Annual Report #9

January 1, 2020, to December 31, 2020
Civil Action No. 1:10cv4039 - WSD

DeKalb County
Department of Watershed Management

March 1, 2021

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Acronyms

ARV	air release valve
CCTV	closed-circuit television
CD	Consent Decree
CERP	contingency and emergency response plan
CIP	capital improvement program
CM	corrective maintenance
CMMS	computerized maintenance management system
CMOM	capacity, management, operations, and maintenance
DWM	Department of Watershed Management (DeKalb County)
EM	emergency maintenance
EPA	U.S. Environmental Protection Agency
FOG	Fats, Oils, and Grease
FSE	food service establishment
EPD	Environmental Protection Division (Georgia)
GIS	geographic information system
I/I	infiltration/inflow
KPI	key performance indicator
LF	linear feet
MCA	manhole condition assessment
MMADF	maximum month average daily flow
MMS	maintenance management system
O&M	operation and maintenance
OSARP	Ongoing Sewer Assessment and Rehabilitation Program
PASARP	Priority Areas Sewer Assessment and Rehabilitation Program
PM	preventive maintenance
PMT	Program Management Team
QA/QC	quality assurance and quality control
SSO	sanitary sewer overflow
SSOAP	Sanitary Sewer Overflow Analysis and Planning
TISCIT	Totally Integrated Sonar and Camera Inspection Technology
WAM	work and asset management
WCTS	wastewater collection and transmission system

Introduction

DeKalb County (the "County") Department of Watershed Management (DWM) submits this 9th Annual Report in accordance with Section IX, Paragraph 58 of the Consent Decree (CD) (Civil Action 1:10cv4039-WSD) to provide:

a) "A narrative summary of progress made, including key accomplishments and significant activities, under the Capacity, Management, Operations, and Maintenance (CMOM) programs implemented or modified pursuant to this Consent Decree for the most recent twelve (12) month period."

b) "A trends analysis of the number, volume, average duration, and cause of the County's Sanitary Sewer Overflows (SSOs) for the previous twenty-four (24) month period."

Executive Summary

The report that follows is divided into two sections as required by the CD. Part I reports on the CMOM Programs' Implementation Activities. Part II, the Sanitary Sewer Overflow (SSO) Trends Analysis, is intended to meet the County's reporting obligations as referenced above. This document details, in narrative form, progress made in the 2020 timeframe as well as significant program accomplishments and SSO Trends Analysis. Any revised milestones and the associated corrective implementation plans are noted in the previously submitted Semi-Annual Report.

During the period from January 1, 2020, to December 31, 2020, the following DWM CMOM implementation programs, reports, and deliverables were submitted to the U.S. Environmental Protection Agency (EPA) and Georgia Department Environmental Protection Division (EPD), as noted in Table ES-1.

Table ES-1 Consent Decree Submittals – Schedule and Status

Consent Decree #	Title	DWM Final Submittal
IX.(56)	4th Quarterly Report 2019	1/30/20
IX.(57)	16th Semi-Annual Report	1/30/20
IX.(58)	Annual Report #8	2/28/20
IX.(56)	1st Quarterly Report 2020	4/30/20
IX.(57)	17th Semi-Annual Report	7/30/20
IX.(56)	2nd Quarterly Report 2020	7/30/20
IX.(56)	3rd Quarterly Report 2020	10/30/20

Table ES-2 summarizes the major activities and key milestones completed in 2020.

Table ES-2 2020 Major Consent Decree Milestones and Accomplishment Summary

Program or Project	Milestones and Accomplishments
Contingency and Emergency Response Plan (CERP)	✓ Trained DWM personnel and CD contractors in Contingency and Emergency Response Plan (CERP) definitions, responses, and reporting. ✓ For all SSOs, even after the initial response, follow-up actions included a combination of closed-circuit television (CCTV); Fats, Oils, and Grease (FOG) education; root control; system cleaning; etc.
Fats, Oils, and Grease Management Program	✓ Increased FOG enforcement for non-compliant food service establishments (FSE) and increased public education of facilities located around grease-related spills. – Delivered 561 warning notices – Delivered 41 court summons ✓ Performed FOG inspections, evaluations, and tracked data: – Total number of FOG inspections: 3,133 – Total number of FOG permits issued: 1,249 ✓ 2020 monthly average permitted active FSEs: 122

Table ES-2 2020 Major Consent Decree Milestones and Accomplishment Summary

Program or Project	Milestones and Accomplishments
Sewer Mapping Program	✓ Continued to update the geographic information system (GIS) with sanitary sewer easement information to facilitate a more efficient access process for maintenance and capital projects. ✓ Used heat maps of root-caused SSOs to identify areas for chemical root control. ✓ Used GIS aerials to accurately estimate easement clearing areas for root intrusion prevention and efficient access during maintenance activities.
MMS Program	✓ Performed 1,601 sewer creek crossing inspections to monitor and maintain the structural integrity of sewer assets near waterways. ✓ Treated 4,002,240 linear feet (LF) of sewer to remove root intrusions and prevent blockages. ✓ Performed easement clearing to minimize root intrusion and allow efficient access to assets during maintenance activities. A total of 9,794,262 square feet of sewer easements were cleared
Collection and Transmission Systems Training Program	✓ Completed 5,919 hours of technical, leadership, managerial, and skills training. ✓ Generated training reports to ensure employees completed scheduled training session within a specified timeframe.
System-Wide Flow and Rainfall Monitoring Program	✓ Completed installation of County-wide flow monitoring and rain gauge system to be used for the development of the dynamic model and system flow analysis; supported monthly average of 275 flow monitors and 41 rain gauges; performed flow meter maintenance visits. ✓ Placed temporary monitors in the system, as needed, to assist in determining available sewer capacity for specific projects.
System-Wide Hydraulic Model	✓ Completed DWM and peer review process for Snapfinger and Pole Bridge model areas. ✓ Completed training for County staff on model for North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas. ✓ Submitted dynamic hydraulic models and reports to EPA/EPD for Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas. ✓ Completed the South Fork Peachtree Creek and Intrenchment Creek groundwater infiltration module calibration update.
Financial Analysis Program	✓ Tracked expenditures for both the operations and maintenance (O&M) budgets and capital improvement projects (CIP) budgets. ✓ Continued use of work order management system (see MMS section) to track costs of emergency, corrective, and preventive work by asset.
Infrastructure Acquisitions Program	✓ Evaluated and/or acquired 47,503 LF of pipe. ✓ Reviewed 1,330 plans and received 400 sewer capacity requests.
PASARP	✓ Continuing design of additional rehabilitation packages by four engineering firms and the CD Program Management Team (CDPMT) and totaling 770,133 LF of sewer to date. Construction ongoing through design-build rehabilitation packages, Annual Construction Contracts, and two Cooperative Agreements, completing 263,216 LF of sewer rehabilitation. Total amount spent to date on these contracts is $112.2 million.

Table ES-2 2020 Major Consent Decree Milestones and Accomplishment Summary

Program or Project	Milestones and Accomplishments
OSARP	✓ Completed CCTV and associated pipeline cleaning and manhole condition assessment (MCA) in the OSARP areas, including: 448,272 LF (84.9 miles) of acoustic inspection; 547,536 LF (103.7 miles) of smoke testing; 1,214,400 LF (230 miles) of CCTV; 71,280 LF (13.5 miles) of Totally Integrated Sonar and Camera Inspection Technology surveys; and 3,876 MCAs.
Supplemental Environmental Project	✓ Completed program in 2014.
SSO Trend Analysis	✓ Completed a detailed SSO trends analysis and major spill analysis for the period from 2018 through 2020.

Part I – Capacity, Management, Operations and Maintenance (CMOM) Programs' Implementation Activities Completed

1. CERP (CD VI.B.i)

DWM continued to implement the CERP in 2020 using the approved revised CERP CMOM plan to mobilize labor, materials, tools, and equipment to respond to and appropriately remedy conditions that may cause or contribute to an SSO. Considerable effort was made in 2020 to train DWM personnel in the CERP CMOM document and to verify that personnel were consistently and accurately applying the policies and procedures of the document through new employment orientation and refresher training. In March 2020, a Socially Distant Service Delivery Strategy was implemented in response to the COVID-19 pandemic. As a result, training sessions were adapted for smaller groups to allow appropriate distancing while virtual sessions were developed. However, DWM employees and contractors were continuously provided with necessary documents to understand the CERP response plan.

Key Accomplishments and Significant Activities:

1. Completed the following activities to resolve and remedy current and potential SSOs:
   a. Cleaning total 3,977,191 LF
      i. First response and follow up 189,953 LF
      ii. Contractor cleaning 3,787,238 LF[1]
   b. Point repairs 39[2]
   c. CCTV 429,700 LF[3]
2. Responded to 306 reportable spill events and performed after spill follow-up actions.
3. Conducted monthly SSO meetings with program area managers to review the previous month's SSOs and discuss any emerging trends and possible mitigation efforts.
4. Distributed more than 3,054 FOG education flyers in areas where grease was identified as the cause of a spill to increase awareness of the impact of allowing grease to enter the sewer system and thus, potentially averting future SSOs.
5. Discovered and resolved three minor spills from in-stream monitoring.

[1]Total encompasses all cleaning performed for SSO response as well as prevention of potential SSOs.
[2]Total reported reflects Point Repairs completed to address SSOs and are coordinated with PASARP construction.
[3]The total reported for CCTV activities in this section is limited to CCTV work performed as a follow up to an identified SSO and does not include CCTV work performed as a part of the assessment of the WCTS.

6. Discovered and potentially prevented three overflows from occurring using flow monitoring technology. High level alarms and data assessment alerted personnel to potential overflows at lift stations. Crews were able to respond before an actual overflow occurred.

2. FOG Management Program (CD VI.B.ii)

The DeKalb County FOG Management Program has met all major program milestones. However, to support the County's ongoing implementation of the CD, the FOG program has taken on a greater rolein the ongoing trends analysis efforts and in developing cleaning protocols pursuant to the MMS program. While the FOG program is designed to reduce the amount of FOG that enters the WCTS, the cleaning instituted under the MMS program is designed to remove FOG from the system. Together, these programs represent a fully integrated FOG prevention and elimination program.

In 2020, DWM continued its enforcement of the FOG ordinance and unregistered FSEs, as described below. DWM also increased the amount of public education about FOG and the effects of FOG on the sewer system through social media, media advertisements, and press releases. DWM successfully continued efforts to engage the municipalities within the County to ensure implementation of the FOG Management Program throughout the County.

Key Accomplishments and Significant Activities:

1. Distributed educational materials at multi-family apartment complexes and residential neighbor-hoods that have been identified as located near sewer spills and investigated nearby FSEs for grease violations.
2. Reviewed pump-out manifests as part of the Hauler Company Assessment program to ensure that haulers are properly disposing of FOG. A total of 700,000 gallons of FOG was recorded as being removed from the system through this program.
3. Delivered 561 warning notices and 41 court summonses to non-compliant FSEs.
4. Performance Measures:
   a. Total number of FOG inspections: 3,133
   b. Total number of FOG evaluations: 185
   c. 2020 monthly average permitted active FSEs: 122
5. Issued 1,249 permits.
6. Continued to sponsor the "No FOG, No Clog" campaign to educate students about the hazards of grease clogs in sewer systems. Distributed FOG information at 17 school events where approximately 816 students were in attendance. Sponsored three outreach events reaching approximately 162 citizens with information about FOG and its effect on the sewer system.
7. While continued revision of the FOG ordinance is not a Consent Decree requirement, the FOG ordinance was revised beyond the scope of the CD to include multi-family residences and was passed by the Board of Commissioners on December 11, 2018. This ordinance extends the application of existing FOG-related regulations to certain multi-family dwelling units. There are currently 20 sites that have qualified to be under the FOG ordinance.

3. Sewer Mapping Program (CD VI.B.iii)

The purpose of the Sewer Mapping Program is to provide an integrated system capable of mapping, inventorying, and depicting system assets. In 2015, the Sewer Mapping Program enhancements and milestones were substantially completed, thus allowing the County in 2020 1) to produce certain maps using GIS technology, 2) to integrate sewer system locations and attribute data with the hydraulic model and the computerized maintenance management systems (CMMS), 3) to reproduce maps in a manner that will allow use by O&M crew leaders in the field, and 4) to identify and track problems geographically.

Though the County has achieved completion of the major components of the program, data updates to the GIS system continue for new developments or system changes that have been reported by DeKalb County personnel in the regular course of business or by non-DeKalb County personnel engaged in assessment and rehabilitation projects. Moreover, the information from the Sewer Mapping Program is being used in other CD-related programs including the hydraulic model, flow and rainfall monitoring, PASARP, OSARP, CERP, FOG, Infrastructure Acquisitions, and MMS programs.

Key Accomplishments and Significant Activities:

1. Captured sanitary sewer easement information from record drawings and subdivision plats to augment existing data and facilitate a more efficient access process for maintenance and capital projects. Maps of easements were scanned into GIS software and digitized into the GIS layer. Attributes of the easement were recorded for future use. Approximately 1,198 easements have been identified from drawings and subdivision plats, scanned into GIS software, and added to the GIS layer.
2. Used heat maps of root-caused SSOs to prioritize areas needing chemical root control, address known root intrusions, and prevent potential future root-caused SSOs.
3. Used GIS aerial photographs to (i) identify areas where sanitary sewer easements need clearing for maintenance access; (ii) make accurate estimates of the work needed; and (iii) provide contractors with precise areas to clear.
4. Installed and implemented FME Desktop and Sewer tools to connect applications and transform GIS data. This tool allows a robust QA/QC process with workflows on a schedule or when an event is triggered to ensure data is incorporated into GIS efficiently.
5. Created applications and workflows to streamline and organize the submission and retention of as-built drawings as the GIS is updated.
6. Continued to use GIS tools, such as dashboards, web accessible maps, and web accessible apps, to provide data to users throughout the County.
7. Continued updates to GIS to reflect new developments, connectivity issues, sewer system improvements, and maintenance revisions. As assets are added to GIS, they are also added to the Maintenance Management System Program for maintenance and evaluation. Maintenance activity is regularly updated to the GIS and used in planning for continuing maintenance.

4. Maintenance Management System Program (CD VI.B.iv)

The County's MMS Program involves a combination of preventive, corrective, and predictive inspection and maintenance activities to maintain the WCTS. The Program is divided into two key areas: 1) tools that support the maintenance activities and 2) specific maintenance activities performed for the County's gravity system, lift stations, and force mains. Communication systems, physical inspection and testing, information management systems, and inventory management are tools used to support maintenance activities. Gravity system maintenance and lift stations, force mains, and ARV maintenance describe the County's maintenance activities established under the MMS Program. Finally, the MMS provides key performance indicators (KPIs) that will enable the County to measure its performance.

Key Accomplishments and Significant Activities:

1. <u>Inventory Management</u>
    a. Successfully performed physical inventory at each warehouse location. The DWM Operations' warehouse location achieved outstanding audit results of 99.6 percent for 2020, demonstrating that DWM is accurately tracking and maintaining the computerized inventory of the warehouse.
    b. DWM warehouse inventory value was $6,701,925 for 2020, thus providing assets as needed to ensure efficient maintenance and repair activities.

2. Gravity System Maintenance

   a. Performed 1,601 sewer creek crossing inspections.

   b. Continued chemical root control application in the system to remove root intrusions identified during assessment. A total of 4,002,240 LF of sewer mains were treated for roots.

   c. Continued sewer easement clearing in the system to allow efficient access to assets during maintenance activities. A total of 9,794,262 square feet of sewer easements were cleared.

   d. Continued to input repair and maintenance data into CMMS, including lining, point repairs, cleaning, etc., to track these maintenance activities and their effectiveness on system operation.

   e. Completed 549 miles of small-diameter sanitary sewer cleaning despite the current COVID-19 pandemic where one of County's three prime contractors was unable to work for a month and another is no longer able to provide the County with services.

3. Lift Station, Force Main, and ARV Maintenance

   a. Working statistics:
      i. Completed 4,395 preventive maintenance work orders (366/month) to ensure proper maintenance and continued functioning of the assets.

      ii. Maintained a 30 day backlog of two or less work orders for 12 months to ensure work is being conducted in an efficient manner and within a short time after being identified and planned. Three months had zero backlogged work orders.

      iii. Averaged one lift station per month with one pump out for service to minimize the risk of an entire station being without pumping capacity.

      iv. Inspected all 62 force main easements to ensure continued access for maintenance and assess if any vegetative growth could potentially affect the structural integrity of the force main.

      v. Inspected all 64 discharge manholes for structural integrity.

      vi. Performed force main pressure testing at 64 stations to test for any pipe leakage.

      vii. Inspected 46 of 55 ARVs to ensure they were operating automatically to release air pockets in the force main.

      viii. Completed lift station work orders:
         1. 76 percent preventive maintenance
         2. 23 percent corrective maintenance
         3. 1 percent emergency maintenance

   b. DWM performed electrical ground testing (amp and volt readings) and thermal scans of all 65 lift stations as a preventive measure to ensure proper operation and identify any potential developing electrical problems.

4. Tracked KPIs (refer to Attachment A).

5. Collection and Transmission Systems Training Program (CD VI.B.v)

In 2020, the County continued to deliver technical and skills training to DWM personnel related to applicable job responsibilities. CERP training is a focus each year and included coordination with New Employee Orientation classes to train all new DWM personnel on CD responsibilities (in earlier years, only new Operations personnel received CERP training).

Key Accomplishments and Significant Activities:

1. Continued to implement the updated Training Program Plan (2018) using the Training Matrix, Training Calendar, and Compliance Software.
2. Completed 5,919 hours of technical, leadership, managerial, and skills training.
3. Developed training reports to ensure employees completed scheduled training session within a specified timeframe.

6. System-Wide Flow and Rainfall Monitoring Program (CD VI.B.vi)

The Program's goal is to provide an efficient and effective data monitoring network to assess capacity and infiltration/inflow (I/I) issues within the WCTS. All major milestones for this program have been completed. The ongoing program's focus is on data collection for analysis of capacity requests and I/I reduction efforts. Moreover, the County continues to use the program for SSO reduction efforts and identification of areas that could possibly lead to an SSO.

Key Accomplishments and Significant Activities:

1. Maintained the County-wide flow monitoring and rain gauge system for the dynamic model and system flow analysis.
2. Continued implementing a maintenance and calibration program, supporting a monthly average of 275 flow monitors and 41 rain gauges. Maintenance field operations are supported by daily, weekly, and monthly QA/QC measures to identify meters in need of additional attention. Flow monitoring field crews performed maintenance site visits. County engaged contractors to support flow monitoring operations and to supplement County resources, which were reduced because of the pandemic.
3. Maintained and deployed temporary flow monitors in the system to assist in determining available sewer capacity and collecting additional data on known collection system issues.
4. Continued to deploy manhole-mounted I/I monitoring system in new areas. Additional location candidates have been identified for future deployments in 2021.
5. Continued collecting data to support multiple CMOM programs and engineering studies.
    a. Generated reports for inter-governmental billing.
    b. Determined spill volumes where possible as part of CERP.
    c. Performed I/I studies for areas with suspected new or changing system flow.
    d. Investigated other non-ideal flow, including backwater and surcharge conditions.
6. Implemented an audit program to quantify and track data quality. The audit program includes consideration for timeliness of maintenance visits, consistency, and timeliness of QA/QC communications.

7. System-Wide Hydraulic Model (CD VI.B.vii)

Calibration of each of the dynamic hydraulic models (Nancy Creek, Snapfinger, Intrenchment Creek, Pole Bridge, North Fork Peachtree Creek, South Fork Peachtree Creek, and Miscellaneous) was completed and documented. These models and reports were reviewed by DWM and a third party and were submitted to EPA and EPD. The regulatory agencies submitted comments that were subsequently reviewed and addressed. CDPMT staff were trained on how the models were developed and how to use them for capacity requests.

Since completion of the CD requirements, the modeling team has focused on updating the models with new GIS and survey data, as well as improving the calibration using the full groundwater infiltration module in InfoWorks ICM. The calibrated models have been used to identify capacity relief projects in Snapfinger and South Fork Peachtree Creek. The calibrated models have also been used to verify planned capacity improvement projects, pending approval of the Modification.

Key Accomplishments and Significant Activities:

1. Completed DWM and peer review process for Snapfinger and Pole Bridge model areas.
2. Completed training to County staff on model for North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas.
3. Submitted dynamic hydraulic models and reports to EPA/EPD for Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous model areas.
4. Held conference call with EPA/EPD to discuss technical review comments for the Nancy Creek Model Report.
5. Completed the South Fork Peachtree Creek and Intrenchment Creek groundwater infiltration module calibration update.
6. Began the North Fork Peachtree Creek hydraulic model and groundwater infiltration module update.

8. Financial Analysis Program (CD VI.B.viii)

The Financial Analysis Program incorporates aspects of revenue estimating, budgeting, costs analysis, and customer rate setting such that DWM provides the desired level of service to its customers while meeting its regulatory requirements. DWM continues to monitor its revenue and expenditure budgets and is on track to meet its revenue target and fall within its expenditure budget.

Key Accomplishments and Significant Activities:

1. Continued tracking of maintenance costs associated with work done on assets through a work-order-based CMMS software in the Operations Division. The software tracks equipment, labor, and material costs, and classifies work order type as corrective, preventive, or emergency maintenance. All work associated with design and construction of sewer rehabilitation projects are tracked in the PASARP and OSARP tasks.
2. Table 8-1 lists the costs associated with work orders and maintenance type.

Table 8-1 2020 Sewer System Costs by Work Order Type

Work Order Type	Sewer System Costs ($)	Sewer System Costs (%)
Corrective Maintenance	$531,469	22%
Preventive Maintenance	$80,979	3%
Emergency Maintenance	$1,648,900	68%
Miscellaneous Maintenance	$158,802	7%
Total	**$2,420,150**	**100%**

9. Infrastructure Acquisitions Program (CD VI.B.ix)

The goals of the Infrastructure Acquisitions Program are to acquire infrastructure that meets County standards for design, construction, capacity, and efficiency, and to maintain a program that properly monitors the acquisition process, encourages input, and is efficient for contractors, developers, property owners, and the County. During 2016 through 2019, DWM saw large increases in the number of

development applications in the County, but recorded a decrease in 2020, presumably because of the pandemic. Additional resources were added to the program to handle the increased workload and to coordinate with the municipalities within the County. Capacity allotment and certification will continue to be one of the main focuses of the program going forward.

Key Accomplishments and Significant Activities:

1. Evaluated and/or acquired 47,503 LF of pipe, thereby ensuring adherence with the County's design standards.
2. Reviewed 1,330 plans.
3. Reviewed 44 plats.
4. Received 400 sewer capacity requests.
5. Issued 316 sewer capacity letters either confirming available capacity, requiring a sewer action plan, or noting that the capacity request resulted in a zero or less impact to system capacity.

10. Priority Areas Sewer Assessment and Rehab Program (CD VI.B.x)

The main purpose of the PASARP is to provide for the identification, delineation, assessment, prioritization, and rehabilitation of Priority Areas (both Initial Priority Areas and Additional Priority Areas) as explained in the CD within the County WCTS. The Initial and Additional Priority Areas total approximately 831 miles of sewers (approximately 33 percent of the WCTS).[4] In implementing the PASARP, the County is undertaking certain condition, structural, and hydraulic assessments within the Priority Areas to identify, prioritize, and complete appropriate rehabilitation measures within those areas. As part of the implementation process, the County is tracking rehabilitation measures completed within the Priority Areas and will determine the effectiveness of those measures, using selected KPIs.

In 2017, the County substantially completed the 2-year condition assessment phase of the PASARP, using a wide range of evaluative tools and programs including private lateral investigations, corrosion defect identifications, MCA, flow monitoring, CCTV inspection, gravity sewer line defect analysis, TISCIT, acoustical testing, and smoke testing. The data obtained during this sewer system condition assessment process have been documented and archived in the County's data management system. Defects identified during the assessment phase, which potentially posed an immediate risk of structural failure or which could contribute to an SSO occurrence, were scheduled for immediate rehabilitation. Examples of immediate rehabilitation measures already undertaken by the County include making urgent point repairs and raising buried manholes to allow for asset access. Because the PASARP assessment is complete, the focus is on continuing to package and prioritize cost-effective rehabilitation recommendations. The first of many prioritized rehabilitation contracts resulting from the assessment phase began in 2017.

Key Accomplishments and Significant Activities:

1. Continued construction in Design-Build packages 1–3 to address structural defects identified from assessment activities and improve conveyance capacity. This includes sewer rehabilitation of 31,468 LF, of which 14,965 LF involved pipe replacement.
2. Continued design of remaining PASARP rehabilitation packages for more than 770,133 LF of sewer to date by four annual engineering firms and the CIPPMT.
3. Procured annual Construction Contract 1 and Cooperative agreements with two contractors and began construction of lining and point repairs, including 231,748 LF of sewer rehabilitation.

[4]Updated mileage based on DWM's 2020 GIS database update that removed assets found during survey to be abandoned or not owned by the County.

4. Total amount spent in 2020 to date for design and construction in contracts as noted above exceeds $112 million.
5. Continued execution of project communications and community outreach for ongoing projects.
6. Tracked KPIs as shown in Table 10-1.

Table 10-1 2020 PASARP KPIs

KPI	2020 Performance
SSOs per 100 miles of WCTS within the Priority Areas per year	22.3 per 100 miles within the Priority Areas per year
SSOs per 100 miles of WCTS within the Priority Areas per year per inch of rain within the Priority Areas	0.34 per 100 miles per year per inch of rain within the Priority Areas
Total volume[a] of spills per 100 miles of WCTS within the Priority Areas	604,493 gallons per 100 miles within the Priority Areas
Total volume[b] of spills per 100 miles per inch of rain within the Priority Areas	9,126 gallons per 100 miles per inch of rain within the Priority Areas
Number of dry weather SSOs[b] within the Priority Areas	90 dry weather SSOs[b] within the Priority Areas

[a] For the year 2020, volume was recorded for 100 percent of the spills.

[b] Dry weather SSO KPI; removed the SSOs with cause listed as STORM or I/I (assumed others were dry weather SSOs).

11. Ongoing Sewer Assessment and Rehabilitation Program (CD X 38.)

The main purpose of the OSARP is to ensure continuous assessment and rehabilitation of the County's WCTS. The OSARP governs assessment and rehabilitation of those areas outside the Priority Areas while the CD is in effect and will continue to exist after the CD expires. This program enables the County to continuously and proactively identify, delineate, and prioritize areas or sewer segments in the WCTS for condition assessment and rehabilitation, as appropriate, starting with areas not being addressed under the PASARP. The implementation of the OSARP takes into consideration data obtained through other ongoing County programs and operations including:

- CMOM programs, information obtained from customers and the public
- Assessment and rehabilitation work performed under the PASARP
- Hydraulic modeling results
- Knowledge and experience of County personnel
- Best engineering practices and/or best management practices

Key Accomplishments and Significant Activities:

1. Performed assessments and cleaning that included approximately:
   a. 448,272 LF (84.9 miles) of acoustic inspection
   b. 547,536 LF (103.7 miles) of smoke testing
   c. 1,214,400 LF (230 miles) of CCTV and associated cleaning
   d. 71,280 LF (13.5 miles) of TISCIT assessments
   e. 3,876 manhole condition assessments
2. Tracked KPIs as shown in Table 11-1.

Table 11-1 2020 OSARP KPIs

KPI	2020 Performance
SSO per 100 miles of WCTS per year within the OSARP areas	15.4 per 100 miles per year
SSO per 100 miles of WCTS per year per inch of rain within the OSARP areas	0.23 per 100 miles per year per inch of rain
Total volume[a] of spills per 100 miles of WCTS within the OSARP areas	1,817,608 gallons per 100 miles
Total volume[a] of spills per 100 miles per inch of rain in the OSARP areas	27,440 gallons per 100 miles per inch of rain
Number of dry weather SSOs[b] in the OSARP areas	173 dry weather SSOs[b]

[a] For the year 2020, volume was recorded for 100 percent of the spills.

[b] Dry weather SSO KPI; removed the SSOs with cause listed as STORM or I/I (assumed others were dry weather SSOs).

12. Supplemental Environmental Project (CD VIII)

The Supplemental Environment Project was completed in 2014.

Attachment A
MMS KPIs

KPI	Formula	2020 Results
Communication System Program		
Landline abandoned calls—no reason available for why caller abandoned call	Number of dropped calls	Average of 435 abandoned calls per month
Call Duration	Duration of calls in minutes divided by the number of calls	Average duration of call: 1 minute 59 seconds Total number of calls in 2020: 58,540
Information Management		
Active SSO-Driven Sewer Work Order Percentage	Number of active SSO-driven sewer work orders ÷ number of completed sewer work orders in the reporting period x 100	0.16% SSO-driven sewer work orders
Inventory Management		
Percentage of out-of-stock items	For the reporting period, the number of parts out of stock when requested ÷ total number of parts requested x 100	<1% of out-of-stock items
Percentage of Physical Inventory Performance	The percentage of items whose quantity on hand does match the quantity in Oracle Work and Asset Management (WAM)	99.6% of items match the quantity in Oracle WAM
Percentage of Physical Inventory Audit	The net cost difference in the value of the physical count vs. the value of inventory shown in Oracle WAM	-0.4% net cost difference
Gravity System		
Percentage of Preventive Maintenance (PM): CCTV Inspection of Sewer Lines, Operations and Contractors	Number of miles inspected ÷ total miles of sewer line x 100	11.0% sewer lines inspected by CCTV
PM: Percentage of Sewer Lines Cleaned	Number of miles cleaned ÷ total miles x 100	28.8% sewer lines cleaned
PM: Linear feet of Root Treatment per year	Number of feet of roots removed ÷ number of linear feet of sewer system x 100 Conversion factor: 5,280 feet/mile	30.5% of system (4,002,240 LF of root treatment)
PM: Percentage of manholes inspected per year	Number manholes inspected ÷ total number of manholes in system x 100	5.9% manholes inspected
Emergency Maintenance (EM): Number of SSOs per mile of gravity sewer line	Number of SSOs ÷ WCTS total miles of gravity lines x 100	17.7 SSOs per 100 miles of gravity sewer line

KPI	Formula	2020 Results
Lift Stations, Force Mains, and Appurtenances		
PM: Percentage of PM Hours Worked versus Corrective Maintenance (CM) and EM Hours Worked	Oracle WAM Value: PM hours total ÷ total hours worked CM and EM hours total ÷ total hours worked. Each Number x 100 to show percentage. Display as ratio.	Preventive Maintenance: 76% Corrective and Emergency Maintenance:24%
PM: Percentage of Backlogged PM Work Orders	Number of work order not completed ÷ total number of work orders (x 100)	<1% backlogged PM work orders
PM: Completed PM Work Orders (based on timeframe specified)	Number of work orders completed by timeframe	>60 days: 0 annually
CM: Percentage of lift stations with pumps out of service	Percent Value. number of stations with pumps out of service ÷ total number of stations (x 100)	1.5% lift stations with pumps out of service
PM: Percent of ARVs inspected, flushed, and serviced	Number of ARVs inspected, flushed, and serviced per year ÷ total number of ARVs (x 100)	82% ARVs inspected, flushed, and serviced

Part II Sanitary Sewer Overflow Trends Analysis

Executive Summary

As required by Section IX, Reporting Requirements 58(b) of the CD, a trends analysis is to be submitted on an annual basis, as follows:

> *"A trends analysis of the number, volume, average duration, and cause of the County's Sanitary Sewer Overflows (SSOs) for the previous twenty-four (24) month period."*

This Trends Analysis includes the 24-month period of 2019 and 2020, but also includes data from 2018 for reference. 2017 is the first year the County implemented an updated SSO reporting process that has been consistently applied through 2020. As required by the CD, the report addresses SSO types (spills, overflows, and building backups) as applied to the various data and trends. This analysis consists of the following sections:

- Section 1 – Classification of SSO Types and Causes
- Section 2 – Number and Volume of SSOs
- Section 3 – Average Duration of SSOs
- Section 4 – Causes of SSOs
- Section 5 – Other Trends

Of the SSOs occurring in the County during 2020, 175 were wet weather SSOs, 111 of which were attributed to six severe wet weather events exceeding a 2-year recurrence level, with stream gauges also recording flooding for four of these events. January through March 2020 recorded approximately 26 inches of rain, which represents more than half of the average annual rainfall in metro Atlanta.[5] Within those months, per USGS and DWM rain gauges, two events exceeded 2-year recurrence levels, February 6 and March 5 (a Georgia declared State of Emergency for flooding), which experienced 26 and 20 wet weather SSOs, respectively. In the month of September, Hurricane Sally alone resulted in 19 wet weather SSOs followed by three major storm events in October, two of which were Hurricanes Delta and Zeta. Hurricane Delta occurred on October 10 and resulted in 24-hour rain totals that ranged from 3.5 inches to 5.5 inches across the County and resulted in 36 SSOs. On October 24, a 2-year recurrence level storm occurred, quickly followed by Hurricane Zeta that caused a total of 9 wet weather SSOs.

The County has identified that many of these wet weather SSOs are due to capacity limitations within the large diameter trunks and has begun to develop projects to address these limitations and provide additional capacity. 38 of the wet weather SSOs in 2020 occurred along the Shoal Creek Trunk. Capacity upgrades for this sewer are proposed for completion at the end of 2027. Other sewer rehabilitation and smaller diameter capacity projects will be completed in the interim.

One project completed this year addressed the repeat SSO in the vicinity of Hood Circle. 22 SSOs have been reported in this area since 2012. Since completion of the sewer replacement project in June 2020, however, no SSOs have been reported in the area.

Overall, the number of SSOs per year has decreased by 14 percent since the Consent Decree was lodged in 2012. For maintenance-related SSOs, this is largely attributable to the County's MMS program including sewer cleaning, the FOG program, and extensive public education campaigns. Figure ES-1 shows the number of SSOs from 2018 to 2020.

[5] National Oceanic and Atmospheric Administration (NOAA) Rainfall Scorecard www.weather.gov/ffc/rainfall_scorecard

Figure ES-1 Reported SSOs per Year (2018–2020)

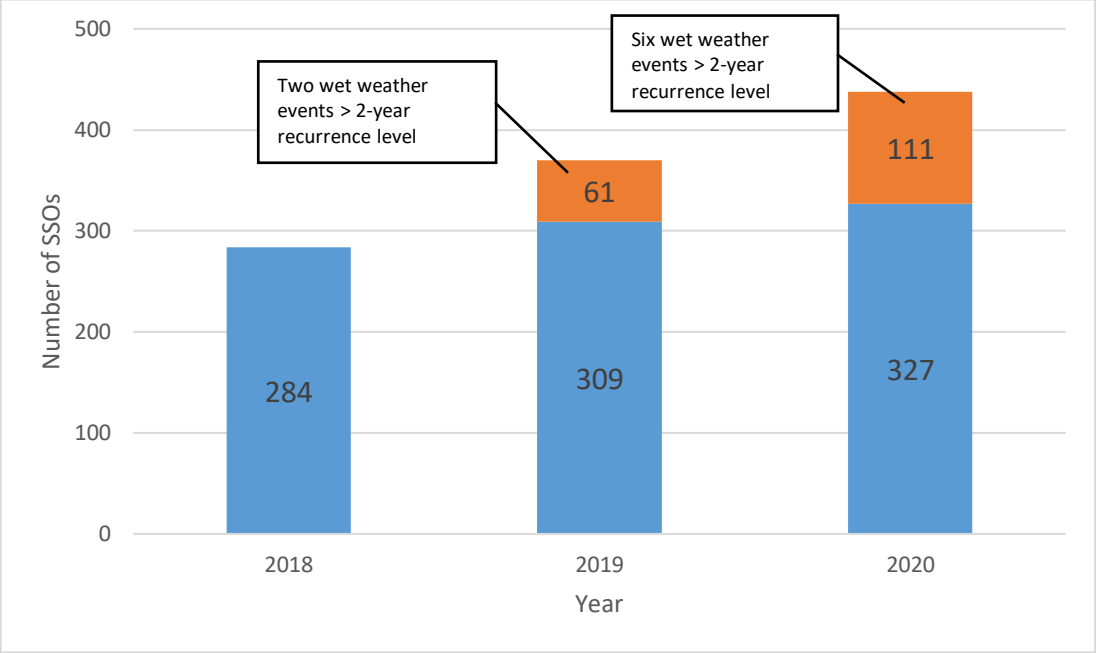
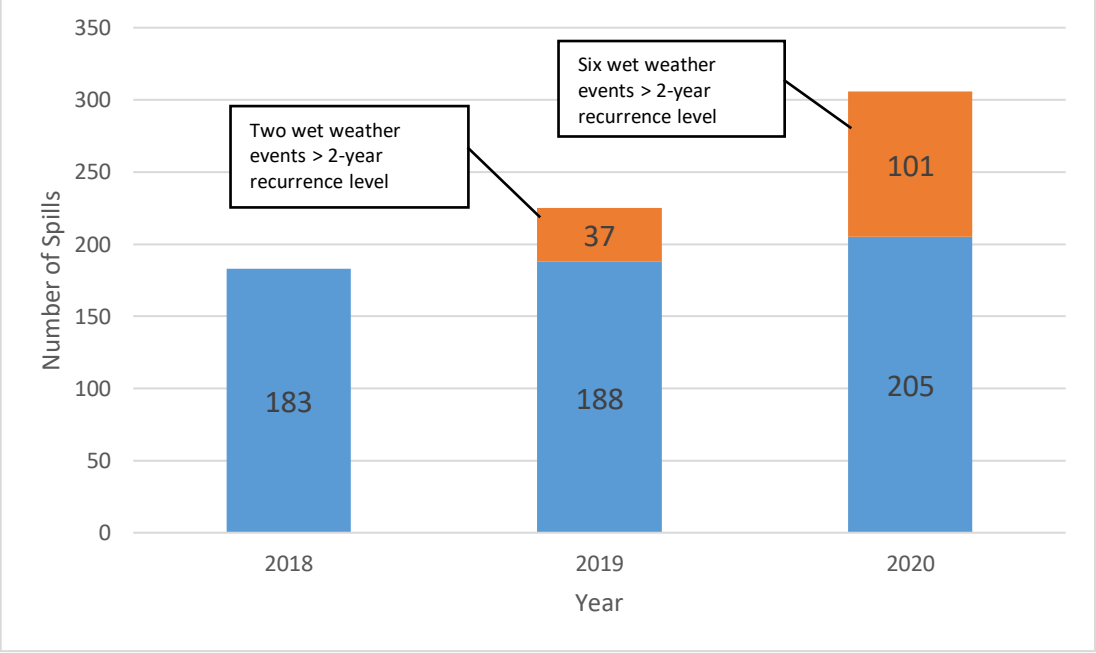


Figure ES-2 shows the number of spills, or discharges of wastewater, that reach waters of the United States or the State. The number of spills increased from 2019 to 2020. Of the 306 spills reported in 2020, 33 percent (101 spills) were reported from six wet weather events: February 6, March 5, September 17 (Hurricane Sally), October 10 (Hurricane Delta), October 24, and October 29 (Hurricane Zeta). Excluding these wet weather events, a total of 205 spills would have occurred, which is more typical of 2018 and 2019 totals.

Figure ES-2 Total Spills by Year (2018–2020)



As shown on Figure ES-3, the number of spills attributable to structural causes remained the same from 2019 to 2020, and is the lowest number of structural spills recorded since 2012. Spills attributable to grease decreased slightly by 7 percent from 2019 to 2020. The number of spills attributable to wet weather increased in 2020 compared to previous years, primarily because of a multiple significant wet

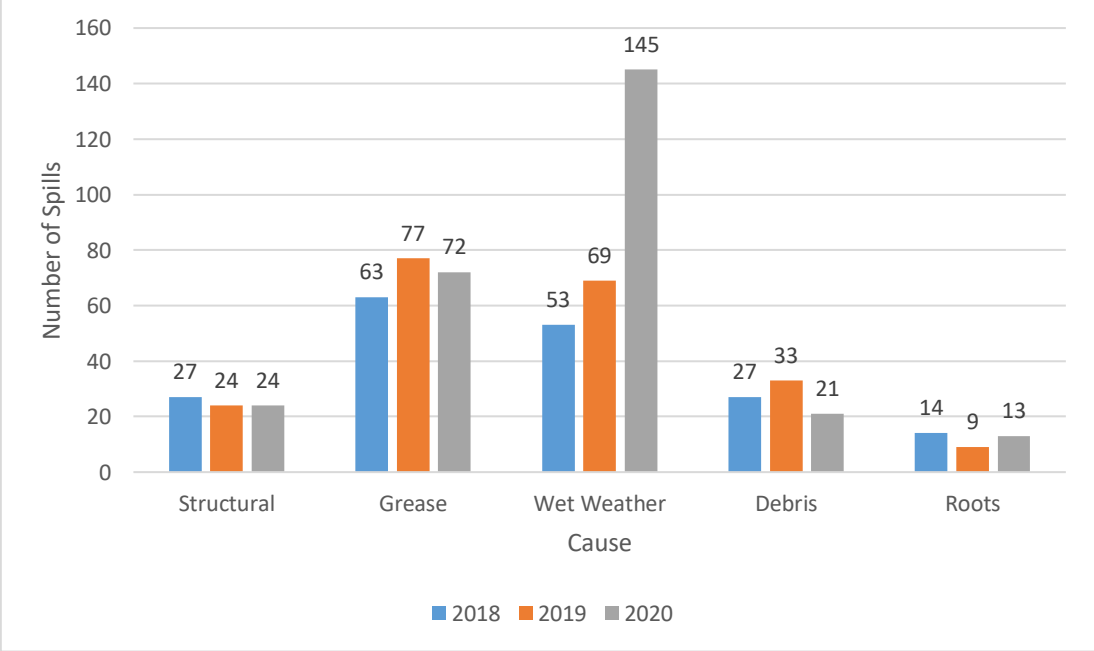
weather events as noted previously. Spills attributable to debris decreased by 36 percent in 2020 from 2019. This significant improvement demonstrates that the ongoing public outreach on disposable wipes as well as the County's existing small-diameter sewer cleaning contracts and a large-diameter cleaning contract in place are working.

Furthermore, as the County maintains an extensive flow monitoring network, continues its efforts to conduct sewer condition assessment, and continues to implement MMS programs, the County can more readily identify SSOs. With a flow monitoring network of more than 200 flow meters throughout the County that provides data that can be reviewed on a daily, weekly, and monthly basis, any sudden changes in flow behavior which may indicate a possible SSO are called in for further investigation. This has resulted in prevention of potential SSOs. On October 27, 2020, the flow monitoring team noticed steadily increasing depth in a flow meter upstream of a lift station. A crew visited the lift station and noticed an issue with the grinder. They were able to resolve it quickly and verified that flow returned to normal. In total, DWM used flow monitoring data to identify, self-report and address 48 SSOs in 2020.

Sewer condition assessment work identifies defects that can contribute to SSOs as well. Since 2016, as part of the MMS program, DWM increased the number of inspections and put resources into the field in remote places, such as along streams and in ravines that are generally out of sight. If SSOs were found, DWM subsequently reported the findings appropriately.

DWM's increased stream sampling effort also continues to help identify SSOs that would have previously remained unknown. Source tracking from elevated fecal counts in stream samples identified three SSOs that DWM was able to locate and address.

Figure ES-3 Total Spills by Year by Cause Category (2018–2020)



Notes: Cause Categories may include more than one cause.
Some spills appear in more than one Cause Category.
Other causes for spills not shown in this figure include pump failure, vandalism, contractor-related, etc.

1. Classification of SSO Types and Causes

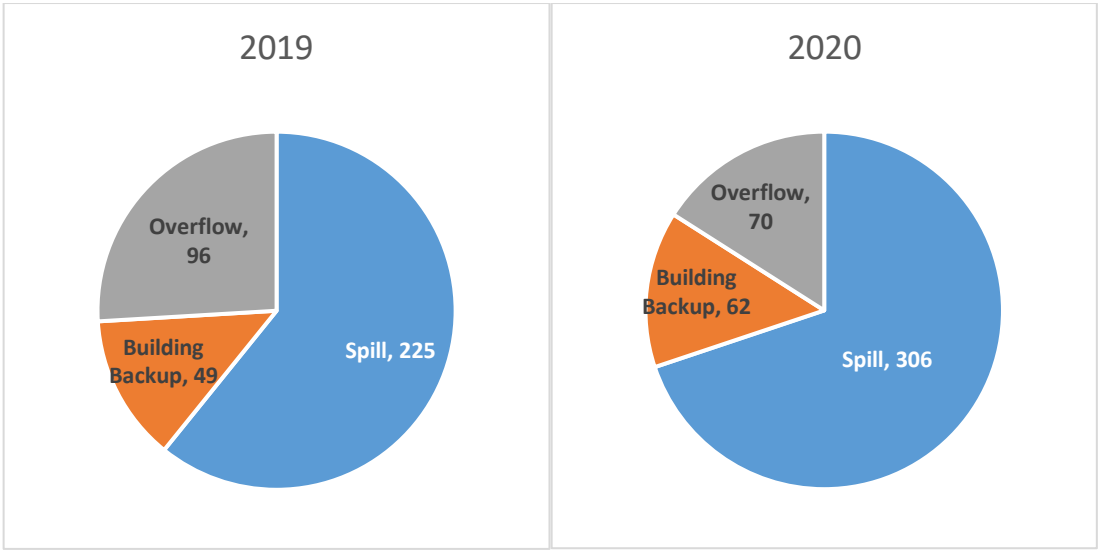
The CD requires a trend analysis of the prior 24-month period. Although 2017 was the first year the County implemented an updated SSO reporting process that has been consistently applied through 2020, this report focuses on trends from 2018 through 2020.

DWM categorizes each SSO that occurs as one of three types as defined in the CD. This initial categorization is based on multiple factors, including details provided by the reporting party, details provided by County response crews, and reports from County labs. As details of each SSO are learned, an SSO might be re-categorized accordingly. Definitions from the CD of each type of SSO are as follows:

- **Spill**: a discharge of wastewater from the WCTS, or from a wastewater treatment facility caused by problems in the WCTS, that reaches waters of the United States or the State, including a prohibited bypass, but not including other discharges from a point source that is specified in the National Pollutant Discharge Elimination System permits.
- **Overflow**: a release of wastewater from the WCTS, or from a wastewater treatment facility caused by problems in the WCTS that does not reach waters of the United States or the State.
- **Building Backup**: a wastewater backup into a building that is caused by blockages, malfunctions, or flow conditions in the WCTS; however, provided that a wastewater backup into a building that is caused by a blockage or other malfunction of a Private Lateral, or other piping or conveyance system that the County does not own or operate, is not a Building Backup.

Figure 1-1 shows the distribution of SSOs by type for 2020 as compared to 2019. Spills account for the majority of the SSOs followed by overflows then building backups. From 2019 to 2020, the number of occurrences of each SSO type increased, primarily because of extreme wet weather events in 2020.

Figure 1-1 SSOs by Type (2019–2020)



In addition to categorizing SSOs based on type, the County investigates the root cause of SSOs and classifies the events accordingly. Table 1-1 lists the types of causes used by DWM for the period of 2017 to 2020. This investigation and classification includes a review of the results of assessment tools, such as CCTV, and includes consideration of whether other sections of the WCTS might be vulnerable to a similar SSO event. To identify and prevent future SSOs, a portion of this analysis focuses on causes determined to be maintenance-related. For this Trends Analysis, the following terms are defined:

- Maintenance-Related: an SSO caused by grease, roots, debris, or any combination thereof.
- Other: an SSO caused by anything other than grease, roots, debris, or any combination thereof.

Table 1-1 SSO Causes Used by DWM

Cause Code	Cause Title	Description
BRK LN/STR	Broken line/structure	Broken pipe, manhole, force main, or other appurtenance.
CC	County contractor	Caused by a contractor performing work for the County.
CRK BRK	Creek crossing break	Structural failure of sewer infrastructure at a creek crossing.
DB	Debris	Solids that have collected in a pipe or manhole.
GR	Grease	Build-up of grease in a pipe or manhole.
GRDB	Grease and debris	Combination of grease and solids build-up in a pipe or manhole.
GRRT	Grease and roots	Combination of grease build-up and root intrusion in a pipe or manhole.
GRRTDB	Grease, roots, and debris	Combination of grease and solids build-up and root intrusion in a pipe or manhole.
I&I	Infiltration and Inflow	Occurs when I/I enters the system and uses existing capacity, not necessarily associated with a wet weather event.
LFT STN FLR	Lift station failure	Failure at a lift station.
MH	Manhole	Caused by structural defect at or in manhole.
OTH	Other	Use of this code requires a detailed description.
OUTSIDE CON	Outside contractor	Caused by a contractor not performing work for the County.
PMP FLR	Pump failure	Caused by failure during bypass pumping.
RT	Roots	Intrusion of roots into a pipe or manhole.
RTDB	Roots and debris	Combination of root intrusion and solids build-up in a pipe or manhole.
STORM	Storm	Caused by a storm. Includes wet weather capacity, failures at lift stations resulting from lightning strikes or storm-induced power outages, and maintenance-related SSO during storm events.
TREE	Tree (fallen)	Damaged caused by falling trees.
UNK	Unknown	Used when no clear cause can be identified. The in-depth data review previously conducted in 2016 identified additional SSOs where the cause could not be determined retroactively. For those instances, the UNK code was used.
VAND	Vandalism	Intentional damage caused by vandals.

2. Number and Volume of SSOs

As shown on Figure 2-1, the number of SSOs per year increased from 2018 to 2020, which can be partially attributed to the increase in extreme wet weather events, particularly six severe wet weather events that exceeded 2-year recurrence levels: February 6, March 5 (Georgia State of Emergency for flooding), September 17 (Hurricane Sally), October 10 (Hurricane Delta), October 24, and October 29 (Hurricane Zeta). These six events account for 111 of the reported SSOs for the year. Overall, the number of SSOs has decreased by 14 percent since the CD was lodged in 2012. The overall decreasing trend in the number of SSOs since 2012 can be attributed to the County's MMS programs including sewer cleaning, root control, the FOG program, and extensive public education campaigns. Multiple program improvements have allowed the County to more readily respond to and identify SSOs. These improvements include expansion of the County's flow monitoring network, further progress of sewer system investigation activities, new stream sampling protocols to detect spills, and implementation of the Cityworks work order management system to track identification and response to SSOs.

Figure 2-1 Reported SSOs per Year (2018–2020)

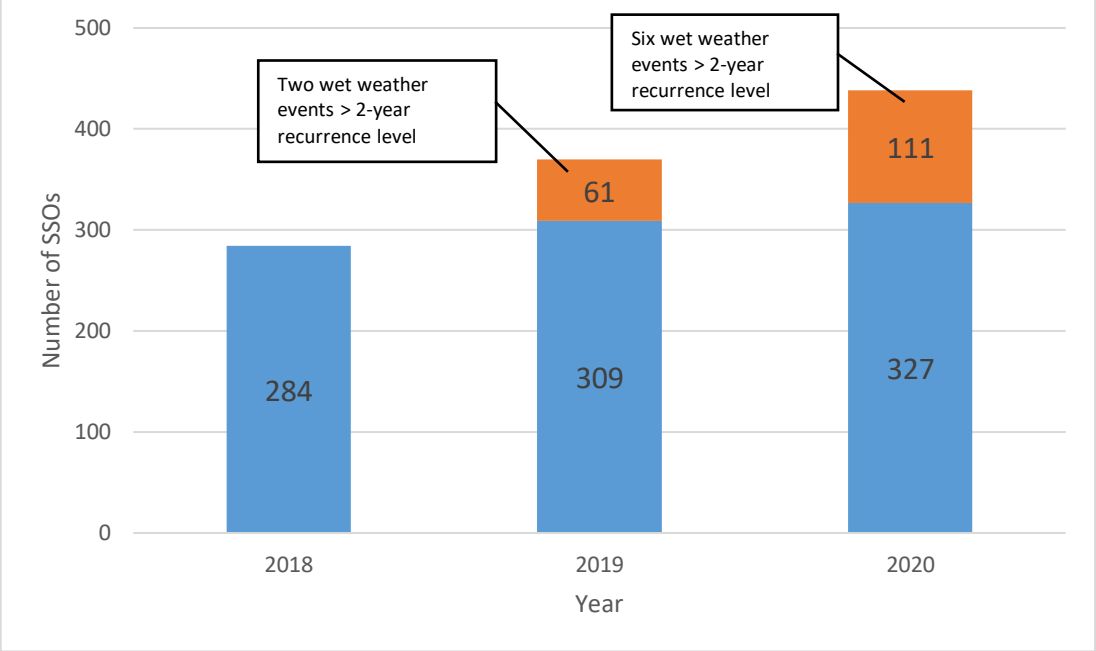


Figure 2-2 shows annual rainfall for the same period of record (2018–2020). Total rainfall for the year decreased from 2018 to 2019 but then increased from 2019 to 2020. Although the total rainfall recorded in 2020 is 3 inches less than that of 2018, 2020 experienced multiple severe wet weather events that exceeded a 2-year recurrence level.

Figure 2-2 Annual Precipitation (inches) (2018–2020)

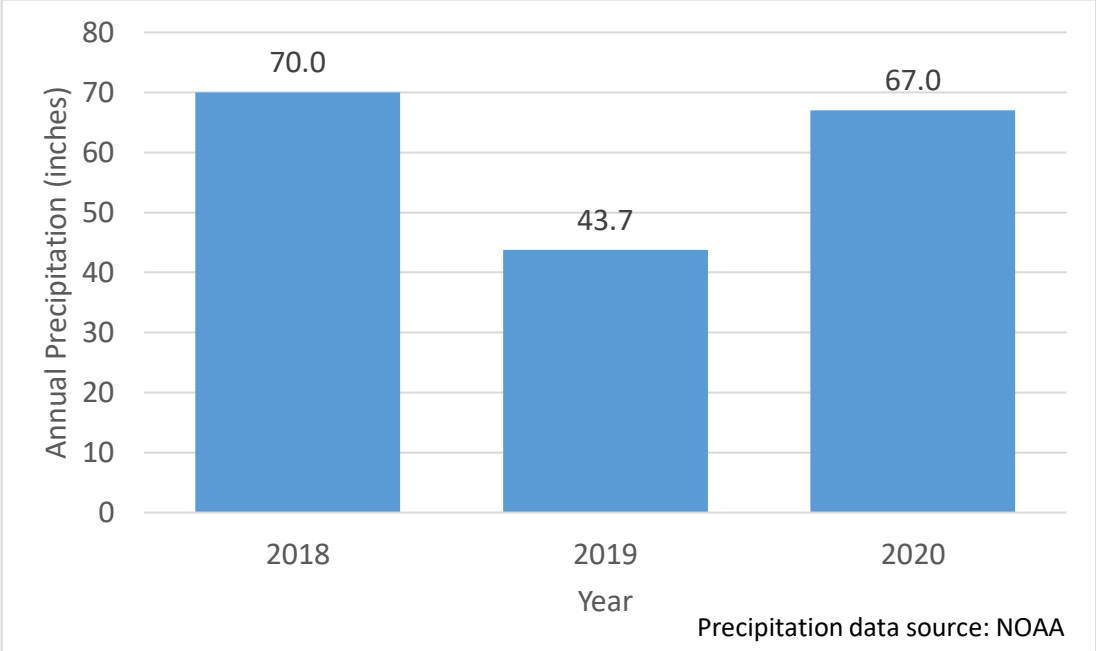
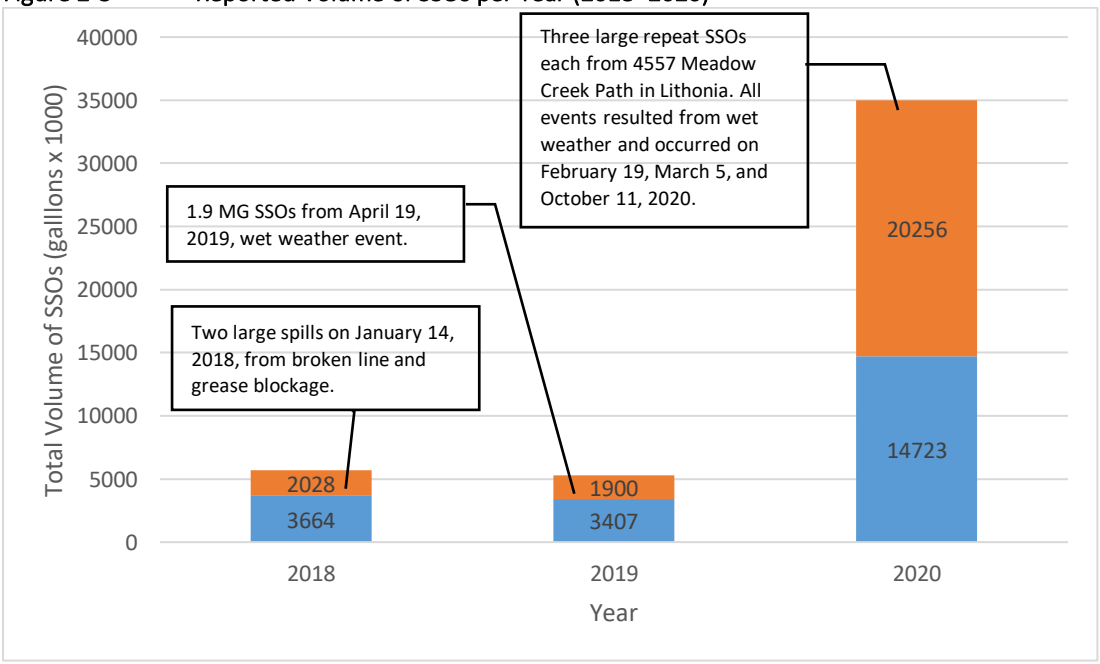


Figure 2-3 presents the total volume (gallons) of SSOs for each year. From 2018 to 2020, an overall trend in decreasing volume can be seen, especially when taking outliers into account. However, the major storm events of 2020 resulted in a significant increase in SSO volumes, with the three largest outliers all occurring at repeat SSO site, Meadow Creek Path. A project is being developed to address the Meadow Creek SSO with a proposed completion timeline of December 2025. While cleaning and FOG program enforcement has overall decreased maintenance-related SSOs, wet-weather-related SSOs are expected to decrease as the County begins construction on large capacity projects.

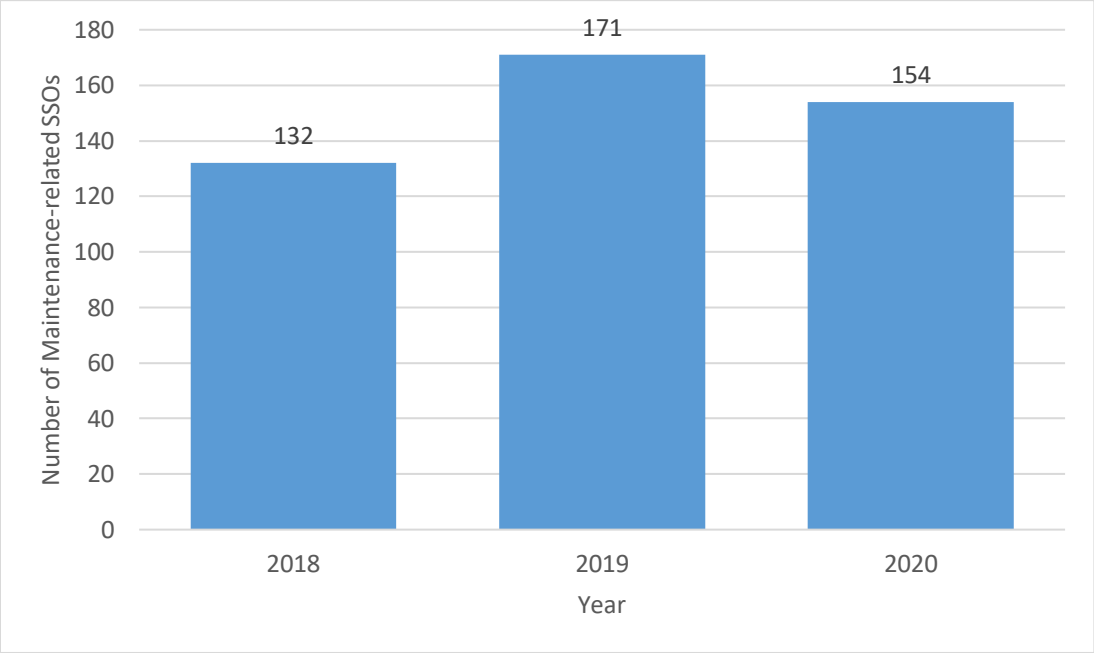
Figure 2-3 Reported Volume of SSOs per Year (2018–2020)



Figures 2-4 and 2-5 show the number of maintenance-related SSOs and the associated annual volumes, respectively, from 2018 through 2020. From a peak of 265 SSOs in 2013 to 154 SSOs in 2020, DWM has reduced maintenance-related SSOs by 42 percent. The increase in maintenance-related SSOs from 2018 to 2019 is attributed primarily to the increase of blockages caused by hygienic wipes. However, with

increased educational programs, maintenance-related SSOs decreased by approximately 10 percent from 2019 to 2020.

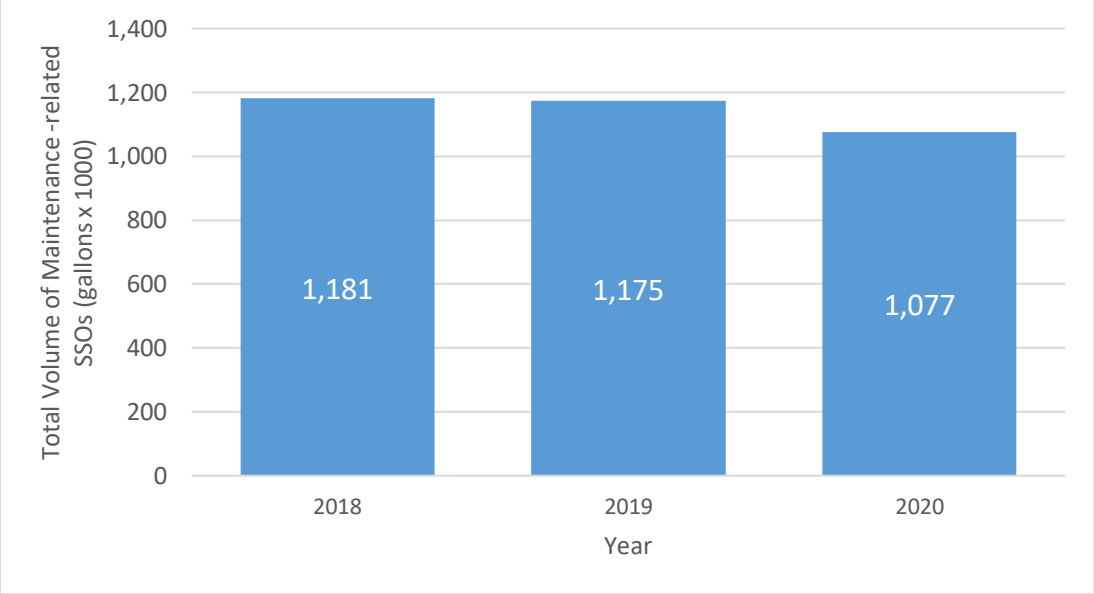
Figure 2-4 Maintenance-Related SSOs per Year (2018–2020)



Note: Maintenance-related SSOs are caused by grease, roots, debris, or any combination thereof.

The volume of maintenance-related SSOs for 2020 decreased slightly from prior years. As discussed previously, DWM believes this is attributable to the County's implementation of MMS programs, such as sewer cleaning, root control, Cityworks, and the effectiveness of the FOG Program and public education campaigns.

Figure 2-5 Volume of Maintenance-Related SSOs per Year (2018–2020)



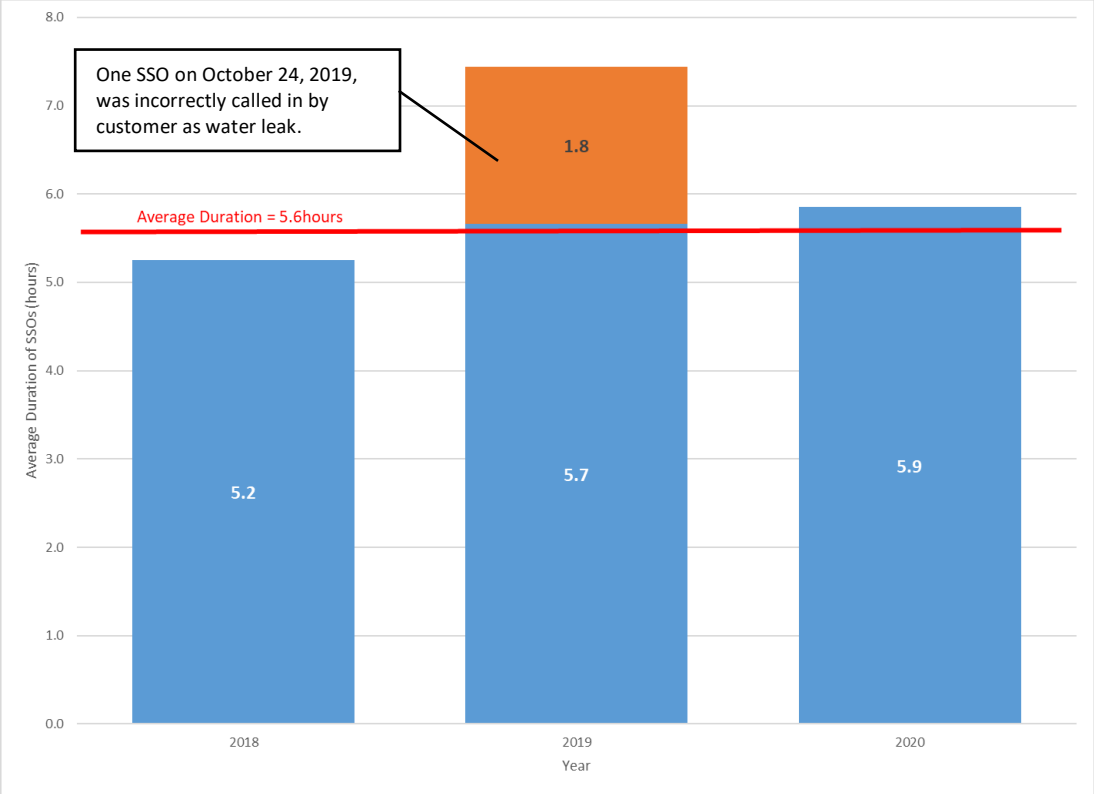
DWM's continued focus on its comprehensive cleaning program has resulted in the decrease in volume of maintenance-related SSOs in 2020. Because the assessment of the PASARP areas was substantially completed in 2017, a new focus on rehabilitation can be seen in 2018 as DWM procured two design-build rehabilitation contracts, issued Task Orders to engineering firms with existing contracts for the design of four additional rehabilitation packages, and has also started rehabilitation construction in the PASARP

areas. In 2019 a third design-build rehabilitation contract was procured in addition to annual construction contracts and cooperative agreements for two additional rehabilitation contractors. In 2020 procurement began for two large Gravity Sewer Rehabilitation and Replacement contracts that will continue pipe rehabilitation as needed as well as upsize pipes to improve capacity within the system. While addressing the structural integrity of the sewer assets, rehabilitation will address and reduce sources of I/I to help minimize SSOs that occur because of wet weather.

3. Average Duration of SSOs

Duration of SSOs are calculated from the time that the SSO was reported until it is resolved. This parameter depends on how the SSO was identified, how quickly the source can be located and accessed, and the cause of the SSO. The average SSO duration from 2018 through 2020 was approximately 5.6 hours, as shown on Figure 3-1. The increase in SSO duration since 2018 can largely be attributed to SSOs located by self-reporting, as described below.

Figure 3-1 Average SSO Duration by Year (2018–2020)



While receiving calls is the primary source of SSO reporting, DWM also locates spills using in-house programs, including flow monitoring and stream sampling. As data is collected that indicates a possible SSO, whether through a sudden, significant change in metered flows or an increase in fecal count in waterways, DWM investigates through site visits and creek walks. The investigation to locate the SSO source can significantly increase the total duration. In 2020, DWM identified 48 SSOs through flow monitoring and 3 from stream sampling. The duration of a spill also heavily depends on the flow restoration actions needed to address the SSO. Evaluating the duration of SSOs is more effectively done by grouping causes together that have the same general flow restoration action. Table 3-1 lists all causes noted in Table 1-1 and maps them to a broader group.

Table 3-1 Mapping Cause to Cause Groups

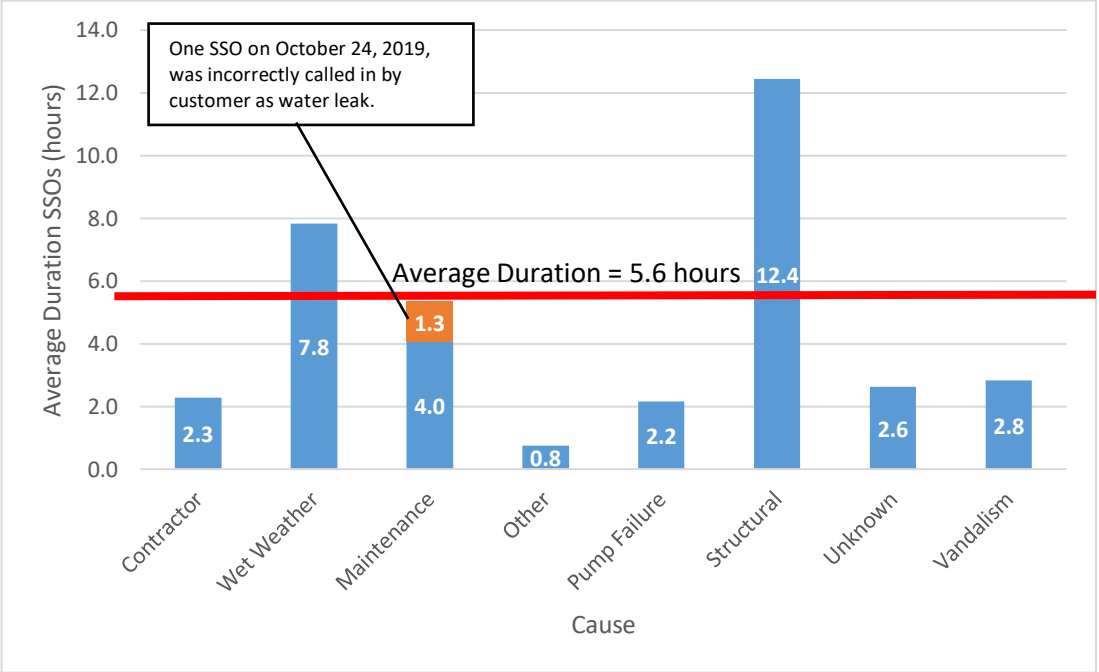
Cause	Group
BRK LN/STR	Structural
CC	Contractor
CRK BRK	Structural
DB	Maintenance
GR	Maintenance
GRDB	Maintenance
GRRT	Maintenance
GRRTDB	Maintenance
I&I[a]	Wet Weather
LFT STN FLR	Pump Failure

Cause	Group
MH	Structural
OTH	Other
OUTSIDE CON	Contractor
PMP FLR	Pump Failure
RT	Maintenance
RTDB	Maintenance
STORM	Wet Weather
TREE	Structural
UNK	Unknown
VAND	Vandalism

[a] All I/I SSOs recorded to date were wet-weather-related.

Figure 3-2 presents average durations for all SSOs from 2018 through 2020. Two causes had durations that were greater than average: wet weather and structural.

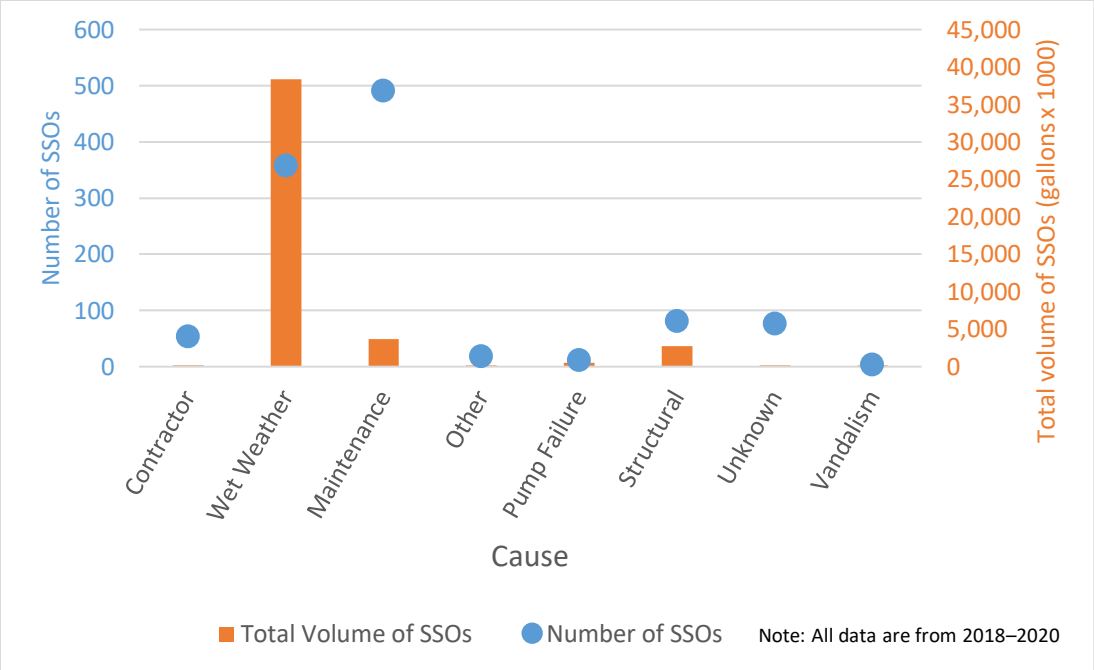
Figure 3-2 Average SSO Duration by Cause (2018–2020)



4. Causes of SSOs

Maintenance-related SSOs, including grease, roots, and debris, decreased from 2012 to 2020 by 33 percent, resulting in part from increased sewer cleaning and the County's commercial FOG Management Program and Public Education Programs. In reviewing data from the past 3 years, blockages continue to account for more SSOs than any other cause (45 percent) and represent the second greatest volume (8 percent) of all SSO causes (refer to Figure 4-1). The cause with the greatest volume is storms, and the County has taken steps to address impacts from storm-related events. Specifically, the County has undertaken follow-up and corrective action for private I/I and stormwater connections to the sanitary sewer in the Priority Areas. In 2020, 1,254 notices were sent to private owners or other incorporated cities to correct violations that may have allowed stormwater to enter the sewer infrastructure. The continuation of these programs, along with the rehabilitation construction that is now underway, will begin to eliminate sources of I/I within the sewer system and provide additional capacity to help reduce the SSOs that occur because of wet weather.

Figure 4-1 SSOs by Count, Volume, and Cause (2018–2020)



Selected causes can be grouped into categories that help assess the effectiveness of DWM's efforts to reduce SSOs. These broader categories are grease, structural, wet weather, and debris. Table 4-1 lists the causes assigned to each category. As shown on Figure 4-2, the number of grease, debris, and structural SSOs remained relatively constant from 2019 to 2020 despite a reduced work force as a result of the pandemic. Because the County experienced more extreme wet weather events in 2020 compared to 2018 and 2019, more SSOs resulting from storms occurred in 2020 compared to the previous year.

Table 4-1 Mapping Cause to Cause Categories

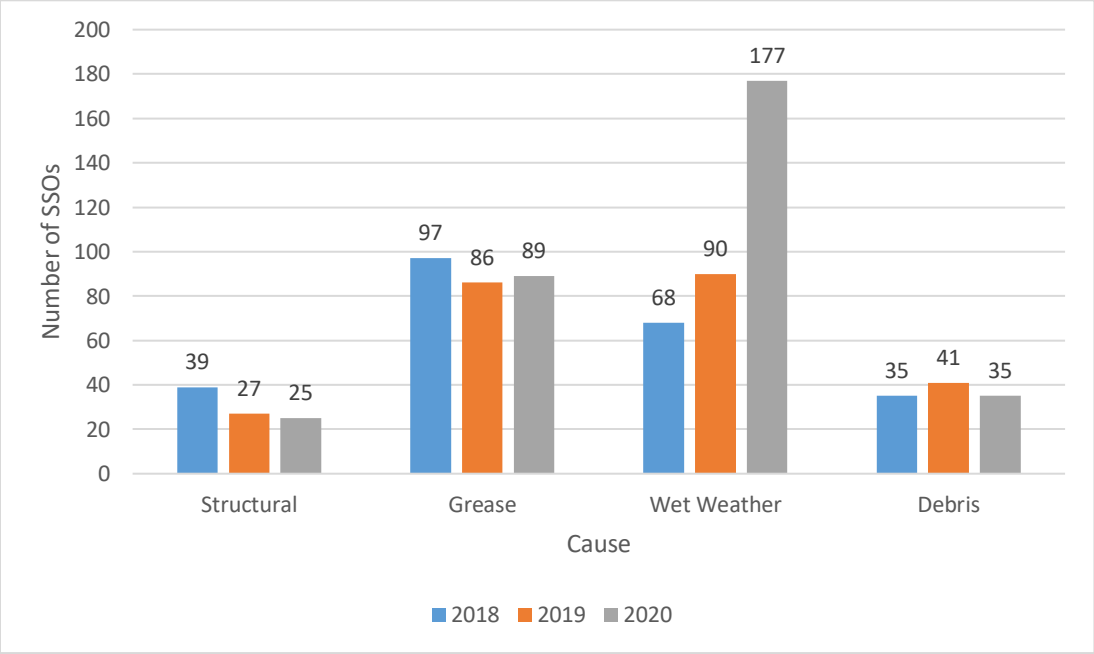
Cause	Grease	Structural	Wet Weather	Debris
BRK LN/STR		STRUC		
CC				
CRK BRK		STRUC		
CRK BRN		STRUC		
DB				DB

Table 4-1 Mapping Cause to Cause Categories

Cause	Grease	Structural	Wet Weather	Debris
GR	GR			
GRDB	GR			DB
GRRT	GR	STRUC		
GRRTDB	GR	STRUC		DB
I&I[a]			WET WEATHER	
LFT STN FLR				
MH				
OTH				
OUTSIDE CON				
PMP FLR				
RT		STRUC		
RTDB		STRUC		DB
STORM			WET WEATHER	
TREE				
UNK				
VAND				

[a] All I/I SSOs recorded to date were wet-weather-related.

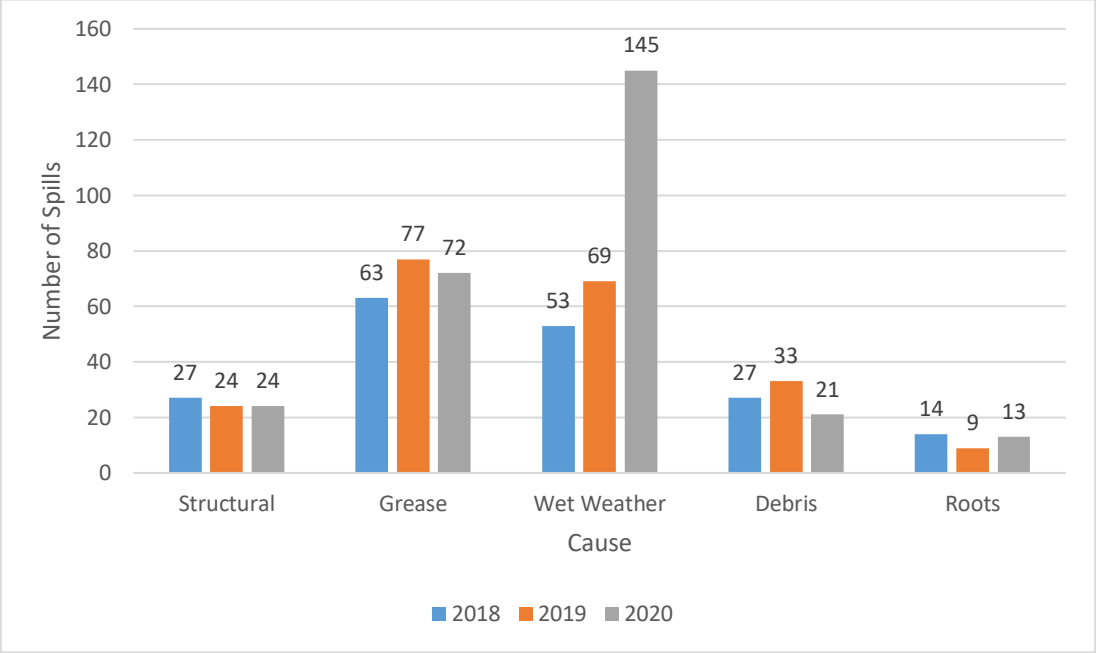
Figure 4-2 SSOs by Year by Cause Category (2018–2020)



Notes:
Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category.

These same cause categories, when applied specifically to spills, show similar trends (refer to Figure 4-3).

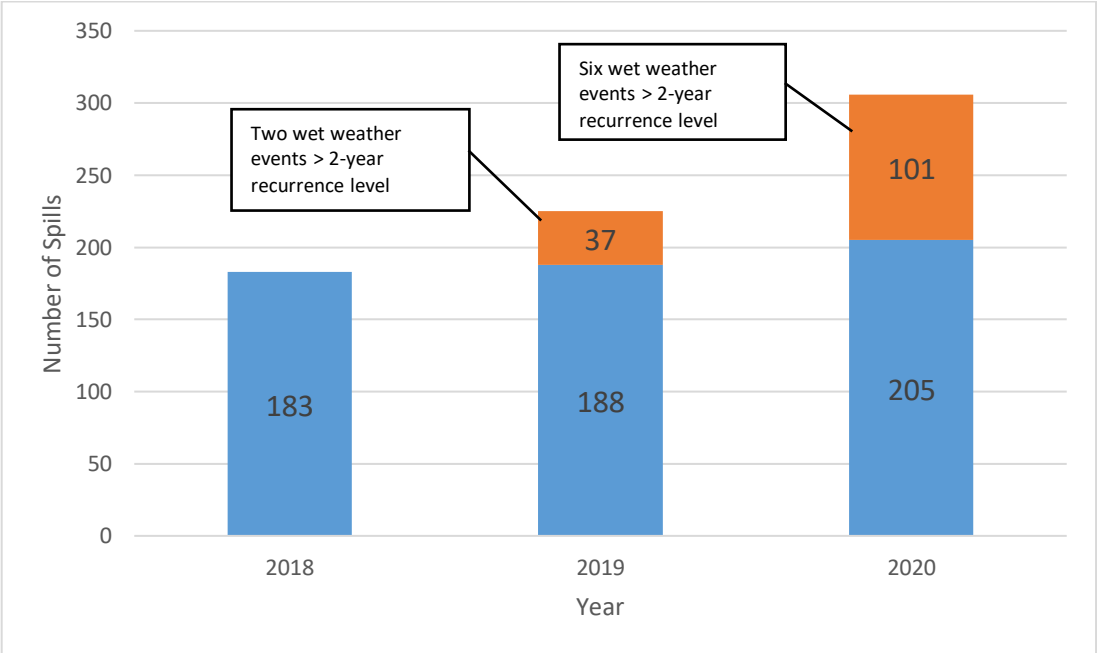
Figure 4-3 Spills by Year by Cause Category (2018–2020)



Note: Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category. Other causes for spills not shown in this figure include pump failure, vandalism, contractor-related, etc.

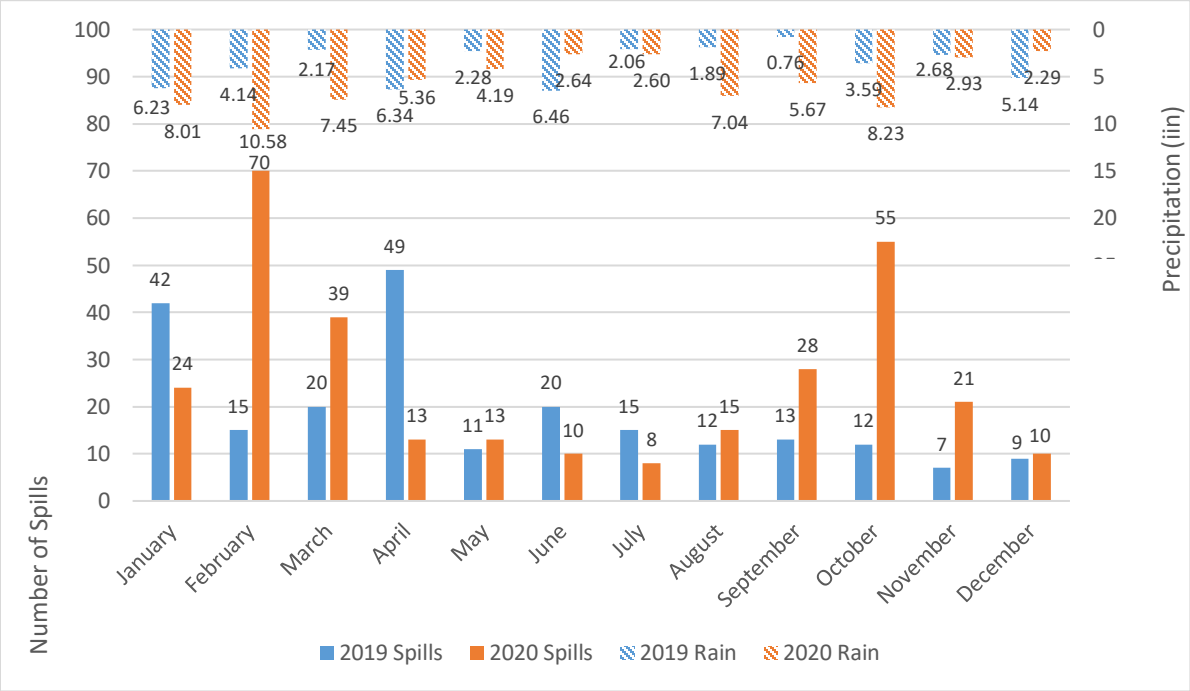
Figure 4-4 presents the number of spills by year. The number of spills per year increased steadily from 2018 to 2020. In addition to increases in wet weather events, this may be partially attributable to the expanded flow monitoring system as well as increased field inspections and putting resources into the field in remote places, such as along streams and in ravines that are generally out of site. If SSOs were found, DWM subsequently reported the findings appropriately. DWM also increased the stream sampling effort, which has resulted in identifying SSOs that could have gone undetected or spilled for a longer time without DWM's proactive work in interpreting sampling data. In 2020, 48 spills were identified and reported based on analysis of flow monitoring data and 3 spills were identified from stream sampling efforts.

Figure 4-4 Spills by Year (2018–2020)



Spills increased from 2019 to 2020 because of the increase in extreme wet weather events. Figure 4-5 shows a month-to-month comparison of spills from 2019 and 2020. In 2019 a large number of spills were reported in January because of significant rain events that occurred when the soil was saturated. Though the total monthly rainfall for April 2019 was not uncharacteristically high, an extreme wet weather event on April 19 contributed to the high number of spills for that month. In 2020, extreme storm events in February and October resulted in precipitation totals of 10.58 inches and 8.23 inches, respectively.

Figure 4-5 Spills by Month (2018–2020)



5. Other Trends

DWM evaluated other potential trends including those based on pipe size and rainfall.

Pipe Size

The most common pipe diameter in the collection system is 8 inches, as shown in Figure 5-1. Pipes with a diameter of 8 inches account for 85 percent of the total number of pipes and 83 percent of the total length of pipe. Likewise, most spills are associated with pipes of 8 inches in diameter, as shown in Figure 5-2.

Figure 5-1 Sewer Gravity Main Pipe Count and Length by Diameter

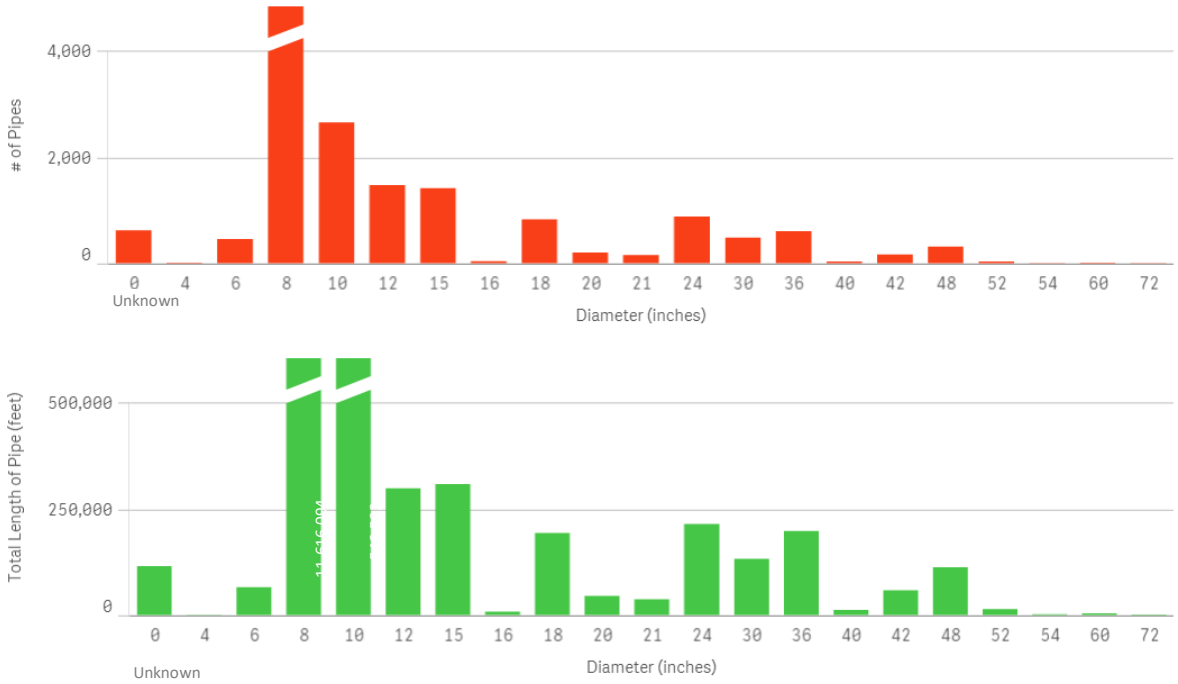
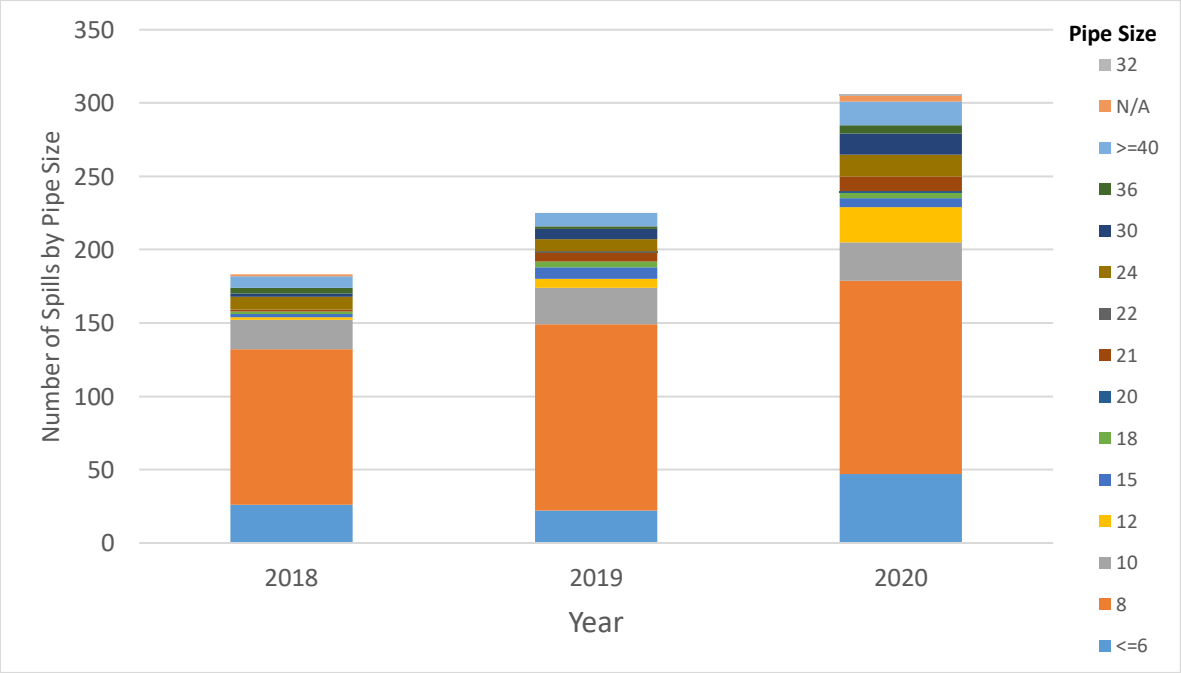


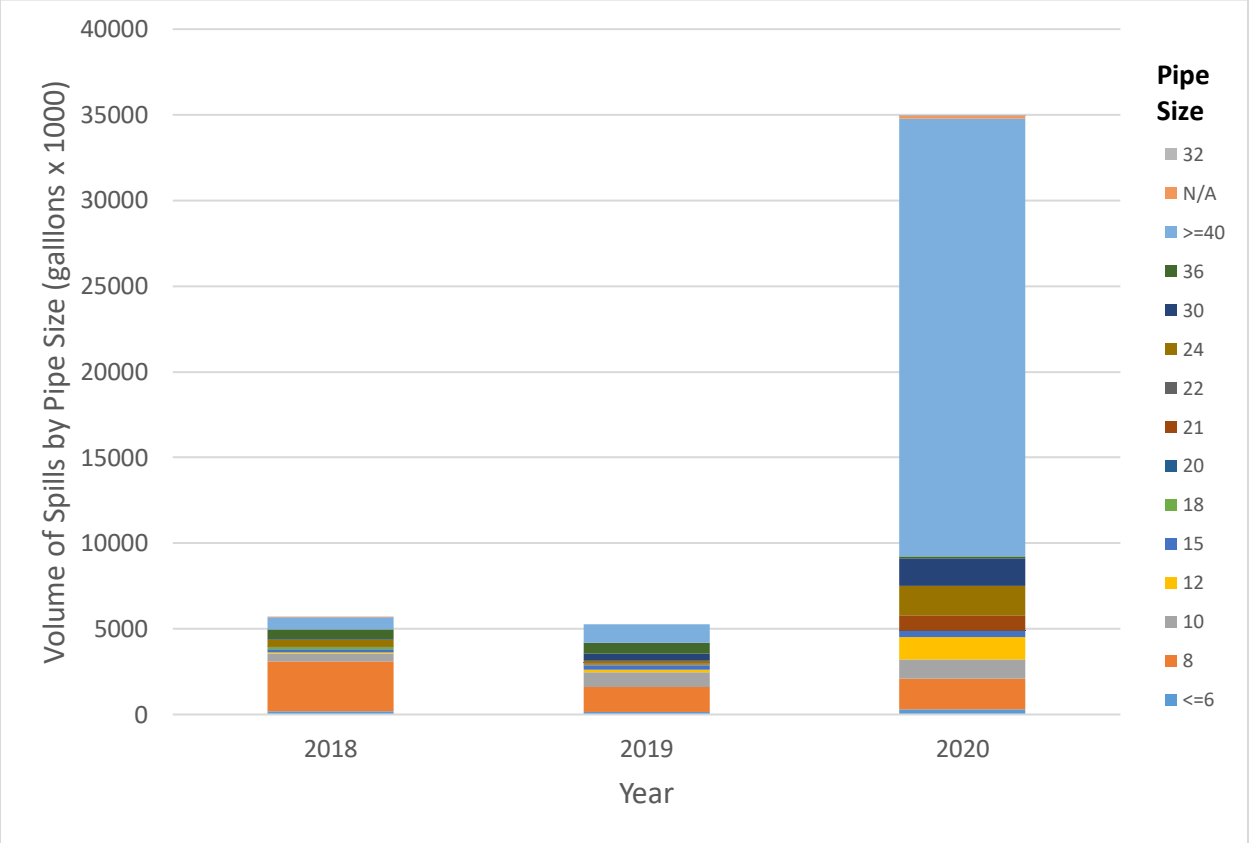
Figure 5-2 Spills by Year by Pipe Size (inches) (2018–2020)



Notes:
Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure.

Figure 5-3 shows the volume of spills by pipe size. There is correlation between pipe size and volume of SSO, as larger pipes have greater capacity, generally convey more flow, and in cases of structural repairs, can take longer to restore.

Figure 5-3 Spill Volume by Year by Pipe Size (2018–2020)

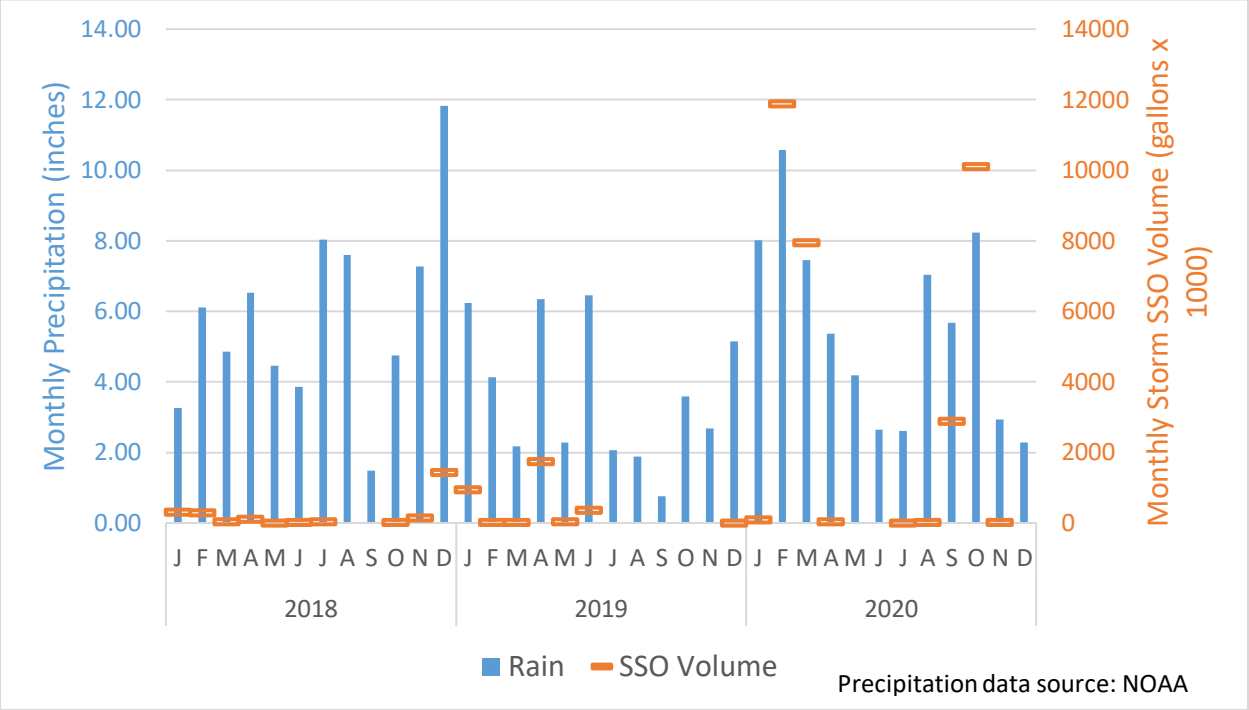


Notes:
Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure. Pipe diameter was not always recorded; thus, some are blank or N/A.

Rainfall

The difference in rainfall intensity is reflected in the data for SSOs and spills caused by wet weather. In 2018, 53 spills were attributed to wet weather; in 2020, 145 spills were attributed to wet weather (101 occurred on six severe wet weather events that exceeded 2-year recurrence levels). The volume for spills caused by wet weather was approximately 2.3 million gallons in 2018 compared to more than 32.9 million gallons in 2020 (20.2 million gallons attributed to the four events noted previously). Similarly, there were eight overflows caused by wet weather in 2018 and 17 in 2020 (10 occurred on April 19). There were 8 building backups in 2018 caused by wet weather but 15 in 2020. Figure 5-4 shows rainfall and SSO volume by month from 2018 through 2020.

Figure 5-4 Monthly Precipitation and Wet-Weather-Induced SSO Volume (2018–2020)



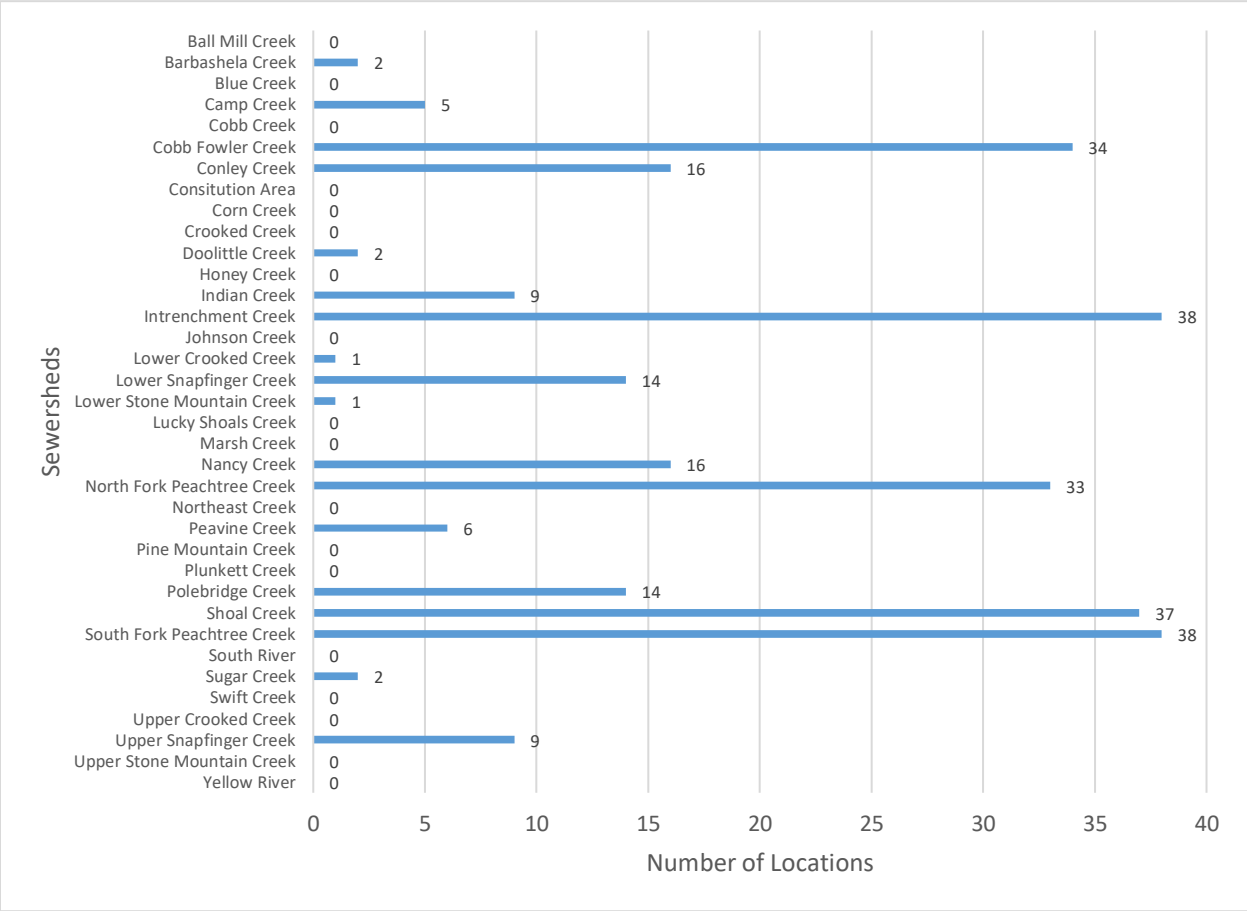
Note: Only spills with a cause of STORM or I/I are represented on this figure.

Repeat SSOs

DWM reviewed SSOs in their spatial context to identify repeat SSO locations. These locations were recorded and prioritized for further investigation to define solutions to minimize future recurrence of SSOs.

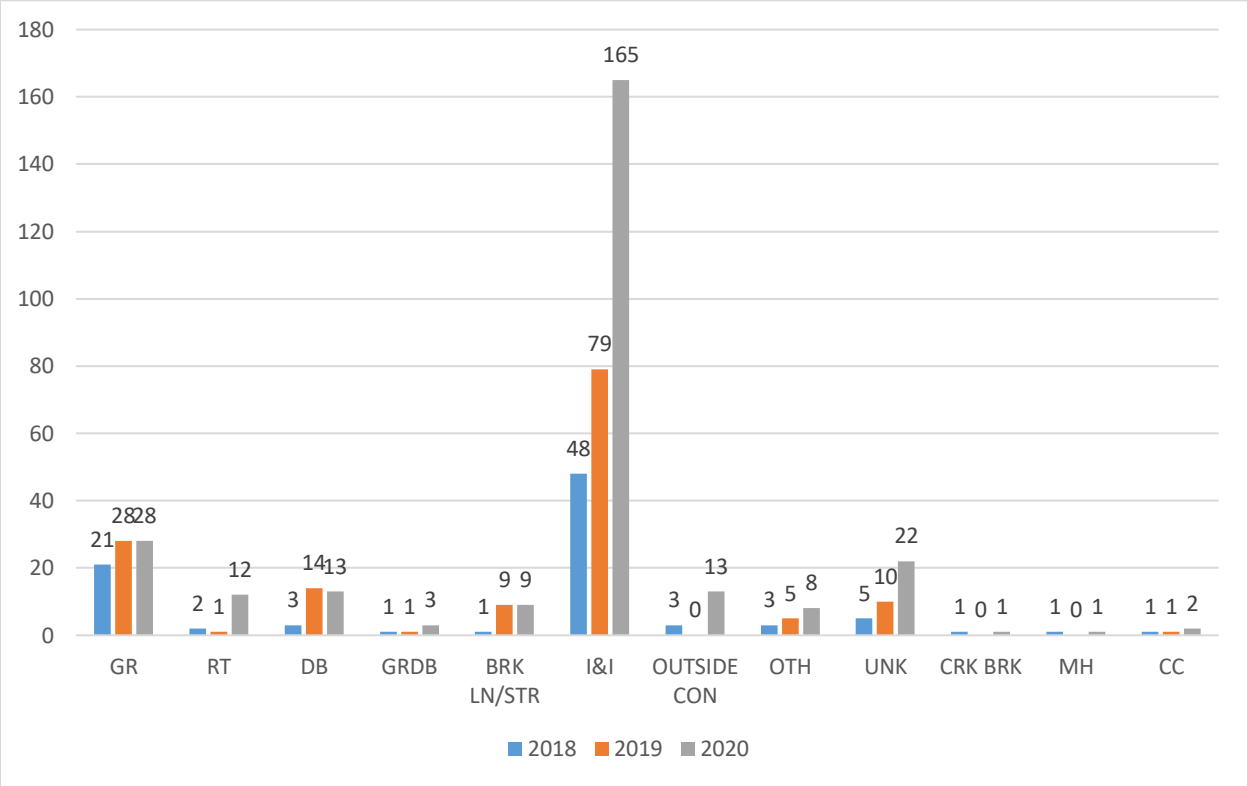
DWM defined 500-foot radius areas with repeat SSOs and tallied the repeat SSO locations by sewershed (refer to Figure 5-5). For 2020, the total number of repeat SSOs is 277. Intrenchment Creek, Shoal Creek, and South Fork Peachtree Creek have the greatest number of repeat SSO locations.

Figure 5-5 Number of Locations with Repeat SSOs by Sewershed



The most common cause of repeat SSOs in 2020 was wet weather (refer to Figure 5-6). Wet-weather-related repeat SSOs increased from 2018, as increased extreme rain events in 2020 resulted in numerous localized capacity restrictions. As planned rehabilitation measures are constructed to reduce I/I sources and provide capacity in the system, wet-weather SSOs are expected to decrease. DWM has identified historical repeat SSOs and has developed remediation plans to address these issues.

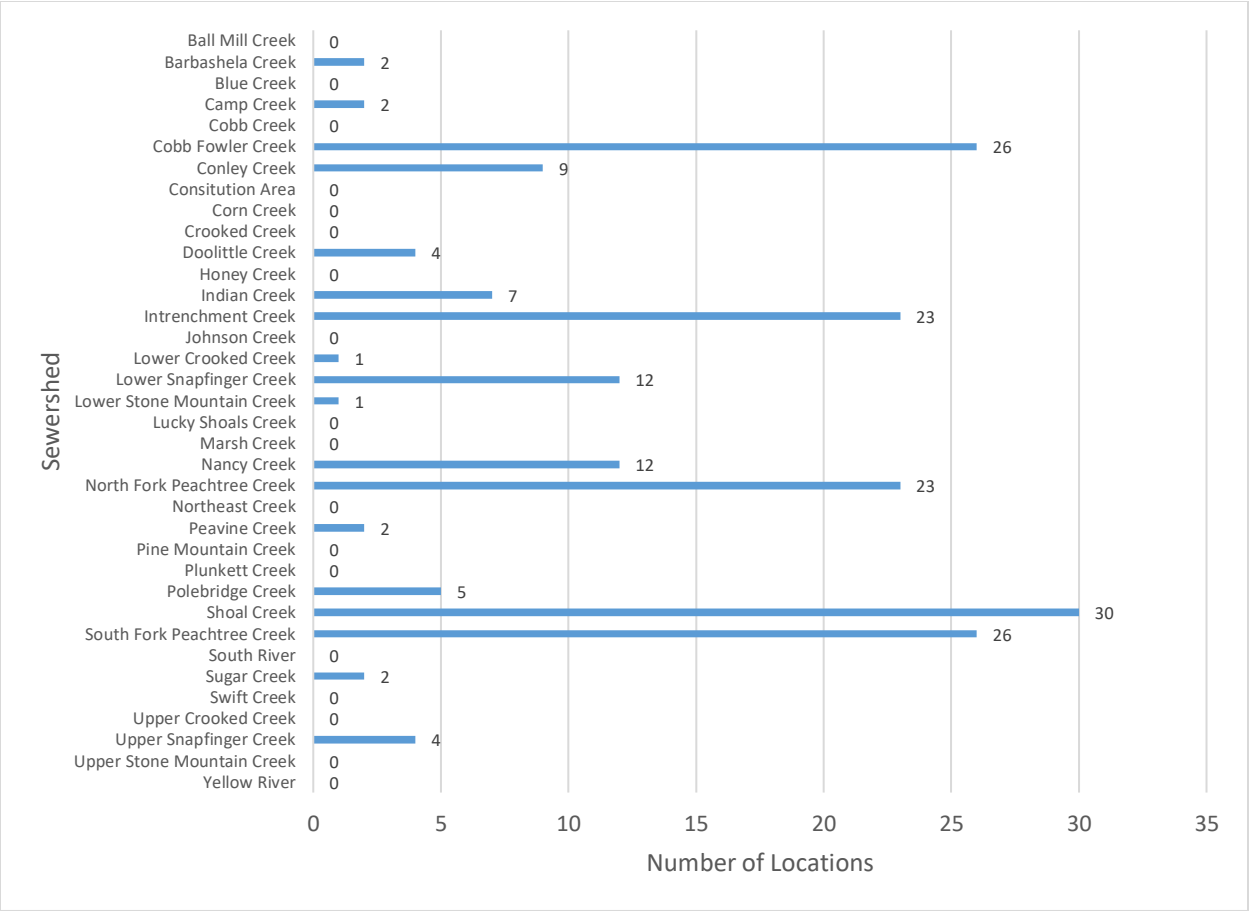
Figure 5-6 Number of Repeat SSOs by Cause



Note: All I/I SSOs recorded to date were wet-weather-related.

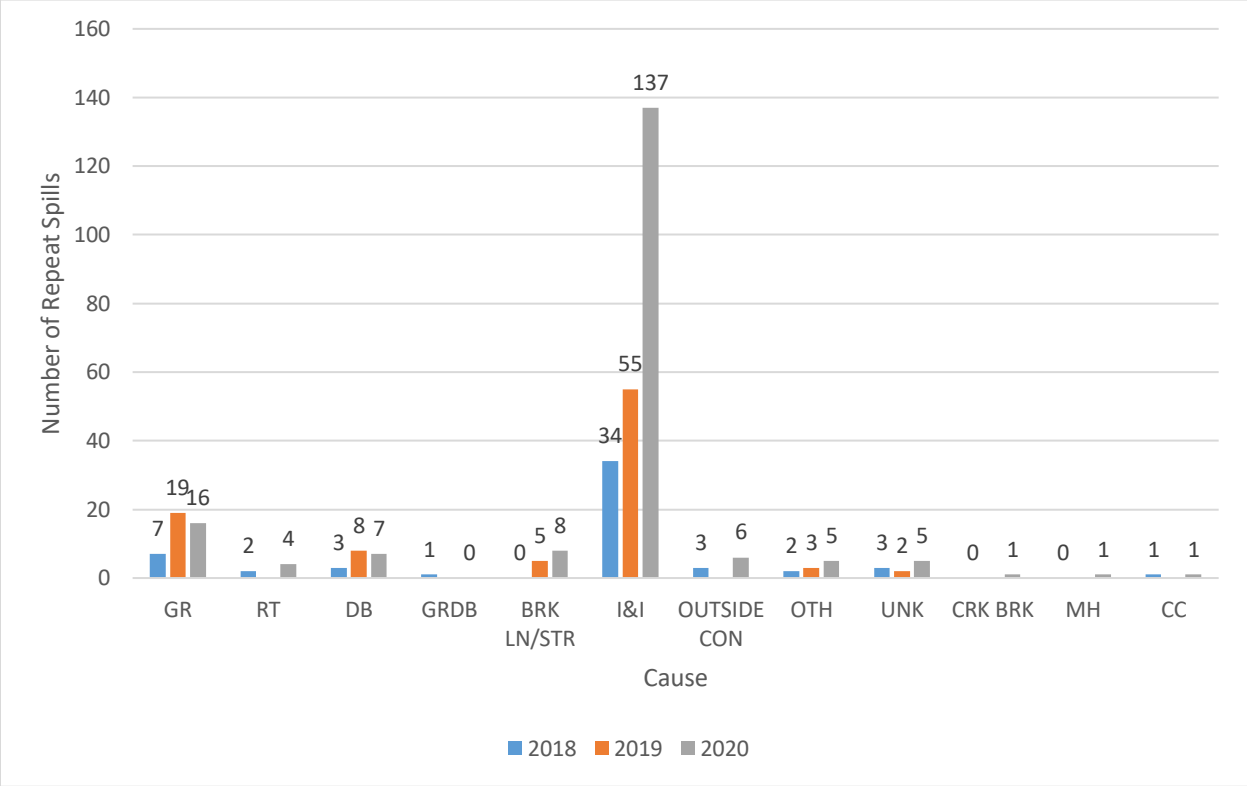
Similarly, DWM analyzed only those SSOs that are categorized as spills. From 2018 to 2020, repeat spills increased. Cobb Fowler Creek, South Fork Peachtree Creek, and Shoal Creek had the greatest number of repeat spill locations in 2020 (refer to Figure 5-7).

Figure 5-7 Number of Locations with Repeat Spills by Sewershed



The most common cause of repeat spills is wet weather (refer to Figure 5-8). Wet-weather-related repeat SSOs increased from 2018, as increased extreme rain events in 2020 resulted in numerous localized capacity restrictions. As rehabilitation measures are constructed to reduce I/I sources and provide capacity in the system, wet-weather SSOs are expected to decrease.

Figure 5-8 Number of Repeat Spills by Cause



Note: All I/I SSOs recorded to date were wet weather related.

The spatial distribution of repeat SSOs and repeat spills are shown on Figures 5-9 and 5-10, respectively.

Figure 5-9 Repeat SSOs

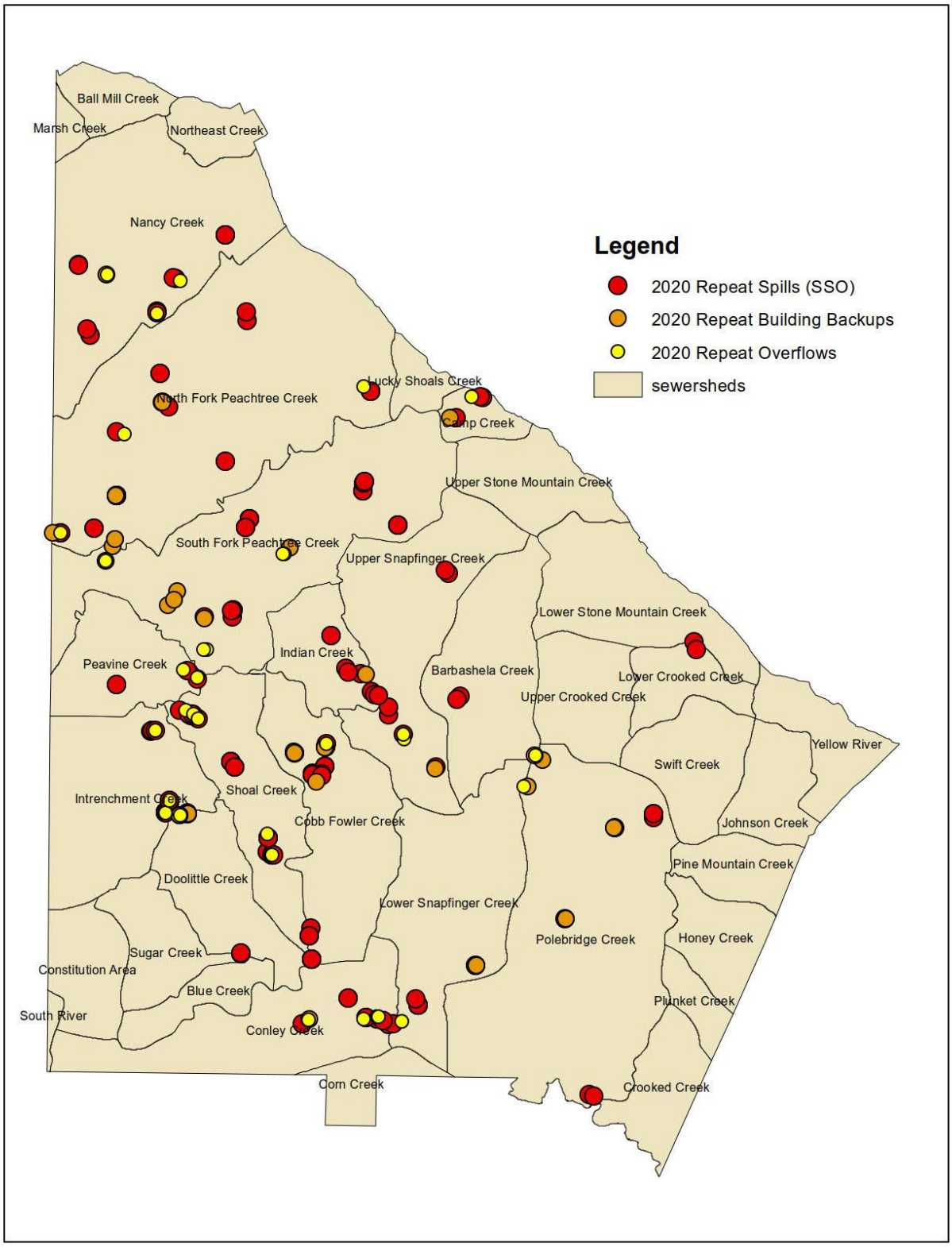
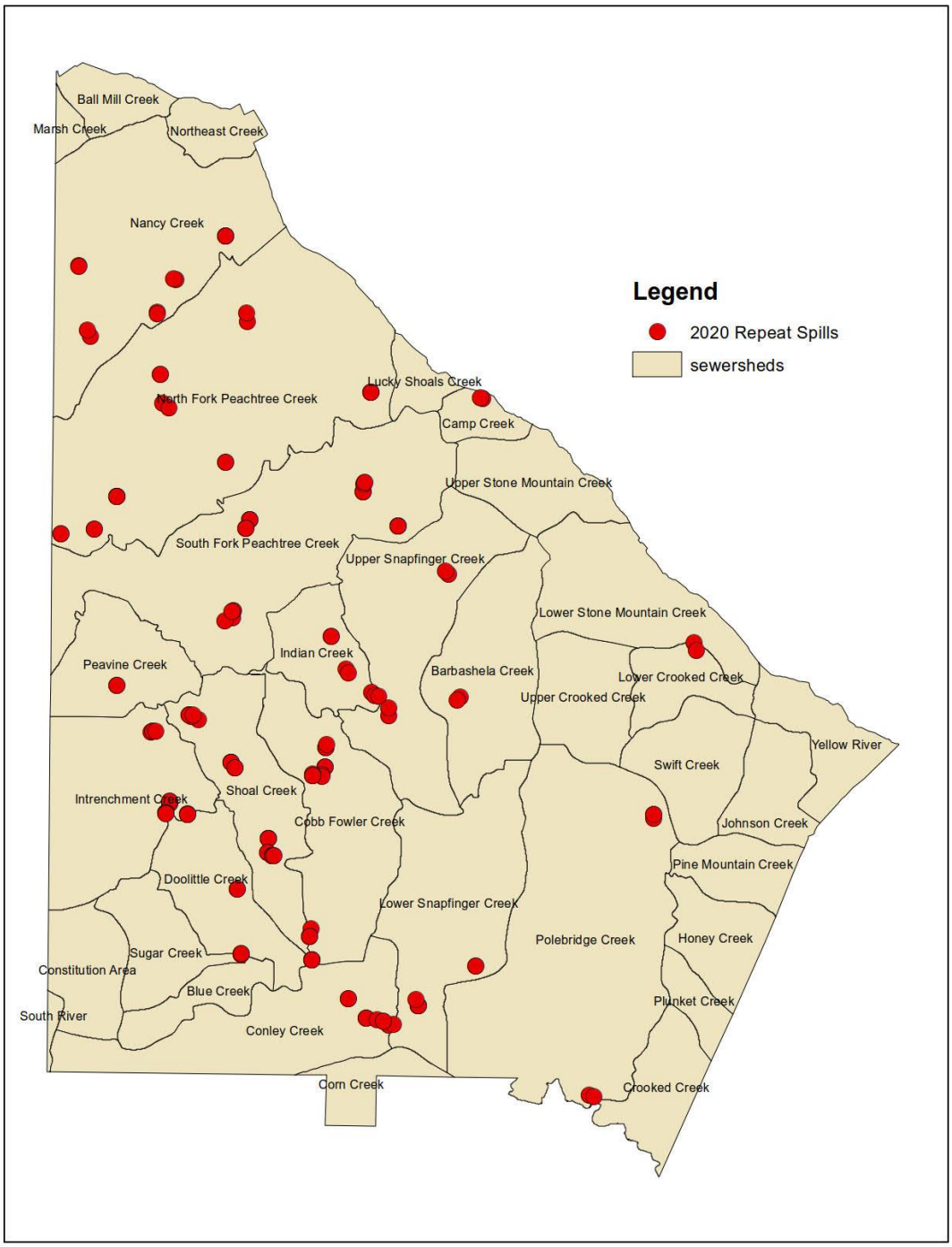


Figure 5-10 Repeat Spills



6. Summary

A summary of the trend analysis presented in this report is provided below:

- The number of SSOs increased this year compared to last year, particularly for wet weather, which can be attributed to the increase in extreme wet weather events. Incidences of maintenance- and structural-related SSOs decreased because of maintenance programs including sewer cleaning, the FOG program, and extensive public education campaigns as well as the sewer rehabilitation program (refer to Figures ES-1 and 2-1).
- Compared to 2018, spills increased in 2020, which can be attributed to increased reporting of spills from DWM's flow monitoring and stream sampling programs as well as the increase of extreme wet weather events.
- The average SSO duration for the last 3 years is approximately 5.6 hours (refer to Figure 3-1). Above-average durations are caused by:
    - I/I – SSOs can be contained but will not return to the system until capacity becomes available
    - Structural – Longest duration because of the time needed to locate the spill, bypass the failure, and perform the repair
- SSOs resulting from maintenance issues (including grease, debris, and roots) accounted for 45 percent of the SSOs occurring from 2018 to 2020. During this same period, maintenance-related SSOs accounted for 8 percent of the estimated volume of SSOs (refer to Figure 4-1).
- SSOs caused by sewer line breaks occurred less often than SSOs attributed to other causes but accounted for more SSO volume, except for wet weather SSOs (refer to Figure 4-1).
- The months with significant rainfall recorded correlate to a large volume of SSOs. However, the volume of SSOs is not solely attributable to the amount of rainfall over the course of the month. February and October, the months with the largest rainfall, also contained two of the larger wet weather events to occur in the year. A large number of spills occurred in March, which also had a significant wet weather event, likely because of the saturated soil from wet weather in February. While the total monthly rainfall in September 2020 was not as high as other months, the majority of the spills for that month could be attributed to a single extreme wet weather event during Hurricane Sally (refer to Figure 5-4).
- In 2020, there were 277 locations of repeat SSOs and 191 locations of repeat spills within the year (refer to Figure 5-5).
- The main cause of repeat SSOs in 2020 was wet weather (refer to Figure 5-6). An increase in I/I-related repeat SSOs was observed, influenced by the recorded extreme rain events in 2020, as noted previously.