Annual Report #8

January 1, 2019, to December 31, 2019
Civil Action No. 1:10cv4039 - WSD

DeKalb County
Department of Watershed Management

March 2, 2020

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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
FOG	Fats, Oils, and Grease
FSE	food service establishment
GAEPD	Georgia Environmental Protection Division
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
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
USEPA	U.S. Environmental Protection Agency
WAM	work and asset management
WCTS	wastewater collection and transmission system

Introduction

DeKalb County (the "County") Department of Watershed Management (DWM) submits this 8th 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 2019 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, 2019, to December 31, 2019, the following DWM CMOM implementation programs, reports, and deliverables were submitted to the U.S. Environmental Protection Agency (USEPA) and Georgia Department Environmental Protection Division (GAEPD), 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 2018	1/30/19
IX.(57)	14th Semi-Annual Report	1/30/19
IX.(58)	Annual Report #7	2/27/19
IX.(56)	1st Quarterly Report 2019	4/30/19
IX.(57)	15th Semi-Annual Report	7/30/19
IX.(56)	2nd Quarterly Report 2019	7/30/19
IX.(56)	3rd Quarterly Report 2019	10/30/19

Table ES-2 summarizes the major activities and key milestones completed in 2019.

Table ES-2 2019 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 may include 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 1,455 warning notices – Delivered 270 court summons ✓ Performed FOG inspections, evaluations, and tracked data: – Total number of FOG inspections: 8,236 – Total number of FOG evaluations: 1,174 ✓ 2019 monthly average permitted active FSEs: 2,680

Table ES-2 2019 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 1,044 sewer creek crossing inspections to monitor and maintain the structural integrity of sewer assets near waterways. ✓ Treated 1,372,800 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 13,963,800 square feet of sewer easements were cleared ✓ Substantially completed renovations at three lift stations to either expand station capacity or maintain proper operations.
Collection and Transmission Systems Training Program	✓ Completed 15,704 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; network now has 231 flow monitors and 41 rain gauges. ✓ Placed temporary monitors in the system, as needed, to assist in determining available sewer capacity for specific projects.
System-Wide Hydraulic Model	✓ Completed dry and wet weather calibration for all seven models. ✓ Started DWM and peer review process for Snapfinger and Pole Bridge models and completed the same process for Nancy Creek, Intrenchment Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, and Miscellaneous sewersheds models. ✓ Submitted Nancy Creek and Intrenchment Creek Models and reports to EPA/EPD.
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 49,716 LF of pipe. ✓ Reviewed 1,463 plans and received 487 sewer capacity requests.
PASARP	✓ Four engineering firms and the CIPPMT are completing design of additional rehabilitation packages. Construction ongoing through three design-build rehabilitation packages, Annual Construction Contract and two Cooperative agreements. This includes completing design for over 690,000 LF of sewer and construction of over 176,000 LF of sewer rehabilitation. Total amount spent on these contracts was $45.5 million.
OSARP	✓ Completed CCTV and associated pipeline cleaning and manhole condition assessment (MCA) in the OSARP areas including 1,637,275 LF (310 miles) of acoustic inspection, 2,611,330 LF (495 miles) of smoke testing, 723,360 LF (137 miles) of CCTV, 144,778 LF (27 miles) of TISCIT surveys, and 6,726 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 2017–2019.

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 2019 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 2019 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.

Key Accomplishments and Significant Activities:

1. Completed the following activities to resolve and remedy current and potential SSOs:
   a. Cleaning total 3,904,832 LF
      i. First response and follow up 29,312 LF
      ii. Contractor cleaning 3,875,520 LF[1]
   b. Point repairs 32[2]
   c. CCTV 367,314 LF[3]
2. Responded to 225 reportable spill events and performed after spill follow-up actions.
3. Conducted monthly SSO meetings with program area managers to review previous month's SSOs and discuss any emerging trends and possible mitigation efforts.
4. Distributed more than 25,000 FOG education flyers in areas where grease was identified as the cause of the 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 major spills and two minor spills from in-stream monitoring.
6. Discovered and prevented seven overflows from occurring using flow monitoring technology. High level alarms and data assessment alerted personnel to possible overflows. 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 greater significance in 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 2019, 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.

[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.

Key Accomplishments and Significant Activities:

1. Distributed educational materials at multi-family apartment complexes and residential neighborhoods 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 7,900,000 gallons of FOG was designated as being removed from system through this program.
3. Delivered 1,455 warning notices (increase of 39 percent year over year) and 270 court summonses to non-compliant FSEs.
4. Performance Measures:
   a. Total number of FOG inspections: 8,236
   b. Total number of FOG evaluations: 1,174
   c. 2019 monthly average permitted active FSEs: 2,680
5. Issued 2,675 permits.
6. Distributed FOG information at 266 public events where approximately 24,000 people were in attendance. These public events included community gatherings, town hall meetings, city-sponsored events, and County-sponsored events.
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 five 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 2019 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.
2. Used heat maps of root-caused SSOs, to prioritize areas needing chemical root control to 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. Revised the data schema for the sanitary sewer datasets within the GIS. This improves the ability to use the GIS with other software and to make the data labels easier to understand.
5. Moved GIS data to a new, more robust and versatile server. In addition to a size and speed upgrade, the server operating system can interface with more applications used by DeKalb County and DWM.
6. Continued to use GIS tools, such as dashboards, web accessible maps, and web accessible apps, to provide data to users throughout the County.

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. Inventory Management
    a. Successfully performed physical inventory at each warehouse location. The DWM Operations warehouse location achieved outstanding audit results of 101.6 percent for 2019, demonstrating that DWM is accurately tracking and maintaining the computerized inventory of the warehouse.
    b. DWM warehouse inventory value was $6,181,720 for 2019, thus providing assets as needed to ensure efficient maintenance and repair activities.
2. Gravity System Maintenance
    a. For 2019, projected to complete 861 sewer creek crossing inspections. However, performed 1,044 sewer creek crossing inspections. The additional creek crossing inspections were performed because of re-inspection, SSOs in certain areas, and special projects.
    b. Continued chemical root control application in the system to remove root intrusions identified during assessment. A total of 1,372,800 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 13,963,800 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.
3. Lift Station, Force Main, and ARV Maintenance
    a. Substantially completed renovations at three lift stations, completing all planned major mechanical replacement and rehabilitation to the County's lift stations as noted in Table 7-2 of the Maintenance Management System Program Report (the status of the MMS Lift Station projects is shown in Attachment A).

b. Working statistics:
   i. Completed 4,816 preventive maintenance work orders (401/month) to ensure proper maintenance and continued functioning of the assets.
   ii. Maintained a backlog of two or less work orders per month for 30 days for 10 of 12 months to ensure work is being conducted in an efficient manner and within a short time after being identified and planned. One month had three backlogged work orders and another had five 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 64 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 63 discharge manholes for structural integrity.
   vi. Performed force main pressure testing at 54 stations to test for any pipe leakage.
   vii. Inspected 54 of 55 ARVs to ensure they were operating automatically to release air pockets in the force main.
   viii. Completed lift station work orders:
      1. 73 percent preventive maintenance
      2. 26 percent corrective maintenance
      3. 1 percent emergency maintenance

c. 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 (see Attachment B).

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

In 2019, the County continued to deliver technical and skills training to DWM personnel related to applicable job responsibilities. CERP training was a major focus of the year and included coordination with New Employee Orientation classes to train all new DWM personnel on CD responsibilities (in previous 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 15,704 hours of technical, leadership, managerial, and skills training for 556 different staff members.
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. In 2019, additional flow monitors and rain gauges were installed in the WCTS to support further development of the existing static sewershed and basin models into more robust dynamic models. The ongoing program's focus is 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. 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. Network now has 231 flow monitors and 41 rain gauges.
2. Placed temporary monitors in the system, as needed, to assist in determining available sewer capacity for specific projects.
3. Maintained monitors (battery changes, modem service) and calibrated as needed per site to ensure data integrity.
4. Deployed monitors to collect data to support multiple CMOM programs.
5. County evaluated and selected manhole-mounted I/I monitoring system. Flow analysis from the current flow monitoring network will be used to identify drainage areas that have greater than average I/I contributions into the system. These I/I monitors will be used to further isolate potential locations of I/I. DWM purchased new flow monitors, modems, and rain gauges to augment existing equipment.

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

Fully developed, computer-based, steady-state hydraulic models were finalized for the County's WCTS sewersheds and basins in 2017. The hydraulic model network and part of the flow distributions have been updated three times: once to incorporate changes identified in the November 2016 County GIS database, and subsequently to incorporate GIS updates and field verification results provided in August 2017. These first two updates provided additional information from critical field check locations needed to verify connectivity in the model as well as lift station updates to accurately model decommissioning and addition of lift stations. The most recent update was to include field surveys and lift station updates through February 2018. The maximum month average daily flow (MMADF) condition, as calculated from the 2015 flow study, was input into the steady-state model for capacity request evaluations.

A fourth update started in 2018 to sequentially upgrade the individual sewershed and basin models from static to dynamic models once more current flow monitoring and rainfall data are recorded and analyzed.

Key Accomplishments and Significant Activities:

1. Completed flow data analysis, model flow loading update, and subcatchment delineation for North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous sewersheds model areas.
2. Completed review of water billing data and established Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox data import procedures.
3. Completed data collection for model sanitary flow distribution refinement on latest water billing data, large users/wastewater dischargers, and septic tank services areas.
4. Completed model boundary condition setup using data received from the City of Atlanta, Clayton County, Fulton County, Henry County, and Rockdale County.
5. Completed dry and wet weather model calibration for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous sewersheds model areas.

6. Completed model network verification and updates based on major system changes in North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous sewersheds model areas.
7. Completed model capacity assessment for Intrenchment Creek, Nancy Creek, North Fork, Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous sewersheds model areas.
8. Submitted draft hydraulic modeling reports for DWM and peer review for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and sewersheds Miscellaneous model areas.
9. Completed DWM and peer review processes for Intrenchment Creek, Nancy Creek, North Fork Peachtree Creek, South Fork Peachtree Creek, and Miscellaneous sewersheds model areas.
10. Provided Nancy Creek and Intrenchment Creek models and report to EPA/EPD.

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 2019 Sewer System Costs by Work Order Type

Work Order Type	Sewer System Costs (dollars)	Sewer System Costs (percent)
Corrective Maintenance	$1,256,311	38.0%
Preventive Maintenance	$125,189	3.8%
Emergency Maintenance	$1,908,456	57.7%
Miscellaneous Maintenance	$18,133	0.5%
Total	**$3,308,089**	**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 2018, DWM saw large increases in the number of development applications in the County, which continued through 2019. Additional resources were added to the program to handle the increased workload and to coordinate with the municipalities within the County. The process to verify capacity in the WCTS was modified because of the 2017 delivery of the fully developed hydraulic model. 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 49,716 LF of pipe, thereby ensuring adherence with the County's design standards.
2. Reviewed 1,463 plans.
3. Reviewed 63 plats.
4. Received 487 sewer capacity requests.
5. Issued 588 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 838 miles of sewers (approximately 31 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. As 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 57,800 LF of sewer rehabilitation completed, 30,380 LF of this was pipe replacement.
2. Continued design of remaining PASARP rehabilitation packages consisting of over 690,000 LF of sewer, by four annual engineering firms and CIPPMT.
3. Procured annual Construction Contract 1 and Cooperative agreements with two contractors and began construction of lining and point repairs including 129,300 LF of sewer rehabilitation.
4. Total amount spent in 2019 for design and construction in contracts noted above exceeds $45 million.
5. Continued execution of project communications and community outreach for ongoing projects.
6. Substantially completed select PASARP rehabilitation projects (the status of the PASARP rehabilitation projects is shown in Attachment A).

[4]Updated mileage based on DWM's February 2017 GIS database.

7. Tracked KPIs as shown in Table 10-1.

Table 10-1 2019 PASARP KPIs

KPI	2019 Performance
SSOs per 100 miles of WCTS within the Priority Areas per year	18.9 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	0.43 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	256,375 gallons per 100 miles within the Priority Areas
Total volume[b] of spills per 100 miles per inch of rain within the Priority Areas	5,867 gallons per 100 miles per inch of rain within the Priority Areas
Number of dry weather SSOs[b] within the Priority Areas	87 dry weather SSOs[b] within the Priority Areas

[a] For the year 2019, 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. 1,637,275 LF (310.1 miles) of acoustic inspection
   b. 2,611,330 LF (494.6 miles) of smoke testing
   c. 723,360 LF (137 miles) of CCTV and associated cleaning
   d. 144,778 LF (27.4 miles) of TISCIT assessments
   e. 6,726 manhole condition assessments
2. Replaced 165 vented manhole lids with solid covers to reduce inflow.
3. Substantially completed select OSARP rehabilitation projects (the status of the OSARP rehabilitation projects is shown in Attachment A).
4. Tracked KPIs as shown in Table 11-1.

Table 11-1 2019 OSARP KPIs

KPI	2019 Performance
SSO per 100 miles of WCTS per year within the OSARP areas	13.0 per 100 miles per year
SSO per 100 miles of WCTS per year per inch of rain within the OSARP areas	0.30 per 100 miles per year per inch of rain
Total volume[a] of spills per 100 miles of WCTS within the OSARP areas	192,191 gallons per 100 miles
Total volume[a] of spills per 100 miles per inch of rain in the OSARP areas	4,398 gallons per 100 miles per inch of rain
Number of dry weather SSOs[b] in the OSARP areas	168 dry weather SSOs[b]

[a] For the year 2019, 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)

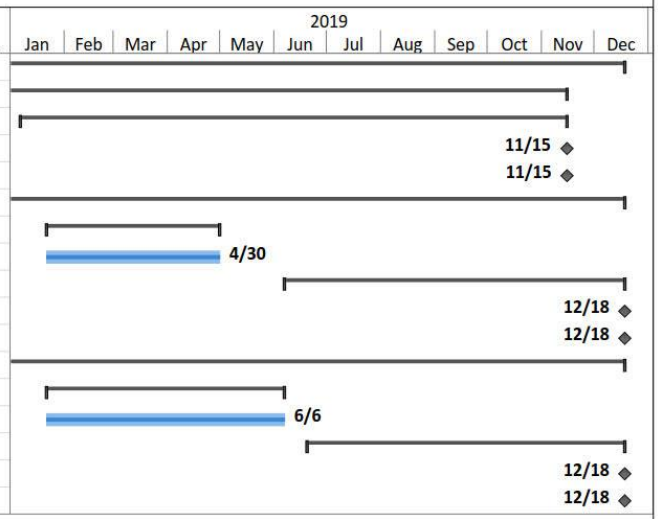
The Supplemental Environment Project was completed in 2014.

Attachment A
Lift Stations and Other CIP Projects' Schedule

DeKalb County Department of Watershed Management

CDPMT Master Schedule
Annual Report - Consent Decree
CIP PROJECTS

ID	Task Name	Start	Finish	CD/CMOM Date	% Complete.
2336	**CIP Rehab/Construction Projects**	**4/1/14**	**12/18/19**	**NA**	**100**
3367	**Leeshire LS {DBB - Construction} {12/31/19}**	**1/2/17**	**11/15/19**	**NA**	**100**
3417	**Construction**	**1/7/19**	**11/15/19**	**NA**	**100**
3419	Substantial Completion	11/15/19	11/15/19	12/31/19	100
3421	Final Completion	11/15/19	11/15/19	NA	100
3426	**New Gibraltar LS {DBB} {12/31/19}**	**5/15/17**	**12/18/19**	**NA**	**100**
3442	**Design**	**1/22/19**	**4/30/19**	**NA**	**100**
3443	Design	1/22/19	4/30/19	NA	100
3493	**Construction**	**6/7/19**	**12/18/19**	**NA**	**100**
3495	Substantial Completion	12/18/19	12/18/19	12/31/19	100
3497	Final Completion	12/18/19	12/18/19	NA	100
3502	**Kings Way LS {DBB} {12/31/19}**	**5/2/16**	**12/18/19**	**NA**	**100**
3518	**Design**	**1/22/19**	**6/6/19**	**NA**	**100**
3519	Design	1/22/19	6/6/19	NA	100
3569	**Construction**	**6/20/19**	**12/18/19**	**NA**	**100**
3571	Substantial Completion	12/18/19	12/18/19	12/31/19	100
3573	Final Completion	12/18/19	12/18/19	NA	100



Statused thru 1/31/20

Attachment B
MMS KPIs

KPI	Formula	2019 Results
Communication System Program		
Landline abandoned calls—no reason available for why caller abandoned call	Number of dropped calls	Average of 303 abandoned calls per month
Call Duration	Duration of calls in minutes divided by the number of calls	Average duration of call: 2 minutes 0 seconds Total number of calls in 2019: 56,576
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	4.0% 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)	100% 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	-0.5% 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	6.2% sewer lines inspected by CCTV
PM: Percentage of Sewer Lines Cleaned	Number of miles cleaned ÷ total miles x 100	28% 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	9.8% of system (1,372,800 LF of root treatment)
PM: Percentage of manholes inspected per year	Number manholes inspected ÷ total number of manholes in system x 100	10.9% manholes inspected
Percentage of Emergency Maintenance (EM): Number of SSOs per mile of gravity sewer line	Number of SSOs ÷ WCTS total miles of gravity lines x 100	13.9 SSOs per 100 miles of gravity sewer line

KPI	Formula	2019 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: 73% Corrective and Emergency Maintenance: 27%
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: 6 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)	2% 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)	98% 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 2018 and 2019, but also includes data from 2017 for reference. 2017 is the first year the County implemented an updated SSO reporting process that has been consistently applied through 2019. 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

SSOs increased from 2018 to 2019, which can be partially attributed to a major wet weather event on April 19, 2019, that accounted for 56 of the SSOs reported for the year as well as the County's increased accuracy in identifying SSOs (see Figure ES-1). Overall, the number of SSOs per year has decreased by 28 percent since the Consent Decree was lodged in 2012, which can be attributed to the County's MMS program including sewer cleaning, the FOG program, and extensive public education campaigns.

Figure ES-1 Reported SSOs per Year (2017–2019)

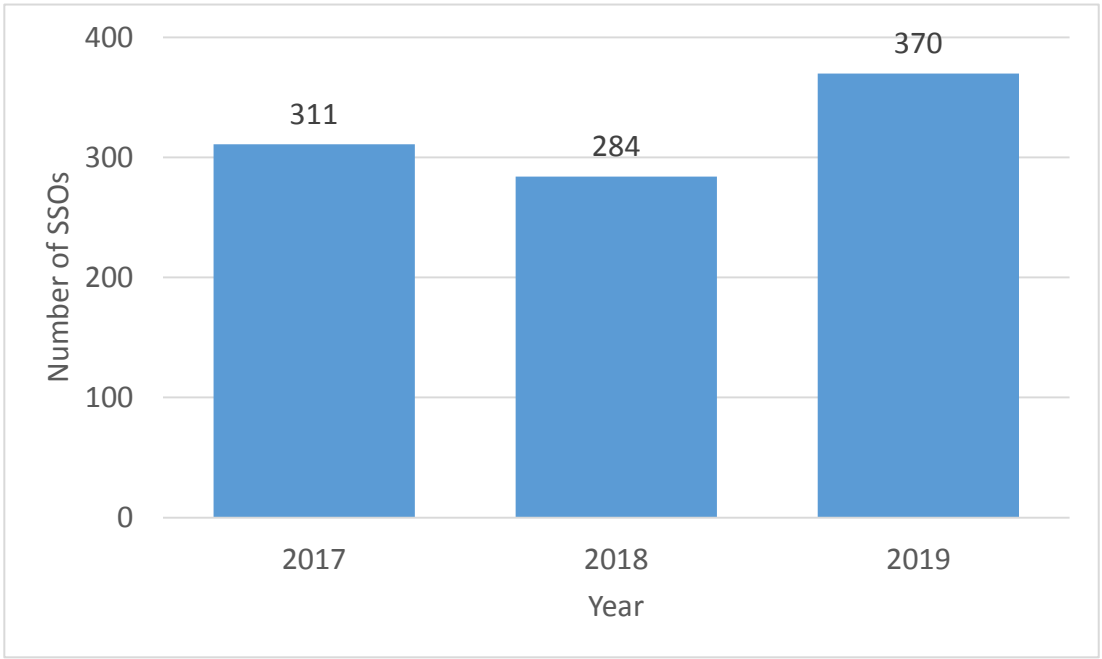
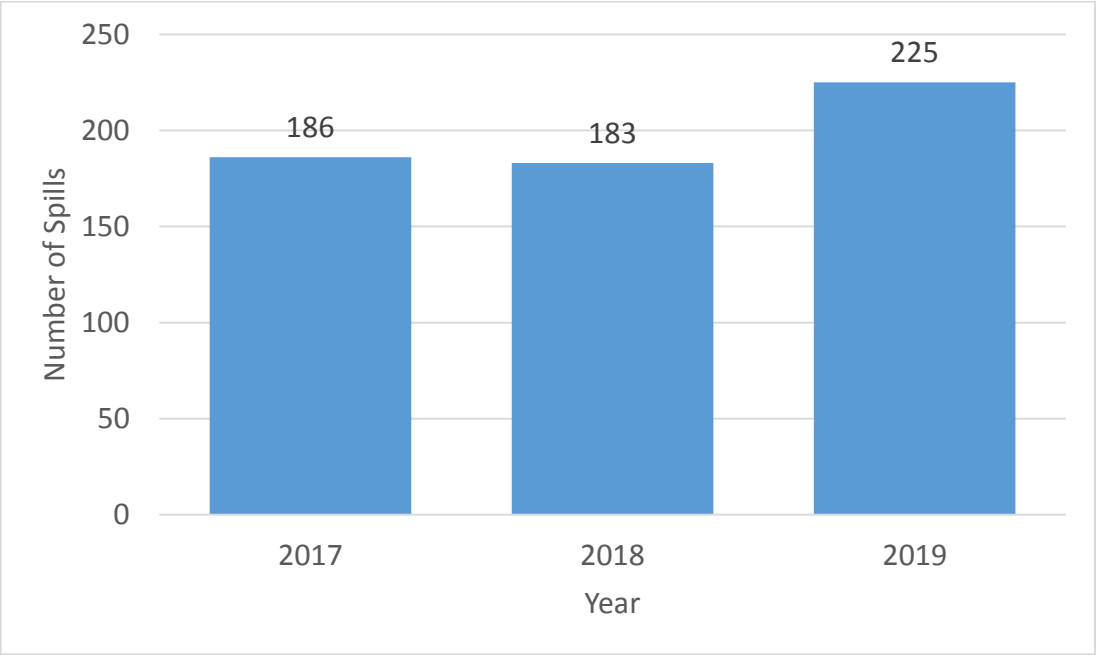


Figure ES-2 shows the number of spills, or discharges of wastewater, that reach waters of the United States or the State. The number of spills increased from 2018 to 2019. As noted previously, 34 of the 225 spills reported in 2019 resulted from a single severe wet weather event on April 19, 2019. Excluding this event, the overall spill count has remained consistent during the last 3 years.

Figure ES-2 Total Spills by Year (2017–2019)

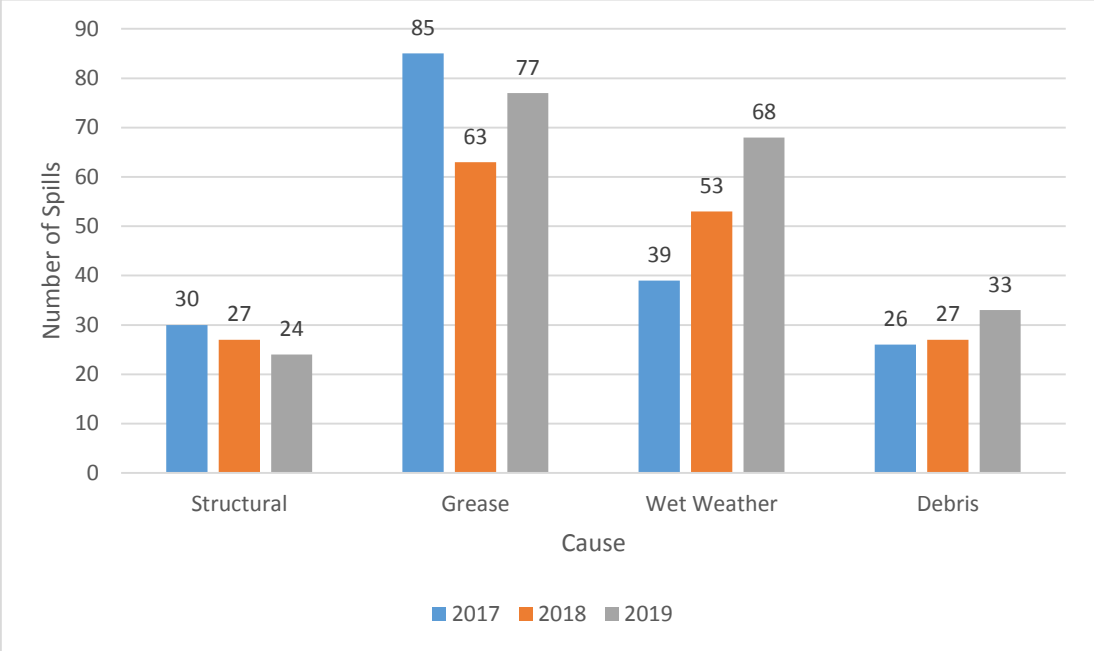


As shown on Figure ES-3, the number of spills attributable to structural causes decreased 10 percent from 2018 to 2019 to the lowest number of structural spills recorded since 2012. Spills attributable to grease increased 22 percent from 2018 to 2019. The number of spills attributable to wet weather increased in 2019 compared to previous years, primarily because of a singular significant wet weather event on April 19, 2019. Half of the wet weather spills in 2019 (34 of 69 total) are attributed to the April 19 event. Spills attributable to debris increased 22 percent in 2019 from 2018. Reviewing the work orders for the spills resulting from debris, it is evident that hygienic wipes are becoming an increasing problem in the County's sewers with nearly 50 percent of the spills from debris attributed to wipes. To address ongoing issues with grease and debris, including wipes, DWM has three existing small-diameter sewer cleaning contracts and a large-diameter cleaning contract in place and has added information on wipes to their education campaign.

Furthermore, as the County's flow monitoring network has expanded, sewer condition assessment work progresses, and MMS programs are established, the County can more readily identify SSOs. With a flow monitoring network of more than 200 flowmeters throughout the County, with data reviewed on a daily, weekly, and monthly basis, any sudden changes in flow behavior that can mark possible SSOs are called in for further investigation. In 2019, DWM self-reported and addressed 21 SSOs, totaling 887,000 gallons, identified from flow monitoring. 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 five SSOs that DWM was able to locate and address. One such SSO was located near 3054 Toney Drive where a tree fell onto a creek crossing and broke the sewer main. Through stream sampling and site investigation, DWM was able to locate the broken pipe and setup bypass pumping to stop the spill to creek until the sewer could be repaired.

Figure ES-3 Total Spills by Year by Cause Category (2017–2019)



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

1. Classification of SSO Types and Causes

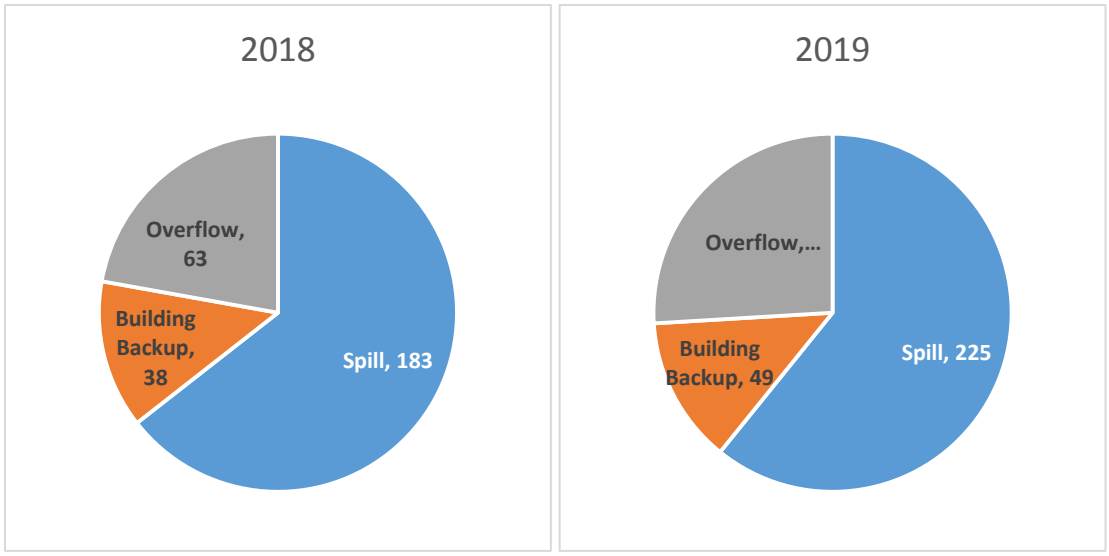
The CD requires a trend analysis of the prior 24-month period. This report analyzes trends from 2017 as this is the first year the County implemented an updated SSO reporting process that has been consistently applied through 2019.

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 2019 as compared to 2018. Spills account for the majority of the SSOs followed by overflows then building backups. From 2018 to 2019, the number of occurrences of each SSO type increased, primarily because of extreme wet weather events in 2019.

Figure 1-1 SSOs by Type (2018–2019)



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 2019. 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 in Figure 2-1, the number of SSOs per year increased from 2018 to 2019 which can be partially attributed to the increase in extreme wet weather events, particularly April 19, 2019 which accounts for 56 of the reported SSOs for the year. Overall, DWM has reduced the number of SSOs by 28 percent, from 512, since the Consent Decree was lodged 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 (2017–2019)

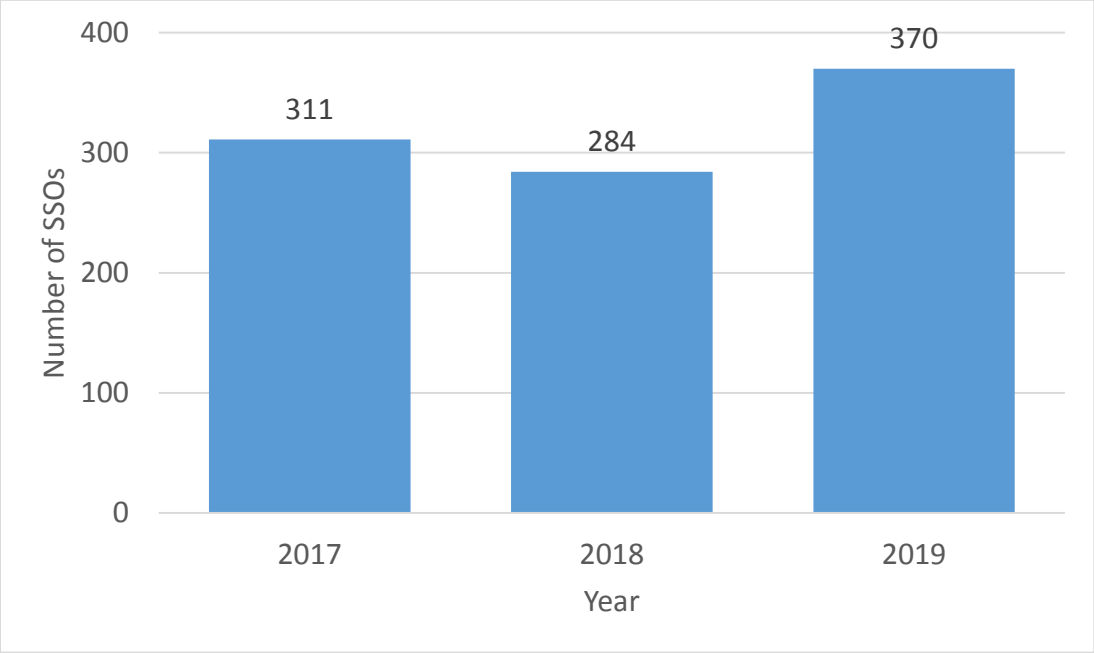


Figure 2-2 shows annual rainfall for the same period of record (2017–2019). Total rainfall for the year decreased from 2018 to 2019 but the individual rain events have changed as well. While 2019 rainfall totals were lower than 2018, the number of significant events increased, with five rain events greater than 2 inches total depth in 2019, compared to four in 2018, and two of those five events, April 19 and June 11, were greater than 3 inches total depth and categorized at a recurrence level greater than 2 years.

Figure 2-2 Annual Precipitation (inches) (2017–2019)

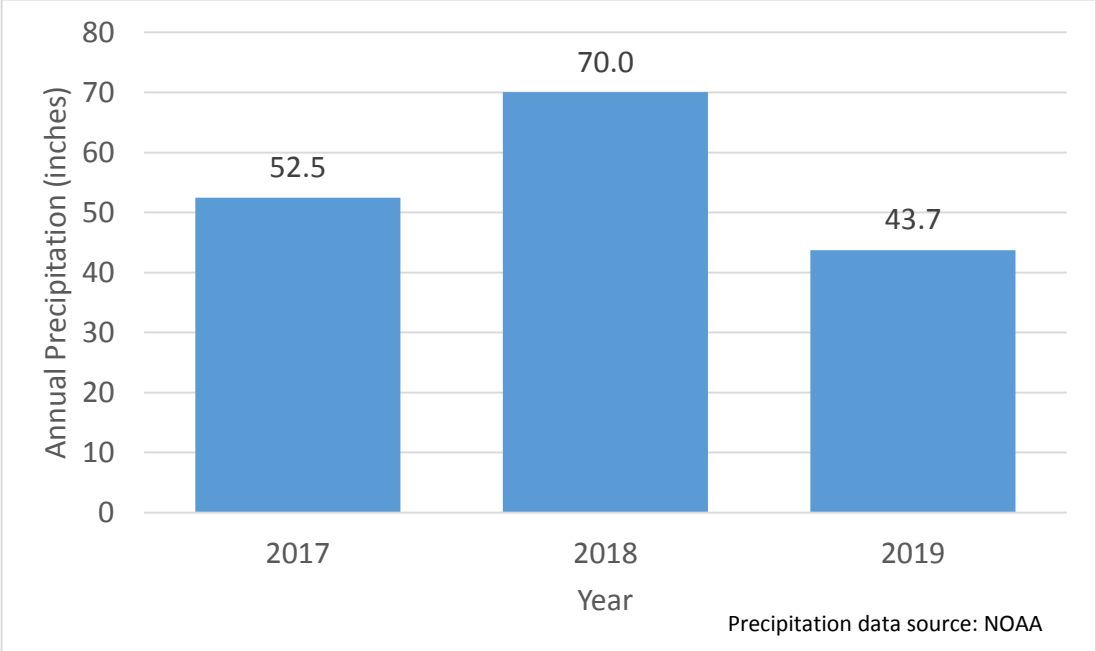
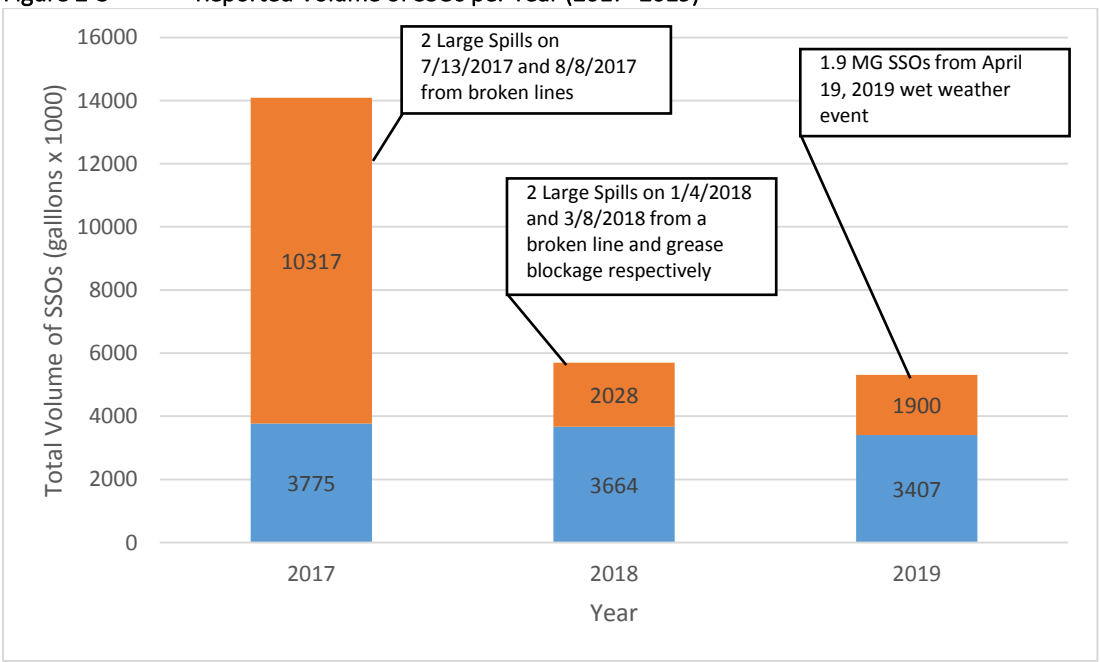


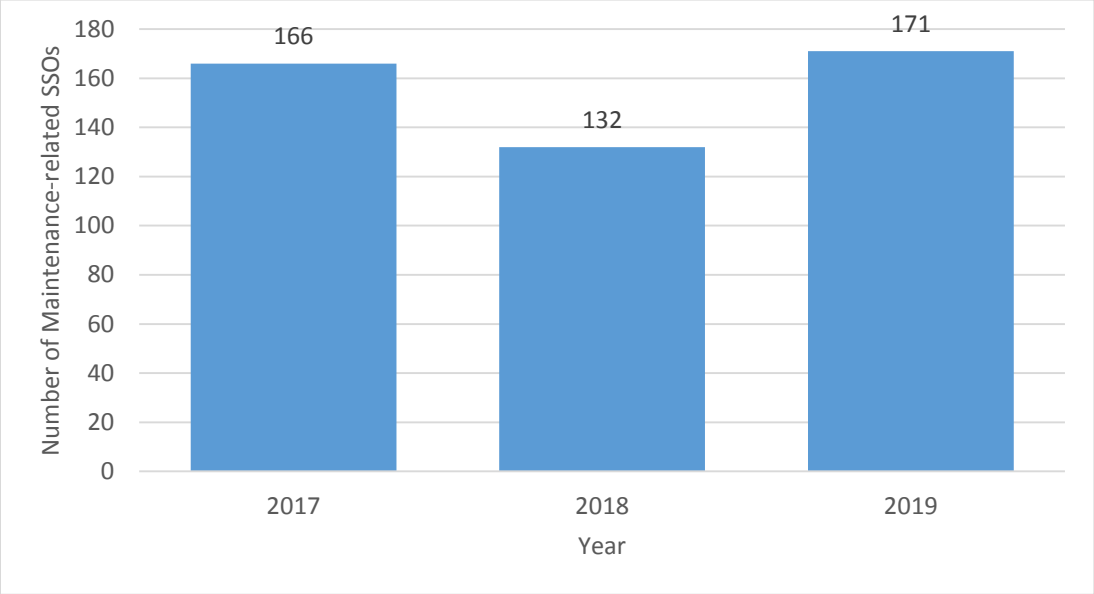
Figure 2-3 presents the total volume (gallons) of SSOs for each year. From 2017 to 2019, an overall trend in decreasing volume can be seen, especially when taking outliers into account. In 2019, approximately 1.9 million gallons, 35 percent of the total volume of SSOs for the year, are attributed to the extreme rain event on April 19, 2019. The overall decrease in spill volume from 2017 to 2019 can be attributed to a reduction in maintenance-related SSOs as a result of increased cleaning and FOG program enforcement.

Figure 2-3 Reported Volume of SSOs per Year (2017–2019)



Figures 2-4 and 2-5 show the number of maintenance-related SSOs and the associated annual volumes, respectively, for the 2017 - 2019). From a peak of 265 SSOs in 2013 to 171 SSOs in 2019, DWM has reduced maintenance-related SSOs by 35 percent through a steady downward trend until 2019. The increase in maintenance-related SSOs from 2018 is attributed primarily to the increase of blockages caused by hygienic wipes.

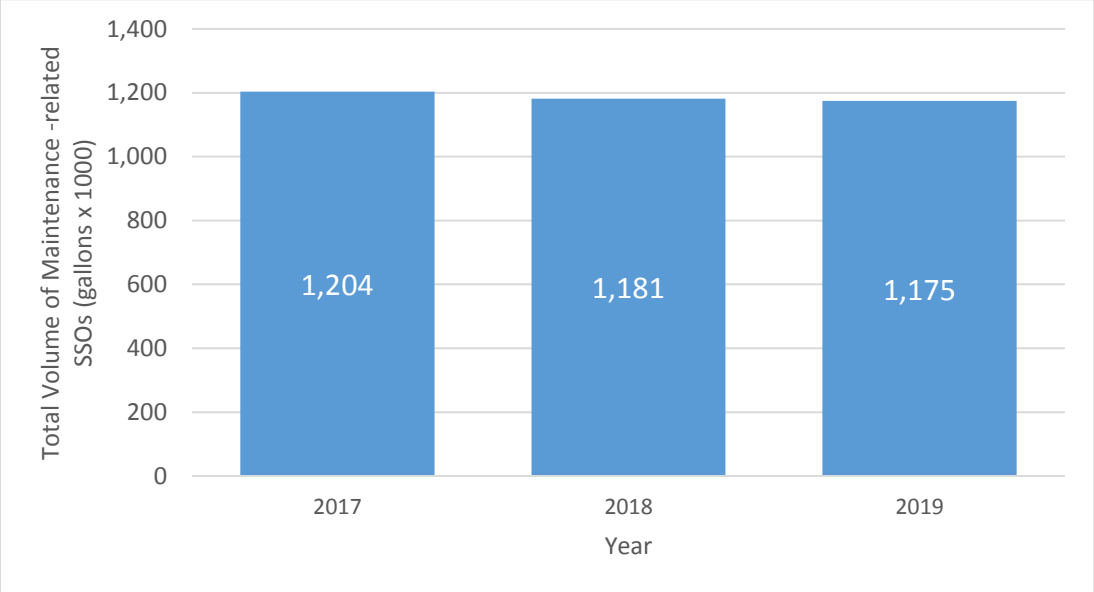
Figure 2-4 Maintenance-related SSOs per Year (2017–2019)



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

The volume of maintenance-related SSOs for 2019 was 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 (2017–2019)

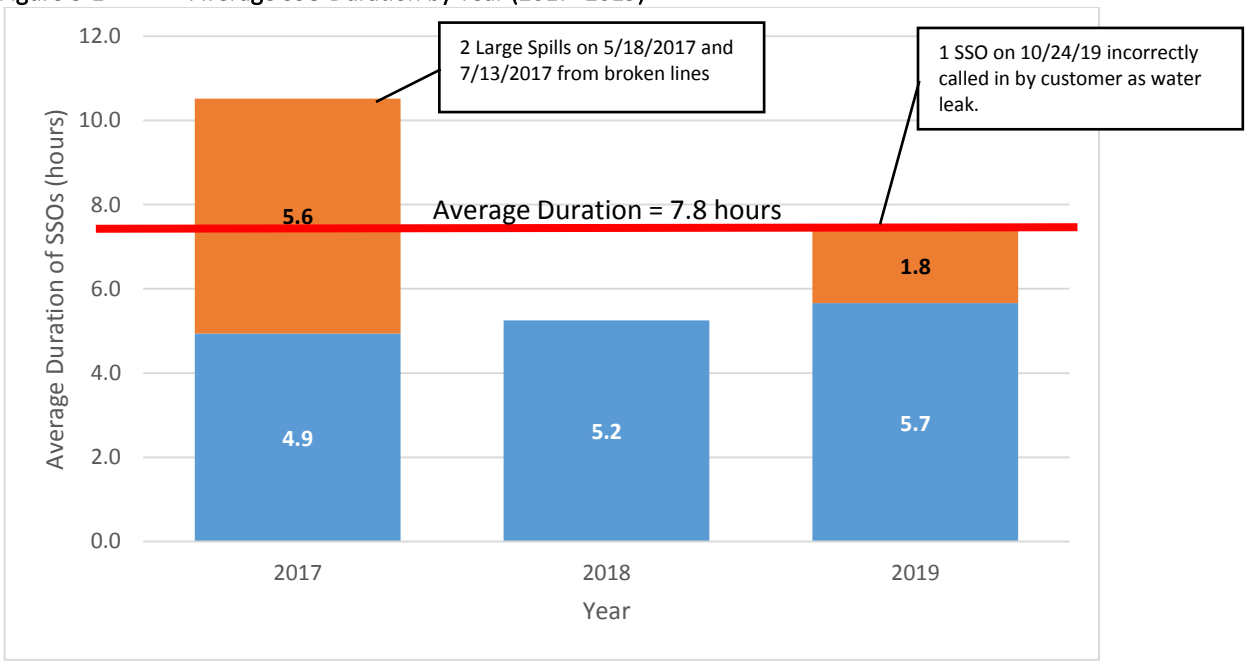


DWM's continued focus on its comprehensive cleaning program has resulted in the decrease in volume of maintenance-related SSOs in 2019. As the assessment in the PASARP area was substantially completed in 2017, a new focus on rehabilitation can be seen in 2018 as DWM has procured two design build rehabilitation 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 area. In 2019, a third design-build rehabilitation contract was procured in addition to annual construction contracts and cooperative agreements for two additional rehabilitation contractors. 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 during the last 3 years (2017–2019) was approximately 7.8 hours, as shown in Figure 3-1. An increase in duration in 2019 can be attributed to SSOs located by self-reporting, as described below. In addition, one small 10 gallon SSO occurred that was called in and categorized incorrectly by the customer as a water leak. This work order was prioritized for investigation after addressing a larger water main break. When investigated, it was found that the sewer lateral and water meter were located in the same general area and the leak was actually a small SSO that leaked from a buried cleanout. The extended duration for investigation and addressing the issue raised the overall average SSO duration for 2019 by almost two hours.

Figure 3-1 Average SSO Duration by Year (2017–2019)



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 are collected that indicate 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 2019, DWM identified 21 SSOs through flow monitoring and 5 from stream sampling. Duration of 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

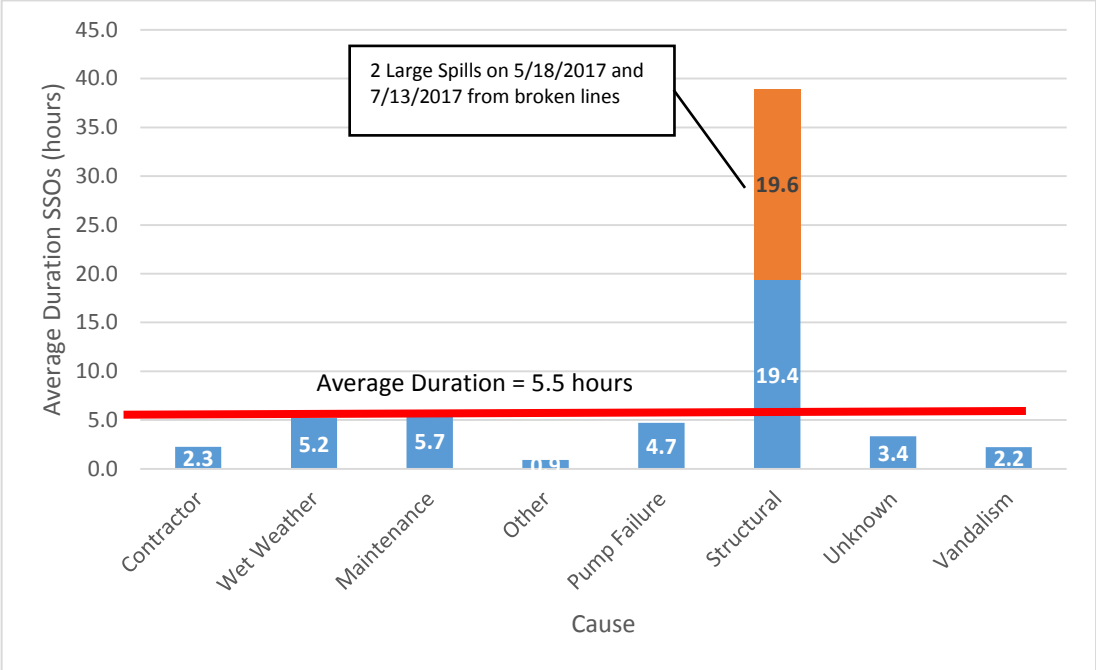
Cause	Group
BRK LN/STR	Structural
CC	Contractor
CRK BRK	Structural
DB	Maintenance
GR	Maintenance
GRDB	Maintenance
GRRT	Maintenance
GRRTDB	Maintenance
I&I[a]	Wet Weather
LFT STN FLR	Pump Failure

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 2017 through 2019. Two causes had durations that were greater than average: structural and maintenance. The category with the greatest duration (structural) includes two specific events in 2017 that required significant time to repair including broken lines at 130 Barry Street on May 18, 2017, and 3724 Eagles Beek Circle on July 13, 2017.

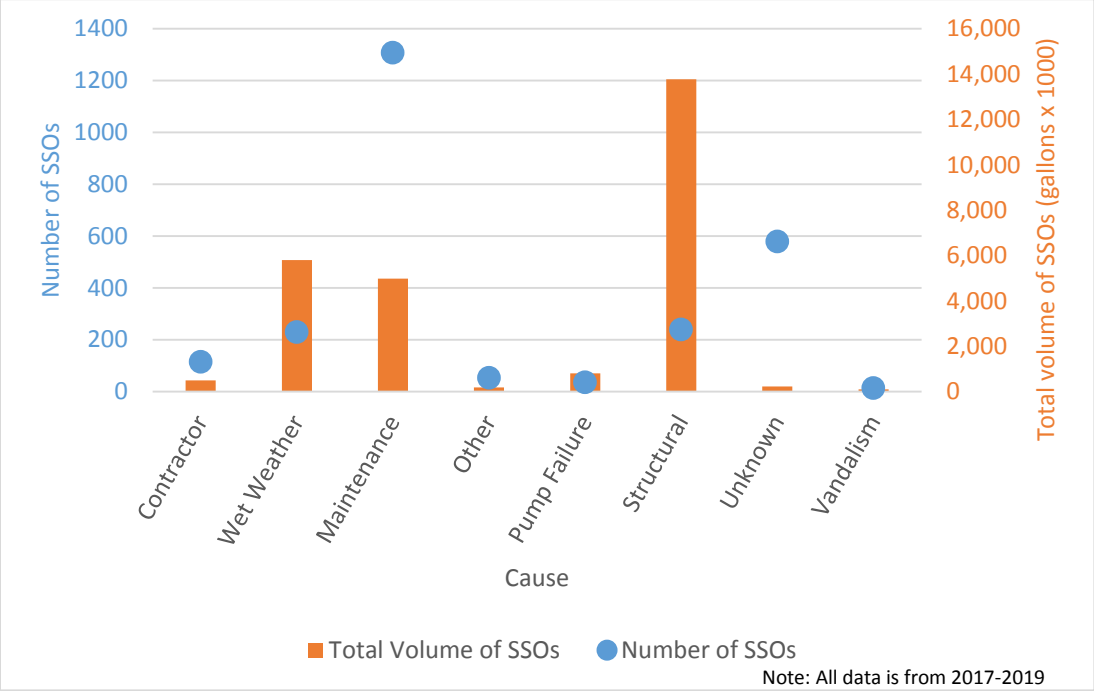
Figure 3-2 Average SSO Duration by Cause (2017–2019)



4. Causes of SSOs

Maintenance-related SSOs, including grease, roots, and debris, decreased from 2012 to 2019 by 35 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 three years, blockages continue to account for more SSOs than any other cause (52 percent) and represent the third greatest volume (15 percent) of all SSO causes (see Figure 4-1). Broken line/structural SSOs account for more volume than any other cause but occur less frequently. This is attributable to the difficulty in conducting repairs/bypasses on large-diameter lines as well as the time taken to locate broken lines or creek crossing breaks based on source tracking. The cause with the second greatest volume is storms, and the County has taken steps to address impacts from storm-related events. Specifically, follow-up and corrective action for private I/I and stormwater connections to the sanitary sewer has been undertaken in the Priority Areas. In 2019, 412 notices were sent to private owners or other incorporated cities to correct violations that may have allowed stormwater to enter the sewer infrastructure. The County has also replaced 165 vented manhole covers in 2019 to reduce the amount of inflow into the sewer system. 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 help reduce the SSOs that occur because of wet weather.

Figure 4-1 SSOs by Count, Volume, and Cause (2017–2019)



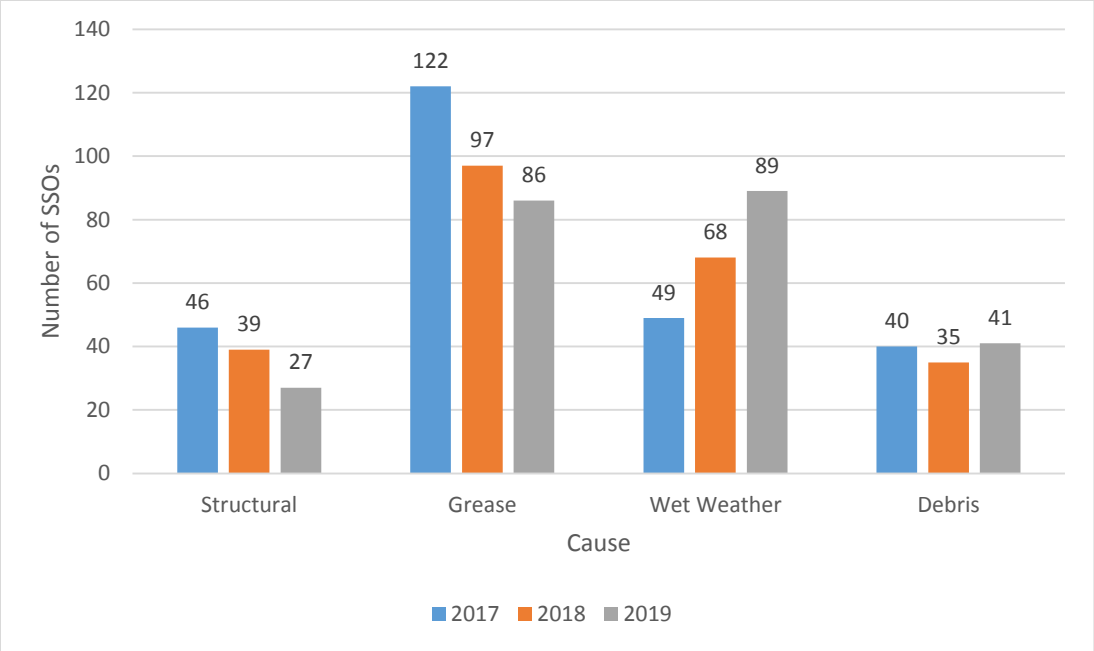
Selected causes can be grouped into categories that help assess the effectiveness of DWM's efforts to reduce SSOs. These broader categories are grease, structural, wet weather, and debris. Table 4-1 lists the causes assigned to each category. As shown in Figure 4-2, the number of grease and structural SSOs decreased from 2017 to 2019. This is a positive trend and directly correlates to the increased field activity undertaken by DWM to clean sewer lines and conduct CCTV inspections to assess structural conditions. Because the County experienced more extreme wet weather events in 2019 compared to 2018, more SSOs resulting from storms occurred in 2019 compared to the previous year. SSOs due to debris have remained consistent over the previous three years.

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
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.

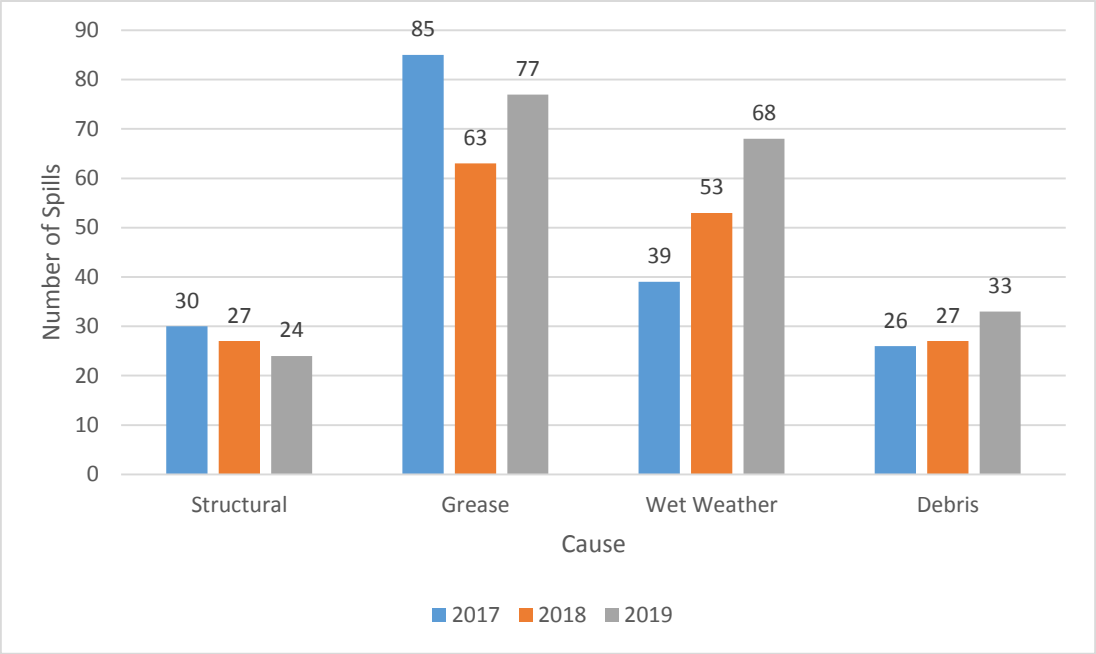
Figure 4-2 SSOs by Year by Cause Category (2017–2019)



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 the same trends, except for debris-related spills (see Figure 4-3). The number of spills attributable to debris decreased initially but has since increased in recent years.

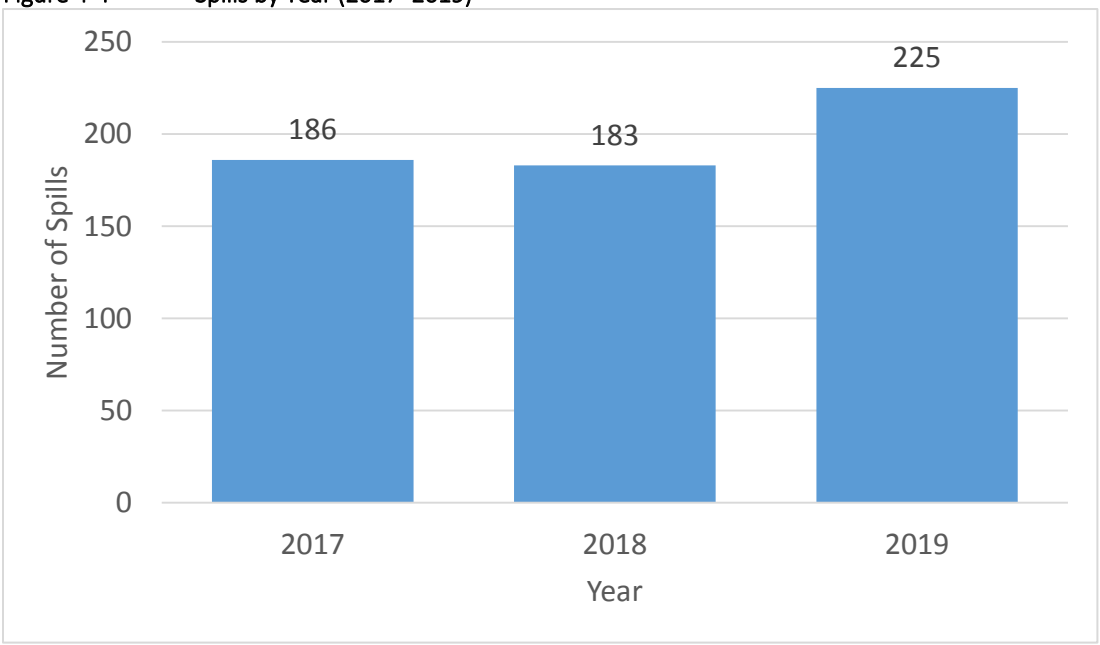
Figure 4-3 Spills by Year by Cause Category (2017–2019)



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

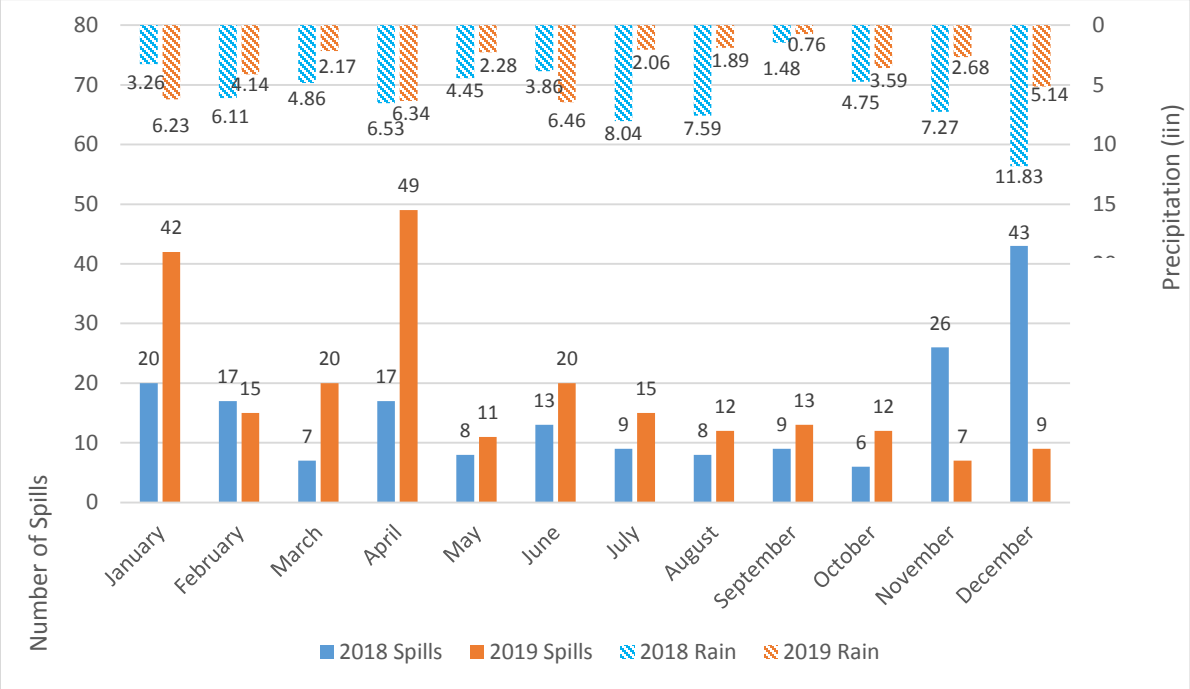
Figure 4-4 presents the number of spills by year. The number of spills per year increased from 2017 to 2019. This may be partially attributable to the expanded flow monitoring system as well as increased field inspections and putting resources into the field in remote places, such as along streams and 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 2019, 21 spills were identified and reported based on analysis of flow monitoring data and 5 spills were identified from stream sampling efforts.

Figure 4-4 Spills by Year (2017–2019)



Spills increased from 2018 to 2019 because of the increase in extreme wet weather events. Figure 4-5 shows a month-to-month comparison of spills from 2018 and 2019. In 2018, the months with the highest reported spills were November and December, correlating with months of high rainfall and the beginning of a wet weather period. 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.

Figure 4-5 Spills by Month (2018–2019)



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

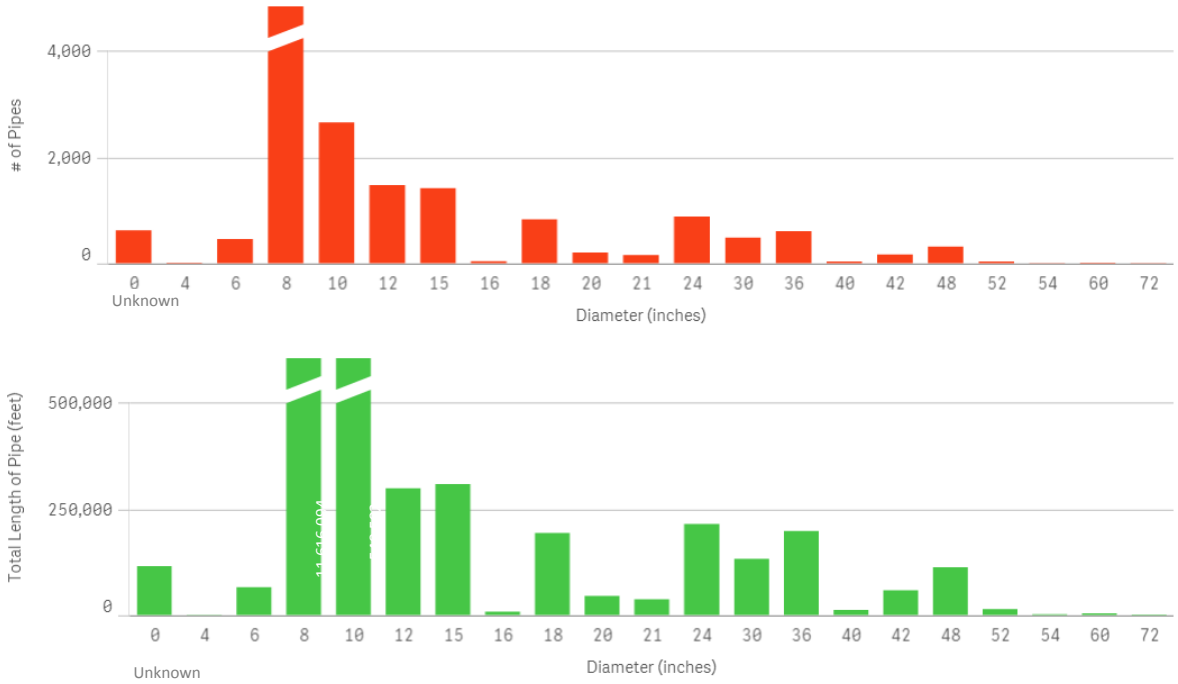
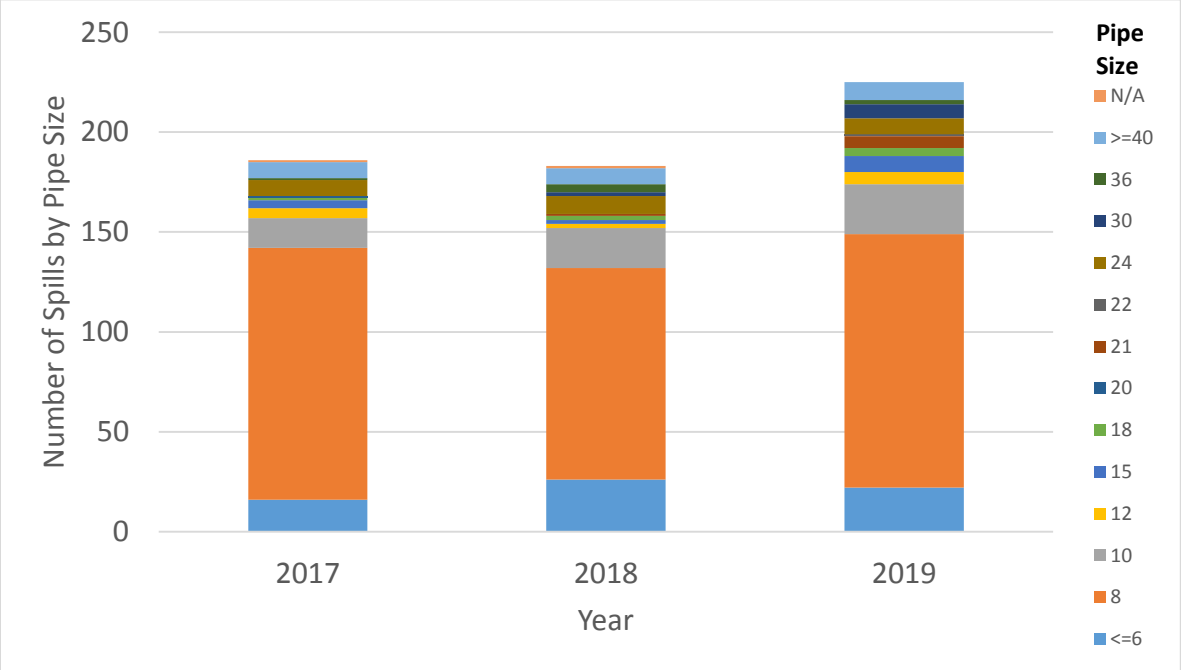


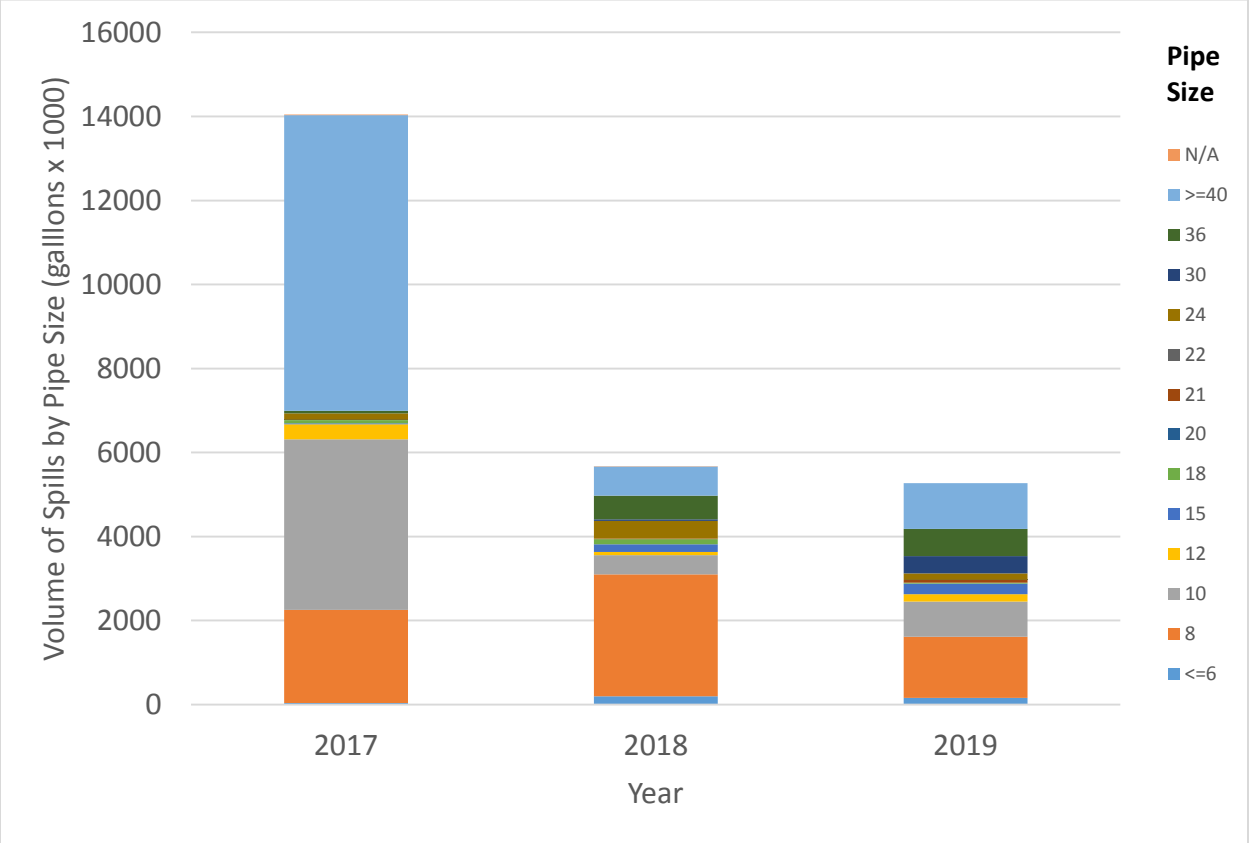
Figure 5-2 Spills by Year by Pipe Size (inches) (2017–2019)



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 (2017–2019)

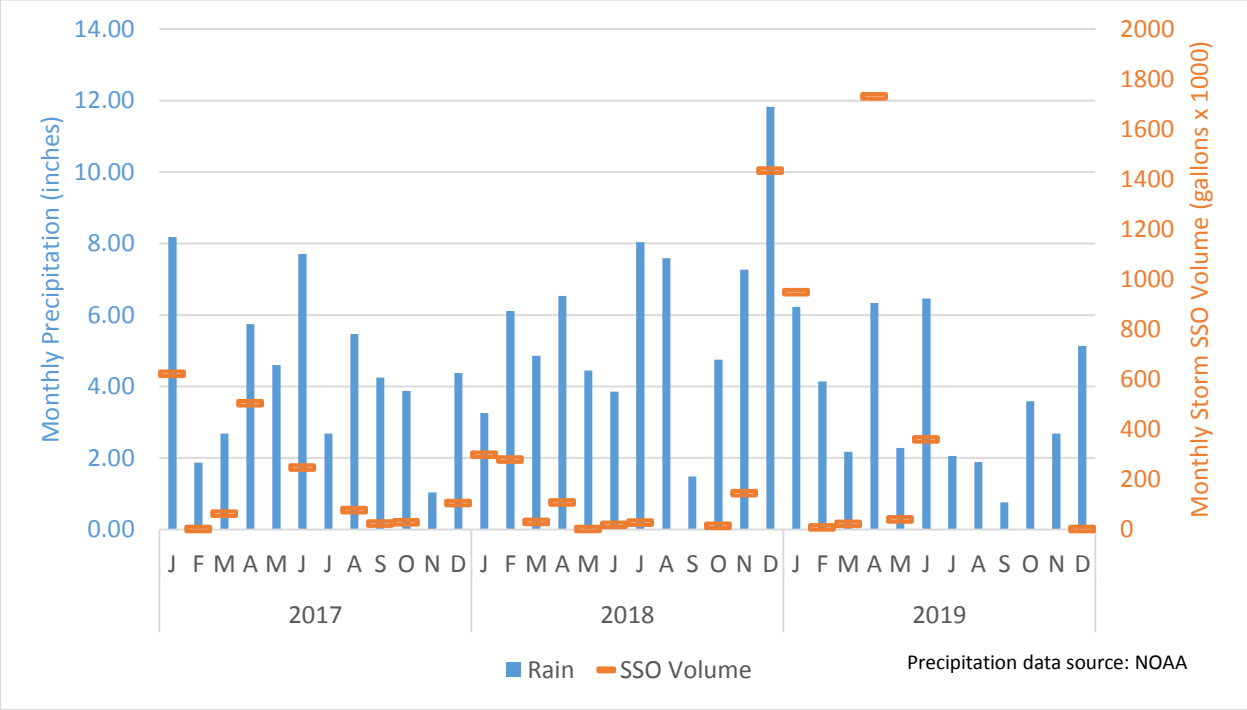


Notes:
Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure. Pipe diameter was not always recorded; thus, some are blank or N/A.

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 2019, 69 spills were attributed to wet weather (34 occurred on April 19). The volume for spills caused by wet weather was approximately 2.3 million gallons in 2018 compared to more than 3.1 million gallons in 2019 (1.8 million gallons attributed to April 19). Similarly, there were eight overflows caused by wet weather in 2018 and 31 in 2019 (10 occurred on April 19). There were eight building backups in 2018 caused by wet weather but fifteen in 2019 (twelve occurred on April 19). Figure 5-4 shows rainfall and SSO volume by month from 2017 through 2019. Note that there were no wet weather SSOs from July through November 2019.

Figure 5-4 Monthly Precipitation and Wet Weather-induced SSO Volume (2017–2019)



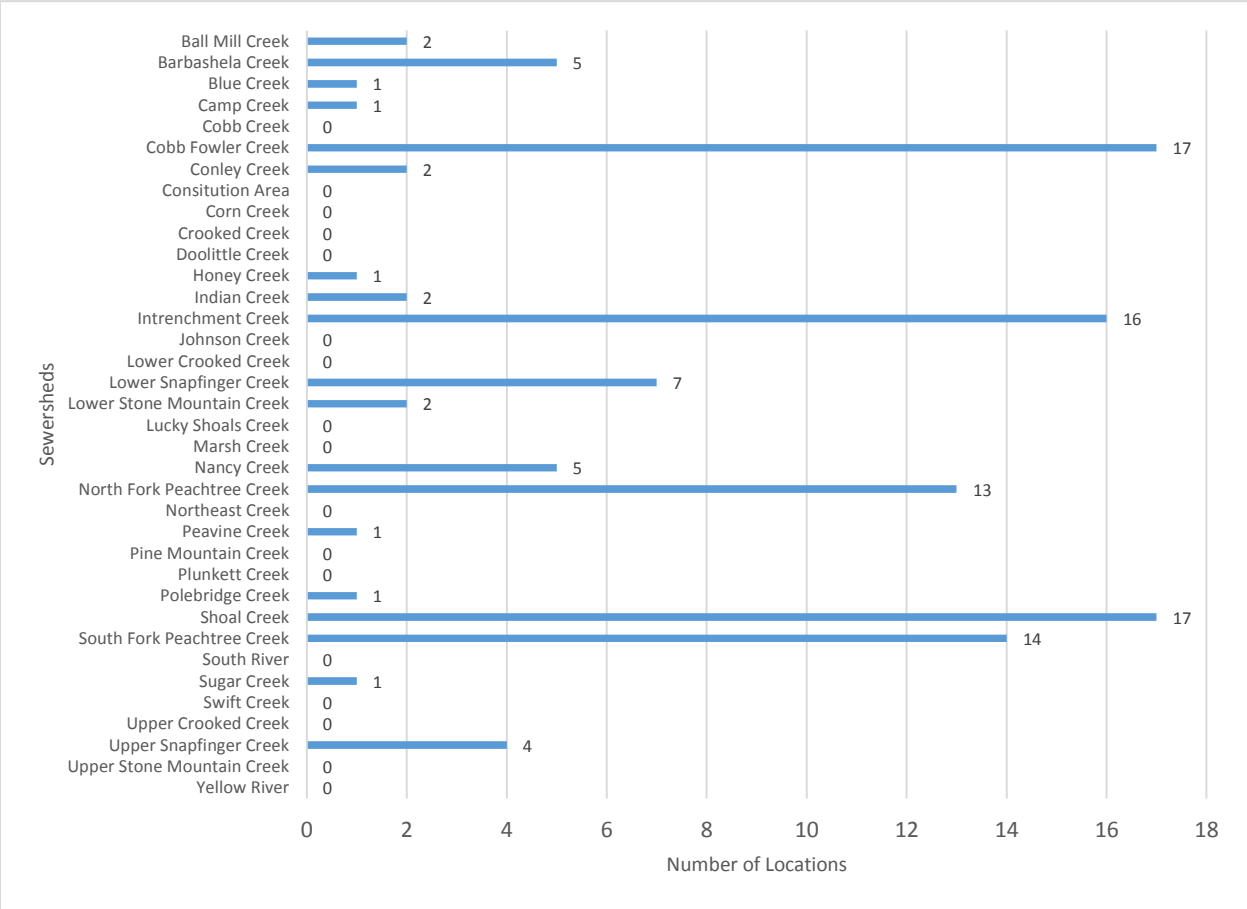
Note: Only spills with a cause of STORM or I/I are represented in this figure.

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.

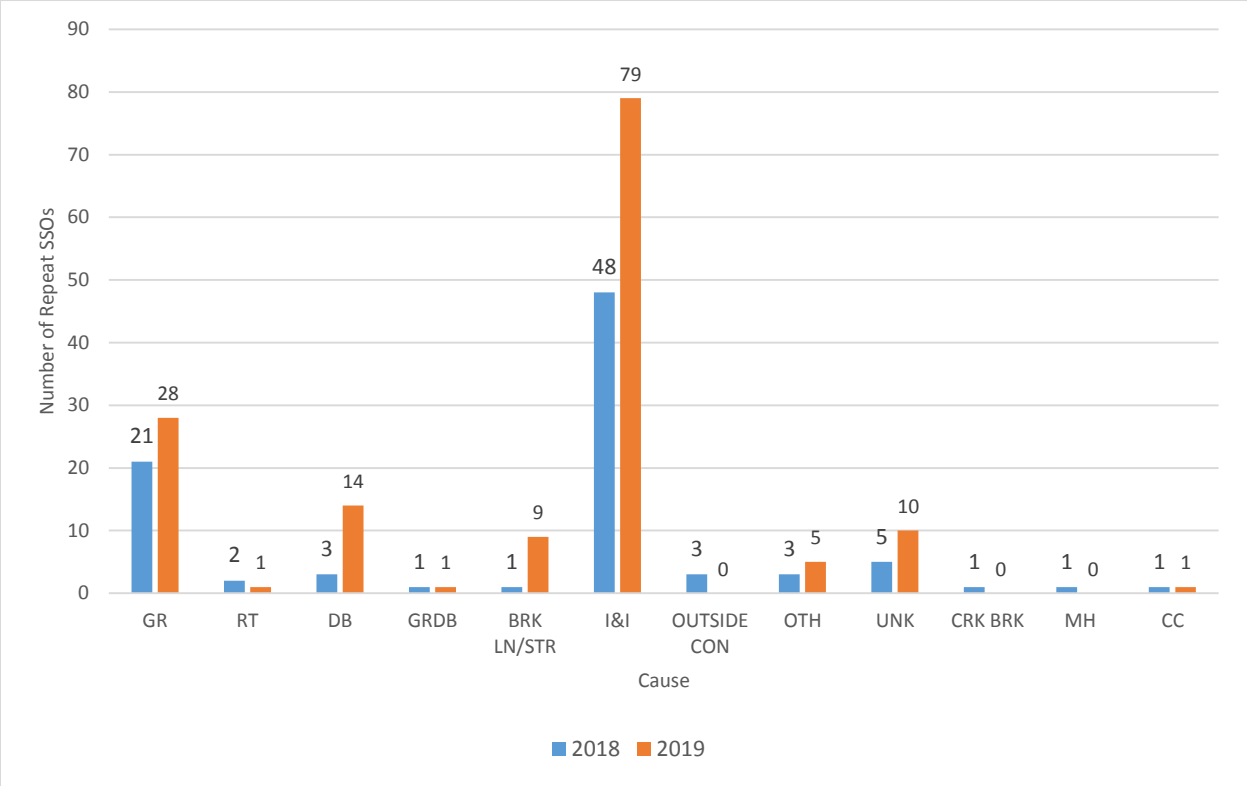
DWM defined 500 -foot radius areas with repeat SSOs and tallied the repeat SSO locations by sewershed (see Figure 5-5). For 2019 the total number of repeat SSOs is 112, Cobb Fowler, Intrenchment Creek, and Shoal Creek have the greatest number of repeat SSO locations.

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



The most common causes of repeat SSOs in 2019 were wet weather and grease (see Figure 5-6). Wet-weather-related repeat SSOs increased from 2018, as increased extreme rain events in 2019 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 have developed remediation plans to address issues. In 2019, construction has started to address some of these sites including 161 Hood Circle and 1615 Melanie Ct.

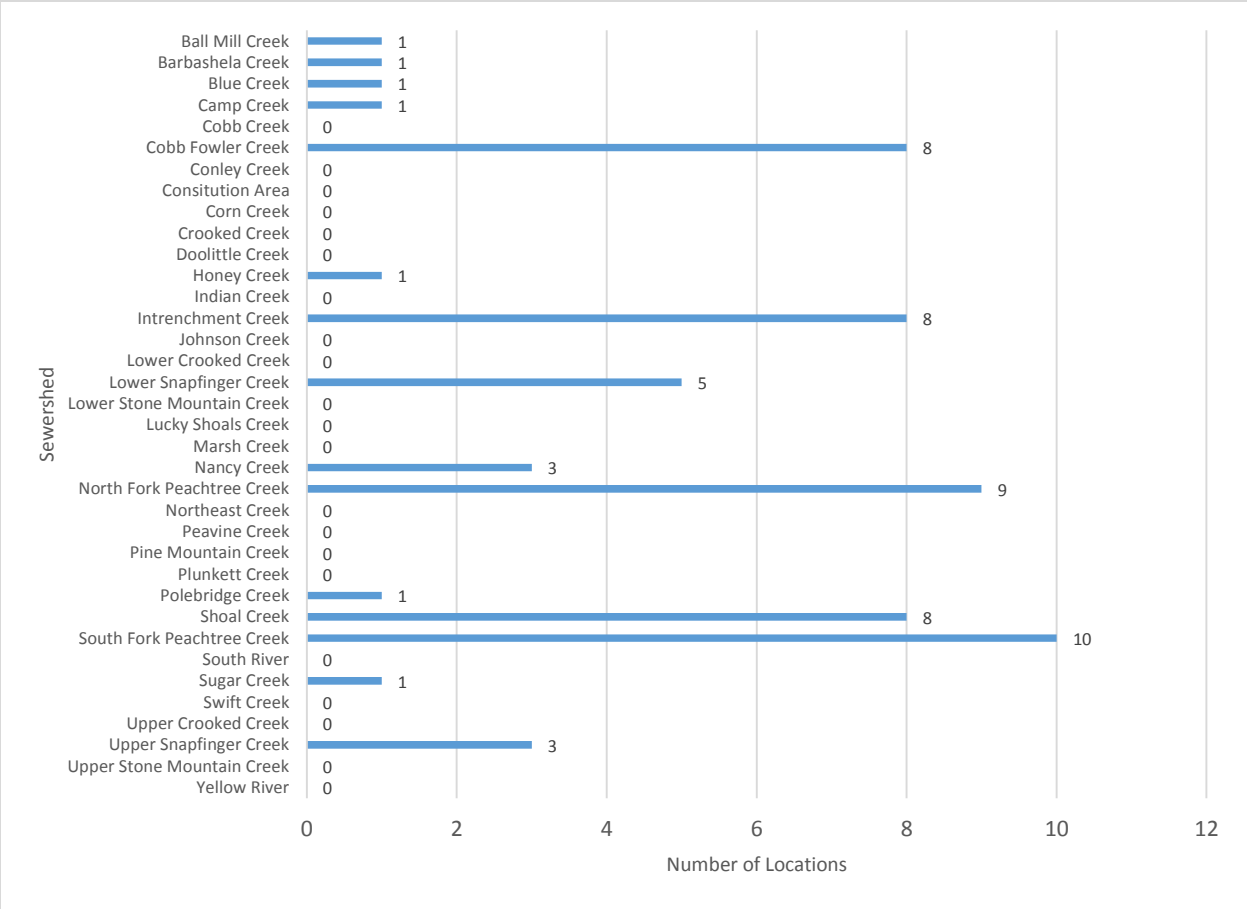
Figure 5-6 Number of Repeat SSOs by Cause



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

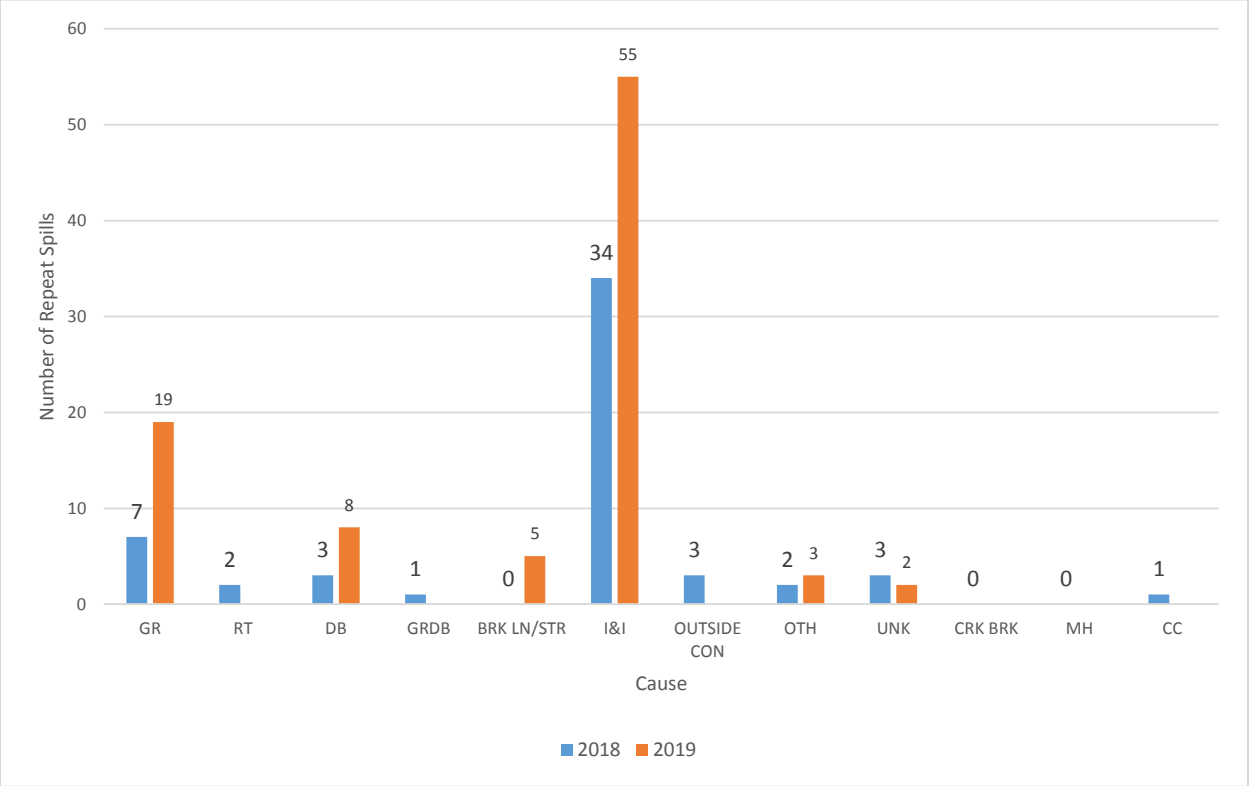
Similarly, DWM analyzed only those SSOs that are categorized as spills. From 2018 to 2019, repeat spills increased. North Fork Peachtree Creek and South Fork Peachtree Creek had the greatest number of repeat spill locations in 2019 (see Figure 5-7).

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



The most common cause of repeat spills is wet weather (see Figure 5-8). Wet-weather-related repeat SSOs increased from 2018, as increased extreme rain events in 2019 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 in Figures 5-9 and 5-10, respectively.

Figure 5-9 Repeat SSOs

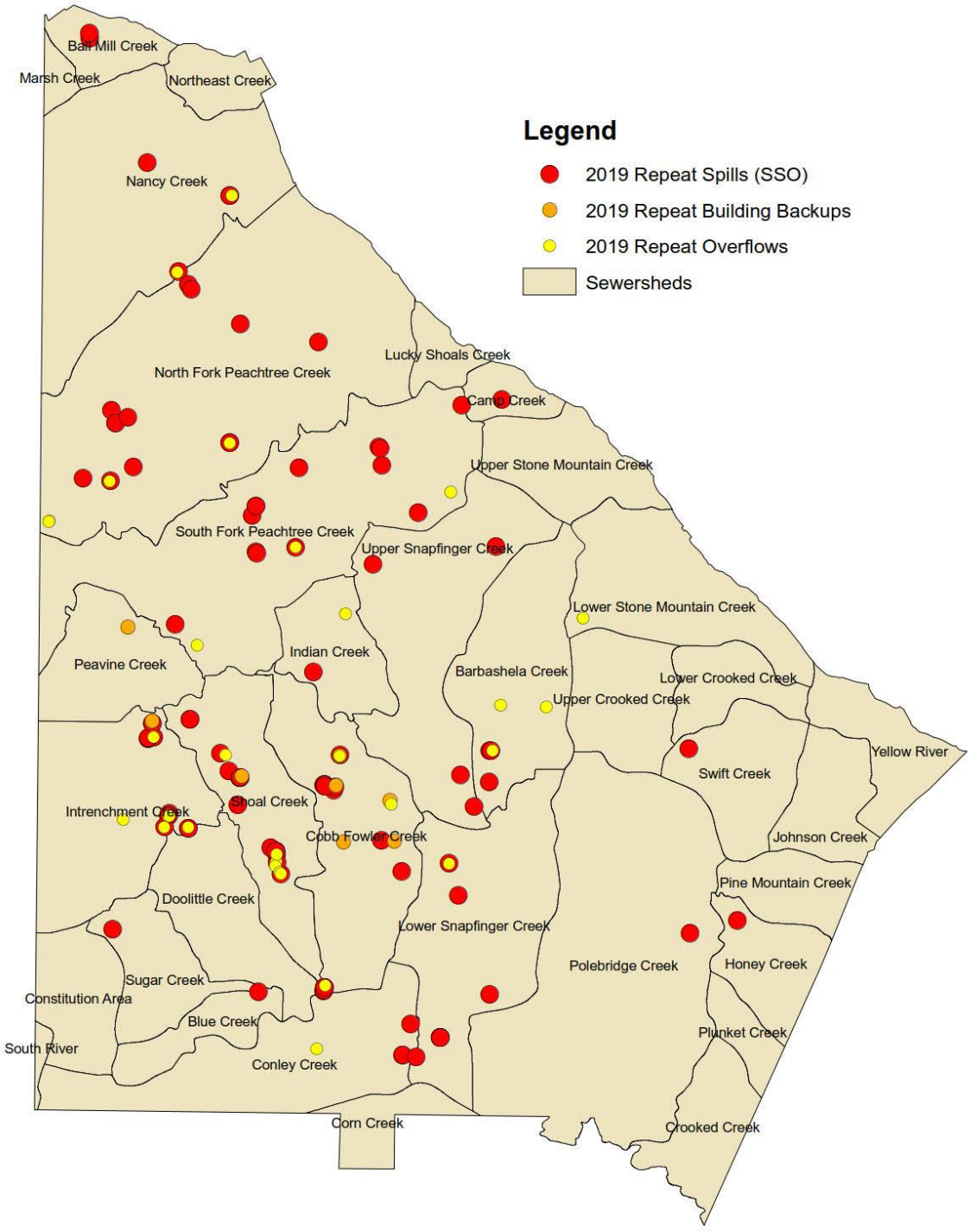
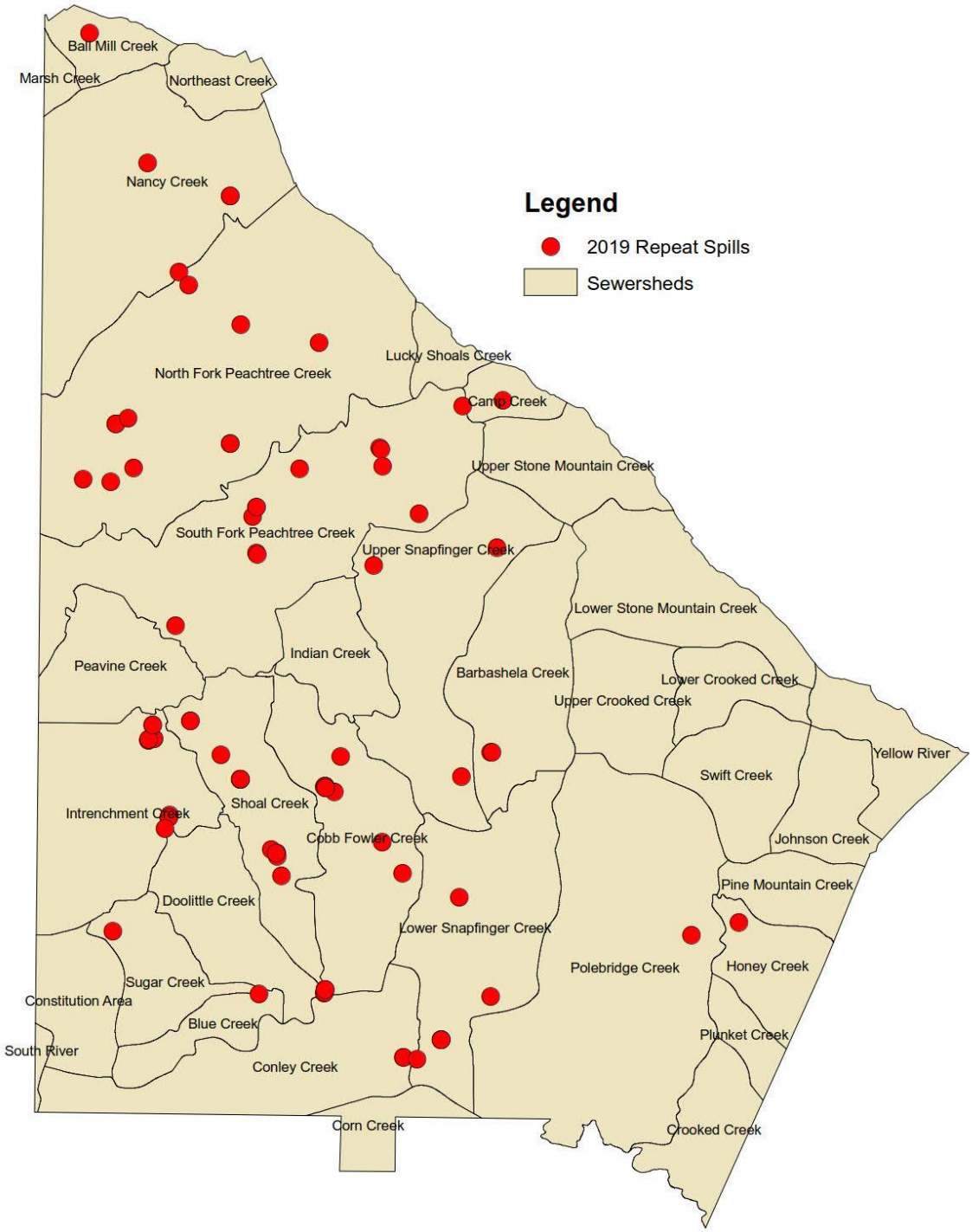


Figure 5-10 Repeat Spills



6. Summary

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

- The number of SSOs per year during the period of record (2012–2019) increased this year, particularly for wet weather and debris, which can be attributed to the increase in extreme wet weather events and the increased use and disposal of hygienic wipes. Incidences of grease 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 (see Figures ES-1 and 2-1).
- Compared to 2018, spills increased in 2019, 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 7 years is approximately 5.2 hours (see 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
    - Vandalism – Time needed to locate the issue and often includes atypical blockages in the system that cannot be removed from normal cleaning of the line
- SSOs resulting from maintenance issues (including grease, debris, and roots) accounted for 51 percent of the SSOs occurring from 2012 to 2019. During this same period, maintenance-related SSOs accounted for 20 percent of the estimated volume of SSOs (see Figure 4-1).
- SSOs caused by sewer line breaks occurred less often than SSOs attributed to other causes but accounted for more SSO volume (see Figures 2-7 and 4-1).
- The number of SSOs caused by grease declined from 175 in 2012 to 86 in 2019 (see Figure 4-2).
- The months with significant rainfall recorded correlate to a large volume of SSOs, but not singularly because of the amount of rainfall for the month. In January 2019, the rainfall combined with the saturated soil from wet weather in November and December 2018 resulted in a large number of spills. In April 2019, while to total monthly rainfall was high, the majority of the spills for that month could be attributed to a single extreme wet weather event on April 19, 2019 (see Figure 5-4).
- In 2019, there were 148 locations of repeat SSOs and 121 locations of repeat spills within the year (see Figure 5-5).
- Two main causes of repeat SSOs in 2019 were grease and wet weather (see Figure 5-6). An increase in I/I-related repeat SSOs was observed, influenced by the recorded extreme rain events in 2019, particularly April 19.