WATER RESOURCE MANAGEMENT PLAN

Metropolitan North Georgia Water Planning District

Prepared by

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Acronyms and Abbreviations

AAD	annual average day
AMI	Advanced Metering Infrastructure
ARC	Atlanta Regional Commission
ATS	advanced treatment system
AWRF	Advanced Water Reclamation Facility
AWWA	American Water Works Association
BAC	Basin Advisory Council
BFE	base flood elevation
CCR	Consumer Confidence Report
CDBG	Community Development Block Grant
CH2M	CH2M HILL Engineers, Inc.
CID	Community Improvement District
CLUP	Comprehensive Land Use Plan
CMMS	Computerized Maintenance Management System
CMOM	Capacity Management Operations and Maintenance
CRS	Community Rating System
CWSRF	Clean Water State Revolving Fund
District	Metropolitan North Georgia Water Planning District
DSS	Decision Support System
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
EPC	energy performance contracting
FEMA	Federal Emergency Management Agency
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
I/I	infiltration/inflow
IDDE	Illicit Discharge Detection and Elimination
IPaC	Information for Planning and Conservation
IRT	interconnection reliability target
IWA	International Water Association
LAS	land application system
LCI	Livable Centers Initiative
LIA	Local Issuing Authority
MaP	Maximum Performance
mg/L	milligrams per liter
MGD	million gallon(s) per day
MMF	maximum month flow
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Stormwater Sewer
NA	not available
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
NRW	non-revenue water
O.C.G.A.	Official Code of Georgia Annotated
OPB	Office of Planning and Budget

P3	public private partnership
PDM	Pre-Disaster Mitigation
PEP	Population Estimates Program
Plan	Water Resource Management Plan
RAD	Research and Analytics Division
REMI	Regional Econometric Models Inc.
SOP	standard operating procedure
SPOLST	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
TCC	Technical Coordinating Committee
TECP	tax-exempt commercial paper
TMDL	total maximum daily load
USDA	U.S. Department of Agriculture
USEDA	U.S. Economic Development Administration
USHUD	U.S. Department of Housing and Urban Development
UV	ultraviolet
WIFIA	Water Infrastructure Finance and Innovation Act
WIP	watershed improvement project
WPCP	Water Pollution Control Plant
WRC	Water Reclamation Center
WRF	Water Reclamation Facility
WTP	water treatment plant
WWTP	wastewater treatment plant

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SECTION 1

Introduction

This Water Resource Management Plan (Plan) presents an integrated approach to water resource 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 resource 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 resource management plans to be implemented by local governments. The District's purpose is to establish policy, create plans and promote inter-governmental coordination of water issues from a regional perspective. The District's planning efforts provide local jurisdictions and state officials with recommended 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 93 municipalities partially or fully within these counties (Figure 1-1). The District also has seven 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 also, more specific guidance from Georgia EPD for planning in the District. The District also considers the most recent water resource assessment information developed in the regional water planning process.

The District issued its first water resource 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. This updated Plan combines the three separate plan documents into one comprehensive plan to highlight the interrelationships between approaches to water, wastewater and watershed management.

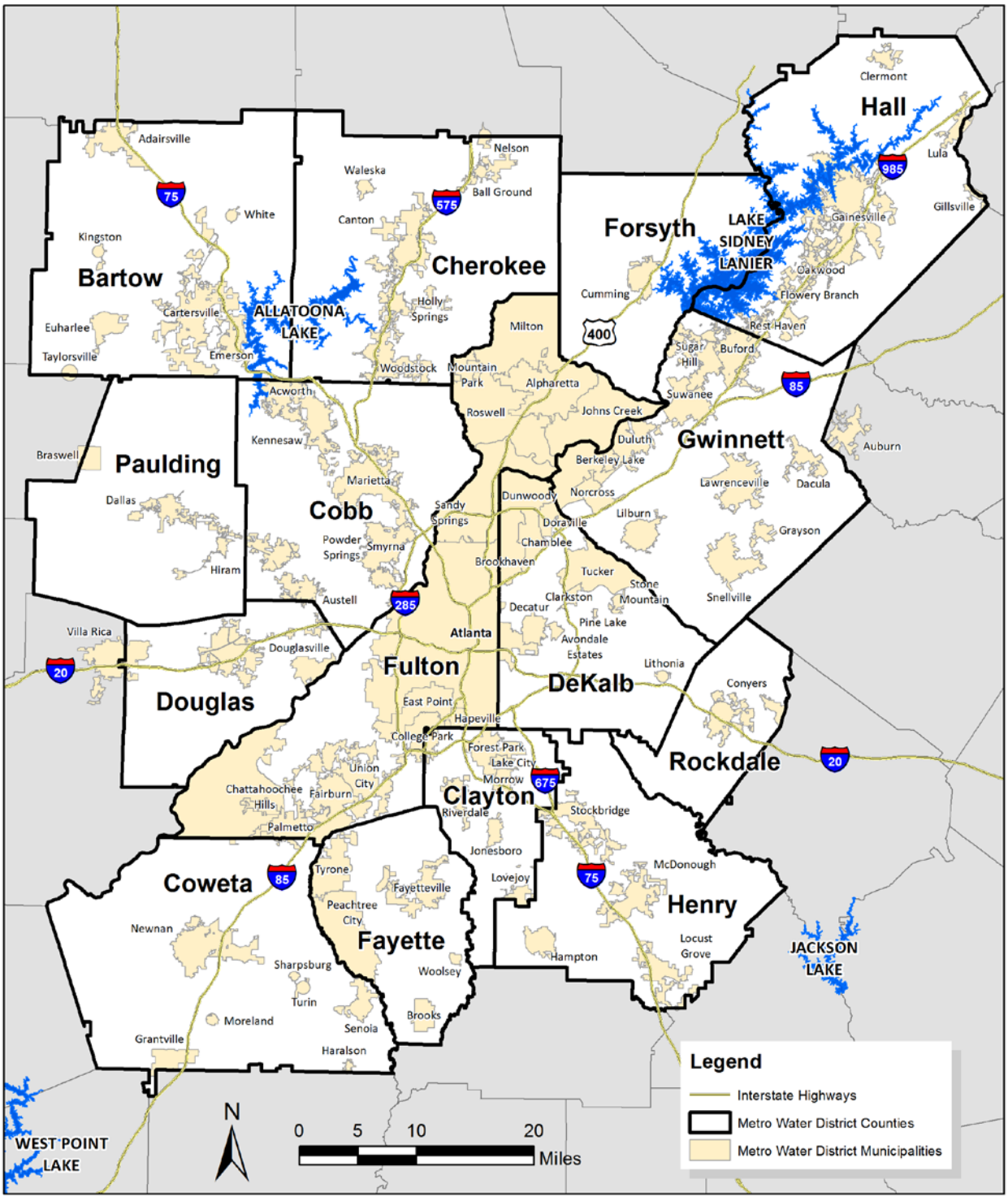

Figure 1-1. Metropolitan North Georgia Water Planning District

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

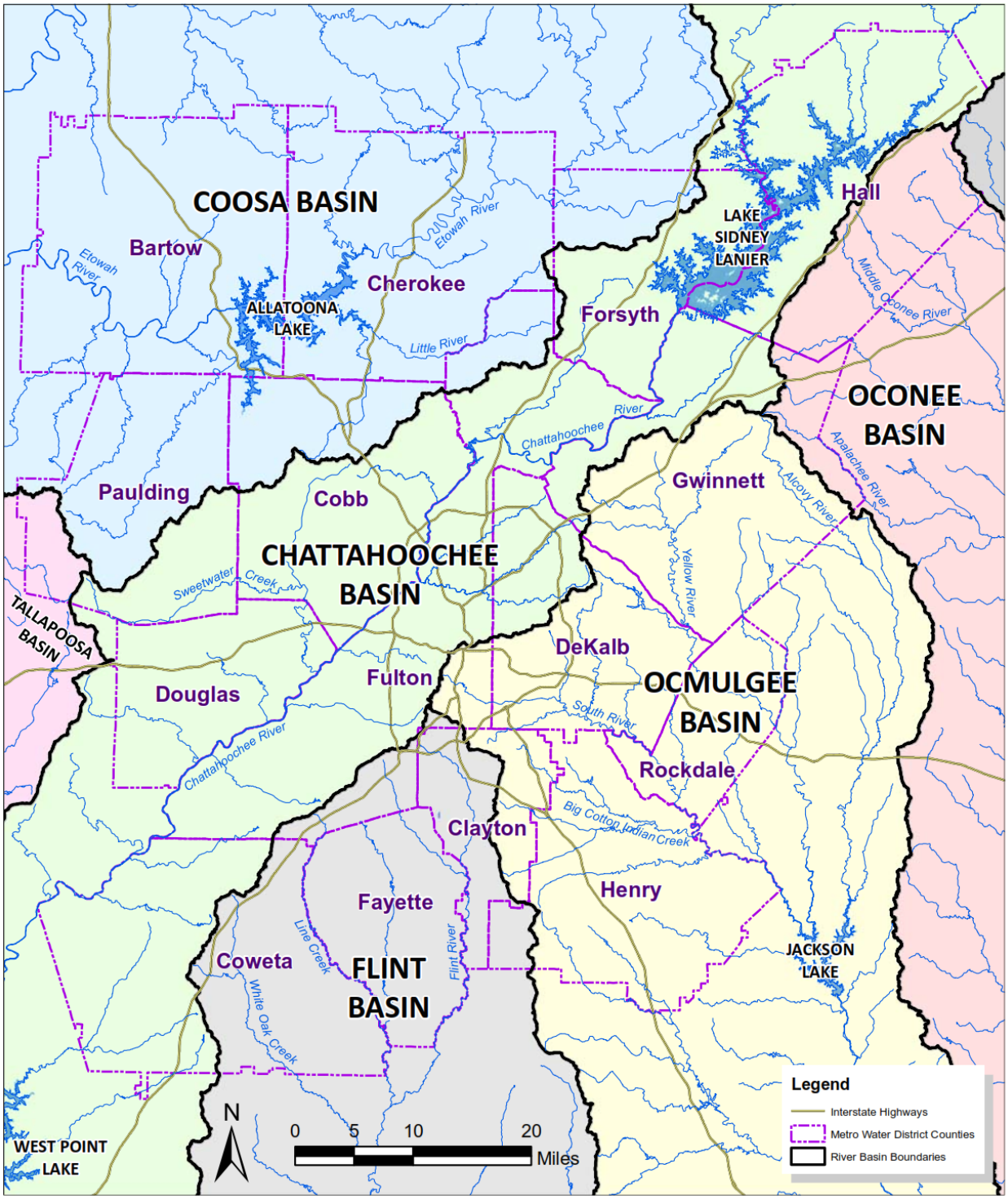

Figure 1-2. Metropolitan North Georgia Water Planning District: Major River Basins

1.2 Integrated Regional Water Resource Planning

The District recognizes that water resource planning management is most effective when it addresses the interrelationships among water resource management strategies. Planning must address current and future needs while considering implications for water supply, treatment, reuse, watershed health, water quality, in-stream 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 resource 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 resource planning in this Plan Update. This working group developed the following guidance on integrated water resource planning for the District:

> *The District's approach to water resource 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 resource planning uses adaptive management and technical analyses to encourage actions designed to achieve multiple benefits or outcomes.*

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

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

- Identify a clear path to multiple benefits
- Recognize water resource 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 resource planning in the District, this Plan Update includes and combines the District's plans for Water Supply and Water Conservation, Wastewater Management and Watershed Management. 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.

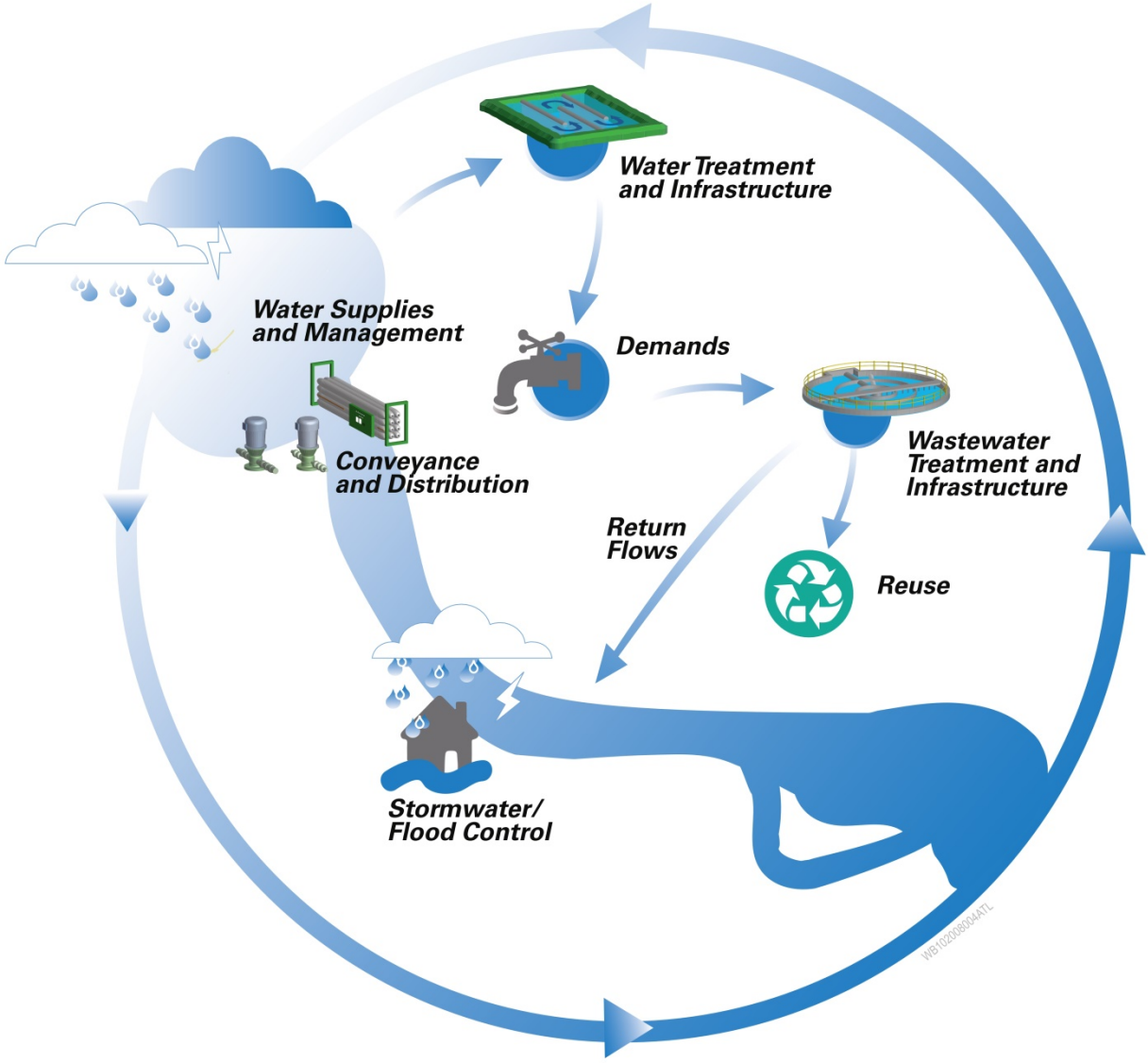

Figure 1-3. Water Resource Management Integration

1.3 Plan Update Focus

While the primary focus of the 2017 Plan Update is the integration of the previous plans into one comprehensive document, other major areas of focus include the following:

- Updated water demand and wastewater flow forecasts based on current usage patterns, revised population and employment projections, changes in state requirements and building codes that affect water use and implementation of the region's water conservation and efficiency program
- Enhanced strategies that maintain the region as a national leader in water conservation and efficiency, with specific consideration of the potential role of commercial water users in water supply and water conservation programs
- Improved efforts to promote management of septic systems across the District to protect water quality and public health

- Better alignment of the watershed management Action Items with existing federal stormwater management programs (that is, National Pollutant Discharge Elimination System [NPDES] Municipal Separate Stormwater Sewer [MS4]) to reduce duplication of effort and simplify implementation
- Improved design of public education requirements to better match the range of community sizes in the District
- Identification of new information on sources of financing for implementation
- Coordination of planning with the State Water Plan and the Regional Water Plans of neighboring regional Water Planning Councils

1.4 Key Changes in the Plan

The shift to an integrated plan significantly changes the organization of the previous plans of the District. The most obvious change is the consolidation of three documents into one. In this consolidation, several sections from the three 2009 Plans are now presented as integrated sections in this Plan, including:

- Existing Facilities and Conditions
- Future Conditions
- Public Education
- Plan Implementation and Evaluation

Other major changes to the Plan include the following:

- A new section that combines multiple sections from the 2009 Plan documents to describe planning principles as well as continuing and emerging water resource management challenges
- A new set of Integrated Water Resource Management Action Items that supports multiple planning areas, in addition to the individual and distinct Action Items for Water Supply and Water Conservation, Wastewater Management, Watershed Management and Public Education
- Integrated county level summaries with information on water and wastewater infrastructure (Appendix B, formerly Appendix B in the 2009 Water Supply and Water Conservation and Wastewater Management Plans)

This Plan has been streamlined to simplify the document. Some material included in the previous plans is now available in separate documents, available by hyperlink in the electronic version (http://northgeorgiawater.org/plans-manuals/), including:

- Model ordinances
- Policy recommendations
- Additional information on financing options for implementation

1.5 Developing the Plan

The 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.

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 second 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 of this update was delayed slightly, with approval from Georgia EPD, to improve coordination with the planning cycle for neighboring regional Water Planning Councils.

The update process included a full review of the 2009 plans 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 land use 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 a series of structured discussions in 2014 with the TCC, BACs and Governing Board, and the goals were refined based on their input. The revised 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.

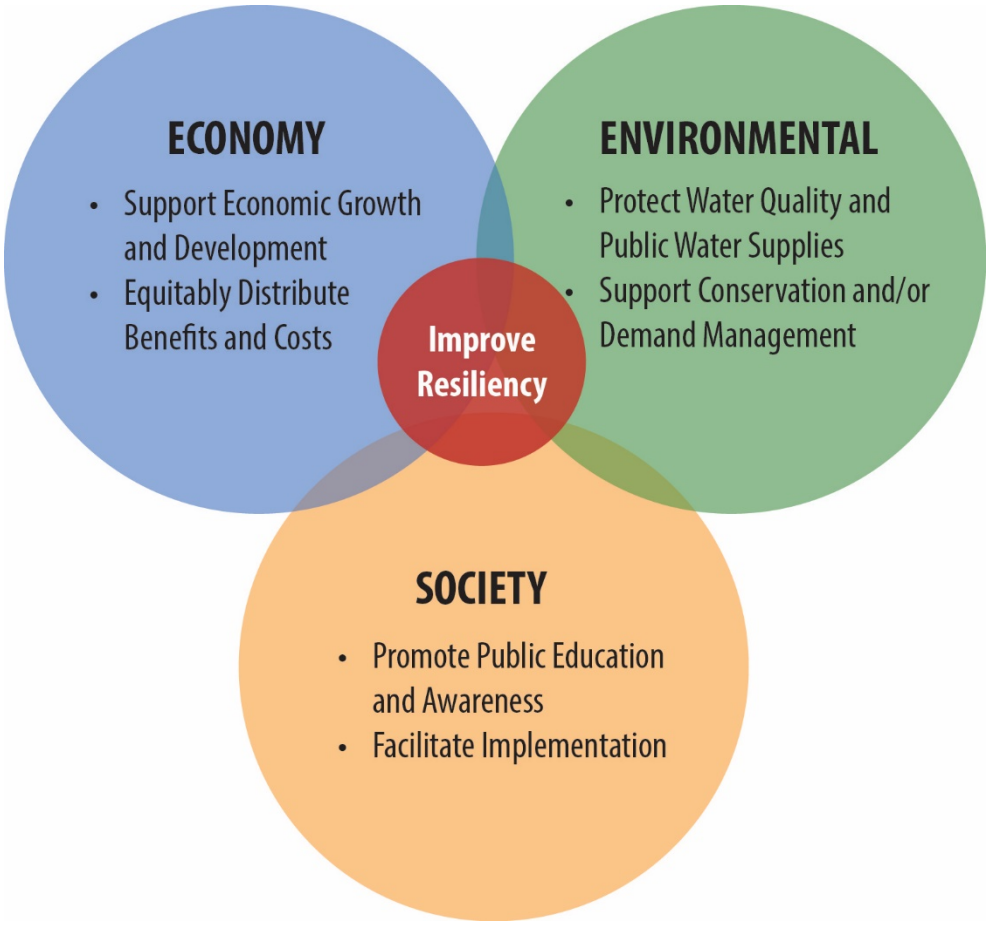

Figure 1-4. Policy Goals for the Plan Update

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 resource 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 resource 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 resource 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 2017.

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 NPDES 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 surveys implementation progress by local jurisdictions. These implementation surveys are typically conducted on an annual basis.

Figure 1-6. Plan Development and Implementation

Through its implementation surveys, the District has documented the following achievements in the region:

- The Toilet Rebate program has supported the replacement of over 120,000 toilets with high-efficiency toilets. Water savings from this program are estimated to be over 860,000,000 gallons per year.
- 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 55 percent since 2003.
- Most local jurisdictions have adopted one or more of the following model ordinances (or equivalent regulations) that protect the region's watersheds: Post-Development Stormwater Management, Stream Buffer Protection, Illicit Discharge and Illegal Connection, Floodplain Management and Litter Control.

The most recent implementation survey was conducted by the District in early 2015 to evaluate 2014 implementation progress. Details about implementation to date can be found on the District website. The next survey of implementation will be conducted in early 2017 to assess 2016 implementation progress. With regular efforts to measure implementation, the District is able to evaluate whether its goals for the region's water resources are being attained. Tracking implementation also provides the documentation needed to support timely and effective updates of this Plan. More discussion of the measurement of implementation progress can be found in Section 6 of this document.

SECTION 2

Planning Principles and Management Challenges

This 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 resource 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 2017 Plan Update

In preparation for the 2017 Plan Update, the TCC, BACs and Governing Board discussed the District's goals and objectives for the planning process in a series of structured discussions in 2014. Through these discussions, the stakeholders and District leaders provided valuable input from a broad range of perspectives. This input was used to identify planning principles and areas of focus for the Plan Update process, and it also helped to refine the over-arching policy goals.

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 for the plan update process 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 1-3):

- *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*

In addition to the policy goals, a key area of focus in the Plan Update process was integration of the water, wastewater and watershed management plans in this update. An integrated planning approach was adopted to support consideration of the inter-relationships among management strategies and their impacts. More discussion of Plan integration can be found in Section 1.2.

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.

- **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 at right).
- **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 at right). GAEPD'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, in-stream 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

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. 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 above a downstream 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 GAEPD 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 U.S. Army Corps of Engineers crediting "made inflows" in a manner consistent with Georgia law. Assuming the U.S. Army Corps of Engineers takes steps to do so 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, however, this alternative will rarely make sense for any jurisdiction that is not permitted to store and use the water it returns.

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 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.

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 resource 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 resource 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 AMI Benefit and Feasibility Studies WSWC-6 Toilet Replacement Program WSWC-7 High-Efficiency Toilets and Urinals in Government Buildings WSWC-8 Commercial Water Use Assessments WSWC-9 Pre-Rinse Spray Valve Replacement Program WSWC-11 State Water Conservation and Drought Response Requirements (rain sensor requirements) WSWC-14 Water System Asset Management WSWC-16 Local Public Education Program
In-stream Flows: Water withdrawals affect downstream flows, and without management of withdrawal quantities, detrimental impacts to natural aquatic habitats and downstream users can occur.	In-stream 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 AMI Benefit and Feasibility Studies WSWC-6 Toilet Replacement Program WSWC-7 High-Efficiency Toilets and Urinals in Government Buildings WSWC-8 Commercial Water Use Assessments WSWC-11 State Water Conservation and Drought Response Requirements WSWC-14 – Water System Asset Management WSWC-16 Local Public Education Program WATERSHED-7 Promoting a Green Infrastructure Approach WATERSHED-8 Watershed Improvement Projects

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
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
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.	INTEGRATED-10 Septic System Septage Disposal
Emergency Water Supplies: Sound planning is important to reduce the vulnerability of local water infrastructure to unplanned events.	The impacts of unexpected events on water supplies and water quality can be mitigated through planning and preparation.	INTEGRATED-3 Update Local Emergency Water Plans
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. In-stream assimilative capacity may be limited by low flows.	WSWC-11 State Water Conservation and Drought Response Requirements
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
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). If these chemicals are regulated in the future, adoption of advanced treatment techniques, such as ultraviolet (UV) disinfection,	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
nanofiltration or reverse osmosis membranes, may be necessary.		
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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-4 Stream Buffer Protection WATERSHED-7 Promoting a Green Infrastructure Approach 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.	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.	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.
Private Wastewater Facilities: Of the 155 wastewater treatment facilities in the District, 96 are privately owned.	Although the total volume of water treated by private wastewater facilities is very small relative	INTEGRATED-5 Connections to Public Sewer

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
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.	to other wastewater facilities in the District, many small private wastewater systems are LAS, and therefore contribute to consumptive use of water.	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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-3 Floodplain Management WATERSHED-4 Stream Buffer Protection WATERSHED-5 Illicit Discharge Detection and Elimination Program WATERSHED-7 Promoting a Green Infrastructure Approach 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 2014 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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-3 Floodplain Management WATERSHED-4 Stream Buffer Protection WATERSHED-5 Illicit Discharge Detection and Elimination Program WATERSHED-6 Litter Control WATERSHED-7 Promoting a Green Infrastructure Approach WATERSHED-8 Watershed Improvement Projects WATERSHED-9 Ongoing Stormwater System Management WATERSHED-10 Long-term Ambient Trend Monitoring WATERSHED-11 Macroinvertebrate Bioassessment 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 has a TMDL for chlorophyll a concentrations associated with nutrient loading. Lake Lanier has a pending TMDL for chlorophyll a. 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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-4 Stream Buffer Protection WATERSHED-5 Illicit Discharge Detection and Elimination Program WATERSHED-6 Litter Control WATERSHED-7 Promoting a Green Infrastructure Approach 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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-4 Stream Buffer Protection WATERSHED-5 Illicit Discharge Detection and Elimination Program WATERSHED-7 Promoting a Green Infrastructure Approach 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 Reclaim Water for Lake Lanier and Allatoona Lake
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	INTEGRATED-2 Local Water Master Plans INTEGRATED-3 Update Local Emergency Water Plans INTEGRATED-4 Local Wastewater Master Plans

Table 2-1. Continuing and Emerging Management Challenges

Management Challenge	Integrated Management Considerations	Action Items that Address this Challenge
	related to ensuring that water quality can meet these multiple needs, and protect human health.	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-development Stormwater Management WATERSHED-2 Construction Erosion and Sedimentation Control WATERSHED-4 Stream Buffer Protection WATERSHED-5 Illicit Discharge Detection and Elimination Program WATERSHED-6 Litter Control WATERSHED-7 Promoting a Green Infrastructure Approach 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-3 Update Local Emergency Water Plans INTEGRATED-4 Local Wastewater Master Plans The District recently published a Utility Climate Resiliency Study, which addresses this challenge.

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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 resource management infrastructure. This section supports an integrated approach to water resource 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, watershed development and instream conditions.

3.1 Population

The 15 counties within the District have experienced continued growth and currently have a population of over five million people. The region saw population increase by 208 percent from 1970 to 2014, or 4.6 percent per year, and in recent years, by seven percent from 2009 to 2014, or 1.2 percent per year. Figure 3-1 shows regional population growth between 1970 and 2014. Since the 2009 Plan Update, population grew fastest in the following counties: Forsyth (16 percent), Fulton (ten percent), Gwinnett (nine percent) and Coweta (nine percent). During this same period, growth was slowest in the following counties: Fayette (two percent), Clayton (three percent), DeKalb (four percent) and Rockdale (four percent). Population forecasts for the region are described in Section 4.1.

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 is a regional wholesaler of water that was created by the Georgia Legislature. The Authority treats and distributes potable water for wholesale purchase by municipalities 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 one percent) of the public water supply is from groundwater sources. Water withdrawals for water supply are measured in terms of annual average day (AAD) 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.

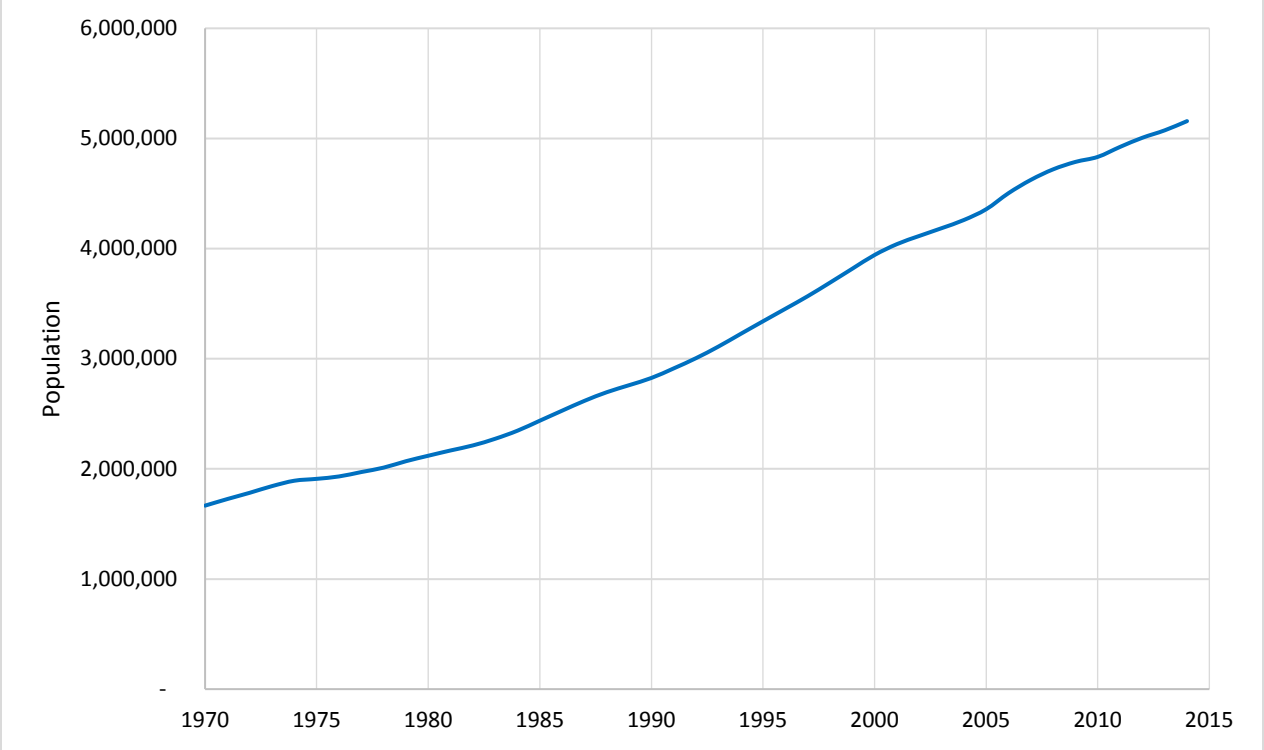


Figure 3-1. District Population: 1970-2014[a]

[a] Population data for the District obtained from U.S. Census Bureau, Population Estimates Program (PEP)

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 924 AAD-MGD of water supply withdrawals in the District.

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)*		2014 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[a]	Primary Source[a]	
Chattahoochee River Basin				
Lake Lanier	City of Cumming	*NA*	18	8.2
	Forsyth County Board of Commissioners	*NA*	14	11.3
	Gwinnett County	*NA*	150	68.8
	City of Buford	*NA*	2	1.3
	City of Gainesville	*NA*	30	17.5
Chattahoochee River	Atlanta - Fulton County Water Resources Commission	*NA*	90	37.8
	DeKalb County Public Works	*NA*	140	69.0
	Cobb County-Marietta Water Authority	*NA*	87	42.6
	City of Atlanta Watershed Management	*NA*	180	90.5
Bear Creek Reservoir [b]	Douglasville-Douglas County Water and Sewer Authority	6	23	1.2
Dog River Reservoir [b]		*NA*		9.3
Big Creek	City of Roswell	*NA*	2.8	1.1
Sweetwater Creek [c]	City of East Point	*NA*	11.5	7.7
Sweetwater State Park (George Sparks Reservoir) [c]		11.5		
Cedar Creek Reservoirs	City of Palmetto	*NA*	0.45	0.3
Cedar Creek (B.T. Brown) Reservoir	Coweta County Water and Sewerage Authority	*NA*	6.7	0.1
J.T. Haynes Reservoir [d]	Newnan Utilities	*NA*	14	5.9
Sandy/Browns Creek [d]		8		2.4
Monthly Average Day Withdrawal in Chattahoochee River Basin			***769.5***	***375.0***

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)*		2014 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[a]	Primary Source[a]	
Coosa/Etowah River Basin				
Etowah River	City of Canton	39	18.7	2.7
	City of Cartersville [e]	*NA*	23	*NA*
Hollis Q. Lathem (Yellow Creek) Reservoir/Etowah River	Cherokee County Water and Sewerage Authority	*NA*	36	14.8
Allatoona Lake	City of Cartersville [e]	*NA*	18	10.7
	Cobb County-Marietta Water Authority	*NA*	78	36.9
Lewis Spring	City of Adairsville	*NA*	4.1	2.4
Bolivar Springs	Bartow County Water System	*NA*	0.8	0.5
Moss Springs	City of Emerson	*NA*	0.5	0.2
Hickory Log Creek Reservoir [f]	City of Canton	11	*NA*	0.1
	Cobb County-Marietta Water Authority	33	*NA*	*NA*
Monthly Average Day Withdrawal in Coosa/Etowah River Basin			***161.1***	***68.3***
Flint River Basin				
Flint River	Clayton County Water Authority [g]	40	*NA*	4.2
	Fayette County Water System [h]	16	*NA*	1.2
J.W. Smith Reservoir (Shoal Creek) [g]	Clayton County Water Authority [g]	*NA*	17	9.7
White Oak Creek [d]	Newnan Utilities	7	*NA*	1.1
Line Creek [d]		12	*NA*	1.7
Hutchins Lake	City of Senoia	*NA*	0.3	0.3
Whitewater Creek	City of Fayetteville	*NA*	3	0.6
Lake Kedron [h]	Fayette County Water System	*NA*	4.5	0.3
Lake Peachtree (Flat Creek) [h]				
Horton Creek Reservoir [i]		*NA*	14	3.4
Whitewater Creek [i]		2		
Lake McIntosh	Fayette County Water System	*NA*	12.5	5.4
Still Branch Creek Reservoir [j]	City of Griffin (provides water to Pike, Spalding and Coweta Counties)	*NA*	1.875	1.875
Monthly Average Day Withdrawal in Flint River Basin			***53.2***	***29.8***

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)*		2014 Actual Annual Average Withdrawals (MGD)
		Supplemental Source[a]	Primary Source[a]	
Ocmulgee River Basin				
W.J. Hooper Reservoir (Little Cotton Indian Creek)	Clayton County Water Authority	*NA*	20	16.1
Edgar Blalock Jr. Reservoir (Pates Creek) [g]		*NA*	10	0.8
John Fargason (Walnut Creek) Reservoir	City of McDonough	*NA*	2.4	1.2
S. Howell Gardner (Indian Creek) Reservoir [k]	Henry County Water Authority	*NA*	8	2.4
Rowland (Long Branch) Reservoir [k]		*NA*	10	2.1
Towaliga River Reservoir		*NA*	11	4.4
Tussahaw Creek Reservoir		*NA*	32	7.5
Big Haynes Creek (Randy Poynter Lake)	Rockdale County	*NA*	32.8	11.9
Brown Branch	City of Locust Grove	*NA*	0.3	0.3
Monthly Average Day Withdrawal in Ocmulgee River Basin			***121.5***	***46.7***
Oconee River Basin				
Cedar Creek Reservoir [l]	City of Gainesville	*NA*	2	0
North Oconee River [l]		20	*NA*	0
Monthly Average Day Withdrawal in Oconee River Basin			***2.0***	***0***
Tallapoosa River Basin				
Lake Paradise (Little Tallapoosa River) [h]	City of Villa Rica	*NA*	1.5	1.2
Cowens Lake (Astin Creek) [h]				
Monthly Average Day Withdrawal in Tallapoosa River Basin			***1.5***	***1.2***
Total Permitted Withdrawal in District [m]		**Monthly Average Day**	**1,108.7**	*NA*
		AAD-MGD	**923.9**	**521.0**

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

[a] 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.

[b] The Bear Creek Reservoir withdrawal serves as a supplemental supply to the primary Dog River Reservoir Source (Permit No. 048-1216-3). The withdrawals stated for the Dog River and Bear Creek Reservoirs cannot be added; the total permitted withdrawal from both sources is 23 MGD. The Dog River Reservoir releases are augmented with reuse water from the Douglasville-Douglas County Water and Sewer Authority's South Central WWTP, which is piped to a point below the foot of the dam.

[c] The City of East Point has one surface water withdrawal permit for withdrawal from Sweetwater Creek. The City may supplement the withdrawals from Sweetwater Creek with water from the George Sparks Reservoir. Amounts are not to exceed quantities shown

on the permit.
[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] Construction of the Hickory Log Creek Reservoir was completed in 2007. Cobb County-Marietta Water Authority is entitled to 75% (33 MGD) of the water from the project and the City of Canton to the remaining 25 percent (11 MGD). The withdrawal intakes for Cobb County-Marietta Water Authority and City of Canton are not located in the reservoir, but in the Etowah River and Allatoona Lake, respectively.
[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] These two sources share a combined permit limit.
[i] Lake Horton is a pump-storage facility only that receives water from the Flint River and Whitewater Creek.
[j] 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 3.00 MGD of finished water from the City of Griffin through June 30, 2022. The amount increases to 5.00 MGD on July 1, 2022 through the duration of the contract ending in 2049.
[k] 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.
[l] 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.
[m] Monthly average day is 1.2 times AAD.

3.2.2 Groundwater Supplies

Groundwater sources account for less than one 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)	2014 Actual Monthly Average Withdrawals (MGD)
City of Emerson	Bartow	1.0	NA
City of Kingston	Bartow	0.15	NA
City of White	Bartow	0.2	NA
City of Ball Ground	Cherokee	0.25	NA
Clayton County Water Authority	Clayton	0.4	0.01
Coweta County Water & Sewer Department	Coweta	0.504	NA
City of Senoia	Coweta	0.233	0.16
City of Villa Rica[a]	Carroll	0.125	NA
City of Fayetteville	Fayette	0.937	0.60
Board of Commissioners of Fayette County	Fayette	0.875	0.04
City of College Park	Fulton	0.125	NA
City of Roswell	Fulton	0.167	0.11
City of Lawrenceville	Gwinnett	2.0	0.45
City of Flowery Branch	Hall	0.7	NA

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)	2014 Actual Monthly Average Withdrawals (MGD)
City of Lula	Hall	0.5	NA
City of Hampton	Henry	0.369	0.09
City of Locust Grove	Henry	1.0	NA
City of McDonough	Henry	0.3	0.04
City of Stockbridge	Henry	0.52	0.23
City of Dallas	Paulding	0.202	0.03
Total Groundwater Supply [b]		**10.6**	**1.77**

[a] For planning purposes, Villa Rica's groundwater well is in this list because it affects the water needed by the city, even though it is located in Carroll County.
[b] The total permitted groundwater supply amount is expressed in terms of monthly average day; groundwater withdrawal permit limits are not set in terms of AAD, as they are for surface water.
NA = not available

3.2.3 Existing Water Treatment Facilities

The District currently has 38 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 1,175.7 MGD (peak day limit). Table 3-3 lists the existing surface WTPs in the District, including treatment capacities.

Treatment capacity volumes are reported in different units than those for withdrawals because, in the state of Georgia, WTP permits are based on a 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, 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 noted above, groundwater sources provide less than one percent of the public water supply in the District. Typically, groundwater only requires disinfection prior to distribution to customers. The City of Lawrenceville owns and operates the only groundwater treatment plant in the District that applies additional treatment for removal of radon, iron and manganese to a groundwater-only source.

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

County	WTP	Entity	Source Stream/Reservoir	2015-2016 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

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

County	WTP	Entity	Source Stream/Reservoir	2015-2016 Permitted WTP Capacity (Peak Day, MGD)[a]
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	86
	Hugh A. Wyckoff		Allatoona Lake	72
Coweta	B.T. Brown	Coweta County	Cedar Creek (B.T. Brown) Reservoir	7.7
	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 Dog River Reservoir	23.94
	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			9.3
	Fayetteville	City of Fayetteville	Whitewater Creek	4
Forsyth	Cumming	City of Cumming	Lake Lanier	24
	Forsyth County	Forsyth County	Lake Lanier	16.72
Fulton	Atlanta-Fulton County	Atlanta-Fulton County Water Resources Commission	Chattahoochee River	90
	Hemphill	City of Atlanta	Chattahoochee River	136.5
	Chattahoochee			65
	Roswell Cecil Wood	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

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

County	WTP	Entity	Source Stream/Reservoir	2015-2016 Permitted WTP Capacity (Peak Day, MGD)[a]
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	24.4
	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
Rockdale	Big Haynes Creek	Rockdale County	Big Haynes Creek (Randy Poynter Lake)	22.1
Total District Treatment Capacity (Peak Day MGD)				**1,175.7**

[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.

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 not addressed in this Plan. 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)[a]
Chattahoochee	6.97	9.94
Coosa/Etowah	12.63	13.21
Flint	0.5	0.5
Ocmulgee	-	-
Oconee	-	-
Tallapoosa	-	-
Total	**20.1**	**23.6**

[a] 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 strategies that have been expanded upon with the 2009 plan and 2010 amendments.

Table 3-5 lists the water conservation programs implemented by the District since its creation in 2001. These programs were selected based on their cost-effectiveness and applicability to the District water users, as well as their potential ability to decrease water demands across the region. Through each revision, the programs were strengthened to build on the success already achieved and continue to move the District forward as a national leader in water conservation and efficiency.

Table 3-5. Water Conservation Measures Implemented in the District, Based on Requirements in the 2003 Plan, 2009 Plan Update and 2010 Plan Amendments

#	Conservation Measure [a,b]	2003 Plan	2009 Plan	2010 Amendments
1	Conservation pricing	●	●	●
2	Replace older, inefficient plumbing fixtures (toilet rebate program)	●	●	●
3	Require pre-rinse spray valve retrofit education program	●	●	●
4	Rain sensor shut-off switches on new irrigation systems	●	●	●
5	Require sub-meters in new multi-family residential buildings	●	●	●
6	Assess and reduce water system leakage	●	●	●
7	Conduct residential water audits	●	●	●
8	Distribute low-flow retrofit kits to residential users	●	●	●
9	Conduct commercial water audits	●	●	●
10	Implement public education and awareness plan	●	●	●
11	Install high efficiency toilets and high efficiency urinals in government buildings		●	●
12	Require new car washes to recycle water		●	●
13	Expedited water loss reduction (Chattahoochee and Lanier) [c]			●
14	Multi-family HET rebates (Chattahoochee and Lanier) [c]			●
15	Meters with point of use leak detection (Chattahoochee and Lanier) [c]			●
16	Require private fire lines to be metered (Chattahoochee and Lanier) [c]			●
17	Maintain a water conservation program (Chattahoochee and Lanier) [c]			●
18	Water waste policy			●
19	Require high efficiency plumbing fixtures consistent with state legislation			●

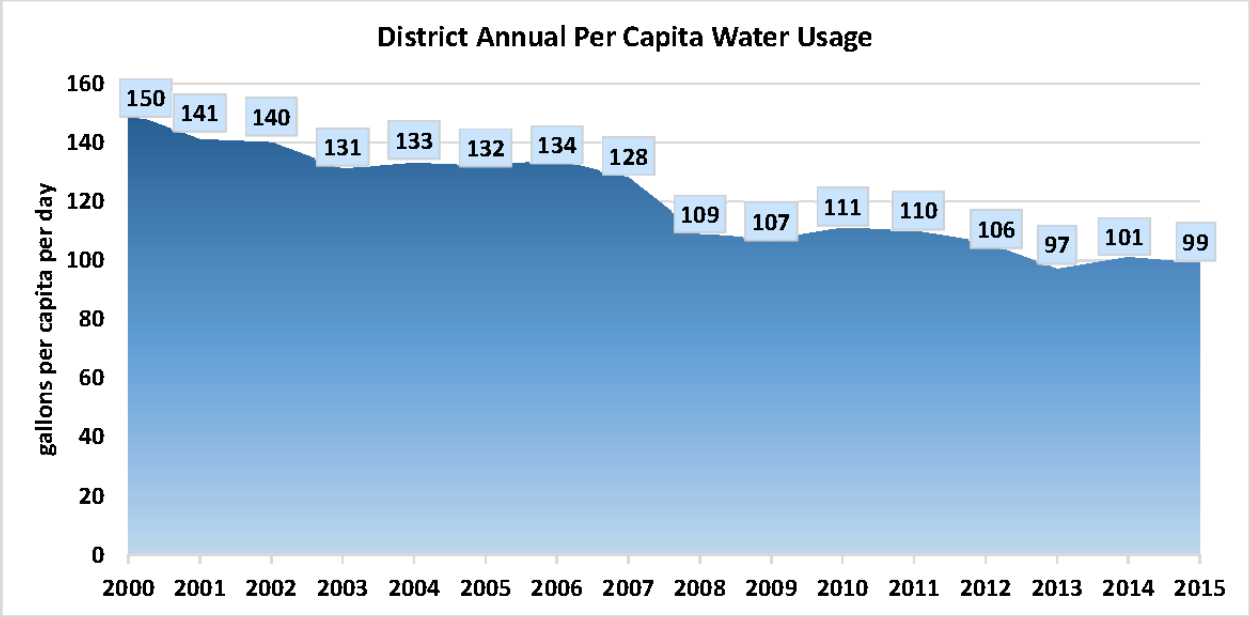
[a] Conservation practices listed in the 2003 and 2009 District Plans were developed prior to the enactment of the Georgia Water Stewardship Act (2010).
[b] In 2010, items 13 through 19 were added by a Plan amendment.
[c] Water conservation measures adopted in 2010 were recommended for the Chattahoochee River Basin utilities only.
NRW = non-revenue water

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

- Water conservation pricing that includes higher residential water rates as customers use more water
- Toilet rebate program that has replaced over 110,000 inefficient toilets, saving more than 2.5 million gallons per day

- Requirement for rain sensors to be installed on new irrigation systems in the District since 2005
- Water loss assessment and leak detection programs that have pre-dated the state's award-winning program by a half-decade
- Award-winning public education and outreach efforts. The District received the 2015 WaterSense Excellence Award for Outreach and Education from the EPA's WaterSense program. The District received this national recognition for making a difference through water efficiency innovation and WaterSense promotion.

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 below.



Note: The US Census Bureau revised population estimates for 2000 through 2009 after the decennial census was conducted in 2010. Per Capita numbers for 2000 - 2009 have been updated from prior published values to reflect the new population estimates.

Figure 3-2. District Per Capita Water Use Trend 2000-2015

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.

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.

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 2016, the District had 87 publicly owned (municipal) wastewater treatment facilities in operation. The total permitted capacity of these facilities was 700 MGD (Table 3-6). At least 91 percent 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 3-6 and 3-7 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 six percent since 2006, the year for which data were provided in the 2009 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 2006, and the permitted capacity for these facilities has increased from 660 MGD of wastewater to 700 MGD.

Table 3-6 shows that 66 percent of the total existing municipal permitted capacity in the District is located in the Chattahoochee Basin. Table 3-7 shows that three counties, Cobb, Fulton, and Gwinnett, have 67 percent of the treatment capacity of the District. Table 3-8 presents a detailed summary of permitted treatment capacity by facility for each county.

Publicly owned facilities decommissioned during the last planning period (2009-2015) and facilities that are not currently in operation include the following:

- **Douglas County:** Southside Water Pollution Control Plant (WPCP), South Central Urban Water Reuse Facility (permit remains active), Beaver Estates WPCP and St. Andrew's LAS
- **Fulton County:** Cauley Creek Water Reclamation Facility (WRF) – This facility remains permitted but is not currently in operation
- **Gwinnett County:** Gwinnett Jack's Creek WRF and Jackson Creek WRF
- **Hall County:** Lula Facultative Pond
- **Henry County:** Springdale Road WPCP, Springdale LAS and Springdale Walnut Creek WPCP
- **Paulding County:** Dallas North WPCP and Dallas West WPCP

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.

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

River Basin	2016	
	Permitted Capacity of Municipal Facilities (MMF-MGD)[a]	Number of Municipal Wastewater Treatment Facilities
Coosa/Etowah	74	21
Chattahoochee	464	38
Flint	27	8

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

River Basin	2016	
	Permitted Capacity of Municipal Facilities (MMF-MGD)[a]	Number of Municipal Wastewater Treatment Facilities
Ocmulgee	132	18
Tallapoosa	2	1
Oconee	1	1
Total	**700**	**87**

[a] The current permitted capacity as obtained from 2015 data requests, data provided by Georgia EPD, and meetings with individual utilities.

Table 3-7. Municipal Permitted Wastewater Treatment Capacity in the District by County

County	2016
	Permitted Capacity of Municipal Facilities[a] (MMF-MGD)
Bartow	17.2
Cherokee	18.5
Clayton	38.4
Cobb	112.0
Coweta	6.9
DeKalb	56.0
Douglas	12.3
Fayette	11.0
Forsyth	14.02
Fulton	256.1
Gwinnett	100.3
Hall	18.5
Henry	17.5
Paulding	7.7
Rockdale	10.2
District Total	**697**

[a] The current permitted capacity as obtained from 2015 data requests, data provided by Georgia EPD, and meetings with individual utilities.

Table 3-8. Existing Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2016 Permitted Treatment Capacity (MMF-MGD)
Bartow	Cartersville WPCP	Coosa/Etowah	Etowah River	15
	Emerson Henry Jordan WWTP	Coosa/Etowah	Pumpkinvine Creek	0.45
	Adairsville North WPCP	Coosa/Etowah	Oothkalooga Creek	1
	Adairsville South WPCP	Coosa/Etowah	Oothkalooga Creek	0.5
	Bartow Southeast WPCP	Coosa/Etowah	Etowah River	0.1
	Bartow Two Run WPCP	Coosa/Etowah	Two Run Creek	0.1
Cherokee	CCWSA Rose Creek WPCP	Coosa/Etowah	Etowah River Arm of Allatoona Lake	6
	CCWSA Fitzgerald Creek WPCP	Coosa/Etowah	Little River to Allatoona Lake	5
	Woodstock Rubes Creek WPCP	Coosa/Etowah	Rubes Creek, Tributary to Little River	2.5
	Canton WPCP	Coosa/Etowah	Etowah River	4
	Fulton Little River WRF	Coosa/Etowah	Coosa River	1
Clayton	Clayton W.B. Casey WRF	Ocmulgee	Huie Constructed Wetlands to Shamrock Lake	17.4
	Clayton W.B. Casey WRF	Flint	Flint River	6.6
	Clayton Northeast WRF	Ocmulgee	Panther Creek	6
	Clayton Shoal Creek WRF	Flint	Shoal Creek Reservoir, Tributary to Flint River	4.4
Cobb	Cobb Noonday Creek WRF	Coosa/Etowah	Noonday Creek Tributary	20
	Cobb Northwest WRF	Coosa/Etowah	Allatoona Lake	12
	Cobb RL Sutton WRF	Chattahoochee	Chattahoochee River	40
	Cobb South Cobb WRF	Chattahoochee	Chattahoochee River	40
Coweta	Coweta Crossroads LAS	Flint	Land Application	0.023
	Coweta Shenandoah WPCP	Flint	White Oak Creek, Tributary to Flint River	2
	Coweta Arnco WPCP	Chattahoochee	Wahoo Creek	0.1
	Coweta Arnall/Sargent WPCP	Chattahoochee	Wahoo Creek	0.06
	Newnan Wahoo Creek	Chattahoochee	Wahoo Creek Tributary	3

Table 3-8. Existing Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2016 Permitted Treatment Capacity (MMF-MGD)
	Newnan Mineral Springs	Chattahoochee	Mineral Springs Branch/Mountain Creek	0.75
	Senoia LAS	Flint	Land Application	0.49
	Grantville Colley Street LAS	Chattahoochee	Land Application	0.15
	Grantville Ponds	Chattahoochee	Various	0.12
DeKalb	Pole Bridge Creek	Ocmulgee	South River Tributary	20
	Snapfinger Creek	Ocmulgee	South River	36
Douglas	Douglas South Central WPCP	Chattahoochee	Chattahoochee River	6
	Douglas Sweetwater Creek WPCP	Chattahoochee	Chattahoochee River	3
	Douglas Northside WPCP	Chattahoochee	Gothards Creek to Sweetwater Creek	0.6
	Douglas Rebel Trails WPCP	Chattahoochee	Anneewakee Creek Tributary	0.04
	Douglas South Central Urban Water Reuse Facility	Chattahoochee	Reuse	0.5
	Villa Rica North	Chattahoochee	Town Branch to Sweetwater Creek	0.52
	Villa Rica West	Tallapoosa	NA	2.15
Fayette	Fayetteville Whitewater Creek WPCP	Flint	Whitewater Creek	5
	Peachtree City Rockaway WPCP	Flint	Line Creek Tributary	4
	Peachtree City Line Creek/Larry B. Turner WPCP	Flint	Line Creek	2
Forsyth	Forsyth Fowler WRF	Chattahoochee	Reuse	1.75
	Forsyth Shakerag WRF	Chattahoochee	Chattahoochee River	1.25
	Forsyth James Creek	Chattahoochee	Chattahoochee River	1
	Forsyth Dick Creek	Chattahoochee	Dick Creek	0.76
	Forsyth Windermere WRF	Chattahoochee	Reuse	0.55
	Forsyth Parkstone LAS	Coosa/Etowah	Land Application	0.1
	Forsyth Manor Water Reuse Facility	Coosa/Etowah	Reuse	0.5
	Cumming Habersham WPCP	Coosa/Etowah	Lake Lanier	0.11
	Cumming Bethelview Rd AWRF	Chattahoochee	Big Creek	8

Table 3-8. Existing Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2016 Permitted Treatment Capacity (MMF-MGD)
Fulton	Fulton Big Creek WRF	Chattahoochee	Chattahoochee River	24
	Fulton Johns Creek Environmental Campus	Chattahoochee	Chattahoochee River	15
	Fulton Camp Creek WRF	Chattahoochee	Chattahoochee River	24
	Fulton Little Bear WRF	Chattahoochee	Little Bear Creek, tributary to Bear Creek	0.1
	Fulton Cauley Creek WRF	Chattahoochee	Cauley Creek to Chattahoochee	5
	Atlanta RM Clayton WRC	Chattahoochee	Chattahoochee River	100
	Atlanta South River WRC	Chattahoochee	Chattahoochee River	48
	Atlanta Utoy Creek WRC	Chattahoochee	Chattahoochee River	40
Gwinnett	Gwinnett F. Wayne Hill WRC	Chattahoochee	Lake Lanier	40
	Gwinnett F. Wayne Hill WRC	Chattahoochee	Chattahoochee River	20
	Gwinnett Yellow River WRF	Ocmulgee	Yellow River	22
	Gwinnett Crooked Creek WRF	Chattahoochee	Chattahoochee River	16
	Buford Southside WPCP	Chattahoochee	Little Suwanee Creek	2
	Buford Westside WPCP	Chattahoochee	Richland Creek	0.25
Hall	Flowery Branch WPCP	Chattahoochee	Lake Lanier	0.4
	Gainesville Flat Creek WRF	Chattahoochee	Flat Creek	12
	Gainesville Linwood WRF	Chattahoochee	Lake Lanier	5
	Hall Spout Springs	Oconee	Lollis Creek	0.75
	Lula WRF	Chattahoochee	Hagen Creek	0.375
Henry	Henry Indian Creek LAS	Ocmulgee	Land Application	1.5
	Henry Walnut Creek WRF	Ocmulgee	Land Application	8
	Henry Bear Creek LAS	Flint	Land Application	1.25
	Hampton WPCP	Flint	Bear Creek Tributary	1.75
	Locust Grove Indian Creek WPCP	Ocmulgee	Indian Creek to Towaliga River	1.5

Table 3-8. Existing Permitted Wastewater Treatment Facilities in the District

County	Wastewater Treatment Facilities	Basin	Receiving Water Body	2016 Permitted Treatment Capacity (MMF-MGD)
	McDonough Walnut Creek WPCP	Ocmulgee	Walnut Creek	2
	Stockbridge WPCP	Ocmulgee	Bush Creek Tributary	1.5
Paulding	Paulding Coppermine WRF	Chattahoochee	Mill Creek	1
	Paulding Coppermine LAS	Chattahoochee	Land Application	1.033
	Paulding Pumpkinvine WRF	Coosa/Etowah	Pumpkinvine Creek	1.5
	Paulding Pumpkinvine LAS	Coosa/Etowah	Reuse	1
	Paulding Upper Sweetwater WRF	Chattahoochee	Reuse	0.3
	Dallas Pumpkinvine Creek WPCP	Coosa/Etowah	Pumpkinvine Creek	1.5
Rockdale	Rockdale Almand Branch WPCP	Ocmulgee	Almand Creek to South River	1.25
	Rockdale Quigg Branch WRF	Ocmulgee	Yellow River	8
	Rockdale Honey Creek WPCP	Ocmulgee	McClains Branch	0.3
	Rockdale Snapping Shoals WPCP	Ocmulgee	Snapping Shoals Creek	0.45
	Rockdale Scott Creek WPCP	Ocmulgee	Scott Creek to South River	0.22

AWRF = Advanced Water Reclamation Facility
WRC = Water Reclamation Center
The acronyms listed above to describe the wastewater treatment facilities (WPCP, WRF, WPCP, WRC) was based on name listed in the NPDES permit for each facility.

3.3.2 Non-Municipal Permitted Wastewater Facilities

In 2016, the District had 96 non-municipal (privately owned) wastewater treatment facilities in operation. The total permitted capacity of these facilities was 12 MGD. Table 3-9 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 96 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 3-9 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 3-9. Total Non-Municipal Permitted Wastewater Treatment Capacity in the District by River Basin

River Basin	2016	
	Permitted Capacity of Non-Municipal Facilities (MMF-MGD)[a]	Number of Non-Municipal Facilities
Coosa/Etowah	2.5	28
Chattahoochee	6.9	41
Flint	0.9	9
Ocmulgee	0.7	11
Tallapoosa	0	0
Oconee	0.9	7
Total	**12.0**	**96**

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.
[a] The current permitted capacity as obtained from 2015 data requests and data provided by Georgia EPD.

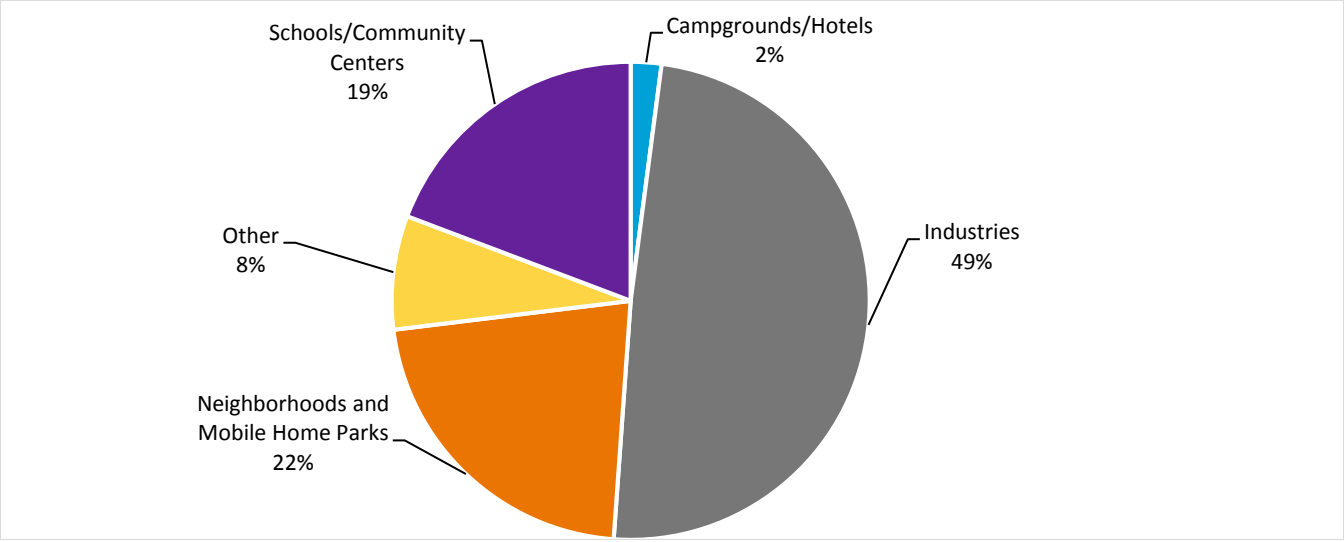


Figure 3-3. Non-Municipal Wastewater Facilities in the District - Permitted Capacity Distribution by Sector

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

Since the previous Plan Update in 2009, GADPH has provided more detailed information on septic system use in the region. This information improves upon the septic system data previously available to the District. Table 3-10 lists 2013 estimates of the number of septic systems for each county in the District.

The estimated septic flows were calculated using the baseline flows to septic systems from the wastewater forecasts. The baseline wastewater flows were calculated based on indoor water use data from 2010 to 2014, and the septic system use percentages obtained from 2013 data were applied to the 2015 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 65 AAD-MGD. Thirty-four 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 (2013) is shown on Figure 3-4. This figure also shows estimated flows to septic systems in the region.

Table 3-10. Estimated Number of Existing Septic Systems in the District by County (2013)

County	Estimated Number of Septic Systems (2013) [a]
Bartow	22,992
Cherokee	39,056
Clayton	14,230
Cobb	34,241
Coweta	28,345 [b]
DeKalb	22,638
Douglas	19,116 [b]
Fayette	21,044
Forsyth	33,032
Fulton	28,133
Gwinnett	65,265
Hall	38,717 [b]
Henry	38,587
Paulding	34,172 [b]
Rockdale	15,314
District Total	**454,882**

[a] Data provided by GADPH for 2013. 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.
[b] The number of septic systems is estimated based on available water and sewer account data provided by individual utilities.

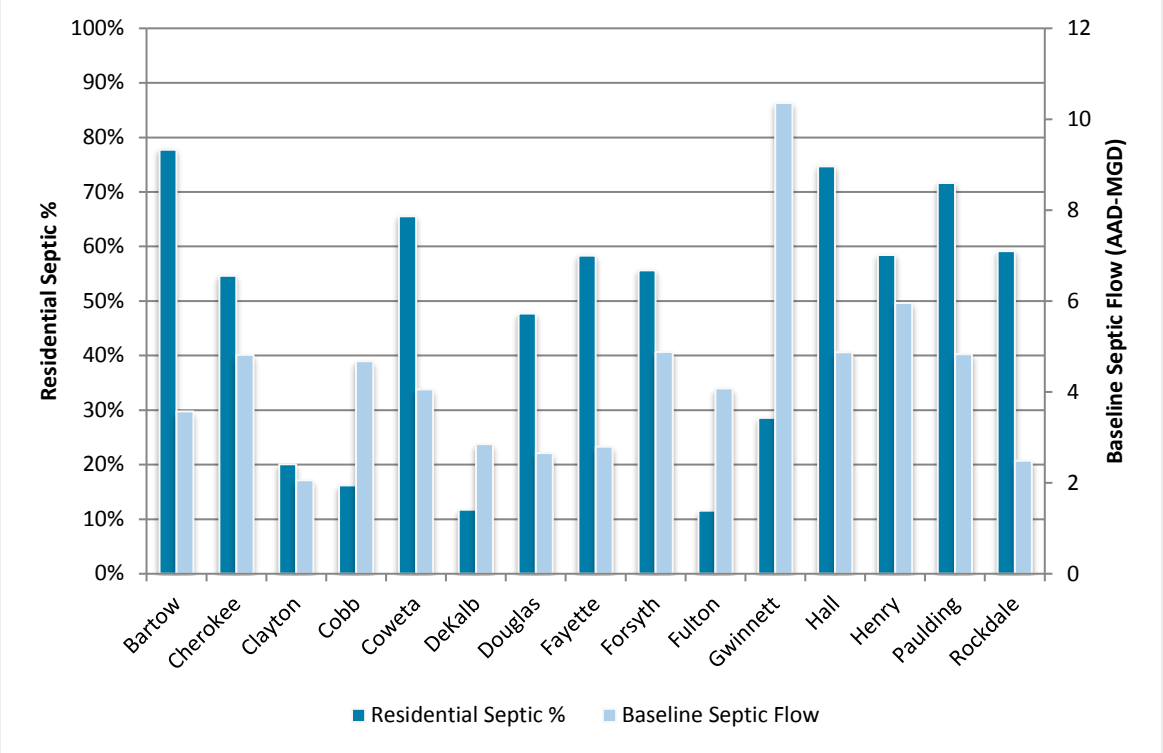


Figure 3-4. Estimated Percent of Single Family Residences with Septic Systems and Baseline Septic Flows in the District[a]

[a] The total number of single-family residences estimated for 2013 is derived from the U.S. Census Bureau, 2009-2013 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 inter-basin transfer of water within the District.

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 LASs or septic systems is consumed through evaporation and transpiration. As a result, the District has assumed for planning purposes that no water treated by LASs and septic systems is returned to the environment or contributes to streamflows.

Available research in Georgia suggests that substantial quantities of water treated by LASs and septic systems may contribute to groundwater and surface water flows. For example, research in Georgia found that 91 percent of the water discharged into the soil by septic systems went to groundwater, explaining that "only a small percentage of the water used by onsite systems is lost to evaporation and transpiration" (Radcliffe, D.E. et al. 2006). The same study in Georgia also found that 70 percent or more of wastewater applied through onsite systems and LAS should return to the stream, noting that the "percentage of wastewater returns to the stream from [septic systems] may be greater than that from a LAS since the

[septic system] wastewater is discharged in the subsoil where root abundance is less than that near the soil surface."

For purposes of this 2017 Plan Update, the District has continued its highly conservative assumptions regarding the consumptive nature of wastewater flows treated by septic systems and LASs. Whether to continue these assumptions in the future plan updates will be addressed during the relevant planning processes.

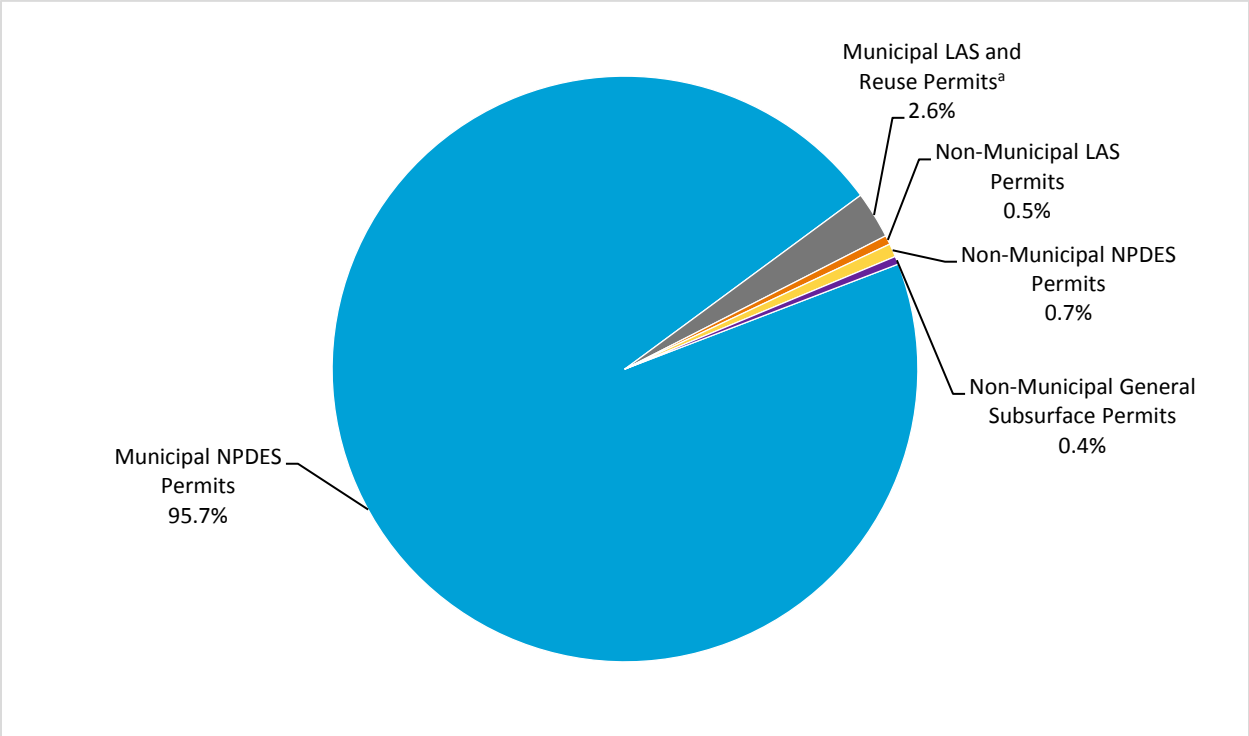


Figure 3-5. Permitted Capacity Distribution of Treated Wastewater Flows in the District (2015)

[a] 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

3.4.2 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 3-11. 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.

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 3-11. 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 is currently building a distribution system that will provide 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 2.5 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 (31.6 MG used for reuse for 2014). 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	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 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
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 3-11, 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
- Fayette County Larry B. Turner WRF and Rockaway WWTP
- 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, see Appendix B.

3.4.3 Existing Interbasin Transfers

The water and wastewater systems of the District operate as an interconnected service network. Interbasin transfer is commonly described as a withdrawal of water from one river basin, followed by use and/or return of some or all of that water to a second river basin. Transfers among basins are particularly common within counties that straddle the ridges between two or more basins. This situation applies in 11 of the District's 15 counties. Transfers of water and wastewater occur among municipalities, counties and basins. While interbasin transfers are an important tool for water resource management in the District, the law that created the District prohibits it from studying or including it in its plan any interbasin transfers from outside of the District area (O.C.G.A. § 12-5-584).

Table 3-12 presents the net estimated interbasin transfers in the District based on 2013 data. The information provided in Table 3-12 was submitted to Georgia EPD by utilities as part of their water withdrawal permit compliance and compiled by the Georgia EPD Water Withdrawal Permitting Program. Accordingly, this methodology differs from the methodology used in prior plans.

Table 3-12. Summary of Interbasin Water Transfers for 2013[a]

River Basin	Water Gained (MGD)	Water Lost (MGD)	Net (+/- MGD)[b]
Chattahoochee	22.4	56.9	-34.5
Coosa	3.0	12.0	-9.0
Flint	1.4	16.3	-14.9
Ocmulgee	55.3	0.7	54.6
Oconee	3.8	0.0	3.8

[a] Source: Memo from Ade Oke to Judson Turner, 2013 Annual Accounting of Interbasin Transfers in Georgia, June 13, 2014
[b] +/- indicates cumulative gain and indicates cumulative loss

3.5 Watershed Development

Land development affects the physical, chemical and biological conditions of the District's watersheds, waterways and water resources. As land use changes from forested and rural to suburban and urban uses, the natural cycle of water (hydrology) is disrupted and altered. Clearing removes the vegetation that intercepts, slows and returns rainfall to the air through evaporation and transpiration. Grading flattens hilly terrain and fills in natural depressions that slow and provide temporary storage for rainfall. The 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.

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 further modify the natural hydrology that speeds stormwater runoff to local streams and concentrates pollutants from human activities in the watershed. Figure 3-6 illustrates how the water balance changes when natural forest cover is cleared and replaced by residential and urban development.

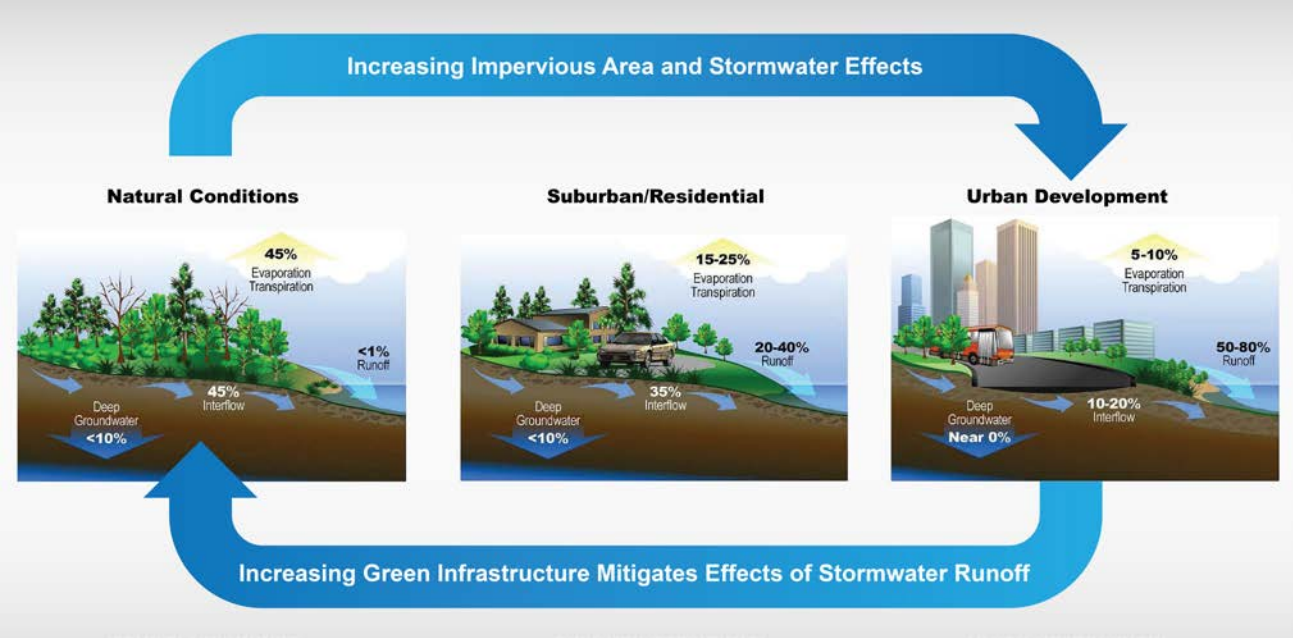


Figure 3-6. Changes in Runoff and Hydrology Due to Development

Notes: Changes in runoff and hydrology can occur based on the intensity of development. Percentages given in this figure represent a generalized scenario and are not specific to the Metro Water District.

Population growth and redevelopment in the District have resulted in land use and land cover changes over the past few decades. Generally, land use has shifted from forest and agricultural lands to residential, commercial, industrial and other urbanized land uses. Figure 3-7 illustrates the change in land cover between 1978 and 2011. Based on a different dataset, Table 3-13 summarizes the percent change in land use between 1999 and 2012. Figure 3-8 illustrates the existing (2012) land use and cover in the District. More detailed information on land use in the region can be found in the River Basin Profiles in Appendix A of this Plan.

The changes in watershed hydrology from land use changes can have impacts on stream conditions including:

- **Changes in Stream Flow** – Increased runoff volumes, increased peak discharges, greater runoff velocities, increased flooding and lower dry weather stream flows
- **Changes in Stream Geometry** – Stream erosion (widening and down-cutting), loss of riparian tree cover, sedimentation in the channel and increased flood elevations
- **Degradation of Aquatic Habitat** – Degradation of habitat structure, loss of pool-riffle structure, reduced stream base flows, increased temperatures and reduced abundance and diversity of aquatic biota
- **Water Quality Impacts** – Reduced dissolved oxygen and increased suspended solids, nutrients (phosphorus and nitrogen compounds), hydrocarbons (oils and grease), organic contaminants, heavy metals, toxic chemicals, trash, debris and microbial contamination (bacteria, viruses and other pathogens)

These stream and watershed impacts can have physical, economic and aesthetic consequences to communities in the District, including the following:

- Losses and damages to private and public property and infrastructure due to flooding and erosion
- Impairment of drinking water supplies
- Increased cost of water supply treatment and watershed protection
- Loss of recreational opportunities
- Declining value of waterfront property
- Increased litigation between property owners regarding nuisance flooding
- Reduction in quality of life

A key focus of this plan is to provide strategies to help local communities protect their watersheds from future impacts and effectively mitigate existing problems to the extent practicable.

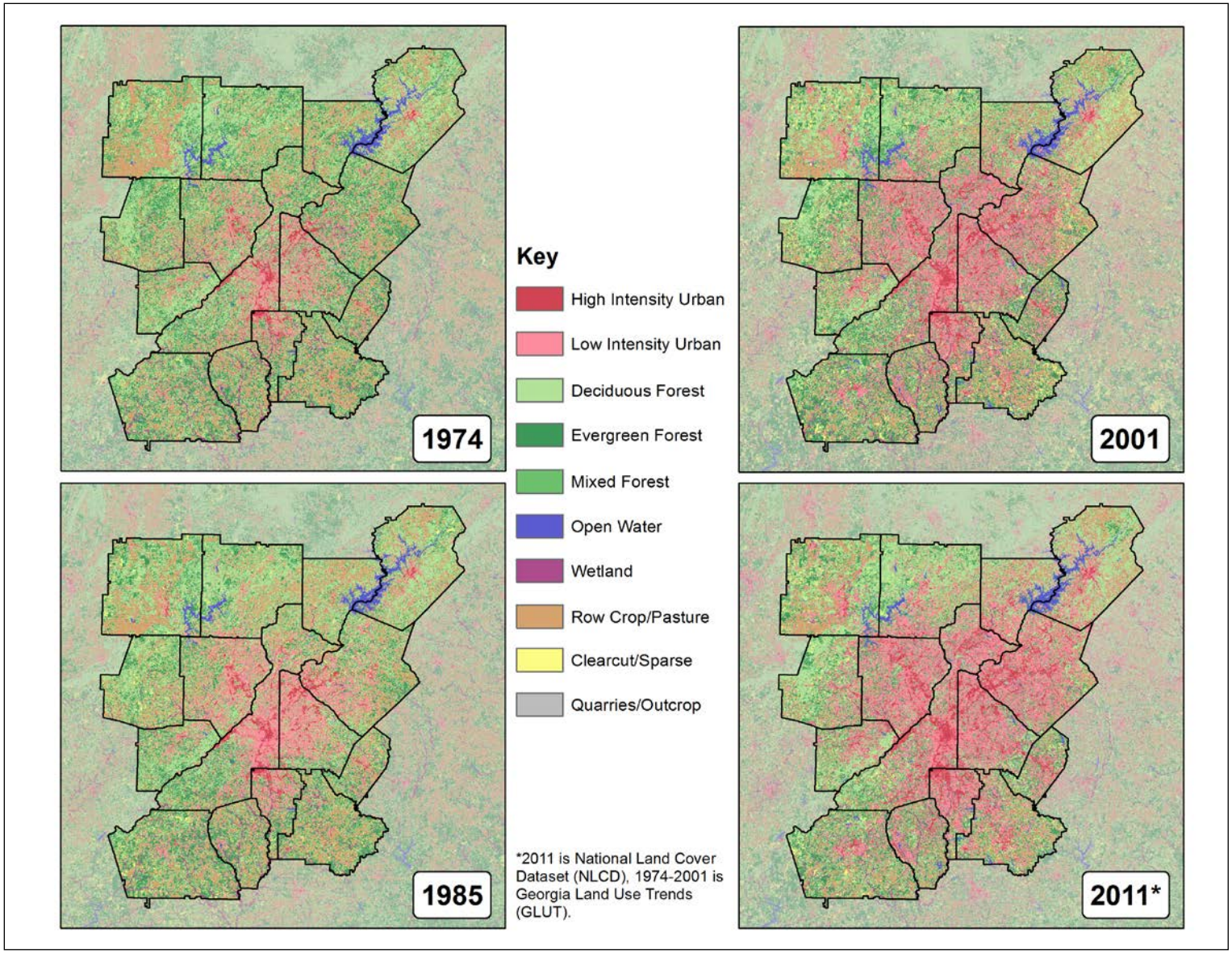


Figure 3-7. Land Cover in the District, 1974 and 2011

Table 3-13. Land Use in the District: 2012

	Coosa/Etowah		Chattahoochee		Oconee		Ocmulgee		Flint		Tallapoosa		Districtwide Total	
	1999	2012	1999	2012	1999	2012	1999	2012	1999	2012	1999	2012	1999	2012
Agricultural Lands	16%	16%	12%	10%	32%	36%	14%	13%	20%	24%	28%	28%	20%	13%
Commercial	2%	3%	6%	7%	1%	4%	6%	8%	5%	5%	0%	0%	3%	6%
Forest/Open Space	56%	47%	38%	30%	53%	43%	36%	29%	35%	40%	53%	52%	45%	32%
High Density Residential	0%	2%	3%	5%	0%	0%	2%	4%	1%	2%	0%	0%	1%	4%
Industrial/Institutional	1%	1%	2%	3%	1%	0%	1%	1%	1%	4%	15%	0%	4%	2%
Low Density Residential	11%	15%	11%	14%	9%	7%	10%	8%	10%	10%	0%	16%	9%	15%
Medium Density Residential	9%	11%	20%	21%	3%	5%	24%	31%	17%	7%	1%	3%	12%	18%
Transitional/Extractive Lands	2%	2%	2%	2%	1%	2%	3%	2%	2%	1%	3%	0%	2%	3%
Transportation and Utilities	1%	2%	1%	2%	1%	2%	1%	1%	2%	0%	0%	0%	1%	2%
Water/Wetlands	2%	2%	5%	6%	0%	1%	3%	3%	7%	8%	0%	0%	3%	4%
Undeveloped	74%	65%	55%	45%	85%	80%	53%	45%	62%	71%	81%	81%	68%	49%
Developed	26%	35%	45%	55%	16%	20%	47%	55%	38%	29%	19%	19%	32%	51%
Total Impervious	6%	10%	14%	17%	4%	11%	14%	18%	12%	15%	12%	2%	11%	12%
Effective Impervious	3%	6%	8%	10%	2%	6%	8%	11%	7%	9%	6%	1%	6%	7%

Notes:
Undeveloped = Agricultural, Forest/Open Space and Water/Wetlands

Data Source: Aggregated Land Cover categories from ARC's 1999 and 2012 LandPro GIS

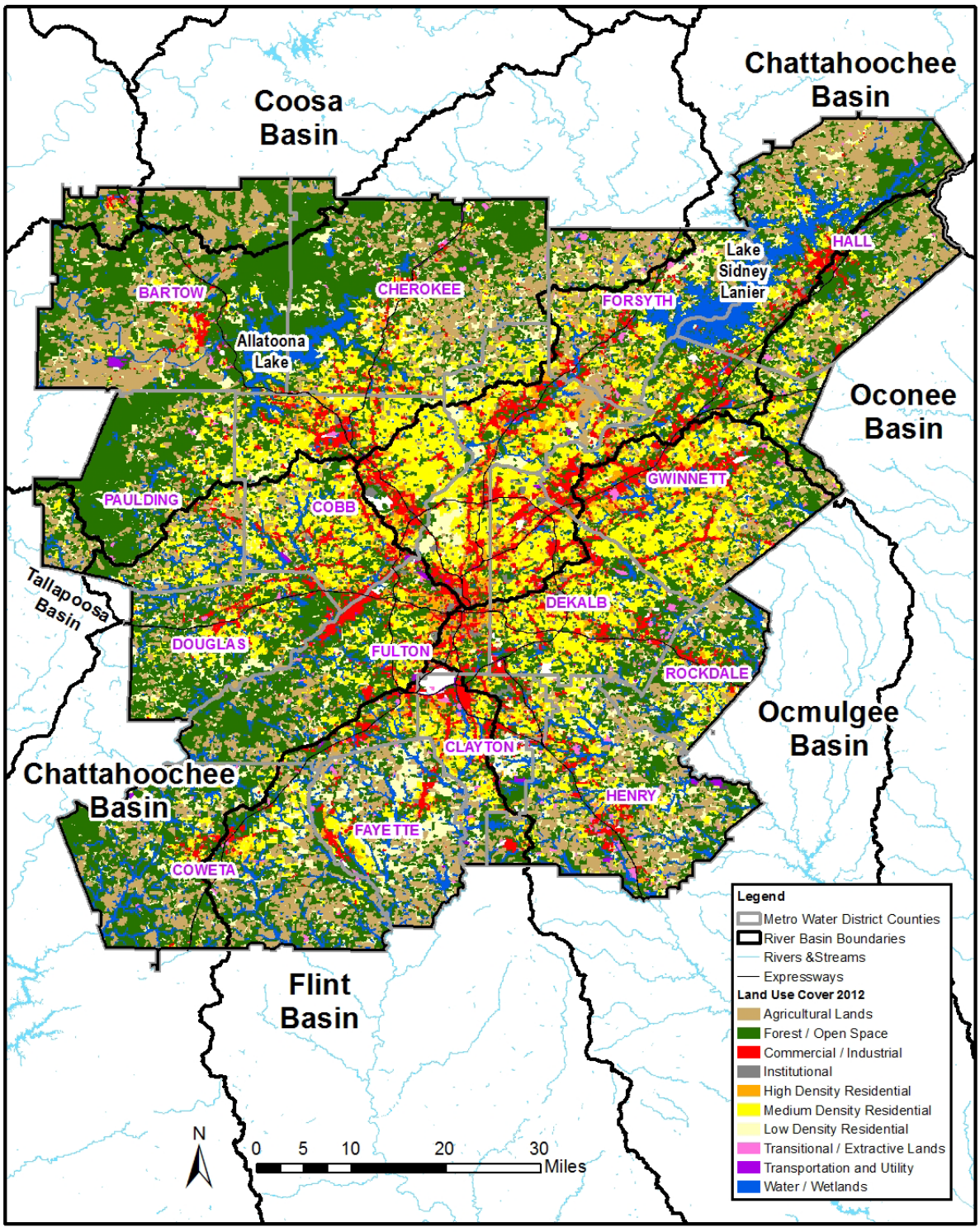


Figure 3-8. Land Use in the District: 2012
Source: Atlanta Regional Commission, 2012

3.6 Drinking Water Supply Watersheds

Most of the District's public drinking water supplies come from surface water sources, including streams, rivers and reservoirs, and therefore, protection of source water (drinking water supply) watersheds is vitally important to the region. Degradation of source water can potentially pose human health threats and increase water treatment costs for local communities. Protecting existing water supply watersheds, as well as future potential water supply watersheds, is an important element of this Plan. Figure 3-9 shows the water supply watersheds for the District.

Source water watersheds are classified by drainage area size in the state of Georgia: small water supply watersheds have less than 100 square miles of land within the drainage basin upstream of the water intake, and large water supply watersheds are 100 square miles or greater in size. Small watersheds are more vulnerable than large watersheds to contamination by land use development and spills, and therefore, more intensive watershed protection is needed. This Plan provides key protections for water supply watersheds through several Action Items in Section 5 of this Plan.

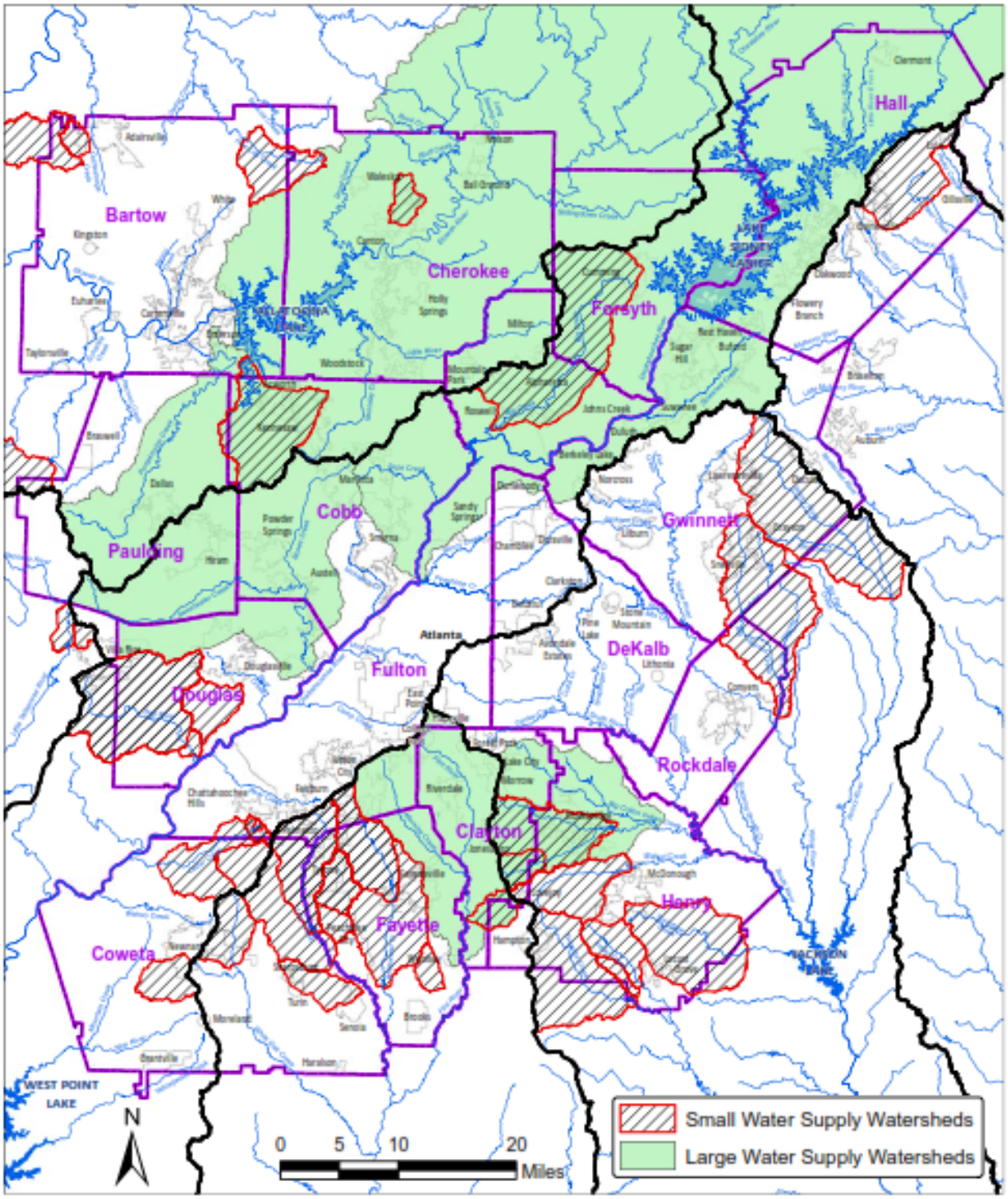


Figure 3-9. Source Water Supply Watersheds for the District
NOTE: New map is currently in development.

3.7 Instream Conditions

The lakes, ponds, streams and wetlands in the District are critical resources that provide multiple benefits including drinking water, wastewater assimilation, recreation, aesthetic benefits and wildlife habitat. Use and enjoyment of these resources is dependent upon protection of water quality and aquatic habitat. This section is an overview of water quality and habitat conditions in the region.

3.7.1 Surface Water Quality

The Georgia EPD establishes water quality standards for the state's surface waters. Section 303(d) of the federal Clean Water Act requires that all states list waterbodies that do not meet water quality standards. The Georgia EPD publishes a biennial list of streams that do not meet State water quality standards, referred to as the 303(d)/305(b) list. If a water body does not support its designated use (drinking, recreation, fishing, wild/scenic rivers or coastal fishing) because conditions violate water quality standards, it is considered an "impaired" stream or water body.

Tables 3-14 and 3-15 summarize findings of the 2014 305(b)/303(d) list for streams in the District. The 2014 list was finalized May 2016. These tables indicate the number of stream miles with water quality that support/do not support their designated uses and the number of stream miles impaired by each parameter for which stream miles are listed in the region. Some stream segments are listed for multiple parameters, and therefore, the sum of the stream miles in Table 3-14 is not equal to the sum of the stream miles listed in Table 3-15. The River Basin Profiles in Appendix A provide additional information on surface water impairments in the District. Despite progress since 2003, roughly 1,500 miles of stream and almost 34,000 acres of lake within the District do not meet state water quality standards according to the 2014 final list of impaired waters. More information about impaired streams in the region can be found in the Georgia 305(b)/303(d) List documents.

Over the past 15 years, the total number of stream miles listed as impaired in the District has decreased slightly. Stream miles and water bodies remain on the 305(b)/303(d) list until an active delisting procedure is undertaken. Over 50 percent of the listed streams are impaired due to fecal coliform levels. Fecal coliform is a parameter that may not meet state water quality standards in some waterbodies due to natural background sources. The primary source of fecal coliform is nonpoint source runoff, such as wildlife and pet waste, failing septic systems, SSOs and runoff from agricultural properties. Discharges from wastewater treatment facilities are considered to impair only a small number of stream miles, according to the inventory compiled by the Georgia EPD. The agency is currently evaluating alternative indicators that may be more specific to human health concerns. Microbial Source Tracking programs are becoming more common to characterize bacteria sources based on molecular analysis of genetic material. Microbial Source Tracking programs can help determine human or animal sources, and sometimes the species (that is, horse, dog and deer). This knowledge can then be used to select more targeted management measures.

After fecal coliform impairment, impaired fish biota, then impaired benthic macroinvertebrate biota, are the most common impairments in the District. Impaired biota (for fish and benthic macroinvertebrates) is often associated with excessive in-stream sediment. Sediment enters waterbodies either from stormwater runoff leaving upland areas, as well as from stream and shoreline erosion and sedimentation. Increased impervious cover without sufficient stormwater controls can lead to increases in stormwater flows and velocities that can cause further sediment impairments that degrade in-stream habitat for biota including fish and benthic macroinvertebrate communities.

Many of the Action Items in Section 5 of this Plan are designed to address water quality impairments and provide future protection for water quality. The River Basin Profiles in Appendix A provide more detail on watershed conditions and management strategies.

Table 3-14. Impaired Stream Miles in the District (2014)

Category	Total Stream Miles
Supporting Uses	765
Not Supporting Uses	1,476
Assessment Pending	7
Total	**2,248**

Source: Georgia EPD 2014 303(d)/305(b) Final List

Table 3-15. Impaired Streams in the District by Water Quality Parameter (2014)

Criterion Violated	Total Stream Miles[a]
Fecal Coliform	1,108
Impaired Biota - Fish	506
Impaired Biota - Macroinvertebrates	211
Fish Consumption Guidance (polychlorinated biphenyls, toxaphene-like chlorinated camphenes, dieldrin)	176
Commercial Fishing Ban	44
Dissolved Oxygen	19
Copper	16
Lead	12
Zinc	9
pH	3
Other[b]	12

[a] Total Stream Miles may include impaired stream segments which extend across County boundaries outside of the District

[b] Other = Alpha-Hexachlorocyclohexane, Beta-Hexachlorocyclohexane, Toxicity, Trichloroethane and Tetrachloroethene

Source: Georgia EPD 2014 303(d)/305(b) Final List

3.7.2 Protected Aquatic Species

The District is home to a number of native species that are considered threatened or endangered and receive federal or state protection based on their rare status. These species include a number of protected animal species that spend all or part of their life cycle in rivers and streams, or depend on streams for a portion of their life history. They also include protected plants that are either aquatic or semi-aquatic and grow within or along the margins of rivers and streams. At present, the Etowah sub-basin of the Coosa Basin, which is partially located in the District, is habitat for several federally protected fish species. In addition, a portion of the Tallapoosa basin in Paulding County is officially designated as critical habitat for federally-protected freshwater mussels. This area in Paulding County is a part of Designated Critical Habitat Unit 16. The mainstem Oostanaula and Coosawatee Rivers are also designated critical habitat for federally protected freshwater mussels, but the designated parts of these basins are not located in the District. The Georgia Division of Wildlife Resources has set forth a plan to protect the state's biodiversity, including its rare species, in "A Comprehensive Wildlife Conservation Strategy for Georgia."

SECTION 4

Future Conditions

Developing a long-term water resource management plan requires projecting forward from baseline conditions to envision the region's future water resource 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 projects future watershed development conditions that will affect watershed management needs and concerns.

4.1 Population and Employment Projections

For the 2017 Plan Update, the District used two sets of population and employment projections, presented in Tables 4-1 and 4-2, to forecast future water and wastewater demands:

Scenario 1: ARC Population and Employment Projections (2020 to 2050)

Scenario 2: Georgia Office of Planning and Budget (OPB) Population Projections and OPB-Based Employment Projections (2020 to 2050)

ARC population and employment projections were prepared by ARC's Research and Analytics Division (RAD) for use by the District for the purpose of water demand forecasting as part of the 2017 Plan Update. ARC provided county-level population and employment projections that were calculated using a Regional Econometric Models Inc. (REMI) econometric model. County level projections were reviewed by Metro Water District jurisdictions and adjusted to account for factors driving future growth that are not captured by the REMI model.

OPB population projections were prepared in 2015 by the University of Georgia's Carl Vinson Institute of Government using a traditional population cohort-component model. OPB and ARC used different methodologies for their projections, and OPB did not provide future employment forecasts. Therefore, corresponding future employment forecasts for the OPB population projections were developed by ARC's RAD using a simple share allocation method. A ratio of population to employment for each year by county was calculated using the standard REMI projection per county. This ratio was then applied to the OPB population number to create an annual employment projection for each county.

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, and the District developed projected water demand and wastewater flows using both projection scenarios to improve forecast reliability. The water demand and wastewater flow forecasts are described in Sections 4.2 and 4.3.

Table 4-1. Population Projections by County

County	ARC Population Projections (Scenario 1)				OPB Population Projections (Scenario 2)			
	2020	2030	2040	2050	2020	2030	2040	2050
Bartow	130,924	160,133	178,780	189,569	108,763	118,274	125,461	131,085
Cherokee	270,994	336,152	394,907	437,370	265,020	331,015	406,740	494,713
Clayton	283,792	304,371	327,266	350,555	282,488	302,823	315,351	321,509
Cobb	726,369	799,383	893,279	969,932	781,311	863,236	930,414	984,089
Coweta	165,321	204,744	235,587	256,038	152,575	182,430	213,856	247,779
DeKalb	725,746	789,454	870,176	945,468	756,138	800,302	824,638	835,063
Douglas	148,812	175,224	201,144	220,545	155,959	185,446	215,834	247,930
Fayette	109,427	124,558	140,809	148,739	114,379	122,584	127,011	129,033
Forsyth	255,412	356,079	431,478	468,230	245,429	334,694	450,066	597,255
Fulton	1,050,286	1,143,594	1,235,645	1,310,110	1,104,788	1,278,928	1,453,507	1,631,265
Gwinnett	927,056	1,073,102	1,239,115	1,392,162	985,396	1,176,845	1,375,267	1,581,299
Hall	234,487	287,486	330,425	362,697	210,468	244,958	280,791	318,828
Henry	256,188	311,014	353,232	379,989	241,568	289,270	339,799	395,121
Paulding	169,951	213,806	259,524	297,884	170,901	209,745	253,980	304,621
Rockdale	96,909	113,320	129,993	145,344	95,285	106,944	116,872	126,086
Total	**5,551,674**	**6,392,420**	**7,221,360**	**7,874,632**	**5,670,468**	**6,547,495**	**7,429,586**	**8,345,677**

Table 4-2. Employment Projections by County

County	ARC Employment Projections (Scenario 1)				OPB-based Employment Projections (Scenario 2)			
	2020	2030	2040	2050	2020	2030	2040	2050
Bartow	62,524	69,819	76,352	82,193	56,867	60,238	64,315	67,420
Cherokee	95,421	108,787	123,123	128,021	93,318	107,124	126,812	144,806
Clayton	187,706	201,227	216,228	231,625	186,843	200,204	208,356	212,433
Cobb	526,073	581,725	641,877	699,093	565,865	628,192	668,561	709,297
Coweta	64,037	71,972	79,668	86,453	59,100	64,128	72,319	83,664
DeKalb	524,712	573,647	625,031	679,851	546,685	581,529	592,322	600,463
Douglas	71,786	81,812	91,924	100,510	75,234	86,585	98,637	112,990
Fayette	84,908	93,954	102,838	111,192	88,750	92,465	92,761	96,461
Forsyth	85,801	100,872	115,834	134,805	82,447	94,814	120,824	171,952
Fulton	1,098,358	1,182,107	1,268,878	1,360,794	1,155,354	1,321,998	1,492,600	1,694,373
Gwinnett	488,390	549,702	611,597	671,565	519,125	602,845	678,798	762,803
Hall	118,756	133,564	147,120	160,535	106,591	113,806	125,021	141,118
Henry	96,029	107,685	118,775	127,670	90,549	100,156	114,258	132,754
Paulding	54,898	63,544	72,732	80,089	55,205	62,337	71,178	81,900
Rockdale	54,289	61,027	67,890	74,363	53,379	57,593	61,037	64,510
Total	**3,613,688**	**3,981,444**	**4,359,867**	**4,728,759**	**3,735,312**	**4,174,014**	**4,587,799**	**5,076,944**

4.2 Water Demand Forecasts

4.2.1 Methods

Water demand forecasts for the Plan Update were generated with the same approach used for prior versions of the Plan. The water demand forecasts are mainly a function of two variables: (1) future projections of population and employment, and (2) future water use by residents and employees. The latter category includes assessment of specific projections of future per capita water use, future per employee water use and water conservation impacts and adjustment of the total demand to account for potential uncertainty in projecting the future. The methodology is discussed below.

The District employed the Demand Side Management Least Cost Planning Decision Support System (DSS) Model computer model tool developed by Maddaus Water Management to develop the water demand forecasts. This model, which was developed in 1999 and is continually updated, was also used for the 2003 Plan and 2009 Plan Update. The projections developed for the 2017 Plan Update include an additional element of analysis that was not used in previous projection calculations. To account for the variability of key forecast determinants, an uncertainty factor, which progressively increases to 13 percent in 2050, was applied to the base water demand forecasts for each county. The key forecast determinants used in this uncertainty analysis included population growth rate, employment-to-population ratio, per capita residential water use and per employee commercial water use.

The DSS Model was used to forecast water demand for the 15 District counties for 2015 through 2050. The DSS Model includes a conservation component that quantifies savings from existing efficiency standards (for example, plumbing codes and appliance standards) and active conservation programs over time. Only conservation impacts from existing efficiency standards were assessed for the 2017 Plan Update. Conservation from existing efficiency standards refers to water savings resulting from customer actions and activities that do not depend on direct involvement with utility conservation programs. These activities are required by the current plumbing codes and appliance standards: (1) natural replacement of existing plumbing fixtures and appliances with water-efficient models, and (2) installation of water-efficient fixtures in new buildings and retrofits in existing buildings. The forecasts in this Plan consider potential water savings from existing efficiency standards that are implemented over time.

The steps in the DSS Model process are illustrated on Figure 4-1. Using two distinct approaches, “top-down” and “bottom-up,” the DSS Model calculates anticipated indoor and outdoor water demands for each customer category: single-family residential, multifamily residential, commercial, industrial, institutional and other categories, as established by the local water provider. The “top-down” approach breaks overall water usage by total consumed/billed, by customer category and by indoor and outdoor use. The “bottom-up” approach examines the specific end uses of water (for example, toilets, showers, faucets and irrigation) and the frequency of those end uses. The model aggregates the specific end uses to calculate total water use for each customer category. Each county’s specific conditions were calibrated using this approach. The following sections describe the water demand forecasts methods in more detail.

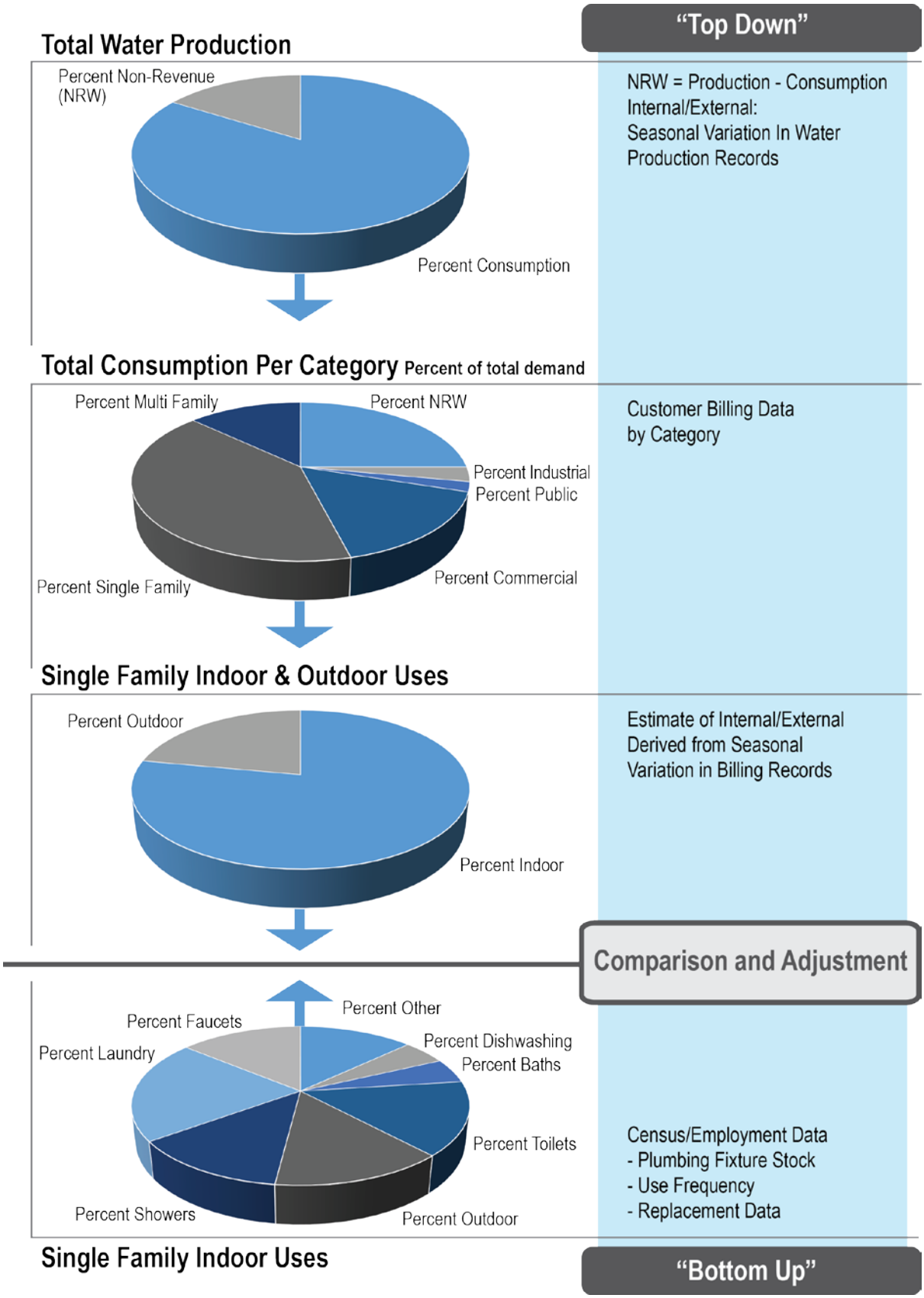


Figure 4-1. DSS Model Overview

Data Collection

Water demand forecasts for the District were based on three main data inputs:

1. Population and employment forecasts (presented in Section 4.1)
2. Water billing, production and withdrawal data
3. Plumbing fixture and appliance stock (by county)

The second input enables the model to build a water use profile by customer category for existing conditions. The first input is used to project current unit-based demands forward through the planning horizon. The third input is used to quantify the expected reduction in current water use trends based on the conversion of inefficient plumbing fixtures and appliances as a result of the current requirements of the plumbing code and appliance standards (existing efficiency standards). Other demographic data used for the model were obtained from the 2010 decennial U.S. Census and 2013 U.S. Census estimates.

Water Billing, Production and Withdrawal Data

Water use data were obtained from local water providers in the District. These data included customer billing (water use data) by customer category, water withdrawals, water production, water loss audits, maximum day demands, records of abnormal years and planning documents, if available. Figure 4-2 shows the process by which water is conveyed from its source to its end use and how the provided billing data were separated into various components for further analysis. Water utility data were collected to take into account water sold between counties. In cases where more than one water utility exists in a county, the billing data from those utilities were combined to support county-level calculations.

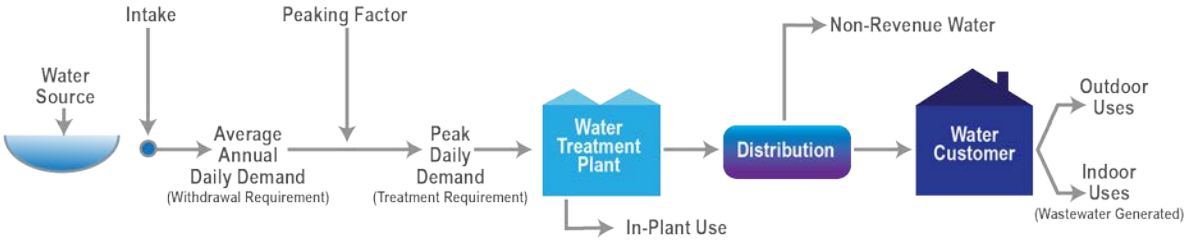


Figure 4-2. Water System Diagram

These data were used to develop estimates of water demand per account for each customer category and to calculate a forecast baseline for county-level water use totals. The forecast baseline of water use for each county in the District is shown in Table 4-3 in AAD-MGD. The baseline use estimates were based on data from 2010, 2011, 2012 and 2014, as available. Rainfall totals in 2013 were much higher than normal, and water demands that summer were lower than normal. In order to create a representative baseline demand, demand data for 2013 were removed from the baseline calculations. Baseline water use in the District incorporates the District's historical and ongoing water conservation program and existing plumbing codes and appliance standards. In order to reflect the enhanced efficiency and conservation effects, only the most recent several years of data were included in the baseline calculation.

Table 4-3. Municipal Water Demand Baseline per County (AAD-MGD)

County	Baseline Water Demand (AAD-MGD)
Bartow	27.49
Cherokee	19.89
Clayton	25.02
Cobb	71.31
Coweta	13.65
DeKalb	72.95
Douglas	12.83
Fayette	11.77
Forsyth	22.65
Fulton	142.67
Gwinnett	84.42
Hall	20.24
Henry	23.66
Paulding	12.77
Rockdale	13.15
Total	**574.47**

Note:
These baseline demands account for all people and jobs in each county, not reflective of water source location, or WTP production. They account for self-supplied, as well as publicly supplied, and include losses due to production and distribution, if applicable.

Non-revenue Water

The forecast baseline water demands include NRW. Estimates of NRW were compiled using water loss audits from each water provider and compiled withdrawal/production and consumption data. NRW and water loss are indicators of the efficiency of a water distribution system. NRW is defined by the International Water Association (IWA)/American Water Works Association (AWWA) as the total water in the system (including water produced and imported) minus the total billed consumption. It is the water that does not provide revenue to the local water provider.

NRW can be subdivided into three categories: unbilled authorized, apparent losses and real losses. Unbilled authorized uses include fire-fighting, hydrant flushing, street cleaning and public fountains. Apparent losses include meter inaccuracies, data errors and unauthorized consumption (theft or illegal connections). Real losses include physical losses from any type of leakage, breakage or overflow. For this Plan Update, NRW and water loss were determined using the withdrawal/production and consumption data and verified using the system-specific water audits. The IWA/ AWWA methodology that defines NRW and water loss is a new national standard, and as it becomes more widely understood and used by water systems, more complete local data should become available. Although the NRW and water loss information has limitations, it is important to highlight that the integrity and quality of the data provided by the local water providers were more robust and complete compared to that used for previous versions of the Plan. The forecast baseline

for water demands also accounts for production losses during the water treatment process. These losses were accounted as part of the NRW.

Consumption by Customer Service Category

The local water provider production data is broken out by customer category (such as single-family residential, commercial and industrial) and used along with NRW and water loss data to create a District water use profile (Figure 4-3). With the demand per account estimate for each customer category, the number of accounts was used to calculate the total baseline demand in each county. In cases where all the major water suppliers within each county provided their complete billing data, the number of accounts was taken directly from the data. In cases where part or all of the billing data were unavailable, the number of accounts was estimated using 2010 and 2013 U.S. Census data or extrapolated from the water demand modeling conducted for previous versions of the Plan, relative to any population or employment increase.

A self-supplied customer category was included for counties with a historically significant population using private wells. Self-supplied populations were calculated from the 2003 Plan water demand modeling efforts and data from the U.S. Census for 2010 and 2013.

Residential water use, including single-family and multifamily residential use, accounts for 54 percent of the District's total water use. Figure 4-4 shows the water use profile for each county in the District. Table 4-4 shows the resulting baseline per capita and per employee uses for residential single-and multi-family, as well as other non-residential uses, including indoor and outdoor use. Baseline per capita water use was calculated using the years 2010, 2011, 2012 and 2014. As such, and because of the declining per capita trend, this number may be higher than the current per capita use. The use of conservative baseline per capita estimates allows for reasonably conservative planning and takes into account the interannual variability in water use. Figure 4-5 summarizes the District's Single Family End Uses, which were applied to calibrate the model as described in the Modeling and Analysis section.

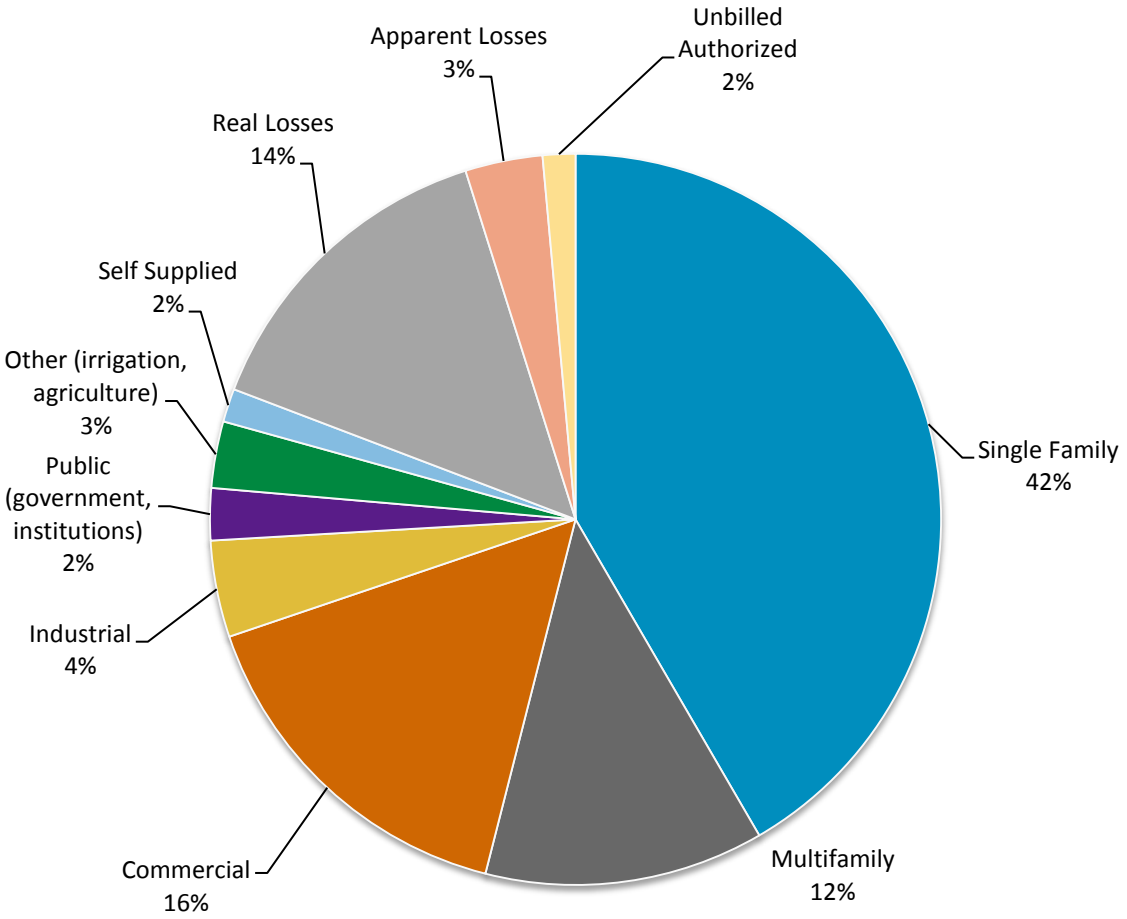


Figure 4-3. Water Use Profile, District Baseline

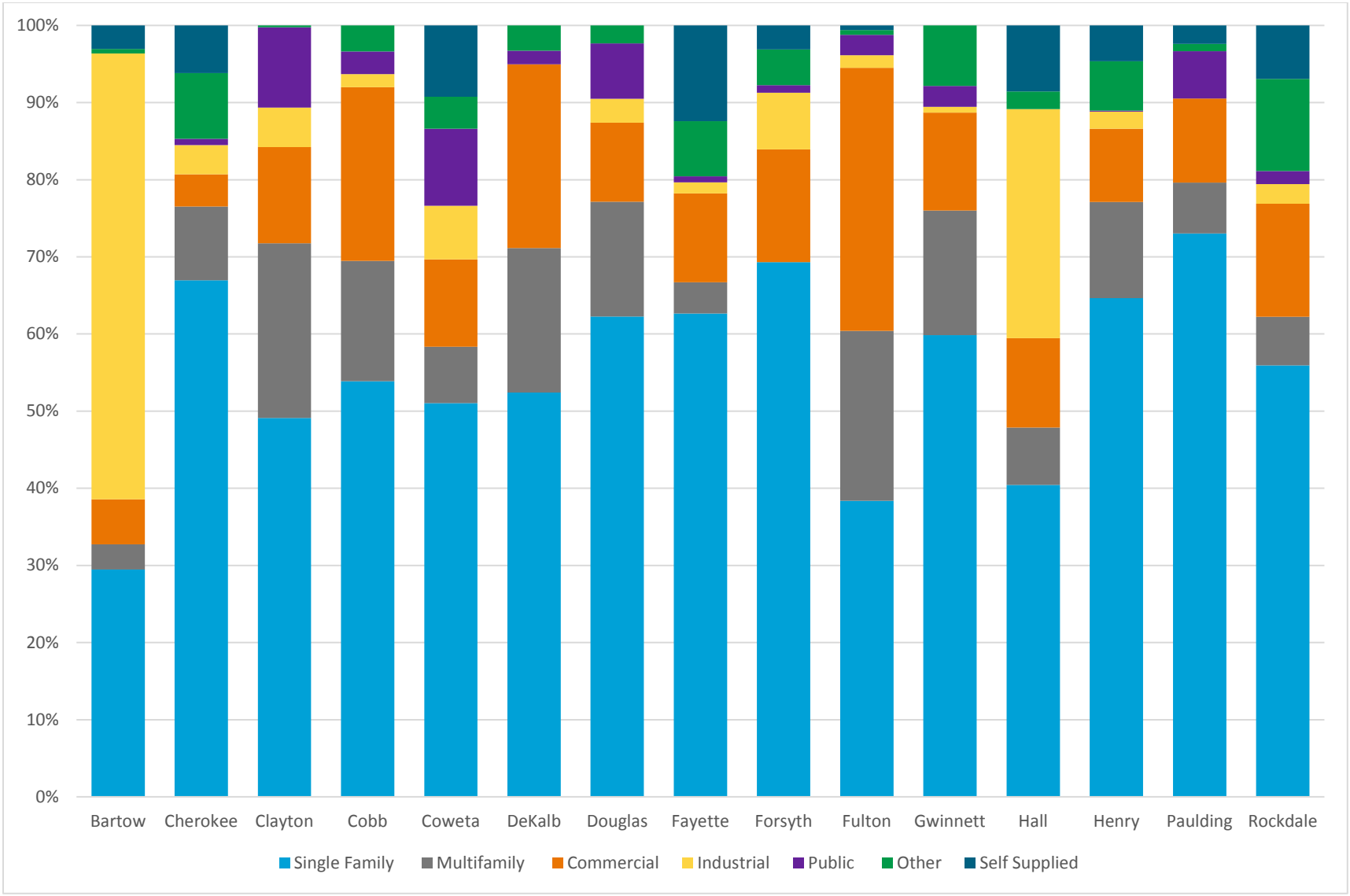


Figure 4-4. County-Level Water Use Profiles, District Baseline

Table 4-4. Baseline Water Use Profile by County (GPCPD)

County	Baseline Total System Use (gpcpd)[a]	Baseline without NRW (GPCPD)[b]				Single-family Residential (GPCPD)[c]				Multifamily Residential (GPCPD)[c]				Non-Residential (gallons per day per employee)[c]			
		Baseline Indoor	Baseline Outdoor[e]	Baseline % Outdoor	Baseline Total Use	Baseline Indoor	Baseline Outdoor[e]	Baseline % Outdoor	Baseline Total Use	Baseline Indoor	Baseline Outdoor[e]	Baseline % Outdoor	Baseline Total Use	Baseline Indoor	Baseline Outdoor[e]	Baseline % Outdoor	Baseline Total Use
Bartow	250	142	31	18%	174	54	12	18%	67	52	11	17%	63	177	38	18%	215
Cherokee	82	52	16	24%	68	47	12	20%	59	42	4	9%	46	17	16	48%	33
Clayton	90	71	10	12%	81	57	5	8%	62	53	4	6%	57	27	9	24%	36
Cobb	96	71	17	20%	88	53	11	18%	64	52	7	12%	59	29	11	26%	40
Coweta	95	69	16	19%	85	51	10	16%	60	49	5	9%	54	50	19	27%	69
DeKalb	99	64	14	18%	78	49	12	20%	61	44	3	6%	47	26	8	23%	33
Douglas	90	59	13	17%	72	56	9	13%	65	42	7	14%	49	25	11	31%	36
Fayette	106	67	31	32%	98	58	24	29%	82	51	9	15%	59	16	12	42%	28
Forsyth[d]	106	57	25	30%	82	43	16	28%	60	NA	NA	NA	NA	40	23	36%	62
Fulton	138	86	18	17%	103	60	10	14%	70	50	9	15%	58	31	8	21%	40
Gwinnett	93	64	14	18%	78	54	9	15%	63	48	5	9%	53	25	13	34%	37
Hall	100	67	18	21%	84	44	12	22%	56	46	4	8%	50	54	15	22%	69
Henry	104	60	18	23%	78	52	14	21%	66	51	7	11%	58	23	14	39%	37
Paulding	82	50	12	19%	62	42	10	19%	51	40	9	19%	49	28	8	21%	36
Rockdale	144	82	20	19%	102	60	14	19%	75	51	8	14%	59	46	12	21%	58
Weighted Average[f]	**108**	**70**	**17**	**19%**	**87**	**53**	**11**	**17%**	**64**	**46**	**6**	**11%**	**52**	**32**	**12**	**28%**	**44**

[a] The baseline total per capita use was calculated using the baseline water demand estimates and the average population estimates. This column includes NRW.
[b] Includes self-supplied, does not include NRW.
[c] Publically supplied water and population only
[d] Billing data for Forsyth County include multifamily in single-family category.
[e] Outdoor use is defined as all use above the winter minimum level.
[f] Weighted average is based on population.
GPCPD = gallons per capita per day

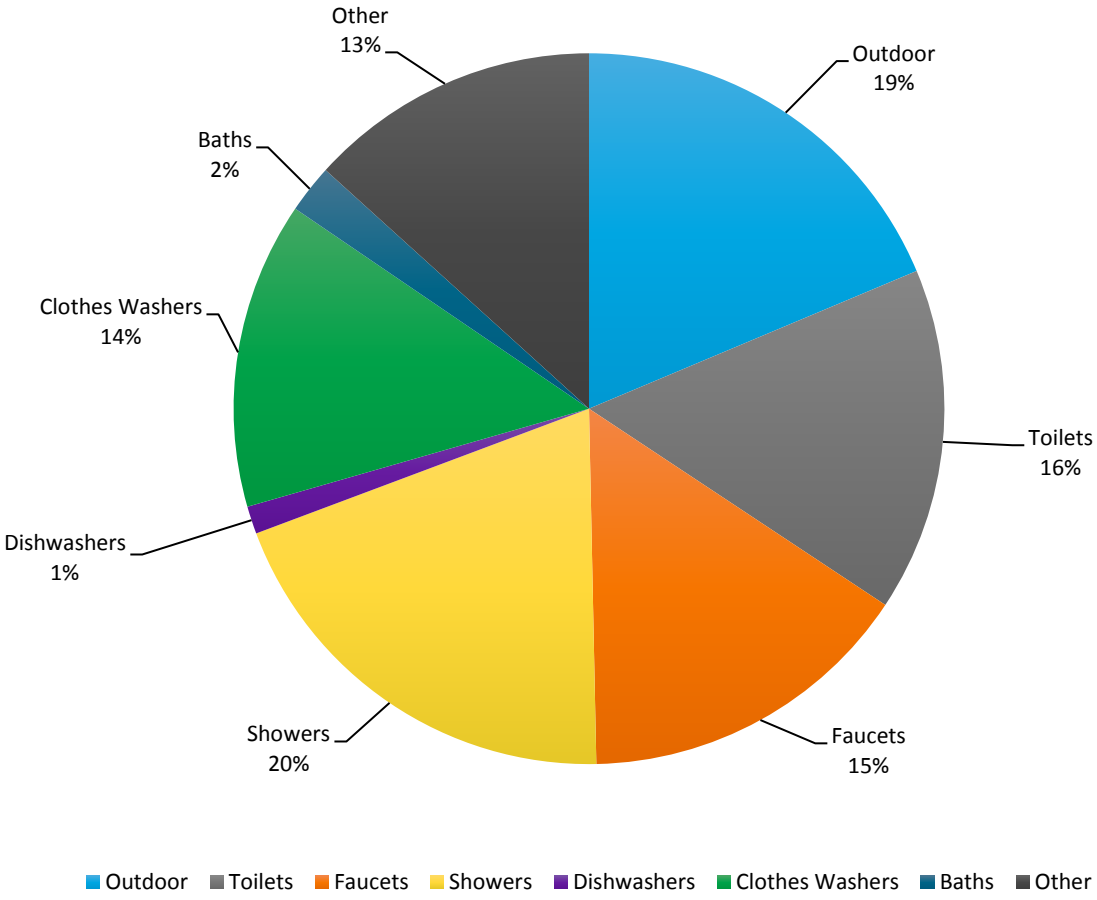


Figure 4-5. Single Family End Uses, District Baseline

Plumbing Fixture Stock

Plumbing fixture stock was estimated from housing age data provided by the 2010 decennial U.S. Census, 2013 U.S. Census estimates and the implementation status reports developed by the District with input from its member jurisdictions. It was adjusted based on a projected replacement rate that estimated the rate of installation of more efficient fixtures, as described below.

The types of plumbing fixtures installed in houses and other buildings play a large role in current and forecasted indoor water use. Toilets are historically the largest indoor water use, and therefore, the analysis of plumbing stock is focused on toilet replacement. Counties with more recent development, such as Forsyth and Paulding, are estimated to have low levels of inefficient toilets. Alternatively, counties that developed more heavily in past decades, such as Fulton and DeKalb, have a higher percentage of inefficient toilets. Therefore, counties with large percentages of high flush toilets have a higher water savings potential in the future from the natural replacement of fixtures due to plumbing code. Estimates for existing types of toilet fixtures by county are shown on Figure 4-6. A decrease in use can be attributed to the conservation and efficiency programs implemented across the District. One such example is retrofits on reconnection as implemented by DeKalb County.

The housing stock also allows for estimates of other water using fixtures and appliances to be determined. In addition to toilets, these estimates were developed for urinals, faucets, and washing machines.

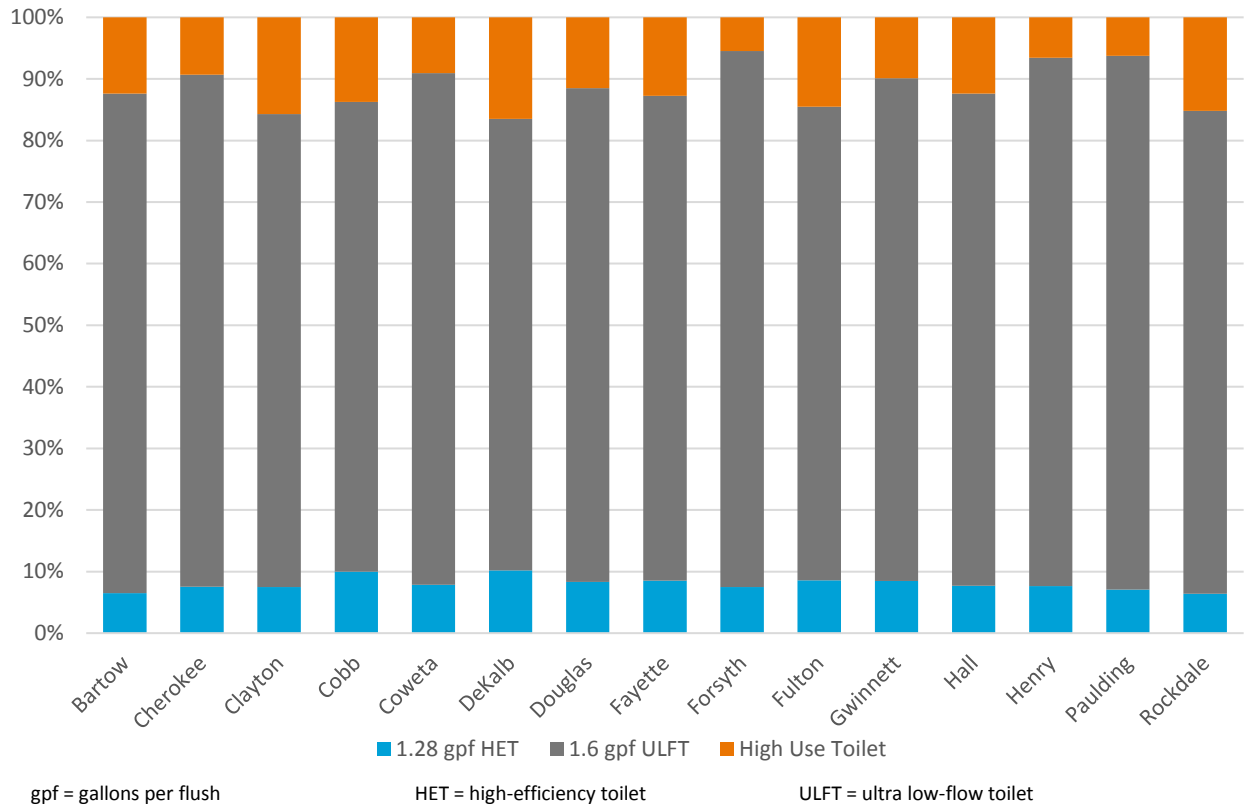


Figure 4-6. Toilet Fixture Estimates by County, District Baseline

Analysis

The total demand for each county was estimated based on gallons-per-day per-account unit-based demands for each customer category and the number of customer accounts. In most cases, the numbers of accounts were taken directly from the data provided by the water utilities. Since there is no standard billing category system in place in the District, common categories were used across the District for comparative purposes. The main categories were:

- Single-Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional

Other categories were included based on the billing data submitted by the water utilities. These included categories for separately metered irrigation use and individual industries (for example, food processing and beverage production). These categories were aggregated under the non-residential category in Table 4-4.

To forecast self-supplied, a one percent annual conversion from self-supplied water to water utility service was assumed through the forecasting horizon. In some cases, this annual conversion rate was lowered to 0.5 percent based on feedback from the water utilities.

The bottom-up analysis considered end uses of water and was conducted to confirm and adjust the top-down water use estimates. For this analysis, the initial estimates for fixture use (frequency and volume) were obtained from the Water Research Foundation study, “Residential End Uses of Water” (Version 2, 2016, #4309). Table 4-5 lists end uses, share of total use, frequency of use factors and average volume per

use for a single-family account, based on the Water Resources Foundation study. These initial end use estimates were compared to the existing stock of plumbing fixtures in each of the counties from the top-down analysis. For instance, counties with a larger percentage of older homes have a larger portion of indoor use attributed to toilet flushing than counties with a higher percentage of new development.

Table 4-5. National Average Single Family Indoor Water End Uses – Water Research Foundation

End Use	Share of Total Indoor Water Use[a]	GPCPD	Average Number of Uses per Capita per Day[a]
Toilets	24%	14.2	5.05 flushes
Washing Machines	16%	9.6	0.37 loads
Shower	19%	11.1	0.75 showers and baths
Faucet	19%	11.1	8.1 minutes
Leaks	13%	7.9	--
Other Domestic	4%	2.5	--
Bath	3%	1.5	--
Dishwasher	1%	0.7	0.1 loads
Indoor Total	**100%**	**58.6**	--

[a] Data Source: Water Research Foundation, 2016

Forecasted demands for the planning period (2015 to 2050) account for the effects of the existing state and federal plumbing codes and appliance standards. These include the National Energy Policy Act of 1992, Georgia Water Stewardship Act of 2010 and the EPA ENERGY STAR program. These codes and standards apply to a broad range of plumbing fixtures and appliances, but those considered in the DSS Model analysis for the 2017 Plan Update were toilets, urinals, showerheads and washing machines.

The bottom-up end use analysis supports adjustment of water demand forecasts to account for the effect of existing efficiency standards due to the implementation of the Georgia Water Stewardship Act and the plumbing and building codes. Over time, the code and standards gradually have and will continue to reduce indoor per capita water use because they will result in a growing percentage of homes and buildings with high-efficiency fixtures. The forecast demands that include water savings due to existing efficiency standards are referred to as the "with enhanced efficiency" demand.

The savings from enhanced efficiency standards reduce the baseline water demand forecast for each county through 2050. The savings per county vary between 9 and 11 percent depending on the existing age of housing stock and population growth. Overall, the District-wide savings from enhanced efficiency standards amount to a 10 percent reduction over baseline by 2050. The estimated rates for natural replacement due to enhanced efficiency standards (that is, plumbing codes and appliance standards) that were used in the demand forecast model are presented in Table 4-6. Specific water savings resulting from enhanced efficiency standards vary by county depending upon the demographics of each county and its current share of various flow fixtures in existing dwellings and businesses. The calibration of the top-down and bottom-up analyses in the model generated estimates of typical single-family residential end uses.

Table 4-6. Current Plumbing and Appliance Standards and Estimates of Natural Rate of Plumbing Fixture and Appliance Conversion

End Use	Current Plumbing Code	Natural Replacement Rate[a]
Toilets	≤ 1.28 gpf[b]	2% per year
Urinals	≤ 0.5 gpf[b]	2% per year
Showerheads	≤ 2.5 gpm[c]	4% per year
Washing Machines	19 gallons per load or less	10% per year[d]

[a] Source: Water Research Foundation, 2015

[b] Georgia Water Stewardship Act of 2010 applies to toilets and urinal standards of 1.28 and 0.5 gallons per flush (gpf)

[c] National Energy Policy Act of 1992 applies to showerhead standard of 2.5 gallons per minute (gpm).

[d] EPA, 2012

Uncertainty Analysis

Water demand forecasts that will be used for water resource planning purposes must be reasonably conservative, because it takes many years to plan, develop, and construct the infrastructure necessary to meet future water needs. Any projection of future water demand, however, is subject to some uncertainty because the drivers of water use vary over time.

For the 2017 Plan Update, the DSS Model provided forecasts of future water demands by county for each of the population scenarios analyzed. Actual future water use over the long-term (35-year) planning horizon could be lower or higher than these forecasts as a result of variability in the key drivers of water demand, including population growth, employment growth and water use rates. For example, two key water demand drivers include potential shifts in employment sectors and job growth across the region.

Because the District needs to provide reasonably conservative projections of water demands, an "uncertainty factor" was used to adjust water demand projections to account for potential variability. This uncertainty factor was derived by analyzing historical variability relative to four water demand drivers:

1. Population growth rate
2. Employment/population ratio
3. Per capita residential water use
4. Per employee commercial water use

Probability distributions based on historical data were created for each demand driver and truncated to remove unrealistic extremes. Then, a Monte Carlo analysis (50,000 simulations) was conducted to determine future water demand probabilities based on the observed historical variability in demand drivers. The results of this Monte Carlo analysis were used to estimate the range of probabilities around the median water demand forecasts.

It is industry best practice to select a level of uncertainty above the median probability for water demand and supply planning. Many large local and regional planning entities, such as Seattle, Tacoma and Tampa Bay, use somewhere between the 60th and 75th percentile for water demand forecasting. The 65th percentile of the water demand forecast was used to calculate the uncertainty factor that was applied to each individual county. For each county, this resulted in an increase in water demands of approximately three percent at the start of the projections that grew to approximately 13 percent for the 2050 projections.

4.2.2 Water Demand Forecasts with Enhanced Efficiency Standards and Uncertainty Analysis

Using the methods described above, the model generated water demand forecasts for the District for the baseline through 2050. Table 4-7 presents the county-level water demand forecasts. As noted above, the baseline was calculated based on data from 2010, 2011, 2012 and 2014. The forecasts are adjusted to reflect the effects of efficiency standards and the uncertainty factor. The forecasts are reported in terms of AAD-MGD basis.

Figure 4-7 summarizes the District population projections and water demand forecasts. It demonstrates how the water demand forecasts have decreased from the previous versions of the Plan. The availability of better data for the 2017 Plan Update produced a more reliable set of water demand forecasts. As discussed in Section 4.1, the water demand forecast scenarios are based on two different population projections by ARC (Scenario 1) and Georgia OPB (Scenario 2). Figure 4-7 shows the effect of enhanced efficiency standards by providing two lines for each 2017 Plan Update Scenario: one with the effect of the enhanced efficiency standards (lower line) and one without this effect (upper line).

Table 4-7. Water Demand Forecasts for the District with Enhanced Efficiency Standards and Uncertainty through 2050

County	Baseline Water Demand (AAD-MGD)	2025 Water Demand (AAD-MGD)		2050 Water Demand (AAD-MGD)	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2
Bartow	27.5	36.4	31.4	52.0	40.4
Cherokee	19.9	25.0	24.4	35.2	39.5
Clayton	25.0	28.9	29.1	37.6	33.6
Cobb	71.3	77.1	80.6	98.1	96.0
Coweta	13.7	17.4	16.0	23.7	23.5
DeKalb	73.0	77.5	78.7	95.4	83.2
Douglas	12.8	14.9	15.2	20.0	21.7
Fayette	11.8	12.9	12.8	16.7	14.0
Forsyth	22.7	31.5	29.5	47.9	59.6
Fulton	142.7	155.3	166.4	186.4	227.4
Gwinnett	84.4	96.2	101.2	132.1	145.2
Hall	20.2	25.0	22.7	33.9	31.0
Henry	23.7	29.6	28.1	39.4	41.5
Paulding	12.8	15.6	15.5	23.0	24.0
Rockdale	13.2	15.4	14.8	21.1	18.3
District Total	**574.5**	**658.6**	**666.5**	**862.5**	**899.0**

Note: The Metro Water District provided information comparing water use projections in the Plan with the State of Georgia's 2015 Water Supply Request in a memorandum to the Georgia EPD Director dated May 2, 2017. There is no substantive difference between the projections.

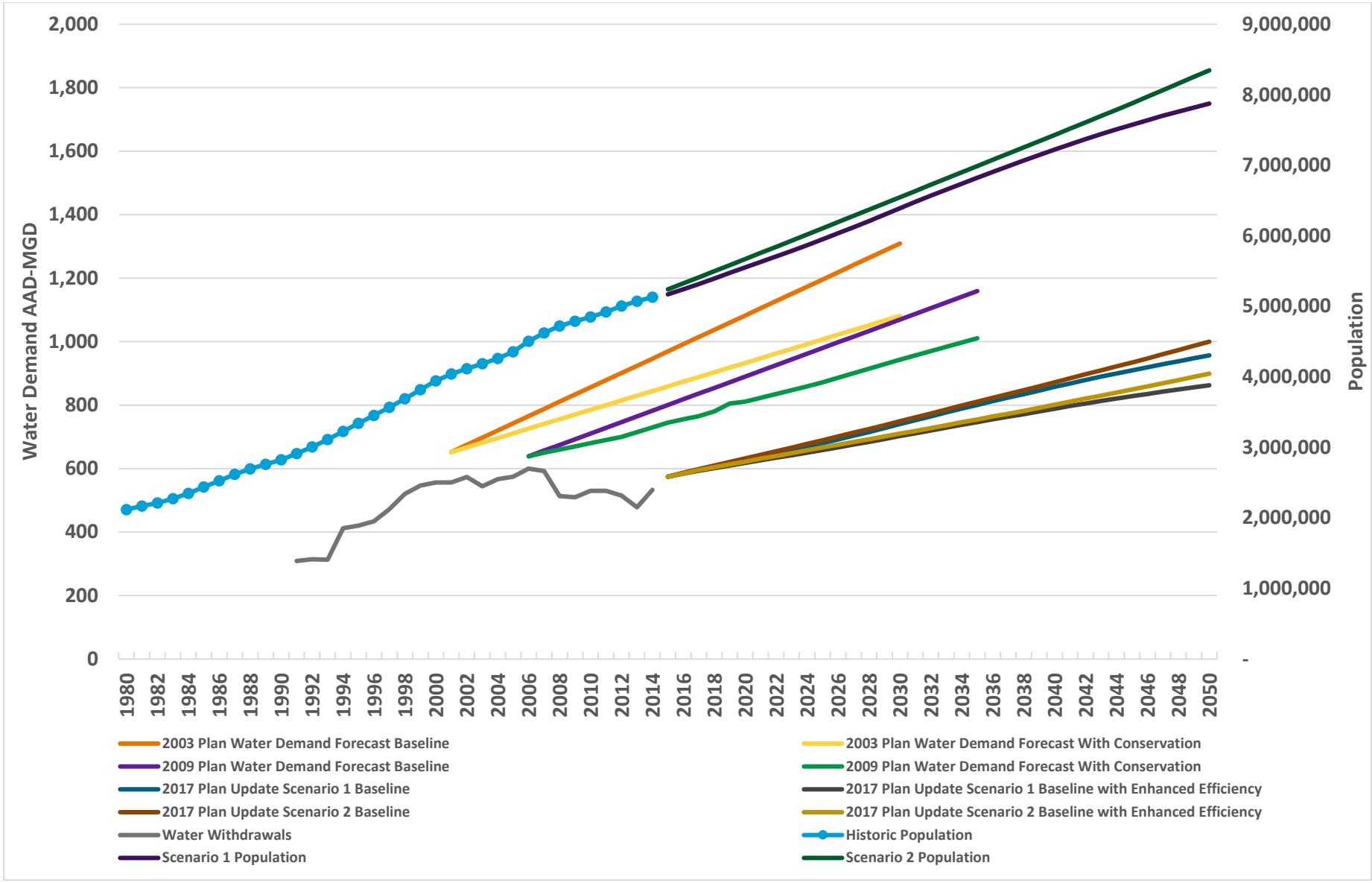


Figure 4-7. Comparison of Water Demand Forecasts for the District

4.3 Wastewater Forecasts

This section explains the methods used to develop the wastewater demand forecasts for the District, and it provides the wastewater demand forecasts for the region through 2050. In summary, in 2050, the District will generate 631 to 667 MGD that will be treated in centralized wastewater systems and 76 to 79 MGD that will be treated by septic systems on an AAD basis. The AAD volume for centralized systems is equivalent to a maximum monthly flow of 788 to 833 MGD. Many counties have current wastewater treatment capacities that exceed the MMF projections for 2050. Data from 2014 show actual discharge flows totaling 390 MGD (AAD) for centralized systems in the District.

4.3.1 Methods

The wastewater flow calculation methods used for this Plan are illustrated on Figure 4-8. 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. In general, the wastewater flow forecasts were calculated based on the water use forecasts.

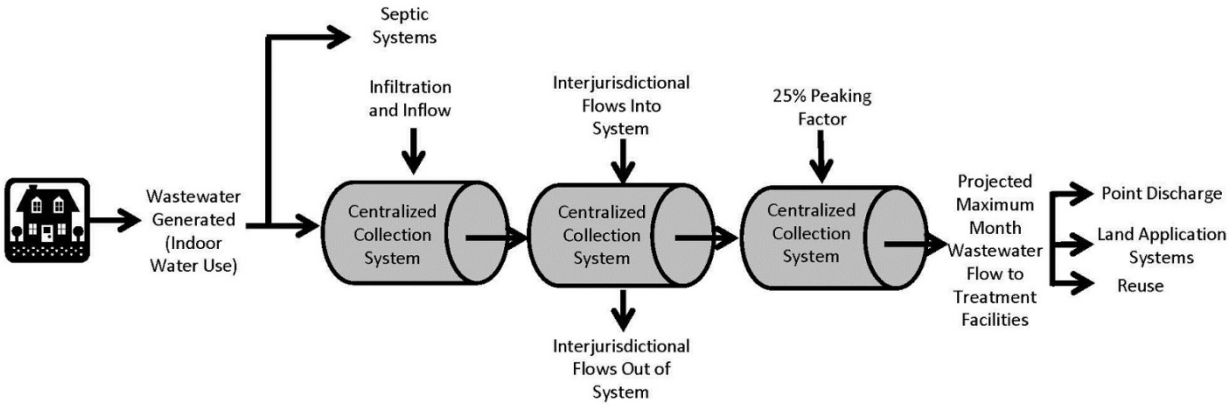


Figure 4-8. Wastewater Flow Calculation

Wastewater Generated

Because outdoor water use does not influence wastewater flows, 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. Two sets of water use projections were developed for this Plan Update, and these scenarios are described in Section 4.1. 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 AAD flows, which are adjusted for peak flows as described below.

Septic Systems

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

The District's 2009 Wastewater Management Plan estimated future septic flows based on an equation that projected the conversion of septic tanks to sewer over time. As a part of this plan update, however, utilities within the District report this has not occurred at the rate previously forecasted. Therefore, for the 2017 Plan Update, future septic system flows were forecasted using a county-by-county approach that accounts for variation among counties in the amount and type of growth.

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 use are provided in Section 4.3.2. The number of single-family residences was based on U.S. Census data from 2010 to 2013.

Next, one of three types of projection estimates was performed for each county:

1. **Urban Counties** (Cobb, Cherokee, Clayton, DeKalb, Forsyth, Fulton and Gwinnett): For these counties, it was assumed that the number of new septic systems will be offset by those transitioning to sewer. Thus, the initial number of septic systems was estimated to remain constant for the 2015 to 2050 planning period for these counties.
2. **Suburban Counties** (Bartow, Fayette, Henry and Rockdale): For these counties, the historical percentage of single-family residences on septic systems was retained through the forecast period (2015 to 2050), reflecting the expectation of new septic systems in the future.
3. **Modified Suburban Counties** (Coweta, Douglas, Hall and Paulding): For these counties, the estimated baseline number of septic systems was modified based on utility input. It was assumed that all residences that have self-supplied water also use septic systems. The remainder of single-family residences on septic systems was calculated based on available water and sewer connection data to reflect the number of water utility customers that are not sewer customers. The future percentage of septic versus centralized sewer was based on utility input regarding expected county development trends.

The septic system projections were modified on a county-by-county basis as necessary to address specific feedback received from individual utilities. Additionally, a confirmation check was performed using data on the number of water accounts and sewer accounts, when available, to assist in validating the septic system estimates.

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 sources other than wastewater flows generated from indoor water use. For the District's 2009 Wastewater Management Plan, a standard industry estimate of 20 percent infiltration and inflow was used for each of the counties; however, based on feedback from District utilities, county-specific infiltration and inflow factors are thought to provide more accurate estimates. County input was reviewed, and initial forecasts were aligned with the trend line of historical flow data from 2006 to 2014 to estimate county-specific infiltration and inflow factors, which were then applied to the county level wastewater forecasts.

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 2006 to 2014. The average of the historical flow data was used as the starting point for each 2015 county-to-county interconnection projection. 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. Flows were added to each county's initial wastewater projections to account for flow entering from other counties, and flows were subtracted to account for flows leaving the county to be treated at another county's facility. In instances where county-to-county agreements include a maximum capacity limit, interjurisdictional flows were capped at that maximum value.

Peaking Factor

Because wastewater treatment facilities are permitted on an average daily MMF basis, it is necessary to add a peaking factor to the AAD flow that was calculated to account for situations in which flow into facilities is greater than normal. The District's 2009 Wastewater Management Plan added a standard 25 percent peaking factor to calculate maximum month average daily flow entering the county's wastewater treatment facilities. For the 2017 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.

4.3.2 Septic System Use Forecasts

The resulting forecasts for wastewater flows to septic systems in the District are provided in Table 4-8. There are two sets of projections based on two different population scenarios, ARC (Scenario 1) and Georgia OPB (Scenario 2), described in Section 4.1. As noted above, the 2009 Plan Update projected that a substantial number of single-family residences on septic systems would convert over time to sewer, but for the 2017 Plan Update, the rate of future conversion was adjusted on a county-by-county basis.

Table 4-8. Forecasted Septic System Flows by County (AAD-MGD)

County	Baseline Septic System Flows (AAD-MGD)	2025 Septic System Flows (AAD-MGD)		2050 Septic System Flows (AAD-MGD)	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2
Bartow	3.6	4.7	3.9	6.1	4.5
Cherokee	4.8	4.8	4.8	4.8	4.8
Clayton	2.1	2.1	2.1	2.1	2.1
Cobb	4.7	4.7	4.7	4.7	4.7
Coweta	4.1	5.0	4.7	6.5	6.4
DeKalb	2.9	2.9	2.9	2.9	2.9
Douglas	2.7	3.0	3.1	4.0	4.3
Fayette	2.8	3.1	3.1	4.1	3.4
Forsyth	4.9	4.9	4.9	4.9	4.9
Fulton	4.1	4.1	4.1	4.1	4.1
Gwinnett	10.4	10.4	10.4	10.4	10.4
Hall	3.9	4.6	4.2	5.8	5.3
Henry	6.0	7.3	7.0	9.5	9.9
Paulding	4.8	4.9	4.9	5.1	5.1
Rockdale	2.5	2.9	2.9	4.0	3.5
District Total	**63.9**	**69.3**	**67.4**	**78.7**	**76.1**

Note:
The two scenarios are based on different population projections, as described in Section 4.1.

4.3.3 Wastewater Flows Forecasts

The resulting wastewater flow forecasts for centralized wastewater systems in the District are provided in Tables 4-9 and 4-10. Table 4-9 provides county level projections of AAD flows in MGD for centralized wastewater systems in 2025 and 2050. Table 4-10 provides county level projections of MMFs in MGD for centralized wastewater systems in 2025 and 2050. In both tables, there are two sets of forecasts based on the two

population projection scenarios, ARC (Scenario 1) and Georgia OPB (Scenario 2), described in Section 4.1. 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.

The wastewater forecasts for the 2017 Plan Update were compared to the forecasts for the 2009 Plan Update. The total centralized wastewater flow projections for 2050 are 16 to 20 percent lower than 2035 projections from the 2009 Plan Update. The decrease in the forecast is primarily due to decreased water demand projections, as well as changes in the assumptions used for septic system conversion to central sewer.

Table 4-9. Wastewater Flow Forecasts for Centralized Wastewater Treatment Facilities (AAD)

County	Baseline Centralized Wastewater Treatment System Flows (AAD-MGD)	2025 Centralized Wastewater Treatment System Flows (AAD-MGD)		2050 Centralized Wastewater Treatment System Flows (AAD-MGD)	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2
Bartow	14.5	19.1	16.7	28.1	22.1
Cherokee	11.0	15.1	14.7	23.1	26.8
Clayton	20.7	24.2	24.4	32.1	28.4
Cobb	65.9	71.5	75.0	91.7	91.7
Coweta	5.4	7.4	6.7	10.8	10.7
DeKalb	35.6	37.3	37.9	45.3	39.5
Douglas	7.4	7.9	8.1	9.5	10.4
Fayette	5.2	5.6	5.6	6.8	5.8
Forsyth	6.7	12.6	11.3	22.3	29.7
Fulton	167.6	180.0	191.0	215.4	247.1
Gwinnett	57.3	66.1	70.1	93.8	104.2
Hall	10.7	13.2	11.9	18.0	16.4
Henry	8.6	10.7	10.2	14.2	14.9
Paulding	3.7	5.3	5.3	9.5	10.1
Rockdale	6.3	7.4	7.3	10.0	8.7
District Total	**426.6**	**483.7**	**496.2**	**630.6**	**666.5**

Note:
The two scenarios are based on different population projections, as described in Section 4.1.

Table 4-10. Wastewater Flow Forecasts for Centralized Wastewater Treatment Facilities (MMF-MGD)

County	Baseline Centralized Wastewater Treatment System Flows (MMF-MGD)	2025 Centralized Wastewater Treatment System Flows (MMF-MGD)		2050 Centralized Wastewater Treatment System Flows (MMF-MGD)	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2
Bartow	18.1	23.9	20.9	35.1	27.6
Cherokee	13.7	18.8	18.3	28.9	33.5
Clayton	25.9	30.3	30.5	40.1	35.5
Cobb	82.4	89.4	93.7	114.6	114.6
Coweta	6.8	9.2	8.4	13.5	13.4
DeKalb	44.5	46.7	47.4	56.7	49.3
Douglas	9.3	9.9	10.1	11.9	13.0
Fayette	6.5	7.0	7.0	8.5	7.2
Forsyth	8.4	15.8	14.2	27.9	37.1
Fulton	209.5	225.0	238.8	269.3	308.9
Gwinnett	71.6	82.7	87.6	117.2	130.2
Hall	13.4	16.5	14.9	22.5	20.5
Henry	10.8	13.4	12.7	17.7	18.7
Paulding	4.6	6.6	6.6	11.9	12.7
Rockdale	7.9	9.4	9.1	12.5	10.9
District Total	**533.4**	**604.6**	**620.2**	**788.3**	**833.1**

Note:
The two scenarios are based on different population projections, as described in Section 4.1.

4.3.4 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 (INTEGRATED-10).

4.4 Watershed Land Uses Changes

As regional population and employment continue to grow, land development will also continue to increase. A trend of continued development is expected in the District through 2050 with the larger land use transitions occurring outside of the urban core areas. Within the urban core areas, increases in density and land use intensity are anticipated due to infill and redevelopment, which is expected to continue and accelerate in future years throughout the region.

Continued land development will be accompanied by consequent increases in impervious surfaces. Impervious surfaces, both natural and manmade, do not allow rainfall to soak or infiltrate into the soil, and rainfall that falls on impervious surfaces runs off to pervious areas or surface waters.

Concurrent with the development of this Plan, ARC developed the Atlanta Region's Plan, described in Section 1.5.3. For that planning process, a Unified Growth Policy Map was developed. While this map does not project *where* future development and growth will occur, it does inform ARC and other regional commission on where policies may be used to direct future growth. Figure 4-9 is a map for the development and growth types for a 20-county area of Metropolitan Atlanta. This map includes five counties that are not in the 15-county District: Spalding (to the southeast), Barrow, Newton and Walton (to the east) and Carroll (to the west).

Additional information on regional land-use and growth policies can be found in The Atlanta Region's Plan. Detailed information on current and potential future land-use can be obtained using local comprehensive development plans and zoning maps.

Overall, historic land cover changes in the future suggest that undeveloped lands, including water/wetlands, forests and agricultural lands, will transition to more developed, urbanized lands with residential and urban land uses. The most significant transitions in land cover are expected to occur outside of the central, urbanized areas of the District, with the largest changes projected in areas that currently have more agricultural and undeveloped lands, including Cherokee, Bartow, Paulding, Coweta, Hall and Rockdale Counties.

As land uses change to accommodate growth, actions such as post-construction stormwater management, design standards, and comprehensive land use planning will be critical to manage stormwater runoff and prevent nonpoint source pollution. More detailed land use characterizations are described in the River Basin Profiles in Appendix A for each HUC-8 watershed.

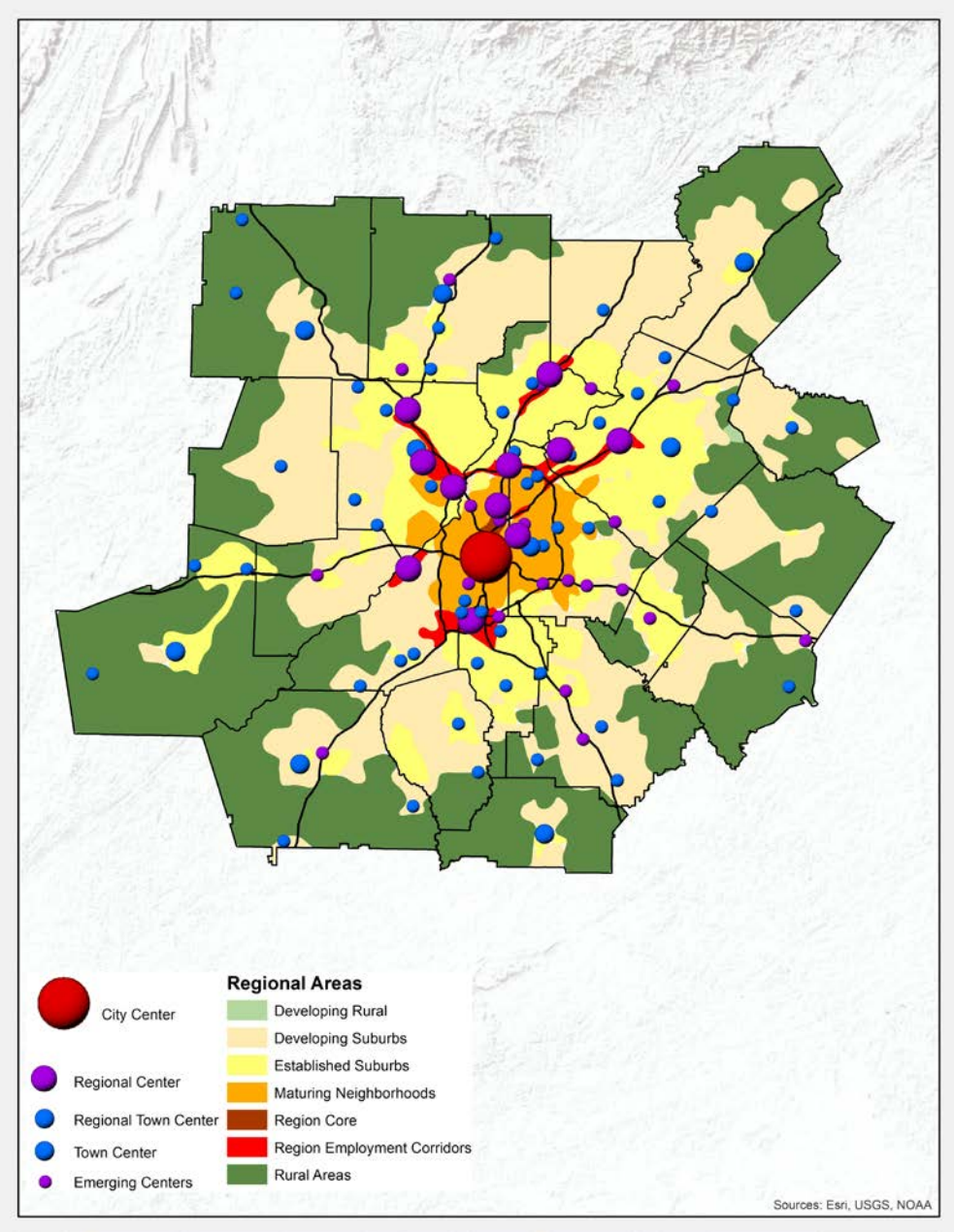


Figure 4-9. Unified Growth Policy Map, The Atlanta Region's Plan
Source: ARC, 2016

SECTION 5

Action Items

Section 5 includes the required Action Items of this Plan. The Metro Water 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 MS4 permits. Furthermore, consistency with Plan requirements is necessary to obtain GEFA grant or loan funding for water resource projects.

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

- 5.1: Integrated Water Resource 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.
- ***Points of Integration:*** Describes the relationship of the Action Item with other planning areas. Responsible parties are encouraged to coordinate with other partners who may see benefits or implications through the implementation of the action items.
- ***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:*** Discusses the rationale for the Action Item.
- ***Implementation Guidance:*** Provides specific guidance on how the Action Item can be performed by the responsible parties.
- ***Considerations for Enhanced Implementation:*** Describes additional, optional actions that a responsible party may take to increase implementation effectiveness. These considerations are optional and,

therefore, are not a component of the Georgia EPD audit process for compliance with this Plan. Nonetheless, local governments and utilities in the Metro Water District are encouraged to consider enhanced implementation. For Action Items related to water conservation and drought management and in jurisdictions where water supply reliability and low flows are a concern, special consideration should be given to the enhanced implementation options.

- ***Opportunities for Technical Assistance:*** Describes how the Metro Water District may support implementation through special programs, projects, guidance documents and research developed as needed and based on funding availability.
- ***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 the table below, 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 EPD on required action item(s).

Small Communities	2014 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)	651	Recommended	N/A	Recommended	Required
Taylorsville (Bartow County)	213	N/A	N/A	Recommended	Required
White (Bartow County)	674	Recommended	N/A	Recommended	Required
Emerson (Bartow County)	1,492	Required	Recommended	Required	Required
Ball Ground (Cherokee County)	1,658	Recommended	Recommended	Recommended	Required
Nelson (Cherokee County)	1,342	N/A	N/A	Recommended	Required
Waleska (Cherokee County)	871	Required	N/A	Recommended	Required
Grantville (Coweta County)	3,145	Required	Recommended	Required	Required
Haralson (Coweta County)	173	N/A	N/A	Recommended	Required
Moreland (Coweta County)	418	N/A	N/A	Recommended	Required
Sharpsburg (Coweta County)	351	N/A	N/A	Recommended	Required
Turin (Coweta County)	336	Recommended	N/A	Recommended	Required
Brooks (Fayette County)	540	Required	Recommended	Recommended	Required
Woolsey (Fayette County)	2,086	N/A	N/A	Recommended	Required
Clermont (Hall County)	915	N/A	N/A	Recommended	Required
Gillsville (Hall County)	246	N/A	N/A	Recommended	Required
Lula (Hall County)	2,867	Recommended	Recommended	Recommended	Required
Rest Haven (Gwinnett County)	62	N/A	N/A	Recommended	Required
Braswell (Paulding County)	379	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 don't have a Municipal Separate Storm Sewer System (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 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 Resource Management Action Items

The Metro Water District has long recognized that water resource management is most effective when strategies are integrated in approach and implementation (see 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 approach can also be seen throughout this Plan in the Points of Integration descriptions in the Action Items, which discuss how implementation of an Action Item may affect related water resource management outcomes.

The integrated Water Resource 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.

ACTION ITEM

INTEGRATED-1: COORDINATED ACTIONS

Intent	Responsible Parties	In Coordination With
To develop and administer a process to regularly coordinate across watershed, water supply, and wastewater actions. **Points of Integration** Coordination across entities involved in water resource management will support attainment of the benefits of integrated management by providing for information sharing and collaboration.	Local Government Local Water Provider Local Wastewater Provider	Elected Officials/Governing Board Stormwater and Watershed Management Staff Site Plan Review Planning and Zoning Legal Counsel Inspection/Code Enforcement/Maintenance Staff County Board of Health Emergency Services

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

Sub-Tasks: Each 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.

Each local government and local water provider shall:

2. Identify source water watersheds within the jurisdiction as well as priority issues and areas for watershed protection actions. 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.

Each local government and local wastewater provider 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 (see Action Items INTEGRATED-8 through INTEGRATED-11).

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

Implementation Guidance: It is recommended that the local governments (i.e. 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 together 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 have

jurisdiction in more than one county, then they should attend the integrated meetings for each county in which they have jurisdiction. The Metro Water 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 or 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 (e.g., 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 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.

Land Use Coordination: It is recommended that responsible parties discuss how local land use and associated growth management decisions and policies impact water supply, water conservation efforts, wastewater management and other infrastructure considerations. Because of these interconnections, strategic land use planning is critical to effective watershed management. The development of Comprehensive Land Use Plans is an important tool for communities to manage future growth and development and the associated impacts on water resource management.

Source Water Watershed Management: It is recommended that the responsible parties discuss how the Part V Environmental Planning Criteria, established by the Georgia Department of Community Affairs (Georgia DCA) and enforced by Georgia EPD, are implemented locally through riparian buffer and lake management requirements to protect drinking water supplies. Local governments must adopt riparian buffers and other measures in compliance with the Part V Environmental Planning Criteria.

Source Water Assessment Plans (SWAPs): It is recommended that the responsible parties discuss risks identified in SWAPs that have been completed for public water systems, as required by the Safe Drinking Water Act. SWAPs include an assessment of the susceptibility of each drinking water supply watershed to sources of potential contamination and provide each supply watershed with a risk-based score. SWAPs may be starting points for identification of potential parameters of concern. Emergency Response Maps may be created for communities with source water supply watersheds, and jurisdictions along major transportation corridors may choose to provide emergency response personnel with maps outlining the source water supply watersheds. First responders to accidents, especially those with spills of hazardous materials, would be able to alert the appropriate water plant(s) of spills so that the intake(s) can be shut down until the threat of pollution has passed. The maps may show the emergency contact information for the water plant(s) associated with each source water supply watershed and may be laminated for field use by emergency responders.

Sewer Lines and Septic System Management: It is recommended that local governments, local wastewater providers and County Boards of Health discuss watershed management challenges that may include water quality problems potentially caused by septic and/or sanitary sewer systems, as well as proactive wastewater system and septic service area planning to support watershed protection. Coordination can address critical areas planning required by Action Item INTEGRATED-9 to identify septic system critical areas and additional management requirements for septic systems in those areas. Prevention of SSOs is also a potential topic for these coordination meetings.

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 (see Action Item INTEGRATED-10).

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Organize coordination meetings more frequently than once per year to maintain effective awareness and collaboration across entities that may not otherwise share information.
- Prioritize communications with other jurisdictions that occur upstream or downstream within shared watersheds or river basins. Consider developing or adding to existing intergovernmental Memorandums of Agreement or Memorandums of Understanding coordination activities under other Action Items, such as long-term ambient or macroinvertebrate bioassessment monitoring (Action Items WATERSHED-10 and WATERSHED-11). Periodic interjurisdictional meetings may allow coordination and discussion on current actions, projects and issues.
- Conduct an annual meeting and more frequent coordination activities related to outdoor grease storage and reporting among FOG inspectors and stormwater managers. This type of coordination may help to identify potential pollutant sources and ensure proper preventative actions.
- Identify, on an annual basis, opportunities for incorporating watershed improvement projects (WIPs) (Action Item INTEGRATED-8) in other maintenance and capital improvement projects to ensure that they can be properly addressed during design. This type of coordination will also support annual reporting associated with MS4 permit requirements and Watershed Protection Plans.
- Engage additional stakeholders for routine coordination on key issues. These stakeholders may include the following:
  - Neighborhood or community service groups
  - Developers
  - Other jurisdictions
  - Partnering corporations and businesses
  - Environmental groups
  - Federal or state agencies

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Assisting communities in developing draft meeting materials. District staff may also be available to attend coordination meetings.
- Facilitating discussions between required and optional parties, if requested.

Resources:

- Georgia Water Toolkit, http://www.georgiaplanning.com/watertoolkit/

- 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, http://www.georgiawildlife.com/rare_species_locations
- Georgia Department of Natural Resources, Environmental Protection Division, Chapter 391-3-16, Rules for Environmental Planning Criteria, http://www.dca.state.ga.us/development/planningqualitygrowth/programs/downloads/EPC.pdf
- Georgia EPD Source Water Assessment and Protection Implementation Plan, March 28, 2000, https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/swapfinal.pdf

ACTION ITEM

INTEGRATED-2: LOCAL WATER MASTER PLANS

Intent	Responsible Party	In Coordination With
To plan for future water supply, treatment and distribution needs in a manner consistent with this Plan. **Points of Integration** Coordination of local water and wastewater master planning supports integrated water resource management through alignment of water and wastewater forecasts and consideration of connections between water and wastewater management decisions.	Local Water Provider	Planning and Zoning Local Wastewater Provider County Board of Health Neighboring Jurisdictions

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 2050).
2. Update the local water master plan every five 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 entitled Climate Resiliency. This section shall discuss infrastructure potentially vulnerable to extreme weather events and identify adaptive strategies for mitigating impacts.

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

Implementation Guidance: Typically, local water master plans include the following elements:

Introduction – Describes the planning period, program objectives, regulatory framework and key stakeholders involved in the planning process.

City/County Characteristics & Demographics – Describes the population, land use, 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.

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 and estimated costs and provides a capital improvements phasing plan for the recommended alternative.

Climate Resiliency – Identifies infrastructure vulnerable to extreme weather events and adaptive strategies for mitigating impacts.

Additional elements that may be considered during the development of local water master plans include the following:

- Source water supply watershed or wellhead protection areas
- Water reuse management
- Targets for water withdrawals and/or consumptive use
- Interconnections facilities
- Cross-connection program
- Drought and emergency plans

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 Maintenance (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 Comprehensive 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 inter-jurisdictional 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 inter-jurisdictional 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Coordinate local water master planning with local wastewater master planning (Action Item INTEGRATED-4), as well as with the development of local watershed studies and plans, such as watershed assessments and watershed protection plans.
- Coordinate ongoing monitoring for this Action Item, with the monitoring for Action Items WATERSHED-10 and WATERSHED-11 and other local monitoring efforts to maximize the benefit of the local investment.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Facilitating discussions between water and wastewater providers, if requested.
- Developing a workshop on the preemptive adaptation measures recommended in the Metro Water District 2015 Utility Climate Resiliency Study (or the most recent update).
- Establishing climate tracking protocols and identifying potential trigger levels for adaptive measures in coordination with stakeholders.

Resources:

- Georgia Association of Water Professionals (GAWP) Best Practice Master Planning Guidelines & Resource Document, December 2015, https://c.ymcdn.com/sites/www.gawp.org/resource/resmgr/Master_Planning_Guidelines/GAWP_Master_Planning_Guideli.pdf
- GAWP Water Master Planning Sample Table of Contents, December 2015, http://c.ymcdn.com/sites/www.gawp.org/resource/resmgr/Master_Planning_Guidelines/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
- Georgia Comprehensive State-wide Water Management Plan, 2008, http://www.georgiawaterplanning.org/pages/more_information/state_water_plan.php

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ACTION ITEM

INTEGRATED-3: UPDATE LOCAL EMERGENCY WATER PLANS

Intent	Responsible Party	In Coordination With
To ensure all local water providers are prepared for potential water emergencies by having an up-to-date emergency water supply plan. **Points of Integration** Strong local emergency water plans will consider not only emergency water supplies, but also integrated concerns such as impacts to potential wastewater infrastructure during emergencies.	Local Water Provider	Neighboring Local Water Providers Elected Officials/Governing Board Local Wastewater Provider

Action Item: Develop or update local emergency water plans to include sufficient emergency water supply sources and detailed steps to modify system operations in order to accept or share water with adjacent local water providers. Review interconnection reliability targets to estimate minimum water supplies for reliability, efficiency and emergencies.

Sub-Tasks: Each local water provider shall:

1. Adopt a written local emergency water plan that defines specific steps required to accept or share water in an emergency.
2. Assess the need for the establishment and maintenance of service connections and share existing regional water supplies, where practicable.
3. Meet interconnection reliability targets and ensure that such interconnections provide needed reliability, efficiency and emergency water supplies.

Description: A detailed local emergency water plan is an essential component of compliance with the federal Public Health Security and Bioterrorism Preparedness and Response Act of 2002. A local emergency water plan is also crucial during droughts when systems may be forced to rely on neighboring local water providers for additional water supply.

Implementation Guidance: A local emergency water plan that addresses the needs of the community and the local water provider should include the following components:

- Procedure to conduct a damage assessment following an emergency and respond to restore full water service
- A system-specific IRT for emergencies
- Clearly identified alternate emergency water supplies
- Coordination with neighboring local water providers and partners to plan to accept or share water as practicable in an emergency
- Procedures for exercise and maintenance of emergency connections

The system-specific IRT should be the estimated annual average daily demand (AAD) that is needed for meeting emergency water needs, including eating, drinking, toilet flushing, firefighting and hospital use. Each local water provider will need to define its own IRT and evaluate other factors affecting water system

reliability, including raw and finished water storage, infrastructure conditions, equipment redundancy and existing interconnection capability. The pipe sizes, approximate locations and lengths for potential interconnections should be refined by hydraulic evaluations. The actual location, pipe size, length and alignment of future interconnections, pumping or pressure reducing arrangements should be determined as part of detailed design.

Each local water provider should evaluate the feasibility and cost-effectiveness of providing multi-directional flows at existing and future interconnections with a pipe diameter greater than or equal to 12 inches. Each local water provider should improve and continuously update its inventory of distribution system components, including location and size of pipes, valves and storage facilities. An updated inventory, including detailed system maps, will be beneficial in locating future interconnection locations and addressing other system maintenance problems, such as pipe breaks and leaks. Distribution system maps can be incorporated into a Geographical Information System (GIS), as is currently done by many water systems in the Metro Water District.

The local emergency water plan should include steps that must be taken to receive water from adjacent water providers or to provide water to another water provider. For example:

- For a receiving local water provider, the local emergency water plan may include: (1) identification of sub-areas within the water system that can be served by other water providers; (2) valving, piping and pumping changes for flow reversal in the identified sub-areas during the water sharing period; (3) procedures for public notice and media announcement of additional water conservation initiatives and potential water quality changes in supplied water; and (4) a process to coordinate with Georgia EPD. If necessary, the plan should also address the need to request variances from the Drought Management Rules, as may be needed for outdoor water use restrictions.
- For the supplying local water provider, the local emergency water plan may include pumping and piping changes to supply the local water provider in need.

It is recommended for local emergency water plans to consider and address wastewater infrastructure, because it is an integral to local water quality and quantity. Local emergency water plans should also be coordinated and consistent with the local water provider's drought contingency plan (see Action Item WSWC-10).

Local water providers should take care in preparing their local water emergency plans to protect information relating to their critical water infrastructure against sabotage or criminal or terrorist acts, including protecting records of the type that are not required to be disclosed pursuant to O.C.G.A. § 50-18-72(a)(25).

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Consider and implement, as practicable, recommendations from the GEFA Water System Interconnection Redundancy and Reliability Plan (2011) for the 33 systems that were included.

Resources:

- GEFA Water System Interconnection Redundancy and Reliability Plan, September 2011, https://gefa.georgia.gov/water-studies-and-reports
- EPA, State-Level Water Sector Emergency Response Exercises 2009-2011: Lessons Learned, https://www.epa.gov/waterresiliencetraining/learn-state-water-emergency-response-exercises

ACTION ITEM

INTEGRATED-4: LOCAL WASTEWATER MASTER PLANS

Intent	Responsible Party	In Coordination With
To continue master planning to address wastewater collection, treatment, and effluent and biosolids management. **Points of Integration** Coordination of local water and wastewater master planning supports integrated water resource management through alignment of water and wastewater forecasts and consideration of connections between water and wastewater management decisions.	Local Wastewater Provider	Stormwater Management Staff Elected Officials/Governing Board Site Plan Review Planning and Zoning Legal Counsel Inspection/Code Enforcement Maintenance Staff Local Water Provider County Board of Health Neighboring Jurisdictions

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 2050).
2. Update the local wastewater master plan every five 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 entitled Climate Resiliency. This section shall discuss infrastructure potentially vulnerable to extreme weather events and identify adaptive strategies for mitigating impacts.

Description: 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.

Implementation Guidance: 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:

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.

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.

The local wastewater master plans should 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

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 (see Action Item INTERGRATED-1). This section will address the following:

1. Areas to be sewered in the near-term (approximately five years).
2. 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 development that will rely on private decentralized facilities will be permitted. 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.
3. 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 (see Action Item INTEGRATED-8). For most parts of the Metro Water District, one-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 and estimated costs and providing 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.

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 inter-jurisdictional 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 inter-jurisdictional projects should be in compliance with the Georgia Service Delivery Act (O.C.G.A. § 36-70-20).

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Coordinate with local water master planning (Action Item INTEGRATED-2), as well as with the development of local watershed studies and plans, such as watershed assessments and watershed protection plans.
- Coordinate ongoing monitoring requirements with the requirements of other local plans to maximize the benefit for the local investment.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Facilitating discussions between local water and wastewater providers, if requested.
- Developing a workshop on the preemptive adaptation measures recommended in the 2015 Metro Water District Utility Climate Resiliency Study.
- Establishing climate tracking protocols and identifying potential trigger levels for adaptive measures in coordination with stakeholders.

Resources:

- GAWP Best Practice Master Planning Guidelines & Resource Document, December 2015, https://c.ymcdn.com/sites/www.gawp.org/resource/resmgr/Master_Planning_Guidelines/GAWP_Master_Planning_Guideli.pdf

- GAWP Water Master Planning Sample Table of Contents, December 2015, http://c.ymcdn.com/sites/www.gawp.org/resource/resmgr/Master_Planning_Guidelines/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
- Georgia Comprehensive State-wide Water Management Plan, 2008, http://www.georgiawaterplanning.org/pages/more_information/state_water_plan.php

ACTION ITEM

INTEGRATED-5: CONNECTIONS TO PUBLIC SEWER

Intent	Responsible Party	In Coordination With
To allow for transition of areas from septic systems to public sewer service. **Points of Integration** Septic system management and transition to public sewer is connected with water quality and return flows management.	Local Government	Local Wastewater Provider Site Plan Review Legal Counsel Local Planning and Zoning County Board of Health Neighboring Wastewater Providers (where appropriate)

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: 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.

Implementation Guidance: 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 (e.g., letters, emails, memoranda).

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Consider whether to require developers to install dry sewers for future connection to the public sewer in locations where the local wastewater master plan designates an area that will be served by sewer in the future, but where septic systems are currently allowed as an interim treatment solution.
- Consider whether to require developers to extend the public sewer rather than install septic systems in areas within one mile (or other specified distance) of an existing sewer and where the wastewater master plan calls for future sewer.

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ACTION ITEM

INTEGRATED-6: SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Intent	Responsible Party	In Coordination With
Gather basic information about the source(s) of the drinking water and their potential threats. **Points of Integration** Source water assessments are closely linked to and complimentary with watershed and stormwater management requirements.	Local Water Provider	Local Government/Elected Officials Governing Board Local Wastewater Provider Planning and Zoning

Action Item: 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. Delineate the source water assessment area.
2. Conduct an inventory of potential sources of contamination.
3. Determine the susceptibility of the water supply to contamination.
4. Publish the results of the source water assessment in the Consumer Confidence Report (CCR).
5. Integrate this information into the Local Emergency Water Plan (Action Item INTEGRATED-3).
6. Update the SWAP by January 1, 2020 and every 10 years thereafter.

Description: The SWAP will support communities in determining how susceptible the local water system is to contamination.

Implementation Guidance: Development of a SWAP will typically require the following activities:

1. 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.
2. 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.
3. 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.

4. 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. Source Water Assessment Plan 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.
5. Integrate this information into the Local Emergency Water Plan (Action Item INTEGRATED-3). Communities can and should use the information gathered through the assessment process to broaden their source water protection programs and implement emergency plans.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Performing Sub-Tasks on behalf of local water providers depending on available funding and approval of intergovernmental agreements
- Providing template CCR for local water providers to be tailored with system specific information

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

ACTION ITEM

INTEGRATED-7: WATER SUPPLY WATERSHED PROTECTION

Intent	Responsible Party	In Coordination With
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. **Points of Integration** Water supply watershed protection requires the coordination of water supply, watershed management, and wastewater management planning and implementation and the outcomes provide not only for safe drinking water but also for water quality in general.	Local Government	Local Water Provider Elected Officials/Governing Board Site Plan Review Planning and Zoning Inspection/Code Enforcement Staff Local Wastewater Provider

Action Item: Adopt water supply watershed buffers as required by the Part V Environmental Planning Criteria established by Georgia DCA and enforced by Georgia EPD. Develop and implement inter-jurisdictional agreements as necessary.

Sub-Tasks: Each local government with source water supply watersheds within its jurisdiction shall:

1. Identify source water supply watersheds within its jurisdiction, as well as priority issues and areas for watershed protection, in coordination with local water provider.
2. Adopt the Part V Environmental Planning Criteria, including adoption of drinking water supply watershed buffers in local ordinances.

Description: Water supply watershed protection programs serve to protect water resources from contaminants, thereby effectively preserving the amount of water supply available. By limiting the amount of pollution that enters the water supply, local water providers can reduce the costs of treatment and protect public health. Action Item INTEGRATED-6 outlines requirements for the protection of water supply watersheds, and Action Item INTEGRATED-1 requires coordination among local water providers and local water suppliers to address water quality challenges in drinking water supply watersheds.

Implementation Guidance: The Criteria for Water Supply Watersheds, Rule 391-3-16-.01, establishes a set of protections to assure that surface sources of drinking water are of a quality so they may be treated to meet all State and Federal drinking water standards. One of the ways the rule accomplishes these ends is through the establishment of buffers. This rule is jointly administered by the DCA and Georgia EPD. This is accomplished via the rule's requirement that Local Governments adopt, and Georgia EPD approves, water supply watersheds protection plans (or in the County's case, an ordinance) as part of their comprehensive planning process. Experience with the administration of the rule, particularly the buffer requirements, led to the rule's 2005 amendments which provide local governments a set of options.

SWAPs may be a starting point for identification of potential parameters of concern for water supply watershed protection. SWAPs are completed for public water systems as required by the Safe Drinking Water Act and Action Item INTEGRATED-6 in this Plan. SWAPs include an assessment of the susceptibility of each drinking water supply watershed to sources of potential contamination and provide each water supply watershed with a risk-based score.

Local governments and water providers must also adhere to Wellhead Protection Requirements, as stated in the 1986 amendments to the federal Safe Drinking Water Act. Wellhead protection areas are intended to help protect wells and springs that are used as sources of water supply for community public water systems.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Prioritize projects, such as TMDL implementation programs and WIPs (see Action Item WATERSHED-8), in water supply watersheds over other areas, where practical.
- Provide emergency response personnel with maps outlining water supply watersheds. First responders to accidents, especially when there are spills of hazardous materials, would be able to alert the appropriate water treatment facilities so that the intake(s) can be shut down if necessary until the threat of pollution had passed. It is recommended that local governments coordinate with local water providers to implement this activity (see Action Item INTEGRATED-1). It is also recommended that the maps show emergency contact information for the water treatment facilities associated with each water supply watershed and that maps be laminated for field use by emergency responders.

Resources:

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

Metro Water District, Technical Assistance for Implementing the Additional Stream Buffer and Setback Requirements for Small Water Supply Watershed Protection, https://northgeorgiawater.org/technicalassistance/

ACTION ITEM

INTEGRATED-8: SEPTIC SYSTEM PLANNING

Intent	Responsible Party	In Coordination With
To protect human and environmental health by requiring the proper planning and tracking of septic systems. **Points of Integration** Septic systems planning addresses water quality and wastewater return flows, as well as wastewater management.	Local Government	Elected Officials/Governing Board Local Wastewater Provider County Board of Health Stormwater Management Staff Planning and Zoning Site Plan Review Local Water Provider State Department of Public Health

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: 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 (see also 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 Comprehensive Land Use Plan (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 (see Action Item INTEGRATED-4), the local water supply master plan (see 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 Metro Water District, minimum lot sizes of one-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 (see 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. 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 five 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 (e.g., letters, emails, memoranda) that establish when the written policy was adopted.

ACTION ITEM

INTEGRATED-9: SEPTIC SYSTEM CRITICAL AREA MANAGEMENT

Intent	Responsible Party	In Coordination With
To increase protection from failure risks of septic for critical watershed areas. **Points of Integration** Management directed at septic system critical areas has potential benefits for water quality, water supply protection, and return flows management.	Local Government	Stormwater Management Staff Planning and Zoning Elected Officials Site Plan Review Local Water Provider Local Wastewater Provider County Board of Health State Department of Public Health

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 septic systems in identified critical areas.

Description: 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.

Implementation Guidance: 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 (see 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 5-1.

Table 5-1. 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 five 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 five 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Provide direct outreach to owners of advanced treatment systems (ATSs) in critical areas to notify them of the need to perform annual inspections and routine maintenance.
- Implement any of the Management Options listed in Table 5-1 across the entire jurisdiction (not only in critical areas).

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Developing GIS maps to support critical areas planning by local governments and local wastewater providers
- Developing and administering a regional incentive program to promote the inspection and/or maintenance of septic tanks

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ACTION ITEM

INTEGRATED-10: SEPTIC SYSTEM SEPTAGE DISPOSAL

Intent	Responsible Party	In Coordination With
To minimize illegal dumping of septage by providing for proper disposal. **Points of Integration** Septage disposal management is linked to water quality, source water protection, watershed management, and wastewater management.	Local Government Local Wastewater Provider	Planning and Zoning County Board of Health Neighboring Wastewater Providers (where appropriate) State Department of Public Health

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

Sub-Tasks: Each local government shall develop a plan for septage disposal when determining future areas served by septic and developing wastewater master plans.

Each local wastewater provider who accepts septage shall:

1. Determine acceptable parameters for septage disposal at local wastewater treatment facilities.
2. Collect septage hauling manifests and provide them to the County Board of Health at least once per year.
3. Plan for future septage disposal needs when upgrading or designing new wastewater treatment facilities.
4. Report septage quantity received, rate structure for disposal, and septage receiving policies each year to the Metro Water 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: Illegal septage disposal can negatively impact local water quality and disrupt operations at wastewater treatment facilities. 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. 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.

Implementation Guidance: Local wastewater providers should plan for future septage disposal demands based on local wastewater master plans (Action Item INTEGRATED-4), anticipated zoning density and average disposal frequency. Local wastewater providers should plan for future septage demands when developing wastewater master plans and designing 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 and quality of septage accepted. 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 Metro Water District. The District shall publish this information each year and provide it to the GADPH for coordination with local County Boards of Health and certified haulers.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Evaluate the need to modify septage receiving fees and protocols to encourage proper disposal of septage waste by haulers within the wastewater provider's jurisdiction. Based on a 2015 survey of receiving facilities, there may be a correlation between receiving fees and the amount of septage received. Wastewater providers should consider implications for improper disposal associated with higher fee structures, while balancing this potential concern with actual costs of treating septage.
- Accept septage during the common business hours of septage haulers. Recommended hours for acceptance are Monday through Saturday between 8:00 a.m. and at least 5:00 p.m. Currently, the operating hours and practices of facilities that accept septage vary widely across Metro Water District. Haulers may not have a local wastewater facility that can accept septage if they need to dispose of waste after normal business hours or on weekends.
- Develop procedures for coordination with wastewater treatment facilities in neighboring jurisdictions to provide service to haulers when a local wastewater facility cannot accept septage for disposal. These procedures could outline nearby facilities that accept out-of-county septage or facilities that will accept septage from haulers displaced by the facility closure. The provision of this information to local haulers would support proper disposal.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing information to local wastewater facilities on the operating hours, days of the week and septage fees charged by plants across the Metro Water District, as well assistance with developing emergency aid procedures
- Developing a standard manifest template for waste haulers to improve consistency across jurisdictions

ACTION ITEM

INTEGRATED-11: SEPTIC SYSTEM MAINTENANCE EDUCATION

Intent	Responsible Party	In Coordination With
To encourage proper maintenance resulting in longer septic system life and lower numbers of system failures. **Points of Integration** By providing increased educational outreach to promote proper maintenance of septic systems, future system failures can be reduced, which may reduce environmental impacts to watersheds, limit impacts to assimilative capacity in streams and help protect water supply sources.	Local Government	Elected Officials/Governing Boards Site Plan Review Planning and Zoning Local Wastewater Provider County Board of Health Stormwater Management Staff State Department of Public Health Local Community Groups

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

Description: 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. Georgia DPH estimates that one 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.

Implementation Guidance: 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, Metro Water 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 Metro Water District has developed education tools for homeowners, and these resources available on the District's website.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Expand public education programs about septic system maintenance to include a larger audience that reaches beyond homeowners to also include septage pumpers and haulers and real estate agents.
- Develop partnerships with other utilities, GADPH, local County Boards of Health, local realtor associations and businesses and the local septage pumper/hauler industry to support public education on septic system maintenance.

- Target public education programs on homeowner maintenance of existing septic systems in critical areas.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing public education resources for local governments and utilities to use in their local public education programs. A list of available resources is provided on the Resources pages of the Metro Water District website, and it includes links and downloadable documents
- Assisting members in the development of their local education programs and facilitate dialogue with industries, such as real estate, septage pumpers and haulers and other stakeholders

Resources:

- Metro Water District, Public Education and Awareness Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/
- Georgia DPH, Manual for On-site Sewage Management Systems, January 2016, https://dph.georgia.gov/wastewater-rules-and-regulations

ACTION ITEM

INTEGRATED-12: PRIVATE DECENTRALIZED WASTEWATER SYSTEMS ORDINANCE

Intent	Responsible Party	In Coordination With
To encourage proper design, operation and maintenance of private decentralized wastewater systems to protect human and environmental health. **Points of Integration** Adopting private wastewater system ordinances helps protect watershed health and increase source water protection. Private wastewater systems management should consider impacts on return flows.	Local Government	Elected Officials/Governing Board Planning and Zoning Local Wastewater Provider Legal Counsel Stormwater Management Staff Site Plan Review Inspection/Code Enforcement Maintenance Staff Local Water Provider County Board of Health Neighboring Wastewater Providers, as necessary

Action Item: Adopt and maintain local ordinances regarding decentralized wastewater systems and provide technical support when ordinance changes are proposed.

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 Georgia DCA and incorporate into local wastewater master plans.

Description: 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, (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 Metro Water 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.

Implementation Guidance: 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 return wastewater 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.

ACTION ITEM

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

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. **Points of Integration:** The feasibility of returning highly treated wastewater to these reservoirs for indirect potable reuse depends to a significant degree on policies ensuring that returned water is stored and accounted for so that water supply benefits are realized and that compliance with water quality requirements, including any applicable TMDLs, are met.	**Responsible Parties:** Local Water Provider (Allatoona and Lanier) Local Wastewater Provider (Allatoona and Lanier)	**In Coordination With:** Local governments (Allatoona and Lanier) Elected Officials Neighboring local governments, local water providers and local wastewater providers Relevant regulatory agencies

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: Each local water provider that withdraws or plans to withdraw water from Allatoona Lake or Lake Lanier shall, 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.

Each local wastewater provider that returns or may in the future return highly treated wastewater to Allatoona Lake, Lake Lanier, or any tributary to these reservoirs 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 above in Subtask 2 shall meet with staff for the District 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. 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: 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. In many instances, these investments and added costs would only be justified if the full additional water supply benefits are realized. Thus, in the absence of appropriate Corps policies that recognize and honor the State of Georgia's permitting decisions and allocation of water rights, water providers and wastewater providers may pursue other alternatives that ensure returned water is available to meet water supply needs in the District.

Securing needed water supplies and managing water supply withdrawals from Lake Lanier and Allatoona Lake present unique challenges owing to the reservoirs' ownership and operation by the Corps. The State of Georgia and local water providers have been working for many years to secure needed water supply storage in these reservoirs. In support of these efforts, detailed projections of water supply needs from these sources, and wastewater returns to these sources, have been prepared by the District and Georgia EPD. These projections, which are based upon and reflect information included in the development of this Plan, have been submitted to the Corps by the State of Georgia. This information has been utilized by the Corps in lengthy administrative processes to reallocate storage in these reservoirs to water supply.

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. However, the return of highly treated wastewater to Lake Lanier and Allatoona Lake—and the investment by local water and wastewater providers in developing the infrastructure necessary to return large volumes of water to these

sources—will be incentivized if the Corps recognizes the State of Georgia's allocation decisions and accounts for made inflows in a manner consistent with Georgia law.

Implementation Guidance: 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 waterbodies, available assimilative capacity, and compliance with any applicable Total Maximum Daily Limits, 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 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 a local wastewater provider seek an amendment as early as possible in its 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.

Resources:

- Georgia 2015 Water Supply Request
- USACE ACF Final EIS and WCM
- USACE ACT Final EIS and WCM
- TMDL Information

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ACTION ITEM

INTEGRATED-14: Encouraging the Return of Highly Treated Wastewater to the Chattahoochee and Flint

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 above. **Points of Integration:** Decisions made by local wastewater providers affect the future potential for indirect potable reuse and watershed management in these basins.	**Responsible Parties:** Local Wastewater Provider (Chattahoochee and Flint Only)	**In Coordination With:** Local Water Provider

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 wastewater treatment plants and related sewer lines, pump stations and other conveyance infrastructure.

Sub-Tasks: Each local wastewater provider that is treating water sourced from the Chattahoochee River Basin below Buford Dam or 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 above in Subtask 2 shall meet with staff for the District 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. 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 Upper Flint River Basin.

Description: 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.

Implementation Guidance: 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 water provider seek an amendment as early as possible in its 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.

As described in item 5 of the general section of EPD's Water Planning Guidance issued on February 11, 2015, 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 EPD's 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 Subtask 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.

5.2 Water Supply Planning and Water Conservation Action Items

The water demand forecasts developed for this Plan project that demands in the Metro Water District will be 862.5 to 899 AAD-MGD in 2050. See Section 4.2.2 for details on these water demand forecasts. To meet the 2050 water demands, this Plan includes the following water supply sources: (1) water saved from water conservation measures, including the enhanced efficiency standards in place prior to the date of this Plan, (2) surface water withdrawals, including but not limited surface water withdrawals from existing reservoirs and streams, (3) groundwater withdrawals and (4) new water supply reservoirs.

In the development of this Plan, each of these water supply sources was evaluated and considered in conjunction with local plans, priorities and preferences. The Metro Water District focused on the water conservation measures that will apply throughout the District, and local water providers submitted information on their planned surface water withdrawals, groundwater withdrawals and planned new reservoirs. This information from the local water providers is included in the county level summaries in Appendix B, and this information serves as the basis for the analysis of water supply sources in this Plan.

On an average annual basis, the anticipated 2050 permitted surface water supply will be [1,023.2] AAD-MGD, and the groundwater supply will be [10.6] AAD-MGD (approximately 1% of overall supply in 2050), based on the information submitted by local water providers. Groundwater used for self-supplied domestic use is projected to be [9.1] AAD-MGD in 2050, which are not permitted by Georgia EPD, because the individual withdrawals are less than 100,000 gallons per day. See Appendix B for the county-level breakdown of planned water supply sources. Based on these planned water supply sources, the supply available is projected to meet demand in 2050. As a whole, the anticipated 2050 permitted surface water and groundwater supply for the Metro Water District is greater than 2050 forecasted water demands for two primary reasons:

1. As 2050 approaches, local water providers will be planning and seeking permits for water supply sources to meet projected demands beyond the 2050 planning horizon. Advanced planning is required due to the significant lead times needed to permit, design and construct new or upgraded water treatment capacity (and as may be needed, new water supply reservoirs).
2. Although supply is adequate to meet demand based on aggregate supply and demand projections (Table 5-2) for the Metro Water District as a whole, individual local water providers may need additional water supply sources to meet localized demands in areas of the District where localized supply is not sufficient.

Figure 5-1 shows that a substantial portion of the 2050 demands will be offset by the enhanced efficiency standards. These measures act to reduce the demand that needs to be satisfied from other water supply sources.

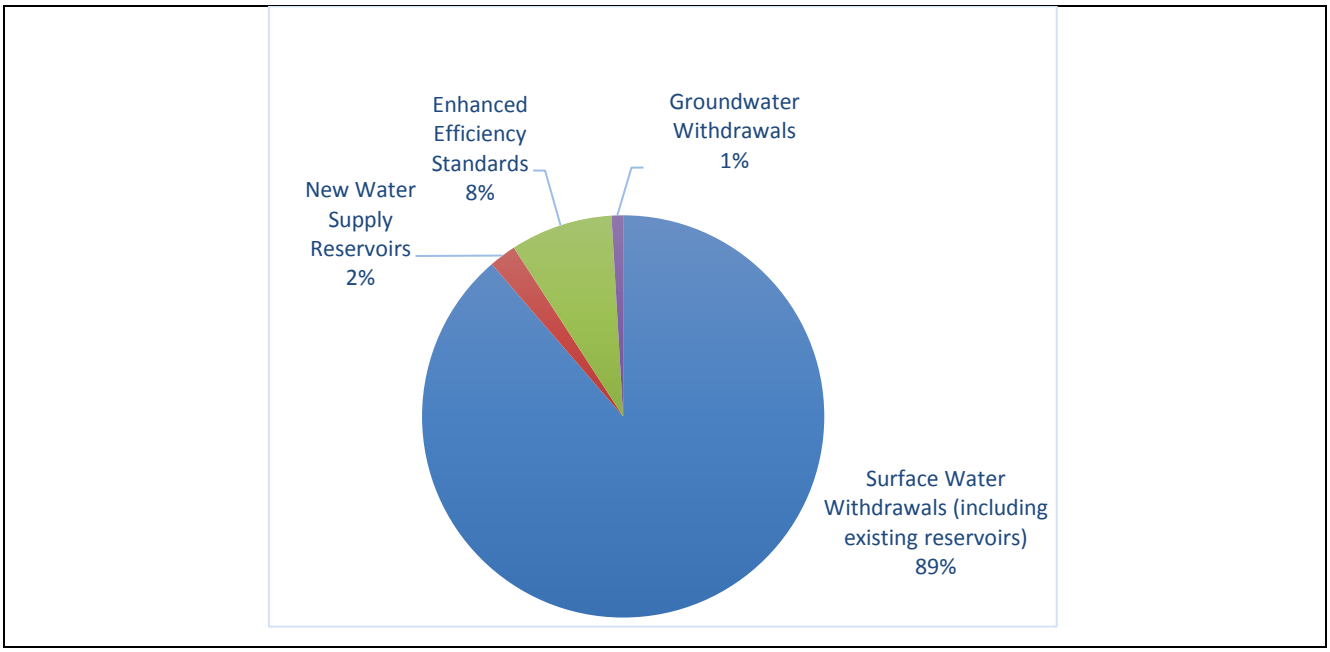

Figure 5-1. Planned Water Supply Sources to Meet 2050 Water Demands – Metro Water District

NOTE: This chart illustrates water supply based on the water demand forecasts calculated for population projection Scenario 1. Population projection scenarios are described in Section 4.2.

5.2.1 Expanded and New Water Conservation Measures

Water conservation is a critical strategy in ensuring that the region can meet its future water supply needs. The Metro Water District has become a national leader in water conservation through the implementation of numerous conservation measures in the 2003 Plan, the 2009 Plan and the 2010 amendments (see Table 3-5 for the 19 existing conservation measures). The State has also enacted a number of laws related to water conservation, including but not limited to the Water Stewardship Act of 2010. These efforts have resulted in a 30 percent reduction in per capita water use in the District since 2000. Total water withdrawn in the Metro Water District has decreased more than 10%, while population has increased by approximately one million people since 2000. The supply and demand forecasts in this Plan are based on these enhanced efficiency standards in place prior to the date of this Plan.

The water planning guidance from Georgia EPD for the Metro Water District states that the District should continue existing water conservation measures, at a minimum, and preferably include new and expanded water conservation measures.

Consistent with the Metro Water District's mission, and in order to promote continued progress toward greater water conservation and ensure future reductions in per capita use, the District has expanded some of the existing conservation measures and added new conservation measures in this Plan. This Plan also clarifies and provides additional implementation guidance on existing water conservation measures and describes optional enhanced implementation measures. The conservation measures that were added by a Plan amendment in 2010 that applied to only the Chattahoochee/Lanier basin have been expanded in this Plan to apply to the entire Metro Water District. Additionally, many of the Action Items in this Plan have been updated to address how existing ordinances and state water conservation and drought response requirements relate to this Plan, and other Action Items have been clarified to ensure more consistent implementation. Notable expanded water conservation measures in the Action Items of this Plan include the following:

- Private Fire Lines Metering Requirement (Action Item WSWC-4)

- Advanced Metering Infrastructure (AMI) Benefit and Feasibility Studies (Action Item WSWC-5)
- Toilet Replacement Program (Action Item WSWC-6)
- Ultra-High-Efficiency Toilets and Urinals in Government Buildings (Action Item WSWC-7)
- Commercial Water Use Assessments (Action Item WSCW-8)
- Pre-Rinse Spray Valve Replacement Program (Action Item WSWC-9)
- Water Loss Control and Reduction (Action Item WSWC-15)

This Plan adds the following new water conservation measures to build upon the success of the enhanced efficiency standards and more comprehensively address residential and commercial sectors, indoor and outdoor uses and new and existing customers:

- Billing Cycles and Billing System Functionality (Action Item WSWC-3)
- Outdoor Water Requirements for Large Landscapes (See Action Item WSWC-10)

5.2.2 Surface Water Supply Sources by River Basin: 2014 to Planned 2050

For the purpose of water supply planning at the Metro Water District level, information from the county-level summaries in Appendix B regarding anticipated surface water supply sources is presented below in Table 5-2, which is organized by river basin. This table shows the 2014 permitted withdrawals and 2050 planned permitted withdrawals, as anticipated by local water providers.

Table 5-2. Surface Water Supply Sources Through 2050

Water Supply Source	Owner/Operator Utilizing Source	2014 Permitted Monthly Average Day Withdrawal (MGD) [a]	2050 Planned Monthly Average Day Withdrawal (MGD)
Chattahoochee River Basin			
Lake Lanier	City of Cumming	18	27
	Forsyth County Board of Commissioners	14	45
	Gwinnett County	150	169.15
	City of Buford	2	3.62
	City of Gainesville	30	41.3
Chattahoochee River	Atlanta - Fulton County Water Resources Commission	90	105
	DeKalb County Public Works	140	120
	Cobb County-Marietta Water Authority	87	87
	City of Atlanta Watershed Management	180	180
Bear Creek Reservoir [b]	Douglasville-Douglas County Water and Sewer Authority	23	23
Dog River Reservoir [b]			
Big Creek	City of Roswell	2.8	3.8

Table 5-2. Surface Water Supply Sources Through 2050

Water Supply Source	Owner/Operator Utilizing Source	2014 Permitted Monthly Average Day Withdrawal (MGD) [a]	2050 Planned Monthly Average Day Withdrawal (MGD)
Sweetwater Creek [c]	City of East Point	11.5	11.6
Sweetwater State Park (George Sparks Reservoir) [c]			
Cedar Creek Reservoirs	City of Palmetto	0.45	0.45
Cedar Creek (B.T. Brown) Reservoir	Coweta County Water and Sewerage Authority	6.7	7.5
J.T. Haynes Reservoir [d]	Newnan Utilities	14	14
Sandy/Browns Creek [d]			
Monthly Average Day Withdrawal in Chattahoochee River Basin		***769.5***	***838.4***
Coosa/Etowah River Basin			
Etowah River	City of Canton	18.7	7.5
	City of Cartersville [e]	23	32
Hollis Q. Lathem (Yellow Creek) Reservoir/Etowah River	Cherokee County Water and Sewerage Authority	36	39.8
Allatoona Lake	City of Cartersville [e]	18	25
	Cobb County-Marietta Water Authority	78	78
Lewis Spring	City of Adairsville	4.1	4.5
Bolivar Springs	Bartow County Water System	0.8	0.8
Moss Springs	City of Emerson	0.5	0.5
Hickory Log Creek Reservoir [f]	City of Canton	*NA*	*NA*
	Cobb County-Marietta Water Authority	*NA*	*NA*
Richland Creek Reservoir [g]	Paulding County	*NA*	30
Monthly Average Day Withdrawal in Coosa/Etowah River Basin		***161.1***	***186.1***
Flint River Basin			
Flint River	Clayton County Water Authority [h]	*NA*	*NA*
	Fayette County Water System [i]	*NA*	*NA*
J.W. Smith Reservoir (Shoal Creek) [h]	Clayton County Water Authority [h]	17	17
White Oak Creek [d]	Newnan Utilities	*NA*	*NA*
Line Creek [d]			
Hutchins Lake	City of Senoia	0.3	0.34
Whitewater Creek	City of Fayetteville	3	0

Table 5-2. Surface Water Supply Sources Through 2050

Water Supply Source	Owner/Operator Utilizing Source	2014 Permitted Monthly Average Day Withdrawal (MGD) [a]	2050 Planned Monthly Average Day Withdrawal (MGD)
Lake Kedron [j]	Fayette County Water System	4.5	23.3
Lake Peachtree (Flat Creek) [j]			
Horton Creek Reservoir [i]		14	
Whitewater Creek [i]			
Lake McIntosh	Fayette County Water System	12.5	
Still Branch Creek Reservoir [k]	City of Griffin (provides water to Pike, Spalding and Coweta Counties)	1.875	3.125
Monthly Average Day Withdrawal in Flint River Basin		***53.2***	***43.8***
Ocmulgee River Basin			
W.J. Hooper Reservoir (Little Cotton Indian Creek)	Clayton County Water Authority	20	20
Edgar Blalock Jr. Reservoir (Pates Creek) [h]		10	10
John Fargason (Walnut Creek) Reservoir	City of McDonough	2.4	2.4
S. Howell Gardner (Indian Creek) Reservoir [l]	Henry County Water Authority	8	18
Rowland (Long Branch) Reservoir [l]		10	
Towaliga River Reservoir		11	
Tussahaw Creek Reservoir		32	30
Big Haynes Creek (Randy Poynter Lake)	Rockdale County	32.8	32.8
Brown Branch	City of Locust Grove	0.3	0.3
Monthly Average Day Withdrawal in Ocmulgee River Basin		***121.5***	***113.5***
Oconee River Basin			
Cedar Creek Reservoir [m]	City of Gainesville	2	0
North Oconee River [m]			
Raw Water Storage Pond [o]	*City of Auburn*	***0***	***1.91***
Monthly Average Day Withdrawal in Oconee River Basin		***2.0***	***1.91***
Tallapoosa River Basin			
Lake Paradise (Little Tallapoosa River) [j]	City of Villa Rica	1.5	0.5
Cowens Lake (Astin Creek) [j]			
Monthly Average Day Withdrawal in Tallapoosa River Basin		***1.5***	***0.5***
Total Permitted Withdrawal in District [n]	**Monthly Average Day**	**1,108.7**	**1,184.2**
	AAD-MGD	**923.9**	**986.8**

[a] Only the primary sources of water are shown because that 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.
[b] The Bear Creek Reservoir withdrawal serves as a supplemental supply to the primary Dog River Reservoir Source (Permit No. 048-1216-3). The withdrawals stated for the Dog River and Bear Creek Reservoirs cannot be added; the total permitted withdrawal from both sources is 23 MGD. The Dog River Reservoir releases are augmented with reuse water from the Douglasville-Douglas County Water and Sewer Authority's South Central WWTP, which is piped to a point below the foot of the dam.
[c] The City of East Point has one surface water withdrawal permit for withdrawal from Sweetwater Creek. The City may supplement the withdrawals from Sweetwater Creek with water from the George Sparks Reservoir. Amounts are not to exceed quantities shown on the permit.
[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] Construction of the Hickory Log Creek Reservoir was completed in 2007. Cobb County-Marietta Water Authority is entitled to 75% (33 MGD) of the water from the project and the City of Canton to the remaining 25 percent (11 MGD). The withdrawal intakes for Cobb County-Marietta Water Authority and City of Canton are not located in the reservoir, but in the Etowah River and Allatoona Lake, respectively.
[g] In October 2015, the U.S. Army Corps of Engineers granted a 404 Permit allowing the construction of the Richland Creek Reservoir Water Supply Program (http://rcrwater.com/project-information/background/).
[h] 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.
[i] These two sources share a combined permit limit.
[j] Lake Horton is a pump-storage facility only that receives water from the Flint River and Whitewater Creek.
[k] 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 3.00 MGD of finished water from the City of Griffin through June 30, 2022. The amount increases to 5.00 MGD on July 1, 2022 through the duration of the contract ending in 2049.
[l] 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.
[m] 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.
[n] Monthly average day is 1.2 times AAD.
[o] The Auburn Raw Water Storage Pond and pumping system will be capable of providing 1.59 MGD annual average day flow to meet the City'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.

5.2.3 2050 Planned Reservoirs

As of the date of this Plan, the Richland Creek Reservoir is the only reservoir that is permitted and under construction in the Metro Water District. The Richland Creek Reservoir is a pumped-storage reservoir which receives supply from the Etowah River. Paulding County is developing the Richland Creek Reservoir, located in Paulding County and in the Coosa River Basin. This includes the raw water intake infrastructure, a new water treatment facility and related water transmission and distribution infrastructure to provide potable water supply in the county.

The Glades Reservoir in Hall County is not currently planned as a water supply reservoir. Therefore, it is not included as a component of this Plan for water supply purposes. The Bear Creek Reservoir, in South Fulton County, is currently under local consideration, but it is not permitted (as of June 2017). If it is permitted and constructed, it would be the main water supply source for the Palmetto, Union City and Fairburn communities in South Fulton County. Union City and Fairburn are currently supplied with water from the City of Atlanta and Palmetto has its own limited supply. Both the reservoir and the City of Atlanta water supply source are within the Chattahoochee River basin. If the reservoir and supporting WTP are constructed, this new reservoir will decrease the need for water supplied from the Chattahoochee River by

the City of Atlanta, but will increase pumping water from the Chattahoochee River south of Peachtree Creek for storage in the Bear Creek Reservoir.

5.2.4 New and Expanded Water Treatment Facilities

To meet 2050 demands, many existing water treatment facilities will require capacity expansions and upgrades, and some additional facilities will need to be built. The capital improvements phasing plans for these expansions are listed in Appendix B on a county-by-county basis. Because treatment process upgrades may be triggered by future regulatory requirements, the date and scope of process upgrades are not provided in Appendix B. Treatment facility expansions include many tasks such as financing, inter-jurisdictional agreements and State permitting, which also affect timing and scope. It is important to note that treatment capacity may not be expanded without the issuance of a new or amended water withdrawal permit from Georgia EPD if the proposed expansion will exceed currently permitted water withdrawal limits.

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ACTION ITEM

WSWC-1: WATER CONSERVATION PROGRAM

Intent	Responsible Parties	In Coordination With
To maintain and sustain a water conservation program meeting national standards. **Points of Integration** This measure should result in decreased water demands, which will have implications for wastewater management and planning, such as reduction in the volume of flows entering the wastewater collection system.	Local Water Provider Local Government	Elected Officials/Governing Board

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: 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.

Implementation Guidance: 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Become an EPA WaterSense promotional partner to educate the community about the value of water, water efficiency and the WaterSense brand. Partners are asked to commit to goals and make pledges on the activities they will undertake to meet their goals.
- Meet the ANSI/AWWA G480 Water Conservation Program Operation and Management Standard. The G480 standard is a voluntary, utility management standard that lists appropriate practices, procedures and behaviors for effective and efficient utility operations. A checklist of the elements of the standard is available through the Alliance for Water Efficiency. The G480 Standard itself must be purchased through AWWA's bookstore.
- Perform a feasibility study and, as appropriate, adopt a commercial water efficiency fee to provide funding for the various commercial water conservation measures in this Plan.

Resources:

- AWWA G480-13 Water Conservation Program Operation and Management, 2013, http://www.awwa.org/store/productdetail.aspx?productid=35009354
- Alliance for Water Efficiency, Resource Library, http://www.allianceforwaterefficiency.org/resource-library/default.aspx
- Alliance for Water Efficiency, Checklist for G480 Standard, http://www.allianceforwaterefficiency.org/WorkArea/DownloadAsset.aspx?id=9236
- EPA WaterSense Partnership Program, https://www3.epa.gov/watersense/partners/become_a_watersense_partner.html
- San Antonio Water System, Commercial Water Efficiency Fee, http://www.saws.org/latest_news/NewsDrill.cfm?news_id=43

ACTION ITEM

WSWC-2: CONSERVATION PRICING

Intent	Responsible Party	In Coordination With
To reduce discretionary water use by increasing the cost of water as the volume of use increases. **Points of Integration** This measure should result in decreased water demands. Wastewater planning implications include reducing the volume of flows entering the wastewater collection system.	Local Water Provider	Legal Counsel

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, multi-family, 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.
4. 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.

Description: 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.

Implementation Guidance: Water providers shall perform the necessary analysis to select the most appropriate pricing scenarios. The Metro Water 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.

In some communities, water conservation by commercial, multi-family, institutional and industrial customers may be encouraged by adopting a tiered rate structure for these customers. In other communities, commercial, multi-family, 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 Metro Water District.

The Metro Water 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. See Section 2.1 for more on the Metro Water District's reclaimed water policy. The Metro Water 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 Metro Water District, usually for irrigation, the Metro Water District discourages these and other uses when they increase net consumption.

Resources:

- AWWA M1 Principles of Water Rates, Fees and Charges, 6th Edition, 2012, http://www.awwa.org/store/productdetail.aspx?productid=28731
- GEFA and Environmental Finance Center, Georgia Water and Wastewater Rates, Rate Structures and Connection Fees Project, http://www.efc.sog.unc.edu/project/georgia-water-and-wastewater-rates-and-rate-structures

ACTION ITEM

WSWC-3: BILLING CYCLES AND BILLING SYSTEM FUNCTIONALITY

Intent	Responsible Party
To facilitate water conservation through improved billing system functionality. **Points of Integration** This measure should result in decreased water demands. Wastewater planning implications include reducing the volume of flows entering the wastewater collection system.	Local Water Provider

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, multi-family 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 towards 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: 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.

Implementation Guidance: 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.

Resources

- GAWP, Georgia Water Use and Efficiency Reporting Guidance for Public Water Systems, October 2012. https://c.ymcdn.com/sites/www.gawp.org/resource/resmgr/water_loss_audit_files/water_use_and_efficiency_rep.pdf
- Metro Water District, Resources, http://northgeorgiawater.org/education-awareness/technical-resources/
- Water Research Foundation, Evaluation of Customer Information and Data Processing Needs for Water Demand Analysis, Planning, and Management, Project 4527, 2016, http://www.waterrf.org/Pages/Projects.aspx?PID=4527

ACTION ITEM

WSWC-4: PRIVATE FIRE LINES METERING REQUIREMENT

Intent	Responsible Party	In Coordination With
Identify and reduce unmetered water losses by metering private fire lines in commercial buildings.	Local Water Provider	Local Government Legal Counsel Site Plan Review Planning and Zoning Inspection/Code Enforcement Staff

Action Item: Adopt an ordinance or policy to meter private fire lines supplying commercial buildings to identify avoidable system leakage and non-fire related water consumption.

Sub-Tasks: Each local water provider shall:

1. Adopt an ordinance or policy by January 1, 2019 to require private fire lines supplying all new commercial buildings to have full flow meters or double detector checks.
2. Adopt an ordinance or policy by January 1, 2019 to require private fire lines supplying any commercial building that is undergoing a substantial renovation to have full flow meters or double detector checks.
3. Incorporate these private fire line metering requirements by January 1, 2019 into the development review process.

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

Implementation Guidance: 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 very 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 meter 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 three 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 detectors 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.

All policies must be written policies that either include their date of adoption or are accompanied by other documents (letters, emails, memoranda, etc.) that establish when the written policy was adopted.

Considerations for Enhanced Implementation: The optional consideration for enhanced implementation is to consider installing full flow metering or double detector checks as practicable on existing fire lines, not just those in buildings that meet the renovation criteria.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item by developing guidance or model language for policies and ordinances that require metering private fire lines.

Resources:

- City of Atlanta, Code of Ordinances, Chapter 154 Utilities, Article III Water, Division 2 Fire Hydrants, Section 154.91, Installation of detector meter or fire line meter on private unmetered fire service systems having fire hydrants, https://www.municode.com/library/ga/atlanta/codes/code_of_ordinances?nodeId=COORATGEVOII_CH154UT_ARTIIIWA_DIV2FIHY
- Cobb County, Code of Ordinances, Chapter 54 Fire Prevention and Protection, Article III Fire Safety Standards, Section 54.57, Installation mutual fire line meter on unmetered fire service systems, https://www.municode.com/library/ga/cobb_county/codes/code_of_ordinances?nodeId=PTIOFCOCOCOGE_CH54FIPRPR_ARTIIIFISAST_S54-57INMUFILIMEUNFISESY
- AWWA, Opflow, Reduce Apparent Water Loss, September 2008, http://www.awwa.org/publications/opflow/abstract/articleid/18361.aspx

ACTION ITEM

WSWC-5: AMI BENEFIT AND FEASIBILITY STUDIES

Intent	Responsible Party
To facilitate accurate customer metering and water conservation through better and more timely information about customer water use.	Local Water Provider

Action Item: Evaluate the improvement of customer metering technologies to improve accuracy, notify customers of suspected leaks, enhance customer service and provide other benefits. This includes metering technology with the capability to store hourly readings (or more frequently) and transmit these readings daily to the local water provider, which is known as AMI.

Sub-Tasks: Each local water provider shall:

1. Except for those local water providers that have already completed or are currently installing AMI system-wide or that have completed an AMI pilot program pursuant to Action Item 5.15 of the 2009 Plan (as amended), all other local water providers shall conduct a system-specific study by December 31, 2018 on the benefits and feasibility of the system-wide installation of AMI.
2. If a local water provider determines that such system-specific study has shown that system-wide implementation is feasible and yields sufficient benefits, then develop a plan, schedule and budget to implement AMI system-wide.
3. If a local water provider has already completed or is installing AMI system-wide whether based on a pilot program or benefits and feasibility study, then implement a program to identify, notify and track customers with continuous usage, if not already completed.

Description: Metering technology has advanced greatly over the last five 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.

Implementation Guidance: AMI is the complete automation of the metering process which includes meter reading, distribution and monitoring. AMI is the next evolution of what many utilities have implemented over the last several decades: Automated Meter Reading (AMR). AMI has many advantages over AMR, such as the ability to obtain hourly interval meter reads on a daily basis, flag a customer-side leak when it occurs (rather than only at the monthly reading) and support proactive customer service capabilities. The method of transmitting the readings to the local water provider can vary depending on the AMI provider and is often proprietary. Some use base stations or towers to collect readings, others use a mesh-network and others use cellular networks. Additionally, some AMI systems feature two-way technologies for remote disconnect or distribution sensing technologies, such as leak detection, pressure sensors and other operational data. New metering technology includes solid state technology using ultrasonic or magnetic flow measuring elements for improved low-flow accuracy, as opposed to the moving parts of traditional metering technologies.

Some water providers that use direct meter reading are considering AMR, and this Action Item strongly recommends moving directly to AMI implementation. The cost difference may be insignificant, and the

benefits of AMI may far exceed those of AMR. Installing AMI system-wide can be done in stages over time, and phasing may include installation of AMI in certain areas of the system first and/or installation of meters with encoder registers first, with remaining communications infrastructure coming later. The AMI technology to be adopted in the Metro Water District should have encoder registers that can be equipped with a Meter Interface Unit in the future without changing the register.

AMI benefits and feasibility studies should consider the cost-effectiveness and costs and benefits of implementing AMI technology and should consider costs and benefits that are both quantifiable and non-quantifiable. The studies shall conclude with a recommendation regarding AMI implementation: begin, continue, or delay AMI implementation system-wide or begin or implement a pilot program for compliance with EPD audits. Local water providers should prepare and maintain in its records a written feasibility study report.

Some financial benefits of AMI to consider include the following:

- Increased low-flow meter accuracy (through new metering technology)
- Improved registration (through replacement of older meters)
- Eliminating estimates and rereads
- Reducing potential theft of service, meter tampering issues and bad debt
- Reducing operating expenses associated with reading meters and vehicles

Some non-financial benefits to consider include the following:

- Operational benefits from reducing call center costs, improving staff morale, reducing tampering by using alarms and improving backflow detection
- Other benefits from improved customer usage data for hydraulic modeling, water loss assessment calculations, water rate studies, meter degradation, etc.
- Customer service improvements including:
- More prompt responses to customer inquiries
- Elimination of long and short reading periods
- Ability to address billing and usage concerns more accurately
- Fewer home and yard intrusions
- On-demand access to consumption information
- High usage and demand response notice
- Leak detection notification
- Budget tracking/setting

Resources:

- AWWA, M6: Water Meters - Selection, Installation, Testing, and Maintenance, Fifth Edition, 2012, http://www.awwa.org/store/productdetail.aspx?productid=28471
- AWWA, M22: Sizing Water Service Lines and Meters, Third Edition, 2014, http://www.awwa.org/store/productdetail.aspx?productid=44766350

- Water Research Foundation, AMR/AMI Standardization for Water Utilities, Report #4467, April 2016, http://www.waterrf.org/Pages/Projects.aspx?PID=4467
- Alliance for Water Efficiency, AMI-ABLE Committee, resources to support AMI/AMR implementation, http://www.allianceforwaterefficiency.org/AMIableCommittee.aspx

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ACTION ITEM

WSWC-6: TOILET REPLACEMENT PROGRAM

Intent	Responsible Party	In Coordination With
To reduce indoor water use and speed the conversion of older, inefficient toilets toward WaterSense labeled ultra high-efficiency toilets in single- and multi-family homes. **Points of Integration** This measure should result in decreased water demands, as well as decreased wastewater flows.	Local Water Provider	Local Government Local Wastewater Provider

Action Item: Implement a program to replace older, inefficient toilets with WaterSense labeled high-efficiency toilets using 1.1 gpf or less (WaterSense UHET) in single- and multi-family homes. WaterSense labeled toilets using 1.28 gpf will no longer be eligible for rebates after July 1, 2021.

Sub-Tasks: Each local water provider shall:

1. Establish a program to replace 3.5 gpf or greater toilets in single- and multi-family 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 Metro Water District website or other local resources.

Description: Single- and multi-family 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.

Implementation Guidance: 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. 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 multi-family home. Rebates shall be $75.
- Direct install program: Customer exchanges a toilet from pre-1994 single- or multi-family 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 multi-family 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 multi-family homes, funds may be made available on a first come, first served basis.

As a matter of customer service, rebates of 1.28 gpf 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 multi-family homes, it is recommended that the local water provider include an inspection element in any multi-family 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation include the following:

- Add an additional requirement that program participants provide documentation or other proof that the replaced toilet uses 3.5 gpf or more, such as requiring a section on the rebate application form for the customer to record the gallons per flush of the old toilet or including a customer self-certification.
- Low-income and disadvantaged customers often live in pre-1994 single- and multi-family homes and spend a greater percentage of their income on utility bills. These customers may experience financial difficulties participating in a rebate incentive program if they cannot afford to purchase the new plumbing fixture before the rebate money is received. A voucher or direct install program for customers with a lower household income would encourage indoor water efficiency in in pre-1994 single- and multi-family homes. As an example, the City of Atlanta's Care and Conserve program provides payment assistance to qualified customers.
- Local water providers may also consider placing toilet recycling containers at other local government buildings. The City of Atlanta provides free toilet recycling to its residential water customers at the Center for Hard to Recycle Materials. Gwinnett County Water Resources offers free toilet recycling to its residential customers by providing a recycling container for old toilets at its building. Gwinnett County Water Resources covers the cost of transporting the container to a local recycler. This free service is promoted to customers participating in the toilet replacement program and has kept hundreds of tons of porcelain from the landfill.
- Require recycling for all toilets replaced through the multi-family toilet replacement program. Some local water providers require the customer to agree to transport the used porcelain toilets to an approved recycler within the Metro Water District area. The customer must provide documentation from the recycler that the toilets were disposed properly before the rebate credit will be issued to the account.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Administering a regional rebate program for single-family homes
- Creating and administering a regional rebate program for multi-family homes
- Offering a regional program for low-income and disadvantaged customers using grant funding
- Developing a regional list of toilet recycling facilities

Resources:

- EPA, WaterSense Toilets, information page, https://www3.epa.gov/watersense/products/toilets.html
- MaP Testing Premium Ultra-High-Efficiency Toilet page, http://www.map-testing.com/content/info/menu/map-premium.html

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ACTION ITEM

WSWC-7: HIGH-EFFICIENCY TOILETS AND URINALS IN GOVERNMENT BUILDINGS

Intent	Responsible Party	In Coordination With
To speed the conversion of older toilets and urinals in existing government buildings. **Points of Integration** This measure should result in decreased water demands, as well as decreased wastewater flows.	Local Water Provider Local Government	Elected Officials/Governing Board Maintenance Staff Legal Counsel

Action Item: Replace toilets using 3.5 gpf or more and urinals using more than 1.0 gpf with WaterSense labeled high-efficiency toilets and urinals in local government buildings.

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

1. Develop a written list for all remaining buildings owned by the local water provider and local government (excluding buildings owned by the local public school system, sheriff's office or tax commissioner's office) that still have toilets using 3.5 gpf or more and urinals using more than 1.0 gpf by January 1, 2018.
2. Develop a retrofit schedule and funding mechanism to replace all the inefficient toilets and urinals in the buildings on the retrofit list by January 1, 2020 with high-efficiency WaterSense labeled toilets and urinals.
3. Replace all the inefficient toilets and urinals in the buildings on the retrofit list by January 1, 2020; based on the 2009 Plan, local government and local water providers should be able to show that this retrofitting is underway.
4. For all buildings owned by the local public school system, sheriff's office or tax commissioner's office, the local water provider serving these buildings shall coordinate regarding these buildings with the appropriate elected officials and staff to perform each of the subtasks above with a target start date for retrofits of January 1, 2019 and completion date of January 1, 2025.

Description: This Action Item will improve the efficiency of toilets and urinals in all government buildings in an effort to conserve water and demonstrate leadership in conservation.

Implementation Guidance: As described in Action Item WSWC-6, toilet efficiencies have improved substantially in the past several decades. Urinal efficiencies have also improved. 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 and urinals. However, older, less efficient fixtures are still commonly in use in existing buildings.

WaterSense is a voluntary program of the EPA designed to identify and promote water efficient products and practices. WaterSense labeled toilets and urinals are independently certified to meet rigorous criteria for both performance and efficiency.

This Action Item calls for a program to replace older, inefficient toilets and urinals in local government buildings with WaterSense labeled toilets and urinals. As of the date of this Plan, the WaterSense efficiency

criteria is 1.28 gpf or less for toilets and 0.5 gpf or less for urinals, and in the future, the WaterSense label standards may become more stringent. If more stringent criteria are adopted, they will apply as of the date of adoption for the purposes of this Plan. Non-flushing (or waterless) urinals are not EPA WaterSense-certified and not recommended for this measure due to maintenance and existing plumbing concerns.

It is recommended that local water providers begin replacement programs with their own administration buildings to demonstrate leadership and then proceed to work with the local governments it serves to develop a retrofit list, schedule and funding for replacements in other local government buildings. Options for implementation of this Action Item include: direct replacement programs, rebates for government building retrofits or establishment of a new toilet replacement line item in department.

Coordination with the local public school system, sheriff's office or tax commissioner's office shall be initiated by the local water provider serving their buildings. Coordination shall include inviting appropriate elected officials and staff to meetings on at least an annual basis and explaining to them the role of the Metro Water District, the requirements of this Action Item and the financial and water supply benefits of implementation. In the meeting, the local water provider should share lessons learned and best practices based on the local water provider's experience retrofitting its old buildings. If a local water provider can show reasonable and persistent efforts to coordinate with these parties, it is not the local water provider's responsibility if the local public school system, sheriff's office or tax commissioner's do not complete Subtask 4.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Assisting communities in developing draft meeting materials. District staff may also be available to attend coordination meetings.
- Facilitating discussions between responsible parties and the local public school system, the sheriff's office and the tax commissioner's office.

Resources:

- Metro Water District, Local Community Choices Implementation Assistance, http://www.atlantaregional.com/local-government/community-choices-implementation-assistance-program
- EPA, WaterSense Toilets, information page, https://www3.epa.gov/watersense/products/toilets.html
- EPA WaterSense Water-Efficient Urinals, information page, http://www3.epa.gov/watersense/products/urinals.html
- MaP Testing Premium Ultra-High-Efficiency Toilet page, http://www.map-testing.com/content/info/menu/map-premium.html

ACTION ITEM

WSWC-8: COMMERCIAL WATER USE ASSESSMENTS

Intent To reduce water use from commercial water users, by site-specific assessments of use and identification of potential for improved efficiency. **Points of Integration** This Action Item should result in decreased water demands. Wastewater planning implications include reducing the volume of flows entering the wastewater collection system.	**Responsible Party** Local Water Provider Effective January 1, 2021: Due to COVID-19 business impacts and public health considerations, this action item has been suspended and no action is required by the responsible party. Education materials will be available by the District upon request by commercial water users.

Action Item: Develop or participate in a commercial water use assessment program that targets highest commercial customers or other groups of commercial customers that may have significant water savings potential.

Sub-Tasks: Each local water provider shall:

1. Target highest commercial customers, or other groups of commercial customers identified by the local water provider that may have significant water savings potential, and advertise water use assessment program.
2. Establish a program or participate in the District's regional program to conduct water use assessments with interested commercial customers and report results with recommendations to these customers with cost-beneficial water conservation measures.

Description: A commercial water use assessment program includes on-site water assessments at commercial facilities, characterization of existing water uses and recommended changes to process and operations to reduce water usage. Commercial customers will typically provide basic water use information about the facility prior to an onsite assessment. Local water providers may want to ask commercial facilities to make an early commitment to reduce water consumption.

Commercial water uses are variable and complex. Examples of types of facilities may include, but are not limited to, commercial and retail centers, office buildings, hotels and motels, coin and card operated laundries, auto service and repair shops, restaurants and fast food, bakery and pastry shops, commercial printers, fuel service stations and convenience stores, vehicle washes, schools, grocers, hospitals, bakers, laundries and dry cleaners, water features and pools and landscapes. A facility's water use is related to the type and number of commercial customers that they service. Different types of facilities will have different water use characteristics and potential efficiencies; however, efficiency may also vary within the same type of facility. Therefore, an on-site water use assessment provides a more accurate assessment than estimating efficiencies based on type of facility.

Implementation Guidance: Local water providers may develop their own program that they offer to their interested commercial customers with some, all or none of the costs being paid for by the local water provider. The level of funding, the use of staff or contractors and the program scope may vary from local water provider to local water provider based on local desires, needs and expressed interest from customers. Alternatively, local water providers may participate in and assist in promoting the Metro Water District's commercial water use assessment program. Local water providers shall identify their highest commercial water customers, or other groups of commercial customers that may have significant water savings

potential, document the methodology used for selecting the customers, and advertise the availability of a water use assessment program.

All commercial water use assessments on buildings with cooling towers shall evaluate and, where feasible based on the equipment and local conditions, make recommendations to improve their efficiency, including by increasing the cycles of concentration from two to six or more. All commercial water use assessments on buildings with pre-rinse spray valves shall consider their replacement.

If a local water provider has expressed an interest in participating in the District's regional program (pending its review of the final program structure and costs), then such local water provider is not required to create a local program until the District establishes its regional program and the local water provider has made a timely decision about its participation in the regional program.

All commercial water use assessments involving irrigation shall evaluate the replacement of simple clock timers with WaterSense labeled irrigation controllers. Replacing standard clock timers with WaterSense labeled irrigation controllers can provide an average annual water savings of 15 percent. These controllers use prevailing weather conditions, current and historic evapotranspiration, soil moisture levels and other relevant factors to adapt water applications to meet the actual needs of plants. Additionally, water efficient landscapes can help reduce irrigation runoff, reduce pollution of waterways and limit property damage.

The EPA WaterSense program has developed WaterSense at Work, a compilation of commercial water-efficiency best management practices. This program helps commercial customers understand and better manage their water use, establish an effective water management program and identify projects and practices that can reduce water use.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program will provide support for implementation of this Action Item by offering to administer the commercial water assessments, either through District staff or contractors. The costs of this regional program will be paid for by the local water providers choosing to use the regional program to conduct commercial water use assessments.

TAP
TECHNICAL ASSISTANCE PROGRAM

Resources:

- EPA, WaterSense Commercial, information page, https://www.epa.gov/watersense/commercial-buildings
- EPA, WaterSense Commercial, Best Management Practices page, https://www.epa.gov/watersense/best-management-practices
- Energy.gov, Federal Energy Management Program Water Efficiency, Best Management Practice #10: Cooling Tower Management, http://energy.gov/eere/femp/best-management-practice-10-cooling-tower-management

ACTION ITEM

WSWC-9: PRE-RINSE SPRAY VALVE REPLACEMENT PROGRAM

Intent	Responsible Party	In Coordination With
To reduce water use in facilities with commercial and institutional kitchens by replacing older pre-rinse spray valves. **Points of Integration** This measure should result in decreased water demands, as well as decreased wastewater flows.	Local Water Provider	County Board of Health

Action Item: Based on new, mandatory high-efficiency standards, this action item will sunset effective January 1, 2021. No further action is required by local water providers regarding this action item.

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ACTION ITEM

WSWC-10: OUTDOOR WATER REQUIREMENTS FOR LARGE LANDSCAPES

Intent	Responsible Party	In Coordination With
To reduce discretionary water use by requiring water efficient irrigation systems on large landscapes. **Points of Integration** Reducing irrigation water use on large landscapes can also provide potential watershed management benefits by reducing irrigation runoff and pollution that enters waterways.	Local Water Providers	Local Government Inspection/Code Enforcement Staff Legal Counsel Site Plan Review

Action Item: Each local water provider shall adopt an ordinance or policy by January 1, 2019 requiring all new irrigation systems for large landscapes (greater than one acre or 43,560 square feet and excluding single-family homes) to include:

- Pressure regulators and master shut-off valves
- Flow sensors that detect and report high flow conditions due to broken pipes and/or popped sprinkler heads

Description: Outdoor water efficiency on large landscapes can be improved by maintaining optimum pressure with regulators and monitoring the system for high flow conditions.

Implementation Guidance: This Action Item does not apply to irrigation systems for single-family homes, however the policy or ordinance adopted should cover large landscapes (greater than one acre or 43,560 square feet) irrigated on property owned by homeowner associations. This Action Item does not apply to irrigation systems that use water withdrawn from private wells or surface water by an owner or operator of a property if such well or surface water is solely on the owner/operator's property (i.e., the irrigated property). To calculate the area of irrigated landscapes, all irrigated areas included in a development should be added together. When implementing this action item, it is recommended that:

- The enacted ordinance or policy requires a post-installation inspection.
- The local water provider coordinates with the local government to educate staff on enacted ordinances or policies.
- The local water provider should develop outreach materials regarding smart irrigation controllers and target distribution to owners and managers of properties with large landscapes.

All policies must be written policies that either include their date of adoption or are accompanied by other documents (letters, emails, memoranda, etc.) that establish when the written policy was adopted.

The local water providers should confirm compliance with this Action Item when it reviews site plans and as part of providing meters.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation include the following:

- Include single-family residential components in implementation of this Action Item where irrigated single-family residential turfgrass area is exceptionally large.
- Create a requirement that large landscape irrigation systems submit a certification statement at least every other year that an audit of their irrigation system was performed by a Certified Landscape Irrigation Auditor.
- Require dedicated sub-meters for new irrigation systems in large landscapes.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Developing a model ordinance for water efficient irrigation systems
- Administering a regional incentive program for smart irrigation controllers for local water providers interested in participating in a regional program, rather than creating an independent local program

Resources:

- EPA, WaterSense Labeled Irrigation Controllers, information page, http://www3.epa.gov/watersense/products/controltech.html
- California Department of Water Resources, Water Efficient Landscape Ordinance, Technical Assistance, http://www.water.ca.gov/wateruseefficiency/landscapeordinance/technical.cfm
- Alliance for Water Efficiency, Resource Library, Landscape, Irrigation and Outdoor Water Use, http://www.allianceforwaterefficiency.org/Landscape_and_Irrigation_Library_Content_Listing.aspx

ACTION ITEM

WSWC-11: STATE WATER CONSERVATION AND DROUGHT RESPONSE REQUIREMENTS

Intent	Responsible Party	In Coordination With
To ensure local water providers, local governments and citizens are aware of the existing state laws related to water conservation and drought response.	Local Water Provider Legal Counsel Local Government	Elected Officials/Governing Board Site Plan Review Planning and Zoning Inspection/Code Enforcement/Maintenance Staff Local Wastewater Provider County Board of Health

Action Item: Continue adopting, implementing and complying with existing state laws related to water conservation and drought response.

Sub-Tasks: Each local government shall:

1. Adopt and implement the Georgia State Minimum Standard Plumbing Code that requires high-efficiency plumbing fixtures in all new construction.
2. Implement existing Georgia state law requiring that new irrigation systems in the Metro Water District be installed with a rain shutoff sensor.
3. Coordinate with and provide support to the local water provider as necessary to implement all responsibilities pursuant to the Drought Management Rule, and if any inconsistencies are identified, then update such plans to ensure they are consistent with the Drought Management Rule.

Each local water provider shall:

4. Adopt and implement an ordinance or policy to measure the use of each unit in new multi-unit residential, retail and light industrial buildings based on the measured quantity of water used by each unit, as required by and subject to the exceptions in O.C.G.A. § 12-5-180.1.
5. Comply with water conservation plan and drought contingency plan prepared in connection with any application for a new or modified surface or ground water withdrawal permit. See Georgia Rules and Regulations, Chapter 391-3-6-.07(4)(b)(8) and (9) and 391-3-2-.04(11).
6. Review the water conservation plan and drought contingency plan for consistency with the Drought Management Rule, and if any inconsistencies are identified, then update such plans to ensure they are consistent with the Drought Management Rule.
7. Coordinate with and request support from local government(s) as necessary to implement all responsibilities under the drought management rule, including applicable drought response strategies under drought response level 1, 2, 3 or 3 plus pursuant to the Drought Management Rule (Georgia Rules and Regulations, Chapter 391-3-30).

Description: This Action Item consists of existing state laws related to water conservation. These measures help improve water system efficiency, encourage water conservation and promote consistent and uniform responses to droughts.

Implementation Guidance: Each local government and local water provider retains an independent obligation to identify, understand and comply with state laws. The laws listed in this action item may be amended, replaced or repealed from time to time, and the list in this Action Item may not be a complete list of laws related to water conservation and drought response.

For Sub-Task 4, sub-metering is now covered by state law instead of a stand-alone Action Item in this Plan. The terms "new multi-unit residential, retail and light industrial buildings" likely refer to zoning classifications as opposed to customer classifications that a local water provider uses for billing. Much of the public information available on this sub-metering requirement focuses on its applicability to new multi-unit residential buildings, but local water providers should consider how to apply this requirement to retail and light industrial buildings, in accordance with and subject to the exceptions in O.C.G.A. § 12-5-180.1.

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

Resources:

- Georgia EPD, Existing Rules and Corresponding Laws, https://epd.georgia.gov/existing-rules-and-corresponding-laws
- Georgia State Minimum Standard Plumbing Code, http://www.dca.state.ga.us/development/constructioncodes/programs/codeAmendmentsPlumbing.asp

ACTION ITEM

WSWC-12: REQUIRE NEW CAR WASHES TO RECYCLE WATER

Intent	Responsible Party	In Coordination With
Reduce water use by conveyor car wash facilities. **Points of Integration** This measure should result in decreased water demands, as well as decreased wastewater flows.	Local Government	Elected Officials/Governing Board Legal Counsel Site Plan Review Planning and Zoning Inspection/Code Enforcement/Maintenance Staff Local Wastewater Provider County Board of Health

Action Item: Each local government shall adopt 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: Substantial water savings can be realized by improving the efficiency of commercial car wash water use through the adoption of water recycling systems.

Implementation Guidance: 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 Metro Water District has developed a model ordinance on new car wash water recycling as a resource for local governments. All policies must be written policies that either include their date of adoption or are accompanied by other documents (letters, emails, memoranda, etc.) 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.

Resources:

- Metro Water District, Model Ordinance to Require New Car Washes to Recycle Water, September 2, 2010, http://documents.northgeorgiawater.org/Car_Wash_Ordinance_9-02-10.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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ACTION ITEM

WSWC-13: WATER WASTE POLICY

Intent	Responsible Party	In Coordination With
To reduce water waste such as outdoor leaks and improper irrigation. **Points of Integration** This Action Item should result in decreased water demands. Watershed planning implications include reducing the volume of flows entering the stormwater collection system.	Local Government	Elected Officials/Governing Board Legal Counsel Site Plan Review Planning and Zoning Inspection/Code Enforcement/Maintenance Staff Local Water Provider County Board of Health

Action Item: Each local government shall adopt a water waste ordinance or policy to reduce outdoor water waste.

Description: Water waste means the excessive application of water that results in water flowing down any curb and gutter, street or storm drain or onto an adjacent property.

Implementation Guidance: Water waste policies and ordinances can range from simple statements that prohibit the waste of outdoor water to more detailed policies and ordinances that specify types of outdoor water waste. Non-compliance with such provisions may be treated as a municipal code violation. Violators should be warned and could potentially be subject to monetary penalties or termination of water service. Action Item WSWC-11 addresses water waste and conservation, and coordinated implementation of these two Action Items is advised. All policies and ordinances must be written policies that either include their date of adoption or are accompanied by other documents (letters, emails, memoranda, etc.) that establish when the written policy was adopted.

Resources:

- Metro Water District, Water Waste Policy or Ordinance, March 1, 2012, http://northgeorgiawater.org/education-awareness/technical-resources/

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ACTION ITEM

WSWC-14: WATER SYSTEM ASSET MANAGEMENT

Intent	Responsible Party
To facilitate effective operation and maintenance of the system to minimize water system leakage and to ensure proper functioning. **Points of Integration** This Action Item improves the management and efficiency of the water system. Watershed, wastewater and water distribution personnel can work together, with cross-training, to identify infrastructure problems in the field.	Local Water Provider

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

Sub-Tasks: Each local water provider shall:

1. Develop a map of the water distribution system and assets. All local water providers shall develop digital GIS water system mapping by January 1, 2021.
2. Develop a written asset management program to prioritize and implement activities to inspect, maintain and rehabilitate the local water system components.

Description: The condition of water infrastructure in the Metro Water 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.

Implementation Guidance: 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 Metro Water 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).

Resources:

- GAWP, Asset Management Committee, A Guide to Asset Management for Small Water Systems, July 2015 http://c.ymcdn.com/sites/www.gawp.org/resource/collection/244A5665-6A99-4A34-BD64-AAC465A2DB88/Small_Water_Systems_Guide_2015.docx
- GAWP, 2015 Pamphlet, 10 Questions A Small System Should be Asking About Asset Management Planning, http://c.ymcdn.com/sites/www.gawp.org/resource/collection/244A5665-6A99-4A34-BD64-AAC465A2DB88/2015_Pamphlet_for_Small_Water_Systems.pdf

ACTION ITEM

WSWC-15: WATER LOSS CONTROL AND REDUCTION

Intent	Responsible Party
To control and reduce local water provider's real losses. **Points of Integration** This Action Item improves the management and efficiency of the water system. Watershed, wastewater, and water distribution personnel can work together, with cross-training, to identify infrastructure problems in the field.	Local Water Provider

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. Comply with Georgia EPD's Water Supply Efficiency Rule (see Georgia Rules and Regulations, Chapter 391-3-33) and any related guidance that may be issued from time to time [the "Water Supply Efficiency Rule"], including but not limited to the requirements for water loss audits, reporting and demonstration of progress.
2. Track key metrics from the AWWA water audit annually as required by the Georgia Water Stewardship Act and the Water Supply Efficiency Rule.
3. For each local water provider with density greater than 32 connections per mile of main and real losses above 60 gallons per day per connection (based on 2013 water loss audit results), adopt a 2025 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 2025 should continue cost-effective water loss controls and initiate progress toward 35 gallons per day per connection.
4. For each local water provider with density greater than 32 connections per mile of main and real losses are between 35 and 60 gallons per day per connection (based on 2013 water loss audit results), adopt a 2025 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 2025 should continue cost-effective water loss controls by setting new individualized goals and demonstrating progress as required by the Water Supply Efficiency Rule.
5. If a local water provider required to adopt a target pursuant to Sub-Tasks (3) and (4) above reasonably believes after detailed analysis that the applicable 2025 goal exceeds its system-specific economic level of leakage, then the local water provider may send a notice to the District Chairperson by no later than July 1, 2018 establishing a new 2025 goal. See implementation guidance below for details on this notice.

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

Implementation Guidance: 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 Metro Water 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 Georgia DNR 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 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 AWWA Free Water Audit Software ® uses the 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. 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 2025 goals in the Sub-Tasks (3) and (4) are based on an analysis of the latest published water audit results (2013 calendar year) for local water providers in the Metro Water District. In 2013, the median real water losses for local water providers with densities of greater than 32 connections per mile of main was 34.5 gallons per day per connection. Progress towards meeting the 2025 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 (3) and (4), demonstrating progress will be based on gallons per day per connection.

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, which provides the overall reliability of the results. Target and goal setting is not recommended in the software or by AWWA until 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 on key inputs. Key inputs include Volume From Own Sources (or Water Imported), Master Meter Error Adjustments, Billed Metered and Customer Metering Inaccuracies. Specific activities that can be performed to improve the data grades are listed in the water audit software.

The 2025 goals in Sub-Tasks (3) and (4) 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 2025 goals as demonstration of progress.

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 2025 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 cost, respectively, found in the water audit.

For any local water provider sending notice of a new 2025 goal under Sub-Task (5), the new 2025 goal and the form and substance of the related notice to the Metro Water District must be approved by the local water provider's governing body. The notice must include a detailed summary of their analysis and attach detailed data supporting their determination of their system-specific economic level of leakage. If a local water provider does not send a notice changing its 2025 goal by the deadline of July 1, 2018, then the 2025 goal shall apply.

Resources:

- AWWA, M36: Water Audits and Loss Control Programs, Fourth Edition, 2016, http://www.awwa.org/store/productdetail.aspx?productid=51439782
- Water Research Foundation, Water Audits and Real Loss Component Analysis, 2015, http://www.waterrf.org/Pages/Projects.aspx?PID=4372
- AWWA, Water Loss Control Resource Community, **Free Water Audit Software v5.0** and Water Audit Software and Compiler **v5.0**, 2014, http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx
- GAWP, Water Loss Auditing and Efficiency Reporting Guidance, Georgia Water Loss Control Manual, Version 2.0, March 2016, http://www.gawp.org/?page=WaterLossAudits

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ACTION ITEM

WSWC-16: LOCAL PUBLIC EDUCATION PROGRAM

Intent	Local Responsibility	In Coordination With
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. **Points of Integration** The development and implementation of an integrated education program is encouraged. Water conservation education can be integrated with education regarding watershed management, septic systems, and wastewater to emphasize the interconnected nature of water resources and their management.	Local Water Provider	Stormwater Management Staff Local Wastewater Provider

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. Promote the EPA WaterSense New Homes program.
5. Provide information on water efficient landscape practices to residential water customers.

Description: 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.

Implementation Guidance: 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 lists 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 developed by the Metro Water District to educate customers on their water use through a self-water assessment.
- Local water providers may distribute information developed through the EPA WaterSense New Homes program to local developers, architects, engineers and builders interested in building higher water efficient homes.
- Water providers and local governments may use the Water-Wise Landscape Guide for the Georgia Piedmont developed by the Metro Water District and UGA Extension to educate customers on water efficient landscape practices.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing education resources for local governments and utilities to use in their local public education programs. A list of available resources is provided on the Resources pages of the Metro Water District website, and it includes links and downloadable documents.
- Centrally acquiring high-efficiency retrofit kits or identifying affordable, quality-tested models for local water providers.
- Assisting members in the development of their local education programs

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, http://documents.northgeorgiawater.org/HouseholdWaterAudit.pdf
- EPA, WaterSense Labeled Homes, information page, https://www3.epa.gov/watersense/new_homes/
- 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 Action Items

The forecasts developed for this Plan project that wastewater demands in Metro Water District will be 786 to 831 MMF-MGD in 2050. 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 Metro Water District on a county-by-county basis. The Action Items below, along with Appendix B, describe the plan for meeting the Metro Water 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 2050. This plan indicates that by 2050 the region will have the following:

- 13 new wastewater treatment facilities
- 54 expansions of existing wastewater treatment facilities
- 24 existing wastewater treatment facilities that will continue to be in use without expansion
- 9 decommissioned wastewater treatment facilities

It is projected that 96 percent of the wastewater volume collected by local wastewater providers in 2050 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. See the Metro Water 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 Metro Water District through 2050. 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

There are approximately 16,000 miles of sewers and more than 450,000 manholes in the Metro Water District. Sewers and manholes in the District range in age from new to over 100 years old. As the system continues 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 Metro Water District have found inspection and maintenance programs to be very helpful in meeting their permit obligations, reducing or preventing 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 can 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:

- ***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 Metro Water 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 Metro Water 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

Intent	Responsible Party
To enhance the reliability of wastewater pumping stations and provide more clarity for auditing purposes. **Points of Integration** Enhanced reliability of wastewater pumping stations sustains watershed health and can support source water protection by reducing the risk of SSOs.	Local Wastewater Provider

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 (see Action Item INTEGRATED-4).
2. For all newly constructed major (one MGD or greater firm capacity) wastewater pump stations, or those receiving an upgrade to a firm capacity of one MGD or greater, provide a dedicated secondary power supply, emergency generator(s) or dedicated stand-by pumping system to allow continued firm pumping capacity with the primary power supply out of service.
3. For wastewater pump stations with firm capacity less than one MGD without a dedicated secondary power supply or emergency generator, provide, at a minimum, to enhance reliability:
    a. Backup power connection via an emergency generator receptacle
    b. Availability of a portable utility-owned or rental generator
    c. Quick connections for a stand-by pumping system
    d. Availability of a portable utility owned or rental pumps or an overflow basin sized for at least 24-hour overflow protection under maximum month average daily flow conditions
4. Compliance with this action item shall be achieved by January 1, 2021.

Description: Reliable wastewater pumping systems are important in the Metro Water District for a number of reasons. Many areas of the Metro Water 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 Metro Water 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 resource needs of the Metro Water District, reliable infrastructure will be needed to pump and treat the flow.

Implementation Guidance: 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 (i.e., 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.

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 water providers that provide for the connection of a portable generator for operating wastewater pump stations with firm capacity less than one MGD should consider access to the site during extreme flood, snow or icy conditions when backup power is more likely to be needed.

Considerations for Enhanced Implementation: An optional consideration for enhanced implementation is for facilities upstream from drinking water intakes or recreational waters to consider providing even greater enhanced reliability, including additional mechanical redundancy and offline storage for wastewater pump stations.

Resources:

- Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Recommended Standards for Wastewater Facilities, 2004 Edition, see Section 47 Emergency Operation, http://10statesstandards.com/wastewaterstandards.html#47

ACTION ITEM

WW-2: SEWER SYSTEM INVENTORY AND MAPPING

Intent	Responsible Party	In Coordination With
To improve documentation of existing infrastructure for improved planning and targeted infrastructure improvements. **Points of Integration** Wastewater system maps can be used to support watershed health and source water protection by improving the management of the system and reducing the risk of inadvertent spills.	Local Wastewater Provider	Local Government Site Plan Review Local GIS Department

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. Create a sewer system map based on the database. All wastewater utilities shall develop digital GIS sewer system mapping by January 1, 2021.
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: 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.

Implementation Guidance: 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, entering 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 on-going 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Update standards to require new developments to provide digital as-built data suitable for incorporation into GIS maps of the wastewater system
- Make use of electronic handheld device technology to collect and upload data into the electronic map. Handheld devices reduce the need for cumbersome printing of map books and the liability of having old, inaccurate maps in the field. While not required, these automatic data collection tools may be helpful to larger utilities as a tool for efficient map maintenance. Use of these devices can help operators and maintenance personnel to better understand their system and support relatively easy retrieval of locational and attribute data when needed for operational, maintenance and management purposes.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Developing GIS base maps for local governments and local wastewater providers
- Supporting GIS mapping by wastewater utilities by providing datasets, ArcGIS interactive online mapping tools and a GIS user group for information through ARC

Resources:

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

ACTION ITEM

WW-3: SEWER SYSTEM MAINTENANCE MANAGEMENT

Intent	Responsible Party	In Coordination With
To improve sewer system maintenance to address collection system capacity and condition issues, which might result in SSOs. **Points of Integration** This Action Item improves the management of the wastewater system and reduces the risk of SSOs, which supports watershed health and source water protection.	Local Wastewater Provider	Site Plan Review Maintenance Staff Local GIS Department

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: 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.

Implementation Guidance: 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 (see 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, stream banks 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.

ACTION ITEM

WW-4: SEWER SYSTEM INSPECTION PROGRAM

Intent	Responsible Party	In Coordination With
To ensure sewer system assets are inspected and cleaned on a regular basis to reduce SSOs. **Points of Integration** This Action Item improves the management of the sewer system and reduces the risk of SSOs, which supports watershed health and source water protection. Watershed, wastewater, and water distribution personnel can work together, with cross-training, to identify infrastructure problems in the field.	Local Wastewater Provider	Inspection/Code Enforcement/Maintenance Staff

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: 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.

Implementation Guidance: 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

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Inspect portions of the collection system that are adjacent to impaired waterbodies more regularly than other areas of their system. Surface water data revealing high fecal coliform levels, for example, may indicate a sewer line failure. Therefore, increased inspections of these areas may be a priority, depending on local conditions.
- Use standards for the assessment of gravity pipelines and manholes developed by National Association of Sewer Service Companies or any other method of assessing infrastructure condition.
- Use handheld devices connected to inventory databases for documentation of inspections.
- Cross-train sewer inspection personnel with watershed protection and water distribution system personnel to increase opportunities for identifying infrastructure problems in the field.

ACTION ITEM

WW-5: SEWER SYSTEM REHABILITATION PROGRAM

Intent	Responsible Party	In Coordination With
To restore structural integrity of sewer systems and reduce hydraulic loads by reducing I/I. **Points of Integration** By coordinating with local watershed monitoring efforts (Action Items WATERSHED-10 and 11), rehabilitation projects may be prioritized where local surface waters have been directly impaired due to sewer overflows. Additionally, coordination of wastewater and stormwater programs can help to identify cross connections and eliminate direct stormwater inflow to the sewer system.	Local Wastewater Provider	Site Plan Review Neighboring Wastewater Providers, as necessary Stormwater Management Staff Elected Official/Governing Board

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: 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 Metro Water District maintain ongoing sewer rehabilitation programs and have accomplished substantial projects through these programs.

Implementation Guidance: 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 Items WATERSHED-10 and WATERSHED-11 will generate data on watershed health, and state water quality monitoring information can also support this assessment (e.g., 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.

ACTION ITEM

WW-6: CAPACITY CERTIFICATION PROGRAM

Intent	Responsible Party	In Coordination With
To ensure adequate capacity to accept new flows to minimize SSOs **Points of Integration** A capacity certification program reduces the likelihood of sewer overflows and thereby promotes and sustains watershed health and potential source water protection.	Local Wastewater Provider Local Government	Site Plan Review Planning and Zoning

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

Sub-Tasks: Each local wastewater provider 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.

Each local government shall:

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

Description: A capacity certification program can reduce the number of SSOs in the Metro Water 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 Metro Water 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.

Implementation Guidance: 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.

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, 6th Edition, https://www.e-wef.org/Store/ProductDetails.aspx?productId=5307

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ACTION ITEM

WW-7: GREASE MANAGEMENT PROGRAM

Intent	Responsible Party	In Coordination With
To reduce SSOs and plant operational problems related to FOG and Rags. **Points of Integration** A grease management program reduces the risk of SSOs, and thereby promotes and sustains watershed health and potential source water protection.	Local Government Local Wastewater Provider	Inspection/Code Enforcement Staff County Board of Health Elected Officials/Governing Board

Action Item: For wastewater providers who do not have an approved CMOM with Georgia EPD, 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 government and local wastewater provider 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: 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 Metro Water 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 Metro Water 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.

Implementation Guidance: 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 during future Plan Implementation Surveys from the Metro Water District (see Section 6.2).

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 Metro Water District can choose to implement an inspection program or delegate inspection responsibilities to a designee. The Georgia 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 (letters, emails, memoranda, etc.) 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Analyze sewer blockage records on a continual basis to provide management feedback on occurrence trends, which could support proactive efforts to further reduce grease blockages and sewer spills.
- Inspect and track the collection, transport and disposal of grease trap waste using a manifest system. Tracking the disposal of grease trap waste with a manifest system may help communities with challenges related to improper grease disposal or illicit discharges.
- Provide an incentive program for grease trap or interceptor installation downstream of new multi-family units or other known grease buildup locations. Utility operational experience indicates that SSOs due to grease buildup and blockage is most prevalent downstream from areas of concentrated development. New multi-unit facility owners may consider plans for separating kitchen and sanitary wastewater for each “individual” unit, with “stub-out” locations to accommodate a grease interceptor for each unit of the multi-unit facility. Where separate interceptors per unit are not practical due to suitable physical property space and sewer gradient, options for treating flow from multiple units may be explored.

Opportunities for Technical Assistance: The Metro Water District’s Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing fact sheets and door hangers (in English and Spanish) for public education about proper disposal of FOG and rags
- Developing and distributing a model ordinance as a resource for local governments to use to address Sub-Task 1

Resources:

- Southeastern F.O.G. Alliance, https://www.southeasternfogalliance.org/
- Metro Water District, F.O.G. Fact Sheet, http://northgeorgiawater.org/wp-content/uploads/2015/05/Final_FOG_Flyer.pdf

ACTION ITEM

WW-8: SEWER SYSTEM OVERFLOW EMERGENCY RESPONSE PROGRAM

Intent	Responsible Party	In Coordination With
To minimize watershed impacts from SSOs. **Points of Integration** An SSO emergency response program helps to promote and sustain watershed health and protect drinking water sources. Wastewater providers should notify appropriate staff as soon as possible regarding any SSOs or spills that might affect surface waters or drinking water supplies both within and downstream of the local wastewater provider's jurisdiction.	Local Wastewater Provider	Local Stormwater Management Staff County Board of Health Georgia EPD

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: 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.

Implementation Guidance: 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Develop procedures to document spill locations and collect other necessary data into GIS or other appropriate mapping software.
- Analyze collected spill data to provide management feedback on occurrence trends, potential maintenance prioritization or other proactive efforts which can help reduce the number and volume of SSOs.

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

Intent	Responsible Party	In Coordination With
To ensure effectiveness of sewer system inspection and maintenance program. **Points of Integration** This Action Item improves the management of the sewer system and reduces the risk of SSOs, which supports watershed health and source water protection. Watershed, wastewater, and water distribution personnel can work together, with cross-training, to identify infrastructure problems in the field.	Local Wastewater Provider	Site Plan Review Local Water Provider

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: 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.

Implementation Guidance: 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Consider additional training elements that may be needed as the sewer system changes over time.
- Cross-train sewer inspection personnel with watershed protection and water distribution system personnel to increase opportunities for identifying infrastructure problems in the field.
- Provide cross training to other staff to increase awareness and supplement the efforts of the traditional inspections staff, including transportation, sheriff/police, code enforcement, bus drivers, etc.

ACTION ITEM

WW-10: LOCAL PUBLIC EDUCATION PROGRAM

Intent	Responsible Party	In Coordination With
To increase knowledge and awareness of water resource protection with the goal of building public support for local actions and activities as well as long term behavior change. **Points of Integration** The development and implementation of an integrated education program is encouraged. Public education can be integrated to address water conservation, watershed management, septic systems and wastewater in order to emphasize the interconnected nature of water resources and their management.	Local Wastewater Provider	Stormwater Management Staff County Board of Health Local Water Provider

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: 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.

Implementation Guidance: 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.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing education resources for local governments and utilities to use in their local public education programs. A list of available resources is provided on the Resources pages of the Metro Water District website, and it includes links and downloadable documents.
- Assisting members in the development of their local education programs

Resources:

- Metro Water District, Public Education and Awareness Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/

- Georgia F.O.G. Alliance, http://www.georgiafog.com/homepage
- Metro Water District, F.O.G. Fact Sheet, http://northgeorgiawater.org/wp-content/uploads/2015/05/Final_FOG_Flyer.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/portal/gwinnett/Departments/PublicUtilities/PublicEducation/FOG/Home

5.4 Watershed Management Action Items

Land use development within the Metro Water 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 as described in more detail in Section 3.5. The Watershed Management Action Items are designed to help mitigate adverse impacts of land development.

The Metro Water District's 2003 and 2009 Watershed Management Plans created a strong foundation of strategies and management measures for meeting watershed management goals. Since 2003, local jurisdictions in the Metro Water District have actively implemented these measures in an effort to meet their local permit requirements. From this foundation, this Plan focuses on adapting the 2003 and 2009 Plans' management measures to better respond to the most current regulatory requirements, simplifying language to make requirements as concise as possible for local governments and address basin-specific priorities identified in the River Basin Profiles in Appendix A. As a result of this evaluation, the Watershed Management Action Items were updated to:

- Help manage and mitigate sources of nonpoint source pollution.
- Support continued implementation of existing stormwater management measures and model ordinances.
- Facilitate closer coordination of Plan requirements with most recent MS4 permits and wastewater discharge permits (as described in Georgia EPD-approved Watershed Protection Plans).
- Support the monitoring of watershed health to support future management and planning.
- Support integrated water resources planning and management.

Action Items are management measures to be performed at the local level by the Metro Water 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 waterbodies.

As listed above, many Action Items coordinate with other permit requirements. However, not all local governments in the Metro Water District are subject to an MS4 or wastewater discharge permit. The Action Items provide details to describe how these local governments without MS4 permits are to comply with the requirements. This description for non-permittees is typically more detailed than for permittees, because permittees are directed to follow their permit requirements to comply with the Action Item.

The District encourages GAEPD 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 with GAEPD and work collaboratively to determine the best approach for using this data.

Some Action Items that were previously found in the Watershed Management Plan are now a part of the Integrated Water Resources Action Items (Section 5.1). These include the Action Items related to source water assessment and water supply watershed protection, sanitary sewer and septic tank coordination, and land use planning.

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ACTION ITEM

WATERSHED-1: POST-DEVELOPMENT STORMWATER MANAGEMENT

Intent	Responsible Party	In Coordination With
To protect long-term water quality by effectively managing runoff from developed areas. **Points of Integration** Plan reviews conducted by other departments, particularly water and wastewater providers related to new development should be coordinated with the stormwater review procedure. Development review process and design standards and criteria are included in this Action Item to demonstrate the dependency of these actions.	Local Government	Stormwater Management Staff Site Plan Review Inspection/Code Enforcement Staff Elected Officials/Governing Board Planning and Zoning Legal Counsel Maintenance Staff

Action Item: Adopt a post-development stormwater management ordinance, a local design manual and a site plan development plan review and inspection process to address post-development stormwater management.

Sub-Tasks: Each local government shall:

1. Adopt the Metro Water District Model Post-Development Stormwater Management Ordinance for New Development and Redevelopment Ordinance 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 and implement site plan reviews for development plans based on the GSMM or equivalent local design manual.
3. Require maintenance agreements on all new post-construction stormwater facilities, including local inspections.
4. Develop a site development plan review and inspection process and checklist(s) that lists stormwater and watershed management related requirements.

Description: Post-construction stormwater management includes program elements that provide legal authority, design standards and review process, maintenance agreements and other related activities in order to provide for long-term management of runoff from developed areas and protection for water quality.

Implementation Guidance: The Metro Water District Model Post-Development Stormwater Management Ordinance for New Development and Redevelopment Ordinance establishes development regulations for mitigating the long-term water quality and quantity impacts from stormwater runoff that result from land cover changes and land use activities. Local governments are to adopt the model ordinance, or an equivalent ordinance or regulations, that:

- Requires a post-development stormwater management plan for all development and redevelopment that adds 5,000 square feet of impervious cover or more than one acre of disturbance. This plan must specify how the development will mitigate the stormwater runoff quality and quantity impacts.
- Adopts the GSMM or develops a 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 control facilities. Privately maintained structural stormwater controls approved under this ordinance must have a 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 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.

This Action Item consolidates multiple actions that were previously described separately in the 2009 Plan, including 5.A.1 – Post-Development Stormwater Management Ordinance, 5.C.1 – Integrated Development Review Process, 5.C.2 – Stormwater Management Design Review Criteria and Standards. Post-development stormwater management 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, the development regulations must provide the necessary enforcement mechanisms.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Implement a Runoff Reduction-based Ordinance: EPA provides examples of more protective ordinances on its website. As an added incentive toward green infrastructure practices, runoff reduction ordinances can require a runoff reduction volume of the first one inch of rain in lieu of treatment of the first 1.2 inches of rain for new development and redevelopment. The City of Atlanta Department of Watershed Management revised its Post-Development Stormwater Management Ordinance to be more protective by including runoff reduction requirements for smaller more frequent storm events. This approach is also being used in other parts of the country where there is a critical need to improve infiltration and reduce the amount of stormwater runoff.
- Incentivize Redevelopment Projects: From a watershed perspective, redevelopment activities are often preferred over new (greenfield) development as they often involve less land disturbance and fewer construction phase impacts, but also provide an opportunity to address previous stormwater quality and quantity impacts. Retrofitting existing detention facilities and regional stormwater facilities are two common strategies for managing stormwater on redeveloped sites. Some communities may choose to incentivize redevelopment activities. The Water Environment Research Federation provides guidance on possible incentives on its website.
- Implement Alternative Arrangements for Residential Stormwater Maintenance: The post-development model ordinance requires that structural stormwater controls for new residential subdivisions are located on an individual lot of record. Typically, these structural facilities will be the responsibility of a

homeowners association. Due to issues with the nature of homeowner associations, local governments may consider alternate arrangements for ensuring long-term inspection and maintenance including accepting maintenance responsibility.

- Require Electronic As-Built Submission: To ensure that stormwater infrastructure inventories remain up-to-date, communities may choose to require electronic as-built submissions in either an AutoCAD or GIS format. Staff will need to check the detail and accuracy of the electronic submissions, including use of correct reference locations.
- Implement Stream Crossing and Culvert Design Policy: To minimize the negative habitat impacts of traditional stream crossings, local governments may consider implementing a stream crossing and culvert design policy for stream crossings, including clear span bridges, bottomless culverts (arched culverts) and embedded culverts. The U.S. Forest Service provides guidance and an interactive tool related to aquatic organism passage on its website. Additionally, in Georgia, the U.S. Fish and Wildlife Service provides a handbook detailing regulations and ecological considerations for stream crossings.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing support to communities, as requested, with runoff reduction ordinance implementation through information on lessons learned and key success elements.

Resources:

- GSMM, 2016 Edition, http://www.georgiastormwater.com
- 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, https://www.atlantawatershed.org/stormwaterordinance
- EPA, guidance on redevelopment activities, https://www.epa.gov/smartgrowth/stormwater-guidelines-green-dense-redevelopment
- Water Environment Research Federation, Using Incentive Programs to Promote Stormwater Best Management Practices, http://www.werf.org/liveablecommunities/toolbox/incentives.htm
- Metro Water District, Model Post-Development Stormwater Management Ordinance for New Development and Redevelopment Ordinance
- 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

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ACTION ITEM

WATERSHED-2: CONSTRUCTION EROSION AND SEDIMENTATION CONTROL

Intent	Responsible Party	In Coordination With
To reduce soil erosion from active development sites and enforce applicable erosion and sedimentation control provisions in order to reduce adverse impacts to watershed health. **Points of Integration** Proper compliance with the action reduces siltation and habitat impacts in local streams and downstream reservoirs, improving water supply and water quality.	Local Government	Stormwater Management Staff Site Plan Review Inspection/Code Enforcement Staff

Action Item: Comply with the requirements of the Georgia Erosion and Sedimentation Act (GESA).

Sub-Tasks: Each local government shall comply with one of the following:

1. Communities that do not have Local Issuing Authority (LIA) status through Georgia EPD must ensure that local public projects are properly permitted with Georgia EPD. Efforts will be employed to ensure that locally funded projects comply with all erosion and sedimentation control requirements.

   or

2. Communities that have LIA status are to review, inspect and enforce erosion and sedimentation control requirements at the local level, including:

   a. Educate applicants of the Notice of Intent requirement under the NPDES Construction Permit and ensure the mandatory fee per disturbed acre is collected as described in the Notice of Intent. Plans must be submitted to the local Soil and Water Conservation District for review and approval prior to issuing a land disturbance permit, unless a memorandum of understanding has been signed by the LIA, the local Soil and Water Conservation District, and the Georgia SWCC which allows the LIA to conduct in-house reviews.

   b. Ensure that erosion and sedimentation control measures are properly designed, installed and maintained.

   c. Verify that site personnel involved with the project are certified to perform land disturbance activities; verification can be checked on the Georgia SWCC website.

   d. Identify deficiencies and take enforcement actions where necessary.

Description: GESA protects Georgia's waters from soil and erosion and sediment deposition. Local governments with implementing authority (LIAs) administer the requirements of the Act locally. All local governments should ensure that local projects comply with the requirements of the Act in order to reduce erosion and protect watershed health.

Implementation Guidance: GESA requires permits for land-disturbing activities on sites one acre or larger, as well as an approved erosion and sedimentation control plan for the activity. In addition, sedimentation and erosion control regulations require undisturbed buffers that, for all projects, prohibit most development

activity within 25 feet of most streams and 50 feet for streams classified as trout streams (Georgia Rules and Regulations, Chapter 391-3-7.05).

LIAs are audited periodically for compliance by the Georgia SWCC. Communities that pass their LIA audits are considered in compliance with this Action Item. The most recent letter of compliance received from the Georgia SWCC is adequate to document compliance.

The Manual for Erosion and Sedimentation Control in Georgia (Green Book) provides details on the proper design of erosion and sedimentation control methods. The Georgia SWCC also publishes a plan review checklist related to erosion and sedimentation control requirements. Additionally, several organizations and groups offer the state-mandated training and certifications courses on erosion and sedimentation control to professionals involved with land disturbance.

Considerations for Enhanced Implementation: An optional consideration for enhanced implementation is to identify opportunities for off-stream regional stormwater control structures, green infrastructure and other watershed improvements as part of erosion and sedimentation control plan reviews and inspections. These projects are typically more feasible and cost-effective if conducted in conjunction with other land disturbance activities.

Resources:

- Manual for Erosion and Sediment Control in Georgia, https://gaswcc.georgia.gov/sites/gaswcc.georgia.gov/files/Manual_for_Erosion_and_Sediment_Control_in_Georgia_Sixth_Edition_2014.pdf
- GSMM, 2016 Edition, http://www.georgiastormwater.com
- Georgia SWCC, verification portal land disturbance activities certification, https://gaswcc.georgia.gov/check-exam-scores-or-verify-current-certification

ACTION ITEM

WATERSHED-3: FLOODPLAIN MANAGEMENT

Intent	Responsible Party	In Coordination With
To minimize future flooding impacts and integrate floodplain management with stormwater management during the land development process. **Points of Integration** Local governments may incorporate the adoption of floodplain management/flood damage prevention ordinances with a larger program to promote green infrastructure approaches to stormwater management.	Local Government	Local Floodplain Administrator Stormwater Management Staff Site Plan Review Planning and Zoning Legal Counsel Inspection/Code Enforcement Staff Maintenance Staff

Action Item: Adopt a floodplain management and flood damage prevention ordinance, develop and maintain floodplain maps, and incorporate ordinance 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 other regulations.
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 (one 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: Floodplain management involves the designation of flood-prone areas and the management of their uses. It is also intended to minimize modifications to streams, reduce flood hazards and protect 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.

Implementation Guidance: 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 Metro Water District Model Floodplain Management/Flood Damage Prevention Ordinance is intended 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 are to adopt the model ordinance, or an equivalent ordinance or regulations, 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 the Sub-Tasks. 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 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 re-development, 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Prohibit development in the floodplain to the maximum extent practicable. Flood damage and risk to properties can be minimized through prohibiting development within the existing or future conditions floodplain. Additionally, establishing a buy-out program for repetitive loss properties may be beneficial to reducing or eliminating existing properties within the floodplain.

- Identify Critical Facilities: For some activities and facilities, the consequences of the facility being flooded are so severe that additional flood protection may be needed. Typical critical facilities include hospitals, fire stations, police stations, water and wastewater facilities, critical records storage facilities and similar facilities. These facilities may be given special consideration when formulating regulatory alternatives and floodplain management plans. A critical facility should not be located in a floodplain if at all possible. If a critical facility must be located in a floodplain, it should be provided a higher level of protection so that it can continue to function and provide services after a flood. Communities may develop emergency plans to continue to provide these services in the event of a flood. Under Executive Order 11988 regarding floodplain management, facilities subject to federal agency funding and/or permitting are required to avoid the 0.2 percent (500-year) floodplain or protect the facilities to the 0.2 percent chance flood level.
- Participate in the FEMA Community Rating System (CRS): The NFIP's CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. By participating in the CRS program, flood insurance premium rates are discounted for residents of a local jurisdiction to reflect the reduced flood risk resulting from the community actions in meeting the three goals of the CRS: reducing flood losses, facilitating accurate insurance ratings and promoting the awareness of flood insurance. Adopting and enforcing the Metro Water District's higher regulatory floodplain management standards will help a local jurisdiction to receive CRS credit points and premium reductions for its citizens. Metro Water District communities that are in compliance with this Action Item should be able to receive CRS credits under Activity 400 (Mapping and Regulations) and Activity 500 (Flood Damage Prevention) sections of the CRS program.
- Adopt Flood Study Approaches: There are currently four flood study approaches used to develop FEMA flood maps, all of which can be considered for developing local future-conditions floodplain maps. The major difference between these engineering approaches is the quantity of data available. The following methods should be considered additional enhancements to the future floodplain mapping requirement. These modeling approaches should be considered enhancements because they are above the minimum level of effort for future floodplain mapping and would be more consistent with FEMA methods. A brief description of each is provided below:
  - Detailed Study: A detailed study results in the delineation of floodplain boundaries for the one percent (base flood) and 0.2 percent annual chance storms. The one percent annual chance floodplain is mapped as Zone AE and the 0.2 percent annual chance floodplain is mapped as shaded Zone X. BFEs are established and shown on the FIRMs. A regulatory floodway is established and mapped on the FIRMs. This study method entails using the digital elevation data, supplementing the data with field surveys for channel bathymetry, detailed structure geometry and channel and floodplain characteristics in order to conduct fully detailed hydrologic and hydraulic analyses and floodplain mapping.
  - Limited Detail Study**:** A limited detail study results in the delineation of floodplain boundaries for the one percent annual chance storm. It may be mapped on the FIRMs as Zone AE (with BFEs) or Zone A, depending on the preference of the State or local jurisdiction. However, the one percent annual chance flood profile may not be contained in the FIS report and the regulatory floodway may not be shown on the FIRMs. Structures are contained in the hydraulic modeling, but only essential structure geometry is obtained from a field survey.
  - Approximate Study: A flood hazard study that results in the delineation of floodplain boundaries for the one percent annual chance storm, but does not establish BFEs. The floodplain is mapped as Zone A. Structures are not contained in the hydraulic models.

  - Re-delineation: This study method involves no new hydrologic or hydraulic analyses and only applies to detailed studies (Zone AE). Effective detailed flood elevations are used to revise the one percent and 0.2 percent annual chance flood hazard area to fit the best available topography.

  As the future-conditions floodplain maps are for local use and not for federal flood insurance purposes, local communities have wide latitude in the modeling and mapping approaches that can be utilized. However, the use of FEMA-approved methodologies is encouraged so that future-floodplain information can be added to FIRM maps (as Zone X) as well as subsequent use to update FIRM's based on community and FEMA needs.

- Participate in the Map Modernization Program: Map Modernization is a nationwide, five-year program to update the nation's FIRMs being undertaken by FEMA. Georgia EPD is the Cooperating Technical Partner to FEMA and administers the Map Modernization program in the State of Georgia. The Map Modernization program is primarily being undertaken to convert existing FIRM maps into a digital (GIS-ready) product for Georgia counties. It may incorporate completed studies into the updated maps, but the Map Modernization program will not be undertaking new studies or restudies of existing floodplains, and therefore this effort is complementary to the Metro Water District mapping requirements.
- Educate and encourage businesses, homeowners and Home Owner's Associations on floodplain management.

Resources:

- Metro Water District, Model Floodplain Management/Flood Damage Prevention Ordinance
- FEMA, NFIP 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
- Executive Order 11988: Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, https://www.whitehouse.gov/the-press-office/2015/01/30/executive-order-establishing-federal-flood-risk-management-standard-and-
- Georgia EPD, http://epd.georgia.gov/floodplain-management

ACTION ITEM

WATERSHED-4: STREAM BUFFER PROTECTION

Intent	Responsible Party	In Coordination with
To protect and stabilize stream banks, protect water quality and preserve aquatic and riparian habitat. **Points of Integration** Stream buffer protection provides a barrier to pollutants and reduces soil and stream bank erosion and thereby can protect downstream surface water supply sources and assimilative capacity.	Local Government	Stormwater Management Staff Site Plan Review Planning and Zoning Legal Counsel

Action Item: Adopt a stream buffer protection ordinance and incorporate review and enforcement procedures into development plan reviews.

Sub-Tasks: Each local government shall:

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

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

Implementation Guidance: Local governments are to adopt the Metro Water District Model Stream Buffer Protection Ordinance, or an equivalent ordinance or other regulations, 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 either as an ordinance or as part of the local development regulations. If the requirements are incorporated in the local development regulations, the development regulations must provide the necessary enforcement mechanisms.

Below are the key elements to developing an ordinance that is equivalent to the Metro Water District model ordinance:

- A local ordinance or regulations must provide for *undisturbed* 50-foot stream buffers with an additional 25-foot impervious surface setback (i.e., 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 regulations must provide guidance on how stream determinations are performed. While the mapping of all streams within the local jurisdiction is one option, the Metro Water 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.

Considerations for Enhanced Implementation: An optional consideration for enhanced implementation is that local governments may create maps that clearly identify the appropriate stream buffers within their jurisdiction and incorporate these stream buffer maps into the community's zoning maps and other community planning efforts. Mapping stream buffers for known streams may help ensure that local staff, the development community and private citizens are aware of the stream buffer requirements. Local governments have the responsibility for making stream determinations based on state guidelines for smaller, unmapped streams within their jurisdiction. Educate and encourage Home Owner's Associations to provide buffer protections for streams and ponds that may exist on their common property.

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
- Cobb County, stream buffer maps, http://www.cobbcounty.org/index.php?option=com_content&view=article&id=2171&Itemid=1081

ACTION ITEM

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

Intent	Responsible Party	In Coordination with
To prevent water pollution due to unauthorized discharges to the public stormwater system. **Points of Integration** Addressing illicit discharges to the stormwater management system can reduce the impact of pollutants in surface waters and thereby protect downstream surface water supply sources and assimilative capacity.	Local Government	Stormwater Management Staff Legal Counsel Inspection/Code Enforcement Staff Local Wastewater Provider

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 or other regulation at least as effective
2. For MS4 permittees only: Develop an 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
3. Incorporate an enforcement process into development review procedures.

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

Implementation Guidance: Local governments should adopt the Metro Water District Model Illicit Discharge and Illegal Connection Ordinance, or an equivalent ordinance or regulations, 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

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Include one or more approach in the program that goes beyond the requirements of the MS4 permit. These approaches are further defined in the Metro Water District Standards and Methodologies for Surface Water Monitoring, including commercial and industrial inspections, asset management inspections and stream walks.
- Cross-train inspections staff to look for illicit discharges and illegal connections as part of their routine system inspections. Inspections of catch basins can look for dry weather flows and staining that might indicate an illicit discharge. Also, consider cross-training sewer inspection personnel with watershed protection and water distribution system personnel to increase opportunities for identifying infrastructure problems in the field. As inspections take place throughout the community, it may be easier to identify and track the source of an illicit discharge. Inspecting ten percent of the stormwater system annually is recommended for local governments that will utilize asset management inspections as the only option for their IDDE program. However, most communities must also conduct dry weather outfall screening for compliance with their MS4 permit.
- Perform routine stream walks to identify illicit discharges with the added benefit of greater understanding of local water resources. Some local governments may elect to perform stream walks of ten percent of wadeable streams annually for their IDDE program. The survey should specifically look at outfalls under dry weather conditions and similar to outfall screenings investigate any flows during dry conditions.

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
- Center for Watershed Protection, Illicit Discharge information page, http://www.cwp.org/illicit-discharge-detection-and-elimination/

ACTION ITEM

WATERSHED-6: LITTER CONTROL

Intent	Responsible Party	In Coordination With
To provide legal authority to prohibit and penalize the littering of public or private waters. **Points of Integration** Litter control can reduce the impact of pollutants in surface waters and thereby protect downstream surface water supply sources and assimilative capacity.	Local Government	Stormwater Management Staff Inspection/Code Enforcement Staff Maintenance Staff

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 or other regulation that is at least as effective.
2. Develop inspection, violation and enforcement procedures based on the ordinance or equivalent regulation.

Description: Litter often is carried by stormwater to streams, rivers and lakes, where it contributes to water quality degradation. A litter control ordinance or regulation provides a mechanism for local governments to have the legal authority to address this source of water quality degradation.

Implementation Guidance: Local governments should to adopt the Metro Water District Model Litter Control Ordinance, or an equivalent ordinance or regulation, 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 Metro Water 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.

Considerations for Enhanced Implementation: An optional consideration for enhanced implementation is to authorize local government employees to enforce the ordinance. The local police department may deputize local employees to enforce certain aspects of local code. The model ordinance provides enforcement authority to law enforcement personnel as well as anyone "authorized, empowered and directed to enforce compliance with this article." Many communities delegate authority to code enforcement officers, environmental compliance officers, inspections staff, stormwater enforcement personnel and others to issue warnings and citations for littering.

Resources:

- Metro Water District, Model Litter Control Ordinance
- Keep Georgia Beautiful, Litter and Illegal Dumping in Georgia, information on litter control, http://www.dca.state.ga.us/environmental/kgb/illegal_dumping.html

- Metro Water District, Clean Water Campaign Report a Polluter, http://cleanwatercampaign.org/report-a-polluter/

ACTION ITEM

WATERSHED-7: PROMOTING A GREEN INFRASTRUCTURE APPROACH

Intent	Responsible Party	In Coordination With
To ensure an environmentally protective approach is promoted to minimize and prevent stormwater runoff and nonpoint source pollution. **Points of Integration** A green infrastructure approach can improve stream baseflow and groundwater recharge, thereby protecting downstream source water supplies, flows and water quality.	Local Government	Stormwater Management Staff Elected Officials/Governing Board Site Plan Review Planning and Zoning Legal Counsel Inspection/Code Enforcement Staff Maintenance Staff

Action Item: Implement development and land use policies or practices to encourage the protection of greenspace and/or the use of green infrastructure within the community.

Sub-Tasks: Each local government shall select and implement one or more of the following options that go above and beyond current MS4 requirements to address growth management for the protection of water resources by encouraging protection of open space and greenspace and use of green infrastructure:

1. Adopt protective ordinances or other local mechanisms to preserve open space and greenspace for watershed protection while accommodating development.
2. Develop and adopt a formalized Greenspace or Green Infrastructure Plan.
3. Identify impediments and barriers to the use of the green infrastructure and greener approaches to growth consistent with MS4 permit requirements for Phase I and II communities with a population greater than 10,000. Evaluate local building codes, ordinances and other regulations and provisions for potential barriers. Identify opportunities to promote the use of infiltration, reuse and evapotranspiration.

   or

4. Develop a green infrastructure program that evaluates the feasibility and applicability of different green infrastructure and low impact development practices, develops an inventory of these practices within the community and establishes inspection procedures and responsibility for green infrastructure in a manner consistent with MS4 permit requirements.

Description: Green infrastructure is defined broadly as the network of vegetated or open lands and engineered structures that promote infiltration. A green infrastructure approach includes actions that improve the functions of natural ecosystems. This will include a mix of site-specific stormwater management and larger scale greenspace management. Benefits of green infrastructure can include water quality, air quality, flood risk reduction, property value improvement, economic growth, public health benefits, recreation, community revitalization, quality of life improvement, urban heat island reduction and urban agriculture opportunities. As part of an effective watershed management strategy, it is important that green infrastructure is considered in plans, reviews and implementation.

Stormwater better site design, sustainable site design, low impact development and green infrastructure are overlapping approaches that are included within a green infrastructure approach. Encouraging these site planning and design techniques can reduce contributions to the stormwater system and have a positive benefit on local watershed health. In addition, many of these greener development approaches can reduce the costs of construction and need for infrastructure while creating more sustainable development and more livable communities. EPA provides multiple tools and analysis techniques that may be used to perform cost analyses, cost-benefit analyses, and to provide additional information on appropriate implementation of green infrastructure.

Implementation Guidance: This Action Item includes multiple options for compliance, in recognition of the many ways to promote green infrastructure and the unique watershed characteristics and management challenges and opportunities in each Metro Water District community. In considering what green infrastructure practices may be best suited to each unique watershed, it is recommended that local governments consider surface water base flows, existing impervious surface coverage, geology, soils, other hydrologic features and climate resiliency when selecting practices. Practices should be best suited both to manage runoff during wet years and to withstand drought during dry years. Additionally, jurisdictions should consider the use of native plants, which can adapt to wet and dry years, as per Volume 2, Appendix D of the 2016 Georgia Stormwater Management Manual. By considering these items, local governments will be better equipped to choose when to use green infrastructure practices and which green infrastructure practices may be best suited to their unique watershed. A green infrastructure approach can be integrated with multiple Action Items in this Plan. Local governments should include green infrastructure considerations with land use planning and policy decisions, as well as in managing and promoting growth and development. Action Item WATERSHED-1 requires post-development stormwater management, and a local government may incorporate low impact development and green infrastructure practices into the plan review and inspection process. Reviewing local code evaluation for impediments to green infrastructure can be conducted as a part of the implementation of Action Item INTEGRATED-1 regarding governmental coordination.

In considering the use of green infrastructure practices, it is recommended that local governments consider which practices will be best suited both to manage runoff during wet years and to withstand drought during dry years.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Implement green infrastructure approaches as part of implementation of Action Item INTEGRATED-1 regarding government coordination. In addition, coordination with potential partners and stakeholders will also promote green infrastructure and may include outreach to the local development community, potential corporate sustainability partners, other departments such as transportation or planning and other neighboring jurisdictions.
- Implement more than one (or all) of the options included within the Sub-Tasks. Each of these options builds a stronger level of watershed management, and local governments should consider implementing more than one (or all) of these options for a greater level of watershed management. In its broadest definition, green infrastructure is intrinsically tied to communities and their quality of life, as well as watershed health. These benefits can best be achieved through coordinated, widely distributed and diverse activities and projects to implement green infrastructure. Additional guidance is provided below:
  - Protective ordinances, zoning categories or other local mechanisms may be used to preserve greenspace and critical areas for watershed protection while accommodating development. Adopting a zoning category or planned unit development process are effective options that require close coordination with the local planning departments. The Metro Water District Model

Conservation Subdivision/Open Space Development Ordinance is one approach to preserve open space and greenspace for watershed protection and provide for non-structural management of stormwater runoff while accommodating development projects. Conservation subdivisions provide for residential designs that can allow for increased lot density in order to preserve open spaces. This approach can also be successfully applied to other zoning categories such as commercial, industrial and institutional land uses.

- Communities wishing to increase the open space and greenspace conservation may offer incentives to developers, such as expedited plan review, property tax reductions/elimination in conservation areas, increased density or bonus lots and stormwater utility fee credits.
- Tree preservation during land development can serve many important stormwater management and watershed protection functions, including stormwater runoff quantity and quality mitigation, decreased soil erosion and sedimentation, increased groundwater recharge, water conservation and riparian habitat shading. Tree protection ordinances are a mechanism that a community can use to preserve trees in land development projects.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing guidance for implementing a green infrastructure/low impact development program that is consistent with MS4 permit requirements
- Assisting communities in developing other green infrastructure/green space management programs that are tailored to their specific context

Resources:

- GSMM, 2016, http://www.georgiastormwater.com
- Georgia EPD, Phase I MS4 Stormwater Management Program Guidance, July 2014, http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Phase_I_ML_SWMP_Guidance_073114.doc
- GSMM, Coastal Stormwater Supplement, Green Infrastructure Practices, https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Section_7_Georgia_Coastal_Stormwater_Supplement_2009.pdf
- EPA, Urban Runoff: Low Impact Development, http://www.epa.gov/nps/lid
- EPA, Green Infrastructure Cost-Benefit Resources, https://www.epa.gov/green-infrastructure/green-infrastructure-cost-benefit-resources

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ACTION ITEM

WATERSHED-8: WATERSHED IMPROVEMENT PROJECTS

Intent	Responsible Party	In Coordination With
To address water quality problems and improve streams and waterbodies to meet their designated uses **Points of Integration** Local governments may consider prioritizing WIPs that benefit water supply watershed protection, address TMDL impairments or reduce pollutant loads in assimilative capacity limited surface waters	Local Government	Stormwater Management Staff Elected Officials/Governing Board Legal Counsel Local Wastewater Provider

Action Item: Identify substantially-impacted watersheds and implement 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 retrofit and restoration activities that can be conducted as WIPs as a part of a Watershed Improvement Plan.
3. Incorporate WIPs into the local Capital Improvement Plan list and develop implementation schedule.
4. Design and construct WIPs based on local implementation schedule as budgets and resources allow.

Description: WIPs reduce stormwater runoff and restore streams and waterbodies to improve water quality, meet designated use and promote sustainable watershed functioning. WIPs include structural or physical improvements (i.e., 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, trash removal and other activities.

Implementation Guidance: Each local government shall identify substantially-impacted watersheds within its jurisdiction and develop watershed improvement plans to address these impairments. At minimum, the list of substantially impacted watersheds should include areas with water quality impairment including waterbodies on the Georgia EPD 303(d) list and waterbodies 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 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, re-planting 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 he highly effective with 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 to 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 effect 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 by the public, as appropriate

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Align watershed improvement plans with the EPA list of nine key elements for a watershed plan for impaired waters in order to enhance effectiveness and maximize available funding through grant programs. The nine key elements are as follows:
    - Element 1: Causes and Sources
    - Element 2: Expected Load Reductions
    - Element 3: Management Measures
    - Element 4: Technical and Financial Assistance
    - Element 5: Information/Education Component

  - Element 6: Schedule
  - Element 7: Measurable Milestones
  - Element 8: Evaluation of Progress
  - Element 9: Effectiveness Monitoring

- Develop watershed improvement plans for each substantially-impacted watershed to include potential WIPs that are developed at a conceptual level and location within the watershed. The WIPs can be prioritized for implementation based on cost-effectiveness, local needs and objectives and feasibility. Each watershed improvement plan can provide a milestone schedule for further sub-watershed planning, if needed, and WIP design and implementation.
- Develop a public outreach or communications program to support WIP implementation and success. Depending on the size and watershed issues within each community, WIP implementation has continued to increase since 2003. In communities that have requirements for nonpoint source pollution management tied to their NDPES wastewater discharge permits, the level of WIP implementation is typically highest. In the most successful programs, multiple community benefits are evaluated when selecting WIPs for implementation. For example, WIPs tend to be most feasible and accepted by the local citizens when they not only provide water quality or aquatic habitat benefits, but also are associated with neighborhood access, such as walking trails and parks, and aesthetic appeal. Examples are provided in the success stories included in Appendix A – River Basin Profiles. Implementation feasibility is dependent on property ownership or easement acquisition, and citizen support is extremely important.
- Implement a single- or multi-jurisdiction watershed-based approach to strengthen the effectiveness of WIPs toward overall watershed protection. Stormwater and watershed management activities generally take place within political boundaries, not within the overall context of a watershed. Local governments may elect to develop and implement watershed-based detailed investigations and implementation programs, either on their own or in conjunction with neighboring local governments that share a watershed.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Supporting local governments in identifying goals and developing WIPs
- Identifying funding opportunities for watershed improvement plans and WIPs

Resources:

- EPA, Nine Minimum Elements to Be Included in a Watershed Plan for Impaired Waters Using Incremental Section 319 Funds, http://www3.epa.gov/region09/water/nonpoint/9elements-WtrshdPlan-EpaHndbk.pdf
- EPA, National Menu of Best Management Practices (BMPs) for Stormwater, https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#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-9: ONGOING STORMWATER SYSTEM MANAGEMENT

Intent	Responsible Party	In Coordination With
To provide ongoing stormwater system management in order to prevent nonpoint source pollution as a result of unmanaged runoff or infrastructure disrepair. **Points of Integration** Effective stormwater system management can reduce pollutants in downstream surface waters thereby protecting downstream source water supplies, flows and water quality. Additionally, infrastructure inspection and maintenance programs may be coordinated across stormwater, water, and wastewater asset management programs to improve efficiencies and leverage shared resources.	Local Government	Stormwater Management Staff Inspection/Code Enforcement Staff Maintenance Staff

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 local operations, including:
    a. Identification of public facilities and activities with pollution potential
    b. Development of practices and procedures to prevent pollution

Description: This Action Item consolidates several Action Items that were previously described separately in the 2009 Watershed Management Plan, including 5.D.1 – Stormwater Infrastructure Inventory, 5.D.2 – Extent and Level of Service Policy, 5.D.3 – Stormwater System Inspections, 5.D.4 – Stormwater Maintenance Program, 5.D.5 – Capital Improvement Plan and 5.E.1 – Pollution Prevention/Good Housekeeping for Local Operations. These Action Items were consolidated in this Plan because they should be implemented in combination to form a basic stormwater management program.

Implementation Guidance: 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 what type of enforcement activities 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 ten 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 2016 Georgia Stormwater Management Manual, 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 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Develop a Private Dam Inspection Program: The Georgia Safe Dam Program covers dams greater than 25 feet tall or that impound more than 100-acre-feet of water. Dams associated with small retention and neighborhood ponds are therefore not inspected by Georgia EPD. While the threat of loss of life and property damage is lower from these smaller impoundments, the breach of a dam can still have a catastrophic impact on watershed health and the local community. Local governments may choose to inspect these private dams either as part of a calendar-based or criticality-based asset management program. FEMA has published a Technical Manual for Dam Owners on the impacts of plants on earthen dams. This manual may help educate private dam owners on their responsibilities.
- Develop a CMMS: A CMMS is a type of database-derived software that performs functions in support of asset management and tracking of inspection and maintenance activities. Scheduling routine maintenance and tracking inventory supplies may create more efficient stormwater operations. Communities interested in implementing a CMMS may select from a wide range of both "out of the box" and customized solutions. The level of sophistication and cost of these systems vary greatly. Many will integrate with an existing GIS platform. In some communities, it may be possible to share a CMMS with the local wastewater provider (see Action Item WW-3).
- Perform Private Stormwater System Inspections and Maintenance: Most local governments will focus inspections and maintenance efforts on public property and publicly-maintained right-of-way. Some communities with dedicated funding sources or communities with specific private property concerns may choose to perform inspections and/or maintenance for stormwater structures on private property. These structures are beyond the scope of requirements of this Action Item. However, it is important to clarify that to implement the requirements of this Action Item, local governments must inspect private structural stormwater controls constructed since the adoption of their post-development stormwater management ordinance (Action Item WATERSHED-1). These structural controls should have maintenance agreements filed with the local government and must be periodically inspected for compliance with the maintenance agreements. Some local governments in the Metro Water District have agreed to accept maintenance responsibility for private detention ponds that meet certain minimum criteria. This type of program has generally been established in response to poor local maintenance of these structures by homeowners groups. Some communities with dedicated stormwater funding mechanisms may also choose to accept responsibility for certain residential stormwater facilities.
- Require Electronic As-Built Submission: To ensure that stormwater infrastructure inventories remain up-to-date, communities may choose to require electronic as-built submissions in either an AutoCAD or GIS format. The electronic standards can specify the line size, color and style required for each feature in the as-built submission to allow seamless integration with the jurisdiction's local AutoCAD and/or GIS maps. Importing electronic as-built records can result in a significant time savings. If a local government chooses to implement this approach, staff will need to check the detail and accuracy of the electronic as-built submissions, including use of correct reference locations.
- Develop a Street and Parking Lot Cleaning Program: Local governments may implement a street and parking lot cleaning programs to reduce nonpoint source pollutant loading to local waterways through mechanical sweeping and vacuuming of roadway and parking lot debris using heavy equipment. Many communities in the Metro Water District have street cleaning programs for the aesthetic benefits of litter removal as well as water quality benefits. Update ordinances so that pressure washing or hosing down streets, parking lots or sidewalks without a wash water collection system is treated as an illicit discharge and shall not be performed.
- Consider Development and Implementation of a Stormwater Utility: Many local governments have implemented stormwater utilities to provide a dedicated funding source to support stormwater

management program implementation. Stormwater utility fees may be a desirable funding option depending on local conditions to help achieve the recommendations in this plan and support repair and replacement of aging infrastructure.

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
- FEMA, Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams, FEMA 534, September 2005, https://www.fema.gov/media-library-data/20130726-1446-20490-2338/fema-534.pdf

ACTION ITEM

WATERSHED-10: LONG-TERM AMBIENT TREND MONITORING

Intent	Responsible Party	In Coordination With
To provide comprehensive and consistent watershed-based water quality monitoring from across the Metro Water District and to consolidate data from local monitoring efforts to better assess watershed conditions and effectiveness of watershed protection and management efforts. **Points of Integration** Long-term ambient trend monitoring can provide valuable information related to source water supply quality and may be implemented in leveraged coordination with monitoring requirements related to NPDES discharge permits.	Local Government	Stormwater Management Staff Elected Officials/Governing Board Local Wastewater Provider

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 Metro Water District Standards and Methodologies for Surface Water Monitoring with the exception of bacteria (which are addressed in Sub-Task #2 below). 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 an MOA or 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) representative stations. Develop and implement a TMDL monitoring plan for 303(d) listed stream segments, with the exception of impaired biota (see 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 Metro Water District Standards and Methodologies for Surface Water Monitorings for waterbodies 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 waterbodies. 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. Establishment of an 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 three to five years to identify long-term trends, successes and potential WIPs (see Action Item WATERSHED-8).

4. After the Metro Water District establishes a reporting process, submit data annually to the District using the electronic Watershed Assessment Data Reporting Template from Georgia EPD. As of the publication of this Plan, the Metro Water District has not yet established this process.

**Note: The Sub-Tasks above states 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 habitat and biological communities.*

Description: 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 waterbodies 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 (i.e., average, median, minimum and maximum) and statistical tests for each parameter.

Implementation Guidance: 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[a]	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

[a] 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 Metro Water 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, see Georgia EPD's guidance document.

While it is not currently a requirement to submit monitoring data to the Metro Water 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation include the following:

- Establish an MOA or MOU among neighboring local governments to centralize the collection of monitoring data in a watershed so that data can be more efficiently collected and analyzed.
- Conduct additional monitoring to further establish the success of Action Items and to monitor specific improvements or impairments within targeted watersheds. In some locations, a more rigorous long- or short-term monitoring program may be used. Many local governments in the Metro Water District have a long-term monitoring program that complies with multiple regulatory requirements. They have maintained robust long-term monitoring programs that include a greater number of monitoring stations that required by this Action Item, more or less frequent sampling events during both dry and wet weather and annual rotations among monitoring stations. An increased level of monitoring data allows these communities to better identify baseline conditions and more effectively evaluate watershed trends over time.
- Where appropriate, local jurisdictions are encouraged to work with and make use of community groups in carrying out watershed monitoring efforts. This may also provide support for other activities such as Source Water Assessments and Watershed Improvement Programs.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Developing an online platform for member governments to submit monitoring data
- Helping jurisdictions prioritize watershed projects based on water quality data
- Assisting in coordination of monitoring locations among jurisdictions to support collection of data that is useful to multiple jurisdictions

Resources:

- Georgia EPD, Watershed Assessment and Protection Plan Guidance Documents, https://epd.georgia.gov/watershed-assessment-and-protection-plan-guidance-documents
- Water Environment Research Federation, 2008, Protocols for Studying Wet Weather Impacts and Urbanization Patterns, Project Number 03-WSM-3, Project Leader: Danial Woltering, https://www.werf.org/a/ka/Search/ResearchProfile.aspx?ReportId=03-WSM-3
- Metro Water 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, http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/EPA_Approved_WQS_May_1_2015.pdf
- 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
- Georgia EPD, Stormwater Management, technical guidance page, http://epd.georgia.gov/storm-water
- Georgia EPD, Watershed Assessment and Protection Plan Data Reporting Template and Instructions, September 2016, http://epd.georgia.gov/watershed-assessment-and-protection-plan-guidance-documents
- 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

ACTION ITEM

WATERSHED-11: MACROINVERTEBRATE BIOASSESSMENT

Intent	Responsible Party	In Coordination With
To provide additional data to establish ecological health and identify overall long-term trends for pollution and water quality. **Points of Integration** Habitat and biological monitoring can serve as a useful indicator of overall watershed health, water quality, and success in water resource management implementation.	Local Government	Stormwater Management Staff Local Wastewater Provider

Action Item: This action item will sunset effective January 1, 2021 because it was duplicative with EPD requirements and/or otherwise duplicative in practice. No further action is required by local entities regarding this action item.

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ACTION ITEM

WATERSHED-12: LOCAL PUBLIC EDUCATION PROGRAM

Intent	Local Responsibility	In Coordination With
To increase knowledge and awareness of water resource protection with the goal of building public support for local actions and activities as well as long term behavior change. **Points of Integration** The development and implementation of an integrated education program is encouraged. Public education can be integrated to address water conservation, watershed management, septic systems and wastewater in order to emphasize the interconnected nature of water resources and their management and to leverage public education resources.	Local Government	Stormwater Management Staff

Action Item: Each local government shall develop and implement a local public education program that addresses watershed protection, stormwater issues and prevention of nonpoint source pollution in compliance with Action Item PUBLIC EDUCATION-1.

Description: Public education and outreach at the local level is important to raise awareness of watershed protection, stormwater issues and prevention of nonpoint source pollution 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 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. Changes in basic behavior and practices are necessary to achieve maximum, long-term improvements in water quality.

Implementation Guidance: 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.

Opportunities for Technical Assistance: The Metro Water District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Providing education resources for local governments and utilities to use in their local public education programs. A list of available resources is provided on the Resources pages of the District website, and it includes links and downloadable documents.
- Assisting members in the development of their local education programs

Resources:

- Metro Water District, Resources List, http://northgeorgiawater.org/education-awareness/technical-resources/

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5.5 Public Education

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 resource management, and it is an essential strategy for effective Plan implementation.

The Metro Water District has implemented a public education program since its original 2003 management plans. This program has supported regional water resource managers in attaining achievements including the following:

- Decrease of 30 percent per capita in water consumption since 2000
- Installation of over 110,000 high-efficiency toilets through the Toilet Rebate Program
- Total reduction of 45 percent SSOs since 2003 and a reduction in grease related sewer clog related overflows by 63 percent during the same period

The Metro Water 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 Metro Water District and its messages

In this Plan, the Public Education and Outreach section integrates the three public education sections from the 2009 plans for Water Supply and Water Conservation, Wastewater Management and Watershed Management. Bringing these sections together provides an opportunity for the integration of public education efforts and messages to address linkages across functional areas of water resources planning and raise public awareness of the interconnected nature of our water resources.

5.5.1 Public Education Approach

The Metro Water 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 5-2 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.

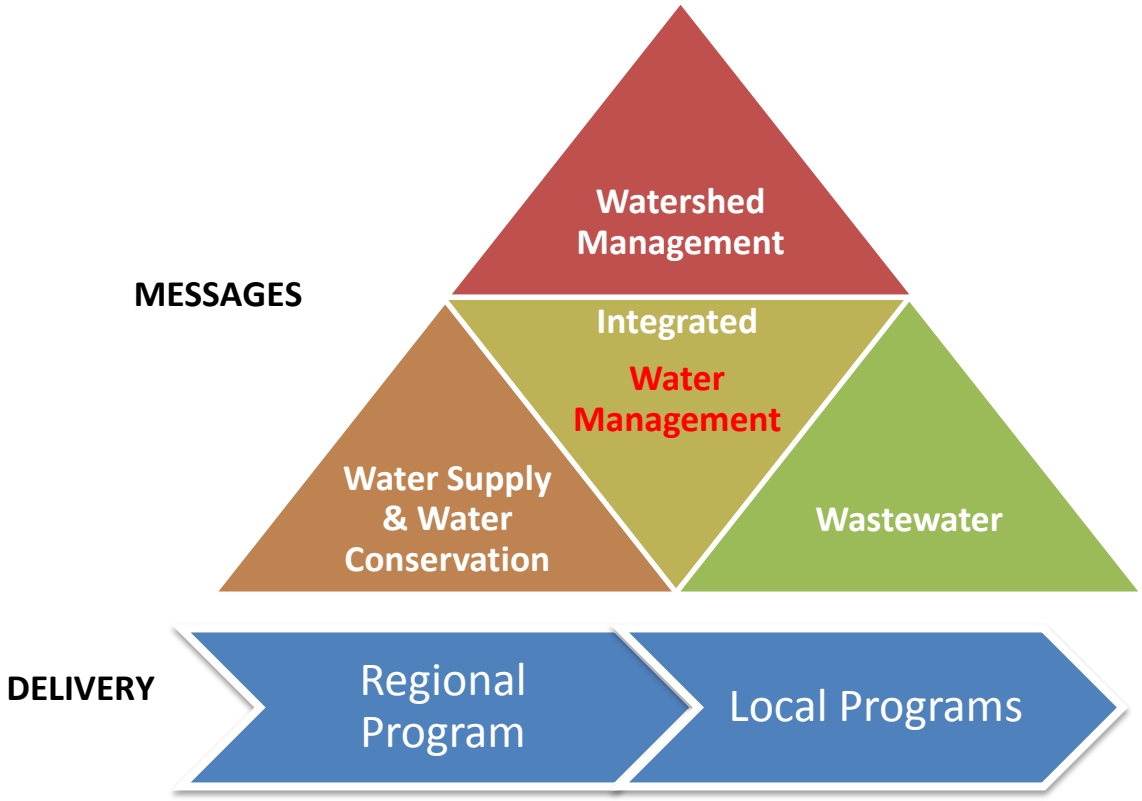

Figure 5-2. Public Education Approach

5.5.2 Regional Public Education Program

Since 2003, the Metro Water District has developed and implemented a comprehensive public education program to support implementation of the regional water resource plans. The Metro Water 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 such as 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 Metro Water District's regional public education program includes the following elements:

Regional Public Education Initiatives: The Metro Water District coordinates two initiatives to coordinate regional messaging about water conservation and water quality protection:

- ***My Drop Counts*** (http://www.mydropcounts.org/) is a grassroots regional water conservation initiative developed by the Metro Water 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 on the My Drop Counts website.
- 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 Metro Water 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 stations television stations are provided with public service announcements related to the campaigns as well.

Regional Public Education and Outreach Events: The Metro Water 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 Metro Water 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.

Coordination with Local Public Education Programs: The Metro Water 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 resource 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 Metro Water 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 Metro Water District have invested in developing strong public education programs that provide a foundation of support for water resources management in the Metro Water 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 are 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 (see also Action Items INTEGRATED-11 and WW-10).

Integrated Water Resources Management: The Integrated Water Resource 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 resource management topics that are central to supporting implementation of this Plan:

- Our region's water resources and water and wastewater infrastructure are extremely valuable. This theme should carry through all public education efforts to the extent possible.
- The Metro Water District has had great success in improving water resource management in the region over the past 16 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 resource 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 of Action Item PUBLIC EDUCATION-1.)

These key messages provide a consistent base for education efforts related to integrated water resource 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.

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 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 can be incorporated into our growth through 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.

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 Metro Water 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 for 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.

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:

- Everything we do, where we work, live or play, can impact our water resources.
- We are all part of the solution to nonpoint source pollution, which includes stormwater runoff.
- Clean water for drinking, recreation and economic benefits needs to be protected for the future.
- Watershed stewardship: It is the responsibility of everyone to protect our water resources.
- We all live 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

Intent	Responsible Parties	In Coordination With
To build local support for implementation of this Plan and for the attainment of local goals for water resource management. **Points of Integration** The local public education requirements address all areas of this integrated water resources management plan. Public education activities that help the public to understand the interconnected nature of our water resources are encouraged.	Local Government Local Water Provider Local Wastewater Provider	Elected Officials Stormwater Management Staff County Board of Health Local Planning Zoning Staff

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 Metro Water 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: 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 resource management. Involving the public in local water resource 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.

Implementation Guidance: 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 resource 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 resource 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 resource 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 resource 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 resource 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 & Outreach and Public Participation & 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 [a]
<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. • Promote EPA's WaterSense New Homes program. • 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	

[a] 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 [a]
<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	

[a] 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 [a]
<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	

[a] 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.

Considerations for Enhanced Implementation: The optional considerations for enhanced implementation are:

- Conduct public education activities in partnerships with other public and private entities. Collaborative implementation of public education is encouraged. Activities to meet the public education requirements may be implemented jointly with other communities, local water and wastewater service providers, the Metro Water District and other public or private entities.
- Develop and implement innovative public education activities. The list of activities in Table C-2 of Appendix C is not comprehensive, and other activities may be used by local public education programs. Innovations that modify these approaches and that introduce new approaches are encouraged. The Metro Water District recently supported the development of a set of case studies on innovative public education activities that are used in other metropolitan areas of the United States. The case studies were developed as a source of ideas and information to support innovation in public education implementation in the District. The case studies are available on the District website.

Opportunities for Technical Assistance: The Metro Water District supports local public education programs through its regional public education program, which is described in Section 5.5.2. The District's Technical Assistance Program may provide support for implementation of this Action Item through the following types of activities:

- Assisting members in the development of their local education programs
- Implementing regional public education initiatives, mass media advertising, regional public education and outreach events
- Providing education resources for local governments and utilities to use in their local public education programs. A list of available resources is provided on the Resources pages of the Metro Water District website, and it includes links and downloadable documents.
- Facilitating regional coordination, cooperation and information sharing among local public education programs

Resources: The Metro Water 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.

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 layers 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 Metro Water 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 resource 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 resource 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 five 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

With the adoption of this Plan, the Metro Water District is launching the Technical Assistance Program to support Plan implementation by utilities and local governments. The Technical Assistance Program will consolidate all of the assistance work that District staff currently undertakes with a new menu of services in a one-stop-shop implementation assistance center. Through the Technical Assistance Program, District staff will provide technical and implementation assistance across a broad range of water resource 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. In addition to assisting those requesting assistance, District staff will use the information provided in the Annual Assessment surveys to reach out proactively to members most in need of assistance in implementing Action Items and other measures.

The Technical Assistance Program may offer a variety of assistance services. The following is a list of examples of how the TAP may support implementation of this Plan:

General

- Assisting utilities and local governments in completing the Metro Water District's annual assessment survey
- Facilitating and coordinating of inter-governmental groups
- Bridging connections among peer utilities and working governments working on similar projects
- Developing guidance or model language for policies and ordinances

Integrated

- Developing draft meeting materials for coordination meetings and offering to attend meetings, if requested
- Establishing climate tracking protocols, identifying indicators of climate trends and setting trigger levels for adaptive measures. (See Action Item INTEGRATED-2)
- Surveying local wastewater facilities annually on the reported septage received, policies and rate structures and publishing this information (See Action Item INTEGRATED-10)
- Developing a standard manifest template for waste haulers to improve consistency across jurisdictions (See Action Item INTEGRATED-10)

Water Supply and Water Conservation

- Administering a regional incentive program for smart irrigation controllers and high efficiency toilets (See Action Items WSWC-6, WSWC-7 and WSWC-10)
- Developing a regional list of toilet recycling facilities (See Action Item WSWC-6)
- Offering to perform the commercial water use assessments (See Action Item WSWC-8)
- Centrally acquiring high-efficiency residential retrofit kits and pre-rinse spray valves or identifying affordable, quality-tested models for local water providers (See Action Item WSWC-9)

Wastewater

- Developing GIS base maps for local governments and local wastewater providers to use in sewer system inventories (See Action Item WW-2)

Watershed Management

- Assisting in development of Section 319(h) grants
- Providing guidance for implementing a green infrastructure/low impact development program that is consistent with MS4 permit requirements (See Action Item WATERSHED-7)
- Identifying funding opportunities for watershed improvement plans and projects (See Action Item WATERSHED-8)
- Developing an online platform for member governments to submit water quality monitoring data (See Action Items WATERSHED-10 and WATERSHED-11)

Education and Outreach

- Assisting in the development of local education programs
- Providing public education resources for local governments and utilities to use in their local public education programs.
- Facilitating regional coordination, cooperation and information sharing among local public education programs
- Implementing regional public education initiatives, mass media advertising, regional public education and outreach events
- Facilitating dialogue for outreach to industries, such as real estate agents, food service, medical facilities and septage pumpers

This menu of services is expected to grow over time. Current offerings are listed on the Technical Assistance Program webpage. The Technical Assistance Program is coordinated with other ARC assistance and outreach activities in the 10-county ARC region, including the following:

- Assistance with Green Communities applications and education on sustainability
- Consultation with Chattahoochee River Corridor governments regarding the Chattahoochee Corridor Plan (under the Metropolitan River Protection Act, O.C.G.A. § 12-5-440)
- Assistance with local planning and plan implementation through the Community Choices Program

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

Capital Expenditures and Revenues

Capital project expenditures are distinct from everyday expenses, such as salary, 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.

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:

Inter-Departmental Cost Sharing

In some cases, it makes sense for more than one department within a local government to pay for a project. If a project has the potential to create or revitalize green space, it may prove attractive to the parks department. Gainesville completed Phase I of the Midtown Greenway in 2012 using a mix of traditional stormwater practices, green infrastructure/low impact development, stream restoration and community enhancements. The project involved the City's stormwater program, community development department and parks and recreation departments. Currently, all greenspace with the project is maintained by the parks and recreation department, while the stormwater program continues to maintain the subsurface and related infrastructure. The Old Fourth Ward Park in Atlanta is another example. It involved collaboration of the city's Watershed Management and Parks departments. 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 sewer 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.

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 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 sewer authorities do not typically have taxation authority and cannot issue GO debt.

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 sewer 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. Water, electricity, natural gas and sewer customers understand and appreciate the utility services they receive. They are accustomed to paying for the electricity that lights their rooms, the natural gas that heats their homes and the water that sustains their households. They even understand paying to flush away their waste and carry away the water that runs down their drain.

These other utility services 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 their water and sewer cousins:

- A rate structure that is set according to the utility's financial needs and provides for stable 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 sections below examine various financing tools and revenue enhancement options for water, wastewater and watershed projects in the Metro Water 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 (e.g., 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.

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 capital improvement plan 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 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 inter-customer 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 (e.g., in the form of a resolution), parent governments may siphon off the funds to meet gaps in other areas of the budget. Additionally, using this approach for long-lived assets can lead to intergenerational inequity since current ratepayers are paying for an asset that will yield benefit for years to come. Some of those customers may leave the service territory and not benefit from this use of their payments while new customers will enjoy those benefits without having paid for them.

Impact Fees

Impact fees, also called "system development charges," 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 sewer, 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.

Impact fees are not really 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 water 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 an SPOLST, typically referred to by its acronym: 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 five 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 2005 entitled: *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, indirectly benefitting 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, sewer 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 straight-forward. 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:

- *Eligibility:* Grant funding for water projects may be tied to an income benchmark (e.g., median household income) or other eligibility criteria. Many of the existing state grants programs provide few, if any, grant awards to local governments and utilities in the Metro Water District.
- *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. Furthermore, it may make better sense to pay for a large capital project through debt financing, ensuring the long-term beneficiaries of the project are the customers that pay the project's cost. 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 the GEFA and the U.S. Department of Agriculture's (USDA's) Rural Development program. Also, a new low-interest loan program is on the horizon: the Water Infrastructure Finance and Innovation Act (WIFIA) program.

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 and 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 Business Enterprise compliance, Davis-Bacon compliance, 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. Section 6.4.3 Relevant Loan and Grant Program Descriptions provides detailed information about each program.

Table 6-1. Relevant Loan and Grant Programs

		Type of Assistance			Type of Work		
#	Program (agency), in alpha order	Grant	Loan	Loan Guar.	Water	Sewer	WS / SW†
1	319(h) Grant Program (Georgia EPD)	✓					✓
2	Clean Water State Revolving Fund (CWSRF) (GEFA)	✓*	✓			✓	✓

[1] More information on the public referendum requirement can be found in the section on tax-exempt bonds.

Table 6-1. Relevant Loan and Grant Programs

		Type of Assistance			Type of Work		
#	Program (agency), in alpha order	Grant	Loan	Loan Guar.	Water	Sewer	WS / SW†
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	Flood Mitigation Assistance (FMA) Grant Program (Georgia Emergency Management Agency [GEMA])	✓					✓
6	Georgia Fund (GEFA)		✓		✓	✓	✓
7	Georgia Land Conservation Program (GLCP) (GEFA)		✓				✓
8	Healthy Watersheds Consortium Grant Program (EPA and U.S. Endowment for Forestry and Communities)	✓					✓
9	Livable Centers Initiative (ARC)	✓					✓
10	Pre-Disaster Mitigation (PDM) Program (GEMA)	✓					✓
11	Public Works and Development Facilities Program (U.S. Economic Development Administration [USEDA])	✓			✓	✓	✓
12	Water and Waste Disposal Loan and Grant Program (USDA)	✓	✓	✓	✓	✓	
13	WIFIA Program (EPA)		✓	✓	✓	✓	✓

† Stands for Watershed/Stormwater

* Grant funding through the state revolving fund (SRF) programs is in the form of "principal forgiveness" on a portion of a loan only

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 requires more capital than a utility has in reserve or the utility may seek a better generational "fit," ensuring 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 more common type of revenue pledge and more favorable to the borrower.

The ***advantages*** of municipal bonds include a relative 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 ten 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 three 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.

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 (sometime 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 due to 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 city of Atlanta is using TAD funds to finance the Beltline Project, a 22-mile trail/transit system/park encircling the city.

The ***advantages*** of TAD financing include allocating payment of project costs to those that 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, sewer 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 of 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 WIPs.

6.4.3 Relevant Loan and Grant Program Descriptions

The following section provides details of the public loan and grant programs listed in Table 6-1.

1. **319(h) Grant Program** (Georgia EPD)
    a. ***Focus***: The 319(h) Program provides grants for nonpoint source projects such as restoration, best management practices demonstrations, outreach and education, regulatory enforcement and watershed planning. Priority is given to projects that (a) implement TMDLs, (b) implement Watershed Plans, (c) restore an impaired stream and (d) have direct measurable benefits to water

quality. This funding is available for projects listed in a Watershed Protection Plan or a project to create such a plan.

b. ***Available Funding***: The maximum amount of individual federal awards is $400,000 over a maximum timeline of three years. From 2009 to 2015, the grant awards to recipients in the Metro Water District have ranged from $5,000 to more than $400,000. The average grant over that timeframe has been $265,000.

c. ***Administration***: Under authority provided by Section 319(h) of the Clean Water Act, EPA awards Nonpoint Source Implementation Grants to Georgia EPD to fund projects in support of Georgia's Nonpoint Source Management Program. The funding is distributed by Georgia EPD through an annual competitive award process. The grant's cost-share policy requires a maximum of 60 percent federal dollars and a minimum of 40 percent non-federal cash or in-kind match toward the total project cost.

d. ***Applicability to the Metro Water District***: The 319(h) program is active in the Metro Water District. From 2009 to 2015, the 319 program has made 17 grant awards, worth a total of $4.5 million, to recipients in the District (an average of 2 ½ grants per year).

2. Clean Water State Revolving Fund (GEFA)

a. ***Focus****:* The CWSRF provides funding for a wide variety of clean water projects, including water quality improvement, wastewater treatment, stormwater control and water conservation.

b. ***Available Funding***:

i. *Loans*: The CWSRF can provide loans up to $25 million per year (and can provide annual or "phased" loans for larger projects). Loans terms can go up to 30 years. Current interest rates are available on GEFA's website.

ii. *Principal Forgiveness*: The annual amount of principal forgiveness available through the CWSRF depends on Federal appropriations and EPA guidance. For FY2015 funding year, the Georgia CWSRF awarded $1.5 million in principal forgiveness to five projects (average amount of forgiven principal was $292,000).

c. ***Administration***: GEFA administers the CWSRF program. The CWSRF program conducts an annual solicitation that requests interested applicants submit basic project information. Based on the responses, GEFA scores the projects and prepares a ranked list of fundable projects.

i. *Loans*: Eligible applicants may apply for a loan year-round, and loan funds are generally available for all applicants that can afford the loan (regardless of ranking on the list). The CWSRF does not require local match.

ii. *Principal Forgiveness*: GEFA awards principal forgiveness to applicants based on published affordability criteria that take into account median household income, unemployment, population trend, project type and a project's ranking on the fundable list.

The CWSRF is a federally funded program. As such, the program includes specific federal compliance requirements such as state environmental review, Davis-Bacon compliance, American Iron and Steel compliance, and Disadvantaged Business Enterprise compliance.

d. ***Applicability to the Metro Water District***: GEFA loan funding is available to all local governments and utilities in the District. Principal forgiveness is available subject to eligibility, scoring and funding levels.

3. **Community Development Block Grant Program** (USHUD and Georgia DCA)

   a. ***Focus***: The CDBG Program provides funding for projects that benefit low and moderate income residents, particularly those projects that ensure decent affordable housing, expand economic opportunity and provide relevant services. Funding can go to water, sewer and watershed projects that support these goals.

   b. ***Available Funding***:

      i. *Entitlement Communities:* Data not available to assess available funding levels.

      ii. *Non-Entitlement Communities:* The amount of CDBG funding that flows through Georgia DCA each year is dependent on federal appropriations. In 2015, Georgia DCA awarded 66 grants worth more than $31 million. While the grant size ranged from $280,000 to $800,000, the majority of grants were around $500,000.

   c. ***Administration***: CDBG funds are awarded within the Metro Water District in two different ways depending on the county.

      i. *CDBG Entitlement Communities* receive their funds directly from the USHUD. Jurisdictions in the Metro Water District that are currently entitlement communities include: Cherokee, Clayton, Cobb, DeKalb, Fulton and Gwinnett Counties and the cities of Atlanta, Gainesville, Johns Creek, Marietta, Roswell and Sandy Springs. Entitlement communities develop their own programs and funding priorities. USHUD determines the amount of each entitlement grant.

      ii. *CDBG Non-Entitlement Communities* receive funds on a competitive grant basis from Georgia DCA. Counties that participate in the state competitive grant process in the Metro Water District include: Bartow, Coweta, Douglas, Fayette, Forsyth, Hall, Henry, Paulding and Rockdale.

   d. ***Applicability to the Metro Water District***: Recent CDBG awards include numerous Metro Water District communities, and many of them are for water, sewer and drainage improvements.

4. **Drinking Water State Revolving Fund (GEFA)**

   a. ***Focus****:* The DWSRF provides funding for various public health and compliance-related water supply projects, including water treatment, transmission, distribution, storage and loss abatement.

   b. ***Available Funding***:

      i. *Loans*: The DWSRF can provide loans up to $25 million per year (and can provide annual or "phased" loans for larger projects). Loans terms can go up to 20 years. Current interest rates are available on GEFA's website. The DWSRF does not require local match.

      ii. *Principal Forgiveness*: The annual amount of principal forgiveness available through the DWSRF depends on federal appropriations and EPA guidance. For FY2015 funding year, the Georgia DWSRF awarded $6.9 million in principal forgiveness to 22 projects (average amount of forgiven principal was $314,000).

   c. ***Administration***: GEFA administers the DWSRF program. The DWSRF program conducts an annual solicitation that requires interested applicants submit basic project information. Based on the responses, GEFA scores the projects and prepares a ranked list of fundable projects.

      i. *Loans*: Eligible applicants may apply for a loan year-round and loan funds are generally available for all applicants that can afford the loan (regardless of ranking on the list).

      ii. *Principal Forgiveness*: GEFA awards principal forgiveness to applicants based on published affordability criteria that take into account median household income, unemployment, population trend and project type and a project's ranking on the fundable list.

The DWSRF is a federally funded program. As such, the program includes specific federal compliance requirements such as state environmental review, Davis-Bacon compliance, American Iron and Steel compliance and Disadvantaged Business Enterprise compliance.

d. ***Applicability to the Metro Water District***: GEFA loan funding is available to all District utilities. Principal forgiveness is available subject to eligibility, scoring and funding levels.

5. Flood Mitigation Assistance Grant Program (GEMA)

a. ***Focus****:* The FMA Program was created as part of the 1994 National Flood Insurance Reform Act with the goal of reducing or eliminating the risk of repetitive flood damage to buildings and structures insurable under the NFIP. Eligible activities include property acquisition, structure demolition or relocation, minor localized flood reduction projects and the flood portion of hazard mitigation planning.

b. ***Available Funding***: In 2016, the FMA Program will distribute $199 million nationally. The majority of this amount will be awarded on a competitive basis to all eligible applicants for flood hazard mitigation projects.

c. ***Administration***: GEMA administers the FMA Program for Georgia. Only GEMA is eligible to apply directly to FEMA for FMA funding. Local governments are considered sub-recipients under the program and must apply to GEMA. FEMA will select eligible project sub-applications on a competitive basis according to the agency's priorities for that fiscal year.

d. ***Applicability to the Metro Water District***: Data not available to assess number of prior awards in the District.

6. Georgia Fund (GEFA)

a. ***Focus****:* The Georgia Fund is a state-funded loan program for water, wastewater and solid waste infrastructure improvements. The program provides funding for a wide array of infrastructure projects including water and sewer lines, treatment plants, pumping stations, wells, water storage tanks and water meters. The Georgia Fund can also provide interim loans for projects that have a definite, permanent source of financing, such as a USDA loan.

b. ***Available Funding***: The Georgia Fund can provide loans up to $3 million per year subject to funding availability. Loans terms can go up to 20 years. Current interest rates are available on GEFA's website. The Georgia Fund does not require local match.

c. ***Administration***: GEFA administers the Georgia Fund program. Local governments and authorities may apply for a loan year-round and loan funds are generally available for all applicants that can afford the loan. Unlike GEFA's two federal loan programs, the Georgia Fund derives its funding from state-issued bonds and loan repayments. Consequently, the Georgia Fund does not involve the federal compliance measures required by the federal loan programs.

d. ***Applicability to the Metro Water District***: GEFA loan funding is available to all District utilities.

7. Georgia Land Conservation Program (GEFA)

a. ***Focus****:* The GLCP provides financing for local governments, state agencies and non-government organizations for permanent land conservation projects. Eligible projects include those land conservation projects that protect water quality, mitigate flooding, reduce erosion and protect streambanks, wetlands or riparian buffers. Land conservation can be achieved through the purchase of conservation easements or fee simple interest in land.

b. ***Available Funding***: The GLCP can provide loans up to $25 million per year (and can provide annual or "phased" loans for larger projects). Loans terms can go up to 30 years. Current interest rates are available on GEFA's website. The GLCP does not require local match.

c. ***Administration***: GEFA administers the GLCP program. Loan financing through the GLCP functions as a subset of the CWSRF program. The administration details outlined under the CWSRF apply equally to the GLCP. While the GLCP uses federal funds to provide loan financing, most of the federal compliance requirements inherent to the CWSRF do not apply to land conservation activities.

d. ***Applicability to the Metro Water District***: GLCP loan funding is broadly available to all local governments and utilities in the Metro Water District.

8. Healthy Watersheds Consortium Grant Program (EPA and the U.S. Endowment for Forestry and Communities)

a. ***Focus****:* The goal of the Healthy Watersheds Consortium Grant Program is to accelerate protection of healthy, freshwater ecosystems and their watersheds. The program provides funding for projects identified in existing watershed protection or conservation plans, for efforts to grow the organizational capacity necessary for large-scale, long-term protection of watersheds and for innovative projects that broadly advance the field of practice for watershed protection efforts. In general, the program does not provide funding for land acquisition, conservation easements or habitat restoration. This program is distinct from Section 319(h) funding in that it focuses on preventing deterioration of land in the watershed. While nonpoint sources of pollution may be addressed through landscape protection, it is not the focus of this program.

b. ***Available Funding***: Up to $1.5 million is available for the 2016 initial grant round. Annual funding at about this level is anticipated to be available through 2020. Individual grant awards range from $50,000 to $200,000.

c. ***Administration***: The U.S. Endowment for Forestry and Communities administers this program. The program issues an annual request for proposals and awards grants competitively, based on 100-point evaluation system. The program requires a minimum of 25 percent match funding.

d. ***Applicability to the Metro Water District***: This is a new program and the program guidelines appear to accommodate a potential project in the District.

9. Livable Centers Initiative (ARC)

a. ***Focus***: The Livable Centers Initiative (LCI) awards planning grants on a competitive basis to local governments and nonprofit organizations to prepare and implement plans for the enhancement of existing population centers and transportation corridors consistent with regional development policies. The LCI also provides transportation infrastructure funding for projects identified in the LCI plans. While LCI focuses on land use and transportation planning and the funding of transportation projects, the program can support certain watershed protection and stormwater management activities. LCI studies can include stormwater impacts and the incorporation of stormwater and bioretention facilities into transportation projects. Additionally, LCI funded projects may incorporate certain watershed and stormwater improvements, such as green infrastructure or traditional stormwater management practices.

b. ***Available Funding***: The ARC Board created the LCI in 1999 and has committed to providing $500 million in federal funding for the LCI program through 2040 (the planning horizon year of the current Atlanta Region's Plan). ARC awards funding to new LCI projects approximately biannually, depending on funding availability.

c. ***Administration***: ARC administers the LCI program. ARC awards LCI grant and project funding on a competitive basis. For planning and transportation project grants, applicants must provide a match of at least 20 percent.

d. ***Applicability to the Metro Water District***: Cities and counties within the Atlanta Metropolitan Planning Organization (MPO) boundary are eligible for these funds. This includes all District counties except Bartow (Cartersville MPO) and Hall (Gainesville MPO).

10. Pre-Disaster Mitigation Program (GEMA)

a. ***Focus****:* The PDM Program provides funds to states and local governments for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. Funded projects include acquisition of flood-prone properties, vegetation management, stormwater management and localized flood control projects designed specifically to protect critical facilities.

b. ***Available Funding***:

i. *State*: The amount of funding available to the state of Georgia includes a baseline allocation plus the amounts awarded to individual sub-recipients. For FY2016, Georgia will receive an allocation of $575,000. The total state award (based on allocation plus awards to individual sub-recipients) may not exceed $15 million.

ii. *Individual Sub-recipients*: The PDM program has different grant maximums depending on the type of project (i.e., mitigation projects, new mitigation plans, mitigation plan updates). The maximum federal share for individual sub-recipient mitigation projects is $4 million.

c. ***Administration***: The GEMA administers the PDM Program for Georgia and is the official grant recipient of PDM funds. Local governments are considered sub-recipients under the program and must apply to GEMA. FEMA makes the award determinations. PDM grants are awarded on a competitive basis, without reference to state allocations, quotas or other formula-based allocation of funds. PDM grants require a non-federal match of at least 25 percent. To be considered for PDM funding, local governments must have a FEMA approved mitigation plan.

d. ***Applicability to the Metro Water District***: Data not available to assess number of prior awards in the District.

11. Public Works and Development Facilities Program (USEDA)

a. ***Focus***: The USEDA Public Works Program provides grants for the construction, expansion or upgrade of essential public infrastructure to promote economic development in economically distressed areas. The range of funded activities is broad, but includes traditional public works projects such as water and sewer systems improvements.

b. ***Available Funding***: Over the last five fiscal years, the USEDA Public Works program has awarded 23 grants in Georgia, an average of between four and five grants per year. While not abundant in number, the USEDA grants can provide significant support. Over the last five fiscal years (FY2010-FY2014), the average USEDA Public Works Program grant size has been roughly $925,000. The maximum award amount is $3 million.

c. ***Administration***: The Public Works program is administered by the USEDA, a bureau within the U.S. Department of Commerce. USEDA has eliminated quarterly deadlines and now accepts applications year-round.

d. ***Applicability to the Metro Water District***: This program's focus on promoting economic development in distressed areas may result in limited applicability to the District. Of the 23 grants awarded since 2010, only one went to an entity in the District.

12. Water and Waste Disposal Loan and Grant Program (USDA)

a. ***Focus***: This program provides low-interest loans and grants for eligible community water, sewer, storm sewer and solid waste projects. The program provides long-term low-interest loans (up to 40 years) and grant funds, combined with loan funds, if grant funds are necessary to keep user costs reasonable.

b. ***Available Funding***: The amount of annual funding is dependent on federal appropriations. From 2009 to 2015, this program has awarded 56 loans totaling $129 million in Georgia (an average loan size of $2.3 million). Additionally, the program has awarded 60 grants totaling more than $87 million (an average grant size of $1.45 million).

c. ***Administration***: This program is administered by the Rural Development Program of the USDA. The program accepts applications year round.

d. ***Applicability to the Metro Water District***: Eligible recipients are rural areas and towns with fewer than 10,000 people. While the USDA eligibility map indicates there are some eligible areas within the outer areas of the District, the program has made few commitments in the District's 15 counties. Since 2009, only two recipients were from the District: in FY2012 the program obligated loan and grant funding for projects in the cities of White and Kingston in Bartow County.

13. Water Infrastructure Finance and Innovation Act Program (EPA)

a. ***Focus***: WIFIA was authorized as part of the Water Resources Reform and Development Act of 2014. The WIFIA program is designed to provide low interest rate financing for the construction of large water and wastewater infrastructure projects. Funded projects must be nationally or regionally significant and cost no less than $20 million. Eligible projects include CWSRF projects, DWSRF projects and water recycling projects.

b. ***Available Funding***: The program does not currently have funding to provide loans. When Congress appropriates funds for the program, WIFIA will begin to provide loan financing for projects. Loans may go up to 35 years.

c. ***Administration***: The WIFIA program is administered by the EPA. The final rules for the program are not set, but the Act lays out some basic parameters. The maximum loan amount may not exceed 49 percent of the project cost.[2] Davis-Bacon and American Iron and Steel compliance requirements apply in the same manner as under the SRF programs.

d. ***Applicability to the Metro Water District***: WIFIA was designed to fund large infrastructure projects, typically built in large metro areas. Given the scale of some projects in the District, WIFIA may provide a viable financing opportunity.

6.4.4 Considerations on Which Option to Choose

The following questions may provide a framework for choosing a financing option.

1. Determining funding needs

a. What is the total project cost?

[2] The original bill required that the remaining 51 percent of funds not be proceeds of tax-exempt financing, but this limitation was recently removed as part of the new transportation bill (FAST ACT).

b. Is there another party that might share the cost of this project? Could certain project modifications make it more attractive to another party?

c. If there is an interested co-funder, how much of the total project cost is my utility or enterprise fund responsible for paying?

2. Identifying the right repayment stream

a. Should this cost be borne by utility ratepayers alone or is the project appropriately paid for by sales or property taxes?

i. If the latter, could it be SPLOST funded?

ii. Is there a CID in my area and would it share the cost?

3. Identifying applicable grants

a. Are there any grant programs that might provide grant funding for this project?

b. If yes, is the scale of grant funding worth any administrative burdens, including application, additional project requirements and long-term reporting?

c. Does the grant program timing fit my project construction timeline?

4. Using pay-as-you-go / system equity financing

a. If a utility collects impact fees, is the proposed project consistent with the purpose of that fee? If yes, how much does the utility have available in reserved impact fees?

b. What is the useful life of the asset being built? Is the utility comfortable using revenues from current customers to pay for this asset?

i. If no, is there a debt-financing option that allows the utility to better tailor the repayment schedule with the useful life of the asset?

c. If yes, what portion of the remaining total project cost could be paid with reserved revenues?

5. Identifying next best option

a. Is there uncertainty as to the final project cost or the construction timeline? If yes, a utility might consider short-term municipal financing, such as bond anticipation notes, to bridge the gap until one can obtain long-term debt.

b. Is the remaining funding need very large? If the remaining funding need is very significant, a utility should likely focus on specific options including the SRFs, the bond market or WIFIA.

c. What is the right financing timeframe?

i. What is the useful life of the asset? A utility may want to tailor the repayment timeframe and maturity of debt with this schedule.

ii. Which is more important to the utility right now: lower total financing costs or lower annual debt service?

1. If lower annual debt service is more important than total financing costs, a utility might look at longer repayment timeframes.

2. If lower total costs are more important, what is the shortest repayment timeframe the utility can afford? A utility can typically get lower interest rates for shorter-term debt. If this is important, a utility should ensure the financing options will provide this discount.

d. Which debt option provides lowest costs?

   i. When all financing costs (credit rating, bond issuance costs, loan closing costs, interest payments, etc.) are taken into account, which option is the best option?

   ii. What does the utility anticipate its credit rating will be and how will this impact the cost of capital? If a utility anticipates its credit rating having a negative impact on its cost of capital, it may be desirable to consider GEFA or USDA loan programs.

6. Is it a project ripe for a different sort of approach?

a. If a utility is trying to fund an energy-related project and wants to include water efficiency, could guaranteed EPC meet any funding needs?

b. Does the project pose a special challenge or risk that may be better managed by private industry? Does a utility have any concerns about long-term maintenance and asset preservation? If yes, a utility might consider P3 contracting options that allocate risk or tap private industry's specialized skills for project operation and maintenance.

6.4.5 More Implementation Funding Information

Additional information on implementation funding options and case studies that demonstrate various approaches are available in a companion document to this Plan available on the Metro Water District website.

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 Metro Water 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 Metro Water District reviews and updates this Plan on an approximate five-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 five years are reasonably firm, whereas those beyond 20 years are expected to be refined, possibly multiple times, before they are implemented.

Annual Reviews

The Metro Water District staff reviews the Plan and its implementation annually to determine whether there is a need to update this Plan. As a part of the annual review, the District conducts an annual assessment of implementation. The survey results are compiled into an *Annual Activities and Progress Report* by District staff and are available on the Resources page of the Metro Water District website. These surveys generally include measures of implementation and data from outcomes monitoring.

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.

Plan Updates

Plan updates are scheduled to occur every five years. During the regular plan updates, the Metro Water 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 ten 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 Metro Water District members and stakeholders. Plan amendments between regular plan updates can be made to provide for adaptive management. The Metro Water District 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 Georgia EPD audit process described above. At the Metro Water District level, the annual assessment survey, also described above, is the primary tool for measuring implementation progress.

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 resource 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 Metro Water District
- Continued success with water conservation implementation
- Ongoing implementation of the Metro Water 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 annual surveys performed by the Metro Water District, audits performed by Georgia EPD and developing population and usage data, the Metro Water District plans to periodically consider improvements to the Plan's implementation to ensure that the Metro Water 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, clearer guidance and education.