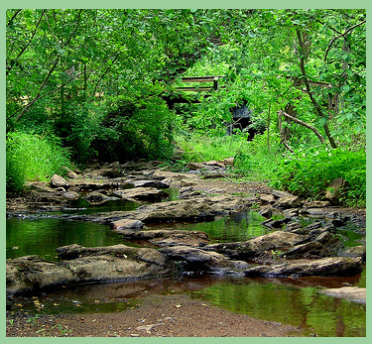

Watershed Management Plan

May 2009

Prepared By:
AECOM

Metropolitan North Georgia
Water Planning District

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Watershed Management Plan

Prepared for:
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May 2009

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EXECUTIVE SUMMARY

The Metropolitan North Georgia Water Planning District (Metro Water District) was created by the Georgia General Assembly in 2001 (O.C.G.A. §12-5-572) to serve as the water planning organization for the greater metropolitan Atlanta area. The Metro Water District's purpose is to establish policy, create plans and promote intergovernmental coordination of water issues in the District from a regional perspective.

The Metro Water District includes 15 counties (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Forsyth, Gwinnett, Hall, Henry, Paulding, and Rockdale counties) as well as 91 municipalities partially or fully within these counties. The Metro Water District also has seven authorities which provide water, sewer and/or stormwater services. The Metro Water District's plans and policies work to protect water resources in the Chattahoochee, Coosa, Flint, Ocmulgee, Oconee and Tallapoosa River Basins.

With the adoption of the Georgia State-wide Water Management Plan by the Georgia General Assembly in 2008, the Metro Water District is now one of eleven regional water planning councils in the state, and will continue to work within the integrated framework of state water resources planning.

The Metro Water District enabling legislation mandated the development of three long-term regional plans to address the metropolitan area's water resources challenges:

- Water Supply and Water Conservation Management Plan
- Wastewater Management Plan
- Watershed Management Plan

The first plans were completed and adopted in 2003 and have been actively implemented by local jurisdictions in the Metro Water District.

This document serves as the first update to the original Watershed Management Plan and details strategies and recommendations for both effective watershed and stormwater management and water quality protection. It includes specific tasks and milestones for implementing these recommendations for local governments as well as regional and state agencies.

THE PLAN UPDATE PROCESS

The Metro Water District utilized an integrated planning effort for the plan updates similar to that used to develop the original plans in order to build consensus for long-term regional water resources management solutions. The Metro Water District water resources plans are the result of a collaborative effort between the Metro Water District's local jurisdictions, the Georgia EPD, and numerous stakeholders.

As envisioned by the Metro Water District's enabling legislation, the planning process includes the Metro Water District Governing Board, a Technical Coordinating Committee (TCC), six Basin Advisory Councils (BAC), Georgia EPD, planning staff from the Atlanta Regional Commission and technical consulting firms.

INTEGRATION OF PLANNING EFFORTS

The Metro Water District also prepared two other plan updates which together with the Watershed Management Plan represent an integrated and holistic approach to water resources planning and management. The **Water Supply and Water Conservation Management Plan** provides the framework for meeting local water supply demands over its planning horizon. It calls for intensive water demand management and an aggressive water conservation program. The plan includes recommended supply sources and facilities for the Metro Water District, as well as the interim sizing of water treatment plants required to meet local demands. The **Wastewater Management Plan** sets forth strategies for comprehensive wastewater management efforts to meet future needs across the Metro Water District. The plan outlines a long-term implementation schedule for public wastewater treatment. It also provides for comprehensive wastewater planning to establish future sewer service areas and calls for more intensive management of privately owned septic systems.

KEY CHANGES TO THE PLAN

In this plan update, there are a number of changes from the original 2003 Watershed Management Plan, including a substantial reorganization of the document. The most notable change involved consolidating all of the required local management measures into a single section (Section 5) and providing more background, implementation guidance and resources than were included in the 2003 document. In addition, the measures were placed into functional categories to make it easier to determine which personnel or department has responsibility for implementation.

Based on implementation experiences with the 2003 Watershed Management Plan, the local management measures were rewritten and formatted to provide more background, implementation guidance and resources for local programs. Another major change is the preparation of a set of additional optional measures (Section 6). The implementation section was also revisited and now provides simple, one-page implementation summaries for each responsible entity.

RATIONALE FOR WATERSHED MANAGEMENT

The Metro Water District is faced with a number of water resources challenges which reinforce the need for active watershed management efforts, including:

- Mitigating the water quality and quantity impacts resulting from increased stormwater runoff associated with land use changes;
- Protecting drinking water supply sources within and downstream of the Metro Water District;
- Ensuring adequate assimilative capacity for wastewater discharges to support future growth projections;
- Addressing over 1,500 miles of rivers and streams in the Metro Water District that fail to meet State water quality standards, primarily due to the effects of stormwater runoff and nonpoint source pollution;

- Improving water quality in the major lakes inside and just downstream of the Metro Water District which serve as a recreation destination for millions of visitors and generate billions of dollars for the local economy;
- Protecting aquatic health and habitat in the Metro Water District, including threatened and endangered species;
- Educating the region's growing population on the need for good stewardship of our limited water resources;
- Managing and maintaining public stormwater infrastructure; and
- Need for a regional approach to stormwater and watershed management.

FEDERAL AND STATE REGULATIONS

The District-wide Watershed Management Plan builds upon the existing watershed planning efforts being undertaken by local jurisdictions. Many of these efforts are the result of a number of Federal and State regulations related to watershed and water quality protection. These laws and programs, including new and revised regulations since the 2003 Plan, were reviewed and taken into account during the development of the local management measures in this plan, including:

- National Pollutant Discharge Elimination System permits for municipal stormwater and wastewater, industrial stormwater and wastewater, and construction stormwater
- Water Quality and Total Maximum Daily Load (TMDL) provision of the Clean Water Act
- Wetland Protection regulations (Section 404 permits)
- Federal Safe Drinking Water Act requirements
- National Flood Insurance Act and National Dam Safety Program
- Federal Endangered Species Act
- Related State of Georgia regulations including Watershed Assessment & Protection Plan requirements, Georgia Erosion & Sedimentation Control Act, Metro River Protection Act, Georgia Planning Act, and Comprehensive State-wide Water Management Plan (State Water Plan).

BASIN SPECIFIC PROFILES

The Metro Water District lies within six major river basins: the Chattahoochee, Coosa, Flint, Ocmulgee, Oconee and Tallapoosa River watersheds. Basin specific profiles are provided for each of the river basins within the Metro Water District which highlight their unique watershed characteristics and challenges, including geography, hydrology, current and future projected land use, drinking water supply, water quality conditions, management issues and recommendations, and success stories. Addressing these challenges is another important driver for the measures and policies provided in the Plan.

LOCAL MANAGEMENT MEASURES

The local management measures are the activities to be performed at the local level by the Metro Water District's member local governments. These include a suite of model stormwater and watershed protection ordinances, jurisdiction-wide watershed planning programs, development review oversight actions, asset management activities, pollution prevention programs, watershed conditions assessment and monitoring, education and public awareness activities, and watershed management efforts specific to certain watersheds, such as water supply watersheds and impaired waters. Some of these measures will require intra-local and/or inter-jurisdictional coordination and cooperation.

The local management measures form a comprehensive program for addressing watershed issues within the Metro Water District, including the protection of water quality and designated uses as well as improving the health of impacted waterbodies. Through the Georgia EPD audit process, local jurisdictions will be held accountable for implementation of these local management measures.

Starting with the foundation of the 2003 Watershed Management Plan, the plan update process focused on adapting the original plan's management measures to better help local governments to address their watershed management needs and goals, regulatory requirements, and the basin-specific issues and priorities.

Each local measure was rewritten and formatted to provide more background, implementation guidance and resources for local programs. A number of local management measures were clarified and some new measures were added to the Plan to address gaps from the original plan. The local management measures are organized into functional categories to facilitate implementation and inter-departmental coordination within a local jurisdiction.

Another major change is the preparation of a set of additional optional measures which are intended to be a resource for additional watershed management efforts at the local level. The optional section provides a strong emphasis on land use planning aspects that can benefit watershed health.

STATE AND REGIONAL POLICY RECOMMENDATIONS

State and regional policy recommendations are provided to further implementation of watershed management and water resources protection in the Metro Water District. These recommendations are intended for state and regional agencies, and require no action on the part of local governments. Implementation of these policy recommendations are intended to advance the progress towards protecting and improving watershed health within the Metro Water District including:

- Georgia Department of Transportation (GDOT) compliance with the NPDES MS4 permit program
- Consider guidance for local government programs to manage fertilizer related to lawn use in watersheds where phosphorus loading is an issue
- Consideration of recommendations for bacteria standards and guidance
- Coordination of comprehensive land use planning efforts
- Septic system planning and coordination

- Streamlining of Georgia EPD reporting requirements for watershed-related permits and programs
- Updating the Georgia Stormwater Management Manual

EDUCATION AND PUBLIC AWARENESS

Education and public awareness is essential to effective water resources management. This Plan includes a detailed education and awareness program specifically designed to:

- Raise public awareness of water issues and needs to foster support for solutions;
- Educate the public and other identified target groups in order to increase awareness and encourage behavioral changes; and
- Coordinate with other public as well as private entities to maximize the visibility of the Metro Water District and its messages.

The Metro Water District education and public awareness program is comprised of two elements: a regional program managed by the Metro Water District staff; and education activities undertaken by local governments. The Metro Water District provides a regional education and public awareness program, the *Clean Water Campaign*, which develops mass media content and educational tools, including a comprehensive website, brochures and presentation materials. The local governments' role in education and public awareness is to reach out to specific groups in their community, provide educational materials and share knowledge of subject matters with the public by undertaking specific education and outreach activities.

PLAN IMPLEMENTATION

The Watershed Management Plan provides implementation guidance and schedules for the management measures and actions included in the Plan. Local jurisdictions have a high level of accountability for implementing the Watershed Management Plan's local management measures through the Georgia EPD audit process. Georgia EPD auditors conduct a thorough review of the local programs and procedures to determine consistency with the Metro Water District Water Supply and Water Conservation Management Plan. Communities must substantially comply with the Metro Water District plan provisions in order to modify or obtain new water withdrawal permits, wasteload allocations, GEFA loan funding, or the renewal of MS4 stormwater permits. Overall, this system has worked well to ensure implementation of the provisions of all three Metro Water District water resources plans.

COSTS AND FUNDING

Costs for the implementation of the Plan's required local management measures were estimated based upon a combination of technical literature review and actual expenditures provided by local governments.

Successful implementation of the Plan's watershed management activities will require adequate program funding. There are two primary funding methods available to local governments, general appropriations (general fund) and stormwater user fees. In addition, there are a number of supplemental sources of funding, including loans, bonds, service fees and grants. A blend of funding methods is recommended for most local governments.

FUTURE PLAN EVALUATION

The Metro Water District enabling legislation identifies the need to periodically assess regional progress toward implementation of the specific actions identified in the Watershed Management Plan and toward meeting the long-term goal of comprehensive water resources management. The Metro Water District conducts an annual survey that reports on the progress of implementation of the local management measures within this Plan. The Metro Water District summarizes the survey results in their annual report.

There are two types of plan reviews and updates: annual reviews and plan updates that occur every five years. The reviews and updates are an important component of an adaptive management approach for all three of the Metro Water District's long-term management Plans (water supply and conservation, wastewater, and watershed).

Section 1: INTRODUCTION

The Watershed Management Plan provides the framework for regional water resources protection for the 15-county Metropolitan North Georgia Water Planning District. The Watershed Management Plan prescribes strategies and recommendations for effective stormwater and watershed management and builds upon existing efforts to meet the overall goal of protecting and improving water quality.

THE METRO WATER DISTRICT

The Metropolitan North Georgia Water Planning District (Metro Water District) was created by the Georgia General Assembly in 2001 (O.C.G.A. §12-5-572) to serve as the water planning organization for the greater metropolitan Atlanta area. The Metro Water District's purpose is to establish policy, create plans and promote intergovernmental coordination of water issues in the District from a regional perspective.

The Metro Water District includes 15 counties (Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Forsyth, Gwinnett, Hall, Henry, Paulding, and Rockdale counties) as well as 91 municipalities partially or fully within these counties (Figure 1-1). The Metro Water District also has seven authorities which provide water, sewer and/or stormwater services. Table 1-1 provides a list of the local jurisdictions that make up the Metro Water District. The Metro Water District's plans and policies work to protect water resources in the Chattahoochee, Coosa, Flint, Ocmulgee, Oconee and Tallapoosa River Basins (Figure 1-2).

With the adoption of the Georgia State-wide Water Management Plan by the Georgia General Assembly in 2008, the Metro Water District is now one of eleven regional water planning councils in the state, and will continue to work within the integrated framework of state water resources planning.

REGIONAL WATER RESOURCES PLANS

The Metro Water District enabling legislation mandated the development of three long-term regional plans to address the water resources challenges: water supply and water conservation, wastewater management and watershed protection and management. The first plans were completed and adopted in 2003 and have been actively implemented by local jurisdictions in the Metro Water District over the last five years.

This document, the **Watershed Management Plan**, details strategies and recommendations for both effective watershed and stormwater management and water quality protection. It includes specific tasks and milestones for implementing these recommendations for local governments as well as regional and state agencies.

FIGURE 1-1
Metro Water District Area

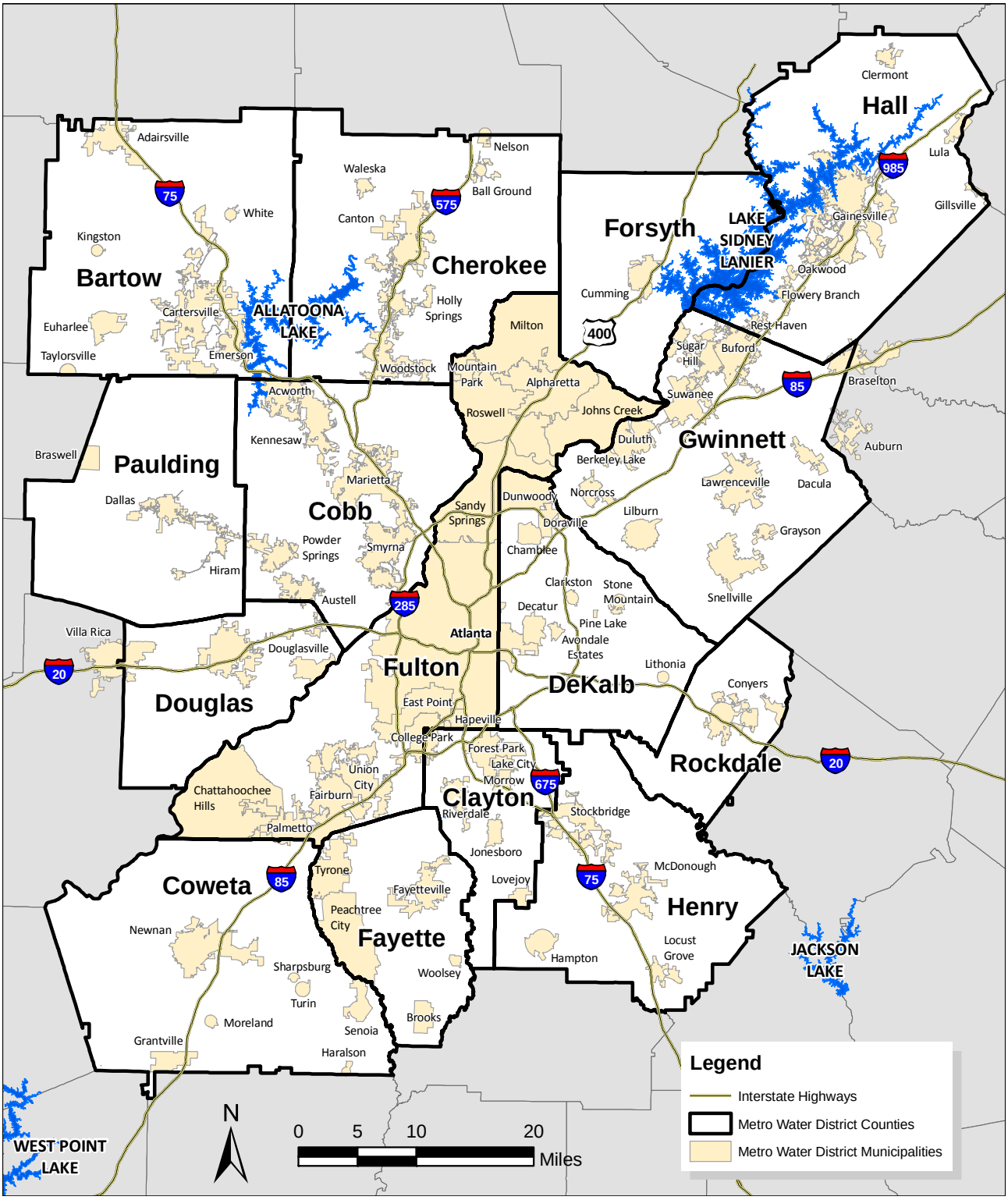


TABLE 1-1
Metro Water District Local Jurisdictions

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	

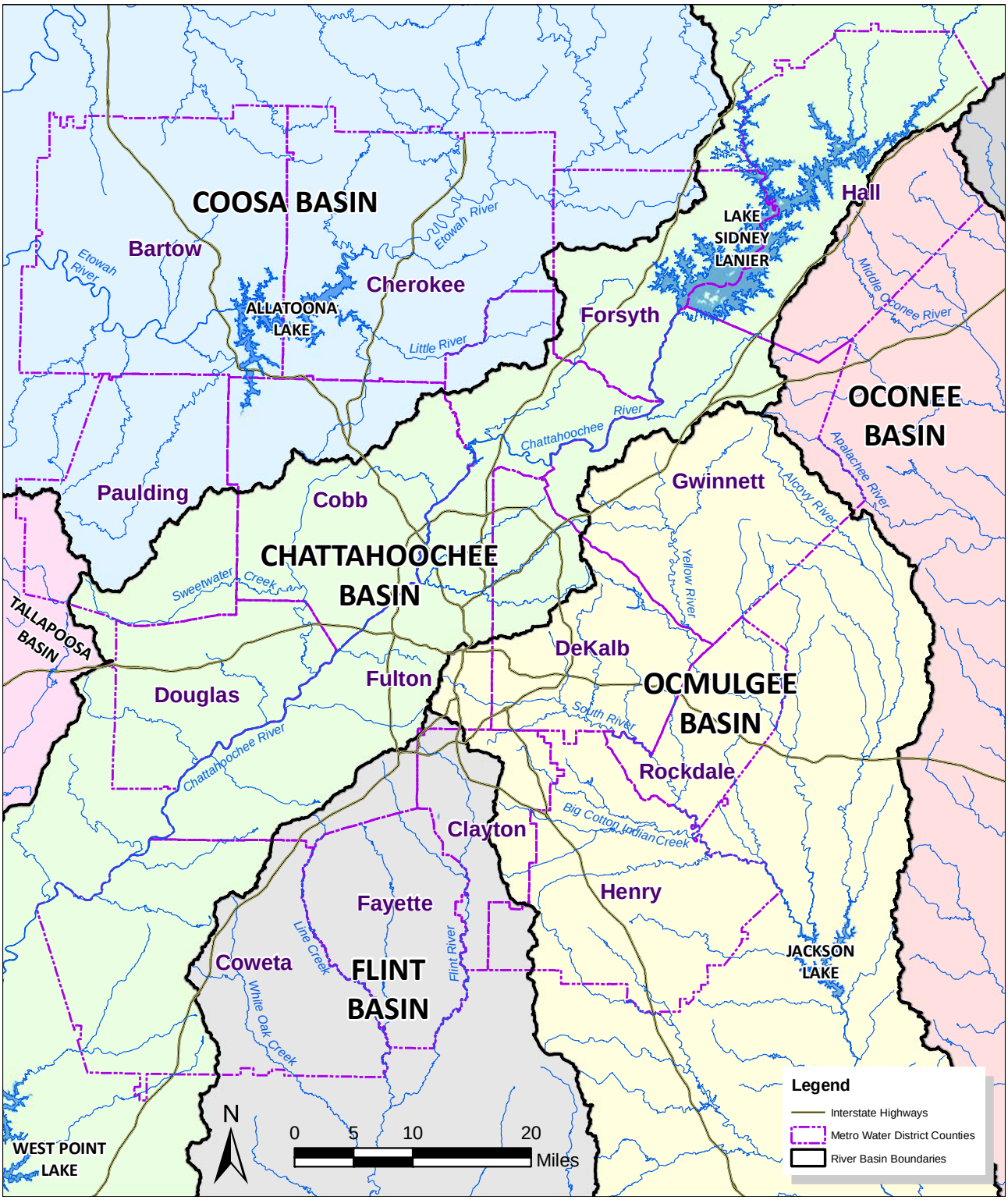
Municipalities

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

Authorities

Cherokee County Water and Sewerage Authority	Douglasville-Douglas County Water and Sewer Authority
Clayton County Water Authority	Henry County Water and Sewerage Authority
Cobb County-Marietta Water Authority	Peachtree City Water and Sewerage Authority
Coweta County Water and Sewerage Authority	

FIGURE 1-2
Metro Water District Major River Basins



The 2003 Watershed Management Plan's planning process evaluated a wide spectrum of management measures to develop a comprehensive regional program to protect water quality and watershed health. The selected measures established a strong foundation of watershed management including a consistent set of model ordinances, stormwater management program, source water protection, pollution prevention, and watershed evaluation measures for the region. The communities within the Metro Water District have worked aggressively over the past five years towards implementation of these management measures.

The Metro Water District also prepared two other plans which together with the Watershed Management Plan represent an integrated and holistic approach to water resources planning and management. The **Water Supply and Water Conservation Management Plan** provides the framework for meeting local water supply demands over the planning horizon. It calls for intensive water demand management and an aggressive water conservation program. The plan includes recommended supply sources and facilities for the Metro Water District, as well as the sizing of water treatment plants required to meet local demands. The **Wastewater Management Plan** sets forth strategies for comprehensive wastewater management efforts to meet future needs across the Metro Water District. The plan outlines a long-term implementation schedule for public wastewater treatment. It also provides for comprehensive wastewater planning to establish future sewer service areas and calls for more intensive management of privately owned septic systems.

PLAN IMPLEMENTATION

The Metro Water District, Georgia EPD and local governments all play important roles in implementing the District's water resources plans as illustrated in Figure 1-3 below. The Metro Water District develops the plans which are implemented by local jurisdictions. The Georgia Environmental Protection Division (Georgia EPD) enforces the plans' provisions through its permitting process. All local jurisdictions within the Metro Water District are required to substantially comply with the plans in order to obtain new or expanded water withdrawals or wastewater discharges, renewal of their NPDES municipal stormwater permits, or any Georgia Environmental Facilities Authority (GEFA) grant or loan funding.

FIGURE 1-3
Metro Water District Plan Development and Implementation

IMPLEMENTATION PROGRESS

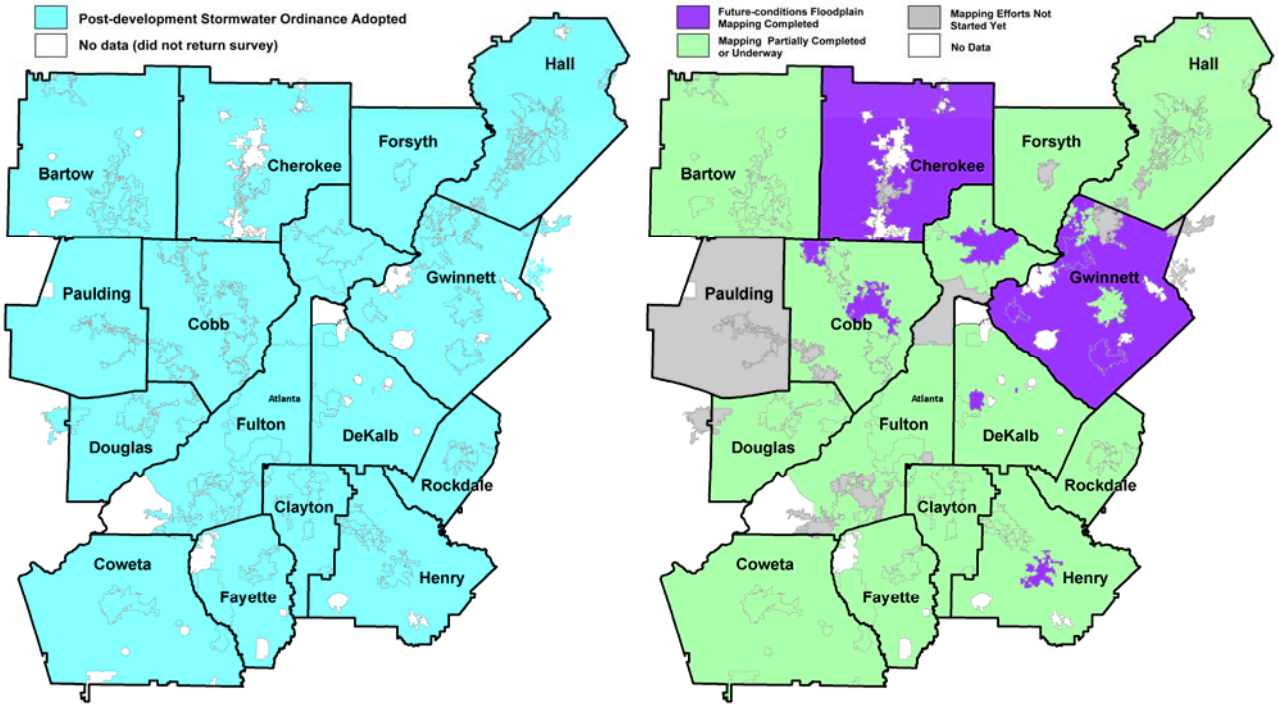
A survey was conducted in 2008 asking Metro Water District communities about their activities related to implementation of the 2003 District Watershed Management Plan. Responses were received from 73 of the Metro Water District's local jurisdictions which represent 97% of the population and 98% of land area. The survey results showed significant commitment from local jurisdictions in implementing both required and optional measures from the 2003 Watershed Management Plan.

Stormwater and Watershed Protection Model Ordinances

- All local jurisdictions surveyed have adopted the model Post-Development Stormwater Management Ordinance or equivalent regulations. 93% have incorporated the ordinance requirements into their local development review process and over 64% have adopted procedures for long-term maintenance of new stormwater facilities.
- All communities surveyed have adopted a Stream Buffer Protection Ordinance with at least 50-foot undisturbed stream buffers with an additional 25-foot impervious setback. Seven jurisdictions have adopted steam buffer requirements that exceed the model ordinance.
- All jurisdictions surveyed except one have adopted the Illicit Discharge and Illegal Connection Ordinance and 80% have an active illicit discharge detection and elimination (IDDE) program.
- 85% of local jurisdictions surveyed have adopted the model Floodplain Management Ordinance or equivalent regulations. 82% of these have completed or have efforts underway to map future-conditions floodplains to support implementation of the ordinance.

A list of ordinance adoption by jurisdiction is provided in Appendix A.

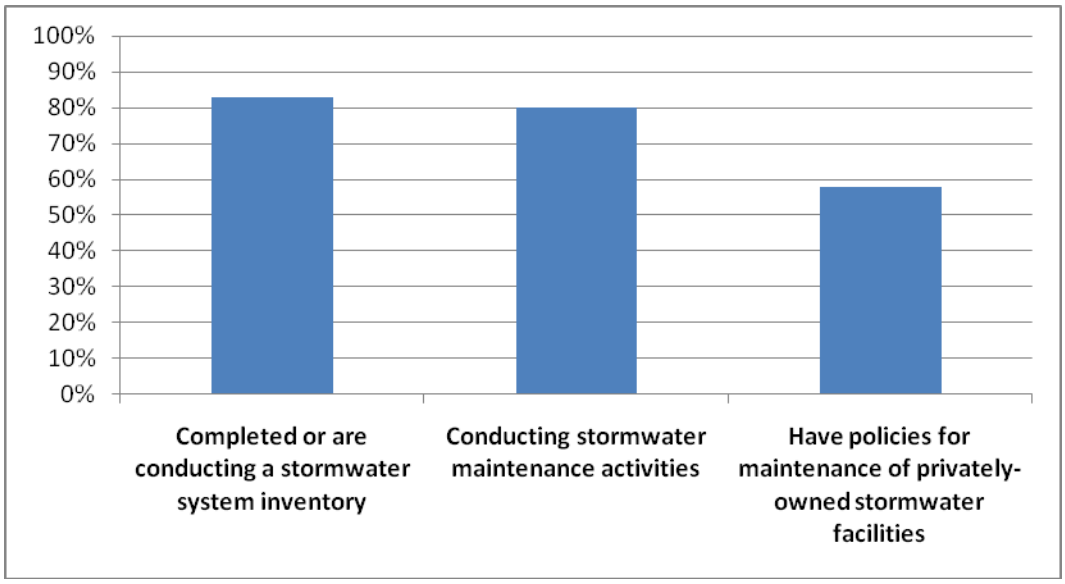
FIGURE 1-4
Implementation of Post-development Stormwater Ordinance and Floodplain Mapping Progress



Stormwater System Operations and Maintenance

Over 83% of jurisdictions surveyed have completed or are performing local stormwater system inventories. 80% conduct inspection and maintenance activities for publicly-owned stormwater system components, and 58% have also developed policies for requiring ongoing maintenance of privately-owned stormwater facilities.

FIGURE 1-5
Implementation of Local Stormwater System Operations and Maintenance Programs



Stormwater Pollution Prevention Measures

Nearly 90% of jurisdictions surveyed have implemented a required municipal good housekeeping program for local government facilities and operations. Local governments are also implementing a number of optional measures to reduce stormwater pollution: almost 75% inspect commercial and industrial facilities; 20 jurisdictions offer household hazardous waste collection programs to residents while 21 encourage or require the installation of "pet posts" in residential areas to help dog owners clean up after their pets.

Education and Public Awareness

Nearly every community surveyed utilizes the stormwater educational materials available from the Metro Water District's *Clean Water Campaign* in their local education programs. Four out of five jurisdictions have held some type of public involvement/participation activity in the last year, including sixteen communities who hosted Clean Water Campaign workshops that were developed as part of the Metro Water District's regional education program.

Stormwater Program Funding

The majority of jurisdictions surveyed fund stormwater activities from their general fund, but a growing number of communities are finding benefits from implementing a stormwater utility. One-third of jurisdictions in the Metro Water District now use funds generated from a stormwater utility or enterprise fund to finance stormwater programs and activities.

PLAN DEVELOPMENT

PLANNING PROCESS

The Metro Water District enabling legislation requires that "the district shall prepare an updated watershed management plan no less frequently than every five years after finalization of the initial plan." (O.C.G.A. §12-5-582(c)) In conjunction with updates to the Water Supply and Water Conservation Management Plan and Wastewater Management Plan, this Plan is an update of the initial 2003 plan.

The Metro Water District utilized an integrated planning effort similar to that used to develop the original plans in order to build consensus for long-term regional water resources management solutions. The Metro Water District water resources plans are the result of a collaborative effort between the Metro Water District's local jurisdictions, the Georgia EPD, and numerous stakeholders.

PLANNING PARTICIPANTS

As envisioned by the Metro Water District's enabling legislation, the planning process includes the Metro Water District Governing Board, a Technical Coordinating Committee (TCC), six Basin Advisory Councils (BAC), Georgia EPD, planning staff from the Atlanta Regional Commission and technical consulting firms.

Metro Water District Board: The 26-member Metro Water District Governing Board is the decision-making body for the Metro Water District which includes local representatives from the Metro Water District communities as well as citizen members.

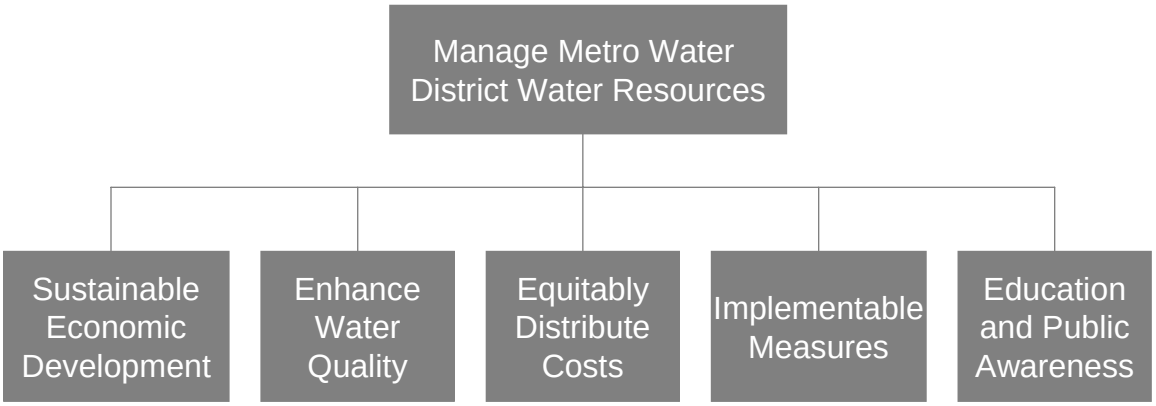
Technical Coordinating Committee (TCC): The TCC is comprised primarily of local government officials and staff from counties, cities, and authorities in the Metro Water District, and provides planning and policy support in the areas of water supply and conservation, wastewater management, stormwater and watershed management, septic systems, and education and public awareness.

Basin Advisory Council (BAC): The BACs are comprised of basin stakeholders including water professionals, business leaders, environmental advocates and other interested individuals and parties. Six BACs represent the Chattahoochee, Etowah, Flint, Oconee, Ocmulgee 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 Metro Water District staff.

POLICY GOALS

The Metro Water District planning process was driven by policy goals agreed upon by all planning participants and adopted by the Board in 2002. These policy goals, shown in Figure 1-6, served as guideposts and helped ensure consistency of purpose for the watershed, wastewater, and water supply plans.

FIGURE 1-6
Metro Water District Policy Goals



PLAN UPDATE FOCUS

Since their adoption in 2003, the Metro Water District plans have become valuable tools for protecting and preserving water resources. For the plan update process, there were a number of objectives developed in conjunction between Metro Water District staff, TCC and BAC's. For the Watershed Management Plan these included:

- Placing a stronger emphasis on the linkages of land use and water quality; investigate opportunities to strengthen the land use and water quality connection through existing mechanisms, such as comprehensive land use plans and water/wastewater plans
- Recognizing the unique nature of each basin within the Metro Water District through resource-specific management measures to address individual challenges or protect exceptional resources
- Placing a stronger emphasis on sustainability and integration of the water supply and conservation, wastewater management, and watershed management plans
- Streamlining the implementation section to improve plan accessibility and understanding
- Reorganizing the document to function more easily as a reference tool

KEY CHANGES TO THE PLAN

In this plan update, there are a number of important changes from the original 2003 Watershed Management Plan, including a substantial reorganization of the document. The most notable change involved consolidating all of the required local management measures into a single section (Section 5) based on implementation experiences with the 2003 Watershed Management Plan. Each of the local management measures was rewritten and formatted to provide more background, implementation guidance and resources for local programs than was included in the 2003 document. In addition, the measures were placed into functional categories to make it easier to determine which personnel or department has responsibility for implementation. The local management measures were consolidated to form the minimum requirements for a comprehensive watershed management program that offer solutions and enhancements for community programs based on local needs.

New measures were added to address gaps and topic areas that the 2003 Watershed Management Plan did not adequately address, including:

- Coordination of watershed and land use planning
- Sanitary sewer and septic system coordination
- Construction erosion and sediment control
- Endangered species

Another major change is the preparation of a set of additional optional measures (Section 6). The optional section provides a strong emphasis on land use planning aspects that can benefit watershed health. Note that the Georgia EPD audit process will cover only the measures outlined in the local management measures in Section 5.

The implementation section was revisited and now provides simple, one-page implementation summaries for each responsible entity. The one-page view is helpful for local program budgeting and planning, as it distinguishes between the development of new programs and ongoing implementation. As most communities have limited funds for watershed management, the plan streamlines existing watershed and stormwater requirements and identifies a wider range of funding sources for local consideration.

PLAN OVERVIEW

ORGANIZATION OF THE WATERSHED MANAGEMENT PLAN

The Watershed Management Plan is organized in the following sections:

Section 1: Introduction – Provides an overview of the Metro Water District, watershed management planning process, a summary of the successes of the 2003 Plan, and organization of this Plan.

Section 2: Rationale for Watershed Management – Summarizes the need for watershed and stormwater management in the Metro Water District.

Section 3: Federal and State Regulations – Provides the federal and state requirements and programs related to stormwater and watershed management which impact local governments in the Metro Water District.

Section 4: River Basin Profiles – Summarizes the major river basins within the Metro Water District, including a description of the watershed management successes and challenges.

Section 5: Local Management Measures – Outlines the local watershed management measures that all Metro Water District communities are required to implement.

Section 6: Optional Local Management Measures – Describes additional optional local management measures for Metro Water District communities.

Section 7: State and Regional Policy Recommendations – Summarizes recommendations for various state and regional agencies to help advance watershed protection in the Metro Water District.

Section 8: Education and Public Awareness – Outlines public education and outreach efforts at the regional and local levels.

Section 9: Implementation Plan – Includes the specific tasks, milestones, and responsibilities for implementation of the recommended Watershed Management Plan. In addition, funding mechanisms for local governments are identified.

Section 10: Future Plan Evaluation – Summarizes metrics for future evaluation of the Watershed Management Plan.

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Section 2: RATIONALE FOR WATERSHED MANAGEMENT

INTRODUCTION

The Metro Water 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, however, lies at the headwaters of several major river basins which limits the availability and increases the need for protection of water resources. In addition, rapid population growth has resulted in increasing demands on the limited available water supplies while increasing the volume of treated wastewater being discharged to the region's rivers, lakes and streams. Simultaneously, development associated with this rapid growth has impacted watersheds by changing the peak rates, volume, velocity, timing and quality of stormwater runoff affecting man-made infrastructure as well as the natural environment.

As a result, the Metro Water District is faced with a number of water resources challenges which reinforce the need for active watershed management efforts, including:

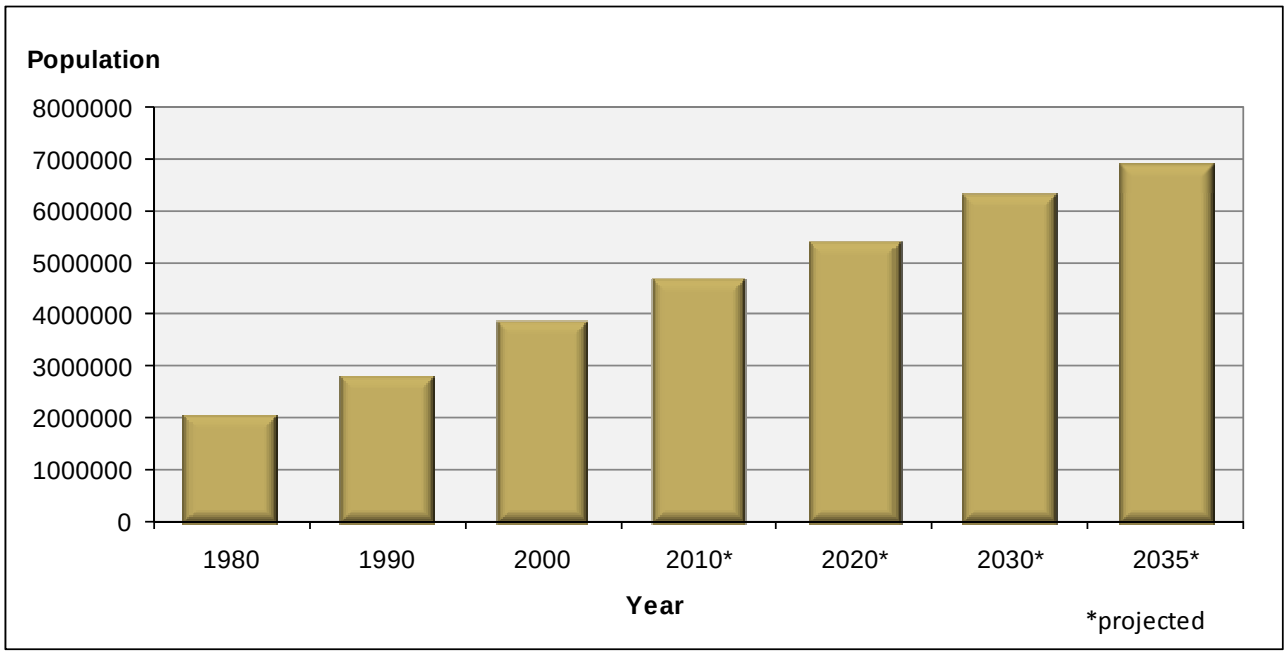
- Mitigating the water quality and quantity impacts resulting from increased stormwater runoff associated with land use changes;
- Protecting drinking water supply sources within and downstream of the Metro Water District;
- Ensuring adequate assimilative capacity for wastewater discharges to support future growth projections;
- Addressing over 1,500 miles of rivers and streams in the Metro Water District that fail to meet State water quality standards, primarily due to the effects of stormwater runoff and nonpoint source pollution;
- Improving water quality in the major lakes within and downstream of the Metro Water District which serve as a recreation destination for millions of visitors and generate billions of dollars for the local economy;
- Protecting aquatic health and habitat in the Metro Water District, including threatened and endangered species;
- Educating the region's growing population on the need for good stewardship of our limited water resources;
- Managing and maintaining public stormwater infrastructure; and
- Need for a regional approach to stormwater and watershed management.

This Section examines these issues and the rationale for comprehensive watershed management within the Metro Water District.

A GROWING AND DYNAMIC REGION

The Metro Water District has experienced unprecedented growth and development over the last three decades and is currently home to more than 4.5 million residents. The metropolitan area has been one of the fastest growing in the country with three of the top 25 fastest growing counties in the U.S. in 2007: Forsyth, Paulding, and Cherokee Counties. Figure 2-1 shows the historical population growth in the Metro Water District as well as forecasts for 2010 through 2035. The population of the region almost doubled between 1980 and 2000. Within the planning horizon of this Plan, the Metro Water District population is projected to increase to almost 7 million residents by 2035.

FIGURE 2-1
Metro Water District Population



Source: U.S. Census Bureau (1980-2000), Atlanta Regional Commission (2010-2035)

Both population growth and redevelopment have resulted in significant land use and land cover changes within the Metro Water District. Within the last several decades there has been a dramatic shift of forest and agricultural lands to residential, commercial, industrial and other urbanized land uses. Figure 2-2 and Table 2-1 illustrate the changes in land cover that have occurred in the region from 1985 to 2005. Figure 2-3 shows the existing (2007) land use within the Metro Water District.

The trend of further development is expected to continue through 2035 with the larger land use transitions occurring outside of the more developed core areas. In addition, due to recent housing trends and sharply higher transportation costs, it is anticipated that increases in density and land use intensity due to infill and redevelopment will continue to occur and accelerate in future years throughout the region.

FIGURE 2-2
Land Cover in the Metro Water District Region in 1985 and 2005

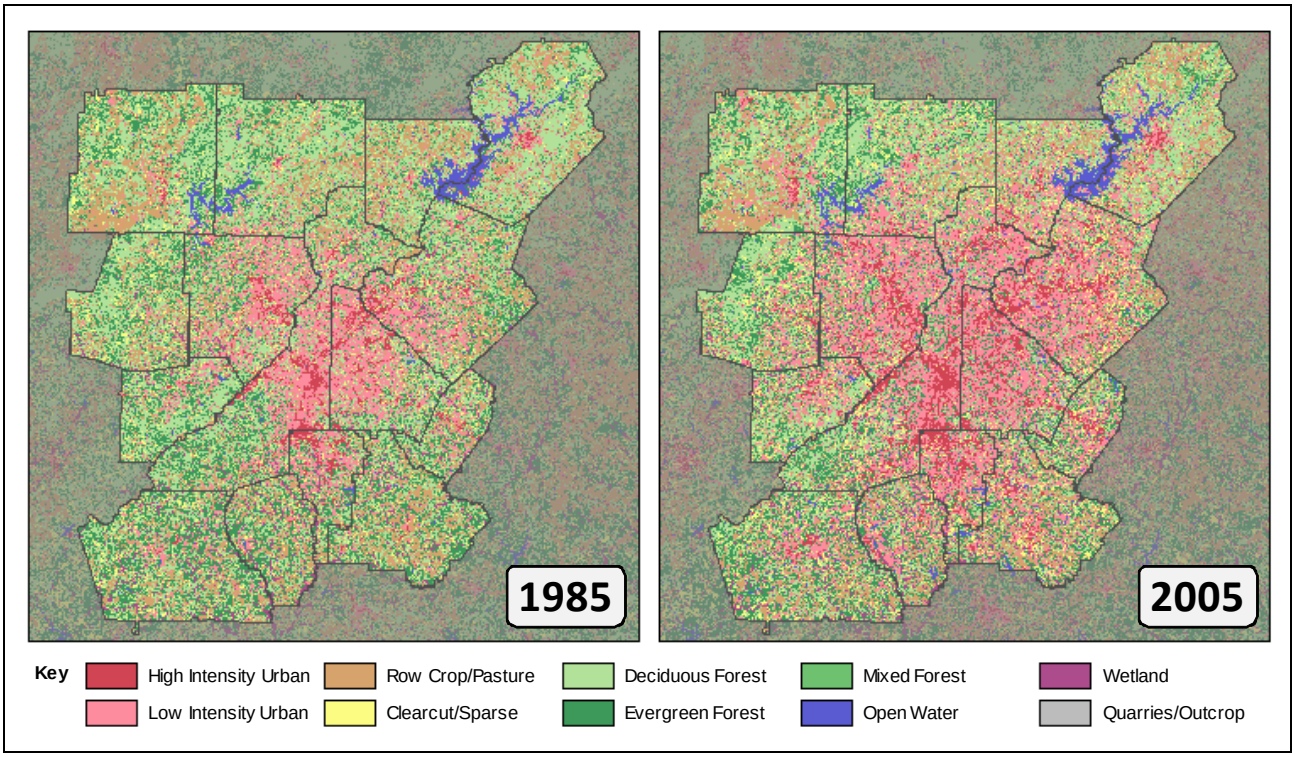
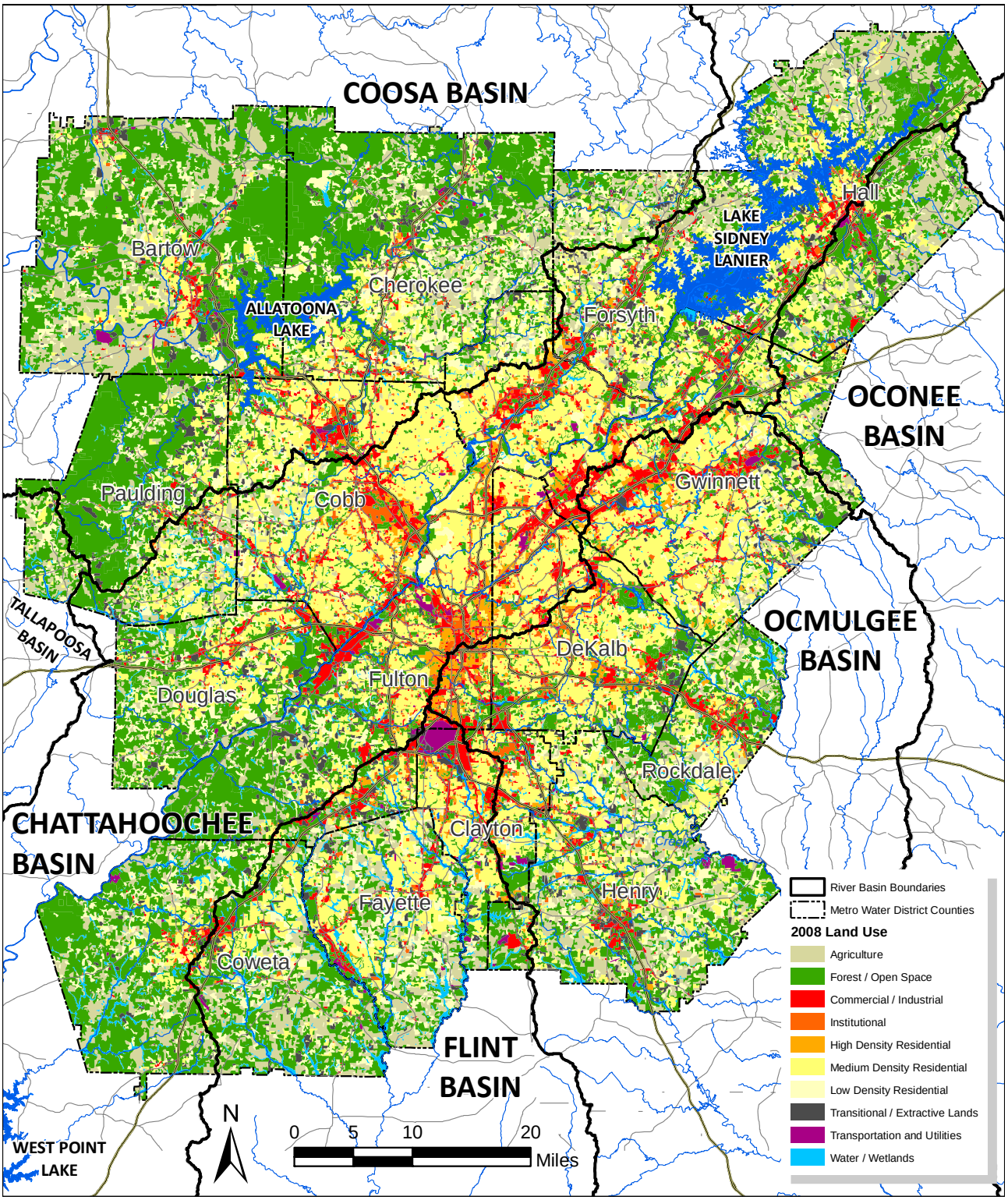


TABLE 2-1
Land Cover Changes 1985-2005

Land Cover Type	1985 Data		2005 Data		Change 1985-2005	
	Acres	% of Total	Acres	% of Total	Acres	Change
High Intensity Urban	89,652	2.8	216,472	6.9	126,820	141.5%
Low Intensity Urban	448,265	14.2	802,182	25.4	353,917	79.0%
Row Crop/Pasture	547,450	17.3	398,140	12.6	-149,310	-27.3%
Clearcut/Sparse	157,644	5.0	218,310	6.9	60,666	38.5%
Deciduous Forest	1,064,922	33.7	784,213	24.8	-280,709	-26.4%
Evergreen Forest	599,989	19.0	495,574	15.7	-104,415	-17.4%
Mixed Forest	85,891	2.7	60,992	1.9	-24,899	-29.0%
Open Water	58,973	1.9	85,271	2.7	26,298	44.6%
Wetland	101,070	3.2	90,136	2.9	-10,934	-10.8%
Quarries/Outcrop/Other	5,966	0.2	8,532	0.3	2,566	43.0%
TOTAL	*3,159,822*	*100.0*	*3,159,822*	*100.0*		

Source (both figure and table): University of Georgia Natural Resources Spatial Analysis Laboratory

FIGURE 2-3
Existing Metro Water District Land Use (2008)

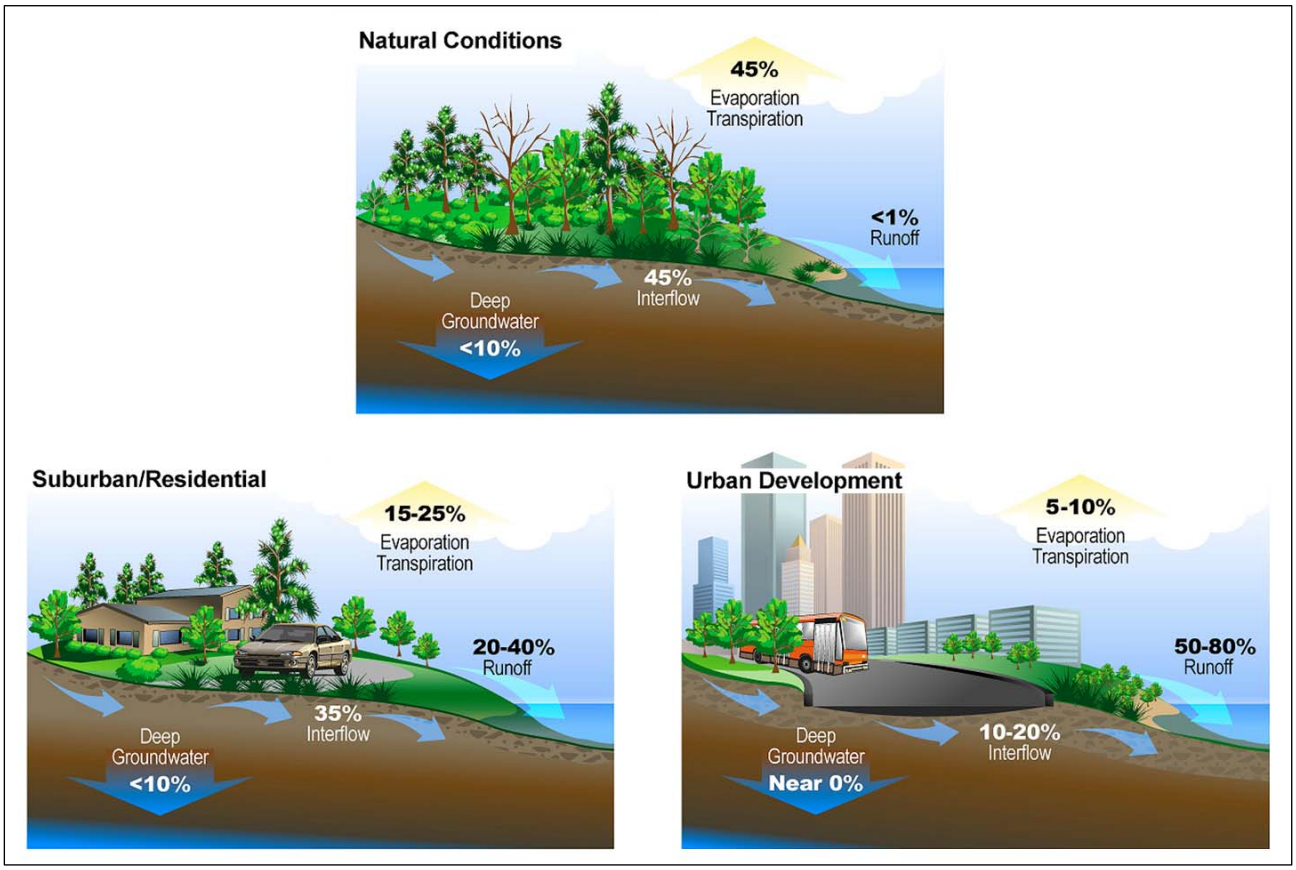


WATERSHED IMPACTS FROM LAND USE CHANGES

Land development affects the physical, chemical, and biological conditions of the Metro Water 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 which speeds stormwater runoff to local streams and concentrate pollutants coming from human activities in the watershed. Figure 2-4 illustrates how the water balance changes when natural forest cover is cleared and replaced by suburban and urban development.

FIGURE 2-4
Changes in Runoff and Hydrology as a Result of Land Use Changes



The changes in watershed hydrology from land use changes can have significant 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 dramatic physical, economic and aesthetic consequences to communities in the Metro Water District, including:

- Losses and damages to private & 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
- Reduction in quality of life

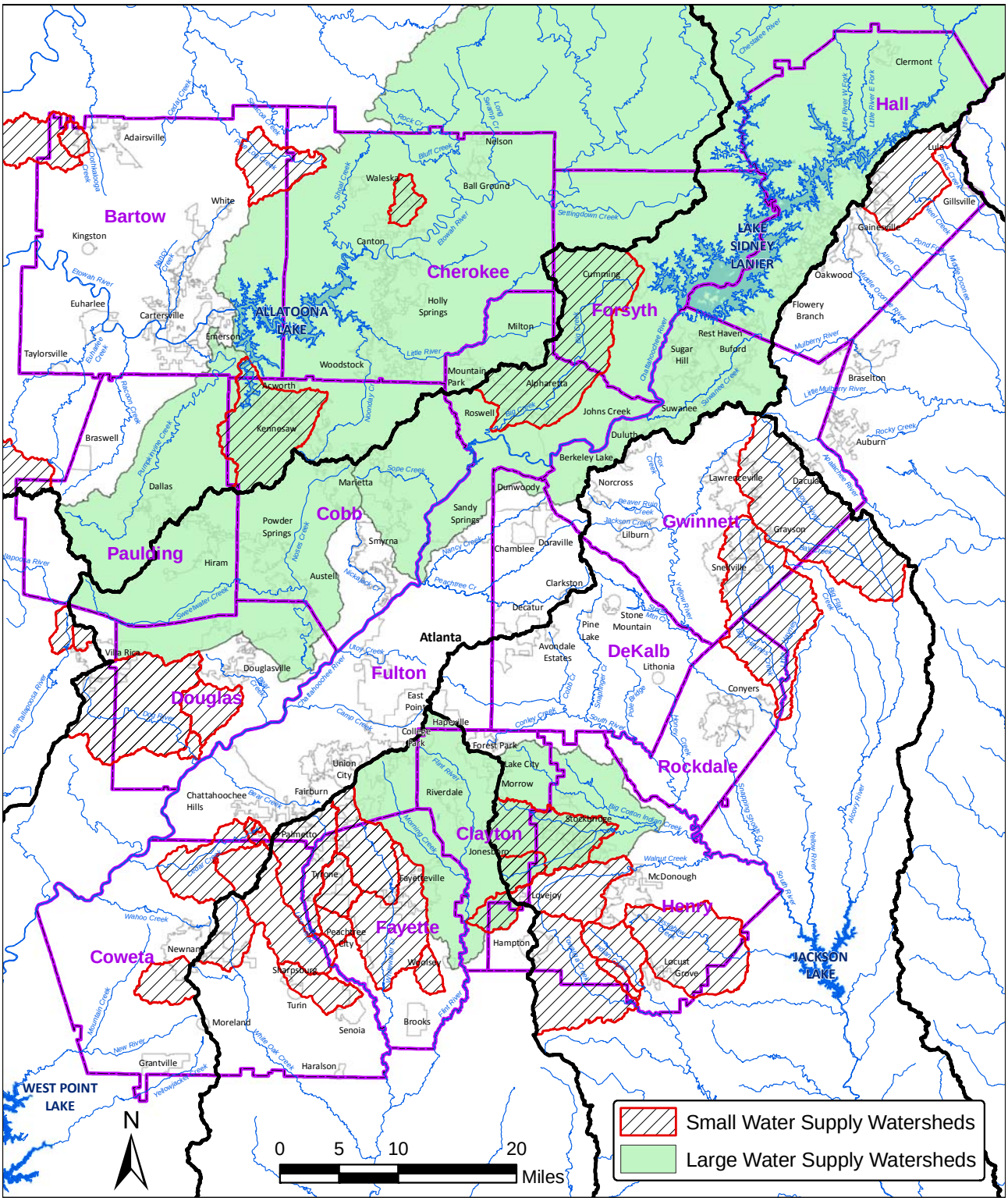
The key focus of this regional Watershed Management Plan is to provide watershed management measures, strategies to help local communities to protect their watersheds from future impacts and to help effectively mitigate existing problems to the maximum extent practicable.

DRINKING WATER SUPPLY PROTECTION

The protection of source water (drinking water supply) watersheds is vitally important to the region, as almost all of the Metro Water District's public drinking water supplies come from surface water sources, including streams, rivers and reservoirs. Water quality degradation of these surface waters can potentially pose human health threats, and often increases water treatment costs for local communities. Protecting existing water supply watersheds as well as protecting future potential drinking water supplies is an important element of this Watershed Management Plan. Figure 2-5 shows the water supply watersheds located within the Metro Water 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, while large water supply watersheds are 100 square miles or greater in size. Smaller drainage basins are more vulnerable to contamination by land use development and spills than larger watersheds, therefore more intensive watershed protection is needed. The Watershed Management Plan provides key protections for water supply watersheds through a number of its local management measures.

FIGURE 2-5
Source Water Supply Watersheds



WASTEWATER MANAGEMENT

Associated with increased growth and drinking water demands is an anticipated increase in need for additional wastewater treatment and discharge capacity. The surface waters used for drinking water, recreation, and fisheries in the region are often the same waters used for assimilating treated wastewater from wastewater treatment plants within the Metro Water District. As such, there is a balancing act between returning valuable reclaimed water to the watershed and maintaining water quality conditions.

Assimilative capacity generally defines the natural ability of a waterbody to accept contaminants without exceeding water quality standards or impacting aquatic life. Given the limitations of assimilative capacity of local waterbodies and impacts of nonpoint source pollution from stormwater runoff, higher levels of wastewater treatment will be required in the future in addition to implementation of the Metro Water District's Watershed Management Plan. This is critical to meeting the region's future water supply needs as well, given the emphasis in the future of reducing consumptive use and returning treated wastewater to local waterbodies.

In addition, the Metro Water District will also need to continue to focus on reducing nonpoint source pollution to ensure that assimilative capacity is available for discharges of highly treated wastewater effluent. In certain areas of the Metro Water District, assimilative capacity is limited as a result of nonpoint source pollution which has triggered the use of land application systems and growth on septic systems, which are more consumptive uses than surface water discharges. This approach is not sustainable across the Metro Water District, given the future wastewater quantities to be managed and the need to return flows to streams for other uses.

The Watershed Management Plan in conjunction with the Long-term Wastewater Management Plan and Water Supply and Water Conservation Management Plan are intended to provide guidance to local communities on these water resources management challenges for the Metro Water District.

WATER QUALITY

The lakes, ponds, streams, and wetlands in the Metro Water District are critical resources that provide multiple benefits including drinking water, wastewater assimilation, recreational and aesthetic benefits, and wildlife habitat. Because water quality is so closely linked to land use, as we continue to develop, the Metro Water District will continue to face water quality challenges.

Section 303(d) of the Clean Water Act requires that all states list waterbodies that do not meet water quality standards. The Georgia EPD publishes a bi-annual list of streams that do not meet State water quality standards, referred to as the 303(d) list. Table 2-2 provides the miles of stream by category and provides totals of streams supporting and not supporting uses based on the 2008 list. Table 2-3 shows a summary of streams that do not meet water quality standards by the parameter of concern for the Metro Water District based on the 2008 list. These impaired streams are shown in Figure 2-6. (Note that several impaired streams are listed for violations of more than one parameter, therefore the sum of the impaired stream miles by parameter is not equal to the value of not supporting listed streams found in Table 2-2.)

Since 2003, the total number of stream miles is greater than that provided in the original Watershed Management Plan. This increase in listed waters does not necessarily reflect worsening water quality or show that the Watershed Management Plan has not been effective for a number of reasons: (1) The increase in number of impaired stream miles is due in part to an almost 20% increase in miles of stream

monitored; (2) Water bodies remain on the 303(d)/305(b) list until an active delisting procedure is undertaken; (3) Over 50% of the listed streams are for fecal coliform which is a parameter which may not meet state water quality standards due to natural background sources. This standard also does not accurately reflect the potential for human illness based on contact with surface water.

Evidence provided by a recent USGS study in Gwinnett County shows that despite explosive population growth and land development within that county, water quality conditions have not declined in part through the implementation of an active watershed and stormwater management program.[1]

TABLE 2-2
Metro Water District Streams on the 303(d) List by Category

Category	Total Miles of Stream
Supporting (Category 1)	611
Not Supporting (Category 4-5)	1,541
Assessment Pending (Category 2-3)	3
Total	**2,155**

Source: Georgia EPD 2008 303(d)/305(b) list of impaired waters

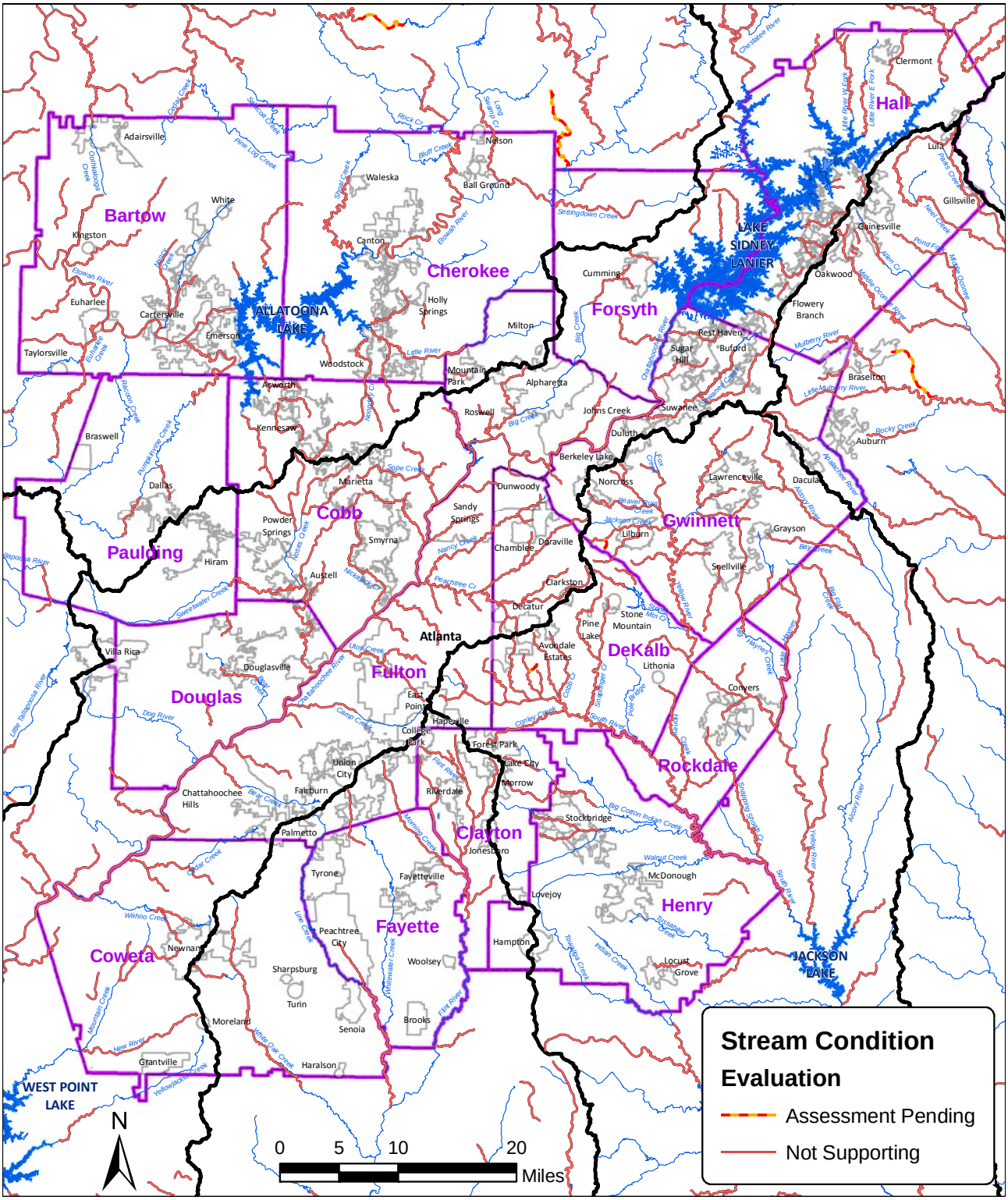
TABLE 2-3
Metro Water District Streams Not Meeting State Standards by Parameter

Criterion Violated	Total Miles of Listed Stream
Biota (Fish Community)	389
Biota (Macroinvertebrate Community)	209
Copper	5
1,1- Dichloroethylene	3
Dissolved Oxygen	42
Commercial Fish Ban	44
Fecal Coliform	1,166
Fish Consumption Guidance(PCBs)	159
Tetrachloroethylene	10
pH	40
Temperature	9
Toxicity	6
Zinc	5

Source: Georgia EPD 2008 303(d)/305(b) list of impaired waters

[1] Watershed Effects on Streamflow Quantity and Quality in Six Watersheds of Gwinnett County, Georgia. USGS report 2007-5132.

FIGURE 2-6
Impaired Streams on the 303(d) List in the Metro Water District



PROTECTED SPECIES

The Metro Water District is home to a number of native species that are considered threatened or endangered. Protecting watershed health is more than protecting water quality; it also includes protection of biological resources. Within the Metro Water District, there are 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 significant portion of their life history. In addition, there are protected plants that are either aquatic or semi-aquatic and grow within or along the margins of rivers and streams.

Table 2-4 lists the number of protected species in each river basin with the Metro Water District. At present, the Etowah subbasin of the Coosa Basin within the Metro Water District is home to several federally-protected fish species. In addition, a portion of the Tallapoosa basin in Paulding County is designated critical habitat for federally-protected mussels. This portion of Paulding County is part of Designated Critical Habitat Unit 16. The mainstem Oostanaula and Coosawatee Rivers are also critical habitat for mussels, but the portions of these basins are not located within the Metro Water District.

TABLE 2-4
Aquatic and Semi-Aquatic Protected Species in the Metro Water District

Fauna Type	Common Name	Status	Bartow	Cherokee	Clayton	Cobb	Coweta	DeKalb	Douglas	Fayette	Forsyth	Fulton	Gwinnett	Hall	Henry	Paulding	Rockdale
Bird	Bald Eagle	US		X											X		X
Fish	Amber Darter	US		X													
Fish	Cherokee Darter	US	X	X		X						X				X	
Fish	Etowah Darter	US	X	X												X	
Invertebrates	Cylindrical Lioplax	US	X														
Invertebrates	Finelined Pocketbook	US														X	
Invertebrates	Gulf Moccasinshell	US				X	X			X		X					
Invertebrates	Oval Pigtoe	US					X										
Invertebrates	Purple Bankclimber	US					X										
Invertebrates	Shinyrayed Pocketbook	US					X			X		X					
Mammal	Gray Myotis	US	X														
Bird	Bachman's Sparrow	GA										X					
Bird	Peregrine Falcon	GA										X					
Fish	Altamaha Shiner	GA						X									
Fish	Bluestripe Shiner	GA										X		X			
Fish	Coosa Chub	GA	X	X													
Fish	Frecklebelly Madtom	GA		X													
Fish	Freckled Darter	GA		X													
Fish	Highscale Shiner	GA			X	X	X		X	X		X					
Fish	Lined Chub	GA	X													X	
Fish	Rock Darter	GA	X	X													
Fish	Tallapoosa Darter	GA														X	
Invertebrates	Chattahoochee Crayfish	GA				X		X	X		X	X		X			
Invertebrates	Delicate Spike	GA				X	X					X					
Invertebrates	Etowah Crayfish	GA		X													
Invertebrates	Inflated Spike	GA					X										
Invertebrates	Rayed Creekshell	GA					X										
Invertebrates	Southern Creekmussel	GA					X			X							
Invertebrates	Southern Elktoe	GA					X										

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Section 3: FEDERAL AND STATE REGULATIONS

The Metropolitan North Georgia Water Planning District Act requires that the District-wide Watershed Management Plan "shall build upon and be coordinated with existing watershed planning efforts undertaken by local governments." Local governments in the Metro Water District are required to follow a number of Federal and State regulations related to watershed and water quality protection. These laws and programs form the basis for watershed and stormwater management in the Metro Water District and were the starting point for the development of the local management measures provided in Section 5.

This Section summarizes the key requirements for relevant Federal and State regulations which are illustrated in Figure 3-1.

FEDERAL CLEAN WATER ACT – NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM

The National Pollutant Discharge Elimination System (NPDES) permit program was established under the Federal Clean Water Act to control water pollution by regulating the discharge of pollutants into waters of the United States. The NPDES program covers several pollutant sources that are regulated by permits issued by the Georgia Environmental Protection Division (Georgia EPD).

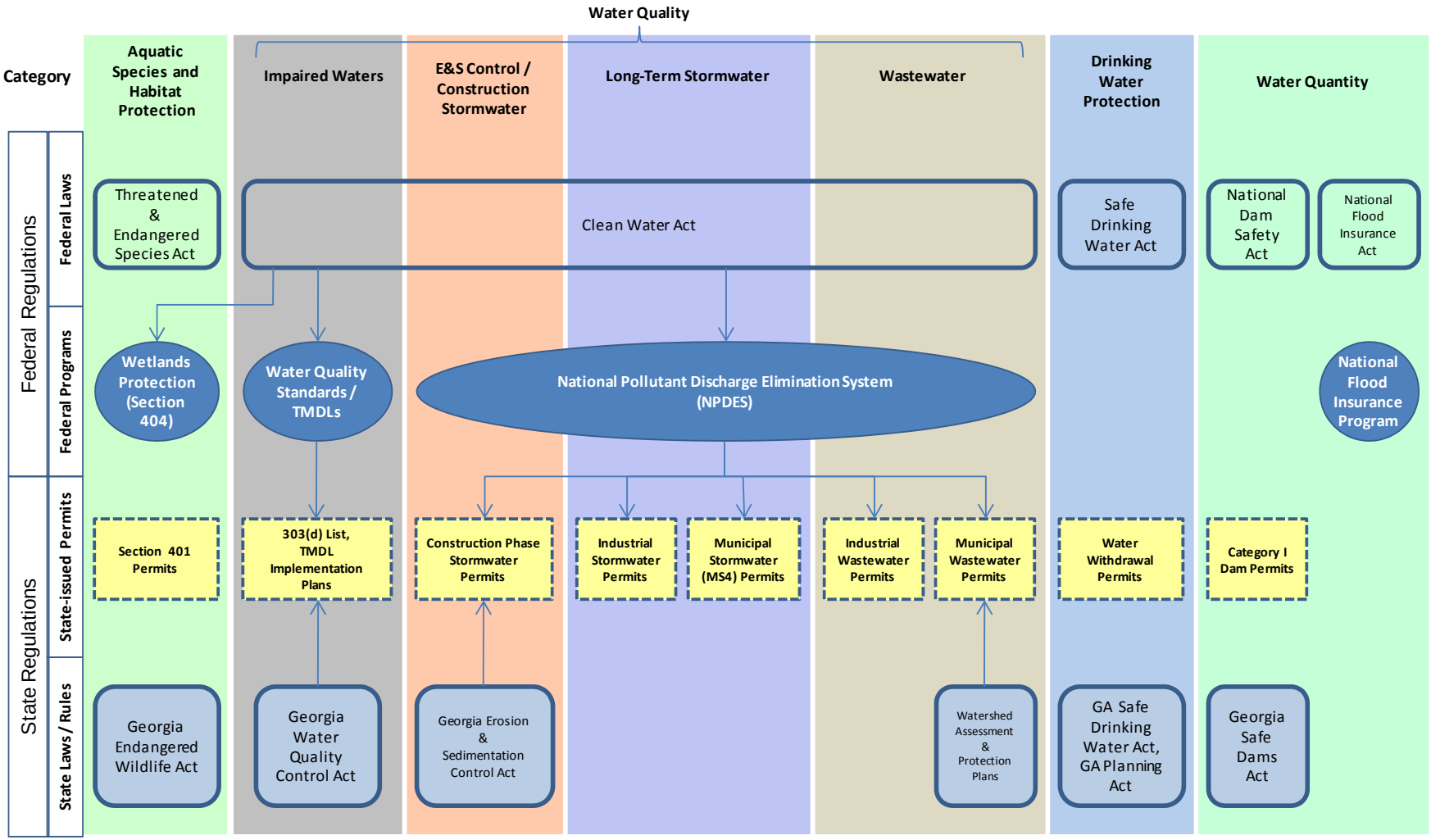
NPDES MUNICIPAL STORMWATER

Municipal separate storm sewer systems (MS4) that discharge to surface waters are required to have a permit under the federal Clean Water Act. The U.S. Environmental Protection Agency (EPA) NPDES stormwater regulations have established two phases (Phase I and Phase II) for the municipal stormwater permit program. Phase I communities have individual permits whereas Phase II communities are covered under a general permit. Prior to permit issuance and renewal, both Phase I and II permittees are required to submit their Stormwater Management Plan (SWMP) to Georgia EPD. Table 3-1 provides a current listing of communities within the Metro Water District by permit type.

Phase I MS4 Program

Georgia EPD brought the entire five-county area of Clayton, Cobb, DeKalb, Fulton and Gwinnett Counties (municipalities and unincorporated counties) into the Phase I MS4 program in 1994. Unincorporated Forsyth County was added to the Phase I program in 2000. Phase I permittees are required to develop and implement a stormwater management program that includes structural and source control measures, illicit discharge detection and elimination, industrial facility stormwater runoff control, and construction site management as minimum elements. The MS4 Phase I permits will be reissued in 2009 (2010 for Forsyth County).

FIGURE 3-1
Watershed Management Regulatory Framework



Phase I permittees are required to submit an annual report form to Georgia EPD demonstrating progress towards permit requirements. The major activities outlined by the report form, which is available on the Georgia EPD website, currently include:

- Description of the local stormwater management plan (including any revisions);
- Annual inspections and maintenance of the drainage system;
- Screening of MS4 system outfalls annually;
- Inspection of industrial, commercial, and highly visible facilities;
- Development of a monitoring plan for 303(d) listed streams for the parameter(s) of concern;
- Identification of outfalls that discharge within or one mile upstream of listed stream segments;
- Implementation and assessment of the effectiveness of best management practices to address TMDL listed waters;
- Budget and staffing information for the stormwater management program;
- Enforcement actions taken to address violations;
- Local education program activities;
- Street maintenance;
- Municipal waste facility monitoring;
- Pesticide, fertilizer, herbicide application activities; and
- Construction site management.

Phase II MS4 Program

In 2002, Georgia EPD issued Phase II MS4 stormwater permits to additional communities in the Metro Water District who were in metropolitan urbanized areas as defined by the 2000 Census. New municipalities created since 2002 have also been brought under the Phase II program. The MS4 Phase II permits were reissued in 2007 and will be reissued again in 2012.

Phase II permittees are required to comply with the following set of 6 minimum measures:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention and Good Housekeeping

Phase II permittees submit an annual report form to Georgia EPD demonstrating progress towards permit requirements. The report form is available on Georgia EPD's website.

In addition to the six minimum measures, other permit requirements currently include:

- Developing a map of the outfalls and receiving streams.
- Developing an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.
- Taking steps to reduce pollutants in impaired waters to the maximum extent practicable.

TABLE 3-1
Metro Water District NPDES MS4 Permittees by Category

Phase I MS4 Jurisdictions	Acworth Alpharetta Atlanta Austell Avondale Estates Berkeley Lake Buford Chamblee Clarkston Clayton County (unincorporated) Cobb County (unincorporated) College Park Dacula Decatur DeKalb County (unincorporated) Doraville	Duluth East Point Fairburn Forest Park Forsyth County (unincorporated) Fulton County (unincorporated) Grayson Gwinnett Co. (unincorporated) Hapeville Jonesboro Kennesaw Lake City Lawrenceville Lilburn Lithonia Lovejoy	Marietta Morrow Norcross Palmetto Pine Lake Powder Springs Riverdale Roswell Smyrna Snellville Stone Mountain Sugar Hill Suwanee Union City
Phase II MS4 Jurisdictions	Auburn Bartow Co. (unincorporated) Canton Cherokee Co. (unincorporated) Conyers Coweta County (unincorporated) Cumming Dallas Douglas Co. (unincorporated) Douglasville Dunwoody	Emerson Fayette County (unincorporated) Fayetteville Flowery Branch Gainesville Hall County (unincorporated) Hampton Henry County (unincorporated) Hiram Holly Springs Johns Creek McDonough	Milton Mountain Park Newnan Oakwood Peachtree City Paulding Co. (unincorporated) Rockdale Co. (unincorporated) Sandy Springs Stockbridge Tyrone Woodstock

NPDES INDUSTRIAL STORMWATER

NPDES industrial stormwater permits authorize discharges of stormwater associated with industrial facilities, including industrial manufacturing and processing, and raw material storage areas associated with an industrial plant. Permittees are required to file a Notice of Intent (NOI) with Georgia EPD and develop a stormwater pollution prevention plan (SWPPP). The SWPPP includes appropriate stormwater management practices to control pollutants in discharges of stormwater associated with industrial activity from their facility.

The NPDES Industrial Permit, reissued in 2006, includes annual reporting requirements, additional numeric effluent limits, removal of quantitative sampling for water priority chemicals, and the addition of sampling of impaired waters as defined by the State 303(d) list where applicable. The permit will be reissued again in 2011. Municipal facilities that may require an NPDES industrial permit include wastewater treatment facilities, land application sites, solid waste or recycling transfer stations, landfills, and fueling stations.

NPDES INDUSTRIAL WASTEWATER

Discharges from industrial wastewater systems are permitted by Georgia EPD under the NPDES industrial wastewater program, similar to municipal wastewater systems. Typical industrial wastewater permits establish specific discharge levels (e.g. pollutant-specific limits and wasteloads), monitoring requirements, and reporting requirements. Industrial wastewater operators are responsible for meeting the specific discharge permit requirements for that facility.

NPDES MUNICIPAL WASTEWATER

Discharges from municipal sanitary wastewater systems are permitted by Georgia EPD under the NPDES municipal wastewater program. Regulations address publicly-owned treatment works (POTW's), separate and combined wastewater systems and facilities, sludge and biosolids handling, and pretreatment requirements for industrial users discharging into a municipal wastewater system. Typical municipal wastewater permits establish specific discharge levels (e.g. pollutant-specific limits and wasteloads), monitoring requirements, and reporting requirements. Municipal wastewater operators are responsible for meeting the specific discharge permit requirements for that facility.

NPDES CONSTRUCTION RUNOFF

The NPDES Construction Stormwater program requires land development projects one acre or larger (including smaller sites that are part of a larger common plan of development) to obtain authorization to discharge stormwater under an NPDES construction stormwater permit. Permittees must submit an NOI to Georgia EPD as well as the Local Issuing Authority (LIA), if applicable, which include an erosion, sedimentation and pollution control (ES&PC) plan. The ES&PC plan is reviewed and approved by the LIA, or Georgia EPD if the jurisdiction is not a LIA. The Construction NPDES Permit includes inspection, documentation, and sampling requirements. This permit was renewed in 2008.

FEDERAL CLEAN WATER ACT – OTHER PROVISIONS

TMDL PROGRAM

A Total Maximum Daily Load (TMDL) is the calculation of the maximum amount of a pollutant of concern that a specific segment of a waterbody can receive and still meet water quality standards. The TMDL represents the sum of allowable loads of a single pollutant from all contributing sources (including nonpoint sources) and includes a margin of safety and seasonal variations in water quality.

TMDL = sum of load allocations (nonpoint sources) + sum of wasteload allocations (point sources) + margin of safety

Pursuant to various sections of the Clean Water Act, Georgia EPD must assign a designated use for Georgia's waterways and develop a list of impaired waters that do not meet water quality standards. The Section 303(d) list is a subset of the Section 305(b) list of impaired waters that consists only of segments where Georgia EPD must establish TMDLs that allocate pollutant loads among point and nonpoint sources of pollution, including stormwater.

As a result of legal action in Georgia, the rapid scheduled development of TMDLs and later implementation plans for Georgia's river basin groups began in 1998 and continues for newly listed segments following Georgia's basin group planning cycle. Following an initial interagency agreement between Georgia EPD and U.S. EPA Region IV, every TMDL includes a boilerplate "Initial TMDL Implementation Plan" that provides guidelines for and schedules the subsequent preparation of a more detailed "Revised TMDL Implementation Plan". The Revised TMDL Implementation Plans identify the management practices and activities needed to reduce the pollutant load and restore water quality. TMDL Implementation Plans can be found on the Georgia EPD website.

WETLANDS (SECTION 404)

The Federal Clean Water Act was amended in 1977 (Section 404) to address the placement of fill in waters of the United States and the preservation of wetlands. Section 404 is administered by the Army Corps of Engineers (Corps), with consultation from U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service. Any unavoidable dredge or fill activities associated with "waters of the United States" must be permitted and mitigation activities performed to compensate for the loss of wetlands. In recent years, case law has shaped the definition of protected wetlands and the interpretation of activities requiring permits.

Local permit review staff are required to ensure that land disturbance activities that affect waters of the U.S. are properly permitted. There are a number of nationwide permits for different activities used by the Corps to authorize activities that have minimal individual and cumulative adverse effects on the aquatic environment. Associated with the Section 404 permits, a Section 401 Water Quality Permit must be granted from Georgia EPD prior to any dredge or fill activities.

FEDERAL SAFE DRINKING WATER ACT

The Federal Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply as a response to outbreaks of waterborne diseases and increasing chemical contamination. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells.

One component of the 1996 amendment requires the creation of Source Water Assessment Plans (SWAP) by public water systems. SWAP plans for most of the communities in the Metro Water District were completed with the help of the Atlanta Regional Commission, other Regional Development Centers, and the Lake Allatoona Preservation Authority. A SWAP identifies areas of risk for source water pollution within a drinking water supply watershed. The criteria for determining the overall watershed ranking for the 10-county Atlanta region included the number of potential pollutant sources located in the watershed, transitional land, impervious area, number of sanitary sewer crossings, number of railroad crossings, and the number of identified spills. The watersheds were then provided with an overall watershed ranking (low, medium, medium-high, high) that indicates the watershed risk for future pollution. Thus a drinking water supply watershed with an overall watershed ranking of low has a lower risk of pollution than a watershed that ranks high. The overall watershed ranking does not indicate the quality of treated drinking water from that supply source.

Wellhead protection requirements were also included in the 1986 amendments to the SDWA. Georgia EPD has established protection areas around drinking water supply wells that can vary based on the local geology, well depth, and pumping rate, among other factors. These wellhead protection areas are intended to help protect wells and springs used as sources of water supply for community public water systems owned by and/or serving municipalities, counties, and authorities from nearby pollution sources.

FEDERAL FLOOD PROTECTION PROGRAMS

NATIONAL FLOOD INSURANCE ACT

The National Flood Insurance Act of 1968 led to the creation of the National Flood Insurance Program (NFIP) and offered new flood protection to homeowners. Participation in the NFIP is voluntary, based on an agreement between local communities and the federal government which states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in “special flood hazard areas”, the Federal government will make flood insurance available within the community as a financial protection against flood losses.

In 2001, FEMA promulgated hazard mitigation planning regulations pursuant to the Disaster Mitigation Act of 2000. FEMA established the 10-step Community Rating System (CRS) process that identified four essential parts to mitigation planning and created a point-based evaluation system. The CRS rewards communities that undertake floodplain activities beyond the requirements with lower flood insurance premiums. A Class 1 rating requires the most credit points and gives the greatest premium reduction; Class 10 receives no premium reduction. A community that does not apply for the CRS, or does not obtain the minimum number of credit points is automatically categorized a Class 10 community.

The program was further amended by the Flood Insurance Reform Act of 2004, with the goal of reducing losses to repetitive loss properties. The 2004 reforms to the NFIP were incorporated into the amendment to the Metro Water District model floodplain management and flood damage prevention model ordinance.

NATIONAL DAM SAFETY PROGRAM

The National Dam Safety Program (NDSP) was formally established through the Water Resources and Development Act of 1996 but requirements for dam inspections have existed since 1972. The intent of the NDSP is to reduce the risk of life and property damage through the regulation of high hazard dams. Georgia EPD has managed a Safe Dam Act program since 1978. Dams regulated by the Safe Dams Act include those greater than 25 feet tall or that impound greater than 100 acre-feet of water. Category I dams are those with the potential for the loss of life due to dam failure and Category II dams are those with the potential for loss of property. Regulated dams are inspected by Georgia EPD and deficiencies must be addressed or the dam will be breached. The Georgia Safe Dams Act has detailed criteria for the design and inspections of regulated dams. Responsibility for inspections of dams that do not meet these criteria to ensure protection of downstream persons and property are the responsibility of the local jurisdictions.

FEDERAL ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and their habitats. The FWS and the National Marine Fisheries Service maintain a list of endangered and threatened species.

The ESA prohibits any action that results in a “taking” (harassing, harming, or killing) of a listed species or adversely affects its habitat. It also requires federal agencies to consult with the relevant management agency before taking action or granting a permit that would jeopardize a species. Protection or improvement of habitat on state or private lands may be addressed through the development and implementation of Habitat Conservation Plans on a regional basis or through individual incidental take permits.

STATE OF GEORGIA REGULATIONS

The State of Georgia has passed laws that are part of the delegation of federal regulations to the state. In addition, the State has a number of water quality and watershed protection regulations which complement and extend the intent of federal provisions.

GEORGIA WATER QUALITY CONTROL ACT

The Georgia Water Quality Control Act provides for the establishment of water quality standards, as well as policies and procedures for waterbodies that do not meet these standards. Under Section 303(d) of the Federal Clean Water Act, the Georgia EPD must assign a designated use for Georgia’s waterways and develop water quality standards based on the designated use. Georgia currently has five categories of designated uses including; drinking water supplies, recreation, fishing, wild and scenic river, and coastal fishing. The majority of the streams in the Metro Water District are designated as fishing and/or drinking water. The water quality standards for each designated use are developed by Georgia EPD, based on EPA water quality guidelines.

Monitored waters that do not meet their state water quality standards are considered impaired and published in the State's 303(d) list of impaired waters, per the Clean Water Act. Substantial changes to the 2008 Georgia 303(d) list were made to comply with EPA guidance. Assessed waters are now placed into one of five categories, as outlined in Table 3-2. The goal of the five-category system is to increase clarity. According to the Clean Water Act, the 303(d) list identifies waters not meeting their designated uses and for which TMDL's have not been completed for the parameters of concern. Once the TMDL is completed, the water will no longer be on the 303(d) list regardless of whether it meets its designated use. With the new five-category system, Georgia EPD adjusted the ranking method for TMDL development to reflect the existing basin rotation schedule. Other changes to the 2008 303(d) list include discontinuation of the term "partially supporting" and inclusion of "EPA added waters" or stream segments assessed by EPA as part of the TMDL development process.

Georgia EPD also designates streams as primary or secondary trout streams. Primary trout streams support self-sustaining populations of Rainbow, Brown or Brook Trout. Secondary trout streams are those with no evidence of natural trout reproduction, but are capable of supporting trout throughout the year. There are no primary trout streams located in the Metro Water District, but there are several secondary trout streams.

TABLE 3-2
2008 303(d) List Assessed Waters Categories

2008 Category	2008 Category Description	Prior to 2008
Category 1	Supporting designated use(s).	Supporting
Category 2	The water has more than one designated use. One designated use is met and insufficient information exists regarding the other designated use.	None
Category 3	Insufficient data to make a determination.	Not Listed
Category 4a	Not supporting use(s) - TMDL completed.	Not Supporting and "3" in the 303(d) column
Category 4b	Not supporting use(s) - actions in place other than TMDL to bring water into compliance.	Not Supporting and "2" in the 303(d) column
Category 4c	Not supporting use(s) - source of non-attainment is not a pollutant.	None
Category 5	Not supporting use - TMDLs not completed.	Not Supporting and "x" in the 303(d) column

WATERSHED ASSESSMENTS AND WATERSHED PROTECTION PLANS

In addition to the Federal NPDES wastewater permit requirements, Georgia EPD requires watershed monitoring plans, watershed assessments, and watershed protection plans from all POTWs greater than 1.0 MGD or for new or expanding facilities. Recognizing that existing and additional wastewater capacity supports growth, the local wastewater providers must address the potential for water quality

impacts from stormwater runoff and nonpoint source pollution that would result from that growth. Many local governments within the Metro Water District have completed watershed assessments and are implementing their watershed protection plans. The specific requirements for each of these three elements are detailed in guidance documents on Georgia EPD's website and are outlined below.

Watershed Monitoring Plans

The Watershed Monitoring Plan describes the field study to document current water quality conditions and identify stressors that affect water resources quality in the watershed area. The monitoring plan must include a watershed characterization, a description of the monitoring stations selected, and a schedule for chemical and habitat monitoring. The data collected during watershed monitoring is then analyzed as part of the Watershed Assessment.

Watershed Assessments

The Watershed Assessment defines the current watershed conditions and predicts the direct and indirect effects of growth and development on the watershed. The watershed characterization includes discussions of population, land use changes, and analysis of other potential pollutant sources within the watershed. Water quality data collected from the monitoring plan plus other locally available data should identify, document and rank any impaired waters in the study area. Any anticipated changes in water quality based on future growth should also be documented in the Watershed Assessment.

Watershed Protection Plans

The Watershed Protection Plan is based on the information in the Watershed Assessment. The Watershed Protection Plan must contain the protection strategies and necessary steps to improve and meet water quality standards. The Watershed Protection Plan must include specific actions and detailed schedules for implementation. Local governments must submit an annual certification of implementation with a progress report of specific actions and long-term monitoring data must be available for review. Local governments are urged to coordinate Watershed Protection Plan actions with those required for compliance with NPDES MS4 permits or other similar watershed requirements. The goal of Watershed Protection Plans is to protect water quality from anticipated land use changes and nonpoint sources of pollution.

GEORGIA EROSION AND SEDIMENTATION CONTROL ACT

Georgia's Erosion and Sedimentation Control Act (ESCA) was first passed in 1975 to protect Georgia's waters from soil erosion and sediment deposition. The Act requires permits for land-disturbing activities on sites one acre or larger as well as an erosion, sedimentation and pollution control (ES&PC) plan for preventing and/or minimizing erosion and sedimentation from the activity. In addition, the regulations require undisturbed buffers between the land-disturbing activity and streams to minimize adverse impacts to water quality. Development is not allowed within 25 feet of most streams in Georgia and 50 feet for trout streams. Unlike the NPDES Construction Permit, the ESCA is administered primarily through the Local Issuing Authority (LIA). Plan review checklists, updated in 2008, are available by development type on the Georgia Soil and Water Conservation Commission website.

In 2003, O.C.G.A. § 12-7-19 amended the ESCA to include mandatory certification for all individuals involved in any aspect of land disturbance activities in Georgia by December 31, 2006. The amendment also included mandatory fees per acre of disturbed land to fund enforcement programs for Georgia EPD and for the LIA. While similar to the NPDES Construction Permit, the ESCA further

outlines the responsibilities of the LIA. Georgia EPD has asked LIA's to educate the development community on the need to file an NOI under the NPDES Construction Permit, which are processed by Georgia EPD.

The buffer variance procedure and criteria, amended in 2004, provides a list of exempted activities that may be allowed by the LIA and a list of activities that will be considered for a variance by Georgia EPD. The rule also outlines the minimum information needed for the buffer variance application and the details for buffer mitigation plans, if required. Enforcement of the buffer variance procedure requires support from the local issuing authority in identifying waters of the state within their jurisdiction, related to new development and redevelopment projects. Georgia EPD has recently released a field guide to assist local governments in making stream determinations that is available on their website.

METROPOLITAN RIVER PROTECTION ACT

In 1973, the Georgia General Assembly passed the Metropolitan River Protection Act (MRPA) to provide protection to the land and water resources of the Chattahoochee River between Buford Dam and Peachtree Creek. MPRA established the 2,000-foot Chattahoochee River Corridor on both banks of the River and authorized the Atlanta Regional Commission (ARC) to adopt a plan for its protection.

Under the Chattahoochee Corridor Plan, all development activities in the Corridor must be consistent with plan standards to be approved. These standards include limits on land disturbance and impervious surface, buffers and setbacks on the river, and floodplain requirements. The Act was amended in 1998 to extend the Corridor to the downstream limits of Fulton and Douglas Counties. The jurisdictions impacted by MRPA should ensure that all land development permittees within the Corridor have completed a MRPA review by ARC and, when necessary, adopt the review recommendations as permit conditions.

GEORGIA PLANNING ACT

The Georgia Planning Act of 1989 requires local governments to adopt comprehensive land use plans. One component of the Act, generally known as the "Environmental Planning Criteria" or "Part V Criteria", requires local governments to incorporate minimum planning measures to protect natural resources into their comprehensive plans. The Environmental Planning Criteria include the protection of: wetlands, water supply watersheds, groundwater recharge areas, protected rivers, and protected mountains. Sensitive features such as wetlands, groundwater recharge areas, and protected mountains should be identified in land use plans and protected to the extent practicable as defined in O.C.G.A. §391-3-16, located on the Georgia EPD website. Protected rivers as part of the Part V criteria include any perennial river or watercourse with an average annual flow of at least 400 cubic feet per second that are not covered by the Metropolitan River Protection Act.

The stream buffer requirements for the protection of drinking water supply watersheds were recently amended by Georgia EPD to include alternate minimum buffer criteria for drinking water supply watersheds as long as the additional minimum criteria are met as outlined in Table 3-3.

TABLE 3-3
GEORGIA EPD Alternative Minimum Criteria for Drinking Water Supply Watersheds

Management Principles	Rule Paragraph 391-3-16(10)	Rule Option 3.(i)	Rule Option 3.(ii)	Rule Option 3.(iii)	Current Rule
Critical area extent (see Note 1)	-----	1-mile	-----	-----	7-miles
Critical area buffer	-----	100-foot	-----	-----	100-foot
Buffer width (outside of critical area)	-----	50-foot	75-foot	100-foot	50-foot (Note 2)
Setback	-----	-----	-----	-----	150-foot
Implement public education	3.(i)	Yes	Yes	Yes	-----
Design guidelines (diffuse flow)	3.(ii)	Yes	Yes	Yes	-----
Declarations on deed/plat	-----	Yes	Yes	Yes	-----
Stormwater ordinance	3.(iii)	Yes	Yes	Yes	-----
Septic tank inspections every 7 years	3.(vii)	Yes	Yes	-----	-----
Monitoring program	3.(iv)	Yes	Yes	Note 3	-----
Buffer vegetation	3.(v)	Yes	Yes	Note 3	-----
Septic notification	-----	-----	-----	Note 3	-----
Maintain Local Issuing Authority status	-----	Yes	Yes	Note 3	-----
10% Effective Impervious Area	3.(vi)	Yes	-----	Note 3	-----
Impervious Surface Limits (25-percent)	-----	-----	-----	-----	Yes (Note 2)

Notes:
1. Critical area extent is the radius upstream of the public drinking water supply.
2. This requirement is only for small drinking water supply watersheds (less than 100 square miles of land upstream of supply).
3. These practices are recommended but not required in the drinking water supply watershed.

The Georgia Department of Community Affairs (Georgia DCA) reviews the Part V standards as part of the Local Comprehensive Plan reviews every 10 years. The Minimum Standards and Procedures for Local Comprehensive Planning also require local governments within the Metro Water District to incorporate recommendations from the three water management plans into their local comprehensive land use plans. Failure to properly administer and enforce these planning standards can lead to "Unqualified Local Government" status and the loss of State and Federal funds.

STATE WATER PLAN

In 2004, the Georgia General Assembly passed the Comprehensive State-wide Water Management Planning Act to establish a set of policies to govern water management decisions. Following two years of development and public comment, the Comprehensive State-wide Water Management Plan (State Water Plan) was adopted by the Georgia General Assembly on January 18, 2008. The overall goal of the plan is to manage "water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens".

Key themes repeated throughout the State Water Plan include: management of consumptive use to ensure present and future opportunities for use of the resource, management of point and nonpoint sources on a watershed basis, and protection of waters that currently meet state standards and restoration of waters that are currently impaired. Several meetings were held with Georgia EPD throughout the planning process to provide consistency with the State Water Plan. Future action items that may affect

the Watershed Management Plan include adoption of an E. coli bacteria water quality standard, calculations of assimilative capacity to balance stormwater and wastewater loads, recommendations for consumptive use that may consider stormwater treatment, and an increased future focus on restoration of impacted waters.

Georgia EPD will establish guidelines and criteria for local plans to be implemented by the Metro Water District and the other planning districts statewide. As the state water planning process progresses, the Metro Water District will evaluate and update its water resources plans and programs as needed to stay in compliance with the State Water Plan guidelines and criteria.

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Section 4: RIVER BASIN PROFILES

INTRODUCTION

The Metro Water District lies within six major river basins: the Chattahoochee, Coosa, Flint, Ocmulgee, Oconee and Tallapoosa River watersheds. This section discusses each of the river basins within the Metro Water District and highlights their unique watershed characteristics and challenges. Addressing these challenges is another important driver for the measures and policies provided in Sections 5, 6 and 7.

Each of the six river basin profiles outlines the conditions that impact water resources within the basin and influence management decisions, including:

- Geography – General characteristics, including political jurisdiction within the basin;
- Hydrology – Overview of the major tributaries and reservoirs in the basin;
- Land Use – Current land use data for 2007, as well as land use projections for 2035;
- Drinking Water Supply – Water supply sources by owner/operators and source water assessments;
- Water Quality – Miles of streams by parameter that do not meet state water quality standards;
- Management Issues and Recommendations – Management issues and recommended strategies; and
- Success Stories – Local watershed protection accomplishments with the river basin.

CHATTAHOOCHEE RIVER BASIN

The Chattahoochee River basin supplies drinking water and serves as the primary receiving water for treated wastewater effluent for over 3 million people in the Metro Water District. Lake Lanier and the Chattahoochee River National Recreation Area (CRNRA) are major recreational destinations within the region and Southeast U.S.

GEOGRAPHY

The Chattahoochee River has its headwaters in the Blue Ridge Mountains northeast of the Metro Water District. The basin occupies a relatively narrow corridor through the center of the Metro Water District, averaging about 40 miles wide, starting in the northeast corner and extending to the southwest corner (Figures 4-1 and 4-2).

Counties within the Metro Water District that are partially within the Chattahoochee basin include Cherokee, Cobb, Coweta, DeKalb, Forsyth, Fulton, Gwinnett, Hall, and Paulding. All of Douglas County is located within the Chattahoochee basin. Most of the City of Atlanta is located within the Chattahoochee basin. The Chattahoochee basin covers 1,828 square miles and is the largest river basin within the Metro Water District.

HYDROLOGY

The flow of the Chattahoochee River through the Metro Water District is regulated primarily by Buford Dam, a Federal impoundment forming Lake Sidney Lanier, which is operated by the U.S. Army Corps of Engineers (Corps). Lake Lanier has a drainage area of 1,040 square miles, and extends from Buford Dam about 44 miles up the Chattahoochee River and about 19 miles up the Chestatee River. Constructed in the 1950's, Lake Lanier is a multi-purpose reservoir that provides for flood protection, power production, water supply, navigation, recreation, and fish and wildlife management. Lake Lanier is the largest reservoir in the Metro Water District and provides the majority of the Metro Water District's water supply, either through direct withdrawals or downstream releases.

A second smaller downstream dam, the Georgia Power Morgan Falls Dam, is a run-of-the-river project that provides minor regulation of the river. West Point Lake, the second major reservoir on the Chattahoochee River system, lies just south of the Metro Water District. The Chattahoochee River flows to the Gulf of Mexico after joining with the Flint River to form the Apalachicola River in south Georgia.

Main tributaries feeding the Chattahoochee River through the Metro Water District include the Chestatee River, Big Creek, Nancy Creek, Peachtree Creek, Noses Creek, Sweetwater Creek, and Dog Creek. In contrast to the mainstem Chattahoochee River, many tributaries remain free-flowing.

Annual flows in the Chattahoochee River at Atlanta range from a low of 888 cubic feet per second (cfs) to a high of 15,100 cfs, with a mean flow of 2,722 cfs. Measurements recorded near Fairburn indicate annual flows ranging from a low of 1,100 cfs to a high of 28,200 cfs, with a mean flow of 3,863 cfs. Rainfall ranges from an average of 60 inches per year in the northeastern part of the basin to 53 inches in the southwestern part.

FIGURE 4-1
Upper Chattahoochee Basin within the Metro Water District

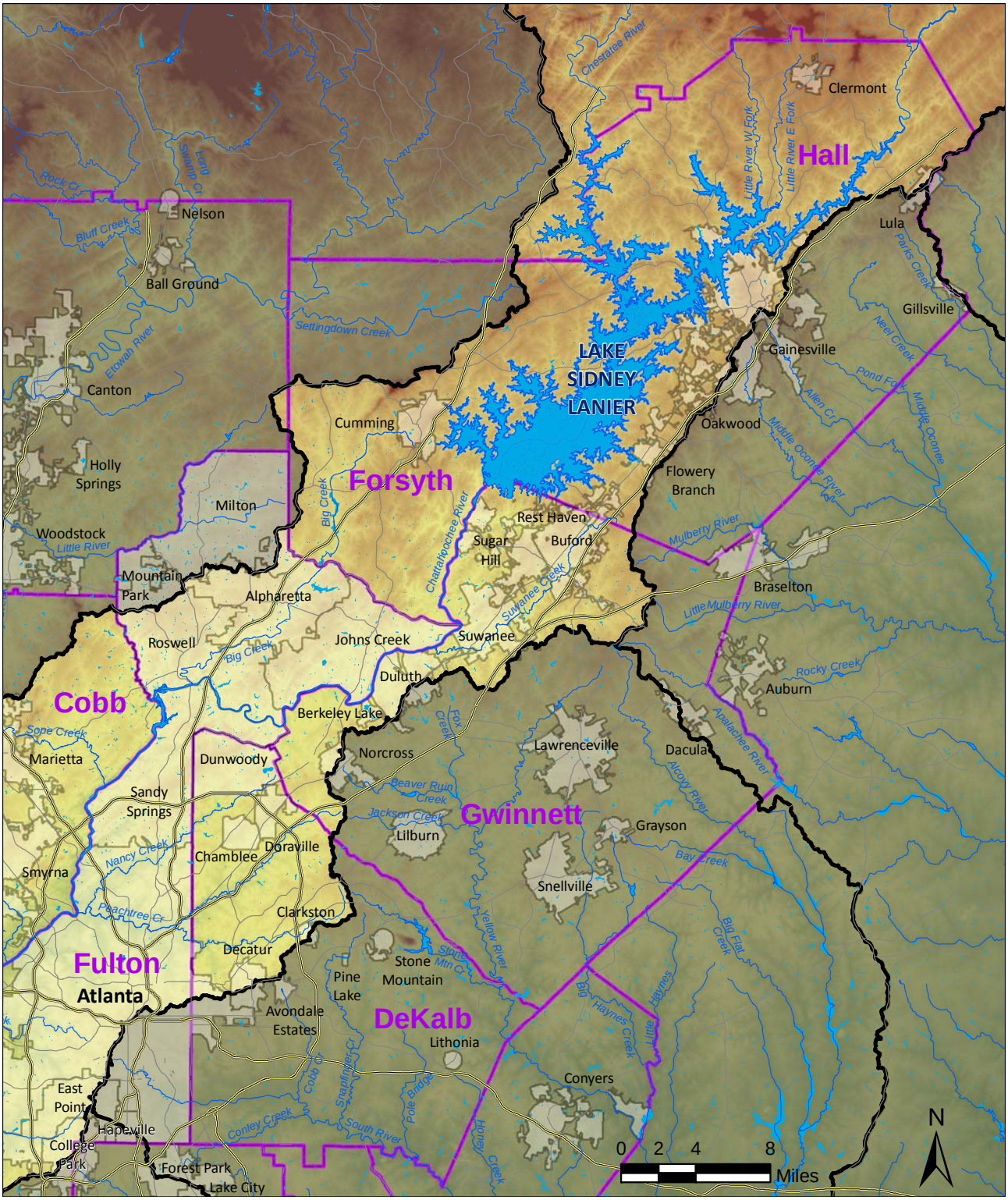
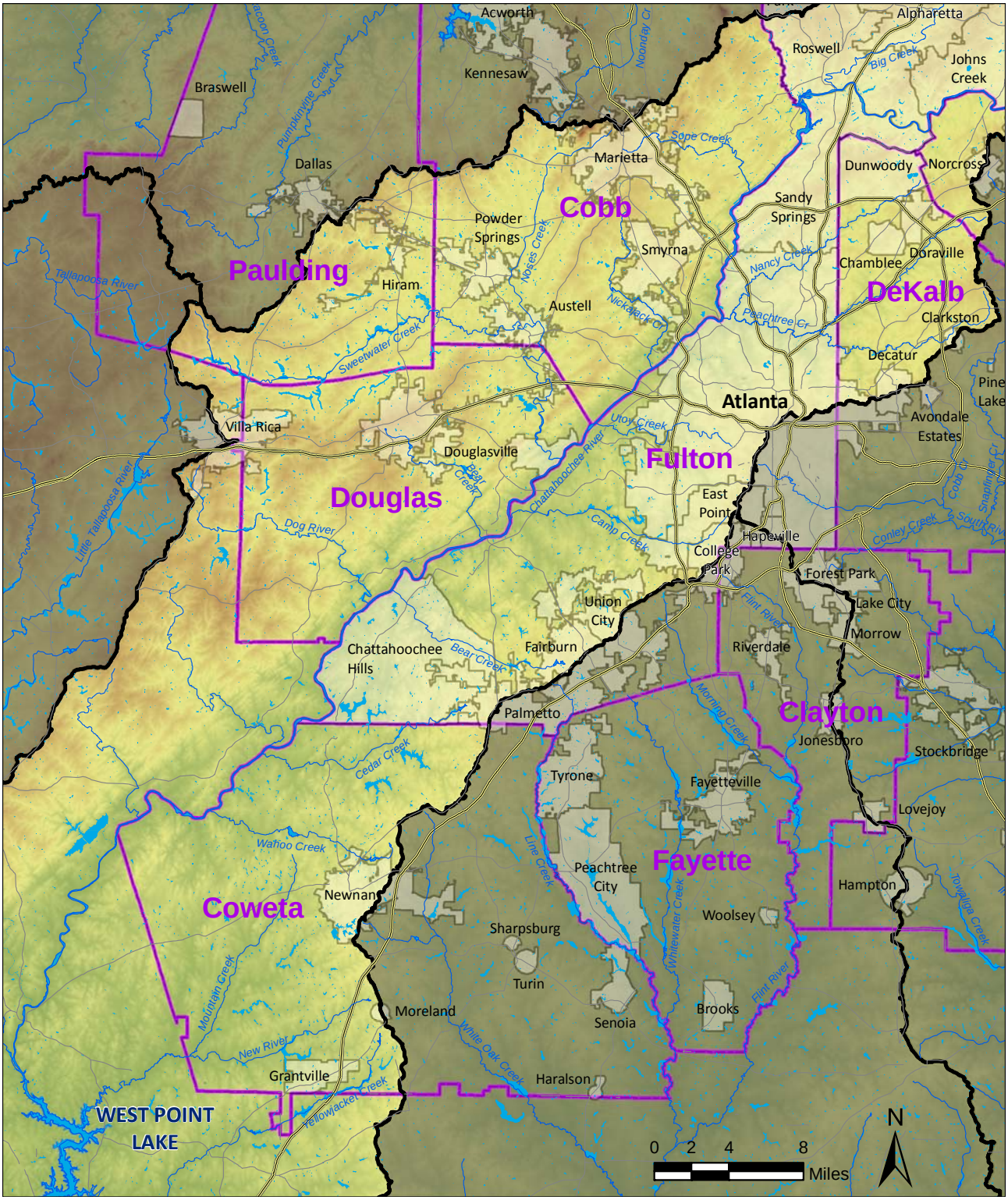


FIGURE 4-2
Lower Chattahoochee Basin within the Metro Water District



LAND USE

Certain areas of the Chattahoochee basin are very urban in nature, including downtown and midtown Atlanta, Buckhead, Cobb Galleria, Perimeter Center, Fulton Industrial Area, and a number of other activity centers and corridors throughout the basin. Overall the basin within the Metro Water District is predominantly residential (39%) with about the same percentage of forested and agricultural area.

The population within the Chattahoochee basin is expected to increase over the next 30 years, growing from just over 2 million in 2005 to just over 3 million by 2035. Over the course of the planning horizon, the basin is expected to have steady growth through 2035, as shown in Table 4-1. The 2035 future land projections estimate approximately one-half of the current forest and agricultural land being developed. Much of this growth is anticipated to occur in the northeast and southwest portions of the basin in Forsyth, Hall, Douglas, south Fulton and Coweta Counties.

TABLE 4-1
Chattahoochee Basin Land Use

Land Use Categories	Land Use Percentage		
	2007 Actual	2035 Projected	Change 2007-2035
Low Density Residential	9.7%	14.7%	5.0%
Medium Density Residential	25.5%	26.6%	1.1%
High Density Residential	3.3%	4.4%	1.1%
Industrial/Manufacturing/Transportation	3.0%	9.3%	6.3%
Retail/Commercial/Institutional	6.8%	14.5%	7.7%
Open Water/Wetlands/Unusable Land	12.3%	10.2%	-2.1%
Forested and Agricultural	39.4%	20.3%	-19.1%

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

DRINKING WATER SUPPLY

The Chattahoochee basin is the primary drinking water supply source for the Metro Water District, providing water to all or parts of ten Metro Water District counties, including the four most populous: Cobb, DeKalb, Fulton and Gwinnett. Withdrawals from the Chattahoochee basin account for 72 percent of the District's total public water supplies. Table 4-2 lists the water supply sources and Figure 4-3 shows the water supply watersheds within the Chattahoochee basin.

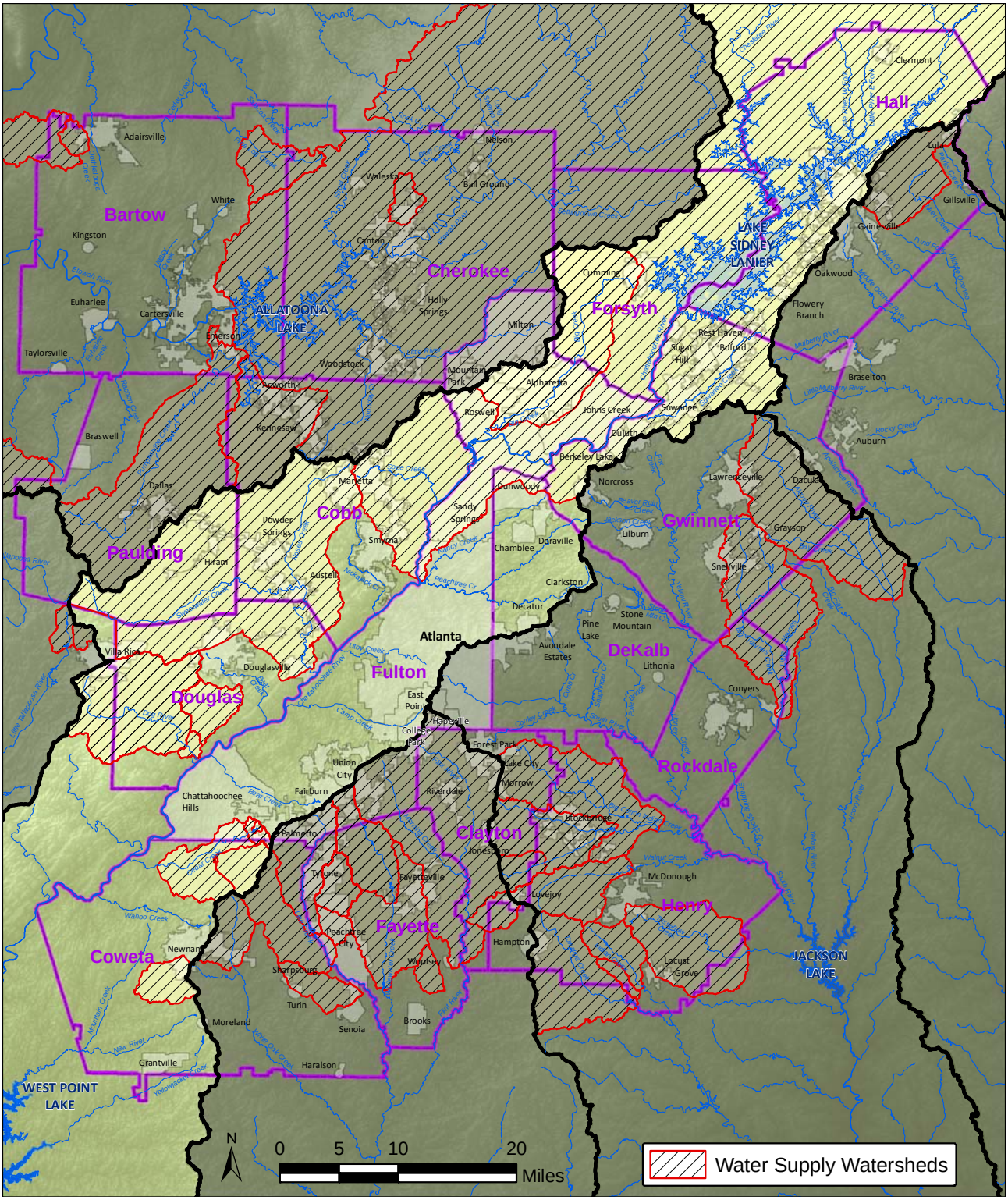
TABLE 4-2
Chattahoochee Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Chattahoochee River	Cobb County-Marietta Water Authority
	DeKalb County
	City of Atlanta
	Atlanta - Fulton County Water Resources Commission
Lake Lanier	City of Cumming
	Forsyth County
	Gwinnett County
	City of Buford
	City of Gainesville
Bear Creek	Douglasville-Douglas County Water and Sewer Authority
Dog River	Douglasville-Douglas County Water and Sewer Authority
Big Creek	City of Roswell
Sweetwater Creek	City of East Point
Cedar Creek (Fulton County)	City of Palmetto
Cedar Creek (Coweta County)	Coweta County
Sandy Brown Creek	Newnan Utilities

SOURCE WATER ASSESSMENTS

Source water assessments were performed for all drinking water supplies within the Chattahoochee basin as required by the U.S. Environmental Protection Agency (EPA). The source water assessments determined the potential for pollution based on a number of watershed characteristics and assigned a susceptibility ranking to each source. The susceptibility rankings throughout the basin were generally medium to high depending on the location of the water source. These susceptibility rankings indicate the urban and suburban nature of most of the watersheds within the Chattahoochee basin.

FIGURE 4-3
Chattahoochee Basin Drinking Water Supply Watersheds



WATER QUALITY

Of the 789 miles of streams monitored in the Metro Water District portion of the Chattahoochee basin, 591 miles did not meet state water quality standards based on the 2008 303(d) list. The not supporting streams are summarized in Table 4-3 by parameter and graphically shown in Figure 4-4. Several streams are listed for violations of more than one parameter, therefore the summation of impaired miles by parameter will not equal the 591 miles of not supporting stream.

TABLE 4-3
Chattahoochee Basin Summary of Impaired Streams

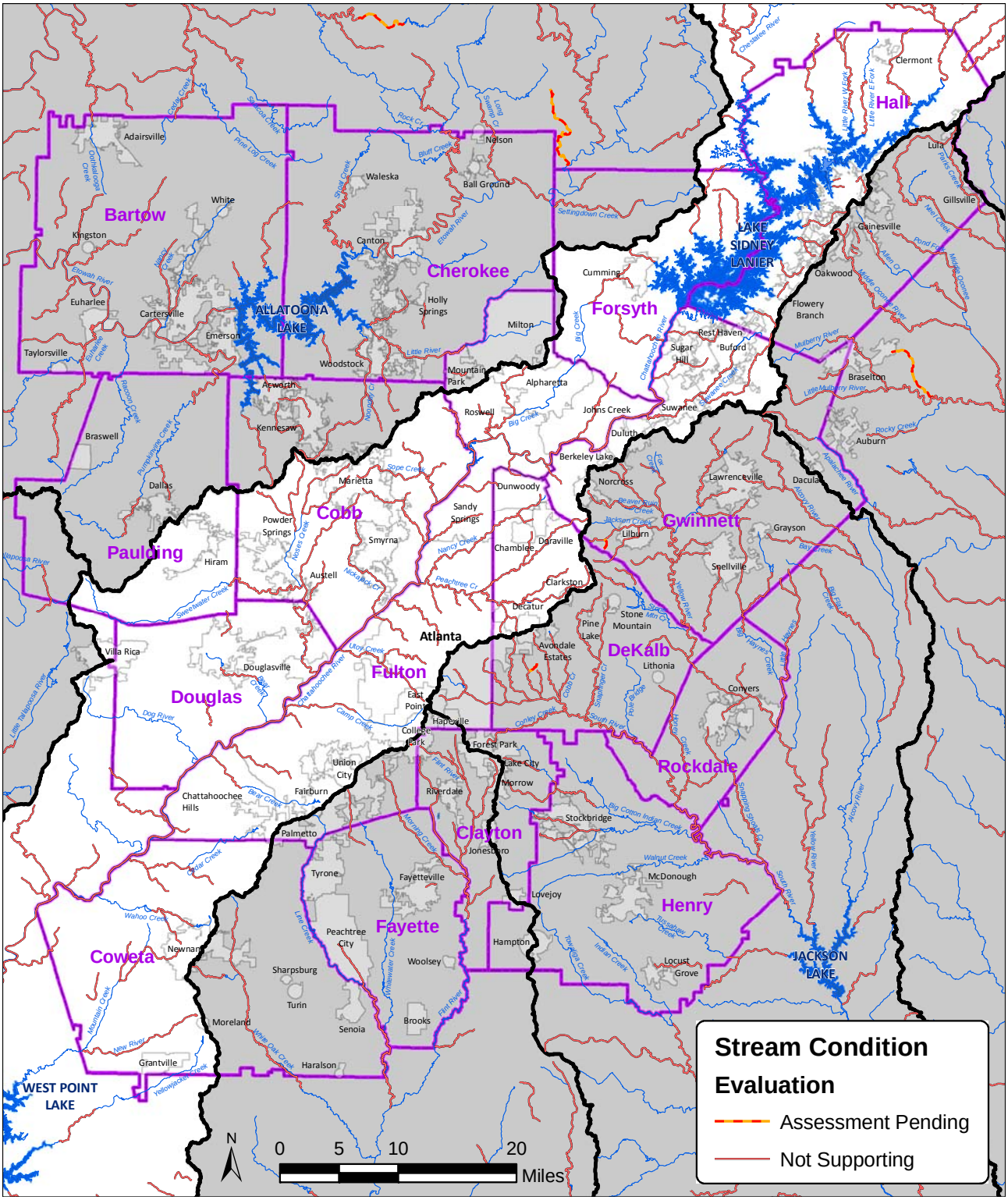
Criterion Violated	Miles of Stream
Biota (Fish Community)	177
Biota (Macroinvertebrate Community)	49
Copper	5
1,1-Dichloroethylene	3
Dissolved Oxygen	9
Fecal Coliform Bacteria	477
Fish Consumption Guidance (PCBs)	77
Tetrachloroethylene	10
pH	29
Temperature	9
Toxicity	6

The majority of streams in the Chattahoochee basin do not meet water quality standards for fecal coliform bacteria as a result of nonpoint source pollution. Biota listings typically indicate high sediment loads in streams, which decreases habitat quality for macroinvertebrates and fish. Sediment sources include runoff from construction sites as well as from streambank erosion due to accelerated streamflow velocities associated with urbanization. Woodall Creek in Atlanta is listed for both 1,1-Dichloroethylene and Tetrachloroethylene, which are typically associated with industrial applications. The Chattahoochee River is listed for Fish Consumption Guidance as a result of legacy PCB levels.

In addition to the impaired stream segments, Lake Lanier is also listed for not meeting state water quality standards for chlorophyll-a, with a TMDL (total maximum daily load) anticipated in 2010. Over 22,000 acres of the Lake are affected according to the 2008 303(d) list, including Lanier Bridge Road, Browns Bridge Road, and Flowery Branch areas.

TMDLs and TMDL Implementation Plans have been developed to help jurisdictions address impaired streams and specific parameters of concern. More information on specific TMDLs in the Chattahoochee basin can be found on the Georgia EPD website.

FIGURE 4-4
Chattahoochee Basin Impaired Stream Segments



CHATTAHOOCHEE BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following tables outline management issues and strategies for the Chattahoochee River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements. For this discussion the Chattahoochee basin is divided into three sub-basins: Lake Lanier, Upper Metro Chattahoochee, and Lower Metro Chattahoochee.

TABLE 4-4
Lake Lanier Sub-basin Management Issues and Recommended Strategies

Lake Lanier Sub-basin - includes the portion of the Chattahoochee basin within the Metro Water District and upstream of Buford Dam, including Lake Lanier. The Lake Lanier sub-basin includes portions of Hall and Forsyth Counties and a small section of Gwinnett County.

Management Issues

- Lake Lanier is the primary water supply reservoir for the Metro Water District.
- Many of the tributaries to Lake Lanier are impaired and have TMDLs, primarily for fecal coliform bacteria and biota.
- Lake Lanier does not meet State standards for chlorophyll-a and Georgia EPD is developing a TMDL anticipated for 2010.
- Recreation is a multi-billion dollar industry for the communities surrounding the Lake and is impacted by impaired water quality and operations affecting Lake levels.
- Proper management practices for animal production facilities (poultry) and grazing operations are important to help protect water quality.
- Assimilative capacity of Lake Lanier is affected primarily by nonpoint source pollution.
- Sedimentation to the Lake from nonpoint source pollution is a concern as increased sedimentation affects water quality and recreation. Lower Lake levels during the drought have elevated these concerns.
- Land use in the sub-basin is shifting from agriculture/rural to residential and supporting commercial. Forsyth County was the 5th fastest growing county in the U.S. according to the 2006 census.
- The Flat Creek subwatershed is degraded as a result of stormwater impacts from existing development within the City of Gainesville.
- Increasing use of decentralized wastewater systems (e.g. septic tanks) presents long-term maintenance challenges.
- Increasing development in the area upstream of the Metro Water District in Dawson, Habersham, and White Counties will further affect water quality in the Lake.
- Managing and maintaining public stormwater infrastructure.

Recommended Strategies

- Implement source water protection measures in all subwatersheds draining to Lake Lanier.
- Address sources of nutrients identified in the chlorophyll-a TMDL for the Lake, which will be completed by Georgia EPD in 2010.
- Educate the public on proper fertilizer application and the impacts of excess nutrients on the Lake and local economy.
- Continue progress in the City of Gainesville on watershed improvements for Flat Creek.
- Through the Comprehensive State-wide Water Management Plan, work with other regions on stricter post development stormwater management and erosion and sedimentation control measures; include counties above Lake Lanier (Dawson, Habersham and White Counties) in this effort.

TABLE 4-5
Upper Metro Chattahoochee Sub-basin Management Issues and Recommended Strategies

Upper Metro Chattahoochee Sub-basin - includes the portion of the Chattahoochee basin within the Metro Water District that is downstream of Buford Dam and upstream of the confluence with Peachtree Creek. The Upper Metro Chattahoochee sub-basin includes portions of Forsyth, Gwinnett, Fulton, Cherokee, Cobb, and DeKalb Counties.

Management Issues

- The Upper Metro Chattahoochee River is the largest source of drinking water supplies for the Metro Water District, accounting for 56-percent of the Metro Water District's permitted water supply.
- Designated as a secondary trout stream below Buford Dam due to cold water releases from Lake Lanier.
- The Chattahoochee River in this sub-basin does not meet State water quality standards for fecal coliform bacteria and biota. There are also Fish Consumption Guidelines as a result of legacy PCBs.
- The Chattahoochee River National Recreation Area serves as an important recreation destination for the region. Recreational activities are dramatically impacted by impaired water quality.
- Much of the Upper Metro Chattahoochee sub-basin, especially in Cobb, DeKalb, and Fulton Counties, was developed prior to the post development stormwater management ordinance. Inadequate stormwater controls have led to increased stormwater runoff (increases in quantity and velocity), resulting in stream scouring, sedimentation and erosion problems.
- Biota impairment in this sub-basin are the result of high sediment loads, primarily associated with existing development with inadequate stormwater controls, which is a concern for drinking water source supplies, biota and recreation.
- Several areas in the Upper Metro Chattahoochee sub-basin adjacent to the Chattahoochee River National Recreation Area are prone to sanitary sewer overflows due to inadequate sewer capacity or blockages.
- Managing and maintaining public stormwater infrastructure.

Recommended Strategies

- Implement source water protection measures in all subwatersheds upstream of Peachtree Creek.
- Continue collaborative efforts in small drinking water supply watersheds, such as Big Creek, to protect the viability of these supplies.
- Address fecal coliform bacteria contributions from sanitary sewer overflows as outlined in the Long-term Wastewater Management Plan.
- Watershed improvement projects, such as stream restoration and streambank stabilization are recommended in areas with failing stream banks to reduce instream sediment load contributions.
- With some of the oldest infrastructure in the Metro Water District, significant investment in asset management is recommended.

TABLE 4-6
Lower Chattahoochee Sub-basin Management Issues and Recommended Strategies

Lower Metro Chattahoochee Sub-basin - includes the portion of the Chattahoochee basin within the Metro Water District downstream of the confluence of the Chattahoochee River with Peachtree Creek. The Lower Metro Chattahoochee sub-basin includes portions of Fulton, Cobb, Douglas, Paulding, and Coweta Counties
Management Issues
• The Chattahoochee River and several of its tributaries do not meet State water quality standards for fecal coliform bacteria, biota, and temperature. There are two smaller tributaries that exceed the copper standard. There are also Fish Consumption Guidelines as a result of legacy PCBs. • Land use in the Fulton and Cobb County portions of the sub-basin are urban with the remainder of the Lower Metro Chattahoochee sub-basin--Paulding, Douglas, and Coweta Counties--being high growth areas. • Biota impairment in this sub-basin is the result of high sediment loads, primarily associated with existing development with inadequate stormwater controls. • Algae blooms have been identified in West Point Lake downstream of the Metro Water District, indicating high nutrient contributions. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Implement sanitary sewer rehabilitation program to replace failing infrastructure and reduce the occurrence of SSOs, especially in areas with fecal coliform bacteria exceedences. • Septic systems will be the long-term wastewater treatment alternative in portions of Paulding, Douglas, Fulton, and Coweta Counties. Homeowner education on the importance of long-term maintenance will be needed to prevent future water quality issues that can be caused by these systems. • With some of the oldest infrastructure in the Metro Water District, significant investment in asset management is recommended.

CHATTAHOOCHEE BASIN SUCCESS STORIES

City of Atlanta Clean Water Initiative – In 2002, Mayor Shirley Franklin announced the City of Atlanta's Clean Water Atlanta Initiative. Clean Water Atlanta is the City's comprehensive, long-term plan to ensure clean drinking water for Atlanta, and clean streams and clean wastewater flows for Atlanta and its downstream neighbors. The objective of Clean Water Atlanta was to create the cleanest urban streams and rivers in the country within a decade from inception.

The City has substantially completed the combined sewer separation projects and sewer treatment projects according to the EPA/EPD Consent Decree Status Report on April 30, 2008. Additionally, the City has purchased $25 million of greenspace throughout the region, including areas in the Chattahoochee basin.

Georgia Power Programs – Georgia Power has installed cooling towers at all of its power plants in the Metro Water District to reduce the temperature of water discharges to improve receiving stream water quality. Additionally, through the "Renew our Rivers" effort, Georgia Power has removed over 14.5 million tons of trash from the Chattahoochee basin.

Lake Lanier Association – Founded in 1998, the Lake Lanier Association (LLA) works to protect water quality in the Lake through hands on activities as well as through education. Two programs sponsored by the LLA include the Shore Sweep and Adopt-A-Lake. Shore Sweep brings together over 1,000 volunteers every September to clean the shoreline surrounding Lake Lanier. The Adopt-A-Lake program trains volunteers to monitor water quality of the Lake. The Adopt-A-Lake program educates participants on keeping Lake Lanier healthy and also collects baseline data on lake health.

Metropolitan River Protection Act – The Metropolitan River Protection Act (MRPA) provides protection to the land and water resources of the Chattahoochee River from Buford Dam and to the southern boundaries of Fulton and Douglas Counties by establishing a 2,000-foot protection corridor on both banks of the river. Under the Chattahoochee Corridor Plan, which is required under the Act, all development activities in the corridor must be consistent with Plan standards including limits on land disturbance and impervious surface, buffers and setbacks on the River, and floodplain requirements.

COOSA RIVER BASIN

The Coosa River basin is the second major water supply source for the Metro Water District, and includes Allatoona Lake which is the second largest reservoir in the Metro Water District. The basin is rapidly developing, but is also home to a number of protected species which are a major focus of habitat protection.

GEOGRAPHY

The northwest portion of the Metro Water District lies in the Coosa River basin which has its headwaters in the Blue Ridge Mountains to the north. The Coosa basin within the Metro Water District covers about 1,322 square miles, including all of Bartow County, most of Cherokee County, and portions of Forsyth, Fulton, Cobb, and Paulding Counties (Figure 4-5). The majority of this area is in the Etowah River sub-basin. Small sections of Bartow and Cherokee Counties are in the Oostanaula and Coosawattee River sub-basins.

HYDROLOGY

The Etowah sub-basin above Allatoona Lake includes both headwater and larger streams such as Little River, Yellow River, Noonday Creek, Sharp Mountain Creek, and Shoal Creek. Allatoona Lake is impoundment of the Etowah River which is operated by the U.S. Army Corps of Engineers (Corps). The reservoir has a drainage area of 1,110 square miles and is managed for hydropower, flood control, recreation, water quality, water supply, fish and wildlife and navigation. Allatoona Lake is an important resource for recreation and drinking water supply for the Metro Water District. It is one of the most frequently visited Corps of Engineers projects in the nation, with more than 6 million visitors per year who come to enjoy picnicking, swimming, camping, hunting, fishing, and boating.

Below Allatoona Lake, the flow in the Etowah River is primarily regulated by releases from the Allatoona Dam. Larger downstream tributaries include Pumpkinvine Creek, Raccoon Creek, Euharlee Creek, and Two Run Creek. Pine Log Creek is a larger stream in the Metro Water District in the Coosawattee sub-basin. The Coosa River is formed by the confluence of the Etowah and Oostanaula Rivers in Rome, Georgia just west of the Metro Water District. From there, the Coosa flows southwest through Alabama to the Alabama River and Gulf of Mexico.

Annual flows in the Etowah River near Kingston range from a low of 8,110 cubic feet per second (cfs) to a high of 52,000 cfs, with a mean flow of 15,617 cfs. Rainfall ranges from 55 inches to 58 inches per year across the basin in the Metro Water District.

LAND USE

The Coosa basin within the Metro Water District remains largely forested and agricultural (48%), although the percentage of forested area has declined significantly since 1999 (14%) as this portion of the metropolitan area rapidly develops. Forsyth, Paulding and Cherokee Counties are currently near the top the Census Bureau list of fastest growing counties in the United States. The population within the basin is expected grow from 570,000 in 2005 to over one million by 2035.

Table 4-7 shows the current and projected changes in land use within the Coosa Basin by 2035. Approximately 30% of currently undeveloped land is expected to transition to suburban and urban land uses within the planning horizon.

FIGURE 4-5
Coosa Basin within the Metro Water District

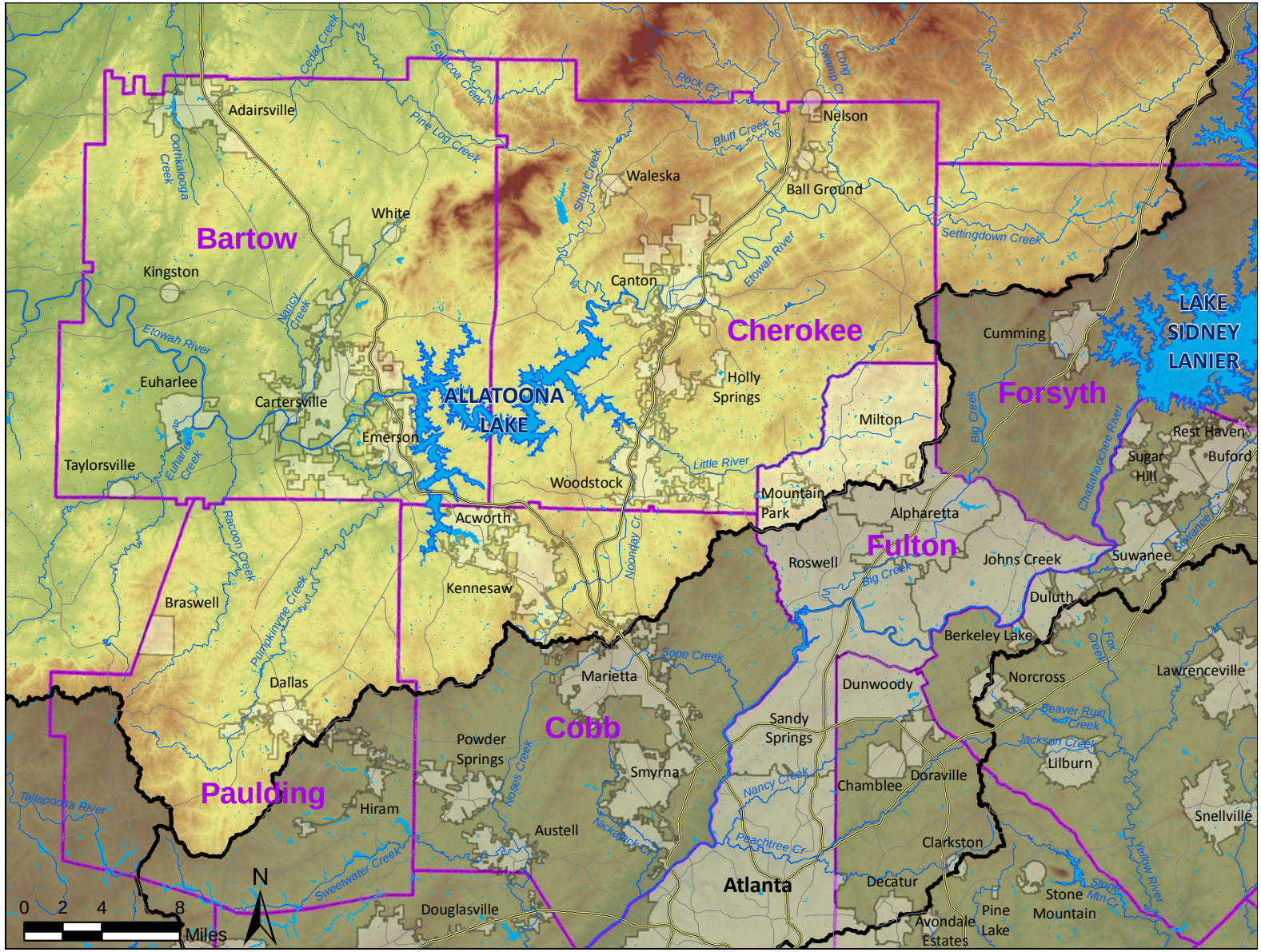


TABLE 4-7
Coosa Basin Land Use

Land Use Categories	Land Use Percentage		
	2007 Actual	2035 Projected	Change 2007-2035
Low Density Residential	13.0%	22.4%	9.4%
Medium Density Residential	12.4%	17.1%	4.7%
High Density Residential	0.6%	4.2%	3.6%
Industrial/Manufacturing/Transportation	1.0%	5.2%	4.2%
Retail/Commercial/Institutional	2.5%	10.4%	7.9%
Open Water/Wetlands/Unusable Land	13.5%	9.3%	-4.2%
Forested and Agricultural	57.0%	31.4%	-25.6%

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

DRINKING WATER SUPPLY

The Coosa basin is the second largest drinking water supply source in the Metro Water District. In addition to Allatoona Lake, several communities rely on the Etowah River and its tributaries for drinking water. Table 4-8 lists the drinking water supply sources and Figure 4-6 shows the drinking water supply watersheds within the Coosa basin.

TABLE 4-8
Coosa Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Etowah River	City of Canton
Yellow Creek / Etowah River	Cherokee County Water and Sewerage Authority
Allatoona Lake	City of Cartersville
	Cobb County-Marietta Water Authority
Lewis Spring	City of Adairsville
Bolivar Springs	Bartow County
Moss Springs	City of Emerson
Hickory Log Creek	City of Canton
	Cobb County-Marietta Water Authority

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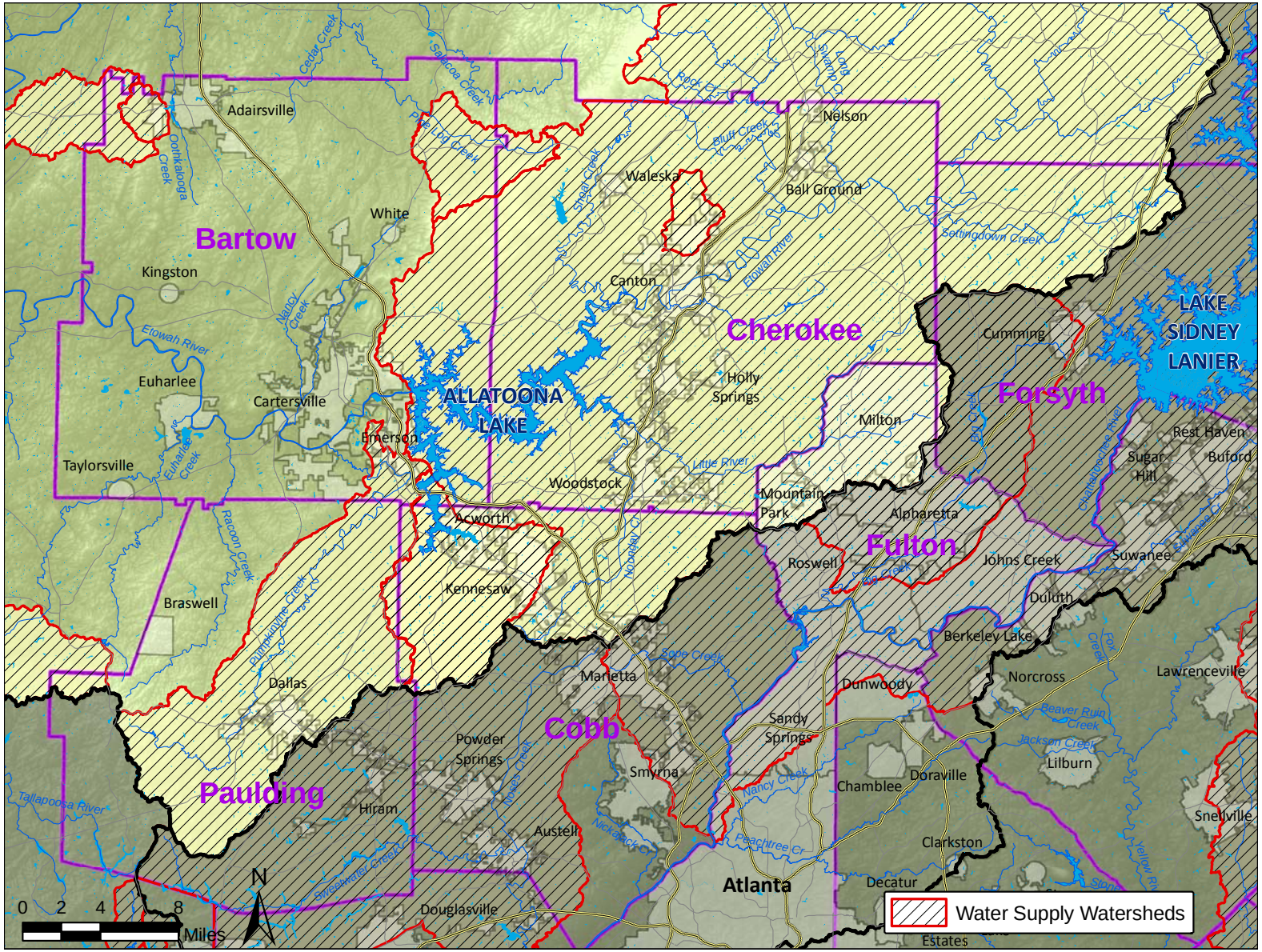
FIGURE 4-6
Coosa Basin Drinking Water Supply Watersheds



SOURCE WATER ASSESSMENTS

Source water assessments were performed for all drinking water supplies within the Coosa basin as required by the U.S. Environmental Protection Agency. The source water assessments determined the potential for pollution based on a number of watershed characteristics and assigned a susceptibility ranking to each source. The susceptibility rankings throughout the basin ranged from medium to high depending on location of the water source. These susceptibility rankings indicate the suburban nature of most of the watersheds within the Coosa basin.

WATER QUALITY

Of the 508 miles of stream monitored in the Metro Water District portion of the Coosa basin, 340 miles did not meet state water quality standards based on the 2008 303(d) list. These not supporting streams are summarized in Table 4-9 by parameter of concern and graphically shown in Figure 4-7. Several streams are listed for violations of more than one parameter, therefore the summation of impaired miles by parameter will not equal the 340 miles of not supporting streams.

TABLE 4-9
Coosa Basin Summary of Impaired Streams

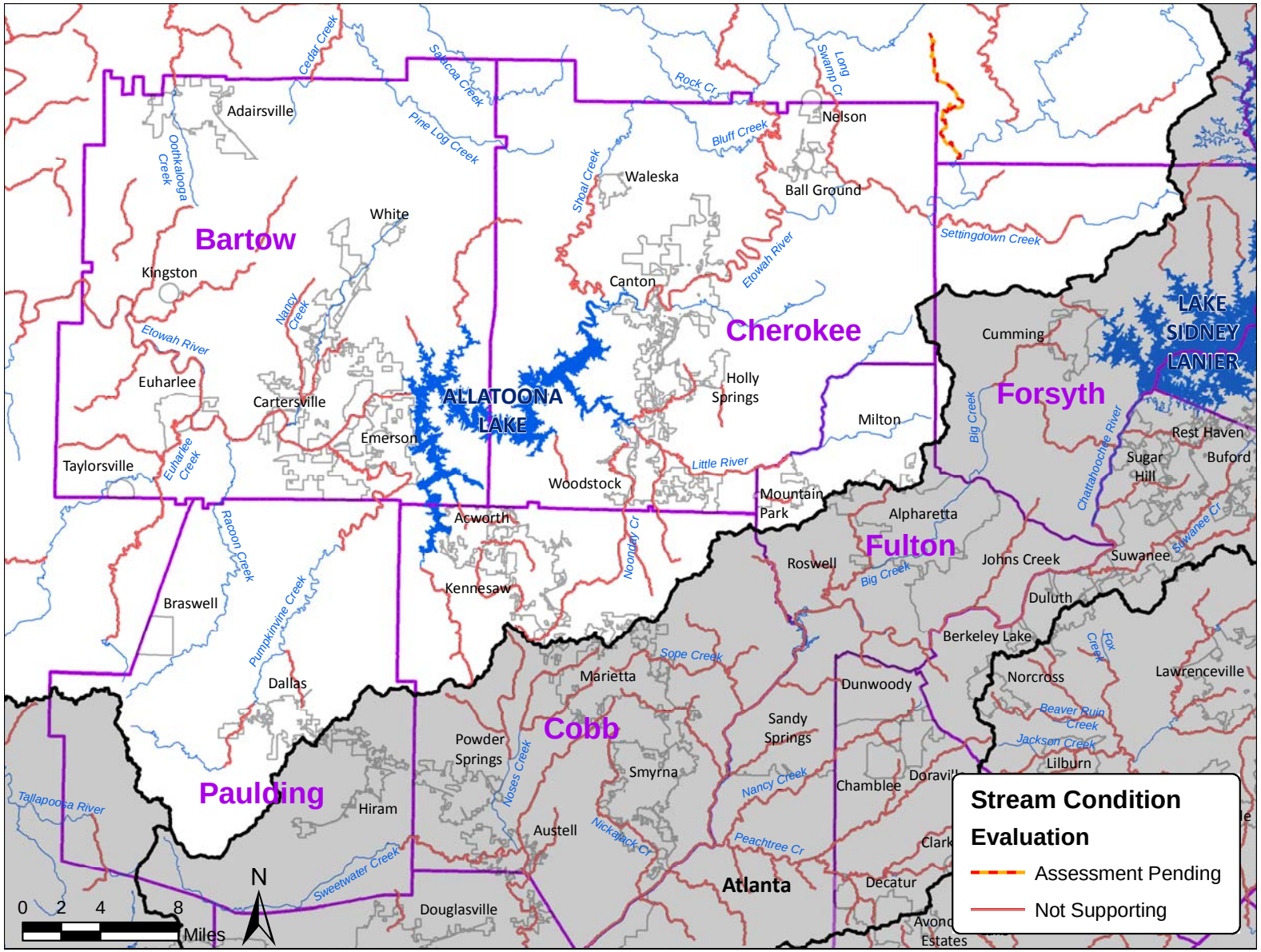
Criterion Violated	Miles of Stream
Biota (Fish Community)	122
Biota (Macroinvertebrate Community)	48
Dissolved Oxygen	12
Commercial Fishing Ban	44
Fecal Coliform Bacteria	171
Fish Consumption Guidance (PCBs)	47

Most of the impaired stream segments exceed the standard for fecal coliform bacteria, primarily resulting from nonpoint sources of pollution. There has been an increase in the number of streams listed for biota impairment since 2002, likely due to the increase in habitat and fish sampling. The Etowah River and three of its tributaries have commercial fishing bans, as a result of industrial nonpoint source runoff and the Etowah River mainstem has a fish consumption guidance due to legacy PCB levels.

In addition to the listed streams, there are two lakes in the Coosa basin within the Metro Water District that do not meet state water quality standards according to the 2008 303(d) list. Lake Acworth is listed for fecal coliform bacteria with 194 acres affected. Portions of Allatoona Lake including Little River Embayment, Allatoona Arm, Etowah Arm, and Mid Lake totalling over 19,000 acres are listed for chlorophyll-a. Chlorophyll-a levels are attributed primarily to nonpoint source pollution and can lead to environmental problems such as fish kills, poor water clarity and algae blooms. A TMDL (total maximum daily load) is expected in 2008 for Allatoona Lake.

TMDLs and TMDL Implementation Plans have been developed to help jurisdictions address impaired streams and specific parameters of concern. More information on specific TMDLs in the Coosa basin can be found on the Georgia EPD website.

FIGURE 4-7
Coosa Basin Impaired Streams



COOSA BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following table outlines management issues and strategies for the Coosa River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements.

TABLE 4-10
Coosa Basin Management Issues and Recommended Strategies

Management Issues
• Paulding, Forsyth, and Cherokee Counties are consistently noted as among the fastest growing counties in the United States. • The Coosa basin is an important water source for Bartow, Cobb, Cherokee and Paulding Counties, therefore protection of source water supply watersheds is critical. • Allatoona Lake currently exceeds State standards for chlorophyll-a. A TMDL is currently being developed by Georgia EPD for release in 2008. Nonpoint source runoff has been identified as the primary source of nutrient loadings associated with chlorophyll-a exceedances. • The Coosa basin has great diversity of aquatic species, a number of which are on the Federal threatened and endangered species list. • The dominant form of wastewater management outside of the urban areas is septic systems. Therefore, septic system planning and maintenance is important to protect water quality for human and environmental health. • Several tributaries exceed State water quality standards for fecal coliform bacteria and biota. Segments of the Etowah River do not meet State water quality standards for dissolved oxygen, commercial fishing ban and fish consumption guidance. • Lake Acworth exceeds State water quality standards for fecal coliform bacteria. Sources may include several homes surrounding the Lake that have undersized septic systems that were originally intended for seasonal use but are now used as primary residences. • Biota challenges are related to erosion and sedimentation. Sediment build up in lakes has been noted. Increased biota monitoring associated with threatened and endangered fish species concerns have increased local understanding of these challenges. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Key focus on post-development stormwater controls to address nonpoint source runoff from rapid new development in sensitive areas. • Watershed improvement projects are recommended for incised and eroding streams leading into Allatoona Lake to protect source water quality and reduce sedimentation into the Lake embayments. • Prioritize development of watershed improvement plans for areas with biota impairment that have known threatened and endangered fish species. • Consider sustainable growth planning and development and more intensive watershed planning efforts to protect threatened and endangered fish species. Septic systems surrounding Lake Acworth and Allatoona Lake that are prone to failures are recommended for connection to the sanitary sewer system. In some areas, converting these septic systems to sanitary sewer service may provide assimilative capacity needed for discharges of treated effluent.

COOSA BASIN SUCCESS STORIES

Lake Allatoona / Upper Etowah Comprehensive Watershed Study – The goal of the Study is to develop a technically sound and defensible comprehensive analysis of the entire Lake Allatoona/Upper Etowah River Watershed for improved decision making (drinking water and wastewater capacity) and resource protection. The Study will result in a comprehensive monitoring plan, watershed assessment, and watershed protection plan. The Study includes ten local partners, as well as Georgia EPD, and four Federal agencies. The first three years of monitoring under this program is complete and the group continues to work towards the completion of the Watershed Protection Plan. One of the goals of the Study is to implement a true multi-jurisdictional approach to protect and sustain the watershed.

Paulding County Forest – Paulding County helped preserve the largest, contiguous urban forest in metropolitan Atlanta with assistance from the Georgia Conservation Land Program and citizen-approved SPLOST funding. The new Wildlife Management Area, operated by the Georgia Department of Natural Resources (Georgia DNR), will permanently protect and preserve over 7,000 acres in the northwestern section of Paulding County. The property protects a tributary to the Etowah River as well as remnants of a rare mountain longleaf pine forest and will almost certainly have a positive impact on watershed health in the Coosa basin.

Blankets Creek – Cherokee County Water & Sewerage Authority's actions are just one example of improving water quality while at the same time increasing treatment capacity. The authority approached a local poultry processing plant that held an industrial NPDES permit with the idea of eliminating the discharge and using the facility's assimilative loading capacity to expand one of the authority's public wastewater treatment facilities. The poultry processing plant discharged treated effluent into Blankets Creek, a small feeder stream to the Little River, joining it in the Little River Embayment of Lake Allatoona. This was a region of Lake Allatoona that is highly impacted by increased nutrient loads, so moving the poultry processing plant's discharge out of Blankets Creek was an environmentally desirable action. This poultry plant was also listed as a source of phosphorus by Georgia EPD. By removing the chicken plant's discharge from Blankets Creek and treating the flows at the authority's facility, a problematic discharge was eliminated and additional treatment capacity was generated. The phosphorus loading, through enhanced treatment techniques, was spread over a larger hydraulic capacity, thereby creating new capacity in the public sewer system. Working jointly with Georgia EPD, Cherokee County Water & Sewerage Authority and the poultry processing facility were able to craft the necessary agreements to facilitate this project, resulting in approximately 12 MGD of new wastewater treatment capacity for Cherokee County.

FLINT RIVER BASIN

The Metro Water District sits at the headwaters of the Flint River, which is a key water supply source for communities in the southern portions of the Metro Water District. The Flint basin is also known for abundant wetlands and is home to several endemic fish species.

GEOGRAPHY

The Flint River originates near the Atlanta Hartsfield-Jackson International Airport and flows south through Clayton County. All of Fayette County is within the Flint basin as well as portions of Clayton, Coweta, Fulton, and Henry Counties (Figure 4-8). The western boundary of the Flint basin roughly follows Interstate 85 through south Fulton and Coweta Counties. Historical railroad lines followed the ridge lines on both sides of the basin, which today bisects most of the cities which grew up along them. The Flint basin encompasses about 556 square miles of the Metro Water District.

HYDROLOGY

The Flint River is unregulated through the Metro Water District as it is along its entire course. Main tributaries of the Flint River in the Metro Water District include Line, Morning, White Oak, and Whitewater Creeks. There are eight reservoirs located on tributaries in the Metro Water District which are used for water supply. The Flint River eventually flows to the Gulf of Mexico after its confluence with the Chattahoochee River in south Georgia.

Annual flows in the Flint River near Lovejoy range from a low of 41 cubic feet per second (cfs) to a high of 646 cfs, with a mean flow of 182 cfs. Rainfall averages 52 inches per year across the basin in the Metro Water District.

LAND USE

Despite being heavily developed in the headwater areas near the Atlanta airport in Clayton County, the Flint basin has a high percentage of undeveloped and forested land use. The Flint basin also has the highest percentage of wetland areas within the Metro Water District. Approximately one third of the land is currently residential, while almost 4 percent is classified industrial—more than any other basin in the District.

The population in the Flint basin is expected to increase from 280,000 in 2005 to over 475,000 by 2035. Much of the new growth is anticipated for the southern portions of the Flint basin, with large increases in commercial and industrial land use as well as high density residential in 2035. Table 4-11 shows the current and projected changes in land use within the Flint basin by 2035.

FIGURE 4-8
Flint River Basin within the Metro Water District

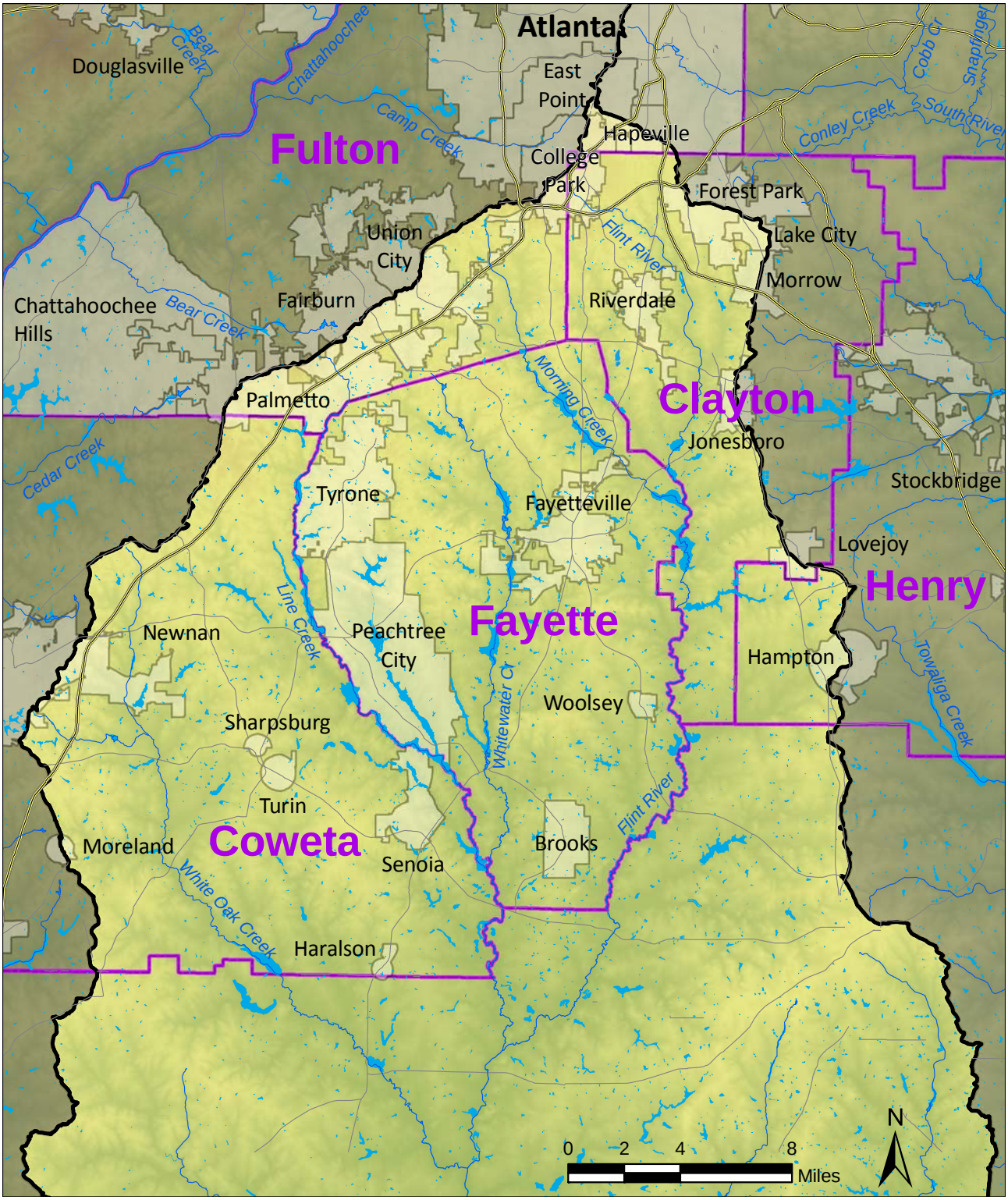


TABLE 4-11
Flint Basin Land Use

Land Use Categories	Land Use Percentage		
	2007 Actual	2035 Projected	Change 2007-2035
Low Density Residential	11.3%	12.0%	0.7%
Medium Density Residential	21.0%	23.1%	2.1%
High Density Residential	1.9%	4.3%	2.4%
Industrial/Manufacturing/Transportation	3.9%	8.9%	5.0%
Retail/Commercial/Institutional	4.8%	8.4%	3.6%
Open Water/Wetlands/Unusable Land	10.1%	9.2%	-0.9%
Forested and Agricultural	47.0%	34.1%	-12.9%

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

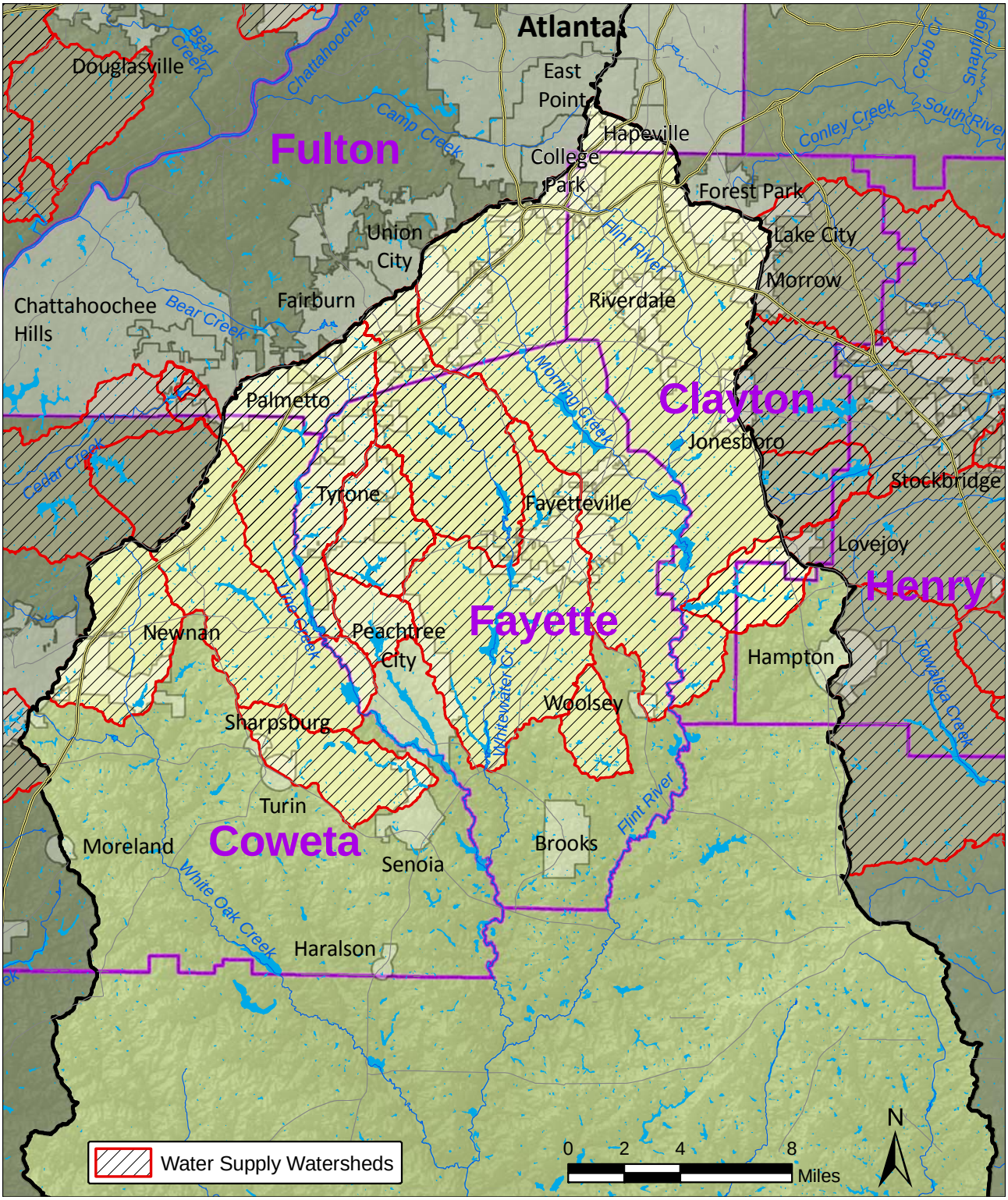
DRINKING WATER SUPPLY

Several communities rely on the Flint basin for drinking water supplies, both from the mainstem of the Flint River and several small drinking water supply watersheds. Drinking water supply sources for the Metro Water District portion of the Flint basin are listed in Table 4-12. Figure 4-9 shows the drinking water supply watersheds.

TABLE 4-12
Flint Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Flint River	Clayton County Water Authority
	Fayette County Water System
Shoal Creek	Clayton County Water Authority
White Oak Creek	Newnan Utilities
Line Creek	Newnan Utilities
Hutchins' Lake	City of Senoia
Whitewater Creek	City of Fayetteville
Lake Kedron	Fayette County Water System
Lake Peachtree (Flat Creek)	
Lake Horton	Fayette County Water System
Whitewater Creek	Fayette County Water System
Lake McIntosh	Fayette County Water System
Still Branch Creek	City of Griffin (will provide water to Pike, Spalding and Coweta Counties)

FIGURE 4-9
Flint Basin Drinking Water Supply Watersheds



SOURCE WATER ASSESSMENTS

Source water assessments were performed for all drinking water supplies within the Flint basin as required by the U.S. Environmental Protection Agency. The source water assessments determined the potential for pollution based on a number of watershed characteristics and assigned a susceptibility ranking to each source. The susceptibility rankings throughout the basin ranged from medium to high depending on location of the water source. Horton Creek is the exception, as its susceptibility ranking was low. These susceptibility rankings are an indication of the urban and suburban nature of most of the sub-watersheds within the Flint basin.

WATER QUALITY

Of the 234 miles of streams monitored in the Metro Water District portion of the Flint basin, 110 miles did not meet state water quality standards based on the 2008 303(d) list. The not supporting streams are summarized in Table 4-13 by parameter of concern and graphically shown in Figure 4-10. Several streams are listed for violations of more than one parameter, therefore the summation of impaired miles by parameter will not equal the 110 miles of not supporting streams.

TABLE 4-13
Flint Basin Summary of Impaired Streams

Criterion Violated	Miles of Stream
Biota (Fish Community)	6
Biota (Macroinvertebrate Community)	8
Dissolved Oxygen	18
Fecal Coliform Bacteria	86

The majority of impaired stream segments exceed State water quality standards for fecal coliform bacteria. These may be due to sanitary sewer overflows, agriculture, septic systems, or natural sources. There has been an increase in the number of streams listed for biota impairment since 2002, likely due to increased monitoring. Addressing the water quality challenges in the Flint River is important as it is a drinking water source for several communities. Portions of Flat Creek and White Oak Creek are listed for dissolved oxygen criterion violations.

TMDLs (Total Maximum Daily Load) and TMDL Implementation Plans have been developed to help jurisdictions address impaired streams and specific parameters of concern. More information on specific TMDLs in the Flint basin can be found on the Georgia EPD website.

FLINT BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following table outlines management issues and strategies for the Flint River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements.

FIGURE 4-10
Flint Basin Impaired Streams

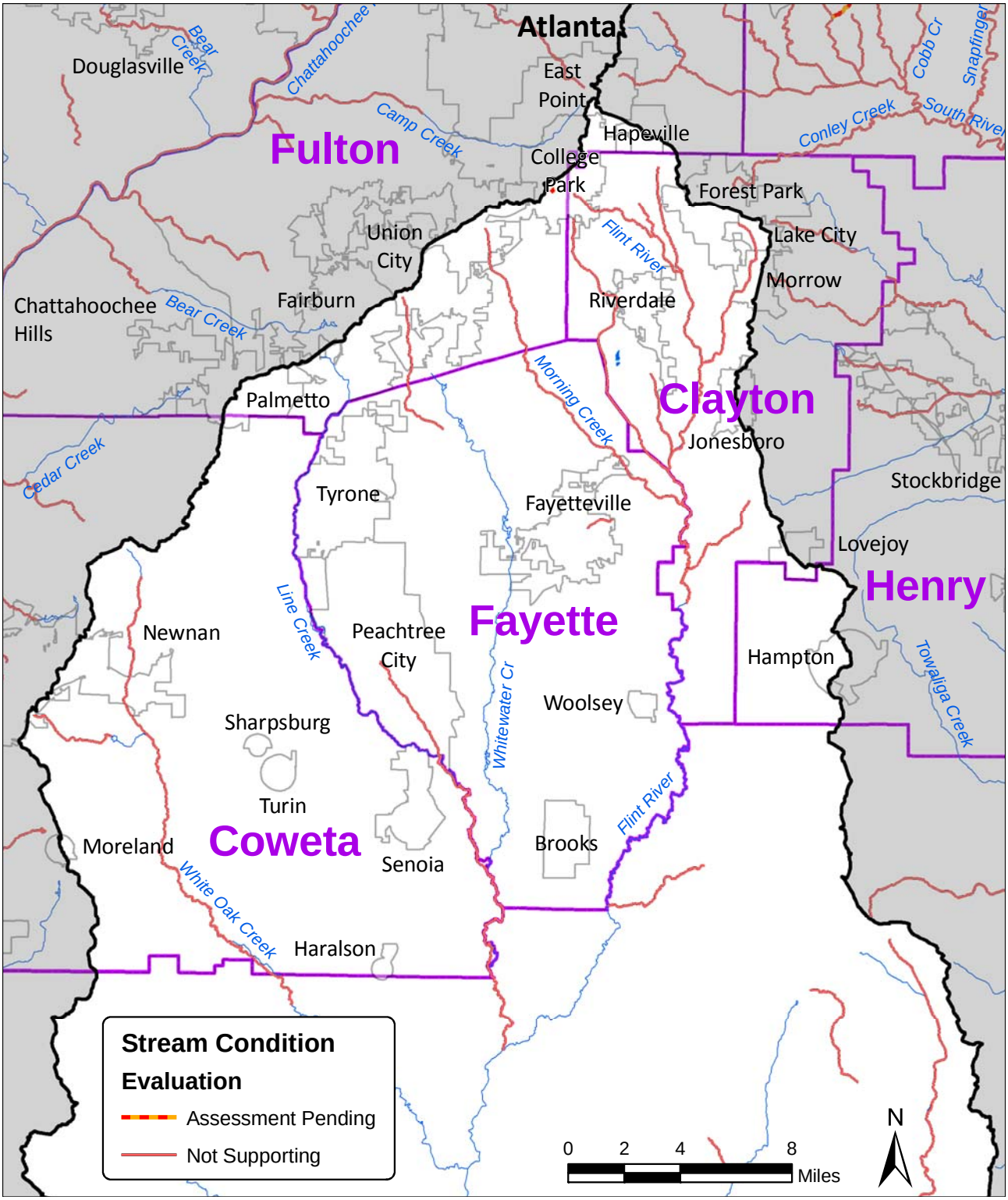


TABLE 4-14
Flint Basin Management Issues and Recommended Strategies

Management Issues
• The headwaters of the Flint basin are highly impervious due to the presence of the Hartsfield-Jackson Atlanta International Airport and associated land uses. • Most of the Flint basin located within the Metro Water District consists of small drinking water supply watersheds. • The Flint River and several tributaries currently exceed the State water quality standards for fecal coliform bacteria. Whitewater Creek does not meet State standard for biota and Flat Creek and White Oak Creek do not meet State standards for dissolved oxygen. • Erosion and sedimentation due to streambank scouring and erosion in the mainstem and tributaries of the Flint River present a challenge for drinking water intakes located on the Flint River. • Many of the new development areas in the Flint basin are slated for septic systems, therefore the proper maintenance and management of septic systems will be critically important for protecting watershed health. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Implement source water protection measures to protect drinking water supply watersheds within the Flint basin. • Develop watershed improvement plans in impacted sub-watersheds, especially in the upper reaches of the basin. Clayton County and the City of Atlanta should continue to coordinate with the Hartsfield-Jackson Atlanta International Airport to address hydrologic and water quality controls at the airport. • Continuing education on the proper use and maintenance of septic systems will be an important long-term protection strategy.

FLINT BASIN SUCCESS STORIES

In addition to implementing mandated watershed measures, some communities are voluntarily implementing additional measures within the Flint basin. Some success stories include:

East Jesters Creek Stream Restoration Projects – As part of Clayton County Water Authority's Watershed Management Program, they completed the restoration of approximately one mile of stream in East Jesters Creek in 2004. The two projects restored the original stream meander and included rock vanes in key locations to dissipate energy in an effort to reduce downstream sedimentation. The Clayton County Water Authority is just starting a restoration project on Camp Creek through a 319(h) grant from Georgia EPD.

Pye Lake Dam – The City of Fayetteville received FEMA Pre-Disaster Mitigation (PDM) grant funds to upgrade the Pye Lake Dam. The large dam was considered unsafe, so the City leveraged existing funds with the PDM money to repair the dam and also increase flood protection storage volume in the lake.

OCMULGEE RIVER BASIN

Within the Metro Water District, several communities use the Ocmulgee basin for drinking water supplies, particularly in the south metro area, and wastewater discharge. Directly downstream of the Metro Water District is Jackson Lake, a Georgia Power lake that is used for recreation and power production.

GEOGRAPHY

The Ocmulgee River basin covers most of the southeast Metro Water District and includes portions Clayton, DeKalb, Fulton, Gwinnett and Henry Counties and all of Rockdale County (Figure 4-11). A small portion of the City of Atlanta is also located in the basin. The Ocmulgee basin comprises 987 square miles of the Metro Water District area, the third largest after the Chattahoochee and Coosa basins.

HYDROLOGY

The Ocmulgee River headwaters are located in the Metro Water District. The river itself is formed by the confluence of these headwaters at Jackson Lake which is located just southeast of the Metro Water District. Major streams in the Ocmulgee basin in the Metro Water District include Towaliga Creek, South River, Yellow River, Big Haynes Creek and the Alcovy River. There are ten water supply impoundments located in the Metro Water District portion of the Ocmulgee basin.

Downstream of the Metro Water District, the Ocmulgee River joins the Oconee River in middle Georgia to form the Altamaha River, which flows south to the Atlantic Ocean.

The average annual rainfall in this basin is 51 inches in the Metro Water District.

LAND USE

The population in the Ocmulgee basin is expected to increase from 1.4 million in 2005 to 2.1 million by 2035, the second most populous basin in the Metro Water District. Currently, the Ocmulgee basin is primarily residential (46%), and approximately one third of the basin is forested or undeveloped land.

Residential growth is expected to continue in the future, with significant increases in both commerical and industrial land uses. Table 4-15 shows the current and projected changes in land use within the Ocmulgee basin by 2035.

FIGURE 4-11
Ocmulgee River Basin within the Metro Water District

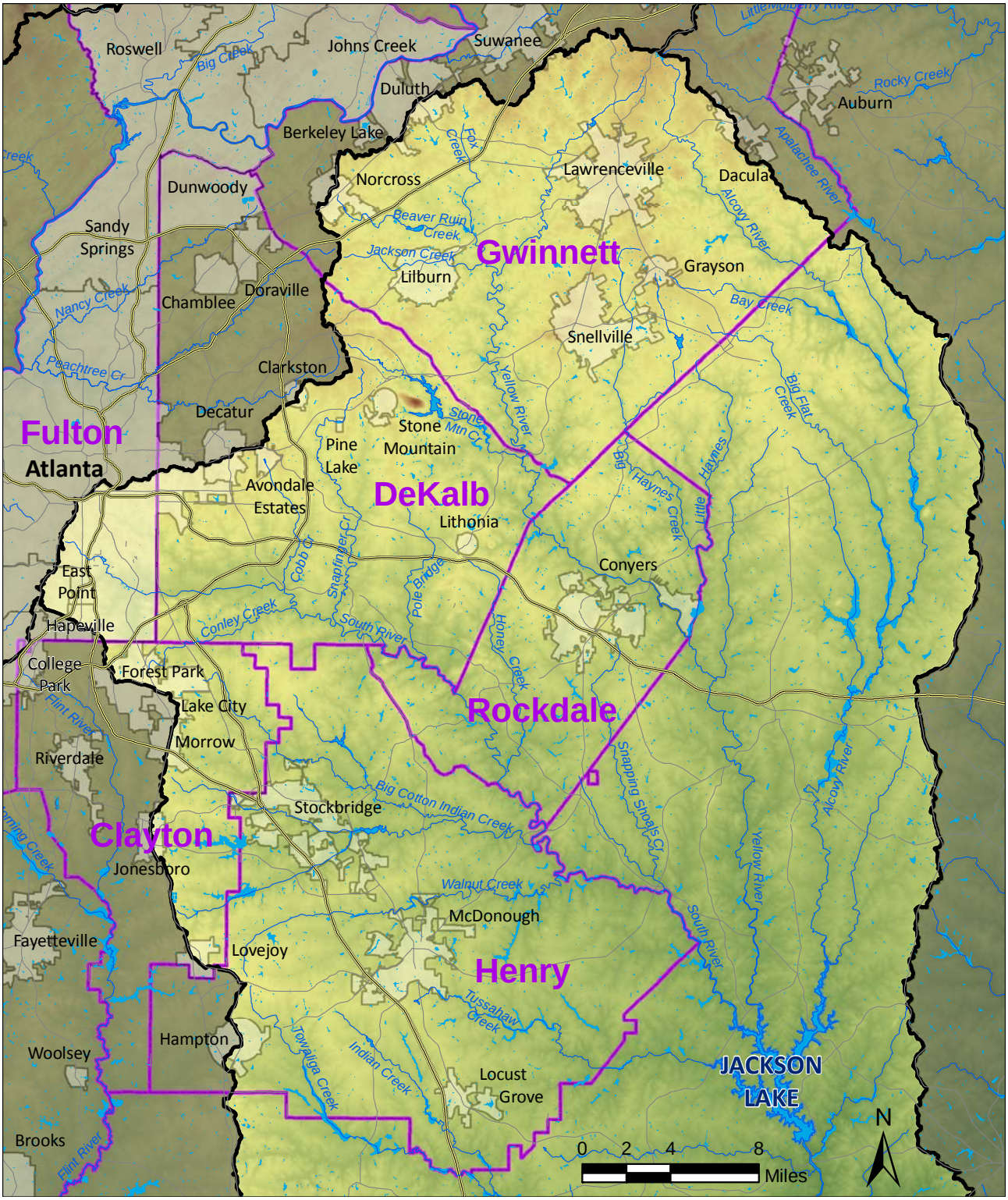


TABLE 4-15
Ocmulgee Basin Land Use

Land Use Categories	Land Use Percentage		
	2007 Actual	2035 Projected	Change 2007-2035
Low Density Residential	9.6%	13.0%	3.4%
Medium Density Residential	32.5%	35.1%	2.6%
High Density Residential	3.8%	6.0%	2.2%
Industrial/Manufacturing/Transportation	3.7%	11.6%	7.9%
Retail/Commercial/Institutional	6.8%	12.8%	6.0%
Open Water/Wetlands/Unusable Land	10.7%	7.9%	-2.8%
Forested and Agricultural	32.9%	13.6%	-19.3%

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

DRINKING WATER SUPPLY

Several communities rely on the Ocmulgee basin for drinking water supplies. Drinking water supply sources for the Metro Water District portion of the Ocmulgee basin are listed in Table 4-16 and Figure 4-12 shows drinking water supply watersheds within the Ocmulgee basin.

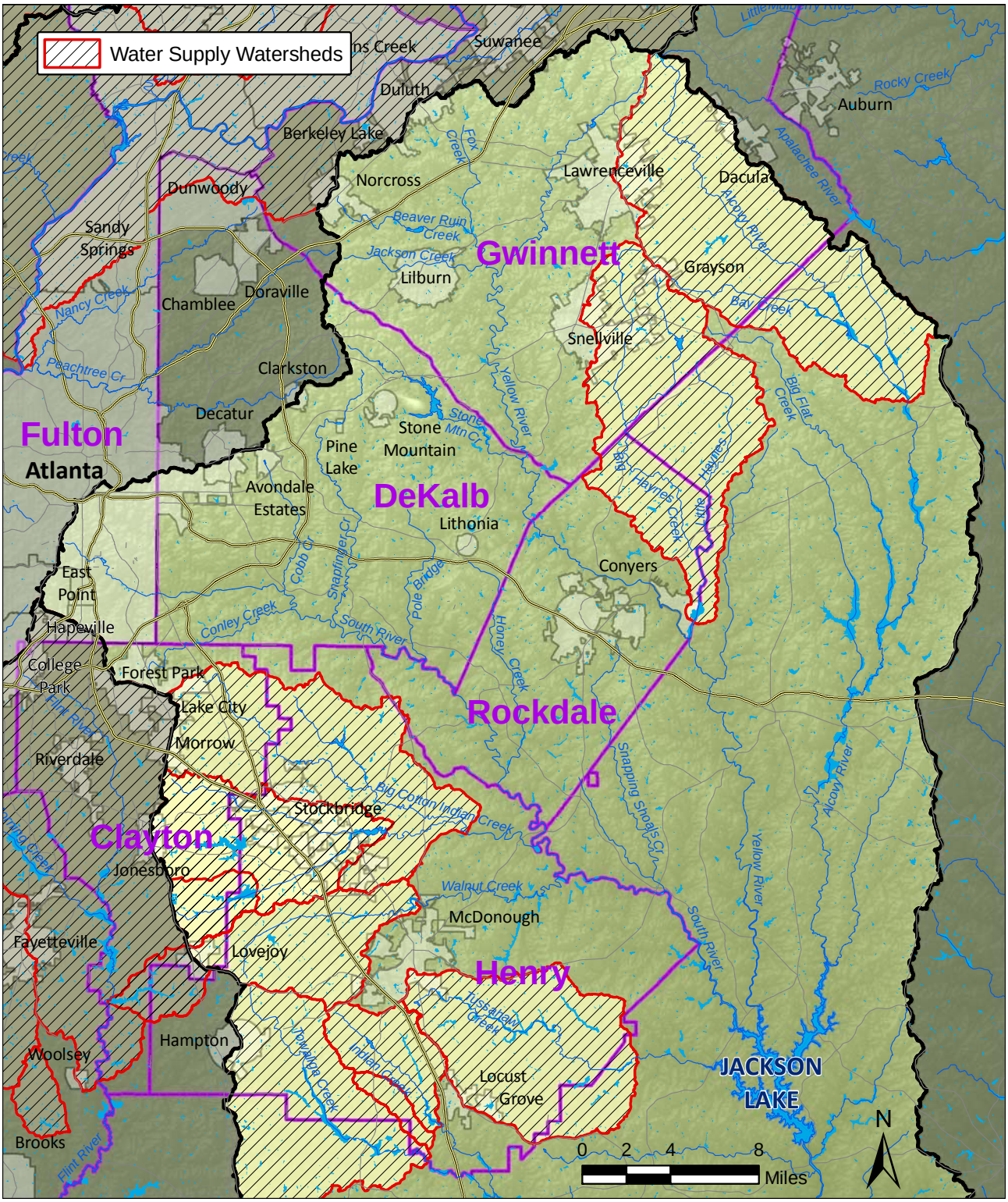
TABLE 4-16
Ocmulgee Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Little Cotton Indian Creek	Clayton County Water Authority
Pates Creek	Clayton County Water Authority
Walnut Creek	City of McDonough
Indian Creek	Henry County Water and Sewerage Authority
Long Branch	Henry County Water and Sewerage Authority
Towaliga River	Henry County Water and Sewerage Authority
Tussahaw Creek	Henry County Water and Sewerage Authority
Big Haynes Creek	Rockdale County

SOURCE WATER ASSESSMENTS

Source water assessments were performed for all drinking water supplies within the Ocmulgee basin as required by the U.S. Environmental Protection Agency. The source water assessments determined the potential for pollution based on a number of watershed characteristics and assigned a susceptibility ranking to each source. The susceptibility ranking for supplies within the Ocmulgee basin ranged from low to high depending on location within the basin. The variations in the susceptability rankings are an indication of the diverse nature of these small drinking water supply watersheds.

FIGURE 4-12
Ocmulgee Basin Drinking Water Supply Watersheds



WATER QUALITY

Of the 457 miles of streams monitored in the Metro Water District portion of the Ocmulgee basin, 385 miles did not meet State water quality standards based on the 2008 303(d) list. The not supporting streams are summarized in Table 4-17 by parameter of concern and graphically shown in Figure 4-13. Several streams are listed for violations of more than one parameter, therefore the summation of impaired miles by parameter will not equal the 385 miles of not supporting streams.

TABLE 4-17
Ocmulgee Basin Summary of Impaired Streams

Criterion Violated	Miles of Stream
Biota (Fish Community)	79
Biota (Macroinvertebrate Community)	45
Dissolved Oxygen	2
Fecal Coliform Bacteria	349
Fish Consumption Guidance (PCBs)	35
pH	11

In the Ocmulgee basin, fecal coliform bacteria is the parameter of most concern, which is attributed to nonpoint source pollution. Over 50 miles of the South River exceeds the fecal coliform bacteria standard, in part due to legacy impacts from the City of Atlanta combined sewer system that have now been addressed. The City of Atlanta's Clean Streams Campaign is working to address these overflows which will improve watershed health. Several streams in Rockdale County do not meet pH standards. Possible equipment calibration errors could have resulted in these streams exceeding the pH standard and sampling is recommended to confirm the violation.

Streams with biota impairment are likely related to habitat degradation from prior development without sufficient stormwater controls. Additional biota concerns include the fish consumption guidance on the South River which indicates long term health concerns related to the consumption of fish from the river.

The Big Haynes Creek Reservoir in Rockdale County was listed for trophic weighted residue value of mercury in fish tissue exceeding the Georgia EPD human health standard of 0.3 mg/kg attributed to mercury from atmospheric deposition. Monitoring for the 2008 303(d) list shows that the Lake meets state water quality standards, however additional data needs to be collected to change the status to meeting its designated use.

TMDLs and TMDL Implementation Plans have been developed to help jurisdictions address impaired streams and specific parameters of concern. More information on specific TMDLs in the Ocmulgee basin can be found on the Georgia EPD website

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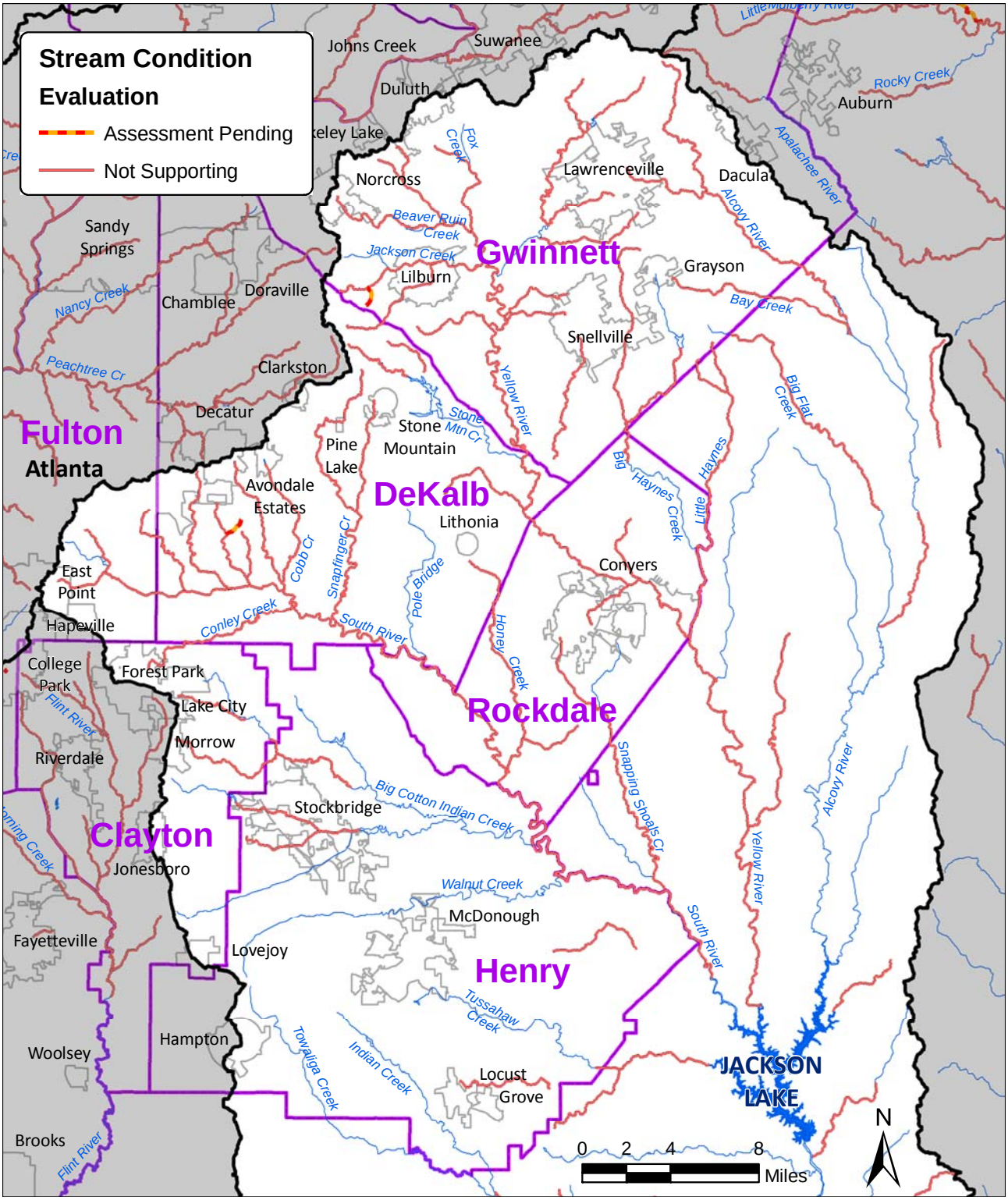
FIGURE 4-13
Ocmulgee Basin Impaired Streams



OCMULGEE BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following table outlines management issues and strategies for the Ocmulgee River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements.

TABLE 4-18
Ocmulgee Basin Management Issues and Recommended Strategies

Management Issues
• Several small drinking water supply watersheds are located in the the Ocmulgee basin. • Henry County is growing rapidly, ranking as the 7th fastest growing county in the U.S. • Downstream of the Metro Water District, the Ocmulgee basin drains to Lake Jackson, which is showing signs of eutrophication due to nutrient loads. • Several streams in the Ocmulgee basin exceed State standards for fecal coliform bacteria and a growing number exceed State standards for biota. There are several streams in Rockdale County that do not meet State standards for pH. The South River exceeds State standards for fish consumption guidance due to legacy PCBs. • Sanitary sewer overflows in older portions of the sanitary sewer collection system in Fulton, DeKalb, and Rockdale Counties contribute to fecal coliform bacteria levels in the basin. • Biota impairment in the basin is the result of high sediment loads, primarily associated with existing development with inadequate stormwater controls. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Implement source water protection measures to protect small drinking water supply watersheds within the Ocmulgee basin. • Prioritize sanitary sewer overflow issues in the areas that negatively impact streams with fecal coliform bacteria challenges. • Watershed improvement projects, such as stream restoration and streambank stabilization are recommended in areas with failing stream banks to reduce instream sediment load contributions. • Sample the streams in Rockdale County listed for pH to confirm these streams are impacted. There is no history of pH challenges in Rockdale County, therefore a sampling probe calibration error is suspected.

OCMULGEE BASIN SUCCESS STORIES

Clean Water Initiative – In 2002, Mayor Shirley Franklin announced the City of Atlanta's Clean Water Atlanta Initiative. Clean Water Atlanta is the City's comprehensive, long-term plan to ensure clean drinking water for Atlanta, and clean streams and clean wastewater flows for Atlanta and its downstream neighbors. The objective of Clean Water Atlanta was to create the cleanest urban streams and rivers in the country within a decade from inception.

The City has substantially completed the combined sewer separation projects and sewer treatment projects projects according to the EPA/EPD Consent Decree Status Report on April 30, 2008. Additionally, the City has purchased $25 million of greenspace throughout the region, including areas in the Ocmulgee basin.

Big Haynes Creek Watershed Wetlands Demonstration Project – Gwinnett County's wetland demonstration project will demonstrate the concept of using manmade wetlands to remove pollutants from urban storm water runoff. These wetlands, located upstream of Rockdale County's drinking water reservoir, will remove contaminants from urban runoff prior to entering Big Haynes Creek. The project was partially funded by an EPA Special Congressional Appropriations Grant.

Lakefield Regional Stormwater Detention Pond – Rockdale County converted an old farm pond with a failing dam into a local amenity. Using an EPA grant, the County restored the dam and created storage for stormwater runoff from the commercial areas upstream. In addition to the benefits of the stormwater detention pond, Rockdale County coordinated the project with transportation improvements and recreational trails for a true multi-faceted project.

Coordinated Water Quality Monitoring – Henry County and Clayton College and State University (CCSU) are in the process of initiating a county-wide assessment of stream health. The CCSU students benefit from the practical knowledge gained through monitoring and Henry County benefits from additional baseline water quality data.

OCONEE RIVER BASIN

The Oconee basin is comprised entirely of headwater streams within the Metro Water District. While traditionally rural, many communities within the basin are currently experiencing growth and new development.

GEOGRAPHY

The Oconee River headwaters originate in Gwinnett and Hall Counties and encompass about 208 square miles along the eastern edge of the Metro Water District (Figure 4-14). The northern boundary of the Oconee Basin roughly follows Interstate 985 through Hall County and Gainesville. The Oconee River basin within the Metro Water District includes the cities of Auburn and Braselton whose city limits extend outside of the 15-county area.

HYDROLOGY

The Oconee basin within the Metro Water District is primarily smaller headwater streams. All of these streams flow south and east out of the Metro Water District. Two major Oconee River tributaries—the North Oconee River and the Middle Oconee River—originate within Hall County. The Oconee River flows to the southeast, joining the Ocmulgee River in south Georgia to form the Altamaha River, which flows to the Atlantic Ocean.

Average annual rainfall ranges from 49 to 54 inches across this basin within the Metro Water District.

LAND USE

In the last decade, the Oconee basin has experienced a steady change in land use with undeveloped land transitioning predominantly to residential. However, the Oconee basin overall currently has the least intensive land use in the Metro Water District with 62 percent of land in forested and agricultural land uses.

The population within the Oconee basin is expected to nearly double over the next 30 years, growing from approximately 115,000 in 2005 to 250,000 by 2035. Land use changes expected to accompany the population growth are shown in Table 4-19. Much of the changes will occur due to commercial and industrial development.

FIGURE 4-14
Oconee River Basin within the Metro Water District

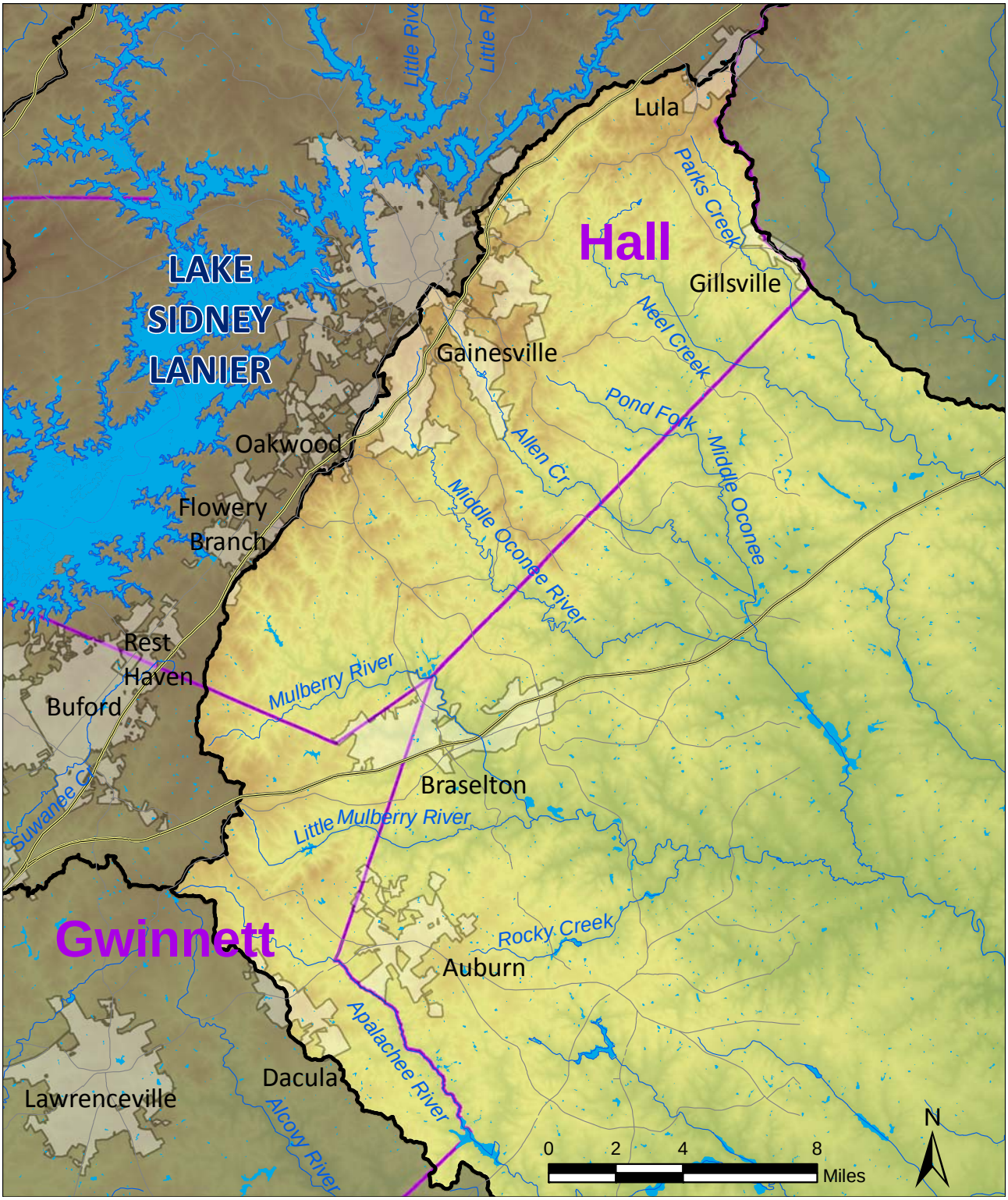


TABLE 4-19
Oconee Basin Land Use

Land Use Categories	Land Use Percentage		
	2007 Actual	2035 Projected	Change 2007-2035
Low Density Residential	9.2%	12.8%	3.6%
Medium Density Residential	18.4%	26.0%	7.6%
High Density Residential	0.4%	2.2%	1.8%
Industrial/Manufacturing/Transportation	1.2%	13.5%	12.3%
Retail/Commercial/Institutional	2.3%	9.3%	7.0%
Open Water/Wetlands/Unusable Land	6.4%	5.1%	-1.3%
Forested and Agricultural	62.1%	31.1%	-31.0%

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

DRINKING WATER SUPPLY

The City of Gainesville has two drinking water supply sources in the Oconee basin which are listed below in Table 4-20. Figure 4-15 shows the drinking water supply watersheds in the Metro Water District portion of the Oconee basin.

TABLE 4-20
Oconee Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Cedar Creek	City of Gainesville
North Oconee River	City of Gainesville

SOURCE WATER ASSESSMENTS

Source water assessments were performed for all drinking water supplies within the Oconee basin as required by the U.S. Environmental Protection Agency. The source water assessments determined the potential for pollution based on a number of watershed characteristics and assigned a susceptibility ranking to each source. The susceptibility rankings throughout the basin ranged from medium to high depending on location of the water source. The susceptibility ranking for the North Oconee intake is high and for the Cedar Creek Reservoir is medium.

WATER QUALITY

Of the 144 miles of streams monitored in the Metro Water District portion of the Oconee basin, 110 miles did not meet State water quality standards based on the 2008 303(d) list. The not supporting streams are summarized in Table 4-21 by parameter of concern and graphically shown in Figure 4-16. Several streams are listed for violations of more than one parameter, therefore the summation of impaired miles by parameter will not equal the 110 miles of not supporting stream.

FIGURE 4-15
Oconee Basin Drinking Water Supply Watersheds

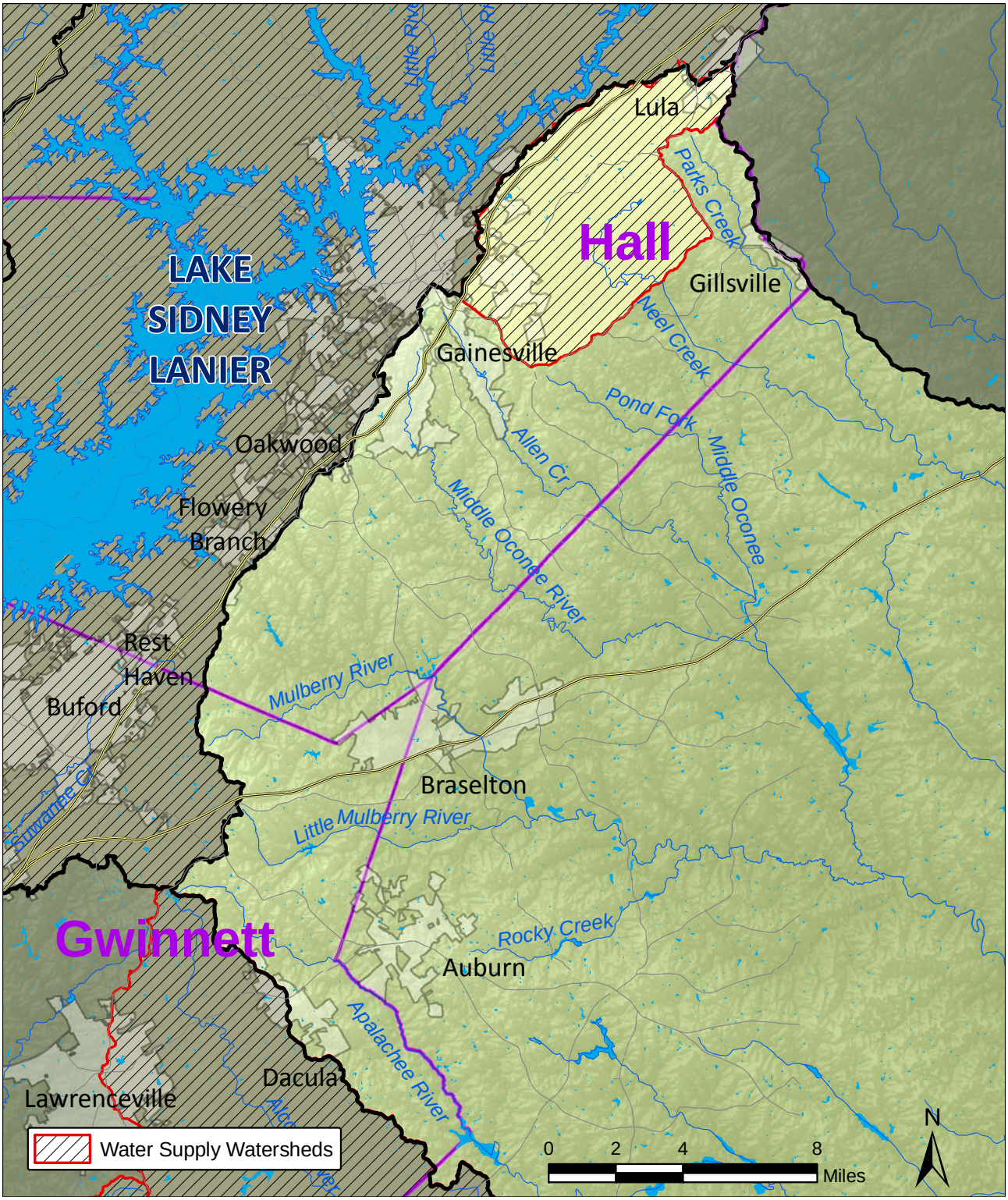


TABLE 4-21
Oconee Basin Impaired Streams

Criterion Violated	Miles of Stream
Biota (Macroinvertebrate Community)	59
Dissolved Oxygen	1
Fecal Coliform Bacteria	83

The parameter of most concern in the Metro Water District portion of the Oconee basin is fecal coliform bacteria as a result of nonpoint source pollution. There is one stream, Bottoms Branch, that is not supporting its designated use for dissolved oxygen. There has been an increase in the number of streams listed for biota impairment since 2002 as a result of additional montioring, which are due to increased erosion and sedimentation.

TMDLs (Total Maximum Daily Load) and TMDL Implementation Plans have been developed to help jurisdictions address impaired streams and specific parameters of concern. More information on specific TMDLs in the Oconee basin can be found on the Georgia EPD website.

OCONEE BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following table outlines management issues and strategies for the Oconee River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements.

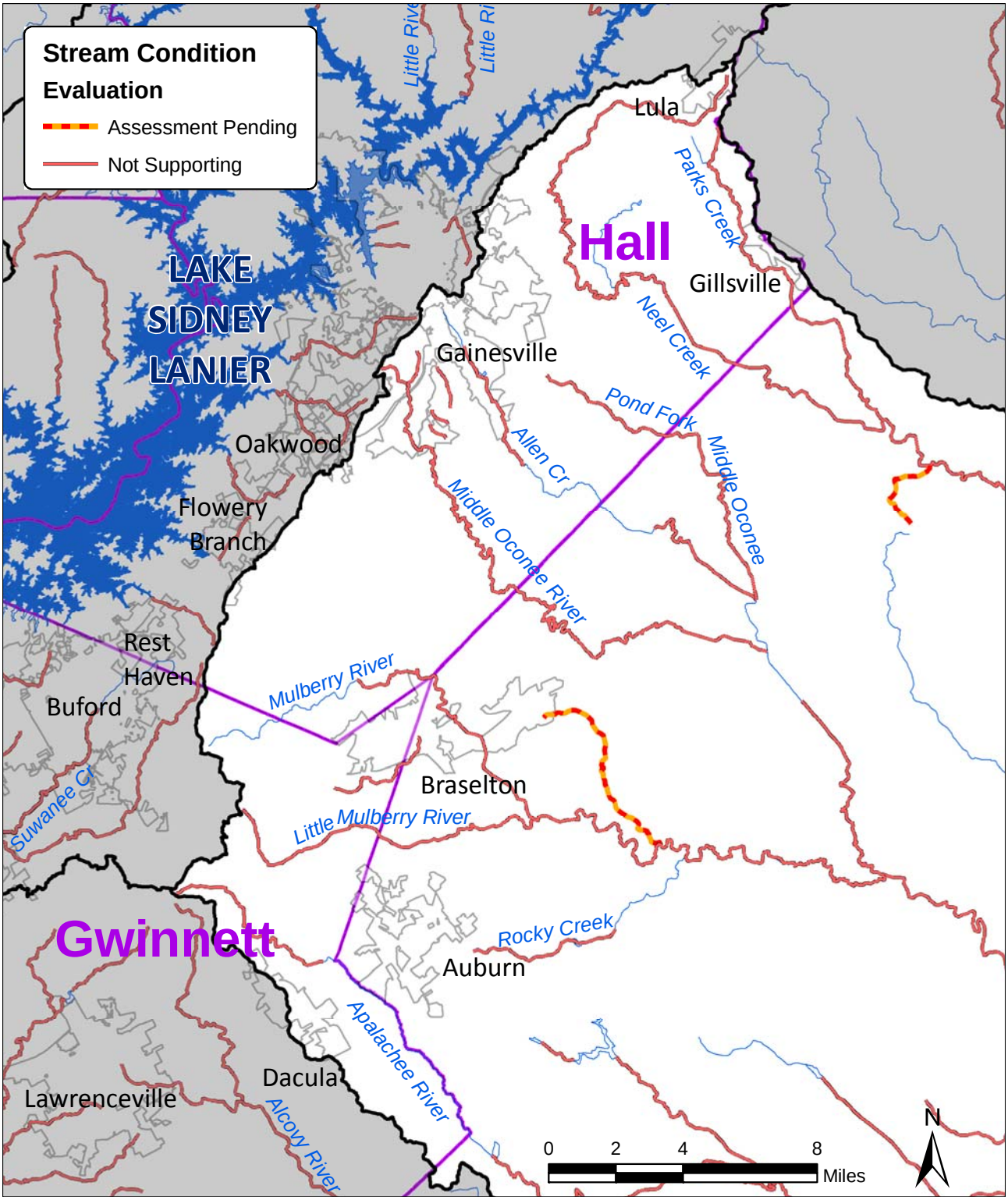
TABLE 4-22
Oconee Basin Management Issues and Recommended Strategies

Management Issues
• Land use is shifting from forested and agricultural land use to residential and supporting commercial land use, with Gwinnett and Hall County in the top 100 fastest growing counties in the U.S. in 2006. • Much of the growth in the Oconee basin is anticipated for septic systems, potentially creating long-term management challenges. Areas planned for increased wastewater treatment capacity will require a watershed assessment and protection plan. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Focus on protection of headwater streams in developing areas

OCONEE BASIN SUCCESS STORIES

Gwinnett County Public Education Programs – Gwinnett County holds regular septic tank workshops for residents and has video tapes of workshops at public libraries available for checkout. Gwinnett County is also planning a new workshop on stormwater detention pond maintenance for homowners and homeowners associations.

FIGURE 4-16
Oconee Basin Impaired Streams



TALLAPOOSA RIVER BASIN

A small piece of the Metro Water District includes the headwaters of the Tallapoosa River, which is part of the larger Alabama-Coosa-Tallapoosa (ACT) system. The Tallapoosa basin is also home to several endemic fish species, including the Tallapoosa Shiner.

GEOGRAPHY

The southwestern corner of Paulding County in the Metro Water District lies within the Tallapoosa River basin, which encompasses about 40 square miles of the Metro Water District. Portions of the City of Villa Rica, which extends outside of the 15-county region, are also located in the Tallapoosa basin (Figure 4-17).

HYDROLOGY

The Tallapoosa basin includes portions of two 10-digit HUC's within the Metro Water District. There are no impoundments in the Tallapoosa basin within the Metro Water District area, however the City of Villa Rica relies on two reservoirs just outside their city limits.

The Tallapoosa River flows to the west, where it joins the Coosa River forming the Alabama River which flows to the Gulf of Mexico. Average annual rainfall is about 55 inches in the Metro Water District portion of the basin.

LAND USE

The Tallapoosa basin within the Metro Water District includes both a rural portion of Paulding County and a portion of the City of Villa Rica Within Paulding County, the population within the basin is expected to grow from 4,800 in 2005 to 11,000 by 2035. This growth is anticipated to be primarily in low density residential land use. Table 4-23 shows the current and projected changes in land use within the Paulding County portion of the Tallapoosa basin by 2035.

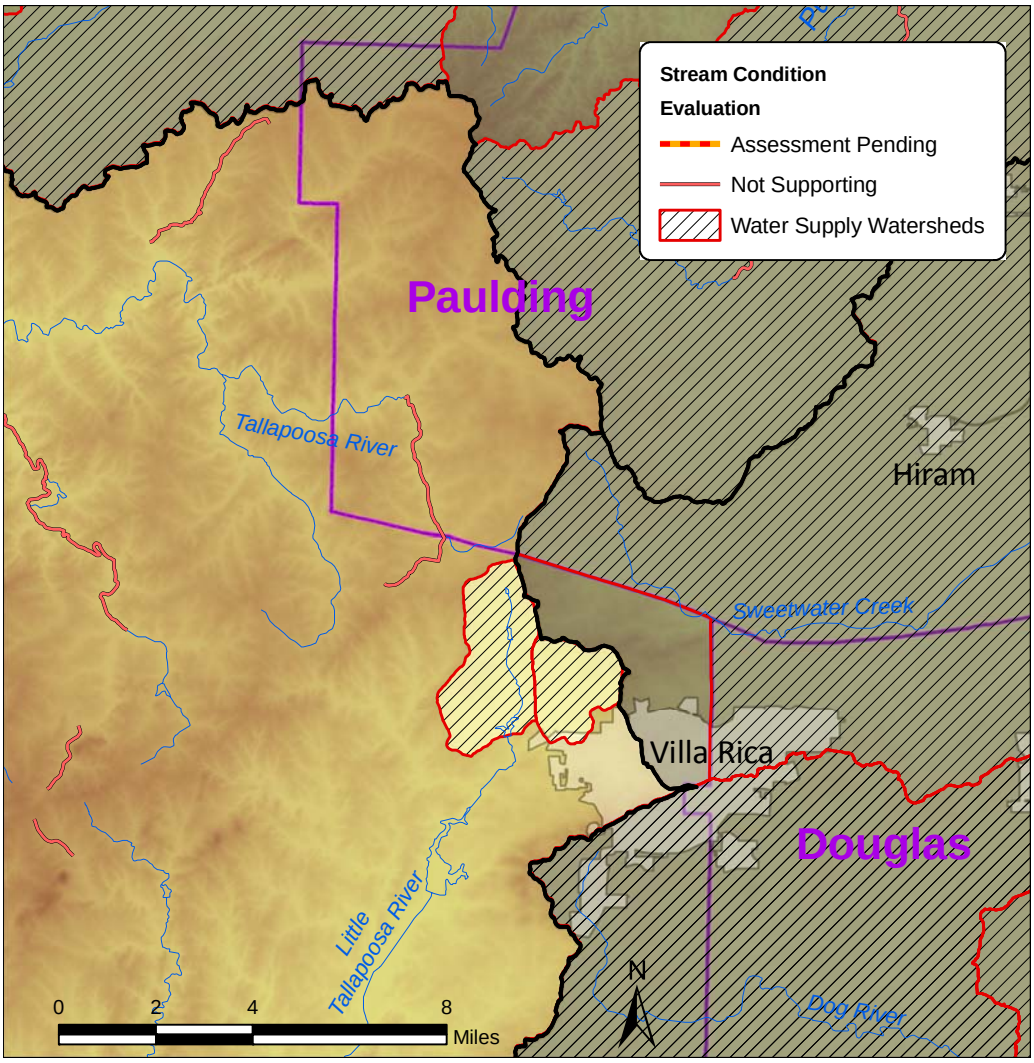
TABLE 4-23
Tallapoosa Basin Land Use*

Land Use Categories	Land Use Percentage		
	2007 Actual	2030 Projected	Change 2007-2030
Low Density Residential	18.3%	42.5%	24.2%
Medium Density Residential	6.0%	26.0%	20.0%
High Density Residential	0%	2.7%	2.7%
Industrial/Manufacturing/Transportation	0%	0.5%	0.5%
Retail/Commercial/Institutional	0.4%	0.7%	0.3%
Open Water/Wetlands/Unusable Land	5.9%	5.4%	-0.5%
Forested and Agricultural	69.4%	22.2%	-47.2%

*Paulding County portion of Tallapoosa Basin only

Source: Atlanta Regional Commission (2007 - LandPro data; 2035 - Envison6 forecasts)

FIGURE 4-17
Tallapoosa River Basin within the Metro Water District (including Drinking Water Supply Watersheds and Impaired Streams)



DRINKING WATER SUPPLY

The City of Villa Rica relies on the Tallapoosa basin for drinking water supplies, as shown in Table 4-24 and Figure 4-17.

TABLE 4-24
Tallapoosa Basin Drinking Water Supply Sources

Water Supply Source	Owner/Operator Utilizing Source
Lake Fashion	City of Villa Rica
Cowan Lake	City of Villa Rica

WATER QUALITY

Of the 23 miles of streams monitored in the Metro Water District portion of the Tallapoosa basin, 5 miles did not meet State water quality standards based on the 2008 303(d) list. The headwaters of the Tallapoosa basin within the Metro Water District have extremely good water quality and this is the first segment to not meet water quality standards. The not supporting stream is summarized in Table 4-25 by parameter of concern and graphically shown in Figure 4-17.

TABLE 4-25
Tallapoosa Basin Impaired Streams

Criterion Violated	Miles of Stream
Biota (Fish Community)	5

Mud Creek in the headwaters of the Tallapoosa basin did not meet water quality standards for biota, specifically fish communities. The biota impairment is likely due to sedimentation associated with nonpoint source pollution. A TMDL (Total Maximum Daily Load) and TMDL Implementation Plan are planned for 2013.

TALLAPOOSA BASIN MANAGEMENT ISSUES AND RECOMMENDATIONS

The following table outlines management issues and strategies for the Tallapoosa River basin within the Metro Water District. These issues and strategies were used to inform and guide the more specific management measures and requirements found in Sections 5, 6 and 7. The commonality of causes and strategies to the watershed issues provide a foundation for guidance and are not presented here as mandatory requirements.

TABLE 4-26
Tallapoosa Basin Management Issues and Recommended Strategies

Management Issues
• Most of the growth in the Tallapoosa basin within the Metro Water District is anticipated to be on septic systems. • There are two small drinking water supply watersheds in the Metro Water District portion of the Tallapoosa basin and a planned reservoir downstream that require protection. • There are threatened and endangered aquatic species of concern in the Tallapoosa basin that require protection. • Managing and maintaining public stormwater infrastructure.
Recommended Strategies
• Implement source water protection measures in response to any downstream source water supplies.

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Section 5: LOCAL MANAGEMENT MEASURES

OVERVIEW

The local management measures in this Section are the activities to be performed at the local level by the Metro Water District's member local governments. These local management measures form a comprehensive program for addressing watershed issues within the Metro Water District, including the protection of water quality and designated uses as well as improving the health of impacted waterbodies. Through the Georgia EPD audit process, local jurisdictions will be held accountable for implementation of these local management measures.

The 2003 Watershed Management Plan looked at an exhaustive list of stormwater and watershed best management practices and programs, and crafted a strong foundation of strategies and management measures for meeting watershed management goals. Since 2003, local jurisdictions in the Metro Water District have been actively implementing these measures as well as meeting their local permit requirements.

Starting with the foundation of the 2003 Watershed Management Plan, the plan update process focused on adapting the original Plan's management measures to better help local governments to address the watershed management needs outlined in Section 2 of this Plan, the regulatory requirements found in Section 3, and the basin-specific issues and priorities identified in Section 4.

Based on the evaluation of the 2003 Plan, each of the local measures was rewritten and formatted to provide more background, implementation guidance and resources for local programs. In addition, the measures were placed into functional categories and a local implementation responsibility box was added as a guide to assist local governments. A number of local management measures were clarified and some new measures were added to the Plan. These separate or new measures primarily address gaps from the original Plan:

- **Model Ordinance Support Activities** – Several of the model ordinances developed as part of the original planning process require specific local actions to support and enforce the ordinance provisions. Three of these activities have been categorized as separate local measures, including Floodplain Mapping and Delineation (Measure 5.B.2), Integrated Development Review Process (Measure 5.C.1), and Stormwater Management Design Review Criteria and Standards (Measure 5.C.2)
- **Regulatory Gaps** – There are two areas subject to both federal and state laws and regulatory programs that were not adequately addressed in the 2003 Plan. Construction Erosion and Sedimentation Control (Measure 5.C.3) and Endangered Species Protection (Measure 5.H.3) have been added as local management measures to help local governments integrate these requirements into their watershed management programs.

- **Local Coordination** – Land use planning is integral to effective watershed management and requires coordination with community development staff. Comprehensive Land Use Planning (Measure 5.B.1) was added to ensure that watershed management issues are considered in local government land use decision making. Sanitary Sewer and Septic System Coordination (Measure 5.B.3) encourages intra-governmental and inter-governmental coordination on wastewater service issues within a community that can impact both development patterns and water quality issues.

The local management measures are organized into eight functional categories. These functional categories group similar management measures together to facilitate implementation and inter-departmental coordination within a local jurisdiction:

A. **Legal Authority** – Stormwater and watershed protection model ordinances.

5.A.1 – Post-Development Stormwater Management Ordinance

5.A.2 – Floodplain Management / Flood Damage Prevention Ordinance

5.A.3 – Stream Buffer Protection Ordinance

5.A.4 – Illicit Discharge and Illegal Connection Ordinance

5.A.5 – Litter Control Ordinance

B. **Watershed Planning** – Community-wide and inter-jurisdictional planning efforts and activities at the watershed scale.

5.B.1 – Comprehensive Land Use Planning

5.B.2 – Floodplain Delineation and Map Maintenance

5.B.3 – Sanitary Sewer and Septic System Coordination

C. **Land Development** – Programs and activities focused on the site-level impacts of development projects.

5.C.1 – Integrated Development Review Process

5.C.2 – Stormwater Management Design Review Criteria and Standards

5.C.3 – Construction Erosion and Sedimentation Control

D. **Asset Management** – Ongoing management, operations and maintenance of stormwater system assets.

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

E. **Pollution Prevention** – Programs that reduce or eliminate potential pollutants to the stormwater system and downstream receiving waters.

5.E.1 – Pollution Prevention / Good Housekeeping for Local Operations

5.E.2 – Illicit Discharge Detection and Elimination Program

F. **Watershed Conditions Assessment** – Chemical, biological, and habitat monitoring of streams.

5.F.1 – Long-term Ambient Trend Monitoring

5.F.2 – Habitat and Biological Monitoring

G. **Education and Public Awareness** – Public education and involvement programs related to stormwater and nonpoint source pollution.

5.G.1 – Local Education and Public Awareness Program

H. **Resource-specific Measures** – Programs based on conditions within a local watershed that necessitate additional protection.

5.H.1 – Source Water Supply Watershed Protection

5.H.2 – TMDL Management

5.H.3 – Endangered Species Protection

5.H.4 – Watershed Improvement Projects

Each local management measure includes the required action item(s), objective, description of measure and detailed guidance on implementing each measure. In addition, some of the measures also include optional considerations and resources, including website links.

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5.A.1 POST-DEVELOPMENT STORMWATER MANAGEMENT ORDINANCE

ACTION ITEM

Adopt the Metro Water District's Model Ordinance for Post-Development Stormwater Management for New Development and Redevelopment, or an equivalent ordinance at least as effective.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☐ Planning and Zoning
- ☑ City/County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

OBJECTIVE

The objective of the post-development stormwater management ordinance is to require all new development and re-development projects to address their long-term (post-construction) stormwater quality and quantity impacts.

DESCRIPTION OF MEASURE

The Metro Water District's *Model Ordinance for Post-Development Stormwater Management for New Development and Redevelopment*, found in Appendix A.1, establishes development regulations for mitigating the long-term water quality and quantity impacts from stormwater runoff that results from land cover changes and land use activities.

Local jurisdictions are to adopt the model ordinance, or an equivalent ordinance or regulations, that:

- Requires a post-development stormwater management plan for land development activities. This plan must specify how the development will mitigate the stormwater runoff quality and quantity impacts resulting from the permanent alteration of the character and hydrology of the land surface and the nonpoint source pollution from land use activities.
- Outlines the specific water quantity and quality performance criteria for managing stormwater runoff and specifies local requirements for the use of structural stormwater controls and nonstructural practices to provide protection for public health and safety, public and private property and infrastructure, and the environment.
- Includes provisions for ongoing long-term inspections and maintenance of stormwater control facilities.

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt the Ordinance	Adopt the *Model Ordinance for Post-Development Stormwater Management for New Development and Redevelopment,* or an equivalent ordinance at least as effective.
Adopt a Stormwater Management Technical Standard and Design Criteria Manual	Adopt either the Georgia Stormwater Management Manual or a local design manual that addresses the performance criteria included in the model ordinance (see Measure 5.C.2).
Revise Development (Site Plan) Review Process & Procedures	Make revisions to local plan review processes and procedures to incorporate the model ordinance and stormwater management plan requirements (see Measure 5.C.1).
Implement a Construction Inspection Program	Stormwater management facilities are to be inspected during construction (prior to as-built certification) by local staff, or be certified by a qualified professional.
Develop and Implement Long-Term Tracking for New Stormwater Facilities	Develop a system for ensuring long-term inspections and maintenance of structural stormwater controls by the appropriate party to ensure they are operating as designed.

IMPLEMENTATION GUIDANCE

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.

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

Stormwater Management Plan: All new development and redevelopment projects that create or add 5,000 square feet or more of impervious cover or that involve land development activities of 1-acre or greater must submit a stormwater management plan as part of the local permitting process. The stormwater management plan will include hydraulic and hydrologic design calculations for the proposed stormwater system that meet the performance criteria established in the Metro Water District model ordinance.

Performance Criteria: The performance criteria must be at least as stringent as those included in the Metro Water District's model ordinance:

- **Water Quality** – All stormwater runoff generated from a site shall be adequately treated before discharge. It will be presumed that a stormwater management system complies with this requirement if: (1) it is sized to treat the prescribed water quality treatment volume from the site, as defined in the Georgia Stormwater Management Manual; (2) appropriate structural stormwater controls or nonstructural practices are selected, designed, constructed or preserved, and maintained according to the specific criteria in the Georgia Stormwater Management Manual (or equivalent manual); and, (3) runoff from hotspot land uses and activities are adequately treated and addressed through the use of appropriate structural stormwater controls, nonstructural practices and pollution prevention practices.

- **Stream Channel Protection** – Protection of stream channels through: (1) preservation, restoration and/or reforestation (with natural vegetation) of the applicable stream buffer; (2) 24-hour extended detention of the 1-year, 24-hour return frequency storm event; and (3) erosion prevention measures such as energy dissipation and velocity control.
- **Overbank Flooding Protection** – Attenuate the post-development peak discharge rate to the pre-development rate for the 25-year, 24-hour return frequency storm event. If stream channel protection is exempted, then peak rate attenuation of the 2-year through the 25-year return frequency storm event must be provided.
- **Extreme Flooding Protection** – Control and/or adequate conveyance of the 100-year, 24-hour return frequency storm event such that flooding is not exacerbated.

Stormwater Design Manual: Technical criteria and standards to support the ordinance are adopted by reference through the use of the Georgia Stormwater Management Manual or other local stormwater management design manual. This manual must be referenced in the local ordinance or regulations. This requirement is discussed further in Stormwater Management Design Criteria and Standards (see Measure 5.C.2).

Long-Term Maintenance Tracking: All 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 to ensure that inspections and proper maintenance is occurring. Compliance may be verified by local staff or through certification by a qualified design professional.

Enforcement: A method for enforcement of the ordinance provisions, including appropriate violations and penalties, must be provided 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/modification of the permit. Long-term maintenance violations may result in civil or criminal penalties and enforcement actions.

OPTIONAL CONSIDERATIONS

Redevelopment Projects: Redevelopment sites that create or replace 5,000 square feet of impervious area or more are subject to the requirements of the post-development stormwater management ordinance. Meeting these requirements may be a challenge for redevelopment and infill development sites.

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 is one way to provide for both channel protection and water quality on a redevelopment site.

A challenge associated with redevelopment, particularly on smaller sites, is having sufficient land or space for stormwater facilities. One potential alternative for meeting the stormwater management requirements is through allowing the use of regional stormwater facilities that serve several parcels or projects. Regional stormwater facilities can be developed either privately or

publicly, and a development will typically "buy in" to the regional facility based upon the amount of runoff from the project being treated and/or controlled.

Residential Stormwater Maintenance: The model ordinance requires that structural stormwater controls for new residential subdivisions be 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 jurisdictions may want to consider alternate arrangements for ensuring long-term inspection and maintenance including accepting maintenance responsibility.

5.A.2 FLOODPLAIN MANAGEMENT / FLOOD DAMAGE PREVENTION ORDINANCE

ACTION ITEM

Adopt the Metro Water District's *Model Floodplain Management / Flood Damage Prevention Ordinance,* or an equivalent ordinance at least as effective.

OBJECTIVE

The objective of the floodplain management ordinance is to minimize future flooding impacts and integrate floodplain management with stormwater management during the land development process.

DESCRIPTION OF MEASURE

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.

The Metro Water District's *Floodplain Management / Flood Damage Prevention* model ordinance, found in Appendix A.2, 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 FEMA minimums.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☑ City/County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☑ Other: Local Floodplain Administrator

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☑ Other: National Flood Insurance Act

Local jurisdictions 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.

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt the Ordinance	Adopt the *Model Floodplain Management / Flood Damage Prevention Ordinance,* or an equivalent ordinance at least as effective.
Implement New Floodplain Review Process	Make revisions to local plan review processes and procedures to incorporate the model ordinance and floodplain plan requirements (see Measure 5.C.1).
Develop Future-Conditions Floodplain Maps	Complete mapping of future-conditions floodplains by 2013 (see Measure 5.B.2).
Regulate to Future-Conditions Floodplains	Regulate development to the future-conditions floodplain maps, as available.

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 the necessary enforcement mechanisms.

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

Area of Special Flood Hazard: Local floodplain regulations must apply to all land subject to a one percent or greater chance of flooding in any given year. This includes all floodplain and flood prone areas at or below the base flood elevation (including A, A1-30, A-99, AE, AO, AH, and AR on the FHBM or the FIRM), and all floodplain and flood prone areas at or below the future-conditions flood elevation on streams with a drainage area of 100 acres or greater. The local jurisdiction is required to delineate the future-conditions floodplains to support its ordinance/regulations (see Measure 5.B.2).

No Adverse Impact for Floodplain Encroachments: A no adverse impact provision for floodplain encroachment equivalent to Section 4.3 of the Metro Water District model ordinance is required, i.e. a floodplain encroachment may not raise the flood elevation equal to or more than 0.01 foot, reduce the flood storage capacity, change the flow characteristics both upstream and downstream, create hazardous or erosion-producing velocities, or result in excessive sedimentation.

Floodplain Management Plan: Any land development project with any area of special flood hazard must submit a floodplain management plan that shows the proposed structures with elevations, flood-proofing measures (for non-residential properties), and the extent to which watercourses will be altered or relocated. If the floodplain (base or future-conditions) will be disturbed, an engineering study for floodplain encroachments is required, following the specifications under Sections 4.4 of the Metro Water District model ordinance.

Standards for Development: Local floodplain regulations must provide building standards for residential structures, non-residential structures, accessory structures and facilities, recreational vehicles, and manufactured homes that are no less stringent than those in the Metro Water District model ordinance.

Variance Procedures: Variance provisions may only address cases of exceptional hardship.

Enforcement: Some method for enforcement of the ordinance provisions, including appropriate violations and penalties, must be provided consistent with other local regulations.

OPTIONAL CONSIDERATIONS

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, storage of critical records, 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 the flood. Communities may develop emergency plans to continue to provide these services in the event of a flood. Under Executive Order 11988, Floodplain Management, Federal agencies funding and/or permitting critical facilities are required to avoid the 0.2% (500-year) floodplain or protect the facilities to the 0.2% chance flood level.

FEMA Community Rating System: The National Flood Insurance Program's (NFIP) Community Rating System (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 who are in compliance with this measure and Measure 5.B.2 should be able to receive CRS credits under Activity 400 (Mapping and Regulations) and Activity 500 (Flood Damage Prevention) sections of the CRS program.

RESOURCES

FEMA Community Rating System Resource Center: FEMA has a Community Rating System Resource Center on its website which provides information on the CRS program as well as tools to develop a local program to increase the CRS rating for a community.

This website is located at **http://training.fema.gov/EMIWeb/CRS/**

FEMA Hazard Mitigation Planning: FEMA has created a series of "how to" guides that are located on their website to help municipalities plan for and respond to emergencies. The guides focus on initiating and maintaining a planning process that will result in safer communities, and they are

applicable to jurisdictions of all sizes and all resource and capability levels. Some of the guides focus on mandatory planning requirements however several show best practices beyond regulatory requirements.

This website is located at **http://www.fema.gov/plan/mitplanning/index.shtm**

5.A.3 STREAM BUFFER PROTECTION ORDINANCE

ACTION ITEM

Adopt the Metro Water District's *Model Stream Buffer Protection Ordinance,* or an equivalent ordinance at least as effective.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☑ City/County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☑ Other: Local Greenspace Coordinator

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☑ NPDES Construction/GESA
- ☑ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other:_____

OBJECTIVE

The objective of the stream buffer ordinance is to protect and stabilize stream banks, protect water quality and preserve aquatic and riparian habitat.

DESCRIPTION OF MEASURE

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. The Metro Water District's *Stream Buffer Protection* model ordinance, found in Appendix A.3, establishes local requirements for stream buffers.

Local jurisdictions are to adopt the model ordinance, or an equivalent ordinance or 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.
- Includes appropriate exemptions, variance procedures and enforcement provisions.

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt the Ordinance	Adopt the *Model Stream Buffer Protection Ordinance,* or an equivalent ordinance at least as effective.
Develop Review and Enforcement Process and Procedures	Make revisions to local plan review processes and procedures to incorporate the model ordinance and stream buffer requirements (see Measure 5.C.1).

IMPLEMENTATION GUIDANCE

The stream buffer protection 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.

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

Stream Buffer Widths: 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 jurisdiction 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.

Stream Determination: 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 (see Measure 6.B.5, *Stream Buffer Mapping and Map Maintenance*), the Metro Water District 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 guidance for state buffers discussed under *Construction Erosion and Sediment Control* (Measure 5.C.3) for 25-foot state water quality buffers.

Land Development Requirements: All land disturbing activity permits must include site plans showing topography, the location of all known streams, and the 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.

Variance Process: A process for variances must be included with the Metro Water District buffer regulations. Provisions for buffers may only be considered in the following cases:

1. When a property's shape, topography or other physical conditions existing at the time of the adoption of the ordinance prevents land development unless a buffer variance is granted.
2. Unusual circumstances when strict adherence to the minimal buffer requirements in the ordinance would create an extreme hardship.

Note that variances to the state water quality buffers are issued by Georgia EPD, unless it is a listed exemption that is approved by the local issuing authority.

Enforcement: Some method for enforcement of the ordinance provisions, including appropriate violations and penalties, must be provided consistent with other local regulations.

5.A.4 ILLICIT DISCHARGE AND ILLEGAL CONNECTION ORDINANCE

ACTION ITEM

Adopt the Metro Water District's *Model Illicit Discharge and Illegal Connection Ordinance*, or an equivalent ordinance at least as effective.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☑ City/County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☑ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

OBJECTIVE

The objective of the illicit discharge and illegal connection ordinance is to prevent water pollution resulting from unauthorized discharges to the public stormwater system.

DESCRIPTION OF MEASURE

An illicit discharge is defined as any discharge to a stormwater drainage system or surface water that is not composed entirely of stormwater runoff. An illegal connection is a pipe or conveyance which allows an ongoing illicit discharge to occur. The purpose of the Metro Water District's *Illicit Discharge and Illegal Connection* model ordinance, found in Appendix A.4, is to provide local jurisdictions with the legal authority to address illicit discharges and illegal connections to the public (county or municipal) stormwater system.

Local jurisdictions are to adopt the model 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 jurisdiction 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.

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt the Ordinance	Adopt the *Model Illicit Discharge and Illegal Connection Ordinance,* or an equivalent ordinance at least as effective.
Develop Enforcement Process and Procedures	Establish an inspections, violation, and enforcement process.

IMPLEMENTATION GUIDANCE

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

Separate Storm Sewer System: A local illicit discharge ordinance or regulation must provide a clear definition of the public (county or municipal) separate storm sewer system. The Metro Water District model ordinance defines the public system as any facility designed or used for collecting and/or conveying stormwater, including but not limited to any roads with drainage systems, highways, locally-maintained streets, curbs, gutters inlets, catch basins, piped storm drains, pumping facilities, structural stormwater controls, ditches, swales, natural and man-made or altered drainage channels, reservoirs, and other drainage structures which are:

1. Owned or maintained by the local jurisdiction;
2. Not a combined sewer; and
3. Not part of a publicly-owned treatment work.

Prohibition of Illicit Discharges and Illegal Connections: Local regulations must prohibit illicit discharges and illegal connections and establish any exemptions (such as flows from fire fighting activities, natural flows, etc).

Right of Entry for Inspections: Provisions must be provided regarding the authority to access and inspect properties and facilities that have the ability to impact the stormwater system. The model ordinance states that "the local enforcement authority shall be permitted to enter and inspect properties and facilities at reasonable times as often as may be necessary to determine compliance with this ordinance."

Enforcement: Some method for enforcement of the ordinance provisions, including appropriate violations and penalties, must be provided consistent with other local regulations.

OPTIONAL CONSIDERATIONS

Health and Public Safety or Nuisance Ordinances: Local public safety and nuisance laws typically allow for inspections of private property to determine if a public safety or nuisance violation exists and provide appropriate mechanisms for enforcement. In some instances violations may be issued under both illicit discharge and nuisance laws. Depending on local practice, local permitting authorities may be deputized to issue notices of violation under the local nuisance ordinance. Typically, nuisance ordinances have less severe penalties than an illicit discharge/illegal connection ordinance.

5.A.5 LITTER CONTROL ORDINANCE

ACTION ITEM

Adopt the Metro Water District's *Model Litter Control Ordinance*, or an equivalent ordinance at least as effective.

OBJECTIVE

The objective of the litter ordinance is to provide legal authority to local jurisdictions to prohibit and penalize the littering of public or private property or waters.

DESCRIPTION OF MEASURE

Litter often is carried by stormwater to streams, rivers, and lakes where it contributes to water quality degradation. The Metro Water District's *Litter Control* model ordinance, found in Appendix A.5, provides a mechanism for local jurisdictions to have legal authority.

Local jurisdictions are to adopt the model ordinance, or an equivalent ordinance or regulations, that:

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

Local Implementation Responsibility

☑ Stormwater Management Staff
☐ Public Works
☐ Development/Site Planning Review
☐ Planning and Zoning
☑ City/County Attorney
☑ Inspection Staff/Code Enforcement
☐ Local Water Provider
☐ Local Wastewater Provider
☐ County Board of Health
☐ Other: _____

Related Regulations

☑ NPDES MS4 (Phase I & II)
☐ NPDES Wastewater/Georgia WPP
☐ TMDL
☐ NPDES Construction/GESA
☐ Georgia Planning Act
☐ Safe Drinking Water Act
☑ Other: Georgia Litter Control Act

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

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt the Ordinance	Adopt the *Model Litter Control Ordinance,* or an equivalent ordinance at least as effective.
Develop Enforcement Process and Procedures	Establish an inspection, violation, and enforcement process.

IMPLEMENTATION GUIDANCE

This section outlines the key elements to developing an ordinance that is equivalent to the Metro Water District model ordinance.

Litter Definition: A local litter ordinance must provide an adequate definition of litter that is consistent with O.C.G.A. §16-7-40.

Enforcement: Some method for enforcement of the ordinance provisions, including appropriate violations and penalties, must be provided consistent with other local regulations.

OPTIONAL CONSIDERATIONS

Enforcement Delegation: 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. To officially delegate authority, the local police department deputizes local jurisdiction employees, thereby authorizing them to enforce certain aspects of local code.

5.B.1 COMPREHENSIVE LAND USE PLANNING

ACTION ITEMS

Annual coordination between watershed staff and local land use planners on issues related to watershed management and protection.

Coordination during the Comprehensive Land Use Plan update process.

OBJECTIVE

Encourage the inclusion of land-use related watershed protection measures and sustainable growth policies into the local planning efforts.

DESCRIPTION OF MEASURE

Local land use decisions and policies directly impact watershed health, therefore strategic land use planning is critical to effective watershed management. Comprehensive Land Use Plans are an important tool for communities to plan and manage their future growth and development.

Local jurisdictions are to ensure coordination, at a minimum annually, between staff responsible for stormwater and watershed management programs and activities, and local land use planning staff. In addition, these staff are to also participate in the Comprehensive Land Use Plan update process for their community. Practices to preserve sensitive areas and encourage sustainable growth, such as those outlined in Section 6.B, may be considered during the Comprehensive Land Use Planning process.

One important element for local coordination is the Part V Environmental Planning Criteria. These guidelines are established by Georgia EPD, but enforced by the Georgia Department of Community Affairs (Georgia DCA). The Environmental Planning Criteria include the protection of: wetlands, water supply watersheds, groundwater recharge areas, protected rivers, and protected mountains.

The specific rules and criteria can be found on the Georgia EPD website.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☑ Local Water Provider
- ☑ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☑ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☑ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Review existing local Comprehensive Land Use Plan	Review the current local planning policies and Comprehensive Land Use Plan to identify areas for coordination.
Coordination between local watershed management and local planning staff	Coordinate, at least once annually, with staff responsible for stormwater and watershed management and local planning staff on land use planning and policy issues related to watershed management and protection.
Coordinate during Comprehensive Land Use Plan updates	Coordination between watershed and planning staff throughout the local Comprehensive Land Use Plan update process

IMPLEMENTATION GUIDANCE

This section outlines the key elements related to implementation of the comprehensive land use planning measure.

Annual Coordination: Documentation of annual coordination is not intended to be a burden to local jurisdictions. Any form of documentation of communication is consistent with the objective of this measure, including but not limited to: email, phone summary, meeting agenda, meeting summary, or fax transmittal.

Comprehensive Land Use Plan Overview: The Georgia Planning Act of 1989 established a statewide comprehensive planning process which requires that each local government prepare a Comprehensive Land Use Plan which includes an analysis of future growth and development, the community's future vision and land use plan, and an implementation strategy for achieving that vision. These Plans are required to be updated, at a minimum, every 10 years in order for a local jurisdiction to maintain its Qualified Local Government Status.

In order to maintain their "Qualified Local Government" status, Georgia DCA requires that Comprehensive Land Use Plans be consistent with the Minimum Planning Standards and Procedures which include six (6) topical areas or elements to be considered in the preparation of local plans: Population, Housing, Economic Development, Natural and Historic Resources, Community Facilities and Land Use. The Natural and Historic Resources section of Comprehensive Land Use Plans often includes policies related to watershed protection.

In addition to establishing goals and policies for the community, the Comprehensive Land Use Plan gives an opportunity to recommend changes to zoning practices. Communities may recommend floodplain overlay districts, conservation subdivision overlay districts, or other watershed protection requirements to be included in the zoning ordinance.

RESOURCES

Georgia Planning Water Toolkit: This toolkit includes a number of different planning tools and resources related to community water resources planning in Georgia.

The toolkit can be found at **http://www.georgiaplanning.com/watertoolkit/**

5.B.2 FUTURE-CONDITIONS FLOODPLAIN DELINEATION

ACTION ITEM

Delineate and map the 100-year future-conditions floodplain; update floodplain maps as conditions warrant.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☑ Other: Floodplain Administrator

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☑ Other: National Flood Insurance Act

OBJECTIVE

The objective of floodplain delineation and map maintenance is to minimize future flooding impacts by identifying areas of current and future flood risk and using this information for floodplain management through the development review process.

DESCRIPTION OF MEASURE

Delineation of 100-year future-conditions floodplains is required to support and administer the Metro Water District's *Floodplain Management / Flood Damage Prevention Ordinance* (Measure 5.A.2). Future-conditions flood studies are based on the best estimate of future land use conditions within a watershed.

Local jurisdictions are to delineate the future-conditions floodplains in their jurisdiction through modeling and mapping. All streams with a drainage area greater than 640 acres (one square mile) must have their future-conditions floodplain delineation completed by 2013. For streams with a drainage area between 100 acres and 640 acres, a local jurisdiction may elect to either delineate the floodplains, or adopt a piecemeal approach where individual parcels model their future-conditions floodplain as part of the development review process. Neighboring jurisdictions are encouraged to work together on future-conditions floodplain mapping, particularly for watersheds that cross jurisdictional boundaries.

Once local future-conditions floodplain maps are developed, local jurisdictions are required to utilize them in their development review process (see Measure 5.C.1).

SPECIFIC SUB-TASKS

Sub-Task	Description
Determine future-conditions floodplain mapping strategy	Outline a local approach and schedule for future-conditions floodplain modeling and mapping.
Delineation of the 100-year future-conditions floodplain	Complete future-conditions floodplain delineation as described below.
Regulate new developments and redevelopments to future-conditions flood maps	Revise local checklists and regulate to future-conditions maps (see Measure 5.C.1).

Sub-Task	Description
Update future-conditions floodplain maps as conditions warrant	Remodel and remap future-conditions floodplain maps if there is a significant change to the future land use projections within a watershed that would significantly impact future-conditions flood elevations.

IMPLEMENTATION GUIDANCE

This section outlines the key elements related to implementation of the floodplain delineation and map maintenance measure.

Future-Conditions Floodplain Mapping Requirements: Future-conditions floodplain delineation is required for all streams with drainage areas greater than 100 acres as follows:

- For streams with a drainage area of 640 acres (1 square mile) or greater, it is the responsibility of the local jurisdiction to establish future-condition floodplains through modeling and creation of future-floodplain maps. Local jurisdictions are expected to complete future-conditions floodplain delineation of these streams no later than 2013.
- For streams with drainage areas between 100 acres and 640 acres, the local jurisdiction can choose to either (1) delineate future-condition floodplains through modeling and mapping **-or-** (2) require future condition floodplains to be determined by developers on a per development basis as developments occur in these watersheds.

Note that the future-conditions floodplain maps developed under this measure are for local use only in administering their floodplain management ordinance. This is neither a FEMA requirement, nor will FEMA utilize a community's future-conditions flood maps for flood insurance purposes. However, a local jurisdiction may elect to use a FEMA-approved modeling process to update current base flood elevations 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.

Modeling Options: Hydraulic modeling, based on future–conditions hydrology, is used to establish future-conditions base flood elevations (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 jurisdiction, and may include a local jurisdiction's adopted future land use map, future-conditions zoning map, or watershed study projections.

Main-stem Chattahoochee and Etowah Rivers: 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.

OPTIONAL CONSIDERATIONS

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: detailed study, limited detail study, approximate study, or re-delineation of existing hazard information. The major difference between these engineering approaches is the quantity of data available:

- **Detailed Study** – A detailed study results in the delineation of floodplain boundaries for the 1% (base flood) and 0.2% annual chance storms. The 1% annual chance floodplain is mapped as Zone AE and the 0.2% annual chance floodplain is mapped as shaded Zone X. Base flood elevations 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 1% annual chance storm. It may be mapped on the FIRMs as Zone AE (with base flood elevations) or Zone A, depending on the preference of the State or local jurisdiction. However, the 1% 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 1% annual chance storm, but does not establish base flood elevations. 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 1% and 0.2% 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, Metro Water District local jurisdictions have wide latitude in the modeling and mapping approaches that can be utilized. However, the use of FEMA-approved methodologies are 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.

Substantially Developed Watersheds: For watersheds or sub-basins that are currently at full build-out, the 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 base flood elevations and floodplain delineations are accurate given existing and future buildout conditions.

Map Modernization Program: Map Modernization is a nationwide, five-year program to update the nation's Flood Insurance Rate Maps (FIRMs) being undertaken by FEMA. Georgia EPD is the Cooperating Technical Partner (CTP) 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, and at the most will incorporate completed studies into the updated maps. 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.

5.B.3 SANITARY SEWER AND SEPTIC SYSTEM COORDINATION

ACTION ITEM

Annual coordination between local jurisdictions, local wastewater providers and the County Board of Health on watershed challenges.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☑ Local Wastewater Provider
- ☑ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☑ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☑ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

OBJECTIVE

Address and coordinate watershed health concerns, related to sanitary sewer systems and septic systems.

DESCRIPTION OF MEASURE

At a minimum, annual planning and coordination is to occur among local jurisdictions, wastewater providers, and environmental health professionals on issues of concern to watershed health. Some communities may choose to meet more frequently, depending on their local watershed challenges.

Watershed health challenges may include:

- Water quality problems potentially caused by septic and/or sanitary sewer systems; or
- Proactive wastewater system and septic service area planning to support watershed protection.

Local jurisdictions, through the Long-term Wastewater Management Plan, are required to identify septic system critical areas and identify additional management requirements for septic systems in those areas. Measures to preserve future septic system operation in these areas and to remove failing systems from these critical areas are potential coordination topics for watershed professionals, wastewater providers, and environmental health professionals. Prevention of sanitary sewer overflows is also a potential coordination topic with local wastewater providers.

SPECIFIC SUB-TASKS

Sub-Task	Description
Annual coordination between local jurisdictions, wastewater service providers, and County Board of Health staff	Coordinate, at least once annually, between local staff, wastewater service providers, and County Board of Health staff on wastewater issues that may impact watershed health.

IMPLEMENTATION GUIDANCE

This section outlines the key elements related to implementation of the sanitary sewer and septic system coordination measure.

Annual Coordination: Documentation of annual coordination is not intended to be a burden to local jurisdictions. Any form of documentation of communication is consistent with the objective of this measure, including but not limited to: email, phone summary, meeting agenda, meeting summary, or fax transmittal.

Critical Areas Determination: Critical areas are those areas where the risks and/or potential impacts of septic system failures are higher. Each local jurisdiction must identify critical areas that are either current problems or could possibly cause problems in the future as required in Section 8 of the Long-term Wastewater Management Plan. In determining critical areas for septic systems the following areas will be considered:

- Septic systems in small drinking water supply watersheds;
- Septic systems found around lakes or other water features;
- Areas with high failure rates;
- Areas with limited soil conditions, rock, steep slopes, or high groundwater levels; and
- Other problem areas as defined by County Board of Health and/or local jurisdictions.

The identification of critical areas will be in coordination with the County Board of Health, local wastewater providers, and the Comprehensive Land Use Plan (see Measure 5.B.1).

OPTIONAL CONSIDERATIONS

Planning Challenges: Availability of water and sewer service influences growth patterns as development frequently follows infrastructure extensions. In particular, sewered areas allow higher density developments. The unavailability of sewer service also influences the need for septic systems and other onsite treatment systems. The Long-term Wastewater Management Plan requires septic system planning, including identification of where and under what conditions septic systems are appropriate considering long-term water quality and quantity concerns. Coordination of watershed planning and septic system planning with comprehensive land use planning can protect watershed health.

Watershed Conditions Assessments: Watershed monitoring results from Measure 5.F.1 may show areas that do not meet State standards for fecal coliform bacteria. Sampling data may be shared with the local wastewater providers and/or County Board of Health staff so that they can look for any potential bacteria sources such as sanitary sewer overflows or failed septic systems.

5.B.4 GREENSPACE AND GREEN INFRASTRUCTURE TOOLS FOR WATERSHED PROTECTION

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☑ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☑ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☑ Georgia Planning Act
- ☑ Safe Drinking Water Act
- ☐ Other: _____

ACTION ITEM

Implement one or more development and land use policies or practices which encourage the protection of greenspace and/or the use of green infrastructure within the community.

OBJECTIVE

Encourage and promote greener development for the purposes of watershed protection.

DESCRIPTION OF MEASURE

In addition to the comprehensive land use planning coordination to be undertaken in 5.B.1, there are a number of tools for local jurisdictions to directly address and mitigate the impact of future growth and development through the protection of greenspace and use of green infrastructure. The optional local measures in Section 6 include a number of methods for achieving the goal of protecting water resources through both land use planning and development policies.

Each city and county within the Metro Water District has its own unique set of attributes as well as watershed management challenges and opportunities, thus this measure allows local governments to select and implement a measure from a toolbox of possible options:

- **Conservation Subdivision / Open Space Development Ordinance** – Adoption of an ordinance or other local mechanism such as a zoning category or planned unit development (PUD) process to preserve open space and greenspace for watershed protection while accommodating development. More details can be found under Measure 6.A.3 in Section 6.
- **Greenspace / Green Infrastructure Plan** – Development and adoption of a formalized greenspace or green infrastructure plan for greenspace protection that prioritizes strategic greenspace acquisition activities by identifying key resources and critical habitats before they are developed. More details can be found under Measure 6.B.1 in Section 6.
- **Sustainable Growth Planning** – Development of a sustainable growth plan for the community to promote a compact, efficient, and environmentally sensitive pattern of development that influences travel, housing, and employment choices by directing new development away from rural or naturally sensitive areas and toward existing or planned activity centers and public facilities. More details can be found under Measure 6.B.2 in Section 6.
- **Evaluation of Local Codes for Green Infrastructure Practices** – Undertake a process to evaluate local building codes, ordinances, and other regulations and provisions to identify impediments and barriers to the use of the green infrastructure and greener approaches to

growth—including the use of infiltration, reuse and evapotranspiration - and the development site planning and design approaches described under Measure 6.B.3 in Section 6.

- **Locally Developed Program** – Other local management program for protecting watershed health through land use and/or growth management mechanisms.

SPECIFIC SUB-TASKS

Sub-Task	Description
Implementation of greenspace/green infrastructure option for watershed protection	Selection and implementation of one of the toolbox options for addressing growth management for the protection of water resources through encouraging the protection of open space, greenspace and the use of green infrastructure.

IMPLEMENTATION GUIDANCE

Local jurisdictions are required to implement at least one of the toolbox options listed above. See Section 6 for more information and details on several of these options.

5.C.1 INTEGRATED DEVELOPMENT REVIEW PROCESS

ACTION ITEM

Develop a site development plan review process and checklist(s) that lists stormwater and watershed management related requirements.

OBJECTIVE

An integrated site development plan review process consolidates watershed and stormwater-related regulations to assist a local jurisdiction in streamlining the development review process and help permit applicants to better understand the local requirements and expectations.

DESCRIPTION OF MEASURE

Several of the Local Management Measures in this Plan include development submittals that must be reviewed by the local jurisdiction or other issuing authority during the local plan review process, including:

- Post-development stormwater management plan (5.A.1);
- Floodplain management / flood damage prevention plan (5.A.2);
- Appropriate stream buffer protection areas, including local buffer requirements (5.A.3), and all state-mandated buffers for water supply watershed protection, river protection, and erosion and sedimentation control;
- Erosion and sedimentation control plan (5.C.3);
- Project compliance with the local comprehensive land use plan (5.B.1); and
- Local sanitary sewer or septic tank requirements (5.B.3).

The goal of an integrated review process is to help local jurisdictions streamline watershed and stormwater related regulations to provide for the efficient and timely review of development site plans and permit requests. In addition, an integrated review process and checklist will provide a clearer understanding of local permitting requirements and submittal expectations to the development community.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☑ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☑ Local Wastewater Provider
- ☑ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☑ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☑ Other: National Flood Insurance Act, Erosion and Sedimentation Control Act

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop a site development plan review process	Develop a process for reviewing local site development plans.
Develop a plan review checklist(s)	Ensure that all required elements of the plan review process are included in either one or more checklists.
Update checklist(s) as needed	Update and revise the checklist as needed to address new or updated regulatory requirements.

IMPLEMENTATION GUIDANCE

A number of local departments are traditionally involved in the site development plan review process; engineering, planning and zoning, public safety, public utilities, transportation, building services, licensing, environmental health, and parks and recreation.

A formal plan review process and checklist(s) for watershed and stormwater management compliance must include the staff members and/or department responsible for each review element/step and the order in which plans will be reviewed. Each local jurisdiction is required to develop an internal plan review checklist(s) appropriate for their local jurisdiction which includes all of the plan submittal requirements from the local management measures included in this Plan as well as any other local, State and Federal regulations and requirements, as appropriate.

OPTIONAL CONSIDERATIONS

Permit Coordination Alternatives: To facilitate the effective processing of applications, communities may want to consider the coordinated review processes outlined below.

- **One Stop Permit Shop**: Typically the one-stop permit shop concept co-locates all of the departments and agencies with input in the permit process in the same building to increase communications. Some one-stop communities will hold regularly scheduled meetings, allowing the development community access to representatives from each department.
- **Online Permit Tracking Systems**: Permit tracking links departments and agencies electronically through a common computer program and a common database to facilitate processing of applications for permits. The common tracking system allows agencies to freely share information and comments both with the other departments and agencies and with the developers.

Integrated development reviews are typically more efficient and provide a better opportunity to mitigate conflicting comments.

External Checklist: In addition to internal checklist, local jurisdictions may also develop an external checklist and instructions for the development community. This checklist can provide clarity on local permitting requirement and permit submittal expectations to parties engaged in land development activities. Communities may choose to post the checklist on the website and/or attach to permit application forms.

5.C.2 STORMWATER MANAGEMENT DESIGN CRITERIA AND STANDARDS

ACTION ITEM

Adopt the Georgia Stormwater Management Manual or an equivalent local design manual.

OBJECTIVE

The objective of stormwater management design criteria is to provide guidance to the development community related to the proper management of stormwater runoff to address the water quantity and quality impacts from new development and redevelopment projects.

DESCRIPTION OF MEASURE

As specified under Post-Development Stormwater Management Ordinance (see Measure 5.A.1), local jurisdictions are to adopt a local stormwater design manual, either the Georgia Stormwater Management Manual (GSMM) or an equivalent local design manual. The stormwater management design manual must include technical specifications and standards to ensure proper design and sizing of long-term (post-development) stormwater management non-structural and structural facilities and practices. Local jurisdictions are required to review stormwater management plan submittals for land development projects against their locally adopted design manual.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Adopt a Stormwater Management Technical Standard and Design Criteria Manual	Adopt either the Georgia Stormwater Management Manual or a local design manual that is as protective of water quality & quantity.
Revise Development (Site Plan) Review Process & Procedures	Make revisions to local processes and procedures to incorporate the model ordinance & design manual elements.

IMPLEMENTATION GUIDANCE

Georgia Stormwater Management Manual (Blue Book): The GSMM is used by most local jurisdictions in the Metro Water District as the local Stormwater Management Technical Standards and Design Criteria Manual. The Manual is available online for download at the GSMM website located at **http://www.georgiastormwater.com**

GSMM Addenda: The Georgia Stormwater Management Manual can be adopted "as is" by a local jurisdiction, or with a local addendum which may supplement or provide additional technical criteria, details, or guidance.

Stormwater Sizing Criteria: The Georgia Stormwater Management Manual includes a set of unified stormwater sizing criteria for sizing structural stormwater control and treatments facilities that are designed to protect water quality and mitigate water quantity impacts of new development and redevelopment projects. A local stormwater manual used in lieu of the GSMM must provide an equivalent level of stormwater control and treatment as outlined in Table 5-1 below.

TABLE 5-1
GSMM Stormwater Sizing Criteria for Stormwater Control and Mitigation

Sizing Criteria	Description
Water Quality	Treat the runoff from 85% of the storms that occur in an average year. For Georgia, this equates to providing water quality treatment for the runoff resulting from a rainfall depth of 1.2 inches. Reduce average annual post-development total suspended solids loadings by 80%.
Channel Protection	Provide extended detention of the 1-year storm event released over a period of 24 hours to reduce bankfull flows and protect downstream channels from erosive velocities and unstable conditions.
Overbank Flood Protection	Provide peak discharge control of the 25-year storm event such that the post-development peak rate does not exceed the pre-development rate, to reduce overbank flooding.
Extreme Flood Protection	Evaluate the effects of the 100-year storm on the stormwater management system, adjacent properties, and downstream facilities and properties. Manage the impacts of the extreme storm event through detention controls and/or floodplain management.

Taken from: Table 1.3.1-1 in the Georgia Stormwater Management Manual

Downstream Analysis: A downstream analysis is intended to protect downstream properties from flow increases due to upstream development activity. The "ten percent" rule establishes a zone of influence for stormwater runoff where the drainage area controlled by the detention or storage facility comprises 10% of the total drainage area. For example, if the structural control drains 10 acres, the zone of influence ends at the point where the total drainage area is 100 acres or greater. The downstream analysis is explained in detail in Section 2.1.9 of the GSMM.

Stormwater Credits: Several "better site design practices" are eligible for stormwater credits through the GSMM to incentivize use of certain non-structural practices that reduce the volume of stormwater runoff and minimize the pollutant loads from a site. The GSMM identifies conditions or circumstances under which the credits may be applied. There has been some misunderstanding on the proper application of site credits, so careful review of the descriptions in the GSMM during the site review process is recommended.

5.C.3 CONSTRUCTION EROSION AND SEDIMENT CONTROL

ACTION ITEM

Comply with the requirements of the Georgia Erosion and Sedimentation Control Act.

OBJECTIVE

The objective is to reduce soil erosion from active development sites and to enforce applicable erosion and sedimentation control provisions to reduce impacts to watershed health.

DESCRIPTION OF MEASURE

Georgia's Erosion and Sedimentation Control Act (ESCA) includes provisions to protect Georgia's waters from soil and erosion and sediment deposition. The Act requires permits for land-disturbing activities on sites 1.0 acres or larger as well as an approved erosion and sedimentation control plan for the activity. In addition, the 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.

Local jurisdictions with Local Issuing Authority (LIA) status are to review local land disturbance permits and enforce erosion and sedimentation control requirements at the local level, including:

- Educate applicants of the Notice of Intent (NOI) requirement under the NPDES Construction Permit;
- Collect the mandatory fee per disturbed acre (half of the fee stays with the LIA and half of the fee is sent to Georgia EPD to fund enforcement programs);
- Ensure that erosion and sedimentation control measures are properly designed, installed, and maintained;
- Verify that site personnel involved with the project are certified to perform land disturbance activities; and
- Identify deficiencies and take enforcement actions where necessary.

LIAs are audited periodically for compliance by the Georgia Soil and Water Conservation Commission (Georgia SWCC). Communities passing these local LIA audits are considered in compliance with this management measure (The most recent letter of compliance received from the Georgia SWCC is adequate to ensure compliance).

Local Implementation Responsibility

- ☐ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☑ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: Georgia Erosion and Sedimentation Control Act

Communities that are not LIA's must ensure that local public projects are properly permitted with the Georgia SWCC and Georgia EPD. Efforts will be employed to ensure that locally-funded projects comply with all erosion and sediment control requirements.

SPECIFIC SUB-TASKS

Sub-Task	Description
Perform local issuing authority requirements under Georgia ESCA (*if an LIA*)	Review erosion,sedimentation and pollution control (ES&PC) plans in compliance with Georgia ESCA.
If not an LIA--Review local government projects for compliance	Ensure local government projects comply with ESCA best practices.

IMPLEMENTATION GUIDANCE

Stream Determination Methodology: Under the Georgia Erosion and Sedimentation Control Act, local issuing authorities are required to make stream determinations on development sites to determine the type of stream, the buffer required, and whether a State variance is required for any buffer encroachment. Georgia EPD provides guidance on making stream determinations available on their website. In general, the guidance states that if base flows are present during the site inspection, the stream is either perennial or intermittent and will require a buffer. If the site is visited during a dry phase and base flows are not evident, the drainage may be ephemeral or intermittent. If there is no flowing water within 24 hours of a rain event, then the drainage feature is probably ephemeral. A trained professional familiar with stream determination methods will perform this investigation. It is recommended that determinations, once completed, be documented in writing.

For difficult stream determinations, the Georgia EPD protocols refer to the North Carolina Division of Water Quality Stream Identification Method (most current version), which includes greater detail on verifying the presence of baseflow. The North Carolina Identification Method has a more detailed process for identification of streams that may help make final determinations, especially for ephemeral streams in the Georgia Piedmont ecoregion.

Note that the Metro Water District model stream buffer protection ordinance (Appendix A.3) provides a rebuttable presumption that a stream is present on any drainage area of 25 acres or greater. This rebuttable presumption only applies to the wider Metro Water District buffers required under Measure 5.A.3. The guidance provided above must be used for the State buffers.

RESOURCES

Manual for Erosion and Sedimentation Control in Georgia (Green Book): This manual is available online for download and provides details on the proper design of erosion and sedimentation control methods. The Georgia Soil and Water Conservation Commission also publishes a plan review checklist related to erosion and sedimentation control requirements.

Both the Manual and checklist, as well as other resources, can be found at **http://gaswcc.georgia.gov**

Erosion and Sedimentation Control Training Courses: There are several organizations and groups that offer the state-mandated training and certifications courses on erosion and sedimentation control to professionals involved with land disturbance.

Field Guide for Determining the Presence of State Waters That Require a Buffer: This field guidance document is available on the Georgia EPD website.

North Carolina Division of Water Quality Identification Methods for the Origins of Intermittent and Perennial Streams: This manual for stream identification is available on the North Carolina Division of Water Quality website.

The website is located at **http://h2o.enr.state.nc.us/ncwetlands/intermittent_perennial.html**

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5.D.1 STORMWATER INFRASTRUCTURE INVENTORY

ACTION ITEM

Develop a stormwater infrastructure inventory of the local stormwater system.

OBJECTIVE

The objective of the stormwater infrastructure inventory is to assess the existing stormwater system to improve system management and maintenance as the first step of a defined asset management program.

DESCRIPTION OF MEASURE

A stormwater inventory identifies a community's stormwater system infrastructure along with attribute information for asset management purposes. An infrastructure inventory is the starting point in developing maintenance plans and schedules as well as assessing potential sources of pollution.

At a minimum, the inventory must include enough information to allow the local jurisdiction to locate individual structures, record inspection results, prioritize maintenance needs, and issue maintenance work orders.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☑ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☑ Other: GIS/Mapping Staff

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Establish data objectives and requirements, and the data collection schedule	Determine the community's long-term data needs and establish a required attribute list (not required if data collection is underway). Create a schedule for mapping if mapping is not completed.
Inventory and map public stormwater system	Map existing public stormwater system, at a minimum the map must include outfall locations.
Maintain data and update inventory as required	As new construction occurs add relevant information to the map; if existing outfalls/intakes are modified add relevant information to map.

IMPLEMENTATION GUIDANCE

The level of sophistication of the community's stormwater structure inventory may vary depending on the 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.

There are several methods for developing an infrastructure inventory. In smaller communities, the system may be mapped by walking from catch basins or other inlets to the outfalls, marking the location of each structure on a paper map. In some communities, development as-built drawings can be used to develop the inventory that may be updated based on field-verified location information. More comprehensive field surveys may use geographic positioning system (GPS) to gather the exact location of the infrastructure components and document asset attributes including digital photos.

Inventories are typically illustrated on a map linked to details of the assets, the level of detail and accuracy of which is dependent on a community's resources. A basic infrastructure inventory may be hand drawn on a local base map with accompanying paper records of system assets. A more advanced inventory would include all of the drainage system components (inlets, conveyance pipes, ditches and swales) in a Geographic Information System (GIS) spatial database linked to local maps with more detailed descriptions including material-type, elevation, and condition.

OPTIONAL CONSIDERATIONS

Pre-inventory Preparations: The collection of data for an infrastructure inventory can be a significant undertaking for local communities. Taking the time to properly prepare for data collection upfront can avoid the costly mistake of duplicating data collection later, either because only a portion of the needed data was collected or because field protocols were not clearly established.

Data Use Objectives: The level of detail of data collected will depend on the long-term local use of the data. Some communities may only use the maps to facilitate outfall inspections, therefore require minimal data collection. Some communities may choose to model the hydraulics of the existing drainage system and therefore will need much more detailed information. Communities developing an asset management-based inspection program will need to collect more than base level data, such as condition and criticality of the infrastructure components.

Inventory Elements: Stormwater system components that are commonly included in infrastructure inventories are listed below. Local knowledge of the stormwater system, system size, and available funding will determine the elements included in a local inventory (*note that outfall locations are required under the NPDES MS4 program*).

- Inlets
- Catch Basins
- Stormwater Drainage Pipes and Conveyances
- Swales and Drainage Ditches
- Culverts
- Outfalls
- Streams and Receiving Water Bodies
- Structural Stormwater Controls (Water Quality Treatment or Quantity Control)
- Headwalls
- Manholes
- Spillways
- Weirs
- Energy Dissipaters

Data Attributes: Some of the information often collected for stormwater inventories includes the following:

- Locations
- Elevations
- Contributing Drainage
- Receiving Drainage
- Outfalls
- Control Structures
- Age / History
- Condition Description / Rating
- Material Types
- Vegetative Species
- Ownership
- Maintenance Requirements
- Maintenance Responsibility
- Digital Photos

Database Development and Organization: Communities should create a database for attributes that will be captured during data collection. This database organization will establish the attribute, field name and data type. This step is very important for communities who may have multiple teams collecting data simultaneously, as the data will be integrated into one database.

Data Collection Methods: There are a number of different options for data collection. Some communities have purchased GPS equipment and completed the inventory with in-house GIS and survey staff or with college interns. Some communities have elected to hire private firms to collect the data. These decisions often are based on funding as well as the level of accuracy desired by the local jurisdiction. Communities with limited funding may also choose to digitize as-built plans or draw stormwater structures on paper maps.

Data Collection Guidelines: Written procedures for data collection will improve the consistency and accuracy of the collected data. Some communities have developed "picture cards" that clearly show the definition of different assets or provide guidelines for rating the condition of specific attributes.

Data Review: The collected data should be periodically inspected and reviewed for accuracy regardless of whether data is being collected by staff or a private firm.

Data Maintenance: Long-term data maintenance will require some staff time to update the inventory as new construction activity occurs and as existing structures are repaired or replaced. Communities may consider the cost of long-term data maintenance as a component of the annual operations and maintenance budget.

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5.D.2 EXTENT AND LEVEL OF SERVICE POLICY

ACTION ITEM

Develop a stormwater management Extent and Level of Service policy.

OBJECTIVE

Define the responsibilities of the local jurisdiction with respect to the stormwater management infrastructure within the community.

DESCRIPTION OF MEASURE

A local *extent of service* policy identifies the publicly-maintained and privately-maintained portions of the stormwater system. Stormwater infrastructure components can be owned, operated and/or maintained either publicly (i.e. by the local jurisdiction) or by private entities (e.g., businesses, land owners, home owner associations, etc). Therefore, after completing a stormwater inventory, the next step is to define the extent (or "where") of local government responsibility, also known as the extent of service. At a minimum, local jurisdictions are responsible for stormwater infrastructure located on locally-owned property. The right-of-way for state roads is maintained by the Georgia DOT.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☑ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☑ Other: GIS/Mapping Staff

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

A local jurisdiction must also determine the specific types and frequencies of operations and maintenance activities that will be provided for the various components of the stormwater infrastructure within the extent of service. A local *level of service* policy is defined as the types of services a community will provide to different parts of the stormwater system or by the specific condition of the system. By defining the maintenance tasks that the local jurisdiction will perform, it will be easier to identify those tasks and responsibilities that need to be addressed by other parties.

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop an EOS/LOS Policy	Develop a local extent of service policy which identifies the publicly-maintained and privately-maintained portions of the stormwater system, as well as a level of service policy which details the types of services a community will provide to different parts of the stormwater system or by the specific condition of the system.

IMPLEMENTATION GUIDANCE

Extent of Service Considerations: Communities are to carefully define their extent of service based on funding, staffing, extent of development, known issues with the stormwater system and/or receiving water quality and guidance from local legal counsel. Some of the key considerations include:

- **Public stormwater definition**: Many communities base their extent of service on the source of the stormwater. If the majority of the stormwater that is causing the problem is considered "public", or water flowing off public property or off of public roads, many local jurisdictions will maintain responsibility for the stormwater until it reaches an outfall or an open drainage easement. Case-by-case decisions are often made in cases where public and private stormwater is blended.
- **Public ownership/ easements**: Many communities look at the property owner and/or the presence of easements in determining the extent of service. Many communities will not perform work without a public easement allowing legal access for maintenance. Some communities require dedication of the easement and others only require the presence of the easement.

Level of Service: The level of service may be "activity-based" and depend on what services will be provided in each extent of service, such as shown in Table 5-2. 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 may also be a "goal-based" statement that relates to the functionality of the system. The following list shows examples of goal-based level of service statements:

- Reduce flooded properties by 10% of habitable structures in 5 years;
- Reduce the stormwater system blockages to less than one per mile of system;
- Minimize stormwater ponding on roads in urban areas for a given storm event frequency; and/or
- Improve water quality by completion of one watershed improvement project every 3 years.

TABLE 5-2
Stormwater Activity-based Level of Service Example

Asset	Inspect	Maintain	Enforce
Government-owned property	Yes	Yes	Yes
Private property with easement	Yes	No	Yes
Private property	No	No	Yes

OPTIONAL CONSIDERATIONS

Coordination with Stormwater Inventory Development: The extent and level of service (EOS/LOS) policies may be developed in conjunction with the stormwater infrastructure inventory discussed above, such that each structure has a corresponding EOS/LOS description. Alternatively, the policy may be a stand-alone document that describes the city or county's responsibilities for the overall system and serve as a public education resource.

Advanced Level of Service Policies: An advanced level of service policy sets performance goals for elements of the system. Comprehensive level of service policies also establish criteria for maintenance of the infrastructure to ensure the system functions properly. For example, within the right-of-way and in critical areas highly susceptible to flood damages, the maintenance level of service might include periodic inspection, priority cleaning and the highest level of emergency response. In similar right-of-way areas not susceptible to flooding, the level of service for maintenance might be much lower.

Public Education: It is recommended that each local jurisdiction have a clear written EOS/LOS policy easily available to the public, preferably on their city or county website. This will help to inform citizens and property owners of the local jurisdiction's responsibilities as well as their own responsibilities in maintaining a working stormwater management system.

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5.D.3 STORMWATER SYSTEM INSPECTIONS

ACTION ITEM

Develop a stormwater system inspection program that includes publicly-maintained infrastructure and private stormwater management practices with local maintenance agreements.

OBJECTIVE

The objective of the stormwater system inspections is to regularly evaluate the existing stormwater infrastructure and identify any areas needing repair, potential future stormwater problems, and any water quality concerns.

DESCRIPTION OF MEASURE

Stormwater inspections ensure that stormwater structural controls and infrastructure meet certain criteria and are functioning as designed and constructed.

The stormwater system components and geographic extent of the system to be inspected by the local jurisdiction are to be based on the local extent and level of service policy developed under Measure 5.D.2 and be tailored to address the operational characteristics of the system, including such factors as age, criticality, water quality issues, etc.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

At a minimum, the program must include publicly-owned structural controls and critical publicly-maintained drainage infrastructure.

All 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.

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop a local stormwater infrastructure inspection program	Based on the local extent and level of service policy, resources, and other considerations, develop a stormwater infrastructure inspection program.
Implement Inspections in Accordance with Established Program	Conduct inspections and schedule maintenance follow-up, as needed.

IMPLEMENTATION GUIDANCE

The intensity and frequency of the inspection program will vary among communities based on a number of factors, including the size of the community and storm sewer system, age of the system and constituent components, system criticality, staff availability, funding levels, and extent of ongoing issues. In addition, the intensity and frequency of inspections may vary from season to season or year-to-year, depending on the particular issues present for a community at any point in time. Many communities will integrate customer service requests into the scheduled inspections program.

Timing of routine inspections may be scheduled on a calendar basis or based on the criticality of the infrastructure. Visual inspections of the infrastructure will at a minimum include inspection of catch basins and other inlet structures for debris blockages and inspections of outfalls. Data collected during routine inspections can be used to update and expand the stormwater infrastructure inventory (see Measure 5.D.2) and GIS database, if available.

Structural stormwater controls constructed after local adoption of the post-development stormwater management ordinance (see Measure 5.A.1) will have ongoing maintenance agreements in place. Periodic inspection of these private structural controls can ensure the maintenance agreement is being followed. In areas with water quality or quantity challenges, local jurisdictions may choose to inspect other private structural controls (see Measure 6.D.3). Homeowners are often not aware of their maintenance responsibility for stormwater structures, so these structures are often not well maintained.

OPTIONAL CONSIDERATIONS

Criticality-Based Inspections Program: A criticality-based inspection program is an asset management approach that prioritizes the frequency of inspections based on the criticality that any system failure might have on the system. For example, a culvert collapse could have public safety, infrastructure, and flooding repercussions. Therefore regular inspections of culverts would be prioritized over inspection of catch basins in non-critical areas. This approach is often associated with water and wastewater infrastructure and is often selected because it tends to yield the most benefit for available funds.

5.D.4 STORMWATER MAINTENANCE PROGRAM

ACTION ITEM

Develop a stormwater system maintenance program.

OBJECTIVE

The objective of stormwater system maintenance is to ensure that the storm sewer system is functioning properly and can convey storm flows and/or reduce pollutants.

DESCRIPTION OF MEASURE

In order for stormwater infrastructure and structural stormwater controls to function as designed and constructed, these assets must be properly maintained.

The stormwater system components and geographic extent of the system to be maintained by the local jurisdiction are to be based on the local extent and level of service policy developed under Measure 5.D.2. The maintenance program must be tailored to address the operational characteristics of the system, including such factors as age, criticality, water quality issues, etc. The local jurisdiction is to have a process for tracking and prioritizing necessary stormwater system maintenance tasks.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

Maintenance activities should include a mix of both reactive maintenance to address issues based on inspections undertaken under Measure 5.D.3 and customer service calls, as well as preventative maintenance performed on a regular basis.

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop a maintenance program	Develop a maintenance program based on local priorities and funding.
Perform maintenance activities based on program	Undertake maintenance program activities based on local priorities and the established extent and level of service.

IMPLEMENTATION GUIDANCE

Reactive versus Preventative Maintenance: There are two kinds of maintenance activities: reactive and preventive.

Reactive maintenance is a response to a particular issue, such as a collapse of a stormwater pipe or a crushed catch basin, and can be more expensive to repair than proactive maintenance activities. Reactive maintenance will most often be determined by stormwater system inspections (see Measure 5.D.3) as well as customer service calls and requests to the local jurisdiction.

Preventive maintenance is intended to ensure that a stormwater system component or structural control is functioning as designed and constructed, as well as to minimize the need for major maintenance actions and capital projects by addressing smaller, critical issues on a regular basis. Typical preventive maintenance activities may include removal of sediment build-up in catch basins, removal of sediment from detention basins, vegetation maintenance, and street-sweeping.

Each jurisdiction will determine the most suitable blend of reactive and preventive maintenance regimes to enable the most effective and affordable lifecycle duration of the infrastructure.

OPTIONAL CONSIDERATIONS

Staff and Funding Considerations: Most communities employ stormwater maintenance staff to perform stormwater infrastructure maintenance tasks. If the community is small, the stormwater maintenance staff might consist of personnel shared with other municipal departments. Some maintenance activities may require outside contractors or professional services, particularly large repair actions; these projects may be identified as capital improvement projects if they are outside of the regular maintenance budget. For some communities, sediment removal from catch basins and detention ponds may also require hiring a contractor with specialized equipment, such as large excavation equipment or vacuum equipment. For larger communities, it may be more beneficial to purchase such equipment and obtain training on its operation, if these services are needed frequently.

Preventative Maintenance Activity Examples: Tasks and frequencies for preventative stormwater maintenance will vary greatly depending on the specific community and local resources. Typically, preventative maintenance is tied to specific maintenance goals as well as the jurisdiction's level of service policy. It is recommended that a local jurisdiction explicitly define these maintenance goals for both public and private systems.

Table 5-3 provides some example stormwater system maintenance activities, including tasks and frequencies. These are intended for illustration only and are not intended as specific requirements under this Plan.

TABLE 5-3
Example Preventative Stormwater Maintenance Activities

Facility	Tasks	Frequency
Culverts	Inspection/cleaning	Cleaned when 25% full of debris or greater
Manholes	Inspection/cleaning	Cleaned when 25% full of debris or greater
Catch basins	Inspection/cleaning	Cleaned when 33% full of debris or greater
Storm drainage pipes	Inspection/cleaning	Clean when 20% full or greater Inspect pipes greater than 30 years of age
Grassed swales, Channel conveyance	Mowing/ vegetative maintenance	Mow when grass is taller than 8-inches tall
	Debris removal	Clean when 25% full or greater
	Sediment removal	Frequency will depend on vegetation, storage capacity, recharge characteristics, sediment loading, and volume of inflow
	Inspection	Periodically, especially following periods of heavy runoff
Structural stormwater facilities		Follow the maintenance procedures in the Georgia Stormwater Management Manual
Natural Stream Channels	Inspection/cleaning	Remove woody debris and other blockages from bridges and where debris threatens public facilities
	Vegetation maintenance	Re-vegetate stream banks with native species through Watershed Improvement Plans

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5.D.5 CAPITAL IMPROVEMENT PLAN

ACTION ITEM

Develop a list of capital improvement projects to address stormwater infrastructure needs. The list may include watershed improvement projects.

OBJECTIVE

Identify and prioritize projects necessary to improve stormwater infrastructure to address drainage, flooding or water quality issues.

DESCRIPTION OF MEASURE

A Capital Improvement Plan (CIP) is composed of projects that exceed typical maintenance activities, internal capabilities of the stormwater personnel, and/or the typical operating budget. CIPs may include repairs or replacement of existing infrastructure, studies, design and construction of projects to address water quality or water quantity concerns. CIPs may also include identified Watershed Improvement Projects being performed under Measure 5.H.4, or the acquisition of greenspace, such as floodplains and wetlands. A quantitative ranking process should be developed to prioritize projects as funding permits.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☐ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

Each local jurisdiction is to appropriately define "capital improvement project" to conform to their jurisdiction's accounting practices, funding sources, and local needs. For example, some communities may consider only infrastructure projects as capital improvements, while others may include planning and studies under their definition.

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop List of Capital Improvement Projects	Identify desired capital improvement projects based on an infrastructure inventory, level of service goals, inspections, and known problems/issues.
Prioritize List	Create a method to rank projects in order of necessity and urgency based on cost and benefits, and apply method.
Update Capital Improvement Projects, as needed	Based on stormwater inspections and customer service requests, update the CIP list as needed.

OPTIONAL CONSIDERATIONS

Capital improvement projects may be prioritized based on a number of factors, such as:

- Cost/ benefit analysis
- Benefits to the natural environment
- Flood reduction or mitigation
- Severity and/or urgency of the problem
- Criticality of the infrastructure
- Impact of the problem on the overall storm drainage system
- Length of time the problem has existed
- Community-specific criteria.

Many communities will create a matrix that assigns a weight related to the importance of the above factors. Every project would then be rated for each factor. A total score that accounts for the individual scores and the weight assigned to the category would provide the basis for prioritization of projects.

5.E.1 POLLUTION PREVENTION / GOOD HOUSEKEEPING FOR LOCAL OPERATIONS

ACTION ITEM

Develop a pollution prevention and good housekeeping program for facilities and operations owned and/or operated by the local jurisdiction.

OBJECTIVE

The objective of a local pollution prevention and good housekeeping program is to take steps at public facilities to minimize nonpoint source and stormwater pollution.

DESCRIPTION OF MEASURE

Many types of public facilities, operations, and activities have the potential to introduce pollutants to the stormwater system. Nonpoint source pollution can occur during activities undertaken by local jurisdictions such as construction projects, landscaping, solid waste management, road maintenance, vehicle maintenance, stormwater infrastructure cleaning, and materials storage. Developing and implementing a local pollution prevention and good housekeeping program can reduce the potential for stormwater pollution, and ensure that a community keeps "its own house in order" to serve as an example to residents, businesses, industry and institutions.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☑ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☑ Local Water Provider
- ☑ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: Fire, Police, Sanitation, Parks & Recreation

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

A comprehensive pollution prevention and good housekeeping program for local operations includes a standard set of management measures and operating procedures for local government-owned or operated facilities and operations to ensure that a local jurisdiction's own operations are not contributing to water quality degradation. A key aspect of a pollution prevention and good housekeeping program is the training of local staff on these procedures and practices.

SPECIFIC SUB-TASKS

Sub-Task	Description
Identify local jurisdiction facilities and operations	Identify facilities owned by, and operations and activities undertaken by the local jurisdiction which have a potential to contribute to stormwater pollution and water quality degradation.
Develop pollution prevention and good housekeeping procedures and practices	Prepare appropriate procedures for the local facilities, operations and activities identified above which can reduce the potential for pollutants to enter the stormwater system.

Sub-Task	Description
Conduct training for local jurisdiction employees	Provide education and training to local employees on general and job-specific pollution prevention and good housekeeping procedures and practices as needed.

IMPLEMENTATION GUIDANCE

The U.S. EPA recommends that, at a minimum, local jurisdictions consider the following when developing their stormwater pollution prevention and good housekeeping program:

- Equipment and facility maintenance activities and schedules;
- Controls for reducing or eliminating the discharge of pollutants from:
    - Streets, roads, and highways (locally-maintained)
    - Municipal parking lots
    - Maintenance and storage yards
    - Fleet or maintenance shops with outdoor storage areas
    - Salt/sand storage locations and snow disposal areas operated by the municipality
    - Waste transfer stations
- Procedures for properly disposing of waste removed from the separate storm water sewers and areas listed above (such as dredge spoil, accumulated sediments, floatables, and other debris).

Industrial Stormwater Permits: Some local jurisdictions' facilities may be covered under the Industrial Stormwater NPDES permit and require a Stormwater Pollution Prevention Plan (SWPPP), similar to other commercial and industrial facilities. These facilities must have a Notice of Intent (NOI) filed with Georgia EPD to be covered under the general NPDES permit. Facilities that may be regulated under the NPDES Industrial Stormwater program include: wastewater treatment facilities, landfills, recycling facilities, fueling stations, and garages.

OPTIONAL CONSIDERATIONS

Stormwater Pollution Prevention and Good Housekeeping Examples: Table 5.4 provides some example "best" procedures and practices for local consideration.

Employee Training and Education: Employee engagement is an important component of municipal good housekeeping. Training and empowering staff to identify and correct or report potential pollution sources as part of their daily routine is a good first step. Training can include distribution of Standard Operating Procedure (SOPs), on-the-job training activities, formal training classes or conferences, or another form of employee education appropriate for the community.

TABLE 5-4
Example Pollution Prevention and Good Housekeeping Activities

General Local Practices

- Regular parking lot and street sweeping
- Proper storage and disposal of hazardous materials
- Minimization of pesticide and herbicide use
- Efficient landscape watering and selection of appropriate plant species
- Development of a recycling program to reduce trash volumes
- Proper management of runoff from landfills and/or transfer stations, including any necessary collection and treatment;
- Refueling and performing maintenance on municipal vehicles in designated, covered locations with an impervious surface
- Closely monitoring vehicles and equipment for leaks
- Prevent untreated vehicle washwater from entering the stormwater sewer system
- Disconnect any process system drains from the storm sewer system

Vehicle Fueling and Equipment Maintenance

- Regularly inspect fuel dispensing areas to look for spills and other potential pollution problems
- Periodic testing of above-ground tanks by a qualified professional
- Provide dry cleanup methods in fuel-dispensing areas
- Perform equipment maintenance in covered areas, where possible
- Minimize use of solvents and non-hazardous cleaners
- Perform vehicle and equipment washing in an area that drains to an oil-grit separator and in compliance with any water use restrictions

Roadway Maintenance

- Pave in dry weather only
- Stage road operations and maintenance activities to reduce spillage
- Clean fluid leaks or spills from paving equipment/ materials
- Restrict use of herbicide/ pesticide application on right-of-way vegetation
- Clean out bridge scuppers and consider retrofitting scuppers
- Vacuum bridge deck to remove debris prior to washing

Hazardous Material Storage

- Properly train personnel in hazardous substance management
- Properly store hazardous materials and provide secondary containment where needed
- Properly handle hazardous materials during all stages of development, use and disposal
- Cover or enclose material storage areas to reduce potential contact with stormwater and wind
- Retrofit existing hazardous material storage areas, giving priority to the most hazardous materials, to make sure there is no potential of release to the environment

5.E.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

ACTION ITEM

Develop a program to identify illicit discharges and illegal connections to the local storm sewer system.

OBJECTIVE

The objective of illicit discharge detection and elimination (IDDE) is to minimize pollution and the degradation of receiving waters from non-stormwater discharges, dumping, and improper connections to the stormwater system.

DESCRIPTION OF MEASURE

Local jurisdictions are to develop an illicit discharge detection and elimination program that best addresses their stormwater infrastructure and watershed conditions, water quality issues, and local 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 jurisdiction

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☑ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Develop a local IDDE program	Local jurisdictions may select one or more approaches for identifying and eliminating illicit discharge and illegal connections.

IMPLEMENTATION GUIDANCE

Local jurisdictions have the flexibility to develop their own illicit discharge detection and elimination program. Each community in the Metro Water District has a different balance between commercial, industrial and other land uses. Therefore, each community should develop a program that fits with the local land uses and water quality challenges.

Potential program elements may include one or more of the following approaches:

- **Dry Weather Outfall Screening –** Dry weather screening involves inspecting stormwater outfalls for flows during dry periods (when no stormwater runoff has occurred) which may indicate illicit discharges upstream of the outfall. Inspecting approximately 10% of stormwater outfalls annually is recommended for communities who only employ dry weather screening for their IDDE program. The recommended program may be adjusted based on screening results. A local jurisdiction may wish to focus on priority areas with a history of dry weather flows and/or illicit discharges, as well as outfalls draining to 303(d) listed waters. Priority areas may also include specific land uses (such as commercial/industrial areas), older portions of the community, or other local areas of concern. As outfall screening only reactively identifies an illicit discharge once it has occurred and reached a waterbody, communities are encourage to consider other IDDE program elements in lieu or in addition to this option.

  Specific guidance with approved procedures for performing dry weather screenings can be found in the most recent edition of the Metro Water District's Standards and Methodologies for Surface Water Monitoring.

- **Commercial and Industrial Inspections –** Inspecting certain commercial and industrial facilities can help to identify existing and potential illicit discharges and illegal connections. Facilities with a potential to cause stormwater pollution include; manufacturing facilities, industrial facilities, vehicle service facilities (may include auto parts stores), food service facilities, gas stations, and nurseries. Inspecting 5% of the identified commercial and industrial facilities annually is recommended for communities who employ commercial and industrial inspections as the only element of their IDDE program. Each community will develop a list of facilities that are considered potential pollutant sources and the inspection frequency. The inspection frequency may be based on site conditions such as; high facility personnel turnover, facility location to sensitive waterbodies, and high volume of potentially hazardous substances used on a regular basis.

  Local commercial and industrial site inspections typically include a tour of the facility and inspections of the grounds surrounding the building with a visual inspection of the site outfall locations that discharge either to the local stormwater system or to waters of the state. If deemed necessary, field testing, sample collection, and laboratory analysis of any flows may be performed. Site deficiencies identified during the inspection must be corrected and a follow up inspection performed to document site compliance.

- **Asset Management Inspections –** Inspections for IDDE may be performed in conjunction with stormwater system inspections performed under Measure 5.D.3. A local jurisdiction may opt to 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. As inspections take place throughout the community, it may be easier to identify and track the source of an illicit discharge. Inspecting 10% of the stormwater system annually is recommended for communities who will utilize asset management inspections as the only option for their IDDE program.

- **Stream Walks –** Routine stream walks can also be used to identify illicit discharges with the added benefit of greater understanding of local water resources. Some communities may elect to perform stream walks of 10% 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.

- Other Local IDDE Program Activities Developed by the Local Jurisdiction

Note: Each community is responsible for coordinating their IDDE program with NPDES MS4 permit requirements. Communities 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.

Addressing Illicit Discharges: If an illicit discharge is found by any of the methods above, an investigation of the drainage area upstream of the outfall should be performed to look for the source. Methods to identify sources include mapping evaluations, windshield surveys, stream walks, smoke testing, dye testing, CCTV, and septic system investigations. The appropriate investigation method(s) will depend on watershed and land use conditions, drainage system characteristics, available resources and the nature of the discharge and screening results.

RESOURCES

Center for Watershed Protection's Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, available from the Center for Watershed Protection website at **http://www.cwp.org**

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5.F.1 LONG-TERM AMBIENT TREND MONITORING

ACTION ITEM

Perform long-term ambient trend monitoring to track local watershed conditions and report the data annually to the Metro Water District.

OBJECTIVE

The objective of the water quality monitoring program is to provide comprehensive and consistent watershed-based water quality monitoring across the Metro Water District, and to consolidate data from the many current local long-term monitoring efforts to better assess water quality and watershed conditions, as well as to evaluate the effectiveness of watershed protection and management activities.

DESCRIPTION OF MEASURE

Monitoring for long-term ambient trends in water quality provides a means of demonstrating progress toward water quality goals as watershed management efforts are implemented. The objective of the long-term trend monitoring is to identify long-term trends in water quality and watershed conditions within the Metro Water District.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☑ Local Water Provider
- ☑ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☑ NPDES Wastewater/ Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☑ Safe Drinking Water Act
- ☐ Other: Georgia Erosion and Sedimentation Control Act

Local jurisdictions are to perform long-term ambient trend monitoring at permanent stream stations. Specific guidance on approved procedures and sampling methodologies for performing long-term ambient stream monitoring will either be outlined in the local Watershed Protection Plan approved by Georgia EPD or in the most recent Metro Water District's *Standards and Methodologies for Surface Water Monitoring*.

SPECIFIC SUB-TASKS

Sub-Task	Description
Evaluate long-term monitoring stations	Compare the number of existing long-term trend monitoring stations within the county to the required number in Table 5-5. Determine the location of additional stations, as needed.
Collect and analyze collected data	Collect and analyze data according to the local Watershed Protection Plan approved by Georgia EPD or the Metro Water District protocols.
Submit data to Metro Water District	Submit water quality data annually to the Metro Water District using the Georgia EPD Watershed Assessment Data Reporting template.

IMPLEMENTATION GUIDANCE

Long-term monitoring involves water quality sampling at permanent stream sampling stations. The long-term ambient trend monitoring within each county can follow the Georgia EPD monitoring requirements for an established and approved Watershed Protection Plan(s). *Those without an approved Watershed Protection Plan* or Watershed Monitoring Plan are to develop a monitoring plan which includes the following three components:

1. **Wet Weather Monitoring:** A minimum of three wet weather samples will be required during both the summer and winter seasons (May-October and November-April) – for a total of six wet weather samples annually.
2. **Dry Weather (Baseflow) Monitoring:** A minimum of one dry weather (baseflow) sample will be required during both the summer and winter seasons (May-October and November-April) – for a total of two samples annually.
3. **Bacteria monitoring:** A minimum of two geometric means of bacteria grab sampling for fecal coliform bacteria annually for the period of May to October.

Monitoring parameters, collection methods, sample handling, sample documentation procedures, and laboratory analysis methods may follow either the approved local Watershed Protection Plan or the Metro Water District's Standards and Methodologies document.

Number of Long-term Monitoring Stations: The number of required long-term trend stream monitoring stations is based on county population. One station is required per 50,000 persons (rounded to the nearest 50,000), as shown in Table 5-5.

Note that long-term trend monitoring is intended to be *county-based* under this Plan. Therefore, local jurisdictions in each Metro Water District county will need to coordinate in terms of local responsibility, financial obligations, and appropriate siting of monitoring stations for their county. In the event that communities within a county cannot agree on a monitoring program, each community will be responsible for the number of stations, rounded up to the nearest whole number, based on their community population. As each local jurisdiction and the unincorporated areas will round the population based sampling stations up to the nearest whole number, an increased number of stations will be required under this alternative.

TABLE 5-5
Long-term Trend Monitoring Stations based on Population

County	Population (2006)*	Number of Stations
Bartow	91,300	2
Cherokee	183,700	4
Clayton	266,400	5
Cobb	648,800	13
Coweta	107,300	2
DeKalb	704,900	14
Douglas	119,600	2
Fayette	102,600	2
Forsyth	151,000	3
Fulton (North)	310,041	6
Fulton (South)	152,706	3
City of Atlanta	450,560	9
Gwinnett	707,100	14
Hall	173,300	3
Henry	171,100	3
Paulding	121,500	2
Rockdale	80,300	2

* Population estimates from U.S. Census Bureau

Selecting Long-term Trend Monitoring Stations: Communities can use existing Watershed Protection Plan monitoring locations to meet the long-term trend monitoring station requirements in Table 5-5. If additional long-term trend monitoring stations are required, they may be selected to meet multiple requirements including TMDLs, or to track the impacts of specific land use categories on water quality.

When developing a county long-term trend monitoring site network, local jurisdictions should consider the following steps:

Step 1: Identify Watershed Protection Plan monitoring locations (if applicable).

Step 2: Identify any 303(d) listed waters to see if trend monitoring stations are applicable on 303(d) listed segments.

Step 3: Look at the local land use map to identify areas of changing land use that might be appropriate for long-term trend monitoring.

Step 4: Add additional sites as needed to provide good coverage of local conditions.

In selecting additional monitoring sites, local jurisdictions may consult the guidelines in the Metro Water District's Standards and Methodologies document.

Long-term Trend Monitoring Data Evaluation: Local jurisdictions are to track water quality data and annually look at water quality trends within the community. Several methodologies for the assessment of water quality monitoring data are outlined in the Metro Water District's *Standards and Methodologies for Surface Water Quality Monitoring* document. Local jurisdictions will also submit water quality data annually to the Metro Water District using the Georgia EPD Watershed Assessment Data Reporting template, available on the Georgia EPD website.

At a minimum, local jurisdictions must compare water quality data with State standards outlined in Table 5-6. Fecal coliform bacteria samples that are elevated may indicate a sanitary sewer overflow (SSO) or failed septic system. Documentation of these elevated occurrences of fecal coliform bacteria may be shared with the local wastewater provider and County Board of Health to identify potential leaks and failing septic systems, respectively (see Measure 5.B.3).

TABLE 5-6
Georgia EPD Water Quality Standards

Parameter	Designated Use	
	Drinking Water and Fishing	Recreation
Fecal Coliform Bacteria (geometric mean)	200 col./100 mL (May - Oct)[1]	200 col./100 mL[1]
	1,000 col./100 mL (Nov - Apr)[2]	
Dissolved Oxygen (daily average)	6.0 mg/L	6.0 mg/L
pH	6.0 - 8.5	6.0 - 8.5
Temperature	≤ 90° [4]	≤ 90° [4]

Notes:
1. Not to exceed value of 300 col/100mL for Lakes and Reservoirs and 500 col/100 mL for streams
2. Not to exceed value of 4,000 col/100mL
3. No sample may be less than 5.0 mg/L
4. Temperature increases may not exceed 5° for streams, 0°F for primary trout streams, 2°F for secondary trout streams

5.F.2 HABITAT AND BIOLOGICAL MONITORING

ACTION ITEM

Perform habitat and biological monitoring to track local watershed conditions.

OBJECTIVE

The objective of habitat and biological monitoring is to identify long-term trends in water quality and watershed conditions across the Metro Water District.

DESCRIPTION OF MEASURE

Biological monitoring is important for identifying trends in stream and watershed integrity. Biological monitoring includes both habitat assessments and benthic macroinvertebrates sampling. Specific guidance on approved procedures and sampling methodologies for performing biological monitoring will either be outlined in the local Watershed Protection Plan approved by Georgia EPD or in the most recent edition of the Metro Water District's *Standards and Methodologies for Surface Water Monitoring* for communities without a local Watershed Protection Plan or Watershed Monitoring Plan.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☑ NPDES Wastewater/ Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Collect and review data	Collect and analyze habitat and benthic macroinvertebrate data according to the local Watershed Protection Plan approved by Georgia EPD or the Metro Water District protocols.

IMPLEMENTATION GUIDANCE

Local jurisdictions with an approved Watershed Protection Plan (or an approved Watershed Monitoring Plan if the Watershed Protection Plan is not yet approved) will follow the biennial habitat and biological monitoring within the approved Watershed Protection Plan. Local jurisdictions that do not have an approved Watershed Protection Plan will perform biennial habitat and biological monitoring at the same number of stations as required for long-term ambient trend monitoring (see Table 5-5) and include the following components.

1. **Habitat Assessments**: Habitat assessments will be conducted following the latest Georgia EPD Standard Operating Procedure (SOP), which include an evaluation of the immediate watershed area, substrates (stream bed material), stream width, and general water quality conditions for riffle/run and glide/pool prevalent systems.

2. **Benthic Macroinvertebrate Sampling**: Benthic macroinvertebrate sampling will follow the latest Georgia EPD Standard Operating Procedure (SOP). The major habitat types (undercut banks, rocks, vegetation, sand, riffles, runs, and pools) at each site as well as the proportion of each habitat type sampled, will be recorded for each station. Samples will be preserved and sent to a laboratory for enumeration and identification.

   Benthic data will be analyzed based on assessment metrics, metric evaluation criteria, and scores for the Georgia Piedmont or Ridge and Valley ecoregion. The metrics include parameters such as:

   - Taxa richness
   - Ephemeroptera, Plecoptera, Trichoptera (EPT) Index
   - Indicator Assemblage Index (IAI)
   - Percent contribution of dominant taxon
   - North Carolina biotic index
   - Percent shredders
   - Total habitat score

5.G.1 LOCAL EDUCATION AND PUBLIC AWARENESS PROGRAM

ACTION ITEM

Develop a local education and public awareness program dealing with watershed protection, stormwater issues and the prevention of nonpoint source pollution.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/ Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

OBJECTIVE

The objective of local education programs is to achieve awareness of water resource protection issues with the goal of building public support for local actions and activities and well as changing behaviors that leads to the long-term protection of our water resources.

DESCRIPTION OF MEASURE

Involving the public in local watershed protection efforts is crucial because it promotes broader public support, helps create an ethic of stewardship and community service, and enables 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.

On a local level, Metro Water District communities are responsible for developing their own local education and public awareness programs to that help both individual citizens as well as business and organizations to become aware of their role in watershed protection. This includes general information on stormwater management and issues as well as ways to prevent common sources of nonpoint source pollution.

IMPLEMENTATION GUIDANCE

When developing a local education and public awareness program, communities are required to include both public education and outreach, as well as public involvement and participation activities. Public education and outreach program activities are designed to distribute education materials and message, and perform outreach to inform citizens and target audiences. Public participation and involvement activities provide opportunities for citizens to participate in programs and active implementation of watershed protection programs, such as Adopt-A-Stream training, watershed fairs, and storm drain stenciling. Public participation also includes citizen participation with local advisory groups on stormwater and watershed protection.

Communities in the Metro Water District are required to implement a minimum number of education and outreach, and public involvement/participation activities annually as part of their local education program as shown in Table 5-7. Table 5-8 provides some examples of activities that could be considered as public education/outreach versus public involvement and participation. These minimum education and outreach programs may be undertaken in coordination with other Metro Water District communities, local water/wastewater providers, or other public or private

entities such as Keep Georgia Beautiful affiliates. Additional guidance on education messages, key target group and education delivery techniques and resources available through the Metro Water District's Clean Water Campaign can be found in Section 8.

TABLE 5-7
Minimum Local Education Activity Requirements

Population	Education / Outreach Activities	Public Involvement / Participation Activities
≤ 50,000	2	2
> 50,000	3	3

TABLE 5-8
Example Activities

Education / Outreach Activities	Public Involvement / Participation Activities
Bill inserts or newsletters	Stream cleanup event
Brochures at local facilities	Stream monitoring program
Website with stormwater education information	Watershed festival
Local cable access programming	Roadside litter cleanup
Speakers bureau presentations	Storm drain stenciling
Kiosks and displays	Stormwater citizen advisory group
Press releases	Community cleanup event
Community workshops	Other innovative public involvement and participation program
School classroom education	
Other innovative education and outreach program	

Note: Each community is responsible for coordinating their education and public awareness program with NPDES MS4 permit requirements.

5.H.1 SOURCE WATER SUPPLY WATERSHED PROTECTION

ACTION ITEM

Undertake additional activities necessary to protect source water supply watersheds.

OBJECTIVE

The objective of this measure is to protect the water quality and viability of drinking water supplies from nonpoint source pollution that could compromise drinking water quality.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☑ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/ Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☑ Safe Drinking Water Act
- ☑ Other: Georgia Planning Act

DESCRIPTION OF MEASURE

The protection of source water (drinking water supply) watersheds is vitally important to the region, as almost all of the Metro Water District's public drinking water supply comes from surface water sources. Water quality degradation of these surface waters increases treatment costs and can potentially pose human health threats. Many of the Metro Water District's local management measures outlined in this Section advance the protection of drinking water sources, including; Stream Buffer Protection (5.A.3), Comprehensive Land Use Planning (5.B.1), Municipal Good Housekeeping (5.E.1), Illicit Discharge Detection (5.E.2), and Local Education Programs (5.G.1). In addition to these measures, local jurisdictions which have source water supply watersheds within their jurisdiction to undertake the following additional activities:

- Adopt drinking water supply watershed buffers as required by Part V Environmental Planning Criteria;
- Coordination between local jurisdictions and water providers on issues related to source water supply protection; and
- Develop and implement interjurisdictional agreements as necessary.

SPECIFIC SUB-TASKS

Sub-Task	Description
Identify water supply watersheds	Identify water supply watersheds within the jurisdiction as well as priority issues and areas for watershed protection actions.
Adopt Part V Environmental Planning Criteria	Local jurisdictions must adopt the Part V Environmental Planning Criteria including adoption of drinking water supply watershed buffers in local ordinances.

Sub-Task	Description
Coordination on watershed protection	Local jurisdictions must coordinate at least annually with water supply providers to discuss local issues and priorities for water supply watershed protection as well as other challenges.

IMPLEMENTATION GUIDANCE

Environmental Planning Criteria: The Part V Environmental Planning Criteria established by Georgia EPD and enforced by the Georgia Department of Community Affairs (DCA) include buffer and lake management requirements intended to protect drinking water supplies. Local jurisdictions must adopt the stream buffers and other measures in compliance with the environmental planning criteria. Communities which are in compliance with these environmental planning criteria are in compliance with this requirement. New water supply sources planned or recommended in the Water Supply and Water Conservation Management Plan must be protected as they are formalized.

Coordination with Water Supply Utilities: Annual coordination is required with all water suppliers with source water watersheds within the local jurisdiction to discuss any challenges or opportunities related to source water supply protection. Source water supply watershed challenges vary throughout the Metro Water District, therefore a one size-fits all solution is not advisable. Table 5-9 provides some common parameters of concern, possible sources, and possible actions to address these sources. These are guidelines and must be measured with local knowledge of source water and watershed conditions. Annual coordination meetings may include discussion of possible local actions based on the challenges and parameters of concern for the community.

Documentation of annual coordination is not intended to be a burden to local jurisdictions. Any form of documentation of communication is consistent with the objective of this measure, including but not limited to: email, phone summary, meeting agenda, meeting summary, or fax transmittal. Coordination requirements with water suppliers for small drinking water supply watersheds, include all upstream communities. For large drinking water supply watersheds, coordination requirements include all communities in the watershed within a seven-mile radius upstream of the intake location.

OPTIONAL CONSIDERATIONS

Management Measure Coordination: Local jurisdictions may consider prioritizing source water supply watershed protection through other local management measures. Under the TMDL program (Measure 5.H.2) and the Watershed Improvement Plans (Measure 5.H.4), communities may choose to prioritize projects in Source Water Supply Watersheds over projects in other areas, where practical.

Source Water Assessment Plans (SWAPs): SWAPs were completed for public water systems as required by the Safe Drinking Water Act. The 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. The SWAP plans may be a starting point for identification of potential parameters of concern.

Emergency Response Maps: Communities with source water supply watersheds and 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 that the intake(s) can be shut down until the threat of pollution had passed. This measure should be coordinated with the Water Supply and Water Conservation Management Plan and the local water providers. It is recommended that maps show the emergency contact information for the water plant(s) associated with each source water supply watershed and that maps be laminated for field use by emergency responders.

TABLE 5-9
Source Water Protection Concerns and Possible Actions

Parameters of Concern	Possible Sources of Pollution	Possible Actions
Excess chlorophyll a/ algae/ nutrients	Wastewater sources	Additional I/I program* Correct sanitary sewer overflows (SSOs)*
	Septic systems	Critical area septic programs*
	Fertilizer	Education (5.G.1)
Excess turbidity	Sediment	Watershed Improvements (5.H.4) Capital Improvement Projects (5.D.5) Enhanced E&SC enforcement (5.C.3) Street cleaning (6.E.1)
Fecal coliform bacteria	Wastewater sources	I/I and SSO programs*
	Septic systems	Septic system programs*
	Pet waste, wildlife, and agricultural sources	Stream walks (5.F.1) Pollution prevention (5.E.1-3) Pet waste programs (5.E.3)
Chemical pollution	Accidental spills	Emergency response maps
	Illicit discharge/ illegal connection	Pollution prevention (5.E.1-3)

* These measures relate to the Metro Water District Wastewater Management Plan

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5.H.2 TOTAL MAXIMUM DAILY LOAD (TMDL) MANAGEMENT

ACTION ITEMS

Develop a sampling program for assessing waterbodies that do not meet State water quality standards.

Participate in the development of TMDL implementation plans.

OBJECTIVE

Address water quality in waterbodies not meeting water quality standards for their designated use.

DESCRIPTION OF MEASURE

Federal law requires a TMDL be developed for all waterbodies not meeting their designated use. In Georgia, TMDLs for impaired waterbodies have, and will continue to be, prepared by Georgia EPD on a rotating river basin planning cycle. TMDLs are calculated as the sum of load allocations (non-point sources) plus the sum of wasteload allocations (point sources) with a margin of safety. This calculation represents the maximum level of a specific pollutant that the waterbody can accept and still achieve state water quality standards.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☐ Development/Site Planning Review
- ☐ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☑ Local Wastewater Provider
- ☑ County Board of Health
- ☐ Other: _____

Related Regulations

- ☑ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/ Georgia WPP
- ☑ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

TMDL implementation plans outline activities that can be undertaken by stakeholders within a watershed to address the water quality impairment. Non-point source pollution is the major cause of water quality impairment in the Metro Water District, and addressing these impairments will rely heavily on measures outlined in this Plan, and any additional best management practices put into action on a local level through the implementation plan. Copies of TMDLs and TMDL implementation plans for the Metro Water District impaired waterbodies can be found on the Georgia EPD website.

SPECIFIC SUB-TASKS

Sub-Task	Description
Evaluate existing impaired waters	Determine impaired waters from 303(d) list and review existing TMDLs and TMDL implementation plans.
Investigate potential pollutant sources	Develop a monitoring plan for 303(d) listed waters as required under existing permits and current TMDL implementation plans.
Participate in TMDL implementation plan process	Participate in the TMDL implementation plan preparation and revision process.

IMPLEMENTATION GUIDANCE

TMDL Monitoring Activities: Local jurisdictions are required to develop a strategy for assessing and improving water quality in streams with TMDLs. At a minimum, communities will develop a monitoring plan for assessments of streams with TMDLs. TMDL monitoring may 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 an approved SQAP plan. The TMDL monitoring plan may be integrated with long-term trend monitoring. Local jurisdictions must also identify stormwater outfalls that discharge to 303(d) listed waters. In coordination with the illicit discharge/ illegal connection management measure (see Measure 5.E.2) communities may prioritize dry weather screenings for these outfalls.

Participate in TMDL Implementation Plan Development: The Georgia EPD, and in some instances the EPA, is responsible for developing TMDLs for 303(d) listed impaired waterbodies in Georgia. Upon completion of a TMDL and with the State acting as lead, local jurisdiction are to participate in the development of an implementation plan for executing measures necessary to achieve required reductions in non-point source loads entering impaired waterbodies.

The TMDL implementation plans are intended to: verify significant sources of the pollutant of concern through local monitoring; determine management practices and activities required to attain the load allocations calculated in the TMDL; and, develop recommendations for future monitoring to assess responses to management. TMDL implementation plans should not be considered universal to multiple impaired waterbodies located within a single political jurisdiction. Rather, they must be tailored to the conditions, and pollutant(s) of concern, specific to each site. Table 5-10, provided as guidance, provides some common pollutants of concern, possible sources, and possible actions to address these sources that may be included in TMDL implementation plans.

When deciding how to allocate resources and time between multiple sites, where appropriate, local jurisdictions may elect to prioritize Watershed Improvement Projects (see Measure 5.H.4) on TMDL streams and prioritize TMDL projects that fall in drinking water supply watersheds (see Measure 5.H.1) or that benefit endangered and threatened species (see Measure 5.H.3).

Schedule for Preparation or Revision of Plans for the Metro Water District:

- Ocmulgee and Oconee – Fall 2008
- Chattahoochee and Flint – Fall 2009
- Coosa and Tallapoosa – Fall 2010

OPTIONAL CONSIDERATIONS

Sampling Quality Assurance Plan: Georgia EPD has developed a procedure for removing streams from the 303(d) list based on water quality monitoring that shows the stream is meeting state water quality standards and is no longer impaired. Local jurisdictions wishing to remove streams from the impaired waters list must first develop a local Sampling and Quality Assurance Plan (SQAP) for approval by Georgia EPD. Guidance on development of a SQAP is available on the Georgia EPD website

TABLE 5-10
Water Quality Parameters of Concern and Potential Actions

Parameter of Concern	Possible Sources of Pollution	Potential Actions
Fecal Coliform Bacteria	Wastewater sources	I/I and SSO programs*
	Septic systems	Septic system programs*
	Pet waste, wildlife and agricultural sources	Stream walks (5.F.1) Pollution prevention (5.E.1-3) Local education program (5.G.1) Pet waste programs (6.E.3) Livestock/ agricultural Practices (6.E.4)
Biota	Sediment	Watershed improvements (5.H.4) Capital improvement projects (5.D.5) E&SC enforcement (5.C.3) Stream crossing /culvert design (6.C.3) Street cleaning (6.E.1)
pH	Chemical pollution	Sample to confirm violation Pollution prevention (5.E.1-3)
Dissolved Oxygen	Chemical pollution Temperature (see below)	Sample to confirm violation Pollution Prevention (5.E.1-3)
Metals	Roadway runoff Industrial pollution	Street cleaning (6.E.1) Pollution prevention (5.E.1-3)
Temperature	Urban runoff Cooling water	Post-development stormwater (5.A.1) Regulated by the Georgia EPD
Chlorophyll a	Fertilizer (non-point sources)	Pollution prevention (5.E.1-3) Local education program (5.G.1)
	Fecal coliform bacteria	See fecal coliform bacteria (above)
	Atmospheric deposition	Pollution prevention (5.E.1-3)

*See Wastewater Management Plan

Note: Some additional stream impairments identified in the Metro Water District, including toxicity, fish consumption guidance, and commercial fishing bans are the result of legacy chemical problems, so site specific that general recommendations cannot be provided.

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5.H.3 ENDANGERED SPECIES PROTECTION

ACTION ITEM

Consider additional watershed measures to protect threatened and endangered species based on local conditions and needs.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/ Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☑ Other: Endangered Species Act

OBJECTIVE

The objective of this management measure is to protect threatened and endangered species.

DESCRIPTION OF MEASURE

Several protected aquatic species have been identified within the Metro Water District. Section 3 includes a summary of federal and state threatened and endangered species thought to be present within the Metro Water District's watersheds. The federal Endangered Species Act (ESA) prohibits any action that results in a "taking" (harassing, harming, or killing) of a listed species or adversely affects its habitat. An otherwise-lawful activity could result in an "incidental take" of a listed wildlife species, thereby requiring an incidental take permit from the U.S. Fish and Wildlife Service (FWS). Local jurisdictions should determine whether protected species are thought to reside in their watersheds and consult with the FWS and the Georgia Department of Natural Resources, and consider whether additional protection measures are needed.

SPECIFIC SUB-TASKS

Sub-Task	Description
Review available lists of endangered species	Review available lists of endangered species for your community.
Consider additional watershed measures to protect endangered species	Consider additional watershed protection measures or development standards as appropriate within the community to protect endangered species.

Several of the local management measures support the protection of watershed health and threatened and endangered species, including the post-development stormwater management ordinance (see Measure 5.A.1) and construction erosion and sedimentation control measure (Measure 5.C.3). Communities may need to implement additional watershed management measures to protect local endangered species. Optional local management measures that local jurisdictions may wish to consider include Greener Approaches to Growth (Measure 6.B.3), Clearing and/or Grading Limits (Measure 6.C.1), Steep Slopes Requirements (Measure 6.C.2), and Stream Crossing and Culvert Design Requirements (Measure 6.C.3).

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5.H.4 WATERSHED IMPROVEMENT PROJECTS

ACTION ITEM

Identify substantially-impacted watersheds and implement watershed improvement projects that address impacted areas.

OBJECTIVE

The objective of watershed improvement projects is to restore streams to meet designated uses, as well as improve impacted habitat conditions and flow regimes.

DESCRIPTION OF MEASURE

Watershed Improvement Projects (WIPs) are watershed-based projects that include physical improvements (i.e. structural measures, retrofits and/or restoration efforts) to address specific problems in the watershed including flooding, hydraulic capacity, streambank stability and erosion, degraded aquatic habitat, and impaired water quality. The objective of watershed improvement projects is to restore streams to meet designated uses, as well as improve impacted habitat conditions and flow regimes.

Plans for WIPs provide the following information; identification of the problems in the drainage basin or watershed; potential structural measures, infrastructure improvement, retrofits, and restoration efforts that will help address the problems identified; and project cost estimates and prioritization based on community-based criteria. The size and scale of watersheds or drainage areas for a WIP will depend heavily upon the attributes of the local jurisdiction (physical size, land use, etc.) and the local approach to watershed planning.

Local Implementation Responsibility

- ☑ Stormwater Management Staff
- ☐ Public Works
- ☑ Development/Site Planning Review
- ☑ Planning and Zoning
- ☐ City/ County Attorney
- ☐ Inspection Staff/Code Enforcement
- ☐ Local Water Provider
- ☐ Local Wastewater Provider
- ☐ County Board of Health
- ☐ Other: _____

Related Regulations

- ☐ NPDES MS4 (Phase I & II)
- ☐ NPDES Wastewater/ Georgia WPP
- ☐ TMDL
- ☐ NPDES Construction/ GESA
- ☐ Georgia Planning Act
- ☐ Safe Drinking Water Act
- ☐ Other: _____

SPECIFIC SUB-TASKS

Sub-Task	Description
Identify substantially-impacted watersheds	Based on local criteria and impaired streams, identify substantially-impacted watersheds.
Prioritize watersheds	Prioritize watersheds or retrofit and restoration alternatives.
Develop a local schedule	Develop a local schedule that provides for public review by 2009.
Prepare WIP plans	Design and prepare improvement projects.
Incorporate WIPs into CIP list	Incorporate WIPs into the local CIP list and construct WIPs as funding is available. The infrastructure inventory may need to be updated.
Re-evaluate program	Re-evaluate program to see if the project met the stated goals or if additional restoration is required.

IMPLEMENTATION GUIDANCE

Each local jurisdiction must identify the substantially-impacted watersheds within their community and prepare WIPs based on local needs and priorities. These impacted watersheds at a minimum include areas with water quality impairment including waterbodies on the 303(d) list and waterbodies with TMDLs. Local jurisdictions may choose to add watersheds with high levels of impervious area, areas with flooding problems, streambank erosion and sedimentation, aging or degraded infrastructure, or other aquatic habitat degradation. These watersheds may be prioritized and are intended to be flexible based on local community priorities. Streams listed for fecal coliform bacteria may be excluded from the list of substantially-impacted watersheds so long as they are addressed in a TMDL program (see Measure 5.H.2).

WIPs can include a number of different retrofit or restoration strategies based on the problems within the sub-watershed area. Retrofit measures can include modifying existing stormwater structures, such as detention/retention ponds, to provide water quality treatment and/or improve hydrologic function. Restoration measures can include stream restoration, wetland enhancements, re-planting riparian corridors and other projects to restore habitat and improve the hydrologic regime. Protection of sensitive resources can also be considered a watershed improvement project.

Due to the high cost associated with development and implementation of watershed improvement plans, this measure has a long-term and systematic approach. An adaptive management approach to restoration plans is recommended. Adjustments to local watershed improvement plans will be made regularly as new information is collected, data on restoration technologies become available, and new technologies emerge.

There are six steps for creating a Watershed Improvement Plan to address impacted water quality, as outlined below.

1. Identify the substantially-impacted watersheds within the community. At a minimum this includes all watersheds with a non-fecal coliform bacteria water quality impairment or TMDL. It may also include any area, stream reach, or water body with significant impacts such as:

   - Flooding and property damage
   - Streambank erosion and sedimentation
   - Aging/degraded stormwater infrastructure and/or hydraulic capacity issues
   - Aquatic habitat degradation
   - Fecal coliform bacteria impairment
   - High percentage of impervious area

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

   - Existing watershed studies prepared by a local jurisdiction, or regional, state or federal agency, including Watershed Assessment and Protection plans prepared for Georgia EPD under the NPDES regulations for surface water intakes and wastewater discharges
   - State 303(d)/305(b) designations of impaired waters

- State TMDL designations and local TMDL assessment and implementation plans
- Local stormwater management system and infrastructure inventories
- Stormwater or drainage system master plans
- Results of water quality monitoring activities, biological and habitat assessments, streamwalks, and other field work or data collection
- GIS and/or computer modeling analyses
- Drainage and stormwater 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.

2. Prioritize watersheds or specific areas of the community for developing WIPs based on locally-developed criteria or priorities. These criteria might 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
   - Other programs, activities or funding that would influence the implementation of watershed improvement projects
   - Provide for public review of prioritized watersheds, specific target areas, or projects by the public as appropriate.
3. Develop a local schedule for preparing WIP plans based on the prioritization completed above. The schedule will include all substantially-impacted watersheds in the community and provide specific planning horizon for completion of the WIP plans. The schedule for WIP planning is 2009.
4. Prepare designs for WIPs for each of the substantially-impacted watersheds in the community following the locally-developed schedule.
5. Each WIP plan will include the following elements, as necessary:
   - Introduction – Brief overview of the watershed being addressed, including watershed delineation and drainage area maps.
   - Problem Identification – Assessment of watershed impairments including flooding, bank/channel erosion and stability, hydraulic capacity, aquatic habitat/biological, and water quality. Field sampling, data collection and/or modeling may be used to evaluate existing or potential problems and impairments.
   - Mitigation / Improvement Projects – Potential structural measures, infrastructure improvements, retrofits, and restoration efforts that will help address the problems identified in the watershed. Include conceptual plans and/or designs with a level of detail sufficient to prepare planning level cost estimates. Modeling can be used to evaluate the potential projects to meet the proposed objectives.
   - Project Cost Estimates – Cost estimates for the potential projects.

- Project Ranking and Prioritization – Evaluation of the potential project based upon a set of criteria.
- Capital Improvement Plan – Final recommended list of watershed improvement projects which includes the rationale for inclusion, overall potential to address objectives, estimated project costs, funding potential and preliminary schedule for implementation.

6. Incorporate WIP capital improvements into the overall community capital improvement plan(s) and implement as funding permits.

Section 6: OPTIONAL LOCAL MANAGEMENT MEASURES

OVERVIEW

This Section describes optional management measures for local jurisdictions, and is intended to be a resource for additional watershed management efforts at the local level. These measures are *not* required and therefore, are not a component of the Georgia EPD audit process for compliance with the Metro Water District Plans.

The optional local management measures are organized into functional categories similar to the local management measures in Section 5. The optional measures include:

6.A. **Legal Authority** – Additional model ordinances and enforcement tools

- 6.A.1 – Local Environmental Judiciary
- 6.A.2 – Tree Protection Ordinance
- 6.A.3 – Conservation Subdivision/ Open Space Development Ordinance
- 6.A.4 – Stormwater Utility Ordinance
- 6.A.5 – Stormwater Enabling Legislation
- 6.A.6 – Pet Waste Ordinance

6.B. **Watershed Planning** – Additional community-wide planning tools at the watershed scale

- 6.B.1 – Greenspace Planning and Protection
- 6.B.2 – Sustainable Growth Planning
- 6.B.3 – Greener Approaches to Growth
- 6.B.4 – Wetland and Stream Restoration Mitigation Bank
- 6.B.5 – Stream Buffer Mapping and Map Maintenance
- 6.B.6 – Watershed-based Planning and Implementation Approaches

6.C. **Land Development** – Additional measures to address the site-level impacts of development projects

- 6.C.1 – Clearing and/or Grading Limits
- 6.C.2 – Steep Slopes Requirements
- 6.C.3 – Stream Crossing and Culvert Design Requirements

6.D. **Asset Management** – Additional tools for managing stormwater system assets

6.D.1 – Private Dam Inspection Program

6.D.2 – Computerized Maintenance Management System

6.D.3 – Private Stormwater System Inspections and Maintenance

6.D.4 – Electronic As-Built Submission Guidelines

6.E. **Pollution Prevention** – Additional pollution prevention measures

6.E.1 – Street and Parking Lot Cleaning

6.E.2 – Household Hazardous Waste Collection

6.E.3 – Pet Waste Program

6.E.4 – Livestock/Agricultural Practices

6.E.5 – Mobile Car Washing Policy

6.E.6 – Swimming Pool Discharge Permits

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6.A LEGAL AUTHORITY

6.A.1 LOCAL ENVIRONMENTAL JUDICIARY

To improve the enforcement of stormwater management and watershed protection regulations, communities may elect to establish a local environmental judiciary. A local environmental judiciary specializes in environmental cases, under which most stormwater management and watershed protection regulation violations and citations would be prosecuted. The authority for the environmental judiciary can be structured in one of the following methods:

- Create a separate court or court division to handle environmental cases
- Group environmental cases on one specific day of the week in an existing court, and/or assign these cases to judges familiar with these ordinances and regulations

In general terms, the steps to establish a local environmental judiciary might include:

- Determine the environmental/watershed ordinances to be heard by the environmental judiciary;
- Establish the formal organization for the court in coordination with the court solicitor;
- Determine additional funding needs, if any;
- Identify potential judges;
- Establish a system for channeling cases to the environmental court (day/time/location cases are heard);
- Train participants (judges, court recorder, clerk, attorneys); and
- Training on both the legal and technical aspects of watershed management and environmental concerns is recommended to improve consistent enforcement of local stormwater management and watershed protection regulations.

6.A.2 TREE PROTECTION ORDINANCE

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 shading of riparian habitats. Tree protection ordinances are one mechanism that a community can utilize to ensure that trees are preserved on land development projects.

An effective local tree protection ordinance should:

- Establish authority and specify the body responsible for administering the ordinance. The responsible entity may be staff, an appointed board, elected body, or a variation of all three.
- Provide the basis for the tree protection ordinance, especially as the stated purpose may vary based on community goals. The ordinance should link the requirements to stormwater mitigation, erosion prevention, water quality protection, water conservation, habitat function and protection, and avoidance of nuisance species.
- Include new development requirements for a tree plan and clear marking of “tree save” areas during construction.

- Establish a methodology for tree retention, whether it be based on preserving tree stands, tree canopy, specific tree species, or a combination of these methods.
- Specify that the preservation of trees and native vegetation should specifically count towards minimum landscaping requirements within the local zoning code.
- Include a list of recommended native tree species that encourage diversity and habitat throughout the jurisdiction.

The enforcement of tree protection ordinances is easier during construction as there are regular site visits by erosion and sedimentation control inspectors. Communities may choose to require a stormwater facility maintenance agreement for tracks of land conserved, especially if tree save areas are counted towards stormwater management requirements. The long term maintenance agreement will provide additional support to the protection and maintenance of these important natural resources.

6.A.3 CONSERVATION SUBDIVISION / OPEN SPACE DEVELOPMENT ORDINANCE

The goal of a Conservation Subdivision/Open Space Development ordinance is to preserve open space and greenspace for watershed protection and the nonstructural management of stormwater runoff while accommodating development projects. Conservation subdivisions provide for residential designs that preserve open spaces and can also be successfully applied to other zoning categories such as commercial, industrial and institutional land uses.

Conservation design seeks to facilitate development while still maintaining the most valuable natural features and functions of the site. Under a local conservation subdivision and open space development ordinance, a project must have a minimum restricted amount of open space that encompasses a certain portion of the gross tract area. Under a model ordinance, for example, conservation subdivisions could be required to have a minimum restricted open space that encompasses at least 40 percent of the gross tract area, which includes wetlands, stream buffers, and other sensitive areas. The number of lots that may be developed on the remaining property (for a residential subdivision) is determined through a calculation method or by preparing a yield plan that identifies the maximum number of lots for the property based on a conventional subdivision design.

The ordinance may specify how the open space may be used and identify ownership and management requirements for the open space. In addition, most conservation subdivision ordinances require a legal instrument for permanent protection of open space. For instance, conservation easements are often required for open space preserved through conservation subdivisions.

In some communities, conservation subdivision ordinances face opposition due to a perceived increase in the density of these subdivisions. To minimize density-related opposition, local communities may wish to:

- Require that the total number of units allowed under conservation subdivisions does not exceed the average density for surrounding areas
- Ensure that yield plans used to calculate the number of lots allowed under a conventional subdivision design account for areas such as streams, wetlands, and steep slopes that would not normally be developed
- Include provisions to allow developers to meet with surrounding communities to solicit input

- Encourage developers to place open space between existing neighborhoods and the conservation subdivision, if topography and site features allow

Most conservation design projects are approved through the Planned Unit Development (PUD) process. This method has both benefits and drawbacks as it allows for a Planning Commission to maintain close oversight of unconventional development projects, but is taxing for both developers and planning staff. Another route is to update local ordinances to allow conservation design by right. This strategy reduces approval time for the project. Additionally, it is important to ensure that site design standards, such as parking space requirements, street widths, and cul-de-sac dimensions, allow for environmentally-friendly alternatives.

Communities wishing to increase the use of conservation subdivisions may choose to offer incentives to developers, such as expedited plan review. Where politically viable, bonus lots or increased density for conservation subdivisions are attractive incentives to the development community. Communities may also offer reduced or no property tax assessments for the greenspace areas of conservation subdivisions. As the number of houses is identical to a traditional subdivision, the local government will still receive the appropriate tax revenue from a conservation subdivision.

A model conservation subdivision and open space development ordinance developed by the Metro Water District is available on the District website.

6.A.4 STORMWATER UTILITY ORDINANCE

A stormwater utility ordinance defines the basis and scope for a local stormwater utility and establishes the legal authority to collect fees for stormwater services. Within Georgia, the state Supreme Court has ruled that stormwater utility charges are an appropriate fee, not a tax. The ruling found a direct relationship between the stormwater utility service fee and legitimate government interest, as long as there is a correlation between the stormwater management program and the stormwater utility fee. A properly written and implemented stormwater utility ordinance can help protect a local community from legal challenges to its stormwater utility program.

Additional details on stormwater utilities and utility development are outlined in further detail in the funding discussion in Section 9 of this Plan.

6.A.5 STORMWATER AUTHORITY ENABLING LEGISLATION

A multi-jurisdictional or authority-led stormwater utility typically requires special enabling legislation through the Georgia General Assembly. Georgia statutes authorize the creation of a variety of special districts or authorities that are counted as separate government entities. Water and sewer authorities created to provide water supply or sewerage (or both) have been created by these special acts of the Georgia legislature.

Similarly, a multi-jurisdictional stormwater utility can be created through enabling legislation. In cases where an existing water and/or wastewater authority wishes to assume stormwater management responsibilities (such as Douglasville-Douglas County Water and Sewer Authority and Clayton County Water Authority), the Georgia Assembly must approve the changes to the Act that originally created the authority. In addition to enabling legislation, individual local governments under a multi-jurisdictional stormwater utility may still need to pass utility ordinances (measure 6.A.4) for their community.

6.A.6 PET WASTE ORDINANCE

Pet waste contains fecal coliform bacteria and is high in nutrients that can lead to algae growth in receiving waters. Pet waste ordinances, better known as "pooper scooper laws" require the immediate and proper disposal of pet waste, making it illegal to leave pet waste on any property, including private property. A pet waste ordinance can provide additional support to the local illicit discharge and illegal connection ordinance.

6.B WATERSHED PLANNING

6.B.1 GREENSPACE PLANNING AND PROTECTION

Greenspace includes open space and natural areas that have been preserved for a variety of reasons ranging from habitat preservation to recreation. Greenspace planning and protection provides a number of watershed management benefits including water supply watershed protection, floodplain management, wetlands protection, groundwater recharge, and riparian wildlife habitat.

Communities trying to encourage greenspace protection may choose to adopt a formalized green infrastructure plan. A formal green infrastructure plan creates a road map for greenspace protection and prioritizes strategic greenspace acquisition activities by identifying key resources and critical habitats before they are developed. Steps for communities to consider when creating a green infrastructure plan include:

- Consult with surrounding communities, state entities, and federal efforts to identify existing natural assets and linkages to existing greenspace;
- Identify "priority conservation areas" for the purposes of watershed protection, including but not limited to drinking water supply watershed critical areas, groundwater recharge areas, wetland habitats, steep slopes, and riparian buffer zones. The acting entity may want to target these areas for a conservation easement or acquisition before development as restoration is often more difficult;
- Map the formalized green infrastructure plan (including desired connections and future acquisitions) with Geographic Information Systems (GIS);
- Focus the green infrastructure plan on existing parks within a community, to serve as anchors for the green infrastructure network; and
- Coordinate with all relevant local departments on the green infrastructure plan to maximize opportunities for protection of priority conservation areas.

Some regional and state resources available to communities who are initiating a green infrastructure plan include:

Atlanta Regional Commission's Green Infrastructure Toolkit – This interactive toolkit provides information specific to Georgia on green infrastructure including successful tools and strategies.

Georgia Greenspace GIS Mapping for Priority Ecological Locations – The Georgia Institute of Technology at the Center for Geographic Information Systems provides GIS data sets for free. The program has identified, prioritized, and mapped locations of ecological importance within the region.

Georgia DNR Wildlife Comprehensive Wildlife Conservation Strategy – This program was developed by the Georgia DNR to identify, prioritize, and map critical habitats and locations for wildlife throughout the state. The program primarily focuses on wildlife, but is still useful for identifying critical wetland and riparian areas.

U.S. Environmental Protection Agency's (US EPA) Southeast Ecological Framework – The EPA has developed a GIS-based tool that maps the critically important ecological habitats in the southeastern United States.

Many communities in the Metro Water District have programs to acquire and protect greenspace. One of the biggest deterrents for communities trying to acquire greenspace is the large up-front cost and the prospect of slow return on the investment, given that funds generated by greenspace often are minor or non-existent. Alternatives to purchasing greenspace, or fee-simple ownership of greenspace, include conservation easements and transfer of development rights. All three acquisition techniques are outlined below, with an understanding that a blend of these techniques will probably be required in most communities.

Conservation Easements – Conservation easements involve acquisition of development rights by a local government or a non-profit entity such as a land trust. These can be volunteered by local land owners or mandated during the zoning and land development process. Typically, the maintenance responsibility stays with the property owner with opportunities for decreased property taxes. Conservation easements are often required for open space preserved through conservation subdivisions.

Fee-simple Ownership of Greenspace – The benefit of fee-simple ownership is that the local government owns the land and therefore it is permanently protected. Challenges of local government fee-simple ownership include the maintenance costs associated with land preserved in perpetuity. Fee-simple ownership is often used to protect drinking water supply reservoirs from future development.

Transfer of Development Rights (TDR) – TDRs protect certain areas from development without requiring major expenditures of public funds to purchase these lands. TDR programs allow land owners in certain protected areas ("sending" areas) to sell their development rights to be used or 'transferred' to support more intensive development in certain target areas ("receiving" areas). TDRs may be used to protect sensitive environmental resources, farmlands, or greenspace. The selling landowner must enter into a conservation easement permanently restricting development of the sending parcel. The Georgia DCA and the Georgia Quality Growth Partnership have developed resources for TDRs in Georgia.

6.B.2 SUSTAINABLE GROWTH PLANNING

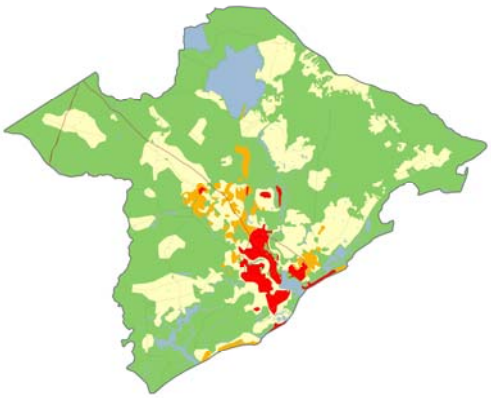
Local land use decisions have a significant influence on water management and protection, and local infrastructure needs. Planning entities including the Georgia Department of Community Affairs, the Atlanta Regional Commission, and the Georgia Quality Growth Partnership have led the way in promoting a more integrated approach to local land use decisions through the use of sustainable growth tools. Tools such as livable communities concepts have advanced efforts to guide development activity to desired growth areas.

Sustainable growth measures promote a compact, efficient, and environmentally sensitive pattern of development that influences travel, housing, and employment choices by directing new development away from rural or naturally sensitive areas and toward existing or planned activity centers and public facilities.

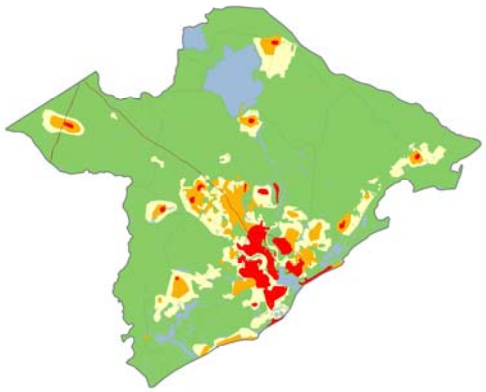
As part of watershed planning, communities may choose to designate target areas for growth based on the greenspace/sensitive lands targeted for preservation. Tools for sustainable growth planning may include establishing nodal development patterns, infill and redevelopment of city centers, and planning capital improvement projects for desired growth areas. Each of these planning concepts focuses growth on areas that can support the growth without impacting watershed health.

Development Node Planning – Scattered, low-density development tends to spread growth uniformly across the landscape, consuming more greenspace, eroding rural character and disrupting natural systems and habitat. A nodal pattern in contrast promotes more concentrated growth in areas suitable for development, such as land with limited environmental sensitivity, strong transportation and transit access, and proximity to existing infrastructure.

Nodal development can enhance the overall environmental quality of communities by accommodating the same level of activity in a smaller footprint, thus reducing the amount of land that is disturbed and eventually converted into impervious surfaces. More concentrated forms of development can also produce associated social and economic benefits related to more walkable, attractive, and vital settings. The graphic below demonstrates the ability of node-based planning to protect more open space by directing growth closer to established areas or within defined, denser cores.



Sprawl development



Nodal development

Infill and Redevelopment – Adopting infill development codes promotes a more efficient and intensive use of existing infrastructure and suburban/urban sites and thus reduces development pressure on greenfields. Redevelopment of brownfield and greyfield sites provides more efficient use of existing infrastructure and has economic development benefits.

Brownfields are abandoned or underutilized industrial and commercial facilities that have real or perceived environmental contamination. Greyfield developments are abandoned or underutilized properties, such as regional shopping malls and strip malls. Encouraging infill and redevelopment can maintain growth in areas that already have services (water, sewer, transportation) and revitalize underutilized areas of the city or county.

Capital Improvement Plans & Service Delivery Areas – A community's capital improvement plan (CIP) can be utilized as a valuable tool in sustainable growth planning. Beyond the stormwater CIP requirements in Measure 5.D.5, an expanded CIP and/or the creation of "service delivery areas" can help to prioritize public facilities and projects and guide infrastructure priorities across multiple departments to support community development goals and programs. Some potential uses and benefits of using CIPs and service delivery areas include:

- Directing growth towards the most suitable lands while discouraging growth on environmentally sensitive lands. By focusing public infrastructure dollars on areas targeted for development or redevelopment, local governments can promote development in these desired locations.
- Infrastructure extensions including water, sewer, and transportation are limited to the service delivery area plan to encourage denser development and infill in those areas that can support it versus facilitating sprawling development patterns.
- Interjurisdictional cooperation and coordination through agreements related to service delivery, zoning and infrastructure improvement.

Another related policy that local governments can consider is a "repair first" policy for infrastructure. A repair first policy ensures that existing residents benefit from the taxes they pay to maintain the quality and adequacy of their infrastructure before infrastructure is extended to benefit new development.

6.B.3 GREENER APPROACHES TO GROWTH

Stormwater better site design, sustainable site design, Low Impact Development (LID), and Green Infrastructure are overlapping approaches that seek to reduce the impact a development site has on a watershed by attempting to preserve the hydrologic functions of the site. 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.

Stormwater Better Site Design – Stormwater better site design, as outlined in the Georgia Stormwater Management Manual, is a set of site design techniques intended to reduce the environmental impact "footprint" of a land development project. These techniques include preserving natural features and resources, effectively laying out the site elements to reduce impact, reducing the amount of impervious surfaces, and utilizing natural features on the site for stormwater management.

Sustainable Site Design – Sustainable design attempts to reduce the amount of impervious area to minimize impact on native vegetation, and maintain recharge capacity. The management of stormwater is close to the source where it is generated with a strong emphasis on beneficial reuse where practicable. Sustainable site design provides multiple benefits for water quality, cooling, energy conservation, property enhancement and recreation.

Low Impact Development (LID) – The basic principle for LID sites is to model natural systems: manage rainfall at the source using uniformly distributed smaller stormwater management features at the lot level. LID's goal is to mimic a site's predevelopment hydrology as closely as possible. LID is a versatile approach that can be applied to new development, urban retrofits, and redevelopment/revitalization projects.

Green Infrastructure – Green infrastructure approaches focus on the capture, infiltration, evapotranspiration, and reuse of stormwater to maintain or restore the natural hydrology. Preservation and restoration of natural landscape features and more natural methods of stormwater conveyance and storage are important elements of green infrastructure.

A thorough review of local practices and policies to identify those that discourage stormwater-friendly design approaches may lead to a more sustainable local development practices. The Center for Watershed Protection has a list of 22 model development principles and conducts local Site Planning Roundtables that focus on identifying opportunities for local policy changes to protect watershed health. Communities interested in promoting sustainable growth concepts may choose to use this checklist and process to modify local development requirements.

In addition to reviewing the practices that discourage desired land use patterns, it may be beneficial to work with the development community to identify incentives, which may be helpful in some communities to increase interest from engineers, designers, and contractors in greener design approaches. Incentives might include expedited plan review, recognition as "green communities", provisions for infrastructure, financial/tax incentives, or bonus lots. In some areas, financial/tax incentives may already exist to encourage redevelopment activities for economic development purposes and could be modified to provide watershed protection benefits.

6.B.4 WETLAND AND STREAM RESTORATION MITIGATION BANK

Wetland mitigation and stream restoration are required by the U.S. Army Corps of Engineers (Corps) to offset impacts to wetlands and streams authorized under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The goal of restoration activities is to replace lost wetland functions which provide benefits including water quality protection, flood storage, fish and wildlife habitat, and groundwater recharge.

A mitigation bank may be set up for a wetland or stream that has been "restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. Wetlands or streams restored for a mitigation bank serve as credits that can be sold to permit applicants or used by the bank to offset other wetland and stream impacts.

The value of a mitigation bank is founded upon compensatory mitigation credits, which are credits available for sale. Based on an ecological assessment, the earned credits from each restoration project vary based on the ecological function provided by the project. Post-construction monitoring and maintenance is required to ensure the ecological functions have been replaced by the project.

Several jurisdictions in the Metro Water District have developed mitigation banks as a method of advancing watershed improvements. A jurisdiction may choose to identify impaired waters and complete restoration as part of their watershed improvement program. The sale of credits from the restoration project can then be used to fund additional restoration efforts.

6.B.5 STREAM BUFFER MAPPING AND MAP MAINTENANCE

There are a number of different stream buffer requirements that affect communities within the Metro Water District, including the Georgia Erosion and Sedimentation Control Act (ESCA) buffers for streams and trout streams, the small drinking water supply watershed buffer requirements under the Georgia Planning Act, the Metropolitan River Protection Act, and the Metro Water District's stream buffer protection ordinance. Communities may wish to create maps that clearly identify the appropriate stream buffers within their jurisdiction. It is recommended that these stream buffer maps be incorporated into the community's zoning maps and other community planning efforts wherever possible.

Local issuing authorities under the ESCA are responsible for making stream determinations for new development and re-development sites in order to determine the appropriate buffer widths, as discussed in Section 5 (measure 5.B.3). Developing a map of known streams and their associated stream buffers may help ensure that all local staff, the development community, and private citizens are aware of the stream buffer requirements. Local governments do have the responsibility for making stream determinations based on state guidelines for smaller, unmapped streams within their jurisdiction.

Communities should note on the map that additional streams and stream buffers may exist that are not indicated on the map. Communities may elect to color-code watersheds according to stream buffer requirements, to avoid confusion that the map does not show all streams with buffers within the jurisdiction.

6.B.6 WATERSHED-BASED PLANNING & IMPLEMENTATION PROGRAMS

Local stormwater programs and watershed management activities generally taken place within the political boundaries of a local jurisdiction, not within the overall context of a watershed. Some communities may elect to develop and implement watershed-based detailed investigations and implementation programs, either on their own or in conjunction with neighboring jurisdictions that share a watershed. For example, a jurisdiction may choose to perform their asset management, pollution prevention, and resource-specific management activities all within a specific watershed, which would rotate from watershed to watershed within the community on an annual basis.

6.C LAND DEVELOPMENT

6.C.1 CLEARING AND/OR GRADING LIMITS

Unnecessary clearing and grading of large areas of land often results in water quality and water quantity problems. There are a number of alternatives that local governments may consider to control the extent of clearing and grading associated with new development sites.

- Require fully-phased projects by establishing the maximum acreage of land that may be exposed to erosion and sedimentation at any given time. One phase must be completed and stabilized before clearing/grading the next phase.
- Limiting the area that a developer may clear and/or grade during construction to retain minimum lot coverage of native vegetation and topsoil, in addition to the required buffer zones adjacent to waterbodies and other sensitive resources.
- Only issue grading permits to sites with a proposed or approved grading plan, reducing the practice of clearing and grading properties to make sale more marketable.
- Limit initial clearing and grading to only road construction and utility installation until building permits are issued for individual residential lots.
- Delay construction activity for sites that have been commercially logged by establishing a wait time between logging activities and issuance of a land disturbance permit. These timelines are typically 2 years or greater.

6.C.2 STEEP SLOPES REQUIREMENTS

The threat of erosion and sedimentation increases as the slope of the land increases, especially if steep slopes are intended to be graded during construction. Several communities have initiated local requirements that restrict the development of steep slopes, requiring additional erosion and sedimentation control, or both to protect watershed health. Some requirements are based solely on the steepness of the slope while others are related to both the slope and proximity to streams. Examples for local governments in the Metro Water District to consider include:

- Prohibit development activity on all slopes greater than 40%;
- Require a steep slopes analysis for any development activity on slopes greater than 25% but less than 40% that outlines mitigation measure to prevent erosion;
- Require mitigation measures such as increased stream buffer width or additional erosion and sediment control measures; and
- Require a more detailed construction phasing plan that shows the installation of erosion and sediment control measures and adequate drainage measures during each phase of construction.

6.C.3 STREAM CROSSING AND CULVERT DESIGN REQUIREMENTS

Traditional pipe and box culvert stream crossings can cause negative impacts to fish migration and also may cause erosion upstream and sedimentation downstream of the crossing. To minimize the negative habitat impacts of traditional crossings, local governments may consider implementing a stream crossing and culvert design policy that is more stringent than the Corps requirements under Section 404 of the Clean Water Act for stream crossings.

A typical stream crossing and culvert design policy for fish migration and erosion prevention would provide for:

- Bridges (especially clear span bridges) which are the preferred option for stream crossings.
- Bottomless or embedded culverts which are preferred for smaller streams. Bottomless culverts (arch culverts) are essentially spans on top of poured-in-place footings with a natural surface bottom. Profiles may be arched, rectangular or round and materials may be corrugated metal, pre-cast concrete, cast-in-place concrete, or HDPE. Like a span bridge, bottomless culverts allow the stream to maintain its natural flow and sediment transport functions.
- Embedded culverts are closed bottom structures that consist typically of round or elliptical arch pipes with a simulated stream bed of natural stream bed materials. A round pipe in an embedded culvert will need to be larger to accommodate flood flows and to account for the sediment in the bottom of the pipe to simulate natural stream conditions. Current U.S. Fish and Wildlife Service's design manual does allow perched culverts when used in combination with embedded culverts.

Example requirements include:

- Bridges are required for any stream with a drainage area equal to or greater than 20 square-miles. Clear span bridges are the preferred option for smaller streams, but other alternatives will be acceptable if constructed according to specific guidelines.
- For streams smaller than 20 square-miles and greater than 0.2 square-miles in drainage area, bridges, bottomless culverts or embedded box or pipe culverts are recommended. It is preferable that box culverts be constructed using prefabricated materials to minimize the duration of in-stream construction activities. Single-barrel designs should be used whenever pipe culverts are used. Pipes are not acceptable for use in the design of multi-barrel culverts. Multi-barrel culverts should be designed using box culverts, and it is preferable that the center barrel(s) be made bottomless. Under no circumstances shall non-embedded or perched culverts (box or pipe) be used.

The U.S. Fish and Wildlife Service's stream crossing design manual for Georgia and additional information is available on their website:

http://www.fws.gov/athens/stream_crossing/index.htm

6.D ASSET MANAGEMENT

6.D.1 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. Since most local governments do not have staff certified in dam inspections, the inspections are focused on visual concerns. Features for the visual inspections may include:

- Upstream and downstream slopes for sinkholes or signs of erosion or seepage;
- Upstream and downstream slopes for vegetation, such as trees, that should be removed;
- Outlet structure for visible clogs or damage;
- Toe of slope for seepage and properly functioning toe drains;
- Primary spillway and settling basin for erosion or cracks depending on the dam type;
- Emergency spillway for obstructions or damage; and
- Outlet flow should be visible depending on the water level in the impoundment.

If the routine inspection uncovers any potential concerns, the private property owner should be instructed to hire a qualified dam engineer to perform a thorough assessment and correct any deficiencies. Before initiating a private dam inspection program, it is important to communicate the program goals with the legal department to ensure the proper enforcement mechanism exists for dams of concern.

A common maintenance concern with dams is the presence of trees and vegetation that compromise the structural integrity of dams. FEMA has published a Technical Manual for Dam Owners on the impacts of plants on earthen dams that is available for download on their website. This manual may help educate private dam owners on their responsibilities.

6.D.2 COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM

A computerized maintenance management system (CMMS) is a type of database-derived software that performs functions in support of management and tracking of operations and maintenance (O&M) activities. A CMMS may be a valuable tool to communities in the Metro Water District creating an asset management-based approach to infrastructure inspections and maintenance. The functionality of CMMS varies greatly, but some of the more common features include:

- Work order generation, prioritization, and tracking by equipment/component;
- Historical tracking of all work orders generated that can be sorted by equipment, date, person responding, etc;
- Tracking of scheduled and unscheduled maintenance activities;

- Storing of maintenance procedures as well as all warranty information by component;
- Storing of all technical documentation or procedures by component;
- Real-time reports of ongoing work activity;
- Calendar-based or criticality-based preventive maintenance work order generation;
- Capital and labor cost tracking by component as well as shortest, median, and longest times to close a work order by component;
- Complete parts and materials inventory control with automated reorder capability;
- Handheld device interface to streamline input and work order generation; and
- Outside service call/dispatch capabilities.

CMMS may be a valuable support tool when moving from a reactive to a proactive operations and maintenance (O&M) program. 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 differs greatly and many will integrate with an existing GIS platform. In some communities, it may be possible to share a CMMS system with the local wastewater provider.

6.D.3 PRIVATE STORMWATER SYSTEM INSPECTIONS AND MAINTENANCE

Local governments under the mandatory local management measures in Section 5 are responsible for developing a local inspections and maintenance program (Measures 5.D.3 and 5.D.4). Most communities 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 that are beyond the scope of the mandatory local management measures.

It is important to clarify that under the mandatory local management measure for local stormwater system inspections (Measure 5.D.3), communities must inspect private structural stormwater controls constructed since the adoption of their post-development stormwater management ordinance. These structural controls should have maintenance agreements filed with the local government and must be periodically inspected for compliance with the maintenance agreements.

Inspection of legacy stormwater controls is optional under the Watershed Management Plan, but may be helpful in areas with water quality or flooding challenges. The acceptance of maintenance responsibilities for private facilities should be outlined in the local extent of service/ level of service (EOS/LOS) policy (Measure 5.D.2).

Some local governments in the Metro Water District have agreed to accept maintenance responsibility for private detention ponds that meet certain minimum criteria. This program was 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. If a community elects to accept maintenance responsibility, it is recommended that the property owner perform any necessary remedial maintenance prior to deeding maintenance responsibility to the local government.

6.D.4 ELECTRONIC AS-BUILT SUBMISSION GUIDELINES

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 to allow seamless integration with the jurisdiction's local AutoCAD and/or GIS maps.

Submissions may be required in both paper and electronic format and may be requested through a secure website or other electronic media. Currently, most local governments must digitize all new development features based on the paper as-built drawings. Importing electronic as-built records can result in a significant time savings. Staff will need to check the detail and accuracy of the electronic submissions, including use of correct reference locations.

6.E POLLUTION PREVENTION

6.E.1 STREET AND PARKING LOT CLEANING

Street and parking lot cleaning programs can reduce nonpoint source pollutant loading to local waterways through the mechanical sweeping and vacuuming of roadway and parking lot debris using heavy equipment. Street sweeping and vacuuming helps proactively minimize water quality degradation of receiving waters by reducing the amount of sediment, metal particles, litter, paper, leaves and other debris discharged into urban waterways. Street and parking lot cleaning may also reduce localized flooding by removing vegetative and other debris that might otherwise clog the conveyance system during a storm event. Many communities in the Metro Water District have street cleaning programs for the aesthetic benefits of litter removal as well as water quality benefits.

Advances in street sweeping and vacuuming equipment have increased the ability to remove pollutants, especially finer sediment particles, from roadways. A recent Terrene Institute study concluded that new vacuum assisted dry street sweeper equipment may reduce annual sediment loading by 50-88% for residential streets depending on sweeping frequency. Regenerative-air sweepers, which blast air on to pavement surfaces to loosen particles to be vacuumed, have also proven to be effective for capturing fine sediment particles from roadways. Vacuum-assisted sweepers have additional benefits as they may also be used to clean clogged stormwater catch basins. Pressure washing or hosing down streets, parking lots, or sidewalks without a wash water collection system creates an illicit discharge and should not be performed.

6.E.2 HOUSEHOLD HAZARDOUS WASTE COLLECTION

A variety of hazardous and potentially harmful chemicals and materials are improperly used and disposed of by residential homeowners. Materials such as paints and thinners, cleaning products, wood preservatives, driveway sealants, and a variety of other miscellaneous household chemicals can enter stormwater if improperly used, stored, or disposed. Many household waste items pose potential water quality threats if disposed of improperly.

Local governments may choose to provide accessible recycling programs for hazardous/toxic household waste to assure proper disposal of these items. Several local governments have elected to hold household hazardous waste amnesty days with a great deal of success. The Georgia Pollution Prevention Assistance Division (P2AD) has information on proper disposal techniques for a number of household wastes on their website.

6.E.3 PET WASTE PROGRAM

When pet waste is not properly disposed, it can wash into nearby waterbodies or can be carried by runoff into storm drains. It is recommended that multi-family dwellings and high-density mixed-use developments be encouraged to participate in a voluntary program to install animal waste stations or “pet posts” for their residents. These stations provide plastic bags and instructions for disposing of pet wastes.

Pet-specific park areas are one way to involve neighborhood residents and community organizations to ensure that owners are picking up after their pets and properly disposing of the waste. It is recommended that new parks also have pet posts. As opportunities arise, existing recreational areas may be retrofitted with these structures.

6.E.4 LIVESTOCK / AGRICULTURAL PRACTICES

The primary function of an animal waste management system is to improve water quality by providing stormwater mitigation to store and handle livestock and poultry waste to minimize pollution and to provide information to producers about the value of keeping livestock out of streams. Collection and proper treatment of animal wastes, fertilizers, and pesticides can significantly reduce nutrient and bacteria runoff associated with confined or concentrated livestock feeding areas and cattle and chicken processing facilities.

As potential animal waste issues are identified through monitoring programs, local governments may encourage landowners to work with the local office of the Natural Resources Conservation Service (NRCS) to address these issues. Local governments with a significant level of agriculture/livestock operations may encourage periodic or ongoing interaction among farmers/operators and the local NRCS office to maintain effective and current BMPs for farming activities and livestock waste management. Grant programs may be available through the NRCS to implement best practices.

6.E.5 MOBILE CAR WASHING POLICY

Mobile car washing activities may be a concern to some jurisdictions in the Metro Water District due to the number of car washing charity events or entrepreneurs who set up mobile carwashes in uncontrolled environments. To mitigate the stormwater pollution effects from mobile car washing activities, some communities may elect to establish policies and permitting mechanisms for these activities.

Mobile car washing is distinct from commercial car washing activities in that cleaning is not conducted in a fixed location with drainage conveyed to the sanitary sewer system but rather in a variety of areas where the discharge is usually conveyed in to the storm sewer system.

Local governments may wish to regulate mobile car washing activities through permits to reduce the potential negative impact. The permit system may also be coordinated with outdoor watering restrictions to ensure all local rules are followed. Through the permit, local governments may require use of appropriate best management practices such as:

- Wash pads or absorbents to capture waste water from the washing activities;
- Washing vehicles on grassed or gravel (permeable) surfaces, not paved surfaces;
- Use of spill response kits to soak spilled chemicals or detergents;
- Use of biodegradable and non-toxic soaps and phosphorus-free detergents;
- Sealing or buffering storm sewer drains using absorbent booms near the wash activity so wastewater is not introduced into receiving streams but instead vacuumed up with a wet vacuum; and
- Routing flows to the sanitary sewer collection system.

Local governments may wish to implement outreach programs that could include the distribution of “water friendly” car wash kits to charity organizers or other operators of mobile car washing, as well as training and education videos and literature explaining the link between stormwater pollution and car washing activities. Alternatively, local governments that issue mobile car washing permits may choose to collect a fee from the mobile wash operator that could contribute funding to the jurisdiction’s watershed protection program, such as their watershed education campaign.

6.E.6 SWIMMING POOL DISCHARGE PERMITS

The discharge of swimming pool water often contains elevated levels of chlorine (approximately 2 to 4 parts per million of chlorine) and other chemicals used to reduce bacteria and algae and control pH. The average in-ground swimming pool has a capacity of about 20,000 gallons of water.

Public pools, including city/county-owned, hotel pools, and some residential neighborhood pools fall under the jurisdiction of the County Board of Health. However, there are no requirements that preclude a community in the Metro Water District implementing a permit requirement. Since 2000, all pools regulated by the County Board of Health are required to be connected to sanitary sewer or a septic system. Older pools and some residential pools may not be connected to sanitary sewer or a septic system, so may pose a risk to watershed health. Depending on the prevalence of pools and their age, local governments within the Metro Water District may choose to require swimming pool discharge permits as a mechanism to ensure that pools are emptied according to local requirements.

Discharging chlorinated pool water to stormwater drains can pollute receiving surface waters. The best methods for discharging pool water include discharging the water to the sanitary sewer or de-chlorinating pool water and then discharging it over a grassed or permeable area. Holding pool water in a pool for about a week after stopping chlorination practices allows the chlorine levels to break down due to sunlight exposure. Therefore, holding pool water before discharging the water on to permeable surfaces may be a desirable pollution prevention practice. Similarly, pH levels of pool water to be discharged onto pervious surfaces should be between 6.5 and 8.5. Discharge permits could require pool owners to obtain the chlorination and pH levels and ensure a proper discharge method to protect local waterbodies.

Section 7: STATE AND REGIONAL POLICY RECOMMENDATIONS

This Section focuses on state and regional policy recommendations to further implementation of watershed management and water resources protection in the Metro Water District. These recommendations are intended for state and regional agencies, and require no action on the part of local governments. Implementation of these policy recommendations are intended to advance the progress towards protecting and improving watershed health within the Metro Water District. The recommendations identify actions to be taken, the agency to lead the action, and the year for the action to begin is shown in parenthesis.

GEORGIA DEPARTMENT OF TRANSPORTATION NPDES MS4 COMPLIANCE

Water quality issues resulting from the significant amount of impervious surface associated with major roads across the Metro Water District can threaten watershed health. The Georgia Department of Transportation (GDOT) is responsible for the design, installation, and maintenance of state highways and roads. Currently, GDOT is exempt from applying for land disturbance permits (O.C.G.A. Section 12-7-17(a) (9)) for their construction projects. With this exemption, the primary regulatory authority for GDOT stormwater activities is the Georgia Water Quality Control Act and Phase II of the Municipal Separate Storm Sewer System (MS4) NPDES permit system, both enforced by Georgia EPD. GDOT is required to meet the same six minimum measures that local governments must address.

In some locations, existing GDOT-maintained roads were constructed without best management practices for water quantity and/or quality. Retrofit projects may be necessary to mitigate the impact of these impervious areas on local waterbodies, especially in drinking water supply watersheds and on impaired streams. GDOT should coordinate with local governments within the Metro Water District on individual watershed improvement projects.

The following recommendations should be considered by the GDOT and the Georgia EPD related to compliance with their NPDES Phase II permit:

- Georgia EPD should issue GDOT an NPDES MS4 Phase II permit that includes the six minimum measures. (2009)
- GDOT should develop road design standards that ensure post-construction stormwater controls are designed and developed to meet the same design criteria for stormwater management included in the Georgia Stormwater Management Manual and the Model Ordinance for Post-Development Stormwater Management. (2009 – 2012)
- GDOT should look at other State Transportation Departments, such as Caltrans in California for guidance on developing their MS4 Phase II permit. (2009 – 2010)

- GDOT should develop a capital improvement plan that includes stormwater retrofits to address areas where GDOT-maintained roads have impacted watershed health. Watershed improvement projects should be coordinated with the local governments both during design and construction. (2010 – 2014, and ongoing)

FERTILIZER NUTRIENT CONTENT

The composition and concentration of certain nutrients, principally nitrogen and phosphorus, in residential and commercial fertilizers can contribute to elevated amounts of these nutrients in stormwater runoff due to the amount of imperviousness and the high clay content of local soils.

Considering current water quality challenges in Lake Lanier and Allatoona Lake and the importance of these reservoirs as drinking water supply sources, additional research is needed on the potential impact of lawn fertilizer on water quality. Georgia EPD as part of the Comprehensive State-wide Water Management Plan will develop guidance for local government programs to manage fertilizer related to lawn use in watersheds where phosphorus loading is an issue. The Metro Water District should consider the benefits of these recommendations prior to conducting additional research or creating additional recommendations for future action.

BACTERIA STANDARDS AND GUIDANCE

Fecal coliform bacteria is the primary water quality parameter of concern in the Metro Water District as demonstrated by the 2008 Georgia 303(d) list of impaired waters. According to this list, over 1,100 miles of streams in the Metro Water District exceed the fecal coliform bacteria standard. Currently, the standard does not accurately reflect the potential for human illness based on contact with surface water. The standard also does not allow for natural background levels of bacteria found in some forested streams with only wildlife sources which are currently classified as impaired.

Studies have shown a stronger relationship between the presence of E. coli and the occurrence of human illness than between the presence of fecal coliform bacteria and human illness. Georgia EPD initiated actions to consider the use of E. coli as a bacteria standard and is currently awaiting EPA guidance documents for the monitoring of E. coli before continuing efforts to revise the bacteria standards. This standard may provide an appropriate measure of the potential health risk related to exposure to human-related waste products.

Current rules and regulation provide for a variation in fecal coliform standards if water quality and sanitary surveys show that fecal coliform from non-human sources exceed 200/100mL occasionally. The E. coli standard would provide another tool to determining the source of fecal coliform bacteria concerns.

The following recommendations should be considered by Georgia EPD related to the Metro Water District Watershed Management Plan:

- Review EPA guidance documents on monitoring when available.
- The Georgia EPD should allow local governments to remove streams from the 303(d) list of impaired waters if, through E. coli monitoring, it is proven that the source of impairment is natural wildlife sources. (2014)

COMPREHENSIVE LAND USE PLAN COORDINATION

Georgia Department of Community Affairs (Georgia DCA) is responsible for overseeing required Comprehensive Land Use Plans and implementation of Part V Environmental Planning Criteria under the Georgia Planning Act.

Georgia DCA currently reviews Comprehensive Land Use Plan for compliance with the Metro Water District Watershed Management Plan. The updated Watershed Management Plan includes new coordination actions for local governments related to watershed planning. For example, local governments are required to communicate annually with the local land use planning staff on watershed health issues (Measure 5.B.1). These requirements are important to protecting watershed health by avoiding problems that could occur due to future land use changes.

The Part V Environmental Planning Criteria include important protections for source water supply watersheds. These criteria were recently updated by Georgia DCA and Georgia EPD. Reviews of the Part V Environmental Planning Criteria will need to be more thorough as local governments have several options available for compliance with the updated criteria.

The following recommendations should be considered by Georgia DCA related to required Comprehensive Land Use Plan reviews:

- The new Comprehensive Land Use Plan review checklist should be updated as needed to reflect the updated Watershed Management Plan requirements. (2009)
- Require annual coordination between the land use planning staff and watershed management/ stormwater staff to mirror the requirement for this annual coordination in the Watershed Management Plan. (2010 and ongoing)
- Georgia DCA should communicate periodically with the Metro Water District staff on local implementation challenges that are shared by multiple communities so that staff may work through these challenges with the Technical Coordinating Committee (TCC). (2009 and ongoing)
- A thorough review of local ordinances during 10-year Comprehensive Land Use Plan updates should be accomplished to ensure that Part V drinking water supply watershed buffers have been adopted and are being implemented at a local level. (2009 and ongoing)
- Consider adding additional reviews of the Part V Environmental Planning Criteria implementation prior to issuance of grants or awards sponsored by Georgia DCA. (2010 and ongoing)
- Georgia DCA should discuss implementation challenges of the Part V Environmental Planning Criteria annually with Georgia EPD. (2010 and ongoing)

SEPTIC SYSTEM PLANNING AND COORDINATION

The Georgia Department of Human Resources (Georgia DHR) is responsible for setting standards for the installation of septic systems and post-construction inspections of septic systems. The Georgia DHR is also responsible for working with homeowners on addressing failed septic systems. As failure of septic systems can have an impact on watershed health, they play an important role in implementation of both the Long-term Wastewater Management Plan and the Watershed Management Plan.

The following recommendations should be considered by Georgia DHR:

- Environmental Health professionals should meet annually with local governments and local wastewater providers. (2009 and ongoing)
- Local governments under the Long-term Wastewater Management Plan are required to identify critical areas that may not be appropriate for septic systems or where additional management of septic systems is needed. Environmental Health professionals should work with the local jurisdictions to identify these critical areas and support the additional management measures that local jurisdictions require in these critical areas. (2009 and ongoing)
- Consider amending current law to allow establishment of maintenance requirements for non-mechanical wastewater systems (i.e. septic systems). (2009)

STREAMLINE REPORTING REQUIREMENTS

Georgia EPD oversees a number of permit programs, each with their own reporting cycle and reporting requirements. The reporting requirements for the NPDES permits, Metro Water District, State Water Plan, and Watershed Protection Plan programs managed by the State often overlap and require the same information to be reported to several different departments within Georgia EPD during different times of the year. Instead of focusing on addressing local watershed issues, local governments spend valuable time completing these reports. The Georgia EPD and the Metro Water District participated in the Georgia Association of Water Professionals (GAWP) committee focused on the streamlining of watershed and stormwater reporting requirements.

Meeting all of the programs' reporting requirements could be streamlined without changing the individual programs by aligning the reporting periods and establishing a web-based electronic data management center for long-term water quality results and annual reporting. Web-based data entry would allow Georgia EPD to query data submitted over several years and electronically search for key words. If implemented correctly the web-based reporting will simplify reporting procedures and decrease the amount of paperwork for both the local jurisdiction and the Georgia EPD.

The following recommendations should be considered by Georgia EPD related to streamlining existing reporting requirements related to the Watershed Management Plan:

- Develop an internal implementation team with community representatives to work towards implementation of the GAWP Streamlining Task Force recommendations. (2009 – 2010)
- Update reporting timelines for interested communities so that their reports have the same reporting cycle to reduce challenges of streamlined reporting. (2009)
- Assess the viability of a web-based electronic data management center that would accept and store data related to reporting requirements. (2010)

GEORGIA STORMWATER MANAGEMENT MANUAL

The objective of the Georgia Stormwater Management Manual is to provide guidance on addressing post-construction stormwater runoff. The goal is to provide an effective tool for use by local governments and the development community to reduce both stormwater quality and quantity impacts, and protect downstream areas and receiving waters. The Manual was first published in 2001 and should be updated to include additional best management practices for addressing stormwater.

The Atlanta Regional Commission (ARC) has received a 319(h) grant from Georgia EPD for the creation of Volume 3 of the Georgia Stormwater Management Manual on Pollution Prevention. This manual will provide a resource for communities implementing the pollution prevention requirements of this Watershed Management Plan as well as NPDES MS4 permit requirements.

The following recommendations should be considered:

- ARC should update Volume 2 of the Georgia Stormwater Management Manual (Technical Handbook). Additional stormwater controls for consideration may include: greenroofs, tree planter boxes, rain gardens and cisterns. Consider additional/revised design variants for stormwater controls already in the Manual as well as additional guidance on downstream analysis requirements. (2009 – 2011)
- ARC and the Metro Water District should coordinate training classes on the Georgia Stormwater Management Manual as needed with organizations such as the Georgia Association of Water Professionals (GAWP). (2009 and ongoing)
- ARC should complete Volume 3 of the Georgia Stormwater Management Manual (Pollution Prevention Guidebook). (2009)
- Conduct training, as needed, with the communities in the Metro Water District on use and applicability of Volume 3 when completed. (2009 – 2012)

WATERSHED MANAGEMENT PROGRAM EVALUATION

The Metro Water District should work through the Technical Coordinating Committee (TCC), and if necessary, a sub-committee of the TCC to discuss options for measuring progress to improve the Metro Water District annual progress reports. Metro Water District staff should facilitate discussions to establish additional methodologies for measuring progress of the Watershed Management Program (2009 – 2011).

REGIONAL MONITORING NETWORK

Monitoring efforts--a particularly those on inter-jurisdictional water bodies and main-stem rivers--can expand the assessment of the Watershed Management Plan and implementation efforts across the Metro Water District.

The Metro Water District should explore leveraging existing real-time flow and water quality monitoring data currently performed by USGS and other entities within the region. The Metro Water District should also consider using USGS or other entity to perform more detailed analysis of the monitoring data to determine linkages between watershed conditions and the water quantity and quality data. As funding permits, the Metro Water District may consider supplementing the existing monitoring stations with additional stations and/or adding equipment to existing stations.

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Section 8: EDUCATION AND PUBLIC AWARENESS

INTRODUCTION

Education and public awareness is essential to effective water resources management. The 2003 Watershed Management Plan developed an education and public awareness program that has made significant progress in reaching the Metro Water District population with its messages on stormwater, non-point source pollution and watershed protection over the last five years.

The Metro Water District education and public awareness program is specifically designed to:

- Raise public awareness of water issues and needs to foster support for solutions;
- Educate the public and other identified target groups in order to increase awareness and encourage behavioral changes; and
- Coordinate with other public as well as private entities to maximize the visibility of the Metro Water District and its messages.

The Metro Water District education and public awareness program is comprised of two elements: a regional program managed by the Metro Water District staff; and education activities undertaken by local governments. The Metro Water District provides a regional education and public awareness program through the Clean Water Campaign. The Clean Water Campaign works through the Education TCC to expand upon the key watershed management themes identified in this plan and develop mass media content and educational tools. The local government's role in the education and public awareness program is to reach out to specific groups in their community, provide education materials and share knowledge of subject matters with the public through specific education and outreach activities. Without local implementation of the education program the full potential of this plan cannot be realized.

The following pages outline the key messages, the identified targeted audiences and the various delivery techniques. This is followed by an overview of the Metro Water District's regional education and public awareness program and activities. The final part of this section includes the local education and public awareness requirements.

EDUCATION AND PUBLIC AWARENESS APPROACH

WATERSHED MESSAGES

The Metro Water District along with the Watershed TCC has created central messages, identified below, for both the regional and local watershed management education and public awareness program:

- Everything we do, where we work, live or play can impact our water resources
- We are all part of the solution to stormwater pollution
- Clean water for drinking, recreation and economic benefits need to be protected for future generations

- Watershed stewardship: It is the responsibility of everyone to protect our water resources
- We all live downstream

TARGET AUDIENCES

Identifying stakeholders helps in tailoring messages and education materials. While regional watershed messages will be consistent, specific information may be more applicable to certain audiences. The Metro Water District has identified the appropriate target audiences for the Watershed Management Plan in Table 8-1.

TABLE 8-1

Education Focus for Target Audience

Target Audience	Education Focus
General Public	Basic concepts of stormwater runoff and non-point source pollution including how their actions on the local level can impact water quality.
Students / Schools	General knowledge about water pollution and prevention. Work with school systems to incorporate water pollution prevention lesson plans into current curriculum. Getting these messages to students through educators is important in protecting our future water quality.
Homeowners / Urban Agriculture / Golf Courses	Proper fertilizer and pesticide use on gardens and landscapes and proper disposal of grass clippings and leaves in order to protect nearby water sources. Use of low impact practices, such as rain gardens, to mitigate runoff.
Auto / Body Shop Owners	Proper disposal, cleanup and recycle methods of auto fluids and parts to prevent water pollution.
Builders / Developers / Design Professionals	Best management practices on proper disposal of construction materials, erosion and sedimentation control, low impact development and buffer protection.
Restaurant / Food Service / Hospitality	Proper disposal of cleaning supplies, trash, fats, oils and greases.
Heavy / Light Industrial	Best management practices for water pollution prevention.
Water Professionals	Metro Water District Watershed Management Plan goals and requirements.
Local Government Staff	Educate local government staff such as D.O.T, parks and recreation, code enforcement, planning and zoning, etc. on best management practices that affect water quality.
Local Elected Officials / Governing Boards	Importance of promoting and sufficiently funding the implementation of best management practices in order to protect local watersheds.

DELIVERY TECHNIQUES

There are a number of ways to reach target audiences in a public education effort both at a local and regional level. Some examples of these delivery methods are outlined below.

Internet

- **Website** – An internet site or page can provide an inexpensive way to foster awareness and education of stormwater management and watershed protection issues at the community or regional level. A website can also serve as an information clearinghouse for other educational materials, and provide resources and additional links for target groups such as the general public, the development communities, and various industries.
- **Email** – Email newsletters can provide information on upcoming outreach events as well as tips on nonpoint source pollution control for targeted audiences and the general public. Email is often the least expensive way to reach a larger number of individuals and entities.
- **Streaming media** – Tools such as streaming audio and video, webcasts, online training workshops, and other interactive electronic media tools can provide additional opportunities for reaching target audiences.

Printed Materials

- **Brochures & Fact Sheets** – Brochures, fact sheets and other literature can be for general information or provide messages and tips specific to a particular topic or target group. Printed materials often complement other education and public awareness activities such as public outreach events, workshops, and on-site inspections of businesses.
- **Bill Inserts** – Printed materials can be designed to accompany utility bills or other correspondence to local citizens and businesses. Inserts can include brochures, newsletters, tips on best management practices and events notices. Bill inserts are an excellent way to distribute educational materials without additional postage expenses.
- **CD / DVDs and DVD-ROMs** are mediums for providing interactive educational material and are especially well-suited for youth and classroom education. In addition, video DVD's can be used to distribute content such as public service announcements (PSAs), video programs, and instructional/training videos.
- **Posters** – Wall posters provide a great deal of information quickly to the target audience at a stationary location and can be displayed at locations such as libraries, schools, and other public locations.

Mass Media

- **Press Relations** – Both local communities and the Metro Water District can work with the media to ensure coverage of stormwater and watershed protection issues and activities. This can include both articles and events listings in general circulation newspapers, specialty papers, and regional magazines; radio and television interviews; features on radio and television news and public affairs programming; and coverage of events such as watershed fairs and stream cleanups.
- **Television Public Service Announcements** – Television advertising using PSAs provide an immediate impact with a visual message. Broadcast channels reach a wide audience but are high-priced. Cable television offers local communities the ability to target their citizens and even tailor advertising to specific channels and audiences.

- **Radio Public Service Announcements** – Radio PSAs are an alternative to television and provide a less expensive way to reach a large number of individuals with messages and nonpoint source pollution tips.
- **Outdoor Advertising** – Billboards and other outdoor advertising such as bus shelter ads can be a way to reach audiences through a different medium. These outdoors ads are well suited to short theme messages and specific tips on stormwater pollution prevention.
- **Other Advertising** – Other advertising methods that may be considered include movie theater PSAs, paid ads in newspapers and print magazines, and sponsorship of traffic and/or weather spots on radio.

Outreach and Involvement

- **Workshops** – Workshops and seminars are opportunities to provide more detailed information and training to citizens, businesses and industry groups.
- **Speakers Bureau** – A speakers bureau provides an opportunity for government staff and other professionals to address community organizations, business groups, homeowners' associations, church groups and educational institutions on issues related to stormwater and watershed management.
- **Events** – Hosting or participation in community events provides an opportunity for the distribution of information and resources directly to target communities. In addition, topic-specific events such as watershed fairs, river/stream cleanups and storm drain stenciling are an important way to involve citizens directly in watershed management efforts.
- **Kiosks / Exhibits** – A kiosk or exhibit provides a way to present information and educational messages at workshops and other events. Exhibits may be permanent or portable and can have static displays, videos, or interactive features. Portable display boards are often effective for use at events or workshops.
- **Promotional Items** – Promotional giveaways such as magnets, pencils and bumper stickers can be imprinted with pollution prevention messages and tips and distributed at community events, schools and workshops.

REGIONAL EDUCATION PROGRAM

The previous sections of this chapter outlined the messages, the target audiences and the educational tools needed to deliver the watershed messages. Over the years, the Metro Water District has developed a comprehensive education and public awareness plan that includes all the elements outlined in this section. A regional public awareness and education plan has many benefits including reducing duplication of effort, improving cost effectiveness by sharing costs, and expanding the size and scale of education efforts to include mass media such as television and radio advertising.

These benefits were recognized in 2000 by 19 metro area local governments that formed the Clean Water Campaign, a regional stormwater education program. In order to maximize local governments' education funds, the Clean Water Campaign became the Metro Water District's comprehensive stormwater education campaign which provides a variety of educational resources such as brochures, posters, teacher lesson plans, television PSAs, videos and promotional items as outlined in Table 8-2.

TABLE 8-2

Education Materials Available through the Clean Water Campaign

Educational Tools	Description
Brochures	The Metro Water District provides camera ready brochures for local governments to personalize with their own logo and contact information. These files are available for all Clean Water Campaign educational materials.
CD/DVD	The Metro Water District provides a number of educational materials such as PowerPoint presentations, videos and public service announcements.
Presentations	The Metro Water District provides pre-packaged presentations with speaker's notes on a variety of topics such as Lawn Care, Rain Gardens, Composting and Auto Care.
Posters	The Metro Water District provides a number of stormwater posters appropriate for all ages. The posters focus on simple ways to prevents water pollution, such as picking up after pets and properly disposing of yard waste. Posters are also available for lawn care and auto care professionals.
Clean Water Campaign Website	The Metro Water District provides a comprehensive stormwater education campaign, the Clean Water Campaign. The Clean Water Campaign has a website at *cleanwatercampaign.com.* This website provides general information on stormwater pollution prevention, an events calendar, and multimedia resources. This website also allows citizens to report polluters anonymously.
Storm Drain Stencils	The Metro Water District provides stencils to local governments in order encourage local youth, civic and neighborhood groups to mark storm drains in order to educate others about the importance of not littering and keeping our waterways clean.
Exhibits	The Metro Water District has an exhibit display and "water drop" costume available to loan to local governments for community events. The exhibit display has stormwater pollution prevention facts and tips. Local governments can also customize the exhibit board with local information.
Press Materials	The Metro Water District provides templates for press releases, fact sheets, news articles, flyers, mailers and newsletter inserts to be used by local governments.

A large part of the regional education program is the media campaign. The regional media campaign is made up of paid advertising through a variety of outlets such as television, radio, outdoor and theatre advertising. In the past, the Metro Water District has partnered with local television stations to air the stormwater PSAs and create additional water pollution prevention PSAs with local weather personalities.

Clean Water Campaign messages are also developed into radio PSAs or embedded into traffic reports on nearly 30 radio stations within the Atlanta region. The media campaign has proven successful in educating the public on water pollution prevention. An annual survey is conducted on behalf of the Clean Water Campaign to gauge the effectiveness of the regional education campaign. The survey reveals overwhelmingly that the public are aware of the Clean Water Campaign and its messages.

Another component of the regional education campaign is the annual essay contest. The Metro Water District essay contest encourages middle school students within the District to write an essay on water quality and water conservation. The Metro Water District recognizes one winner from each county and one overall District winner.

Moving forward into the next five years, the Metro Water District regional education and public awareness program will continue to focus on water pollution prevention messages as it relates to identified target groups such as homeowners, restaurants and business owners. The Metro Water District will continue to support the messages of all three plans by building upon the current educational resources. The Metro Water District will continue to work through the Education TCC and Metro Water District staff to develop materials and provide resources that will assist local governments.

LOCAL EDUCATION PROGRAMS

The goal of local education programs is to achieve awareness of water resource protection issues with the goal of building public support for local actions and activities as well as changing behaviors that lead to the long-term protection of our water resources. Involving the public in local watershed protection efforts is crucial because it promotes broader public support, helps create an ethic of stewardship and community service and enables 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.

On a local level, Metro Water District communities are responsible for developing their own local education and public awareness programs that help both individual citizens as well as businesses and organizations to become aware of their role in watershed protection. This includes general information on stormwater management and issues as well as ways to prevent common sources of nonpoint source pollution.

LOCAL EDUCATION PROGRAM REQUIREMENTS

When developing a local education and public awareness program, communities are required to include both public education and outreach, as well as public participation and involvement activities:

- **Education and outreach activities** are designed to distribute education materials and message, and perform outreach to inform citizens and target audiences.
- **Public participation and involvement activities** provide opportunities for citizens to participate in programs and active implementation of watershed protection programs, such as Adopt-A-Stream training, watershed fairs, and storm drain stenciling.

Communities in the Metro Water District are required to implement a minimum number of education and outreach, and public participation and involvement activities annually as part of their local education program as shown in Table 8-3. Table 8-4 provides some examples of activities that could be considered as public education/outreach versus public participation and involvement. These minimum education and outreach programs may be undertaken in coordination with other Metro Water District communities, local water/wastewater providers, or other public or private entities such as Keep Georgia Beautiful affiliates.

TABLE 8-3
Minimum Local Education Activity Requirements

Population	Education and Outreach Activities	Public Participation and Involvement Activities
< 50,000	2	2
> 50,000	3	3

TABLE 8-4
Example Activities

Education / Outreach Programs	Public Involvement / Participation Programs
Bill inserts or newsletters	Stream cleanup event
Brochures at local government facilities	Stream monitoring program
Website with stormwater education information	Watershed festival
Local cable access programming	Roadside litter cleanup
Speakers bureau presentations	Storm drain stenciling
Kiosks and displays	Stormwater citizen advisory group
Press releases	Community cleanup event
Community workshops	Other innovative public involvement and participation program
School classroom education	
Other innovative education and outreach program	

TABLE 8-5
Watershed Public Education Resources

Materials	Materials Description / Resource Location
Metro Water District Materials	
Clean Water Campaign Resources	Various water resource and pollution prevention printed media, audio and video and teachers resources. http://www.cleanwatercampaign.com
Georgia EPD Materials	
Pollution Prevention Assistance Division	Pollution prevention guidance for businesses and industry http://www.p2ad.org
Georgia Project Wet	Water Education Resources for Teachers http://gaprojectwet.org
Adopt-a-Stream	Volunteer Water Sampling and Monitoring Program http://www.georgiaadoptastream.org
River of Words	Poetry, Writing and Art program for K-12 http://gaprojectwet.org/gawet_row.html
Rivers Alive	Annual Volunteer Waterway Cleanup http://www.riversalive.com
Georgia Outdoors	Public Broadcasting Television Show to inform about preserving Georgia's Natural Resources http://www.gpb.org
Other Education Materials	
U.S. Environmental Protection Agency	Stormwater Outreach Materials and Reference Documents http://cfpub.epa.gov/npdes/stormwatermonth.cfm
Center for Watershed Protection	http://www.cwp.org
Georgia Association of Water Professionals	Student and Teacher Resources link to materials websites all water resources http://www.gawponline.org
University of Georgia (UGA) Urban Agriculture	http://ugaonsite.com/

Section 9: IMPLEMENTATION PLAN

This Section provides implementation schedules for the required management measures for local governments included in this Plan in Section 5, as well as schedules for the recommendations for the regional and State agencies provided in Section 7. As funding is a key challenge for local government implementation, this Section also provides a summary of various program funding alternatives including a detailed discussion of stormwater utilities.

IMPLEMENTATION SCHEDULES

Three separate implementation schedules are included on the following pages: one for local governments, one for regional agencies, and one for State agencies. It should be noted that local governments are only responsible for implementing management measures on this implementation schedule, and are not responsible for Metro Water District or State-level tasks. The reference page numbers provide the location of the full description of each measure in the Watershed Management Plan where descriptions of the measure and implementation guidance may be found.

New program implementation or creation of a program is indicated differently than ongoing implementation in the implementation schedules. The distinction provides a quick snapshot for the level of intensity of implementation on an annual basis.

Tasks in the implementation schedule are outlined individually for the first few years of the Watershed Management Plan, considered the short-term. The management measures for implementation in the years 2012 to 2015 are considered medium-term and the management measures for the 2015 to 2035 time-frame are considered long-term recommendations. The schedule for medium-term and long-term tasks may be adjusted during updates every 5 years, following an adaptive management approach.

TABLE 9-1
Local Government Implementation Schedule

Category	#	Implementation Action Item	2009	2010	2011	2012 - 2015	2015 - 2035	Ref. Pages
Legal Authority	**5.A.1**	Post-Development Stormwater Management						5-5 to 5-8
	5.A.2	Floodplain Management/Flood Damage Prevention						5-9 to 5-12
	5.A.3	Stream Buffer Protection						5-13 to 5-14
	5.A.4	Illicit Discharge and Illegal Connection						5-15 to 5-16
	5.A.5	Litter Control						5-17 to 5-18
Watershed Planning	**5.B.1**	Comprehensive Land Use Planning						5-19 to 5-20
	5.B.2	Future-Conditions Floodplain Delineation						5-21 to 5-24
	5.B.3	Sewer and Septic Planning						5-25 to 5-26
	5.B.4	Greenspace and Green Infrastructure Tools for Watershed Protection						5-27 to 5-28
Land Development	**5.C.1**	Integrated Development Review Process						5-29 to 5-30
	5.C.2	Stormwater Design Criteria & Standards (Georgia Stormwater Management Manual)						5-31 to 5-32
	5.C.3	Construction Erosion and Sediment Control						5-33 to 5-36
Asset Management	**5.D.1**	Stormwater Infrastructure Inventory						5-37 to 5-40
	5.D.2	Extent and Level of Service Policy						5-41 to 5-44
	5.D.3	Inspections (public and private systems)						5-45 to 5-46
	5.D.4	Maintenance						5-47 to 5-50
	5.D.5	Capital Improvement Program						5-51 to 5-52
Pollution Prevention	**5.E.1**	Pollution Prevention/ Good Housekeeping for Local Operations						5-53 to 5-56
	5.E.2	Illicit Discharge Detection and Elimination Program						5-57 to 5-60
Watershed Conditions Assessment	**5.F.1**	Long-term Ambient Trend Monitoring						5-61 to 5-64
	5.F.2	Habitat and Biological Monitoring						5-65 to 5-66
Education and Public Awareness	**5.G.1**	Local Education and Public Awareness Program						5-67 to 5-68
Watershed-specific Measures	**5.H.1**	Source Water Watershed Protection						5-69 to 5-72
	5.H.2	Total Maximum Daily Load (TMDL) Management						5-73 to 5-76
	5.H.3	Endangered Species Protection						5-77 to 5-78
	5.H.4	Watershed Improvement Projects						5-79 to 5-82

Active Implementation Ongoing Implementation/ Program Maintenance

TABLE 9-2
Regional Agency Implementation Schedule

Category	Implementation Action Item	2009	2010	2011	2012 - 2015	2015 - 2035	Ref. Pages
Fertilizer Nutrient Content	Research water quality benefits of restricting sale of certain fertilizers within Metro Water District						7-2
	Consider recommending legislation based on research of fertilizer impacts on water quality						7-2
Georgia Stormwater Management Manual	Update the Georgia Stormwater Management Manual						7-5
	Coordinate training classes with the Georgia Association of Water Professionals as needed						7-5
	Complete Volume III of the Georgia Stormwater Management Manual on Pollution Prevention						7-5
	Develop Volume III training and conduct as needed.						7-5
Watershed Management Program Evaluation	Work with the TCC to develop metrics for evaluating the watershed management plan implementation.						7-5
Regional Monitoring Network	Consider the evaluation of watershed monitoring data and compile information on all active monitoring programs.						7-5
Regional Education and Public Awareness Program	Continue supporting the regional education and public awareness program.						8-4 to 8-6

Active Implementation ····· Ongoing Implementation/ Program Maintenance

TABLE 9-3
State Agency Implementation Schedule

Category	Implementation Action Item	2009	2010	2011	2012 - 2015	2015 - 2035	Ref. Pages
Georgia Department of Community Affairs (Georgia DCA)							
Comprehensive Land Use Plan Coordination	Update Comprehensive Land Use Plan review checklist to reflect updated Watershed Management Plan requirements, including annual coordination between land use planners and watershed managers	■	·····	·····	·····	·····	7-3
	Communicate with Metro Water District regarding implementation challenges shared by multiple communities	■	·····	·····	·····	·····	7-3
	Ensure drinking water supply watershed buffers have been adopted and are being implemented	■	·····	·····	·····	·····	7-3
	Consider adding additional reviews of Part V Environmental Planning Criteria implementation prior to issuance of grants or awards		■	·····	·····	·····	7-3
	Discuss implementation challenges of Part V Environmental Planning Criteria annually with Georgia EPD		■	·····	·····	·····	7-3
Georgia Department of Human Resources (Georgia DHR)							
Septic System Planning and Coordination	Meet annually with local governments & wastewater utilities	■	·····	·····	·····	·····	7-4
	Work with local jurisdictions to identify critical areas and support additional management measures needed in these areas	■	·····	·····	·····	·····	7-4
Georgia Department of Transportation (Georgia DOT)							
Georgia Department of Transportation (GDOT) NPDES MS4 Compliance	Develop and implement road design standards that meet GSWMM criteria for post-construction stormwater controls	■	■	■	·····	·····	7-1
	Review other states' transportation department programs for guidance with MS4 Phase II permit development	■	■				7-1
	Develop a capital improvement plan that includes stormwater retrofits		■	■	■ ·····	·····	7-1
Georgia Environmental Protection Division (Georgia EPD)							
GDOT NPDES MS4 Compliance	Enforce GDOT complaince with MS4 Phase II permit	■	·····	·····	·····	·····	7-1
Bacteria Standards and Guidance	Review white paper developed by Bacteria TMDL Technical Advisory Group and consider its recommendations	■					7-4
	Allow local governments to remove streams from 303(d) list if E. coli monitoring proves wildlife to be impairment source				■ ·····	·····	7-4
Streamline Reporting Requirements	Participate in GAWP Streamlining Task Force and dialogue related to streamlining regulatory reporting requirements; Develop an internal implementation team with community representatives	■	■	·····	·····	·····	7-4
	Update reporting timelines for interested communities to streamline reporting requirements	■					7-4
	Assess viability of web-based electronic data management center		■				7-5
■	Active Implementation	·····	Ongoing Implementation/ Program Maintenance				

IMPLEMENTATION COSTS

Costs for the implementation of this Plan's required local management measures were estimated through a combination of technical literature review and actual expenditures provided by local governments in the Metro Water District. Per capita costs for the programmatic measures are detailed in Table 9-4. For some local measures and activities, per capita costs were not meaningful and are listed separately in Table 9-5.

TABLE 9-4
Estimated Annual Implementation Cost by Program Category

Management Measures	Per Capita Cost [1] Level of Service		
	Low	Medium	High
5.A Legal Authority	$0.50	$1.13	$1.75
5.B Watershed Planning	$0.15	$0.38	$0.60
5.C Land Development	$0.50	$0.88	$1.25
5.D Asset Management	$3.10	$14.55	$26.00
5.E Pollution Prevention	$1.30	$2.13	$2.95
5.F Watershed Conditions Assessment	$0.30	$0.44	$0.58
5.G Education and Public Awareness	$0.22	$0.29	$0.36
5.H Resource-specific Measures	$0.25	$0.75	$1.25
TOTAL	**$6.32**	**$20.53**	**$34.74**

Notes:
1. Basis for cost includes: Metro Water District 2003 Watershed Management Plan, EPD NPDES MS4

TABLE 9-5
Estimated Discrete Costs by Program or Activity

Management Measures	Estimated Cost[1]		
	Low	Medium	High
Floodplain Delineation			
Future Floodplain Conditions Mapping (PER MILE)	$750	$3,125	$5,500
Additional Maintenance Elements			
CCTV Pipe Inspections (PER LINEAR FOOT)	$2	$3	$4
Inlet Cleaning (PER INLET)	$507	$563	$619
Pipe Cleaning (PER LINEAR FOOT)	$1	$51	$100
Pipe Rehabilitation (PER LINEAR FOOT)	$100	$225	$350
Point Repairs (PER LINEAR FOOT)	$330	$698	$1,066
BMP Cleaning/ Inspections (PER POND ACRE)	$1,700	$2,800	$5,300
Sweeping (PER CURB-MILE)	$12.90	$21.20	$27.20
Ditch Cleaning/ Maintenance (PER LINEAR FOOT)	$2.70	$3.00	$3.30
Computerized Maintenance Management System (PER SYSTEM)	$40,000	$120,000	$200,000
Capital Improvements & Watershed Improvement [2]			
Upgrade, Remove and Replace Storm System (PER IN-FT)	$2.50	$3.33	$5.73
Floodplain Buyout/ Open Space (PER ACRE)	$15,000	$30,000	$45,000
Watershed Improvement Plan (PER ACRE OF BASIN)	$4.00	$9.50	$15.00
Streambank Stabilization/ Restoration (PER FOOT)	$150	$325	$500
Retrofit BMP (PER ACRE OF POND)	$35,000	$92,500	$150,000
New BMP Construction (PER ACRE OF POND)	$35,000	$55,000	$75,000

Notes:
1. Basis for costs includes: Metro Water District 2003 Watershed Management Plan, EPA NPDES MS4 implementation cost literature and budget information provided by Metro Water District communities
2. Retrofit and restoration costs include engineering, permitting, and construction

IMPLEMENTATION FUNDING

Successful implementation of local watershed management efforts requires adequate program funding. There are two primary funding methods available to local governments, general appropriations (general fund) and stormwater user fees. In addition, there are number of supplemental sources of funding, including loans, bonds, service fees, and grants. A blend of funding methods is recommended for most local governments.

General Appropriations (General Fund) – Revenues from local taxes typically comprise the "General Fund" which funds most activities performed by local governments. Annually, the local government divides the general fund based on local priorities into budgets for police, fire, transportation and other activities. Currently, general funds are the most common funding source for watershed and stormwater management in the Metro Water District. The principal advantage of using the general fund for implementation of the Watershed Management Plan is that it is an existing, stable funding source. The disadvantage is that stormwater and watershed management activities must compete with other local programs for limited funds, so funds are not expressly dedicated.

Stormwater User Fees / Stormwater Utilities – Like other public utilities, stormwater utilities charge property owners for services provided by the local government. Stormwater utilities provide a stable and dedicated revenue source for most of the mandatory local management measures in this Watershed Management Plan. User fees provide an alternative to tax increases or impact fees for the support of local programs. Stormwater utilities are very similar in nature to enterprise funds established by more traditional water and wastewater utilities. Stormwater utilities have existed for a number of years in several states, but are relatively new to Georgia with the first stormwater utility created for the City of Griffin in 1998.

Specifically, stormwater utilities collect stormwater fees from property owners in relationship to their stormwater impacts. These impacts are calculated based on a property's relative burden on the stormwater system resulting from changes that they have made to the character (volume, rate, and pollutant content) of the stormwater that runs off their property. Most stormwater utilities relate this burden to the type of land use activity and the percentage of impervious ground surface for each property. Properties with a greater level of impervious surface pay more for their increased negative contribution to the system.

A stormwater utility can provide a vehicle for consolidating and coordinating activities and responsibilities; generating funding that is adequate, stable, equitable, and dedicated; and developing programs that are comprehensive, cohesive, and consistent. More detail on stormwater utilities as a funding source and the process for developing a stormwater utility are outlined later in this Section.

LOANS AND BONDS

Loans and bonds allow immediate expenditures on stormwater and watershed projects beyond readily available local funds. Funds are typically paid over a 15-year to 20-year period with interest charges, similar to a home mortgage. Despite interest charges, loans and bonds are often a financially sound method for funding capital improvement projects. For some capital improvement projects, such as replacement of culverts to avoid collapse or flood mitigation projects to reduce property damage, the upfront expenditure may be less than the long-term expense of damage repair due to procrastination. Typically loans and bonds are used for capital improvement projects that cannot wait until local funds are available; loans and bonds are not recommended for routine operations. Repayment schedules for

loans and bonds can be developed to smooth out peaks and valleys in revenue requirements and thus reduce the need for sporadic large rate increases.

General Obligation and Revenue Bonds – Debt financing of capital projects can be accomplished by issuing general obligation bonds, revenue bonds, or a combination of the two. General obligation bonds are issued based on the "taxing powers" of the local government therefore no assets are required as collateral. Revenue bonds are issued based on revenues generated by a specific revenue-generating entity such as special service fees, special assessments, or stormwater utility. Because revenue bonds typically exclude property tax revenues, the interest rate on revenue bonds is typically higher.

Bonds require voter approval in a referendum and are subject to local administrative policy regarding debt ceilings. Bonds are not a revenue source, but rather are a means of borrowing money for a specific purpose. Most bonds are financed over a 15 year period with interest payments based on the community's bond rating.

Georgia Environmental Facilities Authority Loans – The Georgia Environmental Facilities Authority (GEFA) provides low-interest state loans to assist local governments across the state with a number of environmental-related efforts. Loan programs administered by GEFA cover water, wastewater, solid waste, and land conservation projects. Low interest loans are available for a maximum timeframe of 20 years with population-based limits on loan amounts. GEFA loans require that a community has a good payment history for previous GEFA loans, has identified the project and secured 100% of the total project funds, and the minimum debt service coverage is 105%. There are two GEFA loans capable of supporting implementation of this Watershed Management Plan; land conservation financing and the Clean Water State Revolving Fund.

- Land conservation financing through GEFA may be used to support projects including: flood protection, wetlands protection, erosion reduction, protection of riparian buffers, and water quality protection for rivers, streams, and lakes.
- The Clean Water State Revolving Loan Fund (CWSRF) is a federal loan program administered by GEFA that funds a wide variety of wastewater infrastructure and non-point source projects.

Communities in the Metro Water District that apply for a GEFA loan must demonstrate through a Georgia EPD audit that they are in compliance with this Watershed Management Plan as well as the Water Supply and Water Conservation Management Plan and Long-term Wastewater Management Plan.

WaterFirst – Although typically considered a voluntary recognition program, communities designated by the Georgia DCA as "WaterFirst" communities receive discounts on GEFA loan interest rates. The WaterFirst Community Program is a voluntary partnership sponsored by the Department of Community Affairs (DCA) to increase the quality of life in communities through the wise management and protection of water resources. The award program recognizes local governments that make the connection between land use and water quality, and requires thinking beyond political boundaries to recognize the inextricable links created by shared water resources. Becoming a WaterFirst community demonstrates the desire to be responsible stewards of water resources for both environmental and economic benefits today and in the future.

SERVICE FEES

Local governments have the authority to establish special taxes or service fees to address specific local challenges. Service fees include SPLOST funds, impact fees, special assessments/tax districts, in-lieu of construction fees, and mitigation banks as outlined below.

SPLOST Funds – A Special Purpose Local Option Sales Tax (SPLOST) can be voted on and approved by communities for the purpose of funding the building and maintenance of public facilities. Cities and counties are allowed to add up to a 1% sales tax levied against the sale of goods and services with a SPLOST. A SPLOST is recommended by an elected body and voted upon by residents generally during a scheduled election. A SPLOST expires at the end of six years. If additional funds are still needed, they must be voted upon and approved again by the citizens of the community. Counties and school systems are required to provide an independent accountants' report, examining the way the funds were allocated and verify that the system receiving the funds managed those funds appropriately. SPLOST revenues are generated from sales tax versus property tax, therefore are attractive in communities with significant commercial centers or high tourism rates.

Development Impact Fees – Local governments may legally assess new development projects an impact fee within a proposed watershed system service area. The impact fee is calculated based on expenses incurred to provide the additional public capacity needed to serve the new growth and development and not based on the benefits received. Development impact fees to pay for watershed management projects are not common in Georgia, because the burden of proof is on the local government to accurately demonstrate the cost of the impact.

Development impact fees related to local services, including permit and/or plan review fees are common in the Metro Water District. These are generally one-time fees with revenues used specifically to fund salaries for personnel needed to perform the reviews and inspections required for the new development projects.

Special Assessments/Tax Districts – Special assessments are best suited where a specific area directly benefits from capital improvements, land acquisition, special studies, and/or extraordinary maintenance of the stormwater systems. Special assessments establish a “user pays” approach where only those who benefit from the assessment pay for them. Special districts function as quasi-municipal corporations created by law, with several funding options available: special taxes on property, development fees, user fees, and debt financing. Creation of special assessment districts requires voter approval.

Community Improvement Districts (CIDs) are a unit of government with the power to provide governmental services and facilities. CIDs are similar to authorities that are often created by special tax districts. The benefit of the CID is that they may issue tax-exempt special assessment bonds to finance facilities that provide essential governmental functions, such as stormwater-related projects. The debt is supported by the assessment power of the CID and not by the local government. CIDs are often used to support economic development activities.

In-Lieu Construction Fees – Local governments may elect to construct larger regional stormwater facilities that provide benefit to new development areas as well as existing areas through a local Capital Improvement Plan. If regional stormwater facilities are designed to handle flows from new developments, local governments may charge developers an in-lieu fee for their portion of the storage area. This strategy may support economic development, especially in redevelopment and infill

development areas where stormwater management requirements are hard to address on an individual lot basis.

Wetland and Stream Restoration Mitigation Banks – Mitigation banks proactively restore, create, enhance, or preserve a wetland, stream, or habitat conservation area to offset expected adverse impacts to similar nearby ecosystems. Proactive restoration activities developed as part of a mitigation bank create "credits" that may be sold to offset the buyer's impacts to wetland and stream function elsewhere. Local governments who develop a mitigation bank through the Army Corps of Engineers (USACE), may complete restoration as part of a watershed improvement project and then sell the credits to replenish funds expended and provide a continuous revenue stream for watershed improvement project. Mitigation banks are outlined in the optional local management measure section.

GRANTS

A grant is a form of federal or state financial aid that does not need to be repaid and is typically based on demonstrated need. Grants typically require a local match but are a good way to leverage existing funds. While grants are helpful to extend locally-available funds, they typically are awarded on a competitive basis and involve a long lead time to secure funds. Most grants will not fund completed projects.

319 (h) Grants – The Georgia EPD nonpoint source implementation grant, defined in Section 319(h) of the Clean Water Act, funds implementation projects designed to prevent, control, and eliminate nonpoint source pollution. The funds originating from the U.S. Environmental Protection Agency (US EPA) are distributed by Georgia EPD on a competitive application basis.

The 319(h) grant has a 40% local cost share requirement that may be either financial or documented in-kind services. Applications are typically accepted on an annual basis by the Georgia EPD, and selection is based on pre-determined annual priorities. Typically Georgia EPD gives priority to implementation projects that solve water quality challenges, especially in 303(d) listed waters.

Flood Mitigation Grants (Pre-Disaster Mitigation) – The Georgia Emergency Management Agency (GEMA) administers the Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation (PDM) program for the State of Georgia. This program provides funds to local governments for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Pre-disaster Mitigation (PDM) grants are awarded on a competitive basis and have a 25% local match requirement for most projects. Commonly funded projects include acquisition of floodprone properties and drainage/stormwater management plans and/or projects to alleviate flooding. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.

Intermodal Surface Transportation Efficiency Act (ISTEA, pronounced "Ice-Tea") – This transportation grant program is primarily focused on transportation, however funds may be used to mitigate water pollution due to highway runoff. Funds are distributed annually by the U.S. Department of Transportation to the Georgia Department of Transportation (GDOT). GDOT issues grants on a competitive basis with a 20% local match requirement, which may be financial or documented local in-kind services.

Community Development Block Grants (CDBG) – The CDBG grant program provides funding for projects that substantially benefit low and moderate income persons. Eligible projects that support implementation of the Watershed Management Plan include stormwater infrastructure projects and water quality improvement projects. CDBG funds are distributed within the Metro Water District in two different manners depending on the county.

- CBBG Entitlement Communities receive their funds directly from the US Department of Housing and Urban Development (HUD). Jurisdictions in the Metro Water District that are currently entitlement communities include: Clayton, Cobb, DeKalb, Fulton, and Gwinnett Counties and the cities of Atlanta, Gainesville, Marietta, and Roswell. Entitlement communities develop their own programs and funding priorities. HUD determines the amount of each entitlement grant by a statutory dual formula which uses several objective measures of community needs, including the extent of poverty, population, housing overcrowding, age of housing and population growth lag in relationship to other metropolitan areas. There are a number of local requirements for communities to receive their annual funding allocations.
- CDBG Non-Entitlement Communities receive funds on a competitive grant basis from the Georgia Department of Community Affairs (Georgia DCA) with approximately $36 million available for the annual competition. Counties that participate in the state-wide competitive grant process in the Metro Water District include: Bartow, Cherokee, Coweta, Douglas, Fayette, Forsyth, Hall, Henry, Paulding, Rockdale, Walton.

Livable Centers Initiative Supplemental Funds – The Atlanta Regional Commission (ARC) Livable Centers Initiative (LCI) program supports local projects that create quality growth plans that will enhance the livability of that community. While initial LCI funds are not eligible to fund implementation of this Watershed Management Plan, supplemental grant funds may be eligible if associated with transportation needs. Eligible projects may include culvert replacements or pedestrian trails associated with watershed improvement projects. All of the counties within the Metro Water District are eligible for these funds since they are in the metro Atlanta Metropolitan Planning Organization (Atlanta MPO) for transportation funding. The supplemental funds are issued on a competitive grant basis with a 50% local cost share.

Targeted Watershed Grants – The Environmental Protection Agency (EPA) distributes grant money to state and local governments to support collaborative partnerships to protect and restore the nation's water resources. The EPA only selects up to 12 watershed organizations nationally to receive grants to implement watershed-based, on-the-ground implementation projects. Targeted Watershed Grants require a 25% local match and a letter of support from the Governor with the average grant award of $900,000. The grants focus on strong stakeholder support and producing improved environmental change.

STORMWATER UTILITY DEVELOPMENT

Stormwater utilities are increasing in number in the Metro Water District as they have several distinct benefits over traditional funding mechanisms. Stormwater utilities are:

- **Equitable** – Stormwater utility fees are considered equitable because property owners pay in proportion to their impact on the stormwater management system. Fees are also based on the planned stormwater management program expenditures to address the collective stormwater impacts.
- **Dedicated** – Unlike general funds, all revenue collected under the stormwater utility must be allocated to stormwater programs. Audits and financial assessment ensure that fees continue to be related to actual costs incurred, and that expenses are aligned to the mission of the utility.
- **Continuous** – The stormwater utility ensures that funds will be available in the future in a regular fashion for necessary maintenance, as general funds tend to be allocated to stormwater maintenance with funding peaks in wet years and funding valleys in dry years.
- **Legal** – When based on a utility rate study and a detailed evaluation of billing units, stormwater utilities are legal in the State of Georgia. The Official Code of Georgia Annotated (O.C.G.A.) recognizes the authority and duty of local governments to operate the stormwater system as a utility and allows for the collection of fees from customers who use that system.

To ensure that the stormwater utility is legally defensible, each community's utility will be unique and developed around their local needs. Due to political and public acceptance challenges, many communities elect to implement their stormwater utility using a phased approach. The general steps to create a stormwater utility are outlined below.

INITIAL STORMWATER UTILITY SCOPING

The initial stormwater utility scoping phase focuses on defining local stormwater problems and in general terms how the stormwater utility will address the stated problems. This justification is tied closely to education of the public and elected officials on the stormwater utility and how it would function within the community. The initial scoping phase typically takes 6 to 12 months and may include the following tasks:

- **Problem Definition** – It is important to first define the problem or challenge that the stormwater utility will address. Local challenges may include increasing regulations, limited capacity to address growing customer concerns, backlog of operations and maintenance projects, aging stormwater system, local flooding damage, regulatory compliance problems, and water quality challenges. Research of the community may include average age and condition of stormwater infrastructure, customer acceptance of the current extent of service/ level of service policy, and map specific capital projects that need completed providing coverage throughout the community. Providing a blend of detailed statistics and pictures of local challenges will assist with "making the case" to the public.
- **Research Solutions** – Based on the identified challenges, local governments should outline desired solutions. If the problem is a backlog of projects, the level of staffing and funding needed to alleviate the backlog should be determined. If the problem is customer complaints related to a very limited extent of service/ level of service (EOS/LOS) policy, the enhanced EOS/LOS policy and its impact on staffing and funding should be determined. Involving

stakeholders in this discussion of proposed solutions may help in securing community support for the stormwater utility.

- **Organizational Structure** – For some communities, organization and management challenges will be significant because stormwater staff are located in several departments. As part of the initial program development, local governments should determine what department or entity will house the stormwater utility and what staff will be fully or partially funded.
- **Create a Vision** – Create a vision for the future stormwater utility including the future EOS/LOS policy and what services will be provided. The vision should portray a better quality of life for property owners, showing a distinct value for the proposed fees. During the creation of this vision, future policy challenges should be identified and addressed.
- **Preliminary Fee Analysis** – The potential funding needs are calculated based on the vision established for the stormwater utility. An initial analysis of potential customers can show the projected revenues to compare against the projected funding needs. Typically the revenues are balanced against projected funding needs until a reasonable fee is developed. The preliminary fee analysis should also consider whether the stormwater utility will be added to tax bills, water and sewer bills, or a separate stand alone bill. The collections rate will vary based on this decision. The community should evaluate the available information for developing a customer database and calculating stormwater fees.
- **Public Education and Outreach** – A public education program will be important to educate citizens, businesses, and elected officials on the need for the program and the program characteristics. Public education is the most important component to local success in developing a stormwater fee. Impacted property owners generally see the benefit, so the challenge is showing the benefit of a properly operated and maintained system to property owners who are not currently affected by a drainage problem.

STORMWATER UTILITY DEVELOPMENT

The implementation phase of a utility development typically takes one to two years and includes the following tasks. At the conclusion of the implementation phase, a community is prepared to implement the stormwater utility and begin collecting fees for services provided.

- **Cost-of-service Analysis** – Based on the information developed in the scoping phase, the final determination of the services provided and the cost of these services is calculated. The fees are finalized based on the final cost-of-service analysis and the customers in the billing database.
- **Stormwater Utility Ordinance** – An ordinance that outlines the stormwater utility must be developed and passed by the local government, as outlined in Measure 6.A.4. A Stormwater Utility Enabling Legislation may also be required in certain conditions, as outlined in Measure 6.A.5.
- **Customer Database** – A customer database is developed that includes the fee for that customer based on the definition of their impact. The customer database should be carefully checked to avoid improper billing. Many communities send a draft bill with “$0 due” prior to the first bill to check the billing database for errors.
- **Cash Flow Analysis** – Based on the final cost-of-service analysis and customer database, a cash flow analysis for the first several years of operation can be developed. The cash flow analysis will allow a realistic picture of services that will be provided in the first several years of

operation. Managing customer expectations based on cash flow is important for customer acceptance.

- **Public Education** – Public education should focus on the benefits of the stormwater utility and a clear explanation of the stormwater utility fees. This stage of public education should build on the understanding created during the scoping phase of the stormwater utility development.
- **Stormwater Utility Policies** – Stormwater utility policies on exemptions, credits, and appeals should be outlined in a Stormwater Utility Operations Manual. This Manual should include data management protocols for updating and revising the customer database.
- **Billing and Collection System** – The billing database is completed and verified. The process for collection of fees is completed including how collected fees will be processed and managed in the internal financial system.
- **Customer Service Program** – The county or community should develop a plan to manage inquiries or challenges about fees, especially in the first several months of operation. Customer service staff should all be trained to answer questions regarding the stormwater fees. Phone call centers may be necessary for the first several months to address customer questions. Long-term customer service plans should address how customer service requests will be tracked and handled.

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Section 10: FUTURE PLAN EVALUATION

INTRODUCTION

The Watershed Management Plan was updated in compliance with the minimum planning elements identified in O.C.G.A. §12-5-571. The legislation identifies the need to periodically assess regional progress towards implementation of the specific actions identified in the Watershed Management Plan and towards meeting the long-term goal of healthy watersheds.

The O.C.G.A. specifically states the following Plan requirements:

> *"[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."*
>
> *"The District shall review …management plan(s) and (their) implementation annually to determine whether there is a need to update such plan(s) and shall report to the director the progress of implementation of its goals…"*
>
> *"…the District shall prepare updated …management plan(s) no less frequently than every five years…"*

The short and long-term watershed management goals are summarized in Section 9 in the implementation schedule, with greater detail provided in the mandatory local management measures in Section 5. The mandatory local management measures provide the framework for evaluating implementation of this Watershed Management Plan. This section provides an overview of the required plan reviews and plan updates as well as provides a summary of regional progress to date.

PLAN REVIEWS AND UPDATES

There are two types of plan reviews and updates: annual reviews and plan updates that occur every five years. The reviews and updates are an important component of the adaptive management approach for all three of the Metro Water District's long-term management Plans (water supply and conservation, wastewater, and watershed).

> *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)*

This adaptive management approach recognizes the limitations of current knowledge regarding future situations, and the inevitability of change. These Plans provide a big-picture context for specific actions based on best available data, and will need to be adjusted as better information or new conditions arise. By design, the short-term management measures are outlined in greater detail than the long-term

management measures. Recommendations for the first 5 years are reasonably firm, whereas those beyond 20 years are expected to be refined several times before they are implemented.

ANNUAL REVIEWS

The purpose of the annual plan review is to identify and discuss implementation challenges to determine if there is a need for plan amendments. The evaluation process provides stakeholders an opportunity to discuss concerns about a particular element of the Watershed Management Plan. The annual reviews are a reminder that the Plans are adaptable, dynamic and flexible.

PLAN UPDATES

Plan updates occur at least every 5 years and take a more holistic look at changed conditions and implementation actions since the last Plan Update. Evaluations of changed conditions for Plan Updates may include:

- Population forecasts and trends;
- Water quality trends using the 303(d) list and available watershed assessment data;
- Additional funding sources; and
- Water quality modeling for future land use projections (this is recommended every 10 years).

Undoubtedly, other issues will emerge that merit in-depth consideration in the future. As with existing efforts, future planning work should be open and inclusive, involving all Metro Water District members and stakeholders.

RECOMMENDED ANNUAL REVIEWS AND UPDATES

Table 10-1 displays key items for the Metro Water District to consider in its annual reviews and 5-year updates. It is essential that an updated Plan be prepared no less frequently than every 5 years in order to allow for appropriate adjustments.

TABLE 10-1
Summary of Plan Elements to be Reviewed and Updated Regularly by the Metro Water District

Key to Actions: ● = Required ⊙ = Recommended ○ = Desirable ✱ = Automatic Plan Review Trigger

Plan Elements	Annual Reviews		Five-Year Update	
	Review	Update	Review	Update
Metro Water District Plan recommendations	●	○	●	⊙
Education & Public Awareness Programs	●	⊙	●	⊙
Watershed mandatory local management measures	●	⊙	●	⊙
Local conservation pricing	●		●	
Local water conservation programs	●	⊙	●	⊙
Recommended Metro Water District actions	●	⊙	●	⊙
Recommended actions for state agencies	○		●	
Related MNGWPD and State Plans (Water Supply/ Long-term Wastewater/ Watershed, etc)	○		●	⊙
Local septic system programs	○		●	●
Local sewer system operation and maintenance programs	○		●	
New population and demand forecasts			●	●
Funding trends	●		●	
Special Triggers for Plan Reviews *Note: Any of these actions should trigger an automatic review of their implications for Metro Water District Plans, and needed Plan modifications. Additionally, the status of any of these pending actions should be monitored routinely.*				
State-wide Comprehensive Water Management Plan resource assessments or guidance	✱	○	●	●
Georgia EPD policy or permit requirement changes	✱	○	●	●
Georgia EPD guidance on ACF and ACT basins modified	✱	○	●	●
Georgia EPD permit action on water withdrawal, reservoir or discharge (issued/denied/modified)	✱	○	●	●
Court rulings on general standards or district-specific cases (e.g. discharges to Lake Lanier)	✱	○	●	●
Legislative action relevant to Plans	✱	⊙	●	●
Major policy action by Metro Water District Board	✱	○	●	●
New reservoir permit actions	✱	○	●	●
Major change in Georgia DHR regulations on septic systems	✱	⊙	●	●
Major change in Georgia EPD policies or regulations	✱	⊙	●	●
Major change in GEFA or federal funding levels or policies	✱	○	●	●

PLAN ACCOUNTABILITY

Municipalities have a high level of accountability for implementing the Watershed Management Plan's mandatory management measures through the Georgia EPD audit process. Georgia EPD auditors conduct a thorough review of the local programs and procedures to determine consistency with the Metro Water District Watershed Management Plan. Communities must substantially comply with the Metro Water District plan provisions in order to modify or obtain new water withdrawal permits, wasteload allocations, GEFA loan funding, or the renewal of MS4 stormwater permits. Overall, this system has worked well to ensure implementation of the provisions of all three Metro Water District plans.

ANNUAL PLAN SURVEY AND REPORTING

The Metro Water District performs an annual survey of local jurisdictions to appraise overall progress towards implementing the Watershed Management Plan. A summary of these survey results are published annually in the Metro Water District's *Annual Activities and Progress Report*.

Information that will be collected as part of the annual survey and evaluation of progress will include:

- **Model Ordinances** – Adoption status of each model ordinance or equivalent
- **Future-Conditions Floodplain Delineation** – Status of modeling and mapping efforts
- **Integrated Development Review Process** – Collect each local government's checklist or other review instrument
- **Asset Management** – Reporting of status of inventory efforts, as well as inspection/maintenance program
- **Pollution Prevention** – Status of local implementation programs
- **Watershed Conditions Assessment** – Collect long-term ambient trend monitoring program data
- **Watershed Improvement Projects** – Collect list of project and locations, provide regional summary including map

As additional metrics for measuring progress are developed by the Metro Water District and TCC (see Section 7), they will be included in the annual survey and progress report.

CONCLUSIONS

While the performance will be reported annually by the responsible entities, the final measure of implementation success will be the longer term, demonstrable trends of:

- Ongoing implementation of the model ordinances;
- Watershed planning and greater local coordination on land use and watershed health;
- Asset management and the progression of communities towards proactive programs;
- Proactive detection of potential pollutant sources;
- Collection of better watershed conditions data;
- Heightened public awareness and community support through an effective public education and awareness program; and
- Progress on improving surface water quality.

Appendix A: MODEL ORDINANCES

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MODEL ORDINANCE IMPLEMENTATION BY JURISDICTION (2008)

	Post-Dev. Stormwater	Floodplain Management	Illicit Discharge	Stream Buffer
Bartow County (unincorporated)	●	●	●	●
Adairsville	●	●	●	●
Cartersville	●	●	●	●
Emerson	●	●	●	●
Euharlee	nr			
Kingston	nr			
Taylorsville	nr			
White	nr			
Cherokee County (unincorporated)	●	●	●	●
Ball Ground	nr			
Canton	nr			
Holly Springs	●	●	●	●
Nelson	nr			
Waleska	nr			
Woodstock	nr			
Clayton County (unincorporated)	●	●	●	●
Forest Park	●	●	●	●
Jonesboro	●	●	●	●
Lake City	●	●	●	●
Lovejoy	●	●	●	●
Morrow	●	●	●	●
Riverdale	●	●	●	●
Cobb County (unincorporated)	●	●	●	●
Acworth	●	●	●	●
Austell	●	●	●	●
Kennesaw	●	●	●	●
Marietta	●	●	●	●
Powder Springs	●	●	●	●
Smyrna	●	●	●	●
Coweta County (unincorporated)	●	●	●	●
Grantsville	nr			
Haralson	nr			
Moreland	nr			
Newnan	●	●	●	●
Senoia	●	●	●	●
Sharpsburg	●	●	●	●
Turin	nr			
DeKalb County (unincorporated)	●	●	●	●
Avondale Estates	nr			
Chamblee	●	●	●	●
Clarkston	nr			
Decatur	●	●	●	●
Doraville	nr			
Dunwoody	nr			
Lithonia	nr			
Pine Lake	●	⊘	●	●
Stone Mountain	nr			
Douglas County (unincorporated)	●	●	●	●
Douglasville	●	●	●	●
Villa Rica	●	●	●	●
Fayette County (unincorporated)	●	●	●	●
Brooks	nr			
Fayetteville	●	●	●	●

	Post-Dev. Stormwater	Floodplain Management	Illicit Discharge	Stream Buffer
Peachtree City	●	●	●	●
Tyrone	nr			
Woolsey	nr			
Forsyth County (unincorporated)	●	●	●	●
Cumming	●	●	●	●
Fulton County (unincorporated)	●	●	●	●
Alpharetta	●	●	●	●
Atlanta	●	●	●	●
Chattahoochee Hill County	nr			
College Park	●	●	●	●
East Point	●	●	●	●
Fairburn	●	●	●	●
Hapeville	●	⊘	●	●
Johns Creek	●	●	●	●
Milton	●	●	●	●
Mountain Park	●	●	●	●
Palmetto	●	●	●	●
Roswell	●	●	●	●
Sandy Springs	●	●	●	●
Union City	●	⊘	●	●
Gwinnett County (unincorporated)	●	●	●	●
Auburn	●	●	●	●
Berkeley Lake	nr			
Braselton	●	●	●	●
Buford	●	●	●	●
Dacula	nr			
Duluth	nr			
Greyson	nr			
Lawrenceville	●	●	●	●
Lilburn	nr			
Norcross	●	●	●	●
Rest Haven	nr			
Snellville	●	●	●	●
Sugar Hill	●	●	●	●
Suwanee	●	●	●	●
Hall County (unincorporated)	●	●	●	●
Clermont	nr			
Flowery Branch	●	●	●	●
Gainesville	●	●	●	●
Gillsville	nr			
Lula	●	●	●	●
Oakwood	●	●	●	●
Henry County (unincorporated)	●	●	●	●
Hampton	nr			
Locust Grove	nr			
McDonough	●	●	●	●
Stockbridge	●	●	●	●
Paulding County (unincorporated)	●	●	●	●
Braswell	nr			
Dallas	●	●	●	●
Hiram	●	●	●	●
Rockdale County (unincorporated)	●	●	●	●
Conyers	●	●	⊘	●

Survey results as of November 15, 2008

● have adopted ordinance
⊘ have not adopted ordinance
-- did not respond to question
nr did not return 2008 survey

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APPENDIX A1 – MODEL ORDINANCE FOR POST-DEVELOPMENT STORMWATER MANAGEMENT ORDINANCE FOR NEW DEVELOPMENT AND REDEVELOPMENT

DESCRIPTION

This model ordinance addresses post-development stormwater management requirements for new development and redevelopment in a community. The ordinance defines requirements for a post-development stormwater management plan, which is required in order to undertake land development activities. This plan contains the details of how the development will address post-development stormwater runoff quality and quantity impacts resulting from the permanent alteration of the character and hydrology of the land surface as well as the nonpoint source pollution from land use activities. The ordinance also outlines the water quantity and quality performance criteria for managing this runoff and specifies local requirements for the use of structural stormwater controls and nonstructural practices, in order to protect public health and safety, protection of public and private property and infrastructure, and environmental protection. Ongoing long-term inspection and maintenance provisions are provided. The majority of technical criteria and standards are adopted by reference through the use of a local stormwater management design manual.

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Note: Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the local government in tailoring the ordinance. This text would not appear in a final adopted ordinance.

INTRODUCTION

It is hereby determined that:

Land development projects and other land use conversions, and their associated changes to land cover, permanently alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, which in turn increase flooding, stream channel erosion, and sediment transport and deposition;

Land development projects and other land use conversions also contribute to increased nonpoint source pollution and degradation of receiving waters;

The impacts of post-development stormwater runoff quantity and quality can adversely affect public safety, public and private property, drinking water supplies, recreation, fish and other aquatic life, property values and other uses of lands and waters;

These adverse impacts can be controlled and minimized through the regulation of stormwater runoff quantity and quality from new development and redevelopment, by the use of both structural facilities as well as nonstructural measures, such as the conservation of open space and greenspace areas. The preservation and protection of natural area and greenspace for stormwater management benefits is encouraged through the use of incentives or "credits." The Georgia Greenspace Program provides a mechanism for the preservation and coordination of those greenspace areas which provide stormwater management quality and quantity benefits;

Localities in the State of Georgia are required to comply with a number of both State and Federal laws, regulations and permits which require a locality to address the impacts of post-development stormwater runoff quality and nonpoint source pollution;

Therefore, **(local jurisdiction)** has established this set of stormwater management policies to provide reasonable guidance for the regulation of post-development stormwater runoff for the purpose of protecting local water resources from degradation. It has determined that it is in the public interest to regulate post-development stormwater runoff discharges in order to control and minimize increases in stormwater runoff rates and volumes, post-construction soil erosion and sedimentation, stream channel erosion, and nonpoint source pollution associated with post-development stormwater runoff.

SECTION 1. GENERAL PROVISIONS

1.1. Purpose and Intent

The purpose of this ordinance is to protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and nonpoint source pollution associated with new development and redevelopment. It has been determined that proper management of post-development stormwater runoff will minimize damage to public and private property and infrastructure, safeguard the public health, safety, environment and general welfare of the public, and protect water and aquatic resources. This ordinance seeks to meet that purpose through the following objectives:

(1) Establish decision-making processes surrounding land development activities that protect the integrity of the watershed and preserve the health of water resources;
(2) Require that new development and redevelopment maintain the pre-development hydrologic response in their post-development state as nearly as practicable in order to reduce flooding, streambank erosion, nonpoint source pollution and increases in stream temperature, and maintain the integrity of stream channels and aquatic habitats;
(3) Establish minimum post-development stormwater management standards and design criteria for the regulation and control of stormwater runoff quantity and quality;
(4) Establish design and application criteria for the construction and use of structural stormwater control facilities that can be used to meet the minimum post-development stormwater management standards;
(5) Encourage the use of nonstructural stormwater management and stormwater better site design practices, such as the preservation of greenspace and other conservation areas, to the maximum

extent practicable. Coordinate site design plans, which include greenspace, with the county's greenspace protection plan;

(6) Establish provisions for the long-term responsibility for and maintenance of structural stormwater control facilities and nonstructural stormwater management practices to ensure that they continue to function as designed, are maintained, and pose no threat to public safety; and,

(7) Establish administrative procedures for the submission, review, approval and disapproval of stormwater management plans, and for the inspection of approved active projects, and long-term follow up.

➲ *The above list is a general set of objectives to reduce the impacts of post-development stormwater runoff quantity and quality from land development activities. The local stormwater authority may wish to set more specific objectives based upon a watershed management plan, impervious surface targets, the findings of a watershed assessment or study, or in order to address a local water quality problem or TMDL.*

1.2. Applicability

(1) This ordinance shall be applicable to all land development, including, but not limited to, site plan applications, subdivision applications, and grading applications, unless exempt pursuant to Subsection 2 below. These standards apply to any new development or redevelopment site that meets one or more of the following criteria:

a. New development that involves the creation of 5,000 square feet or more of impervious cover, or that involves other land development activities of 1 acre or more;

b. Redevelopment that includes the creation, addition or replacement of 5,000 square feet or more of impervious cover, or that involves other land development activity of one (1) acre or more;

c. Any new development or redevelopment, regardless of size, that is defined by the **(administrator)** to be a hotspot land use; or,

d. Land development activities that are smaller than the minimum applicability criteria set forth in items A and B above if such activities are part of a larger common plan of development, even though multiple, separate and distinct land development activities may take place at different times on different schedules.

(2) The following activities are exempt from this ordinance:

a. Individual single-family or duplex residential lots that are not part of a subdivision or phased development project;

b. Additions or modifications to existing single-family or duplex residential structures;

c. Agricultural or silvicultural land management activities within areas zoned for these activities; and,

d. Repairs to any stormwater management facility or practice deemed necessary by the **(administrator)**.

1.3. Designation of Ordinance Administrator

The **(title of administrator)** or **(designee)** is hereby appointed to administer and implement the provisions of this ordinance.

1.4. Compatibility with Other Regulations

This ordinance is not intended to modify or repeal any other ordinance, rule, regulation or other provision of law. The requirements of this ordinance are in addition to the requirements of any other

ordinance, rule, regulation or other provision of law, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule, regulation or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control.

1.5. Severability

If the provisions of any section, subsection, paragraph, subdivision or clause of this ordinance shall be adjudged invalid by a court of competent jurisdiction, such judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision or clause of this ordinance.

1.6. Stormwater Design Manual

The **(local permitting authority)** will utilize the policy, criteria and information including technical specifications and standards in the latest edition of the Georgia Stormwater Management Manual and any relevant local addenda (➲ *or equivalent local stormwater management design manual*), for the proper implementation of the requirements of this ordinance. The manual may be updated and expanded periodically, based on improvements in science, engineering, monitoring and local maintenance experience.

➲ *All references to the Georgia Stormwater Management Manual (GSMM) are presumed to be the "latest edition" as defined on the GSMM website at www.georgiastormwater.com. Updates, errata and revisions will be provided on the website. Local authorities may wish to develop a local manual or addendum that complements the GSMM. Further, the local permitting authority may wish to use its own equivalent stormwater management design manual provided that it includes an approach and standards at least as stringent as the Georgia Stormwater Management Manual.*

SECTION 2. DEFINITIONS

"**Applicant**" means a person submitting a post-development stormwater management application and plan for approval.
"**Channel**" means a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.
"**Conservation Easement**" means an agreement between a land owner and the (local jurisdiction) or other government agency or land trust that permanently protects open space or greenspace on the owner's land by limiting the amount and type of development that can take place, but continues to leave the remainder of the fee interest in private ownership.
"**Detention**" means the temporary storage of stormwater runoff in a stormwater management facility for the purpose of controlling the peak discharge.
"**Detention Facility**" means a detention basin or structure designed for the detention of stormwater runoff and gradual release of stored water at controlled rates.
"**Developer**" means a person who undertakes land development activities.
"**Development**" means a land development or land development project.
"**Drainage Easement**" means an easement appurtenant or attached to a tract or parcel of land allowing the owner of adjacent tracts or other persons to discharge stormwater runoff onto the tract or parcel of land subject to the drainage easement.
"**Erosion and Sedimentation Control Plan**" means a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during land disturbance activities.

"**Extended Detention**" means the detention of stormwater runoff for an extended period, typically 24 hours or greater.
"**Extreme Flood Protection**" means measures taken to prevent adverse impacts from large low-frequency storm events with a return frequency of 100 years or more.
"**Flooding**" means a volume of surface water that is too great to be confined within the banks or walls of a conveyance or stream channel and that overflows onto adjacent lands.
"**Greenspace**" or "Open Space" means permanently protected areas of the site that are preserved in a natural state.
"**Hotspot**" means an area where the use of the land has the potential to generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.
"**Hydrologic Soil Group (HSG)**" means a Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from group A soils, with high permeability and little runoff produced, to group D soils, which have low permeability rates and produce much more runoff.
"**Impervious Cover**" means a surface composed of any material that significantly impedes or prevents the natural infiltration of water into soil. Impervious surfaces include, but are not limited to, rooftops, buildings, streets and roads, and any concrete or asphalt surface.
"**Industrial Stormwater Permit**" means a National Pollutant Discharge Elimination System (NPDES) permit issued to an industry or group of industries which regulates the pollutant levels associated with industrial stormwater discharges or specifies on-site pollution control strategies.
"**Infiltration**" means the process of percolating stormwater runoff into the subsoil.
"**Jurisdictional Wetland**" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.
"**Land Development**" means any land change, including, but not limited to, clearing, digging, grubbing, stripping, removal of vegetation, dredging, grading, excavating, transporting and filling of land, construction, paving, and any other installation of impervious cover.
"**Land Development Activities**" means those actions or activities which comprise, facilitate or result in land development.
"**Land Development Project**" means a discrete land development undertaking.
"**Inspection and Maintenance Agreement**" means a written agreement providing for the long-term inspection and maintenance of stormwater management facilities and practices on a site or with respect to a land development project, which when properly recorded in the deed records constitutes a restriction on the title to a site or other land involved in a land development project.
"**New Development**" means a land development activity on a previously undeveloped site.
"**Nonpoint Source Pollution**" means a form of water pollution that does not originate from a discrete point such as a sewage treatment plant or industrial discharge, but involves the transport of pollutants such as sediment, fertilizers, pesticides, heavy metals, oil, grease, bacteria, organic materials and other contaminants from land to surface water and groundwater via mechanisms such as precipitation, stormwater runoff, and leaching. Nonpoint source pollution is a by-product of land use practices such as agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.
"**Nonstructural Stormwater Management Practice**" or "Nonstructural Practice" means any natural or planted vegetation or other nonstructural component of the stormwater management plan that provides for or enhances stormwater quantity and/or quality control or other stormwater management benefits, and includes, but is not limited to, riparian buffers, open and greenspace areas, overland flow filtration areas, natural depressions, and vegetated channels.
"**Off-Site Facility**" means a stormwater management facility located outside the boundaries of the site.
"**On-Site Facility**" means a stormwater management facility located within the boundaries of the site.

"**Overbank Flood Protection**" means measures taken to prevent an increase in the frequency and magnitude of out-of-bank flooding (i.e. flow events that exceed the capacity of the channel and enter the floodplain), and that are intended to protect downstream properties from flooding for the 2-year through 25-year frequency storm events.

"**Owner**" means the legal or beneficial owner of a site, including but not limited to, a mortgagee or vendee in possession, receiver, executor, trustee, lessee or other person, firm or corporation in control of the site.

"**Permit**" means the permit issued by the (local permitting authority) to the applicant which is required for undertaking any land development activity.

"**Person**" means, except to the extent exempted from this ordinance, any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, any interstate body or any other legal entity.

"**Post-development**" refers to the time period, or the conditions that may reasonably be expected or anticipated to exist, after completion of the land development activity on a site as the context may require.

"**Pre-development**" refers to the the time period, or the conditions that exist, on a site prior to the commencement of a land development project and at the time that plans for the land development of a site are approved by the plan approving authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being approved or permitted shall establish pre-development conditions.

"**Project**" means a land development project.

"**Redevelopment**" means a land development project on a previously developed site, but excludes ordinary maintenance activities, remodeling of existing buildings, resurfacing of paved areas, and exterior changes or improvements which do not materially increase or concentrate stormwater runoff, or cause additional nonpoint source pollution.

"**Regional Stormwater Management Facility**" or "Regional Facility" means stormwater management facilities designed to control stormwater runoff from multiple properties, where the owners or developers of the individual properties may assist in the financing of the facility, and the requirement for on-site controls is either eliminated or reduced.

"**Runoff**" means stormwater runoff.

"**Site**" means the parcel of land being developed, or the portion thereof on which the land development project is located.

"**Stormwater Better Site Design**" means nonstructural site design approaches and techniques that can reduce a site's impact on the watershed and can provide for nonstructural stormwater management. Stormwater better site design includes conserving and protecting natural areas and greenspace, reducing impervious cover and using natural features for stormwater management.

"**Stormwater Management**" means the collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner intended to prevent increased flood damage, streambank channel erosion, habitat degradation and water quality degradation, and to enhance and promote the public health, safety and general welfare.

"**Stormwater Management Facility**" means any infrastructure that controls or conveys stormwater runoff.

"**Stormwater Management Measure**" means any stormwater management facility or nonstructural stormwater practice.

"**Stormwater Management Plan**" means a document describing how existing runoff characteristics will be affected by a land development project and containing measures for complying with the provisions of this ordinance.

"**Stormwater Management System**" means the entire set of structural and nonstructural stormwater management facilities and practices that are used to capture, convey and control the quantity and quality of the stormwater runoff from a site.
"**Stormwater Retrofit**" means a stormwater management practice designed for a currently developed site that previously had either no stormwater management practice in place or a practice inadequate to meet the stormwater management requirements of the site.
"**Stormwater Runoff**" means the flow of surface water resulting from precipitation.
"**Structural Stormwater Control**" means a structural stormwater management facility or device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow of such runoff.
"**Subdivision**" means the division of a tract or parcel of land resulting in one or more new lots or building sites for the purpose, whether immediately or in the future, of sale, other transfer of ownership or land development, and includes divisions of land resulting from or made in connection with the layout or development of a new street or roadway or a change in an existing street or roadway.

SECTION 3. PERMIT PROCEDURES AND REQUIREMENTS

3.1. Permit Application Requirements

No owner or developer shall perform any land development activities without first meeting the requirements of this ordinance prior to commencing the proposed activity.

Unless specifically exempted by this ordinance, any owner or developer proposing a land development activity shall submit to the **(local permitting authority)** a permit application on a form provided by the **(local permitting authority)** for that purpose.

Unless otherwise exempted by this ordinance, a permit application shall be accompanied by the following items in order to be considered:

(1) Stormwater concept plan and consultation meeting certification in accordance with Section 3.2;
(2) Stormwater management plan in accordance with Section 3.3;
(3) Inspection and maintenance agreement in accordance with Section 3.4, if applicable;
(4) Performance bond in accordance with Section 3.5, if applicable; and,
(5) Permit application and plan review fees in accordance with Section 3.6.

➲ *The following stormwater concept plan and consultation meeting is an optional step. At the local government's discretion, the concept plan stage could be made a requirement, particularly for large development projects or those with substantial impact, or for developers and engineers who are unfamiliar with the local government's requirements.*

3.2. Stormwater Concept Plan and Consultation Meeting

Before any stormwater management permit application is submitted, it is recommended that the land owner or developer [shall] meet with the (local permitting authority) for a consultation meeting on a concept plan for the post-development stormwater management system to be utilized in the proposed land development project. This consultation meeting should [shall] take place at the time of the preliminary plan of subdivision or other early step in the development process. The purpose of this meeting is to discuss the post-development stormwater management measures necessary for the

proposed project, as well as to discuss and assess constraints, opportunities and potential ideas for stormwater management designs before the formal site design engineering is commenced.

To accomplish this goal the following information should [shall] be included in the concept plan which should [shall] be submitted in advance of the meeting:

A. Existing Conditions / Proposed Site Plans

Existing conditions and proposed site layout sketch plans, which illustrate at a minimum: existing and proposed topography; perennial and intermittent streams; mapping of predominant soils from soil surveys (when available); boundaries of existing predominant vegetation and proposed limits of clearing and grading; and location of existing and proposed roads, buildings, parking areas and other impervious surfaces.

B. Natural Resources Inventory

A written or graphic inventory of the natural resources at the site and surrounding area as it exists prior to the commencement of the project. This description should include a discussion of soil conditions, forest cover, topography, wetlands, and other native vegetative areas on the site, as well as the location and boundaries of other natural feature protection and conservation areas such as wetlands, lakes, ponds, floodplains, stream buffers and other setbacks (e.g., drinking water well setbacks, septic setbacks, etc.). Particular attention should be paid to environmentally sensitive features that provide particular opportunities or constraints for development.

C. Stormwater Management System Concept Plan

A written or graphic concept plan of the proposed post-development stormwater management system including: preliminary selection and location of proposed structural stormwater controls; location of existing and proposed conveyance systems such as grass channels, swales, and storm drains; flow paths; location of floodplain/floodway limits; relationship of site to upstream and downstream properties and drainages; and preliminary location of proposed stream channel modifications, such as bridge or culvert crossings.

Local watershed plans, the **(county)** greenspace projection plan (if applicable), and any relevant resource protection plans will be consulted in the discussion of the concept plan.

3.3. Stormwater Management Plan Requirements

The stormwater management plan shall detail how post-development stormwater runoff will be controlled or managed and how the proposed project will meet the requirements of this ordinance, including the performance criteria set forth in Section 4 below.

This plan shall be in accordance with the criteria established in this section and be prepared under the direct supervisory control of either a registered Professional Engineer or a registered Landscape Architect licensed in the state of Georgia. Section C, D, E
and F shall be prepared under the direct supervisory control of a registered Professional Engineer, who shall seal and sign the work. Portions of the overall plan may be prepared and stamped by a registered Land Surveyor licensed in the state of Georgia as appropriate, such as boundary surveys, contour maps, erosion and sedimentation control plans.

The stormwater management plan must ensure that the requirements and criteria in this ordinance are being complied with and that opportunities are being taken to minimize adverse post-development stormwater runoff impacts from the development. The plan shall consist of maps, narrative, and supporting design calculations (hydrologic and hydraulic) for the proposed stormwater management

system. The plan shall include all of the information required in the Stormwater Management Site Plan checklist found in the stormwater design manual. This includes:

A. Common address and legal description of site
B. Vicinity Map
C. Existing Conditions Hydrologic Analysis

The existing condition hydrologic analysis for stormwater runoff rates, volumes, and velocities, which shall include: a topographic map of existing site conditions with the drainage basin boundaries indicated; acreage, soil types and land cover of areas for each subbasin affected by the project; all perennial and intermittent streams and other surface water features; all existing stormwater conveyances and structural control facilities; direction of flow and exits from the site; analysis of runoff provided by off-site areas upstream of the project site; and methodologies, assumptions, site parameters and supporting design calculations used in analyzing the existing conditions site hydrology. For redevelopment sites, predevelopment conditions shall be modeled using the established guidelines for the portion of the site undergoing land development activities.

➲ *The local government will need to establish guidelines for how the predevelopment conditions will be modeled for redevelopment sites.*

D. Post-Development Hydrologic Analysis

The post-development hydrologic analysis for stormwater runoff rates, volumes, and velocities, which shall include: a topographic map of developed site conditions with the post-development drainage basin boundaries indicated; total area of post-development impervious surfaces and other land cover areas for each subbasin affected by the project; calculations for determining the runoff volumes that need to be addressed for each subbasin for the development project to meet the post-development stormwater management performance criteria in Section 4; location and boundaries of proposed natural feature protection and conservation areas; documentation and calculations for any applicable site design credits that are being utilized; methodologies, assumptions, site parameters and supporting design calculations used in analyzing the existing conditions site hydrology. If the land development activity on a redevelopment site constitutes more than 50 percent of the site area for the entire site, then the performance criteria in Section 4 must be met for the stormwater runoff from the entire site.

➲ *The Metropolitan North Georgia Water Planning District is developing a spreadsheet-based computer modeling tool that will assist site developers in performing the post-development hydrologic water quality analysis.*

E. Stormwater Management System

The description, scaled drawings and design calculations for the proposed post-development stormwater management system, which shall include: A map and/or drawing or sketch of the stormwater management facilities, including the location of nonstructural site design features and the placement of existing and proposed structural stormwater controls, including design water surface elevations, storage volumes available from zero to maximum head, location of inlet and outlets, location of bypass and discharge systems, and all orifice/restrictor sizes; a narrative describing how the selected structural stormwater controls will be appropriate and effective; cross-section and profile drawings and design details for each of the structural stormwater controls in the system, including supporting calculations to show that the facility is designed according to the applicable design criteria; a hydrologic and hydraulic analysis of the stormwater management system for all applicable design storms (including stage-storage or outlet rating curves, and inflow and outflow hydrographs); documentation and supporting

calculations to show that the stormwater management system adequately meets the post-development stormwater management performance criteria in Section 4; drawings, design calculations, elevations and hydraulic grade lines for all existing and proposed stormwater conveyance elements including stormwater drains, pipes, culverts, catch basins, channels, swales and areas of overland flow; and where applicable, a narrative describing how the stormwater management system corresponds with any watershed protection plans and/or local greenspace protection plan.

F. Post-Development Downstream Analysis

A downstream peak flow analysis which includes the assumptions, results and supporting calculations to show safe passage of post-development design flows downstream. The analysis of downstream conditions in the report shall address each and every point or area along the project site's boundaries at which runoff will exit the property. The analysis shall focus on the portion of the drainage channel or watercourse immediately downstream from the project. This area shall extend downstream from the project to a point in the drainage basin where the project area is 10 percent of the total basin area. In calculating runoff volumes and discharge rates, consideration may need to be given to any planned future upstream land use changes. The analysis shall be in accordance with the stormwater design manual.

G. Construction-Phase Erosion and Sedimentation Control Plan

An erosion and sedimentation control plan in accordance with the Georgia Erosion and Sedimentation Control Act (*or reference to the local Erosion and Sedimentation Control Ordinance*) or NPDES Permit for Construction Activities. The plan shall also include information on the sequence/phasing of construction and temporary stabilization measures and temporary structures that will be converted into permanent stormwater controls.

H. Landscaping and Open Space Plan

A detailed landscaping and vegetation plan describing the woody and herbaceous vegetation that will be used within and adjacent to stormwater management facilities and practices. The landscaping plan must also include: the arrangement of planted areas, natural and greenspace areas and other landscaped features on the site plan; information necessary to construct the landscaping elements shown on the plan drawings; descriptions and standards for the methods, materials and vegetation that are to be used in the construction; density of plantings; descriptions of the stabilization and management techniques used to establish vegetation; and a description of who will be responsible for ongoing maintenance of vegetation for the stormwater management facility and what practices will be employed to ensure that adequate vegetative cover is preserved.

I. Operations and Maintenance Plan

Detailed description of ongoing operations and maintenance procedures for stormwater management facilities and practices to ensure their continued function as designed and constructed or preserved. These plans will identify the parts or components of a stormwater management facility or practice that need to be regularly or periodically inspected and maintained, and the equipment and skills or training necessary. The plan shall include an inspection and maintenance schedule, maintenance tasks, responsible parties for maintenance, funding, access and safety issues. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.

J. Maintenance Access Easements

The applicant must ensure access from public right-of-way to stormwater management facilities and practices requiring regular maintenance at the site for the purpose of inspection and repair by securing all the maintenance access easements needed on a permanent basis. Such access

shall be sufficient for all necessary equipment for maintenance activities. Upon final inspection and approval, a plat or document indicating that such easements exist shall be recorded and shall remain in effect even with the transfer of title of the property.

➲ *The local government will establish which stormwater facilities and practices will require regular maintenance.*

K. Inspection and Maintenance Agreements

Unless an on-site stormwater management facility or practice is dedicated to and accepted by the **(local permitting authority)** as provided in Section 3.4 below, the applicant must execute an easement and an inspection and maintenance agreement binding on all subsequent owners of land served by an on-site stormwater management facility or practice in accordance Section 3.4.

L. Evidence of Acquisition of Applicable Local and Non-local Permits

The applicant shall certify and provide documentation to the **(local permitting authority)** that all other applicable environmental permits have been acquired for the site prior to approval of the stormwater management plan.

3.4. Stormwater Management Inspection and Maintenance Agreements

Prior to the issuance of any permit for a land development activity requiring a stormwater management facility or practice hereunder and for which the **(local permitting authority)** requires ongoing maintenance, the applicant or owner of the site must, unless an on-site stormwater management facility or practice is dedicated to and accepted by the **(local permitting authority)**, execute an inspection and maintenance agreement, and/or a conservation easement, if applicable, that shall be binding on all subsequent owners of the site.

➲ *The local government will establish which stormwater facilities and practices will require formal inspection and maintenance agreements.*

The inspection and maintenance agreement, if applicable, must be approved by the (**local permitting authority)** prior to plan approval, and recorded in the deed records upon final plat approval.

The inspection and maintenance agreement shall identify by name or official title the person(s) responsible for carrying out the inspection and maintenance. Responsibility for the operation and maintenance of the stormwater management facility or practice, unless assumed by a governmental agency, shall remain with the property owner and shall pass to any successor owner. If portions of the land are sold or otherwise transferred, legally binding arrangements shall be made to pass the inspection and maintenance responsibility to the appropriate successors in title. These arrangements shall designate for each portion of the site, the person to be permanently responsible for its inspection and maintenance.

As part of the inspection and maintenance agreement, a schedule shall be developed for when and how often routine inspection and maintenance will occur to ensure proper function of the stormwater management facility or practice. The agreement shall also include plans for annual inspections to ensure proper performance of the facility between scheduled maintenance and shall also includeremedies for the default thereof.

In addition to enforcing the terms of the inspection and maintenance agreement, the **(local permitting authority)** may also enforce all of the provisions for ongoing inspection and maintenance in Section 6 of this ordinance.

The **(local permitting authority)**, in lieu of an inspection and maintenance agreement, may accept dedication of any existing or future stormwater management facility for maintenance, provided such facility meets all the requirements of this ordinance and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

3.5. Performance and Maintenance Bonds

➲ *The local permitting authority may insert provisions under this section requiring the posting of bonds or other security to guarantee performance of construction and/or maintenance obligations hereunder.*

3.6. Application Procedure

(1) Applications for land development permits shall be filed with the **(local permitting authority)**.

(2) Permit applications shall include the items set forth in Section 3.1 above (two copies of the stormwater management plan and the inspection maintenance agreement, if applicable, shall be included).

(3) The **(local permitting authority)** shall inform the applicant whether the application, stormwater managment plan and inspection and maintenance agreement are approved or disapproved.

(4) If either the permit application, stormwater management plan or inspection and maintenance agreement are disapproved, the **(local permitting authority)** shall notify the applicant of such fact in writing. The applicant may then revise any item not meeting the requirements hereof and resubmit the same, in which event subparagraph 3 above and this subparagraph shall apply to such resubmittal.

(5) Upon a finding by the **(local permitting authority)** that the permit application, stormwater management plan and inspection and maintenance agreement, if applicable, meet the requirements of this ordinance, the **(local permitting authority)** may issue a permit for the land development project, provided all other legal requirements for the issuance of such permit have been met.

(6) Notwithstanding the issuance of the permit, in conducting the land development project, the applicant or other responsible person shall be subject to the following requirements:

- (a) The applicant shall comply with all applicable requirements of the approved plan and this ordinance and shall certify that all land clearing, construction, land development and drainage will be done according to the approved plan;
- (b) The land development project shall be conducted only within the area specified in the approved plan;
- (c) The **(local permitting authority)** shall be allowed to conduct periodic inspections of the project;
- (d) No changes may be made to an approved plan without review and written approval by the **(local permitting authority)**; and,
- (e) Upon completion of the project, the applicant or other responsible person shall submit the engineer's report and certificate and as-built plans required by Section 5.2.

➲ *Jurisdictions may modify the above local review process to accommodate their current subdivision or development approval process. In addition, local officials will need to decide the appropriate time frames for review based on the number of stormwater management plans, maintenance agreements, etc. submitted, while keeping in mind the time frames for the review of initial and resubmitted applications, as well as the need for timely review turnaround for the applicant. This will often be determined by the staff available for permit review and inspection of sites undergoing construction.*

3.7. Application Review Fees

The fee for review of any stormwater management application shall be based on the fee structure established by the **(local permitting authority)** and shall be made prior to the issuance of any building permit for the development.

➲ *It is recommended that all of the monetary contributions be credited to a local budgetary category to support local plan review, inspection and program administration.*

3.8. Modifications for Off-Site Facilities

The stormwater management plan for each land development project shall provide for stormwater management measures located on the site of the project, unless provisions are made to manage stormwater by an off-site or regional facility. The off-site or regional facility must be located on property legally dedicated for the purpose, must be designed and adequately sized to provide a level of stormwater quantity and quality control that is equal to or greater than that which would be afforded by on-site practices and there must be a legally-obligated entity responsible for long-term operation and maintenance of the off-site or regional stormwater facility. In addition, on-site measures shall be implemented, where necessary, to protect upstream and downstream properties and drainage channels from the site to the off-site facility.

A stormwater management plan must be submitted to the **(local permitting authority)** which shows the adequacy of the off-site or regional facility.

To be eligible for a modification, the applicant must demonstrate to the satisfaction of the **(local permitting authority)** that the use of an off-site or regional facility will not result in the following impacts to upstream or downstream areas:

(1) Increased threat of flood damage to public health, life, and property;
(2) Deterioration of existing culverts, bridges, dams, and other structures;
(3) Accelerated streambank or streambed erosion or siltation;
(4) Degradation of in-stream biological functions or habitat; or
(5) Water quality impairment in violation of State water quality standards, and/or violation of any state or federal regulations.

SECTION 4. POST-DEVELOPMENT STORMWATER MANAGEMENT PERFORMANCE CRITERIA

The following performance criteria shall be applicable to all stormwater management plans, unless otherwise provided for in this ordinance:

4.1. Water Quality

All stormwater runoff generated from a site shall be adequately treated before discharge. It will be presumed that a stormwater management system complies with this requirement if:

(1) It is sized to treat the prescribed water quality treatment volume from the site, as defined in the Georgia Stormwater Management Manual;

(2) Appropriate structural stormwater controls or nonstructural practices are selected, designed, constructed or preserved, and maintained according to the specific criteria in the Georgia Stormwater Management Manual; and,

(3) Runoff from hotspot land uses and activities identified by the **(local permitting authority)** are adequately treated and addressed through the use of appropriate structural stormwater controls, nonstructural practices and pollution prevention practices.

4.2. Stream Channel Protection

Protection of stream channels from bank and bed erosion and degradation shall be provided by using all of the following three approaches:

(1) Preservation, restoration and/or reforestation (with native vegetation) of the applicable stream buffer;

(2) 24-hour extended detention storage of the 1-year, 24-hour return frequency storm event;

➲ *This requirement may be adjusted or waived by the (local permitting authority) for sites that discharge directly into larger streams, rivers, wetlands, or lakes, or to a man-made channel or conveyance system where the reduction in these flows will not have an impact on upstream or downstream streambank or channel integrity.*

(3) Erosion prevention measures such as energy dissipation and velocity control.

4.3. Overbank Flooding Protection

Downstream overbank flood and property protection shall be provided by controlling (attenuating) the post-development peak discharge rate to the pre-development rate for the 25-year, 24-hour return frequency storm event. If control of the 1-year, 24-hour storm under Section 4.2 is exempted, then peak discharge rate attenuation of the 2-year through the 25-year return frequency storm event must be provided.

➲ *This requirement may be adjusted or waived by the (local permitting authority) for sites where the post-development downstream analysis shows that uncontrolled post-development conditions will not increase downstream peak flows, or that meeting the requirement will cause greater peak flow downstream impacts than the uncontrolled post-development conditions.*

4.4. Extreme Flooding Protection

Extreme flood and public safety protection shall be provided by controlling and safely conveying the 100-year, 24 hour return frequency storm event such that flooding is not exacerbated.

➲ *This requirement may be adjusted or waived by the (local permitting authority) for sites where the post-development downstream analysis shows that uncontrolled post-development conditions will not increase downstream peak flows, or that meeting the requirement will cause greater peak flow downstream impacts than the uncontrolled post-development conditions.*

4.5. Structural Stormwater Controls

All structural stormwater management facilities shall be selected and designed using the appropriate criteria from the Georgia Stormwater Management Manual. All structural stormwater controls must be designed appropriately to meet their intended function. For other structural stormwater controls not included in the Georgia Stormwater Management Manual, or for which pollutant removal rates have not been provided, the effectiveness and pollutant removal of the structural control must be documented through prior studies, literature reviews, or other means and receive approval from **(local permitting**

authority) before being included in the design of a stormwater management system. In addition, if hydrologic or topographic conditions, or land use activities warrant greater control than that provided by the minimum control requirements, the **(local stormwater permitting authority)** may impose additional requirements deemed necessary to protect upstream and downstream properties and aquatic resources from damage due to increased volume, frequency, and rate of stormwater runoff or increased nonpoint source pollution loads created on the site in question.

Applicants shall consult the Georgia Stormwater Management Manual for guidance on the factors that determine site design feasibility when selecting and locating a structural stormwater control.

4.6. Stormwater Credits for Nonstructural Measures

The use of one or more site design measures by the applicant may allow for a reduction in the water quality treatment volume required under Section 4.1. The applicant may, if approved by the **(local permitting authority)**, take credit for the use of stormwater better site design practices and reduce the water quality volume requirement. For each potential credit, there is a minimum set of criteria and requirements which identify the conditions or circumstances under which the credit may be applied. The site design practices that qualify for this credit and the criteria and procedures for applying and calculating the credits are included in the Georgia Stormwater Management Manual.

4.7. Drainage System Guidelines

Stormwater conveyance facilities, which may include but are not limited to culverts, stormwater drainage pipes, catch basins, drop inlets, junction boxes, headwalls, gutter, swales, channels, ditches, and energy dissipaters shall be provided when necessary for the protection of public right-of-way and private properties adjoining project sites and/or public right-of-ways. Stormwater conveyance facilities that are designed to carry runoff from more that one parcel, existing or proposed, shall meet the following requirements:

(1) Methods to calculate stormwater flows shall be in accordance with the stormwater design manual;
(2) All culverts, pipe systems and open channel flow systems shall be sized in accordance with the stormwater management plan using the methods included in the stormwater design manual; and,
(3) Design and construction of stormwater conveyance facilities shall be in accordance with the criteria and specifications found in the stormwater design manual.

4.8. Dam Design Guidelines

Any land disturbing activity that involves a site which proposes a dam shall comply with the Georgia Safe Dams Act and Rules for Dam Safety as applicable.

SECTION 5. CONSTRUCTION INSPECTIONS OF POST-DEVELOPMENT STORMWATER MANAGEMENT SYSTEM

5.1. Inspections to Ensure Plan Compliance During Construction

Periodic inspections of the stormwater management system construction shall be conducted by the staff of the **(local permitting authority)** or conducted and certified by a professional engineer who has been approved by the **(local permitting authority)**. Construction inspections shall utilize the approved stormwater management plan for establishing compliance.

All inspections shall be documented with written reports that contain the following information:

(1) The date and location of the inspection;
(2) Whether construction is in compliance with the approved stormwater management plan;
(3) Variations from the approved construction specifications; and,
(4) Any other variations or violations of the conditions of the approved stormwater management plan.

If any violations are found, the applicant shall be notified in writing of the nature of the violation and the required corrective actions.

5.2. Final Inspection and As Built Plans

Upon completion of a project, and before a certificate of occupancy shall be granted, the applicant is responsible for certifying that the completed project is in accordance with the approved stormwater management plan. All applicants are required to submit actual "as built" plans for any stormwater management facilities or practices after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and practices and must be certified by a Professional Engineer. A final inspection by the **(local permitting authority)** is required before the release of any performance securities can occur.

SECTION 6. ONGOING INSPECTION AND MAINTENANCE OF STORMWATER FACILITIES AND PRACTICES

6.1. Long-Term Maintenance Inspection of Stormwater Facilities and Practices

Stormwater management facilities and practices included in a stormwater management plan which are subject to an inspection and maintenance agreement must undergo ongoing inspections to document maintenance and repair needs and ensure compliance with the requirements of the agreement, the plan and this ordinance.

A stormwater management facility or practice shall be inspected on a periodic basis by the responsible person in accordance with the approved inspection and maintenance agreement. In the event that the stormwater management facility has not been maintained and/or becomes a danger to public safety or public health, the **(local permitting authority)** shall notify the person responsible for carrying out the maintenance plan by registered or certified mail to the person specified in the inspection and maintenance agreement. The notice shall specify the measures needed to comply with the agreement and the plan and shall specify the time within which such measures shall be completed. If the responsible person fails or refuses to meet the requirements of the inspection and maintenance agreement, the **(local permitting authority)**, may correct the violation as provided in Subsection 6.4 hereof.

Inspection programs by the **(local permitting authority)** may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in stormwater management facilities; and evaluating the condition of stormwater management facilities and practices.

6.2. Right-of-Entry for Inspection

The terms of the inspection and maintenance agreement shall provide for the **(local permitting authority)** to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when it has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

6.3. Records of Maintenance Activities

Parties responsible for the operation and maintenance of a stormwater management facility shall provide records of all maintenance and repairs to the **(local permitting authority).**

6.4. Failure to Maintain

If a responsible person fails or refuses to meet the requirements of the inspection and maintenance agreement, the **(local permitting authority)**, after thirty (30) days written notice (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient), may correct a violation of the design standards or maintenance requirements by performing the necessary work to place the facility or practice in proper working condition. The **(local permitting authority)** may assess the owner(s) of the facility for the cost of repair work which shall be a lien on the property, and may be placed on the ad valorum tax bill for such property and collected in the ordinary manner for such taxes.

SECTION 7. VIOLATIONS, ENFORCEMENT AND PENALTIES

Any action or inaction which violates the provisions of this ordinance or the requirements of an approved stormwater management plan or permit, may be subject to the enforcement actions outlined in this Section. Any such action or inaction which is continuous with respect to time is deemed to be a public nuisance and may be abated by injunctive or other equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief.

7.1. Notice of Violation

If the **(local permitting authority)** determines that an applicant or other responsible person has failed to comply with the terms and conditions of a permit, an approved stormwater management plan or the provisions of this ordinance, it shall issue a written notice of violation to such applicant or other responsible person. Where a person is engaged in activity covered by this ordinance without having first secured a permit therefor, the notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the site.

The notice of violation shall contain:

(1) The name and address of the owner or the applicant or the responsible person;
(2) The address or other description of the site upon which the violation is occurring;
(3) A statement specifying the nature of the violation;
(4) A description of the remedial measures necessary to bring the action or inaction into compliance with the permit, the stormwater management plan or this ordinance and the date for the completion of such remedial action;

(5) A statement of the penalty or penalties that may be assessed against the person to whom the notice of violation is directed; and,

(6) A statement that the determination of violation may be appealed to the **(local permitting authority)** by filing a written notice of appeal within thirty (30) days after the notice of violation (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient).

7.2. Penalties

In the event the remedial measures described in the notice of violation have not been completed by the date set forth for such completion in the notice of violation, any one or more of the following actions or penalties may be taken or assessed against the person to whom the notice of violation was directed. Before taking any of the following actions or imposing any of the following penalties, the **(local permitting authority)** shall first notify the applicant or other responsible person in writing of its intended action, and shall provide a reasonable opportunity, of not less than ten days (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) to cure such violation. In the event the applicant or other responsible person fails to cure such violation after such notice and cure period, the **(local permitting authority)** may take any one or more of the following actions or impose any one or more of the following penalties.

(1) **Stop Work Order -** The **(local permitting authority)** may issue a stop work order which shall be served on the applicant or other responsible person. The stop work order shall remain in effect until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violation or violations described therein, provided the stop work order may be withdrawn or modified to enable the applicant or other responsible person to take the necessary remedial measures to cure such violation or violations.

(2) **Withhold Certificate of Occupancy -** The **(local permitting authority)** may refuse to issue a certificate of occupancy for the building or other improvements constructed or being constructed on the site until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein.

(3) **Suspension, Revocation or Modification of Permit -** The **(local permitting authority)** may suspend, revoke or modify the permit authorizing the land development project. A suspended, revoked or modified permit may be reinstated after the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein, provided such permit may be reinstated [upon such conditions as the **(local permitting authority)** may deem necessary] to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.

(4) **Civil Penalties -** In the event the applicant or other responsible person fails to take the remedial measures set forth in the notice of violation or otherwise fails to cure the violations described therein within ten days, or such greater period as the **(local permitting authority)** shall deem appropriate (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) after the **(local permitting authority)** has taken one or more of the actions described above, the **(local permitting authority)** may impose a penalty not to exceed $1,000 (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the notice of violation.

(5) **Criminal Penalties -** For intentional and flagrant violations of this ordinance, the **(local permitting authority)** may issue a citation to the applicant or other responsible person, requiring such person to appear in **(appropriate municipal, magistrate or recorders)** court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not

to exceed $1,000 or imprisonment for 60 days or both. Each act of violation and each day upon which any violation shall occur shall constitute a separate offense.

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APPENDIX A2 – MODEL FLOODPLAIN MANAGEMENT/ FLOOD DAMAGE PREVENTION ORDINANCE

DESCRIPTION:

Floodplain management involves the designation of flood-prone areas and the managing of their uses. It is also aimed at minimizing modifications to streams, reducing flood hazards, and protecting the beneficial uses of the floodplain such as water quality protection. As such, floodplain management can be seen as a subset of the larger consideration of surface water and stormwater management.

Floodplain regulations and development restrictions can greatly reduce future flooding impacts, preserve greenspace and habitat, and protect their function in safely conveying floodwaters and protecting water quality. This model ordinance aims to help communities integrate floodplain management with stormwater management during the land development process.

The ordinance requires that a local government regulate the floodplains that will be expected with future land-use conditions, which are based upon the communities adopted future land use map, zoning, or watershed study projections. The ordinance also requires the local government to regulate floodplains on all streams with a drainage area of 100 acres and greater.

In order to administer the ordinance, "future-conditions" floodplains must be established:

Future-conditions floodplains for streams with a drainage area of one square mile (640 acres) and greater in size are to be delineated by the local jurisdiction. As required in the District-wide Watershed Management Plan, cities and counties are expected to model and map at least 10% of their area each year until future-conditions floodplains have been established for the entire community.

For streams with a drainage area between 100 acres and 640 acres, the local jurisdiction shall model and map the future-conditions floodplains -or- require the future-conditions floodplains be determined on a per development basis by the applicant.

For development projects in watersheds of any size where future-conditions floodplains have not yet been established, the applicant will be required to determine the future-conditions floodplain boundaries located on their property.

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Note: Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the local government in tailoring the ordinance. This text would not appear in a final adopted ordinance.

INTRODUCTION

It is hereby determined that:

The flood hazard areas of **(jurisdiction)** are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood relief and protection, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

Flood hazard areas can serve important stormwater management, water quality, streambank protection, stream corridor protection, wetland preservation and ecological purposes when permanently protected as undisturbed or minimally disturbed areas.

Effective floodplain management and flood hazard protection activities can (1) Protect human life and health; (2) Minimize damage to private property; (3) Minimize damage to public facilities and infrastructure such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains; and (4) Minimize expenditure of public money for costly flood control projects associated with flooding and generally undertaken at the expense of the general public.

Article IX, Section II of the Constitution of the State of Georgia and Section 36-1-20(a) of the Official Code of Georgia Annotated have delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, **(jurisdiction)**, Georgia, does ordain this ordinance and establishes this set of floodplain management and flood hazard reduction policies for the purpose of regulating the use of flood hazard areas. It is determined that the regulation of flood hazard areas and the prevention of flood damage are in the public interest and will minimize threats to public health and safety, as well as to private and public property.

SECTION 1. GENERAL PROVISIONS

1.1. Purpose and Intent

The purpose of this ordinance is to protect, maintain and enhance the public health, safety, environment and general welfare and to minimize public and private losses due to flood conditions in flood hazard areas, as well as to protect the beneficial uses of floodplain areas for water quality protection, streambank and stream corridor protection, wetlands preservation and ecological and environmental protection by provisions designed to:

(1) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(2) Restrict or prohibit uses which are dangerous to health, safety and property due to flooding or erosion hazards, or which increase flood heights, velocities, or erosion;
(3) Control filling, grading, dredging and other development which may increase flood damage or erosion;

(4) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands;
(5) Limit the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of flood waters; and,
(6) Protect the stormwater management, water quality, streambank protection, stream corridor protection, wetland preservation and ecological functions of natural floodplain areas.

1.2. Applicability

This ordinance shall be applicable to all Areas of Special Flood Hazard within **(jurisdiction)**.

1.3. Designation of Ordinance Administrator

The **(title of administrator)** or **(designee)** is hereby appointed to administer and implement the provisions of this ordinance.

1.4. Basis for Area of Special Flood Hazard – Flood Area Maps and Studies

For the purposes of this ordinance, the following are adopted by reference:

(1) The Flood Insurance Study (FIS), dated _____, with accompanying maps and other supporting data and any revision thereto are hereby adopted by reference. [*For those land areas acquired by a municipality through annexation, the current effective FIS and data for* ***(unincorporated county)****, dated* _____*, with accompanying maps and other supporting data and any revision thereto are hereby adopted by reference.*]
(2) Other studies which may be relied upon for the establishment of the base flood elevation or delineation of the 100-year floodplain and flood-prone areas include:
  (a) Any flood or flood-related study conducted by the United States Army Corps of Engineers, the United States Geological Survey or any other local, State or Federal agency applicable to **(jurisdiction)**; or
  (b) Any base flood study authored by a registered professional engineer in the State of Georgia which has been prepared by FEMA approved methodology and approved by **(local permitting authority)**.
(3) Other studies which may be relied upon for the establishment of the future-conditions flood elevation or delineation of the future-conditions floodplain and flood-prone areas include:
  (a) Any flood or flood-related study conducted by the United States Army Corps of Engineers, the United States Geological Survey, or any other local, State or Federal agency applicable to **(jurisdiction)**; or
  (b) Any future-conditions flood study authored by a registered professional engineer in the State of Georgia which has been prepared by FEMA approved methodology approved by **(local permitting authority)**.
(4) The repository for public inspection of the FIS, accompanying maps and other supporting data is located at **(specify repository location)**.

1.5. Compatibility with Other Regulations

This ordinance is not intended to modify or repeal any other ordinance, rule, regulation, statute, easement, covenant, deed restriction or other provision of law. The requirements of this ordinance are in addition to the requirements of any other ordinance, rule, regulation or other provision of law, and where any provision of this ordinance imposes restrictions different from those imposed by any other

ordinance, rule, regulation or other provision of law, whichever provision is more restrictive or impose higher protective standards for human health or the environment shall control.

1.6. Severability

If the provisions of any section, subsection, paragraph, subdivision or clause of this ordinance shall be adjudged invalid by a court of competent jurisdiction, such judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision or clause of this ordinance.

1.7. Warning and Disclaimer of Liability

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur; flood heights may be increased by manmade or natural causes. This ordinance does not imply that land outside the Areas of Special Flood Hazard or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of (jurisdiction) or by any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made there under.

SECTION 2. DEFINITIONS

➲ ** NOTE: data must be inserted*

"**Addition (to an existing building)**" means any walled and roofed expansion to the perimeter of a building in which the addition is connected by a common load-bearing wall other than a fire wall. Any walled and roofed addition which is connected by a fire wall or is separated by an independent perimeter load-bearing wall shall be considered New Construction.
* "**Appeal**" means a request for a review of the (appointed official)'s interpretation of any provision of this ordinance.
"**Area of Shallow Flooding**" means a designated AO or AH Zone on a community's Flood Insurance Rate Map (FIRM) with base flood depths from one to three feet, and/or where a clearly defined channel does not exist, where the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident.
"**Area of Special Flood Hazard**" is the land subject to a one percent or greater chance of flooding in any given year. This includes all floodplain and flood prone areas at or below the base flood elevation (including A, A1-30, A-99, AE, AO, AH, and AR on the FHBM or the FIRM), all floodplain and flood prone areas at or below the future-conditions flood elevation, and all other flood prone areas as referenced in Section 1.4. All streams with a drainage area of 100 acres or greater shall have the area of special flood hazard delineated.
"**Base Flood**" means the flood having a one percent chance of being equaled or exceeded in any given year, also known as the 100-year flood.
"**Base Flood Elevation**" means the highest water surface elevation anticipated at any given point during the base flood.
"**Basement**" means that portion of a building having its floor subgrade (below ground level) on all sides.
"**Building**" means any structure built for support, shelter, or enclosure for any occupancy or storage.
"**Development**" means any man-made change to improved or unimproved real estate including but not limited to buildings or other structures, mining, dredging, filling, clearing, grubbing, grading, paving, any other installation of impervious cover, excavation or drilling operations or storage of equipment or materials.
"**Elevated Building**" means a non-basement building built to have the lowest floor of the lowest enclosed area elevated above the ground level by means of fill, solid foundation perimeter walls, pilings,

columns, piers, or shear walls adequately anchored so as not to impair the structural integrity of the building during a base flood event.

* "**Existing Construction**" Any structure for which the "start of construction" commenced before (a specific date) [i.e., the effective date of the FIRST floodplain management code or ordinance adopted by the community as a basis for that community's participation in the National Flood Insurance Program (NFIP)].

* "**Existing Manufactured Home Park or Subdivision**" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum the installation of utilities, the construction of streets, and final site grading or the pouring of concrete pads) is completed before a specific date [i.e., the effective date of the FIRST floodplain management regulations adopted by a community].

"**Expansion to an Existing Manufactured Home Park or Subdivision**" means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed, including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads.

"**FEMA**" means the Federal Emergency Management Agency.

"**Flood**" or "**Flooding**" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(a) the overflow of inland or tidal waters; or

(b) the unusual and rapid accumulation or runoff of surface waters from any source.

"**Flood Hazard Boundary Map**" or "**FHBM**" means an official map of a community, issued by the Federal Insurance Administration, where the boundaries of areas of special flood hazard have been defined as Zone A.

"**Flood Insurance Rate Map**" or "**FIRM**" means an official map of a community, issued by the Federal Insurance Administration, delineating the areas of special flood hazard and/or risk premium zones applicable to the community.

"**Flood Insurance Study**" or "**FIS**" means the official report by the Federal Insurance Administration evaluating flood hazards and containing flood profiles and water surface elevations of the base flood.

"**Floodplain**" means any land area susceptible to flooding.

"**Floodproofing**" means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

"**Floodway**" or "**Regulatory Floodway**" means the channel of a stream or other watercourse and the adjacent areas of the floodplain which is necessary to contain and discharge the base flood flow without cumulatively increasing the base flood elevation more than one foot.

"**Functionally Dependent Use**" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water.

"**Future Conditions Flood**" means the flood having a one percent chance of being equaled or exceeded in any given year based on future-conditions hydrology. Also known as the 100-year future-conditions flood.

"**Future-conditions Flood Elevation**" means the flood standard equal to or higher than the Base Flood Elevation. The Future-conditions Flood Elevation is defined as the highest water surface anticipated at any given point during the future-conditions flood.

"**Future-conditions Floodplain**" means any land area susceptible to flooding by the future-conditions flood.

"**Future-conditions Hydrology**" means the flood discharges associated with projected land-use conditions based on a community's zoning map, comprehensive land-use plans, and/or watershed study projections, and without consideration of projected future construction of flood detention structures or projected future hydraulic modifications within a stream or other waterway, such as bridge and culvert construction, fill, and excavation.

"**Highest Adjacent Grade**" means the highest natural elevation of the ground surface, prior to construction, adjacent to the proposed foundation of a building.

"**Historic Structure**" means any structure that is;

(a) Listed individually in the National Register of Historic Places (a listing maintained by the U.S. Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(c) Individually listed on a state inventory of historic places and determined as eligible by states with historic preservation programs which have been approved by the Secretary of the Interior; or

(d) Individually listed on a local inventory of historic places and determined as eligible by communities with historic preservation programs that have been certified either:
1. By an approved state program as determined by the Secretary of the Interior, or
2. Directly by the Secretary of the Interior in states without approved programs.

"**Lowest Floor**" means the lowest floor of the lowest enclosed area, including basement. An unfinished or flood resistant enclosure, used solely for parking of vehicles, building access, or storage, in an area other than a basement, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of other provisions of this ordinance.

"**Manufactured Home**" means a building, transportable in one or more sections, built on a permanent chassis and designed to be used with or without a permanent foundation when connected to the required utilities. The term includes any structure commonly referred to as a “mobile home” regardless of the date of manufacture. The term also includes parked trailers, travel trailers and similar transportable structures placed on a site for 180 consecutive days or longer and intended to be improved property.

"**Mean Sea Level**" means the average height of the sea for all stages of the tide. It is used as a reference for establishing various elevations within the floodplain. For purposes of this ordinance the term is synonymous with National Geodetic Vertical Datum (NGVD) and/or the North American Vertical Datum (NAVD) of 1988.

"**National Geodetic Vertical Datum (NGVD)**" as corrected in 1929 is a vertical control used as a reference for establishing varying elevations within the floodplain.

* "**New Construction**" means any structure (see definition) for which the “start of construction" commenced after (* specific date) and includes any subsequent improvements to the structure. [* i.e., the effective date of the FIRST floodplain management ordinance adopted by the community as a basis for community participation in the (NFIP)].

* "**New Manufactured Home Park or Subdivision**" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after (* specific date) [i.e., the effective date of the first floodplain management regulations adopted by a community].

"**North American Vertical Datum (NAVD) of 1988**" is a vertical control used as a reference for establishing varying elevations within the floodplain.

"**Owner**" means the legal or beneficial owner of a site, including but not limited to, a mortgagee or vendee in possession, receiver, executor, trustee, lessee or other person, firm or corporation in control of the site.

"**Permit**" means the permit issued by the (local permitting authority) to the applicant which is required prior to undertaking any development activity.

"**Recreational Vehicle**" means a vehicle which is:

(a) built on a single chassis;
(b) 400 square feet or less when measured at the largest horizontal projection;
(c) designed to be self-propelled or permanently towable by light duty truck; and,
(d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

"**Site**" means the parcel of land being developed, or the portion thereof on which the development project is located.

"**Start of Construction**" means the date the permit was issued, provided the actual start of construction, repair, reconstruction, or improvement was within 180 days of the permit date. The actual start means the first placement of permanent construction of the structure such as the pouring of slabs or footings, installation of piles, construction of columns, or any work beyond the stage of excavation, and includes the placement of a manufactured home on a foundation. Permanent construction does not include initial land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers or foundations or the erection of temporary forms; nor does it include the installation on the property of buildings appurtenant to the permitted structure, such as garages or sheds not occupied as dwelling units or part of the main structure. (NOTE: accessory structures are not exempt from any ordinance requirements). For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

"**Structure**" means a walled and roofed building that is principally above ground, a manufactured home, a gas or liquid storage tank.

"**Subdivision**" means the division of a tract or parcel of land resulting in one or more new lots or building sites for the purpose, whether immediately or in the future, of sale, other transfer of ownership or land development, and includes divisions of land resulting from or made in connection with the layout or development of a new street or roadway or a change in an existing street or roadway.

"**Substantial Damage**" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

"**Substantial Improvement**" means any combination of repairs, reconstruction, alteration, or improvements to a building, taking place during a 10-year period, in which the cumulative cost equals or exceeds 50 percent of the market value of the structure prior to the improvement. The market value of the building means (1) the appraised value of the structure prior to the start of the initial repair or improvement, or (2) in the case of damage, the value of the structure prior to the damage occurring. This term includes structures which have incurred "substantial damage" regardless of the actual amount of repair work performed. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the building. The term does not, however, include those improvements of a building required to comply with existing health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, which have been pre-identified by the Code Enforcement Official, and not solely triggered by an improvement or repair project.

"**Substantially Improved Existing Manufactured Home Park or Subdivision**" is where the repair, reconstruction, rehabilitation or improvement of the streets, utilities and pads equals or exceeds 50 percent of the value of the streets, utilities and pads before the repair, reconstruction or improvement commenced.

"**Variance**" is a grant of relief from the requirements of this ordinance which permits construction in a manner otherwise prohibited by this ordinance.

"**Violation**" means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the

elevation certificate, other certificates, or other evidence of compliance required in this ordinance is presumed to be in violation until such time as that documentation is provided.

SECTION 3. PERMIT PROCEDURES AND REQUIREMENTS

3.1. Permit Application Requirements

No owner or developer shall perform any development activities on a site where an Area of Special Flood Hazard is located without first meeting the requirements of this ordinance prior to commencing the proposed activity.

Unless specifically excluded by this ordinance, any landowner or developer desiring a permit for a development activity shall submit to the **(local permitting authority)** a permit application on a form provided by the **(local permitting authority)** for that purpose.

No permit will be approved for any development activities that do not meet the requirements, restrictions and criteria of this ordinance.

3.2. Floodplain Management Plan Requirements

An application for a development project with any Area of Special Flood Hazard located on the site will be required to include a floodplain management / flood damage prevention plan. This plan shall include the following items:

(1) Site plan drawn to scale, which includes but is not limited to:
- (a) Existing and proposed elevations of the area in question and the nature, location and dimensions of existing and/or proposed structures, earthen fill placement, amount and location of excavation material, and storage of materials or equipment;
- (b) For all proposed structures, spot ground elevations at building corners and 20-foot or smaller intervals along the foundation footprint, or one foot contour elevations throughout the building site;
- (c) Proposed locations of water supply, sanitary sewer, and utilities;
- (d) Proposed locations of drainage and stormwater management facilities;
- (e) Proposed grading plan;
- (f) Base flood elevations and future-conditions flood elevations;
- (g) Boundaries of the base flood floodplain and future-conditions floodplain;
- (h) If applicable, the location of the floodway; and
- (i) Certification of the above by a registered professional engineer or surveyor.

(2) Building and foundation design detail, including but not limited to:
- (a) Elevation in relation to mean sea level (or highest adjacent grade) of the lowest floor, including basement, of all proposed structures;
- (b) Elevation in relation to mean sea level to which any non-residential structure will be floodproofed;
- (c) Certification that any proposed non-residential floodproofed structure meets the criteria in Section 5.2(2);
- (d) For enclosures below the base flood elevation, location and total net area of foundation openings as required in Section 5.1(5).
- (e) Design plans certified by a registered professional engineer or architect for all proposed structure(s).

(3) Description of the extent to which any watercourse will be altered or relocated as a result of the proposed development;
(4) Hard copies and digital files of computer models, if any, copies of work maps, comparison of pre-and post development conditions base flood elevations, future-conditions flood elevations, flood protection elevations, Special Flood Hazard Areas and regulatory floodway widths, flood profiles and all other computations and other information similar to that presented in the FIS;
(5) Copies of all applicable State and Federal permits necessary for proposed development; and
(6) All appropriate certifications required under this ordinance.

The approved floodplain management / flood damage prevention plan shall contain certification by the applicant that all development activities will be done according to the plan or previously approved revisions. Any and all development permits and/or use and occupancy certificates or permits may be revoked at any time if the construction and development activities are not in strict accordance with approved plans.

3.3. Construction Stage Submittal Requirements

For all new construction and substantial improvements on sites with a floodplain management / flood damage prevention plan, the permit holder shall provide to the **(administrator)** a certified as-built Elevation Certificate or Floodproofing Certificate for non-residential construction including the lowest floor elevation or flood-proofing level immediately after the lowest floor or flood-proofing is completed. A final Elevation Certificate shall be provided after completion of construction including final grading of the site. Any lowest floor certification made relative to mean sea level shall be prepared by or under the direct supervision of a registered land surveyor or professional engineer and certified by same. When flood-proofing is utilized for non-residential structures, said certification shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same.

Any work undertaken prior to approval of these certifications shall be at the permit holder's risk. The **(administrator)** shall review the above referenced certification data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to further work being allowed to proceed. Failure to submit certification or failure to make the corrections required hereby shall be cause to issue a stop work order for the project.

3.4. Duties and Responsibilities of the Administrator

Duties of the **(administrator)** shall include, but shall not be limited to:

(1) Review all development applications and permits to assure that the requirements of this ordinance have been satisfied and to determine whether proposed building sites will be reasonably safe from flooding;
(2) Require that copies of all necessary permits from governmental agencies from which approval is required by Federal or state law, including but not limited to Section 404 of the Federal Water Pollution Control Act Amendments of 1972,33 U.S.C. 1334, be provided and maintained on file;
(3) When Base Flood Elevation data or floodway data have not been provided, then the **(administrator)** shall require the applicant to obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, state or other sources in order to meet the provisions of Sections 4 and 5;
(4) Review and record the actual elevation in relation to mean sea level (or highest adjacent grade) of the lowest floor, including basement, of all new or substantially improved structures;

(5) Review and record the actual elevation, in relation to mean sea level to which any substantially improved structures have been flood-proofed;

(6) When flood-proofing is utilized for a non-residential structure, the **(administrator)** shall obtain certification of design criteria from a registered professional engineer or architect;

(7) Notify affected adjacent communities and the Georgia Department of Natural Resources prior to any alteration or relocation of a watercourse and submit evidence of such notification to the Federal Emergency Management Agency (FEMA);

(8) Where interpretation is needed as to the exact location of boundaries of the Areas of Special Flood Hazard (e.g., where there appears to be a conflict between a mapped boundary and actual field conditions) the **(administrator)** shall make the necessary interpretation. Any person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in this ordinance. Where floodplain elevations have been defined, the floodplain shall be determined based on flood elevations rather than the area graphically delineated on the floodplain maps; and,

(9) All records pertaining to the provisions of this ordinance shall be maintained in the office of the **(administrator)** and shall be open for public inspection.

SECTION 4. STANDARDS FOR DEVELOPMENT

4.1. Definition of Floodplain Boundaries

(1) Studied "A" zones, as identified in the FIS, shall be used to establish base flood elevations whenever available.

(2) For all streams with a drainage area of 100 acres or greater, the future-conditions flood elevations shall be provided by the **(local permitting authority)**. If future-conditions elevation data is not available from the **(local permitting authority)**, then it shall be determined by a registered professional engineer using a method approved by FEMA and the **(local permitting authority)**.

4.2. Definition of Floodway Boundaries

(1) The width of a floodway shall be determined from the FIS or FEMA approved flood study. For all streams with a drainage area of 100 acres or greater, the regulatory floodway shall be provided by the **(local permitting authority)**. If floodway data is not available from the **(local permitting authority)**, then it shall be determined by a registered professional engineer using a method approved by FEMA and the **(local permitting authority)**.

4.3. General Standards

(1) No development shall be allowed within the future-conditions floodplain that could result in any of the following:

- (a) Raising the base flood elevation or future-conditions flood elevation equal to or more than 0.01 foot;
- (b) Reducing the base flood or future-conditions flood storage capacity;
- (c) Changing the flow characteristics as to the depth and velocity of the waters of the base flood or future-conditions flood as they pass both the upstream and the downstream boundaries of the development area; or,
- (d) Creating hazardous or erosion-producing velocities, or resulting in excessive sedimentation.

(2) Any development within the future-conditions floodplain allowed under (1) above shall also meet the following conditions:

(a) Compensation for storage capacity shall occur between the average ground water table elevation and the base flood elevation for the base flood, and between the average ground water table elevation and the future-condition flood elevation for the future-conditions flood, and lie either within the boundaries of ownership of the property being developed and shall be within the immediate vicinity of the location of the encroachment. Acceptable means of providing required compensation include lowering of natural ground elevations within the floodplain, or lowering of adjoining land areas to create additional floodplain storage. In no case shall any required compensation be provided via bottom storage or by excavating below the elevation of the top of the natural (pre-development) stream channel unless such excavation results from the widening or relocation of the stream channel;

(b) Cut areas shall be stabilized and graded to a slope of no less than 2.0 percent;

(c) Effective transitions shall be provided such that flow velocities occurring on both upstream and downstream properties are not increased or decreased;

(d) Verification of no-rise conditions (0.01 foot or less), flood storage volumes, and flow characteristics shall be provided via a step-backwater analysis meeting the requirements of Section 4.4;

(e) Public utilities and facilities, such as water, sanitary sewer, gas, and electrical systems, shall be located and constructed to minimize or eliminate infiltration or contamination from flood waters; and

(f) Any significant physical changes to the base flood floodplain shall be submitted as a Conditional Letter of Map Revision (CLOMR) or Conditional Letter of Map Amendment (CLOMA), whichever is applicable. The CLOMR submittal shall be subject to approval by the (local permitting authority) using the Community Consent forms before forwarding the submittal package to FEMA for final approval. The responsibility for forwarding the CLOMR to FEMA and for obtaining the CLOMR approval shall be the responsibility of the applicant. Within six months of the completion of construction, the applicant shall submit as-built surveys for a final Letter of Map Revision (LOMR).

4.4. Engineering Study Requirements for Floodplain Encroachments

An engineering study is required, as appropriate to the proposed development activities on the site, whenever a development proposes to disturb any land within the future-conditions floodplain, except for a residential single-lot development on streams without established base flood elevations and/or floodways for which the provisions of Section 5.4 apply. This study shall be prepared by a currently registered Professional Engineer in the State of Georgia and made a part of the application for a permit. This information shall be submitted to and approved by the **(local permitting authority)** prior to the approval of any permit which would authorize the disturbance of land located within the future-conditions floodplain. Such study shall include:

(1) Description of the extent to which any watercourse or floodplain will be altered or relocated as a result of the proposed development;

(2) Step-backwater analysis, using a FEMA-approved methodology approved by the **(local permitting authority)**. Cross-sections (which may be supplemented by the applicant) and flow information will be obtained whenever available. Computations will be shown duplicating FIS results and will then be rerun with the proposed modifications to determine the new base flood profiles, and future-conditions flood profiles;

(3) Floodplain storage calculations based on cross-sections (at least one every 100 feet) showing existing and proposed floodplain conditions to show that base flood floodplain and future-conditions floodplain storage capacity would not be diminished by the development;
(4) The study shall include a preliminary plat, grading plan, or site plan, as appropriate, which shall clearly define all future-conditions floodplain encroachments.

4.5. Floodway Encroachments

Located within Areas of Special Flood Hazard are areas designated as floodway. A floodway may be an extremely hazardous area due to velocity flood waters, debris or erosion potential. In addition, floodways must remain free of encroachment in order to allow for the discharge of the base flood without increased flood heights. Therefore the following provisions shall apply:

(1) Encroachments are prohibited, including earthen fill, new construction, substantial improvements or other development within the regulatory floodway, except for activities specifically allowed in (2) below.
(2) Encroachments for bridges, culverts, roadways and utilities within the regulatory floodway may be permitted provided it is demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the encroachment shall not result in any increase to the pre-project base flood elevations, floodway elevations, or floodway widths during the base flood discharge. A registered professional engineer must provide supporting technical data and certification thereof; and,
(3) If the applicant proposes to revise the floodway boundaries, no permit authorizing the encroachment into or an alteration of the floodway shall be issued by the **(local permitting authority)** until an affirmative Conditional Letter of Map Revision (CLOMR) is issued by FEMA and no-rise certification is approved by the **(local permitting authority)**.

4.6. Maintenance Requirements

The property owner shall be responsible for continuing maintenance as may be needed within an altered or relocated portion of a floodplain on his property so that the flood-carrying or flood storage capacity is not diminished. The **(local permitting authority)** may direct the property owner (at no cost to **[jurisdiction]**) to restore the flood-carrying or flood storage capacity of the floodplain if the owner has not performed maintenance as required by the approved floodplain management plan on file with the **(local permitting authority)**.

SECTION 5. PROVISIONS FOR FLOOD DAMAGE REDUCTION

5.1. General Standards

In all Areas of Special Flood Hazard the following provisions apply:

(1) New construction of principal buildings (residential or non-residential), including manufactured homes, shall not be allowed within the limits of the future-conditions floodplain, unless all requirements of Sections 4.3, 4.4 and 4.5 have been met;
(2) New construction or substantial improvements of existing structures shall be anchored to prevent flotation, collapse or lateral movement of the structure;
(3) New construction or substantial improvements of existing structures shall be constructed with materials and utility equipment resistant to flood damage;

(4) New construction or substantial improvements of existing structures shall be constructed by methods and practices that minimize flood damage;

(5) Elevated Buildings - All new construction and substantial improvements of existing structures that include any fully enclosed area located below the lowest floor formed by foundation and other exterior walls shall be designed so as to be an unfinished and flood resistant enclosure. The enclosure shall be designed to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater.

(a) Designs for complying with this requirement must either be certified by a professional engineer or architect or meet the following minimum criteria:

(i) Provide a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;

(ii) The bottom of all openings shall be no higher than one foot above grade; and,

(iii) Openings may be equipped with screens, louvers, valves or other coverings or devices provided they permit the automatic flow of floodwater in both directions.

(b) So as not to violate the "Lowest Floor" criteria of this ordinance, the unfinished and flood resistant enclosure shall solely be used for parking of vehicles, limited storage of maintenance equipment used in connection with the premises, or entry to the elevated area; and,

(c) The interior portion of such enclosed area shall not be partitioned or finished into separate rooms.

(6) All heating and air conditioning equipment and components (including ductwork), all electrical, ventilation, plumbing, and other service facilities shall be designed and/or located three (3) feet above the base flood elevation or one (1) foot above the future-conditions flood elevation, whichever is higher, so as to prevent water from entering or accumulating within the components during conditions of flooding;

(7) Manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This standard shall be in addition to and consistent with applicable State requirements for resisting wind forces;

(8) New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;

(9) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;

(10) On-site waste disposal systems shall be located and constructed to avoid impairment to them, or contamination from them, during flooding; and,

(11) Any alteration, repair, reconstruction or improvement to a structure which is not compliant with the provisions of this ordinance, shall be undertaken only if the non- conformity is not furthered, extended or replaced.

(12) If the proposed development is located in multiple flood zones or multiple base flood elevation cross the proposed site, the higher or more restrictive base flood elevation or future condition elevation and development standards shall take precedence.

5.2. Building Standards for Structures and Buildings Within the Future-Conditions Floodplain

The following provisions, in addition to those in Section 5.1, shall apply:

(1) Residential Buildings

(a) New construction. New construction of principal buildings, including manufactured homes shall not be allowed within the limits of the future-conditions floodplain unless all requirements of Sections 4.3, 4.4 and 4.5 have been met. If all of the requirements of Sections 4.3, 4.4 and 4.5 have been met, all new construction shall have the lowest floor, including basement, elevated no lower than three (3) feet above the base flood elevation or one (1) foot above the future-conditions flood elevation, whichever is higher. Should solid foundation perimeter walls be used to elevate the structure, openings sufficient to equalize the hydrologic flood forces on exterior walls and to facilitate the unimpeded movements of floodwaters shall be provided in accordance with standards of Section 5.1(5).

(b) Substantial Improvements. Substantial improvement of any principal structure or manufactured home shall have the lowest floor, including basement, elevated no lower than three (3) feet above the base flood elevation or one (1) foot above the future-conditions flood elevation, whichever is higher. Should solid foundation perimeter walls be used to elevate a structure, openings sufficient to equalize the hydrologic flood forces on exterior walls and to facilitate the unimpeded movements of flood waters shall be provided in accordance with standards of Section 5.1(5).

(2) Non-Residential Buildings

(a) New construction. New construction of principal buildings, including manufactured homes shall not be allowed within the limits of the future-conditions floodplain unless all requirements of Sections 4.3, 4.4 and 4.5 have been met. New construction that has met all of the requirements of Sections 4.3, 4.4 and 4.5 may be flood-proofed in lieu of elevation. The structure, together with attendant utility and sanitary facilities, must be designed to be watertight to one (1) foot above the base flood elevation, or at least as high as the future-conditions flood elevation, whichever is higher, with walls substantially impermeable to the passage of water and structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered Professional Engineer or architect shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions above, and shall provide such certification to the **(administrator).**

(b) Substantial Improvements. Substantial improvement of any principal non-residential structure located in A1- 30, AE, or AH zones, may be authorized by the **(administrator)** to be flood-proofed in lieu of elevation. The structure, together with attendant utility and sanitary facilities, must be designed to be water tight to one (1) foot above the base flood elevation, or at least as high as the future-conditions flood elevation, whichever is higher, with walls substantially impermeable to the passage of water, and structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered Professional Engineer or architect shall certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions above, and shall provide such certification to the **(administrator).**

(3) Accessory Structures and Facilities

Accessory structures and facilities (i.e., barns, sheds, gazebos, detached garages, parking lots, recreational facilities and other similar non-habitable structures and facilities) which are permitted to be located within the limits of the floodplain shall be constructed of flood-resistant materials and designed to pass all floodwater in accordance with Section 5.1(5) and be anchored to prevent flotation, collapse or lateral movement of the structure.

(4) Standards for Recreational Vehicles
All recreational vehicles placed on sites must either:
(a) Be on the site for fewer than 180 consecutive days and be fully licensed and ready for highway use, (a recreational vehicle is ready for highway use if it is licensed, on its wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached structures or additions); or
(b) The recreational vehicle must meet all the requirements for Residential Buildings—Substantial Improvements (Section 5.2(1)(b)), including the anchoring and elevation requirements.

(5) Standards for Manufactured Homes
(a) New manufactured homes shall not be allowed to be placed within the limits of the future-conditions floodplain unless all requirements of Sections 4.3, 4.4 and 4.5 have been met.
(b) Manufactured homes placed and/or substantially improved in an existing manufactured home park or subdivision shall be elevated so that either:
(i) The lowest floor of the manufactured home is elevated no lower than three (3) feet above the level of the base flood elevation, or one (1) foot above the future-conditions flood elevation, whichever is higher; or
(ii) The manufactured home chassis is elevated and supported by reinforced piers (or other foundation elements of at least an equivalent strength) of no less than 36 inches in height above grade.
(c) All manufactured homes must be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement in accordance with standards of Section 5.1(7).

5.3. Building Standards for Structures and Buildings Authorized Adjacent to the Future-Conditions Floodplain

(1) Residential Buildings – For new construction or substantial improvement of any principal residential building or manufactured home, the elevation of the lowest floor, including basement and access to the building, shall be at least three (3) feet above the base flood elevation or one (1) foot above the future-conditions flood elevation, whichever is higher.

(2) Non-Residential Buildings – For new construction or substantial improvement of any principal non-residential building, the elevation of the lowest floor, including basement and access to the building, shall be at least one (1) foot above the level of the base flood elevation or at least as high as the future-conditions flood elevation, whichever is higher.

5.4. Building Standards for Residential Single-Lot Developments on Streams Without Established Base Flood Elevations and/or Floodway (A-Zones)

For a residential single-lot development not part of a subdivision that has Areas of Special Flood Hazard, where streams exist but no base flood data have been provided (A-Zones), the **(administrator)** shall review and reasonably utilize any available scientific or historic flood elevation data, base flood elevation and floodway data, or future-conditions flood elevation data available from a Federal, State, local or other source, in order to administer the provisions and standards of this ordinance.

If data are not available from any of these sources, the following provisions shall apply:

(1) No encroachments, including structures or fill material, shall be located within an area equal to twice the width of the stream or fifty (50) feet from the top of the bank of the stream, whichever is greater.

(2) In special flood hazard areas without base flood or future-conditions flood elevation data, new construction and substantial improvements of existing structures shall have the lowest floor of the lowest enclosed area (including basement) elevated no less than three (3) feet above the highest adjacent grade at the building site. Openings sufficient to facilitate the unimpeded movements of floodwaters shall be provided in accordance with Section 5.1(5).

5.5. Building Standards for Areas of Shallow Flooding (AO-Zones)

Areas of Special Flood Hazard may include designated "AO" shallow flooding areas. These areas have base flood depths of one (1) to three (3) feet above ground, with no clearly defined channel. In these areas the following provisions apply:

(1) All substantial improvements of residential and non-residential structures shall have the lowest floor, including basement, elevated to no lower than one (1) foot above the flood depth number in feet specified on the Flood Insurance Rate Map (FIRM), above the highest adjacent grade. If no flood depth number is specified, the lowest floor, including basement, shall be elevated at least three (3) feet above the highest adjacent grade. Openings sufficient to facilitate the unimpeded movements of flood waters shall be provided in accordance with standards of Section 5.1(5).

(2) Substantial improvement of a non-residential structure may be flood-proofed in lieu of elevation. The structure, together with attendant utility and sanitary facilities, must be designed to be water tight to the specified FIRM flood level plus one (1) foot above the highest adjacent grade, with walls substantially impermeable to the passage of water, and structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the design and methods of construction are in accordance with accepted standards of practice; and,

(3) Drainage paths shall be provided to guide floodwater around and away from any proposed structure.

5.6. Standards for Subdivisions

(1) All subdivision proposals shall identify the special flood hazard area and provide base flood elevation data and future-conditions flood elevation data;

(2) All residential lots in a subdivision proposal shall have sufficient buildable area outside of the future-conditions floodplain such that encroachments into the future-conditions floodplain for residential structures will not be required;

(3) All subdivision plans will provide the elevations of proposed structures in accordance with Section 3.2.

(4) All subdivision proposals shall be consistent with the need to minimize flood damage;

(5) All subdivision proposals shall have public utilities and facilities such as water, sanitary sewer, gas, and electrical systems located and constructed to minimize or eliminate infiltration of flood waters, and discharges from the systems into flood waters; and,

(6) All subdivision proposals shall include adequate drainage and stormwater management facilities per the requirements of **(jurisdiction)** to reduce potential exposure to flood hazards.

SECTION 6. VARIANCE PROCEDURES

The following variance and appeals procedures shall apply to an applicant who has been denied a permit for a development activity, or to an owner or developer who has not applied for a permit because it is clear that the proposed development activity would be inconsistent with the provisions of this ordinance. A request for a variance may be submitted by an applicant who has been denied a permit by the **(local permitting authority)**, or by an owner or developer who has not previously applied for a permit for the reasons stated herein above.

(1) Requests for variances from the requirements of this ordinance shall be submitted to the **(local permitting authority)**. All such requests shall be heard and decided in accordance with procedures to be published in writing by the **(local permitting authority)**. At a minimum, such procedures shall include notice to all affected parties and the opportunity to be heard.

(2) Any person adversely affected by any decision of the **(local permitting authority)** shall have the right to appeal such decision to the **(appointed board)** as established by **(jurisdiction)** in accordance with procedures to be published in writing by the **(appointed board)**. At a minimum, such procedures shall include notice to all affected parties and the opportunity to be heard.

(3) Any person aggrieved by the decision of the **(appointed board)** may appeal such decision to the **(appropriate court)**, as provided in **Section 5-4-1 of the Official Code of Georgia Annotated**.

(4) Variances may be issued for the repair or rehabilitation of Historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as an Historic structure, and the variance issued shall be the minimum necessary to preserve the historic character and design of the structure.

(5) Variances may be issued for development necessary for the conduct of a functionally dependent use, provided the criteria of this Section are met, no reasonable alternative exists, and the development is protected by methods that minimize flood damage during the base flood and create no additional threats to public safety.

(6) Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

(7) In reviewing such requests, the **(local permitting authority)** and **(appointed board)** shall consider all technical evaluations, relevant factors, and all standards specified in this and other sections of this ordinance.

(8) Conditions for Variances:

(a) A variance shall be issued only when there is:

(i) a finding of good and sufficient cause;

(ii) a determination that failure to grant the variance would result in exceptional hardship; and,

(iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, or the creation of a nuisance.

(b) The provisions of this ordinance are minimum standards for flood loss reduction; therefore, any deviation from the standards must be weighed carefully. Variances shall only be issued upon determination that the variance is the minimum necessary, considering the flood hazard, to afford relief; and, in the instance of a Historic structure, a determination that the variance is the minimum necessary so as not to destroy the historic character and design of the building.

(c) Any person to whom a variance is granted shall be given written notice specifying the difference between the base flood elevation and the elevation of the proposed lowest floor and stating that the cost of flood insurance will be commensurate with the increased risk to life and property resulting from the reduced lowest floor elevation.

(d) The **(administrator)** shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency upon request.

(9) Any person requesting a variance shall, from the time of the request until the time the request is acted upon, submit such information and documentation as the **(local permitting authority)** and **(appointed board)** shall deem necessary to the consideration of the request.

(10) Upon consideration of the factors listed above and the purposes of this ordinance, the **(local permitting authority)** and the **(appointed board)** may attach such conditions to the granting of variances as they deem necessary or appropriate, consistent with the purposes of this ordinance.

(11) Variances shall not be issued "after the fact."

SECTION 7. VIOLATIONS, ENFORCEMENT AND PENALTIES

Any action or inaction which violates the provisions of this ordinance or the requirements of an approved stormwater management plan or permit, may be subject to the enforcement actions outlined in this Section. Any such action or inaction which is continuous with respect to time is deemed to be a public nuisance and may be abated by injunctive or other equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief.

7.1. Notice of Violation

If the **(local permitting authority)** determines that an applicant or other responsible person has failed to comply with the terms and conditions of a permit, an approved stormwater management plan or the provisions of this ordinance, it shall issue a written notice of violation to such applicant or other responsible person. Where a person is engaged in activity covered by this ordinance without having first secured a permit therefor, the notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the site.

The notice of violation shall contain:

(1) The name and address of the owner or the applicant or the responsible person;

(2) The address or other description of the site upon which the violation is occurring;

(3) A statement specifying the nature of the violation;

(4) A description of the remedial measures necessary to bring the action or inaction into compliance with the permit, the stormwater management plan or this ordinance and the date for the completion of such remedial action;

(5) A statement of the penalty or penalties that may be assessed against the person to whom the notice of violation is directed; and,

(6) A statement that the determination of violation may be appealed to the **(local permitting authority)** by filing a written notice of appeal within thirty (30) days after the notice of violation (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient).

7.2. Penalties

In the event the remedial measures described in the notice of violation have not been completed by the date set forth for such completion in the notice of violation, any one or more of the following actions or penalties may be taken or assessed against the person to whom the notice of violation was directed. Before taking any of the following actions or imposing any of the following penalties, the **(local permitting authority)** shall first notify the applicant or other responsible person in writing of its intended action, and shall provide a reasonable opportunity, of not less than ten (10) days (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) to cure such violation. In the event the applicant or other responsible person fails to cure such violation after such notice and cure period, the **(local permitting authority)** may take any one or more of the following actions or impose any one or more of the following penalties.

(1) **Stop Work Order -** The **(local permitting authority)** may issue a stop work order which shall be served on the applicant or other responsible person. The stop work order shall remain in effect until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violation or violations described therein, provided the stop work order may be withdrawn or modified to enable the applicant or other responsible person to take the necessary remedial measures to cure such violation or violations.

(2) **Withhold Certificate of Occupancy -** The **(local permitting authority)** may refuse to issue a certificate of occupancy for the building or other improvements constructed or being constructed on the site until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein.

(3) **Suspension, Revocation or Modification of Permit -** The **(local permitting authority)** may suspend, revoke or modify the permit authorizing the development project. A suspended, revoked or modified permit may be reinstated after the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein, provided such permit may be reinstated (upon such conditions as the **(local permitting authority)** may deem necessary) to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.

(4) **Civil Penalties -** In the event the applicant or other responsible person fails to take the remedial measures set forth in the notice of violation or otherwise fails to cure the violations described therein within ten (10) days, or such greater period as the **(local permitting authority)** shall deem appropriate (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) after the **(local permitting authority)** has taken one or more of the actions described above, the **(local permitting authority)** may impose a penalty not to exceed $1,000 (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the notice of violation.

(5) **Criminal Penalties -** For intentional and flagrant violations of this ordinance, the **(local permitting authority)** may issue a citation to the applicant or other responsible person, requiring such person to appear in **(appropriate municipal, magistrate or recorders)** court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not to exceed $1,000 or imprisonment for 60 days or both. Each act of violation and each day upon which any violation shall occur shall constitute a separate offense.

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APPENDIX A3 – MODEL STREAM BUFFER PROTECTION ORDINANCE

DESCRIPTION:

This model ordinance provides a framework for local governments to develop buffer zones for streams, as well as the requirements that minimize land development within those buffers. It is the purpose of these buffer zone requirements to protect and stabilize stream banks, protect water quality and preserve aquatic and riparian habitat.

Note: Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the local government in tailoring the ordinance. This text would not appear in a final adopted ordinance.

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SECTION 1. TITLE

This ordinance shall be known as the "(Local Jurisdiction) Stream Buffer Protection Ordinance."

SECTION 2. FINDINGS AND PURPOSES

2.1. Findings

Whereas, the (name of governing body) of (local jurisdiction) finds that buffers adjacent to streams provide numerous benefits including:

(1) Protecting, restoring and maintaining the chemical, physical and biological integrity of streams and their water resources
(2) Removing pollutants delivered in urban stormwater
(3) Reducing erosion and controlling sedimentation
(4) Protecting and stabilizing stream banks
(5) Providing for infiltration of stormwater runoff
(6) Maintaining base flow of streams

(7) Contributing organic matter that is a source of food and energy for the aquatic ecosystem
(8) Providing tree canopy to shade streams and promote desirable aquatic habitat
(9) Providing riparian wildlife habitat
(10) Furnishing scenic value and recreational opportunity
(11) Providing opportunities for the protection and restoration of greenspace

2.2. Purposes

It is the purpose of this Ordinance is to protect the public health, safety, environment and general welfare; to minimize public and private losses due to erosion, siltation and water pollution; and to maintain stream water quality by provisions designed to:

(1) Create buffer zones along the streams of **(local jurisdiction)** for the protection of water resources; and,
(2) Minimize land development within such buffers by establishing buffer zone requirements and by requiring authorization for any such activities.

Section 3. Definitions

"Buffer" means, with respect to a stream, a natural or enhanced vegetated area (established by Section 5.1.1 below), lying adjacent to the stream.
"Impervious Cover" means any manmade paved, hardened or structural surface regardless of material. Impervious cover includes but is not limited to rooftops, buildings, streets, roads, decks, swimming pools and any concrete or asphalt.
"Land Development" means any land change, including but not limited to clearing, grubbing, stripping, removal of vegetation, dredging, grading, excavating, transporting and filling of land, construction, paving and any other installation of impervious cover.
"Land Development Activity" means those actions or activities which comprise, facilitate or result in land development.
"Land Disturbance" means any land or vegetation change, including, but not limited to, clearing, grubbing, stripping, removal of vegetation, dredging, grading, excavating, transporting and filling of land, that do not involve construction, paving or any other installation of impervious cover.
"Land Disturbance Activity" means those actions or activities which comprise, facilitate or result in land disturbance.
"Floodplain" means any land area susceptible to flooding, which would have at least a one percent probability of flooding occurrence in any calendar year based on the basin being fully developed as shown on the current land use plan; i.e., the regulatory flood.
"Parcel" means any plot, lot or acreage shown as a unit on the latest county tax assessment records.
"Permit" means the permit issued by the **(local permitting authority)** required for undertaking any land development activity
"Person" means any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, any interstate body or any other legal entity.
"Protection Area, or Stream Protection Area" means, with respect to a stream, the combined areas of all required buffers and setbacks applicable to such stream.
"Riparian" means belonging or related to the bank of a river, stream, lake, pond or impoundment.
"Setback" means, with respect to a stream, the area established by Section 5.1.2 extending beyond any buffer applicable to the stream.
"Stream" means any stream, beginning at:
1. The location of a spring, seep, or groundwater outflow that sustains streamflow; or

2. A point in the stream channel with a drainage area of 25 acres or more; or
3. Where evidence indicates the presence of a stream in a drainage area of other than 25 acres, the **(local permitting authority)** may require field studies to verify the existence of a stream.

➲*As a long-term goal, the local jurisdiction can also map its perennial and intermittent streams through field work, prioritizing basins and developing information as time, staffing and budgets permit.*

"Stream Bank" means the sloping land that contains the stream channel and the normal flows of the stream.

"Stream Channel" means the portion of a watercourse that contains the base flow of the stream.

"Watershed" means the land area that drains into a particular stream.

SECTION 4. APPLICABILITY

This ordinance shall apply to all land development activity on property containing a stream protection area as defined in Section 3 of this ordinance. These requirements are in addition to, and do not replace or supersede, any other applicable buffer requirements established under state law and approval or exemption from these requirements do not constitute approval or exemption from buffer requirements established under state law or from other applicable local, state or federal regulations.

4.1. Grandfather Provisions

This ordinance shall not apply to the following activities:

(1) Work consisting of the repair or maintenance of any lawful use of land that is zoned and approved for such use on or before the effective date of this ordinance.

(2) Existing development and on-going land disturbance activities including but not limited to existing agriculture, silviculture, landscaping, gardening and lawn maintenance, except that new development or land disturbance activities on such properties will be subject to all applicable buffer requirements.

(3) Any land development activity that is under construction, fully approved for development, scheduled for permit approval or has been submitted for approval as of the effective date of this ordinance.

(4) Land development activity that has not been submitted for approval, but that is part of a larger master development plan, such as for an office park or other phased development that has been previously approved within two years of the effective date of this ordinance.

4.2. Exemptions

The following specific activities are exempt from this ordinance. Exemption of these activities does not constitute an exemption for any other activity proposed on a property.

(1) Activities for the purpose of building one of the following:
- a stream crossing by a driveway, transportation route or utility line;
- public water supply intake or public wastewater outfall structures;
- intrusions necessary to provide access to a property;
- public access facilities that must be on the water including boat ramps, docks, foot trails leading directly to the river, fishing platforms and overlooks;
- unpaved foot trails and paths;
- activities to restore and enhance stream bank stability, vegetation, water quality and/or aquatic habitat, so long as native vegetation and bioengineering techniques are used.

(2) Public sewer line easements paralleling the creek, except that all easements (permanent and construction) and land disturbance should be at least 25 feet from the top of the bank. This includes such impervious cover as is necessary for the operation and maintenance of the utility, including but not limited to manholes, vents and valve structures. This exemption shall not be construed as allowing the construction of roads, bike paths or other transportation routes in such easements, regardless of paving material, except for access for the uses specifically cited in Item 4.2.(1), above.

(3) Land development activities within a right-of-way existing at the time this ordinance takes effect or approved under the terms of this ordinance.

(4) Within an easement of any utility existing at the time this ordinance takes effect or approved under the terms of this ordinance, land disturbance activities and such impervious cover as is necessary for the operation and maintenance of the utility, including but not limited to manholes, vents and valve structures.

(5) Emergency work necessary to preserve life or property. However, when emergency work is performed under this section, the person performing it shall report such work to the (review and permitting authority) on the next business day after commencement of the work. Within 10 days thereafter, the person shall apply for a permit and perform such work within such time period as may be determined by the (review and permitting authority) to be reasonably necessary to correct any impairment such emergency work may have caused to the water conveyance capacity, stability or water quality of the protection area.

(6) Forestry and silviculture activities on land that is zoned for forestry, silvicultural or agricultural uses and are not incidental to other land development activity. If such activity results in land disturbance in the buffer that would otherwise be prohibited, then no other land disturbing activity other than normal forest management practices will be allowed on the entire property for three years after the end of the activities that intruded on the buffer.

➲*Unless specifically provided for in a State law, local governments generally do not have permitting or enforcement authority over State and Federal departments, agencies and authorities. Local governments need to address these issues in the context of their overall permitting and enforcement regulations and provide for reporting observed problems, first to the agency performing the activity, then, if no corrective action results, to Georgia EPD.*

After the effective date of this ordinance, it shall apply to new subdividing and platting activities.

Any land development activity within a buffer established hereunder or any impervious cover within a setback established hereunder is prohibited unless a variance is granted pursuant to Section 5.2 below.

SECTION 5. LAND DEVELOPMENT REQUIREMENTS

5.1. Buffer and Setback Requirements

All land development activity subject to this ordinance shall meet the following requirements:

(1) An undisturbed natural vegetative buffer shall be maintained for 50 feet, measured horizontally, on both banks (as applicable) of the stream as measured from the top of the stream bank.

➲*The top of the bank is often a clearer landmark than the edge of the water or the end of vegetation, particularly on intermittent streams. The land forming the bank is also considered part of the buffer for purposes of this ordinance.*

(2) An additional setback shall be maintained for 25 feet, measured horizontally, beyond the undisturbed natural vegetative buffer, in which all impervious cover shall be prohibited. Grading, filling and earthmoving shall be minimized within the setback.

➲*Any buffer and setback widths that may be listed are intended as minimums. Local governments are encouraged to adopt wider buffers and setbacks as necessary. A local government has many options in developing wider buffers. One method would be to increase the width as the stream drainage basin increases in size, as Cobb County does. Another method is to offer incentives for voluntary wider buffers. For example, Clayton County allows developers to offset proposed land development with deeper buffers as an alternative to using other stormwater controls.*

(3) No septic tanks or septic tank drain fields shall be permitted within the buffer or the setback.

5.2. VARIANCE PROCEDURES

Variances from the above buffer and setback requirements may be granted in accordance with the following provisions:

(1) Where a parcel was platted prior to the effective date of this ordinance, and its shape, topography or other existing physical condition prevents land development consistent with this ordinance, and the **(review and permitting authority)** finds and determines that the requirements of this ordinance prohibit the otherwise lawful use of the property by the owner, the **(appeals board)** of **(local jurisdiction)** may grant a variance from the buffer and setback requirements hereunder, provided such variance require mitigation measures to offset the effects of any proposed land development on the parcel.

(2) Except as provided above, the **(appeals board)** of **(local jurisdiction)** shall grant no variance from any provision of this ordinance without first conducting a public hearing on the application for variance and authorizing the granting of the variance by an affirmative vote of the **(appeals board)**. The **(local jurisdiction)** shall give public notice of each such public hearing in a newspaper of general circulation within **(local jurisdiction)**. The **(local jurisdiction)** shall require that the applicant post a sign giving notice of the proposed variance and the public hearing. The sign shall be of a size and posted in such a location on the property as to be clearly visible from the primary adjacent road right-of-way. Variances will be considered only in the following cases:

(a) When a property's shape, topography or other physical conditions existing at the time of the adoption of this ordinance prevents land development unless a buffer variance is granted.

(b) Unusual circumstances when strict adherence to the minimal buffer requirements in the ordinance would create an extreme hardship.

Variances will not be considered when, following adoption of this ordinance, actions of any property owner of a given property have created conditions of a hardship on that property.

(3) At a minimum, a variance request shall include the following information:

(a) A site map that includes locations of all streams, wetlands, floodplain boundaries and other natural features, as determined by field survey;

(b) A description of the shape, size, topography, slope, soils, vegetation and other physical characteristics of the property;

(c) A detailed site plan that shows the locations of all existing and proposed structures and other impervious cover, the limits of all existing and proposed land disturbance, both

inside and outside the buffer and setback. The exact area of the buffer to be affected shall be accurately and clearly indicated;

(d) Documentation of unusual hardship should the buffer be maintained;

(e) At least one alternative plan, which does not include a buffer or setback intrusion, or an explanation of why such a site plan is not possible;

(f) A calculation of the total area and length of the proposed intrusion;

(g) A stormwater management site plan, if applicable; and,

(h) Proposed mitigation, if any, for the intrusion. If no mitigation is proposed, the request must include an explanation of why none is being proposed.

(4) The following factors will be considered in determining whether to issue a variance:

(a) The shape, size, topography, slope, soils, vegetation and other physical characteristics of the property;

(b) The locations of all streams on the property, including along property boundaries;

(c) The location and extent of the proposed buffer or setback intrusion; and,

(d) Whether alternative designs are possible which require less intrusion or no intrusion;

(e) The long-term and construction water-quality impacts of the proposed variance;

(f) Whether issuance of the variance is at least as protective of natural resources and the environment.

SECTION 6. COMPATIBILITY WITH OTHER BUFFER REGULATIONS AND REQUIREMENTS

This ordinance is not intended to interfere with, abrogate or annul any other ordinance, rule or regulation, statute or other provision of law. The requirements of this ordinance should be considered minimum requirements, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule, regulation or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

➲*Examples of existing legislation and regulations include:*

Metropolitan River Protection Act and Chattahoochee Corridor Plan

Requires a 50-foot undisturbed vegetative buffer and 150-foot impervious surface setback on the Chattahoochee and its impoundments and a 35-foot undisturbed vegetative buffer (all measured from the edge of the water) on perennial tributary streams in a Corridor extending 2000 feet from either bank of the river and its impoundments. The Corridor extends from Buford Dam to the downstream limits of the Atlanta region (Douglas and Fulton Counties). Streams in the basin of the Corridor are required to be protected by buffers, but no required width is specified. (Georgia Code 12-5-440 et seq.)

DNR Part 5 Criteria for Small (under 100 square miles) Water Supply Watersheds

Authorized under Part V of the Georgia Planning Act of 1989, these criteria require 100-foot undisturbed buffers and 150-foot setbacks on all perennial streams within 7 miles upstream of a public water supply reservoir or public water supply intake. Beyond 7 miles, the required buffer is 50 feet and the required setback is 75 feet. Equivalent protection measures can be adopted with approval from Georgia DCA and DNR.

DNR Part 5 Criteria for River Protection

Authorized under the 1991 Mountains and River Corridors Protection Act of 1991, these criteria require a 100-foot buffer along rivers with average annual flows of greater than 400 cfs

(excepting the portion of the Chattahoochee referenced above). The buffer is measured from the top of the stream bank.

These examples are partial descriptions of more extensive regulations as of July, 2002. They represent only three of the stricter regulations that already exist.

➲ *While the requirements of this ordinance are intended to apply to all streams in (local jurisdiction), special conditions may exist that require greater protection. Nothing in this ordinance should be construed as preventing the establishment of wider and/or more restrictive buffers and setbacks as required under any other existing or future legislation. In addition, nothing in this ordinance should be construed as preventing the establishment of wider buffers for purposes of protecting greenspace, preserving habitat or other goals that may not be specifically mandated by legislation.*

SECTION 7. ADDITIONAL INFORMATION REQUIREMENTS FOR DEVELOPMENT ON BUFFER ZONE PROPERTIES

Any permit applications for property requiring buffers and setbacks hereunder must include the following:

(1) A site plan showing:
- (a) The location of all streams on the property;
- (b) Limits of required stream buffers and setbacks on the property;
- (c) Buffer zone topography with contour lines at no greater than five (5)-foot contour intervals;
- (d) Delineation of forested and open areas in the buffer zone; and,
- (e) Detailed plans of all proposed land development in the buffer and of all proposed impervious cover within the setback;

(2) A description of all proposed land development within the buffer and setback; and,

(3) Any other documentation that the (review and permitting authority) may reasonably deem necessary for review of the application and to insure that the buffer zone ordinance is addressed in the approval process.

All buffer and setback areas must be recorded on the final plat of the property following plan approval.

SECTION 8. RESPONSIBILITY

Neither the issuance of a development permit nor compliance with the conditions thereof, nor with the provisions of this ordinance shall relieve any person from any responsibility otherwise imposed by law for damage to persons or property; nor shall the issuance of any permit hereunder serve to impose any liability upon (local jurisdiction), its officers or employees, for injury or damage to persons or property.

SECTION 9. INSPECTION

The (review and permitting authority) may cause inspections of the work in the buffer or setback to be made periodically during the course thereof and shall make a final inspection following completion of the work. The permittee shall assist the (review and permitting authority) in making such inspections. The (local jurisdiction) shall have the authority to conduct such investigations as it may reasonably deem necessary to carry out its duties as prescribed in this ordinance, and for this purpose to enter at reasonable time upon any property, public or private, for the purpose of investigating and inspecting the sites of any land development activities within the protection area.

No person shall refuse entry or access to any authorized representative or agent who requests entry for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper or interfere with any such representative while in the process of carrying out official duties.

SECTION 10. VIOLATIONS, ENFORCEMENT AND PENALTIES

Any action or inaction which violates the provisions of this ordinance or the requirements of an approved site plan or permit may be subject to the enforcement actions outlined in this Section. Any such action or inaction which is continuous with respect to time is deemed to be a public nuisance and may be abated by injunctive or other equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief.

10.1. Notice of Violation

If the **(review and permitting authority)** determines that an applicant or other responsible person has failed to comply with the terms and conditions of a permit, an approved site plan or the provisions of this ordinance, it shall issue a written notice of violation to such applicant or other responsible person. Where a person is engaged in activity covered by this ordinance without having first secured the appropriate permit therefor, the notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the site. The notice of violation shall contain:

(1) The name and address of the owner or the applicant or the responsible person;
(2) The address or other description of the site upon which the violation is occurring;
(3) A statement specifying the nature of the violation;
(4) A description of the remedial measures necessary to bring the action or inaction into compliance with the permit, the approved site plan or this ordinance and the date for the completion of such remedial action;
(5) A statement of the penalty or penalties that may be assessed against the person to whom the notice of violation is directed; and,
(6) A statement that the determination of violation may be appealed to the **(review and permitting authority)** by filing a written notice of appeal within thirty (30) days after the notice of violation (except that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient).

10.2. Penalties

In the event the remedial measures described in the notice of violation have not been completed by the date set forth for such completion in the notice of violation, any one or more of the following actions or penalties may be taken or assessed against the person to whom the notice of violation was directed. Before taking any of the following actions or imposing any of the following penalties, the **(review and permitting authority)** shall first notify the applicant or other responsible person in writing of its intended action, and shall provide a reasonable opportunity, of not less than ten days (except that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) to cure such violation. In the event the applicant or other responsible person fails to cure such violation after such notice and cure period, the **(review and permitting authority)** may take any one or more of the following actions or impose any one or more of the following penalties.

(1) **Stop Work Order -** The **(review and permitting authority)** may issue a stop work order which shall be served on the applicant or other responsible person. The stop work order shall

remain in effect until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violation or violations described therein, provided the stop work order may be withdrawn or modified to enable the applicant or other responsible person to take necessary remedial measures to cure such violation or violations.

(2) **Withhold Certificate of Occupancy -** The **(review and permitting authority)** may refuse to issue a certificate of occupancy for the building or other improvements constructed or being constructed on the site until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein.

(3) **Suspension, Revocation or Modification of Permit -** The **(review and permitting authority)** may suspend, revoke or modify the permit authorizing the land development project. A suspended, revoked or modified permit may be reinstated after the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein, provided such permit may be reinstated (upon such conditions as the **(review and permitting authority)** may deem necessary) to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.

(4) **Civil Penalties -** In the event the applicant or other responsible person fails to take the remedial measures set forth in the notice of violation or otherwise fails to cure the violations described therein within ten days (or such greater period as the **(review and permitting authority)** shall deem appropriate) (except that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) after the **(review and permitting authority)** has taken one or more of the actions described above, the **(review and permitting authority)** may impose a penalty not to exceed $1,000 (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the notice of violation.

(5) **Criminal Penalties -** For intentional and flagrant violations of this ordinance, the **(review and permitting authority)** may issue a citation to the applicant or other responsible person, requiring such person to appear in **(appropriate municipal, magistrate or recorders)** court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not to exceed $1,000 or imprisonment for 60 days or both. Each act of violation and each day upon which any violation shall occur shall constitute a separate offense.

SECTION 11. ADMINISTRATIVE APPEAL AND JUDICIAL REVIEW

11.1. Administrative Appeal

Any person aggrieved by a decision or order of (review and permitting authority), may appeal in writing within ___ days after the issuance of such decision or order to the (designated official) of (local jurisdiction) and shall be entitled to a hearing before the (designated appeals body) of (local jurisdiction) within __ days of receipt of the written appeal.

11.2. Judicial Review

Any person aggrieved by a decision or order of (review and permitting authority), after exhausting all administrative remedies, shall have the right to appeal de novo to the __ court of (appropriate jurisdiction).

SECTION 12. SEVERABILITY

If any article, section, subsection, paragraph, clause, phrase or provision of this ordinance shall be adjudged invalid or held unconstitutional, such decision shall not affect or invalidate the remaining portions of this ordinance.

APPENDIX A4 – MODEL ILLICIT DISCHARGE AND ILLEGAL CONNECTION ORDINANCE

DESCRIPTION:

An illicit discharge is defined as any discharge to a municipal or county separate storm sewer system (stormwater drainage system) that is not composed entirely of stormwater runoff (except for discharges allowed under an NPDES permit or non-polluting flows). These non-stormwater discharges occur due to illegal dumping or illegal connections to the stormwater drainage system. This model ordinance provides communities with the authority to deal with illicit discharges and establishes enforcement actions for those persons or entities found to be in noncompliance or that refuse to allow access to their facilities.

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Note: Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the local government in tailoring the ordinance. This text would not appear in a final adopted ordinance.

INTRODUCTION

It is hereby determined that:

Discharges to the (municipal/county) separate storm sewer system that are not composed entirely of stormwater runoff contribute to increased nonpoint source pollution and degradation of receiving waters;

These non-stormwater discharges occur due to spills, dumping and improper connections to the (municipal/county) separate storm sewer system from residential, industrial, commercial or institutional establishments.

These non-stormwater discharges not only impact waterways individually, but geographically dispersed, small volume non-stormwater discharges can have cumulative impacts on receiving waters.

The impacts of these discharges adversely affect public health and safety, drinking water supplies, recreation, fish and other aquatic life, property values and other uses of lands and waters;

These impacts can be minimized through the regulation of spills, dumping and discharges into the (municipal/county) separate storm sewer system;

Localities in the State of Georgia are required to comply with a number of State and Federal laws, regulations and permits which require a locality to address the impacts of stormwater runoff quality and nonpoint source pollution due to improper non-stormwater discharges to the (municipal/county) separate storm sewer system;

Therefore, the **(local enforcement authority)** adopts this ordinance to prohibit such non-stormwater discharges to the (municipal/county) separate storm sewer system. It is determined that the regulation of spills, improper dumping and discharges to the (municipal/county) separate storm sewer system is in the public interest and will prevent threats to public health and safety, and the environment.

SECTION 1. GENERAL PROVISIONS

1.1. Purpose and Intent

The purpose of this ordinance is to protect the public health, safety, environment and general welfare through the regulation of non-stormwater discharges to the (municipal/county) separate storm sewer system to the maximum extent practicable as required by Federal law. This ordinance establishes methods for controlling the introduction of pollutants into the (municipal/county) separate storm sewer system in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are to:

(1) Regulate the contribution of pollutants to the (municipal/county) separate storm sewer system by any person;
(2) Prohibit illicit discharges and illegal connections to the (municipal/county) separate storm sewer system;
(3) Prevent non-stormwater discharges, generated as a result of spills, inappropriate dumping or disposal, to the (municipal/county) separate storm sewer system; and,
(4) To establish legal authority to carry out all inspection, surveillance, monitoring and enforcement procedures necessary to ensure compliance with this ordinance

1.2. Applicability

The provisions of this ordinance shall apply throughout the (corporate/other) area of (local government).

1.3. Compatibility with Other Regulations

This ordinance is not intended to modify or repeal any other ordinance, rule, regulation, other provision of law. The requirements of this ordinance are in addition to the requirements of any other ordinance, rule, regulation, or other provision of law, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule, regulation, or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control.

1.4. Severability

If the provisions of any section, subsection, paragraph, subdivision or clause of this ordinance shall be adjudged invalid by a court of competent jurisdiction, such judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision or clause of this ordinance.

1.5. Responsibility for Administration

The **(local enforcement authority)** shall administer, implement, and enforce the provisions of this ordinance.

➲ *The local government may wish to explicitly designate the head of the local enforcement authority or his/her designee here to administer this ordinance.*

SECTION 2. DEFINITIONS

"**Accidental Discharge**" means a discharge prohibited by this ordinance which occurs by chance and without planning or thought prior to occurrence.
"**Clean Water Act**" means the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.
"**Construction Activity**" means activities subject to the Georgia Erosion and Sedimentation Control Act or NPDES General Construction Permits. These include construction projects resulting in land disturbance. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.
"**Illicit Discharge**" means any direct or indirect non-stormwater discharge to the (municipal/county) separate storm sewer system, except as exempted in Section 3 of this ordinance.
"**Illegal Connection**" means either of the following:

(a) Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the storm drain system including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter the storm drain system, regardless of whether such pipe, open channel, drain or conveyance has been previously allowed, permitted, or approved by an authorized enforcement agency; or

(b) Any pipe, open channel, drain or conveyance connected to the (municipal/county) separate storm sewer system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

"**Industrial Activity**" means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).
"**National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit**" means a permit issued by the Georgia EPD under authority delegated pursuant to 33 USC § 1342(b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.
"**(Municipal/County) Separate Storm Sewer System**" means any facility designed or used for collecting and/or conveying stormwater, including but not limited to any roads with drainage systems, highways, (municipal/county) streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, structural stormwater controls, ditches, swales, natural and man-made or altered drainage channels, reservoirs, and other drainage structures, and which is:

(a) Owned or maintained by the **(jurisdiction)**;

(b) Not a combined sewer; and
(c) Not part of a publicly-owned treatment works.

"**Non-Stormwater Discharge**" means any discharge to the storm drain system that is not composed entirely of stormwater.

"**Person**" means, except to the extent exempted from this ordinance, any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, any interstate body or any other legal entity.

"**Pollutant**" means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

"**Pollution**" means the contamination or other alteration of any water's physical, chemical or biological properties by the addition of any constituent and includes but is not limited to, a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

"**Premises**" mean any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

"**State Waters**" means any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, and other bodies of surface and subsurface water, natural or artificial, lying within or forming a part of the boundaries of the State of Georgia which are not entirely confined and retained completely upon the property of a single person.

"**Stormwater Runoff**" or "Stormwater" means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

"**Structural Stormwater Control**" means a structural stormwater management facility or device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

SECTION 3. PROHIBITIONS

3.1. Prohibition of Illicit Discharges

No person shall throw, drain, or otherwise discharge, cause, or allow others under its control to throw, drain, or otherwise discharge into the (municipal/county) separate storm sewer system any pollutants or waters containing any pollutants, other than stormwater.

The following discharges are exempt from the prohibition provision above:

(1) Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not

including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;

(2) Discharges or flows from fire fighting, and other discharges specified in writing by the **(local enforcement authority)** as being necessary to protect public health and safety;

➲ *The local government may evaluate and remove either of the above exemptions if it is determined that they are causing adverse impacts.*

(3) The prohibition provision above shall not apply to any non-stormwater discharge permitted under an NPDES permit or order issued to the discharger and administered under the authority of the State and the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the (municipal/county) separate storm sewer system.

3.2. Prohibition of Illegal Connections

The construction, connection, use, maintenance or continued existence of any illegal connection to the (municipal/county) separate storm sewer system is prohibited.

(1) This prohibition expressly includes, without limitation, illegal connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(2) A person violates this ordinance if the person connects a line conveying sewage to the (municipal/county) separate storm sewer system, or allows such a connection to continue.

(3) Improper connections in violation of this ordinance must be disconnected and redirected, if necessary, to an approved onsite wastewater management system or the sanitary sewer system upon approval of the **(sanitary sewer department/agency)**.

(4) Any drain or conveyance that has not been documented in plans, maps or equivalent, and which may be connected to the storm sewer system, shall be located by the owner or occupant of that property upon receipt of written notice of violation from the **(local enforcement authority)** requiring that such locating be completed. Such notice will specify a reasonable time period within which the location of the drain or conveyance is to be completed, that the drain or conveyance be identified as storm sewer, sanitary sewer or other, and that the outfall location or point of connection to the storm sewer system, sanitary sewer system or other discharge point be identified. Results of these investigations are to be documented and provided to the **(local enforcement authority).**

SECTION 4. INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the **(local enforcement authority)** prior to allowing discharges to the (municipal/county) separate storm sewer system.

SECTION 5. ACCESS AND INSPECTION OF PROPERTIES AND FACILTIES

The **(local enforcement authority)** shall be permitted to enter and inspect properties and facilities at reasonable times as often as may be necessary to determine compliance with this ordinance.

(1) If a property or facility has security measures in force which require proper identification and clearance before entry into its premises, the owner or operator shall make the necessary arrangements to allow access to representatives of the **(local enforcement authority)**.

(2) The owner or operator shall allow the **(local enforcement authority)** ready access to all parts of the premises for the purposes of inspection, sampling, photography, videotaping, examination and copying of any records that are required under the conditions of an NPDES permit to discharge stormwater.

(3) The **(local enforcement authority)** shall have the right to set up on any property or facility such devices as are necessary in the opinion of the **(local enforcement authority)** to conduct monitoring and/or sampling of flow discharges.

(4) The **(local enforcement authority)** may require the owner or operator to install monitoring equipment and perform monitoring as necessary, and make the monitoring data available to the **(local enforcement authority)**. This sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the owner or operator at his/her own expense. All devices used to measure flow and quality shall be calibrated to ensure their accuracy.

(5) Any temporary or permanent obstruction to safe and easy access to the property or facility to be inspected and/or sampled shall be promptly removed by the owner or operator at the written or oral request of the **(local enforcement authority)** and shall not be replaced. The costs of clearing such access shall be borne by the owner or operator.

(6) Unreasonable delays in allowing the **(local enforcement authority)** access to a facility is a violation of this ordinance.

(7) If the **(local enforcement authority)** has been refused access to any part of the premises from which stormwater is discharged, and the **(local enforcement authority)** is able to demonstrate probable cause to believe that there may be a violation of this ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this ordinance or any order issued hereunder, or to protect the overall public health, safety, environment and welfare of the community, then the **(local enforcement authority)** may seek issuance of a search warrant from any court of competent jurisdiction.

SECTION 6. NOTIFICATION OF ACCIDENTAL DISCHARGES AND SPILLS

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the (municipal/county) separate storm sewer system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge.

Said person shall notify the authorized enforcement agency in person or by phone, facsimile or in person no later than 24 hours of the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the **(local enforcement**

authority) within three business days of the phone or in person notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years. Said person shall also take immediate steps to ensure no recurrence of the discharge or spill.

In the event of such a release of hazardous materials, emergency response agencies and/or other appropriate agencies shall be immediately notified.

Failure to provide notification of a release as provided above is a violation of this ordinance.

SECTION 7. VIOLATIONS, ENFORCEMENT AND PENALTIES

7.1. Violations

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. Any person who has violated or continues to violate the provisions of this ordinance, may be subject to the enforcement actions outlined in this section or may be restrained by injunction or otherwise abated in a manner provided by law.

In the event the violation constitutes an immediate danger to public health or public safety, the (local enforcement authority) is authorized to enter upon the subject private property, without giving prior notice, to take any and all measures necessary to abate the violation and/or restore the property. The (local enforcement authority) is authorized to seek costs of the abatement as outlined in Section 7.5.

7.2. Notice of Violation

Whenever the **(local enforcement authority)** finds that a violation of this ordinance has occurred, the **(local enforcement authority)** may order compliance by written notice of violation.

(1) The notice of violation shall contain:
- (a) The name and address of the alleged violator;
- (b) The address when available or a description of the building, structure or land upon which the violation is occurring, or has occurred;
- (c) A statement specifying the nature of the violation;
- (d) A description of the remedial measures necessary to restore compliance with this ordinance and a time schedule for the completion of such remedial action;
- (e) A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed; and,
- (f) A statement that the determination of violation may be appealed to the **(local enforcement authority)** by filing a written notice of appeal within thirty (30) days of service of notice of violation.

(2) Such notice may require without limitation:
- (a) The performance of monitoring, analyses, and reporting;
- (b) The elimination of illicit discharges and illegal connections;
- (c) That violating discharges, practices, or operations shall cease and desist;
- (d) The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
- (e) Payment of costs to cover administrative and abatement costs; and,

(f) The implementation of pollution prevention practices.

7.3. APPEAL OF NOTICE OF VIOLATION

Any person receiving a Notice of Violation may appeal the determination of the**(local enforcement authority)**. The notice of appeal must be received within thirty (30) days from the date of the Notice of Violation. Hearing on the appeal before the (local enforcement authority, or other appropriate authority) or his/her designee shall take place within 15 days from the date of receipt of the notice of appeal. The decision of the appropriate authority or their designee shall be final.

7.4. ENFORCEMENT MEASURES AFTER APPEAL

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or , in the event of an appeal, within _____ days of the decision of the appropriate authority upholding the decision of the **(local enforcement authority)**, then representatives of the **(local enforcement authority)** may enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

7.5. COSTS OF ABATEMENT OF THE VIOLATION

Within _____ days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the assessment or to the amount of the assessment within _____ days of such notice. If the amount due is not paid within thirty (30) days after receipt of the notice, or if an appeal is taken, within thirty (30) days after a decision on said appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment.

Any person violating any of the provisions of this article shall become liable to the **(jurisdiction)** by reason of such violation.

7.6. CIVIL PENALTIES

In the event the alleged violator fails to take the remedial measures set forth in the notice of violation or otherwise fails to cure the violations described therein within ten days, or such greater period as the **(local permitting authority)** shall deem appropriate, after the **(local permitting authority)** has taken one or more of the actions described above, the **(local permitting authority)** may impose a penalty not to exceed $1,000 (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the notice of violation.

7.7. CRIMINAL PENALTIES

For intentional and flagrant violations of this ordinance, the **(local permitting authority)** may issue a citation to the alleged violator requiring such person to appear in **(appropriate municipal, magistrate or recorders)** court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not to exceed $1,000 or imprisonment for 60 days or both. Each act of violation and each day upon which any violation shall occur shall constitute a separate offense.

7.8. VIOLATIONS DEEMED A PUBLIC NUISANCE

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this ordinance is a threat to public health, safety, welfare, and environment and is declared and deemed a nuisance, and may be abated by injunctive or other equitable relief as provided by law.

7.9. REMEDIES NOT EXCLUSIVE

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable Federal, State or local law and the **(local enforcement authority)** may seek cumulative remedies.

The **(local enforcement authority)** may recover attorney's fees, court costs, and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

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APPENDIX A5 – MODEL LITTER CONTROL ORDINANCE

DESCRIPTION

Litter found throughout our community often finds its way into our streams, rivers and lakes and detracts from our quality of life. Pollutants carried into our streams, rivers, and lakes by litter, diminish the quality of our water and its aquatic resources. Litter control ordinances provide a prohibition against littering and provide an enforcement mechanism with penalties for dealing with those found littering.

This ordinance is modeled on the "Georgia Litter Control Law" (O.C.G.A. § 16-7-40 et. seq.) and adoption of this ordinance is authorized by O.C.G.A. § 16-7-48.

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Note: Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the local government in tailoring the ordinance. This text would not appear in a final adopted ordinance.

SECTION 1. GENERAL PROVISIONS

1.1. Purpose and Intent

The purpose of this ordinance is to protect the public health, safety, environment, and general welfare through the regulation and prevention of litter. The objectives of this ordinance are:

(1) Provide for uniform prohibition throughout the **(jurisdiction)** of any and all littering on public or private property; and,
(2) Prevent the desecration of the beauty and quality of life of the **(jurisdiction)** and prevent harm to the public health, safety, environment, and general welfare, including the degradation of water and aquatic resources caused by litter.

1.2. Applicability

This ordinance shall apply to all public and private property within the (jurisdiction).

1.3. Compatibility with Other Regulations

This ordinance is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of this ordinance should be considered minimum requirements, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

1.4. Severability

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this ordinance.

SECTION 2. DEFINITIONS

"**Litter**" means any organic or inorganic waste material, rubbish, refuse, garbage, trash, hulls, peelings, debris, grass, weeds, ashes, sand, gravel, slag, brickbats, metal, plastic, and glass containers, broken glass, dead animals or intentionally or unintentionally discarded materials of every kind and description which are not "waste" as such term is defined in O.C.G.A., §16-7-51, paragraph 6.
"**Public or private property**" means the right of way of any road or highway; any body of water or watercourse or the shores or beaches thereof; any park, playground, building, refuge, or conservation or recreation area; timberlands or forests; and residential, commercial, industrial, or farm properties.

SECTION 3. PROHIBITION AGAINST LITTERING PUBLIC OR PRIVATE PROPERTY OR WATERS

It shall be unlawful for any person or persons to dump, deposit, throw or leave or to cause or permit the dumping, depositing, placing, throwing or leaving of litter on any public or private property in this (jurisdiction) or any waters in this (jurisdiction) unless:

(1) The property is designated by the State or by any of its agencies or political subdivisions for the disposal of such litter, and such person is authorized by the proper public authority to use such property;
(2) The litter is placed into a receptacle or container installed on such property; or,
(3) The person is the owner or tenant in lawful possession of such property, or has first obtained consent of the owner or tenant in lawful possession, or unless the act is done under the personal direction of the owner or tenant, all in a manner consistent with the public welfare.

SECTION 4. VEHICLE LOADS CAUSING LITTER

No person shall operate any motor vehicle with a load on or in such vehicle unless the load on or in such vehicle is adequately secured to prevent the dropping or shifting of materials from such load onto the roadway.

➲ *Section 4 adapted from O.C.G.A. § 40-6-254.*

SECTION 5. VIOLATIONS, ENFORCEMENT AND PENALTIES

5.1. Violations

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this ordinance. Any person who has violated or continues to violate the provisions of this ordinance, may be subject to the enforcement actions outlined in this section or may be restrained by injunction or otherwise sentenced in a manner provided by law.

5.2. Evidence

(1) Whenever litter is thrown, deposited, dropped or dumped from any motor vehicle, boat, airplane, or other conveyance in violation of this ordinance, it shall be prima facie evidence that the operator of the conveyance has violated this ordinance.

(2) Except as provided in subsection (1), whenever any litter which is dumped, deposited, thrown or left on public or private property in violation of this ordinance is discovered to contain any article or articles, including but not limited to letters, bills, publications or other writing which display the name of the person thereon in such a manner as to indicate that the article belongs or belonged to such person, it shall be a rebuttable presumption that such person has violated this ordinance.

5.3. Penalties

Any person who violates this ordinance shall be guilty of a violation and, upon conviction thereof, shall be punished as follows:

(1) By a fine of not less than $200 and not more than $1,200; and

(2) In addition to the fine set out in subsection 1 above, the violator shall reimburse the **(jurisdiction)** for the reasonable cost of removing the litter when the litter is or is ordered removed by the **(jurisdiction)**; and

(3) (A) In the sound discretion of the court, the person may be directed to pick up and remove from any public street or highway or public right-of way for a distance not to exceed one mile any litter he has deposited and any and all litter deposited thereon by anyone else prior to the date of execution of sentence; or

(B) In the sound discretion of the court, the person may be directed to pick up and remove any and all litter from any public property, private right-of-way, or with prior permission of the legal owner or tenant in lawful possession of such property, any private property upon which it can be established by competent evidence that he has deposited litter. Pick up and removal shall include any and all litter deposited thereon by anyone prior to the date of execution of sentence; and,

(4) The court may publish the names of persons convicted of violating this ordinance.

5.4. Enforcement

All law enforcement agencies, officers and officials of this state or any political subdivision thereof, or any enforcement agency, officer or any official of any commission of this state or any political subdivision thereof, are hereby authorized, empowered and directed to enforce compliance with this article.

➲ *Official Code of Georgia § 16-7-43(d) provides procedures for local governments to appoint individuals, in addition to traditional law enforcement officials, to enforce the provisions of this ordinance. The District encourages the use of this procedure to appoint individuals involved in public works, code enforcement (including local environmental code enforcement officers) or building inspection to carry out this important function.*

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Appendix B: MODEL RESULTS FROM 2003

This Appendix includes estimates of existing and future pollutant loadings that were modeled as part of the 2003 Watershed Management Plan. These results remain valid for this update of the Watershed Management Plan as future forecasts of population and watershed development do not significantly differ from the original analysis, while the current plan's management measures are estimated to offer an equivalent level of watershed protection and improvement.

Point and nonpoint source loadings were estimated using the HSPF components within the BASINS modeling platform. Potential sources of pollution include permitted point sources, septic systems, diffuse nonpoint sources, and instream contributions. BASINS-HSPF simulated information about nonpoint source, point source, and septic system loads along with pollutant exit loads from the watershed. The hydrologic model was built on the 12-digit HUC level to allow for consistent comparison of modeling results across the Metro Water District. The 2003 models calculated instream pollutant contribution using the following equation:

Instream Load = Pollutant Exit Load – Nonpoint Source Load – Septic System Load – Point Source Load

The following are the modeling results excerpted from Section 10 of the 2003 Watershed Management Plan. Figure numbering was changed along with removal of references to other sections of the 2003 Plan.

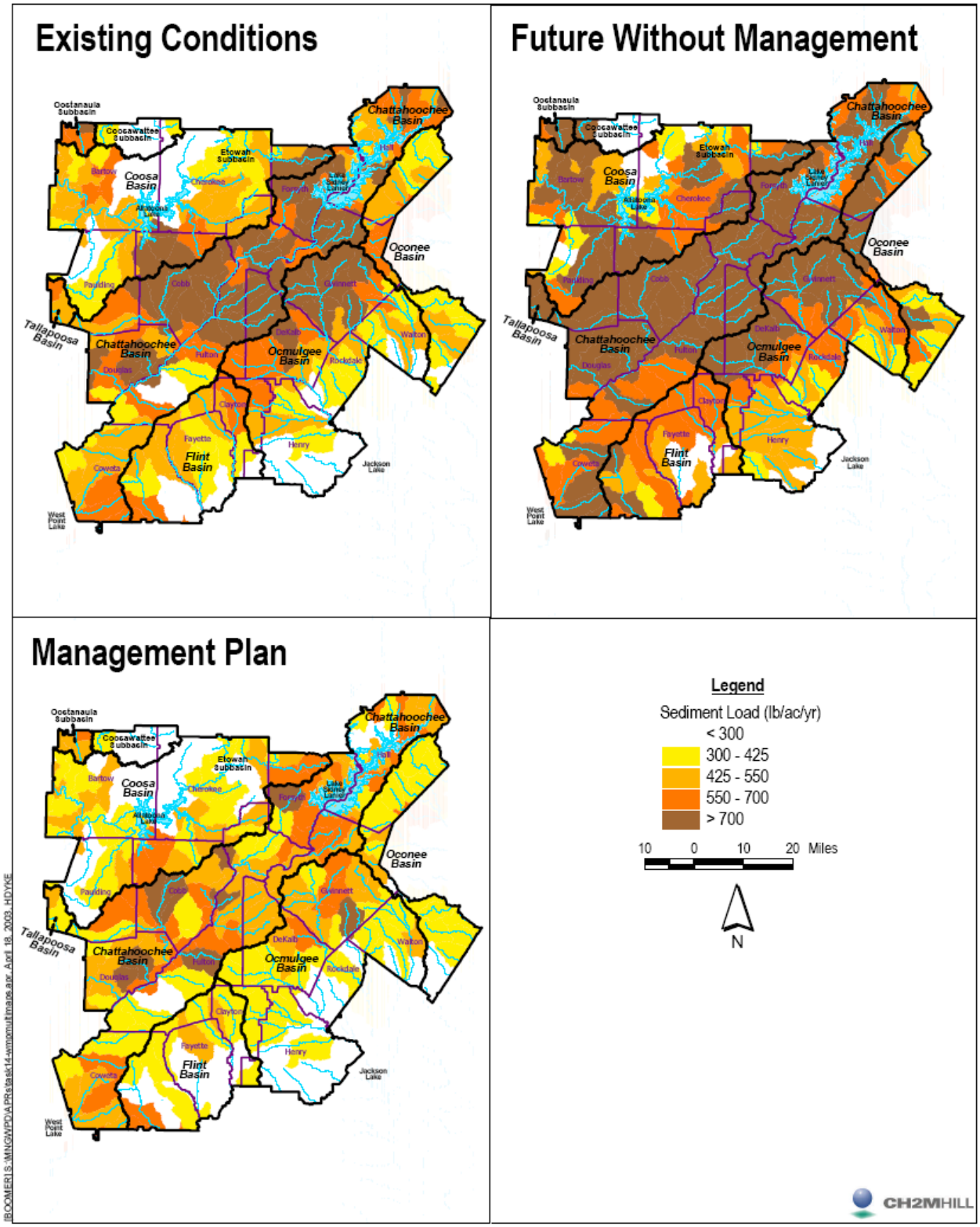
DISTRICT-WIDE RESULTS

TOTAL SUSPENDED SOLIDS

TSS is a good indicator of total nonpoint source pollutant loadings, as many of the key pollutants of concern (i.e., nutrients and metals) are directly related to TSS loadings. Figure B-1 illustrates the estimated TSS loadings under existing conditions, future conditions without additional watershed management measures, and future conditions with such measures.

The estimates of TSS loadings with the recommended management measures would result in only 10 12-digit HUCs exceeding 700 lbs/ac/yr as opposed to 122 HUCs without such management measures. This is a 90 percent reduction in the number of HUCs with TSS loads greater than 700 lbs/ac/yr from future conditions without the recommended watershed management measures. Most importantly, the Metro Water District average TSS loading rate would be reduced from 518 lbs/ac/yr under existing conditions and 676 lb/ac/yr in the future without additional watershed management measures to 406 lbs/ac/year with implementation of such measures. This results in an overall 40 percent District-wide reduction in TSS loadings between future conditions without additional watershed management measures and conditions with such measures in place.

FIGURE B-1
Comparison of TSS Modeling Results



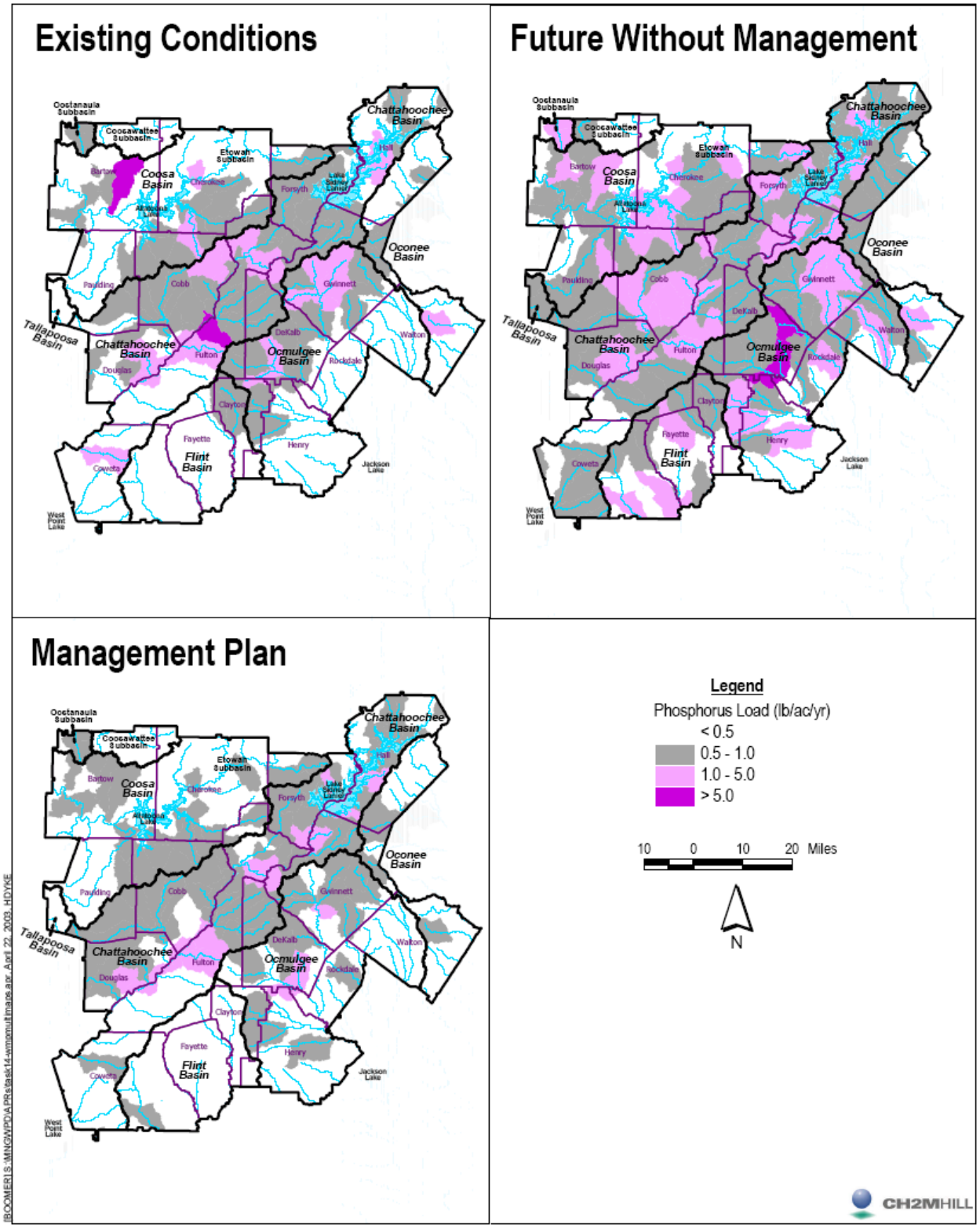
It should be noted that the primary source of TSS loadings is nonpoint source runoff and that point sources do not contribute a significant sediment load within the Metro Water District due the generally high levels of wastewater treatment.

TOTAL PHOSPHORUS

Total phosphorus (TP) is one of the primary nutrients of concern within the Metro Water District due to the potential for eutrophication of downstream lakes. Figure B-2 provides a summary of the estimated TP loads for existing conditions, future conditions without additional watershed management measures, and future conditions with such measures in place.

Under existing conditions, the estimated TP load is 0.6 lbs/ac/yr and would increase in the future without additional watershed management measures to 0.85 lbs/ac/yr. With implementation of such measures, including the recommended wastewater treatment levels, the future TP load would be 0.5 lbs/ac/yr, which is a 40 percent reduction compared to future conditions without additional watershed management measures. The District-wide WMP recommendations would result in a 25 percent reduction from nonpoint source contributions compared to future conditions without additional management measures. Due to the recommended improvements in wastewater treatment levels within the Metro Water District, implementation of the wastewater management plan would lead to more than an 85 percent reduction in TP loads from point sources in five basins (Oconee, Ocmulgee, Flint, Coosa, and Oostanaula) and no change in loadings in three basins (Upper Chattahoochee, Coosawattee, and Tallapoosa). However, there would be a 12 percent increase in the Lower Metro Chattahoochee reach, primarily due growth in this portion of the District. The level of growth would lead to greater increases in TP loading, but updated or new treatment facilities (Douglas South Central and new West Coweta Wastewater Treatment Plants [WWTPs]) will limit the projected increase.

FIGURE B-2
Comparison of Total Phosphorus Modeling Results



BASIN-SPECIFIC RESULTS

For each of the six major basins in the Metro Water District, three conditions were examined in the modeling analysis:

- Existing conditions;
- Future conditions without implementation of the additional measures described in the watershed, wastewater, and water supply management plans; and
- Future conditions with the additional measures described in the watershed, wastewater, and water supply management plans.

For conciseness, in the following discussion the terms “without future management” and “with future management” are used to describe the second and third bullet items, respectively, above.

UPPER METRO CHATTAHOOCHEE REACH

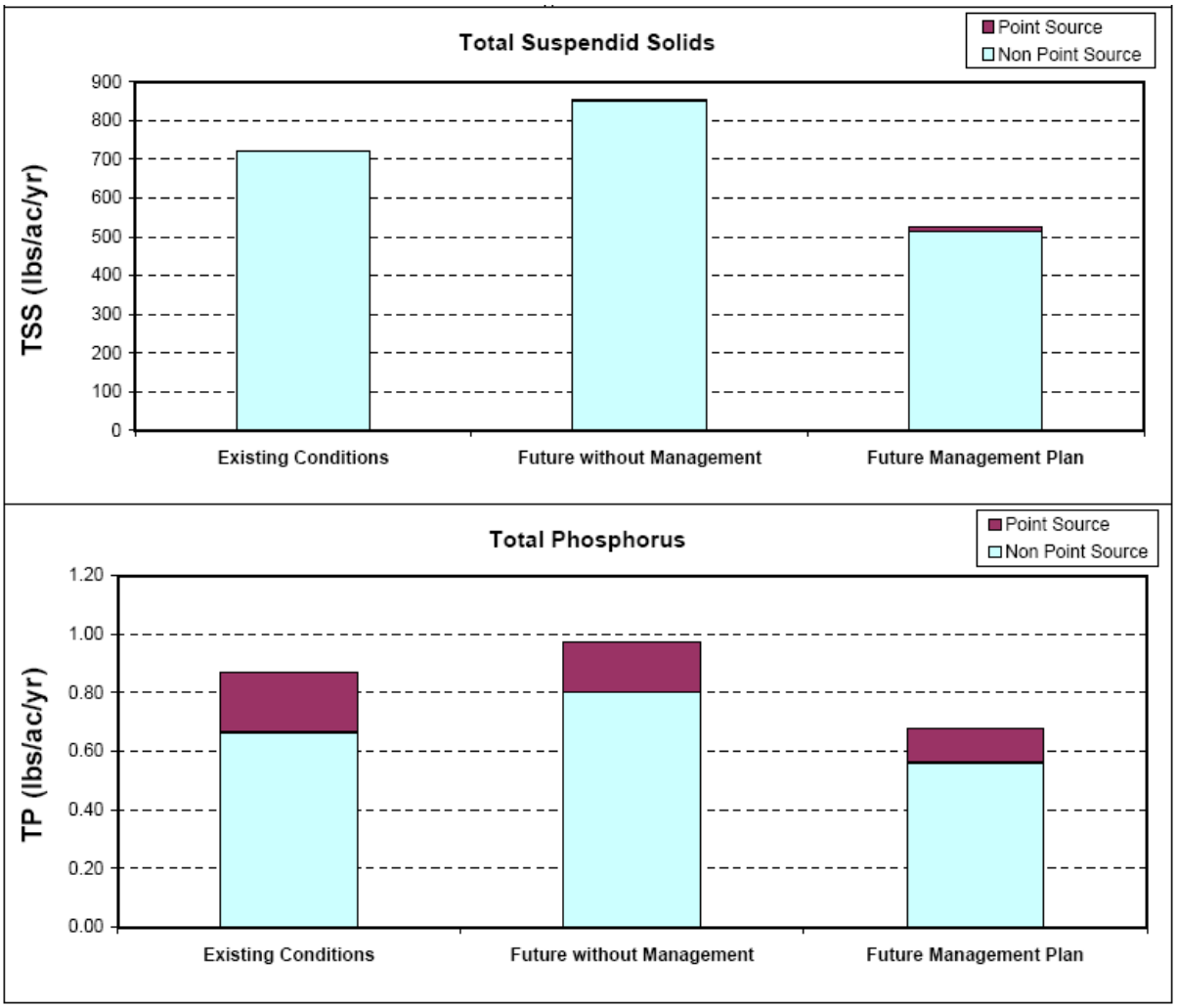
The modeling results are summarized in Figure B-3. Under current conditions, the forested and agricultural land uses comprise more than 50 percent of this watershed. In 2030, these land uses would be reduced to 30 percent of the area. This would result in a significant increase in impervious area without future management. However, with future management, including implementation of the post-development stormwater controls and watershed improvement strategies in the plan, the total EIA would be reduced to less than the existing conditions.

TSS, without future management, would increase significantly. However, with future management, TSS loading rates would be lower than currently estimated within this watershed. This reduction can be directly attributed to the recommended best management practices (BMPs) and watershed restoration activities. The majority of the TSS loadings are associated with nonpoint source runoff, with minimal contributions from point sources due to enhanced treatment technology.

Similar observations can be made for TP loadings. Without future management, including implementation of the wastewater management plan, the TP loading rate would increase by approximately 15 percent. However, with future management, the TP loading rate would be reduced by approximately 14 percent compared to existing conditions. Nonpoint source runoff would still contribute the majority of the TP loadings within this watershed in the future. The effects of the new wastewater treatment technologies (with the higher levels of nutrient removals) would result in an 18 percent point source contribution to the overall TP loads in the future. This is lower than the 25 percent contribution for point sources under existing conditions.

In summary, the combination of watershed and wastewater management activities would result in a significant reduction (approximately 18 percent from existing conditions) in the total TP loadings in the future.

FIGURE B-3
Modeling Results Summary for Upper Metro Chattahoochee Reach



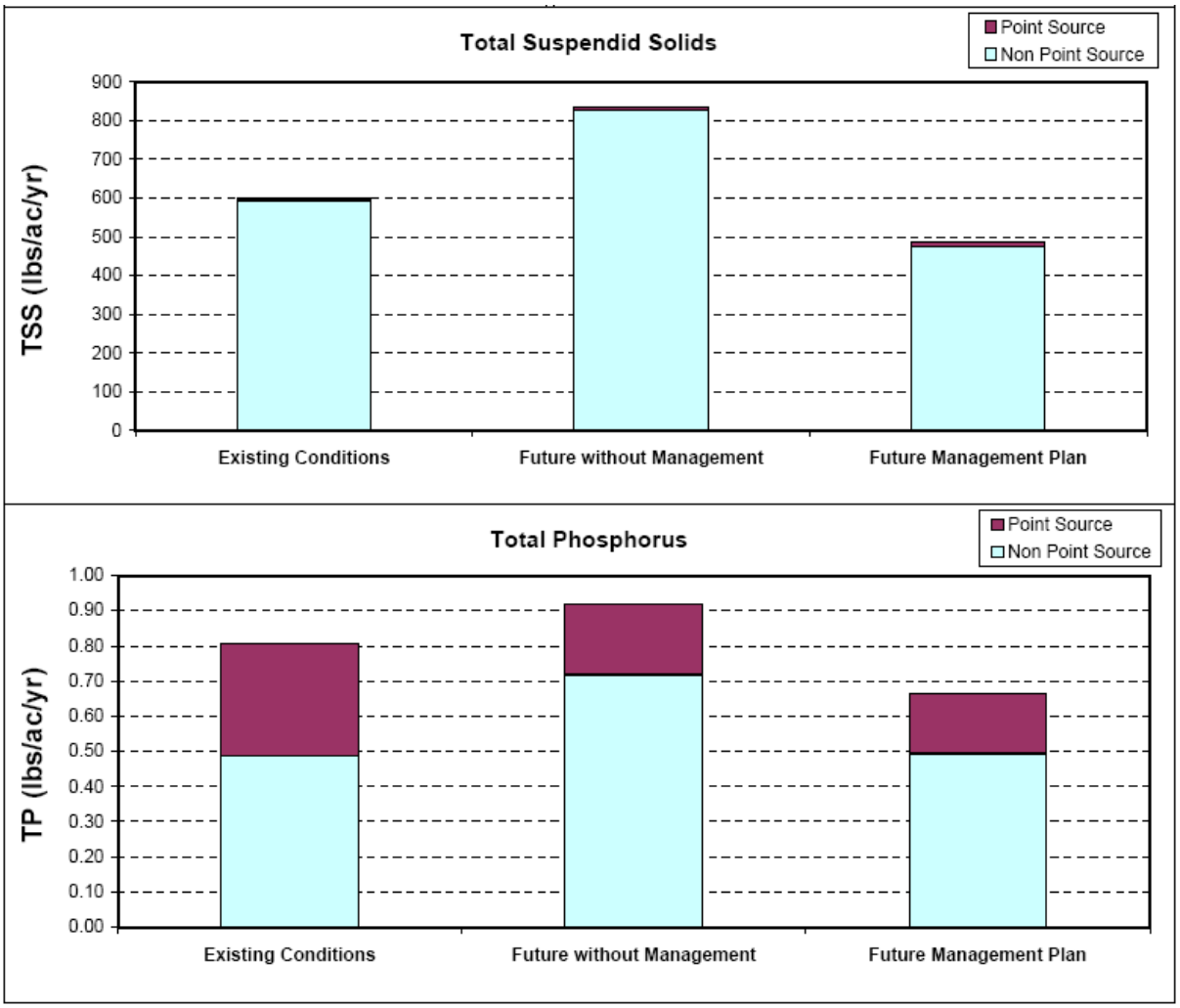
LOWER METRO CHATTAHOOCHEE REACH

The modeling results are summarized in Figure B-4. In the future, land use will shift significantly from forested and agricultural (about 70 percent under existing conditions to less than 40 percent) to residential land uses. This change would result in a 75 percent in EIA without future management. With such management, however, EIA would be only 5 percent (an increase of only 16 percent), which is well within the target of less than 10 percent EIA required to maintain a healthy watershed.

This trend is mirrored in the TSS loadings for this watershed, with an increase in loading rate of 36 percent without future management. However, with future management, there would be a decrease from existing conditions of 17 percent. This reduction would be attributable to application of stormwater controls on new development as it occurs.

For TP, the loading rate would increase (13 percent) without future management. However, with such management, the TP loadings would actually decrease. Again, this reduction in TP loadings, despite increases in development and wastewater needs, would be due to the application of BMPs and the additional nutrient removals in the upgraded treatment facilities.

FIGURE B-4
Modeling Results Summary for Lower Metro Chattahoochee Reach



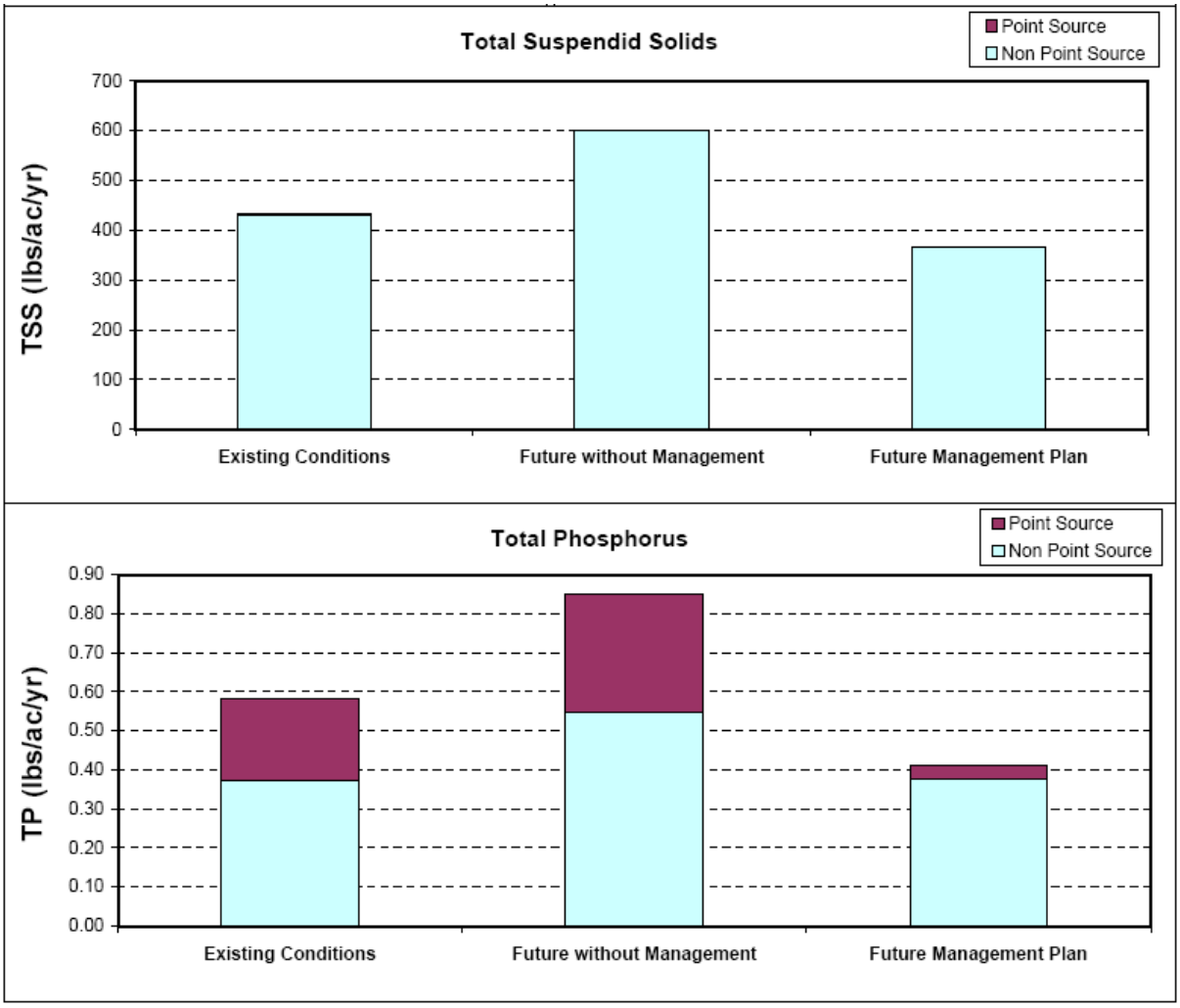
ETOWAH SUB-BASIN

The modeling results are summarized in Figure B-5. This subbasin is currently only about 20 percent developed and, therefore, the EIA is relatively low (about 3 percent). However, the land use will shift from about 60 percent open space to only about 45 percent, resulting in an increase in EIA of 86 percent without future management. This increase in EIA would be reduced to only a 36 percent increase with future management. While this is still a significant increase, the total EIA for the watershed would remain relatively low and well within the target of 10 percent.

TSS loadings would increase by 40 percent without future management; however, with future management, there would be a 13 percent decrease from existing conditions. As noted for the other basins, nonpoint source contributions make up most of the TSS loadings.

Similar trends are estimated for TP, i.e., a 47 percent increase in loadings without future management and a 28 percent decrease with future management. With implementation of the higher wastewater treatment controls and other recommendations of the District-wide plans, point sources would contribute only 10 percent of the total TP loads in the future compared to about 40 percent without the plans.

FIGURE B-5
Modeling Results Summary For Etowah (Coosa) Sub-basin



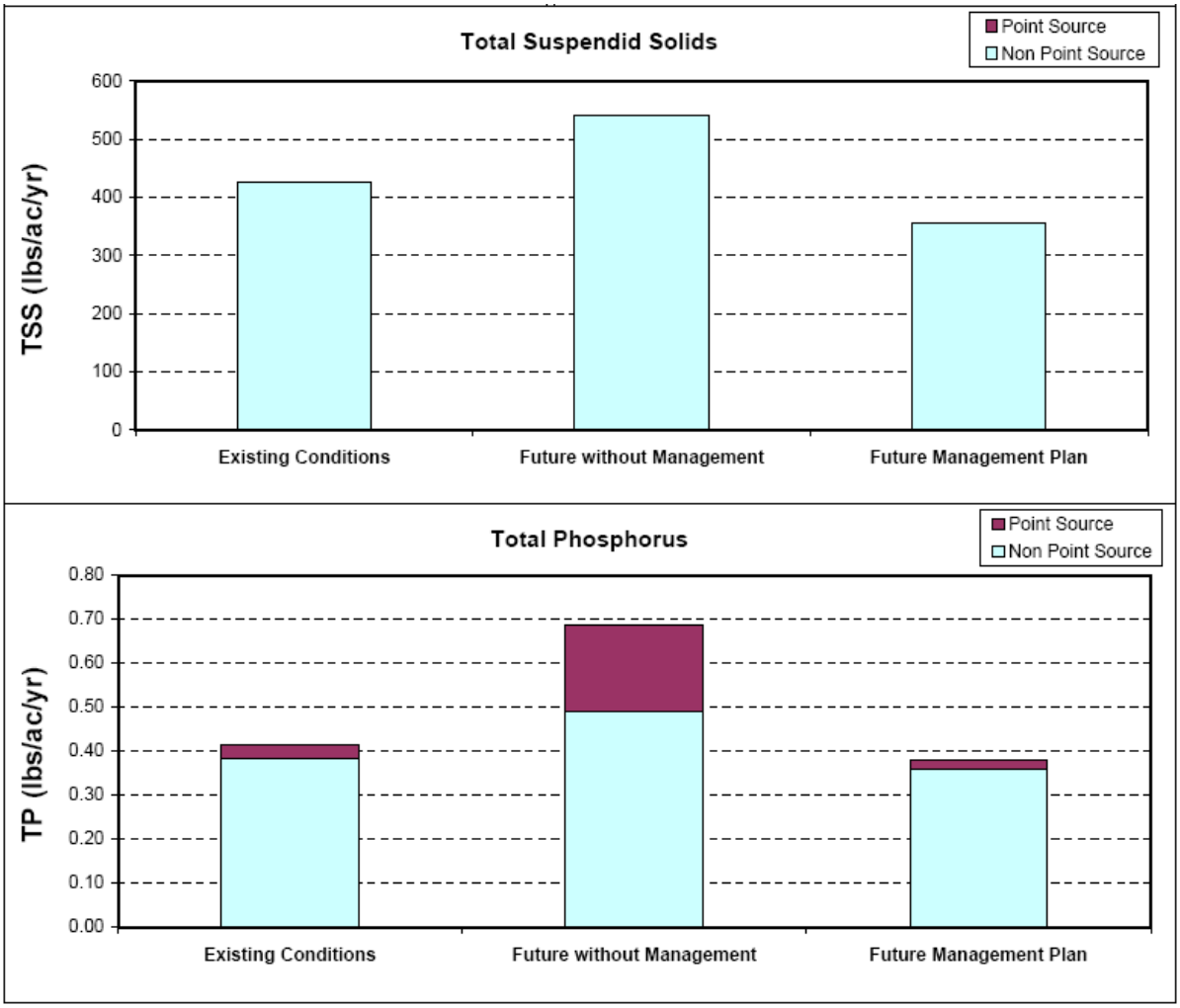
FLINT BASIN

The modeling results are summarized in Figure B-6. The trends in land use changes within the Flint basin are similar to those predicted for the other basins, with decreases in open space (forested and agricultural land uses) and significant increases in residential land use. With management, future impervious levels would be maintained at about 10 percent overall. However, there are portions of this basin, particularly in the headwaters below Hartsfield-Jackson Atlanta International Airport, that are highly impervious and would require significant retrofit to meet the watershed management goals.

Loadings for TSS would increase about 30 percent without future management; however, the TSS loadings would decrease by 12 percent with future management. Significant watershed improvement (retrofit and restoration) would be required to meet this goal, especially in the more developed headwaters.

Total phosphorus loadings would increase approximately 70 percent without future management. Much of the reduction in total loadings would result from the improved treatment technologies.

FIGURE B-6
Modeling Results Summary for Flint Basin



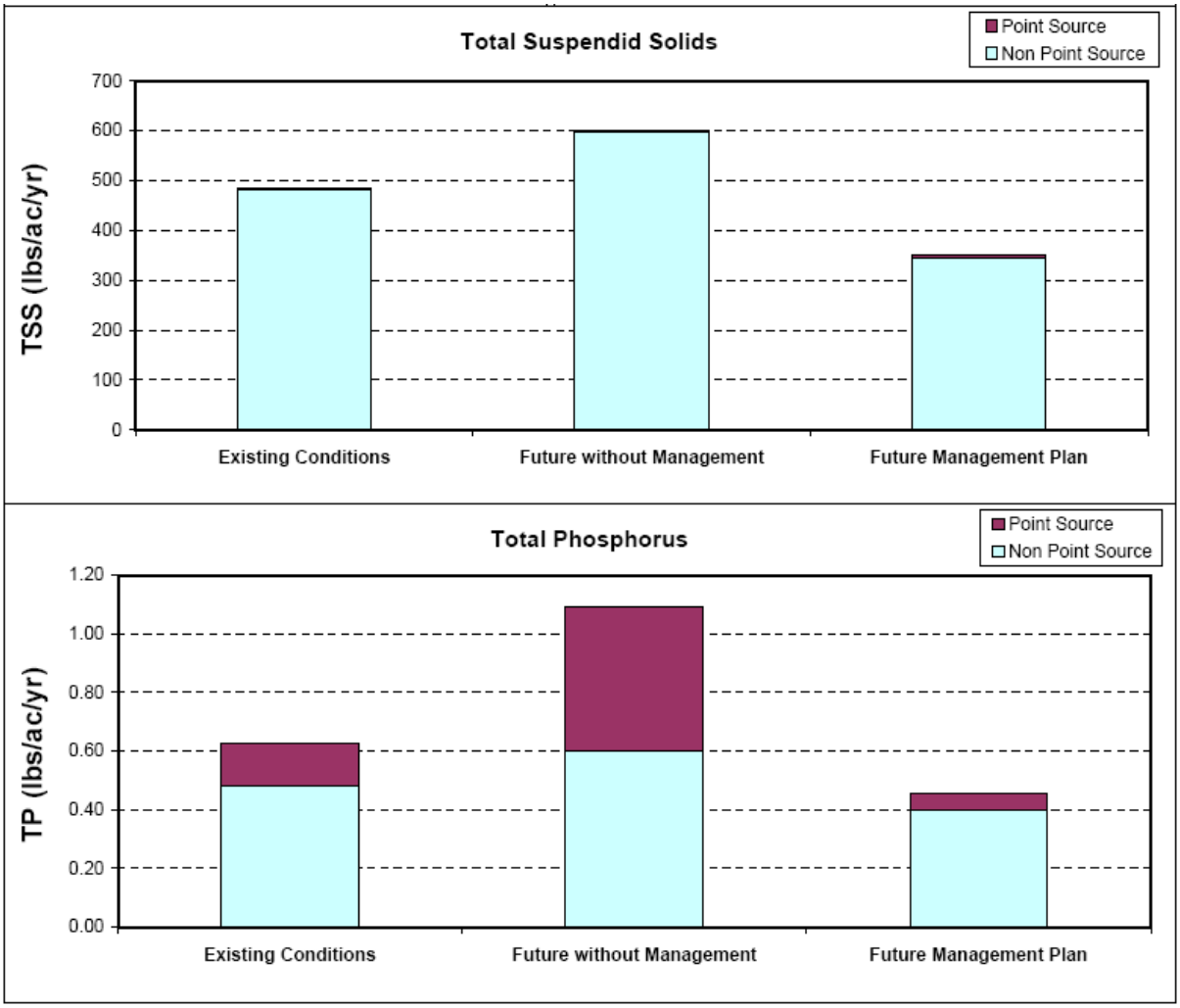
OCMULGEE BASIN

The modeling results are summarized in Figure B-7. The headwaters of the Ocmulgee (the Yellow River and South River in particular) are relatively highly developed (in portions of DeKalb and Gwinnett Counties). However, there is still significant land available for development, with approximately 45 percent of the land in forested and agricultural land uses. This could decrease to less than 35 percent in the future.

The TSS loadings in this basin would increase 25 percent without future management, but would decrease by 28 percent with future management. Much of this decrease would be associated with the watershed improvement plans for the South River watershed.

Due to the anticipated growth and increases in wastewater needs in this basin, the TP loading rates would increase by approximately 80 percent without future management. With such management, on the other hand, TP loadings would decrease by 18 percent. Much of this reduction would come from improvements in nutrient removals at the treatment facilities.

FIGURE B-7
Modeling Results Summary for Ocmulgee Basin



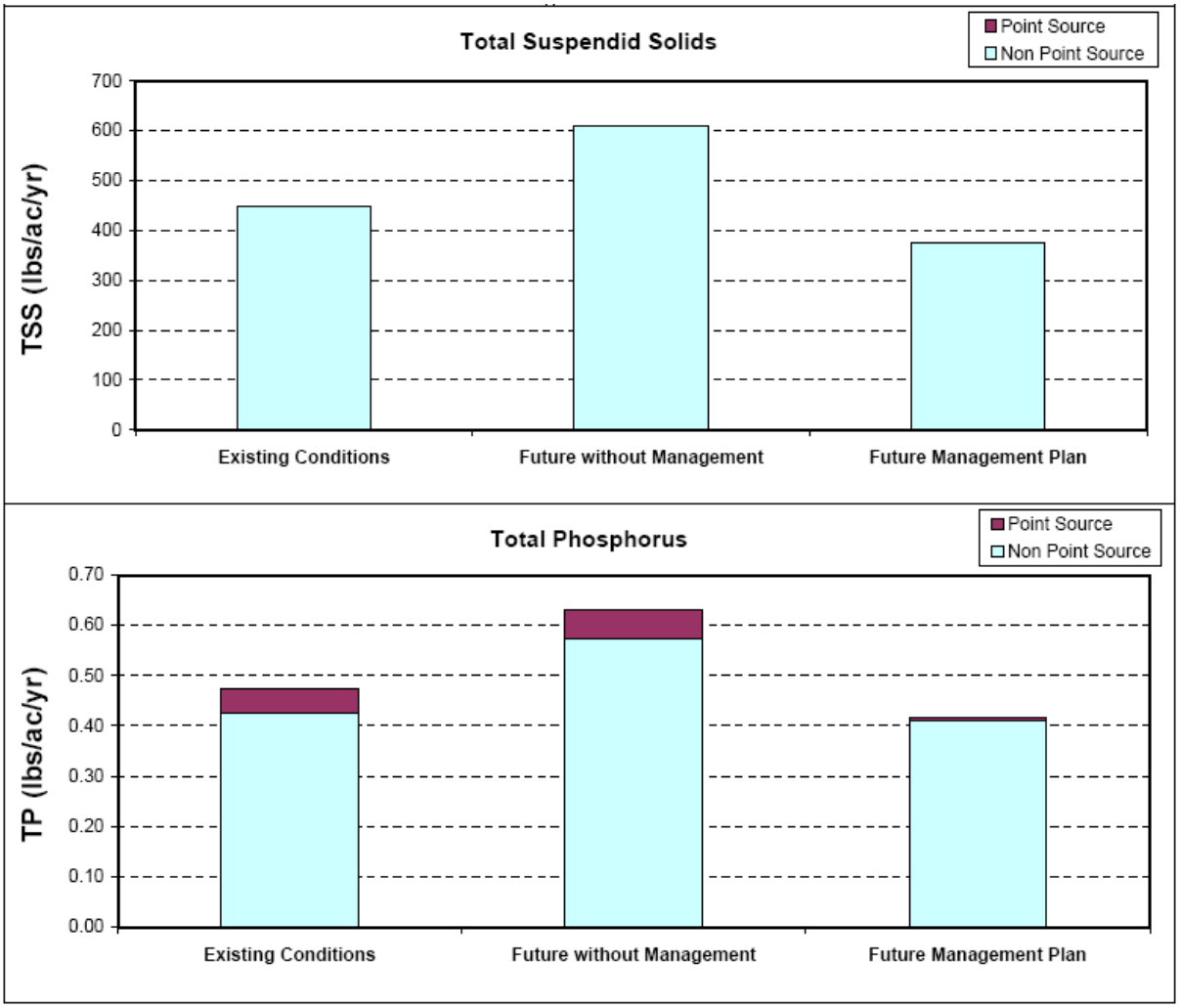
OCONEE BASIN

The modeling results are summarized in Figure B-8. Most of the upper Oconee basin within the Metro Water District is relatively undeveloped, i.e., approximately 90 percent of the existing land use is agricultural and forested. This land use is likely to decrease to about 65 percent of the basin in the future, primarily due to increases in residential land use. Without future management, the amount of EIA would more than double from 1.6 to 4.6 percent basin-wide. Future management, however, would result in an increase of EIA to only 3 percent.

TSS loadings would increase by 35 percent without future management but would decrease by 16 percent with future management. Most of the reduction would be provided by implementation of BMPs as new development is constructed.

The rate of TP loading would also increase significantly, an estimated 33 percent increase over existing conditions, without future management. However, with future management, TP loadings would decrease by 7 percent. Similar to other basins, the wastewater management plan and the associated higher nutrient removals would provide much of the TP loading reductions.

FIGURE B-8
Modeling Results Summary for Oconee Basin



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