Chief Executive Officer
Michael L. Thurmond

Board of Commissioners

District 1
Nancy Jester

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Jeff Rader

District 3
Larry Johnson

District 4
Steve Bradshaw

District 5
Mereda D. Johnson

District 6
Kathie Gannon

District 7
Lorraine Cochran-Johnson

Office of the Chief Executive Officer
Zachary L. Williams
Executive Assistant, Chief Operating Officer

Via Electronic Mail and U.S. Mail

February 27, 2019

Chief, Clean Water Branch
ATTN: Ms. Sara Janovitz
Water Protection Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303

RE: Clean Water Act Consent Decree 1:10cv 4039-WSD
       Annual Report #7 Submittal due March 1, 2019

Dear Ms. Janovitz:

As required by §IX. Reporting Requirement of the Consent Decree associated with the above referenced civil action, we are submitting the following document for your review and comment:

- **Annual Report #7**

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations pursuant to CWA Section 309(c)(4).

If you have questions or comments regarding this submittal, please call me at 404 371-2174.

Respectfully,

Zachary L. Williams,
Chief Operating Officer and Executive Assistant
DeKalb County, Georgia

ZLW/mw/zg
cc: Georgia EPD
       Viviane Ernstes, County Attorney
       William "Ted" Rhinehart, Deputy COO
       Reginald D. Wells, Director, DWM
       Darren Eastall, Consent Decree Administrator
       E. Fitzgerald Veira, Troutman Sanders
       Matthew C. Welch, Deputy County Attorney

Annual Report #7

January 1, 2018, to December 31, 2018
Civil Action No. 1:10cv4039 - WSD

February 27, 2019

Table of Contents

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") submits this 7th 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 2018 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, 2018, to December 31, 2018, the following 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	Final Submittal
IX.(56)	4th Quarterly Report 2017	1/30/18
IX.(57)	12th Semi-Annual Report	1/30/18
IX.(58)	Annual Report #6	3/1/18
IX.(56)	1st Quarterly Report 2018	5/1/18
IX.(57)	13th Semi-Annual Report	7/30/18
IX.(56)	2nd Quarterly Report 2018	7/30/18
VI.B (i)	Revised Contingency and Emergency Response Plan (CERP)	7/31/18
IX.(56)	3rd Quarterly Report 2018	10/30/18
VI.B (v)	Revised Collection and Transmission Systems Training Program Plan	12/10/18

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

Executive Summary

As required by the Consent Decree, a narrative summary of actions undertaken by the County is to be submitted on an annual basis, as follows:

> "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."

Table ES-2 summarizes the major activities and key milestones completed in 2018.

Table ES-2   2018 Major Consent Decree Milestones and Accomplishment Summary

Program or Project	Milestones and Accomplishments
Contingency and Emergency Response Plan (CERP)	✓ Submitted revised CERP CMOM document July 31, 2018 and received approval from USEPA/GAEPD November 20, 2018. ✓ Trained Department of Watershed Management (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 1,045 warning notices
	   – Delivered 321 court summons
	✓ Performed FOG inspections, evaluations, and tracked data:
	   – Total number of FOG inspections: 7,712
	   – Total number of FOG evaluations: 1,419
	✓ 2018 monthly average permitted active FSEs: 2,705

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 2,580 sewer creek crossing inspections to monitor and maintain the structural integrity of sewer assets near waterways. ✓ Procured a contract for root control application and treated 478,096 feet of sewer to remove root intrusions and prevent blockages. ✓ Procured an easement clearing contract to minimize root intrusion and allow efficient access to assets during maintenance activities. ✓ Substantially completed renovations at six lift stations to either expand station capacity or maintain proper operations.
Collection and Transmission Systems Training Program	✓ Submitted an updated Training Program Plan on December 10, 2018, for agency review. ✓ Completed 8,363 hours of technical, leadership, managerial, and skills training. ✓ Generated training reports to ensure employees completed scheduled training session within a specified timeframe.

Table ES-2   2018 Major Consent Decree Milestones and Accomplishment Summary

Program or Project	Milestones and Accomplishments
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 248 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	✓ Initiated development of dynamic models for each of the seven modeled areas. ✓ Completed flow data analysis, model flow loading update, and subcatchment delineation for Intrenchment Creek and Nancy Creek. ✓ Continued flow data analysis and subcatchment delineation for North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous Model Areas.
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 39,512 linear feet (LF) of pipe. ✓ Implemented interim protocols per discussions with agencies in July 2018.
PASARP	✓ Implemented and tracked assessment projects including 216 manhole condition assessments (MCA), 25,942 LF (5 miles) of acoustic inspection, 46,828 LF (9 miles) of smoke testing, 110,392 LF (21 miles) of CCTV and associated cleaning, 87,380 LF (17 miles) of TISCIT inspection, and 25,459 LF (4.8 miles) of heavy cleaning identified during CCTV and TISCIT inspections. ✓ Procured contract for two design build rehabilitation packages and issued task orders to four engineering firms to complete design of additional rehabilitation packages; assigned remaining assets for design; began development of bid package for fourth design build contract. ✓ In Design Build Packages 1 and 2, construction of early work components are complete and remaining assets are in final design or construction.
OSARP	✓ Completed CCTV and associated pipeline cleaning and MCA in the OSARP areas including 434,910 LF (92 miles) of acoustic inspection, 852,080 LF (161 miles) of smoke testing, 433,334 LF (82 miles) of CCTV, 417,962 LF (79 miles) of TISCIT surveys, 45,053 LF (8.5 miles) of cleaning, and 1,913 MCAs.
Supplemental Environmental Project	✓ Completed program in 2014.

1.   CERP (CD VI.B.i)

DWM continued to implement the CERP in 2018 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 2018 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. Submitted revised CERP CMOM document July 31, 2018 and received approval from USEPA/GAEPD November 20, 2018.

2. Completed the following activities to resolve and remedy current and potential SSOs:
   a. Cleaning total   3,436,065 LF
      i.   First response and follow up   38,697 LF
      ii. Contractor cleaning   3,397,368 LF[1]
   b. Point repairs   51[2]
   c. CCTV   20,381 LF[3]

3. Responded to 183 reportable spill events and performed after spill follow-up actions.

4. Conducted monthly SSO meetings with program area managers to review previous month's SSOs and discuss any emerging trends and possible mitigation efforts.

5. Distributed more than 22,500 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.

6. Discovered and resolved five major spills from in-stream monitoring.

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 2018, 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 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 5,592,725 gallons of FOG was designated as being removed from system through this program.

3. Delivered 1,045 warning notices (increase of 33 percent year over year) and 321 court summonses to non-compliant FSEs (increase of 190 percent year over year). Of the 2018 FOG citations, all were fined and compliance achieved except for 31 ongoing cases that were reset for compliance by the court; 6 cases that were held over to Superior Court; and 8 cases that were dismissed by the department.

4. Performance Measures:
   a. Total number of FOG inspections: 7,712
   b. Total number of FOG evaluations: 1,419
   c. 2018 monthly average permitted active FSEs: 2,705

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[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.

5. Issued 2,466 permits.

6. Distributed FOG information at 134 public events where approximately 6,124 people were in attendance. These public events included community gatherings, town hall meetings, city-sponsored events, and County-sponsored events.

7. Partnered with the Georgia Institute of Technology for a *pro bono* consulting project in the fall of 2018. Four graduate students from the Scheller College of Business at the Georgia Institute of Technology worked with DWM staff to create and execute a citizen survey of FOG outreach opportunities and to gauge awareness of the understanding of proper disposal of FOG. The survey was executed, and the results are being analyzed by the consulting team.

8. 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.

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 2018 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.   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 99.5 percent for 2018, demonstrating that DWM is accurately tracking and maintaining the computerized inventory of assets in the warehouse.

   b. DWM warehouse inventory value was $6,417,722 for 2018, thus providing assets as needed to ensure efficient maintenance and repair activities.

2. Gravity System Maintenance

   a. Completed all 571 creek crossing inspections of assets identified in 2017 as needing re-inspection in 2018 to monitor and maintain the structural integrity of sewer assets near waterways. Based on the completion of these re-inspections, the County proceeded with 254 additional inspections ahead of the 2019 schedule.

   b. Performed an additional 1,755 sewer creek crossing inspections to re-evaluate scores, completing an update of initial scoring from the 2015–2016 inspections. Deficiencies requiring immediate remediation were repaired, thus reducing the risk of the occurrence of SSOs.

   c. Procured a contract for chemical root control application in the system to remove root intrusions identified during assessment. A total of 478,096 linear feet of sewer mains were treated for roots.

   d. Procured a contract for sewer easement clearing in the system to allow efficient access to assets during maintenance activities. A total of 2,093,573 square feet of sewer easements were cleared.

   e. 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 six lift stations (the status of the MMS Lift Station projects is shown in Attachment A).

   b. Working statistics:
   i. Completed 4,482 preventive maintenance work orders (374/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 to ensure work is being conducted in an efficient manner and within a short time after being identified and planned.

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

   iv. Inspected all 65 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 49 stations to test for any pipe leakage.

   vii. Inspected 45 of 62 ARVs to ensure they were operating automatically to release air pockets in the force main.

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        viii.   Completed lift station work orders:
1. 67 percent preventive maintenance
2. 31 percent corrective maintenance
3. 2 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 2018, the County continued to deliver technical and skills training to DWM personnel related to applicable job responsibilities. The CMOM document was reviewed and updated to reflect program changes and upgrades. A revised Training Program Plan was submitted to USEPA/GAEPD December 10, 2018. 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. Submitted an updated Training Program Plan on December 10, 2018, for agency review.

2. Completed 8,363 hours of technical, leadership, managerial, and skills training for 802 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 2018, 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 248 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. Since the initial model development in 2015, 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. The most recent update included field surveys and lift station updates through February 2018. The maximum month average daily flow (MMADF), 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. Updated steady-state hydraulic routing model to include field surveys conducted and lift station updates through February 2018.

2. Updated PASARP capacity improvement projects to incorporate capacity requests submitted through February 2018.

3. Completed flow data analysis, model flow loading update, and subcatchment delineation, and began dry weather calibration for Intrenchment Creek and Nancy Creek.

4. Continued flow data analysis and subcatchment delineation for North Fork Peachtree Creek, South Fork Peachtree Creek, Snapfinger, Pole Bridge, and Miscellaneous Model Areas.

5. Continued review of water billing data and established Sanitary Sewer Overflow Analysis and Planning (SSOAP) Toolbox data import procedures.

6. Continued data collection for model sanitary flow distribution refinement on latest water billing data, large users/wastewater dischargers, and septic tank services areas.

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 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.

2. Table 8-1 lists the costs associated with work orders and maintenance type.

Table 8-1   2018 Sewer System Costs by Work Order Type

Work Order Type	Sewer System Costs (dollars)	Sewer System Costs (percent)
Corrective Maintenance	$1,635,375	28.0%
Preventive Maintenance	$1,709,352	29.3%
Emergency Maintenance	$2,480,316	42.5%
Miscellaneous Maintenance	$13,656	0.2%
Total	**$5,838,699**	**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. In 2016 and 2017, DWM saw large increases in the number of development applications in the County, which continued through 2018. 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 39,512 LF of pipe, thereby ensuring adherence with the County's design standards.

2. Reviewed 1,678 plans.

3. Reviewed 63 plats.

4. Received 649 sewer capacity requests.

5. Issued 681 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.

6. Revised and implemented interim protocols per discussions with USEPA/GAEPD in July 2018.

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. In addition to identifying and analyzing defects from the assessment data, the County continues to package and prioritize cost-effective rehabilitation recommendations. The first of many prioritized rehabilitation contracts resulting from the assessment phase began in 2017.

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

Key Accomplishments and Significant Activities:

1. Performed assessments and cleaning that included approximately:

    a. 216 manhole condition assessments
    b. 25,942 LF (5 miles) of acoustic inspection
    c. 46,828 LF (9 miles) of smoke testing
    d. 110,392LF (21 miles) of CCTV inspection and associated cleaning
    e. 87,380 LF (17 miles) of TISCIT inspection
    f. 25,459 LF (4.8 miles) of heavy cleaning because of CCTV and TISCIT inspection

2. Raised 80 manholes for access and urgent manhole repairs.

3. Replaced 199 vented manhole lids with solid covers to reduce inflow.

4. Improved access to assets within Priority Areas by raising manholes and clearing access to facilitate inspection and future maintenance as needed.

5. Procured contracts for two rehabilitation packages estimated at a combined amount of $50 million.

6. Issued Task Orders to annual engineering firms with existing contracts for the design of an additional four rehabilitation packages.

7. Issued work order for an annual contractor with an existing contract to begin lining and point repairs.

8. Continued execution of project communications and community outreach for ongoing projects.

9. Substantially completed select PASARP rehabilitation projects (the status of the PASARP rehabilitation projects is shown in Attachment A).

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

Table 10-1   2018 PASARP KPIs

KPI	2018 Performance
SSOs per 100 miles of WCTS within the Priority Areas per year	13.2 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	0.19 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	316,175 gallons per 100 miles within the Priority Areas
Total volume[b] of spills per 100 miles per inch of rain within the Priority Areas	4,517 gallons per 100 miles per inch of rain within the Priority Areas
Number of dry weather SSOs[b] within the Priority Areas	74 dry weather SSOs[b] within the Priority Areas

[a] For the year 2018, 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. 434,910 LF (82 miles) of acoustic inspection
   b. 852,080 LF (161 miles) of smoke testing
   c. 433,334 LF (82 miles) of CCTV and associated cleaning
   d. 417,962 LF (79 miles) of TISCIT assessments
   e. 1,913 manhole condition assessments

2. Replaced 343 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   2018 OSARP KPIs

KPI	2018 Performance
SSO per 100 miles of WCTS per year within the OSARP areas	9.2 per 100 miles per year
SSO per 100 miles of WCTS per year per inch of rain within the OSARP areas	0.13 per 100 miles per year per inch of rain
Total volume[a] of spills per 100 miles of WCTS within the OSARP areas	162,091 gallons per 100 miles
Total volume[a] of spills per 100 miles per inch of rain in the OSARP areas	2,316 gallons per 100 miles per inch of rain
Number of dry weather SSOs[b] in the OSARP areas	141 dry weather SSOs[b]

[a] For the year 2018, 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 Projects' Schedule

CDPMT Master Schedule
Annual Report - Consent Decree
CIP PROJECTS

ID	Task Name	Start	Finish	CD/CMOM Date	% Complete.	2018
2532	**CIP Rehab/Construction Projects**	**4/1/14**	**6/20/20**	NA		
3257	**Lewis Way LS {DB} {12/31/18}**	**9/15/15**	**1/31/19**	NA		
3275	**Design/Build**	**7/13/17**	**1/31/19**	NA		
3277	Substantial Completion	12/18/18	12/18/18	12/31/18	100	12/18 ◆
3284	**Stone Mill I LS {DB} {12/31/18}**	**10/3/16**	**1/31/19**	NA		
3300	**Design/Build**	**7/13/17**	**1/31/19**	NA		
3302	Substantial Completion	12/18/18	12/18/18	12/31/18	100	12/18 ◆
3311	**Stone Mill II LS {DB} {12/31/18}**	**1/21/16**	**1/31/19**	NA		
3327	**Design/Build**	**7/13/17**	**1/31/19**	NA		
3329	Substantial Completion	12/18/18	12/18/18	12/31/18	100	12/18 ◆
3338	**Pennybrook LS {DB} {12/31/18}**	**8/3/16**	**1/31/19**	NA		
3354	**Design/Build**	**7/13/17**	**1/31/19**	NA		
3356	Substantial Completion	12/18/18	12/18/18	12/31/18	100	12/18 ◆
3365	**Fourth St LS {DB} {12/31/18}**	**2/24/16**	**1/31/19**	NA		
3381	**Design/Build**	**7/13/17**	**1/31/19**	NA		
3383	Substantial Completion	12/18/18	12/18/18	12/31/18	100	12/18 ◆
3392	**Heritage Heights {DB} {12/31/18}**	**10/3/15**	**6/7/18**	NA		
3410	**Design/Build**	**10/11/16**	**6/7/18**	NA		
3413	Substantial Completion	5/7/18	5/7/18	12/31/18	100	5/7 ◆
3420	**I85 / Oakcliff Rd {DBB} {12/31/18}**	**5/20/16**	**2/17/19**	NA		
3474	**Construction**	**10/16/17**	**1/18/19**	NA		
3476	Substantial Completion	1/18/19	1/18/19	12/31/18	95	1/1
3483	**Camp Creek LS {DBB} {12/31/18}**	**1/21/16**	**11/13/18**	NA		
3551	**Construction**	**6/1/18**	**11/13/18**	NA		
3553	Substantial Completion	11/13/18	11/13/18	12/31/18	100	11/13 ◆
3622	**New Gibraltar LS {DBB} {12/31/19}**	**5/15/17**	**11/1/19**	NA		
3623	**Design Procurement**	**5/15/17**	**1/31/18**	NA		
3637	Procurement and Contracting Issuance NTP	1/10/18	1/31/18	NA	100	1/31
3698	**Kings Way LS {DBB} {12/31/19}**	**5/2/16**	**12/31/19**	NA		
3699	**Design Procurement**	**5/15/17**	**1/31/18**	NA		
3713	DWM Issuance NTP	1/10/18	1/31/18	NA	100	1/31

Attachment B
MMS KPIs

KPI	Formula	2018 Results
Communication System Program		
Landline abandoned calls—no reason available for why caller abandoned call	Number of dropped calls	Average of 294 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 2018: 50,433
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	1.1% 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)	99.5% 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	7.5% sewer lines inspected by CCTV
PM: Percentage of Sewer Lines Cleaned	Number of miles cleaned ÷ total miles x 100	25% 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	3.4% of system (478,096 LF of root treatment)
PM: Percentage of manholes inspected per year	Number manholes inspected ÷ total number of manholes in system x 100	8.7% 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	10.5 SSOs per 100 miles of gravity sewer line

KPI	Formula	2018 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: 67% Corrective and Emergency Maintenance: 33%
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: 8 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)	3% 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)	89% 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 2017 and 2018, and includes data from 2012, 2013, 2014, 2015, and 2016 for reference. 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

The number of SSOs per year has decreased by 45 percent since 2012, with the greatest annual reduction occurring from 2015 to 2016 (see Figure ES-1). SSOs increased from 2016 to 2017, which can be partially attributed to the increase in rainfall from 2016 to 2017 as well as the County's increased accuracy in identifying SSOs. SSOs continued to decrease from 2017 to 2018, with a reduction of 9 percent. Overall, the trend for SSOs from 2012 to 2018 continues to decrease, 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 (2012–2018)
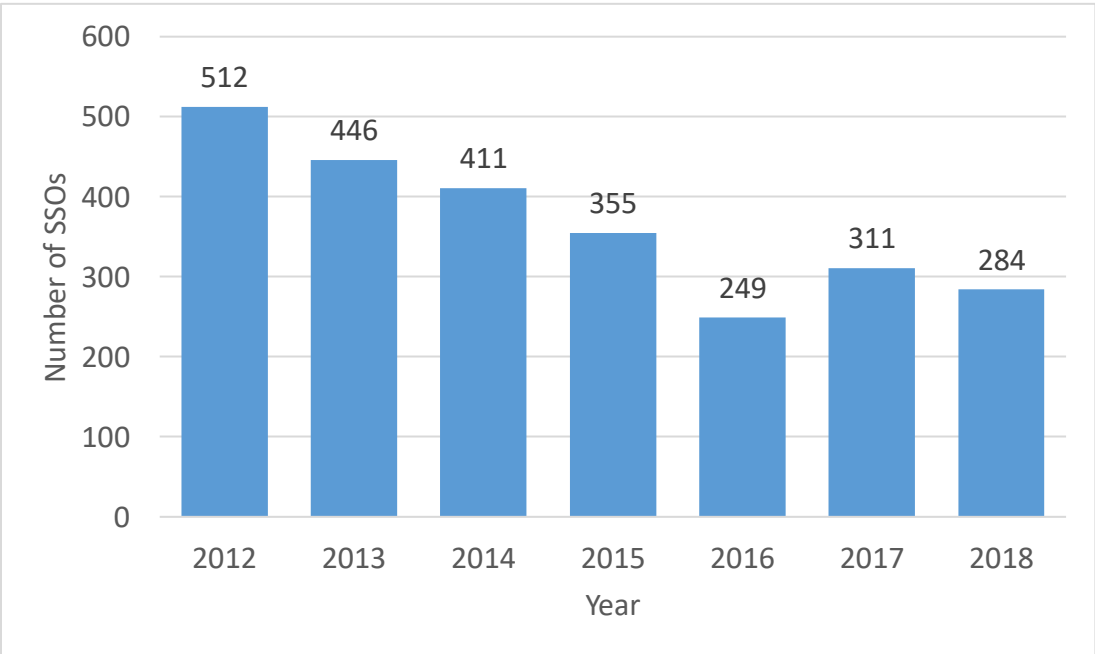
Figure ES-2 shows the number of spills, or discharges of wastewater, that reach waters of the United States or the State. The number of spills decreased 2 percent from 2017 to 2018. Spills were trending at a more significant decrease through October, but the 19 inches of rainfall during November and December, including an event that caused many County creeks to exceed flood stage, resulted in an increase of spills, 37 of them attributable to wet weather, for those 2 months. The County had a significant number of large rainfall events throughout 2018, which also contributed to the number of spills.

Figure ES-2   Total Spills by Year (2012–2018)
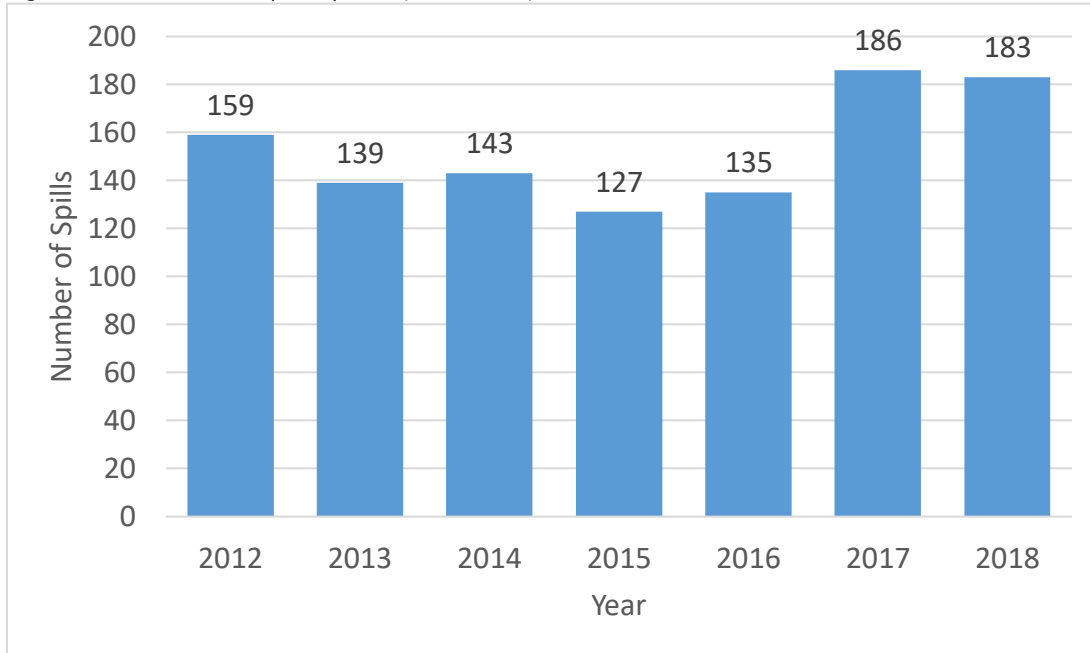
As shown on Figure ES-3, the number of spills attributable to structural causes decreased 10 percent from 2017 to 2018 to a similar number consistent with the number of spills attributable to structural causes recorded in 2014 and 2015. Spills attributable to grease decreased 26 percent from 2017 to 2018, likely a result of DWM's continuing enforcement and education through the FOG program as well as implementation of additional cleaning contracts. The number of spills attributable to wet weather increased in 2018 compared to previous years, coinciding with the 70 inches of rainfall recorded in the County in 2018, a 33 percent increase in rain from 2017. The rainfall totals in 2018 were the largest in the County in the last 20 years. Spills attributable to debris remained relatively the same, increasing 4 percent in 2018 compared to 2017. To address ongoing issues with debris, DWM has three existing small-diameter sewer cleaning contracts and a large-diameter cleaning contract in place.

Figure ES-3   Total Spills by Year by Cause Category (2012–2018)
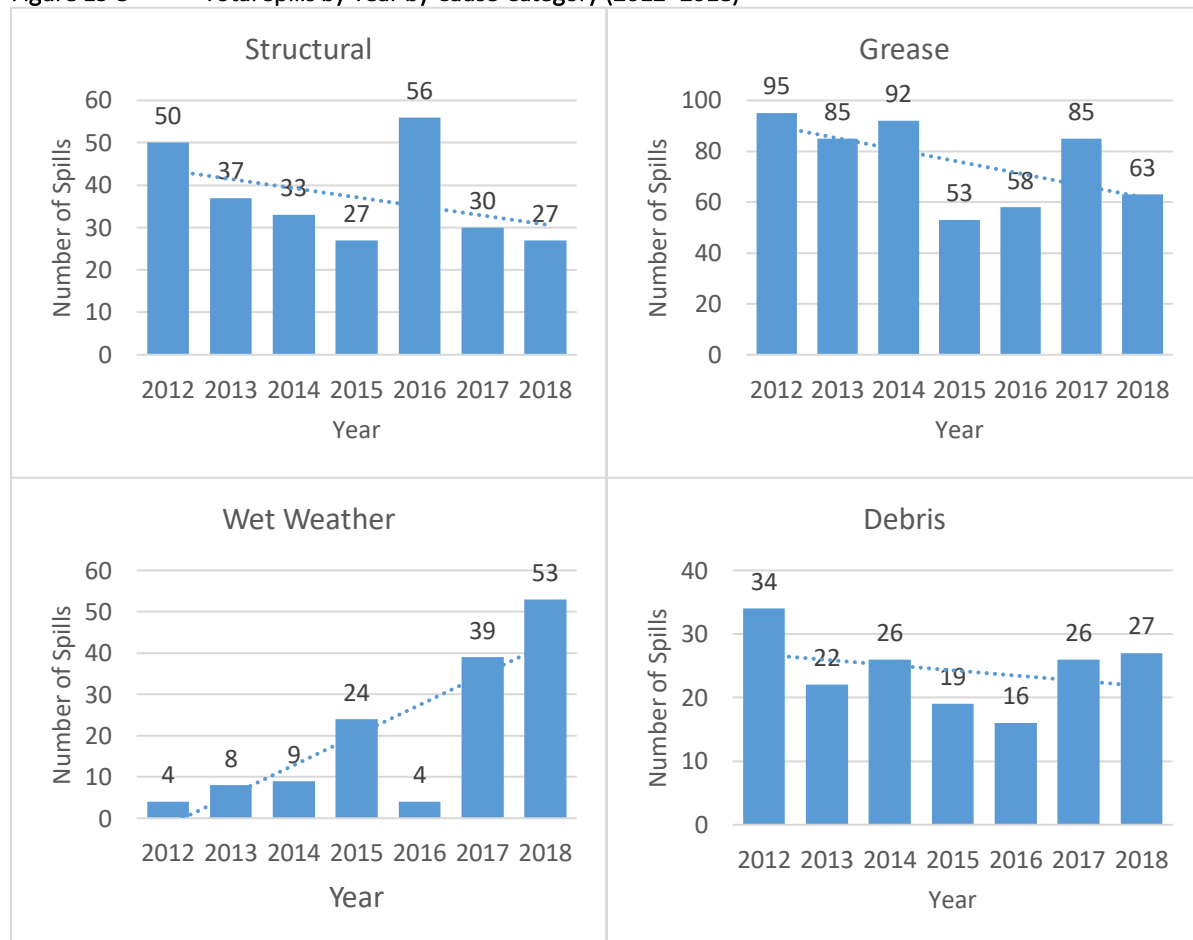
Notes: Cause Categories may include more than one cause. Some spills appear in more than one Cause Category.
Dashed line is the linear trend line for each graph.

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. 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.

The effectiveness of DWM's increased stream sampling effort is also apparent from just one example. On January 19, 2018, a DeKalb County crew responded immediately to notification of an apparent spill. During the County's inspection, it was discovered that an 8-inch-diameter pipe was broken and spilling into the creek. Prior to discovery of the spill, DWM began detecting high fecal counts in the creek on January 4. Source tracking efforts were adversely impacted and delayed because of snow and ice, which hindered access and conditions for dry weather sampling events. However, during this tracking period, other potential sources of high fecal coliform levels were also discovered, such as an overflowing manhole. Because fecal coliform levels remained elevated, source tracking continued until the spill from the 8-inch-diameter pipe was discovered on January 19 by crews walking the creek. Because of DWM's proactive work in interpreting sampling data, the County was able to identify the overflowing manhole as well as estimate that the single spill incident from the 8-inch-diameter pipe accounted for 29 percent (estimated 1,315,800 gallons) of the total volume of non-maintenance-related SSOs in 2018.

1. Classification of SSO Types and Causes

The CD requires a trend analysis of the prior 24-month period. To gain a more comprehensive view of the revised SSO data, DWM analyzed trends for the period from 2012 through 2018.

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 2018 as compared to 2017. Spills account for the majority of the SSOs followed by overflows then building backups. From 2017 to 2018, the number of occurrences of each SSO type decreased.

Figure 1-1   SSOs by Type (2012–2018)
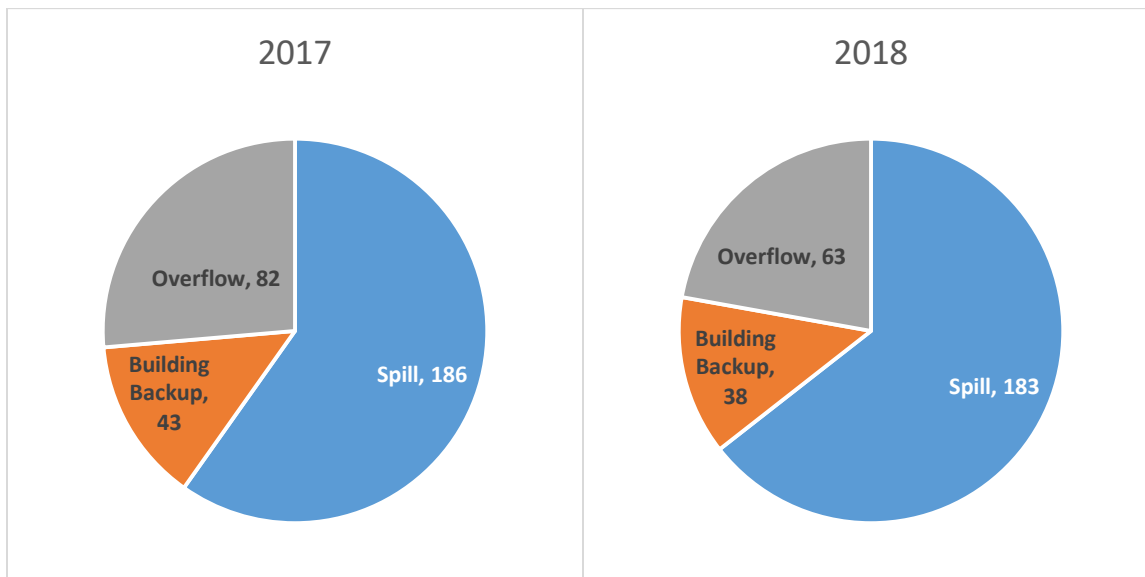
In addition to categorizing SSOs based on type, the County investigates the root cause of SSOs and classifies the events accordingly. Table 1-1 lists the types of causes used by DWM for the period of 2012 to 2018. This investigation and classification includes a review of the results of assessment tools, 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 decreased during the period of record (2012–2018). DWM has reduced the number of SSOs by 45 percent since 2012, with the greatest annual reduction occurring from 2015 to 2016. SSOs increased from 2016 to 2017, which can be partially attributed to the increase in rainfall from 2016 to 2017 as well as the County's increased accuracy in identifying SSOs. As the County's flow monitoring networks has expanded, sewer system condition assessment work progresses and MMS programs such as new stream sampling protocols, increased inspections of creek crossings and remote locations, and implementation of the SSO work order management system (Cityworks) are established, the County can more readily identify SSOs. The overall decreasing trend in the number of SSOs since 2012, including the decrease in SSOs of 9 percent from 2017 to 2018, can be attributed to the County's MMS programs including sewer cleaning, root control, the FOG program, and extensive public education campaigns.

Figure 2-1   Reported SSOs per Year (2012–2018)
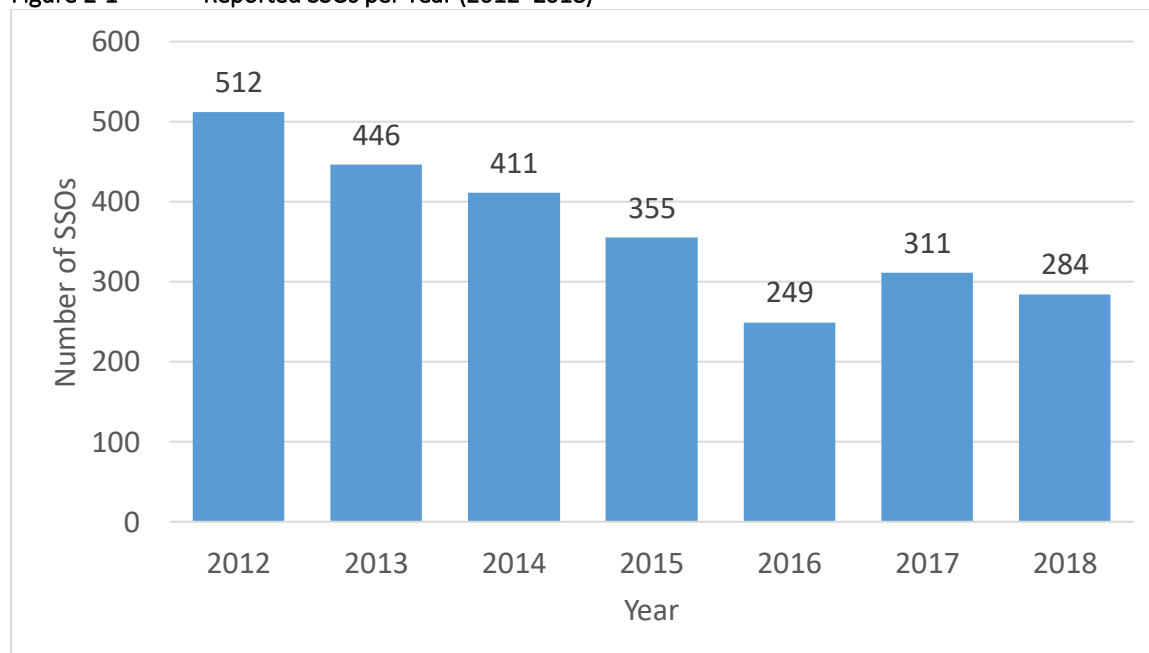
Figure 2-2 shows annual rainfall for the same period of record (2012–2018). Rainfall increased by 33 percent from 2017, with 2018 recording a 20-year high of 70 inches of rainfall. Nearly 30 percent of the rainfall total for 2018 occurred in November and December.

Figure 2-2   Annual Precipitation (inches) (2012–2018)

Precipitation data source: NOAA
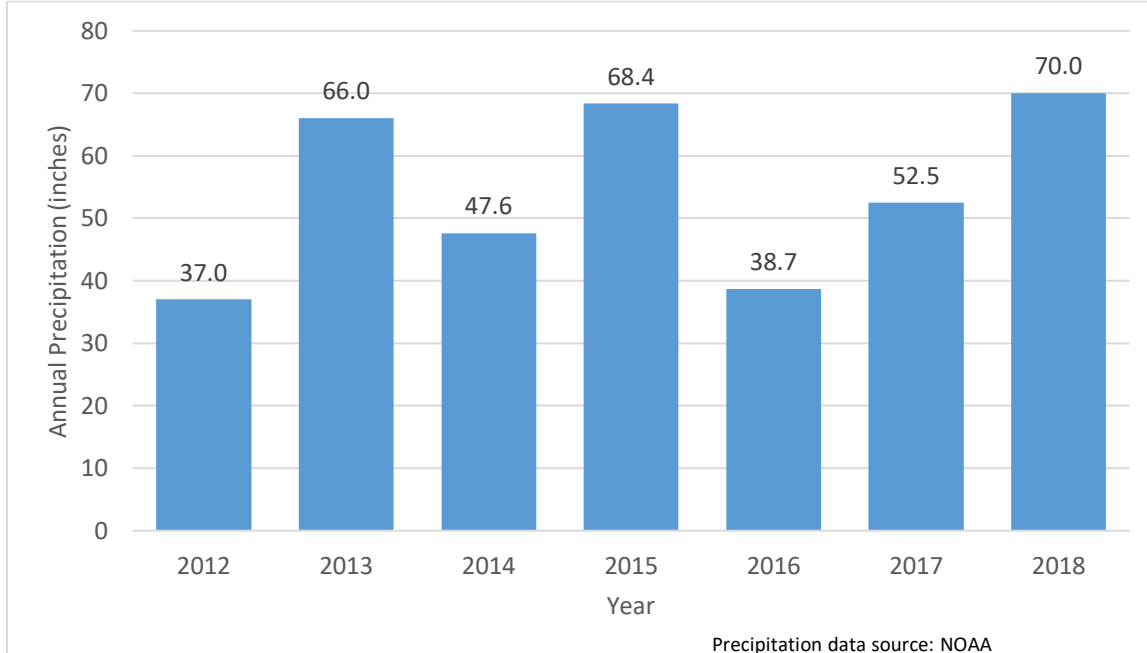
Figure 2-3 presents the total volume (gallons) of SSOs for each year. Volume was recorded for 63 percent of the SSOs that occurred from 2012 to 2016; the remaining 37 percent of SSO records did not include volume information, as SSOs identified by the retroactive data review did not have volumes recorded or information sufficient to estimate volumes. From 2017 to date, 100 percent of the SSO occurrences have a volume recorded.

The volume of SSOs on Figure 2-3 reflects the rainfall increase from 2012 to 2013 and from 2014 to 2015, indicating that larger SSO volumes are related to storm events. Similarly, rainfall decreased from 2013 to 2014 and again from 2015 to 2016 as did the volume of SSOs in those periods. From 2016 to 2017, SSO volume trended up along with total rainfall. From 2017 to 2018, even with the increase in rainfall, total SSO volume decreased. The 2018 total SSO volume was significantly impacted by two large spills that were caused by a broken line and a grease blockage. The spill at 3643 Glenwood Road on January 4, 2018, had a volume of 1,315,800 gallons because of a creek crossing break. A grease blockage at 4776 Snapfinger Woods Drive on March 8, 2018, resulted in a spill volume of 711,900 gallons. The overall decrease in spill volume from 2017 to 2018 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 (2012–2018)
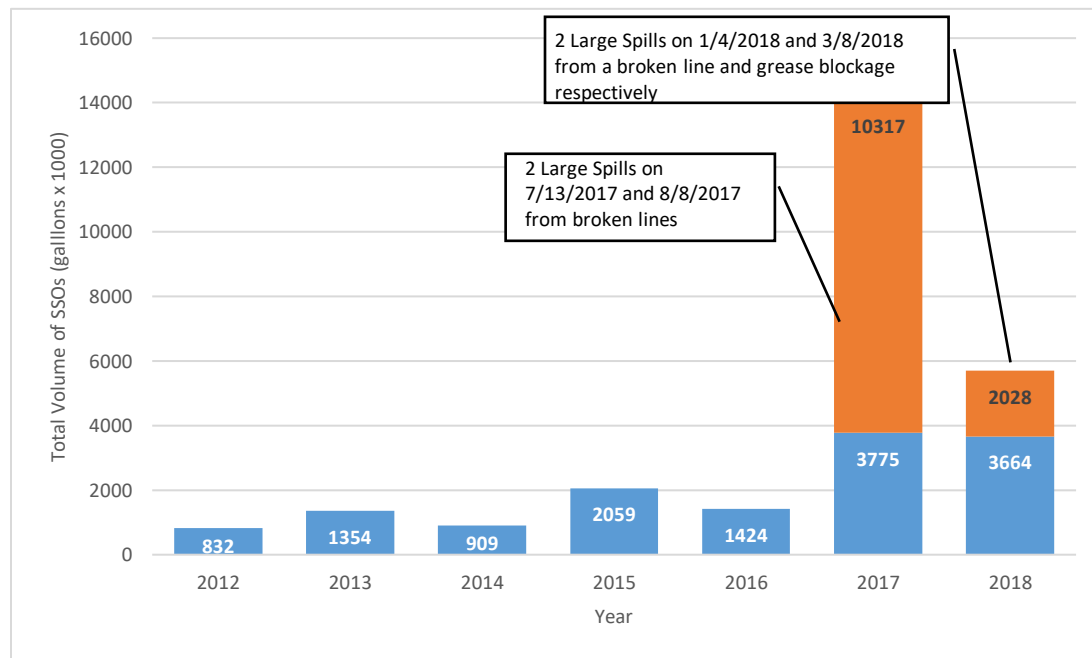
Notes:
For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion. For 2017 onward, all SSOs had a volume recorded.

Figures 2-4 and 2-5 show the number of maintenance-related SSOs and the associated annual volumes, respectively, for the period of record (2012–2018). From a peak of 265 SSOs in 2013 to 132 SSOs in 2018, DWM has reduced maintenance-related SSOs by 50 percent, with a 20-percent decrease from 2017.
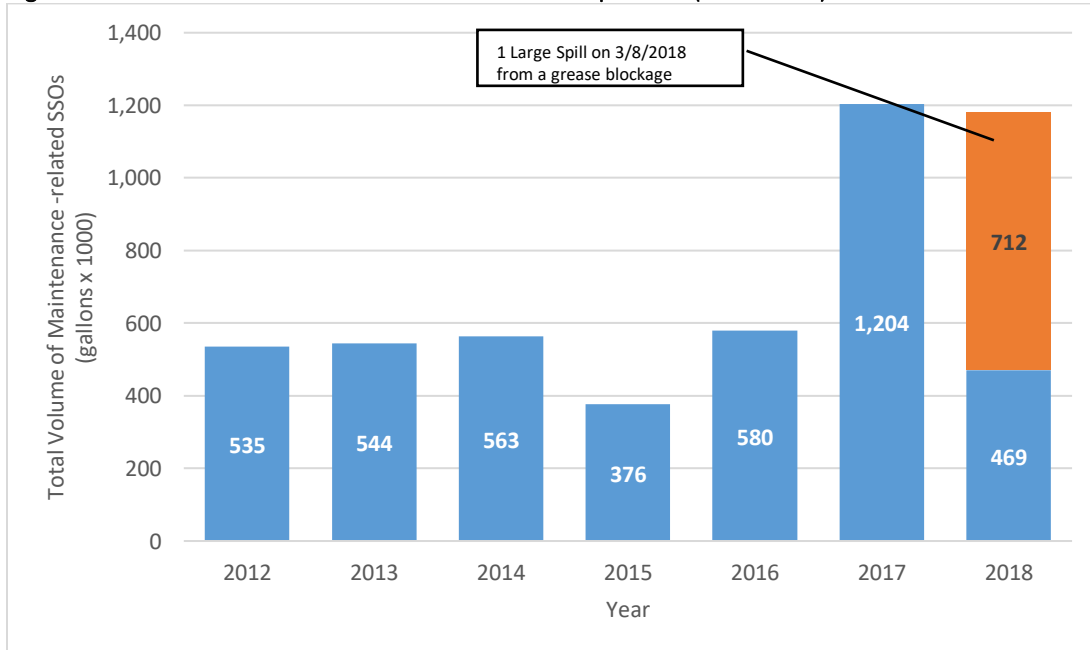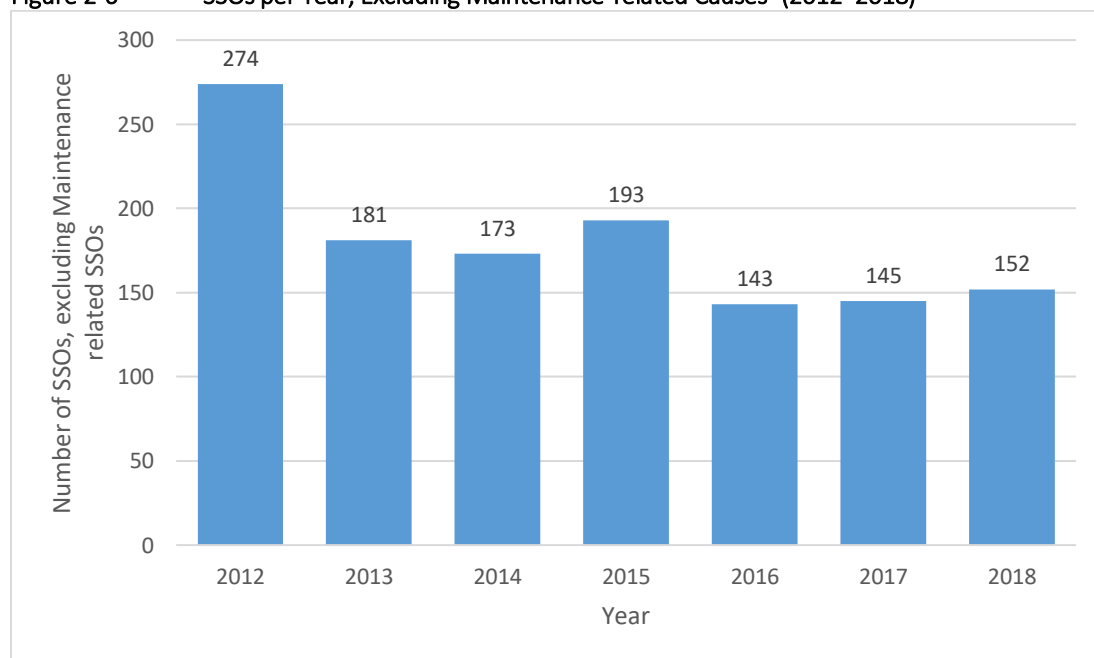
Figure 2-4   Maintenance-related SSOs per Year (2012–2018)
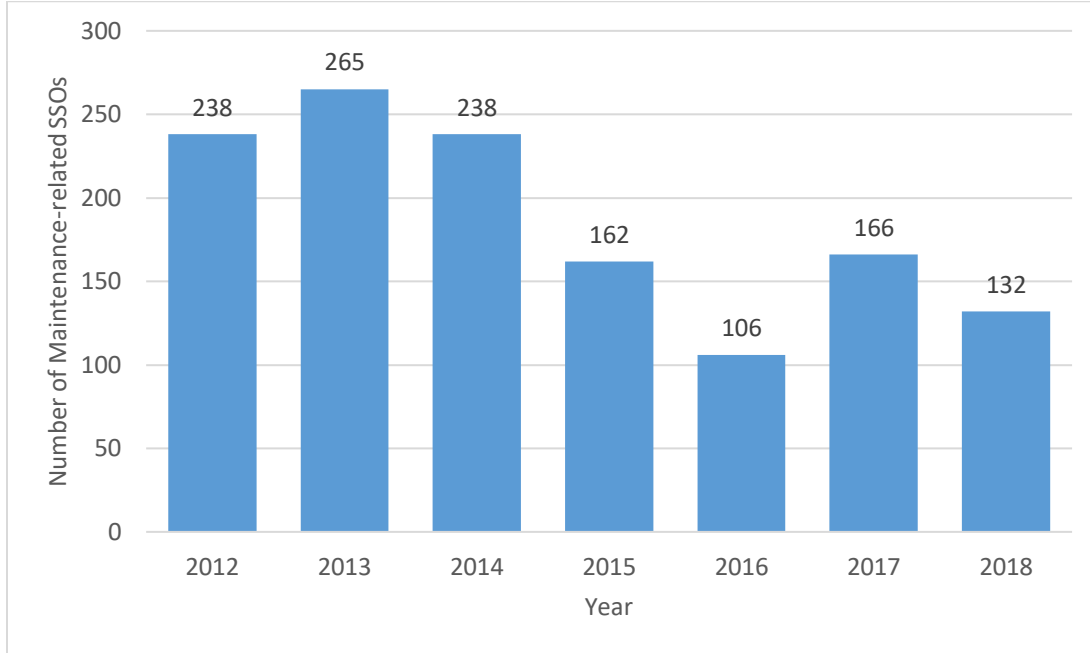
Note:
Maintenance-related SSOs are caused by grease, roots, debris, or any combination thereof.

Figure 2-5   Volume of Maintenance-related SSOs per Year (2012–2018)

Notes:
For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion.
For 2017 onward, all SSOs had a volume recorded.

The volume of maintenance-related SSOs for 2018 was lower than recorded in prior years. It is important to note that all SSOs recorded in 2018 included a total volume whereas from 2012 to 2016, 37 percent of the SSOs did not have a volume recorded. SSO volume decreased from 2017 to 2018 even accounting for the impact of the March 8, 2018, spill.

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.

As shown on Figure 2-6, non-maintenance-related SSOs increased slightly from 145 in 2017 to 152 in 2018. In 2018, an additional 18 inches of rainfall was recorded compared to 2017, which resulted in an additional 19 wet-weather-related SSOs in 2018 as compared to 2017.

Figure 2-6   SSOs per Year, Excluding Maintenance-related Causes[a] (2012–2018)

[a] SSOs attributed to causes other than grease, roots, debris, or any combination thereof.

As shown in Figure 2-7, the overall volume of non-maintenance-related SSOs decreased from 2017 to 2018 when considering the volume from the large spills resulting from broken lines that occurred in both years. Excluding the large spills, an increase in SSO volume is observed because of the increased rainfall in 2018 compared to 2017. Wet weather in 2018 increased SSO volume by 683,000 gallons compared to 2017.

DWM's continued focus on its comprehensive cleaning program has resulted in the decrease in maintenance-related SSOs in 2018. 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. 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.

Figure 2-7   SSO Volume, Excluding Maintenance-related Causes (2012–2018)
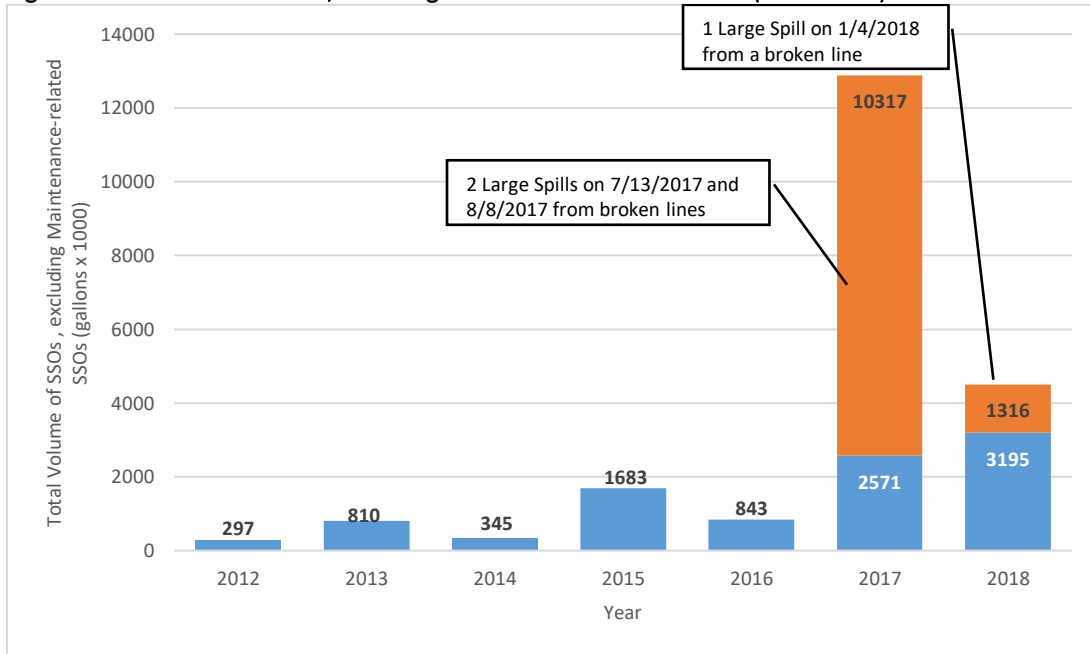
Notes:
For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion. For 2017 onward, all SSOs had a volume recorded.

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 is able to be located and accessed, and the cause of the SSO. From 2012 to 2018, durations are available for 74 percent of the SSOs. The average SSO duration during the last 7 years (2012–2018) was approximately 5 hours, as shown in Figure 3-1.

Figure 3-1   Average SSO Duration by Year (2012–2018)
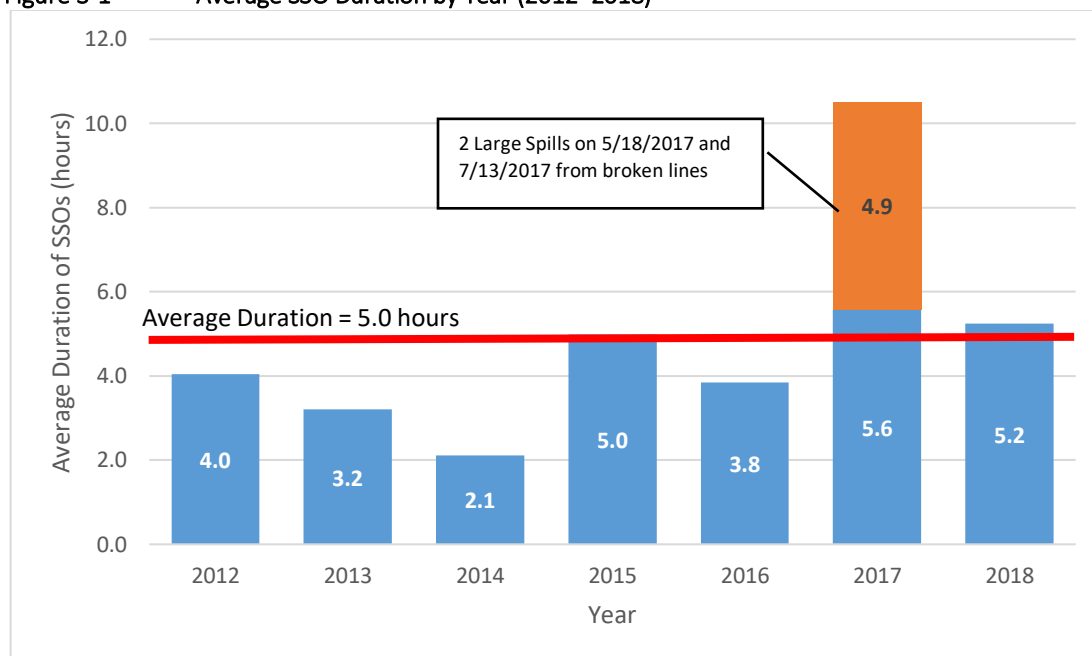
Note:
Durations are available for 74 percent of the SSOs from 2012 to 2018.

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. 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		Cause	Group
BRK LN/STR	Structural		MH	Structural
CC	Contractor		OTH	Other
CRK BRK	Structural		OUTSIDE CON	Contractor
DB	Maintenance		PMP FLR	Pump Failure
GR	Maintenance		RT	Maintenance
GRDB	Maintenance		RTDB	Maintenance
GRRT	Maintenance		STORM	Wet Weather
GRRTDB	Maintenance		TREE	Structural
I&I[a]	Wet Weather		UNK	Unknown
LFT STN FLR	Pump Failure		VAND	Vandalism

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

Figure 3-2 presents average durations for all SSOs from 2012 through 2018. Three causes had durations that were greater than average: wet weather, structural, and vandalism. 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 (2012–2018)
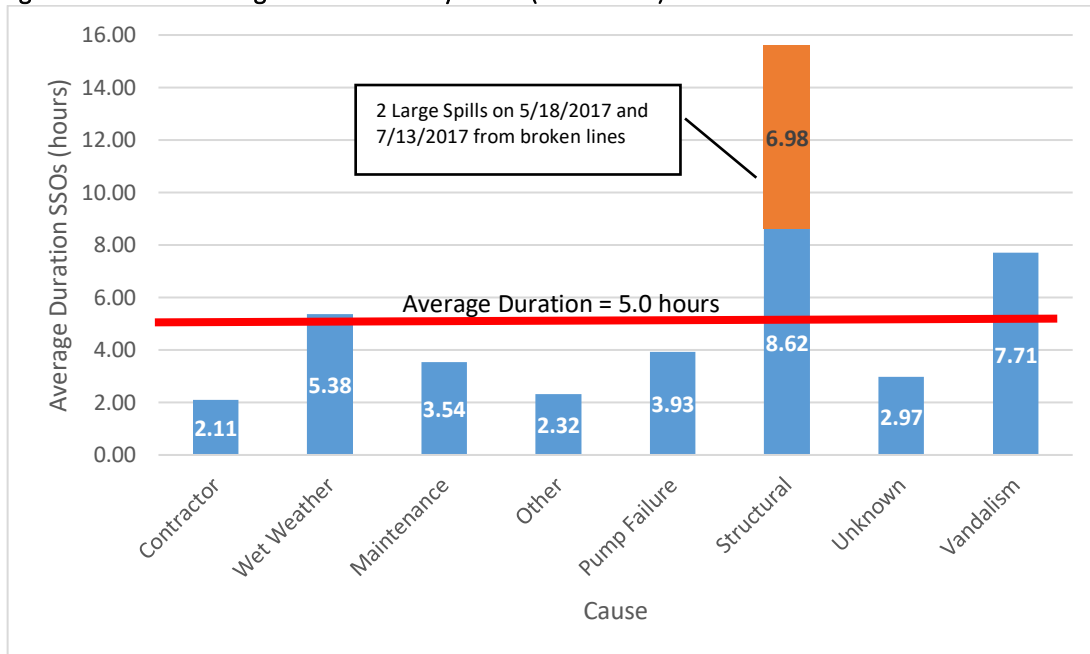
Note:
Durations are available for 74 percent of the SSOs from 2012 to 2018.

4. Causes of SSOs

While maintenance-related SSOs, including grease, roots, and debris, decreased from 2012 to 2018 by 45 percent, resulting in part from increased sewer cleaning and the County's commercial FOG Management Program and Public Education Programs, blockages account for more SSOs than any other cause (51 percent) and represent the third greatest volume (19 percent) of all SSO causes (see Figure 4-1). Broken line/structure 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 2018, 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 542 vented manhole covers in 2018 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 (2012–2018)
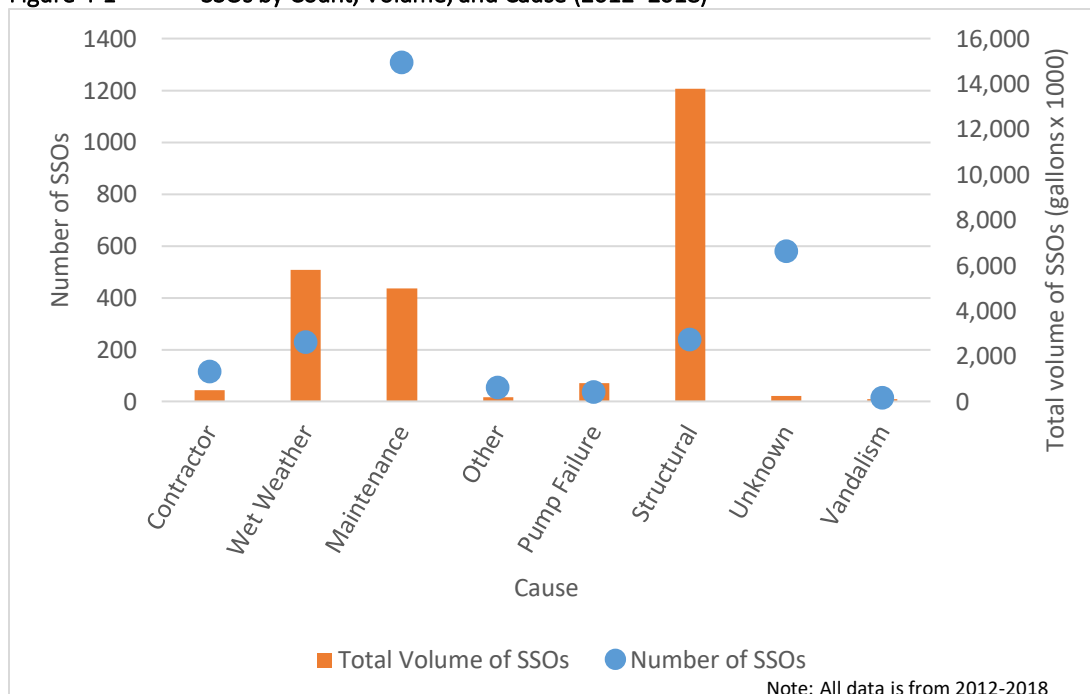
Note:
For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion. For 2017 onward, all SSOs had a volume recorded. The relatively high percentage of causes listed as unknown (UNK) is because of the retroactive data review. The cause of many of the SSOs could not be determined from the information recorded about the event.
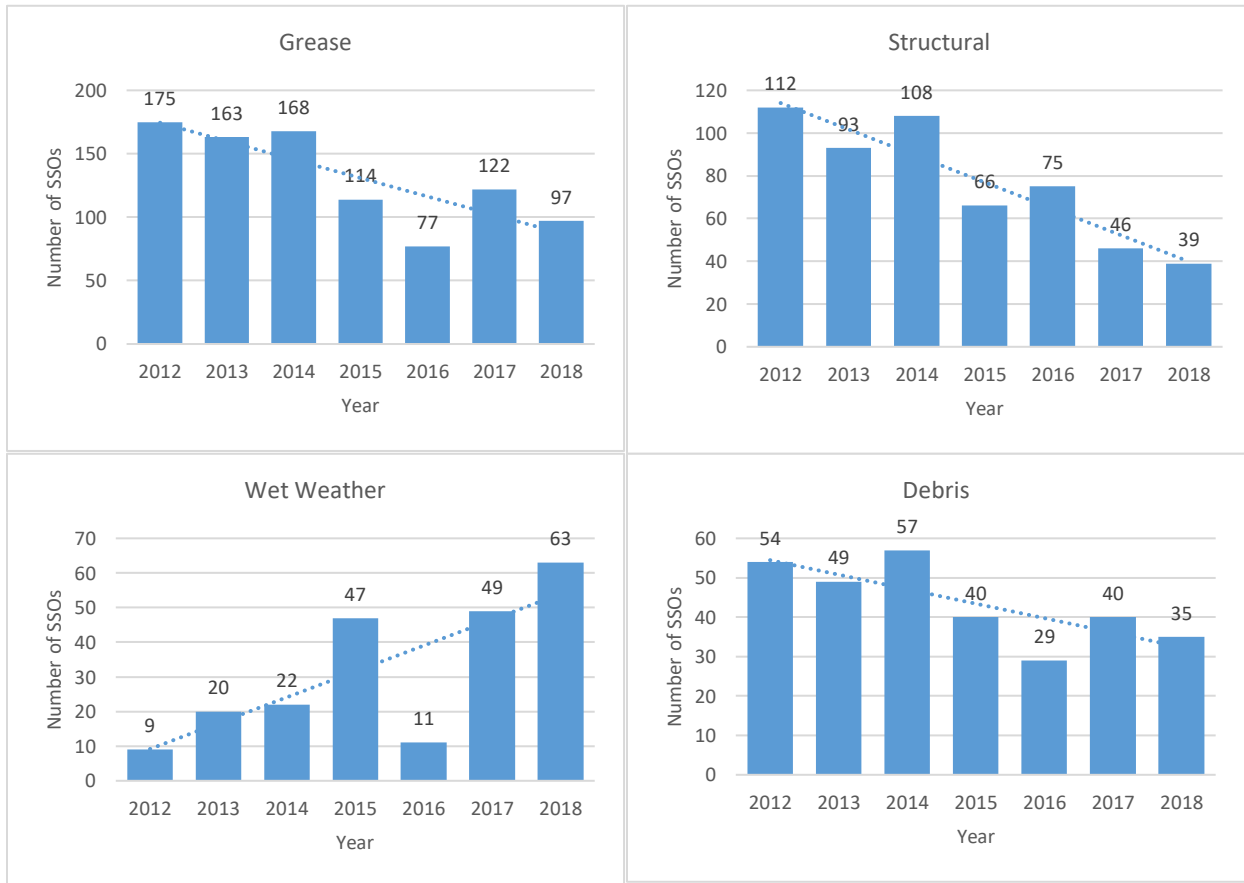
Selected causes can be grouped into categories that help assess the effectiveness of DWM's efforts to reduce SSOs. These broader categories are grease, structural, wet weather, and debris. Table 4-1 lists the causes assigned to each category. As shown by the dashed trend line in Figure 4-2, the number of grease, structural, and debris-related SSOs decreased from 2012 to 2018. 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 a 33-percent increase in rainfall in 2018 compared to 2017, more SSOs resulting from storms occurred in 2018 compared to the previous year. The general trend since 2012 shows the number of SSOs resulting from storms to be increasing. This could be attributed to improved reporting and/or more frequent occurrences of large rain events.

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 (2012–2018)

Grease

Year	Number of SSOs
2012	175
2013	163
2014	168
2015	114
2016	77
2017	122
2018	97

Structural

Year	Number of SSOs
2012	112
2013	93
2014	108
2015	66
2016	75
2017	46
2018	39

Wet Weather

Year	Number of SSOs
2012	9
2013	20
2014	22
2015	47
2016	11
2017	49
2018	63

Debris

Year	Number of SSOs
2012	54
2013	49
2014	57
2015	40
2016	29
2017	40
2018	35

Notes:
Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category.
Dashed line is the linear trend line for each graph.

These same cause categories, when applied specifically to spills, show the same trends, except for structural causes (see Figure 4-3). The number of spills attributable to structural causes decreased 10 percent from 2017 to 2018, remaining consistent with the number of spills attributable to structural causes recorded in 2014 and 2015.

Figure 4-3   Spills by Year by Cause Category (2012–2018)
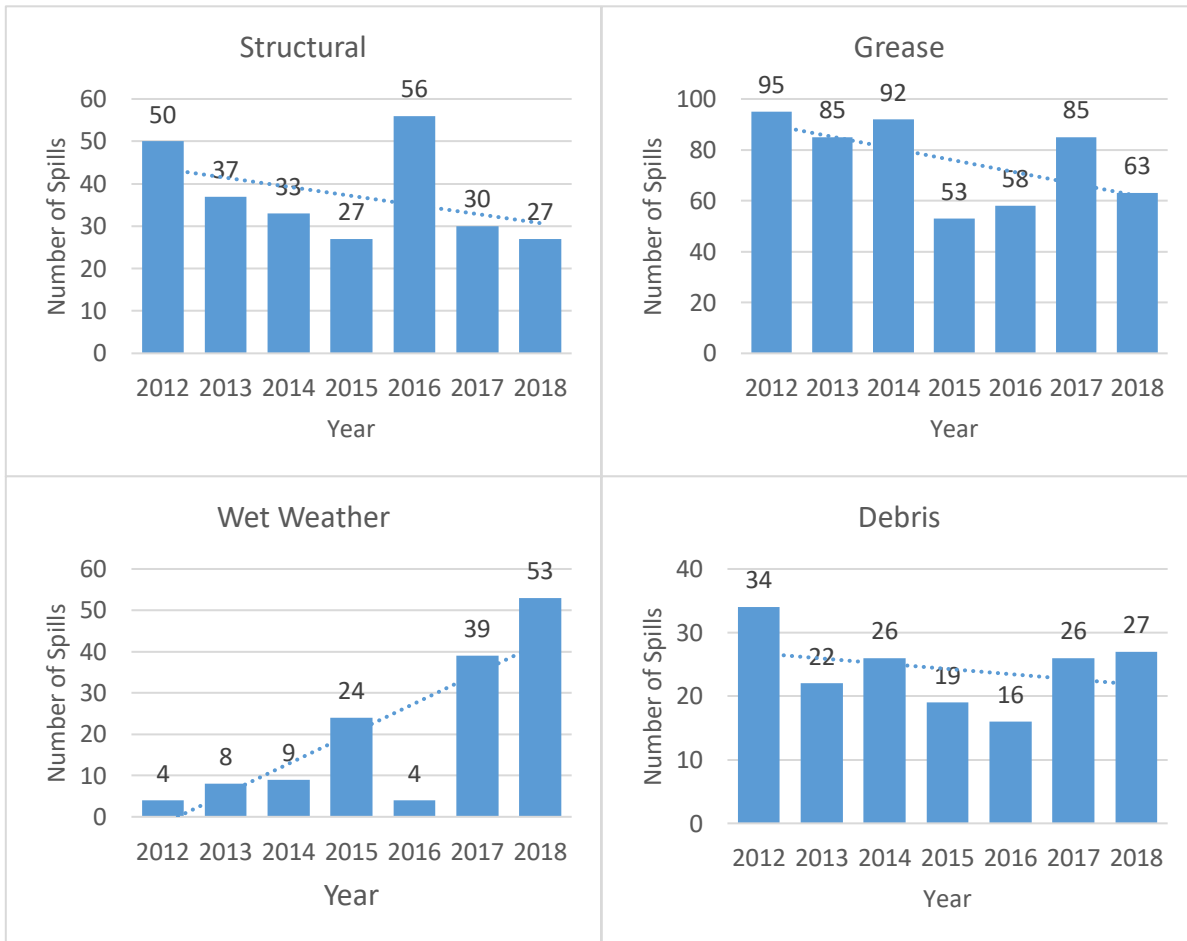
Note:
Cause Categories may include more than one cause. Some SSOs appear in more than one Cause Category.
Dashed line is the linear trend line for each graph.

Figure 4-4 presents the number of spills by year. The number of spills per year increased from 2012 to 2018. 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. Spills decreased 2 percent from 2017 to 2018, despite the additional rainfall that occurred in 2018. Figure 4-5 shows a month-to-month comparison of spills from 2017 and 2018. In 2018, only in months where rainfall was significantly higher than the previous year (February, November, and December) show an increase in spills. December 2018 alone recorded 11.83 inches of rain, including the December 28 event that caused many of DeKalb's creeks to exceed flood stage. This correlates to the increase in spills recorded during that month.

Figure 4-4   Spills by Year (2012–2018)
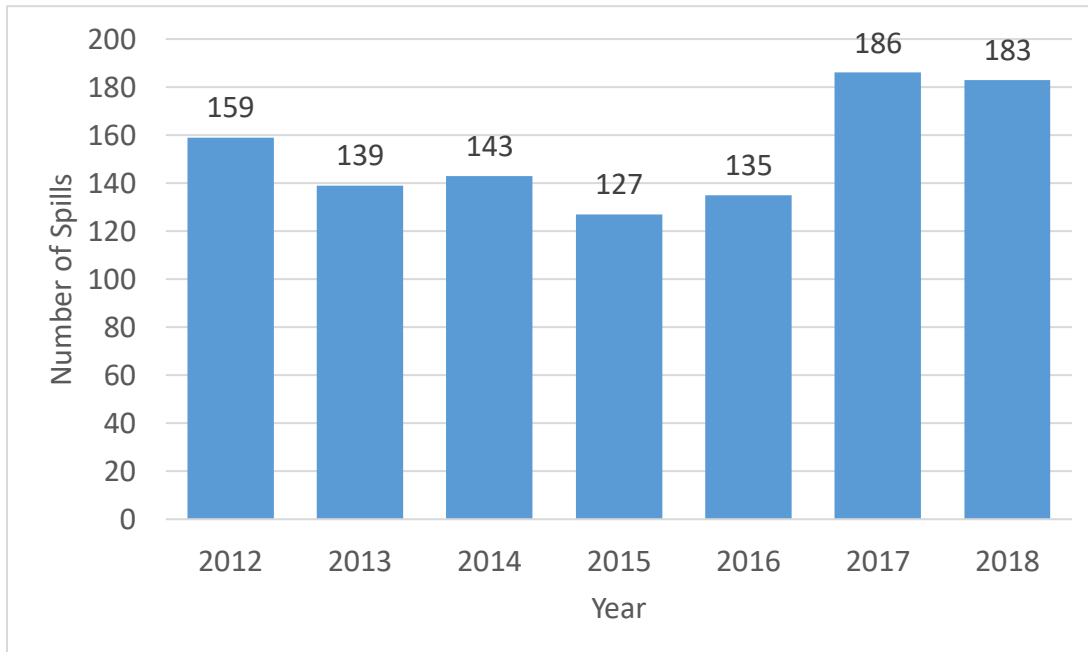
Figure 4-5   Spills by Month (2017–2018)
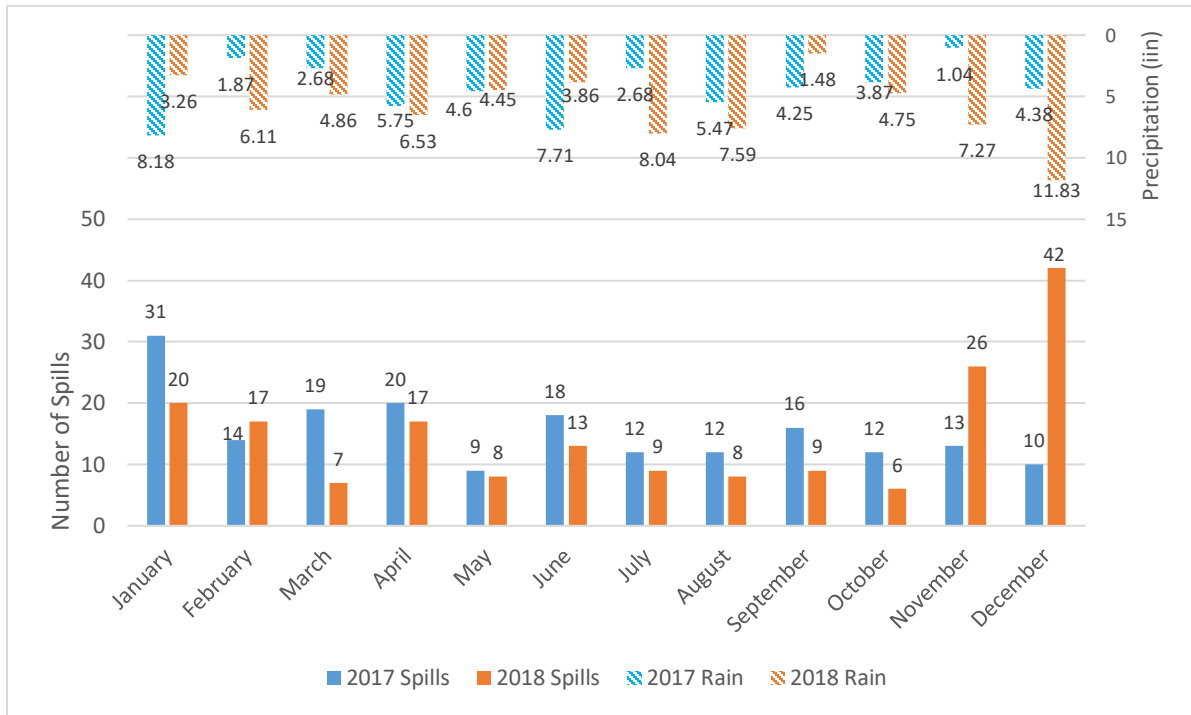
5. Other Trends

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
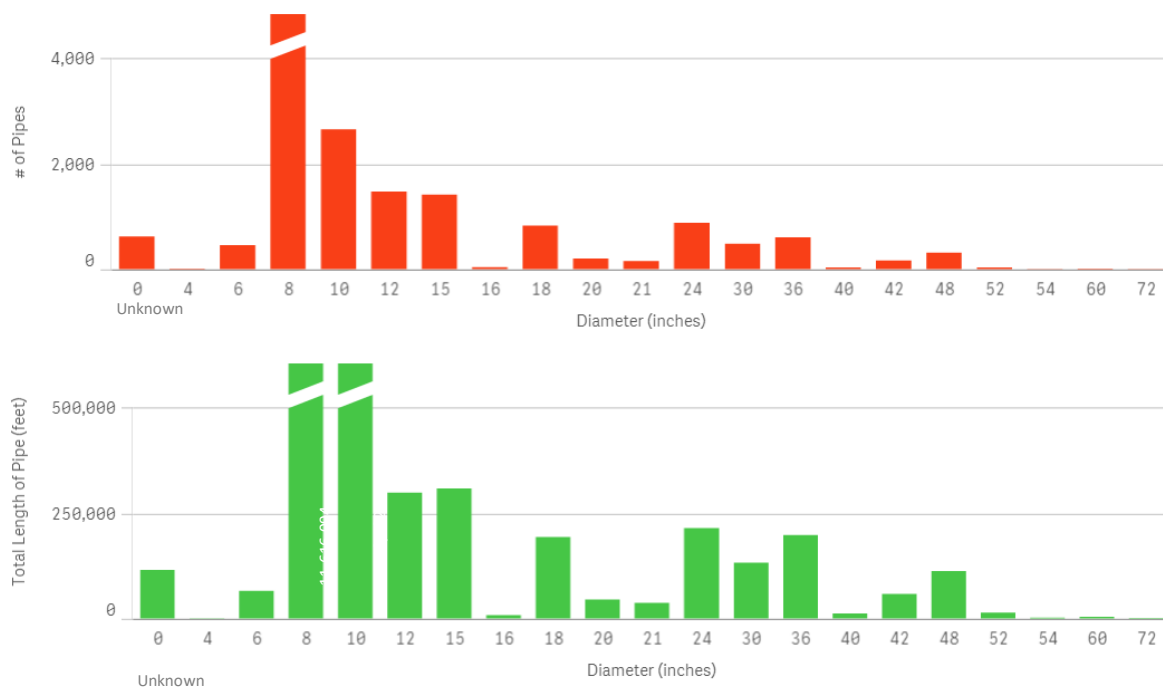
Figure 5-2   Spills by Year by Pipe Size (inches) (2012–2018)
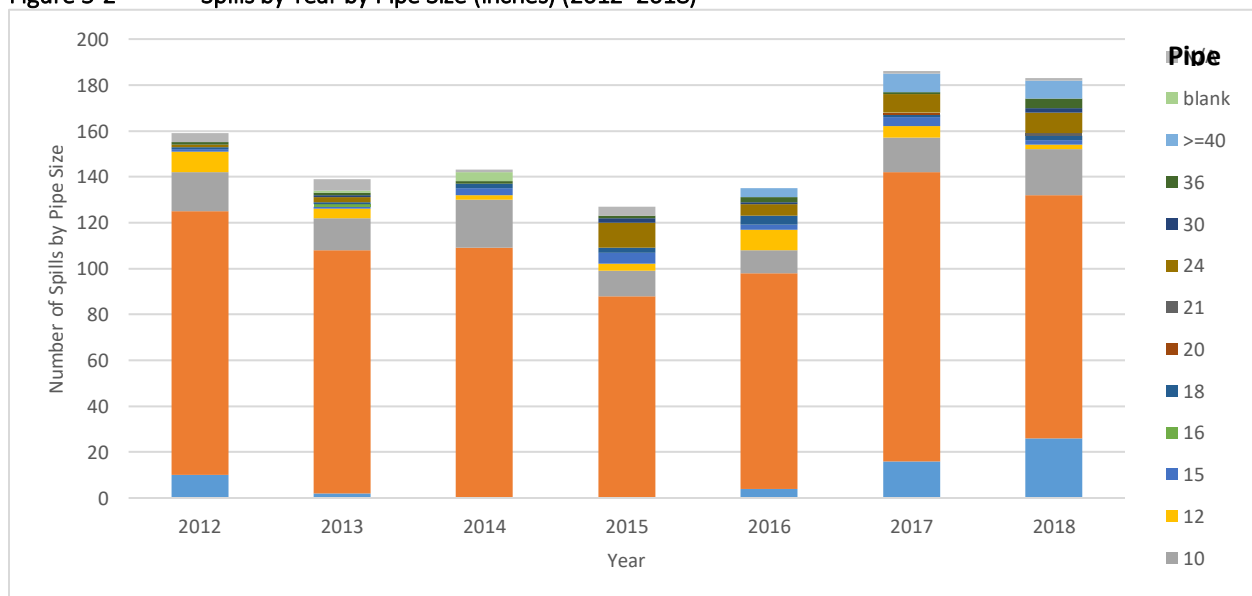
Notes:
Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure.

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. In 2018, 8-inch-diameter pipes, as typically seen in DeKalb County, had the largest overall spill volume. The two largest spills in 2018 (3643 Glenwood Road and 4776 Snapfinger Woods Drive) accounted for 70 percent of the volume (2,901,099 gallons) of spills from 8-inch-diameter pipes.

Figure 5-3   Spill Volume by Year by Pipe Size (2012–2018)
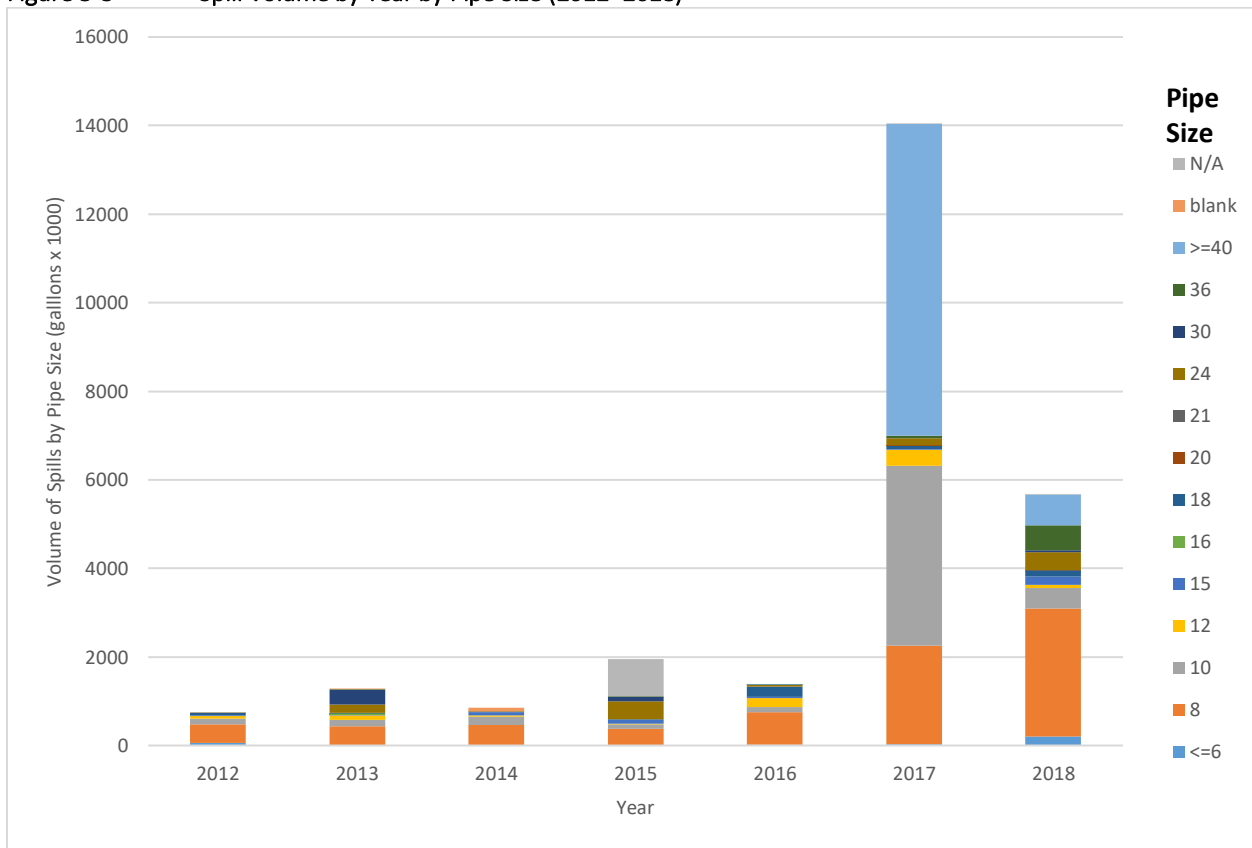
Notes:
Only spills have an associated pipe size linked to an SSO, so only spills are included in this figure. Pipe diameter was not always recorded; thus, some are blank or N/A.

For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion. For 2017 onward, all SSOs had a volume recorded.

Rainfall

The rainfall total for 2018 was 70.0 inches, which was 17.5 inches more than the 52.5 inches of rainfall in 2017. This difference in rainfall total and intensity is reflected in the data for SSOs and spills caused by wet weather. In 2017, 35 spills were attributed to wet weather; in 2018, 53 spills were attributed to wet weather. The volume for spills caused by wet weather was approximately 1,600,000 gallons in 2017 compared to more than 2,250,000 gallons in 2018. Similarly, there were nine overflows caused by wet weather in 2017 and eight in 2018. There was one building backup in 2017 caused by wet weather but eight in 2018. Figure 5-4 shows rainfall and SSO volume by month from 2012 through 2018.

Figure 5-4   Monthly Precipitation and Wet Weather-induced SSO Volume (2012–2018)
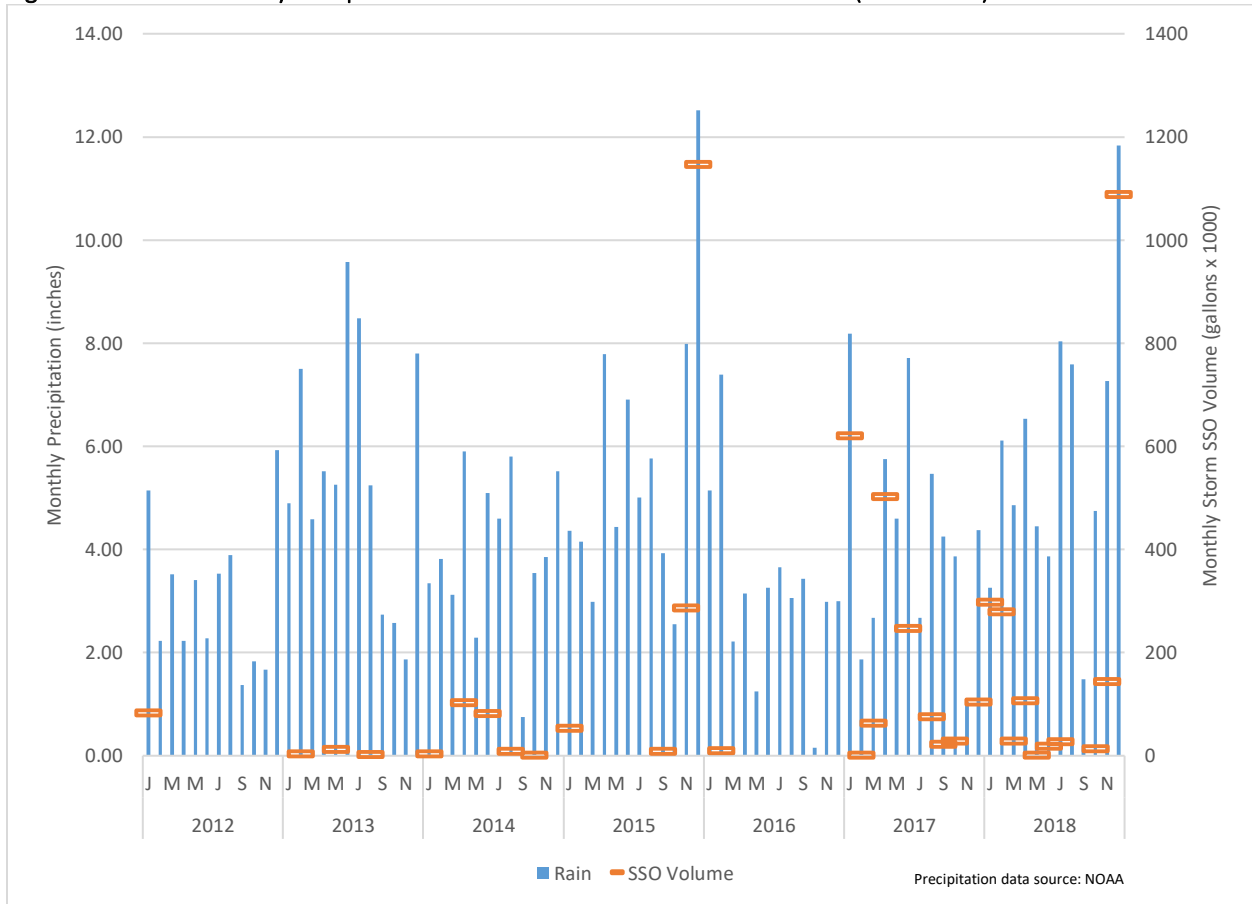

Note: Only spills with a cause of STORM or I/I are represented in this figure. For the period 2012–2016, 37 percent of the SSOs did not have a volume recorded because of retroactive review and inclusion. For 2017 onward, all SSOs had a volume recorded.

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). From 2016 to 2018, the number of repeat SSOs decreased from 186 in 2016 to 65 in 2018. For 2018, Intrenchment Creek and Shoal Creek have the greatest number of repeat SSO locations.

Figure 5-5   Number of Locations with Repeat SSOs by Sewershed
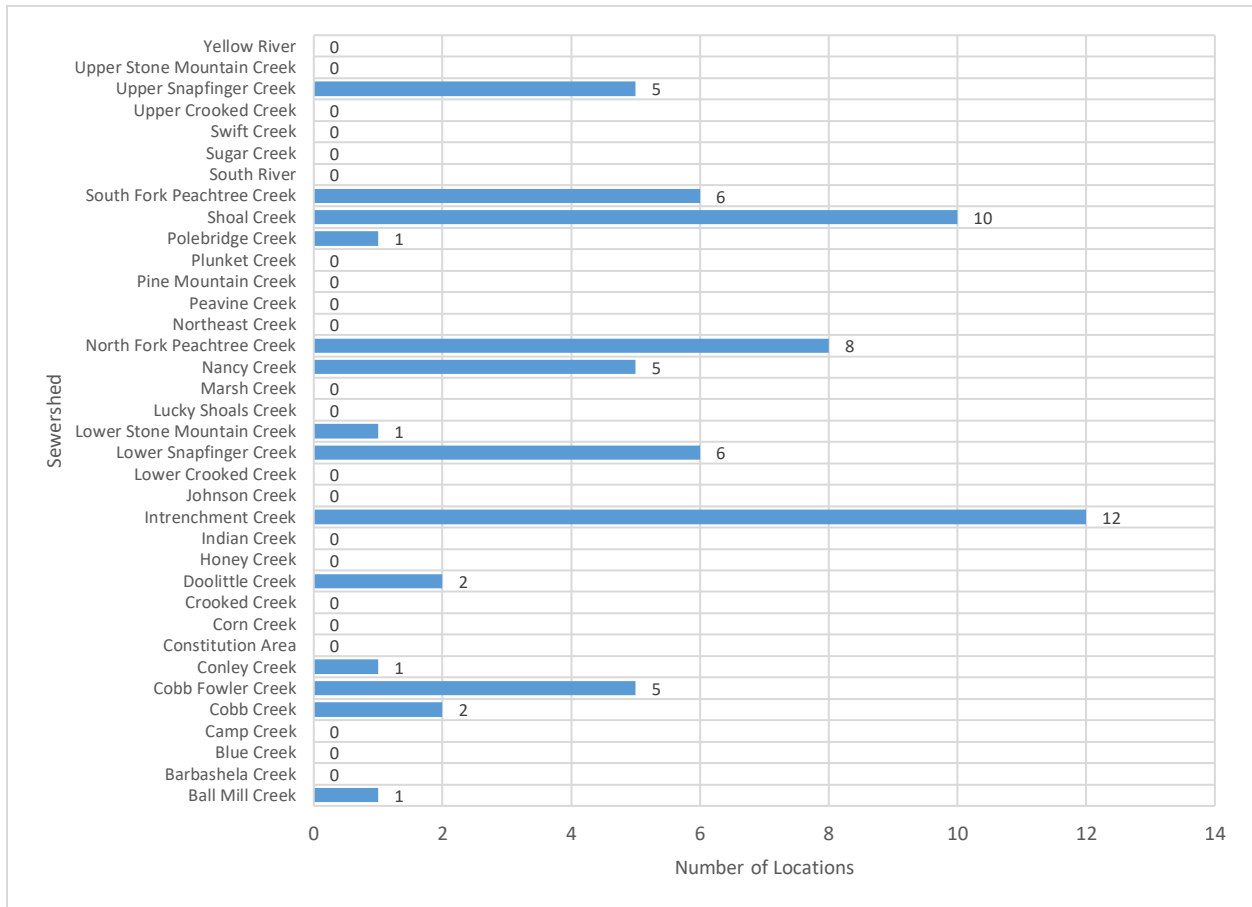
The most common causes of repeat SSOs in 2018 were wet weather and grease (see Figure 5-6). Repeat SSOs caused by grease and other maintenance-related causes decreased in 2018, likely correlating to DWM's increased sewer cleaning, enforcement of the County's FOG Program, and continuing Public Education Programs. Wet-weather-related repeat SSOs increased from 2017, as increased rain in 2018 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.

Figure 5-6   Number of Repeat SSOs by Cause
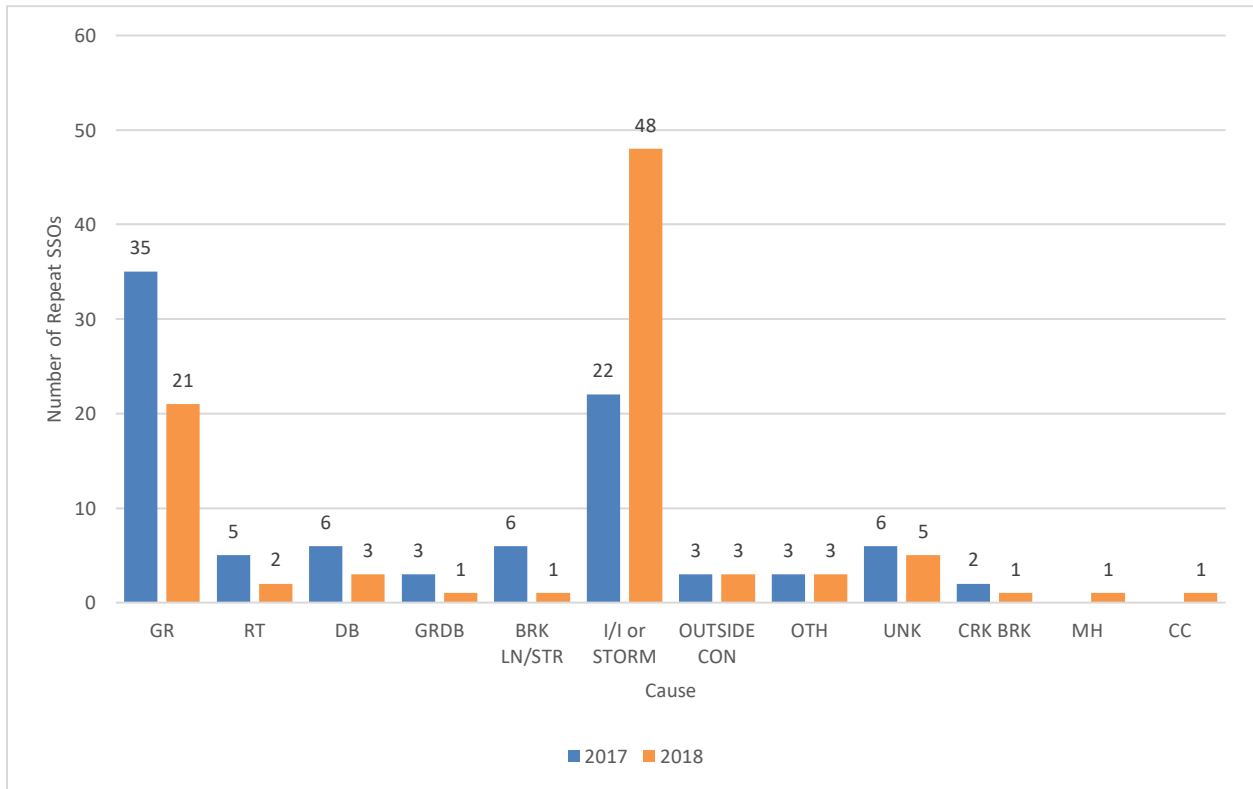
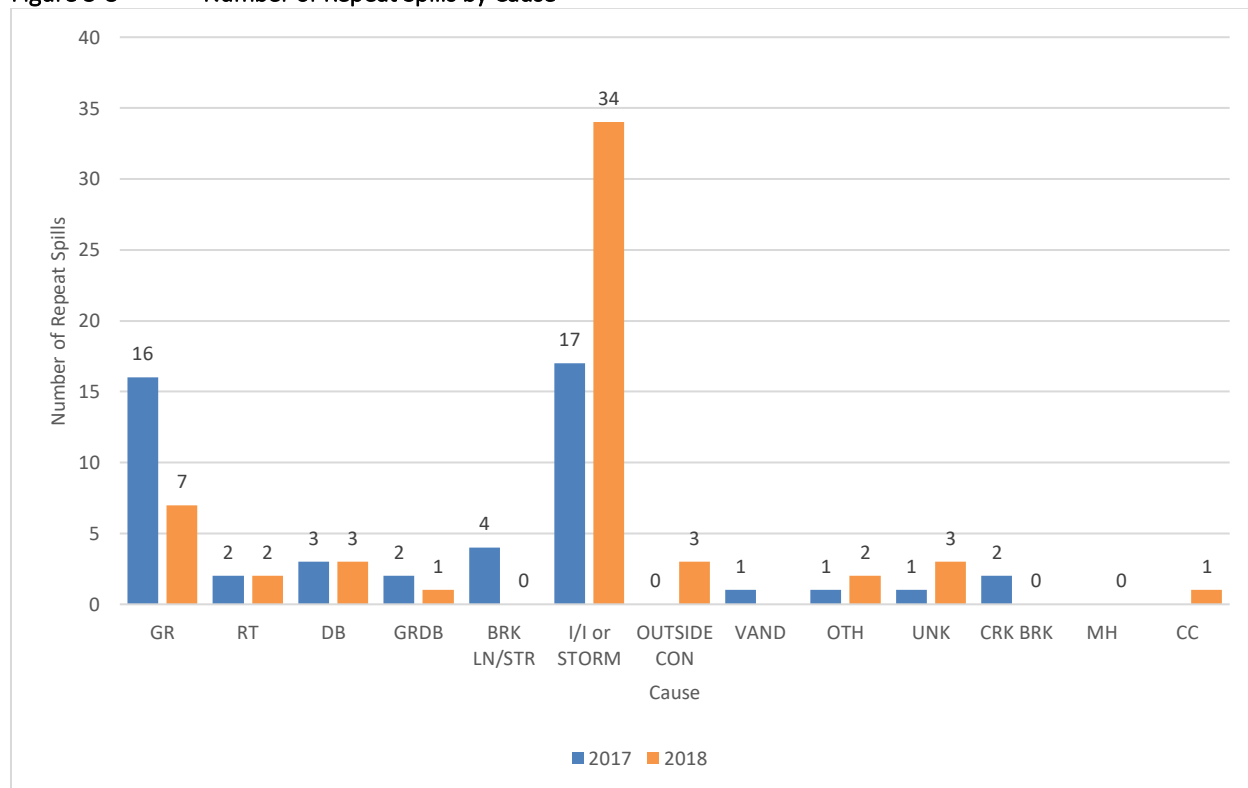Note: All I/I SSOs recorded to date were wet-weather-related.

Similarly, DWM analyzed only those SSOs that are categorized as spills. From 2016 to 2018, repeat spills decreased from 56 to 33. Shoal Creek and South Fork Peachtree Creek had the greatest number of repeat spill locations in 2018 (see Figure 5-7).

Figure 5-7   Number of Locations with Repeat Spills by Sewershed
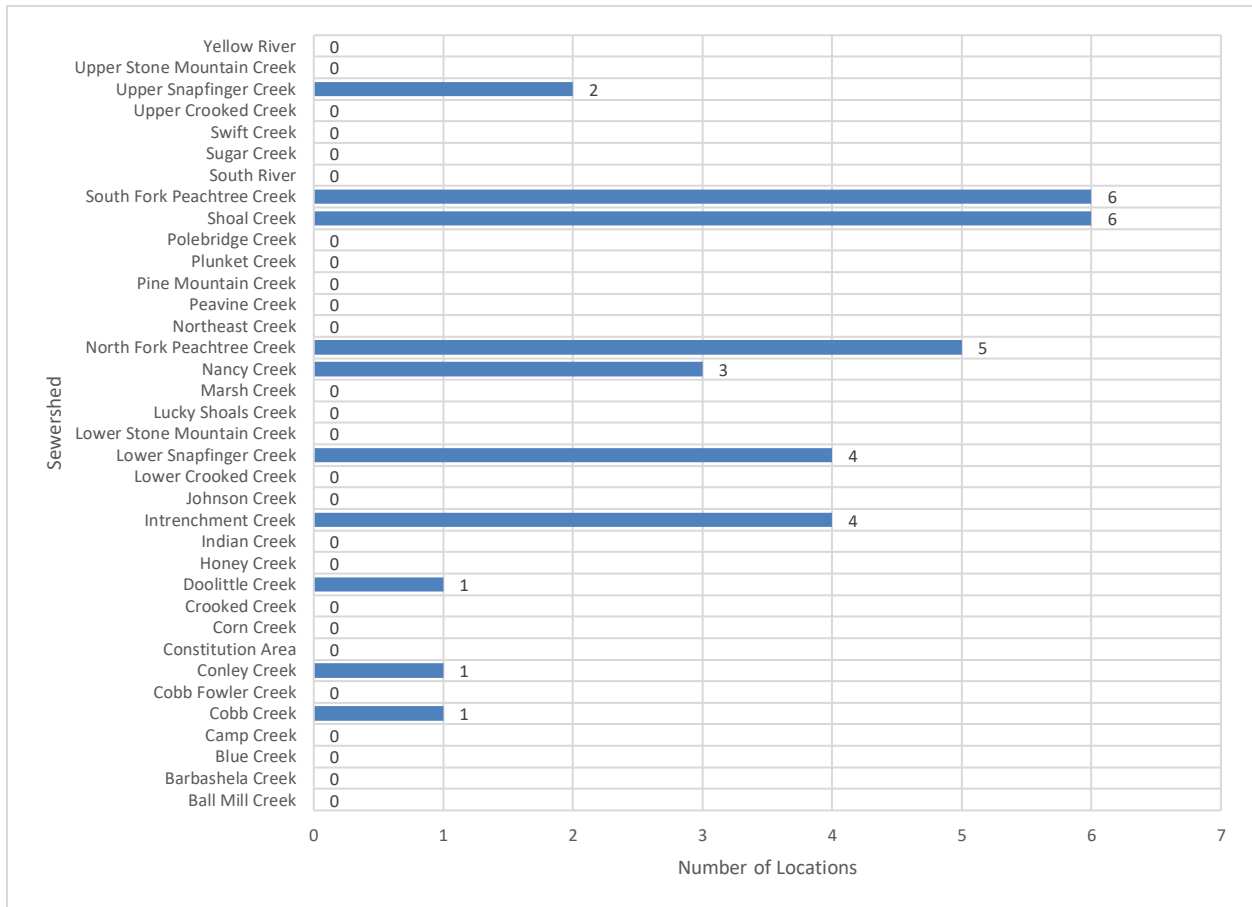
The most common cause of repeat spills is wet weather (see Figure 5-8). Wet-weather-related repeat SSOs increased from 2017, as increased rain in 2018 resulted in numerous localized capacity restrictions. As rehabilitation measures are constructed to reduce I/I sources and provide capacity in the system, 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. Repeat SSOs observed in 2017 in southeastern portion of the County, in Pole Bridge Creek, Pine Mountain Creek, and Honey Creek, were not observed in 2018.
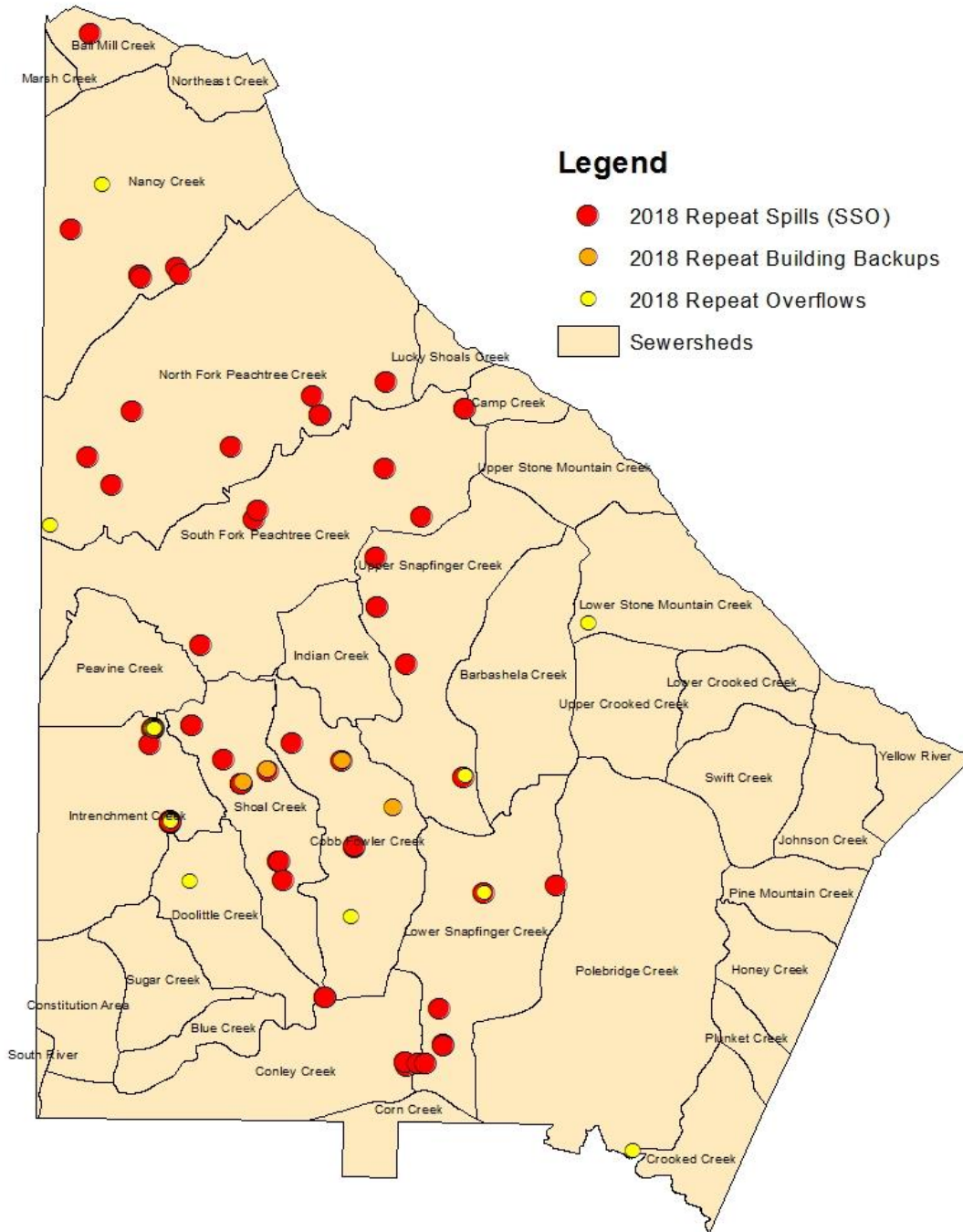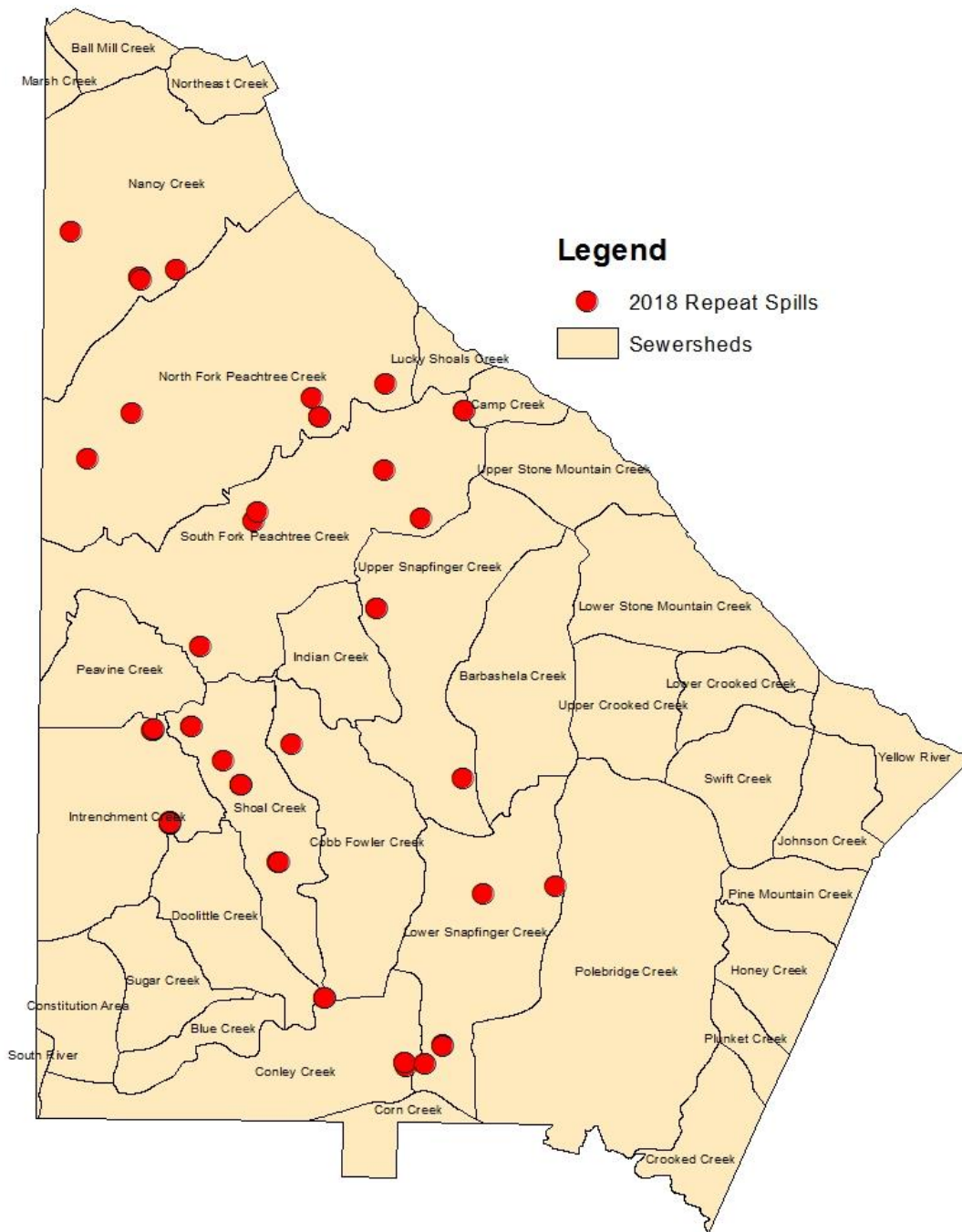
Figure 5-9   Repeat SSOs

Figure 5-10   Repeat Spills

Legend

● 2018 Repeat Spills

▭ Sewersheds

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 (2012–2018) continues to decrease, which can be attributed to maintenance programs including sewer cleaning, the FOG program, and extensive public education campaigns (see Figures ES-1 and 2-1).

- Compared to 2017, spills decreased slightly in 2018, which can be attributed to the following factors:
  - o 70 inches of rain recorded in 2018 represented a 33-percent increase in rainfall from 2017 to 2018 and the most annual rainfall on record in the previous 20 years (see Figure 2-2).

- The average SSO duration for the last 7 years is approximately 5 hours (see Figure 3-1). Above-average durations are caused by:
  - o I/I – SSOs can be contained but will not return to the system until capacity becomes available
  - o Structural – Longest duration because of the time needed to locate the spill, bypass the failure, and perform the repair
  - o 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 2018. During this same period, maintenance-related SSOs accounted for 19 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, including one large SSO in 2018 (see Figures 2-7 and 4-1).

- The number of SSOs caused by grease declined from 175 in 2012 to 97 in 2018 (see Figure 4-2).

- Comparing 2018 to 2017 month to month, the number of spills decreased, except months where 2018 showed substantially more rainfall (see Figure 4-5).

- The months with the most rainfall recorded correlate to a large volume of SSOs, particularly observed in December 2018 (see Figure 5-4). A large wet weather event occurred on December 28, 2018, that caused creeks to exceed their flood stage and resulted in wet weather SSOs in the County. Rehabilitation construction and continuation of I/I reduction measures including private I/I enforcement and replacement of vented manhole lids will target I/I contributions into the system.

- There were 65 locations of repeat SSOs in 2018 (see Figure 5-5). This represents a 65-percent reduction from 2016 where there were 186 locations of repeat SSOs.

- Two main causes of repeat SSOs in 2018 were grease and wet weather (see Figure 5-6). Grease-related repeat SSOS decreased from 35 in 2017 to 21 in 2018, attributed to DWM's MMS and FOG programs. An increase in I/I-related repeat SSOs was observed, influenced by the large amount of rain in 2018, particularly in November and December.