9/17/2019 10:15	16.8	9.02	82.1	7.05	7.38	548	0.405	1.24	0.170
10/15/2019 10:30	9.8	10.94	86.7	3.48	7.52	1986	0.482	0.72	0.000
11/14/2019 10:17	9.3	10.71	89.8	2.53	7.5	687	0.412	1.13	0.000
1/22/2020 10:50	8.9	11.35	59	6.7	7.25	162	1.416	0.89	0.233
2/18/2020 10:55	7.4	12.21	96.4	4.8	7.68	39	1.284	1.3	0.008
4/21/2020 11:05	13.4	10.72	92.9	1.9	7.72	34	0.904	1.16	0.000
5/19/2020 9:40	14.2	10.06	89.2	5.9	7.51	411	0.644	1.72	0.770
6/16/2020 10:30	16.4	9.66	94.8	3.6	7.74	97	0.406	1.32	0.180
Median	13.80	10.39	89.50	3.54	7.51	260.5	0.45	1.22	

Site Name: PRI5							
Site Description: Bush Park							
Collection Date/Time	Total Cop-per (mg/L)	Dissolved Copper (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/L)	Total Zinc (mg/L)	Dissolved Zinc (mg/L)	Hardness
7/16/2019 9:50	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0046	0.0032	32
8/20/2019 9:55	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0036	0.0026	33
9/17/2019 10:15	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0071	0.0046	28
10/15/2019 10:30	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0029	0.0026	28
11/14/2019 10:17	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0038	0.0028	31
1/22/2020 10:50	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0181	0.0148	31
2/18/2020 10:55	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0078	0.0055	34
4/21/2020 11:05	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0043	0.0039	32
5/19/2020 9:40	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0084	0.0045	32
6/16/2020 10:30	< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0062	< 0.0025	36
Median	NA	NA	NA	NA	0.0054	0.0039	32.00

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

NA= Medians not calculated for copper and lead due to the large number of censored values.

Table 7.
Monthly Instream Data - Shelton Ditch (RY 2019/20)

Site Name: SHE1									
Site Description: Church St.									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:30	19.1	8.92	58.7	4.65	7.36	50	0.461	1.33	0.095
8/20/2019 9:35	18.4	9.23	49.2	4.08	7.45	70	0.125	1.25	0.000
9/17/2019 10:00	14.6	9.87	63.3	6.81	7.39	194	0.55	1.07	0.170
10/15/2019 10:05	10.3	11.13	56.9	2.94	7.42	101	0.133	0.99	0.000
11/14/2019 10:00	9.7	11.24	78.4	2.03	7.57	32	0.408	0.95	0.000
1/22/2020 10:30	8	11.72	109.4	14.3	7.13	78	3.88	1.03	0.233
2/18/2020 10:25	6.4	12.25	101.3	6.8	7.51	48	3.511	1.4	0.008
4/21/2020 10:50	13.2	10.73	80.5	3.9	7.7	56	1.175	1.18	0.000
5/19/2020 9:15	13.2	10.23	76.6	9.2	7.52	179	1.22	1.24	0.770
6/16/2020 9:55	14.2	10.11	73.6	12.4	7.08	295	1.679	1.29	0.180
Median	13.20	10.48	75.10	5.73	7.44	74	0.86	1.21	

Site Name: SHE10									
Site Description: Airport Road									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 8:40	18.8	9.05	57	6.3	7.19	88	0.422	1.24	0.095
8/20/2019 8:45	18.1	9.28	48.1	4.38	7.4	46	0.124	1.19	0.000
9/17/2019 9:00	14.4	9.94	61.5	9.95	7.24	152	0.575	0.88	0.170
10/15/2019 9:00	10.2	11.13	55.2	2.52	7.31	37	0.14	0.72	0.000
11/14/2019 8:45	9.7	10.94	76.1	2.56	7.7	25	0.395	0.89	0.000
1/22/2020 9:25	7.9	11.74	109.2	15.2	7.05	96	3.969	0.76	0.233
2/18/2020 9:45	6.3	12.2	100.8	7	7.36	31	3.697	1.03	0.008
4/21/2020 9:30	13	10.58	79.8	4.8	7.58	50	1.181	1.08	0.000
5/19/2020 8:30	13.1	10.29	75.3	12.7	7.22	326	1.263	1.16	0.770
6/16/2020 8:40	14	10.17	75.1	12.5	6.69	364	1.66	1.25	0.180
Median	13.05	10.44	75.20	6.65	7.28	69	0.88	1.06	

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Willamette River (RY 2019/20)

Site Name: WR1									
Site Description: Sunset Park (Keizer)									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 13:35	NA	9.63	NA	2.26	7.16	3	0.228	1.14	0.095
8/20/2019 13:07	22	10.06	67.9	1.27	7.88	8	0.116	1.15	0.000
9/17/2019 13:25	15.6	10.22	65.7	2.68	7.1	38	0.184	0.85	0.170
10/15/2019 13:30	12.9	11.21	70.6	6.39	7.3	12	0.156	0.74	0.000
11/14/2019 13:25	11.3	11.32	75.4	2.3	7.31	12	0.208	0.91	0.000
1/22/2020 13:30	7.5	11.46	65.6		7.2	26	0.729	0.83	0.233
2/18/2020 13:55	7.4	11.61	73	9.2	7.42	42	0.793	1.4	0.008
4/28/2020 12:40	14.5	12.4	64.4	2.3	8.42	50	0.195	1.42	0.065
5/26/2020 13:30	14.7	NA	62.5	2.7	7.56	13	0.174	0.88	0.005
6/16/2020 12:35	14.9	9.87	56.2	3.9	7.48	213	0.165	1.05	0.180
Median	14.50	11.21	65.70	2.68	7.37	19.5	0.19	0.98	

Site Name: WR1					
Site Description: Sunset Park (Keizer)					
Alkalinity (mg/L)	Ammonia (mg/L)	TP (mg/L)	TDS (mg/L)	TS (mg/L)	TSS (mg/L)
29	< 0.050	0.045	62	65	3.2
29	< 0.050	0.033	68	71	3.4
28	< 0.050	0.038	59	62	3.4
31	< 0.050	0.036	62	66	4
28	< 0.050	0.033	71	74	3.2
23	< 0.050	0.065	64	74	10
26	< 0.050	0.057	64	73	9.2
25	< 0.050	0.037	58	71	13.1
25	< 0.050	0.032	50	53	2.7
24	< 0.050	0.043	56	63	6.7
27	NA	0.0375	62	68.5	3.7

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Willamette River (RY 2019/20)

Site Name:		WR5							
Site Description:		Union Street Railroad Bridge							
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 9:00	20	8.63	72.4	2.32	7.31	11	0.196	1.08	0.095
8/20/2019 9:13	19.8	8.65	67.7	2.11	7.26	7	0.108	1.24	0.000
9/17/2019 9:38	15	9.46	63	2.95	7.38	55	0.129	0.89	0.170
10/15/2019 9:20	11.9	10.45	67.3	7.39	7.4	13	0.131	0.91	0.000
11/14/2019 9:20	10.5	10.78	71.6	3	8.05	6	0.169	1.12	0.000
1/22/2020 9:55	7.5	11.62	64.1	8.1	6.64	26	0.588	1.01	0.233
2/18/2020 10:00	6.7	11.77	72	9.8	7.46	62	0.678	1.37	0.008
4/28/2020 9:00	13.6	10.34	62.7	2.6	7.54	16	0.187	1.04	0.065
5/26/2020 9:45	14.4	NA	60.2	3	7.65	18	0.141	1.01	0.005
6/16/2020 9:00	14.3	9.88	55.3	3.5	7.44	148	0.111	0.86	0.180
Median	13.95	10.34	65.70	3.00	7.42	17	0.16	1.03	

Site Name:		WR5			
Site Description:		Union Street Railroad Bridge			
Alkalinity (mg/L)	Ammonia (mg/L)	TP (mg/L)	TDS (mg/L)	TS (mg/L)	TSS (mg/L)
30	< 0.050	0.036	59	63	3.6
29	< 0.050	0.034	63	67	4.3
27	< 0.050	0.042	55	60	5.1
27	< 0.050	0.037	64	68	4.5
26	< 0.050	0.032	58	62	3.6
23	< 0.050	0.063	61	72	11
25	< 0.050	0.059	54	65	10.6
23	< 0.050	0.044	53	57	4.4
25	< 0.050	0.031	51	55	4.3
23	< 0.050	0.037	59	67	7.8
25.5	NA	0.037	58.5	64	4.45

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 7.
Monthly Instream Data - Willamette River (RY 2019/20)

Site Name: WR10									
Site Description: Halls Ferry Road (Independence)									
Collection Date/Time	Temp (°C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTU)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	Rainfall previous 24 hrs
7/16/2019 12:00	20.7	9.25	71	2.2	7.52	1	0.227	0.99	0.095
8/20/2019 11:30	20.5	9.04	66.9	5.2	7.58	285	0.12	1.21	0.000
9/17/2019 12:25	15.8	9.73	63.3	4.95	7.55	38	0.142	0.84	0.170
10/15/2019 13:00	12.8	10.53	68.9	7.73	7.36	24	0.126	0.93	0.000
11/14/2019 12:20	11	10.65	71.2	2.84	7.22	4	0.163	0.95	0.000
1/22/2020 12:40	7.8	11.63	62.3	8.5	7.22	27	0.47	0.89	0.233
2/18/2020 13:00	7.3	11.48	70.1	9.6	7.31	30	0.573	1.47	0.008
4/21/2020 13:30	13.6	11.11	73.5	2.3	7.68	5	0.27	1.09	0.000
5/19/2020 11:33	13.5	10.43	62.6	3.8	7.56	135	0.182	1.22	0.770
6/16/2020 12:30	14.1	9.95	52.5	5.52	7.26	175	0.116	1.23	0.180
Median	13.55	10.48	67.90	5.08	7.44	28.5	0.17	1.04	

Site Name: WR10					
Site Description: Halls Ferry Road (Independence)					
Alkalinity (mg/L)	Ammonia (mg/L)	TP (mg/L)	TDS (mg/L)	TS (mg/L)	TSS (mg/L)
28	< 0.050	0.039	63	68	5.2
28	< 0.050	0.037	69	78	9.4
26	< 0.050	0.038	61	66	4.6
29	< 0.050	0.039	57	61	3.7
27	< 0.050	0.037	61	66	4.6
22	< 0.050	0.062	63	75	12.2
25	< 0.050	0.055	64	74	9.6
26	< 0.050	0.037	70	73	2.6
25	< 0.050	0.036	51	59	8
23	< 0.050	0.053	56	70	14.4
26	NA	0.0385	62	69	6.6

Note: Data in red exceed applicable water quality criteria (see Table 4). Single sample criterion (406 organisms/100 mL) used for E. Coli.

Table 8.
Monthly Instream Data - Duplicates (RY 2019/20)

Site ID	Collection Date/Time	Temp (C)	DO (mg/L)	Sp Cond (µS/cm)	Turb (NTUs)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ -NO ₂ (mg/L)	BOD (mg/L)	TSS	Total Copper (mg/L)	Dissolved Copper (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/L)	Total Zinc (mg/L)	Dissolved Zinc (mg/L)	Hardness
PRI5	07/16/2019 09:55	19.7	8.4	86.7	3.35	7.47	261	0.249	1.19		< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0045	0.0033	31
GLE1	07/16/2019 10:50	17.3	7.89	117.7	9.97	7.35	1120	0.491	1.3								
MIC10	07/16/2019 11:35	18.3	9.52	56.2	5.45	7.07	127	0.362	1.25								
GIB1	08/20/2019 10:45	18.1	6.07	115.2	10.7	7.13	161	0.29	1.29								
CGT1	08/20/2019 12:26	21.3	0.61	319.3	8.11	7.01	>24196	< 0.050									
MIC1	09/17/2019 09:12	14.1	9.77	66.5	6.87	6.98	365	0.62	1.2								
GIB15	09/17/2019 11:35	14.9	8.43	111.6	5.49	7.3	291	0.465	0.97								
SHE10	10/15/2019 09:05	10.2	11.13	55.3	2.8	7.3	40	0.141	0.93								
CLA10	10/15/2019 10:00	13.4	9.71	72.4	3.17	7.28	717	1.241	0.49		< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0053	0.0048	19
MRA10	11/14/2019 09:05	9.5	10.18	78.2	2.1	7.46	108	0.378	0.93								
PRI1	11/14/2019 09:25	9.6	11.02	78.1	1.85	7.53	34	0.342	1.38		< 0.0025	< 0.0025	< 0.0005	< 0.0005	< 0.0025	< 0.0025	28
CRO1	11/14/2019 10:07	8.3	9.74	86.1	2.47	7.3	112	0.152	0.89								
MRA1	01/22/2020 10:15	7.7	11.48	106.1	8.3	7.22	46	3.597	0.95								
CRO10	01/22/2020 10:53	8.3	10.98	49.7	4.5	6.53	23	1.294	0.59								
BAT12	01/22/2020 11:18	8.4	10.81	45.2	4.1	6.38	42	1.701	0.38								
SHE1	02/18/2020 10:30	6.4	12.25	101.3	6.8	7.47	58	3.425	1.41								
CLA1	02/18/2020 10:50	8.6	11.46	97.7	2.9	7.45	107	1.654	1.13		< 0.0025	< 0.0025	< 0.0005	< 0.0005	0.0144	0.0125	30
BAT1	02/18/2020 11:40	7.3	11.5	48	4.9	6.69	30	1.411	1.05								
GLE1	04/21/2020 12:12	11.8	10.53	96.1	4.5	7.49	210	0.723	0.71								
GIB1	04/21/2020 12:35	12.2	10.18	87	4.7	7.35	147	0.952	1								
MIC10	04/28/2020 11:05	13.3	10.78	69.1	5.4	7.53	111	1.003	1.08								
GIB15	05/19/2020 10:42	12.8	9.68	90.7	7.9	7.14	75	1.148	0.87								
CGT5	05/26/2020 12:45	16.2	7.38	262.1	4.8	7.54	457	0.2	1.15								
CGT1	05/26/2020 13:07	18.2		229.1	9.5	7.45	287	0.2	1.54								
MIC1	06/16/2020 08:40	14.4	9.86	77.2	10.6	7.44	780	1.647	1.19								
GLE10	06/16/2020 11:55	12.8	10.43	66.6	10	7.3	146	0.414	0.6								

Note: Duplicate field measurements and duplicate grab samples are taken at a minimum of 10 percent of the sites each month. These sites are selected prior to sampling.

Table 8.
Monthly Instream Data - Willamette River Duplicates (RY 2019/20)

Site ID	Collection Date/ Time	Temp (C)	DO (mg/L)	Sp Cond (μS/cm)	Turb (NTUs)	pH (S.U.)	E-Coli (#/ 100 mL)	NO ₃ - NO ₂ (mg/L)	BOD (mg/L)	Alkalini- ty (mg/L)	Ammonia (mg/L)	TP (mg/L)	TDS (mg/L)	TS (mg/L)	TSS (mg/L)
WR1	08/20/2019 13:12	22.00	10.21	67.90	1.68	7.96	7	0.113	1.09	29	< 0.050	0.039	68	71	3.1
WR10	09/17/2019 12:30	15.8	9.72	63.3	6.11	7.55	52	0.147	0.81	25	< 0.050	0.042	57	62	5.4
WR5	10/15/2019 09:25	12.00	10.44	67.50	7.08	7.39	11	0.125	0.82	28	< 0.050	0.038	59	64	5
WR1	06/16/2020 12:40	15.50	9.94	56.60	3.40	7.48	209	0.142	1.02	23	< 0.050	0.042	60	68	8

Note: Duplicate field measurements and duplicate grab samples are taken at a minimum of 10 percent of the sites each month. These sites are selected prior to sampling.

Table 9.
Continuous Instream Grade A and Grade B Data Qualifications

Grade Values	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
A	$\pm < 0.5$	$\pm \leq 0.30$	$\leq 10\%$	$\pm \leq 3$ or 5% (whichever is greater)	$\pm \leq 0.3$
B	± 0.51 to 2.00	$\pm > 0.3$ to 0.50	$> 10\%$ to $\leq 15\%$	$\pm \leq 5$ or 30% (whichever is greater)	$\pm > 0.3$ to $\pm \leq 1.0$

Note: As stated in the "Continuous Water Quality Monitoring Program Quality Assurance Project Plan", data grades are a result of the absolute difference (value or percent) of station instrument reading and audit instrument reading at the time of site audit.

Table 10.
Monthly Median Values for Continuous Instream Data (RY 2019/20)

Monthly Medians for Turbidity at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)	Turbidity (NTU)
BAT12	5.28	4.16	4.35	4.56	3.44	5.41	NA	3.91	3.20	4.45	5.94	4.90
BAT3	9.53	9.43	8.97	9.14	6.89	9.28	NA	NA	NA	5.99	7.43	6.95
CLK1	NA	3.59	3.24	NA	1.21	NA	4.89	3.20	2.69	2.43	5.44	3.13
CLK12	2.61	5.01	6.10	NA	1.85	3.52	3.41	1.98	2.40	3.26	3.86	NA
GLE12	NA	NA	3.64	1.72	1.61	10.70	16.88	16.22	8.81	9.95	8.47	7.52
GLE3	NA	5.85	6.13	5.60	3.35	7.70	11.26	7.38	5.08	5.05	5.31	6.51
MIC12	5.03	NA	4.44	2.42	2.24	6.80	19.75	NA	NA	5.82	6.09	6.25
MIC3	3.59	3.45	3.68	2.73	1.43	4.49	16.43	4.78	3.82	3.83	4.10	3.75
PRI12	NA	5.20	4.49	5.57	4.99	7.99	11.77	5.00	3.94	4.89	5.97	6.79
PRI3	2.41	2.74	2.86	2.29	2.49	6.22	NA	NA	3.11	NA	3.72	3.68

Monthly Medians for Specific Conductivity at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)	Specific Conductivity (µS/cm)
BAT12	53.98	58.55	61.95	52.31	49.62	48.71	49.80	NA	NA	NA	43.62	44.59
BAT3	56.47	63.06	59.74	56.75	56.77	52.61	49.56	NA	NA	46.32	48.91	51.60
CLK1	98.68	NA	NA	94.03	99.49	101.09	102.11	104.58	101.89	103.62	99.11	98.98
CLK12	75.59	77.59	78.84	74.43	73.21	75.76	NA	NA	74.75	77.69	NA	70.56
GLE12	NA	NA	75.82	73.55	69.38	NA	57.28	55.07	56.50	NA	64.56	70.38
GLE3	119.41	124.57	115.28	114.06	115.45	93.84	86.92	86.47	92.48	93.22	101.30	107.55
MIC12	51.31	46.84	53.87	57.19	74.85	104.32	104.19	NA	NA	81.13	65.96	60.62
MIC3	NA	NA	NA	64.49	81.30	113.35	111.17	111.80	119.68	NA	NA	NA
PRI12	79.59	72.91	80.21	111.90	133.59	125.75	102.55	100.71	107.40	99.62	98.33	93.25
PRI3	104.35	NA	NA	NA	106.94	107.90	104.02	106.85	104.06	106.39	102.28	104.98

Presented median values consist of A and B grade data only.

NA = 60% of the continuous record for a given month is not represented by A and B grade data.

Table 10.
Monthly Median Values for Continuous Instream Data (RY 2019/20)

Monthly Medians for Temperature at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)	Temperature (°C)
BAT12	17.58	17.83	15.28	9.89	5.74	7.24	8.58	7.34	7.92	10.63	13.00	15.44
BAT3	18.13	18.68	16.46	11.52	7.50	8.21	9.14	NA	NA	11.35	13.60	15.82
CLK1	17.65	18.33	17.14	13.10	10.21	9.87	10.28	9.11	9.57	11.68	13.64	15.45
CLK12	15.61	16.45	16.30	13.85	12.12	11.06	11.25	10.28	10.27	11.38	12.92	14.12
GLE12	NA	NA	15.23	10.38	7.02	7.38	8.39	7.34	7.43	9.62	11.54	13.21
GLE3	17.60	18.08	16.60	11.98	8.17	8.62	9.39	8.26	9.07	12.04	13.75	15.47
MIC12	19.87	19.34	15.28	11.40	7.87	7.46	8.39	NA	NA	13.20	14.76	17.43
MIC3	20.66	19.80	16.06	11.75	7.82	7.27	8.32	7.83	9.15	12.84	14.93	17.66
PRI12	18.68	18.59	16.21	11.45	8.08	8.06	8.94	7.52	8.18	11.01	13.26	15.74
PRI3	19.47	19.78	17.72	12.65	8.87	8.33	9.26	8.28	9.39	13.17	15.14	17.37

Monthly Medians for pH at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)	pH (S.U)
BAT12	7.21	7.12	7.10	7.10	6.81	6.76	6.66	6.77	7.05	NA	7.28	7.31
BAT3	6.78	6.79	6.74	6.85	6.83	6.71	6.51	NA	NA	NA	6.43	6.39
CLK1	6.87	7.08	7.28	NA	7.42	7.29	NA	7.07	7.16	NA	7.24	7.14
CLK12	7.17	7.34	7.26	7.17	7.07	6.57	6.70	6.74	6.60	6.64	6.66	6.73
GLE12	NA	NA	7.07	7.22	6.93	7.11	7.10	7.02	7.19	7.24	7.04	7.14
GLE3	7.49	7.54	7.52	7.55	7.44	7.28	7.15	NA	7.19	NA	NA	7.21
MIC12	7.19	7.28	7.28	7.35	7.20	7.26	7.00	NA	NA	7.23	7.58	7.58
MIC3	6.85	6.88	6.97	7.12	7.14	NA	NA	NA	NA	NA	NA	NA
PRI12	6.82	6.81	6.92	6.88	6.89	6.67	6.41	6.54	NA	NA	6.72	6.92
PRI3	7.04	7.30	7.35	7.28	7.40	7.36	NA	NA	NA	7.50	7.25	7.16

Presented median values consist of A and B grade data only.

NA = 60% of the continuous record for a given month is not represented by A and B grade data.

Table 10.
Monthly Median Values for Continuous Instream Data (RY 2019/20)

Monthly Medians for Dissolved Oxygen at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)
BAT12	8.84	8.25	9.09	10.56	12.02	11.95	11.60	12.04	11.75	11.01	10.29	9.55
BAT3	6.88	5.90	6.61	8.53	9.83	10.66	10.86	NA	NA	9.89	8.95	8.17
CLK1	8.90	8.60	8.74	9.83	10.18	10.86	10.90	11.42	11.15	9.99	9.61	9.22
CLK12	9.00	8.94	8.80	9.32	9.60	10.25	10.38	10.73	10.65	10.26	9.62	9.28
GLE12	NA	NA	NA	NA	10.19	11.38	11.24	11.61	11.45	10.86	10.26	9.82
GLE3	8.68	NA	NA	NA	10.71	11.32	11.06	11.51	11.02	10.01	9.44	9.08
MIC12	8.28	8.40	9.34	10.30	11.22	11.29	10.84	NA	NA	9.84	9.16	8.69
MIC3	8.45	8.63	9.46	10.39	11.21	11.96	11.54	11.64	11.09	10.07	9.49	9.00
PRI12	NA	NA	7.83	9.26	9.29	9.37	9.57	10.36	10.07	9.28	8.61	8.16
PRI3	7.88	7.53	8.46	NA	10.11	11.26	10.95	11.20	10.52	9.30	9.02	8.53

Monthly Medians for Stage at Continuous Instream Sites												
	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Station Name	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)	Stage (ft)
BAT12	4.26	4.17	4.25	4.31	4.36	4.46	4.83	4.68	4.54	4.57	4.45	4.38
BAT3	4.01	3.94	4.13	4.20	4.26	4.51	5.14	4.71	4.46	4.46	4.42	4.35
CLK1	3.75	3.68	3.90	3.94	3.88	4.11	4.40	4.10	4.04	3.98	4.02	3.93
CLK12	3.91	3.89	3.92	3.96	3.98	4.07	4.27	4.05	4.02	4.00	4.03	4.02
GLE12	0.72	0.31	0.77	0.93	0.93	1.08	1.21	1.07	0.96	0.96	0.89	0.83
GLE3	3.97	3.92	4.06	4.07	4.03	4.30	4.59	4.34	4.22	4.16	4.13	4.02
LPW1	NA	NA	NA	NA	NA	1.61	2.25	1.88	1.73	1.79	1.77	1.62
MIC12	7.00	7.07	7.09	6.90	6.66	7.14	8.15	7.53	7.06	7.24	7.15	7.12
MIC3	5.36	5.58	5.63	5.38	5.13	5.48	6.62	5.92	5.55	5.71	5.62	5.54
PRI12	4.22	4.11	4.12	4.03	3.98	4.20	4.64	4.36	4.25	4.39	4.43	4.45
PRI3	4.18	4.14	4.20	4.19	4.16	4.42	4.87	4.45	4.32	4.28	4.27	4.19
PRI4	7.37	7.33	7.45	7.44	7.38	7.71	8.23	7.78	7.63	7.60	7.58	7.49
SHE3	6.22	6.12	6.14	6.04	6.00	6.32	6.98	6.57	6.28	6.38	6.31	6.27
WAL3	3.63	3.59	3.76	3.79	3.72	3.93	4.25	3.95	3.87	3.84	3.83	3.82

Presented median values consist of A and B grade data only.

NA = 60% of the continuous record for a given month is not represented by A and B grade data.

Table 11.
Instream Storm Monitoring Data (RY 2019/20)

Site Name:		CLK1																	
Site Description:		Lower Clark Creek just upstream of confluence with Pringle Creek																	
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond. field	Sp. Cond. comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO ₃ -NO ₂	Ortho P	TP	BODs	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 09:10	794	11.13	7.27	8.89	90.2														
02/16/2020 10:00						68.2	0.0051	0.0025	0.0758	0.0397	0.0017	0.0005	23	0.064	0.99	0.015	0.11	1.5	35.6
03/06/2020 12:10	6131	10.88	6.91	10.01	82.6														
03/06/2020 12:15 DUP	8164	10.87	6.92	10.01	80.9														
03/07/2020 09:55						57.5	0.0087	0.0039	0.118	0.0718	0.0021	0.0005	25	0.177	0.89	0.018	0.131	3.2	35.8
05/30/2020 15:41	1187	9.42	6.67	16.1	39.7														
05/31/2020 11:55						51	0.056	0.0101	0.39	0.0821	0.0532	0.0005	35	0.05	0.846	0.01	1.19	22	

Site Name: PRI3																			
Site Description: Lower Pringle Creek in Pringle Park, just upstream of confluence with Shelton Ditch																			
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond. field	Sp. Cond. comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO ₃ -NO ₂	Ortho P	TP	BODs	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 09:40	132	11.5	7.28	8.08	99.5														
02/15/2020 09:52 DUP	201	11.53	7.32	8.08	99.2														
02/16/2020 10:30						72.6	0.0033	0.0025	0.031	0.0094	0.0008	0.0005	31	0.05	1.262	0.018	0.083	0.9	25.1
03/06/2020 12:35	173	11.51	7.35	9.63	96.3														
03/07/2020 10:20						62.5	0.0061	0.0031	0.0522	0.0198	0.0014	0.0005	26	0.081	0.999	0.01	0.114	3	32.9
05/30/2020 16:00	2014	8.76	6.91	16.3	73.1														
05/31/2020 12:15						63.6	0.0124	0.004	0.117	0.0245	0.0065	0.0005	33	0.05	0.726	0.012	0.278	7.2	104

Site Name:		PRI12																	
Site Description:		Upper East Fork Pringle Creek																	
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond. field	Sp. Cond. comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO ₃ -NO ₂	Ortho P	TP	BODs	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 10:27	332	10.65	6.93	7.89	95.7														
02/16/2020 11:10						72.1	0.0025	0.0025	0.01	0.0043	0.0005	0.0005	32	0.05	2.591	0.01	0.069	0.2	15.2
03/06/2020 13:20	20	10.39	7.07	8.9	99.2														
03/07/2020 10:45						81.7	0.0044	0.0026	0.0083	0.004	0.0005	0.0005	33	0.05	2.508	0.01	0.045	1.9	11.6
05/30/2020 16:32	3654	8.01	6.53	14.9	84.4														
05/30/2020 16:35 DUP	3255	7.99	6.53	14.9	84.7														
05/31/2020 12:40						74.2	0.0026	0.0025	0.0172	0.0041	0.0005	0.0005	33	0.05	1.388	0.01	0.134	3.1	32.4

Data in red exceed applicable water quality criteria (see Table 4).

NA= Median not calculated because ≥ 50% of values were censored values.

Table 12.
Stormwater Monitoring Data (RY 2019/20)

Site Name:		Electric¹																	
Land use Type:		Residential																	
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond, field	Sp. Cond, comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO₃-NO₂	Ortho P	TP	BOD5	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 08:35	24196	11.21	7.22	9.12	86.2														
02/16/2020 09:45						60.4	0.0036	0.0025	0.0324	0.0206	0.0008	0.0005	26	0.05	1.392	0.041	0.095	2	18
05/30/2020 16:21	2603	9.48	6.3	15.95	67														
05/31/2020 12:20						78.4	0.0049	0.0041	0.658	0.628	0.0005	0.0005	32	0.052	1.535	0.087	0.113	4.6	5.4

¹Due to the velocity and lift of water coming through the pipe at this site, the flow module is unable to detect the height of the water and often doesn't sample; therefore a time paced sampling method is utilized.

Site Name:		Hilfiker																	
Land use Type:		Commercial																	
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond, field	Sp. Cond, comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO₃-NO₂	Ortho P	TP	BOD5	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 08:20	96	11.71	7.35	7.18	44.4														
02/16/2020 09:30						38.5	0.0043	0.0026	0.0619	0.0501	0.0005	0.0005	11	0.137	0.532	0.01	0.057	2	13.5
05/30/2020 16:00	313	9.33	5.7	15.78	16.9														
05/31/2020 12:10						20.8	0.0073	0.0048	0.0743	0.057	0.0012	0.0005	7	0.095	0.383	0.01	0.093	2.4	14.9

Site Name:		Salem Industrial																	
Land use Type:		Industrial																	
Sample Collection Date/Time	E. Coli	Diss. Oxygen	pH	temp	Sp. Cond, field	Sp. Cond, comp	Cu	Cu diss	Zn	Zn diss	Pb	Pb diss	Hardness	NH3	NO₃-NO₂	Ortho P	TP	BOD5	TSS
mm/dd/yyyy HH:MM	MPN/100 mL	mg/L	S.U	°C	µS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
02/15/2020 11:00	345	10.65	7.03	8.04	40.2														
02/16/2020 11:40						64.7	0.007	0.0051	0.0995	0.0859	0.0005	0.0005	26	0.095	2.022	4.64	4.42	2	15
05/30/2020 17:18	24196	7.65	6.19	14.98	47.6														
05/31/2020 11:37						46.8	0.0074	0.0062	0.0702	0.0611	0.0005	0.0005	22	0.05	0.505	0.84	0.93	7.9	14

¹Due to the velocity and lift of water coming through the pipe at this site, the flow module is unable to detect the height of the water and often doesn't sample; therefore a time paced sampling method is utilized.

Attachment A: Dry Weather Outfall Screening Results RY 2019/2020

Dry Weather Outfall Screening Results RY 2019/2020																							
Basin	Old Asset ID:	Date	Flow Estimate (gpm)	Flow Pattern	Physical Characteristics (odor, color, floatables, stains, pool quality, etc.)	Ch Test trip?	Analytical Sampling	Free CI Test Strip	Total CI Test Strip	CI Colorimeter	Temperature (°C)	Receiving Water Temperature (°C)	Specific Conductivity (µS/cm)	pH (S.U.)	Turbidity (NTU)	Fluoride	Detergents/Surfactants (mg/L)	Ammonia (mg/L)	Potassium (mg/L)	Sodium (mg/L)	E. coli (MPN/100mL)	Inspection Comments	Investigation Comments
Battle Creek	D45444226	11/1/2019	1-5 gpm	Steady	Flow Line, Clear	No	-	-	-														
Battle Creek	Private	11/7/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Battle Creek	Private	11/7/2019	1-5 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Clark Creek	Private	8/20/2019	< 1 gpm	Steady	Iron eating bacteria, Clear	Yes	Test Strip	0 ppm	0 ppm														
Clark Creek	D39460252	9/26/2019	5-10 gpm	Steady	Clear	Yes	Lab and Field	0 ppm	0 ppm		16.6		73.6	6	1.0						63	Receiving water is daylighting of outfall. Bacteria sample collected (1:10 dilution). Very low mV for pH; reading is suspect. Probe later replaced.	
Clark Creek	D42466417	9/26/2019	5-10 gpm	Steady	Clear	Yes	Lab and Field	0 ppm	0 ppm		18.9	15.2	123.2	7.19	2.4						697	Surge occurred during sampling effort. Bacteria sample 1:10 dilution. Chlorine strip from after surge.	Very extensive investigation has occurred at this location and stormline under houses is on CIP list for relocation into right of way.
Clark Creek	D42468244	9/26/2019	> 25 gpm	Steady	Clear	Yes	Lab and Field	0-0.5 ppm	0-0.5 ppm		17.7	15.8	112.3	7.4	1.3						309	>50 gpm approx. 60 gpm. Bacteria sample 1:10 dilution	Mapped springs entering via perforated pipe on Liberty St have made isolating source of CI difficult. Extensive investigation has been completed in past years.
Clark Creek	D42468PVT	9/26/2019	< 1 gpm	Steady	Clear	Yes	Lab and Field	0 ppm	0 ppm		17.3	15.8	144.0	7.5	5.0						355	Not enough flow to collect colorimeter sample without significant suspended sediment. E coli (1:10 dilution) sample collected to confirm ex/infiltration issue resolved.	School district addressing ex/infiltration issue causing high bacteria issues.
Croisan Creek	D33460215	8/6/2019	10-25 gpm	Steady	Clear	Yes	Test Strip	0.5-1.0 ppm	0.5-1.0 ppm													Outfall is badly damaged and has holes in the bottom allowing water to flow out. Before the end of. The pipe	Reported to Water Dept. Leak Detection
Croisan Creek	D33460214	8/6/2019	5-10 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Croisan Creek	D33460239	8/6/2019	5-10 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Gibson Creek	Private	7/26/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Gibson Creek	D33478227	7/29/2019	1-5 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0-0.5 ppm													Stream Crew observation. Needs follow-up investigation.	
Gibson Creek	Private	8/1/2019	5-10 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Gibson Creek	38156	8/1/2019	0 gpm	No Flow	Clear	No	-	-	-														
Gibson Creek	Private	8/1/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Little Pudding River	Private	8/26/2019	< 1 gpm	No Flow	Clear	Yes	Test Strip	0 ppm	0 ppm														
Little Pudding River	Abandoned	8/26/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Little Pudding River	D60474208	10/7/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Little Pudding River	Private	10/7/2019	< 1 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0-0.5 ppm													Roof and/or foundation drain	
Lower Claggett Creek	D54494201	9/5/2019	0 gpm	N/A	Clear	No	-	-	-													Partial sediment. Animal tracks into pipe.	Upstream manholes are dry.
Lower Claggett Creek	D51488236	9/5/2019	0 gpm	N/A	Clear	No	-	-	-													Dry	
Lower Claggett Creek	D51488203	9/5/2019	1-5 gpm	N/A	Clear	Yes	Field	0-0.5 ppm	0-0.5 ppm	0.03	17.8	21.1	231.4	6.8	1.9	0.8	0-0.25					No reagent for NH3 test	Tested manhole at Mainline & Hyacinth for CI (0.09 ppm). Very little water to sample. TV inspection requested on 9/6/2019. Flow originates in Keizer. Further investigation needed, then coordinate with Keizer.
Mill Creek	D45468241	9/25/2019	10-25 gpm	Steady	Clear	Yes	Field	-	-	0.00	17.0	14.6	156.0	7.2	1.4								
Mill Creek	D45468241	9/27/2019	10-25 gpm	Steady	Clear, Suds	Yes	-	0 ppm	0-0.5 ppm	0.00	17.3	13.9	157.4	7.95	1.2	0.4						Batteries died, no Na, K, NH3, or E. coli testing	
Mill Creek	D45476207	9/27/2019	> 25 gpm	Steady	Clear	Yes	Field	-	-	0.00	16.6	14.3	305.9	7.77	0.7	0						Water from wetland by State Penitentiary	
Mill Creek	D42476203	9/27/2019	0 gpm	No Flow	Clear	No	-	-	-													No photo due un-housed living at site.	
Mill Creek	D45476217	9/27/2019	10-25 gpm	Steady	Clear	Yes	-	-	-		18.2	14.4	221.8	7.71	2.4								
Mill Creek	D54470205	9/30/2019	1-5 gpm	Steady	Sulfide, Clear	No	Lab and Field	-	-	0.15	12.0		124.6	6.83	10.5	0	0-0.25		2.042	2.894	309	Detergents test may be suspect due to suspended sediment.	Two upstream manholes are bolted. Third is wet, but not enough to comprise entire flow. Outfall has been influenced in past by sports field irrigation and groundwater. No receiving water, just wet soil. Needs follow-up with TV inspectors.
Mill Creek	D51470205	9/30/2019	5-10 gpm	N/A	Clear	No	Field	-	-		17.1	10.8	303.1	7.48								Outfall submerged	
Pringle Creek	Private	8/3/2019	< 1 gpm	Steady	Clear	No	-	-	-													Stream Crew Observation. Chlorine strips not on hand.	
Pringle Creek	D48454218	8/7/2019	1-5 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm													Outfall seems to have a new retaining wall	
Pringle Creek	D48454230	8/7/2019	5-10 gpm	Steady	Clear	Yes	Test Strip	0 ppm	0 ppm														
Pringle Creek	Private	8/21/2019	< 1 gpm	Steady	Clear	No	None	-	-													No access. Approximately 2ft diameter. Needs further investigation.	
Pringle Creek	D45466212	9/25/2019	< 1 gpm	Steady	Clear	Yes	Field	-	-		16.2	17.3	188.4	8.31	2.5							No chlorine, no extra analysis completed	
Pringle Creek	D48464249	9/25/2019	0 gpm	N/A	Clear	No	None	-	-													Half submerged, no flow apparent	

Dry Weather Outfall Screening Results RY 2019/2020																							
Basin	Old Asset ID:	Date	Flow Estimate (gpm)	Flow Pattern	Physical Characteristics (odor, color, floatables, stains, pool quality, etc.)	Ch Test trip?	Analytical Sampling	Free CI Test Strip	Total CI Test Strip	CI Colorimeter	Temperature (°C)	Receiving Water Temperature (°C)	Specific Conductivity (µS/cm)	pH (S.U.)	Turbidity (NTU)	Fluoride	Detergents/Surfactants (mg/L)	Ammonia (mg/L)	Potassium (mg/L)	Sodium (mg/L)	E. coli (MPN/100mL)	Inspection Comments	Investigation Comments
Pringle Creek	D48464203	9/25/2019	1-5 gpm	Steady	Clear	Yes	Lab and Field	0-0.5 ppm	0-0.5 ppm	0.00	17.1	15.3	266.8	7.23	1.8				2.796	7.83		Sample collected due to high conductivity. Sample ID mislabeled on lab report as D48464249	Lab results received after rainy season began. Needs to be investigated in 2020 season.
Pringle Creek	D42468235	9/25/2019	0 gpm	N/A	Clear	No	None	-	-													Dry, no flow	
Pringle Creek	D48460229	9/25/2019	0 gpm	N/A	Clear	No	None	-	-														
Pringle Creek	D39456229	9/26/2019	10-25 gpm	Steady	Clear	Yes	Lab and Field	0 ppm	0-0.5 ppm	0.30	15.9	15.7	89.3	6.89	8.7	0.2	0		1.977	6.515			Primary source of water has been characterized as groundwater from Liberty ST. Sample mislabeled on lab report as D39456226
Pringle Creek	D45464207	9/30/2019	1-5 gpm	Steady	Clear	Yes	Field	0 ppm	0-0.5 ppm	0.05	14.1		98.8	7.85	4.0	0						Receiving water is inaccessible due to barbed wire fence.	
Upper Claggett Creek	D54486217	9/5/2019	10-25 gpm	Steady	Clear	Yes	Field	0 ppm	0 ppm	0.04	17.5		127.0	7.51	3.1							Receiving water is the outfall daylighting.	
Upper Claggett Creek	D51486201	9/5/2019	10-25 gpm	Steady	Clear	Yes	Field	0 ppm	0 ppm		19.0		114.9	6.93	5.6							Water in wetland lower than in the past. Able to sample at outfall directly. Receiving water is outfall pool and wetland.	
Upper Claggett Creek	D51486216	9/27/2019	10-25 gpm	Steady	Clear, Suds	Yes	Field	0 ppm	0-0.5 ppm	0.04	16.7	14.3	61.5	7.51	2.9	0.6	0					0 free CI, estimated .3 ppm total (colorimeter gave us .04 total). Did not test for NH3, K, Na, or E. coli because figures suggest water main break some distance away.	Very large pipeshed. Windshield investigation performed and found no source. Needs a more lengthy in-pipe investigation.
Waln Creek	Private	7/19/2019	10-25 gpm	Intermittent	Clear	Yes	Field	1.0 ppm	1.0 ppm	1.00												Response to service request reporting intermittent discharge from private outfall to stream. Details recorded post-response.	Water leak in crawlspace of 288 Holder LN SE traveling overland through foundation vents to 298 Holder LN SE. Sump pump at 298 pumping water to dry portion of Waln Creek. Residents at 298 on vacation. Reported to water department who turned off water at 288.
Waln Creek	Private	7/31/2019	< 1 gpm	Steady	Clear	No	-	-	-														
Willamette River	Private	7/23/2019	1-5 gpm	Steady	Clear	Yes	-	0 ppm	0 ppm														
Willamette River	D42482230	9/5/2019	0 gpm	N/A	Clear	No	-	-	-														
Willamette River	D42482213	9/5/2019	0 gpm	N/A	Clear	No	-	-	-													Dry, no flow	
Willamette River	D42482212	9/5/2019	> 25 gpm	Steady	Clear	Yes	Field	0.5-1.0 ppm	1.0 ppm		19.1		69.9	7.23	1.8							Sample bottle broke during collection.	Water leak reported to Water Dept. Leak Detection in 2018 and again on 9/6/2019. Investigation ongoing by Water Dept.
Willamette River	D42480205	9/27/2019	0 gpm	No Flow	Clear	No	-	-	-														
Willamette River	D42482223	9/27/2019	5-10 gpm	Steady	Clear	Yes	Field	0 ppm	0-0.5 ppm	0.05	17.7		183.7	8.03	5.6	0.6	0					Likely a water main break high in the pipeshed.	Needs more thorough investigation
Willamette River	D42480215	9/27/2019	< 1 gpm	Steady	Clear	Yes	Field	0 ppm	0 ppm	0.13	16.4	16.3	87.8	8.05	25.5	0	0-0.25					Extremely low flow. Samples from pipe were pipetted into beaker.	
Willamette River	D42480223	9/27/2019	< 1 gpm	Steady	Sulfide, Clear	Yes	Field	0 ppm	0 ppm	0.03	15.4	16.1	210.7	7.52	1.8	0.4	0					Pool smells a little of sulfur. Unable to test for bacteria, lab cannot fulfill request.	
Willamette River	D39478271	9/27/2019	> 25 gpm	Steady	Clear	Yes	Field	-	-		17.1		101.0	7.63	1.1							Receiving water is the outfall daylighting. Culvert grate moved.	
Willamette River	D42476279	9/27/2019	0 gpm	No Flow	Clear	No	-	-	-														
Willamette River	D36472203	9/27/2019	0 gpm	No Flow	Clear	No	-	-	-														
Willamette Slough	D39470220	9/25/2019	5-10 gpm	Steady	Clear	Yes	Field	-	-		15.9		76.6	7.39	3.7							No chlorine. Outfall flowing similar to what has been noted in past	