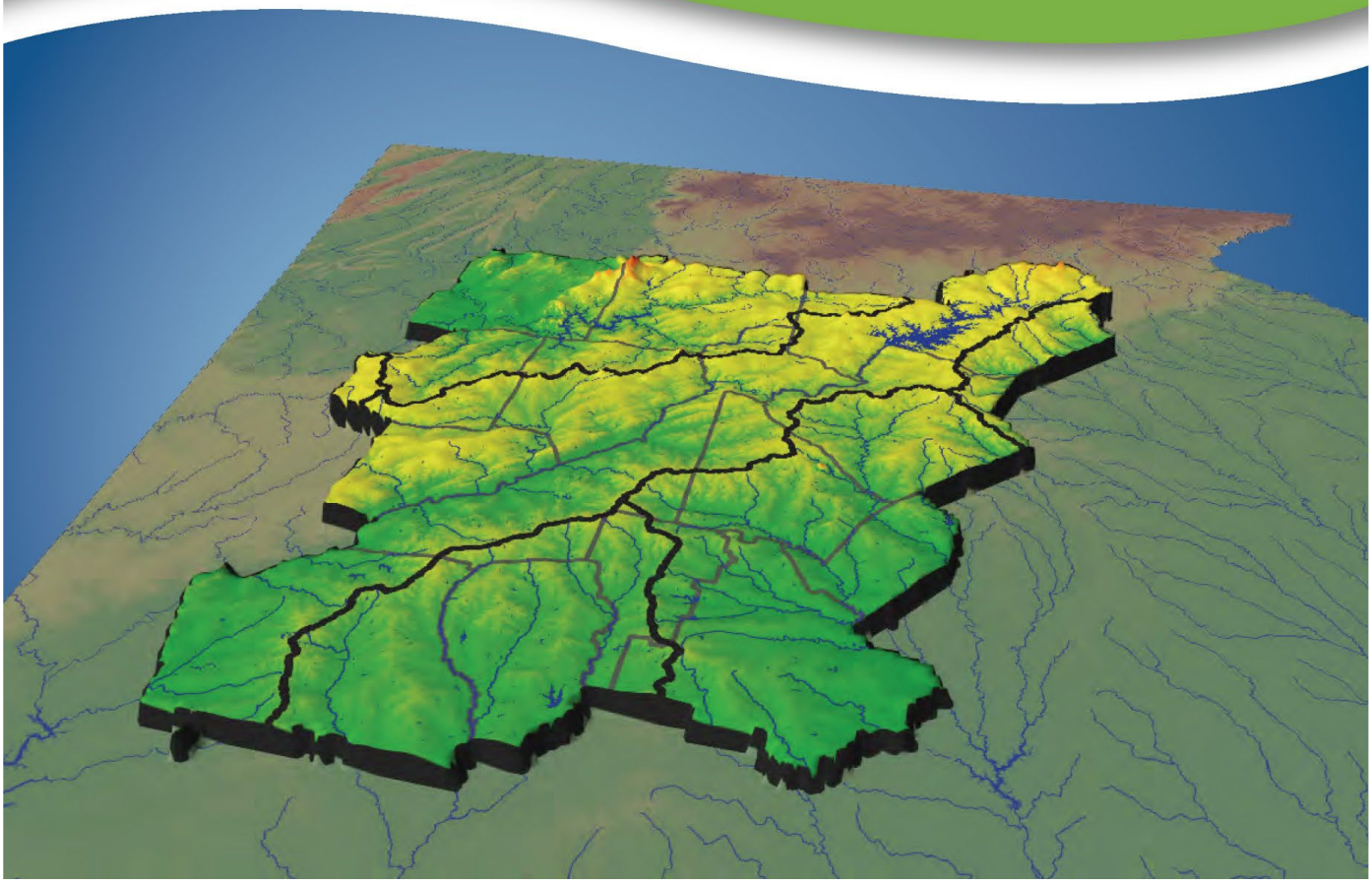
WATER RESOURCES MANAGEMENT PLAN

December 2022

Metropolitan North Georgia Water Planning District



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Appendixes

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Acronyms and Definitions



AADF	annual average day flow
ACF	Apalachicola, Chattahoochee, and Flint
ACT	Alabama, Coosa, Tallapoosa
AMI	Advanced Metering Infrastructure
ARC	Atlanta Regional Commission
ATS	advanced treatment system
AWIA	America's Water Infrastructure Act
AWRF	Advanced Water Reclamation Facility
AWWA	American Water Works Association
BAC	Basin Advisory Council
BFE	base flood elevation
CAP	customer assistance program
CCMWA	Cobb County-Marietta Water Authority
CCWSA	Cherokee County Water and Sewerage Authority
CCR	Consumer Confidence Report
CDBG	Community Development Block Grant
cfs	cubic foot (feet) per second
CH2M	CH2M HILL Engineers, Inc.
CID	Community Improvement District
CIP	capital improvement plan
CLUP	Comprehensive Land Use Plan
CMMS	Computerized Maintenance Management System
CMOM	Capacity Management Operations and Maintenance
CN	curve number
Corps	U.S. Army Corps of Engineers
CPv	channel protection volume
CRS	Community Rating System
CSO	combined sewer overflow
CWSRF	Clean Water State Revolving Fund
District	Metropolitan North Georgia Water Planning District

DSS	Decision Support System
DWSRF	Drinking Water State Revolving Fund
EIA	effective impervious area
EPA	U.S. Environmental Protection Agency
EPC	energy performance contracting
FEMA	Federal Emergency Management Agency
FIB	fecal indicator bacteria
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FOG	fats, oils, and grease
GADNR	Georgia Department of Natural Resources
GADPH	Georgia Department of Public Health
GAWP	Georgia Association of Water Professionals
GEFA	Georgia Environmental Finance Authority
GEMA	Georgia Emergency Management Agency
Georgia DCA	Georgia Department of Community Affairs
Georgia EPD	Georgia Environmental Protection Division
Georgia SWCC	Georgia Soil and Water Conservation Commission
GESA	Georgia Erosion and Sedimentation Act
GIS	Geographical Information System
GLCP	Georgia Land Conservation Program
GPCPD	gallons per capita per day
gpf	gallon(s) per flush
gpm	gallon(s) per minute
GSMM	Georgia Stormwater Management Manual
HUC	Hydrologic Unit Code
IAPMO	International Association of Plumbing & Mechanical Officials
ICC	International Code Council
I/I	infiltration/inflow
IDDE	Illicit Discharge Detection and Elimination
IPaC	Information for Planning and Conservation
IRT	interconnection reliability target
IWA	International Water Association
IWP	Impaired Waters Monitoring and Implementation Plan
LAS	land application system
LCI	Livable Centers Initiative

LIA	Local Issuing Authority
MaP	Maximum Performance
mg/L	milligram(s) per liter
MGD	million gallon(s) per day
MMF	maximum month average daily flow
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Stormwater Sewer
MV	management volume
NA	not available
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source pollution
NRCS	Natural Resource Conservation Service
NRW	non-revenue water
O.C.G.A.	Official Code of Georgia Annotated
OFPv	overbank flood protection volume
OPB	Office of Planning and Budget
P3	public private partnership
PDM	Pre-Disaster Mitigation
PEP	Population Estimates Program
PFAS	per- and polyfluoroalkyl substances
Plan	Water Resources Management Plan
RAD	Research and Analytics Division
RBP	River Basin Profile
REMI	Regional Econometric Models Inc.
SCM	structural control measure
SOP	standard operating procedure
SPLOST	Special Purpose Local Option Sales Tax
SQAP	Sampling Quality Assurance Plan
SRF	state revolving fund
SSO	sanitary sewer overflow

SWAP	Source Water Assessment Plan
TAD	tax allocation district
TAP	Technical Assistance Program
TAZ	Transportation Analysis Zone
TCC	Technical Coordinating Committee
TECP	tax-exempt commercial paper
TMDL	total maximum daily load
UGA	University of Georgia
UHET	ultra high-efficiency toilet
USDA	U.S. Department of Agriculture
USEDA	U.S. Economic Development Administration
USF	Union Sub-catchment Features
USGS	U.S. Geological Survey
USHUD	U.S. Department of Housing and Urban Development
UV	ultraviolet
UWRF	Urban Water Reclamation Facility
WIFIA	Water Infrastructure Finance and Innovation Act
WIP	watershed improvement project
WPCP	Water Pollution Control Plant
WQv	water quality volume
WRC	Water Reclamation Center
WRF	Water Reclamation Facility
WTP	water treatment plant
WWTP	wastewater treatment plant

SECTION 1

Introduction



This Water Resources Management Plan (Plan) presents an integrated approach to water resources management for the 15-county Metropolitan North Georgia Water Planning District (the District). The Plan brings together in one document the plans for Water Supply and Conservation, Wastewater Management and Watershed Management for the region. It describes existing conditions and projects future conditions of the region's water resources and its water, wastewater, and watershed management infrastructure. This Plan is driven by science, data, and good stewardship, and it promotes the protection of water resources for the purposes of supply, quality, and recreation in the region and downstream. The Plan prescribes water resources management strategies that support the region's economic, environmental, and social well-being.

1.1 Metropolitan North Georgia Water Planning District Overview

The District was created by the Georgia General Assembly in 2001 (Official Code of Georgia Annotated [O.C.G.A.] §12-5-572) in order to preserve and protect water resources in the 15-county metropolitan Atlanta area. The District is charged with developing comprehensive regional and watershed-specific water resources management plans to be implemented by local governments. The District's purpose is to establish policy, create plans and promote intergovernmental coordination of water issues from a regional perspective. The District's planning efforts provide local jurisdictions and state officials with recommendations, required actions, policies and investments for water supply and water conservation, wastewater management and watershed management activities.

The District includes 15 counties (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Hall, Henry, Paulding and Rockdale) as well as 95 municipalities partially or fully within these counties (Figure 1-1). The District also has eight authorities that currently provide water, wastewater and/or stormwater services. Table 1-1 provides a list of the local jurisdictions that make up the District. The District's plans and policies work to protect water resources in the Chattahoochee, Coosa/Etowah, Flint, Ocmulgee, Oconee, and Tallapoosa River Basins (Figure 1-2).

The District started in 2001 as the first regional water planning organization in the state. With the adoption of the Georgia State-wide Water Management Plan by the Georgia General Assembly in 2008, the District became one of eleven regional Water Planning Councils in the state and conducts its planning within the framework of the state's regional water planning process. The District follows the guidance of Georgia Environmental Protection Division (Georgia EPD) for the regional water planning process and as well as the more specific guidance from Georgia EPD for planning in the District. The District also considers the most recent water resources assessment information developed in the regional water planning process.

The District issued its first water resources management plan documents in 2003. At that time, the District issued three separate plans: Water Supply and Water Conservation, Wastewater Management and Watershed Management. These plans were updated by the District in 2009. In 2017, the District combined the three separate plan documents into one integrated water plan to highlight the interrelationships between approaches to water, wastewater and watershed management.

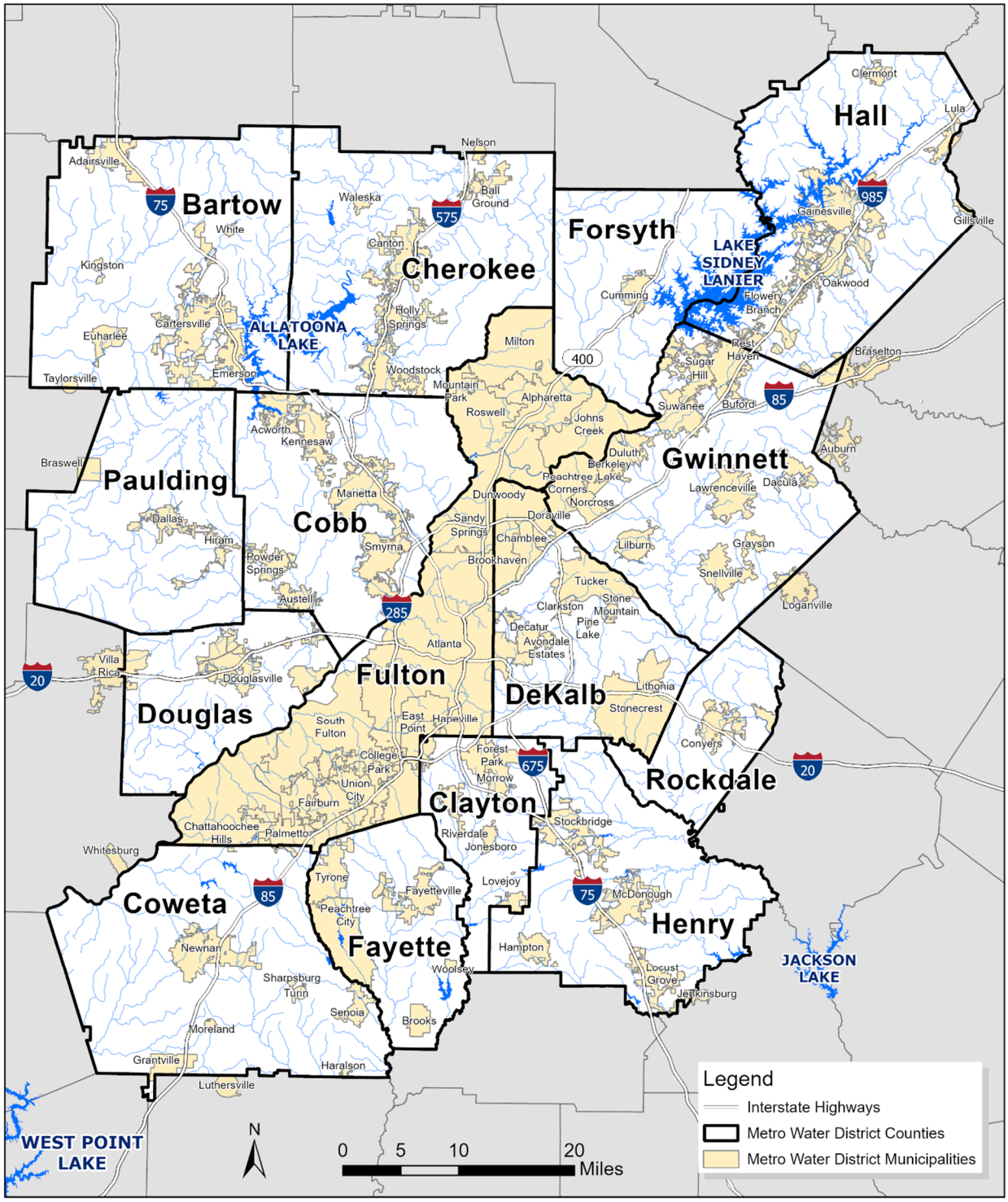


Figure 1-1. Metropolitan North Georgia Water Planning District

Table 1-1. Local Jurisdictions of the Metropolitan North Georgia Water Planning District

Counties			
Bartow County	Coweta County	Forsyth County	Henry County
Cherokee County	DeKalb County	Fulton County	Paulding County
Clayton County	Douglas County	Gwinnett County	Rockdale County
Cobb County	Fayette County	Hall County	
Municipalities			
Acworth	Decatur	Kingston	Riverdale
Adairsville	Doraville	Lake City	Roswell
Alpharetta	Douglasville	Lawrenceville	Sandy Springs
Atlanta	Duluth	Lilburn	Senoia
Auburn	Dunwoody	Lithonia	Sharpsburg
Austell	East Point	Locust Grove	Smyrna
Avondale Estates	Emerson	Lovejoy	Snellville
Ball Ground	Euharlee	Lula	South Fulton
Berkeley Lake	Fairburn	Marietta	Stockbridge
Braswell	Fayetteville	McDonough	Stonecrest
Brookhaven	Flowery Branch	Milton	Stone Mountain
Brooks	Forest Park	Moreland	Sugar Hill
Buford	Gainesville	Morrow	Suwanee
Canton	Gillsville	Mountain Park	Taylorsville
Cartersville	Grantville	Nelson	Tucker
Chamblee	Grayson	Newnan	Turin
Chattahoochee Hills	Hampton	Norcross	Tyrone
Clarkston	Hapeville	Oakwood	Union City
Clermont	Haralson	Palmetto	Villa Rica
College Park	Hiram	Peachtree City	Waleska
Conyers	Holly Springs	Peachtree Corners	White
Cumming	Johns Creek	Pine Lake	Woodstock
Dacula	Jonesboro	Powder Springs	Woolsey
Dallas	Kennesaw	Rest Haven	
Authorities			
Cherokee County Water and Sewerage Authority			
Clayton County Water Authority			
Cobb County-Marietta Water Authority			
Coweta County Water and Sewerage Authority			
Douglasville-Douglas County Water and Sewer Authority			
Henry County Water Authority			
Middle Chattahoochee Regional Water and Sewer Authority			
Peachtree City Water and Sewerage Authority			

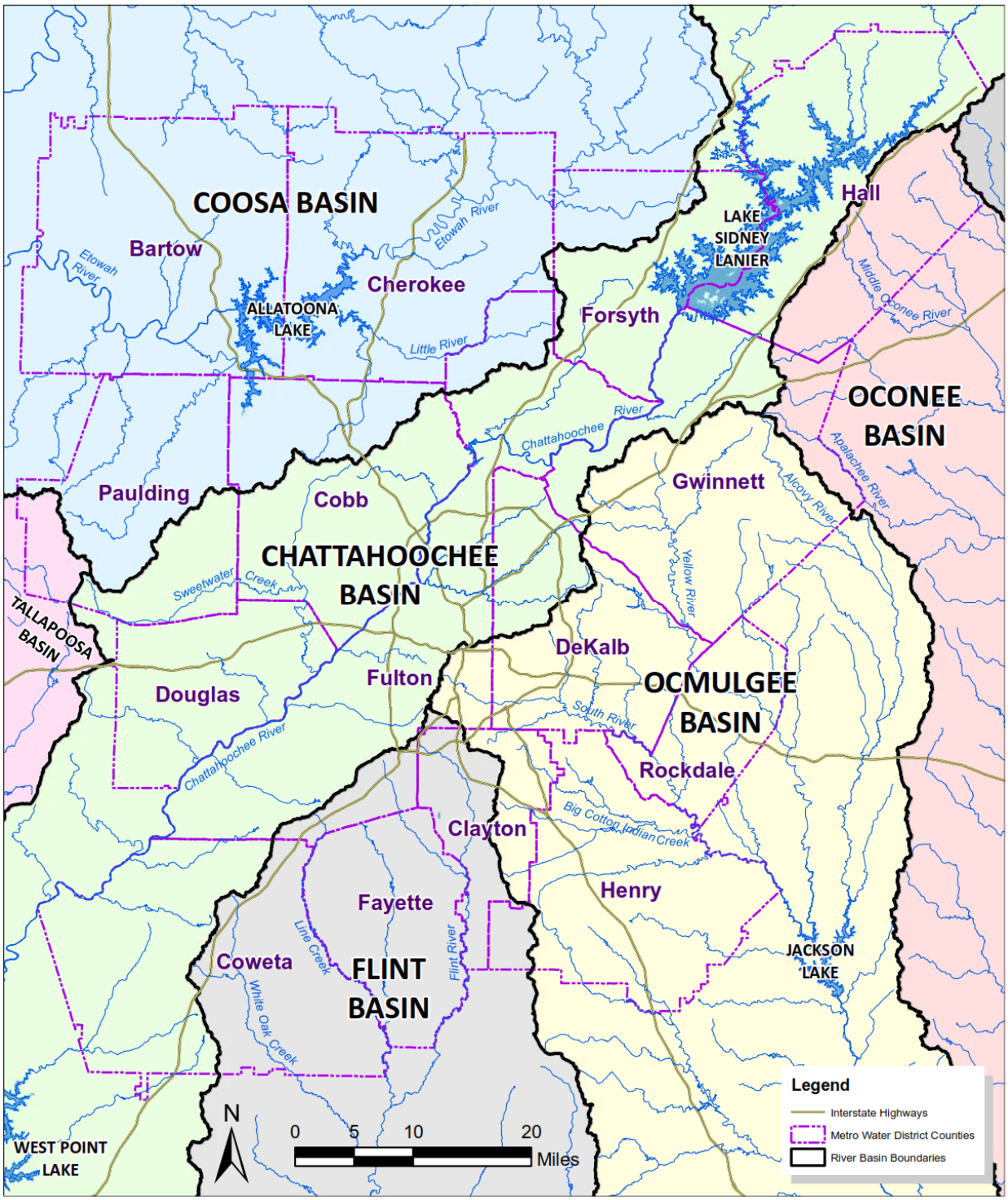


Figure 1-2. Metropolitan North Georgia Water Planning District: Major River Basins

1.2 Integrated Regional Water Resources Planning

The District recognizes that water resources planning is most effective when it addresses the interrelationships among water resources management strategies. Planning must address current and future needs while considering implications for water supply, treatment, reuse, watershed health, water quality, instream flows, community well-being and fiscal conditions. Integrated planning and management decisions consider the entire system and long-term impacts, because "decisions based on only a single point or component in the water management cycle can have unexpected consequences elsewhere" (Patwardhan et al., 2007). Integrated water resources planning supports sustainable management that "facilitates long-term planning, promotes consistency and efficiency, optimizes uses of the water system, encourages and facilitates regional planning, provides flexible solutions and enhances communication and community support" (Freas et al., 2008).

In 2014, the District's Technical Coordinating Committee (TCC) created an Integrated Water Planning Working Group to assess how to advance the integration of the District's water resources planning in future Plan Updates. This working group developed the following guidance on integrated water resources planning for the District:

> *The District's approach to water resources plan integration seeks to understand the range of needs, requirements and other policy drivers concerning the management of the water resources systems that we rely on. When appropriate, integrated water resources planning uses adaptive management and technical analyses to encourage actions designed to achieve multiple benefits or outcomes.*

The working group noted that water resources systems include water supply, water quality, and water resources facilities and infrastructure.

Figure 1-3 illustrates the complexity and scope of water resources management. Through an integrated approach, the District seeks to develop a plan that recognizes and addresses the interrelationships among water resources related goals, strategies, and outcomes. In doing so, the District seeks to attain the following benefits of integrated water resources planning delineated by the working group:

- Identify a clear path to multiple benefits
- Recognize water resources system interrelationships, including cross-jurisdictional connections
- Create opportunities to optimize expenditures and resources
- Drive cost-effective implementation
- Highlight potential unintended consequences
- Avoid redundancies

To integrate water resources planning in the District, the District combines the plans for Water Supply and Water Conservation, Wastewater Management and Watershed Management into one integrated Plan. It emphasizes the connections in management approaches and reduces redundancy. It considers the interrelationships among its strategies and their impacts, and it supports collaborative implementation that broadens traditional organizational roles. With the integrated Plan, the District can also comprehensively implement shared strategies for public education, technical assistance for member jurisdictions and plan evaluation.

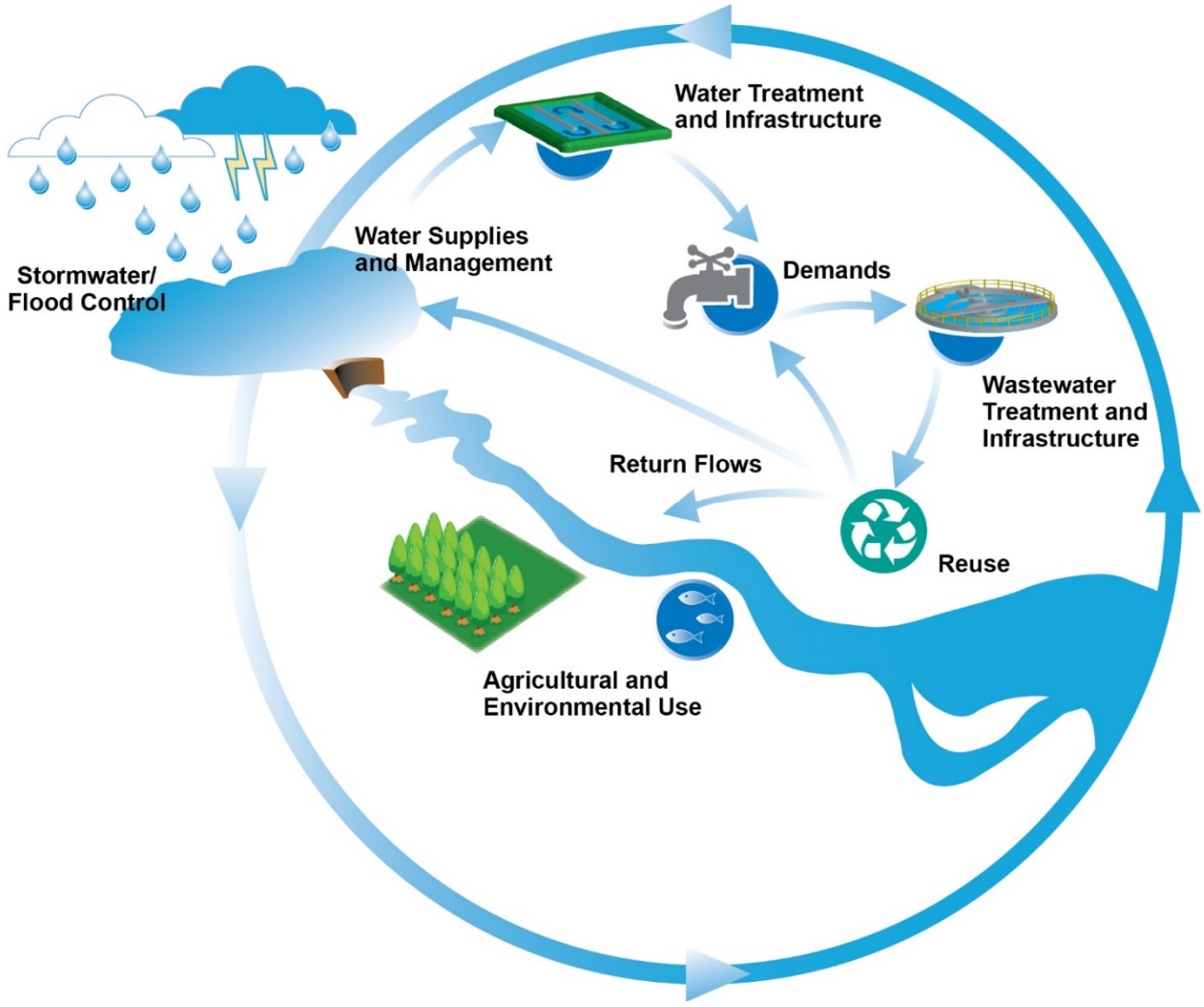


Figure 1-3. Water Resources Management Integration

1.3 Plan Update Focus

While much of the structure and baseline elements will remain intact from the 2017 Plan, this Plan Update includes the following major areas of focus:

- Updating water demand and wastewater flow forecasts based on revised population projections
- Addressing outdated Action Items
- Improving our region's drought resilience and maintaining our national leadership on water conservation, with specific consideration to drought response programs and proven water efficiency technologies
- Developing regional water residuals and wastewater biosolids forecasts
- Developing the District's first stormwater forecast
- Aligning of all Action Items with existing state and federal programs and requirements to reduce duplication of effort and simplify implementation
- Improving public education messaging

- Identifying new information on sources of financing for implementation
- Coordinating planning activities and efforts with the State Water Plan and the Regional Water Plans of neighboring regional Water Planning Councils

1.4 Key Changes in the Plan

While much of the text and Plan Action Items remain unchanged, some sections have been added or expanded and a few Action Items have been developed, modified, or eliminated.

Major changes to the Plan include the following:

- New sections for the forecasts of water plant residuals and wastewater plant biosolids
- The development of the District's first stormwater forecast
- A revised set of Water Supply and Water Conservation Action Items to reflect the major areas of focus stated in the previous section

1.5 Developing the Plan

This Plan was developed through a stakeholder approach envisioned by the District's enabling legislation. The primary participants include:

- Governing Board: The 26-member Governing Board is the decision-making body for the District. The Board includes 16 elected representatives from member jurisdictions and 10 citizen members.
- Basin Advisory Councils (BACs): The BACs are composed of basin stakeholders including water professionals, business leaders, environmental advocates and other interested individuals and groups. Six BACs represent the Chattahoochee, Coosa/Etowah, Flint, Ocmulgee and Oconee River Basins and the Lake Lanier Basin. The BACs advise in the development and implementation of policy related to basin-specific issues and provide input on Plan content to the Governing Board, TCC and District staff.
- Technical Coordinating Committee (TCC): The TCC members are primarily local government officials and staff from counties, cities, and authorities in the District. The TCC provides planning and policy support to the Governing Board and staff in the areas of water supply and conservation, wastewater management, stormwater and watershed management, septic systems, and public education.

The planning process relies on local jurisdictions, the Governing Board, the BACs and the TCC for direction and input. The process also receives support and guidance from Georgia EPD, planning staff for the District and technical consulting firms.

This document is the third update of the initial plans of the District. The District's enabling legislation requires the update of its plans for Water Supply and Water Conservation, Wastewater Management and Watershed Management "no less frequently than every five years after finalization of the initial plan" (O.C.G.A. § 12-5-582 to 584). The timing is coordinated with the planning cycle for the neighboring regional Water Planning Councils.

The update process included a full review of the 2017 integrated plan and consideration of changes in regional conditions and applicable law and regulations since that time. New forecasts for population and employment, water demands, and wastewater flows and updated projections for regional stormwater runoff informed the update process. The process provided for public involvement at the BAC meetings and through a formal public review period for the draft plan.

1.5.1 Policy Goals

The District planning process is driven by policy goals that were initially developed and adopted in 2002. As a part of the update process, the goals were revisited in 2019 with the TCC, BACs and Governing Board. The policy goals guided decision making and helped to ensure consistency of purpose for the Plan Update (Figure 1-4).

More discussion of the policy goals and planning principles can be found in Section 2.

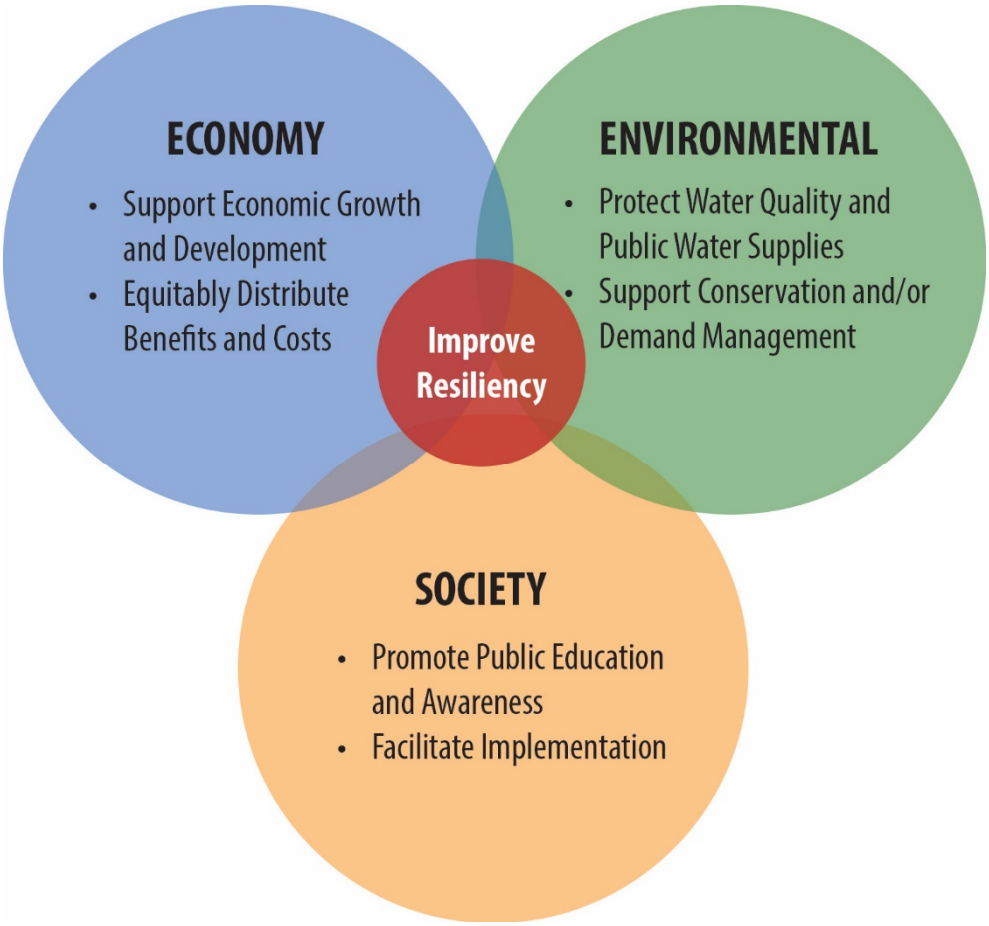


Figure 1-4. Policy Goals for the Plan Update

1.5.2 Planning Context

Local governments in the District are required to comply with many federal and state laws and regulations related to water resources management. These laws and regulations generally concern water supply, water treatment, water conservation, wastewater treatment, wastewater discharge and stormwater management. Other related regulatory requirements address water quality, endangered and threatened species protection, wetlands protection, dam safety, and flood insurance. This Plan is coordinated and consistent with the regulatory programs that affect its member jurisdictions. The Action Items are designed to facilitate their compliance with federal and state regulatory programs.

Moreover, this Plan fulfills the requirements of the state laws, regulations, and implementation guidance that govern the District. The District maintains a record of its compliance with these requirements, and Georgia EPD confirms the District's compliance through its review of the Plan and its involvement in the planning process.

1.5.3 Plan Coordination

The District coordinates its planning with other regional and water resources planning efforts to ensure that plans are complementary and that shared goals can be realized effectively. For this update, the District coordinated with two other planning efforts: the Atlanta Region's Plan, developed by Atlanta Regional Commission (ARC), and the regional water plans developed by regional Water Planning Councils that share water resources with the District.

Developed by ARC, the Atlanta Region's Plan is directed toward ensuring growth, prosperity, and a high quality of life in the metropolitan region for the next 25 years. It focuses on a vision for the region that features world-class infrastructure, a competitive economy, and healthy, livable communities. The plan addresses a broad range of regional resources and needs including transportation, land use, water quality, workforce development, aging and health resources, and arts and culture. The District has coordinated closely with ARC to ensure that their regional plans share goals and strategies.

For example, both plans highlight stormwater management and green infrastructure principles as important strategies. Coordination of these planning processes resulted in collaboration between the District's watershed management strategy and the Atlanta Region's Plan updates on land use, regional resources, and transportation. Both plans promote watershed improvement as a part of transportation and economic development projects to support sustainable outcomes.

Development of this Plan was also coordinated with regional water planning conducted outside of the District. The adoption of the Georgia State-wide Water Management Plan by the Georgia General Assembly in 2008 led to the creation of new regional Water Planning Councils around the state, and the District is now one of eleven regional Water Planning Councils in Georgia. Figure 1-5 shows the state's water planning regions and shows that the District is in the headwaters of six river basins.

The District conducts its planning within the framework of Georgia's regional water planning process. Georgia EPD has established criteria for regional water plans, and the District ensures compliance with these criteria. The District uses the surface water availability, groundwater availability and water quality resources assessments that are conducted by Georgia EPD for the regional water planning process. The District has also reviewed the plans of regional Water Planning Councils with which it shares water resources, including the Upper Flint, Lower Flint-Ochlockonee, Middle Chattahoochee, Coosa-North Georgia, Middle Ocmulgee, Upper Oconee, Coastal, and Altamaha Regional Water Councils. Moreover, the District invited those Councils to review this Plan. As of the development of this Plan, the regional Water Planning Councils outside of the District are updating their regional water plans with a targeted adoption of the updated plans in June 2023.



Figure 1-5. Georgia Water Planning Regions

1.6 Implementing the Plan and Measuring Progress

The District, Georgia EPD and local governments all play important roles in implementing this Plan, as illustrated on Figure 1-6. The District develops the Plan. It is implemented by local jurisdictions, which are required to comply with it. Georgia EPD enforces the Plan's provisions through an auditing and permitting process. For example, local jurisdictions must demonstrate compliance with the Plan in order to obtain permits for new or expanded water withdrawals or wastewater discharges and renewal of National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permits. Furthermore, consistency with Plan requirements is necessary to obtain Georgia Environmental Finance Authority (GEFA) grant or loan funding for water projects.

Implementation progress is tracked in two ways. First, local jurisdictions are audited on a recurring basis by Georgia EPD to ensure local compliance with the Plan. Second, the District periodically reviews implementation progress by local jurisdictions by reviewing results of the Georgia EPD audit process so that targeted technical assistance programs can be more aligned to meet the needs of the communities and utilities. These reviews are typically conducted on an annual basis.



Figure 1-6. Plan Development and Implementation

In addition, the District has documented the following achievements in the region:

- The Toilet Rebate program has supported the replacement of over 150,000 toilets with high-efficiency toilets between 2008 and 2021.
- 100 percent of water providers in the District have multi-tiered conservation rate structures that encourage water conservation by their residential customers.
- Local utilities have distributed over 200,000 door hangers since 2010 to educate residents on the negative impacts of fats, oils, and grease (FOG) in sewer pipes. Grease-related sewer overflows have decreased by 65 percent since 2003.
- Most local jurisdictions have adopted the following model ordinances (or equivalent regulations) that protect the region's water resources: Post-Construction Stormwater Management, Stream Buffer Protection, Illicit Discharge and Illegal Connection, Floodplain Management, Litter Control, Private Decentralized Wastewater Systems, Private Fire Lines Metering Requirements, Car Wash Water Recycling, and Water Waste.

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SECTION 2

Planning Principles and Management Challenges



The purpose of this section is to describe the factors that guided decision making in the Plan Update process. It describes the planning principles that directed the process generally and in specific areas of the Plan, and it describes existing and emerging challenges for the region's water resources managers. The Plan seeks to provide an approach that is consistent with the planning principles and addresses the management challenges.

2.1 Planning Principles for the 2022 Plan Update

As discussed in Section 1, the Plan Update process was driven by the District's policy goals, which were initially developed and adopted in 2002 and refined during prior Plan updates based on input from stakeholders. The following policy goals guide decision making for the District and help ensure consistency of purpose for the Plan (see Figure 1-4):

- *Protect Water Quality and Public Water Supplies*
- *Support Conservation and/or Demand Management*
- *Support Economic Growth and Development*
- *Equitably Distribute Benefits and Costs*
- *Promote Public Education and Awareness*
- *Facilitate Implementation*
- *Improve Resiliency*

While the policy goals and the focus on integration drove decision making overall, more specific principles helped to guide the design and selection of Action Items. Some of these planning principles apply broadly, while others are specific to particular sections of the Plan, as noted below:

- Maximize the use of existing sources and facilities: Water supply sources and water and wastewater treatment facilities are major investments for local jurisdictions. Using existing sources and facilities is cost-effective and generally has the least adverse environmental impact.
- Increase water conservation and efficiency: The need for additional future water supply and treatment capacity can be reduced by increasing efficiency and reducing waste and loss. Demand management and supply efficiency are often more cost-effective than developing new water supplies.
- Utilize Best Practices for non-potable reuse: The District discourages non-potable reuse when its application increases net water use. However, the District recognizes a number of best practices for non-potable reuse that can help extend the life of water supplies (see box on following page). To reduce excessive outdoor water use, Action Item WSWC-8 also prohibits irrigation with reclaimed water sourced from any new private reclaimed wastewater treatment system except for irrigating golf courses and commercial agriculture operations.
- Consider return flows: Local wastewater providers should consider the need for returns of highly treated wastewater to local water bodies within the basin of origin as well as opportunities to enhance available water supplies through indirect potable reuse and the generation of "made inflows" to federal reservoirs (see box on following page). Georgia EPD's planning guidance for this Plan further

states that returning highly treated wastewater to Lake Lanier and Allatoona Lake (and their watersheds) and to the Upper Flint River Basin shall be encouraged, where feasible, to support long-term sustainable water use from these basins.

- Make appropriate use of reclaimed water: The use of highly treated wastewater for indirect potable reuse and non-potable reuse plays an important role in sustaining the District's potable water supplies. Maximizing return flows to local water supply sources is encouraged when feasible. This Plan has a strong focus on indirect potable reuse returns to the river basins and lakes that provide the District's water supplies. The District's policy on the use of reclaimed water is explained in more detail in the box on the right.
- Continue to protect water quality: Water quality protection is essential to ensuring the quality and availability of existing and future drinking water supplies, instream aquatic health, recreational opportunities, and availability of wastewater assimilative capacity.
- Support adoption of advanced treatment technologies: New technologies will advance our abilities to augment water supplies, ensure safe drinking water, and reduce pollutant loadings to our waterbodies.
- Promote maintenance of decentralized wastewater systems: Recognizing the need to promote return flows and reuse, land application systems (LASs) can offer a viable

Non-Potable Reuse Policy: With respect to non-potable reuse, this Plan generally sets a preference for return flows to local water supply sources where assimilative capacities are available. While other areas of the country seek to maximize non-potable reuse for a variety of uses, including irrigation, the District must balance its own needs with the needs of instream water quality and downstream uses. Water providers should consider how to manage flows during drought periods when considering non-potable reuse options. While non-potable reuse water is currently offered by a small number of utilities in the District, usually for irrigation, the District discourages these and other uses when they increase net water use. However, some non-potable reuse may reduce demand and extend the life of surface water supplies. Therefore, the District recognizes the following forms of non-potable reuse as best practices:

- Flushing toilets and urinals
- Irrigation, when offsetting an existing potable water supply source and combined with a conservation pricing strategy
- Industrial reuse opportunities (cooling towers, boilers, non-contact cooling water)
- Commercial reuse opportunities (car washes, construction)

Greywater, another form of reuse, may also provide additional opportunities. In accordance with current state plumbing code, greywater may be used only for flushing toilets and urinals and for subsurface irrigation.

Return Flows, Indirect Potable Reuse and Water Supply Augmentation in Allatoona Lake and Lake Lanier: Return flows play a critical role in maintaining stream flows and in augmenting available water supplies through indirect potable reuse. In the District, indirect potable reuse occurs when water is returned to a river upstream of a water supply intake and when water is returned to a storage reservoir for later withdrawal.

Certain return flows to federal storage reservoirs (e.g., Allatoona Lake and Lake Lanier) may qualify as "made inflows to a reservoir," which are defined by the Georgia Department of Natural Resources (GADNR) to include both wastewater effluent return flows discharged to increase flows to the reservoir and water that flows into a reservoir after being released from another storage project upstream. A GADNR rule authorizes the Georgia EPD Director to allocate "made inflows" to the federal reservoirs to specific users that have contracted for storage in the federal project.

Indirect potable reuse and made inflows to federal reservoirs are an important part of Metro Atlanta's long-term water supply plan. The degree to which such flows can be used for indirect potable reuse to increase the total available water supply for Metro Atlanta, however, depends to a significant degree on the United States Army Corps of Engineers (Corps) crediting "made inflows" in a manner consistent with Georgia law. Assuming the Corps continues to recognize made inflows at Allatoona Lake and agrees to do so at Lake Lanier in the future, then for many users the best alternative to increase supply will be to increase returns. Because substantial investments are needed to return water to federal storage projects, this alternative will rarely make sense for any jurisdiction that is not permitted to store and use the water it returns.

wastewater treatment method in certain local jurisdictions in the District. Septic systems are also viable wastewater treatment methods across the District. In both instances, however, long-term maintenance of these facilities must be adequate to ensure protection of water quality.

- Reduce wastewater treatment facility influent variability: Dramatic changes in wastewater influent can cause difficulties for treatment facilities, especially smaller facilities. Practices that reduce variability, such as pre-treatment, septage disposal planning, and fats, rags, oils, and grease control programs, help to protect wastewater treatment facility operations and water quality.
- Enhance reliability of wastewater pumping stations: Consistent and uninterrupted performance of wastewater pumping stations is critical to protecting water quality. Appropriate measures should be taken to ensure reliability and redundancy, in order to avoid and minimize overflows and discharges of untreated and partially treated wastewater.
- Promote green infrastructure approaches: Green infrastructure approaches use networks of vegetated, open lands and engineered structures to promote infiltration of rainfall and runoff. The benefits of a green infrastructure approach can include water quality, air quality, flood risk reduction, property value improvement, economic growth, public health, recreation, community revitalization, quality of life, urban heat island reduction and urban agriculture opportunities.
- Ensure consistency with existing regulatory programs: To facilitate implementation, the Action Items should be designed to promote consistency of this Plan with the requirements of existing regulatory programs.
- Small private water supply and wastewater systems: In situations where there would likely be improved environmental and/or health protection opportunities, the District encourages the consolidation of small private water supply and wastewater systems with adjacent public systems.

2.2 Continuing and Emerging Management Challenges

The District serves the metropolitan Atlanta region, which is the largest population center in the southeast United States. Water resources are critically important to the region's economic vitality and quality of life. The region lies in the headwaters of six major river basins, where natural surface water sources are small relative to other major metropolitan areas and in need of a high level of protection. Population growth in the region creates demand on the available water supplies while increasing the volume of treated wastewater discharged to the region's rivers, lakes, and streams. At the same time, development associated with this growth has impacted watersheds by changing the peak rates, volume, velocity, timing, and quality of stormwater runoff. The District faces a number of water resources management challenges as it seeks to balance the needs of its communities with the needs of downstream users and instream aquatic health.

Continuing and emerging management challenges are summarized in Table 2-1. The table briefly describes the challenges, discusses integrated management considerations, and indicates provisions of this Plan that address each challenge. These management challenges influenced priorities for the Plan Update. Some challenges are not new to the region, and this Plan seeks to continue to improve efforts to overcome them. Other challenges are new and require new areas of focus in planning and management. Many of these challenges are long-term concerns that will require continued and concerted efforts to address and ensure that they are managed for sustainable outcomes for the region's economic, environmental, and social well-being. This Plan and its Action Items have been developed to help address these key water resources management challenges for the region.

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Consumptive Use: Water use is consumptive when it decreases the amount of water that is returned to surface waters. The District seeks to minimize consumptive uses to the extent possible, while also balancing other goals and considerations.	Management of consumptive use must consider demands on the water source, returns of treated wastewater to that source, demand management, distribution and collection system infrastructure, and septic system and LAS use.	• INTEGRATED-2: Local Water Master Plans • INTEGRATED-4 Local Wastewater Master Plans • INTEGRATED-5 Connections to Public Sewer • INTEGRATED-8 Septic System Planning • INTEGRATED-12 Private Decentralized Wastewater Systems Ordinance • WSWC-1 Water Conservation Program • WSWC-2 Conservation Pricing • WSWC-3 Billing Cycles and Billing System Functionality • WSWC-4 Private Fire Lines Metering Requirement • WSWC-5 Residential Customer Leak Reduction Programs • WSWC-6 Toilet Replacement Program • WSWC-8 Metro Water District – Water Efficiency Code Requirements • WSWC-14 Water System Asset Management • WSWC-16 Local Public Education Program
Instream Flows: Water withdrawals affect downstream flows, and without management of withdrawal quantities, detrimental impacts to natural aquatic habitats and downstream users can occur.	Instream flows affect both water availability and water quality, and management must consider the impacts of development and withdrawals on watershed hydrology and returns of treated wastewater.	• WSWC-1 Water Conservation Program • WSWC-2 Conservation Pricing • WSWC-3 Billing Cycles and Billing System Functionality • WSWC-4 Private Fire Lines Metering Requirement • WSWC-5 Residential Customer Leak Reduction Programs • WSWC-6 Toilet Replacement Program • WSWC-8 Metro Water District – Water Efficiency Code Requirements • WSWC-12 Require New Car Washes to Recycle Water • WSWC-13 Local Drought Response and Water Waste Ordinance/Policy • WSWC-14 Water System Asset Management • WSWC-15 Water Loss Control and Reduction • WSWC-16 Local Public Education Program • WATERSHED-8 Watershed Improvement Projects
Septic Systems: To a varying degree, septic systems are used by single-family housing units in every county in the District. While septic systems can provide a workable alternative for wastewater management in areas without sewer, they require coordinated planning and education to ensure maintenance and prevent failure.	Septic systems must be managed to address potential water quality concerns. Septic system management requires coordination and cooperation across multiple entities to address integrated issues.	• INTEGRATED-5 Sewer System Rehabilitation Program • INTEGRATED-8 Septic System Planning • INTEGRATED-9 Septic System Critical Area Management • INTEGRATED-10 Septic System Septage Disposal • INTEGRATED-11 Septic System Maintenance Education • INTEGRATED-12 Private Decentralized Wastewater Systems Ordinance

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Septage Disposal: Illegal or improper septage disposal can negatively impact local water quality and disrupt operations at wastewater treatment facilities. Local planning is needed to provide for the capacity and procedures for proper disposal.	Septage disposal needs to be considered in wastewater master planning to ensure adequate capacity for proper disposal. Coordination and cooperation across multiple entities will be needed to develop effective local septage management plans. Rate structures should incentivize proper disposal of septage.	• INTEGRATED-10 Septic System Septage Disposal
Drought Response: Recent droughts have constrained water availability, and some communities have experienced low reservoir levels. Drought preparedness and response planning are important to mitigating adverse impacts and ensuring reliable water supplies. Climate variability projections indicate that drought may become more frequent and severe in the region in the future.	Droughts affect water supplies, instream flows and water quality. During droughts, wastewater facility influent can be adversely affected by reduced levels of water entering the collection system as a result of decreased water use. Instream assimilative capacity may be limited by low flows.	• WSWC-13 Local Drought Response and Water Waste Ordinance/Policy
Water Treatment Standards: Recent and anticipated future regulatory changes are resulting in more stringent water treatment standards that require new capital investments and compliance activities by local water systems.	Water treatment needs depend, in part, on the water quality of the supply source, and therefore, drinking water supply protection and watershed management are closely related to water treatment needs.	• INTEGRATED-2 Local Water Master Plans • INTEGRATED-6 Source Water Assessment and Protection Program
Chemicals of Concern: The U.S. Environmental Protection Agency (EPA) tracks a wide range of chemicals and micro-organisms that are not presently regulated, but that might pose a risk to drinking water and public health (that is, pharmaceuticals, personal care products, endocrine disrupting compounds, per- and polyfluoroalkyl substances [PFAS]). If these chemicals are regulated in the future, adoption of advanced treatment techniques, such as ultraviolet (UV) disinfection, activated carbon, nanofiltration or reverse osmosis membranes, may be necessary.	Management of chemicals of concern requires consideration of treatment issues in both water and wastewater systems, as well as prevention of disposal in the wastewater collection system where possible.	The Public Education Section addresses public awareness about proper disposal of pharmaceuticals and household chemicals in order to reduce their disposal to the sanitary sewer waste stream and, ultimately, source water supplies.

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Sedimentation of Stream and River Intakes: Sediment entrainment at pump intakes is caused by erosion and high sediment loads within the contributing watershed. It can cause water supply interruptions and higher operating costs.	The protection of water supplies and intakes from excess sediment relies upon effective implementation of watershed management and stormwater programs.	• WATERSHED-1 Post-construction Stormwater Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-12 Local Public Education Program The Public Education Section targets increased awareness of sedimentation and erosion control requirements among citizens, elected officials and developers.
Wastewater Treatment Standards and Performance: Treating a growing volume of wastewater under conditions of limited available assimilative capacity and meeting future requirements for the removal of ammonia, total nitrogen and phosphorus will require adoption of advanced treatment technologies and high levels of treatment plant reliability.	Wastewater treatment performance and reliability are important for water quality protection and source water supply protection, and therefore, its management requires consideration of water and wastewater treatment needs.	• INTEGRATED-4 Local Wastewater Master Plans • WW-1 Enhanced Reliability of Wastewater Pumping Stations
Biological Loading: Wastewater treatment plants (WWTPs) in the region have experienced higher influent concentrations of biological components (that is, biochemical oxygen demand, volatile suspended solids, ammonia). Increased biological loading has required many local wastewater providers to plan for and implement upgrades and expansions at their treatment facilities.	Wastewater facility planning must consider a number of integrated factors related to the above trends, including: the impacts of water conservation and septage disposal on the biological loading of incoming wastewater.	• INTEGRATED-4 Local Wastewater Master Plans • INTEGRATED-10 Septic System Septage Disposal
Wastewater Collection System Maintenance: Potential problems with sewer systems can be caused by inflow and infiltration and improper disposal of fats, oils, grease, and rags. In some areas, capacity can be strained by new development. Proactive planning, design, inspections, and maintenance are needed to minimize potential problems, including sanitary sewer overflows (SSOs).	Leaking or overflowing collection systems contribute to water quality issues impacting downstream water supplies and assimilative capacity. Inflow and infiltration to treatment facilities unnecessarily uses treatment capacity and consumes electrical energy and other resources in the process.	• WW-2 Sewer System Inventory and Mapping • WW-3 Sewer System Maintenance Management • WW-4 Sewer System Inspection Program • WW-5 Sewer System Rehabilitation Program • WW-6 Capacity Certification Program • WW-7 Grease Management Program • WW-8 Sewer System Overflow Emergency Response Program • WW-9 Sewer System Inspection and Maintenance Training The Public Education Section emphasizes the need for public awareness of proper fats, oils, grease and rags disposal.

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Private Wastewater Facilities: Of the 176 wastewater treatment facilities in the District, 93 are privately owned. Most of these private systems treat small volumes of wastewater. They are subject to high unit costs, lack of staffing, and concerns about performance reliability.	Although the total volume of water treated by private wastewater facilities is very small relative to other wastewater facilities in the District, many small private wastewater systems are LAS, and therefore contribute to consumptive use of water.	• INTEGRATED-5 Connections to Public Sewer • INTEGRATED-12 Private Decentralized Wastewater Systems Ordinance
Residuals Disposal: Transport and disposal of wastewater biosolids residuals is a costly management concern as requirements are tightened and options for disposal are often limited. Additionally, advanced treatment of nutrients is resulting in increased volumes of biosolids.	Planning and management of biosolids requires consideration of septage disposal at wastewater facilities.	• INTEGRATED-4 Local Wastewater Master Plans • INTEGRATED-10 Septic System Septage Disposal
Limited Assimilative Capacity: In some parts of the region, the assimilative capacity of surface waters to receive treated wastewater without exceeding water quality standards is limited. A lack of assimilative capacity can require high levels of wastewater treatment and drive treatment toward land application and septic systems.	In some areas, limited assimilative capacity may point toward land application or septic systems for treatment of wastewater, but these options must be evaluated in light of the regional objective of returning treated wastewater to specific water bodies. Assimilative capacity is reduced by nonpoint as well as point sources, and therefore, watershed management is important to addressing this challenge.	• INTEGRATED-4 Local Wastewater Master Plans • WATERSHED-1 Post-construction Stormwater Management • WATERSHED-3 Floodplain Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-5 Illicit Discharge Detection and Elimination Program • WATERSHED-8 Watershed Improvement Projects • WATERSHED-9 Ongoing Stormwater System Management • WATERSHED-12 Local Public Education Program
Total Maximum Daily Loads (TMDLs): Georgia EPD is required to establish TMDLs for certain water bodies that do not meet state water quality standards (i.e., those listed as Category 5 on the State's 303(d) list). TMDLs set the maximum loading levels for specific pollutants of concern and identify potential pollutant sources. Nonpoint source pollution is the major cause of water quality impairment in the District (Georgia EPD's 2020 305(b) / 303(d) List of Water).	Meeting the requirements of TMDLs and addressing impairments requires integrated consideration of point source discharges and watershed management to address nonpoint sources. Instream flows and returns of treated wastewater can also affect pollutant concentrations.	• INTEGRATED-4 Local Wastewater Master Plans • WATERSHED-1 Post-construction Stormwater Management • WATERSHED-3 Floodplain Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-5 Illicit Discharge Detection and Elimination Program • WATERSHED-6 Litter Control • WATERSHED-8 Watershed Improvement Projects • WATERSHED-9 Ongoing Stormwater System Management • WATERSHED-10 Long-term Ambient Trend Monitoring • WATERSHED-12 Local Public Education Program

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Nutrient Standards: Allatoona Lake and Lake Lanier have a TMDL for chlorophyll a concentrations associated with nutrient loading. Other lakes in the District and downstream water planning regions may also be affected by nutrient loading.	Point sources in the District are subject to high treatment standards to address nutrient loads, but because nonpoint sources are the major source of nutrient loading, watershed management is critical to meeting lake nutrient standards.	• WATERSHED-1 Post-construction Stormwater Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-5 Illicit Discharge Detection and Elimination Program • WATERSHED-6 Litter Control • WATERSHED-8 Watershed Improvement Projects • WATERSHED-9 Ongoing Stormwater System Management • WATERSHED-12 Local Public Education Program
Upper Chattahoochee Trout Fishery: The release of cold waters from Buford Dam supports a trout fishery for portions of the river below the dam that are designated secondary trout waters. This designation affects temperature requirements for wastewater discharges in this area.	The temperature requirements limit the potential to return reclaimed water to the river; however, returns to the basin provide important flows for downstream users and are critical for indirect potable reuse for water supply.	• INTEGRATED-4 Local Wastewater Master Plans • WATERSHED-1 Post-construction Stormwater Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-5 Illicit Discharge Detection and Elimination Program • WATERSHED-8 Watershed Improvement Projects • WATERSHED-9 Ongoing Stormwater System Management
Reclaimed Water Reuse: Various types of water reuse occur in the District. Indirect potable reuse of highly treated wastewater is an important strategy to supplement available water supplies. Non-potable reuse is employed in some areas to provide water for irrigation and commercial and industrial processes.	Reuse strategies must consider the need for returns of treated wastewater to surface waters for other uses. Evaluation criteria for non-potable reuse applications in the District are listed in Section 2.1.	See policy call-out box in Section 2.1
Return Flows ("Made Inflows") to Lake Lanier and Allatoona Lake: Returning highly treated wastewater to Lake Lanier and Allatoona Lake and their tributaries will maximize the use of existing infrastructure, enhance available water supplies, and support the long-term sustainability of water use from these basins.	Management of return flows requires integrated consideration of water supply needs, wastewater treatment infrastructure and watershed management.	• INTEGRATED-13 Corps Reservoirs – Storage, Withdrawals, and Returns

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
Proximity of Wastewater Discharges to Water Supply Intakes: Heavy reliance on surface waters for both water supply and wastewater discharge puts these uses in close proximity and requires careful planning and management to ensure high quality and reliability in treatment.	Water and wastewater planning, operations and management must consider the multiple uses of the region's surface waters and ensure that reliability and treatment protect waters for these uses. Watershed management is also directly related to ensuring that water quality can meet these multiple needs, and protect human health.	• INTEGRATED-2 Local Water Master Plans • INTEGRATED-3 Update Local Emergency Water Plans • INTEGRATED-4 Local Wastewater Master Plans • INTEGRATED-6 Source Water Assessment and Protection Program • INTEGRATED-7 Water Supply Watershed Protection • WW-1 Enhanced Reliability of Wastewater Pumping Stations • WW-2 Sewer System Inventory and Mapping • WW-3 Sewer System Maintenance Management • WW-4 Sewer System Inspection Program • WW-5 Sewer System Rehabilitation Program • WW-6 Capacity Certification Program • WW-7 Grease Management Program • WW-8 Sewer System Overflow Emergency Response Program • WW-9 Sewer System Inspection and Maintenance Training • WW-10 Local Public Education Program • WATERSHED-1 Post-construction Stormwater Management • WATERSHED-4 Stream Buffer Protection • WATERSHED-5 Illicit Discharge Detection and Elimination Program • WATERSHED-6 Litter Control • WATERSHED-8 Watershed Improvement Projects • WATERSHED-9 Ongoing Stormwater System Management • WATERSHED-12 Local Public Education Program
Climate Change: Climate variability adds uncertainty to water resources planning and management. In the District, climate change impacts could include increased frequency of heat waves, increased evaporation, increased annual precipitation and increased variability of precipitation, including more severe and extended droughts and increased frequency and intensity of rain events.	Climate variability has the potential to adversely affect water availability, water quality and watershed hydrology in a manner that will require enhanced implementation of water supply, water conservation, wastewater, and watershed management elements of this Plan.	• INTEGRATED-2 Local Water Master Plans • INTEGRATED-4 Local Wastewater Master Plans The District published a Utility Climate Resiliency Study, which addresses this challenge.
Consolidation of Private Water and Wastewater Systems: Small private water supply and wastewater utilities may pose a challenge to environmental or public health as they age, and the cost of ownership exceeds the benefits to the owners. Larger systems should consider the benefits to improving environmental and public health outcomes as they weigh consolidation costs.	Water and wastewater providers should consider consolidating with smaller systems as they develop local master plans.	• INTEGRATED-2 Local Water Master Plans • INTEGRATED-4 Local Wastewater Master Plans

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SECTION 3

Existing Facilities and Conditions



An understanding of current conditions is a prerequisite for updating the Plan. In the short time since the last Plan Update, regional conditions and infrastructure have changed. This section documents current conditions in the region, its water resources, and its water resources management infrastructure. This section supports an integrated approach to water resources planning; while some parts focus specifically on water and wastewater infrastructure, other parts describe conditions that reflect the interconnected nature of water resources management, including regional population information, basin return flow conditions, and watershed development.

3.1 Population

The 15 counties within the District have experienced continued growth and currently have a population of over five and a half million people. The region saw population increase by 237 percent from 1970 to 2020, or 4.7 percent per year, and in recent years, by 16 percent from 2010 to 2020, or 1.6 percent per year. Figure 3-1 shows regional population growth between 1970 and 2020. Population forecasts for the region are described in Section 4.1.

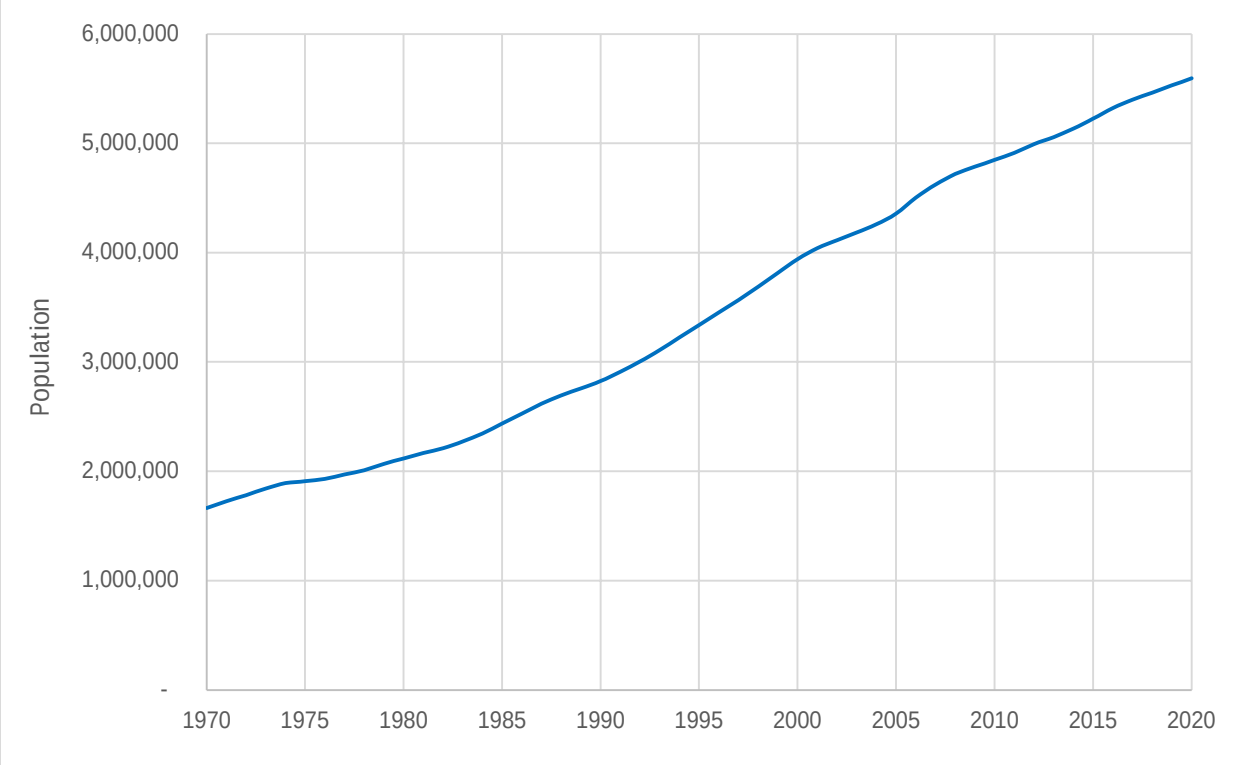


Figure 3-1. District Population: 1970-2020
Population data for the District obtained from U.S. Census Bureau

3.2 Water Supply and Treatment

Various local public water providers treat and distribute water in the 15 member counties of the District. While most providers are publicly operated by a local government or water authority, some are third-party providers that serve public entities. For example, the Cobb County-Marietta Water Authority (CCMWA) is a regional wholesaler of water that was created by the Georgia Legislature. The Authority treats and distributes potable water for wholesale purchase by jurisdictions in Cobb County and neighboring counties.

The District water providers obtain water supply from the headwaters of six river basins: Chattahoochee, Coosa/Etowah, Flint, Ocmulgee, Oconee, and Tallapoosa. A small portion (less than 1 percent) of the public water supply is from groundwater sources. Water withdrawals for water supply are measured in terms of annual average day flow (AADF) and million gallons per day (MGD) volumes.

This section describes the District's water supply sources and water treatment facilities. It also documents water conservation efforts, water system interconnections and non-municipal water withdrawals in the region. This section is intended to provide an understanding of the current water supply infrastructure of the District.

3.2.1 Surface Water Supplies

The District relies primarily on surface water from rivers and storage reservoirs as its main source of water supply. The most significant water supply source for the region is the Chattahoochee River system, which includes Lake Lanier. Table 3-1 summarizes the District's permitted surface water supply sources. Current water supply sources in the District were identified through existing permits issued by Georgia EPD. These permits make up the equivalent of almost 989 AADF-MGD of water supply withdrawals in the District. Since the 2017 Plan, additional capacity has been permitted for the City of Cumming and Forsyth County from Lake Lanier, for Paulding County from the new Richland Creek Reservoir in the Etowah Basin, and for the City of Auburn in the Oconee Basin.

Table 3-1. Existing Permitted Surface Water Supply Withdrawals in the District

Water Supply Source	Owner/Operator Utilizing Source	Permitted Monthly Average Daily Withdrawal (MGD)[a]		2019 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[b]	Primary Source[b]	
Chattahoochee River Basin				
Lake Lanier	City of Cumming	*NA*	23.82	9.4
	Forsyth County Board of Commissioners	*NA*	38.64	14.7
	Gwinnett County	*NA*	150	76.6
	City of Buford	*NA*	2	1.3
	City of Gainesville	*NA*	30	19.2
Chattahoochee River	Atlanta - Fulton County Water Resources Commission	*NA*	90	41.6
	DeKalb County Public Works	*NA*	140	71.2
	Middle Chattahoochee Regional Water and Sewer Authority	*NA*	8.55	NA
	Cobb County-Marietta Water Authority	*NA*	87	40.5
	City of Atlanta Watershed Management	*NA*	135.3	89.6

Table 3-1. Existing Permitted Surface Water Supply Withdrawals in the District

Water Supply Source	Owner/Operator Utilizing Source	Permitted Monthly Average Daily Withdrawal (MGD)[a]		2019 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[b]	Primary Source[b]	
Dog River Reservoir [c]	Douglasville-Douglas County Water and Sewer Authority	*NA*	23	11.7
Bear Creek Reservoir [c]		*6*		0.2
Big Creek	City of Roswell	*NA*	2.8	1.7
Sweetwater Creek	City of East Point	*NA*	11.5	5.4
Cedar Creek Reservoirs	City of Palmetto	*NA*	0.45	0.4
Cedar Creek (B.T. Brown) Reservoir	Coweta County Water and Sewerage Authority	*NA*	6.7	2.8
J.T. Haynes Reservoir [d]	Newnan Utilities	*NA*	14	6.4
Sandy/Browns Creek [d]		8		2.8
Monthly Average Day Withdrawal in Chattahoochee River Basin			*763.76*	*395.5*
Coosa/Etowah River Basin				
Etowah River	City of Canton	39	18.7	3.3
	City of Cartersville [e]	NA	23	NA
Etowah River/Richland Creek Reservoir	Paulding County	47	42	0
Etowah River at Riverbend	Cherokee County Water and Sewerage Authority	NA	4.5	2.4
Hollis Q. Lathem (Yellow Creek) Reservoir/Etowah River		NA	36	14.7
Allatoona Lake	City of Cartersville [e]	NA	18	11.9
	Cobb County-Marietta Water Authority	NA	78	45.3
Lewis Spring	City of Adairsville	NA	4.1	1.6
Moss Springs	City of Emerson	NA	0.5	0.2
Bolivar Springs	Bartow County Water System	NA	0.8	0.4
Hickory Log Creek Reservoir [f]	City of Canton	NA	NA	0.1
	Cobb County-Marietta Water Authority	NA	NA	NA
Monthly Average Day Withdrawal in Coosa/Etowah River Basin			*225.6*	*79.9*
Flint River Basin				
Flint River	Clayton County Water Authority	40	*NA*	3.4
	Fayette County Water System [h]	16	*NA*	1.1
J.W. Smith Reservoir (Shoal Creek) [g]	Clayton County Water Authority	*NA*	17	11.5
White Oak Creek [d]	Newnan Utilities	7	*NA*	0.8
Line Creek [d]		12	*NA*	1.2
Hutchins Lake	City of Senoia	*NA*	0.3	0.2

Table 3-1. Existing Permitted Surface Water Supply Withdrawals in the District

Water Supply Source	Owner/Operator Utilizing Source	Permitted Monthly Average Daily Withdrawal (MGD)[a]		2019 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[b]	Primary Source[b]	
Whitewater Creek	City of Fayetteville	*NA*	3	0.0
Lake Kedron [h]	Fayette County Water System	*NA*	4.5	0.2
Lake Peachtree (Flat Creek) [h]				
Horton Creek Reservoir [i]		*NA*	14	5.3
Lake McIntosh	Fayette County Water System	*NA*	12.5	4.3
Still Branch Creek Reservoir [j]	City of Griffin (provides water to Pike, Spalding, and Coweta Counties)	*NA*	3.1	3.1
Monthly Average Day Withdrawal in Flint River Basin			*54.4*	*31.1*
Ocmulgee River Basin				
W.J. Hooper Reservoir (Little Cotton Indian Creek)	Clayton County Water Authority	*NA*	20	16.5
Edgar Blalock Jr. Reservoir (Pates Creek)[g]		*NA*	10	2.2
John Fargason (Walnut Creek) Reservoir	City of McDonough	*NA*	2.4	1.3
S. Howell Gardner (Indian Creek) Reservoir [j]	Henry County Water Authority	*NA*	8	3.1
Rowland (Long Branch) Reservoir [j]		*NA*	10	1.25
Towaliga River Reservoir [j]		*NA*	11	7.5
Tussahaw Creek Reservoir		*NA*	24	6.8
Big Haynes Creek (Randy Poynter Lake)	Rockdale County	*NA*	32.8	13.0
Brown Branch	City of Locust Grove	*NA*	0.3	0.2
Monthly Average Day Withdrawal in Ocmulgee River Basin			*118.5*	*51.85*
Oconee River Basin				
Cedar Creek Reservoir [k]	City of Gainesville	*NA*	2	0
North Oconee River [k]		20	*NA*	
Rock Creek [l]	City of Auburn	*NA*	1.59	*0*
Monthly Average Day Withdrawal in Oconee River Basin			*3.59*	*0*

Table 3-1. Existing Permitted Surface Water Supply Withdrawals in the District

Water Supply Source	Owner/Operator Utilizing Source		Permitted Monthly Average Daily Withdrawal (MGD)[a]		2019 Actual Annual Average Withdrawals (MGD)
			Supplemental Source[b]	Primary Source[b]	
Tallapoosa River Basin					
Lake Paradise (Little Tallapoosa River)	City of Villa Rica		*NA*	1.5	1.2
Cowens Lake (Astin Creek)					
Monthly Average Day Withdrawal in Tallapoosa River Basin				*1.5*	*1.2*
Total Permitted Withdrawal in District [m]		Monthly Average Day		1167.35	NA
		AADF-MGD		972.79	559.35

[a] Permitted Monthly Average Daily Withdrawal (MGD) is a not-to-exceed monthly withdrawal limit, calculated as a daily average across the month.

[b] The primary source of water is where the intake is located. The supplemental source may be utilized to pump and store water in the primary source or as a substitute for the primary source when it is not available, based on the conditions specified in their individual permit.

[c] The Bear Creek Reservoir is a supplemental source to Dog River Reservoir with a monthly permit of 6 MGD. The total permitted withdrawal from both sources is 23 MGD.

[d] The J.T. Haynes Reservoir is a pump-storage facility that receives water from three different sources: Sandy/Browns Creek, White Oak Creek, and Line Creek.

[e] The City of Cartersville has two intakes covered by one permit. The combined total withdrawal for the Etowah River and the Allatoona Lake intakes shall not exceed the permitted monthly average day withdrawal of 23 MGD. Of that permitted amount, up to 18 MGD may be withdrawn from Allatoona Lake on a monthly average day basis.

[f] Hickory Log Creek Reservoir is a pump-storage reservoir for CCMWA and Canton. The intake on the Etowah River is permitted to pump at a peak day rate of 39 MGD. Water released from Hickory Log Creek Reservoir for CCMWA will contribute to the storage allocation use and be a part of the withdrawal quantity for the Wyckoff Water Treatment Plant (WTP).

[g] Clayton County Water Authority can withdraw any combination of flow from J.W. Smith Reservoir and Edgar Blalock Jr. Reservoir not to exceed a combined total withdrawal of 10 MGD. J.W. Smith Reservoir on Shoal Creek is a pump-storage facility that receives water from the Flint River.

[h] Lake Horton is a pump-storage facility only that receives water from the Flint River and Whitewater Creek.

[i] The permitted monthly average day withdrawal is 42 MGD for the entire reservoir. This reservoir is located outside of the District and is owned by the City of Griffin. The reservoir serves Pike and Spalding Counties, as well Coweta County. Coweta County currently has a purchase contract for 5 MGD of finished water from the City of Griffin through 2049.

[j] Henry County Water Authority may withdraw the combined permitted monthly average day withdrawal of 24 MGD from these three intakes without exceeding each individual limit.

[k] Cedar Creek Reservoir is a pump-storage facility that receives water from the North Oconee River. This reservoir was built in 2000 and may be used as a future potential water supply source.

[l] The Auburn Raw Water Storage Pond and pumping system will be capable of providing 1.59 MGD AADF to meet the City of Auburn's long-term water supply needs. Two intakes on Rock Creek (tributary to Mulberry River) will have the transfer capacity of 15.6 MGD peak day to the Raw Water Storage Pond.

[m] Monthly average day is 1.2 times AADF.

Note:

NA = not available

3.2.2 Groundwater Supplies

Groundwater sources account for less than 1 percent of the total permitted public water supply in the District. Self-supplied wells are also used in the region but are not required to obtain a permit if their usage is below 100,000 gallons per day. Generally, the bedrock geology of the region does not support cost-effective groundwater use in the District. Groundwater is used by some small towns in the region, and it is also used as a supplemental source. Table 3-2 lists groundwater withdrawal permits for public water supply in the District.

Table 3-2. Existing Permitted Groundwater Withdrawals (Non-Farm) for Public Water Supply in the District

Owner/Operator Utilizing Source	County	Permitted Monthly Average Day Withdrawal (MGD)	2019 Actual Monthly Average Withdrawals (MGD)
City of Kingston	Bartow	0.15	0.12
City of White	Bartow	0.2	0.10
City of Ball Ground	Cherokee	0.25	0.22
City of Woodstock	Cherokee	0.71	0.36
Lake Arrowhead Utility	Cherokee	0.5	0.26
Clayton County Water Authority	Clayton	0.4	0.03
Coweta County Water & Sewer Department	Coweta	0.504	NA
City of Senoia	Coweta	0.233	0.15
Shoal Creek Forest Subdivision	Coweta	0.15	0.04
City of Fayetteville	Fayette	1.3	0.86
Forsyth County Department of Water & Sewer	Forsyth	0.742	0.02
City of College Park	Fulton	0.6	0.29
City of Roswell	Fulton	0.167	NA
City of Flowery Branch	Hall	0.7	0.24
City of Lula	Hall	0.5	0.18
City of Hampton	Henry	0.369	0.11
City of Locust Grove	Henry	1.20	0.21
City of McDonough	Henry	0.3	0.02
City of Stockbridge	Henry	0.75	0.34
City of Dallas	Paulding	0.202	0.03
PoyntSource Solutions Inc	Rockdale	0.255	0.08
Total Groundwater Supply* [a]		10.182	3.65

* The total permitted groundwater supply amount is expressed in terms of monthly average day; groundwater withdrawal permit limits are not set in terms of AADF, as they are for surface water.

NA = not available

3.2.3 Existing Water Treatment Facilities

The District currently has 41 publicly owned surface water treatment plants (WTPs), ranging in permitted capacity from less than 1 MGD to 150 MGD (peak day limit). The combined permitted treatment capacity of surface WTPs in the District is 1,223.3 MGD (peak day limit). Table 3-3 lists the existing surface WTPs in the District, including treatment capacities.

Table 3-3. Existing Surface Water Treatment Plants in the District

County	WTP	Entity	Source Stream/Reservoir	2021 Permitted WTP Capacity (peak day, MGD)[a]
Bartow	Lewis Spring	City of Adairsville	Lewis Spring[b]	4
	Clarence B. Walker	City of Cartersville	Allatoona Lake	27
	Emerson	City of Emerson	Moss Spring[b]	0.63
	Bartow County	Bartow County	Bolivar Springs	0.8
Cherokee	Canton	City of Canton	Etowah River	5.45
	Etowah River	Cherokee County Water and Sewer Authority	Etowah River with augmentation from Lathem Reservoir	38
Clayton	Terry R. Hicks	Clayton County Water Authority	Blalock Reservoir	10
	W.J. Hooper		W.J. Hooper Reservoir	20
	J.W. Smith		J.W. Smith Reservoir	12
Cobb	James E. Quarles	Cobb County-Marietta Water Authority	Chattahoochee River	87
	Hugh A. Wyckoff		Allatoona Lake	86
Coweta	B.T. Brown	Coweta County	Cedar Creek (B.T. Brown) Reservoir	6.4
	Hershall Norred	City of Newnan	J.T. Haynes Reservoir	14
	Senoia	City of Senoia	Hutchins' Lake	0.45
DeKalb	Scott Candler	DeKalb County	Chattahoochee River	128
Douglas	Bear Creek	Douglasville-Douglas County Water and Sewer Authority	Bear Creek Reservoir	23.94
			Dog River Reservoir	
	Franklin Smith	City of Villa Rica	Lake Fashion, Cowan Lake	1.5
Fayette	Crosstown	Fayette County	Lake Horton, Lake Kedron, Lake Peachtree, Groundwater	13.5
	South Fayette			9.2
	Fayetteville	City of Fayetteville	Whitewater Creek	1.3
Forsyth	Cumming	City of Cumming	Lake Lanier	24.1
	Forsyth County	Forsyth County	Lake Lanier	33.7

Table 3-3. Existing Surface Water Treatment Plants in the District

County	WTP	Entity	Source Stream/Reservoir	2021 Permitted WTP Capacity (peak day, MGD)[a]
Fulton	Atlanta-Fulton County	Atlanta-Fulton County Water Resources Commission	Chattahoochee River	90
	Hemphill	City of Atlanta	Chattahoochee River	136.5
	Chattahoochee			64.9
	Roswell	City of Roswell	Big Creek	3.3
	East Point	City of East Point	Sweetwater Creek, Sparks Reservoir	13.9
	Palmetto	City of Palmetto	Cedar Creek	0.576
Gwinnett	Lake Lanier	Gwinnett County	Lake Lanier	150
	Shoal Creek			98
	Buford	City of Buford	Lake Lanier	2.5
	Auburn	Auburn	Rock Creek	0
Hall	Lakeside	City of Gainesville	Lake Lanier	10
	Riverside			25
Henry	Towaliga River	Henry County Water Authority	S. Howell Gardner (Indian Creek) and Rowland Reservoirs	24
	Tussahaw		Tussahaw Creek Reservoir	16.1
	McDonough	City of McDonough	John Fargason (Walnut Creek) Reservoir	2.4
	Locust Grove	City of Locust Grove	Brown Branch	0.45
Paulding	Paulding County	Paulding County	Richland Creek Reservoir	18
Rockdale	Big Haynes Creek	Rockdale County	Big Haynes Creek (Randy Poynter Lake)	22.1
Total District Treatment Capacity (Peak Day MGD)				1,223.3

[a] WTP capacity provided is permitted peak day basis.
[b] Lewis Spring and Moss Spring are groundwater sources under the influence of surface water; they are classified by Georgia EPD as surface water WTPs.

Note:

NA = not available

Treatment capacity volumes are reported in different units than those for withdrawals because, in the state of Georgia, WTP permits are based on peak day limits, while withdrawal permits are generally based on monthly average day limits. Some withdrawals are also subject to peak day limits.

The District's surface WTPs range in age and condition. The water quality of the source water for these treatment plants also varies widely and dictates treatment technologies. The vast majority of the WTPs use conventional treatment with chemical coagulation, flocculation, sedimentation, filtration and disinfection. Some WTPs in the District currently use or are investigating advanced treatment technologies such as ozonation, ultraviolet (UV) disinfection and membrane filtration. The regulatory

standards for WTPs are subject to change and tend to become more stringent over time; therefore, treatment operations must continually assess and optimize water treatment facilities and processes to ensure compliance.

As previously noted, groundwater sources provide less than 1 percent of the public water supply in the District. Typically, groundwater only requires disinfection prior to distribution to customers.

3.2.4 Non-municipal Permitted Withdrawals

While this Plan focuses on public water supply, the region's water resources are also used by private, non-municipal water users. It is important to recognize and account for these other water users in the region. Table 3-4 lists the permitted non-municipal withdrawals in the region on a monthly average day basis excluding those for the power generation sector. Water withdrawals by the power generation sector are primarily for cooling water and are regulated by Georgia EPD. These withdrawals are largely non-consumptive and are addressed in Georgia EPD's Energy Water Use Forecast [https://waterplanning.georgia.gov/forecasting/energy-water-use]. The primary uses for the withdrawals listed in Table 3-4 are industrial applications and golf course irrigation. Returns of treated wastewater by public and private users are addressed in Section 3.4.

Table 3-4. Non-municipal Surface Water Permitted Withdrawals in the District – Excluding Power Generation Sector

Basin	Monthly Average Day Permitted Withdrawal (MGD)	Peak Day Limit: Permitted 24-Hour Withdrawal (MGD)*
Chattahoochee	7.02	10.25
Coosa/Etowah	12.63	13.21
Flint	1.25	1.25
Ocmulgee	-	-
Oconee	-	-
Tallapoosa	-	-
Total	20.90	24.71

* Some withdrawals are also subject to peak day limits that exceed the monthly average day limits.

3.2.5 Water Conservation

Since the creation of the District in 2001, water conservation and efficiency have been at the foundation of water supply planning. The District has made water conservation a region-wide priority and is the only major metropolitan area in the country that has more than 100 jurisdictions implementing a comprehensive water conservation program. The 2003 plan introduced many innovative water conservation measures that have been expanded upon with the 2009 plan, 2010 amendments and the 2017 plan.

The District's water conservation program is robust and comprehensive, and it has contributed to a marked decline in the region's per capita water use. Some highlights of these programs include the following:

- For seven consecutive years, the U.S. Environmental Protection Agency (EPA) has recognized the District for its innovative water conservation programming and close collaboration with its network of partners, including the 55 water providers in the metro Atlanta region. Most recently, the District received its fourth WaterSense Sustained Excellence Award in October 2021.

- Water conservation pricing that includes higher residential water rates as customers use more water
- Toilet rebate program for single and multifamily properties that have replaced more than 150,000 inefficient toilets with high-efficiency and ultra-high efficiency toilets
- Requirement for rain sensors to be installed on new irrigation systems in the District since 2005
- Water loss assessment and leak detection programs that build on the state's water loss program

Since 2001, the District has implemented activities and policies that have helped per capita water use in the region drop by more than 30 percent, as shown on Figure 3-2.

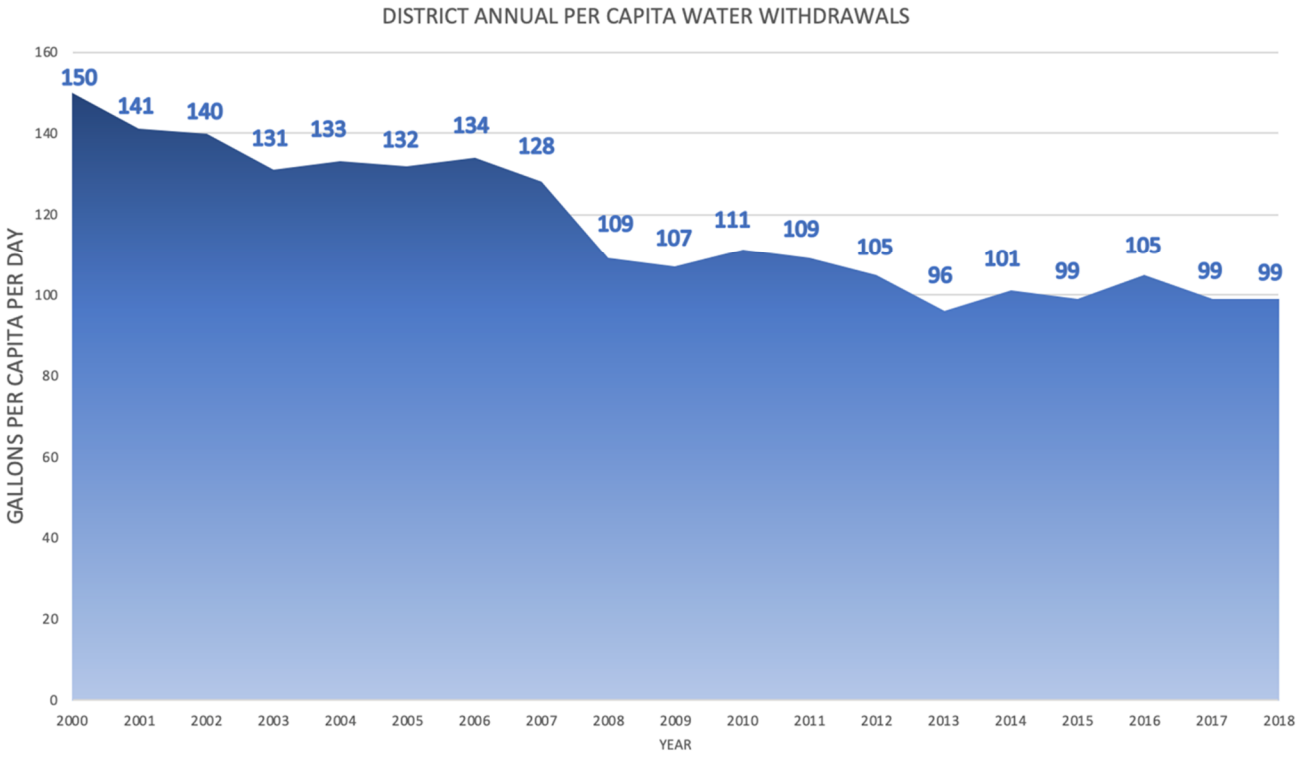


Figure 3-2. District Per Capita Water Use Trend 2000-2018

Note: This gallons per capita per day (GPCPD) calculation is the sum of all municipal and industrial demands in the District divided by the population of the District. It accounts for water sales into and out of the District. Note that population is based upon the latest estimated census values (last visited June 18, 2020).

3.2.6 Existing Interconnections

All of the counties within the District maintain interconnections with at least one other county for either routine or emergency water supply. Interconnections with other water systems provide a valuable means of increasing water system reliability. If water systems are interconnected, finished water supply can readily be available in the event of a major water system failure. These connections can function on an emergency-only basis, as additional supply during peak demand periods, or as major or sole sources of water supply for some water systems. Some of the region's interconnections originally served as a primary water supply source before the water system in the receiving county was developed. These connections are now kept for emergency or peak supply uses. Larger water systems may implement alternative redundancy and reliability infrastructure elements such as multiple treatment plants with looped distribution networks as neighboring systems may not be able to support their larger demands in an emergency.

In 2011, the Georgia General Assembly required that GEFA complete a Water System Interconnection Redundancy and Reliability Study (CH2M HILL Engineers, Inc. [CH2M], Jacobs and Lowe Engineers, September 2011). This study documented water system interconnections for 33 systems in the District and quantified the ability of these systems to meet interconnection reliability targets (IRTs), both short-term and long-term. In addition, the report made recommendations for systems to ensure their ability to meet these targets. GEFA updated this study in 2018, and a summary of the update is available from GEFA upon request.

3.3 Wastewater Generation and Treatment

The following sections describe the wastewater infrastructure of the District and the use of septic systems in the region.

3.3.1 Existing Public Wastewater Treatment Facilities

In 2021, the District had 83 publicly owned (municipal) wastewater treatment facilities in operation. The total permitted capacity of these facilities was 709 MGD (Table 3-5). The vast majority of the permitted capacity of the publicly owned wastewater treatment facilities in the District is advanced treatment that reduces biochemical oxygen demand to below 20 milligrams per liter (mg/L).

Tables 3-5 and 3-6 list the existing permitted wastewater treatment capacity of public facilities by basin and by county in the District. Wastewater treatment facilities are permitted by maximum month flow (MMF) on an average daily basis. This limit is a statistical measure of the average daily flow for the maximum month occurring during a calendar year.

The permitted wastewater treatment capacity for municipal facilities has increased 1 percent since 2016, the year for which data were provided in the 2017 Plan Update. The District met increased demand for municipal wastewater treatment primarily by expanding treatment facilities. The total number of publicly owned wastewater treatment facilities has stayed approximately the same since 2016, and the permitted capacity for these facilities has increased from 700 MGD of wastewater to 709 MGD.

Table 3-5 shows that 67 percent of the total existing municipal permitted capacity in the District is located in the Chattahoochee Basin. Table 3-6 shows that three counties, Cobb, Fulton, and Gwinnett, have 67 percent of the treatment capacity of the District. Table 3-7 presents a detailed summary of permitted treatment capacity by facility for each county.

Table 3-5. Municipal Permitted Wastewater Treatment Capacity in the District by River Basin

	2021	
River Basin	Permitted Capacity of Municipal Facilities (MMF-MGD)*	Number of Municipal Wastewater Treatment Facilities
Chattahoochee	472	37
Coosa/Etowah	77	20
Flint	27	9
Ocmulgee	130	15
Oconee	1	1
Tallapoosa	2	1
Total	709	83

* The current permitted capacity as obtained from 2020 data requests, data provided by Georgia EPD, and meetings with individual utilities.

Table 3-6. Municipal Permitted Wastewater Treatment Capacity in the District by County

County	2021 2021 Permitted Capacity of Municipal Facilities* (MMF-MGD)
Bartow	17.7
Cherokee	19.5
Clayton	34.4
Cobb	122.0
Coweta	7.12
DeKalb	56.0
Douglas	12.8
Fayette	11.0
Forsyth	18.8
Fulton	253.6
Gwinnett	100.3
Hall	18.5
Henry	19.0
Paulding	6.3
Rockdale	12.0
District Total	709.0

* The current permitted capacity as obtained from 2020 data requests, data provided by Georgia EPD, and meetings with individual utilities.

Table 3-7. Existing Municipal Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2021 Permitted Treatment Capacity (MMF-MGD)
Bartow	Adairsville North WPCP	Coosa/Etowah	Oothkalooga Creek	2.0
	Bartow Southeast WPCP	Coosa/Etowah	Etowah River	0.1
	Bartow Two Run WPCP	Coosa/Etowah	Two Run Creek	0.1
	Cartersville WPCP	Coosa/Etowah	Etowah River	15
	Emerson Henry Jordan WWTP	Coosa/Etowah	Pumpkinvine Creek	0.45
Cherokee	Canton WPCP	Coosa/Etowah	Etowah River	4.0
	CCWSA Fitzgerald Creek WPCP	Coosa/Etowah	Little River to Allatoona Lake	6.0
	CCWSA Riverbend WWTP	Coosa/Etowah	Etowah River	1.0
	CCWSA Rose Creek WPCP	Coosa/Etowah	Etowah River Arm of Allatoona Lake	6.0
	Woodstock Rubes Creek WPCP	Coosa/Etowah	Rubes Creek, Tributary to Little River	2.5
Clayton	Clayton Shoal Creek WRF	Flint	Shoal Creek Reservoir, Tributary to Flint River	4.4
	Clayton W.B. Casey WRF	Flint	Flint River	6.6
	Clayton W.B. Casey WRF	Ocmulgee	Huie Constructed Wetlands to Shamrock Lake	17.4
	Clayton Northeast WRF	Ocmulgee	Panther Creek	64
Cobb	Cobb South Cobb WRF	Chattahoochee	Chattahoochee River	40
	Cobb R.L. Sutton WRF	Chattahoochee	Chattahoochee River	50
	Cobb Noonday Creek WPCP	Coosa/Etowah	Noonday Creek Tributary	20
	Cobb Northwest WRF	Coosa/Etowah	Allatoona Lake	12
Coweta	Coweta Arnall/Sargent WPCP	Chattahoochee	Wahoo Creek	0.06
	Coweta Arnco WPCP	Chattahoochee	Wahoo Creek	0.1
	Coweta Grantville Ponds	Chattahoochee	Various	0.12
	Grantville Colley Street LAS	Chattahoochee	Land Application	0.15
	Newnan Mineral Springs WPCP	Chattahoochee	Mineral Springs Branch/Mountain Creek	1.2
	Newnan Wahoo Creek WPCP	Chattahoochee	Wahoo Creek Tributary	3.0
	Coweta Shenandoah WPCP	Flint	White Oak Creek, Tributary to Flint River	2.0
	Senoia LAS	Flint	Land Application	0.49

Table 3-7. Existing Municipal Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2021 Permitted Treatment Capacity (MMF-MGD)
DeKalb	Pole Bridge Creek	Ocmulgee	South River Tributary	20
	Snapfinger Creek	Ocmulgee	South River	36
Douglas	Douglas Rebel Trails WPCP	Chattahoochee	Anneewakee Creek Tributary	0.04
	Douglasville South Central WPCP	Chattahoochee	Chattahoochee River	6.0
	Douglas Northside WPCP	Chattahoochee	Gothards Creek to Sweetwater Creek	0.6
	Douglas Sweetwater Creek WPCP	Chattahoochee	Chattahoochee River	3.0
	Douglas South Central UWRF	Chattahoochee	Reuse	0.50
	Villa Rica North Sweetwater WPCP	Chattahoochee	Town Branch to Sweetwater Creek	0.52
	Villa Rica West WPCP	Tallapoosa	Little Tallapoosa Creek	2.15
Fayette	Fayetteville Whitewater Creek WPCP	Flint	Whitewater Creek	5.0
	Peachtree City Rockaway WRF	Flint	Line Creek Tributary	4.0
	Peachtree City Larry B. Turner WRF	Flint	Line Creek	2.0
Forsyth	Cumming Bethelview Road AWRF	Chattahoochee	Big Creek	8.0
	Forsyth Dick Creek WRF	Chattahoochee	Dick Creek	0.76
	Forsyth Fowler WRF	Chattahoochee	Big Creek, Chattahoochee River, Land Application, Reuse	5.0
	Forsyth James Creek	Chattahoochee	James Creek, Reuse	2.55
	Forsyth Shakerag WRF	Chattahoochee	Chattahoochee River	1.25
	Forsyth The Manor WRF	Coosa/Etowah	Reuse	0.5
	Forsyth Parkstone LAS	Coosa/Etowah	Land Application	0.1
	Settendown Public Utility, LLC (Hampton Creek WRF)	Coosa/Etowah	Settendown Creek, Reuse	0.5
	Cumming Habersham WPCP	Chattahoochee (Lake Lanier)	Lake Lanier	0.11

Table 3-7. Existing Municipal Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2021 Permitted Treatment Capacity (MMF-MGD)
Fulton	Atlanta R.M. Clayton, Utoy Creek and South River WRC	Chattahoochee	Chattahoochee River	188
	Fulton Big Creek WPCP	Chattahoochee	Chattahoochee River	24
	Fulton Camp Creek WRF	Chattahoochee	Chattahoochee River	24
	Fulton Johns Creek Environmental Campus	Chattahoochee	Chattahoochee River	15
	Fulton Little Bear WRF	Chattahoochee	Little Bear Creek	0.1
	Fulton Little River WPCP	Coosa/Etowah	Little River	2.6
Gwinnett	Buford Southside WPCP	Chattahoochee	Little Suwanee Creek	2.0
	Buford Westside WPCP	Chattahoochee	Richland Creek	0.25
	Gwinnett Crooked Creek WPCP	Chattahoochee	Chattahoochee River	16
	Gwinnett F. Wayne Hill WRC	Chattahoochee	Lake Lanier, Chattahoochee River	60
	Gwinnett Yellow River WPCP	Ocmulgee	Yellow River	22
Hall	Flowery Branch WPCP	Chattahoochee	Lake Lanier	0.4
	Gainesville Flat Creek WRF	Chattahoochee	Flat Creek	12
	Gainesville Linwood WRF	Chattahoochee	Lake Lanier	5.0
	Lula WRF	Chattahoochee	Hagen Creek	0.375
	Hall Spout Springs	Oconee	Lollis Creek	0.75
Henry	Hampton WPCP	Flint	Bear Creek Tributary	1.75
	Henry Bear Creek LAS	Flint	Land Application	1.25
	Henry Walnut Creek LAS	Ocmulgee	Land Application	8.0
	Henry Indian Creek WRF	Ocmulgee	Indian Creek	3.0
	Locust Grove Indian Creek WPCP	Ocmulgee	Indian Creek to Towaliga River	1.5
	McDonough Walnut Creek WPCP	Ocmulgee	Walnut Creek	2.0
	Stockbridge Stephen D. Peurifoy WPCP	Ocmulgee	Bush Creek Tributary	1.5

Table 3-7. Existing Municipal Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2021 Permitted Treatment Capacity (MMF-MGD)
Paulding	Paulding Coppermine LAS	Chattahoochee	Land Application	1.033
	Paulding Coppermine Road WRF	Chattahoochee	Mill Creek	1
	Paulding Upper Sweetwater WRF	Chattahoochee	Reuse	0.3
	Dallas Pumpkinvine Creek WPCP	Coosa/Etowah	Pumpkinvine Creek	1.5
	Paulding Pumpkinvine WRF	Coosa/Etowah	Pumpkinvine Creek, Reuse	1.5
Rockdale	Rockdale Almand Branch WPCP	Ocmulgee	Almand Creek to South River	1.25
	Rockdale Honey Creek WPCP	Ocmulgee	McClains Branch	0.3
	Rockdale Quigg Branch WPCP	Ocmulgee	Yellow River	7.0
	Rockdale Scott Creek WPCP	Ocmulgee	Scott Creek to South River	0.45
	Rockdale Snapping Shoals WPCP	Ocmulgee	Snapping Shoals Creek	3.0

Notes:

The acronyms listed above to describe the wastewater treatment facilities (WPCP, WRF, WPCP, WRC) were based on the name listed in the NPDES permit for each facility.

AWRF = Advanced Water Reclamation Facility
CCWSA = Cherokee County Water and Sewerage Authority
UWRF = Urban Water Reclamation Facility
WPCP = Water Pollution Control Plant
WRF = Water Reclamation Facility
WRC = Water Reclamation Center

Publicly owned facilities decommissioned during the last planning period (2016-2020) include the following:

- Forsyth County: Windermere WRF

Most treated wastewater from municipal facilities in the District is returned via discharge to surface waters. A small portion is discharged in LASs or directed to reuse applications. The discharge of treated wastewater is discussed further in Section 3.4.

3.3.2 Non-municipal Permitted Wastewater Facilities

In 2021, the District had 93 non-municipal (privately owned) wastewater treatment facilities in operation. The total permitted capacity of these facilities was 40.5 MGD. Table 3-8 lists the existing permitted non-municipal wastewater treatment by basin in the District. Some non-municipal facilities are LASs or decentralized systems and do not have permitted flow limits. The non-municipal wastewater permitted facilities located in the District include those owned by public school systems, industries, campgrounds, mobile home parks and residential developments. For the 93 non-municipal wastewater facilities located in the District, permitted capacity is distributed across several types of industrial and other users, as indicated on Figure 3-3.

Table 3-8 lists permitted non-municipal wastewater facilities that are permitted to discharge nutrients or oxygen demanding substances. Other non-municipal wastewater facilities operate in the District but do not discharge these substances.

Table 3-8. Total Non-municipal Permitted Wastewater Treatment Capacity in the District by River Basin

	2021	
River Basin	Permitted Capacity of Non-Municipal Facilities (MMF-MGD)*	Number of Non-Municipal Facilities
Chattahoochee	22.1	37
Coosa/Etowah	11.3	27
Flint	1.5	10
Ocmulgee	0.5	11
Oconee	5.1	8
Tallapoosa	0.0	0
Total	40.5	93

* The current permitted capacity as obtained from 2021 data requests and data provided by Georgia EPD.

Note:

This table lists permitted non-municipal wastewater facilities that are permitted to discharge nutrients or oxygen demanding substances. Other non-municipal wastewater facilities operate in the District but do not discharge these substances.

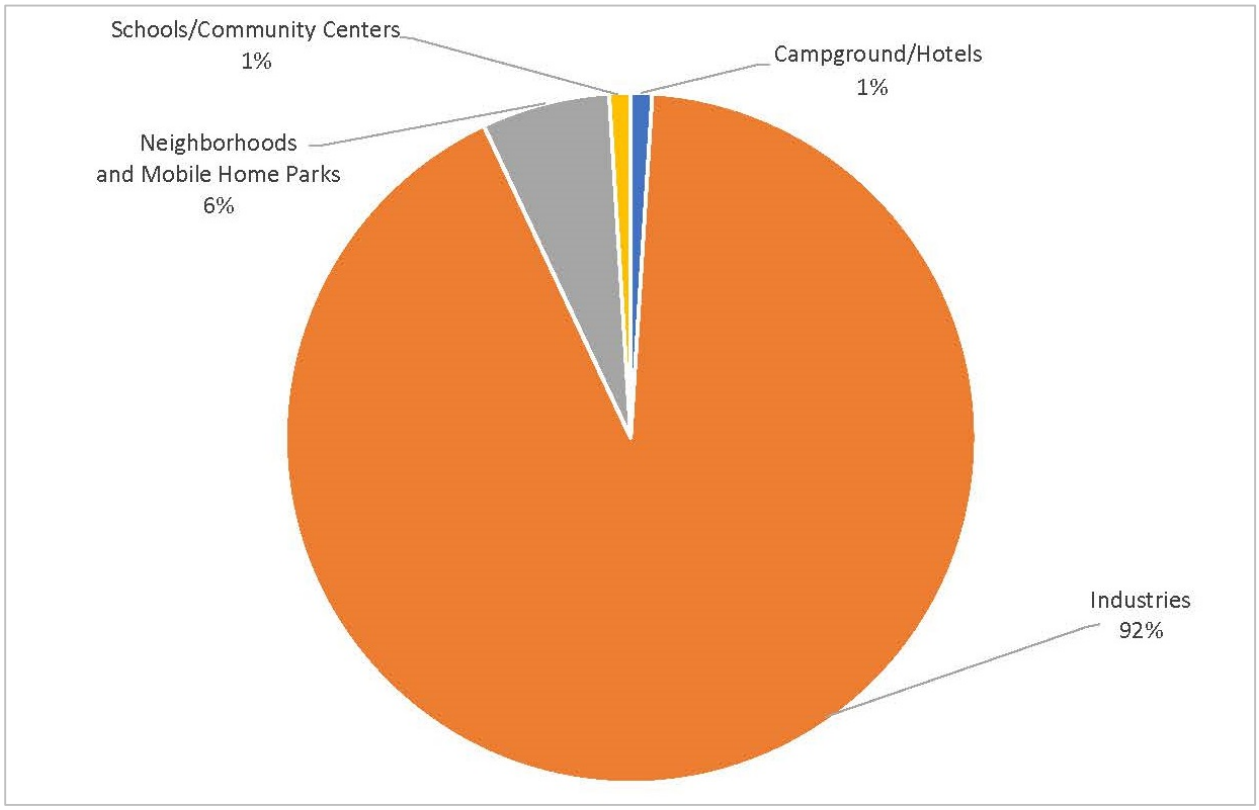


Figure 3-3. Non-Municipal Wastewater Facilities in the District - Permitted Capacity Distribution by Sector

3.3.3 Existing Septic System Use

Septic systems are designed and used to dispose of domestic sewage from individual households and small businesses in areas where public sewage collection and disposal may not be available. Septic systems are regulated by rules set by the Georgia Department of Public Health (GADPH) and administered by County Boards of Health (O.C.G.A. § 31-2A-11, Ga. Comp. R. & Regs. 511-3-1). In general, sewer is available within cities, or just outside city limit boundaries, and septic systems are typically used for less dense development located outside these areas. Septic systems sometimes are located within sewered areas where development has outpaced sewer extensions. According to GADPH, the longevity of a typical septic system depends on the following:

- Soil conditions on the site
- Installation and maintenance practices
- Volume and pattern of use
- Size of the system

Table 3-9 lists 2019 estimates of the number of septic systems for each county in the District based on data provided by GADPH.

The estimated septic flows were calculated using the baseline flows to septic systems from the water forecasts' indoor water use data component. The septic system use percentages obtained from 2019 data were applied to the baseline single-family residential indoor water use to obtain the current flow estimate on Figure 3-4. More information on the calculation of the baseline flows can be found in Section 4.

Total baseline flows to septic systems in the District are estimated to be 67.5 AADF-MGD. Thirty-three percent of the single-family residences in the District are served by septic systems. The estimated percentage of total single-family housing units served by septic systems (2019) is shown on Figure 3-4. This figure also shows estimated flows to septic systems in the region.

Table 3-9. Estimated Number of Existing Septic Systems in the District by County (2019)

County	Estimated Number of Septic Systems (2019)*
Bartow	23,864
Cherokee	40,808
Clayton	14,305
Cobb	34,668
Coweta	30,946
DeKalb	22,677
Douglas	19,397
Fayette	22,414
Forsyth	34,309
Fulton	28,802
Gwinnett	66,162
Hall	40,916
Henry	39,960
Paulding	35,479
Rockdale	15,973
District Total	470,680

* Data provided by GADPH for 2019. The total number of septic systems derives from a baseline 2007 estimate generated by Georgia EPD. The number of septic systems added per year after 2007 is calculated using GADPH inspection records for new systems.

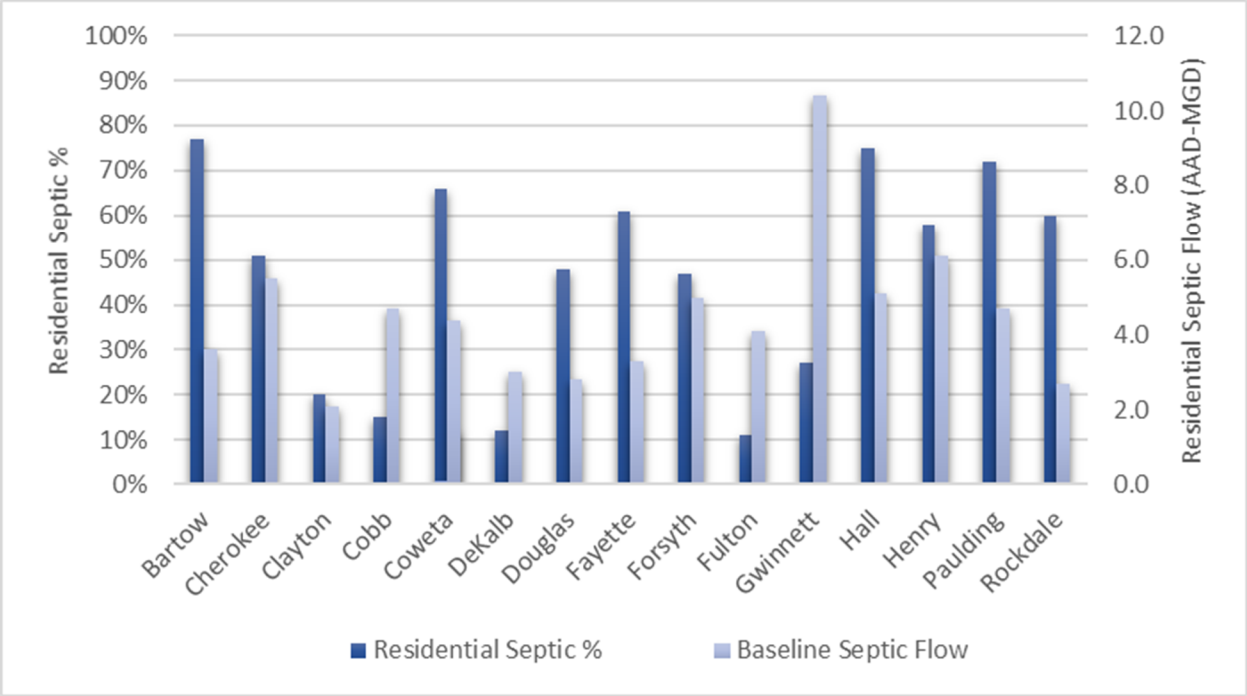


Figure 3-4. Estimated Percent of Single Family Residences with Septic Systems and Baseline Septic Flows in the District
The total number of single-family residences estimated for 2019 is derived from the U.S. Census Bureau, Five-Year American Community Survey.

3.4 Basin Return Flow Conditions

Reclaimed wastewater can be reused or discharged, and when discharged, it may be returned to the river basin from which it was withdrawn or it may be discharged to a different basin. Figure 3-5 shows the distribution of permitted flows of treated wastewater in the District to point source discharges, LASs, and general subsurface return. This figure includes treated wastewater flows from municipal and non-municipal treatment facilities but does not include flows from power generation facilities. In the District, most treated wastewater is returned to surface waters. This section further characterizes current reuse, return and interbasin transfer of water within the District.

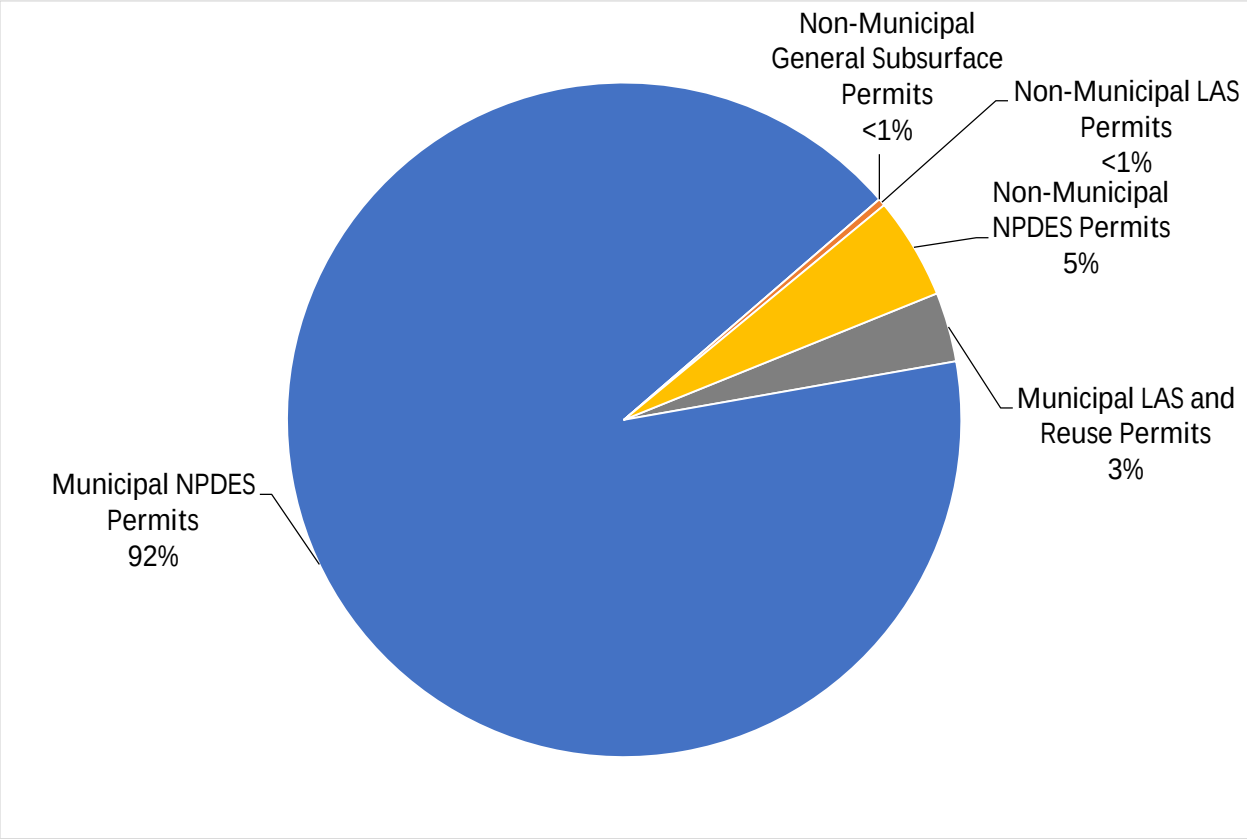


Figure 3-5. Permitted Capacity Distribution of Treated Wastewater Flows in the District (2019)
**Includes facilities solely permitted for LAS or reuse; does not include flow from facilities that are permitted for point source discharge that have a portion of flow dedicated for reuse*

3.4.1 Assumptions Regarding Septic and LAS Returns

In evaluating existing water uses, the District has historically adopted a conservative planning approach that assumes 100 percent of the water treated by septic systems or LASs is consumed through evaporation and transpiration. While debate continues regarding how much, if any, of these flows contribute to groundwater and streamflows, the District has assumed for planning purposes that no water treated by septic systems and LASs is returned to the environment or contributes to streamflows. Whether to continue these assumptions in future plan updates will be addressed during the relevant planning processes.

3.4.2 Reclaimed Water Reuse

Two types of reuse of reclaimed water are currently employed in the District: non-potable reuse and indirect potable reuse. The use of highly treated effluent for non-potable reuse and indirect potable

reuse plays an important role in sustaining the District's potable water supplies. The District's policy on the use of reclaimed water is explained further in Section 2.1.

Selected water reuse applications in the District are described in Table 3-10. Non-potable reuse is currently practiced in the District through irrigation with high quality treated effluent in unrestricted areas such as golf courses and parks. It can also be used as industrial process water like cooling towers as well as within buildings for toilets and urinals and for other purposes where the occupant does not have access to the plumbing.

Indirect potable reuse occurs on a large scale within the District, as returned water plays an important role in expanding available water supplies. For example, facilities in Fulton and Gwinnett Counties discharge upstream of water supply intakes operated by other jurisdictions. Planned indirect potable reuse, which returns reclaimed water to lakes or water bodies used for water supply, has also been instituted by a number of local wastewater providers. "Planned indirect potable reuse" is an industry recognized term meaning a purposeful or intentional strategy to sustain and expand water supply.

Table 3-10. Examples of Non-potable and Planned Indirect Potable Reuse in the District

Facility	Description
Non-potable Reuse	
Cherokee Rose Creek WPCP	The Cherokee County Water and Sewerage Authority owns this facility that is permitted to discharge 6 MGD to either the Towne Lake Golf Course or Allatoona Lake.
Johns Creek Environmental Campus	This Fulton County Department of Public Works facility is situated on 43 acres off Holcomb Bridge Road in the City of Roswell adjacent to the Chattahoochee River. It replaced the Johns Creek WRF and has a total capacity of 15 MGD with an outfall to the adjacent Chattahoochee River. The county provides reuse water to multiple golf courses in northern Fulton County.
Fowler WRF	This Forsyth County Water and Sewer Department facility has a current capacity of 4.75 MGD. Through a 12-mile reuse pipeline, the WRF currently provides reuse water to multiple schools, Sharon Springs Park, and St. Marlo Country Club.
Northwest Cobb WRF	The Northwest Cobb WRF conducts non-potable reuse. It is permitted to discharge 12 MGD to Allatoona Lake or direct a non-potable reuse side stream effluent to Cobblestone Golf Course, Acworth Sports Complex, and Kenworth Park for reuse as irrigation water. The treatment facility provides advanced nitrogen and phosphorus removal, filtration, and UV disinfection before discharge to Allatoona Lake.
Planned Indirect Potable Reuse	
F. Wayne Hill WRC	This Gwinnett County facility is a 60 MGD indirect potable reuse facility. The facility treats wastewater to extremely stringent levels and returns up to 40 MGD of flow to Lake Lanier, a primary source of drinking water for the District. This facility also has the capability to return 20 MGD to the Chattahoochee River via a 20-mile pipeline to a shared discharge with the Gwinnett Crooked Creek WRF, upstream of several drinking water intakes.
Noonday Creek WRF/Northwest Cobb WRF	Cobb County has two facilities that provide for indirect potable reuse through returns of highly treated wastewater to Allatoona Lake. The lake is a major water supply for portions of Cobb, Bartow, Paulding, and Cherokee Counties. The Noonday Creek WRF has a capacity of 20 MGD and it performs biological phosphorus removal, filtration, and UV disinfection before discharging to Noonday Creek, a tributary of Allatoona Lake. The Northwest Cobb WRF has a capacity of 12 MGD and provides advanced nitrogen and phosphorus removal, filtration, and UV disinfection before discharge to Allatoona Lake. Cobb County-Marietta Water Authority has contracted with the U.S. Army Corps of Engineers (Corps) for water supply storage in Allatoona Lake. Georgia EPD has exercised its authority to allocate the made inflows from both treatment facilities to Cobb County-Marietta Water Authority.

Table 3-10. Examples of Non-potable and Planned Indirect Potable Reuse in the District

Facility	Description
W.B. Casey and Shoal Creek WRFs	The Clayton County Water Authority practices indirect potable reuse at two water reclamation facilities. Both facilities discharge high quality effluent into constructed treatment wetlands for natural treatment prior to discharge into Clayton County Water Authority drinking water supply watersheds. During the 2007 drought, these two systems contributed to Clayton County Water Authority water reserves, which were maintained at or above 77 percent of full capacity. The W.B. Casey WRF provides advanced secondary level treatment for 24 MGD, of which 17.4 MGD can be pumped to the E.L. Huie Jr. constructed treatment wetlands. The Huie wetlands discharge to the Pates Creek watershed, which contains the Shamrock and Blalock reservoirs, which are drinking water supply sources for the county. The Shoal Creek WRF provides advanced secondary treatment with UV disinfection for 4.4 MGD with an average of 1.4 MGD of treated effluent pumped to the Panhandle constructed treatment wetlands. The Panhandle wetlands discharge to the Shoal Creek watershed, which contains both the Shoal Creek and the J.W. Smith reservoirs, additional drinking water supply sources for Clayton County.

In addition to the examples in Table 3-10, many other facilities in the District contribute to reclaimed water reuse, including:

- Canton WPCP
- Coweta County Shenandoah WPCP
- Douglas County Sweetwater Creek Sidestream Reuse Facility
- Peachtree City Larry B. Turner WRF and Rockaway WRF
- Forsyth County Dick Creek WRF and Manor Water Reuse Facility
- Fulton County Little River WRF
- Paulding County Pumpkinvine and Upper Sweetwater WRFs

For future expansions of non-potable and planned indirect potable reuse facilities and discharge locations, refer to Appendix B.

3.4.3 Existing Ridgeline Transfers

The water and wastewater systems in the District operate as an interconnected service network. As discussed below, due to the region's geography, a single water system frequently serves customers located in multiple river basins. As a result, water withdrawn from a water supply source that is in one river basin may be used and returned in another basin due to the ridgelines that cross the District. When this occurs, the wastewater may be discharged into another river basin due to the natural flow of gravity-fed sewer systems.

Prior District plans have described and quantified these uses as interbasin transfers. This approach has created confusion, however, because the transfers described above do not fit the common understanding of the term "interbasin transfers," which typically involve long distance transfers of water from one basin to another basin through man-made conveyance for water supply purposes (for example, interbasin transfers of water from the Colorado River). There are no long-distance interbasin transfers of this kind in the District, or in Georgia for that matter.

As noted above, however, the District does include a number of situations where water withdrawn from one basin is used, and then the resulting wastewater is treated and returned to a second basin. These situations are a function of the District's geographic position in the headwaters of six major river basins and the fact that most cities were established along the railroads lines that followed the ridgelines

between river basins, which bisect individual counties and service areas. Historically, assimilative capacity limitations in the Upper Flint River Basin also influenced wastewater treatment and return decisions, but with advancement in wastewater treatment technologies, both the 2017 Plan and this Plan prioritize returns to the Upper Flint Basin where feasible pursuant to Action Item Integrated -14. As a result, these transfers occur based on the historical placement and development of water supply and wastewater infrastructure, including gravity-fed sewer systems. These transfers are referred to in this section as Ridgeline Transfers. These Ridgeline Transfers still fall within Georgia EPD's definition of interbasin transfers in GA Rules and Regs 391-3-6-.07(2)(m) but referring to them as Ridgeline Transfers adds clarity for planning purposes by integrating both water and wastewater flows at the basin scale.

The historical development of water and wastewater infrastructure makes eliminating Ridgeline Transfers prohibitively expensive and unreasonable. Nevertheless, Ridgeline Transfers can inform planning related to wastewater treatment plant locations and capacity expansions, the handling of municipally sourced reuse water, and the use and location of municipally owned land application systems.

Planning decisions on Ridgeline Transfers must necessarily be made on a case-by-case basis. In some cases, changing existing wastewater collection systems and wastewater treatment plant locations would be prohibitively expensive and involve significant environmental impacts in terms of installing new pipelines and using energy for continuous pumping. These Ridgeline Transfers are also relatively small compared to overall water use and wastewater returns in the District. However, there may be strategic opportunities to wisely plan future wastewater collection and treatment infrastructure, where feasible, to limit or reduce Ridgeline Transfers from one river basin to another, and such feasible strategic opportunities may result in water quantity benefits for communities and the environment both within the District and downstream.

Table 3-11 and Figure 3-6 provide a summary of the municipal Ridgeline Transfers by Basin averaged across 2019 and 2020. The principles used for calculating Ridgeline Transfers are as follows:

1. Quantify annual flows from all water supply sources
2. Translate all flows to a percentage of water supplied by basin for each water provider
3. Organize all municipal wastewater treatment facilities by basin of discharge/reuse/LAS
4. Calculate the theoretical basin returns for all sources of wastewater as if all such wastewater was returned proportionally to the basins from which it was sourced
5. Compare theoretical wastewater to actual wastewater discharge/reuse/LAS
6. The difference between theoretical wastewater returns and actual treated wastewater returns is a Ridgeline Transfer

Table 3-11. Summary of Municipal Ridgeline Transfers by Basin for 2019 and 2020

River Basin	Transfers In (AADF-MGD)	Transfers Out (AADF-MGD)	Net (+/- AADF-MGD)*
Chattahoochee	18.5	50.1	-31.6
Coosa	1.7	17.6	-15.9
Flint	2.5	7.5	-5.0
Ocmulgee	57.7	0.3	57.5
Oconee	0.3	0.0	0.3
Tallapoosa	0.0	0.4	-0.4

* +/- indicates cumulative gain and cumulative loss

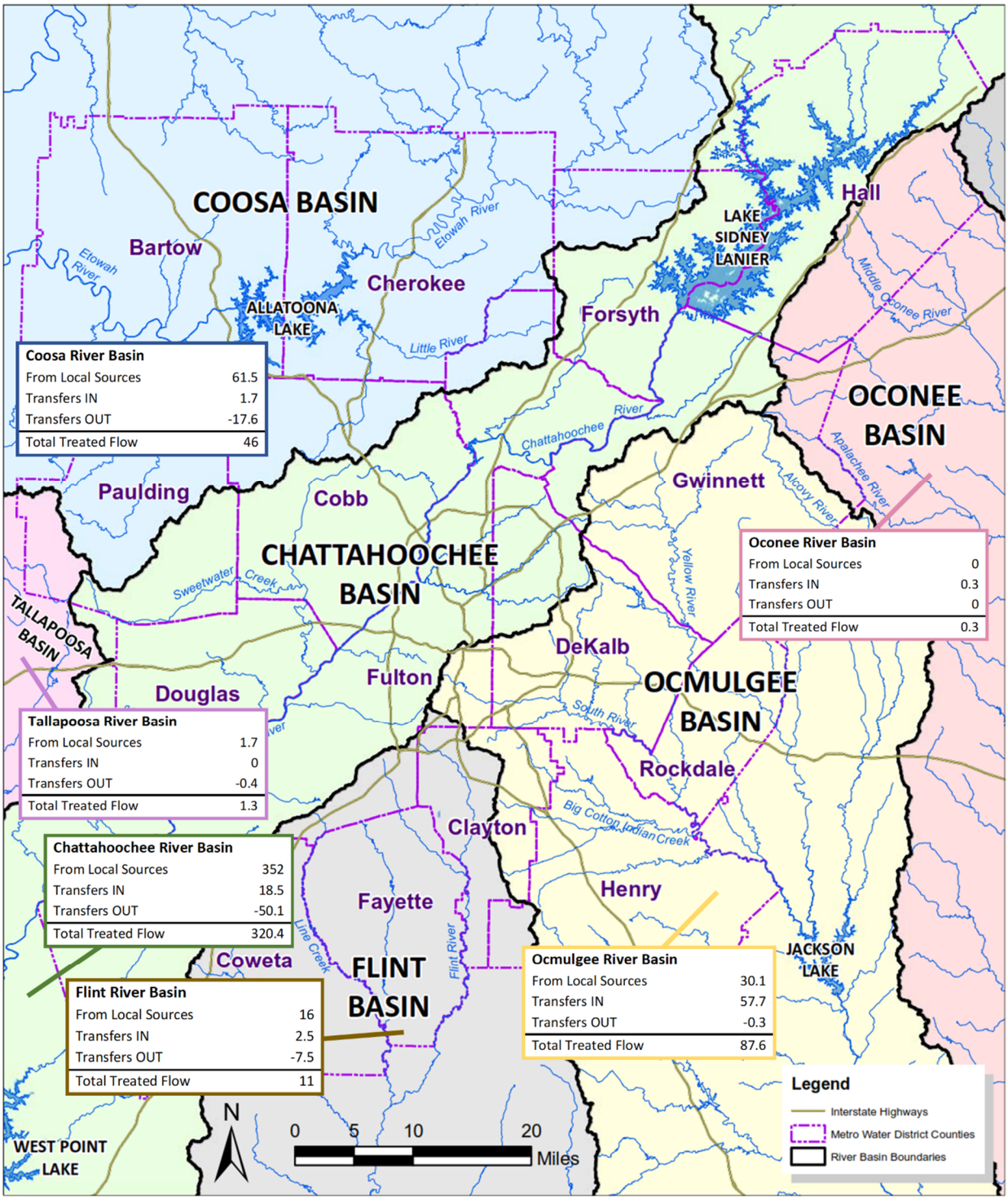


Figure 3-6. Summary of Municipal Ridgeline Transfers by Basin for 2019 and 2020
Values are in AADF-MGD

3.5 Watershed Development and Stormwater Management

Since the original 2003 Plan, the District has worked to protect watershed conditions and manage stormwater in coordination with existing State regulatory frameworks. Previous versions of the Plan have described watershed and stormwater management in terms of land development, imperviousness, water quality impairment and population growth. All of these factors should be considered as part of a robust watershed and stormwater management program. Despite planning that incorporates these factors and implementation of watershed action items over the last 20 years, urban stormwater runoff remains a leading cause of nonpoint source pollution in the District (Georgia EPD, 2020), leaving watershed managers with ongoing stormwater management challenges.

Given these challenges, the District developed a new water quantity-based indicator called the Stormwater Forecast (Forecast) to reframe stormwater and watershed planning for the 2022 Plan. The Forecast provides a top-down planning-level estimate of the total potential runoff management volume from development, calculated at a basin scale using individual watershed characteristics. Existing conditions described in this section relate to the stormwater and watershed parameters used to develop the Forecast. The full Forecast, including future 2030 and 2040 conditions, is provided in Section 4.5.

The objectives of the Forecast are to expand the District's focus beyond water quality for stormwater management solutions by developing a new water-quantity based indicator and to better connect water quantity management at both the site scale and basin scale. Reframing the District's focus on water quantity may also bring new stakeholders together (that is, public and private; industrial and residential) around a metric that is more easily understood.

3.5.1 Existing Conditions

Discussion of watershed development and stormwater management conditions in this section will be outlined following the parameters in the Forecast. Runoff from developed land is the focus of the Forecast, because of the link between development patterns and watershed impacts. Additionally, post-construction stormwater management systems are designed to mitigate impacts from development and are rarely designed for non-developed land cover types. Based on the most current (2019) National Landcover Data Set, the total area of the District is 3,153,984 acres, and the developed area within the District is 1,226,375 acres, or almost 39 percent of the total area. Current land use for the total area of the District is provided in both figure and table format in the Land Cover/Land Use section of each River Basin Profile in Appendix A of this Plan. This section will primarily focus on the current characteristics of the developed acres within the District, which were used to calculate the Forecast.

Based on the Forecast analysis, development patterns in the District over the past century have resulted in substantial changes to watershed characteristics. The effects of development on stream ecosystems are largely driven by impervious cover. There are two ways to quantify impervious cover: total imperviousness (all impervious area in a watershed) and effective imperviousness (impervious area in a watershed that is directly connected to stream channels) (EPA, 2017). Because of the input requirements used to calculate post-construction stormwater management volume, the Forecast analysis used total imperviousness. For the predevelopment scenario, the land cover was assumed to be dominated by forest with an average imperviousness of 1.0 percent. For simple comparison purposes, the area evaluated for the predevelopment scenario was assumed to be the same as the 2019 present-day developed area. In the 2019 scenario, total imperviousness within developed areas was calculated to be 33.4 percent on average District-wide.

The principal physical watershed characteristics affecting the relationship between rainfall and runoff are land use, land treatment, soil types and slope. Soil properties influence the relationship between runoff and rainfall since soils have differing rates of infiltration. Stormwater runoff peak rates and hydrographs for routing stormwater flows can be estimated using the Natural Resources Conservation Service (NRCS) TR-55 hydrologic method. The NRCS TR-55 method uses a combination of soil conditions and land cover (e.g., forested or developed) to assign a runoff factor to an area. These runoff factors, called runoff curve numbers (CNs), indicate the runoff potential of an area. The higher the CN, the higher the runoff potential. For example, impervious areas such as paved parking lots, roofs and driveways have a curve number of 98 out of 100. By contrast, forest in good condition can have a CN between 30 and 77 (based on the soil type) because the potential for runoff for this type of land cover is lower. In the Forecast, the District estimated a predevelopment weighted CN value of 60. As the region began to grow more urban and developed, the weighted CN value increased to 81 by 2019 within developed areas. In addition, slope within the District was calculated for the present-day 2019 condition using U.S. Geological Survey (USGS) Digital Elevation Models. The same slope was also used for the predevelopment condition. The weighted-area average slope for the District was 8.3 percent within developed areas. A summary of the District-wide watershed characteristics within developed areas is presented in Table 3-12.

Table 3-12. District-wide Watershed Characteristics within Developed Areas

	Predevelopment	2019
Total Area (acres)	3,153,984	3,153,984
Developed Area (acres)	1,226,375*	1,226,375
Total Imperviousness (percent)	1.0	33.4
CN	60	81
Slope (percent)	8.3	8.3

* For simple comparison purposes, the area evaluated for the predevelopment scenario was assumed to be the same as the 2019 developed area.

Rainfall is another important element of the Forecast. Specific storm events were selected for analysis that equate to the three post-construction stormwater performance standards from the Georgia Stormwater Management Manual (GSMM) (ARC, 2016): Water Quality Volume (WQv) (85th percentile annual storm event); Channel Protection Volume (CPv) (1-year, 24-hour storm event); and the Overbank Flood Protection Volume (OFPv) (25-year, 24-hour storm event). These standards were selected because they are required for new site development and redevelopment, and they correspond to storm events reported to have the greatest impacts to water quality, streambank erosion, and nuisance flooding. A summary of the existing conditions (2019) District-wide rainfall is presented in Table 3-13. These rainfall depths were also assumed for the predevelopment condition.

Table 3-13. Existing District-wide Rainfall Depths

Storm Event	Performance Standard	Rainfall (inches)
85th Percentile Annual Rainfall	WQv	1.20
1-Year, 24-Hour Rainfall	CPv	3.34
25-Year, 24-Hour Rainfall	OFPv	6.12

Source: NOAA Atlas 14 (NOAA, 2013)

The existing conditions detailed in this section provide the foundation for the Forecast, a planning-level estimate of runoff from all developed lands that have the potential to be managed by stormwater control measures (for example, detention ponds or bioretention basins). These volumes have been calculated for predevelopment, current (2019), and future (2030 and 2040) scenarios and are provided in Section 4.5. Additional information about existing watershed conditions that were not incorporated into the Forecast, such as water quality, protected aquatic species and drinking water supply, are described by river basin in Appendix A of the Plan.

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SECTION 4

Future Conditions



Developing a long-term water resources management plan requires projecting forward from baseline conditions to envision the region's future water resources management needs. This section describes the water demand and wastewater flow forecasts for the District. These forecasts are based on population and employment projections for the region. This section also includes the District's new stormwater forecast, which is a planning-level estimate of the total potential runoff volume from development, calculated at the basin scale using site-scale post-construction stormwater performance standards.

4.1 Forecast Horizon

As part of this Plan Update, the District developed forecasts for water resources infrastructure needs through the year 2040. While the District utilized a planning year of 2050 for the 2017 Plan Update, the forecast horizon was reduced to account for how utilities utilize the plan to develop local master plans and how they implement infrastructure capital spending. The planning horizon was also reduced to better align with Georgia EPD's evaluation process for permit needs in the nearer term.

Because there is significant cost and time needed to develop new water sources, however, communities may wish to consider water supply planning beyond the 2040 horizon. To initiate the consideration of longer-term supplies, water demand forecasts for the year 2060 are also provided in Section 4.3.2. This 2060 forecast also aligns with the water and wastewater forecasts developed for the ten state regional water planning councils.

4.2 Population and Employment Projections

For this Plan Update, the District used three sets of population projections, presented in Table 4-1, to forecast future water and wastewater demands:

1. ARC Series 16 Population Projections, adopted in February 2020
2. Georgia Governor's Office of Planning and Budget (OPB) Series 2020 Population Projections, Medium Projections
3. OPB Series 2020 Population Projections, High Projections

ARC population projections were prepared by ARC's Research and Analytics Division (RAD) through 2050 as part of ARC's ongoing work efforts. The projections were extended by RAD through 2060 for use by the District as part of the 2022 Plan Update. ARC provided county-level population and employment projections that were calculated using a Regional Econometric Models Inc. (REMI) econometric model. County-level population projections were reviewed by jurisdictions and adjusted to account for factors driving future growth that are not captured by the REMI model.

OPB population projections were prepared in 2020 by the University of Georgia's Carl Vinson Institute of Government using a traditional population cohort-component model. OPB provided three growth scenarios: Low, Medium and High. For water supply and wastewater planning purposes, all OPB projections were evaluated, but only the medium and high scenarios were selected during this forecasting analysis.

Table 4-1. Population Projections by County

	ARC Population Projection				OPB Mid Population Projections				OPB High Population Projections			
County	2030	2040	2050	2060	2030	2040	2050	2060	2030	2040	2050	2060
Bartow	138,690	153,549	164,928	172,383	123,958	136,790	147,575	159,552	126,644	141,041	153,144	166,744
Cherokee	313,128	348,813	374,821	397,956	283,999	307,551	331,424	359,519	308,124	348,465	396,995	462,694
Clayton	331,474	360,641	393,005	398,661	372,121	437,299	497,305	556,707	406,576	502,809	614,152	762,682
Cobb	892,066	966,489	1,035,796	1,189,017	855,869	924,679	963,134	991,938	890,171	981,357	1,042,374	1,096,532
Coweta	180,957	201,129	215,037	223,397	181,836	211,755	238,843	268,496	189,442	224,105	255,714	290,192
DeKalb	889,371	941,158	1,012,022	1,120,145	871,576	931,703	969,836	1,000,980	934,234	1,038,759	1,128,982	1,232,962
Douglas	165,194	180,148	192,481	206,268	163,785	176,764	184,273	190,122	177,317	198,749	214,996	230,966
Fayette	132,514	144,328	147,415	155,619	133,022	148,085	163,100	179,341	141,123	161,458	181,961	204,545
Forsyth	313,730	383,673	440,353	460,809	334,204	418,482	544,518	712,024	361,077	460,192	622,000	864,483
Fulton	1,250,822	1,353,425	1,473,300	1,625,090	1,216,292	1,325,885	1,403,472	1,455,566	1,252,528	1,384,937	1,484,617	1,559,755
Gwinnett	1,172,752	1,332,037	1,484,742	1,529,276	1,111,684	1,258,088	1,378,932	1,485,714	1,148,168	1,319,119	1,464,530	1,598,493
Hall	236,057	259,730	282,080	298,248	237,080	263,894	288,501	313,204	250,471	284,625	316,260	348,420
Henry	295,688	338,799	370,445	361,305	283,152	326,914	367,751	412,203	296,475	348,682	398,041	451,466
Paulding	202,162	229,977	253,174	286,537	217,702	268,329	330,941	400,510	237,011	292,108	373,449	489,589
Rockdale	100,001	106,929	112,928	121,762	100,859	108,009	113,914	120,509	105,418	115,730	126,733	142,094
Total	6,614,606	7,300,825	7,952,527	8,546,473	6,487,139	7,244,227	7,923,519	8,606,385	6,824,779	7,802,136	8,773,948	9,901,617

The ARC and OPB forecasts are separate and independent projections of future population for each county in the District. These independent projections were derived using different methodologies. The District developed projected water demand and wastewater flows using OPB and ARC projection scenarios in order to improve forecast reliability. The water demand and wastewater flow forecasts are described in Sections 4.3 and 4.4.

The ARC and OPB forecasts were prepared before the 2020 population data were available from the U.S. Census Bureau's decennial census. When the decennial census data became available, it was compared to the starting population numbers used in the ARC and OPB projections to determine if any adjustments were needed. The census population was slightly lower than the projected 2020 population projections, 3 percent for ARC population and 0.1 percent for OPB projections. Adjustments were not deemed necessary.

4.3 Water Demand Forecasts

For each county, water demand projections were updated through the year 2060 based upon the population projections produced in 2020 as well as recent water system withdrawal data for the period from 2015 through 2019. These inputs were used to update the 2017 Plan Update water demand projections, as follows:

- The water demand per capita trend was calculated using the 2017 forecasting models developed for each county. As described in Section 4 of the 2017 Plan, the Maddaus Decision Support System Model (DSS model) used population and employment projections for each county to calculate future water demands for each customer service category (residential, commercial, industrial, institutional, etc.) as well as non-revenue water (NRW). For this 2022 Plan Update, the total projected water use for each county was then divided by the 2017 population projections to produce a *2017 per capita water demand trend* for each county. The per capita water demand trends are based upon the enhanced efficiency results and take into consideration fixture replacement and water efficiency and conservation.
- Actual water withdrawals provided by the water suppliers from 2015 through 2019 were then evaluated against the projections for those same years in the 2017 water demand forecast. For 12 of the 15 counties, it was determined that the actual water withdrawals were similar to the projections provided in the 2017 Plan Update.
- For those 12 counties, a new water demand forecast was calculated utilizing the 2020 population projections (as presented in Section 4.2) along with the 2017 per capita water demand trends. New demands were forecast for each of the three population scenarios: ARC, OPB High and OPB Mid.
- In three counties – Bartow, Clayton, and Hall – actual water demands over recent years varied from their 2017 projected water demand.
  - In Bartow County, water supply demands were reduced from those in the 2017 Plan due to the termination of a large, planned amusement park along with corresponding hotels and commercial development. This decrease was accounted for in the State of Georgia's 2018 Water Supply Request to the Corps for a water supply reallocation in Allatoona. It should be noted that the City of Cartersville in Bartow County contracts with Anheuser-Busch to supply up to 5 MGD of water. Given the nature of its agreement with Anheuser-Busch, this contracted amount is included in future water demand projections even though recent usage amounts by Anheuser-Busch have been lower.
  - Because the majority of Hall County's water use is in the industrial sector, population trends do not adequately capture water demand projections for the county. Therefore, a new industrial

category had been added to the 2017 Plan Update. These new industrial demands did not develop in the period from 2015 to 2019, so the new demand was delayed until later in the planning horizon.

  - In Clayton County, a new commercial category was added in 2017 based upon projected new growth in the county. Because this new commercial growth did not develop in the years 2015 to 2019, this category was removed as part of the 2022 projections, decreasing the per capita water demand.
  - In all three cases, the per capita water demand trend remained the same as in the 2017 Plan Update; the starting point was just adjusted higher or lower.

- Finally, the uncertainty factor calculated during the 2017 Plan was applied to the 2022 water demand projections for each individual county.

For each county, one of the projections for the 2040 water demand forecast (ARC or OPB) was selected to evaluate future infrastructure needs. This selection was based upon a review with the water suppliers within each County. In some cases, the highest of the water demand projections was used for water supply and infrastructure planning. In other cases, a lower forecast was selected based on the population trends shown. For 2060, water demand is based on the ARC and one of the OPB projections (Medium or High). Both water demand projections are shown to provide a range of the potential future water supply needs.

Further information outlining the process of developing 2017 water demands is provided in the 2017 Plan Update report, Section 4. Specific updates prepared as part of the 2022 Plan Update are provided below.

4.3.1 Water System Data Collection

Water use data were obtained from local water providers in the District for the period from 2015 through 2019 to assess current trends in the District since the 2017 forecast. These data included customer billing by customer category, water withdrawals, water production, water loss audits, maximum day demands, records of abnormal years and planning documents, if available. This information was used to determine what, if any, modifications would be necessary for the 2022 forecast effort. The modifications to baseline assumptions are referenced above in Section 4.3. The 2017 baseline water use profiles can be found in the 2017 Plan Update, Section 4.

4.3.2 Water Demand Forecasts

Using the methods described above and in the 2017 Plan Update, water demand forecasts were generated for the District through 2060. Table 4-2 presents the county-level water demand forecasts. The forecasts are reported in terms of AADF-MGD basis.

As discussed in Section 4.2, the water demand forecast scenarios are based on three different population projections: ARC, OPB Medium, and OPB High. The 2040 water demand forecast provides only the chosen projection. The 2060 water demand forecast lists two projections (ARC and OPB) to allow for a greater range in future water supply planning.

Table 4-2. Water Demand Forecasts for the District

County	2040 Water Demand (AADF-MGD)[a]	2060 Water Supply Need (AADF-MGD)[b]	
		ARC Projection	OPB Projection
Bartow (OPB MID)	28.5	38.4	35.6
Cherokee (OPB HI)	28.1	31.6	36.8
Clayton (ARC)	32.5	36.0	50.2
Cobb (OPB MID)	93.3	122.0	101.8
Coweta (OPB HI)	20.7	21.0	27.3
DeKalb (OPB MID)	94.4	114.0	101.9
Douglas (OPB HI)	17.4	18.2	20.3
Fayette (OPB MID)	16.4	17.8	20.5
Forsyth (OPB MID)	41.4	47.2	72.9
Fulton (OPB HI)	192.0	230.5	221.3
Gwinnett (OPB HI)	121.6	141.0	147.4
Hall (OPB HI)	30.1	35.8	39.4
Henry (OPB MID)	34.3	38.2	43.8
Paulding (OPB MID)	21.3	22.6	31.5
Rockdale (OPB HI)	16.8	17.8	20.8
District Total	788.8	932.1	971.5

[a] The 2040 water demand forecast lists only the chosen projection, which is listed by the county's name.
[b] The 2060 water demand forecast lists two projections (ARC and OPB) to allow for a greater range in future water supply planning. For the OPB projection, the chosen projection is listed by the county's name. Clayton County used OPB MID.

4.3.3 Water Residuals Production Forecasts

This subsection presents forecasts of water treatment residuals production for District counties through 2040. Baseline residuals production is estimated to be 21.5 thousand dry tons per year based on information provided by District utilities. The projected production for 2040 District residuals production is 30.8 thousand dry tons per year, which corresponds to an increase over current production of 43 percent.

4.3.3.1 Data Sources

Baseline residuals production figures were compiled and, in some cases, estimated based on information provided by District utilities for the 2022 Plan. Data on residuals production was provided by 17 of the District's 39 water centralized treatment facilities and these facilities provided approximately 85 percent of centralized water production in the District. For other facilities, residuals production was estimated based on treated water production and raw water turbidity data. Production rates ranged from less than 0.05 dry ton per MG for treatment facilities with low-turbidity raw water and low levels of chemical coagulant addition to more than 0.2 dry ton per MG for facilities with higher-turbidity raw water and the need for more chemical coagulant addition.

4.3.3.2 Methods

The forecast for 2040 is based on residuals production remaining the same in terms of dry tons per MG and total production increasing in proportion to the projected water production increases from Section 4.3.

4.3.3.3 Residuals Forecasts

The resulting residuals production forecasts for the District and constituent counties are provided in Table 4-3.

Table 4-3. Water Treatment Residuals Production Forecast through 2040

County	Baseline Residuals Production (dry tons per year)	Projected 2040 Residuals Production (dry tons per year)
Bartow	340	680
Cherokee	1,590	2,170
Clayton	1,980	2,830
Cobb	3,930	4,310
Coweta	230	510
DeKalb	2,880	3,810
Douglas	620	910
Fayette	430	660
Forsyth	480	830
Fulton	6,190	8,890
Gwinnett	410	670
Hall	1,230	1,910
Henry	750	1,250
Paulding*	-	780
Rockdale	430	550
District Total	21,490	30,760

* Paulding County will transition from a 100 percent purchased water system to a self-supplied system between the baseline condition and 2040 projection.

4.4 Wastewater Forecasts

This section explains the methods used to develop the wastewater flow forecasts for the District, and it provides the wastewater flow forecasts for the region through 2040. In summary, in 2040, the District will generate 586.5 MGD that will be treated in centralized wastewater systems and 76.5 MGD to be treated by septic systems on an AADF basis. The AADF volume for centralized systems is equivalent to a maximum monthly flow of 732.9 MGD. Data from 2019 show actual discharge flows totaling 440 MGD (AADF) for centralized systems in the District.

4.4.1 Methods

The wastewater flow calculation methods used for this Plan are illustrated on Figure 4-1. Each of the components on the figure is described in the following subsections. These methods were used to project flow to central wastewater collection and treatment systems and septic systems. The wastewater flow forecasts were calculated using the water use forecasts as a starting point.

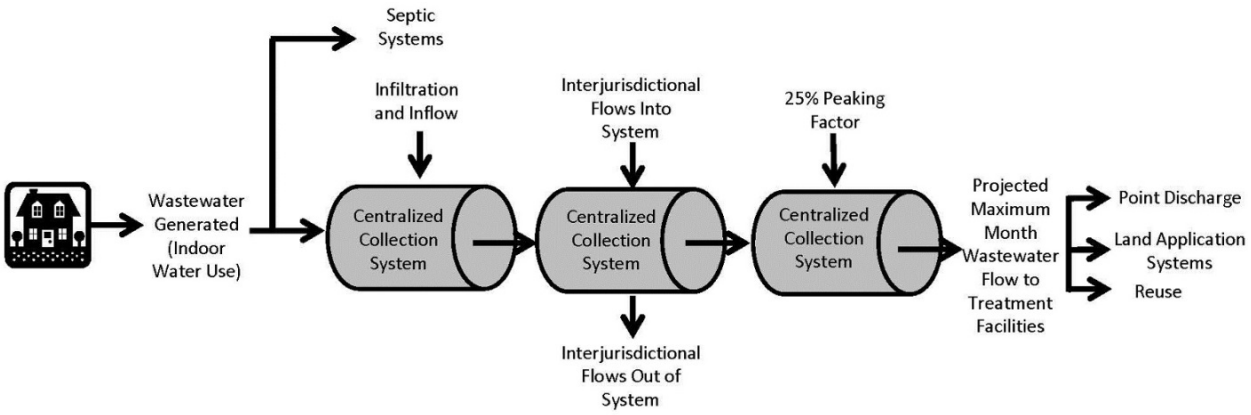


Figure 4-1. Wastewater Flow Calculation

4.4.1.1 Wastewater Generated

Because outdoor water use does not enter the wastewater collection system, the starting point for the wastewater forecasts are the indoor water use forecasts (residential and non-residential) calculated by the DSS Model and described in Section 4.2. The same uncertainty factors that were applied to the overall water use projections were applied to the indoor water use projections for each planning year. The estimates of wastewater flow generated are projected as AADF flows, which are adjusted for peak flows as described below.

4.4.1.2 Septic Systems

Wastewater is discharged to either septic systems or centralized wastewater collection systems. Septic system flows were calculated and subtracted to determine the flow into wastewater collection systems.

To estimate the future septic system flows in each county, the current percentage of single-family residences using septic systems was calculated by dividing the total estimated number of septic systems by the total number of single-family residences in the county. The estimated number of septic systems was based on data from the GADPH, and current estimates of septic system flows are provided in Section 4.3.2. The number of single-family residences was based on U.S. Census data.

The septic system projections were based on historical trends for new construction of single-family homes on septic systems between 2015 to 2019. The projections assumed the recent trends would continue through the forecast period for all counties except Gwinnett and Henry where local utilities provided specific feedback regarding sewerage plans in their service areas.

4.4.1.3 Infiltration and Inflow

Once the total flow entering the wastewater collection system was estimated, an infiltration and inflow factor was added to that flow to account for water entering the collection system from groundwater and stormwater. County-specific infiltration and inflow factors were gathered based on flow data and feedback from District utilities. The county input was reviewed, and forecasts were aligned with the trend line of historical flow data from 2015 to 2019 to estimate the final county-specific infiltration and inflow factors, which were then applied to the county-level wastewater forecasts.

4.4.1.4 Interjurisdictional Flow

Next, the centralized system wastewater flow was adjusted to account for incoming and outgoing interjurisdictional flow. Data on interjurisdictional flow were obtained from District utilities. Historical flows across county lines were gathered for 2015 to 2019. The average of the historical flow data was used as the starting point for each 2019 county-to-county interconnection flow estimate. Each

county-to-county interconnection was then forecasted through the planning period based on the growth rate of total county flow in the originating county and anticipated flow changes provided by utilities. Intercounty flows were added to or subtracted from each county's wastewater projections to account for flow entering or leaving each county. In instances where county-to-county agreements include a maximum capacity limit, interjurisdictional flows were capped at that maximum value.

4.4.1.5 Peaking Factor

Because wastewater treatment facilities are permitted on a maximum month average daily flow (MMF) basis, it was necessary to add a peaking factor to the AADF that was calculated to account for the additional flow received under MMF conditions. Historically, the District's wastewater forecasts have added a standard 25 percent peaking factor to project MMF flow entering the county's wastewater treatment facilities. For the 2022 Plan Update, to verify this number, maximum month peaking factors were calculated for each publicly owned wastewater treatment facility using data provided by the individual utilities. Expected trends were generally demonstrated District-wide, with smaller plants having higher peaking factors and larger plants having lower peaking factors. A review of the calculated results indicated that 25 percent is reasonably representative as a districtwide peaking factor estimate, and therefore, this factor was used for all wastewater flow forecasts for the District.

4.4.2 Septic System Use Forecasts

The resulting forecasts for wastewater flows to septic systems in the District are provided in Table 4-4. By 2040, the flow to septic systems is projected to be 12 percent of the overall wastewater generated within the District.

Table 4-4. Forecasted Septic System Flows by County (AADF-MGD)

County	2040 Septic System Flow (AADF-MGD)
Bartow	4.5
Cherokee	6.1
Clayton	2.2
Cobb	4.9
Coweta	6.4
DeKalb	3.0
Douglas	3.1
Fayette	4.3
Forsyth	5.5
Fulton	4.7
Gwinnett	11.3
Hall	6.4
Henry	6.1
Paulding	4.9
Rockdale	3.1
District Total	76.5

4.4.3 Wastewater Flows Forecasts

The resulting wastewater flow forecasts for centralized wastewater systems in the District are provided in Table 4-5. Table 4-5 provides county-level projections of AADFs and MMFs in MGD for centralized wastewater systems in 2040. The facilities that will treat this wastewater in the future are described in more detail in the county-level summaries in Appendix B of this Plan.

Table 4-5. Wastewater Flow Forecasts for Centralized Wastewater Treatment Facilities

County	2040 Centralized Wastewater Treatment System Flows (AADF-MGD)	2040 Centralized Wastewater Treatment System Flows (MMF-MGD)
Bartow	13.4	16.8
Cherokee	15.8	19.7
Clayton	27.5	34.3
Cobb	83.0	103.7
Coweta	9.3	11.6
DeKalb	85.2	106.5
Douglas	9.9	12.4
Fayette	7.4	9.3
Forsyth	19.3	24.1
Fulton	180.4	225.5
Gwinnett	84.3	105.3
Hall	18.1	22.6
Henry	15.3	19.1
Paulding	9.4	11.8
Rockdale	8.2	10.2
District Total	586.5	732.9

4.4.4 Septic System Impact to Wastewater Treatment Facilities

While septic system flows are not directly treated by the local wastewater treatment facilities, the septage that is pumped from septic systems should be considered in future treatment facility sizing. Septage is stronger than traditional wastewater influent; specifically, it has a higher total suspended solid and biological oxygen demand load on receiving wastewater treatment facilities. If septage is illegally disposed of in storm sewers, sanitary sewers or water bodies, it negatively impacts local water quality and can disrupt operations at wastewater treatment facilities. To minimize illegal dumping, it is essential that communities and wastewater providers maintain a plan for proper septage disposal when determining future areas to be served by septic and consider pricing strategies that incentivize the proper disposal of septage (INTEGRATED-10).

4.4.5 Wastewater Biosolids Production Forecasts

This subsection presents forecasts of wastewater treatment biosolids production for District counties through 2040. Baseline biosolids production is estimated to be 142 thousand dry tons per year. Low and high forecasts were developed based on differing assumptions regarding prevailing phosphorus removal requirements in 2040. The projected range for 2040 District biosolids production is 195 to 219 thousand dry tons per year, which corresponds to an increase over current production of 37 to 54 percent.

4.4.5.1 Data Sources

Baseline biosolids production figures were compiled from the Georgia Association of Water Professionals (GAWP) survey of 2018 Georgia biosolids production and from EPA's ECHO database. Data was available from these sources for 64 of the District's 79 wastewater treatment facilities and the facilities with available data receive approximately 98 percent of wastewater flows to centralized facilities in the District. Data indicated that District counties fell within an anticipated range of biosolids production per MG with the lowest production rates corresponding to anticipated production for relatively weak influent waste streams (about 0.5 dry tons/MG) and the highest corresponding to anticipated production for relatively strong waste streams (about 1.5 dry tons/MG).

4.4.5.2 Methods

The low forecast for 2040 is based on biosolids production remaining the same in terms of dry tons per MG and total production increasing in proportion to the projected wastewater flow increases from Section 4.5. The high forecast was based on implementation of more stringent effluent phosphorus limits in the District. On a facility-by-facility basis the high forecast was estimated based on a scenario of transitioning from current phosphorus limits to a limit of 0.1 mg/L. Additional production for this scenario ranged from zero for facilities already at or below a 0.1-mg/L limit up to 0.47 dry ton per MG for facilities not currently designed to remove phosphorus.

4.4.5.3 Biosolids Forecasts

The resulting biosolids production forecasts for the District and constituent counties are provided in Table 4-6.

Table 4-6. Biosolids Production Forecast through 2040

County	Baseline Biosolids Production (dry tons/year)	Projected 2040 Biosolids Production (dry tons/year)	
		Low Forecast	High Forecast
Bartow	1,400	2,100	4,200
Cherokee	5,700	7,800	8,100
Clayton	5,900	7,500	8,200
Cobb	29,700	39,900	42,700
Coweta	1,400	2,700	3,600
DeKalb	20,600	30,900	32,000
Douglas	1,400	1,400	1,800
Fayette	1,300	1,500	2,800
Forsyth	1,800	4,600	6,100
Fulton	47,100	57,500	66,800
Gwinnett	14,100	20,300	21,200
Hall	5,900	9,600	10,000
Henry	1,800	2,700	4,800
Paulding	1,600	2,400	3,000
Rockdale	2,700	3,600	3,700
District Total	142,400	194,500	219,000

4.5 Stormwater Forecast

For the first time in this Plan, the District has developed a new water quantity-based indicator called the Stormwater Forecast (Forecast) to reframe stormwater and watershed planning. The Forecast provides a top-down planning-level estimate of the total potential runoff management volume from development, calculated at a basin scale using individual watershed characteristics. Undeveloped lands (such as forested or agricultural) were excluded because post-construction stormwater practices are rarely designed for undeveloped land cover types. The Forecast estimates the potential runoff management volume for four scenarios: a predevelopment scenario, 2019 (present day), 2030 (future), and 2040 (future). For each scenario possible, the Forecast estimates the total potential runoff management volume from development using three post-construction stormwater performance standards from the Georgia Stormwater Management Manual (GSMM) (ARC, 2016): Water Quality Volume (WQv) (85th percentile annual storm event); Channel Protection Volume (CPv) (1-year, 24-hour storm event); and the Overbank Flood Protection Volume (OFPv) (25-year, 24-hour storm event). These standards were selected because they are required for new site development and redevelopment, and they correspond to storm events reported to have the greatest impacts on water quality, streambank erosion, and nuisance flooding.

4.5.1 Methods

The Forecast was developed using runoff management volume calculation methods presented in Volume 2, Section 3 of the GSMM. The approach applied standard watershed hydrology and site-scale Structural Control Measure (SCM) sizing methods for estimating total potential runoff management volumes at the basin scale. The site-scale facility design methods were used to support the conversion of Forecast results to basin scale estimates of the total potential runoff management volume from development that may be managed by SCMs. As stated in Section 3, the Forecast estimates total potential runoff management volume for four different development scenarios: predevelopment, 2019, 2030, and 2040 and, when possible, for three post-construction stormwater performance standards (WQv, CPv, and OFPv). Spatial calculations were conducted using Esri ArcGIS software and numerical calculations were performed using spreadsheet methods. A process diagram of the technical approach is presented in Figure 4-2.

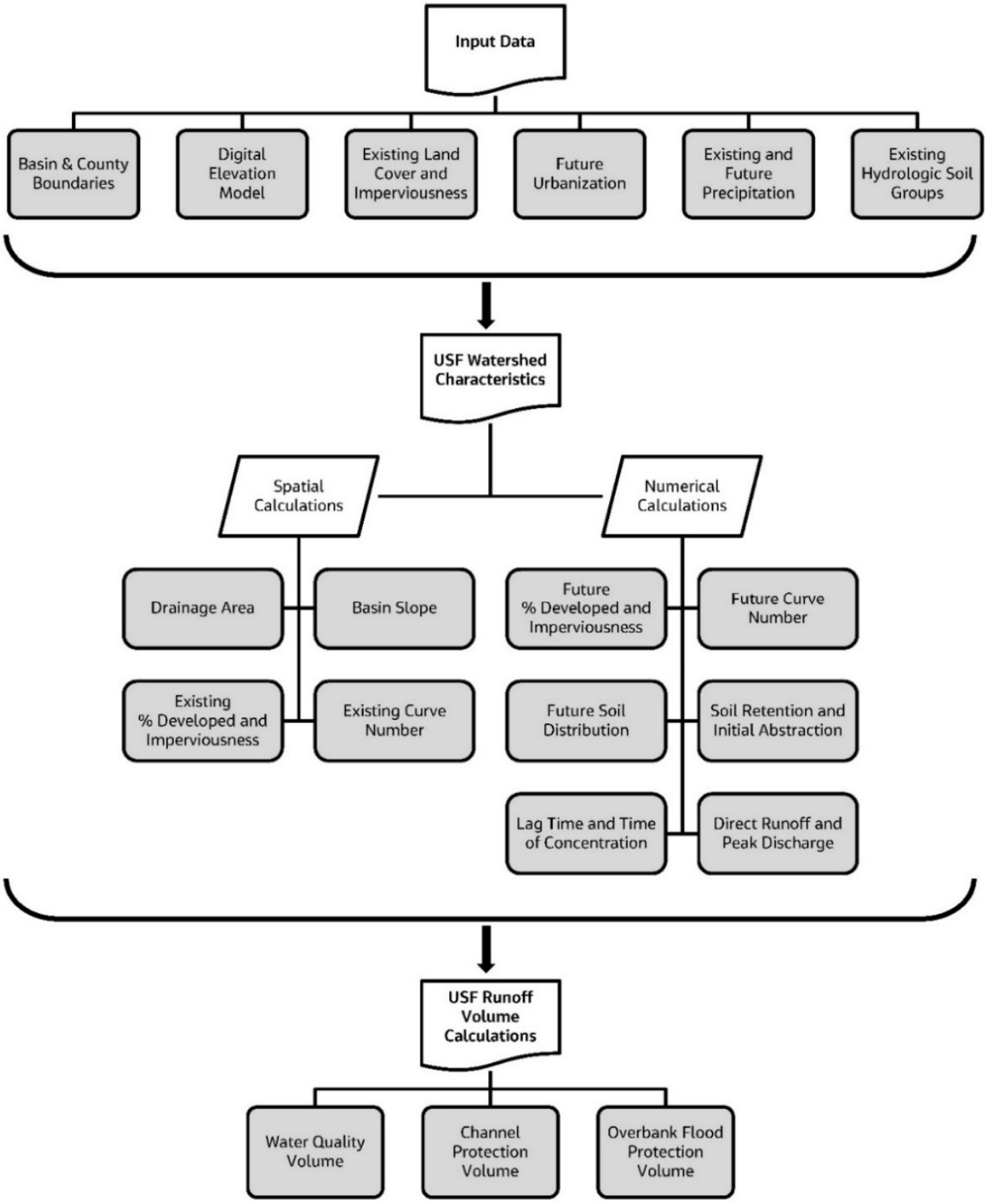


Figure 4-2. Stormwater Forecast – Technical Approach Process Diagram

4.5.1.1 Input Data and Preprocessing

Landcover and Imperviousness. Land development affects the physical, chemical, and biological conditions of the District's watersheds, waterways, and water resources. As landcover changes from forested and rural to suburban and urban (developed) uses, the natural cycle of water (hydrology) is altered. For example, clearing removes the vegetation that intercepts, slows, and returns rainfall to the air through evaporation and transpiration. The addition of buildings, roadways, parking lots and other surfaces that are impervious to rainfall further reduces infiltration and increases runoff. Stormwater drainage systems such as ditches, curb and gutter, and storm drainage inlets and pipes may further modify the natural hydrology that speeds stormwater runoff to local streams and concentrates non-point source pollutants from human activities in the watershed.

To capture these important watershed characteristics in the Forecast, the 2019 USGS National Land Cover Database (NLCD) was incorporated into the Forecast as the existing condition. The NLCD provides spatial reference and descriptive data for characteristics of the land surface such as thematic class (for example, urban, agriculture, and forest), impervious surface, and tree canopy cover.

Soils and Topography. As landcover moves from an undeveloped to developed condition, soil condition and topography may also change. In some developments, grading flattens hilly terrain and fills in natural depressions that slow and provide temporary storage for rainfall. Topsoil and sponge-like layers of humus are scraped and removed, and the remaining subsoil is compacted. Rainfall that once seeped into the ground now runs off the surface. These watershed characteristics are important in the design of SCMs. Areas with flat topography need special consideration because many SCMs require a hydraulic head (liquid pressure) to move stormwater runoff through the facility. Areas with steep topography may limit or exclude the use of SCMs that need flat or gently sloping areas to reduce sediment and runoff flow velocities. The USGS Digital Elevation Model and NRCS Hydrologic Soil Groups were used in the Forecast for soils and topography. The USGS Digital Elevation Model is a representation of the bare topographic surface of the Earth excluding trees, buildings, and any other surface objects. NRCS Hydrologic Soil Groups are based on estimates of runoff potential. Soils are assigned to one of four groups (Groups A through D) according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long duration storms. Group A soils have a high infiltration rate (low runoff potential) when thoroughly wet, and Group D soils have a very slow infiltration rate (high runoff potential) when thoroughly wet.

Future Urbanization. The Forecast estimates the potential runoff management volume for four scenarios: a predevelopment scenario, 2019 (present day), 2030 (future), and 2040 (future). For the future scenarios, the District used a USGS study, The Southern Megalopolis: Using the Past to Predict the Future of Urban Sprawl in the Southeast U.S. (Terando et al., 2014). This study uses street-network information to model future urban land use boundaries. Using street networks allows accurate mapping of suburban areas and enables rapid updates to the model as conditions change. The projections reflect the most recent trends in the expansion of low-density urban areas. As such, they represent a "business-as-usual" scenario depicting how urbanization may evolve in the future given current policies, preferences, and rates of growth. Where the USGS model underestimated future development, compared to the 2019 NLCD, these locations were supplemented with a direct analysis of the percent change in development between the 2001 and 2019 NLCD. Future estimates of development were then extrapolated for 2030 and 2040 based on the historical trend between 2001 and 2019.

Existing and Future Precipitation. Understanding the frequency and intensity of rainfall events is important for planning and design of SCMs. Current rainfall frequency and intensity are derived from historical data using National Oceanic and Atmospheric Administration (NOAA) Atlas 14 as the basis for these calculations. However, the last two decades have shown a measurable increase in both frequency and intensity of rainfall events when compared to historical referenced data. To better understand

future rainfall events, the District developed localized future precipitation frequency estimates reflecting potential impacts from climate change.

The results of the analysis provided future 24-hour duration design storm precipitation frequency events that were used in the Forecast to calculate future channel protection and future overbank flood protection volumes. The results also included the 85th percentile annual storm event that was used to calculate future water quality volumes. The full details of data sources used, and types of analyses performed to develop future precipitation can be found in a technical memorandum titled *Determining Future Rainfall Frequency Estimates for MNGWPD Service Area* posted on the District's website. It should be noted that the scientific study and understanding of climate science is continuously advancing, so potential climate change impacts may need to be revisited as new information becomes available.

Table 4-7 provides a summary of the input data sources used for the Forecast.

Table 4-7. Stormwater Forecast Input Data

Name	Release Date	Source
County Boundary	2008	USCB, 2008
Predevelopment Land Cover and Total Imperviousness from National Land Cover Database (2001)	2007	USGS, 2007
Current Land Cover and Total Imperviousness from National Land Cover Database (2019)	2021	USGS, 2021
NHD Subcatchments and HUC-12 Boundaries	2012	EPA, 2012
Existing Precipitation from Atlas 14 rainfall depths	2013	NOAA, 2013
Future Urbanization	2014	Terando et al., 2014
Digital Elevation Model	2017	USGS, 2017
Future Precipitation	2021	CDM Smith, 2021
Hydrologic Soil Groups	2021	NRCS, 2021

Spatial calculations in the Forecast required the flexibility to summarize information for the full, 15-county District footprint, but also break down into smaller river basin or jurisdictional areas. This section summarizes the process of merging multiple data sources to build this flexibility into the Forecast. National Hydrography Dataset (NHD) subcatchments were used as the boundary condition, or limits, for the Forecast. For each NHD subcatchment, a process was applied in ArcGIS to align the original NHD subcatchment with the HUC-12 boundaries and smooth/reduce shape complexity. The boundary processing reduced the number of subcatchments fully or partially within the District from 7,584 to 6,270. To format the data into HUC-12 and county boundaries, the NHD subcatchments were converted into Union Subcatchment Features (USFs) by combining the data (that is, performing a spatial union). This process created 6,963 USFs located inside the District boundary with some original NHD subcatchments split across multiple HUC-12 or county boundaries.

The USFs had an average area of approximately 160 acres and ranged from about 0.1 acre to nearly 6,500 acres. Developed areas within each USF were then extracted based on the NLCD land cover classes: Developed, Open Space (21); Developed, Low Intensity (22); Developed, Medium Intensity (23); and Developed, High Intensity (24). Separate polygon features were then created for the developed areas which were used as the basis of the watershed characteristic calculations, such as total imperviousness. The watershed characteristics of the developed areas for each USF may be aggregated back to their respective subcatchment, HUC-12, HUC-8, or county, or summarized at the District level. Future estimates

of land cover, total imperviousness, and urbanized soils (transition to D-type soils) for each USF were calculated using future urbanization trends (Terando et al., 2014) and trends observed between the 2001 and 2019 NLCD data.

4.5.1.2 Watershed Characteristic and Potential Runoff Management Volume Calculations

Predevelopment Curve Number (CN) values were calculated assuming a uniform forested landcover type and present-day hydrologic soil groups (NRCS, 2021). These conditions characterized the predevelopment runoff scenario as mostly undeveloped with a range of CN values from 30 to 77. The predevelopment watershed characteristics also assumed a uniform 1.0 percent total imperviousness, existing basin slope, and current NOAA Atlas 14 rainfall depths (NOAA, 2013). A review of CN and total imperviousness concepts can be found in Section 3.5.1. For the 2019 present-day scenario, CN values were derived from 2019 NLCD data and 2021 NRCS soil data and had a range of CN values from approximately 58 to 98 within developed areas. Future CN values within developed areas were derived using estimates of change for future developed land cover and urbanized soils and also had a range of CN values from approximately 58 to 98.

The USGS peak flow and hydrograph methods were used to calculate lag time values for both rural and urban regions depending on percent impervious cover, for each USF (USGS, 2011). The 2011 USGS rural equation (north of the Fall Line) was used in locations with less than 10 percent imperviousness and the Region 1-3 equation was used for urban areas with greater than 10 percent imperiousness. The 2010 NRCS National Engineering Handbook equation was used to convert lag time to time of concentration, where lag time is 60 percent of time of concentration (NRCS, 2010). Direct runoff was calculated using rainfall depths and CN values, which were then translated into the potential maximum soil retention and initial abstraction values per the TR-55 equations (NRCS, 1986). Peak discharge values were also calculated using TR-55 methods. The full details of data sources used, and types of analyses performed can be found in a report, *Stormwater Forecast – Technical Approach and Results*, posted on the District's website.

The final step of the process was to calculate potential runoff management volumes from development for each of the three post-construction stormwater performance standards from the GSMM (ARC, 2016): Water Quality Volume (85th percentile annual storm event); Channel Protection Volume (1-year 24-hour storm event); and the Overbank Flood Protection Volume (25-year 24-hour storm event). These standards were selected because they are required for new site development and redevelopment, and they correspond to storm events reported to have the greatest impacts on water quality, streambank erosion, and nuisance flooding. As summarized in the GSMM, each variable and final volumes have designated units; however, for the Forecast, the final runoff management volumes were converted to cubic feet for each standard.

4.5.2 Stormwater Forecast Results

Based on the analysis, development patterns in the District over the past century have resulted in substantial changes to watershed characteristics. For the Forecast analysis, the predevelopment scenario was assumed to be dominated by a forested land cover type with an average imperviousness of 1.0 percent and a weighted CN value of 60. For simple comparison purposes, the area evaluated for the predevelopment scenario was assumed to be the same as the 2019 developed area. As the region began to grow more urban and developed, the weighted CN value increased to 81 and average imperviousness increased to more than 33 percent by 2019 within developed areas. If current land use policy and recent development patterns continue, future estimates of total developed land area may increase nearly 44 percent by 2040, compared to 2019. Additionally, land use is expected to intensify, with the weighted average CN value potentially reaching approximately 84 and total imperviousness potentially reaching nearly 46 percent by 2040, based on the future developed area.

Precipitation rates are also expected to increase based on the future precipitation study results for the District. By 2040, the District-wide weighted average 85th percentile annual rainfall; 1-year, 24-hour rainfall; and 25-year, 24-hour rainfall events are estimated to potentially increase by 14 percent, 11 percent, and 16 percent, respectively. These changes to watershed characteristics and rainfall intensity will have a direct impact on the total potential runoff management volume generated from development that may require additional management from SCMs. A chart of current and future District-wide rainfall depths by design storm is presented in Figure 4-3. A summary of the District-wide watershed characteristics within developed areas is presented in Table 4-8.

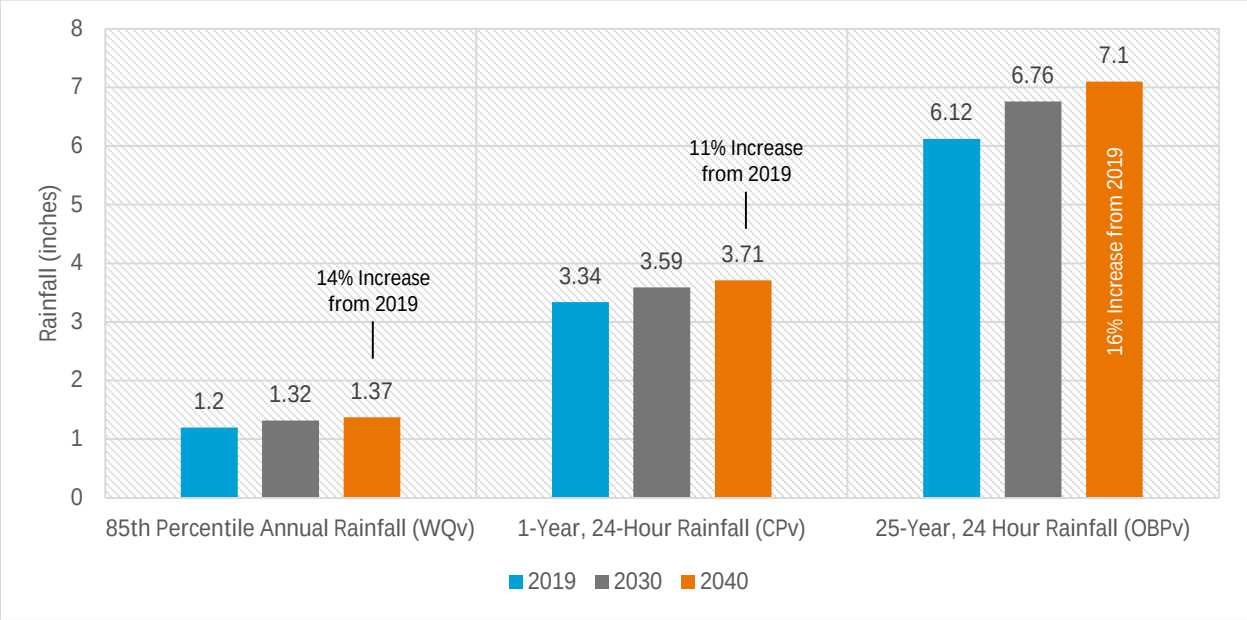


Figure 4-3. Current And Future District-wide Rainfall Depths by Design Storm

Table 4-8. District-wide Watershed Characteristics within Developed Areas

	Pre-development	2019	2030	2040
USFs (count)	6,963	6,963	6,963	6,963
Total area (acres)	3,153,984	3,153,984	3,153,984	3,153,984
Developed area (acres)	1,226,375*	1,226,375	1,561,168	1,764,460
Total imperviousness (percent)	1.0	33.4	41.0	45.6
CN	60	81	83	84
Slope (percent)	8.3	8.3	8.3	8.3
85th percentile annual rainfall (inches)	1.20	1.20	1.32	1.37
1-year, 24-hour rainfall (inches)	3.34	3.34	3.59	3.71
25-year, 24-hour rainfall (inches)	6.12	6.12	6.76	7.10

* For simple comparison purposes, the area evaluated for the predevelopment scenario was assumed to be the same as the 2019 developed area.

For 2019, the estimated District-wide runoff from development associated with the 85th percentile annual rainfall (WQv) was 1.87 billion cubic feet. This volume represents the total estimated runoff impacting instream water quality from all current 2019 development in the District. For comparison, the reservoir at Westside Park in Atlanta has an approximate capacity of 2.4 billion gallons, or 385 million cubic feet, which is 4.85 times smaller than the estimated District-wide runoff from development associated with WQv. Figure 4-4 presents a summary of the Forecast results for 2019 WQv for (a) the entire District and (b) an example county.

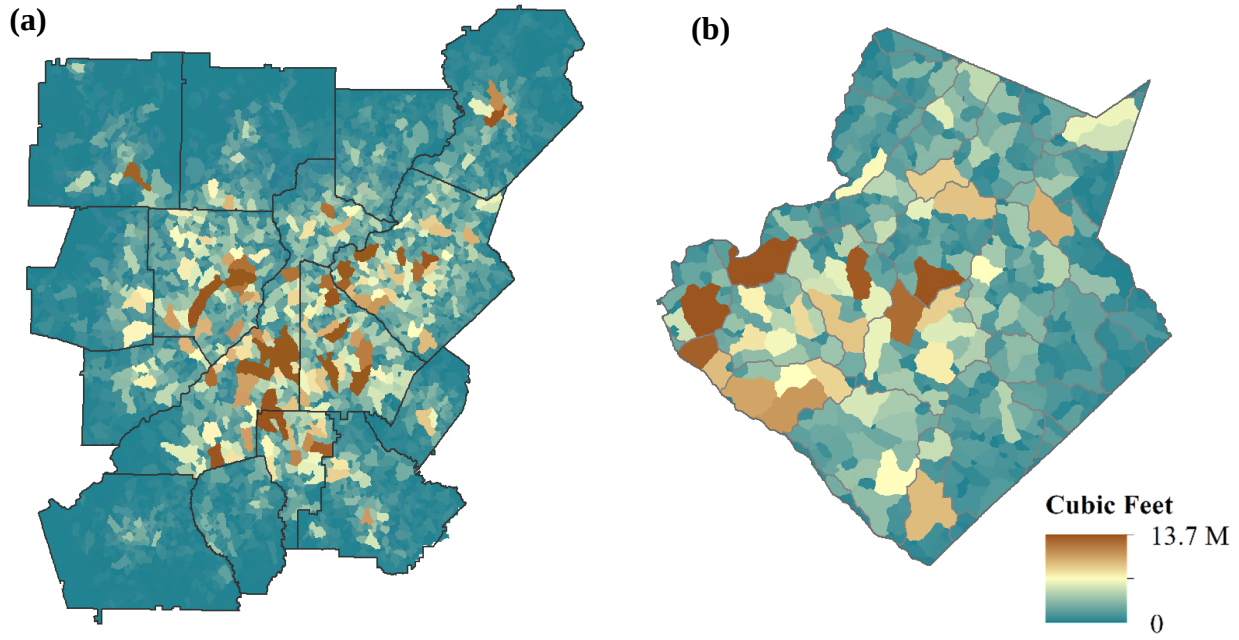


Figure 4-4. Potential Runoff Management from Development for the 2019 Water Quality Volume
(a) District-wide results per USF. (b) Gwinnett County results per USF.

As shown on Figure 4-4, in 2019, the WQv of individual USFs in the District ranged from zero (in locations without development) to more than 13.7 million cubic feet. The estimated District-wide runoff from development associated with the 1-year, 24-hour rainfall (CPv) was 4.39 billion cubic feet and the estimated runoff associated with the 25-year, 24-hour rainfall (OFPv) was 26.75 billion cubic feet. These volumes have a substantial impact on streambank conditions and nuisance flooding, respectively. For these estimates, it should be noted that the WQv is nested within the CPv and both the WQv and CPv are nested within the OFPv.

The 2019 volumes represent a substantial increase compared to the predevelopment scenario with the WQv and CPv increasing by approximately 484 and 269 percent, respectively. The predevelopment OFPv was not calculated because the method requires a comparison between precondition and post-condition flow rates. No precondition was conceived prior to the predevelopment scenario; therefore, the management volume was not able to be calculated for this standard. Based on the anticipated changes to future watershed characteristics and precipitation rates, future runoff estimates from development for each of the three post-construction stormwater performance standards are expected to increase. By 2040, the total potential runoff management volumes from development associated with the WQv, CPv, and OFPv are estimated to potentially increase by 116 percent, 89 percent, and 103 percent, respectively, compared to 2019. Figures 4-5 through 4-7 present summaries of current and future District-wide potential runoff management from development for WQv, CPv, and OFPv.

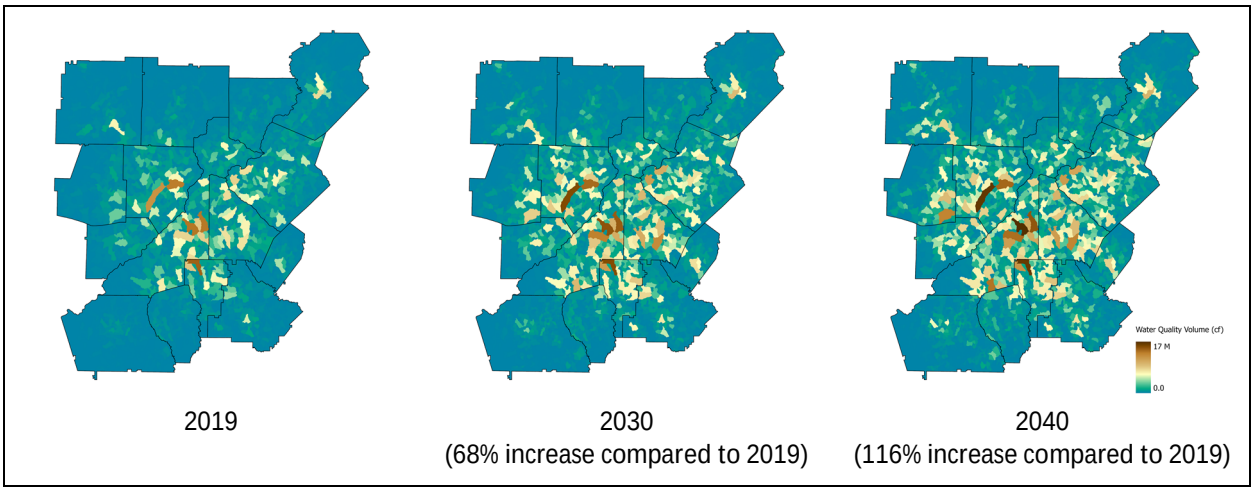


Figure 4-5. WQv (cubic feet) - Current and Future Potential Runoff Management from Development

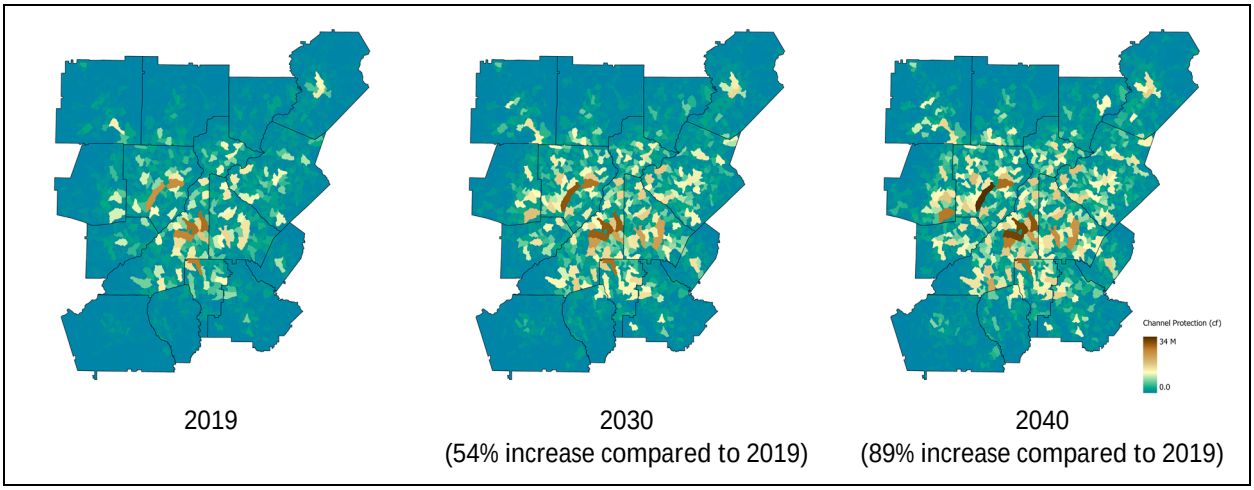


Figure 4-6. CPv (cubic feet) - Current and Future Potential Runoff Management from Development

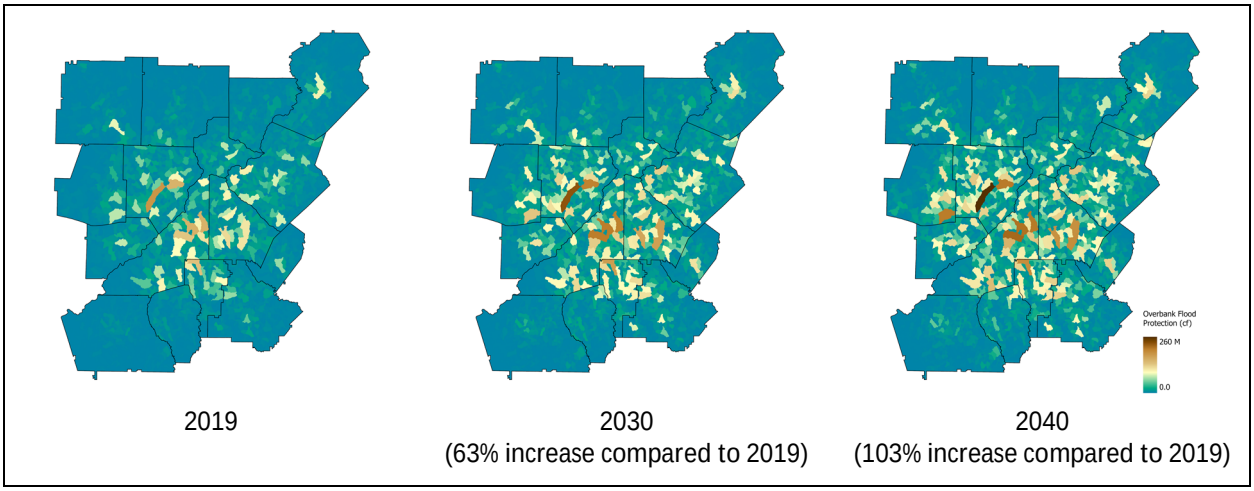


Figure 4-7. OFPv (cubic feet) - Current and Future Potential Runoff Management from Development

*Note: Figures represent planning-level estimates of total urban runoff volume calculated at a basin-scale from developed land. Volume estimates **do not include** the amount of runoff currently managed by Stormwater Control Measures within each jurisdiction.*

While these volumes are helpful for planning-level exercises, estimated volumes in the Forecast do not account for the existing capacity of SCMs already in place. An inventory and capacity analysis (static storage) of existing SCMs may be performed by the local jurisdiction and compared to the District's Forecast to develop the planning-level runoff volume management gap. This gap could be used at the local level as part of a needs assessment or a measure of progress toward stormwater management improvement goals.

At a District-wide level, these large volumes can be challenging to put into context, but the percent change in potential runoff volumes from the predeveloped to 2040 scenario may provide some insight into watershed conditions. For example, local jurisdictions are currently requiring SCMs for new development and redevelopment to meet standards in the 2019 Model Ordinance for Post-Construction Stormwater Management for New Development and Redevelopment (Action Item Watershed-1). Using the Forecast estimate of an 89 to 116 percent increase in future (2040) total potential runoff management volumes, a local jurisdiction may consider a periodic evaluation of their stormwater management standards to ensure SCM design requirements are adequate for both the present and future.

Table 4-9 provides a summary of estimated potential runoff management volume from development for the WQv, CPv, and OFPv standards. As previously noted, the total potential runoff management volume estimates for the forecast are intended for planning purposes. Future versions of the Forecast may include more detailed information or modeling techniques, which may help to improve accuracy.

Table 4-9. District-wide Total Potential Runoff Management Volumes from Development

	Pre-development*	2019	2030	2040
WQv (cubic feet)	0.32 B	1.87 B	3.14 B	4.04 B
CPv (cubic feet)	1.19 B	4.39 B	6.76 B	8.29 B
OFPv (cubic feet)	-	26.75 B	43.51 B	54.40 B

* The predevelopment management volumes for the WQv and CPv standards were *calculated for comparison to present-day (2019) and future (2030 and 2040) volumes. The predevelopment calculation for OFPv evaluates the difference between precondition and post-condition flow rates. No precondition was conceived prior to predevelopment; therefore, the potential OFPv management volume was not able to be calculated for this scenario. The OFPv management volumes were calculated for the 2019, 2030, and 2040 scenarios by comparing to the predevelopment scenario.*

Note:

B = billion

To provide additional flexibility in using the Forecast for multiple scales, a potential runoff management volume rate (MV Rate) was also calculated. This is a simple planning-level ratio that was created to compare the potential runoff management volume rates from development per unit area for each of the three post-construction stormwater performance standards. This ratio provides a standard measure for stormwater managers to understand the intensity of runoff from development between watersheds of different sizes. It represents a normalized indicator of total potential runoff management volume per impervious acre or developed acre.

The WQv had a strong correlation coefficient (r) associated with the number of impervious acres in each respective USF (r = 0.99), while the CPv and OFPv had strong correlation coefficients (r = 0.99 and r = 0.99, respectively) with the number of developed acres in each USF. The MV Rate provides a method for simple comparison between USFs and shows how potential runoff management volume estimates from development may vary based on watershed characteristics. Additionally, the MV Rate may be used for planning purposes to estimate potential runoff management volumes from development for customized

subbasins or boundaries (such as incorporated and unincorporated areas) within their respective jurisdictions.

For 2019, the District-wide WQv MV Rate was estimated to be 4,572 cubic feet per impervious acre, and the CPv and OFPv MV Rates were estimated to be 3,578 and 21,811 cubic feet per developed acre, respectively. The 2019 MV Rates showed an increase compared to the predevelopment scenario with the WQv and CPv increasing by approximately 495 and 270 percent, respectively. Similar to future total potential runoff management volume estimate, future MV Rates are expected to increase in 2030 and 2040. By 2040, the MV rates from development associated with the WQv, CPv, and OFPv standards are estimated to potentially increase by 10 percent, 31 percent, and 41 percent, respectively, compared to 2019. Table 4-10 presents a summary of District-wide MV Rates from development.

Table 4-10. District-Wide Potential Runoff Management Volume Rates from Development

	Pre-development*	2019	2030	2040
WQv MV Rate (cubic feet / impervious acre)	769	4,572	4,896	5,022
CPv MV Rate (cubic feet / developed acre)	967	3,578	4,333	4,696
OFPv MV Rate (cubic feet / developed acre)	-	21,811	27,867	30,830

* The predevelopment management volume rates for the WQv and CPv standards were calculated for comparison to present-day (2019) and future (2030 and 2040) rates. The predevelopment calculation for OFPv evaluates the difference between precondition and post condition. No precondition was conceived prior to predevelopment; therefore, the potential OFPv management volume rate was not able to be calculated for this scenario. The OFPv management volume rates were calculated for the 2019, 2030, and 2040 scenarios by comparing to the predevelopment scenario.

4.5.3 Summary

For the District, the current value of the Forecast is as much about the estimated runoff management volumes themselves as it is about having new conversations to identify stormwater management solutions. The total potential runoff management volume from development at a basin scale may be used as a practical metric to understand and quantify progress on stormwater and watershed performance. It may also encourage new conversations and different approaches to confront recurring stormwater challenges. Over time, this paradigm shift is intended to support and improve the implementation of existing water quality and flood reduction goals across the District.

Testing the Forecast under real-world scenarios will provide new insights on the functionality of this new water quantity-based indicator to identify opportunities and constraints for stormwater management at the local level. Since regional actions that provide District-wide benefit have yet to be identified using the Forecast, no action items will result in the District Plan. However, in the near term, local jurisdictions are encouraged to try out the Forecast as a prioritization tool to evaluate their inventory gaps. Local jurisdictions may want to prioritize basins with high volumes of runoff relative to development trends or to evaluate basins with a higher proportion of unmanaged runoff. In support of this effort, the District plans to provide technical assistance to local jurisdictions for exploring different ways the Forecast might inform new approaches to local stormwater challenges. Since this is a work in progress, using the Forecast under real-world scenarios will also inform potential improvements as part of the District's 2027 Plan Update.

SECTION 5

Action Items



Section 5 includes the required Action Items of this Plan. The District, Georgia EPD, local governments and local water and sewer providers within the District all play important roles in implementing the Action Items described in this section. Local governments and local water and sewer providers are required to comply with the actions as described within this section. Georgia EPD enforces this Plan's provisions through an auditing and permitting process. For example, local jurisdictions must demonstrate compliance with this Plan in order to obtain permits for new or expanded water withdrawals or wastewater discharges and renewal of NPDES Municipal Separate Storm Sewer System (MS4) permits. Furthermore, consistency with Plan requirements is necessary to obtain GEFA grant or loan funding for water resources projects.

The Action Items are organized by planning area in the following sub-sections:

- 5.1: Integrated Water Resources Management Action Items
- 5.2: Water Supply and Water Conservation Action Items
- 5.3: Wastewater Management Action Items
- 5.4: Watershed Management Action Items
- 5.5: Public Education Action Items

Each of the sections above begins with an introduction of each planning area followed by specific Action Items. Each Action Item may include the following elements:

- *Intent:* Describes the purpose of the Action Item.
- *Responsible Parties:* Lists who is responsible for implementation and with whom implementation should be coordinated.
- *Action Item:* Provides a specific action to be taken or a broad overview (when combined with sub-tasks) of the Action Item. If there are no sub-tasks, then the activities listed in the Action Item are the basis for the Georgia EPD audit checklist.
- *Sub-Tasks (where appropriate):* Lists the activities to be performed for an Action Item. These specific activities listed in the sub-tasks are the basis for the Georgia EPD audit checklist.
- *Description and Implementation:* Provides rationale for the Action Item and specific guidance on how the Action Item can be performed by the responsible parties.
- *Resources:* Lists information sources to support implementation, including hyperlinks where available.

All Action Items in this Plan are required, unless otherwise indicated. Many Action Items include detailed requirements that must be implemented in order to be found in good faith compliance, while other Action Items provide the flexibility on implementation to meet the needs of local governments and utilities.

For the small local governments listed in Table 5-1, certain categories of Action Items are recommendations and not requirements. This list is based on whether each local government meets the definition of small community with respect to its role as a local water provider, wastewater provider, and local government. The District encourages these small communities to adopt the recommended

Action Items from the plan that are most relevant to local areas of need. The District's Technical Assistance Program is available to all small communities. Small communities will only be audited by Georgia EPD on required Action Item(s).

Table 5-1. Action Item Requirements for Small Local Governments

Small Communities	2020 Population	Local Water Provider Action Items	Local Wastewater Provider Action Items	Local Government Action Items (excluding W-1)	Post-Development Stormwater Management Action Item (W-1)
Kingston (Bartow County)	722	Recommended	N/A	Recommended	Required
Taylorsville (Bartow County)	263	N/A	N/A	Recommended	Required
White (Bartow County)	820	Recommended	N/A	Recommended	Required
Emerson (Bartow County)	1,415	Required	Recommended	Required	Required
Ball Ground (Cherokee County)	2,560	Recommended	Recommended	Recommended	Required
Nelson (Cherokee County)	1,145	N/A	N/A	Recommended	Required
Waleska (Cherokee County)	921	Required	N/A	Recommended	Required
Grantville (Coweta County)	3,103	Required	Recommended	Required	Required
Haralson (Coweta County)	185	N/A	N/A	Recommended	Required
Moreland (Coweta County)	382	N/A	N/A	Recommended	Required
Sharpsburg (Coweta County)	327	N/A	N/A	Recommended	Required
Turin (Coweta County)	347	Recommended	N/A	Recommended	Required
Brooks (Fayette County)	527	Required	Recommended	Recommended	Required
Woolsey (Fayette County)	206	N/A	N/A	Recommended	Required
Clermont (Hall County)	1,021	N/A	N/A	Recommended	Required
Gillsville (Hall County)	306	N/A	N/A	Recommended	Required
Lula (Hall County)	2,822	Recommended	Recommended	Recommended	Required
Rest Haven (Gwinnett County)	45	N/A	N/A	Recommended	Required
Braswell (Paulding County)	355	N/A	N/A	Recommended	Required

This list was prepared based on the following definition of small communities: (a) local water providers that depend primarily on groundwater and serve less than 3,300 people, (b) local wastewater providers that serve less than 3,300 people and (c) local governments that do not have a MS4 permit. The types of Action Items listed in the table above as recommendations include Integrated and Education action items based on who is listed as the responsible party (local water provider, local wastewater provider or local government).

This list will be updated during future District plan updates and in between plan updates if a small local government applies for a permit that, if issued by Georgia EPD, would result in it no longer meeting the definition of a small community. Small communities are still required to submit information on their planned future water and wastewater facilities for consideration during the update process for Appendix B of the District Plan.

5.1 Integrated Water Resources Management Action Items

The District has long recognized that water resources management is most effective when strategies are integrated in approach and implementation (refer to Section 1.2). This section of the Plan presents an integrated approach to planning for comprehensive water resources management and includes those Action Items that overlap multiple planning areas.

Some Action Items have multiple responsible parties, and some are included in this section to encourage the responsible parties to implement their individual actions in parallel. For instance, it is recommended that local water and wastewater master planning be performed at the same time, even though the responsible parties may be separate jurisdictions, so that local wastewater planning forecasts will build on the output from the local water planning forecasts.

The integrated Water Resources Management Action Items address the following topics:

- Coordinated Actions (Action Item INTEGRATED-1): This Action Item ensures a consistent and cooperative approach to engage multiple entities in the planning and implementation process.
- Infrastructure Planning (Action Items INTEGRATED-2 through INTEGRATED-5): These Action Items help communities support continued economic, environmental, and social well-being, ensure that local water and wastewater infrastructure development is consistent with this Plan and prepare for emergencies. While these Action Items each have identified responsible parties, using an integrated approach across planning areas and jurisdictions may reduce redundancies, eliminate inconsistent base data used for local forecasting, and improve communication.
- Source Water Supply Protection (Action Items INTEGRATED-6 and INTEGRATED-7): The Action Items require careful coordination of water supply planning and management with watershed management activities and development regulations.
- Septic and Private Decentralized Treatment Systems (Action Items INTEGRATED-8 through INTEGRATED-12): These Action Items require coordination across multiple entities and consideration of many factors, including water use, water conservation, wastewater infrastructure planning, wastewater treatment capacity, and drinking water source protection, as well as watershed and public health.
- Corps Reservoirs – Storage, Withdrawals and Returns (Action Item INTEGRATED-13): This Action Item emphasizes an integrated, regional approach for the efficient and sustainable use of Allatoona Lake and Lake Lanier.
- Encouraging the Return of Highly Treated Wastewater to the Chattahoochee and Flint River Basins (Action Item INTEGRATED-14): This Action Item outlines the requirements for amendments to this plan by local wastewater providers relating to the treatment of water sourced from the Chattahoochee River Basin below Buford Dam or Upper Flint River Basin.

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ACTION ITEM

INTEGRATED-1: COORDINATED ACTIONS

Responsible Parties: Local Government, Local Water Provider, Local Wastewater Provider	Intent: To develop and administer a process to regularly coordinate across watershed, water supply, and wastewater actions.

Action Item: Establish annual coordination meetings among entities within the same or in neighboring jurisdictions to support integrated water resources management.

Sub-Tasks:

Local Government shall:

1. Conduct an annual meeting with local watershed management staff and land use planning and zoning staff on issues related to watershed management, as they are linked to land use planning and decisions. Consider holding this meeting more frequently, particularly during updates to the local Comprehensive Land Use Plan (CLUP).

Local Governments and Local Water Providers shall:

2. Review all source water supply assessment plans related to INTEGRATED-6 and water supply watersheds that may require additional buffers pursuant to INTEGRATED-7. Conduct an annual meeting of local government staff and water supply providers to discuss local issues and priorities.
3. Conduct an annual meeting with local governments, water providers, planning and zoning staff, and County Board of Health staff on water supply and conservation Action Items.

Local Governments and Local Wastewater Providers shall:

4. Conduct an annual meeting with local governments, wastewater providers, watershed management/ stormwater staff and County Board of Health staff on watershed issues related to sanitary sewer and septic system management to address bacteria and other water quality concerns (refer to Action Items INTEGRATED-8 through INTEGRATED-11).

Description and Implementation: Integrated planning requires coordination among many entities, and these Sub-Tasks establish coordination requirements to foster communication, information sharing and joint planning by responsible parties.

It is recommended that the local governments (that is, the county and all cities within such county), any authorities that are local water or wastewater providers and the County Board of Health all meet in a single meeting when possible and as appropriate based on the subject matter. If a local government cannot attend these group meetings, then it should meet with the local water and wastewater providers independently. If a local government, water provider or wastewater provider has jurisdiction in more than one county, then they should attend the integrated meetings for each county in which they have jurisdiction. The District may develop and provide meeting materials, such as suggested meeting topics and agendas to support coordination efforts. For the purposes of documenting compliance with this Action Item, it is recommended that the responsible party maintain appropriate documentation, including but not limited to: email, phone summary, meeting agenda, meeting summary, and fax transmittal.

In-person meetings are recommended because they encourage dialogue and help build relationships. A community may choose to include all parties for the same meeting where multiple elements are discussed (for example, land use and nonpoint source pollution, source water supply watershed protection, sewer lines and septic system management, grease management and containment and

stormwater management/green infrastructure). Some communities may choose to meet more frequently, depending on their local watershed challenges.

It is understood that even with proper notice and scheduling, invitees may not actually attend the coordination meeting. If invitees do not attend the meeting, the local jurisdiction may provide documentation of the meeting announcement, RSVPs, related coordination, and meeting materials to demonstrate compliance with this Action Item. Recommended topics include:

- Land use coordination
- Source water assessment plans
- Water supply watershed buffers
- Planned sewer expansions and areas that will remain served by septic tanks

Currently, the location and condition of septic systems is not consistently tracked and managed throughout the state. Some local governments have taken steps to locate and inventory the septic systems in their jurisdiction. It is recommended that local governments encourage County Boards of Health to provide real-time (or up-to-date) information on septic system permit approvals, failures and repairs to the State Digital Health Department Database or an equivalent system. The information provided should be based on an address or parcel ID. Local wastewater providers should support this effort by providing septage manifests, and local governments should support this effort by providing available local data to the County Board of Health (refer to Action Item INTEGRATED-10).

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- U.S. Fish and Wildlife Service Information for Planning and Conservation (IPaC), https://ecos.fws.gov/ipac/
- Georgia Department of Natural Resources, Wildlife Resources Division, Georgia Rare Species and Natural Community Data, https://georgiawildlife.com/conservation/species-of-concern
- Georgia Department of Natural Resources, Environmental Protection Division, Chapter 391-3-16, Rules for Environmental Planning Criteria, http://rules.sos.ga.gov/gac/391-3-16
- Georgia EPD Source Water Assessment and Protection Implementation Plan, March 28, 2000, https://epd.georgia.gov/document/document/swap-source-water-assessment-and-protection-implementation-plan-final-revised-mar/download

ACTION ITEM

INTEGRATED-2: LOCAL WATER MASTER PLANS

Responsible Party: Local Water Provider	Intent: To plan for future water supply, treatment, and distribution needs in a manner consistent with this Plan.

Action Item: Develop and maintain local water master plans that reflect available water sources, water source development, and water treatment facility and/or water distribution improvement needs based on future water demands.

Sub-Tasks: Each local water provider shall:

1. Develop and maintain a local water master plan with a planning horizon consistent with this Plan (through 2040, at a minimum).
2. Update the local water master plan every 5 years and as otherwise needed to support projects and remain consistent with regional and state requirements.
3. Include a section in the next update of the water master plan titled "Climate Resiliency." This section shall discuss infrastructure potentially vulnerable to extreme weather events and identify adaptive strategies for mitigating impacts.

Description and Implementation: The local water master plan (also called a water management plan) will identify future demands, supply sources, water service areas, treatment facilities, and distribution system needs in order to support proposed infrastructure improvements to the local water system.

Typically, local water master plans include the following elements. Some elements may not be relevant if the local water provider is a purchased water system.

- Introduction – Describes the planning period, program objectives, regulatory framework and key stakeholders involved in the planning process.
- City/County Characteristics and Demographics – Describes the population, land use, and physical and biological characteristics of the area including water quality, topography, wetlands, water resources and protected species.
- Inventory and Evaluation of Existing Water System – Identifies the existing water sources and service areas and analyzes the local water distribution system, including hydraulic capacity, as well as water treatment capabilities. May include optional analyses of water treatment processes and identification of problems with treatment processes.
- Future Water Demand Projections – Forecasts future water demands based on demographic projections, water conservation, anticipated reuse, future land use and the projected water service area boundary. The projections should reference the District's population projections as a foundation or starting point for the population projections in local water master plans and should consider the ARC Transportation Analysis Zone (TAZ) data to help refine forecasted growth patterns in a smaller scale.
- Future Water Source, Distribution and Treatment Alternatives – Analyzes alternatives for future extensions and demands for the water system, with a recommended solution for new or expanded supply sources, treatment alternatives, system interconnections, distribution system maintenance and capital needs. Discuss existing interbasin transfers and considerations to minimize, where feasible, net losses from interbasin transfers.

- Implementation of Recommended Alternative – Describes the recommended alternative, including a high-level overview of the potential environmental impacts, required permits, institutional impacts, estimated costs, and a capital improvements phasing plan for the recommended alternative.
- Climate Resiliency – Identifies infrastructure vulnerable to extreme weather events and adaptive strategies for mitigating impacts. The District's 2015 Utility Climate Resiliency Study provides a resource for future climate scenarios and potential adaptive strategies.
- Additional Elements – The following items may also be considered during the development of local water master plans:
  - Source water supply watershed or wellhead protection areas
  - Water reuse management
  - Targets for water withdrawals and/or consumptive use
  - Interconnections and pressure zone management
  - Cross-connection program
  - Drought and emergency plans
  - Consolidation of adjacent small water systems in situations where there would likely be improved environmental and/or health protection opportunities and equitable outcomes for customers

The local water master plan shall outline future system expansions and capital projects for water supply, treatment, and distribution, as well as system optimization and regulatory compliance. The local water master plan shall also coordinate with and include projects related to Water System Asset Management (Action Item WSWC-14) and source water protection (Action Items INTEGRATED-6 and INTEGRATED-7) as required in this Plan. Local water master plans shall also be consistent with the Georgia State-wide Water Management Plan, which encourages integrated and sustainable water resources management. Local water providers have flexibility in the development of their local water master plan; a large system will likely have a more detailed local water master plan than a smaller system.

Local water providers should consult local water master plans when making critical infrastructure decisions. They should also recognize that local water master plans are "living documents" and update these plans as necessary to address changing local conditions. At times, local water master plans will also need to be amended to address proposed interjurisdictional projects. It is recommended that local water master plan amendments be developed in cooperation with all affected jurisdictions. These jurisdictions include the county, cities within the county, neighboring counties, and local water providers. All interjurisdictional projects should be in compliance with the Georgia Service Delivery Act (O.C.G.A. § 36-70-20).

Local water master plans will refine the WTP expansion details outlined in Section 5.2 and Appendix B of this Plan. Local water providers will develop water treatment expansion master plans that define the number, location and capacities of water treatment facilities, and their implementation schedule. A life cycle cost analysis can be used to compare different expansion scenarios. Water treatment technologies, residuals handling, and management issues also will be included as part of this master planning.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Georgia Association of Water Professionals (GAWP) Best Practice Master Planning Guidelines & Resource Document, December 2015, https://www.gawp.org/general/custom.asp?page=TechResources

- GAWP Water Master Planning Sample Table of Contents, December 2015, https://cdn.ymaws.com/www.gawp.org/resource/group/3958cb05-e123-4c0c-9315-9a58134f1bc9/GAWP_Master_Planning_Water_O.pdf
- Metro Water District, Utility Climate Resiliency Study, December 2015, http://northgeorgiawater.org/wp-content/uploads/2015/05/MNGWPD_Utility-Climate-Resiliency-Study.pdf
- Water Research Foundation, Practical Framework for Water Infrastructure Resilience. 2022, https://www.waterrf.org/research/projects/practical-framework-water-infrastructure-resilience
- Georgia Comprehensive State-wide Water Management Plan, 2008, https://waterplanning.georgia.gov/state-water-plan

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ACTION ITEM

INTEGRATED-3: RESERVED

Responsible Party:	Intent:

We recognize the work already put forth by utilities to meet the requirements of the America's Water Infrastructure Act of 2018 (AWIA) and GEFA's Water System Interconnection, Redundancy, and Reliability Plan. To limit the duplication of efforts, Integrated-3 has been removed due to its redundant requirements compared to AWAI and GEFA's plan. As part of the District's Technical Assistance Program, there have been documented cases of utility confusion regarding these redundancies. To best serve utilities in the District, the Plan should only require unique actions that are not redundant or do not overlap other federal and state planning requirements.

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ACTION ITEM

INTEGRATED-4: LOCAL WASTEWATER MASTER PLANS

Responsible Party: Local Wastewater Provider	Intent: To continue master planning to address wastewater collection, treatment, and effluent and biosolids management.

Action Item: Develop and maintain a local wastewater master plan that addresses wastewater collection, treatment, and effluent and biosolids management.

Sub-Tasks: Each local wastewater provider shall:

1. Develop and maintain a local wastewater master plan that addresses wastewater collection, wastewater treatment, and effluent and biosolids management. The plan should have a planning horizon consistent with this Plan (through 2040, at a minimum).
2. Update the local wastewater master plan every 5 years, at a minimum, and as otherwise needed to support projects and to remain consistent with regional and State policy.
3. Include a section in the next update of the wastewater master plan titled "Climate Resiliency." This section shall discuss infrastructure potentially vulnerable to extreme weather events and identify adaptive strategies for mitigating impacts.

Description and Implementation: Local wastewater providers shall maintain a local wastewater master plan (also called a wastewater management plan) that identifies future sewer service areas, projects future wastewater flows and identifies treatment capacity needs and collection system extensions and expansions in order to support proposed infrastructure improvements to the wastewater management system.

Local wastewater master plans typically address local and site-specific issues related to wastewater collection, wastewater treatment, reuse (both indirect potable and non-potable) and effluent and biosolids management. Local wastewater master plans will refine the WWTP expansion details outlined in Section 5.3 and Appendix B of this Plan. Local wastewater providers have flexibility in the development of their local wastewater master plan, as a large system will likely have a more detailed local wastewater master plan than a smaller system. Typically, local wastewater master plans include the following elements. Some elements may not be relevant if the local wastewater provider only maintains a collection system.

- Introduction – Describes the planning period, program objectives, regulatory framework and key stakeholders involved in the planning process.
- Inventory and Evaluation of Existing Wastewater System – Identifies the existing sewer service area and analyzes the local wastewater collection system, with a focus on hydraulic capacity and wastewater treatment capabilities, including optional analyses of wastewater treatment processes, identification of problems with treatment processes and identification of rehabilitation and reuse opportunities.
- Future Wastewater Flow Forecasts – Projects future wastewater flows based on demographic forecasts, indoor water use forecasts and the projected sewer service area boundary. If indoor water use forecasts are not available, the ARC can provide population forecasts by Transportation Analysis Zone (TAZ) to help refine forecasted growth patterns in a smaller scale.
- Future Wastewater Conveyance and Treatment Alternatives – Analyzes system alternatives for future expanded areas and flows with a recommended solution for conveyance and treatment

capacity needs, treatment technology considerations based on available assimilative capacity, as well as effluent and biosolids management. Communities with septic systems need to consider septage disposal needs when upgrading or designing new wastewater treatment facilities. If reuse applications are considered, a summary of treatment technology, quantities, quality and permitting requirements should be included. The consumptive use implications of these alternatives should be identified and factored into the decision making process.

- Future Sewered and Unsewered Area Planning – Addresses plans for the near-term. Long-term planning is expected to be general in nature and evolve through the local wastewater master plan updates. It is recommended that the County Board of Health be involved in septic system area planning (refer to Action Item INTEGRATED-1). This section will address the following:
  - Areas to be sewered in the near-term (approximately 5 years).
  - Areas that are in transition and will not be sewered in the near-term, but are expected to be sewered in the next 30 years, with consideration of the requirements in Action Items INTEGRATED-5 and INTEGRATED-8 through INTEGRATED-12 regarding septic and decentralized systems. Consideration should be given to the relationship between septic system use, stream baseflow, and pollutant loading in areas where more immediate return flows are critical to water supply reliability or protecting water quality standards. Local governments need to determine if they will permit development that will rely on private decentralized facilities. If private decentralized systems will be used, local wastewater master plans should account for these private systems and create a plan to connect the areas served by these facilities into the larger collection system after the private facilities are decommissioned. The need for any easements to make these connections should also be addressed.
  - Areas that are not intended to be served by sewer in the future. The plan should address appropriate zoning for these areas that can accommodate long-term septic system use (refer to Action Item INTEGRATED-8). For most parts of the District, 1 acre or more minimum lot sizes should be considered for these areas.
- Implementation of Recommended Alternative – Describes the recommended alternative, including a high-level overview of the potential environmental impacts, required permits, institutional impacts, estimated costs, and a capital improvements phasing plan associated with the recommended alternative. Environmental justice analyses should be conducted as appropriate as part of the local wastewater master planning process.
- Climate Resiliency – Identifies infrastructure vulnerable to extreme weather events and adaptive strategies for mitigating impacts. Resiliency may be included as a stand-alone section in the local wastewater master plans or included as an element of other sections as may be appropriate.

The local wastewater master plans may also address the following key issues:

- Consumptive use (septic and reuse)
- Water reuse
- Local system expansions
- Biosolids handling and management
- Septage disposal
- Private wastewater systems
- Consolidation of adjacent small wastewater systems in situations where there would likely be improved environmental and/or health protection opportunities

Local wastewater providers will develop wastewater treatment expansion master plans that define the number, location and capacities of wastewater treatment facilities and their implementation schedule.

A life cycle cost analysis can be used to compare different expansion scenarios. Wastewater treatment technologies, biosolids handling and management issues also will be included as part of this master planning.

Recognizing that local wastewater master plans are "living documents," local wastewater providers should consult local wastewater master plans when making critical infrastructure decisions and update these plans as necessary to address changing local conditions. Local wastewater master plans should be consistent with the Georgia Comprehensive State-wide Water Management Plan, which encourages integrated and sustainable water resources management. The local master plan shall coordinate on source water protection issues as required in Action Item INTEGRATED-6.

At times, local wastewater master plans will need to be amended to address proposed interjurisdictional projects. These local wastewater master plan amendments should be developed in cooperation with all affected jurisdictions. These jurisdictions include the county, cities within the county, neighboring counties, and local wastewater providers. All interjurisdictional projects should be in compliance with the Georgia Service Delivery Act (O.C.G.A. § 36-70-20).

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- GAWP Best Practice Master Planning Guidelines & Resource Document, December 2015, https://cdn.ymaws.com/www.gawp.org/resource/resmgr/Master_Planning_Guidelines/GAWP_Master_Planning_Guideli.pdf
- GAWP Water Master Planning Sample Table of Contents, December 2015, https://cdn.ymaws.com/www.gawp.org/resource/group/3958cb05-e123-4c0c-9315-9a58134f1bc9/GAWP_Master_Planning_Water_O.pdf
- District, Utility Climate Resiliency Study, December 2015, http://northgeorgiawater.org/wp-content/uploads/2015/05/MNGWPD_Utility-Climate-Resiliency-Study.pdf
- Georgia Comprehensive State-wide Water Management Plan, 2008, https://waterplanning.georgia.gov/state-water-plan

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ACTION ITEM

INTEGRATED-5: CONNECTIONS TO PUBLIC SEWER

Responsible Party: Local Government	Intent: To allow for transition of areas from septic systems to public sewer service.

Action Item: Each local government shall coordinate with the local wastewater provider and develop and maintain sewer connection policies, including policies addressing redevelopment and conversion of septic systems to sewer service.

Description and Implementation: Local governments shall establish a policy on connections to public sewer consistent with the local wastewater master plan. The focus of the connections policy should be areas that are currently not served by sanitary sewer but proposed for future sewer service.

Local sewer connection policies should address the following:

- Connections to new developments – If the new development is within the planned area for future sewer service and a new sewer will not be extended for the development, the policy needs to address whether or not dry sewers are to be installed at the time of development.
- Connections to existing developments – Where connections will be made to existing developments, the policy should explain how sewer connections will be made within the development, which is likely covered in the sewer specifications. It will also need to address which properties will connect to municipal sewer systems at a later time and how these connection costs will be handled.
- Connections to isolated properties – Where sewers are extended to new developments or pass within reach of properties on septic systems, the policy needs to address whether or not these properties will be required to connect to the sewer: immediately, as redevelopment occurs, if a septic system fails, or not at all.
- Funding methods – It is recommended that the policy address the costs of connecting to the sewer system and who will pay them.

The sewer connection policy must be a written policy that includes a clear indication of the date of adoption, whether within the policy or through accompanying documentation (for example, letters, emails, or memoranda).

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

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ACTION ITEM

INTEGRATED-6: SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Responsible Party: Local Water Provider	Intent: To gather basic information about the source(s) of the drinking water and their potential threats.

Action Item: Local water providers engaged in water treatment shall develop a Source Water Protection Plan that delineates raw water sources and identifies the potential sources of contamination to the drinking water supply.

Sub-Tasks: Each local water provider shall:

1. Publish the results of the source water assessment in the Consumer Confidence Report (CCR).
2. Update the Source Water Assessment Plan (SWAP) by January 1, 2030 and every 10 years thereafter.

Description and Implementation: In 2020, the District completed a SWAP for all municipal water supply sources within the District who had not recently performed their own. SWAPs must be updated on a 10-year basis within the District. The SWAP supports communities in determining how susceptible the local water system is to contamination.

Development of a SWAP typically requires the following activities:

- Delineate the source water assessment area. Map the land area that contributes to the surface water or groundwater supply source. For groundwater supplies, use information about the flow to delineate source water assessment boundaries and the potential of surface spills reaching the source. For surface water sources, delineate a watershed boundary using a topographic map.
- Conduct an inventory of potential sources of contamination. This inventory will usually result in a list and a map of facilities and activities within the delineated area that might release contaminants. Some examples of potential pollutant sources are landfills, underground or aboveground fuel storage tanks, residential or commercial septic systems, stormwater runoff from streets and lawns, farms that apply pesticides and fertilizers and sludge disposal sites. Local inventories might provide information on abandoned dump sites, businesses with septic tanks or floor drains (such as dry cleaners or car repair shops), pesticide mixing and storage areas, golf courses and other land uses that might release pollutants to ground water or surface water.
- Determine the susceptibility of the water supply to contamination. Determine how likely a water supply is to be contaminated by identified potential sources of contamination. This critical step makes the assessments useful for communities because it provides information that local decision makers can use to prioritize their approaches for protecting the drinking water supply.
- Publish the results of the source water assessment in the CCR. After an assessment is finalized, summarize the information for the public. These summaries help communities understand the potential threats to their water supplies and identify priority needs for protecting the water from contamination. The report and its information can be distributed to the public via a variety of methods, such as workshops and the internet. SWAP project results may be found on the District website, http://northgeorgiawater.org/conserve-our-water/water-supply-in-our-region/. Jurisdictions may post the results to a website and include a reference in the CCR or attach the summary of results to the CCR itself.
- Communities can and should use the information gathered through the assessment process to broaden their source water protection programs and implement emergency plans.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- EPA, Conducting Source Water Assessments guidance, https://www.epa.gov/sourcewaterprotection/conducting-source-water-assessments
- Georgia EPD, Hazardous Site Inventory, http://epd.georgia.gov/hazardous-site-inventory
- Metro Water District, Source Water Assessment Plan Project Results, 2020, http://northgeorgiawater.org/conserve-our-water/water-supply-in-our-region/

ACTION ITEM

INTEGRATED-7: WATER SUPPLY WATERSHED PROTECTION

Responsible Party: Local Government	Intent: Protect the water quality and viability of drinking water supplies from nonpoint source pollution and spills of hazardous materials that could compromise drinking water quality.

Action Item: Adopt water supply watershed buffers as required by Georgia Department of Natural Resources (GADNR) Rule 391-3-16- .01(7) (also referred to more generally as part of the Part V Environmental Planning Criteria).

Description and Implementation: Refer to the Technical Assistance Memorandum developed by District staff that provides background, details, and mapping related to where additional water supply watershed buffers are required. GADNR Rule 391-3-16- .01(7) requires 100-foot undisturbed buffers and 150-foot impervious surface setbacks for streams in small water supply watersheds within 7 miles upstream of water supply intakes and within 7 miles upstream of water supply reservoirs, excluding federal reservoirs. The District has mapped the protected areas in small water supply watersheds where this applies, and will make GIS layers to local governments available upon request.

There are two other buffer and setback requirements in GADNR Rule 391-3-16-.01 that are either already covered or already met by complying with the stream buffer protection required by Action Item WATERSHED-4. First, this rule requires 50-foot undisturbed buffers and 75-foot impervious surface setbacks for streams in small water supply watersheds outside of a 7-mile radius. Local governments in the District are already required to have 50-foot buffers and 75-foot setbacks for all streams in their jurisdictions by Action Item WATERSHED-4 in the District's plan. Therefore, this requirement is covered by existing local stream buffer ordinances across the District. Second, this rule requires 100-foot undisturbed buffers and 150-foot impervious surface setbacks in large water supply watersheds within a 7-mile radius upstream of water supply reservoirs owned by local governments (reservoirs other than Corps reservoirs). Given all such local government reservoirs in the District are in small water supply watersheds, buffers and setbacks required for large water supply watersheds do not apply.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- EPA, Protect Sources of Drinking Water, https://www.epa.gov/sourcewaterprotection#watershed

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ACTION ITEM

INTEGRATED-8: SEPTIC SYSTEM PLANNING

Responsible Party: Local Government	Intent: To protect human and environmental health by requiring the proper planning and tracking of septic systems.

Action Item: Develop a plan that identifies where and under what conditions septic systems are appropriate given long-term water quality and quantity concerns.

Sub-Tasks: Each local government shall:

1. Determine future septic system areas and local requirements related to septic system planning.
2. Develop near-term and long-term written policies for transitioning unsewered areas to sewered areas.

Description and Implementation: Local governments shall identify areas planned for future sanitary sewer service and areas intended for long-term septic usage. Local governments shall develop policies to address (1) the conversion of septic systems to sewer as the sewer system is extended, and (2) requirements for connection to the sewer system in those areas (refer to Action Item INTEGRATED-5).

Implementation Guidance: Each local government shall identify appropriate locations and conditions for septic system usage and plan for future sewered and unsewered areas as part of their CLUP and local wastewater master plan (Action Item INTEGRATED-4). This planning should address the management of wastewater generated in transitional areas that are currently served by septic but targeted for sewer connection in the future. Septic system planning should be incorporated into the local wastewater system master plan (refer to Action Item INTEGRATED-4), the local water supply master plan (refer to Action Item INTEGRATED-2), and the CLUP. It should also be coordinated with the County Board of Health.

It is recommended that local governments begin the septic system planning process by identifying the general location of existing septic systems as well as existing sewer lines. The next step is to determine the areas planned for future septic systems as well as the number of anticipated septic systems based on local zoning within the community. Areas that are not intended to be served by sewer in the future should be zoned appropriately for long-term septic system use. For most areas in the District, minimum lot sizes of 1 acre or greater should be considered to ensure enough suitable soil for the initial septic system as well as a full-size replacement drainfield.

It is recommended that local governments consider the following in planning for septic systems:

- Available WWTP capacity for handling septage from routine septic system maintenance
- Useful life of drainfield systems
- Relationship between septic system use, stream baseflow, and pollutant loading in areas where more immediate return flows are critical to water supply reliability or protecting water quality standards
- Areas with failing septic systems
- Local soil types
- Water quality impacts if existing system failures are not addressed
- Cost-effective and sound solutions to refurbish existing systems
- General strategies and criteria that can be used to determine when to provide sewer service (refer to Action Item INTEGRATED-5)

Local governments need to identify transitional areas that are currently undeveloped or served by septic systems but planned for sewer service in the future. After these transitional areas have been identified, the local government will need to determine if development that will rely on private decentralized facilities will be permitted (refer to Action Item INTEGRATED-12). If private decentralized systems will be used, local wastewater master plans should account for these private systems and create a plan to connect the areas served by these facilities into the larger collection system after the private facilities are decommissioned. The need for any easements to make these connections should also be addressed. Planning for future wastewater service, septic systems and decentralized systems should be consistent with the plan for future land use in the CLUP.

Septic system planning must include necessary policies to address connection to sewer in the near-term (within the next 5 years) and long-term. This topic is further discussed in Action Item INTEGRATED-5.

All policies developed to implement this Action Item must be written policies that either include their date of adoption or are accompanied by other documents (for example, letters, emails, memoranda) that establish when the written policy was adopted.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

ACTION ITEM

INTEGRATED-9: SEPTIC SYSTEM CRITICAL AREA MANAGEMENT

Responsible Party: Local Government	Intent: To increase protection from failure risks of septic for critical watershed areas.

Action Item: Identify septic system critical areas, including existing and potential problem areas, and assign additional management requirements for septic systems in those areas.

Sub-Tasks: Each local government shall:

1. Identify critical areas including assessment of risk of and potential impacts on water quality from septic system failures.
2. Provide enhanced management for both new and existing septic systems in identified critical areas.

Description and Implementation: Critical areas are those areas where the risks and/or potential impacts of septic system failures are high and areas where failure could readily impact a drinking water supply source. Each local government must identify critical areas that have experienced problems or could possibly experience failures in the future. Through this planning, local communities can minimize the risks and impacts of septic system failures.

In determining critical areas for septic systems, the following areas should be considered:

- Septic systems in small drinking water supply watersheds
- Septic systems concentrated around lakes or other water features
- Areas with high septic system failure rates
- Areas with limited soil conditions, rock, steep slopes, or high groundwater levels
- Areas adjacent to streams listed on the Georgia EPD 303(d) list for water quality standard violations for fecal coliform
- Areas adjacent to water bodies listed on the Georgia EPD 303(d) list for water quality standard violations for chlorophyll a
- Other problem areas as defined by the County Board of Health or local jurisdictions

Local governments and wastewater providers shall coordinate with the County Board of Health to identify critical areas for septic systems (refer to Action Item INTEGRATED-1). Local wastewater providers may choose to extend sanitary sewer service to some identified critical areas that are adjacent to current or planned service areas. Local water providers are also encouraged to participate in the identification of critical areas, especially if there is a potential impact to drinking water supplies.

Following the identification of the critical areas, local governments shall identify and implement at least one management option for new septic systems and one management option for existing septic systems in the critical areas. Management options that may be implemented are outlined in Table 5-2.

Table 5-2. Management Options for Septic System Critical Areas

Management Option	New Septic Systems	Existing Septic Systems
Require connection to sanitary sewer (if available) when system fails		X
If sanitary sewer is not available when system fails, require repairs to be made using current regulations, including a soils test to determine the best type of system for the site		X
Require County Board of Health to be involved in the building permit review process for modifications to existing structures		X
Offer inspection and/or pump-out incentive program	X	X
Require inspection and/or maintenance at 5-year intervals	X	X
Conduct special homeowner education program within critical areas	X	X
Make critical areas a priority for sewer service connections in local wastewater master plan	X	X
Institute or enhance water quality monitoring in critical areas with a focus on pollutant source identification	X	X
Require larger minimum lot size (based on site criteria) in critical areas	X	
Increase tank size requirement by 50 percent and increase drain field length in critical areas	X	
Require new systems to install risers at grade in critical areas	X	
Require the County Board of Health to be involved in initial site plan review for new developments (before roads and lots are cut)	X	

Management options may vary within a jurisdiction based on the critical area being protected. For example, critical areas with bedrock or poor soils may require larger minimum lot sizes for septic systems, but critical areas associated with a drinking water supply watershed may require inspections and maintenance of septic systems every 5 years. County Boards of Health are prohibited from implementing mandatory maintenance for non-mechanical septic systems. However, local governments and utilities have passed local ordinances to regulate the maintenance of septic tanks.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

ACTION ITEM

INTEGRATED-10: SEPTIC SYSTEM SEPTAGE DISPOSAL

Responsible Parties: Local Government, Local Wastewater Provider	Intent: To minimize illegal dumping of septage by providing for proper disposal.

Action Item: Develop a plan for the disposal of septage generated within a local jurisdiction at local WWTPs or alternative disposal locations.

Sub-Tasks:

Local Governments shall:

1. Develop a plan for septage disposal when determining future areas served by septic and developing wastewater master plans.

Local Wastewater Providers who accept septage shall:

2. Determine acceptable parameters for septage disposal at local wastewater treatment facilities.
3. Collect septage hauling manifests and provide them to the County Board of Health at least once per year.
4. Plan for future septage disposal needs when upgrading or designing new wastewater treatment facilities.
5. Report septage quantity received, rate structure for disposal, and septage receiving policies each year to the District by treatment facility. This information will be used for District tracking as well as shared with the GADPH for coordination with certified haulers.

Description and Implementation: Illegal dumping of septage into local waterways presents a water quality problem, and illegal dumping into manholes can disrupt operations at the wastewater treatment facilities. Further, septage manifests and greater collaboration with the County Board of Health are necessary to provide documentation and accountability regarding local septage haulers. To minimize illegal dumping, it is essential that local governments and wastewater providers maintain a plan for proper septage disposal when determining future areas to be served by septic systems.

Local wastewater providers should plan for future septage disposal demands based on local wastewater master plans. Local wastewater providers should plan for future septage disposal demands when developing wastewater master plans (Action Item INTEGRATED-4) to account for anticipated zoning density, average disposal frequency and the design of WWTP expansions and/or new wastewater facilities.

The septage disposal plan should address, at a minimum: days/times of the week when septage is accepted, volume of septage allowed per day, quality of septage accepted, and pricing structures that incentivize the proper disposal of septage. Septic systems should not be permitted in a location where sufficient capacity for septage disposal has not been identified.

Septage haulers are required to submit copies of their hauling manifests to the wastewater facilities. Wastewater providers must forward these manifests to the County Board of Health as a record of proper septic tank maintenance. At a minimum, these manifests should be forwarded annually, but monthly is recommended. Local monitoring of hauling manifests will help to track whether septage is being properly disposed and minimize public health and environmental problems associated with illegal septage disposal.

Local wastewater providers shall report septage quantity received, receiving policies and rates for septage received at each wastewater treatment facility annually to District. The District shall publish this information each year and provide it to GADPH for coordination with local County Boards of Health and certified haulers.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

ACTION ITEM

INTEGRATED-11: SEPTIC SYSTEM MAINTENANCE EDUCATION

Responsible Party: Local Government	**Intent:** To encourage proper maintenance resulting in longer septic system life and lower numbers of system failures.

Action Item: Each local government shall offer ongoing septic system maintenance education as part of a local government's watershed management education programs.

Description and Implementation: In Georgia, each septic system owner is responsible for proper operation and maintenance of their septic system. New homebuyers and even existing homeowners may be unsure whether their new home has a septic system, and they often do not have information on how to properly maintain a septic system. GADPH estimates that 1 percent of the state's septic systems is failing and over half of those failures are due to lack of maintenance. Routine maintenance of these systems may extend their life and reduce the number of failures. GADPH estimates that pumping a septic tank at least once will double the life expectancy of a drainfield. Public education is needed to promote and support proper septic tank maintenance.

Action Item PUBLIC EDUCATION-1 provides detailed implementation guidance for this Action Item. It requires that all local governments implement local public education activities, and it specifies that at least one watershed management public education activity shall address septic system maintenance.

GADPH, District and others provide resources to educate the septic system owners about the need for proper maintenance. GADPH's Manual for On-site Sewage Management Systems provides general guidance for operation and maintenance. Additionally, the District has developed education tools for homeowners, and these resources available on the District's website.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Public Education and Awareness Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/
- GADPH, Manual for On-site Sewage Management Systems, June 2019, https://dph.georgia.gov/document/document/manual-site-sewage-management-systems-rules/download

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ACTION ITEM

INTEGRATED-12: PRIVATE DECENTRALIZED WASTEWATER SYSTEMS ORDINANCE

Responsible Party: Local Government	Intent: To encourage proper design, operation, and maintenance of private decentralized wastewater systems to protect human and environmental health.

Action Item: Adopt and maintain local ordinances regarding private decentralized wastewater systems.

Sub-Tasks: Each local government shall:

1. Adopt a private wastewater system ordinance that either prohibits private decentralized wastewater treatment systems or provides technical specifications for these systems.
2. Provide a copy of the ordinance to Georgia EPD and incorporate into local wastewater master plans.

Description and Implementation: A private decentralized wastewater system is defined as any privately owned wastewater collection, treatment, or disposal system that: (1) serves more than one residential lot or business, or (2) has a daily flow in excess of 2,000 gallons or (3) flows between more than one parcel or tract of land. Most of the jurisdictions in the District have at one time relied upon small private decentralized wastewater treatment systems to establish sewer services. Some communities may view private decentralized systems as building blocks toward the long-term expansion of the wastewater collection system without the need for initial public funding. Alternatively, a community can choose to incorporate decentralized wastewater systems into its permanent portfolio of wastewater collection, treatment, and disposal alternatives.

This Action Item is not applicable to on-site, non-potable water reuse systems connected to an existing centralized sewer system.

Local governments in coordination with local wastewater providers should determine the long-term community impact of decentralized wastewater systems and adjust long-term wastewater master plans accordingly (Action Item INTEGRATED-4). Local governments must either:

- Enact a local ordinance prohibiting private decentralized wastewater systems, or
- Enact a local ordinance establishing specific conditions for private decentralized wastewater systems.

In selecting from these two options, each local government should consider the long-term impacts of private decentralized wastewater systems on water quality, existing and planned wastewater operations, assimilative capacity, and consumptive use. Private decentralized systems create potential adverse water quality impacts similar to those of septic systems if not properly operated and maintained. Private decentralized systems are often required by state regulation to use land application or subsurface disposal methods for treated effluent. While research is ongoing, it is uncertain whether, and to what extent, these disposal methods contribute to wastewater return flows and this impact should also be factored into the local ordinance decision. Typically, wastewater modeling assumes that these methods are 100 percent consumptive as a conservative modeling assumption.

Local governments should coordinate with your local wastewater provider anytime changes are proposed to the ordinance.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

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ACTION ITEM

INTEGRATED-13: CORPS RESERVOIRS – STORAGE, WITHDRAWALS AND RETURNS

Responsible Parties: Local Water Provider (Allatoona and Lanier), Local Wastewater Provider (Allatoona and Lanier)	Intent: To develop an integrated, regional approach for the efficient and sustainable use of water supply storage in Allatoona Lake and Lake Lanier, considering both the availability of water and storage, the return of highly treated wastewater to these reservoirs, and the potential to expand future water supplies through indirect potable reuse.

Action Item: Coordinate integrated water supply uses and the return of highly treated wastewater to Lake Lanier and Allatoona Lake to support the long-term, sustainable use of water from these reservoirs and their watersheds.

Sub-Tasks:

Local Water Providers that withdraw, or plan to withdraw, water from Allatoona Lake or Lake Lanier shall:

1. After the date of this Plan, coordinate with the State of Georgia through its designated implementing agency(ies) in any requests for water supply storage from the Corps in either Allatoona Lake or Lake Lanier.

Local Wastewater Providers that return, or may in the future return, highly treated wastewater to Allatoona Lake, Lake Lanier, or any tributary to these reservoirs shall:

2. Ensure that treatment capacity developed by the local wastewater provider and permitted wastewater discharges are consistent with the projected wastewater treatment capacities and wastewater discharges included in this Plan (as it may be amended from time to time).
3. If due to changed circumstances or an increase in projected wastewater flows compared to what is included in this Plan a local wastewater provider plans to (a) increase its wastewater treatment capacity by building a new or expanded WWTP, (b) change the location of a currently permitted wastewater discharge to a new location outside of the river basin from which the water was sourced or (c) enter into a new or expanded intergovernmental agreement to send wastewater flows to another local wastewater provider – then the local wastewater provider shall request an amendment to this Plan reflecting such changes. Any requested amendment must be approved by the District prior to Georgia EPD issuing the requested permit.
4. Any local wastewater provider seeking an amendment to this Plan as described in Sub-Task 2 shall meet with District staff and provide any information necessary to support an amendment to this Plan. Such information may include, but is not limited to, current wastewater discharge information, projected future wastewater flows, and capital improvement plans (CIPs). In reviewing the requested amendment, the District's governing board shall consider, among other factors, whether the local wastewater provider's requested amendment includes returning, where feasible, highly treated wastewater to Allatoona Lake, Lake Lanier and their tributaries.

Description and Implementation: Returning highly treated wastewater to Lake Lanier, Allatoona Lake, and the tributaries to these reservoirs, where feasible, is a priority within the District and necessary to support the long-term sustainable use of these water supply sources.

The return of highly treated wastewater to Lake Lanier and Allatoona Lake is a critical component of the District's water supply planning, which relies on indirect potable reuse to enhance and extend the region's water supplies to meet the region's long-term water needs. Indirect potable reuse is a water supply strategy in which highly treated wastewater is returned to a water supply source, so that the returned water can be withdrawn and reused. Within the District, indirect potable reuse occurs on a significant scale at Lake Lanier and Allatoona Lake, the region's primary water supply sources.

Indirect potable reuse is an environmentally sound water supply strategy that maximizes the use of existing infrastructure and that avoids unnecessary environmental impacts and, in many cases, economic costs from making investments in additional water supply infrastructure. However, the continued development and reliance on indirect potable reuse at Allatoona Lake and Lake Lanier depends to a significant degree on the adoption of appropriate policies by the Corps that ensure returned water is available to meet water supply needs.

Extensive infrastructure investments will be required to continue and expand indirect potable reuse at Lake Lanier and Allatoona Lake. Further, returning highly treated wastewater to these sources for indirect potable reuse will increase treatment and pumping costs relative to other wastewater treatment options. The extent of these cost increases will vary based on factors such as the available assimilative capacities of the receiving waters, treatment costs, the degree to which pumping is needed and the length of any new conveyance that may be required, and will be considered as part of the feasibility analysis of specific indirect potable reuse projects.

Consistent with its authority to regulate the impoundment and use of surface water in Georgia, the State of Georgia has promulgated rules under which the Director of Georgia EPD may grant users the right to impound or withdraw "made inflows" to Lake Lanier and Allatoona Lake, among other waters. The State of Georgia, through Georgia EPD, has exercised this authority at Allatoona Lake to allocate certain made inflows to the Cobb County-Marietta Water Authority. Additional allocations of made inflows at Lake Lanier will be addressed by Georgia EPD in the future, as warranted by conditions at the time. Assuming the Corps continues to recognize made inflows at Allatoona Lake and agrees to do so at Lake Lanier in the future, then for many users the best alternative to increase supply will be to increase returns.

Successful implementation of large-scale indirect potable reuse at Lake Lanier and Allatoona Lake requires close coordination among local water providers, wastewater providers, District staff, and relevant regulatory agencies. The amount of water supply available to local water providers depends, in part, on the volume of water that is returned to the water supply source. At the same time, the return of highly treated wastewater to water supply reservoirs implicates complex wastewater discharge permitting considerations, including applicable water quality requirements for the receiving water bodies, available assimilative capacity, and compliance with any applicable Total Maximum Daily Loads (TMDLs), wasteload allocations, and permit limits. Furthermore, due to the geography of the region and the applicable treatment requirements, there are special considerations and potential additional costs associated with planning for, developing, and operating wastewater treatment infrastructure necessary to return water to these sources. For example, increasing wastewater returns to Allatoona Lake and Lake Lanier may mean lower permit limits or needed reductions in nonpoint source loads.

Meeting water supply demands from Lake Lanier or Allatoona Lake, or changing the location or amount of wastewater discharges to Lake Lanier, Allatoona Lake or their tributaries, requires careful coordination and planning. The requirements included in the Sub-Tasks above are intended to facilitate that effort. They will ensure that necessary information is provided to the relevant entities in a timely manner, and that the region's water and wastewater infrastructure is developed in a careful and balanced manner that ensures adequate water supplies and wastewater capacity will be available throughout the planning horizon and beyond.

A local wastewater provider seeking an amendment to this Plan should provide supporting information showing its decision-making process and its evaluation of the feasibility of returning highly treated wastewater to Allatoona Lake, Lake Lanier, and their respective watersheds. The District may make reasonable requests for additional supporting information. It is recommended that local wastewater providers seek an amendment as early as possible in the local wastewater planning process. Determining what is feasible involves a variety of factors that will vary among local wastewater providers based on the specific facts and circumstances presented.

The District will provide notice of amendment requests pursuant to this Action Item to Georgia EPD prior to the District's governing board acting on such amendment requests.

References to the Plan in this Action Item and elsewhere include Appendix B.

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Resources:

- Georgia 2015 Water Supply Request
- Corps Apalachicola-Chattahoochee-Flint (ACF) Final Environmental Impact Statement and Water Control Manual
- Corps Alabama-Coosa-Tallapoosa (ACT) Final Environmental Impact Statement and Water Control Manual
- TMDL Information

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ACTION ITEM

INTEGRATED-14: ENCOURAGING THE RETURN OF HIGHLY TREATED WASTEWATER TO THE CHATTAHOOCHEE AND FLINT

Responsible Parties: Local Wastewater Provider (Chattahoochee and Flint Only)	Intent: Support the long-term sustainability of water use from the Chattahoochee River Basin below Buford Dam and the Upper Flint River Basin by encouraging, where feasible, returns of highly treated wastewater to these basins. Returns above Buford Dam are addressed in Integrated-13.

Action Item: Consider, where feasible, returning any water sourced from the Chattahoochee River Basin below Buford Dam or Upper Flint River Basin as highly treated wastewater to these basins when making future decisions regarding WWTPs and related sewer lines, pump stations and other conveyance infrastructure.

Sub-Tasks:

Local Wastewater Providers that treat water sourced from the Chattahoochee River Basin below Buford Dam or the Upper Flint River Basin shall:

1. Ensure that treatment capacity developed by the local wastewater provider and permitted wastewater discharges are consistent with the projected wastewater treatment capacities and wastewater discharges included in this Plan (as it may be amended from time to time).
2. If due to changed circumstances or an increase in projected wastewater flows compared to what is included in this Plan a local wastewater provider plans to (a) increase its wastewater treatment capacity by building a new or expanded wastewater treatment plant, (b) change the location of a currently permitted wastewater discharge to a new location outside of the river basin from which the water was sourced or (c) enter into a new or expanded intergovernmental agreement to send wastewater flows to another local wastewater provider – then the local wastewater provider shall request an amendment to this Plan reflecting such changes. Any requested amendment must be approved by the District prior to Georgia EPD issuing the requested permit.
3. Any local wastewater provider seeking an amendment to this Plan as described in Sub-Task 2 shall meet with District staff and provide any information necessary to support an amendment to this Plan. Such information may include, but is not limited to, current wastewater discharge information, projected future wastewater flows, and CIPs. In reviewing the requested amendment, the District's governing board shall consider, among other factors, whether the local wastewater provider's requested amendment includes returning, where feasible, highly treated wastewater to the Chattahoochee River Basin below Buford Dam and the Upper Flint River Basin.

Description and Implementation: Returning highly treated wastewater to the Chattahoochee River Basin and Upper Flint River Basin can affect the future potential for indirect potable reuse, increase base flows and improve overall watershed management in these basins. To support the sustainable use of these river basins, the return of highly treated wastewater, where feasible, is an important planning principle to be considered by local wastewater providers when preparing and implementing local

wastewater master plans and by the District's governing board when it considers future amendments to this Plan.

A local wastewater provider seeking an amendment should provide supporting information showing its decision-making process and its evaluation of the feasibility of returning water sourced from the Chattahoochee River Basin below Buford Dam or Upper Flint River Basin as highly treated wastewater to these basins. The District may make reasonable requests for additional supporting information. It is recommended that a local wastewater provider seek an amendment as early as possible in its local planning process.

Determining what is feasible involves a variety of factors that will vary among local wastewater providers based on the specific facts and circumstances presented.

As described in item 7 of the general section of Georgia EPD's Water Planning Guidance issued on February 21, 2020, Georgia EPD directs the District to include measures that, where feasible, minimize net losses from interbasin transfers from each of the six river basins in the District. Additionally, item 4 of the wastewater section of the Water Planning Guidance directs the District to encourage the return of water to the Upper Flint Basin, where feasible, to support long-term sustainability of water use from this basin.

The historical development of wastewater systems has resulted in a net interbasin transfer out of the Upper Flint River Basin. Due to the unique flow characteristics of the Upper Flint River Basin, local wastewater providers should prioritize future return of water withdrawn from the Upper Flint River Basin back to this basin, where feasible, in accordance with this Action Item. Though not a requirement under this Plan, future planning may include the return of water withdrawn from other sources, where feasible, and taking into account impacts on the source watershed, where such returns could offset existing net interbasin transfers out of the Upper Flint River Basin.

For local wastewater providers that currently return highly treated wastewater to both Lake Lanier and the Chattahoochee River Basin below Buford Dam, they may continue doing so in accordance with prior arrangements as reflected in this Plan. If an amendment to this Plan is needed as outlined in Sub-Task 2, then the local wastewater provider shall as a first priority consider returning, where feasible, to Lake Lanier, as outlined in INTEGRATED-13 and then as a second priority, returning, where feasible, to the Chattahoochee River Basin below Buford Dam as outlined in this INTEGRATED-14.

The District will provide notice of amendment requests pursuant to this Action Item to Georgia EPD prior to the District's governing board acting on such amendment requests.

References to the Plan in this Action Item and elsewhere include Appendix B.

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5.2 Water Supply and Water Conservation Action Items

Since 2000, Metro Atlanta's per capita water demands in the region have declined by more than 30 percent. The District has been recognized for its water conservation and efficiency efforts by the EPA's WaterSense program for 8 years in a row, most recently winning their fifth Sustained Excellence Award in October 2022. To build on these successes and to ensure the region's needs are met for years to come, the District is committed to building on its national leadership on water conservation and to better preparing for drought.

5.2.1 New and Updated Action Items

Through the Action Items in this plan, the District and local water providers will take actions to put continued downward pressure on per capita water demands by requiring the use of proven water efficient technologies, to promote new and innovative water efficient technologies through voluntary programs, and to improve the region's readiness to educate and implement watering restrictions when needed during times of drought.

The following new and expanded Action Items are included in this plan:

- Residential Customer Leak Reduction Programs (WSWC-5). Reducing water leaks on the customer-side of the water meter presents a good opportunity to reduce water use and improve customer service. Policies offering credits to customers who repair leaks in a timely manner are already in place for many local water providers. This new Action Item will instate this best practice regionwide. Advanced metering infrastructure (AMI) and new customer-side smart leak detection technologies offer another way for local water providers and their customers to work together on reducing leaks. Based on regional progress on AMI installation, completed feasibility studies, and extensive good faith efforts of local water providers since the 2017 District Plan, the AMI Action Item is being deleted and replaced with the Residential Customer Leak Reduction Programs as the new WSWC-5.
- Metro Water District – Water Efficiency Code Requirements (WSWC-8). Georgia established itself as a national leader when the state passed the Water Stewardship Act of 2010, which directed the Georgia Department of Community Affairs to set more efficient state-wide minimums for indoor water efficiency. In the past 11 years, new water efficient fixtures and appliances have been developed and become widely available at comparable prices in the marketplace. This Action Item also expands and adds to the landscape irrigation system design requirements from the 2017 Plan by applying many of the requirements to all systems and not just large landscapes. The requirements now include pressure regulation through a WaterSense-labeled spray sprinkler body or other devices, which helps improve system performance, reduce misting and overspray, and reduce the number and size of leaks. The District's Water Efficiency Code Requirements will be adopted as local amendments to the plumbing code and will require the use of these more efficient fixtures, appliances, and landscape irrigation system technologies in all new installations starting January 1, 2024.
- Local Drought Response and Water Waste Ordinance/Policy (WSWC-13). As a complement to the requirement in the 2017 Plan to have a water waste ordinance or policy, the 2022 Plan is enhancing the model water waste provisions and adding a requirement for a drought response ordinance or policy. These ordinances and policies can form the basis of water conservation education programming, and when drought conditions merit, local water providers will be ready to enforce these restrictions as necessary. While education should be the primary approach, being ready to respond to drought quickly will improve the resiliency of the region's water supplies. By responding quickly and achieving early results, local water providers reduce the likelihood that more stringent watering restrictions may be needed during a drought.

- Water Loss Control and Reduction (WSWC-15). Compared to the 2017 Plan, new data grades are now required for key inputs. This renewed focus on both water loss and data is based on the implementation work completed since the 2017 Plan. Improving the data grades for these key inputs is important because they are associated with some of the largest volumes of water and are heavily weighted in the overall data validity score. Improving these scores will help identify the best ways to achieve the real water loss goals and therefore help utilities prioritize expenditures on real water loss. The deadline for demonstrating progress contained in the 2017 District Plan has been extended to 2028 and new data grades are now required for key inputs.

Based on these nation-leading water conservation efforts and the water supply planning in Appendix B, existing or planned water supply infrastructure will be in place to meet the District's 2040 water demands. As a result, there are no water supply action items needed at this time.

5.2.2 Local Drought Planning Guide

The new and expanded action items are intended to improve the region's water efficiency on an ongoing, long-term basis, and to supplement these actions, the District is also preparing a local drought planning guide. This guide is intended to assist local water providers in preparing for and responding to drought on an acute basis. The Georgia Environmental Protection Division Drought Management Rule (EPD Drought Rule)[1] and related state laws[2] establish the requirements for drought response in Georgia. The local drought planning guide is intended to assist local water providers in understanding the EPD Drought Rule and to support a coordinated, effective, and regionally consistent approach to implementation. The District plans to finalize the local drought planning guide in 2022 alongside the 2022 Plan. By combining ongoing, long-term action items and with improved, acute drought response, the District and its local water providers are taking the planning steps needed to improve our region's resilience.

5.2.3 Outdated, Duplicative and Redundant Action Items

Some changes have been made to the Action Items in the 2022 Plan to address items that are out of date or that are duplicative of state and federal requirements. Focusing on the most impactful local actions and avoiding redundancy of efforts are essential to an effective program. Recognizing the successes achieved over the last 20 years of planning, some Action Items have been sunset. This allows local water providers and local governments to be recognized for what they have achieved thus far and to focus their energy on the new and expanded Action Items in the 2022 Plan. More explanation is included in this section where Action Items have been deleted. While not achieved in all the same ways or with all the same Action Items, the new and expanded Action Items are intended to improve and increase the overall level of water conservation and related savings.

[1] Drought Management Rules, Ga. Comp. R. & Regs. 391-3-30 available at http://rules.sos.ga.gov/gac/391-3-30.
[2] OCGA § 12-5-7 (Local variances from state restrictions on outdoor watering; limitations on outdoor irrigation; exceptions); OCGA § 12-5-8 (Rules and regulations relating to drought management); Surface water withdrawals, Ga. Comp. R. & Regs. 391-3-6-.07(4)(b)(9) (relating to drought contingency plans and potable water use priorities).

WSWC-1: WATER CONSERVATION PROGRAM

Responsible Parties: Local Water Provider, Local Government	Intent: To maintain and sustain a water conservation program meeting national standards.

Action Item: Provide sufficient funding and staffing to implement the required water conservation measures in this Plan.

Sub-Tasks: Each local government and local water provider shall:

1. Provide for sufficient funding to implement the required water conservation measures in this Plan; funding levels will vary from jurisdiction to jurisdiction.
2. Provide for dedicated, conservation-focused staffing to implement the required water conservation measures in this Plan; staffing levels will vary from jurisdiction to jurisdiction.

Description and Implementation: The water conservation measures in this Plan require coordinated planning and action by local water providers and local governments. Many water conservation measures involve interdepartmental coordination for effective implementation and enforcement.

Funding and staffing needs for water conservation implementation will vary from jurisdiction to jurisdiction. Implementation may require existing staff to assume new responsibilities or additional staff to be hired. Each jurisdiction should determine, in its judgment, what staffing and funding levels are sufficient to meaningfully implement and enforce the conservation measures in this Plan.

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WSWC-2: CONSERVATION PRICING

Responsible Party: Local Water Provider	Intent: To reduce discretionary water use by increasing the cost of water as the volume of use increases.

Action Item: Implement water conservation pricing rate structures as a means to reduce discretionary water use.

Sub-Tasks: Each local water provider shall:

1. Institute a minimum three-tiered water conservation pricing schedule for single-family residential customers.
2. Determine appropriate rates for commercial, multifamily, industrial, and institutional categories that encourage conservation by reducing discretionary water use.
3. If irrigation meters are allowed, develop an irrigation meter pricing schedule that recognizes the impact on peak demand from irrigation. The irrigation rate should be significantly higher than the rate for indoor use. At a minimum, the rate for irrigation use by all customer classes should be equal to or greater than 200 percent of the first-tier rate for single-family residential customers.

Description and Implementation: In general, tiered rate structures that charge higher rates for higher levels of water use encourage conservation. A rate and revenue analysis can help determine the rates to assign each tier, evaluate the effect on the revenue stream and maintain equitable billing rates. By meeting the requirements of this Action Item, each local water provider satisfies its obligation under Georgia EPD's Drought Management Rule (391-3-30) to develop a drought surcharge plan.

Water providers shall perform the necessary analysis to select the most appropriate pricing scenarios. The District has developed guidance to help local water providers determine appropriate rate structures for various customer classes. Local water providers should perform a rate and revenue analysis to determine what percent of customers will typically fall into each tier to produce an estimated revenue stream over time, including fixed charges. It is important to note that local water providers may elect to create more than three tiers to further enhance water conservation and revenue needs. Each local water provider should establish rate structures based on a local rate study and an understanding of the local customer base. It is recommended that local water providers periodically review rates to determine the effectiveness of the conservation pricing schedule and adjust conservation pricing to respond to changes in demand. As part of this process, local water providers should review and adjust pricing schedule to respond to changes in demand and ensure sufficient operation and maintenance funds are available on an as-needed basis.

In some communities, water conservation by commercial, multifamily, institutional, and industrial customers may be encouraged by adopting a tiered rate structure for these customers. In other communities, commercial, multifamily, institutional, and industrial customers may have water use patterns that are more appropriate for uniform rates. While the rate structure for these customer categories is left to the discretion of the local water provider, declining block rate structures are not allowed within the District.

The District recognizes as a best practice using non-potable reuse water for irrigation for existing outdoor landscapes when offsetting an existing potable water supply source and combined with a conservation pricing strategy consistent with this Action Item. Refer to Section 2.1 for more on the District's reclaimed water policy. The District must balance its own needs with the needs of instream water quality and downstream uses. While non-potable reuse water is currently offered by a handful of utilities in the District, usually for irrigation, the District discourages these and other uses when they increase net consumption.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- American Water Works Association (AWWA) M1 Principles of Water Rates, Fees and Charges, 6th Edition, 2012, https://www.awwa.org/portals/0/files/publications/documents/m1lookinside.pdf
- GEFA, University of Georgia (UGA) Carl Vinson Institute for Government, and University of North Carolina Environmental Finance Center, Georgia Water and Wastewater Rates Dashboard and Reports
- AWWA/Raftelis Biannual Water and Wastewater Rate Surveys

WSWC-3: BILLING CYCLES AND BILLING SYSTEM FUNCTIONALITY

Responsible Party: Local Water Provider	Intent: To facilitate water conservation through improved billing system functionality.

Action Item: Implement billing systems that communicate usage with customers, bill on a monthly basis and provide regionally consistent water consumption data.

Sub-Tasks: As billing software is replaced or upgraded, each local water provider shall:

1. Sub-divide customers into the following minimum principal customer categories where appropriate: single-family residential, multifamily residential, commercial, industrial, and institutional.
2. Bill monthly to allow customers to track water use more effectively.
3. Provide historical and current data on bills and when customers pay online.
4. Clearly identify the billing units, with preference given toward gallon-based units. Most customers are familiar with gallons as a unit of measure and less familiar with other units.
5. Include explanation of conservation pricing to customers on their bills or a link on their bills to such information on the website.

Description and Implementation: Billing systems that are capable of providing frequent and current information about usage allows customers and water providers to identify sudden changes that might be attributed to leaks or changes in use patterns. Systems that have monthly billing allow customers, especially those on fixed incomes, to manage their monthly budget more effectively. Additionally, systems that incorporate customer billing categories can provide information on customer equity, cost of serving the customer class, average consumption volume by customer class, and impact of rate changes on affected customers. Regionally consistent customer classes would also allow for more accurate analyses and assessments of future water demands and needs. In addition to the minimum principal categories, utilities may include additional principal categories and further expand them into subcategories as recommended in Table 5.1 of Water Research Foundation Project 4527, if they help meet local utility needs for water use or rate analysis.

It is important to note that water providers are not required to update existing billing software. However, as software is replaced or upgraded, local water providers shall include the functionality described in the Sub-Tasks and monthly billing cycles to facilitate conservation. Local water providers shall assess the feasibility, time, and cost to implement a monthly billing program. Water bills, in both paper and electronic formats, should show the amount and cost of water used separately from wastewater and other charges and also provide monthly consumption history.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources

- Evaluation of Customer Information and Data Processing Needs for Water Utility Planning and Management, Water Research Foundation Project 4527
- GAWP, Georgia Water Use and Efficiency Reporting Guidance for Public Water Systems, October 2012

- Water Research Foundation, Evaluation of Customer Information and Data Processing Needs for Water Demand Analysis, Planning, and Management, Project 4527, 2016, https://www.waterrf.org/sites/default/files/file/2020-03/SWMC17-Kiefer_Krentz.pdf

WSWC-4: PRIVATE FIRE LINES MONITORING REQUIREMENT

Responsible Party: Local Water Provider	Intent: Identify and reduce unmetered water losses by monitoring private fire lines in commercial buildings.

Action Item: Adopt and maintain an ordinance or policy to monitor private fire lines supplying new or substantially renovated commercial buildings to identify avoidable system leakage and non-fire related water consumption through full-flow meters or double-detector checks.

Description and Implementation: Monitoring all possible water uses, including private fire lines, reduces inaccuracies when identifying the potential sources of water system losses.

A private fire line is a commercial customer connection supplying water to a fire sprinkler system or private fire hydrant. Once connected, private fire lines are not used often, but they need to be tested and maintained. As a best practice, fire lines should be kept in good repair and not interconnected with other service pipes. Water drawn from fire lines is for fire protection purposes and should not be used for other non-fire-related purposes.

The purpose of this Action Item is to monitor private fire lines. Although meters that measure flow are preferred, meters can be simple detector check valves that indicate the presence of flow. An option would be to adopt a policy to require a meter for any private fire line that shows use on a detector check for some specified period of time (for example, over 3 consecutive months).

Annual flushing maintains water quality in a private fire line between the public water main and the backflow prevention assembly. The private fire line is flushed through the system main drain or private fire hydrant. During this period, the private fire line is fully opened, and the amount of water to be discharged (from the tap on the public water main to the backflow prevention assembly) through the flushing apparatus is equivalent to five times the volume of water in the private fire line. Metering these maintenance events would provide the property owner and the local water provider with an accurate measure of the amount of water used during maintenance and testing. If private fire service lines are not metered, the water used in testing is not measured and can be improperly categorized.

Each local government shall determine what constitutes substantial renovation, thereby triggering the requirement that meters or double-detector checks be installed on existing commercial buildings. However, the threshold for substantial renovation should be at such a level that it will be reasonable to expect that new meters or double-detector checks will be installed in at least some existing commercial buildings each year.

Local water providers that are part of a local government should pass an ordinance, and local water providers that are authorities should establish written policies. All policies must be written policies that either include their date of adoption or are accompanied by other documents (for example, letters, emails, memoranda) that establish when the written policy was adopted.

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Resources:

- Metro Water District Memorandum re: Optional Model Language Provided as Technical Assistance for Meeting the Requirements of Action Item WSWC – 4 (Metering Private Fire Lines)

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WSWC-5: RESIDENTIAL CUSTOMER LEAK REDUCTION PROGRAMS

Responsible Party: Local Water Provider	Intent: Identify and reduce leaks on the customer side of residential meters to reduce wasted water, surprise increases in water bills, and property damage.

Action Item: Implement programs to assist separately metered residential customers in identifying and repairing leaks in a timely manner.

Sub-Tasks: Each local water provider shall:

1. Adopt a policy providing for a bill reduction credit to any residential customer with an unusually high water bill when the customer demonstrates they timely repaired a leak on the customer side of the meter. Such policy shall be referenced and made available on the local water provider's website and through one or more of the following methods: customer bills, bill inserts, robocalls, emails, or text alerts.
2. Implement one of the following two programs:
    a. Active participation in a rebate program, offering rebates to customers that install smart leak detection devices. This can be accomplished through enrollment in a District-facilitated rebate program. This program will be managed by District staff until the sunset date of December 31, 2025. Local water providers may create and operate their own rebate program for smart leak detection devices.

        or

    b. For systems that use AMI for a significant portion of their residential customer meters, offer a constant consumption notification program, which can be a voluntary, customer-initiated program through a web-based portal or a centrally administered program with periodic notices for AMI customers.

Description and Implementation: This Action Item is focused on reducing leaks on the customer side of the water meter of residential customers with separate utility meters. A leak for the purpose of this Action Item includes, but is not limited to, running toilets, dripping plumbing fixtures, breaks in water service lines and irrigation systems, malfunctioning pool and spa fill lines and equipment, burst pipes in the home, and constant consumption by water filters, humidifiers, and water softeners.

Some local water providers in the District already have policies offering bill reduction credits when a customer can show they had a high water bill attributed to a leak that was repaired in a timely fashion. While these programs are often focused on customer assistance, offering a customer a bill reduction credit for timely repairs also helps reduce the number and duration of leaks. For example, by incentivizing customers with a bill reduction credit, they are more likely to purchase replacement parts or professionally repair the leak. Local water providers remain free to set and determine the details of their policies locally as long as they provide a bill reduction credit, require timely repair of the leak, and are made available on the local water provider's website. Components of a good program typically include clear eligibility guidelines, promotion to reach customers with unusually higher water bills, stated limits on the maximum dollar value or percentage of any discount on the amount in excess of normal use, a standard number of days for what constitutes timely repair, what evidence of the repair must be submitted, and a process for the local water provider to evaluate and improve the program over time based on experience. The frequency of notices via customer bills, bill inserts, robocalls, emails, or text alerts is at the discretion of the local water provider.

Note: Local water providers should consider establishing policy and educating customers on whether they are allowed to install smart leak detection devices on the utility meters or within the meter box. With or without a rebate program, a small group of customers have already started installing smart leak detection devices, so proactively addressing any installation-related concerns is advisable.

A smart leak detection device is a technology that enables a home's occupant to monitor and respond to water usage and/or leaks in real time. As part of the internet of things, these technologies are connected to the internet and can send, and in many cases receive, data and communications. Several types of smart leak detection devices are available in the marketplace, including devices that strap onto the utility meter, devices that strap onto the water service line near where it enters the home, devices that are installed in line with the water service line that contain automatic shut-off valves, and devices that can be placed near pipes and plumbing fixtures that detect moisture following a leak. Given the real-time information, customers can avoid surprise water bills and may be able to avoid or limit property damage caused by leaks.

For utilities that wish to create their own smart leak detector rebate programs, the District can provide technical assistance and convene interested local water providers to assist in the creation of accessible, high-quality rebate programs. Local water providers may set the rebate amount at whatever level they determine is appropriate based on the cost of the technologies, the size of the incentive needed to drive some customers to install them, and the budgets of the local water providers. Local water providers must be able to show that at least some rebates were funded and made publicly available each calendar year. The District encourages funding levels sufficient to meet demand, and the District can recommend, upon request, funding levels and rebate amounts for each local water provider based on the District's experience and research.

Metering technology has advanced greatly over the last 10 years in terms of the accuracy of the measuring devices and the ability to acquire readings. Installation of AMI systems can improve the accuracy of information used to support water management and conservation.

Local water providers using AMI for their residential accounts have the option to create constant consumption notification programs using the hourly meter data they collect. The term "constant consumption" is used here because it is harder to identify leaks with the hourly data from AMI compared to the instantaneous data available from smart leak detection devices. Local water providers may offer customers a web-based portal where customers can choose to sign up for alerts, or they may offer a centrally administered program where local water provider staff periodically review, flag, and notify customers with constant consumption that exceeds a certain threshold level of use for a defined number of hours. Many programs offer customer notifications by text, email, or robocall. Some programs also provide in-person visits for exceptionally high volumes of continuous usage.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

WSWC-6: TOILET REPLACEMENT PROGRAM

Responsible Party: Local Water Provider	Intent: To reduce indoor water use and speed the conversion of older, inefficient toilets toward WaterSense-labeled high-efficiency toilets in single- and multifamily homes.

Action Item: Implement a program to replace older, inefficient toilets with WaterSense-labeled ultra high-efficiency toilets (UHETs) using 1.1 gallons per flush (gpf) or less in single- and multifamily homes. WaterSense-labeled toilets using 1.28 gpf are no longer eligible for rebates.

Sub-Tasks: Each local water provider shall, until toilet replacement program sunset date of December 31, 2025:

1. Establish a program to replace each year 3.5-gpf or greater toilets in single- and multifamily homes constructed prior to 1994 with WaterSense UHETs.
2. Provide information on opportunities to recycle any toilet being discarded pursuant to the toilet replacement program by linking to the District website or other local resources.

Description and Implementation: Single- and multifamily homes built prior to 1994 may contain inefficient toilets. While new toilets meet high efficiency standards, the replacement of older, inefficient toilets is needed to address existing stock and reduce indoor water use.

Before the 1950s, new toilets typically used 7 gpf. By the end of the 1960s, new toilets typically used 5.5 gpf; in the 1980s, new toilets typically used 3.5 gpf. The federal Energy Policy Act of 1992 required all new toilets use no more than 1.6 gpf by 1994. In 2010, the Georgia Water Stewardship Act required that local governments adopt or amend local ordinances to require, among other things, that all new construction, on or after July 1, 2012, use WaterSense-labeled toilets. WaterSense is a voluntary program of the EPA designed to identify and promote water efficient products and practices. WaterSense-labeled toilets are independently certified to meet rigorous criteria for both performance and efficiency. Today, WaterSense UHETs are increasingly available with efficiency levels of 1.1 gpf or less.

This Action Item calls for a program to replace toilets in single- and multifamily homes constructed prior to 1994 with WaterSense UHETs.

The toilet replacement program must specifically address toilet replacement rather than provide toilet retrofit devices. Local water providers must be able to show that rebates were funded and made publicly available each calendar year to both single-family and multifamily customers. For rebate programs, the District encourages funding levels sufficient to meet all demand, and the District can recommend funding levels for each local water provider upon request based on the District's experience.

Examples of acceptable toilet replacement programs include the following:

- Rebate incentive program: Customer receives a water bill credit, cash, or voucher to offset the cost of a new WaterSense UHET to be installed in a pre-1994 single- or multifamily home. Rebates shall be $75.
- Direct install program: Customer exchanges a toilet from pre-1994 single- or multifamily homes for a WaterSense UHET with discounted installation through the local water provider.
- Other: Local water providers may create their own programs as long as the program actually results in the replacement of toilets in pre-1994 single- and multifamily homes with WaterSense UHETs. These programs may take a variety of forms, including but not limited to on-bill financing programs

for toilet replacements and programs requiring that toilets using 3.5 gpf or more be replaced as a condition of a customer establishing water service.

If a local water provider chooses to have a single replacement program covering both single- and multifamily homes, funds may be made available on a first come, first served basis.

As a matter of customer service, rebates on 1.28-gpf toilets may still be allowed as a hardship exception when a customer in good faith purchases a dual-flush toilet with one flush at 1.1 gpf or less or uses an outdated paper rebate application form provided by a retailer.

Due to the high value of rebate programs for multifamily homes, it is recommended that the local water provider include an inspection element in any multifamily rebate program to prevent possible fraud. This can be done through a physical inspection or by reviewing billing data post-installation.

The local water provider should provide information on available toilet recycling opportunities. There are recycling facilities in the region that will recycle crushed porcelain for various uses, such as a concrete aggregate or bathroom tile. Many homeowners may not be aware of recycling options when replacing a toilet.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- EPA, WaterSense Toilets, information page, https://www3.epa.gov/watersense/products/toilets.html
- MaP Testing Premium Ultra-High-Efficiency Toilet page, 2022-02-02-ALL_MaP_PREMIUM-HETs.pdf (map-testing.com)

WSWC-7: RESERVED.

Based on completed retrofits by local water providers and local governments in the District, the Action Item requiring retrofitting government buildings with high efficiency toilets and urinals from the 2017 District Plan is no longer a required Action Item in the 2022 District Plan. All new and renovated government buildings will be required, like all buildings, to meet the new, Metro Atlanta Water Efficiency Plumbing Code Standards included in the 2022 District Plan as WSWC-8. WSWC-7 is being reserved in the 2022 Plan as a placeholder for potential, future action items in the 2027 District Plan update and beyond.

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WSWC-8: METRO WATER DISTRICT – WATER EFFICIENCY CODE REQUIREMENTS

Responsible Party: Local Government	Intent: To increase indoor and outdoor water efficiency through new requirements adopted as local plumbing code amendments.

Action Item: Each local government shall adopt by January 1, 2024 and thereafter maintain the Metro Water District – Water Efficiency Code Requirements as a local amendment to the Georgia State Minimum Standard Plumbing Code. No modifications may be made to the water efficiency requirements or the effective date.

Description and Implementation: Georgia established itself as a national leader when the state passed the Water Stewardship Act of 2010, which directed the Georgia Department of Community Affairs to set more efficient state-wide minimums for indoor water efficiency. In the past 11 years, new water efficient technologies and standards have been developed, and more efficient technologies have become widely available at comparable prices in the marketplace that increase indoor and outdoor water efficiency.

The indoor fixture efficiency requirements in the Metro Water District – Water Efficiency Code Requirements are based on detailed market research on cost, availability, performance, and customer satisfaction performed by District staff. Other requirements are based on cost-benefit analyses performed during the plan update process. The latest WaterSense standards are included as part of the requirements, and while the EnergyStar program is primarily focused on energy use, it is included in the requirements because it also addresses water use in appliances connected to water sources. The requirements are also consistent with other nation-leading mandatory codes adopted by other states and local governments and other green codes and standards like International Association of Plumbing & Mechanical Officials (IAPMO) 2020 Water Efficiency and Sanitation Standard for the Built Environment, and the International Code Council 700-2020 National Green Building Standard.

Outdoor landscape irrigation often results in excessive water use from overspray, an uneven application of water, or high pressure in the line that can cause leaks. Outdoor water efficiency for landscape irrigation systems can be improved by maintaining optimum pressure with regulators, rain-sensor shutoffs, WaterSense irrigation controllers (non-single-family only), and monitoring the system for high-flow conditions (non-single-family only). There are also design practices that avoid water waste from landscape irrigation systems. These technologies and practices are included as requirements for new landscape irrigation systems as part of the Metro Water District – Water Efficiency Code Requirements. These requirements do not apply to landscape irrigation systems (a) used for agricultural operations as defined in O.C.G.A. § 1-3-3, (b) used for golf courses, and (c) dependent upon a nonpublic water source.

To reduce excessive outdoor water use, the Metro Atlanta Plumbing Code Efficiency requirements also prohibit irrigation with reclaimed water sourced from any new private reclaimed wastewater treatment system except for those irrigating golf courses and agriculture operations.

Local governments must follow the procedural requirements provided in O.C.G.A. § 8-2-25(c) for establishing local requirements that are more stringent than the state minimum standard code.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District – Water Efficiency Code Requirements – Local Amendment to Plumbing Code, Model Findings Resolution, and Model Adoption Resolution.

WSWC-9: RESERVED.

Based on new, mandatory high-efficiency standards for pre-rinse spray valves at the national level, the Action Item requiring a replacement program for pre-rinse spray valves in the 2017 District Plan sunset effective January 1, 2021. No further action is required by local water providers regarding this Action Item. WSWC-9 is being reserved in the Plan as a placeholder for potential Action Items in the 2027 District Plan update and beyond.

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WSWC-10: RESERVED.

The outdoor water requirements for large landscapes have been expanded to apply to new landscape irrigation systems for all size landscapes and to include more efficiency requirements and design practices. These requirements were moved from WSWC-10 in the 2022 Plan to be combined with indoor efficiency requirements under the new Action Item WSWC-8: Metro Water District – Water Efficiency Code Requirements. This combination of indoor and outdoor efficiency requirements will streamline administration and enforcement. Given that the responsible party for the code requirements in WSWC-8 is local governments, local water providers no longer need to adopt or maintain a separate large landscape policy or ordinance.

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WSWC-11: RESERVED.

The Action Item from the 2017 District Plan titled "State Water Conservation and Drought Response Requirements" was deleted in the 2022 District Plan because these issues are now covered in WSWC-8: Metro Water District-Water Efficiency Code Requirements, WSWC-10: Metro Atlanta Landscape Irrigation System Efficiency Requirements, WSWC-13: Local Drought Response and Water Waste Ordinance/Policy, through existing state law, and through the District's current and planned Technical Assistance offering.

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WSWC-12: REQUIRE NEW CAR WASHES TO RECYCLE WATER

Responsible Party: Local Government	Intent: Reduce water use by conveyor car wash facilities.

Action Item: Each local government shall adopt and maintain an ordinance that requires all new conveyor car washes to install operational recycled water systems. A minimum of 50 percent of water used must be recycled.

Description and Implementation: Substantial water savings can be realized by improving the efficiency of commercial car wash water use through the adoption of water recycling systems.

There are three main types of car washes: self-service, roll-over/in-bay, and conveyor. Self-service car washes are typically coin-operated with spray wands and brushes operated by the customer. Roll-over/in-bay automatic car washes are characterized by a wash bay in which the customer stays in the car as the carwash equipment uses either spray nozzles or brushes, or a combination of both, to process the individual cycles. A conveyor car wash is usually installed in a tunnel and includes a series of cloth brushes or curtains and arches from which water is sprayed while the car is pulled through the tunnel on a conveyor chain. Self-service car washes typically use 15 gallons per wash, while the in-bay and conveyor washes typically use 50 and 35 gallons per wash, respectively.

The adopted ordinance should set a minimum standard that 50 percent of water used by conveyor car washes should be recycled. The District has developed a model ordinance on new car wash water recycling as a resource for local governments. Local water providers that are part of a local government should pass an ordinance, and local water providers that are authorities should establish written policies. All policies must be written policies that either include their date of adoption or are accompanied by other documents (for example, letters, emails, memoranda) that establish when the written policy was adopted.

Local governments should take appropriate steps to ensure all car wash wastewater is connected to the sanitary sewer system and not the stormwater system.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Model Ordinance to Require New Car Washes to Recycle Water, September 2, 2010, https://northgeorgiawater.org/wp-content/uploads/2015/07/Car_Wash_Ordinance_9-02-101.pdf
- Georgia EPD, Water Conservation Best Management Practices and Certification, Chapter 391-3-31, https://epd.georgia.gov/water-conservation-best-management-practices-and-certification-chapter-391-3-31

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WSWC-13: LOCAL DROUGHT RESPONSE AND WATER WASTE ORDINANCE/POLICY

Responsible Party: Local Water Provider	Intent: To reduce water waste during non-drought periods and to implement and enforce water use restrictions during declared drought under the Georgia EPD Drought Rule.

Action Item: Each local water provider shall adopt and maintain the District Model Ordinance/Policy for Local Drought Response and Water Waste, or equivalent ordinance(s) or policy(ies) at least as effective.

Description and Implementation: Local water providers should be prepared to address water waste and respond to droughts. Water waste includes excessive application of water beyond what is needed or other uses of water that are intended, unnecessary, or uncontrolled. The model ordinance specifies what activities will be considered water waste. Education is the recommended approach for addressing water waste by customers during non-drought periods, and warning and enforcement are more appropriate once a drought response level has been declared. The Georgia EPD Drought Rule in 391-3-30-.07(4)(c) and (5)(j) together provide that drought restrictions and water waste prohibitions must be enforceable to implement this drought response strategy, which is required under drought response level 3. Specifically, the Georgia EPD Drought Rule requires that local water providers "[i]mpose monetary penalties or terminate water services to customers to reduce outdoor water waste due to excessive application, outdoor leaks, improper irrigation, or other similar reasons." When, whether, and how to enforce any drought restrictions and water waste prohibitions is at the discretion of each local water provider based on their local circumstances.

Using this model ordinance/policy on drought response or something substantially similar will be helpful because it will allow for coordinated regional education, training, and public relations. Given local water providers in the District largely share a common media market for TV, radio, and newspapers, differences across jurisdictions are likely to cause public confusion. All District education materials, training, forms, and technical assistance will be based on this model ordinance. The District strongly encourages local water providers to adopt this model ordinance/policy with as few discretionary local modifications as possible. Nonetheless, local water providers may make modifications to this model ordinance/policy on drought response provided they are at least as effective as the District model ordinance and are consistent with the Georgia EPD Drought Rule and other relevant state and federal laws. Local water providers may also adopt more than one policy or ordinance to address local drought response and water waste.

When preparing the model ordinance/policy for local adoption, the local jurisdiction must make some edits. Mandatory edits are highlighted within the Model Ordinance by mandatory edit prompts shown as bold text with brackets (for example, [local jurisdiction]). These items are bracketed because they are jurisdiction-specific concepts, and you should review these and insert the jurisdiction's name and other jurisdiction-specific names, titles, boards, etc.

Adopting a model ordinance/policy gives local water providers the ability to enforce either through monetary penalties or by terminating water service, but it does not obligate them to specific enforcement actions. It is recommended that education, written warnings, and then enforcement be prioritized in order, and that enforcement be limited to drought or other repeated or egregious violations. Local water providers should modify Section [Y]-13 of the model ordinance to reflect local plans for issuing warnings, imposing monetary fines, and/or terminating water service as well as any local process for disputing administrative penalties.

Drought restrictions and water waste prohibitions are included in a single model ordinance/policy for convenience of implementation and enforcement, and this is consistent with the most common practice in the District and nationwide. However, local water providers that have adopted them as two separate ordinances/policies may continue to do so at their discretion.

The declaration of drought response levels and corresponding water use restrictions are set forth in the Georgia EPD Drought Rule (see Drought Management Rules, Ga. Comp. R. & Regs. 391-3-30 available at http://rules.sos.ga.gov/gac/391-3-30). All drought response efforts by local water providers must be consistent with the Georgia EPD Drought Rule. All local water providers should review this model ordinance/policy with their legal counsel and rely on their legal advice. Because the onset of drought can be sudden, having a model ordinance/policy in place allows local water providers to respond quickly if needed. This is consistent with the January 2020 Alliance for Water Efficiency report titled "Use and Effectiveness of Municipal Irrigation Restrictions During Drought." Specifically, the report made the following recommendation for water providers: "Prepare and pass ordinances necessary to implement and enforce the plan when the time comes. This study found that plans need codified rulemaking to include provisions that are enforceable on non-compliant customers and to target water waste, such as irrigation runoff and excessive use."

For more information and recommendations on how to plan ahead for and respond to drought, refer to the District's Local Drought Planning Guide, which is offered as a tool for local water provides but does not impose any additional requirements beyond what's in this Action Item.

Local water providers that are part of a local government should pass an ordinance, and local water providers that are authorities should establish written policies. All policies must be written policies that either include their date of adoption or are accompanied by other documents (for example, letters, emails, memoranda) that establish when the written policy was adopted.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Model Ordinance/Policy for Local Drought Response and Water Waste
- Metro Water District, Local Drought Planning Guide for Metropolitan Atlanta
- Report on Use and Effectiveness of Municipal Irrigation Restrictions During Drought, Alliance for Water Efficiency, January 2020
- Georgia EPD Drought Rule (391-3-30-.01 et seq.) and O.C.G.A. 12-5-7(a.1)(3).

WSWC-14: WATER SYSTEM ASSET MANAGEMENT

Responsible Party: Local Water Provider	Intent: To facilitate effective operation and maintenance of the system to minimize water system leakage and to ensure proper functioning.

Action Item: Develop an asset management program that ensures proper management of the water system.

Sub-Tasks: Each local water provider shall:

1. Maintain a digital map of the water distribution system and assets.
2. Develop a written asset management program to prioritize and implement activities to inspect, maintain and rehabilitate the local water system components.

Description and Implementation: The condition of water infrastructure in the District varies greatly from new systems in outlying counties to systems over 100 years old. Aging water system infrastructure affects the safety, efficiency, and reliability of the water systems. Aging infrastructure can also cause financial challenges, including putting operational funds at risk of being diverted to cover emergency repair costs. Asset management is a framework that can support sustainable infrastructure through planned and prioritized maintenance to minimize life-cycle costs, prevent water loss and ensure proper system functioning.

Asset management approaches to the maintenance of water infrastructure involve managing and maintaining the water system in a way that minimizes the life-cycle costs. Asset management for local water providers includes regular inspections and maintenance from the source to the water treatment facility through the water distribution system up to customer meters. Regular maintenance can extend the lifespan of water system assets as well as prevent customer service interruptions.

Asset management plans are developed to maintain an optimal level of service at best appropriate cost for rehabilitating, repairing, or replacing assets. Asset management is a framework being widely adopted as a means to pursue and achieve sustainable infrastructure. A well-developed asset management program incorporates detailed asset inventories, operation and maintenance tasks and long-range financial planning to build water system capacity, and it puts water systems on the road to sustainability. The GAWP Asset Management Committee has developed a guidance document on Asset Management for Small Systems that may be used as a reference by District water providers.

The water system map, at a minimum, should include survey and inventory of the water distribution system and horizontal and vertical locations of critical components. Comprehensive maps can help to determine which parts of the system need inspection, track ongoing, mostly unscheduled, maintenance work, and help determine appropriate resources for annual inspection and maintenance. Ongoing map maintenance is also critical to ensuring information is up-to-date and incorporates data on new lines and connections. Information collected as a part of water system mapping will vary based on the local water system and may include:

- Pipe information: size, material, age, condition, direction of flow and slope
- Valve information: location, diameter, depth, age, and condition
- Pump station information: location, capacity, number of pumps, condition, method of alarm indication and method of backup power
- Elevated tanks: location, capacity, condition, normal level, and method of alarm indication

In addition, water providers should identify critical infrastructure based on risk and consequence of failure. Risk can be defined as the combination of the likelihood of failure and the consequence of failure. The likelihood of failure can be determined or estimated by assessing the condition of the asset or by evaluating historic performance. The consequence of failure can be determined or evaluated on a case by case basis, depending on the type of asset. If the condition of assets is not known, such as for buried assets like pipes, the consequence of failure determination can be used to prioritize condition assessment activities.

Most local water providers, especially those in communities with a significant level of new development, already use a GIS-based water distribution system map. Water distribution system maps should be kept current and any water system changes should be made to the system map in a timely manner. It is recommended that local water providers coordinate the asset management program with the local water master plan (Action Item WSWC-2) and water loss control program (Action Item WSWC-15).

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- GAWP, Asset Management Committee, A Guide to Asset Management for Small Water Systems, July 2015 http://cdn.ymaws.com/sites/www.gawp.org/resource/collection/244A5665-6A99-4A34-BD64-AAC465A2DB88/Small_Water_Systems_Guide_2015.docx

WSWC-15: WATER LOSS CONTROL AND REDUCTION

Responsible Party: Local Water Provider	Intent: To control and reduce local water provider's real losses.

Action Item: Develop and implement program to identify and reduce real water losses.

Sub-Tasks: Each local water provider serving at least 3,300 individuals shall:

1. By 2025 take the actions required to meet or exceed the following data grades for key inputs using AWWA Free Water Audit Software version 6.0:
    a. A data grade of 7 or greater for Volume from Own Sources if not a purchase water only system;
    b. A data grade of 7 or greater for Water Imported if imports are greater than 25% of Water Supplied;
    c. A data grade of 7 or greater for Water Exported if exports are greater than 25% of Volume from Own Sources; and
    d. A data grade of 6 or greater for Customer Metering Inaccuracies.
2. For each local water provider with real losses above 60 gallons per day per connection (based on 2013 water loss audit results), adopt a 2028 goal to reduce real losses to less than 60 gallons per day per connection and demonstrate progress in the interim years toward meeting this goal. Systems that achieve this goal prior to 2028 should continue cost-effective water loss controls and initiate progress toward 35 gallons per day per connection.
3. For each local water provider with real losses between 35 and 60 gallons per day per connection (based on 2013 water loss audit results), adopt a 2028 goal to reduce real losses to less than 35 gallons per day per connection and demonstrate progress in the interim years towards meeting this goal. Systems that achieve this goal prior to 2028 should continue cost-effective water loss controls by setting new individualized goals and demonstrating progress as required by the Water Supply Efficiency Rule.

Description and Implementation: Audits of real water losses provide information that can be used to set goals to improve water system management and reduce water losses.

The Georgia Water Stewardship Act requires that all local water providers serving at least 3,300 individuals complete an annual local water provider audit using the AWWA Free Water Audit Software® and submit the audit results to Georgia EPD by March 1 of each year. Additionally, the District has required local water providers to assess leakage by performing water loss audits since the adoption of the 2003 Plan. In June 2015, the GADNR board passed the Water Supply Efficiency Rule (Georgia Rules and Regulations, Chapter 391-3-33) as prescribed by the Georgia Water Stewardship Act of 2010. The rule states that audits must be annually reviewed, validated, and certified by a Qualified Water Loss Auditor prior to submitting to Georgia EPD. Another provision is that all local water providers must have a water loss control program by July 1, 2016. The rule also states that local water providers shall establish individual goals to set and improve water supply efficiency and demonstrate progress toward those goals.

The Water Research Foundation's Level 1 Water Audit Validation Guidance Manual, 2nd Ed., Project No. 5057 provides the following recommendation: "The process of water audit review is made more effective when the validator approaches the water audit with fresh eyes, having not been intimately involved in its assembly. Nonetheless, the validator may be a part of the same organization as the auditor, and a validator may validate the audit of their own utility." This practice is recommended in the District where sufficiently trained staff are available. The AWWA Free Water Audit Software® uses the

International Water Association (IWA)/AWWA methodology, which is applied in an Excel spreadsheet. Within IWA/AWWA methodology, no water is considered "unaccounted for," as it is allocated as either a consumption or loss. Local water providers should use the version of the software required by Georgia EPD. Water loss programs can then target the categories of losses, which will vary for every local water provider. The water audit software calculates the following local water provider performance metrics for water loss that can be tracked annually:

- Apparent Losses per connection per day (gallons per day)
- Real Losses per connection per day (gallons per day)
- Real Losses per mile of main per day (gallons per day)

These metrics are identified in the AWWA M36 Manual and in the Georgia Water Loss Manual as recommendations for tracking progress and setting goals.

The use of percentage indicators is not recommended to track progress over time, due to the unrelated factors that can skew such numbers from year-to-year. Using volumes that are normalized for local water provider-specific factors is more applicable for individual local water providers tracking of water losses. The 2028 goals in Sub-Tasks 2 and 3 are based on an analysis of the 2013 calendar year for local water providers in the District. In 2013, the median real water losses for local water providers was 34.5 gallons per day per connection. Progress toward meeting the 2028 goals can be reviewed and demonstrated by tracking the key metrics from consecutive audit years using the AWWA Water Audit Compiler tool. This tracking tool is freely available from the AWWA website, and can be used to create graphics showing the trends of these metrics over several years. The trend can be used to demonstrate progress, and for purpose of Sub-Tasks 2 and 3, demonstrating progress will be based on gallons per day per connection on a 3-year, rolling average basis.

The water audit software also calculates the water audit data validity to provide a level of reliability of the water audit results for the purposes of implementing water loss control activities. The water audit software requires the application of "data grades" to each input based on very specific data quality and operational criteria. These data grades are compiled into an overall data validity score and Data Validity Tiers, which provides the overall reliability of the results. Target and goal setting is not recommended in the software or by AWWA until Data Validity Tier III is achieved (that is, the data validity score is between 50 and 70). The inputs are not weighted equally, and as a result, those water systems with data validity scores below 50 should consider activities to improve their data grades. Specific activities that can be performed to improve the data grades are listed in the water audit software.

The 2028 goals in Sub-Tasks 2 and 3 apply regardless of a local water provider's data validity score, but a local water provider with a data validity score below 50 may prioritize taking action to improve its score before other activities necessary to meet the 2028 goals as demonstration of progress. Compared to the 2017 District Plan, new minimum data grades are now required for key inputs. This renewed focus on both water loss and data is based on the implementation work completed since the 2017 District Plan. Improving the data grades for these key inputs is important because they are associated with some of the largest volumes of water and are heavily weighted in the overall data validity score. All documentation required to meet or exceed the required data grades for key inputs shall be submitted to Georgia EPD as part of the 2022 Plan compliance audits. Improving these grades will help identify the best ways to achieve the real water loss goals and therefore help utilities prioritize expenditures on real water loss.

The deadline for demonstrating progress contained in the 2017 District Plan has been extended to 2028 and new minimum data grades are now required for key inputs. Experience implementing water loss control requirements in the District has shown that improved data collection is needed to identify areas with the greatest potential for reduction and to maximize return on investments in water loss control programs. Further, given the potentially significant costs associated with capital-intensive water loss improvement efforts, equity concerns require that programs be targeted to provide the greatest

benefit. Improving data quality consistent with this Action Item and modifying the compliance deadline best serves these interests.

Consistent with this, local water providers should consider the costs and benefits of their water loss activities in order to implement the most cost-effective programs to reduce water losses and meet the 2028 goals. For example, local water providers should compare the cost of implementing a water loss reduction activity to the value of the water losses recovered. The value of recovered real and apparent losses can be represented by the variable production cost and customer retail unit charge, respectively, found in the water audit.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- AWWA, M36: Water Audits and Loss Control Programs
- Water Research Foundation, Level 1 Water Audit Validation Guidance Manual, 2nd Ed., Project No. 5057
- Water Research Foundation, Water Audits and Real Loss Component Analysis, 4372a, 2015
- AWWA, Water Loss Control Resource Community, Free Water Audit Software and Water Audit Software and Compiler
- GAWP, Georgia Water System Audits and Water Loss Control Manual

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WSWC-16: LOCAL PUBLIC EDUCATION PROGRAM

Responsibility Party: Local Water Provider	Intent: To increase knowledge and awareness of the importance of water efficiency and conservation with the goal of building public support for local actions and activities as well as long-term behavior change.

Action Item: Develop and implement a local water efficiency and conservation education program.

Sub-Tasks: Each local water provider shall:

1. Implement education activities as outlined in Action Item PUBLIC EDUCATION-1.
2. Distribute high-efficiency retrofit kits to residential water customers.
3. Provide residential water assessment information to residential water customers.
4. Provide information on water efficient landscape practices to residential water customers.

Description and Implementation: Public education and outreach is crucial for fostering broad public support for water conservation and efficiency. Involving the public is crucial to developing an ethic of stewardship, and it enables to the public to make informed choices about water resources management. Additionally, education and outreach can encourage changes in basic behavior and practices that are necessary to achieve maximum and long-term objectives to protect our shared water resources. At the local level, water providers must implement education and public awareness programs that help individual citizens, businesses, and organizations to become aware of their role in how water is used and what they can do to support sustainable use and drought mitigation.

Section 5.5 provides more detail on public education programs and Action Item PUBLIC EDUCATION-1 provides more detail on local public education program requirements. Specific guidance for Sub-Tasks listed above includes:

- Local water providers should identify and purchase high-efficiency retrofit kits appropriate for the local water service area and target the distribution to customers in pre-1994 properties. It is recommended that the retrofit kit include a WaterSense certified showerhead. Instead of offering standard retrofit kits to customers, one or more water conservation items from the kit may be offered a la carte to customers based on their needs and preferences.
- Local water providers may use the Do It Yourself Household Water Assessment and the MyDropCounts pledge developed by the District to educate customers on their water use through a self-water assessment.
- Water providers and local governments may use the Water-Wise Landscape Guide for the Georgia Piedmont developed by the District and UGA Extension to educate customers on water efficient landscape practices.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Public Education and Awareness Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/
- Metro Water District, Do It Yourself Household Water Assessment, https://northgeorgiawater.org/wp-content/uploads/2017/02/Household_Water_Audit_2020.pdf

- My Drop Counts Conservation Pledge, mydropcounts.org
- UGA Extension, Water-Wise Landscape Guide for the Georgia Piedmont, June 2015, Bulletin 144, http://extension.uga.edu/publications/files/pdf/B%201444_1.PDF

5.3 Wastewater Management Action Items

The forecasts developed for this Plan project that wastewater demands in the District will be 723 MMF-MGD in 2040. Meeting this demand will require the management of the wastewater system infrastructure to reclaim water in a manner that will protect water quality and public health and support the need for returns to the region's lakes and river basins. Appendix B addresses the future wastewater treatment infrastructure needs of the District on a county-by-county basis. The following Action Items, along with Appendix B, describe the plan for meeting the District's future wastewater needs.

5.3.1 Wastewater Infrastructure Plan

To meet future wastewater needs, Appendix B provides a region-wide overview of where wastewater treatment facilities will be located and an estimate of their capacities. The treatment facilities are owned and operated by local wastewater providers, and these providers will refine this Plan over time in order to optimize it and add innovation. It is important to note that wastewater facilities may not be expanded without the issuance of new or amended permits from Georgia EPD if the proposed expansion will expand the capacity beyond the currently permitted limits for wastewater discharges and land application.

The wastewater treatment infrastructure plan was determined based on the wastewater flow forecasts outlined in Section 4 and the planning considerations outlined in Section 2. Appendix B provides detail on wastewater facility needs in each county. The summaries in Appendix B provide the wastewater facility plan for the District through 2040. This Plan indicates that by 2040 the region will have the following:

- 16 new wastewater treatment facilities
- 43 expansions of existing wastewater treatment facilities
- 29 existing wastewater treatment facilities that will continue to be in use without expansion
- 7 decommissioned wastewater treatment facilities

It is projected that 98 percent of the wastewater volume collected by local wastewater providers in 2040 will be treated by facilities that discharge to surface waters. The remainder will be treated by land application systems or discharged to non-potable reuse end users. Specific projections of non-potable reuse volumes are not available, but volumes are expected to be minimal. Refer to the District's Non-potable Reuse Water Policy in Section 2.1.

Expansion of existing facilities will be the primary source of additional treatment capacity in the District through 2040. Expansion is considered a cost-effective approach but may present some challenges in watersheds with assimilative capacity limitations where advanced technologies may be needed to protect water quality standards. The facilities scheduled to be decommissioned are mostly smaller with less efficient treatment technologies or decentralized systems that were deeded to the local wastewater provider. The new facilities are primarily located in the growing counties on the perimeter of the District.

5.3.2 Wastewater Collection System Inspection and Maintenance

Sewers and manholes in the District range in age from new to over 100 years old. As these systems continue to age, proper inspections and maintenance are necessary to maintain a high level of customer service and protect water quality. Identifying and correcting collection system deficiencies in conjunction with overflow spill response programs may help local water bodies meet State water quality standards.

NPDES and LAS permits require permittees to properly manage, operate and maintain at all times all parts of the collection system they control. Some collection system operators in the District have found inspection and maintenance programs to be very helpful in meeting their permit obligations, reducing or preventing sanitary sewer overflow (SSOs), maintaining superior system performance, extending the

longevity of sewer system components, maintaining relatively high customer satisfaction, protecting WWTPs, and protecting human health and the environment. All local wastewater providers in the District must maintain a wastewater collection system inspection and maintenance program. These programs should consist of the minimum elements identified in the Action Items below, as well as any additional requirements identified in local NPDES and LAS wastewater permits.

Many of the programs outlined in the Action Items below are related to the elements of a Capacity Management Operations and Maintenance (CMOM) program. Communities that have an approved CMOM program with Georgia EPD may be able to demonstrate compliance with Action Items WW-2 through WW-9 through certification of their CMOM program based on the most recent CMOM audit.

5.3.3 Wastewater Treatment Standards

Higher levels of treatment with advanced technologies at wastewater treatment facilities will most likely be required during the planning horizon where current limits may not be sufficient to protect water quality standards. Some reasons to anticipate more stringent wastewater treatment standards include:

- *Total Maximum Daily Loads (TMDLs):* As the causes of impairments of surface water uses are identified in TMDL plans, more restrictive discharge limits may be imposed on some wastewater treatment facilities. These limits will be specific to the cause of the impairment, such as excessive nutrients or inadequate dissolved oxygen. Most of the TMDL challenges in the District are related to nonpoint source pollution, which will be mitigated by implementation of the Watershed Management Action Items in Section 5.4.
- *In-stream nutrient standards:* Georgia EPD is developing standards and implementation strategies for nutrients (including ammonia) in various water bodies. When these are finalized, nutrients in the flow discharged by wastewater treatment facilities may need to be reduced below current levels with higher levels of treatment. At this time, Lake Lanier and Allatoona Lake have limits on the discharge of phosphorus from wastewater treatment facilities.
- *Increasing volumes of wastewater:* Growth in the District will lead to increasing volumes of wastewater for treatment and discharge. As the volume of discharges increases, the level of treatment must increase correspondingly in order to provide the same level of protection for surface water quality.

While this Plan is designed to protect water quality, the determination of specific facility-level wastewater treatment limits that will protect water quality is the responsibility of Georgia EPD. When this Plan uses the term “highly treated wastewater,” it means water meeting the facility-level treatment limits as determined by Georgia EPD. The Plan does not presuppose or require any specific level of treatment, including tertiary treatment. Local wastewater providers should not assume that assimilative capacity is available in a receiving body even if a projected plant capacity is listed in the tables of Appendix B. It is the responsibility of each local wastewater provider to coordinate with Georgia EPD to assess the assimilative capacity of receiving waters as a first step when planning for an expansion or new discharge.

ACTION ITEM

WW-1: ENHANCED RELIABILITY OF WASTEWATER PUMPING STATIONS

Responsible Party: Local Wastewater Provider	Intent: To enhance the reliability of wastewater pumping stations and provide more clarity for auditing purposes.

Action Item: Enhance reliability of wastewater pumping stations by further clarifying backup power requirements.

Sub-Tasks: Each local wastewater provider shall:

1. Maintain a file of the firm capacity of all pump stations within the wastewater master plan (refer to Action Item INTEGRATED-4).
2. For all newly constructed major (1 MGD or greater firm capacity) wastewater pump stations, or those receiving an upgrade to a firm capacity of 1 MGD or greater, provide a dedicated secondary power supply, emergency generator(s), dedicated stand-by pumping system, or battery combined with local renewable source such as solar, to allow continued firm pumping capacity with the primary power supply out of service.
3. For wastewater pump stations with firm capacity less than1 MGD without a dedicated secondary power supply or emergency generator, provide, at a minimum, one of the following to enhance reliability:
    a. Backup power connection via an emergency generator receptacle including availability of a portable utility-owned or rental generator
    b. Quick connections for a stand-by pumping system
    c. Availability of a portable utility owned or rental pumps
    d. An overflow basin sized for at least 24-hour overflow protection under maximum month average daily flow conditions

Description and Implementation: Reliable wastewater pumping systems are important in the District for a number of reasons. Many areas of the District are in the headwaters of basins, where there is limited assimilative capacity and where system failures could affect downstream users. In addition, some wastewater systems in the District are located upstream from drinking water intakes, where failures must be avoided. As more return flows are expected in the future to support the water resources needs of the District, reliable infrastructure will be needed to pump and treat the flow.

The reliability of wastewater pumping stations will be addressed in local wastewater master plans (Action Item INTEGRATED-4) to maintain compliance with regulatory requirements. Pumping facilities shall have a firm capacity (that is, total maximum pumping capacity with the largest pump out of service) such that expected peak flow can be pumped to its desired destination. Wastewater providers shall maintain a file of the firm capacity of all treatment plants and pump stations within their wastewater master plan. Additionally, a dedicated emergency or secondary power supply should be provided that is suitable for meeting total maximum pumping capacity needs with the primary power supply out of service and certified by a professional engineer.

In areas where an automatic diversion to another gravity sewer or pump station is available, secondary power sources or overflow basins should be evaluated, but are not required to meet the requirements of

Sub-Tasks 2 and 3. Local wastewater providers that provide for the connection of a portable generator for operating wastewater pump stations with firm capacity less than1 MGD should consider access to the site during extreme flood, snow or icy conditions when backup power is more likely to be needed.

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Resources:

- Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Recommended Standards for Wastewater Facilities, 2014 Edition, refer to Section 47 Emergency Operation, https://www.health.state.mn.us/communities/environment/water/docs/tenstates/tenstatestan2014.pdf

ACTION ITEM

WW-2: SEWER SYSTEM INVENTORY AND MAPPING

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To improve documentation of existing infrastructure for improved planning and targeted infrastructure improvements.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, develop and maintain a digital sewer system map based on a survey and inventory of the sewer system.

Sub-Tasks: Each local wastewater provider shall:

1. Determine a sewer system mapping strategy. Outline a plan, schedule, and budget for sewer system mapping.
2. Collect field data for sewer system database development, possibly in an electronic form.
3. Maintain a digital GIS sewer system map based on the database.
4. Update sewer system maps periodically to include sewer system extensions and rehabilitation projects.
5. Identify critical infrastructure based on risk and consequence of failure.

Description and Implementation: A comprehensive sewer system map is critical for developing a strong inspections and maintenance program. Without proper mapping of a sewer system, it is difficult to determine which parts of a sewer system need inspection or to track ongoing, mostly unscheduled, maintenance work. Without proper documentation and tracking of inspection and maintenance work, it is difficult and time consuming to determine the amount of resources that should be allocated to sewer system inspection and maintenance on an annual basis.

At a minimum, the sewer system map will include surveying, inventorying, and mapping the sewer system and horizontal and vertical locations of critical sewer system components. The sewer system inventorying and mapping is the basis for a broader asset management program. Information collected as a part of sewer system mapping will vary based on the local wastewater system and may include:

- Pipe information: size, material, age, condition, direction of flow and slope
- Manhole information: location, diameter, depth, material, age, condition, entry and exit line sizes, direction, and elevation
- Pump station information: location, firm capacity, number of pumps, condition, method of alarm indication and method of backup power

Most local wastewater providers, especially in communities with a significant level of new development, already use a GIS-based collection system map. Digital maps have many significant benefits, including safer storage of data, enhanced record-keeping, and the ability to more easily share and access data. Collection system maps should be kept current and any system changes should be made to the system map in a timely manner.

Although most local wastewater providers have completed initial mapping of the wastewater system, map maintenance will be an ongoing activity. Once the initial surveying, inventorying, and mapping are complete, data on new sewers and associated appurtenances can then be added on an ongoing basis. In addition, all local wastewater providers shall identify critical infrastructure based on risk and consequence of failure to enable prioritization of maintenance and replacement efforts.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

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Resources:

- ArcGIS Resources, https://doc.arcgis.com/en/
- ARC, GIS Data and Maps, http://www.atlantaregional.org/info-center/gis-data-maps

ACTION ITEM

WW-3: SEWER SYSTEM MAINTENANCE MANAGEMENT

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To improve sewer system maintenance to address collection system capacity and condition issues, which might result in SSOs.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, develop and implement a Computerized Maintenance Management System (CMMS) and standard operating procedures (SOPs) for maintenance management of collection system components, including pump stations and linear assets.

Sub-Tasks: Each local wastewater provider shall:

1. Select a CMMS and purchase any necessary hardware.
2. Establish SOPs for maintenance management.
3. Implement a CMMS and SOPs.

Description and Implementation: A CMMS is a tool for the following:

- Maintaining sewer system data
- Maintaining information on equipment (inventory and tracking), available maintenance and repair materials and material procurement
- Tracking and documenting activities
- Tracking the value of sewer system assets
- Facilitating adequate overflow emergency response activities
- Facilitating the development and implementation of a capacity certification program

By tracking maintenance data in CMMS, a wastewater provider facilitates easy access and coordination with other sewer system management-related activities.

The focus of sewer system maintenance activities is maintaining the hydraulic capacity of the sewer system because the primary function of the sanitary sewer system is conveyance. Additionally, a maintenance program must help ensure continuous operation and reliability of mechanical systems such as pump stations and generators. Typically, two different classes of problems can reduce hydraulic capacity and reliability: structural and operational. Structural defects involve the degradation of the sewer pipe itself. Serious structural defects can lead to pipe collapse and cause SSOs. Sewer repair and rehabilitation activities are focused on restoring the structural integrity of the pipe. Most operational defects affect the hydraulic capacity of the pipe. Roots, rags, sediments, and FOG can all reduce the cross-sectional area of the pipe, which in turn reduces its hydraulic capacity. Sewer cleaning and source control activities are directed toward preventing or reducing the impacts of operational defects on the collection system. A CMMS approach can address these concerns by supporting improved system maintenance, which can help to maintain system capacity and prevent SSOs.

This plan requires a CMMS be selected and implemented. This system can be sophisticated, as in the case of a database or GIS-based program, or it can be a simpler form, such as a spreadsheet. If a GIS-based program is chosen, system data may be used to map an entire sewer system or portions thereof as needed for inspection and maintenance purposes (refer to Action Item WW-1). Moreover, a GIS-based program can be used to overlay sewer systems on land use categories or impaired stream segments for determining areas in need of inspection and maintenance.

Sewer system maintenance includes the following:

- SOPs as needed to support maintenance activities
- Routine inspection and service of all pumps and associated equipment
- Periodic cleaning of sewers and associated appurtenances
- Routine inspection and maintenance of the sewer system such as rights-of-way, stream crossings, streambanks adjacent to sewers, and force mains
- Tracking of maintenance activities

Maintenance data should be tracked in CMMS to facilitate easy access and coordination with other sewer system management-related activities.

Another component of maintenance management is to establish and maintain standard inspection and condition assessment procedures and cleaning protocols, and execute these programs to document condition of existing assets at least once per decade or as recommended by the utility's asset management program based on criticality. Collection system assets require routine care to ensure they function properly. Handheld devices can be used for this inspection documentation.

In addition, all wastewater providers should identify critical infrastructure based on risk and consequence of failure. Risk can be defined as the combination of the likelihood of failure and the consequence of failure. The likelihood of failure can be determined or estimated by assessing the condition of the asset, or by evaluating historic performance. The consequence of failure can be determined or evaluated on a case-by-case basis, depending on the type of asset. If the condition of the assets is not known, such as for buried assets like pipes, the consequence of failure determination can be used to prioritize condition assessment activities.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

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ACTION ITEM

WW-4: SEWER SYSTEM INSPECTION PROGRAM

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To ensure sewer system assets are inspected and cleaned on a regular basis to reduce SSOs.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, maintain a sanitary sewer system inspection program that determines the condition of the sanitary sewer system and identifies any needed maintenance and rehabilitation activities.

Sub-Tasks: Each local wastewater provider shall:

1. Establish standard inspection and condition assessment procedures and cleaning protocols.
2. Execute these programs to document condition of existing assets at least once per decade or as recommended by the utility's asset management program based on criticality.

Description and Implementation: Regular inspection and cleaning of the sanitary sewer system can help to prevent SSOs. A program that schedules inspection and cleaning can help to ensure that these activities occur on a routine basis.

A sewer system inspection program sets the timing of scheduled inspections. These may be regularly scheduled inspections of the entire system or follow a criticality-based asset management approach. Older areas of the wastewater system and areas with higher flow volumes and certain pipe materials are more prone to failures. Therefore, local wastewater providers may choose to inspect these areas more regularly due to the greater risk of failure or SSOs in these areas. At a minimum, programs shall document the condition of existing assets at least once per decade or as recommended by the utility's asset management program based on criticality.

The wastewater system inspection program must identify the regularity and type of inspections that will occur depending on the type and/or criticality of the assets in the wastewater collection system. The wastewater system inspection program must identify who is responsible for documentation of the inspections, using either handheld devices connected to the inventory database or using paper records. Table 5-3 lists several example inspection techniques and their applicability.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

Table 5-3. Example Sanitary Sewer System Inspection Methods

Inspection Method	Where It Should Be Used	What It Will Find
Physical inspections of manholes and sewer pipes/lines	Manholes and above-ground sewer pipes	• Manholes • Frame and cover defects • Structural defects • Flow surcharging • Root intrusion • Sewer pipes • Signs of leakage and blockages • Exterior structural defects
Smoke testing	Manholes and sewer pipes	• Sources of infiltration/inflow (I/I) • Location of illegal connections • Location of broken sewers • Location of buried manholes
Dye-water testing	Sewer pipes	• Sources of exflow/exfiltration • Proof of building connection to sewer system • Location of illegal connections • Estimating flow velocity
Closed Circuit Television Inspection or other internal pipe evaluation	Sewer pipes	• Structural defects • Maintenance needs • Sources of I/I at joints, breaks, connections • Cross connections or illegal connections
Right-of-way/easement inspection		• Missing/unrecorded sewer pipes and manholes • Flow surcharging • Trees with potential for root intrusion

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ACTION ITEM

WW-5: SEWER SYSTEM REHABILITATION PROGRAM

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To restore structural integrity of sewer systems and reduce hydraulic loads by reducing I/I.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, prioritize rehabilitation projects based on risk and consequence of failure. Budget and execute capital projects to rehabilitate existing infrastructure and document completed projects and effect on I/I reduction where applicable.

Sub-Tasks: Each local wastewater provider shall:

1. Prioritize rehabilitation projects and document the priority list.
2. Develop implementation plan for rehabilitation projects based on budget schedule, and staffing.
3. Implement a program to rehabilitate infrastructure based on schedule and budget for critical infrastructure.
4. Include rehabilitation needs as part of the annual planning and budget process.
5. Document the rehabilitation performed in the asset management program and its beneficial effects of I/I on the sewer system where applicable.

Description and Implementation: Failing sanitary sewer infrastructure presents potential problems for wastewater system operation, watershed health and source water protection. A rehabilitation program that takes a planned and prioritized approach can help to prevent sewer system failures. Priorities can be based on the severity of an infrastructure problem, but also on the potential impacts on watershed health and source water protection. Many local wastewater providers in the District maintain ongoing sewer rehabilitation programs and have accomplished substantial projects through these programs.

The sewer system rehabilitation program, at a minimum, will include the following:

- Procedures for prioritizing rehabilitation projects based on severity of defects, cost effectiveness, and hydraulic capacity
- Schedule for sewer system rehabilitation projects
- Documentation of completed projects and effect on I/I reduction where applicable.

In setting priorities for the rehabilitation program, watershed impairments should be considered. Rehabilitation projects may be prioritized where local surface waters have been directly impaired due to sewer overflows. Action Item WATERSHED-10 will generate data on watershed health, and state water quality monitoring information can also support this assessment (for example, Georgia EPD 305(b)/303(d) impaired waters list).

There are many different technologies used for rehabilitation programs. For example, trenchless technology is a method of construction for replacing sanitary sewer pipelines without employing the longer-term disruptive aspects of conventional open cut excavation. Benefits of rehabilitation work performed using trenchless technology versus conventional rehabilitation methods include shorter disruption of sewer service during work and lower costs. Common trenchless technologies used in sewer system rehabilitation programs include pipe bursting and slip-lining. Elected Officials/Governing Boards are essential to proper planning and budgeting for the use of these technologies. Many sewer systems have interjurisdictional flows with neighboring wastewater providers. Coordination between neighboring

wastewater providers with which there are interjurisdictional flows should be performed as necessary as sewer rehabilitation programs are developed and enhanced.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

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ACTION ITEM

WW-6: CAPACITY CERTIFICATION PROGRAM

Responsible Parties: Local Wastewater Provider without a CMOM, Local Government	Intent: To ensure adequate capacity to accept new flows to minimize SSOs

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD and local governments, maintain a program and process for certifying wastewater collection system capacity for new development and redevelopment projects.

Sub-Tasks:

Local Wastewater Providers shall:

1. Maintain a flow and rainfall monitoring program to support the hydraulic modeling and capacity certification program.
2. Maintain a hydraulic model to determine available capacity.
3. Determine system capacity.
4. Maintain procedures for certifying available capacity.
5. Certify availability of capacity for proposed developments.

Local Governments shall:

6. Develop and implement procedures to coordinate with the local wastewater provider at the determined level of the planning/development review process.

Description and Implementation: A capacity certification program can reduce the number of SSOs in the District. Capacity certification programs allow local wastewater providers to determine whether adequate wastewater collection and treatment capacities exist or will be available within their sewer systems, before authorizing new flows and sewer service connections.

Some portions of the District are experiencing a great deal of infill development and re-development activity, which is expected to continue. When one home on a large lot is subdivided into multiple lots and residences, the volume of wastewater increases. Similarly, if a sewer system extends beyond its originally planned boundaries, additional flows are added to the system. These additional flows can strain the existing collection system that was initially designed for lower volume flows. Capacity certification programs allow local wastewater providers to determine whether adequate wastewater collection and treatment capacities exist or will exist within their sewer systems before authorizing new flows and sewer service connections.

The capacity certification program must be clearly described. It should address at what point in the planning/ development process various levels of review are performed (during initial building permit application, requests for zoning/rezoning, sewer connection requests, etc.) and which agencies of the organization will be responsible for certifying capacity availability. Coordination with local government development agencies will be needed to develop and implement appropriate procedures.

Building permit applications should include detailed plans, estimated wastewater flows and supporting calculations. The authorizing agency within a jurisdiction will certify that the system has available adequate capacity to collect, transmit and treat additional flows associated with new building construction and occupancy. Alternately, the authorizing agency will certify that ongoing or planned sewer system improvements would provide the capacity needed to handle the additional flows. A capacity certification form will be completed and signed by authorized representatives before a service connection is allowed.

Certification of sewer collection capacity alone is not sufficient. In addition to certifying capacity, it is necessary to certify transmission and treatment capacities to ensure reduction in sewer system overflows, while ensuring compliance with the requirements of wastewater permits. Using these guidelines, each local wastewater provider will develop its own unique capacity certification program based on system specific conditions and available information.

To implement flow and rainfall monitoring requirements, most wastewater treatment facilities have flow meters as part of their wastewater permit requirements. Additional flow meters may be needed to address capacity certification, depending on the location of existing flow monitoring devices and the extent of the system. If strategically located, flow monitors can track wastewater flow trends and aid in determining the volume of I/I entering the collection system upstream of the flow monitor. The combination of wastewater flow and rainfall monitoring is typically used to estimate the peak flows associated with various rainfall events. It is recommended that flow and rainfall monitoring be performed continuously within older sewer systems. Where possible, flow monitoring should be performed continuously at all major pump stations and wastewater treatment facilities.

In lieu of traditional flow monitoring, some systems may be able to determine actual flows using run time data from pump stations within the collection system. Pump station run time calculations are acceptable if they accurately determine the volume of flow through the system.

To implement the hydraulic modeling requirements, the conveyance capacity of a sewer system can be estimated through manual calculations or based on data output from a hydraulic model of the collection system. A hydraulic model is a tool that can be used to determine the available sewer system capacity and to estimate the ability of the system to handle additional wastewater flows. A computer-based model may be preferred due to the number of iterations expected with planned system extension. A comprehensive sewer system map (Action Item WW-2) will provide the base data needed to develop an accurate hydraulic model. Flow and rainfall monitoring will be used to calibrate the hydraulic model as well as provide the needed information on anticipated inflow and infiltration volumes.

The hydraulic model of each sewer system should be maintained and updated as needed to minimize SSOs, but at a minimum, it should be updated prior to planned future expansions that may stress the collection system. Some local wastewater providers may choose a method of calculation of available capacity in lieu of developing a hydraulic model with specialized software, such as a spreadsheet. Regardless of the tool chosen, the local wastewater provider must have a means for determining available capacity in the system and determining the impact of additional wastewater flows on the collection system.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

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Resources:

- EPA, Guide for Evaluating CMOM Programs at Sanitary Sewer Collection Systems, January 2005, https://www3.epa.gov/npdes/pubs/cmom_guide_for_collection_systems.pdf
- Georgia EPD, Guidelines for Sewage Collection Systems, November 2010, https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Guidelines%20for%20Sewage%20Collection%20Systems.pdf
- Water Environment Federation, Wastewater Collection Systems Management, 7th Edition, https://www.wef.org/resources/publications/books/MOP7/

ACTION ITEM

WW-7: GREASE MANAGEMENT PROGRAM

Responsible Parties: Local Wastewater Provider without a CMOM, Local Government	Intent: To reduce SSOs and plant operational problems related to FOG and Rags.

Action Item: For local wastewater providers who do not have an approved CMOM with Georgia EPD and local governments, implement and maintain a grease management program, including procedures for grease control and enforcement, inspection and tracking of grease traps and permitting and inspection of grease trap hauling trucks.

Sub-Tasks: Each local wastewater provider and local government shall:

1. Establish an ordinance or policy regulating the grease traps and discharges from industrial, institutional, and commercial facilities.
2. Establish an enforcement program.
3. Develop written methods and procedures for preventing and controlling discharges of grease from industrial, institutional, and commercial facilities.
4. Develop an inspection and tracking methodology.
5. Develop an inspection and permitting program for trucks used to pump grease traps or delegate inspection responsibilities to a designee.

Description and Implementation: The discharge of grease into sewer systems contributes to serious clogging problems and presents local wastewater providers with substantial labor and repair costs for unclogging and cleaning the sewer system. Grease is responsible for a significant amount of system blockages in the District. Of the 699 reported sewer blockages that occurred in 2014, over 50 percent were due to grease blockages. FOG continues to be the leading cause of sewer spills from year to year. The high frequency of these problems highlights the need for grease management programs and enforcement efforts to address the significant potential impacts on water quality and infrastructure.

Many local governments in the District have incorporated grease trap requirements for commercial food establishments or processors that discharge a large volume of waste oils or tallow. Although existing ordinances require the installation of grease traps, a lack of routine maintenance of grease traps can lead to sewer line failure. An inspection and tracking program will support routine inspections of grease traps, tracking of sewer system blockages and overflows associated with grease, and investigations to identify sources causing blockages in the sewer system.

The implementation of this Action Item will vary from jurisdiction to jurisdiction based on the allocation of legal authority for establishing, implementing, and enforcing grease management programs. Local wastewater providers should identify the department responsible for implementing the grease trap inspection program and coordinate roles and responsibilities as needed.

Commercial waste transports must be registered with Georgia EPD, as outlined in the Georgia Water Quality Control Act (O.C.G.A. § 12-15-21). This Act also requires that a local governing authority inspect commercial trucks annually. Local governments in the District can choose to implement an inspection program or delegate inspection responsibilities to a designee. The Southeastern F.O.G. Alliance provides training for local government staff on conducting these inspections.

For Sub-Task 1, all policies must be written policies that either include their date of adoption or are accompanied by other documents (for example, letters, emails, memoranda) that establish when the written policy was adopted. Implementation of this Action Item will be supported through

implementation of the Action Item PUBLIC EDUCATION-1, which requires that each local wastewater provider implement at least one public education activity to raise awareness of the proper disposal of FOG and rags.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Southeastern F.O.G. Alliance, https://www.southeasternfogalliance.org/
- District, F.O.G. Fact Sheet, https://northgeorgiawater.org/wp-content/uploads/2019/09/FOG_VerticalCard_2019.pdf

ACTION ITEM

WW-8: SEWER SYSTEM OVERFLOW EMERGENCY RESPONSE PROGRAM

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To minimize watershed impacts from SSOs.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, maintain a sewer system overflow emergency response program, including updating SOPs, as necessary, and executing existing programs to respond and provide notifications.

Sub-Tasks: Each local wastewater provider shall:

1. Review SSO emergency response program to ensure local response program complies with Federal and State requirements.
2. Update and add SOPs to ensure proper response to overflow.

Description and Implementation: While the prevention of SSOs is a key component of system management, an emergency response system is also critical to minimize adverse impacts in the event of overflows. While many local wastewater providers already maintain emergency response programs for SSOs, SOPs, training and notification systems should be kept up-to-date to ensure rapid and effective response.

The SOPs for emergency response to SSOs must include procedures that will be followed to ensure expedient notification and response to spills, major spills, or overflows impacting or having the potential to impact the public, surface waters, ground surfaces and structures. Common SOP provisions include procedures to:

- Ensure dispatch of personnel and equipment immediately to correct and repair conditions causing or contributing to overflows.
- Investigate the causes of overflow events or spills.
- Estimate spill quantities and areal extents.
- Notify Georgia EPD immediately in the event a spill or major spill occurs.
- Notify the public in the event an overflow occurs.
- Report spill or major spill to the local media (television, radio and print media).
- Limit public access to areas affected by overflows.
- Report spill or major spill to local health departments immediately.
- Notify City/County stormwater staff.
- Post notice immediately and as close as possible to where the spill or major spill occurred and where the spill or major spill entered State waters.
- Publish notice of major spill according to the Georgia Rules and Regulations for Water Quality Control (Chapter 391-3-6-.05).
- Notify downstream city, county and public agencies as required by the Georgia Rules and Regulations for Water Quality Control (Chapter 391-3-6-.05).

- Train personnel adequately regarding the provisions and implementation of the SOP when overflows occur.
- Minimize the volume of untreated wastewater flowing or transmitted to the portion of the sewer system impacted by overflow events.
- Monitor and sample major spill-impacted waters immediately and analyze samples from water impacted, or potentially impacted, by overflow events.
- Reporting the results of the monitoring, sampling, and analysis of water samples impacted or potentially impacted by overflows, to appropriate regulatory authorities.

New staff training programs and continuing education for inspection and maintenance personnel is needed to ensure the sewer system inspection and maintenance program is effective to avoid overflows and the need for emergency response.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Georgia EPD, Rules and Regulations for Water Quality Control, Chapter 391-3-6, http://rules.sos.ga.gov/nllxml/georgiacodesGetcv.aspx?urlRedirected=yes&data=admin&lookingfor=391-3-6

ACTION ITEM

WW-9: SEWER SYSTEM INSPECTION AND MAINTENANCE TRAINING

Responsible Party: Local Wastewater Provider without a CMOM	Intent: To ensure effectiveness of sewer system inspection and maintenance program.

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, maintain a staff training program for sewer system inspection and maintenance.

Sub-Tasks: Each local wastewater provider shall:

1. Review status of existing staff certification and continuing training credits to ensure they meet State requirements under the Wastewater Collection System Operator license.
2. Schedule additional training as needed for new or existing personnel.

Description and Implementation: Regular inspection and cleaning of the sanitary sewer system can help to prevent SSOs. Action Item WW-4 requires an inspection program to provide routine checks on the system. The staff that conducts these inspections needs up-to-date training to perform their field work effectively. Cross-training of inspectors with watershed protection and water distribution system personnel could increase opportunities for identifying infrastructure problems in the field.

The training program for inspectors should be designed so that wastewater personnel have a strong and up-to-date understanding of all aspects of the sewer system inspection and maintenance program, especially related to their areas of responsibility. The sewer system inspection and maintenance training program should include the following:

- General training for all employees: This training should cover basic aspects of the sewer system, including the management, operation, inspection, and maintenance program
- Specific employee training programs: These programs should include detailed courses covering specific inspection and maintenance activities
- Procedures for tracking all training activities
- Schedules for personnel training, including periodic refresher training

Staff training programs and continuing education may be designed to comply with State requirements for operations and maintenance personnel. For example, local wastewater providers must provide State-mandated training such as Wastewater Collections System Operator training and Erosion and Sedimentation Control training to appropriate staff.

Communities that have an approved CMOM program with Georgia EPD can demonstrate compliance through certification of their CMOM program based on the most recent CMOM audit.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

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ACTION ITEM

WW-10: LOCAL PUBLIC EDUCATION PROGRAM

Responsible Party: Local Wastewater Provider	Intent: To increase knowledge and awareness of water resources protection with the goal of building public support for local actions and activities as well as long-term behavior change.

Action Item: Develop and implement a local public education program on wastewater topics.

Sub-Tasks: Each local wastewater provider shall:

1. Implement education activities as outlined in Action Item PUBLIC EDUCATION-1.
2. Direct at least one public education activity to address the proper disposal of fats, rags, oil, and grease.

Description and Implementation: Public education and outreach at the local level is important to raise awareness of wastewater management with the goal of fostering broad public support for local actions and activities as well as changing behaviors that leads to the long-term protection of our water resources. Involving the public in local wastewater efforts is crucial to developing an ethic of stewardship and community service and enabling the public to make informed choices about water resources management. Changes in basic behavior and practices are necessary to achieve maximum, long-term improvements in water quality.

Section 5.5 provides more detail on public education programs and Action Item PUBLIC EDUCATION-1 provides more detail on local public education program requirements. In addition to the general public education requirements for wastewater listed in Table 5-6, there is a specific requirement that at least one public education activity specifically address the proper disposal of rags and FOG.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- District, Public Education and Awareness Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/
- Southeastern F.O.G. Alliance, https://www.southeasternfogalliance.org/
- District, F.O.G. Fact Sheet, https://northgeorgiawater.org/wp-content/uploads/2019/09/FOG_VerticalCard_2019.pdf
- City of Atlanta, F.O.G. Fighter Video, https://www.youtube.com/watch?v=IDC94hhVPv4
- Gwinnett County, F.O.G. informational webpage, https://www.gwinnettcounty.com/web/gwinnett/departments/water/geteducated/fatsoilandgreasefog

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5.4 Watershed Management Action Items

Development within the District is expected to continue through 2050 with the larger land use transitions occurring outside of the urban core areas. Within the urban core areas, density and land use intensity are anticipated to increase due to infill and redevelopment, which is expected to continue and accelerate in future years throughout the region. Land development can have substantial impacts on watershed hydrology. The Watershed Management Action Items are designed to help mitigate adverse impacts of land development.

Action Items are management measures to be performed at the local level by the District's member local governments. Because these local Action Items are framed at a regional level, their implementation will continue to build a comprehensive program for addressing watershed issues, including the protection of water quality and designated uses as well as improving the health of impacted water bodies.

The District encourages Georgia EPD to work with stakeholders in identifying opportunities to make further use of water quality data collected by local jurisdictions in listing, delisting, and other decisions where appropriate. The District is available to work collaboratively with Georgia EPD to determine the best approach for using this data.

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ACTION ITEM

WATERSHED-1: POST-CONSTRUCTION STORMWATER MANAGEMENT

Responsible Party: Local Government	Intent: To protect long-term water quality by effectively managing runoff from developed areas.

Action Item: Adopt a post-construction stormwater management ordinance, a local stormwater design manual, a stormwater management plan review process with checklist(s), a practicability policy, inspection and maintenance agreement requirements for new post-construction stormwater management systems, and inspection process with checklist(s) to ensure stormwater management plan compliance during construction.

Sub-Tasks: Each local government shall:

1. Adopt the District's Model Ordinance for Post-Construction Stormwater Management for New Development and Redevelopment or an equivalent ordinance at least as effective, based on the guidance in the latest Georgia Stormwater Management Manual (GSMM) and MS4 permit as applicable.
2. Adopt the GSMM or an equivalent local stormwater design manual.
3. Implement stormwater management plan reviews as part of the land development application based on the GSMM or equivalent local stormwater design manual.
4. Adopt a practicability policy to document the determination by a stormwater management plan reviewer that it is infeasible to apply the runoff reduction requirement on part or all of a proposed site development.
5. Require inspection and maintenance agreements on all new post-construction stormwater management systems.
6. Develop a process and checklist(s) for stormwater management plan review and inspection.

Description and Implementation: Post-construction stormwater management includes program elements that provide legal authority, design standards and review process, inspection and maintenance agreements and other related activities in order to provide for long-term management of runoff from developed areas, protect water quality, and to enhance and promote public health, safety, and general welfare.

Local governments shall adopt the Model Ordinance for Post-Construction Stormwater Management for New Development and Redevelopment, or an equivalent ordinance, that:

- Requires a stormwater management plan for
  - New development that creates or adds 5,000 square feet or greater of new impervious surface area or that involves land disturbing activity of 1 acre of land or greater; and
  - Redevelopment (excluding routine maintenance and exterior remodeling) that creates, adds, or replaces 5,000 square feet or greater of new impervious surface area or that involves land disturbing activity of 1 acre or more.
- Adopts the GSMM or develops an equivalent local stormwater manual. The GSMM includes minimum requirements for water quantity and quality performance. A local stormwater manual used in lieu of the GSMM must provide an equivalent level of stormwater control and treatment.

The GSMM can be adopted "as-is" by a local government, or with a local addendum, which may supplement or provide additional technical criteria, details, or guidance.

- Includes provisions for ongoing long-term inspections and maintenance of stormwater management systems. Privately maintained stormwater management systems approved under this ordinance must have an inspection and maintenance agreement that outlines the inspection responsibilities and routine maintenance activities that must be performed. The local jurisdiction is required, at a minimum, to track stormwater facilities covered by inspection and maintenance agreements.
- Includes a method for enforcement of the ordinance provisions, including appropriate violations and penalties which are consistent with other local regulations. During the construction phase, enforcement methods for failure to comply with the approved stormwater management plan might include stop work orders, withholding the certificate of occupancy and/or suspension, revocation, or modification of the permit. Long-term maintenance violations may result in civil or criminal penalties and enforcement actions.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- District, Model Post-Construction Stormwater Management Ordinance for New Development and Redevelopment Ordinance
- District, Policy on Practicability Analysis for Runoff Reduction
- GSMM, 2016 Edition, http://www.georgiastormwater.com

  Note: GSMM Volume 1 includes Stormwater Management Plan Review Checklists (Appendix B), Stormwater Construction Inspection Checklists (Appendix C), and an Example Stormwater Facility Maintenance Agreement (Appendix D).
- EPA, Urban Runoff: Model Ordinances for Post Construction Controls, https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/urban-runoff-model-ordinances-post-construction-controls
- City of Atlanta, Post-Development Stormwater Management Ordinance, 2013, https://www.atlantawatershed.org/stormwaterordinance/
- U.S. Forest Service, Aquatic Organism Passage Interactive Tool, http://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=c001b7d3212845129086ad7a88a6e775
- U.S. Fish and Wildlife Service, Georgia's Stream Crossing Handbook, https://www.fws.gov/athens/pdf/GaStreamHandbook2012_Final.pdf

ACTION ITEM

WATERSHED-2: RESERVED.

This Action Item from the 2017 District Plan titled “Construction Erosion and Sedimentation Control” was deleted in the 2022 District Plan because it was duplicative with existing state law and Georgia EPD regulatory programs.

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ACTION ITEM

WATERSHED-3: FLOODPLAIN MANAGEMENT

Responsible Party: Local Government	Intent: To minimize future flooding impacts and integrate floodplain management with stormwater management during the land development process.

Action Item: Adopt a floodplain management and flood damage prevention ordinance, develop and maintain floodplain maps, and incorporate review and enforcement procedures into development plan reviews.

Sub-Tasks: Each local government shall:

1. Adopt the Model Floodplain Management/Flood Damage Prevention Ordinance, or an equivalent ordinance at least as effective.
2. Make revisions to local plan review processes and procedures to incorporate the model ordinance or an equivalent ordinance at least as effective.
3. For all streams with drainage areas greater than 100 acres, delineate and map the 100-year future-conditions floodplain and update floodplain maps as needed. For streams that drain 100 to 640 acres (1 square mile), communities may choose to delineate future condition maps or require developers to delineate future conditions on a site by site basis. Delineating future floodplain boundaries for streams that drain greater than 640 acres are always the responsibility of the local government. Georgia EPD provides additional guidance regarding Floodplain Management on their website.
4. Incorporate future floodplain mapping into development review procedures and regulate development based on the future-conditions floodplain maps, as available.

Description and Implementation: Floodplain management involves the designation of flood-prone areas and the management of their uses. It also minimizes modifications to streams, reduces flood hazards and protects the beneficial uses and functions of floodplains, including water quality protection. Floodplain regulations can greatly reduce future flooding impacts and protect their function to safely convey floodwaters and protect water quality.

The floodplain management/flood damage prevention requirements may be adopted either as an ordinance or as part of the local development regulations. If the requirements are located in the local development regulations, these regulations must provide enforcement mechanisms.

The District's Model Floodplain Management/Flood Damage Prevention Ordinance was developed to help communities integrate floodplain management with stormwater management during the land development process. This ordinance promotes a No Adverse Impact approach to floodplain encroachments, establishes planning requirements to map and regulate land development based on future-conditions hydrology and promulgates higher freeboard and building standards than the National Flood Insurance Program (NFIP) minimums. Local governments shall adopt the model ordinance, or an equivalent ordinance at least as effective, that:

- Regulates floodplains based on expected future land use conditions
- Requires a floodplain management plan for land development activities within areas of special flood hazard
- Includes a requirement that any land development within a floodplain be required to provide an engineering study to demonstrate that it will cause no adverse impact downstream or upstream

- Specifies building requirements and provisions to minimize flood damages for both residential and non-residential structures within the floodplain
- Provides appropriate variance and enforcement procedures

Future-conditions floodplain delineation is required for all streams with drainage areas greater than 100 acres as described in Sub-Task 3. Local governments are expected to develop and follow a prioritized schedule to complete future-conditions floodplain delineation of these streams. Future-conditions floodplain delineation should be coordinated with all local comprehensive plans and their unified growth policy maps.

The future-conditions floodplain maps developed for this Action Item are for local use only in administering their floodplain management/flood damage prevention ordinance. These maps are not a Federal Emergency Management Agency (FEMA) requirement, nor will FEMA use a community's future-conditions flood maps for flood insurance purposes. However, a local government may elect to use a FEMA-approved modeling process to update current base flood elevations (BFEs) for their local Flood Insurance Rate Maps (FIRMs). In addition, a local jurisdiction may also request that future-conditions floodplains to be added to FIRMs as a "Zone X" floodplain.

Hydraulic modeling, based on future-conditions hydrology, is used to establish future-conditions BFEs. The BFEs will be mapped using the best available topographic data to create future condition floodplain maps. Future-conditions hydrology must be based on the best available estimate of future land use conditions within a watershed as determined by the local government and may include a local government's adopted future land use map, future-conditions zoning map or watershed study projections.

For watersheds or sub-basins that are currently at full build-out, communities may use the existing 100-year floodplain boundaries as long as they prove that: (1) the current 100-year floodplains are accurate and effective, (2) the future land use is not expected to change significantly due to new development or redevelopment, and (3) hydraulic and hydrologic modeling is performed to show that the floodplain will not increase in the future. Engineering analysis based on FEMA-approved methodology must show that BFEs and floodplain delineations are accurate given existing and future buildout conditions.

Both the Chattahoochee River and Etowah River are highly regulated below the federally operated Buford and Allatoona Dams, respectively. Therefore, these two main stem river segments are exempt from the mapping requirements under this measure. Even though these rivers are highly regulated, they still have the potential to flood.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- District, Model Floodplain Management/Flood Damage Prevention Ordinance
- FEMA, NFIP Community Rating System (CRS), https://www.fema.gov/national-flood-insurance-program-community-rating-system
- FEMA, Hazard Mitigation Planning Resources, https://www.fema.gov/hazard-mitigation-planning-resources
- Georgia EPD, http://epd.georgia.gov/floodplain-management

ACTION ITEM

WATERSHED-4: STREAM BUFFER PROTECTION

Responsible Party: Local Government	Intent: To protect and stabilize streambanks, protect water quality, and preserve aquatic and riparian habitat.

Action Item: Adopt a stream buffer protection ordinance and incorporate review and enforcement procedures into development plan reviews. For local governments with small water supply watersheds, the ordinance should also include adopting small water supply watershed buffers as outlined in Action Item Integrated-7 and required by the Part V Environmental Planning Criteria.

Sub-Tasks: Each local government shall:

1. Adopt the Metro Water District Model Stream Buffer Protection Ordinance, or an equivalent ordinance at least as effective.
2. Incorporate compliance with this ordinance into development review and inspection procedures.

Description and Implementation: Stream buffers help protect streams and preserve water quality. Stream buffers filter pollutants, reduce erosion and sedimentation, protect and stabilize streambanks, preserve vegetation and provide both aquatic and riparian habitat.

Local governments shall adopt the Metro Water District Model Stream Buffer Protection Ordinance, or an equivalent ordinance at least as effective, that:

- Provides for consistent buffer zones along the streams for the protection of water resources and riparian areas.
- Outlines appropriate stream determination methods, minimum buffer requirements, as well as restrictions for activities within protected stream buffers. All land disturbing activity permits must include site plans showing topography, location of all known streams and location of all required stream buffers. Protected stream buffers must be shown on all final plats to ensure that property owners understand the restrictions on these areas.

Includes appropriate exemptions, variance procedures and enforcement provisions. Note that variances to the state water quality buffers are issued by Georgia EPD. Stream buffer protection requirements may be adopted as an ordinance. Below are the key elements to developing an ordinance that is equivalent to the District model ordinance:

- A local ordinance must provide for *undisturbed* 50-foot stream buffers with an additional 25-foot impervious surface setback (that is, a total 75-foot setback for impervious surfaces from a stream), unless the local government has developed an alternative stream buffer methodology that is as protective and supported by scientific study or analysis. Note that wider stream buffer requirements and/or setbacks may be necessary on certain waters to comply with other State laws or regulations.
- Local stream buffer protection ordinances must provide guidance on how stream determinations are performed. While the mapping of all streams within the local jurisdiction is one option, the District's model ordinance provides a rebuttable presumption that a stream is present on any drainage of 25 acres or greater. Note that communities must use the Georgia EPD guidance for state buffers for 25-foot state water quality buffers.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Model Stream Buffer Protection Ordinance
- Georgia EPD, technical guidance for erosion and sediment control and state-protected stream buffers, http://epd.georgia.gov/erosion-and-sedimentation

ACTION ITEM

WATERSHED-5: ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM

Responsible Party: Local Government	Intent: To prevent water pollution due to unauthorized discharges to the public stormwater system.

Action Item: Adopt an ordinance and develop and implement a local program to address illicit discharges and illegal connections to the stormwater system.

Sub-Tasks: Each local government shall:

1. Adopt the Metro Water District Model Illicit Discharge and Illegal Connection Ordinance, or an equivalent ordinance at least as effective.
2. For MS4 permittees only: Develop an Illicit Discharge Detection and Elimination (IDDE) program with inspection and enforcement procedures consistent with Phase I and II MS4 permits.

   or

   Communities without an MS4 permit: Follow methods in the Metro Water District Standards and Methodologies for Surface Water Monitoring.

Note: Each local government is responsible for coordinating their IDDE program with NPDES MS4 permit requirements. Local governments are encouraged to rotate inspections so that all areas of the local stormwater system are inspected, while recognizing that some areas may have greater potential for illicit discharges and therefore will be inspected more regularly.

Description and Implementation: The purpose of the required ordinance is to provide local governments with the legal authority to address illicit discharges and illegal connections to the public (county or municipal) stormwater system. An illicit discharge is defined as any discharge to a public stormwater drainage system that is not composed entirely of stormwater runoff. An illegal connection is a pipe or conveyance that allows an ongoing illicit discharge to occur.

Local governments shall adopt the Metro Water District Model Illicit Discharge and Illegal Connection Ordinance, or an equivalent ordinance, that:

- Adequately defines the publicly owned and operated stormwater system (municipal/county separate storm sewer system).
- Provides the local government with the legal authority to address illicit discharges and illegal connections to the local stormwater system.
- Establishes enforcement actions for those properties found to be in non-compliance or that refuse to allow access to their facilities.

Most MS4 permittees can comply with this Action Item as part of the Stormwater Management Plan, which defines activities that follow the Phase I or II MS4 permit. For these permittees, no additional activities are required outside of compliance with the MS4 permit.

In concert with the ordinance, communities are to develop an IDDE program that best addresses their local stormwater infrastructure and watershed conditions, water quality issues and priorities. Local programs may include one or more of the following options:

- Dry weather stormwater outfall screening
- Commercial and industrial inspections

- Asset management inspections
- Streamwalks
- Other local IDDE program activities developed by the local government

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Model Illicit Discharge and Illegal Connection Ordinance
- Metro Water District, Standards and Methodologies for Surface Water Monitoring, 2007, http://northgeorgiawater.org/wp-content/uploads/2015/05/MNGWPD_StandardsMethodologies_March2007a.pdf

ACTION ITEM

WATERSHED-6: LITTER CONTROL

Responsible Party: Local Government	Intent: To provide legal authority to prohibit and penalize the littering of public or private waters.

Action Item: Adopt a litter control ordinance.

Sub-Tasks: Each local government shall:

1. Adopt the Metro Water District Model Litter Control Ordinance, or an equivalent ordinance that is at least as effective.
2. Develop inspection, violation, and enforcement procedures based on the ordinance.

Description and Implementation: Litter can be carried by stormwater to streams, rivers, and lakes, where it contributes to water quality degradation. A litter control ordinance provides a mechanism for local governments to have the legal authority to address this nonpoint source pollutant.

Local governments shall adopt the District Model Litter Control Ordinance, or an equivalent ordinance, that:

- Provides a definition of litter and a prohibition against the littering of public or private property and waters.
- Includes an enforcement mechanism with appropriate penalties for violations.

The District's model ordinance is based on the "Georgia Litter Control Law" (O.C.G.A. § 16-7-40 et. seq.). Adoption of the model ordinance, or other ordinances at least as protective, is specifically authorized by O.C.G.A. §16-7-48.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Metro Water District, Model Litter Control Ordinance
- Center for Hard to Recycle Materials (CHaRM) facility operated by the nonprofit, Live Thrive, https://livethrive.org/charm/

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ACTION ITEM

WATERSHED-7: RESERVED.

The Action Item from the 2017 District Plan titled “Promoting A Green Infrastructure Approach” was deleted in the 2022 District Plan because these issues are now covered in the 2019 update to the Model Ordinance for Post-Construction Stormwater Management for New Development and Redevelopment in Watershed-1 and Georgia EPD regulatory programs.

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ACTION ITEM

WATERSHED-8: WATERSHED IMPROVEMENT PROJECTS

Responsible Party: Local Government	Intent: To address water quality problems and improve streams and water bodies to meet their designated uses.

Action Item: Identify substantially impacted watersheds and implement Watershed Improvement Projects (WIPs) to address impaired waters.

Sub-Tasks: Each local government shall:

1. Identify substantially impacted watersheds based on local criteria and the Georgia EPD 303(d) list of impaired streams.
2. Prioritize impaired watersheds for WIPs as a part of a Watershed Improvement Plan or comparable project list.
3. Incorporate WIPs into the local Capital Improvement Project list and develop implementation schedule.
4. Design and construct WIPs based on local implementation schedule as budgets and resources allow.

Description and Implementation: Each local government shall identify substantially impacted watersheds within its jurisdiction and develop WIPs to address these impairments. At minimum, the list of substantially impacted watersheds should include areas with water quality impairment including water bodies on the Georgia EPD 303(d) list and water bodies that have TMDLs. Local governments may choose to add to the list watersheds with high levels of impervious area, flooding problems, streambank erosion and sedimentation, aging or degraded infrastructure or aquatic habitat degradation. A schedule should be created to prioritize all substantially impacted watersheds in the community and provide a specific planning horizon for completion of the WIPs. Implementation of the WIPs should occur as budgets and resources allow.

WIPs reduce stormwater runoff and restore streams and water bodies to improve water quality, meet designated use and promote sustainable watershed functioning. WIPs include structural or physical improvements (that is, structural measures, retrofits and/or restoration efforts) to address specific problems in the watershed including flooding, hydraulic capacity, streambank stability, streambank erosion, degraded aquatic habitat and impaired water quality. WIPs also include nonstructural activities or programs that are developed to improve conditions in a substantially impacted watershed, such as targeted public education efforts, designated areas for more protective stream buffers, watershed investigations, and trash removal.

WIPs can include a number of different retrofit or restoration strategies based on the problems within a watershed. Retrofit measures can include the modification of existing stormwater structures, such as detention/retention ponds, in order to provide water quality treatment and/or improve hydrologic function. Site-level engineered green infrastructure WIPs can include a suite of available practices such as green roofs, rain cisterns, bioretention ponds, grassed swales, green streets, and porous pavement/pervious asphalt. Restoration measures can include stream restoration, wetland enhancements, replanting riparian corridors and other projects to restore habitat and improve the hydrologic regime. A WIP may also be focused on protection or conservation of sensitive resources.

Additionally, non-structural WIPs can be highly effective in improving watershed conditions in a community. The EPA provides a variety of guidance and information at the following website.

The following sources of information may be used to determine and assess the substantially impacted watersheds in a community:

- Existing watershed studies prepared by a local government or regional, state, or federal agency, including Watershed Protection Plans prepared for NPDES wastewater permits
- HUC-8 River Basin Profiles included in Appendix A
- Georgia EPD 305(b)/303(d) list of impaired waters
- Georgia EPD TMDL designations and local TMDL assessment and implementation plans
- Local stormwater master plans, management system inventories and infrastructure inventories
- Results of water quality monitoring activities, biological and habitat assessments, streamwalks, and other field work or data collection and analysis, such as GIS and/or computer modeling
- Calls and complaints from the community related to flooding, streambank erosion and water quality
- Other information sources including staff knowledge of problems, impervious cover assessments, land use and redevelopment planning, etc.

Criteria used by the local government to prioritize watersheds or specific areas of the community for WIPs can be based on locally developed criteria or priorities. These criteria may include:

- Number and/or magnitude of existing or future problems in a drainage area or watershed
- Level of existing or future development or redevelopment, land use activities or population in a drainage area or watershed
- Feasibility-related issues such as land ownership that may drastically affect the cost-effectiveness or expediency of project implementation
- Long-term resource availability and budget planning
- Other programs, activities or funding that would influence the implementation of WIPs
- Public review of prioritized watersheds, specific target areas or projects, as appropriate

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- EPA, Nine Minimum Elements to Be Included in a Watershed Plan for Impaired Waters Using Incremental Section 319 Funds, https://www.epa.gov/sites/default/files/2015-09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf
- EPA, National Menu of Best Management Practices (BMPs) for Stormwater, https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu
- EPA, National Management Measures to Control Nonpoint Source Pollution from Hydromodification, https://www.epa.gov/sites/default/files/2015-09/documents/hydromod_all_web.pdf
- Georgia EPD 305(b)/303(d) impaired waters list, http://epd.georgia.gov/georgia-305b303d-list-documents

ACTION ITEM

WATERSHED-9: ONGOING STORMWATER SYSTEM MANAGEMENT

Responsible Party: Local Government	Intent: To provide ongoing stormwater system management in order to prevent nonpoint source pollution as a result of unmanaged runoff or infrastructure disrepair.

Action Item: Conduct ongoing management of stormwater infrastructure to ensure effective functioning and watershed protection.

Sub-Tasks: Each local government shall:

1. Develop a stormwater infrastructure inventory, including:
    a. Establishment of data objectives and requirements and a data collection schedule
    b. Development of an inventory and map of the public stormwater system
    c. Maintenance and updating of inventory data as required
2. Develop an extent and level of service policy
3. Develop a stormwater systems inspections program
4. Develop a stormwater maintenance program
5. Establish pollution prevention/good housekeeping for publicly owned facilities, including:
    a. Identification of publicly owned facilities and activities with pollution potential
    b. Development of practices and procedures to prevent pollution

Description and Implementation: This Action Item is consistent with some MS4 permit requirements. As a result, MS4-permitted local governments shall comply with the same elements of their MS4 permit to demonstrate compliance with this Action Item. MS4 permitted local governments may satisfy this requirement by providing letters from Georgia EPD that document approval of the MS4 annual reports during the audit process. Local governments that do not hold an MS4 permit shall comply with this Action Item by following the implementation guidance regarding the Sub-Tasks below.

Asset management principles are encouraged in implementing this Action Item. Local governments should use tools and procedures for a prioritized, proactive approach to stormwater management. A brief description of each Sub-Task is provided below.

For Sub-Task 1, a stormwater infrastructure inventory identifies individual structural assets, attributes, and locations. The level of sophistication of the local government's stormwater infrastructure inventory will vary depending on the complexity of the system and funding available. However, the basic intent of the inventory is to understand how stormwater runoff enters the conveyance system and where flows ultimately discharge to receiving water bodies.

For Sub-Task 2, the extent and level of service policy or other similar mechanism should define responsibilities within the community related to stormwater infrastructure. A local extent of service policy identifies the publicly maintained and privately maintained portions of the stormwater system, as defined by the inventory. A local level of service policy may outline services provided in each extent of service for inspection and maintenance activities on public or privately owned property, as well as private property that is subject to an easement. Some communities may choose to be more specific with the frequency of inspections and maintenance and the type of enforcement activities that will be provided. The level of

service policy may also include a goal-based statement that relates to the functionality of the system, such as reducing flooded properties by 10 percent.

For Sub-Tasks 3 and 4, stormwater system inspections should be conducted regularly to evaluate the existing stormwater infrastructure and identify areas needing repair, potential future problems, and water quality concerns. Stormwater maintenance programs ensure that the stormwater system is functioning properly and can convey or infiltrate storm flows and reduce pollutants. At a minimum, inspections must address publicly owned structural controls and publicly maintained infrastructure. Private stormwater structural control facilities with maintenance agreements must be included in the inspection program unless the local jurisdiction allows inspection and certification by a qualified design professional and those provisions and responsibilities are included in the approved maintenance agreements. Standard maintenance agreements can be found in the GSMM, Volume 1, Appendix D. In addition, local governments should develop comprehensive maintenance programs that address both reactive and preventative maintenance needs including customer complaints, routine drainage system cleaning, and repair and replacement of aging infrastructure.

For Sub-Task 5, pollution prevention and good housekeeping programs for local operations aim to minimize nonpoint source pollution from publicly owned facilities and set a good example to residents, businesses, industry, and institutions. The GSMM, Volume 3, Pollution Prevention Guidebook provides guidance for these programs. As a part of this program, publicly owned facilities should be inventoried when a facility has activities that can potentially contribute to stormwater pollution and water quality degradation; this includes facilities with an industrial stormwater NPDES permit. Pollution prevention and good housekeeping practices should be listed for each publicly owned facility with the potential to contribute to stormwater pollution.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Georgia EPD, Stormwater Management, technical guidance page, http://epd.georgia.gov/storm-water
- GSMM, 2016 Edition, http://www.georgiastormwater.com
- EPA, Stormwater Maintenance, technical guidance page, https://www.epa.gov/npdes/stormwater-maintenance

ACTION ITEM

WATERSHED-10: LONG-TERM AMBIENT TREND MONITORING

Responsible Party: Local Government	Intent: To provide comprehensive and consistent watershed-based water quality monitoring from across the District and to consolidate data from local monitoring efforts to better assess watershed conditions and effectiveness of watershed protection and management efforts.

Action Item: Perform long-term trend water quality monitoring program that includes permanent, representative stations, as well as monitoring of 303(d) listed stream segments for the parameters of concern.

Sub-Tasks: Each local government shall:

1. Monitor permanent representative stations. Develop and implement a long-term monitoring plan consistent with any one of the following three options:
    a. Georgia EPD-approved Watershed Protection Plan
    b. Other plan that is consistent with the District Standards and Methodologies for Surface Water Monitoring. For local governments without a Georgia EPD-approved Watershed Protection Plan, the sampling of the following precipitation events and frequencies are required:
        - A total of six events annually for wet weather monitoring: minimum of three wet weather samples during each of the summer and winter seasons (May-Oct, Nov-April)
        - A total of two events annually for dry weather monitoring: minimum of one dry weather sample during each of the summer and winter seasons (May-Oct, Nov-April)

        or

    c. Establish a Memorandum of Agreement (MOA) or Memorandum of Understanding (MOU) with another jurisdiction that will conduct monitoring on behalf of your community. Local governments that have an established MOA or MOU with another jurisdiction that holds a Georgia EPD-approved Watershed Protection Plan should monitor, at a minimum, per the MOA or MOU.
2. Monitor 303(d) listed stream segments at representative stations. Develop and implement a monitoring plan for 303(d) listed stream segments, with the exception of impaired biota (refer to Note*), using any one of the following four options:
    a. Georgia EPD-approved Impaired Waters Monitoring and Implementation Plan (IWP) associated with an MS4 permit
    b. Plan that is consistent with the District Standards and Methodologies for Surface Water Monitoring for water bodies with 303(d) listings in a local community
    c. Georgia EPD-approved Sampling Quality Assurance Plan (SQAP), which is a requirement for data submitted for 305(b)/303(d) listing or delisting of water bodies. A local government may have developed a SQAP in association with an IWP or for another purpose. It may be developed for a specific stream segment or broader use.

d. Establish a MOA or MOU with another local government that will conduct monitoring on your behalf. Note that this option is available to local governments that may not have a Georgia EPD-approved Watershed Protection Plan or provide wastewater services, if these communities are coordinating with another local government that has a Georgia EPD-approved Watershed Protection Plan where the service area includes both jurisdictions.

3. Track data annually to identify changes and conduct a more detailed analysis every 3 to 5 years to identify long-term trends, successes and potential WIPs (refer to Action Item WATERSHED-8).

4. After the District establishes a reporting process, submit data annually to the District. As of the publication of this Plan, the District has not yet established this process.

**Note: The Sub-Tasks above state that monitoring for impaired biota (benthic macroinvertebrates and fish) is not included for 303(d) listed stream segments. This is consistent with current Georgia EPD guidance. Habitat and benthic macroinvertebrate assessments are often included in a Georgia EPD-approved Watershed Protection Plan, but IWPs typically do not require biota assessments. Many local governments monitor total suspended sediment or other sedimentation-related parameters to assess potential sediment impacts on habitat and biological communities.*

Description and Implementation: Monitoring long-term ambient water quality trends provides a means of demonstrating progress toward water quality goals as watershed management efforts are implemented. Local governments that monitor water bodies with TMDLs can investigate water quality trends for the 303(d)-listed violated criteria, as well as identify and address pollutant sources. TMDL monitoring can be used to track the sources of pollution (monitoring several places along a stream to narrow potential sources) and /or performed with the intent of de-listing the waterbody through a Georgia EPD-approved SQAP. Basic data evaluation will vary for each local government but can use a combination of data trending over time, comparisons of values from upstream to downstream within a watershed (accounting for land uses or known sources) and basic statistical summaries (that is, average, median, minimum and maximum) and statistical tests for each parameter.

Permanent representative monitoring stations must be selected by local governments (with or without a Georgia EPD-approved Watershed Protection Plan). Local governments with a Georgia EPD-approved Watershed Protection Plan shall follow the number and location of stations included in the Watershed Protection Plan.

Local governments with a Georgia EPD-approved Watershed Protection Plan should monitor, at a minimum, the permanent stations included in their Watershed Protection Plan.

Only for local governments without a Georgia EPD-approved Watershed Protection Plan, the minimum number of monitoring stations shall be calculated based on the latest census population estimates for the jurisdiction, as listed in Table 5-4.

Table 5-4. Minimum Number of Permanent Stations for Long-term Trend Monitoring

Census Population*	Number of Monitoring Stations
Less than 10,000	1
10,001 – 50,000	2
50,001 – 100,000	4
100,001 – 250,000	8
Communities with greater than 250,000	10

* Population breakdowns generally follow those found in the MS4 permits

Long-term trend monitoring is intended to be conducted by all local governments, which may include cities and counties that share 303(d) listed stream segments. Therefore, local governments in the District will need to coordinate on local responsibility, financial obligations, and appropriate siting of monitoring stations. In the event that local governments within a watershed or county cannot agree on a monitoring program, each local government will be responsible for the number of stations indicated above.

Communities should select stations to represent 303(d) listed waters and areas of changing land uses and should include additional sites to provide good coverage of local conditions. Communities shall compare water quality data with Georgia water quality standards on an annual basis to identify localized problems and impairments. For sampling guidance to delist 303(d) streams using a SQAP, refer to Georgia EPD's guidance document.

While it is not currently a requirement to submit monitoring data to the District, the District will continue to evaluate options to support regional monitoring data evaluation and trending. The District may coordinate with Georgia EPD or local governments to collect monitoring data using the same electronic Watershed Assessment Data Reporting Template that Georgia EPD requires for Watershed Protection Plans. The District is considering the development of an online platform to collect monitoring data.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- Georgia EPD, Watershed Assessment and Protection Plan Guidance Documents, https://epd.georgia.gov/watershed-assessment-and-protection-plan-guidance-documents
- District, Standards and Methodologies for Surface Water Monitoring, 2007, http://northgeorgiawater.org/wp-content/uploads/2015/05/MNGWPD_StandardsMethodologies_March2007a.pdf
- Georgia Rules and Regulations, Chapter 391-3-6-.03, Water Use Classifications and Water Quality Standards, https://rules.sos.ga.gov/GAC/391-3-6-.03?urlRedirected=yes&data=admin&lookingfor=391-3-6-.03
- Georgia EPD, Guidance on Submitting Water Quality Data for Use by the Georgia Environmental Protection Division in 305(b)/303(d) Listing Assessments, https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/SQAP-gwf_1.pdf
- North Carolina State University, Section 319 National Monitoring Program Projects, https://319monitoring.wordpress.ncsu.edu/
- Georgia EPD, 305(b)/303(d) impaired waters list, http://epd.georgia.gov/georgia-305b303d-list-documents

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ACTION ITEM

WATERSHED-11: RESERVED.

This Action Item from the 2017 District Plan titled “Macroinvertebrate Bioassessments” was deleted in the 2022 Plan because it was duplicative with Georgia EPD requirements and/or otherwise duplicative in practice.

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ACTION ITEM

WATERSHED-12: LOCAL PUBLIC EDUCATION PROGRAM

Local Responsibility: Local Government	Intent: To increase knowledge and awareness of water resources protection with the goal of building public support for local actions and activities as well as long-term behavior change.

Action Item: Each local government shall develop and implement a local public education program that addresses watershed protection, stormwater management, and prevention of nonpoint source pollution in compliance with Action Item PUBLIC EDUCATION-1.

Description and Implementation: Public education and outreach at the local level is important to raise awareness of watershed protection, stormwater management, and prevention of nonpoint source pollution. Stormwater is a resource that can replenish clean water for drinking and add recreation or economic benefit to a community. It needs to be protected for the future. The local public education program for this Action Item should engage the public in activities that lead to the long-term protection of our water resources. Involving the public in local watershed protection efforts is crucial to developing an ethic of stewardship and community service and enabling the public to make informed choices about water resources management.

Section 5.5 provides more detail on public education programs and Action Item PUBLIC EDUCATION-1 provides more detail on local public education program requirements. The public education program should include at least one activity that addresses septic system maintenance and pollution prevention, as described in Action Items INTEGRATED-11 and PUBLIC EDUCATION-1. Compliance with Action Item PUBLIC EDUCATION-1 fulfills the requirements of this Action Item.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

Metro Water District, Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/

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5.5 Public Education Action Items

The foundation of effective implementation of this Plan is a coordinated public education effort that engages the citizens of this region in protecting our water resources and using them wisely. We have an interdependent relationship with our region's water resources. We each have an impact on water resources, and water resources have an impact on each of us. Therefore, public education seeks to engage each of us in improving water resources management, and it is an essential strategy for effective Plan implementation.

The District has implemented a public education program since its original 2003 management plans. This program has supported regional water resources managers in attaining achievements including the following:

- Decrease of 30 percent per capita in water consumption since 2000
- Installation of over 150,000 high-efficiency toilets through the Toilet Rebate Program
- Total reduction of 35 percent SSOs since 2003 and a reduction in grease related sewer clog related overflows by 65 percent during the same period

The District public education program is specifically designed to:

- Raise public awareness about our region's water resources and their value in order to foster support for solutions to regional water concerns and for plan implementation.
- Educate the public and other identified target groups in order to increase awareness and encourage behavioral changes.
- Coordinate with other public as well as private entities to maximize the visibility of the District and its messages.

5.5.1 Public Education Approach

The District public education program has two elements: a regional program managed by the District staff and local public education programs administered by local governments and utilities. The regional program provides tools and resources that address key themes in this Plan and support coordinated messaging through regional education initiatives. The local governments and utilities in the region carry the regional program into their communities, reach out to specific local groups and address specific local concerns while also reinforcing regional initiatives and messages. Without local implementation of public education and service activities, the full potential of this Plan cannot be realized. Service activities incorporate a field service component targeting neighborhoods and schools to support a learning experience for all levels of the community.

The following pages address both the process (delivery) and content (messages) for future public education related to water resources in the region. Figure 5-1 shows the primary components of the approach to public education in this Plan. The first part of this section focuses on the on the delivery of public education. It describes the regional public education program and the local public education activities to support implementation of this Plan. Requirements for local public education are presented in Action Item PUBLIC EDUCATION-1. More details on public education activities to fulfill the requirements of this Action Item are provided in Table C-1 of Appendix C.

The second part of this section focuses on the messages for public education programs to support implementation of this Plan. It describes the key public education messages to be delivered and the target audiences for those messages. It references detailed tables that are presented in Appendix C (Tables C-2 through C-5) to further specify the focus areas for public education for specific target audiences. These tables can be used to support the design and execution of local public education programs to support Plan implementation and fulfill the Action Item requirements.

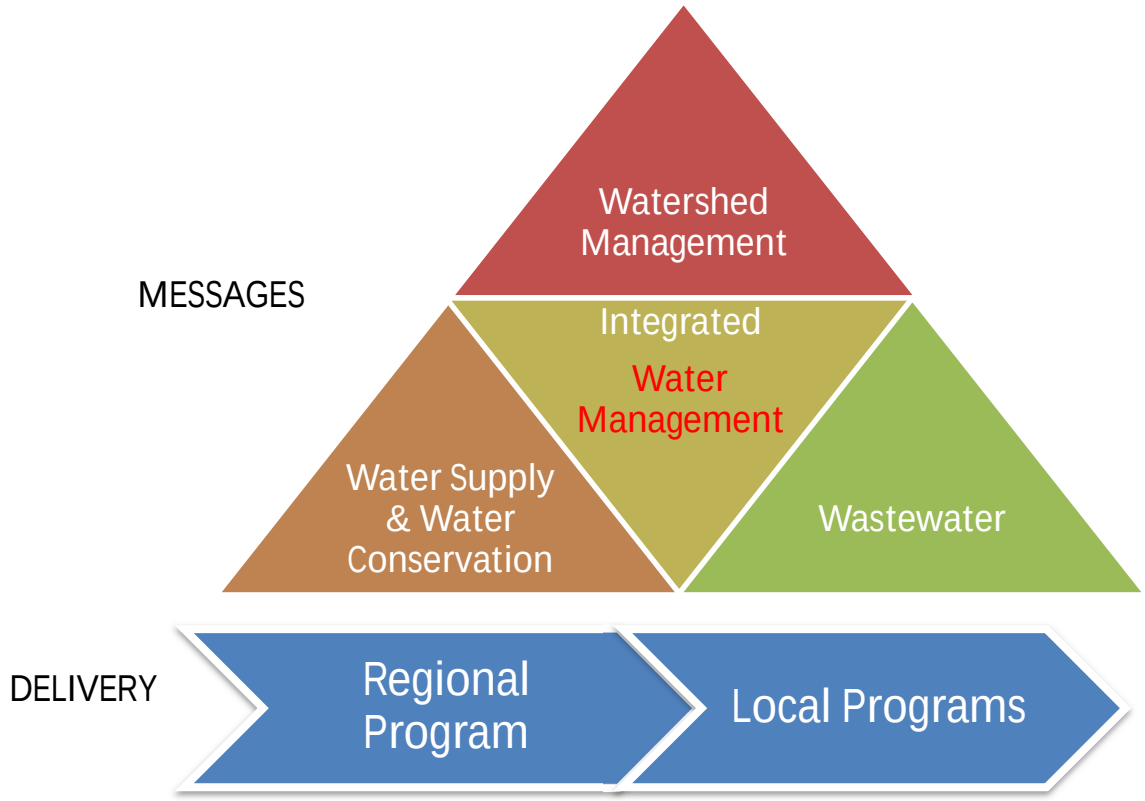


Figure 5-1. Public Education Approach

5.5.2 Regional Public Education Program

Since 2003, the District has developed and implemented a comprehensive public education program to support implementation of the regional water resources plans. The District and its members implement public education programs at both the regional and local levels. The regional public education program provides the benefits of reduced duplication of effort, shared costs, and larger scale efforts, such as mass media, television, and radio advertising. Local public education programs complement the regional program with tailored efforts targeted at local communities and concerns. The coordination of the regional and local public education programs supports a broad and multi-layered initiative that can reach farther than these programs could on their own. Planning provides for consistency and efficiency in implementation. The District's regional public education program includes the following elements:

- Regional Public Education Initiatives: The District coordinates two initiatives to coordinate regional messaging about water conservation and water quality protection:
  - *My Drop Counts* (http://www.mydropcounts.org/) is a regional water conservation initiative developed by the District to create a culture of water conservation in the region. The initiative provides information on the region's unique water story and provides easy-to-implement water conservation tips and water efficiency strategies. Individuals, business, governments, and schools can find out how to use water wisely then pledge their commitment to saving water on the My Drop Counts website. The My Drop Counts campaign is focused on the metro Atlanta region; however, the pledges are available to residents and businesses statewide.
  - The *Clean Water Campaign* (http://www.cleanwatercampaign.org/) is a regional education and outreach initiative focused on stormwater pollution and prevention. This initiative seeks to inform the public about the negative effects of stormwater pollution on our water supply,

recreational opportunities, aquatic ecosystems, and quality of life. It brings together local, state, and federal agencies and environmental and community groups to give residents and businesses ways to prevent stormwater pollution and run-off. This initiative also addresses water quality, sewer, and septic system topics as well as stormwater. The Clean Water Campaign was created by 19 local governments in the District region in 2000.

These regional initiatives include educational materials (website, brochures, videos, how-to manuals), promotional items and media advertising. Local public education programs can leverage these initiatives in their communities to provide a consistent and well-developed message and to take advantage of existing materials available for use by local programs through these initiatives.

- Mass Media Advertising: At times the regional education program has included an annual media buy that is focused on a combination of television, radio, internet, and print advertising. The media time is used to disseminate important public education messages and is often focused on the My Drop Counts and Clean Water Campaign initiatives. The media buys are run at strategic times of year. Local public access television stations are provided with public service announcements related to the campaigns as well.
- Regional Public Education and Outreach Contests and Events: The District sponsors several regional public education and outreach events each year. These events are often tied to the regional initiatives described above. The events include a middle school essay contest, a high school video contest, a calendar photo contest, a 5-kilometer race and regional water festivals. More detail about these events is provided on the Education & Awareness page of the District website.
- Public Education Materials Available to Local Governments and Utilities: The District provides a variety of public education resources for local governments and utilities to use in order to facilitate and manage their local public education programs. Available materials are listed on the Resources page of the District website; the list includes links and downloadable documents. Printed materials may be requested at any time using an online form.
- Coordination with Local Public Education Programs: The District plays an active and leading role in ensuring that water resources related public education activities in the region are coordinated. The Education Subcommittee of the TCC is a primary channel for such efforts. Leaders in public education programs for water resources agencies and utilities throughout the region are active on this subcommittee. The subcommittee meets quarterly to discuss and plan regional public education and outreach activities and concerns. The subcommittee provides input to the District on how to design and implement regional programs to meet the needs of member governments and utilities.

5.5.3 Local Public Education Programs

With the support of the District's regional public education program, local public education programs support citizens in making informed choices and behavior changes to protect water resources. Communities in the District have invested in developing strong public education programs that provide a foundation of support for water resources management in the District and support implementation of this Plan. The requirements for local public education programs are outlined in Action Item PUBLIC EDUCATION-1 below.

Action Item PUBLIC EDUCATION 1 cross-references four Action Items in prior sections, including Action Items INTEGRATED-11, WSWC-16, WW-10, and WATERSHED-12. While multiple Action Items in this Plan address public education, these Action Items are coordinated in a manner to facilitate implementation. Action Item PUBLIC EDUCATION-1 includes all requirements listed in the cross-referenced Action Items. These other Action Items provide more detail, but compliance with Action Item PUBLIC EDUCATION-1 will fulfill the requirements of the cross-referenced Action Items.

Implementation of Action Item PUBLIC EDUCATION-1 is largely focused on the delivery of education and outreach activities by local governments and utilities. The Action Item describes generally the types of activities to implement the Action Item. More detailed descriptions of activities that can fulfill the requirements of Action Item PUBLIC EDUCATION-1 are provided in Table C-1 in Appendix C.

5.5.4 Key Public Education Messages and Target Audiences

The activities implemented to fulfill the local public education requirements of Action Item PUBLIC EDUCATION-1 should be focused on delivering key public education messages that will support plan implementation. Key public education messages for this Plan were identified with the input of the TCCs and Basin Advisory Committees and by reviewing the plan's Action Items. A summary of the key messages is presented below by planning area: Integrated, Water Supply and Water Conservation, Wastewater Management and Watershed Management. More details on focus areas, key messages and targets audiences for public education programs are provided in Tables C-2 through C-5 of Appendix C. It should be noted that Action Item PUBLIC EDUCATION-1 sets two minimum messaging requirements to address priority topics Integrated and Wastewater Action Items (refer to Action Items INTEGRATED-11 and WW-10).

5.5.4.1 Integrated Water Resources Management

The Integrated Water Resources Management Action Items in this Plan address water resources planning and management topics that span across water supply, water conservation, wastewater management and watershed management. Many key public education messages also reach across these areas and can be presented in an integrated manner. The following key messages were identified as integrated water resources management topics that are central to supporting implementation of this Plan:

- Our region's water resources and infrastructure are extremely valuable and integrally connected. The infrastructure that conveys water, wastewater, and stormwater throughout our region is part of the human water cycle and is a critical component of safe and healthy communities. This theme should carry through all public education efforts to the extent possible. The District has had great success in improving water resources management in the region over the past 21 years. Success stories should be highlighted in public education efforts.
- This Plan is a tool that is critical to this region's economy, future, and quality of life. Support is needed to ensure it is implemented. This message should be emphasized with elected officials and government stakeholders at the state and local levels.
- Water resources laws and regulations to protect our water resources exist at the federal, state, and local levels. Understanding of these requirements is important to effective implementation, and implementing these has benefits for individual citizens, localities, and the region. Public education for all stakeholders should include efforts to raise awareness of existing requirements.
- Septic system maintenance is critical to effective operation and protection of the environment. (Note that there is a minimum messaging requirement related to this topic in Table 5-7 - Action Item PUBLIC EDUCATION-1.)

These key messages provide a consistent base for education efforts related to integrated water resources management. Tailored messages can advance public education in support of plan implementation with specific audiences. Table C-2 in Appendix C provides more detail on public education focus areas for specific target audiences regarding integrated water management concerns.

5.5.4.2 Water Supply and Water Conservation

The Water Supply and Water Conservation Action Items of this Plan emphasize the need for water conservation education to support plan implementation. The following key messages were identified as central to supporting effective implementation of the Water Supply and Water Conservation Action Items of this Plan:

- Water conservation is a key strategy in the management of this region's water resources. It is critical to the long-term economy and quality of life in this region. All water users should be urged to adopt water conservation practices and use water efficient equipment.
- Water is a precious resource, and water wasting must be avoided. Wasting includes activities such as runoff from over-watering landscaping, irrigation during rainfall events and unrepaired leaks in and around a building.
- As the Atlanta region develops, water efficiency improvements can help offset the need for new supplies. This can be done indoors and outdoors with water efficient homes, buildings and landscaping combined with regular inspections and maintenance to extend those efficiency savings.
- Commercial entities are an important focus for advancing regional water conservation. Commercial conservation can require the adoption of practices and equipment that are specific to a particular business or industry. Advancing water conservation adoption in the commercial sector should be emphasized as important for its benefits to the region and its water resources.
- Water conservation is always important. We seek to use water wisely at all times and not just during drought.

The key messages above provide a consistent base for public education efforts related to water conservation. Tailored messages can advance public education in support of water conservation and plan implementation with specific audiences. Table C-3 in Appendix C provides more detail on public education focus areas for specific target audiences regarding water conservation.

5.5.4.3 Wastewater Management

The Wastewater Management Action Items of this Plan emphasize the need for public education about wastewater topics to support plan implementation. The following key messages were identified as central to supporting effective implementation of the Wastewater Management Action Items of this Plan:

- The District places a priority on protecting our water resources through advanced levels of treatment, best technologies, and careful placement of effluent discharge.
- Highly treated wastewater should be managed as a valuable resource that can play an important role in supplementing surface water flows as indirect potable reuse and for other downstream benefits.
- FOG and rags that are flushed or put down the drain cause substantial problems for homeowners, building owners, and the sewer collection system. Proper disposal is central to protecting plumbing, infrastructure, and the environment. (Note that there is a minimum messaging requirement related to this topic in Table 5-6 of Action Item PUBLIC EDUCATION-1.)

The key messages above provide a consistent base for public education efforts related to wastewater management. Tailored messages can advance public education in support of plan implementation with specific audiences. Table C-4 in Appendix C provides more detail on public education focus areas for specific target audiences regarding wastewater management.

5.5.4.4 Watershed Management

The Watershed Management Action Items of this Plan emphasize the need for public education about watershed stewardship and nonpoint pollution to support plan implementation. The following key messages were identified as central to supporting effective implementation of the Watershed Management Action Items of this Plan:

- Actions that we take on the land impact our water resources because land is a part of the watershed.
- Stormwater is a resource that can replenish clean water for drinking and add recreation or economic benefit to a community. It needs to be protected for the future.
- Watershed stewardship: It is the responsibility of everyone to protect our water resources.
- Sustainable stormwater management balances the needs of all stakeholders and the natural environment. It includes natural systems like our lakes and rivers and engineered systems like those found in the Georgia Stormwater Management Manual.
- Rivers and watersheds do not stop at the District's jurisdictional boundaries. Water connects us to the rest of Georgia, and our watershed protection efforts will benefit others downstream.

The key messages above provide a consistent base for public education efforts related to watershed management. Tailored messages can advance public education in support of plan implementation with specific audiences. Table C-5 in Appendix C provides more detail on public education focus areas for specific target audiences regarding watershed management.

ACTION ITEM

PUBLIC EDUCATION-1: LOCAL PUBLIC EDUCATION PROGRAMS

Responsible Parties: Local Government, Local Water Provider, Local Wastewater Provider	Intent: To increase knowledge and awareness of water resources protection with the goal of building public support for local actions and activities as well as long term behavior change.

Action Item: Local water providers, wastewater providers, and governments are subject to requirements for local public education programs.

Sub-Tasks: Each local government, local water provider, and local wastewater provider shall:

1. Fulfill the requirements listed in Table 5-5 for local water providers. These requirements address public education related to water conservation. The requirements of this Sub-Task are further described in Action Item WSWC-16.
2. Fulfill the requirements listed in Table 5-6 for local wastewater providers. These requirements address public education related to wastewater management. The requirements of this Sub-Task are further described in Action Item WW-10.
3. Fulfill the requirements listed in Table 5-7. This Sub-Task applies to all local governments in the District. These requirements address public education related to septic systems and watershed management. The requirements of this Sub-Task are further described in Action Items INTEGRATED-11 and WATERSHED-12.

Description and Implementation: Local public education programs build local support for implementation of this Plan and support the local governments and utilities in attaining local goals for water resources management. Involving the public in local water resources management efforts is crucial because it promotes broad public support, helps create an ethic of stewardship and community service and enables the public to make informed choices related to water resources. Changes in basic behavior and practices are necessary to achieve long-term improvements in protecting the region's water resources.

The Local Public Education Program requirements are listed in Tables 5-5 through 5-7. These include minimum activity level requirements, specific water conservation program requirements, and specific messaging requirements regarding septic system maintenance and proper disposal of rags and FOG. The activity level requirements are based on the size of a community's population, and the population is determined using the most recently available decennial federal census for a city or county jurisdiction. As noted in the Sub-Tasks, these requirements cross-reference with other Action Items. All local public education program requirements are listed in this Action Item; more detail on some of the requirements is provided in the cross-referenced Action Items. Compliance with the requirements of this Action Item fulfills the requirements of the Action Items cross-referenced in the Sub-Tasks.

The requirements listed in the tables indicate minimum level of implementation for two types of public education activities:

- Education and Outreach: These activities are designed to distribute education materials and messages and perform outreach to inform citizens and target audiences. These activities are generally passive information delivery activities.
- Public Participation and Involvement: The activities provide opportunities for citizens to participate in programs and active implementation of water resources programs, such as water festivals, water quality monitoring and community workshops. These activities are generally active engagement activities.

The requirements in the tables are divided based on planning areas, but the integrated approach of this Plan seeks to address the interconnections across planning areas. Public education activities that address integrated topics are encouraged. Key messages that address integrated water resources management topics are described in Section 5.5.4 and detailed further in Table C-2 of Appendix C. Because integrated public education messages address multiple areas of water resources management, these activities can be counted toward the requirements of this Action Item with flexibility, as follows:

- Education and Outreach activities that address integrated water resources management topics may be counted toward the Education and Outreach requirements for any Sub-Task (and its corresponding table) that the integrated activities address.
- Similarly, Public Participation and Involvement activities that address integrated water resources management topics may be counted toward the Public Participation and Involvement Activities requirements for any Sub-Task (and its corresponding table) that the integrated activities address.

Generally, each public education activity can only be assigned toward one activity requirement in one of the Sub-Tasks (and their corresponding tables). However, when an integrated public education activity reflects a level of commitment equivalent or greater to that of multiple activities, it can be counted toward requirements in multiple Sub-Tasks (and their corresponding tables) among those Sub-Tasks that it addresses. The level of effort is a qualitative judgment, but one which should be substantiated by documentation of the activity.

To fulfill the requirement presented the Sub-Tasks and their corresponding tables (Tables 5-5 through 5-7), local public education programs can conduct a broad range of activities. Table C-2 in Appendix C describes activities that can fulfill the requirements. This list is not comprehensive, and other activities that are not listed can fulfill the requirements. The table is divided into the sections by type of activity: Education and Outreach, and Public Participation and Involvement. The final section of the table lists activities that could be both types of activity and fulfill either type of requirement.

Public Education activities should be focused on the public education messages identified in Section 5.5.4 and in Tables C-2 through C-5 in Appendix C. These key messages have been identified as the priorities for public education to support implementation of this Plan.

Table 5-5. Local Public Education Requirements – Water Supply and Water Conservation

Population (Most recently available decennial federal census)	Water Supply and Water Conservation (Applies to local water providers)		
	Education and Outreach Activities	Public Participation and Involvement Activities	Additional Requirements*
< 10,000	1	1	All local water providers must do the following (regardless of population size): • Distribute low-flow retrofit kits to residential water customers. • Provide residential water assessment information to residential water customers. • Provide information on water-efficient landscape practices to residential water customers. *Distribution of these materials is required in addition to the completion of the required activities listed in the adjacent columns.*
10,000–50,000	2	2	
50,000–100,000	3	2	
100,000–250,000	3	3	
> 250,000	4	4	

* The additional requirements column of this table lists four activities related to Water Supply and Water Conservation that are required of all local water providers regardless of population size. These activities are discussed in more detail in Action Item WSWC-16.

Table 5-6. Local Public Education Requirements – Wastewater Management

Population (most recently available decennial federal census)	Wastewater Management (Local Wastewater Providers)		
	Education and Outreach Activities	Public Participation and Involvement Activities	Minimum Messaging Requirement*
< 10,000	1	1	Proper disposal of rags and FOG *(at least one activity should address this message)*
10,000–50,000	1	1	
50,000–100,000	2	2	
100,000–250,000	2	2	
> 250,000	3	3	

* The minimum messaging requirement column in this table identifies a priority message area that must be addressed by at least one public education activity conducted by the local wastewater providers. This message requirement is discussed in more detail in Action Item WW-10.

Table 5-7. Local Public Education Requirements – Watershed Management and Integrated

Population (most recently available decennial federal census)	Watershed Management and Integrated (Applies to All Local Governments)		
	Watershed Management Section Minimum Activity Requirements		
	Education and Outreach Activities	Public Participation and Involvement Activities	Integrated Section Minimum Messaging Requirement*
< 10,000	1	1	Septic System Maintenance and Pollution Prevention *(at least one activity should address this message)*
10,000–50,000	2	2	
50,000–100,000	3	2	
100,000–250,000	3	3	
> 250,000	4	4	

* The minimum messaging requirement column in this table identifies a priority message area that must be addressed by at least one public education activity conducted by the local government. This message requirement is discussed in more detail in Action Item INTEGRATED-11. As described in Action Item INTEGRATED-11, public education to address septic system maintenance and pollution prevention should be led by local Stormwater Management personnel, in close coordination with the County Board of Health, wastewater providers, local planning and zoning staff and elected officials.

Need Assistance? Contact the District at TechnicalAssistance@northgeorgiawater.com or visit our website at www.northgeorgiawater.org/technicalassistance.

Resources:

- The District makes available numerous public education resources for local public education programs to use. Beyond these resources, many government agencies and private organizations also provide such resources. Local public education programs may find that resources from these sources can help to address a specific public education need of their program and save them the costs of developing such materials on their own. In some cases, these materials may address specific technical issues that require particular expertise to develop. A list of resources is provided on the Resources page of the District website.

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SECTION 6

Plan Implementation and Future Plan Evaluation



Successful implementation of this Plan requires a clear understanding of the following:

- Implementation actors and roles
- Implementation schedules
- Sources of funding
- Technical assistance to support implementation

6.1 Implementation Actors and Roles

The implementation of this Plan involves participation and action by a broad set of actors, including individual citizens and government agencies at multiple levels of government. The integrated nature of this Plan engages agencies and individuals from different disciplines and backgrounds in different roles. In some cases, new partnerships will be required to implement cross-disciplinary strategies, while other strategies will build on existing implementation relationships. The broad roles for implementation of this Plan are summarized below.

- Local Governments and Water and Wastewater Providers
  - Own and operate local water and wastewater systems that manage water supply, treatment, distribution, and water conservation programs
  - Plan and construct water, wastewater, and stormwater infrastructure, consistent with this Plan
  - Comply with federal and state requirements for water, wastewater, and stormwater management
  - Participate in the District and regional efforts for water resources management related to implementation of this Plan
  - Coordinate Local CLUPs with local water, wastewater master plans and stormwater master plans
  - Coordinate with other local government agencies and implementing actors as needed to ensure successful implementation of the Action Items in this Plan
  - Adopt ordinances
- Metro Water District
  - Promotes interjurisdictional collaboration for water resources management
  - Coordinates the TCC and BACs in order to support Plan implementation, evaluation, and updates
  - Serves as a forum and clearinghouse for regional water resources management issues
  - Presents a regional voice for water resources management
  - Provides responsible parties with technical support and guidance in implementing this Plan
  - Monitors progress in Plan implementation
  - Coordinates this Plan with the plans of Georgia's other regional Water Planning Councils

- Georgia Environmental Protection Division
  - Issues water, wastewater and stormwater permits
  - Continues regulatory functions over water resources management
  - Supports regional planning
  - Enforces compliance with the required components of this Plan
- Georgia Environmental Finance Authority
  - Supports Plan implementation through available funding sources

6.2 Implementation Schedule

Some Action Items include specific dates and deadlines for required activities for compliance. Some Action Items list long-term dates for compliance of certain sub-tasks more than 5 years from the date of this Plan. Most Action Items do not include specific dates and deadlines, and, therefore, activities are expected to be continuous throughout the planning period for these Action Items. The activities of regional and state agencies, described above, are ongoing, and therefore, are not detailed in a schedule. Instead, these activities are expected to be continuous throughout the planning period. Utilities and local governments are expected to begin implementing these Actions Items within as short of a period as practicable following adoption of this Plan.

6.3 Technical Assistance Program

The District maintains a Technical Assistance Program to support Plan implementation by utilities and local governments. Through the Technical Assistance Program, District staff provide technical and implementation assistance across a broad range of water resources planning areas. The Technical Assistance Program will ensure the quality and integration of implementation activities by helping plan projects, identify resources, and develop strategies to address specific problems.

The Technical Assistance Program may offer a variety of assistance services. A current list of technical resources is available here – Technical Assistance Program - Metropolitan North Georgia Water Planning District. Program staff can be reached by email at TechnicalAssistance@northgeorgiawater.com.

6.4 Implementation Funding

While some of the Action Items described in this Plan fit within the everyday operations of a utility or local government, others may be more capital intensive and require financing. The goals of this section are to help utilities and local governments: (1) assess different ways to pay for projects, and (2) choose the financing options that best fit the unique nature of their projects and the borrower.

6.4.1 Fundamentals of Paying for Capital Projects

6.4.1.1 Capital Expenditures and Revenues

Capital project expenditures are distinct from everyday expenses. While day-to-day expenses include items such as salaries, electricity and health insurance, capital expenditures create future long-term benefits. They are payments for projects and assets that have long useful lives. Given that the Action Items in this Plan include many capital projects, this section of the Plan focuses on how utilities and local governments may choose to pay for these long-lived assets. Paying for such projects typically requires financing.

Financing is usually a more suitable option for paying for these types of projects, as opposed to current system revenues, because of the long useful life and the high costs of capital projects. This leads to considerations over intergenerational equity. Since the capital asset will last many years, today's customers should not pay the entire cost when some of those customers may not even live in the utility's service area in, for example, 10 years. With debt repaid over time, the new customers who move to the system within the useful life of the capital asset will also pay part of the capital cost.

6.4.1.2 Cost Sharing

The appropriateness and feasibility of cost sharing flows from a careful analysis of the anticipated benefits of the proposed project. This initial analysis should capture direct and indirect benefits and clearly identify who receives these benefits. Additionally, such an analysis should consider if any potential changes to the project might yield benefits compelling to other parties. There are several ways to consider cost sharing, including the following:

- Interdepartmental Cost Sharing. In some cases, it makes sense for more than one department within a local government to pay for a project. For example, if a project has the potential to create or revitalize green space, it may prove attractive to the parks department. A partnership between the water, stormwater, and parks departments in financing the project may be mutually beneficial. Additionally, there may be opportunities to share project costs with the public works or roads department if needed work can be synchronized.
- Cost Sharing with Other Regulated Entities. Particularly in the case of watershed projects, it is worth exploring if there are other regulated entities, public or private, that must deliver watershed improvements within a specific jurisdiction or service territory. Could the proposed project benefit or be made to benefit the state department of transportation or the railroad? What about a large local business?
- Cost Sharing Among All Taxpayers. Most water and wastewater projects are paid out of the ratepayer revenues of the utility. But, in some cases, it is worth asking if the proposed project has or could have benefits that accrue to local residents more generally and warrants partial or full funding through sales tax or property tax revenues. Special Purpose Local Option Sales Tax (SPLOST), discussed later in this section, represents such an approach.
- Cost Sharing with Neighboring Jurisdictions – Regional Projects. When considering large water, wastewater, or stormwater projects, it is worth considering if any neighboring jurisdictions also might be in need of additional capacity. Such an exploration may open up the possibility of building a more regional asset and sharing the cost with a neighboring jurisdiction.

6.4.1.3 Risk and Security in Financing

Financing involves risk. An investor puts money at risk in the hope of financial return. Given this fact, the financing arrangement must provide the lender or investor sufficient security to participate. For debt financing of water infrastructure, this security typically comes in the form of a pledge: the borrower pledges either its full faith and credit (general obligation, also known as "GO" debt) or the revenues derived from the operation of its utility or enterprise fund (revenue bond). In the case of a revenue pledge, the pledge can take the form of either a gross-revenue pledge (debt payments precede other expenditures) or net-revenue pledge (debt payments are secondary to operations and maintenance expenditures). The latter is a more common type of revenue pledge and more favorable to the borrower. In some cases, the lender or shareholder requires a "double-barrel" pledge. For instance, under the terms of GEFA's loan agreement, borrowers pledge enterprise fund revenues and local government taxing authority to repay the loan. Each approach has benefits and liabilities worth consideration, though not every entity has the luxury to decide. Water and wastewater authorities do not typically have taxation authority and cannot issue GO debt.

6.4.1.4 Stormwater – A Unique Challenge

One common obstacle to stormwater management is funding, which is due in part to the nature of stormwater management compared to water and wastewater services. When executed well, stormwater management is an "invisible" service that occurs offsite in public facilities, and it is measured against the yardstick of how well it prevented something people do not want (flooding) instead of how well it delivered something people desire or need. It can be a challenge to get residents accustomed to paying for that type of service.

Other utility services such as water, electricity, natural gas and wastewater have certain attributes that stormwater management generally lacks: they are tangible and used in the home or business. Billing for these services is largely volumetric, which comports with common sense. When people use more, they pay more, and they exercise some level of control over their consumption. If they fail to pay for the service, the utility can shut off their service as a final remedy. Yet, stormwater management is essential to protecting personal property, ensuring public safety, preserving the environment, and maintaining our quality of life. Additionally, stormwater management providers have regulatory requirements they must meet, requiring certain levels of stormwater management performance. It is an essential service, and we rely on it throughout the year.

Instead of treating stormwater management as a general public works cost and responsibility, more communities are setting up stormwater utilities responsible for ensuring cost-effective stormwater management services. These utilities share common attributes with water and wastewater utilities:

- A fee structure that is set according to the utility's financial needs and provides for stable, predictable and sufficient revenues
- A dedicated enterprise fund in which all revenues and expenses related to providing a service are managed and recorded
- Regular billing

Stormwater utilities and dedicated stormwater utility fees may be desirable depending on local conditions to help achieve the levels of watershed protection and stormwater management envisioned in this Plan.

6.4.2 Options to Pay for Projects

The following sections examine various financing tools and revenue enhancement options for water, wastewater and watershed projects in the District. The options are organized into three groups – traditional and non-traditional project financing options and project-based revenue enhancement opportunities. While a couple of the traditional financing options included here (for example, impact fees or SPLOST) are perhaps more accurately considered specialized revenue sources, they are included in the traditional financing options because they link directly to the task of paying for capital projects.

6.4.2.1 Traditional Project Financing Options

Pay-As-You-Go. Pay-as-you-go financing refers to paying for capital projects with current system revenues and reserves built up from past system revenues (that were in excess of operating expenses). Often, utilities will move these funds into a reserve account for the payment of capital expenditures. In some cases, utilities will set pay-as-you-go policies or targets, such as trying to fund a specific portion of their CIP using pay-as-you-go.

The *advantages* of pay-as-you-go financing are numerous. It is flexible, and its use is entirely at the discretion of the utility. There are no applications to complete, public proceedings to conduct or additional costs to pay in securing the funds. This type of financing offers a utility more control over its project and capital planning process. Additionally, with the possible exception of grant funding, it is the

lowest-cost financing option. Finally, reliance on pay-as-you-go financing generally improves a utility's debt service coverage.

The primary *disadvantages* of pay-as-you-go relate to funding availability and the issue of intergenerational equity. Over-reliance on this financing approach may delay necessary system improvements given the fact that a utility accumulates this capital at a limited pace. This accumulation of funds can also draw unwanted attention. Where strong written policies do not exist to restrict these funds for their intended purpose (for example, in the form of a resolution), parent governments may siphon off the funds to meet gaps in other areas of the budget.

Impact Fees. Impact fees go by many different names in Georgia, but a common one is "system development charges." These are fees imposed by local governments on new or proposed property developments to pay for all or a portion of the cost to provide public services to the new development. These fees are intended to offset the impact of new development on the jurisdiction's infrastructure and services, including water and wastewater, police, fire, library services, etc. The Georgia Development Impact Fee Act (O.C.G.A. § 36-71-1), adopted in 1990, sets rules for local governments in Georgia that wish to impose impact fees.

In the strictest sense, impact fees are not truly a financing tool. They are more appropriately designated as a form of non-operating revenue (revenue not directly derived from the operation of the system) for a utility. They are typically set aside to help pay for capital projects. In this regard, impact fees are a specific form of non-operating revenue, and their use for capital projects a variant of pay-as-you-go financing.

The *advantages* of impact fees are the same as those of pay-as-you-go financing: the money is acquired at no additional cost, its use is at the discretion of the utility, and using it to pay for capital expenditures typically improves a utility's debt service coverage ratio.

The primary *disadvantage* of impact fees is that they depend on strong economic growth. Additionally, some local governments find the requirements of the Georgia Development Impact Fee Act complicated.

SPLOST. Since 1985, Georgia law has allowed for the imposition of a SPLOST. SPLOST is an optional 1 percent county sales tax used to fund capital projects proposed by the county government and participating qualified municipal governments. Generally, a SPLOST may last for up to 5 years.

The SPLOST approval process requires deliberation among the county and qualified municipalities to determine a list of capital projects for which the SPLOST will be used. Although not a legal requirement, counties and municipalities are encouraged to develop a CIP, which represents the county's and municipalities' short- and long-term program goals. The final SPLOST project list must be part of the SPLOST resolution approved by the county and put before voters as part of the SPLOST referendum. If the county plans to issue GO debt in conjunction with the SPLOST, this must also be approved in the resolution and at referendum. For more information, the Association County Commissioners of Georgia published a report in 2016 titled: *Special Purpose Local Option Sales Tax: A Guide for County Officials*. Water, wastewater, and stormwater projects are all eligible for SPLOST funding and local governments have used this tax to pay for numerous such projects.

The *advantages* of SPLOST are that it spreads the project payment over a larger population, provides stable revenue for debt financing options and does not entail extra financing costs to acquire.

The primary *disadvantages* of SPLOST are that it requires public referendum and pits water projects against other capital improvement projects seeking a funding mechanism.

Grants. When available, grants for water, wastewater and watershed projects provide a uniquely advantageous way to pay for projects. They help buy down the cost of a project without burdening

current or future utility revenues. Most applicable grants are available from either the federal or state government.

The *advantages* of grant financing are fairly straightforward. Grants allow the payment of capital expenditures without using current or reserved revenues or taking on debt. The receipt of grants to pay for required projects improves a utility's performance on several common financial ratios, such as debt service coverage and debt per capita.

There are also several *disadvantages* or difficulties with grant financing, including:

- Partial match: Some grants require the recipient to include some of its own funds for the project, so that 100 percent of the project funds do not come from the granting agency.
- Eligibility: Grant funding for water projects may be tied to socioeconomic benchmarks (for example, median household income), location in certain watersheds, or other eligibility criteria.
- Amount: Grants are often available in relatively small amounts. In some cases, utilities have qualified for grant funding, but declined to pursue it, because they did not consider the extra administration worth the relatively small amount of grant funding. In most cases, grant funding will only cover a portion of a project's costs.
- Administration: Grant funding can entail additional application preparation and project reporting. In some cases, it might require an activity that a utility would not otherwise undertake at all, such as an environmental assessment. It is worth the time to fully understand the life-cycle administration expectations of applicable grant funding.

Subsidized Low-Interest Loans. For some projects, pay-as-you-go financing is not sufficient or not the best fit. A project may simply require more in a shorter timeframe than can be met with retained system revenues. The two most common debt financing approaches for water utilities are loans and bonds. There are several public programs that offer low-interest or below-market-rate loans, including GEFA and the U.S. Department of Agriculture's (USDA's) Rural Development program. A newer low-interest program, administered at the federal level, the Water Infrastructure Finance and Innovation Act (WIFIA) program, offers considerable leveraging opportunities as well.

The *advantages* of low-interest loans include relatively low cost of financing, a smaller administrative burden than bonds and a method of financing that promotes intergenerational equity for assets with long useful lives. With respect to cost, these loans are typically cheaper than other debt alternatives, both in terms of interest rate and closing and administrative costs. Even small margins matter. A half-point (50 basis points) reduction in the interest rate on a 20-year loan can save a utility nearly $60,000 in interest payments for each million dollars borrowed. The overall administration of low-interest loans may prove less burdensome than what is required to issue bonds. Additionally, taking on public loan debt does not require a public referendum while issuing GO bonds does.[1] Most public financing loan programs do not impose a penalty for early repayment, and loans are available with terms anywhere from 5 to 30 years, allowing a utility to align the financing payments with the useful life of the asset, promoting intergenerational equity.

There are *disadvantages* to these loan programs that are similar to other forms of debt financing. They are long-term debt obligations that tie up future utility revenues and affect several financial performance indicators, such as debt service coverage and debt per capita. Additionally, these loans programs do entail administrative burden, including applying, underwriting and post-award annual reporting. In particular, loan programs involving federal funding may impose additional compliance requirements, such as National Environmental Policy Act-like environmental review, Disadvantaged

[1] More information on the public referendum requirement can be found in the section on tax-exempt bonds.

Business Enterprise compliance, Davis-Bacon compliance, Build America, Buy America (including American Iron and Steel) compliance and Federal Single Audit Act compliance. Table 6-1 summarizes relevant public water infrastructure funding programs and indicates what types of projects are eligible for funding through the listed programs. For more detailed information about these programs, visit Georgia Funders Forum to find a table that includes application and contact information etc.

Another useful resource for finding relevant financing sources is the EPA's Water Finance Clearinghouse. It includes two searchable databases. The first database contains available funding sources for water, wastewater, and stormwater infrastructure, while the second contains resources, such as reports, weblinks, and webinars on financing mechanisms and approaches that can help local governments access capital to meet water infrastructure needs.

Financing programs sometimes incentivize certain types of projects. For instance, if a community demonstrates good water stewardship and completes the relevant application process, GEFA will designate it as a WaterFirst community. This designation provides not only state-wide recognition for environmental stewardship, but a 1 percent interest rate reduction on GEFA loans and special status for other programs such as 319(h) and CDBG in Table 6-1.

Table 6-1. Relevant Loan and Grant Programs

		Type of Assistance			Type of Work		
#	Program (agency), in alphabetical order	Grant	Loan	Loan Guar.	Water	Sewer	WS/SW
1	319(h) Grant Program (Georgia EPD)	✓					✓
2	Clean Water State Revolving Fund (CWSRF) (GEFA)	✓*	✓			✓	✓
3	Community Development Block Grant (CDBG) Program (U.S. Department of Housing and Urban Development [USHUD] and Georgia DCA)	✓			✓	✓	✓
4	Drinking Water State Revolving Fund (DWSRF) (GEFA)	✓*	✓		✓		
5	Hazard Mitigation Assistance Program Grants (Georgia Emergency Management Agency [GEMA])	✓					✓
6	Georgia Fund (GEFA)		✓		✓	✓	✓
7	Georgia Outdoor Stewardship Program (DNR)	✓	✓				✓
8	Healthy Watersheds Consortium Grant Program (EPA and U.S. Endowment for Forestry and Communities)	✓					✓
9	Livable Centers Initiative (ARC)	✓					✓
10	Public Works and Economic Adjustment Assistance Programs (U.S. Economic Development Administration [USEDA])	✓			✓	✓	✓
11	Water and Waste Disposal Loan and Grant Program (USDA)	✓	✓	✓	✓	✓	
12	WIFIA Program (EPA)		✓	✓	✓	✓	✓

* Grant funding through the state revolving fund (SRF) programs is in the form of "principal forgiveness" on a portion of a loan only.

Note:

WS/SW = Watershed/Stormwater

Tax-Exempt GO or Revenue Bonds. As previously discussed, certain projects may not fit a pay-as-you-go financing approach and are good candidates for debt financing. The project may require more capital than a utility has in reserve, or the utility may seek a better generational "fit," ensuring that the project's long-term beneficiaries are the ones who pay the project's costs.

A common debt financing approach for utilities or local governments is the issuance of tax-exempt bonds, often referred to as municipal bonds. Municipal bonds are debt obligations issued by states, cities, counties, and other governmental entities (the "issuer") to raise funds to build projects for the public good. Bonds typically specify a set interest rate, the schedule for interest payments and a maturity date when the principal will be returned to the investor. The interest payments on municipal bonds are generally exempt from federal taxation, making these investments more attractive to investors and allowing the issuer to offer lower rates of return. The repayment period for municipal bonds can range from a few years to 30 years or more.

Municipal bonds typically take two forms: GO bonds or revenue bonds. For GO bonds, the issuer specifies that the source of repayment for the bonds is tax receipts as received in the issuer's general fund. The issuer is also pledging its taxing authority (sometimes called its "full faith and credit") to repay the debt. For revenue bonds, the issuer specifies the enterprise fund and the specific revenues from which the debt will be repaid. The associated pledge could be in in the form of a gross-revenue (debt payments precede other expenditures) or net-revenue pledge (debt payments are secondary to operations and maintenance expenditures). The latter is a more common type of revenue pledge and more favorable to the borrower.

The *advantages* of municipal bonds include a relatively low cost of borrowing for well-rated issuers, the ability to raise significant amounts of capital (contingent upon the issuer's financing position) and the ability to promote intergenerational equity for assets with long useful lives. Like loans, the duration or maturity of a bond can be tailored to a specific project thereby allowing a utility to align the financing payment with the useful life of the asset and promoting intergenerational equity.

There are *disadvantages* to tax-exempt bonds that are similar to other forms of debt financing. They are long-term debt obligations that tie up future utility revenues and affect several utility financial performance indicators such as debt service coverage and debt per capita. Additionally, the issuance of bonds is a complex undertaking and requires the involvement of a financial advisor, an underwriter, bond counsel and disclosure counsel. Also, bonds require regular administration and reporting until fully paid off. Finally, while typically a low-cost approach, the borrowing costs for bonds rise for issuers with weaker credit ratings.

A note about bonds and public referendums: The Georgia Constitution imposes conditions on the issuance of GO debt by Georgia's local governmental entities. The Georgia Constitution requires issuers to hold a referendum prior to issuing GO bond debt and requires that GO debt not exceed 10 percent of the total assessed value of property subject to taxation in the jurisdiction. These same requirements do not apply to revenue bonds.

Commercial Loans. Water utilities can secure a loan from a commercial bank to finance water infrastructure projects. These types of loans would typically be for shorter-term financing needs (less than 10 years). Such loans have the *advantage* of being readily available with lower transaction costs than bond issuance. The primary *disadvantages* of commercial loans are lower borrowing caps and higher costs of borrowing than with tax-exempt debt (the interest on commercial loans is not exempted from federal taxation).

Short-Term Municipal Obligations. There are several short-term municipal obligations that local governments or public utilities can use to provide immediate funding for a project until a more permanent funding mechanism is implemented. A utility can use these types of "bridge" financing tools to achieve the most advantageous timing of debt service payments. With respect to municipal obligations,

short-term is typically any obligation that has a maturity of less than 3 years. Some of these types of obligations include the following:

- Bond anticipation notes: Notes to be paid off from the issuance of longer-term bonds. These notes can be used to finance construction of a project when the total project cost or construction timeframe remains uncertain. When the time is right, a utility pays off the notes with long-term bond proceeds.
- Revenue anticipation notes: Notes to be paid off from anticipated project revenue stream.
- Tax anticipation notes: Notes to be paid off from anticipated tax levy. These notes could be used to fund a project in anticipation of near-term SPLOST revenues.
- Tax-exempt commercial paper (TECP): Short-term, unsecured debt of municipalities or states with maturities that range from 30 to 270 days. Maturing TECP can be continually rolled over, providing the issuer with flexibility in how to use it. The constant involvement in the market of issuers is expensive, so TECP is typically used for projects in excess of $15 million.

These instruments can provide strategic flexibility for utilities but have similar disadvantages to other debt financing tools.

Blending Approaches. In reality, project financing decisions are not made in isolation. While a utility must decide how to pay for a specific project, it is typically making that decision in the larger context of how to fund its broader CIP. A utility often uses multiple financing approaches across its CIP. For instance, many utilities will aim to fund a portion of their CIP through pay-as-you-go financing, which may include the dedication of impact fees held in reserve. After allocating its retained earnings, a utility may determine that specific projects qualify for available grant financing. Next, a utility will determine which of the other financing tools best fit the types of projects it seeks to build and meets the utility's objectives.

6.4.2.2 Non-Traditional Project Financing Options and Revenue Enhancements

Tax Allocation District Financing (Called Tax Increment Financing in Other States). A tax allocation district (TAD) is an economic development tool that can be used to pay for public infrastructure and other improvements in a specific geographical area. The basis of TAD is to "freeze" tax revenues derived from property in the specific area that will benefit from the infrastructure investments (sometimes called the tax allocation district) and allow the use of any tax revenues in excess of that baseline level of taxation to be used to pay for the specific improvements for a specified period of time. The first step in TAD financing is to delineate the boundaries of the TAD. The second step is to establish the baseline of assessed value of property within the district and the tax revenue generated from it. The final step is to estimate the incremental tax revenue that will be generated as a result of the improvements. This incremental revenue can become the repayment stream for the debt financing of the improvement projects. TAD financing does not increase tax rates but uses increases in property value and the associated increase in tax revenues to pay for projects. The use of TAD financing must be approved by the Georgia General Assembly and at the local level.

The *advantages* of TAD financing include allocating payment of project costs to those who directly benefit and generating financing for improvements based on projected growth. The *disadvantages* include the long-term freeze of tax revenues for a local government, the administrative challenge of TAD approval and possible TAD underperformance, whereby the amount of actual incremental tax collections falls short of initial projections.

Community Improvement Districts. A Community Improvement District (CID) is an entity permitted to levy taxes, fees, or assessments within a specific geographical area for the purpose of paying for improvements such as road construction, road maintenance, parks, water, wastewater and stormwater, and public transportation. The taxes, fees and assessments may not exceed 2.5 percent of the assessed

value of the real property within the district and may only be levied on non-residential property. The Georgia General Assembly must approve the formation of a CID.

CIDs enjoy the *advantages* of paying for infrastructure improvements over a broad base of commercial property owners that will directly benefit from the improvements and providing a stable revenue stream for repayment of debt obligations. CIDs suffer the *disadvantages* of being practical only in commercially vibrant areas and requiring the administrative step of legislative approval.

Guaranteed Energy Performance Contracting (EPC). Local governments and utilities may undertake energy and water efficiency upgrades. Guaranteed EPC is a comprehensive service, provided by energy service companies, that bundles into one package the following deliverables: commercial-grade energy and water audit, project design, equipment installation/retrofit, third-party financing and a guarantee that the energy and water cost savings equals or exceeds any related debt service for the life of the financing. At its core, EPC entails common debt financing, but the comprehensive package approach and the savings guarantee make it a unique approach worth consideration by local governments and utilities seeking both energy and water efficiency upgrades.

The *advantages* of EPC include comprehensive service bundling, ease of execution and a guaranteed level of savings sufficient to service any associated debt. This guarantee shifts some risk away from the public entity to the private party. The *disadvantages* of EPCs can include higher financing costs than other options and involve long-term debt obligations that tie up funds.

Public Private Partnerships. Public private partnership (P3) is a widely used term that, in reality, refers to a broad array of long-term contracts between a public entity and a private party for developing a public asset or providing a public service. P3s can be used to design, build, finance, operate and maintain projects such as roads, airports, WWTPs or water systems. Often P3s are described as falling along a spectrum from more public to more private. At the more public end of the spectrum lie contracts such as Design-Build and Operations and Maintenance. Toward the more private end of the spectrum lie Design-Build-Finance-Maintain-Operate contracts and Concession agreements.

In many respects, P3s are more about project procurement, project delivery responsibilities and managing risk than they are about financing. P3s may or may not involve any private financing. When private financing is involved, it is often in the form of private activity bonds, which share many characteristics with traditional municipal bonds, but are ultimately the financial obligation of the private party. In some cases, private equity is invested in projects.

The *advantages* of P3s include shifting some or all of the design, construction, operational and revenue risk from public entities to private parties, which may be better positioned to manage that risk. Additionally, P3s may result in higher maintenance standards for the public asset. The *disadvantages* of P3s include their complexity and relative higher cost of financing. Given the complexity of P3 arrangements, many P3 participants only pursue large projects worth hundreds of millions of dollars. As mentioned earlier, the assumption of additional risk by the private party often entails higher expectations of return.

Wetland and Stream Restoration Mitigation Banking. Wetland and stream restoration mitigation banking is a system of credits and debits to ensure that ecological loss resulting from project development is offset by the restoration or preservation of similar ecological function elsewhere so that there is no net loss to the environment. A mitigation bank is a specific wetland, stream or other aquatic resource area that has been restored, established, enhanced, or preserved under a formal agreement with a regulatory agency. The formal agreement will define how many compensatory mitigation credits are generated by the restoration activity. While the project owner can use these credits to offset other unavoidable wetland and stream impacts, the owner can also sell these credits to other parties that are required to offset unavoidable ecological impacts from development activities. Mitigation banking is a

form of project-specific revenue enhancement that can be an important element of financing watershed improvement projects.

6.4.3 Customer Assistance Programs

Even when a utility accesses the most appropriate and lowest-cost financing, the utility's costs rise due to factors such as inflation or increased regulation. The increased costs are passed on to the customers via rate increases. Customer assistance programs (CAPs) can help mitigate the impacts of increasing rates on low-income customers. CAPs can take many forms. The most common types, nationally, are bill discount programs, where customers who meet certain eligibility criteria get a fixed dollar amount, or some percent of their bills, discounted. Establishing the eligibility criteria can be simplified by accepting proof of acceptance in related assistance programs. For example, some utilities elect to accept any customer that can prove that they are receiving Supplemental Nutrition Assistance Program (SNAP) benefits. The utility often works with a third-party nonprofit or human service organization to handle the eligibility verification of customers.

In addition to bill discounts, a CAP can also include distribution of low-flow fixtures, and replacement of leaking or inefficient plumbing fixtures in low-income houses. Leak reduction programs may also be considered a type of CAP. For more details, refer to Residential Customer Leak Reduction Programs (WSWC-5). A utility should examine the housing stock and socioeconomic characteristics of its service population when designing a CAP.

Before embarking on creating a CAP, a utility should also assess the current level of affordability of its rate by looking at the impact on low-income customers. A good tool for doing that is the University of North Carolina Environmental Finance Center's Water and Wastewater Residential Rates Affordability Assessment Tool.

A new CAP needs to be marketed well so that eligible customers learn about it. The application process should not be too onerous, and using third-party enrollment such as SNAP facilitates this. CAP outreach should be folded into the utility's public education efforts. Customer service staff also need to be trained on the CAP so that they can refer callers to the program.

While the CAP can be designed in such a way that it does not cut into the utility's revenue unreasonably, funding these programs can be challenging. However, some utilities have built the business case for why their CAPs make financial sense. For examples on how some of the existing CAPs in Georgia have been funded, see How Can Water Utilities Find the Money to Help Their Low-Income Customers?

The City of Atlanta Department of Watershed Management's "Care & Conserve Program" has been in place since 1995, making it one of the oldest of these types of programs in the state. In addition to bill discounts, the Care and Conserve Plumbing Repair Program provides plumbing repairs and replaces high-flow water fixtures within the homes of low to moderate-income customers. This serves both to reduce the customers' bill going forward and helps to conserve water. The City carries out the plumbing program by partnering with specific nonprofit organizations that have an understanding of the low-income community within the city.

6.4.3.1 Events that May Trigger a Utility to Implement a CAP

In most cases, the level of non-payment, or a sharp increase in non-payment, is what triggers a utility to develop a CAP. This can be associated with a rate increase, or an external situation in the economy. A change in utility decisionmakers has also been a factor in elevating CAPs on a utility's list of priorities. Some newly elected officials have affordability as a top concern and may have even run for office with this as a part of their campaign platform. In a more commemorative example, Clayton County Water Authority expanded its CAP by launching its "Veteran Discount Program" on Veteran's Day in 2019. It provides veterans with up to a $5 discount on their bill ($2.50 off water and $2.50 off wastewater). To be eligible,

veterans must have a household income of $25,000 or less and show proof of residency and income. These eligibility criteria are similar to the other CAPs at this utility.

A specific event is not a necessity, of course. A utility's general concern about its customers can be the simple reason for developing a CAP. But there is also evidence from credit rating agencies that high levels of non-payment can hurt the utility's rating. CAPs help address that concern. In general, CAPs can also make an impending rate increase more palatable.

6.5 Future Plan Evaluation

Evaluation is a key strategy in effective implementation of any plan. It supports understanding of the successes and challenges of plan execution and determination of when and how to modify a plan. The legislation that created the Metropolitan North Georgia Water Planning District calls for regular evaluation of implementation and updates to this Plan. The statute requires that the plan includes "e*stablishment of short-term and long-term goals to be accomplished by the plan and measures for the assessment of progress in accomplishing such goals and plan."* Furthermore, the statute requires reporting and plan updates as follows:

> *The district shall review the … plan and its implementation annually to determine whether there is a need to update such plan and shall report to the director the progress of implementation of its goals, and in any case the district shall prepare an updated …plan no less frequently than every five years… (O.C.G.A. § 12-5-582 through 584).*

The Action Items in Section 5 and the county-level summaries in Appendix B provide the detailed framework for evaluation of plan implementation. This section provides an overview of the evaluation process, including implementation assessments and Plan reviews and updates.

6.5.1 Plan Reviews and Updates

The District reviews and updates this Plan on an approximate 5-year cycle. The reviews and updates are an important component of the adaptive management approach used by the District for this Plan. The following describes this approach:

> *Adaptive management is a type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices. (USGS)*

Adaptive management recognizes the limitations of current knowledge regarding future conditions and the inevitability of change. This Plan provides a big-picture context for specific actions based on best available data, and it will need to be adjusted as better information and new conditions arise. By design, the short-term management measures are outlined in greater detail than the long-term management measures. Recommendations for the next 5 years are reasonably firm, whereas those beyond 20 years are expected to be refined, possibly multiple times, before they are implemented.

6.5.1.1 Annual Reviews

The District staff reviews the Plan and its implementation annually to determine whether there is a need to update this Plan. This review is based on direction from the District's Governing Board, staff experience through its Technical Assistance Program, changes in state and federal laws, changes in the economy, changes in environmental conditions, and the Georgia EPD compliance audit results.

6.5.1.2 Compliance Audits

Georgia EPD auditors determine good faith compliance with the plan. Utilities and local governments must demonstrate good faith compliance with Plan provisions in order to obtain permits that allow an increase in water withdrawal, drinking water, or wastewater treatment capacity, renewal of MS4 stormwater permits, or GEFA loan funding.

6.5.1.3 Plan Updates

Plan updates are scheduled to occur every 5 years. During the regular plan updates, the District takes a holistic look at changed conditions since the last plan update, including evaluation of the following:

- Population forecasts and trends
- Emerging water resources management issues
- Water conservation program performance and assessment of the need for enhancements
- Water supply sources and treatment capacity and facilities needed to address demands
- Wastewater treatment capacity and facilities needed to address demands
- Water quality trends as described in the 305(b)/303(d) list and available watershed assessment data
- Water quality modeling with evaluation of future land use projections (recommended every 10 years)
- Changes in MS4 Permit Requirements
- County-level summaries (Appendix B)
- Available funding sources

As with existing planning efforts, future planning should be open and inclusive, involving all District members and stakeholders. Plan amendments between regular plan updates can be made to provide for adaptive management. The District's Governing Board has adopted guidelines that it follows for the consideration of Plan amendments.

6.5.2 Plan Accountability and Measuring Progress

Utilities and local governments have a high level of accountability for implementing the required elements of this Plan's Action Items through the previously described Georgia EPD audit process.

6.6 Conclusions

While implementation progress will be reported annually by the responsible parties, the final measure of implementation success will be this Plan's impacts on long-term water resources trends. Demonstrable success in implementation should be observable through:

- Local water and wastewater master plans that are consistent with this Plan
- Development of the water, wastewater and watershed management infrastructure to meet the future needs of the District
- Continued success with water conservation implementation
- Ongoing implementation of the District's model ordinances
- Improved local coordination for water resources management, land use planning and watershed protection
- Proactive asset management programs
- Positive trends in monitoring data that reflect maintained or improved watershed conditions
- Progress in improving surface water quality
- Continued adoption of an integrated approach to regional water resources management and planning

Based on the audits performed by Georgia EPD and developing population and usage data, the District intends to periodically consider improvements to the Plan's implementation to ensure that the District meets its long-term goals. Improvements may include further technical assistance, seeking funding from the state or federal governments to support high-impact regional projects, and clearer guidance and education.