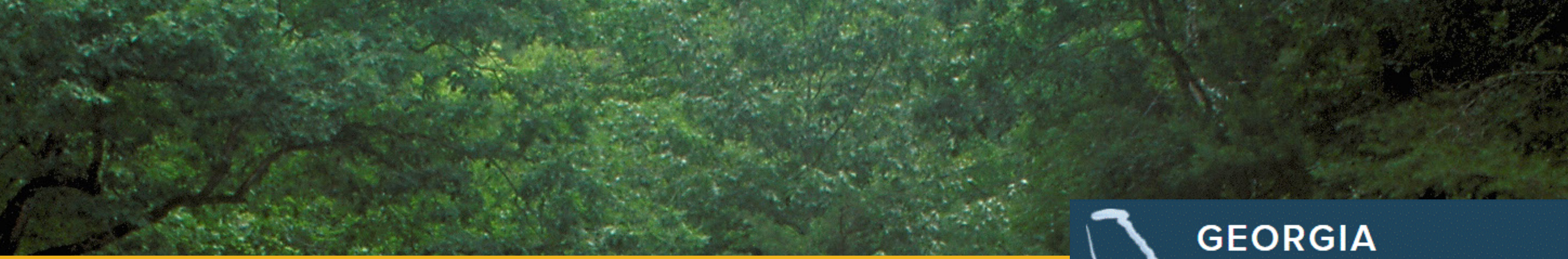

GEORGIA WATER PLANNING

Regional Water Plan

COOSA-NORTH GEORGIA

JUNE 2023

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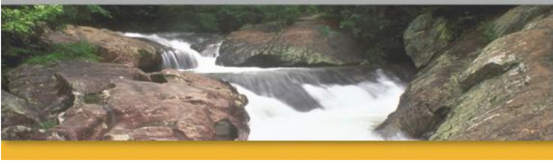

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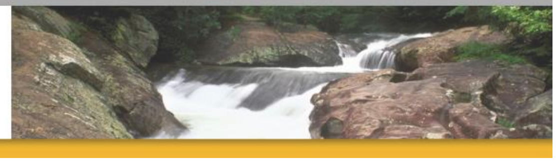
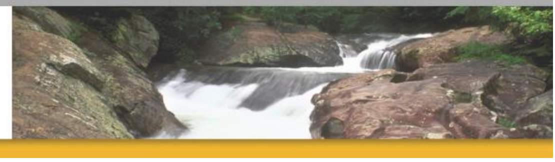
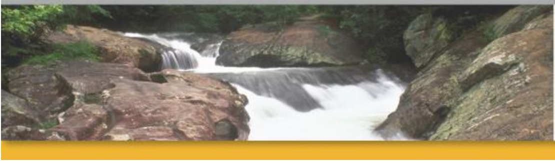
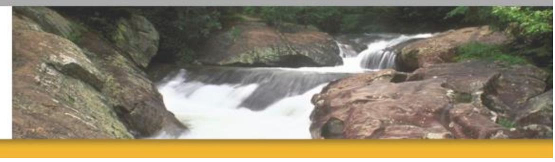




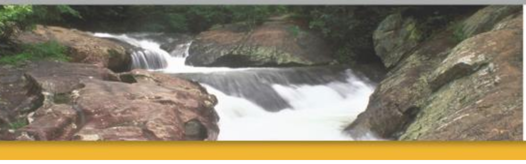
AAD-MGD	Annual Average Demand in Million Gallons Per Day
AAF-MGD	Annual Average Flow in Million Gallons Per Day
ACCG	Association of County Commissioners of Georgia
ACF	Apalachicola-Chattahoochee-Flint
ACT	Alabama-Coosa-Tallapoosa
AD	Administrative
ASR	Aquifer Storage and Recovery
BEAM	Basin Environmental Assessment Model
BMP	Best Management Practice
CFS	Cubic Feet Per Second
CNG	Coosa-North Georgia
The Council	Coosa-North Georgia Regional Water Planning Council
°F	degrees Fahrenheit
DCA	Department of Community Affairs
DO	Dissolved Oxygen
DPH	Georgia Department of Public Health
EPA	U.S. Environmental Protection Agency
EQUIP	Environmental Quality Incentives Program
ES	Executive Summary
FOG	Fats, Oils, and Grease
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division
GAP	Gap Analysis Program



GAWP	Georgia Association of Water Professionals
GEFA	Georgia Environmental Finance Authority
GEMA	Georgia Emergency Management Agency
GGIA	Georgia Green Industry Association
GMA	Georgia Municipal Association
gpcd	gallons per capita per day
gpm	gallons per minute
GRWA	Georgia Rural Water Association
GSWCC	Georgia Soil and Water Conservation Commission
HCP	Habitat Conservation Plan
HUC	hydrologic unit code
I&I	Inflow and Infiltration
LAS	Land Application System
lbs	pounds
lb/yr	pounds per year
MEAG Power	Municipal Electric Authority of Georgia
MGD	Million Gallons Per Day
mg/L	milligrams per liter
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSL	Mean Sea Level
MWh	Megawatt-hour
NESPAL	National Environmentally Sound Production Agriculture Laboratory
NLCD	National Land Cover Database
NNC	Numerical Nutrient Criteria



NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWGRC	Northwest Georgia Regional Water Planning Council
O.C.G.A.	Official Code of Georgia Annotated
OPB	Governor’s Office of Planning and Budget
Partnership	North Georgia Regional Watershed Partnership
PCB	Polychlorinated biphenyl
RC	Regional Commission
The Region	Water Planning Region
RWP	Regional Water Plans
State Water Plan	Comprehensive State-wide Water Management Plan
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WC	Water Conservation
WCIP	Water Conservation Implementation Plan
WQ	Water Quality
WRD	Wildlife Resources Division
WS	Water Supply
WW	Wastewater



Acknowledgments

The authors gratefully acknowledge the cooperation, courtesy, and contributions of the following members of the Coosa-North Georgia Regional Water Planning Council.

Name	City	County
Brooke C. Anderson	Dawsonville	Dawson
Donald Anderson Jr.	Cornelia	Habersham
Jerry Barnes	Jasper	Pickens
John Bennett	Rome	Floyd
Mike Berg	Dawsonville	Dawson
Greg Bowman	Calhoun	Gordon
Mark Buckner	Dalton	Whitfield
Eddie Cantrell	Trenton	Dade
Larry Chapman	Blue Ridge	Fannin
Keith Coffey	Ringgold	Catoosa
Jim Conley	Blairsville	Union
Jerry Crawford	Calhoun	Gordon
Kyle Ellis	Calhoun	Gordon
Keith Ethridge	Cornelia	Habersham
Robert Goff	Trenton	Dade
Terry Goodger	Cleveland	White
Mike Hackett	Rome	Floyd
Joel Hanner	Rome	Floyd
H. Haynes Johnson	Jasper	Pickens
Kevin Jones	Chatsworth	Murray
Rebecca Mason	Ringgold	Catoosa
Gary McVey	Ellijay	Gilmer
Tom S. O'Bryant	Cleveland	White
Lamar Paris	Blairsville	Union
Alex Sullivan	Eastanollee	Habersham
Scott Tidwell	Resaca	Gordon
Allison Watters	Rome	Floyd
Brandon Whitley	Flintstone	Walker
Senator Chuck Payne	(Ex-Officio)	

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EXECUTIVE SUMMARY

Executive Summary

This Regional Water Plan provides a roadmap for implementing specific measures designed to promote wise use and management of the Coosa-North Georgia (CNG) Region's water resources over the next 50 years. It focuses on five categories:

- Administrative—Overarching management practices that benefit multiple categories
- Water Conservation—Responsible use of a public resource
- Water Supply—Sustainable management of water supplies and systems
- Wastewater—Promote properly managed wastewater discharges
- Water Quality—Environmental improvements through reduced pollution

This Plan assesses the Region's current and future water and wastewater needs and describes 20 management practices that can be implemented through collaboration between local, regional, and state entities. It also presents realistic and measurable benchmarks to track short-term and long-term progress toward implementing these management practices. Table ES-1 presents an overview of the Sections of this Regional Water Plan.

Table ES-1: Overview of the Regional Water Plan

Section	Title	Overview
1	Introduction	Introduction of Regional Water Planning process and the Council
2	Coosa-North Georgia Water Planning Region	Characteristics of the Region, including geography and watersheds, aquifers, population, and land cover
3	Water Resources of the Coosa-North Georgia Region	Major water uses and baseline water resource capacities
4	Forecasting Future Water Resource Needs	Municipal, industrial, agricultural, and energy water use forecasts through 2060
5	Comparison of Water Resource Capacities and Future Needs	Groundwater and surface water (quantity and quality) comparisons and identification of potential future gaps, needs, or shortages
6	Addressing Water Needs and Regional Goals	Identified Management Practices to address future goals, shortfalls, needs, and potential gaps
7	Implementing Water Management Practices	Management Practice implementation schedules, roles of responsible parties, cost estimates, and Recommendations to the State
8	Monitoring and Reporting Progress	Benchmarks and measurement tools to track progress toward meeting goals and addressing shortfalls
9	Bibliography	Supporting and referenced materials list

Introduction

The Georgia Environmental Protection Division (GAEPD), with oversight from the Georgia Water Council, developed the first Comprehensive State-wide Water Management Plan (State Water Plan), which was adopted by the Georgia General Assembly in January 2008. The State Water Plan included a provision to create 10 water planning regions across the state, each guided by a regional water planning council. An eleventh region and council, covering the Atlanta metro area, already existed. Part of the mission of each council was to create a Regional Water Plan, and the original plan was adopted by GAEPD in September 2011.

As defined in the Water Planning Act approved by the Georgia General Assembly in 2008, the Regional Water Plans are required to be updated on a 5-year cycle. This document is the product of the second update to the original 2011 plan for the CNG water planning region. In general, the plan update process followed essentially the same overall planning process outlined in Figure 1-2, with some variances in specific steps to accommodate the schedule or available funding. Variances in the planning steps are outlined in the respective sections of the document, including water and wastewater demand forecasts (Section 4) and resource assessment modeling (Sections 3 and 5).

The CNG Council is officially comprised of 29 individuals who represent a cross-section of public and private stakeholders within 14 of the Region's 18 counties: Catoosa, Dade, Dawson, Fannin, Floyd, Gilmer, Gordon, Habersham, Murray, Pickens, Union, Walker, White, and Whitfield. No council member appointments were made during this plan update, which resulted in no representation for Chattooga, Lumpkin, Polk, or Towns Counties. The Council adopted the following vision and goals during this plan update (Table ES-2) to guide the development of this Regional Water Plan:

Vision: Enhance the quality of life for all communities through sustainable use of water resources while supporting natural systems in the region and state with partnerships among a broad spectrum of stakeholders.

Table ES-2: Goals for the Regional Water Plan

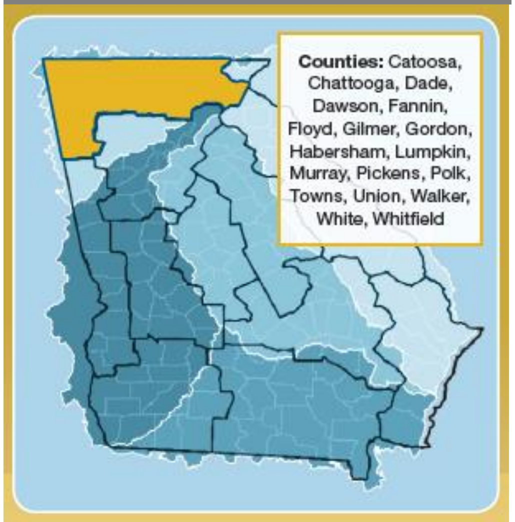
Number	Goal
1	Plan for appropriate levels of water storage, water sources, and long-term supply to meet anticipated need for local communities.
2	Minimize adverse impacts to local communities and adjacent regions, and, when practical, enhance natural systems.
3	Ensure that management practices support economic development and optimize existing water and wastewater infrastructure.
4	Promote technologies that conserve, return, and recycle water; protect water quality; and ensure adequate capacity for water storage within the Region.
5	Promote properly managed wastewater discharges.

Table ES-2: Goals for the Regional Water Plan	
Number	**Goal**
6	Educate stakeholders in the Region on the importance of water resources, including water conservation, efficiency, pollution prevention, and source water protection.
7	Identify practices that reduce nonpoint source pollution and control stormwater to protect and enhance water quality and ecosystems, particularly those in priority watersheds and listed streams.
8	Develop an ongoing adaptive management approach to measure, share, and evaluate water use data and information.

Coosa-North Georgia Water Planning Region

The Coosa-North Georgia Regional Water Planning Council (the Council) prepared a Regional Water Plan for the CNG Region, which includes 18 counties and 51 municipalities, as shown on Figure ES-1. The Region contains portions of the Coosa, Tennessee and Chattahoochee River Basins, and includes various groundwater aquifer systems, particularly the Crystalline rock and Paleozoic rock aquifer systems.

Figure ES-1: Location Map of Coosa-North Georgia Water Planning Region



The Region consists of predominantly forested land. The five most populous counties, Whitfield, Floyd, Walker, Catoosa, and Gordan, represent just over half of the total population in the region. The primary source of employment is the manufacturing sector, mainly the carpet industry, followed by the health care and food sectors. Policies in the Region are developed by local governments as well as two regional planning entities: the Northwest Georgia Regional Commission (RC) and the Georgia Mountains RC.

Water Resources of the Coosa-North Georgia Region

Major water uses in the Region, based on 2015 water withdrawal totals, were energy generation (56 percent), municipal water supply (19 percent), agricultural use (17 percent), and last industrial use (8 percent). Surface water continued to be the main source of water in the Region and conventional wastewater treatment facilities with point source discharges were the leading method for treating wastewater. Throughout the planning process, existing agricultural water use, onsite sewage treatment, subsurface systems, and land application systems are considered to be consumptive. Additional study of this issue in future updates of this Regional Water Plan and related resource assessments will more accurately represent the percentage of this water that should be considered as a return flow.

To understand the impact of water withdrawals and wastewater discharges on the Region's water resources, GAEPD developed Resource Assessments of the State's river basins and aquifers that examine three resource conditions:

Surface Water Quality (Assimilative Capacity)—The capacity of Georgia's surface waters to accommodate pollutants without unacceptable degradation of water quality, i.e., without exceeding State water quality standards or harming aquatic life.

Surface Water Quantity—The ability of surface water resources to meet current municipal, industrial, agricultural, and thermoelectric power water needs, as well as the needs of in-stream and downstream users.

Groundwater Quantity—The sustainable yield or volume of water that can be withdrawn without causing adverse effects in prioritized groundwater resources.

The Region demonstrates limited assimilative capacity remaining for 58 river miles of the 692 miles modeled for this plan update. Additionally, current conditions indicate that 16 modeled facilities are predicted to have at least one day of water supply challenges and 13 facilities are predicted to have at least one day of wastewater assimilation challenges in the Tennessee and Alabama-Coosa-Tallapoosa Study Basins of the CNG Region. No groundwater sustainable yield issues were identified within the Region based on current demands and conditions. Further existing challenges were identified as 57 percent of stream miles not supporting their designated uses in the Region and several species of rare, threatened, or endangered aquatic species.

Forecasting Future Water Resource Needs

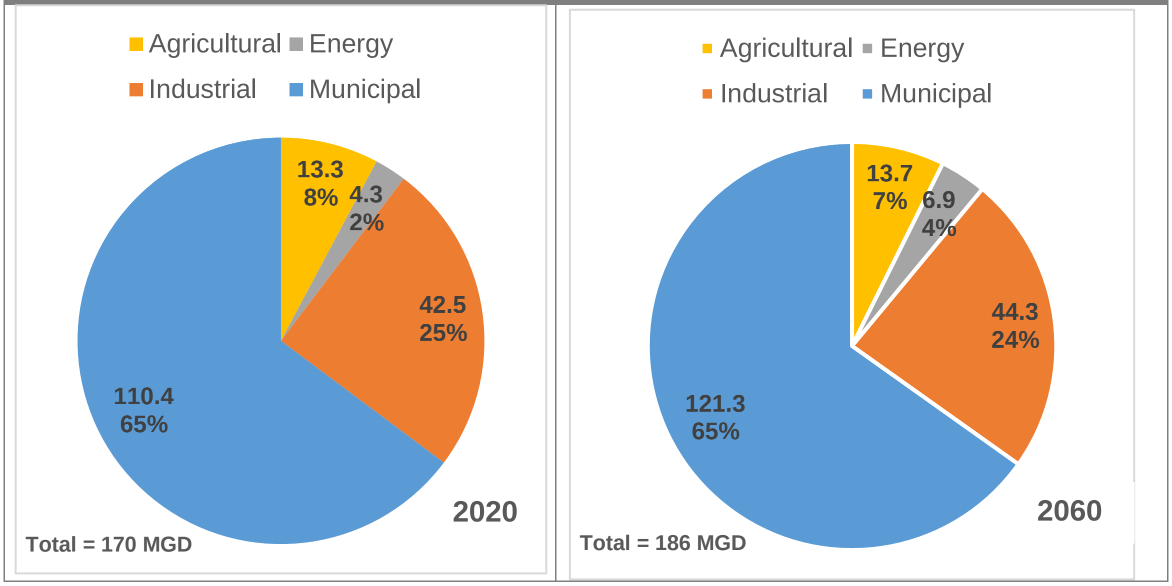
The population projections were developed by the Governor's Office of Planning and Budget (OPB) by county for the planning period. The population in the Region is projected to increase from 792,706 in 2020 to 920,438 in 2060, a growth rate of 16 percent over this 40-year period. The projections provide the basis for municipal water and wastewater forecasts and also indirectly impact forecasts for other categories of water and wastewater projections.

As a general rule, the total water demands and wastewater flows for the Region are expected to have a modest increase from 2020 to 2060. Due to substantial changes in the methodology for energy and industrial forecasts, the total forecasted water demands appear much lower than previous plans; however, water demands are projected to grow in every sector. Wastewater flows show a similar trend as the water demands.

Total water demand in the CNG Region for municipal, industrial, agriculture, and energy use is expected to grow from 170 MGD in 2020 to 186 MGD in 2060.

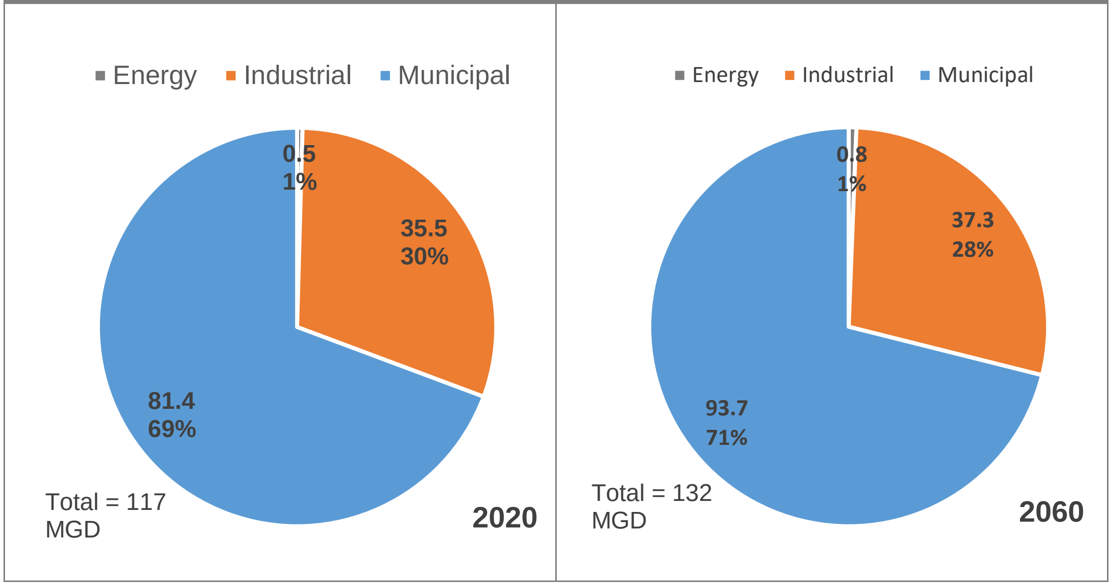
Agricultural and energy water demands are expected to remain relatively constant, while municipal and industrial water demands are projected to increase steadily from approximately 153 MGD in 2020 to 166 MGD in 2060 (Figure ES-2).

Figure ES-2: Total Water Demand Forecast by Sector (AAD-MGD)



Similarly, wastewater flows are expected to increase from 117 MGD in 2020 to 132 MGD in 2060. Figure ES-3 shows the total wastewater flow forecast by sector (energy, municipal, and industrial) for the Region in 2020 and 2060. Municipal returns make up approximately 70 percent of the total in both 2020 and 2060. Direct discharges of wastewater will make up 60 percent, LAS 9 percent, and septic systems 31 percent of the future wastewater flow forecast.

Figure ES-3: Total Wastewater Flow Forecast by Sector (AAF-MGD)



Comparison of Water Resource Capacities and Future Needs

The Resource Assessments and additional analyses identified potential challenges or shortages related to water supply, wastewater assimilation, municipal water withdrawal capacity, municipal wastewater treatment capacity, and water quality based on the 2060 forecasts. Table ES-3 summarizes the potential challenges, needs, and/or shortages identified for each county within the Region.

Insufficient capacity or infrastructure shortages may have multiple solutions such as municipal facility expansions and/or the construction of new local or regional facilities. The intent of this document is to provide a global overview of the Region, but not to replace or undermine local capital improvement planning.

Table ES-3: Summary of 2060 Potential Challenges, Needs, or Shortages by CNG County							
County	Water Supply Challenges (# Facilities) [a]	Wastewater Assimilation Challenges (# Facilities) [a]	Municipal Water Needs (MGD) [b]	Municipal Wastewater Needs (MGD) [b]	Agricultural Water Potential Shortages	Assimilative Capacity Challenges for Dissolved Oxygen (# Segments) [c]	Miles of 303(d) Not Supporting Reaches and (# Segments) [d]
	BEAM Results: Surface Water Availability Section 5.2	BEAM Results: Surface Water Availability Section 5.2	Future Withdrawal Capacity Table 5-3	Future Treatment Capacity Table 5-4	Future Capacity Table 5-5	Water Quality Section 5.3	Water Quality Section 3.3.2
Catoosa	Yes (1)						79 (14)
Chattooga	Yes (2)	Yes (2)					57 (12)
Dade	Yes (1)	Yes (1)			Yes		29 (6)
Dawson			Yes (0.02)				60 (9)
Fannin		Yes (1)					71 (14)
Floyd	Yes (3)	Yes (1)					198 (28)
Gilmer						Yes (1)	93 (22)
Gordon	Yes (1)	Yes (1)					112 (22)
Habersham				Yes (0.72)			46 (11)
Lumpkin							62 (12)
Murray		Yes (1)					62 (10)
Pickens	Yes (1)	Yes (1)				Yes (1)	48 (10)
Polk	Yes (1)	Yes (2)					25 (5)
Towns		Yes (1)		Yes (0.16)			35 (9)

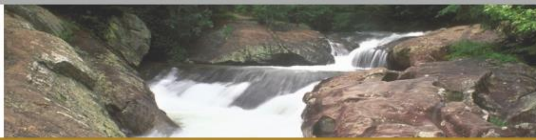


Table ES-3: Summary of 2060 Potential Challenges, Needs, or Shortages by CNG County

County	Water Supply Challenges (# Facilities) [a]	Wastewater Assimilation Challenges (# Facilities) [a]	Municipal Water Needs (MGD) [b]	Municipal Wastewater Needs (MGD) [b]	Agricultural Water Potential Shortages	Assimilative Capacity Challenges for Dissolved Oxygen (# Segments) [c]	Miles of 303(d) Not Supporting Reaches and (# Segments) [d]
	BEAM Results: Surface Water Availability Section 5.2	BEAM Results: Surface Water Availability Section 5.2	Future Withdrawal Capacity Table 5-3	Future Treatment Capacity Table 5-4	Future Capacity Table 5-5	Water Quality Section 5.3	Water Quality Section 3.3.2
Union	Yes (1)	Yes (1)		Yes (0.04)			91 (26)
Walker	Yes (1)	Yes (1)					66 (14)
White			Yes (0.31)				39 (7)
Whitfield	Yes (2)						52 (15)
Total	**10 (14)**	**11 (13)**	**2 (0.33)**	**3 (0.92)**	**1**	**2 (2)**	**1224 (246)**

Notes:

[a] "Yes" indicates that there is at least one day of a water supply or wastewater assimilation challenge in the indicated county.

[b] A municipal "need" is where the current permitted water withdrawal capacity or wastewater discharge, respectively, is less than the future forecast demands.

[c] Potential challenges in assimilative capacity due to dissolved oxygen are for streams modeled to have "At Capacity," or "Exceeding Capacity."

[d] Includes only 303(d) reaches with not supporting status that are fully within each respective county. An additional 430 miles, or 50 stream reaches, are shared between two or more counties. Some reaches are shared with counties outside of the CNG region.

Addressing Water Needs and Regional Goals

The State Water Plan defines Management Practices as reasonable methods, considering available technology and economic factors, for managing water demand, water supply, return of wastewater to water sources, and prevention and control of pollution of the waters of the State. For this 2023 update to the Regional Water Plan, the Council conducted a review and assessment of the existing management practices that were adopted in 2017. Management practices were revised to provide clarity, remove redundancies with existing rules or regulations, and incorporate the Council's experience in the Region. The Council ultimately selected 20 management practices within the following categories: Administration (4 practices), Water Conservation (4 practices), Water Supply (3 practices), Wastewater (2 practices), and Water Quality (7 practices). The management practices seek to address potential challenges, needs, or shortages within a particular category and support the Region's vision and goals.

The Council also re-evaluated the short-term and long-term actions for implementing all management practices and identified the parties responsible for implementation. The bulk of implementation actions will continue to be the responsibility of local governments and utilities, and their respective Regional Commissions; however, extensive support for short-term activities, in particular, will be needed from State entities, such as the GAEPD. While local utilities and governments are encouraged to implement all of the administrative management practices, each is encouraged to routinely review the practices to determine which are appropriate for implementation in their community. In addition, the Council compiled a list of recommendations to the State for actions that will support implementation of the Plan.

Plan Collaboration and Alignment

Collaboration and coordination with other entities, plans, and studies is needed to implement the management practices. Planning level cost estimates for implementation actions were not included in this plan update, but guidance is provided to benchmark and monitor implementation progress. For example, the Council still recommends that progress in implementation of the short-term actions be measured using an annual survey, and improvements in water quality monitoring results be measured using the GAEPD water quality database.

The Regional Water Plan should be updated every five years but can be amended sooner if additional needs (triggering events) are identified in the interim period.

The Regional Water Plan will be used to:

- Guide permitting decisions by GAEPD.
- Guide the awarding of Section 319(h) Nonpoint Source Implementation Grant funds from GAEPD.
- Guide the awarding of State grants and loans for water-related projects.

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SECTION 1
Introduction

Section 1. Introduction

> ***Section Summary***
>
> *Georgia is developing Regional Water Plans for 10 planning regions across the state to define sustainable practices to meet regional water resource needs through 2060.*
>
> *The Coosa-North Georgia Council developed a vision to "**Enhance the quality of life for all communities through sustainable use of water resources while supporting natural systems in the region and state with partnerships among a broad spectrum of stakeholders**" and adopted the eight goals listed in Section 1.3.*

The 2004 Comprehensive State-wide Water Management Planning Act mandated the development of a state-wide water plan that supports a far-reaching vision for water resource management: "Georgia manages 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" (Official Code of Georgia Annotated [O.C.G.A.] §12-5-522(a)).

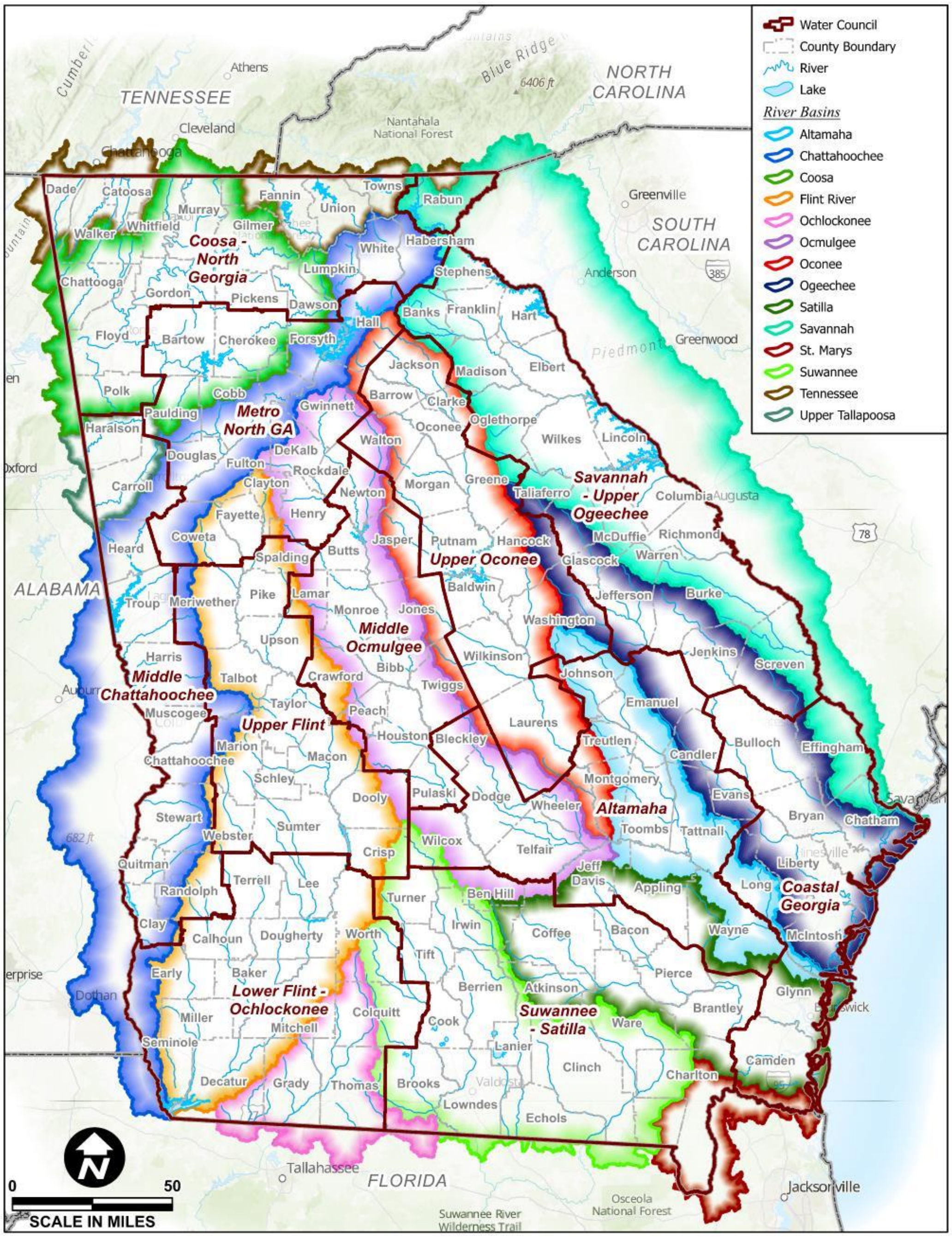
The Georgia Environmental Protection Division (GAEPD), with oversight from the Georgia Water Council, was charged with developing the first Comprehensive State-wide Water Management Plan (State Water Plan), which was adopted by the Georgia General Assembly in January 2008.

The State Water Plan included a provision to create 10 water planning regions across the state, each guided by a regional water planning council. The Governor, Lieutenant Governor, and Speaker of the House appoint members of the regional water planning councils. Figure 1-1 illustrates the location of these regions relative to Georgia's river basins and counties. The Metropolitan North Georgia Water Planning District (Metro Water District) was established in May 2001.

The original 10 Regional Water Plans (RWP) were developed and adopted by GAEPD in 2011. This Regional Water Plan prepared for the Coosa-North Georgia (CNG) Water Planning Region (the Region) by the CNG Regional Water Planning Council (the Council) defined the regionally appropriate water management practices to be employed in the CNG Region. The Regional Water Plan is updated every five years.

The RWP was originally scheduled to be updated and adopted in December 2022, but the timeline for all RWPs was extended to June 2023 to accommodate the enhanced process for surface water assessments. During the 2023 RWP update process, the 2017 RWP for the CNG Region was updated based on regional water demand forecasts, updated resource assessment modeling and the evaluation of potential future gaps in surface water availability and water quality. This updated plan also includes revised management practices recommended by the CNG Council to either address future water resource management needs or to refine or clarify management practices for the local governments and utilities in the CNG Region.

Figure 1-1: Georgia Regional Water Planning Councils



Each updated regional water plan recommends sustainable management practices designed to meet each region's needs through the year 2060, while coordinating with the regional water plans of adjoining regional water planning councils for consistency across the state. As such, this CNG Regional Water Plan contains the following sections:

- Section 2 provides in an overview of the Region's population, municipalities and land use.
- Section 3 describes the Region's existing water resources and unique characteristics.
- Section 4 forecasts the Region's future water resources needs.
- Section 5 compares the Region's future needs with existing capacities to identify potential water resource issues, particularly any potential water challenges or shortages.
- Section 6 reviews existing local and regional plans as part of an effort to select management practices to address potential challenges and shortages, while still meeting goals for the Region. Implementation actions and benchmarks to measure and report progress are presented.
- Section 7 documents the Plan's collaboration and alignment with other studies, partnerships, and entities.

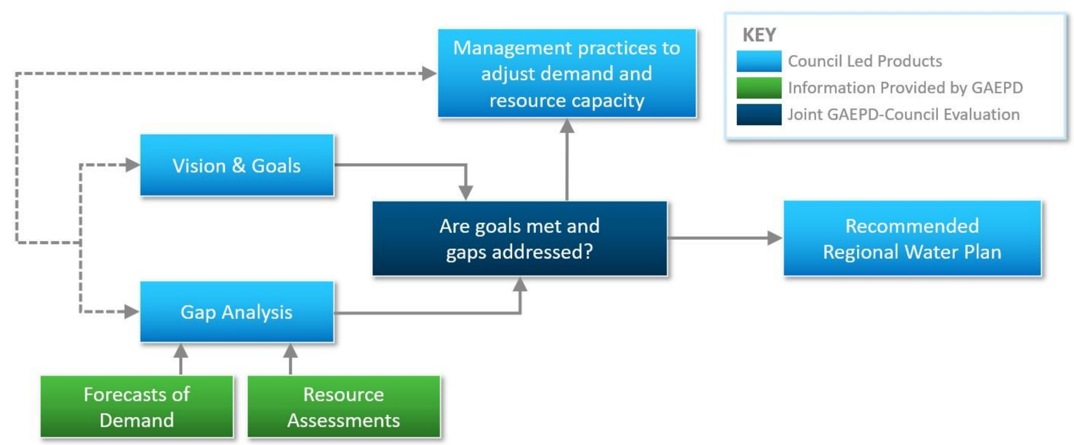
1.1 The Significance of Water Resources in Georgia

Of all Georgia's natural resources, none is more important to the future of the state than water. The wise use and management of water is critical to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens. Georgia has abundant water resources, with 14 major river systems and multiple groundwater aquifer systems. While water in Georgia is abundant, it is not an unlimited resource and must be carefully and sustainably managed to meet long-term water needs. This CNG Regional Water Plan moves the Region toward managing its water resources in a proactive, sustainable manner.

1.2 State and Regional Water Planning Process

The State Water Plan established the 10 regional water planning councils illustrated in Figure 1-1, including the CNG Council, and provided a framework for regional planning. The previous (2011 and 2017) regional water plans were prepared following a consensus-based planning process, which requires the input of regional water planning councils, local governments, and the public. For this plan update, a similar approach was followed including a review of the original vision and goals, updates to the water and wastewater demands, updates to the resource assessments, and a re-evaluation of potential future challenges. GAEPD oversees the planning process and, along with partner agencies, provides support to the councils. The primary role of each council is to develop an updated RWP and submit it to GAEPD for approval. The CNG Council has coordinated its efforts with councils adjacent to the CNG Region, including the Lower Flint-Ochlocknee, Middle Chattahoochee, Metropolitan North Georgia, Savannah-Upper Ogeechee, and Upper Flint councils. Specific roles and responsibilities for regional water planning councils are outlined in a Memorandum of Agreement between each council, GAEPD, and the Georgia Department of Community Affairs (DCA). The planning process is illustrated in Figure 1-2.

Figure 1-2: State Water Planning Process



Source: Georgia Environmental Protection Division, 2022.

1.3 CNG Regional Water Planning Council Vision and Goals

The Council created a vision and a set of goals to guide water management in the Region. The vision and goals guided the evaluation and selection of management practices that will best meet the Region's needs. During the 2023 update to the Regional Water Plan, the Council revised the original vision and goals.

The Council adopted the following vision:

Enhance the quality of life for all communities through sustainable use of water resources while supporting natural systems in the region and state with partnerships among a broad spectrum of stakeholders.

The Council adopted the following updated goals, which include both water quantity and quality management objectives:

1. Plan for appropriate levels of water storage, water sources, and long-term supply to meet anticipated need for local communities.
2. Minimize adverse impacts to local communities and adjacent regions, and, when practicable, enhance natural systems.
3. Ensure that management practices support economic development and optimize existing water and wastewater infrastructure.
4. Promote technologies that conserve, return, and recycle water; protect water quality; and ensure adequate capacity for water storage within the Region.
5. Promote properly managed wastewater discharges.
6. Educate stakeholders in the Region on the importance of water resources, including water conservation, efficiency, pollution prevention, and source water protection.
7. Identify practices that reduce nonpoint source pollution while controlling stormwater to protect and enhance water quality and ecosystems, particularly those in priority watersheds and listed streams.
8. Develop an ongoing adaptive management approach to measure, share, and evaluate water use data and information.

These goals will lead the CNG Region toward sustainable growth in the future while maintaining its existing excellent quality of life. The CNG Council recognizes that the fish, wildlife, streams, rivers, and lakes in the Coosa, Chattahoochee, and Tennessee watersheds are vitally important to the people living in this Region and the entire state. These resources provide numerous people with the opportunity to fish, hunt, and otherwise enjoy areas of unspoiled green space. This public use and the existing natural resources provide significant economic benefits to the Region with minimal outlay of public funds or services. The high quality of the water resources within the Region allows, in many cases, water utilities to operate at lower costs than in areas with more heavily impacted water quality. As a result, the Council places a very high priority on the protection, maintenance, enhancement, and restoration of the natural resources located within the Region.

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SECTION 2

Coosa-North Georgia Water Planning Region

Section 2. Coosa-North Georgia Water Planning Region

Section Summary

The 5,500-square-mile Region includes 18 counties and contains portions of the Savannah, Chattahoochee, Tennessee, and Coosa River Basins. Local governments in the Region are supported by two regional planning entities: the Northwest Georgia Regional Commission and the Georgia Mountains Regional Commission.

The total population of the Region was estimated at 781,012 in 2020 and is projected to grow to over 920,000 in 2060. Approximately 68 percent of the total region was forested based on 2019 data, 12 percent was developed/urban, 14 percent was being used for pasture or row crops, and the remaining area was a mixture of wetlands, grasslands, and barren land.

The CNG Region encompasses the northern extent of the State of Georgia, with portions bordering South Carolina, North Carolina, Tennessee, and Alabama. The Region covers 5,500 square miles and includes 18 counties and 51 municipalities (see Figure 2-1). Its 2020 population was 781,012 according to the US Census and is projected to reach 920,438 in 2060 (Georgia Office of Planning and Budget, 2019). Figure 2-1 illustrates that the Region has a large amount of land dedicated for conservation purposes; approximately 30 percent is conserved as part of the National Forest or as part of a State Forest, State Park, State Conservation Area, Wildlife Management Area, or Historic Area.

2.1 History, Climate and Physiography

The CNG Region has an extensive history of Native American habitation.

The Region is characterized by a moist and temperate climate with mean annual precipitation ranging from 54 to 67 inches, according to historical data from 1991 to 2020. Rainfall occurs throughout the year, but a distinct dry season usually occurs from mid-summer to late fall. Winter is the wettest season and March the wettest month, on average (National Oceanic and Atmospheric Administration, 2020).

The Coosa River Basin Management Plan describes in detail the physiography, geology, and soils in the Region (GAEPD, 1998). The Region encompasses parts of four distinct physiographic provinces: the Cumberland Plateau, the Valley and Ridge, the Blue Ridge, and the Piedmont. Only a small segment of the Appalachian Plateau physiographic province lies in Georgia, encompassing Cloudland Canyon State Park in Dade County (Chowns, 2006). As a result, the Region's geography is diverse.

The Cumberland Plateau province is dominated by relatively flat plateaus, ranging in elevation from 1,500 to 1,800 feet above mean sea level (MSL), that are bounded by narrow, northeast-southwest-trending linear valleys. In contrast, the Valley and Ridge and the Piedmont provinces range from approximately 600 to 1,600 feet above MSL, while the Blue Ridge province is dominated by mountains as high as about 4,100 feet above MSL. The Valley and Ridge province extends northeast to southwest through the western portion of the region, connecting portions of Georgia and Tennessee with eastern Alabama. This province consists of numerous northeast-to-southwest-trending ridges with associated valleys; it historically has been the source of mining activity with some farming in the valley floors. The Blue Ridge province includes most of the eastern portion of the Region and is dominated by mountains with fast-flowing streams, rapids, and steep slopes in the foothills of the Appalachian Mountains. Additionally, the southeastern borders of Habersham and Polk Counties straddle the Piedmont province, which is characterized by low hills and narrow valleys.

2.1.1 Local Governments

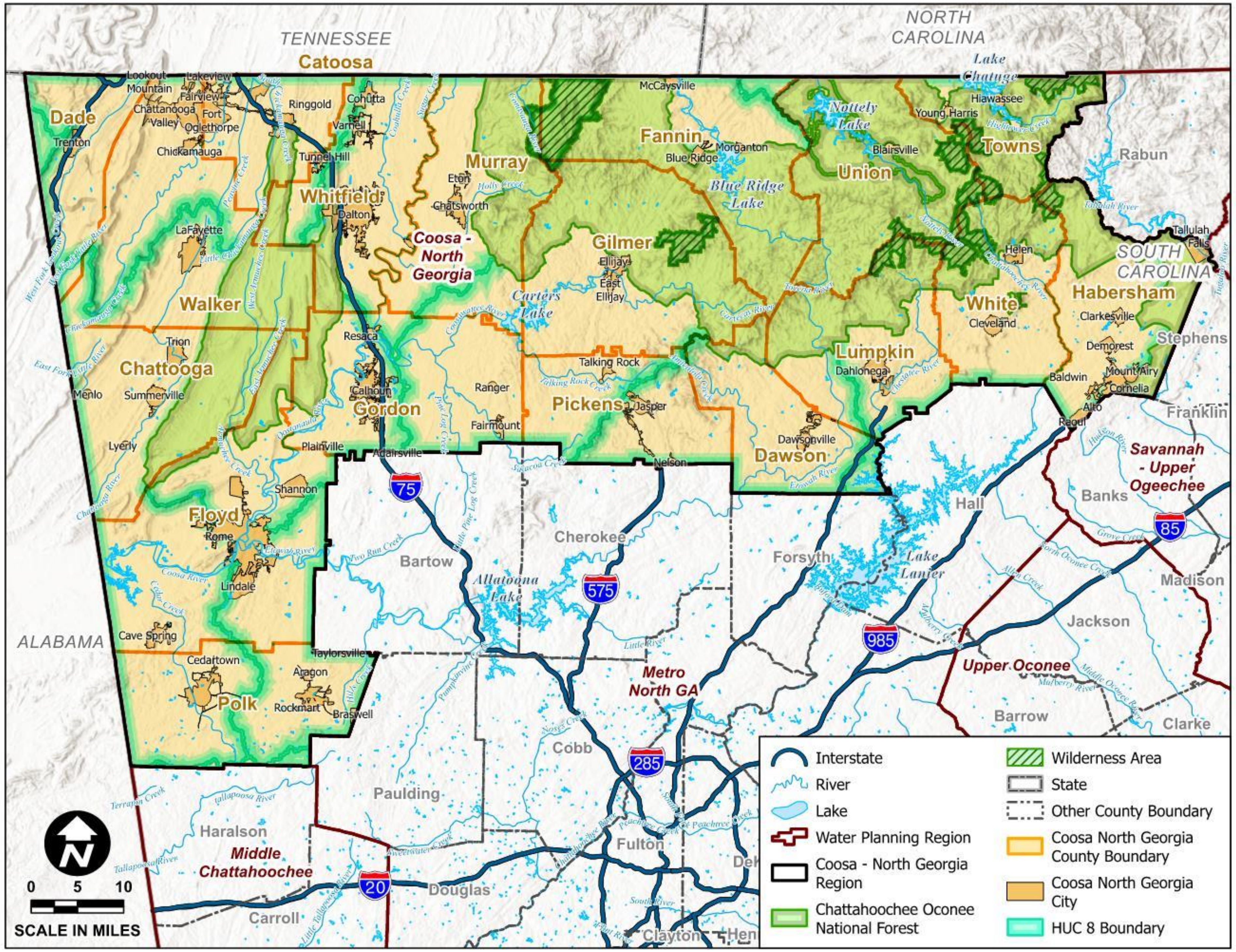
The Region includes 18 counties and 51 municipalities, as illustrated in Figure 2-1 and listed in Table 2-1; these local governments are responsible for land use and zoning decisions that affect water resources management. While many local governments are also responsible for planning, operating, and managing water and wastewater infrastructure, in some cases local or regional water authorities, or private companies, manage local infrastructure separately from local governments, as described in Section 4.

Table 2-1: CNG Counties and Municipalities

County	Municipalities
Catoosa County	Ringgold[a], Fort Oglethorpe[b]
Chattooga County	Lyerly, Menlo, Summerville[a], Trion
Dade County	Trenton[a]
Dawson County	Dawsonville[a]
Fannin County	Blue Ridge[a], McCaysville, Morganton
Floyd County	Cave Spring, Rome[a]
Gilmer County	Ellijay[a,] East Ellijay
Gordon County	Calhoun[a], Fairmount, Plainville, Ranger, Resaca
Habersham County	Alto[b], Baldwin, Clarkesville[a], Cornelia, Demorest, Mount Airy, Tallulah Falls[b]
Lumpkin County	Dahlonega[a]
Murray County	Chatsworth[a], Eton
Pickens County	Jasper[a], Nelson[b], Talking Rock
Polk County	Aragon, Braswell[b], Cedartown[a], Rockmart, Taylorsville
Towns County	Hiawassee[a], Young Harris
Union County	Blairsville[a]
Walker County	LaFayette[a], Chickamauga, Fort Oglethorpe[b], Lookout Mountain, Rossville
White County	Cleveland[a], Helen
Whitfield County	Cohutta, Dalton[a], Tunnel Hill, Varnell

[a] Indicates County Seat
[b] Spans two counties

Figure 2-1: Counties and Cities in the CNG Region



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2.1.2 Watersheds and Water Bodies

The U.S. Geological Survey (USGS) has divided and sub-divided the U.S. into successively smaller hydrologic units, which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system (USGS, 2011). Within the Region, there are portions of five river basins: Savannah, Chattahoochee, Coosa, Tallapoosa, and Tennessee, as shown in Figure 2-1 and summarized in Table 2-2. Table 2-2 provides the 8-digit HUCs for the river basins, and the area and proportion of the Region each HUC represents. The vast majority, almost 99 percent, of the Region drains to the Chattahoochee, Coosa, or Tennessee River Basins. Section 3 describes the Region's water use classifications and impaired waters.

The headwaters of the Chattahoochee River originate in the southeastern corner of the Region and drain approximately 12 percent of the total Region, including portions of Dawson, Lumpkin, White, and Habersham Counties. Major tributaries of the upper Chattahoochee River include the Chestatee River and Soque River. These waterways drain southwest to Lake Lanier, a multi-purpose reservoir constructed and operated by the U.S. Army Corps of Engineers (USACE), located primarily within the Metro District.

As shown in Table 2-2, the Coosa River Basin encompasses 60 percent of the Region and includes the following major rivers: Conasauga, Coosawattee, Etowah, and Oostanaula. The largest water body is 3,200-acre Carters Lake on the Coosawattee River in Gilmer, Gordon, and Murray Counties. Major tributaries to Carters Lake include Talking Rock Creek, Cartecay River, Ellijay River, and Mountaintown Creek. Carters Lake is operated by the USACE and, unlike many reservoirs, has no private docks or development along its 62 miles of shoreline (USACE, 2011a). The Coosa River at the Alabama/Georgia state line in Floyd County also starts to form the upper impoundment of Lake Weiss, an Alabama Power reservoir.

Approximately 26 percent of the Region drains north to tributaries of the Tennessee River. In the northeastern portion of the Region, these tributaries include the Hiwassee River (Chatuge Lake), Nottely River (Nottely Lake), and the Ocoee River (Blue Ridge Lake). In the northwestern corner of the state and Region, Lookout Creek, West Chickamauga Creek, Peavine Creek, Little Chickamauga Creek, East Chickamauga Creek, and Tiger Creek drain portions of Dade, Walker, Catoosa, and Whitfield Counties to the north into Tennessee and ultimately to the Tennessee River (see Figure 2-1).

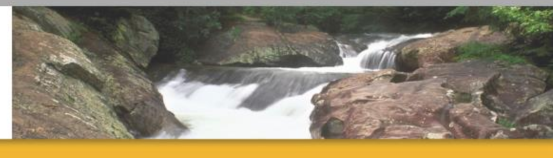


Table 2-2: River Basin Characteristics within Region

River Basin	Watershed Name	HUC-8 Code	Square Miles in Region	Percent of Region
Savannah	Tugaloo	03060102	46	1%
Savannah	Broad	03060104	18	Less than 1%
Chattahoochee	Upper Chattahoochee	03130001	676	12%
Coosa	Conasauga	03150101	600	11%
Coosa	Coosawattee	03150102	758	14%
Coosa	Oostanaula	03150103	523	10%
Coosa	Etowah	03150104	677	12%
Coosa	Upper Coosa	03150105	742	13%
Tallapoosa	Upper Tallapoosa	03150108	9	Less than 1%
Tennessee	Middle Tennessee – Chickamauga	06020001	598	11%
Tennessee	Hiwassee	06020002	425	8%
Tennessee	Ocoee	06020003	418	8%
Tennessee	Guntersville Lake	06030001	12	Less than 1%
	Total Region		**5,502**	

Source: Georgia Department of Natural Resources (GADNR) Basins at 1:24,000 scale
https://epd.georgia.gov/dnr-basins#toc-identification-information-
https://epd.georgia.gov/watershed-protection-branch/georgia-river-basin-management-planning

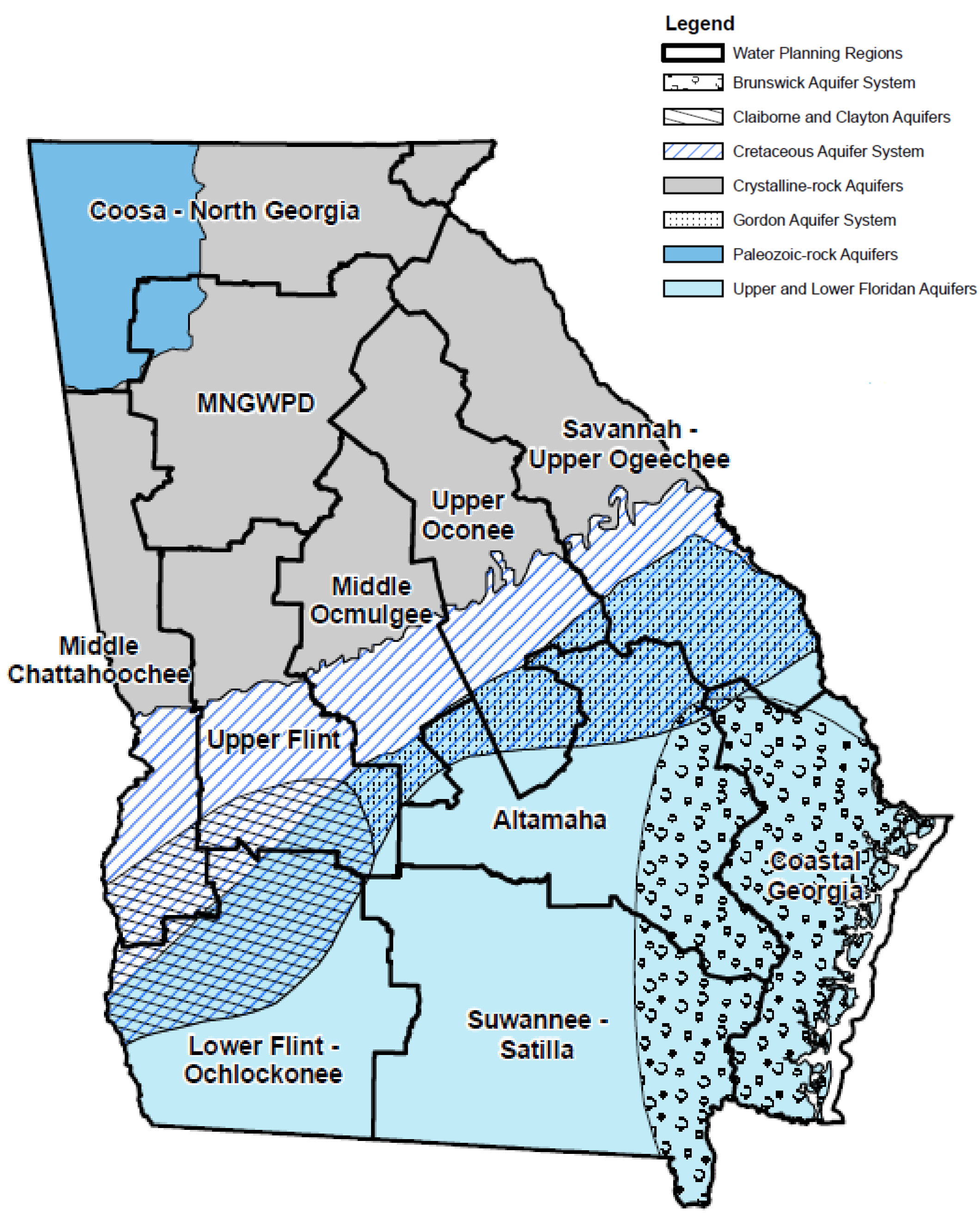
2.1.3 Groundwater Aquifers

The Region includes portions of two principal aquifer systems: the Crystalline rock and Paleozoic rock. See Figure 2-2. The eastern half of the Region includes Crystalline rock aquifer systems of the Piedmont and Blue Ridge physiographic provinces. The aquifer systems in the Crystalline rock aquifer occur in metamorphic and igneous rocks where secondary porosity and permeability has developed as a function of differential weathering along discontinuities. Enlargement of discontinuities, such as joints, faults, compositional layering/bedding, and foliation/cleavage, provides discreet pathways for groundwater storage and flow. The intersection and interconnection of these features creates localized aquifer systems within the bedrock that are dependent on many variables of each rock unit. Although these aquifer systems do not typically provide significant quantities of groundwater over the Region, local topographic and geologic conditions are conducive to development of discreet aquifer systems with sufficient sustainable yield to supplement water supply. These aquifer systems are typically local in extent, and the yield and groundwater chemistry can be affected by localized water use and climate. However, these aquifer systems, if properly managed, provide drought resistant sources of water to supplement surface water supplies.

The western half of the Region includes Paleozoic rock aquifers within the Valley and Ridge physiographic province. The principal aquifer systems in the Valley and Ridge occur in the carbonate sedimentary rocks where chemical weathering via solutioning has enlarged discontinuities (such as joints, faults, compositional layering and/or bedding planes) within the rock mass. Groundwater in these aquifer systems generally occurs under confined and semi-confined conditions, with recharge principally generated from precipitation and surface water percolating downward through the overburden into the underlying carbonate rocks and leakage from other aquifer systems. Karst topography commonly develops in valley floors underlain by carbonate rocks in this physiographic province, especially where the cover of residuum and/or alluvium is thin. Fluctuation of the groundwater table resulting from natural (e.g., drought) or anthropogenic (e.g., pumping) processes can accelerate the development of karstic features such as sinkholes, swallets, and sinking streams. While solution-enlarged discontinuities form conduits that can yield several thousand gallons of water per minute (gpm), the water may have high levels of calcium and bicarbonate; in addition, well yields outside these conduits are low (10 gpm or less). Within the Coosa River Basin, wells in these karst aquifers yield an average of 350 to 700 gpm (GAEPD, 1998), with some well yields in Gordon County exceeding 2,000 gpm (GAEPD, 2005).

The water system is dynamic, with groundwater and surface water interacting with each other differently depending on geologic and climatic conditions; for example, groundwater may provide a large percentage of stream baseflow during extended dry periods. The USGS has estimated that approximately 60 percent of the average annual flow in the Coosa River is supplied by groundwater (Robinson et al, 1996). However, in the Crystalline rock aquifers, well yields are typically less than 1 cubic feet per second (cfs) and have minor, if any, impact on measured baseflow (Williams, 2004; Williams et al., 2005).

Figure 2-2: Groundwater Aquifers



Source: GAEPD, 2009.

2.2 Characteristics of the Region

The characteristics of the region are briefly discussed in the following subsections.

2.2.1 Population

The total 2020 population of the 18-county Region was 781,012 based on US Census counts (United States Census, 2020). Whitfield and Floyd Counties are the two most populated counties in the Region, with 102,727 and 98,593 residents, respectively. Walker, Catoosa, and Gordon Counties have populations between 50,000 and 70,000; the remaining 13 counties have populations below 50,000. The five most populous counties represent just over half, 51 percent, of the total population in the region.

2.2.2 Employment

Employment data from the Georgia Department of Labor estimate that the Region is largely dominated by the manufacturing sector, mainly the carpet industry, followed by the health care and food sectors. The estimated total employment for the Region was 325,682 in 2020, a 3 percent increase from the 314,956 jobs estimated in 2015 (GDOL, 2020).

The principal components of the manufacturing sector are textiles and apparel; paper and allied products; chemicals; transportation equipment; stone, clay, and glass products; food products; furniture; and lumber and wood products. Most of the manufacturing facilities are located in modern industrial parks and/or in proximity to water and the surface transportation network. The CNG Region has 10 of Georgia's higher learning institutions that contribute significantly to the economy of the communities where they are located.

2.2.3 Land Cover

Table 2-3 and Figure 2-3 illustrate land cover distribution across the major river basins in the Region in 2019. Table 2-3 summarizes acres by major river basin.

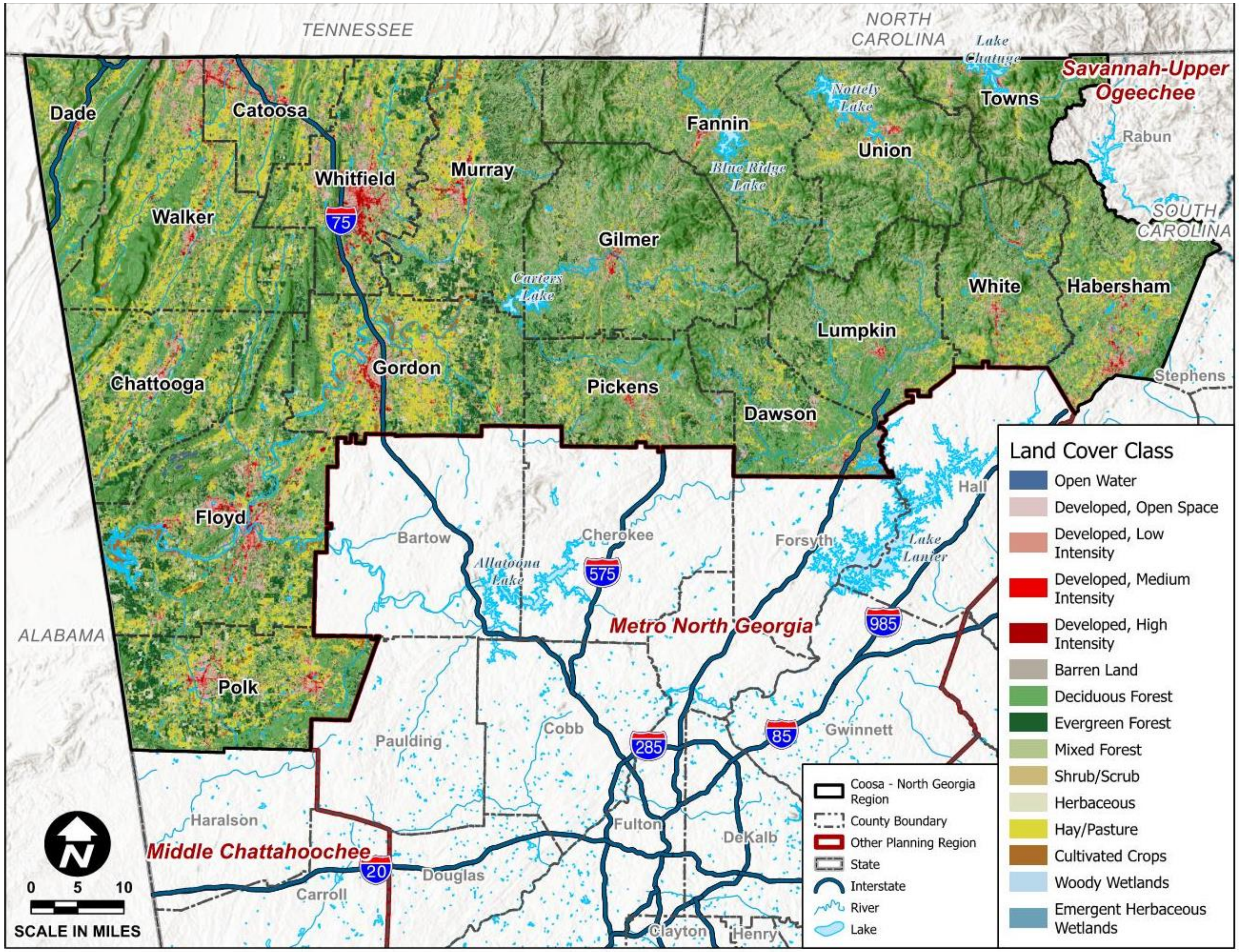
According to the 2019 USGS National Land Cover Database (NLCD), approximately 68 percent of the total Region was forested in 2019, with almost 40 percent as deciduous forests. Twelve percent of the land was considered developed (open, low, medium, and high intensity), while another 14 percent was being used for pasture or row crops. This land cover information provides a relatively complete and consistent source for characterizing land cover conditions, and therefore potential nonpoint pollutant sources across the Region. The data show that the majority of the low and high intensity urban lands are clustered around the incorporated areas in the western third of the Region, while agricultural corridors are found in the western valleys. With the exception of limited pockets of urban land around Blairsville and Dahlonega, most of the lands to the northeast of the Region are forested.

Table 2-3: 2019 Land Cover Distribution

Land Cover Category	Coosa Basin (Acres)	Upper Chattahoochee Basin (Acres)	Tennessee Basin (Acres)	Total Acres	Percent of Total
Open Water	17,562	3,173	10,923	31,659	0.91%
Developed, Open Space	152,405	39,204	75,945	267,555	7.70%
Developed, Low Intensity	57,652	12,016	22,775	92,443	2.66%
Developed, Medium Intensity	24,304	5,087	8,683	38,073	1.10%
Developed, High Intensity	12,617	1,620	2,761	16,999	0.49%
Barren Land	3,556	649	1,225	5,431	0.16%
Deciduous Forest	756,479	204,815	423,099	1,384,392	39.85%
Evergreen Forest	282,281	19,346	50,369	351,995	10.13%
Mixed Forest	344,963	89,191	187,064	621,218	17.88%
Shrub/Scrub	59,675	3,581	12,213	75,470	2.17%
Grassland/Herbaceous	56,546	4,879	10,076	71,500	2.06%
Pasture/Hay	302,701	48,711	118,982	470,394	13.54%
Cultivated Crops	27,334	567	1,902	29,803	0.86%
Woody Wetlands	10,892	660	1,143	12,695	0.37%
Emergent Herbaceous Wetlands	3,862	91	460	4,414	0.13%
Total	**2,112,830**	**433,590**	**927,621**	**3,474,041**	**100%**

Source: USGS National Land Cover Database (NLCD)

Figure 2-3: 2019 Land Cover in the CNG Region



Source: Coosa-North Georgia Land Use Trends, 2019 Land Cover, USGS National Land Cover Database (NLCD).

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2.2.4 Local Policy Context

The CNG Region includes portions of two regional planning entities: the Northwest Georgia Regional Commission (RC) and the Georgia Mountains RC (Table 2-4). Table 2-4 indicates the counties that fall within these two RCs as well as the corresponding Water Planning Region. Georgia's 12 RCs are quasi-governmental regional planning organizations, created and managed under Georgia law by their member local governments to serve regions that share similar economic, physical, and social characteristics. The RCs, working with the DCA, assist communities with a variety of planning issues, including local government planning, economic development, sustainable growth planning, and grant preparation and administration. The RCs also review local comprehensive land use plans and can help coordinate the connections between growth and water planning.

Table 2-4: CNG Counties by RC

RC	CNG Counties	Other Counties in this RC | Water Planning Region
Northwest Georgia	Catoosa, Chattooga, Dade, Fannin, Floyd, Gilmer, Gordon, Murray, Pickens, Polk, Walker, Whitfield	Haralson | Middle Chattahoochee Paulding and Bartow | Metro Water District
Georgia Mountains	Dawson, Habersham, Lumpkin, Towns, Union, White	Banks, Franklin, Hart, Rabun, Stephens | Savannah / Upper Ogeechee Hall | Metro Water District

Local governments develop ordinances, policies, and plans to meet the requirements of State regulations. For example, communities with existing stormwater permits within the Region have developed local requirements for erosion and sediment control, post-construction runoff, and other programs required by the Federal and State stormwater programs. Local government and utility plans considered during the development of this Regional Water Plan are summarized in the Summary of Local Plans supplemental document available on the CNG website. There are also multiple regional water resource planning efforts ongoing within the Region, such as the Lake Allatoona Upper Etowah Partnership and the Northwest Georgia Regional Water Resources Partnership.

Section 7.3 provides a summary of the other water resource planning efforts in the Region.

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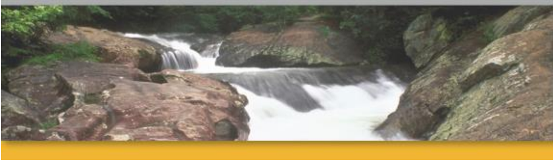
SECTION 3

Water Resources of the Coosa-North Georgia Region



Section 3. Water Resources of the Coosa-North Georgia Region

Water uses in the CNG Region are summarized in this section based on 2015 data from two sources: 2015 wastewater data provided by GAEPD and 2015 water use data developed by the USGS by county (USGS, 2019). The USGS examined both primary water users and water sources. This section incorporates this information and provides an overview of the Resource Assessments of current conditions for surface water and groundwater availability, and surface water assimilative capacity (water quality).

Section Summary

Approximately 91 percent of the CNG Region's water is supplied by surface waters, with the other 9 percent coming from groundwater.

Resource Assessments for current conditions indicated that 58 of the 692 modeled miles of the Region's waterways have limited assimilative capacity remaining, i.e., the ability to receive wastewater discharges and still meet water quality standards for dissolved oxygen.

Resource Assessments for current conditions indicate that under current baseline and drought conditions 16 modeled facilities in the CNG Region are predicted to have at least one day of water supply challenges and 13 facilities are predicted to have at least one day of wastewater assimilation challenges. Challenges observed in the models are limited to the Tennessee and Alabama-Coosa-Tallapoosa Study Basins.

3.1 Major Water Use in Region

For planning purposes, water "withdrawal" is defined as the removal of water from a water source for a specific use. Depending on the kind of use, a portion of the withdrawn water is not returned to a water source as a measurable discharge. Water consumption (or consumptive use) is the difference between the amount of water withdrawn from a water source and the amount returned.

Current water withdrawal information for this Region was compiled for the development of the water use forecasts for four major categories:

- **Municipal** includes water withdrawn by public and private water suppliers and delivered for a variety of uses (such as residential, commercial, and light industrial).
- **Industrial** includes water withdrawn for fabrication, processing, washing, and cooling at facilities that manufacture products, including steel, chemical and allied products, paper, and mining. These industries utilize the largest amount of water among industrial classifications in Georgia.
- **Energy** includes water withdrawn to generate electricity. In the CNG Region, water for energy is typically for cooling purposes at thermoelectric plants. Water returns after use may vary depending on the cooling technology used by each plant.

- **Agriculture** includes permitted water withdrawal for farm use. The vast majority of permitted agricultural withdrawals are from surface water in the CNG Region. Estimates of water use for animal agriculture, horticultural nurseries, greenhouses, and golf courses are also included in this category.

As shown in Figure 3-1, in 2015 surface water continued to be the predominant source of water in the Region. Surface water and groundwater withdrawals that supplied the four major water use categories totaled approximately 413 million gallons per day (MGD) on an annual average.

Figure 3-2 shows the surface water withdrawals by major water withdrawal category for 2015. Thermoelectric energy production was, by far, the largest water withdrawal category (56 percent), followed by municipal use (19 percent), agricultural use (17 percent), and last industrial use (8 percent).

Figure 3-3 shows groundwater withdrawals by major water withdrawal category. The leading use for groundwater withdrawal in 2015 was municipal (73 percent), followed by industrial (17 percent), and last agricultural (10 percent). The three groundwater supply sources for the Region are the Crystalline rock, Valley and Ridge, and Surficial aquifers; however, the Surficial aquifer system is a minor source.

Figure 3-4 summarizes wastewater treatment categories for the Region using 2015 data provided by GAEPD and shows that the leading method for treating wastewater in 2015 was treatment facilities with point source discharges[1]. The municipal wastewater generated in the Region in areas where public collection systems are unavailable was treated by private onsite treatment systems (estimated 32.6 MGD), such as septic tanks. In the 2015 database, the GAEPD listed 227 municipal and industrial discharge permits in the Region comprised of 199 point source facilities permitted by NPDES and 28 land application systems (LASs).[2]

Throughout the planning process, existing agricultural water use, onsite sewage treatment, subsurface systems, and LASs are considered to be consumptive. Although water returns to its source from these applications, it is assumed in the Resource Assessments to not be returned within a time frame that allows for it to offset the impact of related withdrawals. Additional study of this issue in future updates of this Regional Water Plan and related resource assessments will more accurately represent the percentage of this water that should be considered as a return flow.

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[1] Note that the point discharge flows include all returns from Plant Hammond, including once-through cooling, and originate from a different source than the 2015 water withdrawal totals.
[2] The provided database did not include Plant Hammond, a point source facility. Plant Hammond flows were added separately using available flow monitoring data from August 2015.

Figure 3-1: 2015 Water Supply by Source Type [a]

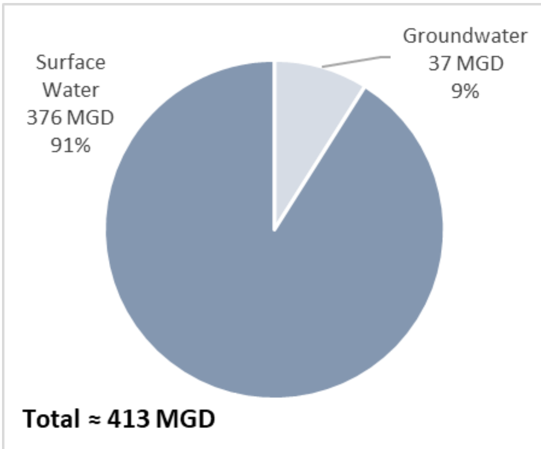


Figure 3-2: 2015 Surface Water Withdrawal by Category [a]

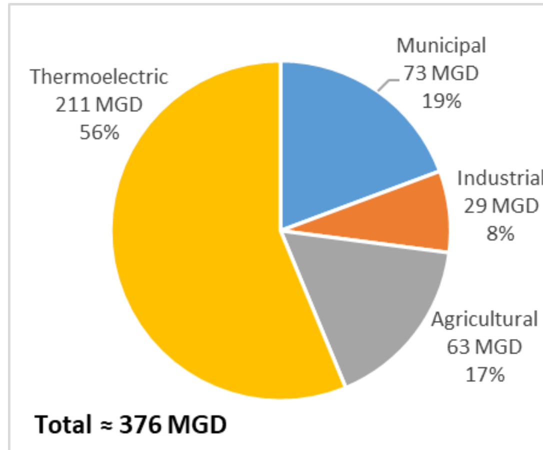


Figure 3-3: 2015 Groundwater Withdrawal by Category [a]

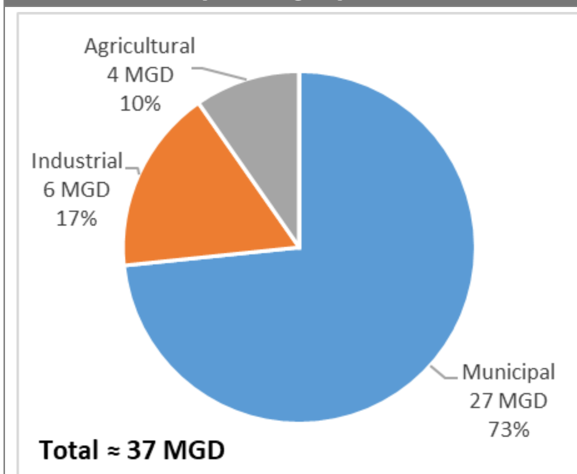
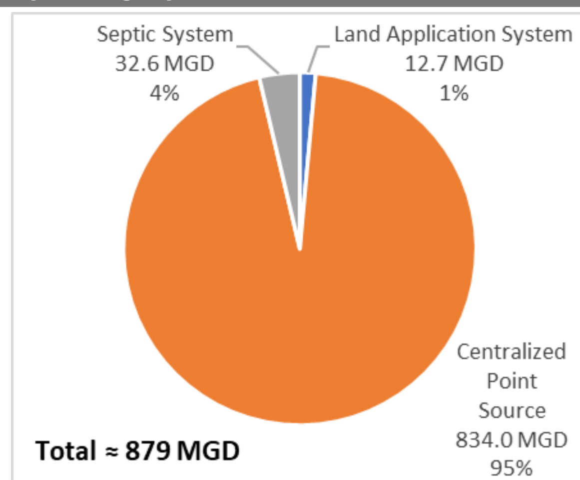


Figure 3-4: 2015 Wastewater Treatment by Category [b, c, d]



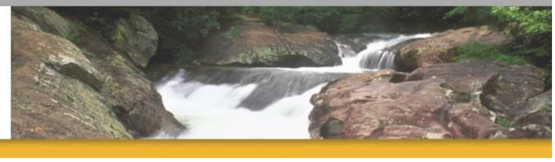
Notes:

[a] Source is USGS Estimated Use of Water in Georgia for 2015 and Water-Use Trends, 1985-2015, 2019. The withdrawals measured for Plant Hammond use a different methodology than the wastewater discharges recorded and should not be compared. Corresponding datasets for water and wastewater were not available.

[b] The totals combine the GAEPD approved permit database with 2015 average annual flows, August 2015 Flow Monitoring and Characterization Study for Plant Hammond, and septic estimates.

[c] Plant Hammond flows were estimated as the final plant discharge from the August 2015 Flow Monitoring and Characterization Study and added to the 2015 point discharge total. The wastewater flows therefore include non-consumptive cooling water returns that are not included in the water demands.

[d] Septic flows use the 2015 county populations estimated by OPB in 2019 as well as the county return rates, per capita rates, and percent of population on septic that GAEPD applies in the 2020 forecasts.



3.2 Resource Assessments

GAEPD developed three Resource Assessments: (1) surface water quality, also known as assimilative capacity, (2) surface water availability, also known as surface water quantity, and (3) groundwater availability. These Resource Assessments analyzed the capacity of streams and aquifers to meet demands for water supply and wastewater discharge without causing unacceptable local or regional impacts according to metrics established by GAEPD. The Resource Assessments are completed on a resource basis (river basins and aquifers) but are summarized here as they relate to the CNG Region. Full details of each Resource Assessment are presented on the GAEPD Water Planning website. Section 5 of this Regional Water Plan compares the Resource Assessments to water demand and wastewater flow forecasts.

In the context of the Resource Assessments, a potential “gap” or challenge is defined as a condition where the current or future use of water has been identified as potentially causing unacceptable impacts based on an exceedance of the Resource Assessment metric. For example, if the estimated sustainable yield of a specific groundwater aquifer is exceeded, then there would be a potential “gap” or challenge in groundwater availablity in that area. Similarly, if an existing water quality standard for nutrient loadings to a lake is projected to be exceeded, then there would be a water quality “gap” or challenge for that location. By contrast, a potential “need” or a potential “shortage” (discussed in Section 5) is defined as a condition where the current permitted water withdrawal or permitted capacity of wastewater treatment facilities is less than the future forecast demands. For example, a potential “shortage” would occur if the permitted capacity of a water treatment plant in 2060 is 10 MGD and the forecast demand is 20 MGD. These potential challenges, gaps, needs, or shortages are addressed through water quantity and water quality management practices in Section 7.

3.2.1 Surface Water Quality (Assimilative Capacity)

The assimilative capacity Resource Assessment estimated the capacity of Georgia’s surface waters to accommodate pollutants without unacceptable degradation of water quality. The term assimilative capacity refers to the ability of a water body to naturally absorb pollutants via chemical and biological processes without harming aquatic life or humans who come in contact with the water. A water body can be overloaded and violations of water quality standards may result. Water quality standards define the uses of a water body and set pollutant limits to protect those uses. The Assimilative Capacity Resource Assessment evaluated the capacity of surface waters to process pollutants without violating water quality standards.

The assimilative capacity results focus on dissolved oxygen (DO), nutrients (specifically total nitrogen and total phosphorus), and chlorophyll-a (the green pigment found in algae that serves as an indicator of lake water quality). Fish and other aquatic organisms need oxygen to survive, and the DO standards have been established to protect aquatic life. Although nutrients support food production for aquatic organisms, high concentrations of nutrients can result in algal blooms, negatively affecting DO concentrations that may result in fish kills and potentially impacting taste and odor in water supplies. The Assimilative Capacity Resource Assessment included an evaluation of the impact of current wastewater and stormwater (including nonpoint source pollutants from all land uses) discharges, combined with current withdrawals, land use, and meteorological conditions, on DO, nutrients, and chlorophyll-a.

The Region includes both trout streams and warm water fishery streams that have daily average DO standards of ≥6 milligrams per liter (mg/L) and ≥5 mg/L, respectively. DO was modeled for each of the Region’s major rivers. For this update, DO was modeled for 692 miles of streams in the Region, which included streams intersecting the Coosa, Tennesee, and Chattahoochee river basins.The results indicated 510 river miles with “Very Good” assimilative capacity (≥1.0 mg/L of available DO), 124 river miles with “Good” or “Moderate” capacity (>0.2 to 1.0 mg/L of available DO), and 58 river miles rated “Limited”, “At Assimilative Capacity” or “None/Exceeded” (≤0.2 mg/L of available DO) capacity.

Lake Allatoona must meet the State standards outlined in Chapter 391-3-6-.03(17)(d) including chlorophyll-a, pH, total nitrogen, total phosphorus, fecal coliform, DO, and temperature. The standards for chlorophyll-a and total phosphorus vary by lake location. GAEPD has developed a total maximum daily load (TMDL) for Lake Allatoona in response to water quality problems caused by high nutrient levels (GAEPD, 2013). Based on direction from GAEPD, for the Etowah River Arm to Lake Allatoona, a 14 percent reduction in total nitrogen loads (in pounds per day [lbs/day]) and a 20 percent reduction in total phosphorus loads (lbs/day) are required to meet the TMDL. For the Allatoona Creek Arm to Lake Allatoona, a 40 percent reduction in total nitrogen loads (lbs/day) and a 41 percent reduction in total phosphorus loads (lbs/day) are required to meet the TMDL. The TMDL recommends compliance with National Pollutant Discharge Elimination System (NPDES) permit limits and requirements, adoption of Natural Resource Conservation Service (NRCS) conservation practices for agriculture, and application of stormwater best management practices (BMPs) appropriate to reduce nonpoint sources.

The U.S. Environmental Protection Agency (EPA) has established a TMDL for total phosphorus for Lake Weiss in Alabama that allocates a 30 percent aggregate pollutant load reduction to upstream Georgia sources from the Coosa River and Chattooga River at the Georgia/Alabama state line (EPA, 2008). This TMDL was undergoing revisions during this Plan update. Chapter 391-3-6-.03(14) of Georgia’s Rules and Regulations for Water Quality Control specify that the Coosa River support recreational water uses at the state line, while the Chattooga River is targeted to support fishing. Updated modeling of the Coosa River indicated that the aggregate pollutant load reductions in total phosphorus would not be met under current loading conditions in both wet and dry years. However, recent (2016) data showed that total phosphorus levels have been consistently at or below 0.06 mg/L at the state line. In 2011, GAEPD began implementing a total phosphorus strategy in permits in the Coosa basin and since that time, there has been a reduction in the total phosphorus levels at the state line.

GAEPD has developed a final TMDL for two portions of Carters Lake (Coosawattee River Embayment and Woodring Branch) in response to water quality issues caused by high nutrient loadings, which have resulted in exceedances of the chlorophyll-a and total phosphorus standards (GAEPD, 2016). The combined loading reductions for both portions of Carters Lake called for a 7 percent reduction in total nitrogen loads (lbs/day) and a 58 percent reduction in total phosphorus loads (lbs/day) to meet the TMDL. The TMDL recommends compliance with NPDES permit limits and requirements, adoption of NRCS conservation practices, and appliction of stormwater BMPs appropriate to reduce nonpoint sources.

GAEPD finalized a TMDL for Lake Lanier in 2018 due to exceedances of the chlorophyll-a criterion. The new criterion ranges from 5 ug/L to 10 ug/L based on location. GAEPD has modeled preliminary nutrient reductions to meet the interim TMDL. GAEPD has indicated that nonpoint source reductions for urban and agricultural land uses will be required, as well as future reductions in point source loadings to meet the required overall nutrient load reductions to achieve the chlorophyll-a standard.

3.2.2 Surface Water Availability

For the current plan, a new tool developed to assess surface water availability, named the Basin Environmental Assessment Model (BEAM) enables assessment of river basin resources at a much finer scale than previous models. As a result, more nodes are included in the BEAM results. BEAM includes nodes (or junctions) for the following elements:

- Permitted water withdrawal intakes,
- Water supply reservoirs,
- Refilling pump stations for off-stream pump-storage facilities,
- Federal reservoirs,
- Private power generating reservoirs,
- NPDES permitted discharging facilities, and
- Long-term USGS gages as model nodes.

Model simulations assessed water demand and supply operational conditions against about 80 years of daily flow data from 1939 to 2018, including all known drought years, normal years, and wet years.

BEAM identifies days when the simulated available water withdrawal is less than its water demand, whether baseline or future projections. When this situation occurs in the model to a permitted water withdrawal facility, it is noted as a potential water supply challenge and is quantified in terms of days of shortage. Minimum instream flow protection thresholds were modeled based on permit conditions. Reservoir physical and operational data was added as available.

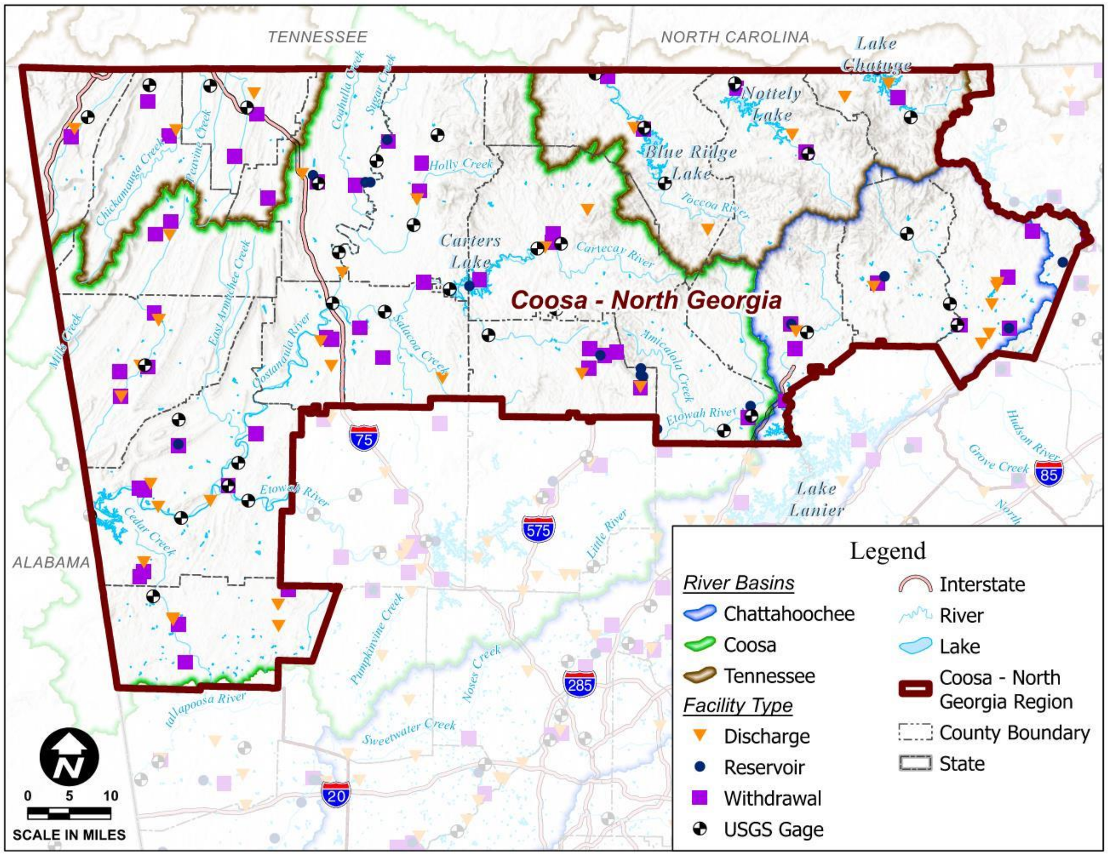
Similarly, the wastewater assimilation modeling using BEAM identifies challenges that result from the quantity of water withdrawal, quantity of return flow and changes in these projected quantities for the future. The regulatory minimum in-stream flow for effluent limitations is based on the 7Q10 at the point of discharge, a statistic that indicates the lowest streamflow for 7 consecutive days that occurs on average once every 10 years. The NPDES discharge facilities are included as nodes in the BEAM to assess assimilative capacity thresholds for the streams, and when modeled stream levels drop below the 7Q10 minimum threshold, a challenge is indicated and quantified in the number of days.

BEAM scenarios assessed include a baseline scenario covering the marginally dry conditions of 2010 to 2018, a baseline 2011 drought year scenario, and a projected 2060 scenario with forecasted withdrawals and discharges. The BEAM assessment identified water supply challenges and wastewater assimilation challenges for the CNG Region:

- A water supply challenge was defined as a period where a facility's withdrawal needs exceeded the available water supply.
- A wastewater assimilation challenge results when the modeled stream levels dropped below the 7Q10 minimum in-stream flows and thus water quality standards are not maintained by the cumulative water withdrawn and returned.
- Both metrics are quantified in terms of days of challenges and total volume of water shortage for each modeled facility.

Figure 3-5 illustrates the facility nodes used in developing the surface water availability Resource Assessments.

Figure 3-5: Modeled Facility Nodes in the CNG Region



Source: GAEPD, 2023

The Coosa North Georgia Region is part of three hydrologic modeling areas: the Tennessee Study Basin, the Alabama-Coosa-Tallapoosa (ACT) Study Basin, and the Apalachicola-Chattahoochee-Flint (ACF) Study Basin.

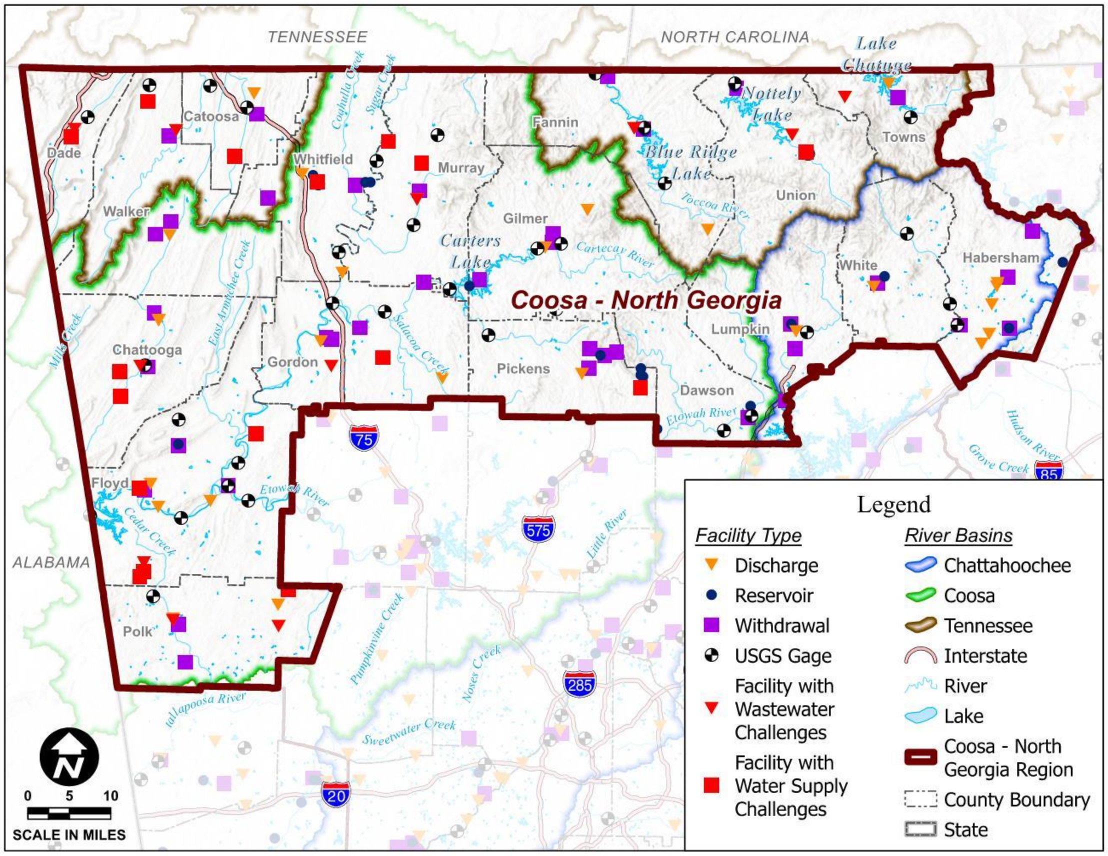
- The Tennessee Study Basin included:
    - Ten municipal withdrawals, six municipal discharges, one industrial withdrawal, and two industrial discharges.
    - Four facilities demonstrated a least one modeled water supply challenge day in the 80-year simulation with baseline or drought water demands, including:
        - Catoosa Utility District
        - Yates Bleachery Company
        - Dade County Water and Sewer Authority
        - City of Blairsville, which had the highest percentage of challenge days compared to simulation duration at 6.25% for the baseline drought scenario.
    - Five facilities demonstrated wastewater assimilation challenges in the 80-year baseline and drought scenarios:
        - Walker County WPCP, which exhibited the greatest percentage of challenges days, or 24.5% of the modeled duration
        - City of Trenton,
        - City of Blue Ridge,
        - City of Blairsville, and
        - City of Young Harris..
- The ACT Study Basin included:
    - 31 municipal withdrawals, 16 municipal discharges, three industrial withdrawals, six industrial discharges, and one energy withdrawal expressed as consumptive use.
    - Twelve facilities demonstrated at least one modeled water supply challenge day in the 80-year simulation with baseline or drought water demands. These facilities included:
        - Utilities, Inc. of Georgia,
        - Chatsworth Water Works Commission,
        - Dalton Utilities (two facilities),
        - City of Calhoun,

        - Floyd County (two facilities), which exhibited the highest percentage of challenge days compared to simulation duration at 3.6% during the baseline drought scenario.
        - Polk County,
        - Georgia Power at Plant Hammond,
        - City of Cave Spring,
        - City of Summerville, and
        - Mohawk Industries.
    - Eight facilities showed wastewater assimilation challenges in the 80-year baseline and drought scenarios:
        - Big Canoe WPCP
        - City of Chatsworth (Judson Vick WPCP)
        - OMNOVA Solutions which exhibited the greatest percentage of challenges days, or 27.9% of the modeled duration.
        - City of Rockmart
        - GEO Specialty Chemicals
        - City of Cave Springs
        - City of Summerville
        - Mohawk Industries.

The ACF Basin included 53 municipal withdrawals, 95 municipal discharges, 27 industrial withdrawals, 15 industrial discharges, and four energy withdrawals expressed as consumptive use. Although potential challenges were predicted in the ACF Basin, no challenges were predicted in the Chattahoochee portion of the CNG Region. The model scenarios indicate no challenges for water supply and wastewater assimilation for the CNG Region within the ACF Basin. Figure 3-6 illustrates the facility nodes with existing water supply or wastewater assimilation challenges according to the 2023 model results.

Additional details are provided in the memorandum, “Development of Basin Environmental Assessment Models (BEAMs) for Georgia Surface Water Basins” (May 2023).

Figure 3-6: Modeled Facility with Challenges in the CNG Region



Source: GAEPD, 2023

3.2.3 Groundwater Quantity

The groundwater availability Resource Assessment estimates the sustainable yield for prioritized groundwater resources based on existing data. GAEPD prioritized the aquifers based on the aquifer characteristics, evidence of negative effects, anticipated negative impacts, and other considerations.

No new analysis of groundwater availability was conducted as part of the Regional Water Plan update process. Two prioritized aquifer systems were evaluated in the Region in 2010 during the original Regional Water Plan process: the Crystalline rock and the Paleozoic rock. The Crystalline rock aquifer system lies within the Chattahoochee and Tennessee River watersheds; the Paleozoic rock aquifer system lies within the Etowah and Oostanaula River watersheds.

As part of the 2010 analysis, GAEPD developed a numerical groundwater model to estimate sustainable yield for a study basin selected within the Paleozoic rock aquifer system; a water budget approach developed for a basin within the Crystalline rock aquifer system was used to estimate sustainable yield in this part of the CNG Region. No groundwater sustainable yield issues were identified within the Region based on current demands and conditions. Although most wells produce less than 200 gpm in the Crystalline rock aquifers, in local geologically unique settings, several wells exist with production rates between 200 and 500 gpm (Georgia Geologic Survey, 2006). Furthermore, within the Paleozoic rock aquifers, carbonate aquifers can produce over 2,000 gpm with little or no impact to the local water table.

Typical water quality issues known to be associated with the Crystalline rock aquifer systems include elevated iron/manganese levels and local concentration of radionuclides. Water quality issues known to be associated with the Paleozoic rock aquifers include turbidity, pH, hardness, and iron.

3.3 Ecosystem Conditions and In-Stream Use

This section includes information on stream classifications, impaired waters, priority watersheds, and fish and wildlife.

3.3.1 Water Use Classifications (Designated Uses)

In accordance with the Federal Clean Water Act, GAEPD classifies each of the State's surface waters according to its uses. At a minimum, all waters are classified as fishable and swimmable. Water quality standards or criteria have been developed for each water use classification to assist GAEPD with making water use regulatory decisions; Table 3-1 summarizes the streams in the Region that are classified by the State for uses other than fishing and swimming as referenced in Chapter 391-3-6-.03(14) of Georgia's Rules and Regulations for Water Quality Control.

Jacks River and the headwaters of the Conasauga River are designated as Wild and Scenic for which no alteration of natural water quality from any source is allowed. Portions of 54 other waterways in the Region are designated as Recreation or Drinking Water, which also have additional water quality criteria. In addition to a water's designated use, standards apply to two levels of trout stream designations: "Primary," which supports self-sustaining populations of wild trout, and "Secondary," which provide habitat suitable for stocking trout. Eleven of the Region's 18 counties contain primary or secondary trout streams. There is to be no elevation of natural stream temperatures for a primary trout stream. A secondary trout stream must have no temperature elevation exceeding 2 degrees Fahrenheit (°F) of natural stream temperatures.

Table 3-1: Special Stream Classifications

Basin	Stream	Reach	Classification
Chattahoochee	Bear Creek	Headwaters to confluence with Chattahoochee River	Drinking Water
Chattahoochee	Camp Creek	Headwaters to confluence with Hazel Creek	Drinking Water
Chattahoochee	Chattahoochee River	Headwaters to confluence with Soque River	Recreation
Chattahoochee	Chattahoochee River	Soque River to White Creek	Recreation and Drinking Water
Chattahoochee	Chattahoochee River	White Creek to Mud Creek	Recreation
Chattahoochee	Chattahoochee River/Lake Lanier	Mud Creek to Buford Dam	Recreation and Drinking Water
Chattahoochee	Hazel Creek	Law Creek to Camp Creek	Drinking Water
Chattahoochee	Smith Creek	Unicoi Lake, Unicoi State Park Beach	Recreation
Chattahoochee	Soque River	Deep Creek to Sutton Mill Creek	Drinking Water
Chattahoochee	Turner Creek	Headwaters to confluence with Tesnatee Creek	Drinking Water
Chattahoochee	Yahoola Creek	Bryant Creek to confluence with Chestatee River	Drinking Water
Coosa	Beech Creek	Headwaters to Dry Creek (including Possum Trot Reservoir)	Drinking Water
Coosa	Cartecay River	Clear Creek to confluence with Ellijay River	Drinking Water
Coosa	Coahulla Creek	Bates Branch to Mill Creek	Drinking Water
Coosa	Conasauga River	Waters within the Cohutta Wilderness Area	Wild and Scenic
Coosa	Conasauga River	Sugar Creek to Spring Creek	Drinking Water
Coosa	Coosa River	At the Alabama State Line	Recreation
Coosa	Coosawattee River	Mineral Springs Branch to confluence with Conasauga River	Drinking Water

Table 3-1: Special Stream Classifications

Basin	Stream	Reach	Classification
Coosa	Coosawattee River/Carters Lake	Confluence with Mountaintown Creek to Carters Dam	Recreation and Drinking Water
Coosa	Dry Creek	Headwaters to confluence with Duck Creek	Drinking Water
Coosa	Duck Creek	Confluence with Dry Creek to Dickson Creek	Drinking Water
Coosa	Ellijay River	Briar Creek to confluence with Cartecay River	Drinking Water
Coosa	Etowah River	Headwaters to Montgomery Creek	Drinking Water
Coosa	Etowah River	Lily Creek to Mill Creek	Drinking Water
Coosa	Etowah River	Long Swamp Creek to Canton Creek	Drinking Water
Coosa	Etowah River	Allatoona Dam to Ward Creek	Drinking Water
Coosa	Etowah River	Dykes Creek to Silver Creek	Drinking Water
Coosa	Etowah River/Lake Allatoona	Georgia Highway 20 to Allatoona Dam	Recreation and Drinking Water
Coosa	Euharlee Creek	Parham Springs Creek to Fish Creek	Drinking Water
Coosa	Headwaters of Gold Mine Branch	Fort Mountain Lake, Fort Mountain State Park Beach	Recreation
Coosa	Holly Creek	Dill Creek to Chicken Creek	Drinking Water
Coosa	Jacks Creek	Waters within the Cohutta Wilderness Area	Wild and Scenic
Coosa	Long Swamp Creek	Lake Tamarack Dam to Cox Creek	Drinking Water
Coosa	Mill Creek	Hurricane Creek to confluence with Conasauga River	Drinking Water
Coosa	Oostanaula River	Confluence of Conasauga and Coosawattee Rivers to Oothkalooga Creek	Drinking Water
Coosa	Oostanaula River	Confluence with Woodward Creek to Coosa River	Drinking Water
Coosa	Raccoon Creek	Headwaters to confluence with Chattooga River	Drinking Water
Coosa	Tributaries to Heath Creek	Rocky Mountain Public Fishing Lakes, Rocky Mountain Public Fishing Area	Recreation
Coosa	Tributary of Dakwa Lake	Headwaters to confluence with Turniptown Creek (including Dakwa Lake)	Drinking Water

Table 3-1: Special Stream Classifications

Basin	Stream	Reach	Classification
Coosa	Woodward Creek	Headwaters to confluence with Oostanaula River	Drinking Water
Tennessee	Hiawassee River	Headwaters to Lake Chatuge	Recreation
Tennessee	Hiawassee River/Lake Chatuge	Lake Chatuge to Georgia - North Carolina State Line	Recreation and Drinking Water
Tennessee	Lookout Creek	Confluence with Turner Branch to confluence with Sitton Gulch Creek	Drinking Water
Tennessee	Mud Creek	Headwaters to confluence with Little Tennessee River	Drinking Water
Tennessee	Nottely River	Headwaters to confluence with Fortenberry Creek	Recreation
Tennessee	Nottely River	Lake Nottely Dam to Georgia - North Carolina State Line	Recreation
Tennessee	Nottely River/Lake Nottely	Confluence with Fortenberry Creek to Lake Nottely Dam	Recreation and Drinking Water
Tennessee	South Chickamauga Creek	Confluence of Tiger Creek with East Chickamauga Creek to confluence with Little Chickamauga Creek	Drinking Water
Tennessee	Toccoa River	Lake Blue Ridge Dam to Georgia - Tennessee State Line	Recreation and Drinking Water
Tennessee	Toccoa River/Lake Blue Ridge	Headwaters to Lake Blue Ridge Dam	Recreation
Tennessee	Tributary to Crawfish Spring Lake	Headwaters to confluence with Coke Oven Branch (including Crawfish Spring Lake) to West Chickamauga Creek	Drinking Water
Tennessee	Wolf Creek	Lake Trahlyta, Vogel State Park Beach	Recreation

Source: GAEPD Rule 391-3-6-.03 Water Use Classifications and Water Quality Standards, August 2022.

[a]All waters classified to support recreational contact; these waters are used for activities such as water skiing, boating, swimming where risk of contact is greater than in most waters

[b]No alteration of natural water quality allowed; no wastewater and stormwater discharges permitted.

3.3.2 Monitored and Impaired Waters

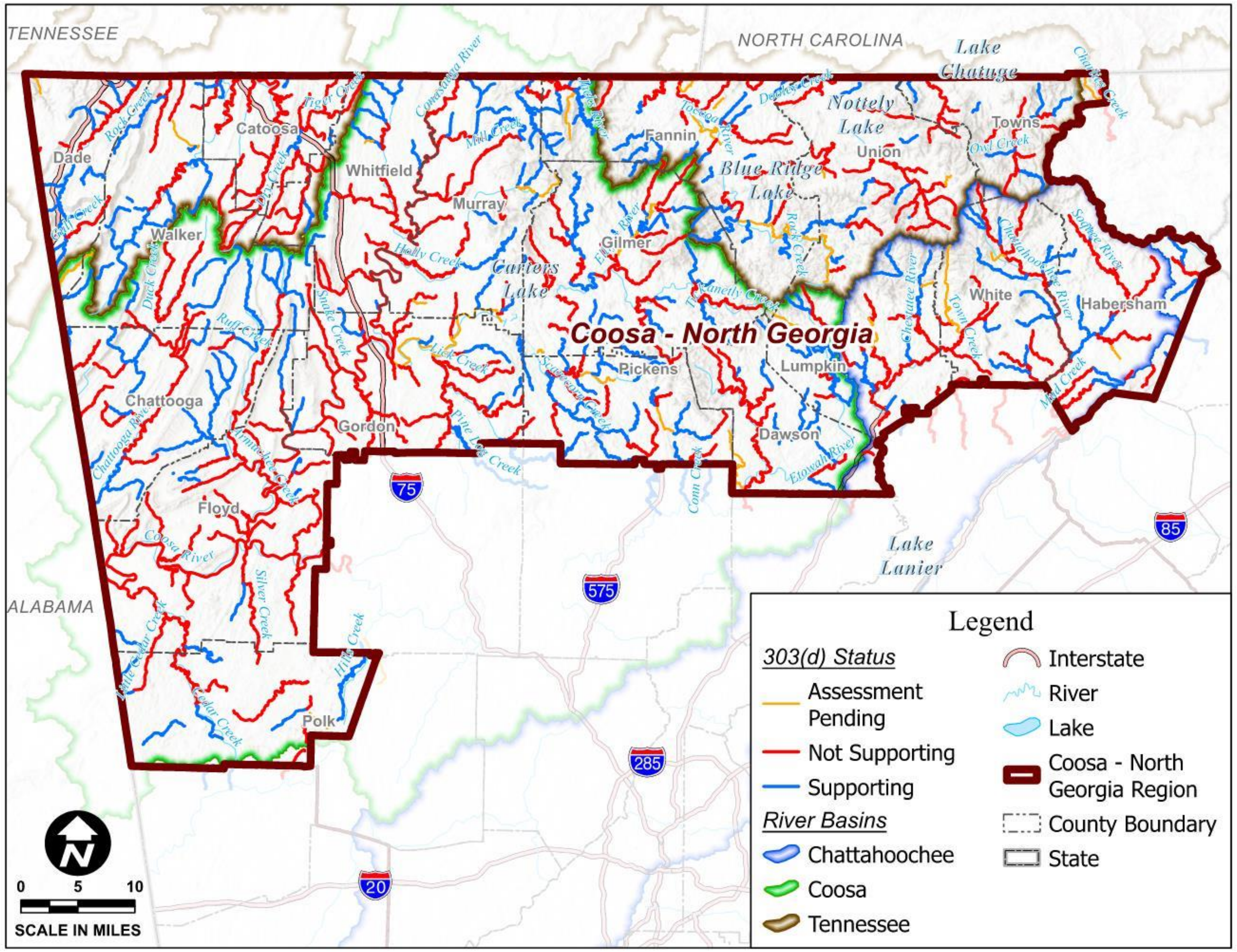
GAEPD publishes a list of streams that do not meet the water quality standards associated with each designated use category. GAEPD monitors streams throughout the State and publishes the list, known as the 303(d) list, every other year. Of the 2,950 stream miles assessed in the CNG Region, 57 percent were not supporting their designated use, or 1,667 miles representing 298 individual stream segments. These statistics also include stream segments that are partially in the CNG region, and partially in another planning region. Most of these waters were rated as impaired based on biological monitoring (i.e., fish or macroinvertebrate data indicated reduced organism numbers or diversity) and/or high levels of fecal coliform. Fecal coliform bacteria are an indicator of the presence of human waste; high levels indicate potential health risks in waters used for swimming and other recreational activities. Figure 3-7 shows the locations of the impaired stream segments within the Region based on the 2022 listings, the most recent year for which mapping data were available.

Lakes also are monitored as part of the 303(d) process and are listed as “not supporting” their uses if sampling results indicate they do not meet State water quality standards. Carters Lake, designated for Recreation in Gilmer County, and Lake Allatoona were not supporting recreational use due to a violation of the chlorophyll-a standard caused by nonpoint source pollution during wet weather conditions between 2019 and 2021.

The EPA accepted as final the GAEPD’s 2022 303(d) list, which includes the following general changes from the 2020 list for waterbodies within the Region (GAEPD, 2014):

- Three stream reaches were changed from “Not Supporting” or “Assessment Pending” to “Supporting” their designated use (or “de-listed”) between the 2020 List and 2022 List.
- Ten stream reaches were changed from “Supporting” or “Assessment Pending” to “Not Supporting” their designated use (or “listed”) between the 2020 List and 2022 List.
- Additional water quality impairments were added to twelve stream reaches that were already listed as Not Supporting their designated use between 2020 and 2022.
- Water quality impairments also were removed from four stream reaches; however, these streams continue to Not Support their designate use due to other water quality factors.

Figure 3-7: Impaired Waters in the CNG Region



Source: GAEPD, Watershed Protection Branch, 305(b)/303(d) List, 2022.

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3.3.3 Conservation Areas

Georgia Department of Natural Resources' (GADNR's) Wildlife Resources Division (WRD) identifies waters and watersheds it believes should be given high conservation priority to protect important populations of high priority species and to protect or restore representative aquatic systems throughout Georgia (GADNR, 2015). The entire list of high priority waters is available at the WRD website.[3] The prioritization was updated in 2015 and approved by the U.S. Fish and Wildlife Service in September 2016 as part of the State Wildlife Action Plan revision. Figure 3-8 shows the high priority waters within the CNG Region.

The streams included on the final priority list are those that are a high priority for restoration, preservation, or other conservation activity; streams that were too degraded were not included in the final list. The streams on the list contain anadromous fish (fish that return to the river where they were born to breed), include rare natural systems, or represent the least disturbed aquatic systems within the Region. Although the individual stream reaches were the basis for the selection process, Figure 3-8 identifies the entire watershed as a high priority watershed since protecting the entire watershed is the only way to protect these high priority waters.

The Georgia Conservation Lands Database, a product of the Georgia Gap Analysis Program (GAP), was compiled to aid a state-wide evaluation of how the distribution of lands managed to protect biodiversity compares with potential natural vertebrate systems in the State. The Region contains more than 740,000 acres of protected land managed for conservation purposes, representing 27 percent of the Region's total area. According to the GIS data from the National Resources Spatial Analysis Lab, approximately 580,000 acres are located in the Chattahoochee National Forest.

The rivers within the CNG Region include some of the most pristine streams and unique aquatic habitats in Georgia, and as a result, this area includes several rare, threatened, and endangered aquatic species. These include 2 State threatened amphibians, 2 rare amphibians, 1 State and Federally listed endangered turtle, 2 rare turtles, 10 federally listed endangered or threatened fish species, 39 State rare, threatened, or endangered fish species, 8 State threatened or endangered crayfish species, 10 federally listed endangered or threatened mussels, and 13 State threatened or endangered mussel species and 1 State and Federally listed endangered aquatic snail. The Georgia DNR Biodiversity Portal maintains an active list of these imperiled species and can be referenced for more information.[4] The federally listed species can be found through the U.S. Fish and Wildlife Service Information for Planning and Consultation system (IPAC)[5].

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[3] https://georgiawildlife.com/WildlifeActionPlan#high-priority-watershed
[4] http://www.georgiawildlife.org/conservation/species-of-concern?cat=6
[5] https://ipac.ecosphere.fws.gov/

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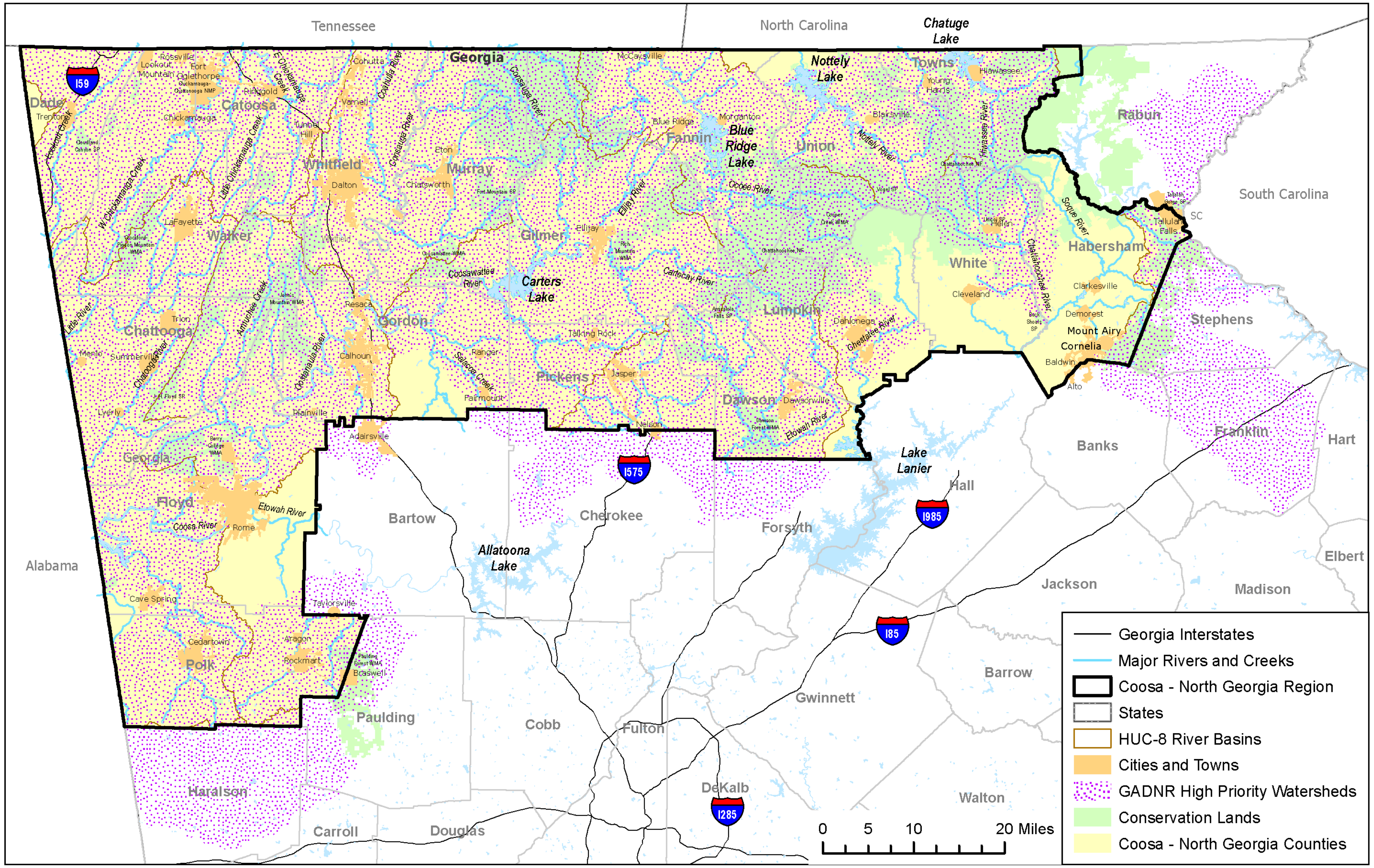
Figure 3-8: Conservation Areas and GADNR High Priority Waters (As Delineated in the State Wildlife Plan) in the CNG Region



Source: High Priority Streams and Watersheds, GADNR Nongame Conservation Section, http://www.georgiawildlife.come/node/1377

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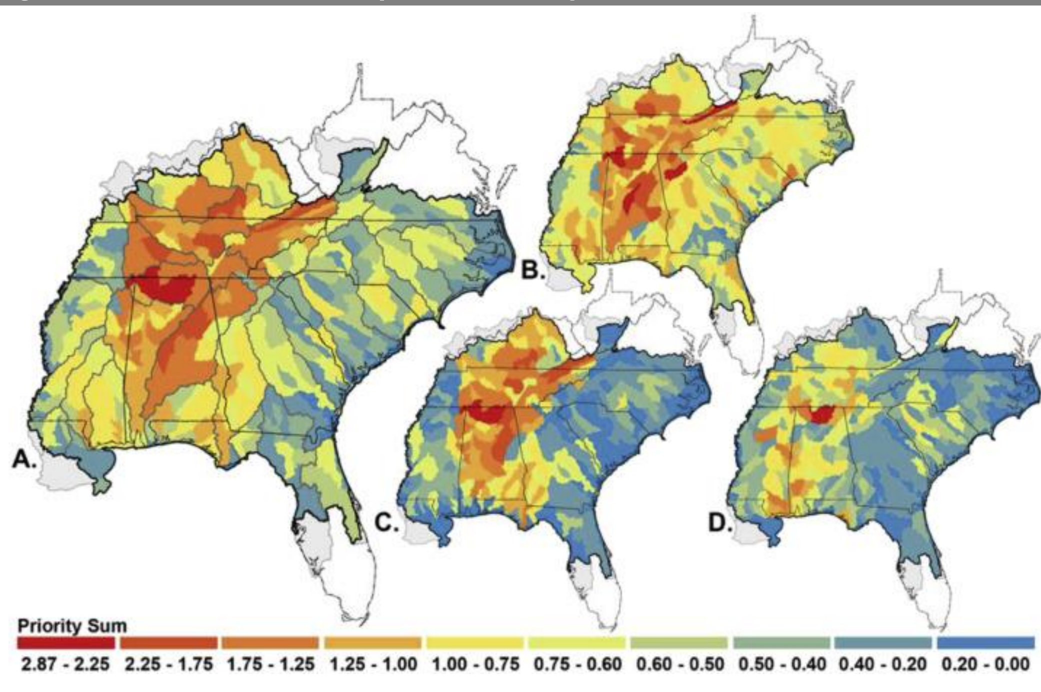
3.3.4 Fisheries Resources

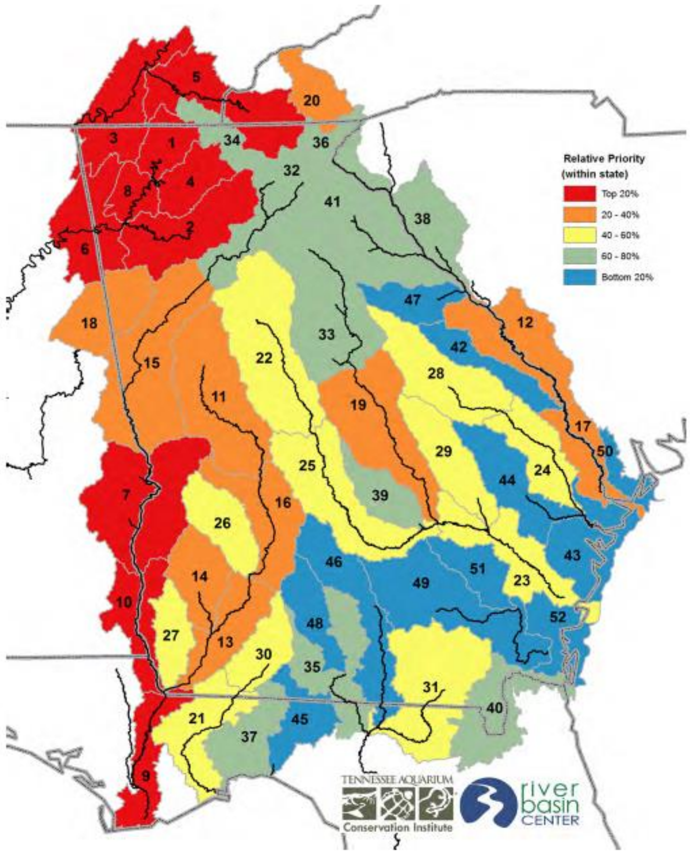
The Coosa and Tennessee River Basins are nationally recognized for their aquatic biological diversity (fish, mussel, and crayfish). In 2016, the Southeastern Aquatic Biodiversity Conservation Strategy (Elkins, et al., 2016) was published, which summarizes the most threatened HUC 8 watersheds within the southeast region. Illuminating hotspots of imperiled aquatic biodiversity in the southeastern US (Elkins, et al., 2019) was then published supporting the previous article but with substantial revisions to the mussel maps. Figure 3-9 (A) shows the overall priority scores for the southeast; the map indicates that multiple watersheds within the CNG Region are among the highest priority in the study, including the Etowah River and the Conasauga River Basins.. Figures 3-9 (B)-(D) show the priority scores for fishes (B), mussels (C), and crayfish(D). The maximum score possible for any watershed was 3. More specifically for Georgia, the study identified six HUC 8 watersheds within the Top 10 priority watersheds for the entire State (Figure 3-10), including, in descending order: Conasauga, Etowah, Middle Tennessee-Chickamauga, Coosawattee, Upper Coosa, and Oostanaula.

Figure 3-9: Southeastern Imperiled Priority Watersheds



Source: Southeastern Aquatic Biodiversity Conservation Strategy, Illuminating hotspots of imperiled aquatic biodiversity in the southeastern US (Elkins et al, 2019).

Figure 3-10: Georgia Imperiled Priority Watersheds



Source: Southeastern Aquatic Biodiversity Conservation Strategy

Sport fishing is very popular in the CNG Region's rivers, lakes, and streams. Important recreational gamefish include striped bass, hybrid bass, and smallmouth bass. In addition, hybrid bass from the Region are used to stock rivers, lakes, and streams throughout Georgia. Other important game species include spotted bass, largemouth bass, smallmouth bass, redeye bass, black crappie, blue catfish, channel catfish, walleye, bluegill, and red ear sunfish. Future changes in water use or water quality could affect all of these fisheries and the economic benefits provided by these resources.

Each year, trout fishing is enjoyed in Georgia by over 100,000 anglers on approximately 4,000 miles of trout streams (almost entirely in the CNG Region), and generates more than $172,000,000 in economic benefits, according to GADNR WRD. Due partially to naturally low productivity in some of these streams, GADNR WRD and the U.S. Fish and Wildlife Service (USFWS) stock over 1.1 million catchable trout annually in Georgia streams and impose special regulations on some streams to help meet demands for trout fishing.

SECTION 4

Forecasting Future Water Resource Needs

Section 4. Forecasting Future Water Resource Needs

> *Section Summary*
>
> *Total water demand in the CNG Region for municipal, industrial, agriculture, and energy use is expected to grow from 170 MGD in 2020 to 186 MGD in 2060. Similarly, wastewater flows are expected to increase from 117 MGD in 2020 to 132 MGD in 2060.*
>
> *Municipal use is forecast to make up the largest portion of future water consumption. Agricultural and energy water consumption are expected to remain relatively constant, while municipal and industrial water demands are projected to increase steadily from 153 MGD in 2020 to 166 MGD in 2060.*

Water demand and wastewater flow forecasts and the resource assessments described in Section 3 form the foundation for water planning in the CNG Region and serve as the basis for the selection of the management practices discussed in Section 7.

This section presents the regional water demand and wastewater flow forecasts from 2020 through 2060 for the four major water use categories: municipal, industrial, agricultural, and energy. Forecasting for each sector is explained in this section as well as some of the differences between forecasting done for the 2017 plan and updated forecasting done for this Plan. These forecasts will continue to be refined and updated as part of the on-going regional water planning process.

The supplemental documents available on the CNG website detail the agricultural, municipal, industrial, and energy sector forecasts.

4.1 Municipal Forecasts

Municipal water demand and wastewater flow forecasts include water supplied to residences, commercial businesses, small industries, institutions, and military bases. Water use by higher water-using industries is forecasted separately and identified in Section 4.2. Most of these high water-using industries possess permits to supply their own water and/or treat their own wastewater and represent the top users in the poultry, manufacturing, mining, and paper industries. Residential water uses include water for normal household purposes: cooking, bathing, and clothes washing, among others. Commercial water uses include water used by hotels, restaurants, retail stores, and office buildings, among others. Municipal water demands may be served by public water systems, private water systems, or self-supplied by the user, such as individual wells.

4.1.1 Population Projections

Municipal water and wastewater forecasts are closely tied to population projections within the Coosa North Georgia Region. The county population projections were developed by the Governor's Office of Planning and Budget (OPB), which is charged in State law (O.C.G.A. 45-12-171) with the responsibility for preparing, maintaining, and furnishing official demographic data for the State. The projection data published in October 2019 by OPB was adopted by the GAEPD for this planning process.

The population projections by county for the planning period are summarized in Table 4-1. These projections provide the basis for municipal water and wastewater forecasts and also indirectly impact forecasts for other categories of water and wastewater projections, as described in the sections that follow.

As seen in the table, the population in the Region is projected to increase from 792,706 in 2020 to 920,438 in 2060, a growth rate of 16 percent over this 40-year period.

Table 4-1: Population Projections by County provided by Office of Planning and Budget[a]

County	2020	2030	2040	2050	2060	Difference (2020 - 2060)	% Increase (2020 – 2060)
Catoosa	68,771	73,567	72,695	69,633	65,174	-3,597	-5%
Chattooga	24,766	25,326	25,534	25,508	25,721	955	4%
Dade	16,162	16,198	15,956	15,624	15,554	-608	-4%
Dawson	27,021	36,078	44,489	54,433	67,974	40,953	152%
Fannin	26,320	26,726	23,592	19,913	17,719	-8,601	-33%
Floyd	99,916	105,145	102,003	96,266	90,096	-9,820	-10%
Gilmer	31,417	32,902	30,444	27,601	25,700	-5,717	-18%
Gordon	58,049	61,448	63,974	65,751	67,485	9,436	16%
Habersham	45,800	49,137	52,289	55,490	59,312	13,512	30%
Lumpkin	33,802	38,311	42,370	46,634	51,945	18,143	54%
Murray	40,261	42,099	43,551	44,730	46,047	5,786	14%
Pickens	33,530	38,936	40,965	42,585	44,999	11,469	34%
Polk	43,482	45,871	44,865	42,390	39,341	-4,141	-10%
Towns	12,034	13,362	15,215	18,145	22,226	10,192	85%
Union	25,335	30,234	32,310	34,454	38,705	13,370	53%
Walker	69,610	71,128	72,128	72,701	74,184	4,574	7%
White	31,758	38,852	43,588	48,727	55,215	23,457	74%
Whitfield	104,672	108,534	111,541	112,706	113,041	8,369	8%
Total	**792,706**	**853,854**	**877,509**	**893,291**	**920,438**	**127,732**	**16%**

[a] Population projections were provided by the Governor's Office of Planning and Budget (2019).

4.1.2 Municipal Water Demand Forecasts

The municipal water demand forecast methodology follows a similar overall approach to the 2017 Plan. Regional municipal water demand forecasts are calculated by multiplying the estimated per person (capita) water use for each county by its population for each planning horizon. Typically, per capita water use rates differ for public water systems and self-supplied private wells; therefore, the demands are calculated separately and then added together for each county.

Baseline per-capita water use rates for publicly supplied water were calculated in different ways as enabled by available data. For most counties, water loss audit data directly provided per-capita water use rates. This audit data was averaged across all utilities in a county to develop a county-specific rate of per capita water use. For other counties with small utilities or a combination including small utilities who do not submit audits, withdrawal and population data reported to GAEPD were used to develop baseline per capita rates. This method revises the 2017 approach that employed adjustment factors to historical per capita rates based on withdrawal data and population data.

Self-supplied water users were assumed to use a standard 75 gallons per capita per day (gpcd), consistent with the 2015 USGS Report and 2017 Plan, unless feedback dictated otherwise. Both the publicly supplied and self-supplied future rates of per capita water use were adjusted to account for water savings as a result of plumbing codes requiring high efficiency plumbing fixtures.

The following data sources were referenced to develop the municipal water demands:

- Georgia Water Loss Audit Data – Used to develop per-capita water use rates for systems with over 3,300 customers.
- “Estimated Use of Water in Georgia for 2015 and Water-Use Trends, 1985-2015” (USGS 2015 Report) – Provided percentages of self-supply by county.
- EPD Surface Water and Groundwater Withdrawal Data – Summarized trends from 2015 to 2019 and established baseline water demands for permitted users using 2019 historical data.

The municipal water demand forecasts were further refined through a stakeholder review and input process which included appointed representatives from each Regional Water Planning Council. An adjustment was made to the per capita rate for Dawson County based on council feedback.

Additional details regarding development of the municipal water demand forecasts, including the per capita rate and plumbing code adjustment for each county, are provided in the supplemental document titled the Municipal Water Demand and Wastewater Flow Forecasting Methods Report (July 2021), which is available on the GAEPD website.

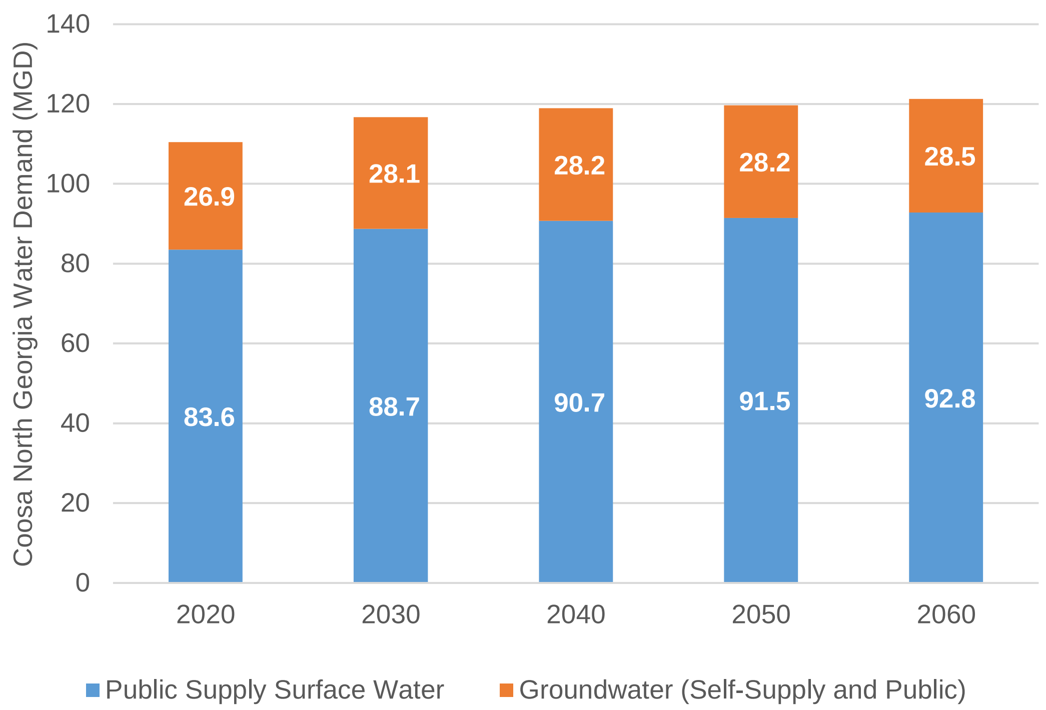
Table 4-2 summarizes municipal water demand forecasts by county for the Region over the planning period.

Table 4-2: Municipal Water Demand Forecasts by County (AAD-MGD)[a]

County	2020	2030	2040	2050	2060
Catoosa	6.8	7.1	6.9	6.4	5.9
Chattooga	3.4	3.4	3.3	3.3	3.2
Dade	2.1	2.1	2.0	2.0	1.9
Dawson	2.6	3.6	4.5	5.4	6.8
Fannin	2.7	2.7	2.3	1.9	1.7
Floyd	12.6	12.9	12.3	11.3	10.3
Gilmer	4.1	4.3	4.2	4.0	3.9
Gordon	10.1	10.6	10.9	11.0	11.2
Habersham	6.8	7.5	8.2	8.7	9.1
Lumpkin	3.5	4.3	4.9	5.6	6.4
Murray	3.9	4.0	4.1	4.1	4.2
Pickens	4.2	4.8	5.0	5.2	5.4
Polk	6.0	6.2	6.1	5.8	5.4
Towns	1.6	1.7	2.0	2.3	2.8
Union	2.0	2.3	2.4	2.5	2.8
Walker	7.6	7.6	7.5	7.3	7.3
White	3.2	3.9	4.3	4.7	5.2
Whitfield	27.1	27.7	28.1	28.1	27.8
Total	**110.4**	**116.7**	**118.9**	**119.6**	**121.3**

Notes:
[a]Municipal water demand forecasts include publicly-supplied and self-supplied demands from surface water and groundwater sources. Major publicly supplied industries are not included.

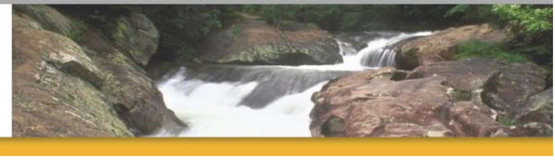
Figure 4-1: Municipal Water Demand Forecast (AAD-MGD)



The demand for municipal water is forecasted to increase from 110 MGD in 2020 to 121 MGD in 2060 in the CNG Region. Based on existing uses, approximately 77 percent of forecasted future water demand will be obtained from surface water sources and 23 percent from groundwater sources; the latter includes private wells (self-supply). Figure 4-1 shows the municipal demand forecasts for the Region; the demands do not include any large publicly supplied industries, as those demands are included in the industrial forecast (See Section 4.2).

4.1.3 Municipal Wastewater Flow Forecasts

Municipal wastewater flow forecasts were developed to determine the amount of treated wastewater returned by users to the watershed. Municipal wastewater may be treated either at a centralized wastewater treatment facility or in septic systems. As there are two types of discharge for centralized treatment facilities, either point source discharges or to a land application system (LAS), this results in three total disposal methods for wastewater flows: (1) centralized point source; (2) LAS; and (3) septic systems.



Like the previous plan update, GAEPD used currently permitted wastewater treatment plant reported discharge flow data and OPB population projections to estimate future wastewater generation, allocations, and expansions. GAEPD utilized 2019 historical (annual average) discharge data to forecast future wastewater flows by county. The percent change between the base year (2020) population projections and the population projections for each planning year (2030, 2040, 2050, and 2060) was applied to the historical wastewater discharge totals for each county from 2019 to estimate total county discharge flows for each planning year. To be conservative, no reduction in discharge flow from water conservation efforts was applied. In addition, the following approach was used for the municipal wastewater forecast update:

1. The percentage of each county's total wastewater flow that was septic was held constant from 2020 through 2060. Despite efforts to extend sewer service in some counties, the presence of septic systems will remain relatively steady for counties with lower population densities.
2. For the update, the percent change between the prior (2015) and updated (2020) population projections for each planning year through 2060 was applied to the prior septic flow forecasts to obtain an updated septic flow projection by county. These flows were estimated by assuming an 80% return ratio (i.e., indoor water use) and a per capita water demand rate of 75 gpcd.
3. Wastewater forecasts were proportionally allocated per facility for each county using the historical discharge data. Forecasts were then manually adjusted based on knowledge of new facilities and the decommissioning of old facilities, such as the City of Dawsonville's and Etowah County Water and Sewer Authority's conversion from LAS to point discharge. Facility type for centralized discharge was broken down into three categories: point discharge, LAS, and general subsurface permits.
4. It was assumed that there will be no expanded capacity in LAS facilities during the planning period. In cases where LAS systems were forecasted to exceed their existing permits; the excess future flows were assigned to point source discharges.
5. Because the updated wastewater forecasts were generated using historical discharge information, it was assumed inflow and infiltration (I&I) was inherently accounted for in the projections. I&I is a term used to describe the entrance of groundwater and stormwater into centralized sanitary sewer systems. Inflow is stormwater that enters the sanitary sewer systems at points of direct connection to the system while infiltration is groundwater that enters sanitary sewer systems through cracks and/or leaks in the sanitary sewer lines.

Table 4-3 summarizes municipal wastewater flows forecasts for the CNG Region over the planning period.

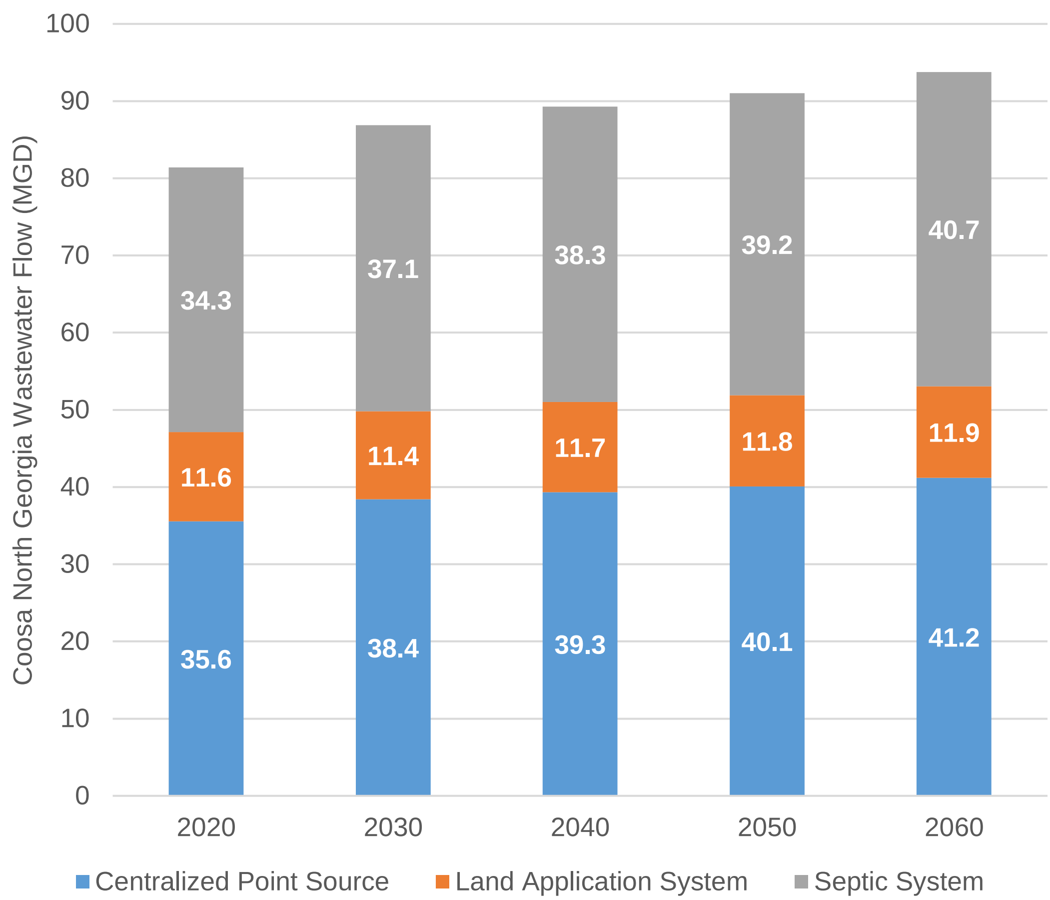
Table 4-3: Municipal Wastewater Flow Forecasts by County (AAF-MGD)[a]

County	2020	2030	2040	2050	2060
Catoosa	2.8	3.0	2.9	2.8	2.6
Chattooga	6.7	6.9	6.9	6.9	7.0
Dade	1.3	1.3	1.3	1.2	1.2
Dawson	1.9	2.7	3.3	4.0	5.1
Fannin	1.7	1.8	1.6	1.3	1.2
Floyd	8.3	8.7	8.5	8.0	7.5
Gilmer	3.4	3.5	3.3	3.1	2.9
Gordon	8.0	8.5	8.8	9.1	9.3
Habersham	6.0	6.6	7.2	7.8	8.4
Lumpkin	2.6	2.9	3.2	3.6	4.0
Murray	3.7	3.9	4.0	4.1	4.2
Pickens	2.5	2.9	3.1	3.2	3.4
Polk	5.3	5.5	5.4	5.2	4.9
Towns	1.0	1.1	1.3	1.6	1.9
Union	1.7	2.1	2.2	2.3	2.6
Walker	7.5	7.6	7.7	7.8	8.0
White	2.2	2.7	3.0	3.4	3.9
Whitfield	14.8	15.2	15.6	15.7	15.7
Total	**81.4**	**86.9**	**89.3**	**91.0**	**93.7**

Notes:
[a]Municipal wastewater flows do not include major industrial sources that treat their water in municipal facilities.

Further details regarding development of the municipal wastewater forecasts and county-specific results are presented in the supplemental document titled Municipal Water Demand and Wastewater Flow Forecasting Methods Report (July 2021), which is available on the GAEPD website. Figure 4-2 shows the municipal wastewater flow forecasts by discharge type.

Figure 4-2: Municipal Wastewater Flow Forecast (AAF-MGD)



Notes:
Values represent forecasted annual average.

The demand for municipal wastewater treatment is forecasted to increase from 81.4 MGD in 2020 to 93.7 MGD in 2060 in the Region. Of either amount, 13 percent is expected to be treated by LASs and 44 percent by systems with point source discharges. Septic systems currently treat approximately 43 percent of the municipal wastewater generated in the Region. The percentage of wastewater treated via septic systems is expected to remain relatively steady in the future for counties with lower population density.

4.2 Industrial Forecasts

Industrial water demand and wastewater flow forecasts anticipate future needs among industries that were identified as major water users through 2060. Industries require water for use in their production processes, sanitation, and cooling, as well as for employee use and consumption. Previous planning efforts forecast industrial needs using future employment data. The current industrial water demand and wastewater flow forecasts are based on permit information and representative input from each industrial sub-sector (paper and forestry products, food processing, manufacturing, and mining). The industrial demands forecasted in this section include major industrial water users and wastewater generators, many of which supply their own water and/or treat their own wastewater. Many industrial users with very small demands are serviced by municipal water and wastewater systems; those demands are included in the municipal forecast.

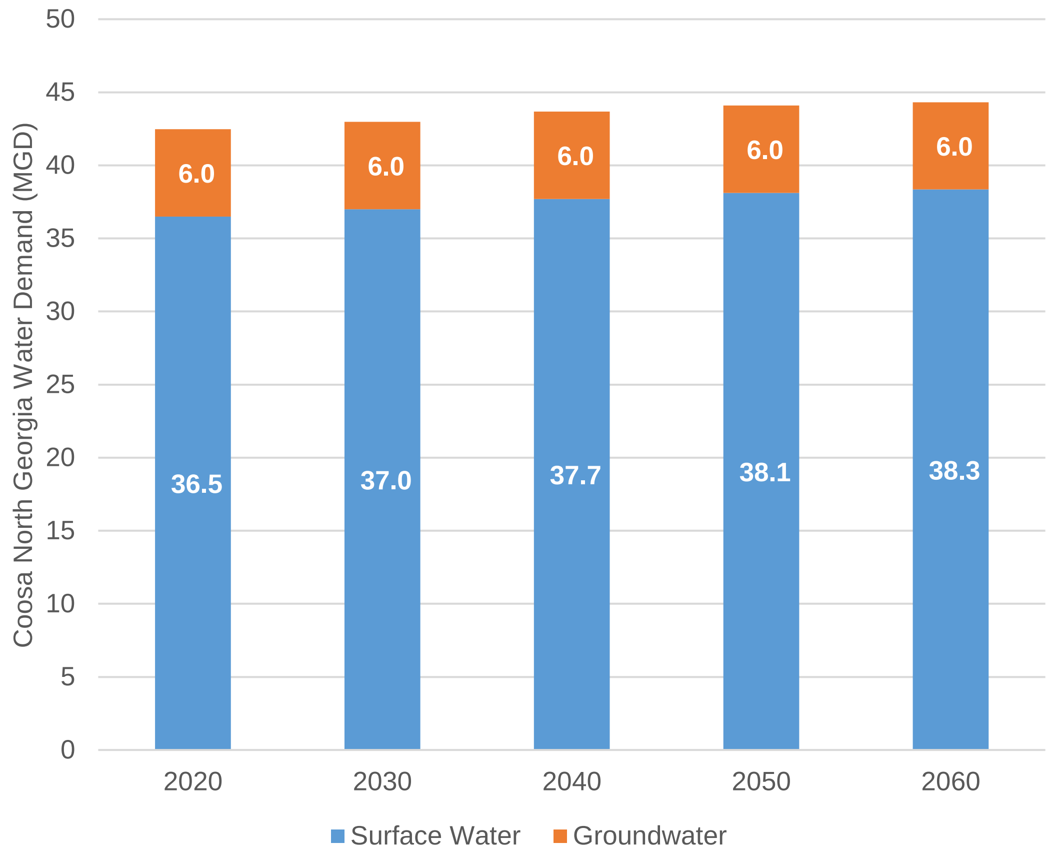
EPD identified experts throughout the State of Georgia to form an industrial stakeholder advisory group representing the state's thirteen largest industrial sectors. Through the advisory group's review of the previous methodology, it was determined that employment projections were no longer a valid basis for estimating future industrial water requirements as increased automation has reduced the number of employees per unit of production. The advisory group subsequently formed sub-sector advisory groups to review water trends and investigate a variety of considerations for paper and forestry products, food processing, manufacturing, and mining industries. Both common and sector-specific conclusions were determined.

4.2.1 Industrial Water Demand Forecasts

Through independent discussions, each sub-sector advisory group reached a series of recommendations to forecast their relevant industrial water and wastewater needs in Georgia. In addition to sub-sector advisory group feedback, confidential trade association surveys were collected for additional input. This information was used in conjunction with municipal water purchases and facility withdrawal permit information to develop the water withdrawals forecast by county and sub-sector. The average water withdrawal from 2010 to 2019 for the majority of industrial facilities was used as the basis for projected water use. Figure 4-3 shows the industrial water and wastewater forecast over the planning period. Water withdrawals are assumed to remain constant over time for all sub-sectors except for an expected increase in water demand for food processing.

The carpet and paper industries will continue to be the most significant water-using industries for this region. Both industries use surface water. Typically, the textile industry, particularly the carpet industry, obtains its supply primarily from municipal suppliers, whereas the paper industry has its own permits for withdrawals. The mining industry primarily relies on groundwater, while the food processing industry relies on municipal supplies.

Figure 4-3: Industrial Water Demand Forecast (AAD-MGD)



Notes:
Values represent forecasted annual average.

Industrial demand for water is forecasted to increase from 42.5 MGD in 2020 to 44.3 MGD in 2060 in the Region. Based on current proportions, in the future approximately 87 percent will come from surface water and 13 percent from groundwater sources. Figure 4-3 shows the steady increase of industrial water demand throughout the planning period.

The results of the industrial water demand forecast for the Region are provided in the supplemental document titled Industrial Water Demand Forecast: Georgia Regional Water Planning Industrial Stakeholders (2020), which is available at the EPD website.

4.2.2 Industrial Wastewater Flow Forecasts

Unlike the 2017 Plan, this update does not rely upon industrial employment projections to predict wastewater flows. Industrial wastewater flow forecasts were estimated based on facilities' wastewater permit data for the years 2015 through 2019, as available. Although some facilities may include stormwater runoff in their discharges, that runoff has been otherwise accounted for in the Resource Assessment modeling process through the incorporation of rainfall events. Accordingly, in these forecasts, wastewater discharges are assumed not to exceed water withdrawals to exclude industrial discharges of captured stormwater.

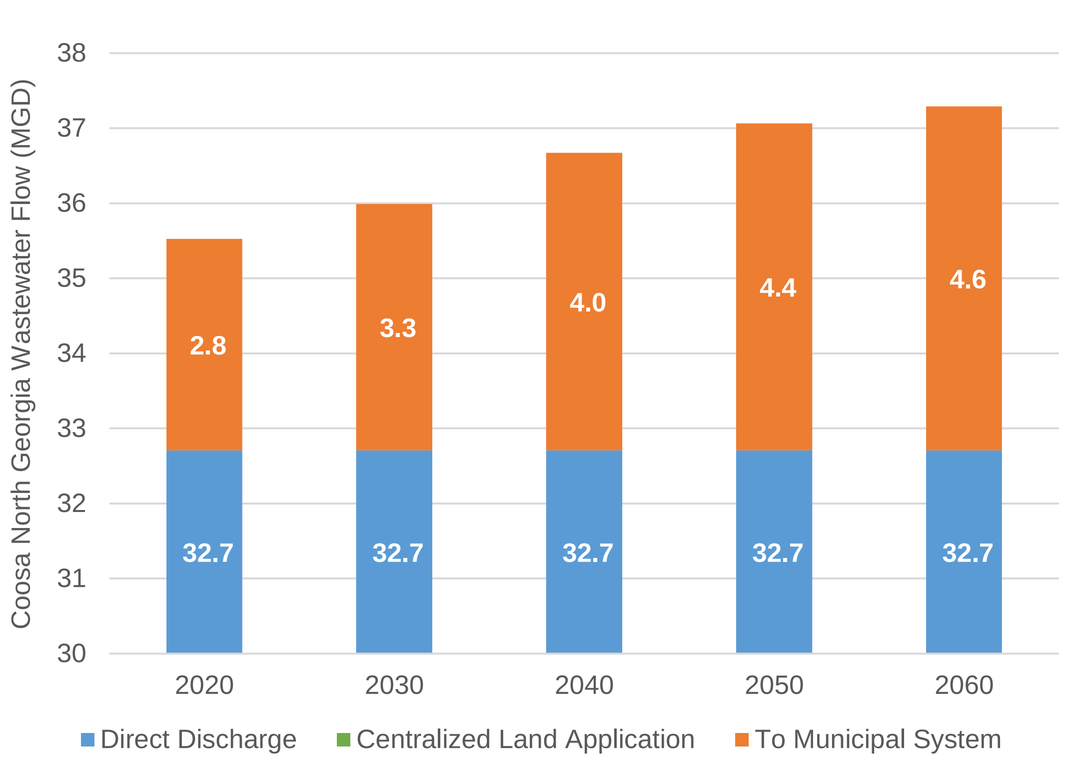
The wastewater flow forecasts are broken down into types: direct discharge to surface waters, discharge to a municipal sewer system, and land application. To be conservative in the resource assessment modeling, wastewater flows sent to land application are not included as a return to surface water bodies. Proportions of wastewater sent to each type of discharge are held constant by county throughout the forecasts.

Wastewater flow forecasts for each sub-sector follow the same growth patterns as water flow forecasts. For the Coosa-North Georgia region, this means that discharges for the food processing sub-sector are expected to increase while the wastewater discharges from other industries remain constant.

Figure 4-4 shows the industrial wastewater flow forecast, which is projected to increase from 35.5 MGD in 2020 to 37.3 MGD in 2060 in the Region. According to current proportions, in the future a nominal percent will be treated by land application and nearly 100 percent will be treated by systems with point source discharges.

The results of the forecasting exercise for industrial wastewater flows are provided in the supplemental document titled Industrial Water Demand Forecast: Georgia Regional Water Planning Industrial Stakeholders (2020), which is available at the EPD website.

Figure 4-4: Industrial Wastewater Flow Forecast (AAF-MGD)



Notes:
The flows for centralized land application are displayed on the graph but small in magnitude.
Values represent forecasted annual average.

4.3 Agricultural Forecasts

Agricultural water use includes both crop production and non-crop agricultural water users. The future irrigation needs for crop production were developed by UGA's National Environmentally Sound Production Agriculture Laboratory (NESPAL). Based on the acres irrigated for each crop, these forecasts provide a range of irrigation water use under dry, medium, and wet climate conditions for the years 2020 through 2060.

Current non-crop (including non-permitted) agricultural water uses, such as water use for horticulture (nurseries/greenhouses), golf courses, and livestock production, have been compiled by respective industry associations. Water forecasts for future non-crop agricultural use were not developed because of the lack of available data. For this planning effort, the non-crop water uses are assumed to remain at current levels throughout the planning period.

The bulk of agricultural water needs are located in Floyd and Gordon Counties. Table 4-4 summarizes agricultural water demands for the Region over the planning period.

Table 4-4: Agricultural Water Demand Forecasts by County (AAD-MGD) for the 75th Percentile Scenario

County	Crop Demand		Non-Crop Demand	
	Irrigation 2020	Irrigation 2060	Horticulture 2020-2060	Livestock 2020-2060
Catoosa	0.04	0.04	0.11	0.14
Chattooga	-----	-----	0.04	0.37
Dade	-----	-----	0.02	0.14
Dawson	0.22	0.24	0.03	0.19
Fannin	0.05	0.05	0.04	0.10
Floyd	1.45	1.70	0.11	0.57
Gilmer	-----	-----	-----	0.71
Gordon	2.87	2.96	0.02	0.96
Habersham	0.17	0.18	0.30	0.61
Lumpkin	0.03	0.03	0.12	0.13
Murray	0.28	0.30	0.11	0.58
Pickens	-----	-----	0.13	0.24
Polk	-----	-----	0.34	0.26
Towns	-----	-----	0.02	0.06
Union	0.06	0.06	0.21	0.04
Walker	-----	-----	0.03	0.60
White	-----	-----	-----	0.37
Whitfield	-----	-----	0.07	0.31
Total	**5.18**	**5.56**	**1.72**	**6.38**

Notes:

Forecasted Agricultural Water Demand based on the 75th percentile scenario (in MGD). This demand is comprised of crop irrigation, livestock watering, greenhouses, and nurseries. The crop irrigation is the only demand with a forecasted value.

It should be noted that the water demand for chicken processing facilities is included in the industrial forecast.

----- indicates information not available.

4.4 Energy Forecasts

Forecasts for future water needs for power production were developed by GAEPD and an advisory group representing Georgia's power industry. The energy sector ad hoc group is composed of representatives from Georgia Power, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia (MEAG Power), the Georgia Environmental Finance Authority (GEFA), the Georgia Public Service Commission, and Dalton Utilities. The group provided guidance related to assumptions used in the statewide and regionally distributed water demand forecasts.

Water requirements for energy generation facilities are estimated based on future energy demands along with the water requirements and consumption rates in gallons per megawatt-hour (MWh) for different power generating configurations. Similar to the last plan update, future energy needs are based on projected population and a fixed per capita energy need based on recent historical data.

The forecast analysis covers both water withdrawal requirements and water consumption associated with energy generation. Information related to water withdrawals is an important consideration in planning for the water needed for energy production; however, water consumption is the more important element when assessing future resources because it represents the volume of water which is not returned to the environment following the energy production process. A baseline and high demand scenario were estimated using the updated population projections. The same regression relationship between historical power generation and population was used to generate updated estimates of power need.

In the last plan update, the CNG Region had one coal-fired power plant, Plant Hammond, with a once-through cooling tower system with large water withdrawals. That plant was retired in 2019 and does not have projected future water demands. Four other facilities in the Region generate power, but do not have the same impact on water resources as do thermoelectric generating facilities. First, there is a 1,240-megawatt combined cycle electrical generating plant that utilizes natural gas and steam, currently owned by KGEN. This plant uses 100 percent treated wastewater from Dalton Utilities. The second facility is Oglethorpe Power's Rocky Mountain pumped-storage hydroelectric generation facility with a capacity of 1,046 megawatts. Neither of these facilities was included in the energy sector water demand forecast in the last 2017 Plan or this update. The remaining two facilities, Oglethorpe Power Smith Energy Facility in Murray County and the Oglethorpe Power Sewell Creek Energy Facility in Polk County, are natural gas facilities that are supplied by municipal surface water. Neither of these facilities were included in the energy sector water demand forecast in the 2017 plan but have been added for this update. Potential gaps in future energy needs are assumed to be met by growth in natural gas-fired facilities and renewable energy production.

The process of generating the forecasted water demands and wastewater returns for power generation is documented in the supplemental document titled, Update of Georgia Energy Sector Water Demand Forecast (2020).

Table 4-5 shows the energy sector's expected water withdrawal and consumptive needs through 2060.

Table 4-5: Energy Sector Water Demand Forecasts

	Coosa-North Georgia Region (MGD-AAD)				
	2020	2030	2040	2050	2060
Withdrawal	4.29	4.29	5.65	6.25	6.85
Consumption	3.78	3.78	4.97	5.50	6.03

Source: Memorandum: Update of Georgia Energy Sector Water Demand Forecast (2020)

4.5 Total Water Demand and Wastewater Flow Forecasts

As a general rule, the total water demands and wastewater flows for the Region are expected to have a modest increase from 2020 to 2060. Due to substantial changes in methodology for energy and industrial forecasts, the total forecasted water demands appear much lower than previous plans; however, water demands are projected to grow in every sector. Wastewater flows show a similar trend as the water demands.

In the Region, municipal use makes up the largest portion (65 percent in 2020) of water consumption, as shown in Figure 4-5. Agricultural and energy water demands are expected to remain relatively constant, while municipal and industrial water demands are projected to increase steadily from approximately 153 MGD in 2020 to 166 MGD in 2060 (Figure 4-5).

Figure 4-5: Total Water Demand Forecast by Sector (AAD-MGD)

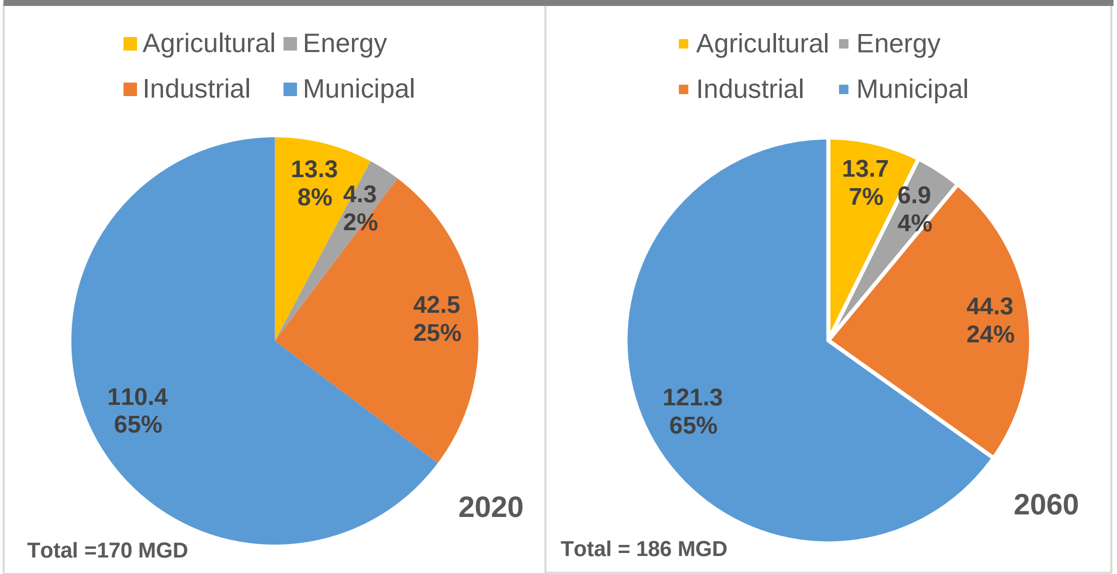


Figure 4-6 shows the total water demand forecast by source. The main water source for this region is surface water, a large portion of which is used to meet municipal water demand.

Figure 4-6: Total Water Demand Forecast (AAD-MGD)

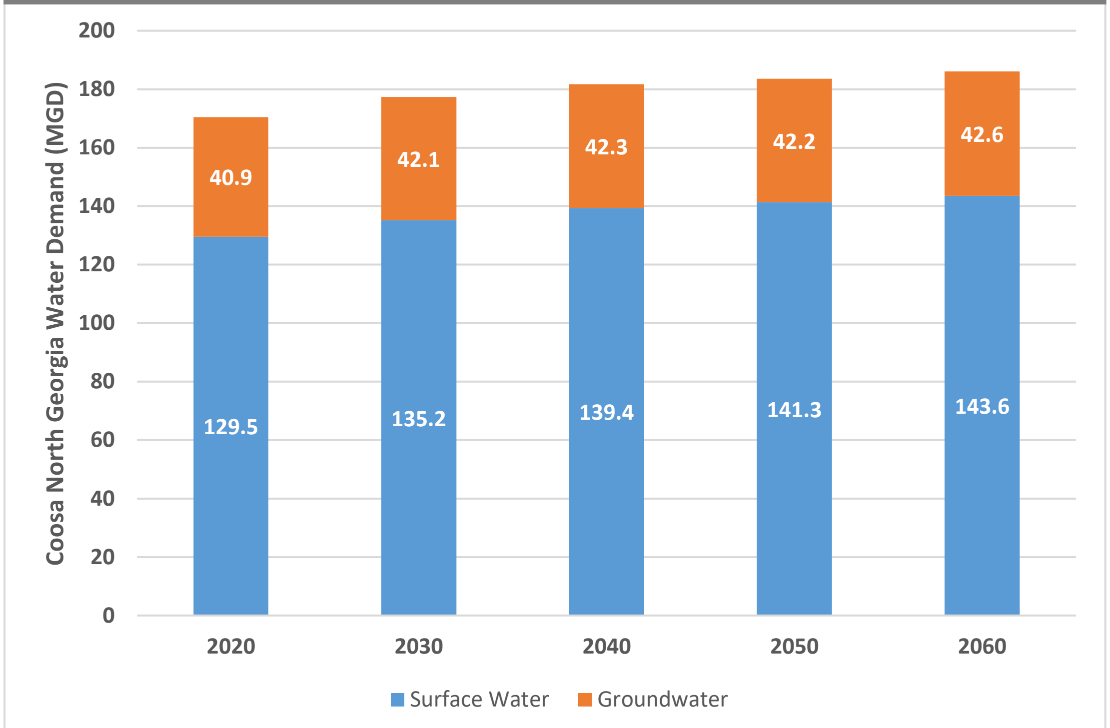
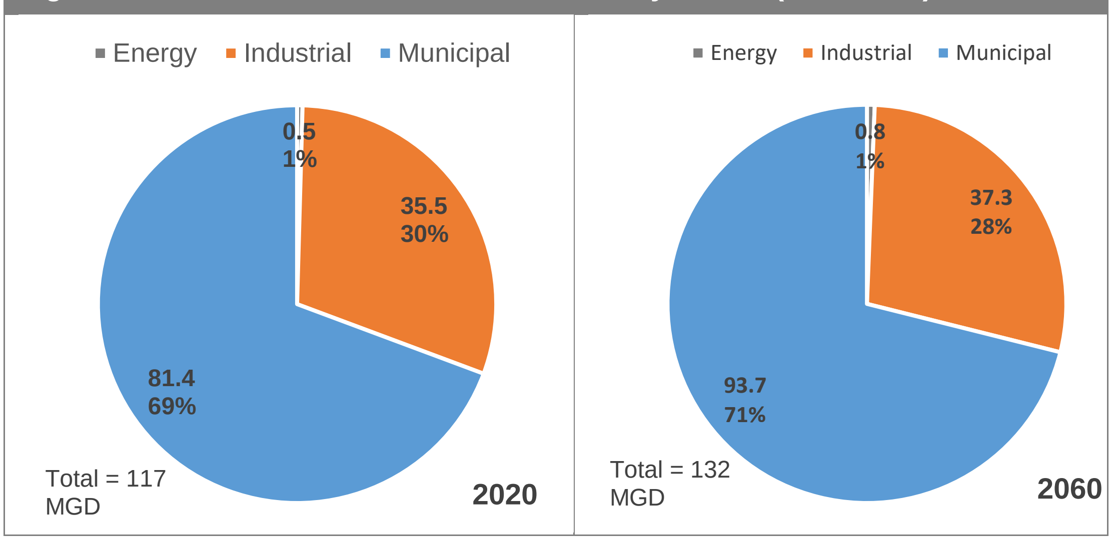


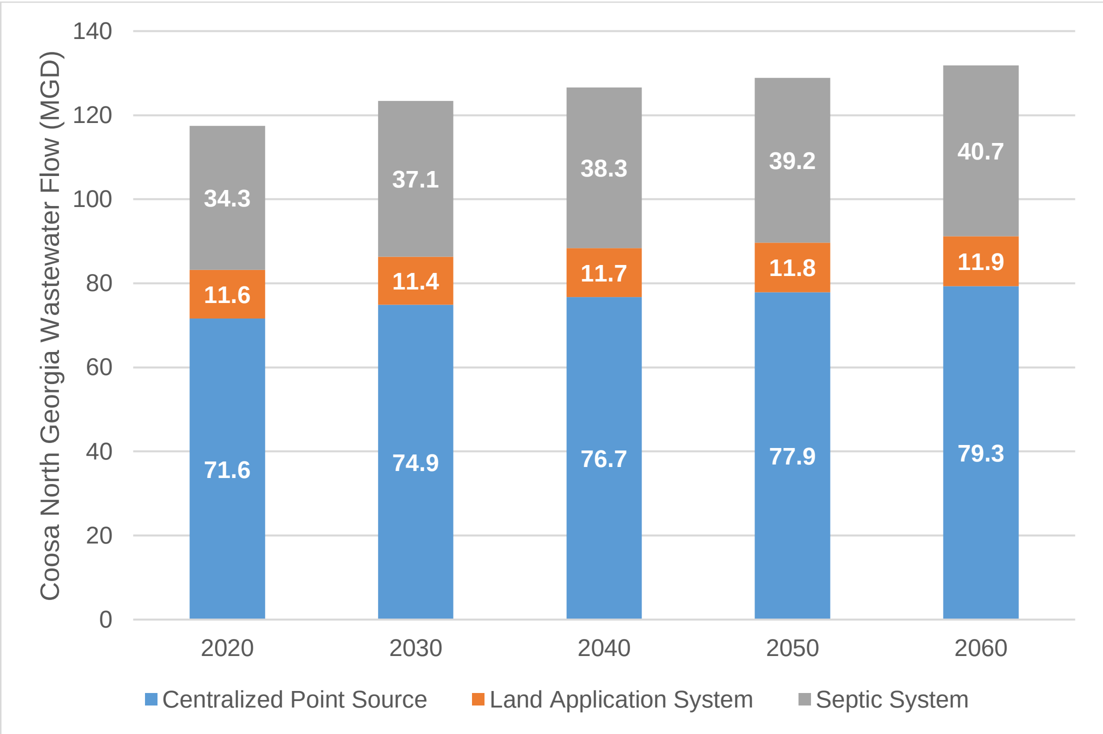
Figure 4-7 shows the total wastewater flow forecast by sector (energy, municipal, and industrial) for the Region in 2020 and 2060. Municipal returns make up approximately 70 percent of the total in both 2020 and 2060.

Figure 4-7: Total Wastewater Flow Forecast by Sector (AAF-MGD)



The total wastewater flow forecast for municipal, energy, and industrial uses are projected to be 132 MGD in 2060. Wastewater demands by treatment and disposal type (point discharge, LAS, or onsite septic) are illustrated for 2020 through 2060 in Figure 4-8. Assuming centralized point source for energy returns, direct discharges of wastewater will make up 60 percent, LAS 9 percent, and septic systems 31 percent of the future wastewater flow forecast.

Figure 4-8: Total Wastewater Flow Forecast by Discharge Type (AAF-MGD)



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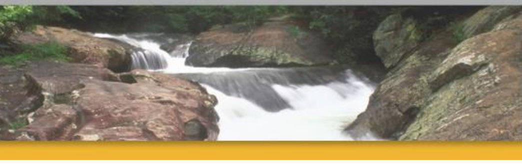
SECTION 5

Comparison of Water Resources Capacities and Future Needs



Section 5. Comparison of Water Resource Capacities and Future Needs

Section Summary

Future assessment results for the groundwater aquifers indicate there is adequate yield to meet future demands from the modeled portion of the Paleozoic rock aquifers.

A potential water supply challenge, in both duration and volume, was observed at 14 facilities in 13 counties for at least one day in the surface water modeling.

The dissolved oxygen stream modeling indicates only two segments with assimilative capacity issues, but 13 facilities exhibited at least one day where assimilative capacity is a challenge in the surface water modeling.

Future nutrient loadings will need to be reduced from point and nonpoint sources to meet existing standards at the Georgia border on the Coosa River, and in Carters Lake, Lake Lanier and Lake Allatoona.

All counties except Dawson, Towns, and White Counties exhibit sufficient permitted water withdrawal capacity for 2060 demands.

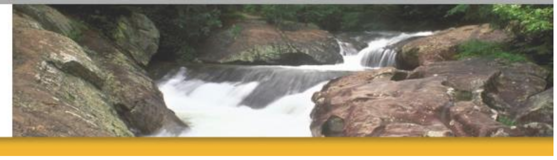
Most counties exhibit a potential shortage in permitted municipal wastewater capacity available to treat 2060 flows.

This section compares the water demand and wastewater flow forecasts (Section 4) to the Resource Assessments, providing the basis for selecting management practices (Section 6) in the CNG Region. Areas where future demands are predicted to exceed the capacity of the resource for groundwater, surface water availability, or surface water quality (assimilative capacity) have a potential challenge, need, or shortage that will be addressed through the management practices described in Section 6. This section summarizes the potential challenges, needs, or shortages, also referred to as water resource management issues, for the Region.

5.1 Groundwater Availability Comparisons

Groundwater sources within the Region include (1) the Crystalline rock aquifer systems in the eastern half of the basin, which cover the counties of Towns, Habersham, Lumpkin, Dawson, Union, Fannin, Gilmer, White, and Pickens, and portions of Murray, Polk, and Gordon; and (2) the Paleozoic rock aquifer systems in the western half of the basin, which cover the counties of Floyd, Chattooga, Walker, Catoosa, and Whitfield, and portions of Polk, Murray, Gordon, and Dade.

The Resource Assessment for groundwater sustainability in the Crystalline rock aquifers, based on a water budget approach and described further in Section 3.2, was developed in 2010 for the Chattahoochee River-Chickamauga Creek and Soque River Basins, which cover 315 square miles in portions of Habersham, Towns, Union, and White Counties. The existing groundwater Resource Assessment indicates that there is potentially additional groundwater available within the groundwater systems of North



Georgia. It is more difficult, however, to develop the estimated sustainable yield for the region due to the nature of the underlying geology in North Georgia, which is fractured rock. To take advantage of these groundwater resources, additional analysis, careful geologic mapping, and well siting by experienced geologists will be necessary at a local level to find sufficient water-bearing fractures in the Crystalline rock aquifers.

The Resource Assessment for sustainable yield in the Paleozoic rock aquifers was conducted in 2010 and covered an area that included portions of Floyd, Polk, Bartow, and Paulding Counties. This area was selected based on the large spatial extent of carbonate rocks of the Knox Group, a geologic formation known to contain prolific karstic aquifer systems. For information on the groundwater Resource Assessment, see the Water Planning website. The results indicated that there is an estimated 28 to 70 MGD sustainable yield to meet future demands (based on the original projections) from the modeled portion of the Paleozoic rock aquifers. This sustainable yield exceeds the forecasted 2060 groundwater demands for the basin.

5.2 Surface Water Availability Comparisons

The comparisons of surface water availability are based on the results of the surface water availability Resource Assessment using the BEAM model described in Section 3.2, and the projected surface water demands in 2060. As discussed in Section 3.2, all permitted water withdrawal facilities are included in the BEAM model as nodes. For modeling purposes, the river basins in the Coosa Region were modeled in groups: the Tennessee Study Basin, ACT Study Basin (Alabama-Coosa-Tallapoosa), and the ACF Study Basin (Apalachicola-Chattahoochee-Flint). In addition to the two baseline scenarios presented in Section 3.2, a future scenario was developed using projected water demands for the 2060 planning horizon. Figure 5-1 illustrates the facility nodes used in the model.

Like the previous plans, the exhaustion of storage within a stream-reach or the breaching of instream minimum flow requirements was used to determine potential resource challenges in the 2060 scenarios. The BEAM modeling platform was used to quantify the days when the simulated available water withdrawal was less than the 2060 water demand at each facility, indicating a potential water supply challenge. The 2060 water demands and water supply operations were assessed with about 80 years of daily flow data, including all known drought years, normal years, and wet years.

Similarly for wastewater, in place of the planning nodes used in previous plans, specific NPDES discharging facilities were modeled. Breaches of each facility's regulatory flow thresholds (typically 7Q10) were used to determine wastewater assimilation challenges.

In the Tennessee Study Basin, four facilities demonstrated at least one modeled water supply challenge day under the 80-year simulation with 2060 water demands, including:

- Catoosa Utility District
- Yates Bleachery Company

- Dade County Water and Sewer Authority
- City of Blairsville, which had the highest percentage of challenge days compared to simulation duration at 6.45% for the 2060 future scenario.

Five facilities in the Tennessee Study Basin demonstrated wastewater assimilation challenges in the 80-year simulation:

- Walker County WPCP, which exhibited the greatest percentage of challenge days, or 24.5% of the modeled duration
- City of Trenton
- City of Blue Ridge
- City of Blairsville
- City of Young Harris

In the ACT Study Basin, ten facilities demonstrated at least one modeled water supply challenge day under the 80-year simulation with 2060 water demands, including:

- Utilities, Inc. of Georgia
- Dalton Utilities (two facilities)
- City of Calhoun, which exhibited the greatest percentage of challenge days compared to simulation duration at 3.14% during the future scenario
- Floyd County (two facilities)
- Polk County Water Authority
- City of Cave Spring
- City of Summerville
- Mohawk Industries, Inc.

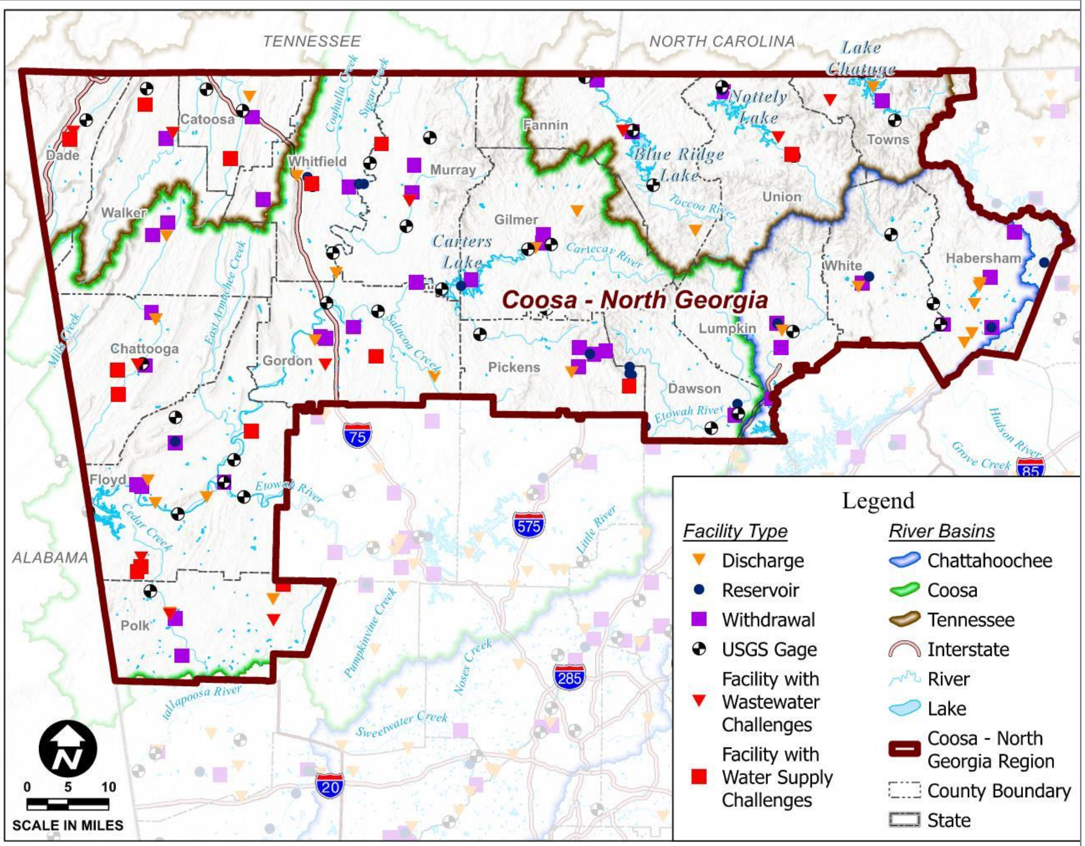
Eight facilities in the ACT Study Basin demonstrated wastewater assimilation challenges in the 80-year simulation:

- Big Canoe WPCP
- City of Chatsworth
- OMNOVA Solutions, Inc., which exhibited the greatest percentage of challenge days, or 28.05% of the modeled duration
- City of Rockmart
- GEO Specialty Chemicals Inc.
- City of Cave Spring
- City of Summerville

- Mohawk Industries, Inc.

Additional details are provided in the memorandum, “Development of Basin Environmental Assessment Models (BEAMs) for Georgia Surface Water Basins” (May 2023).

Figure 5-1: Surface Water BEAM Assessment Results for 2060 Conditions



Source: GAEPD, 2023.

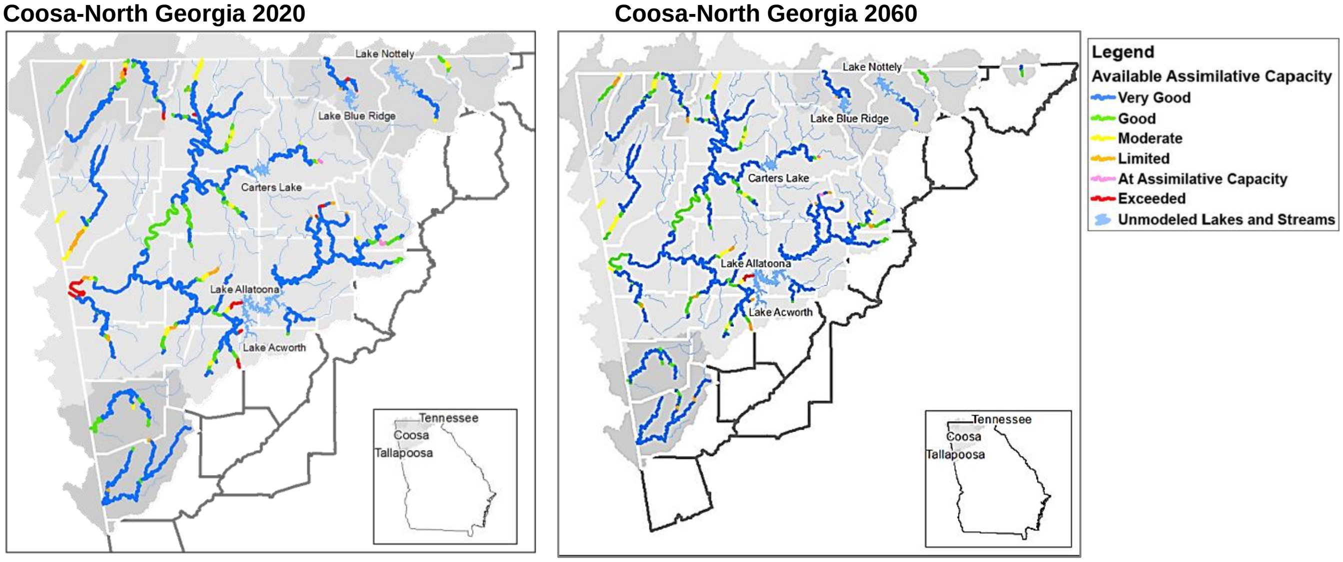
5.3 Surface Water Quality Comparisons (Assimilative Capacity)

The assimilative capacity of a watershed is the amount of a given pollutant that can be discharged to the watershed while maintaining water quality standards. The evaluation of water quality was based on modeling both DO conditions and nutrient loadings, as described in Section 3.2. Instream DO conditions were modeled under critical instream low flow conditions. The instream DO modeling was conducted on streams and tributaries currently receiving major NPDES treated wastewater discharges with permitted flows of at least 0.1 MGD. For purposes of this modeling effort and the identification of potential challenges, wastewater flows for municipal and industrial facilities were assumed to be the current permitted treatment capacity and limits unless planned facility expansions were identified in existing permits.

Overall, the current permitted assimilative capacity in the major tributaries in the Region remains moderate to very good (Figures 5-2 - 5-8). There are specific stream segments that would exceed or be at their assimilative capacity for pollutants that deplete oxygen based on permitted conditions and the predicted DO levels. These waterbodies include segments in the Long Swamp Creek and Lick Log Creek.

Figure 5-2: Permitted Surface Water Quality for Coosa-North Georgia (Assimilative Capacity)

Coosa-North Georgia 2020 **Coosa-North Georgia 2060**



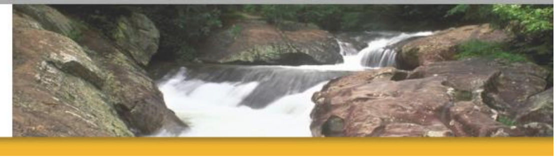
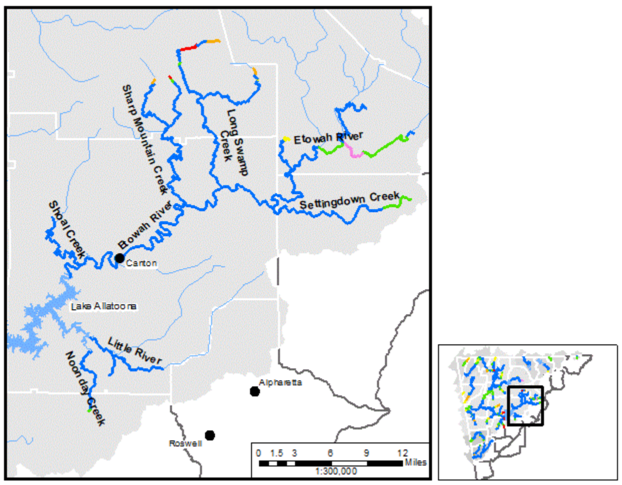


Figure 5-2: Permitted Surface Water Quality for Coosa-North Georgia (Assimilative Capacity)

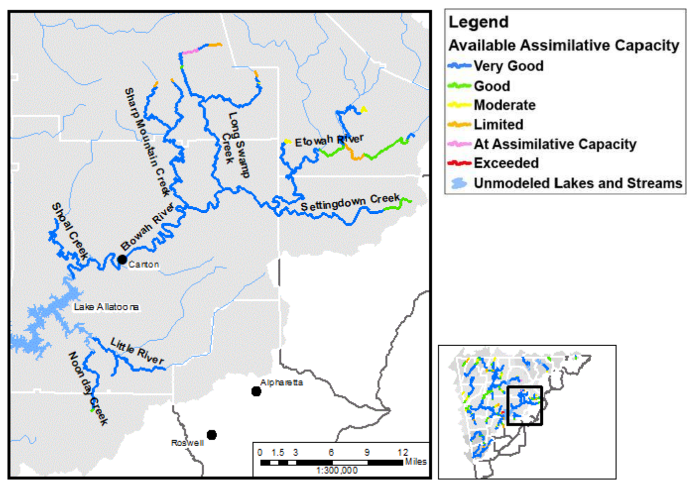
Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-3: Permitted Surface Water Quality for Pickens and Dawson Counties (Assimilative Capacity)

Pickens and Dawson Counties 2020



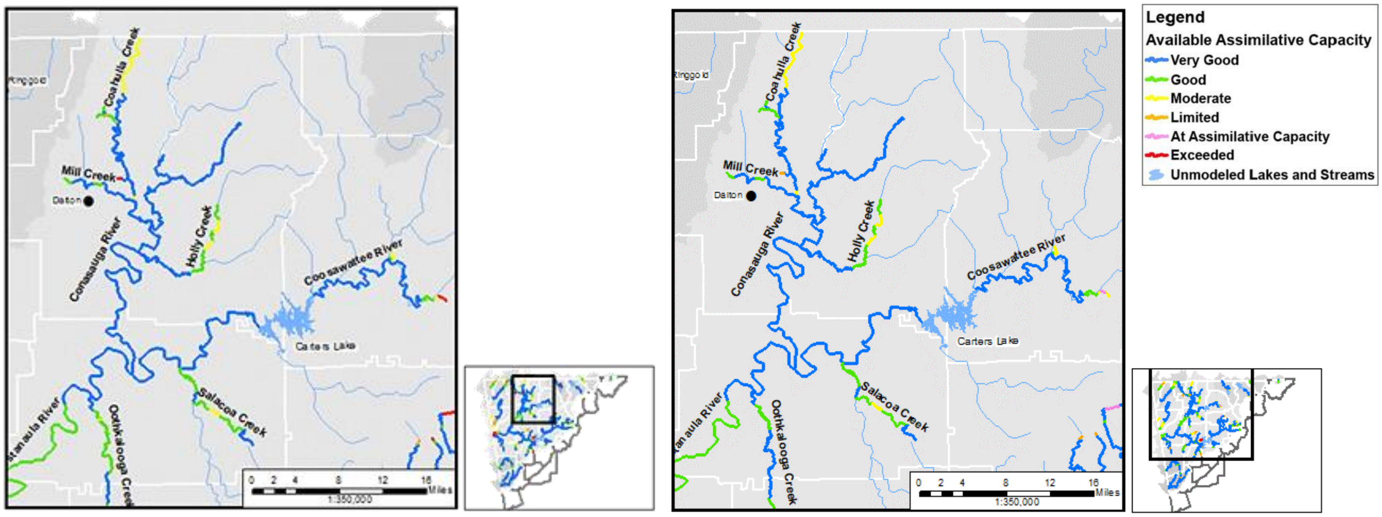
Pickens and Dawson Counties 2060



Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-4: Permitted Surface Water Quality for Whitfield, Gordon, Murray, and Gilmer Counties (Assimilative Capacity)

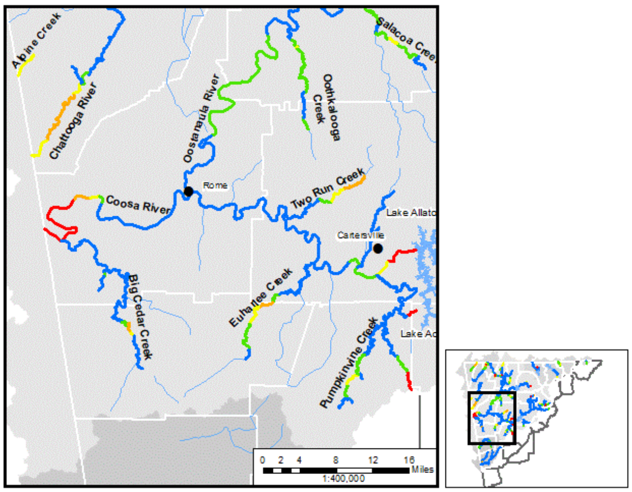
Whitfield, Gordon, Murray, and Gilmer Counties 2020 | **Whitfield, Gordon, Murray, and Gilmer Counties 2060**



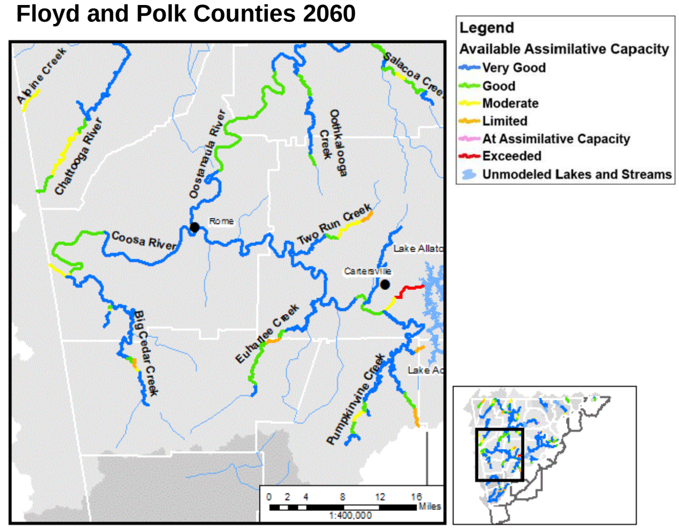
Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-5: Permitted Surface Water Quality for Floyd and Polk Counties (Assimilative Capacity)

Floyd and Polk Counties 2020



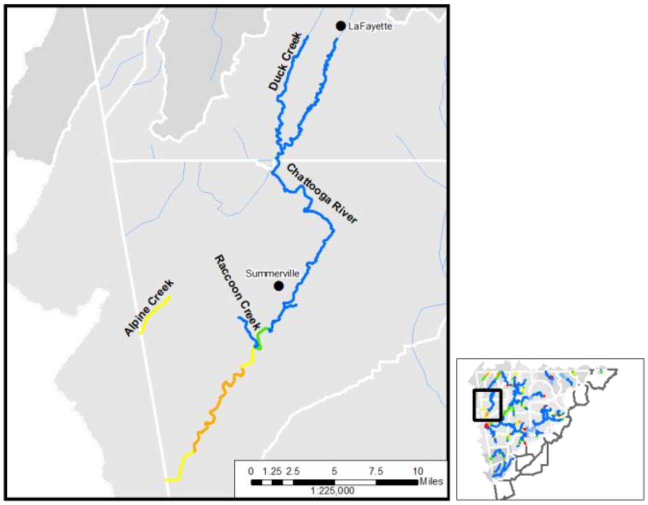
Floyd and Polk Counties 2060



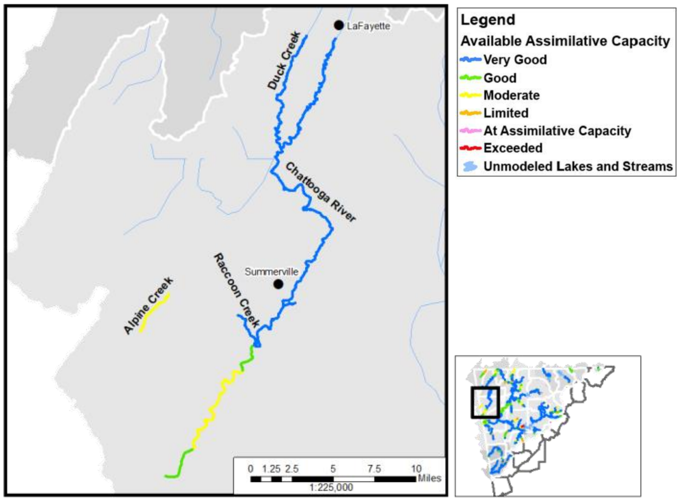
Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-6: Permitted Surface Water Quality for Chattooga and Walker Counties (Assimilative Capacity)

Chattooga and Walker Counties 2020



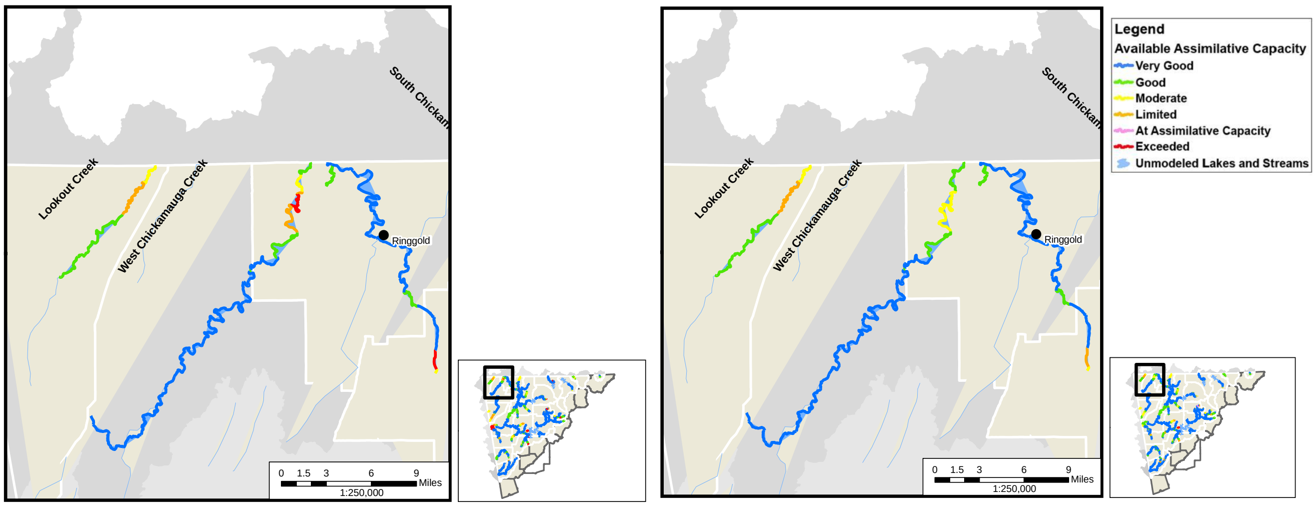
Chattooga and Walker Counties 2060



Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-7: Permitted Surface Water Quality for Dade, Walker, and Catoosa Counties (Assimilative Capacity)

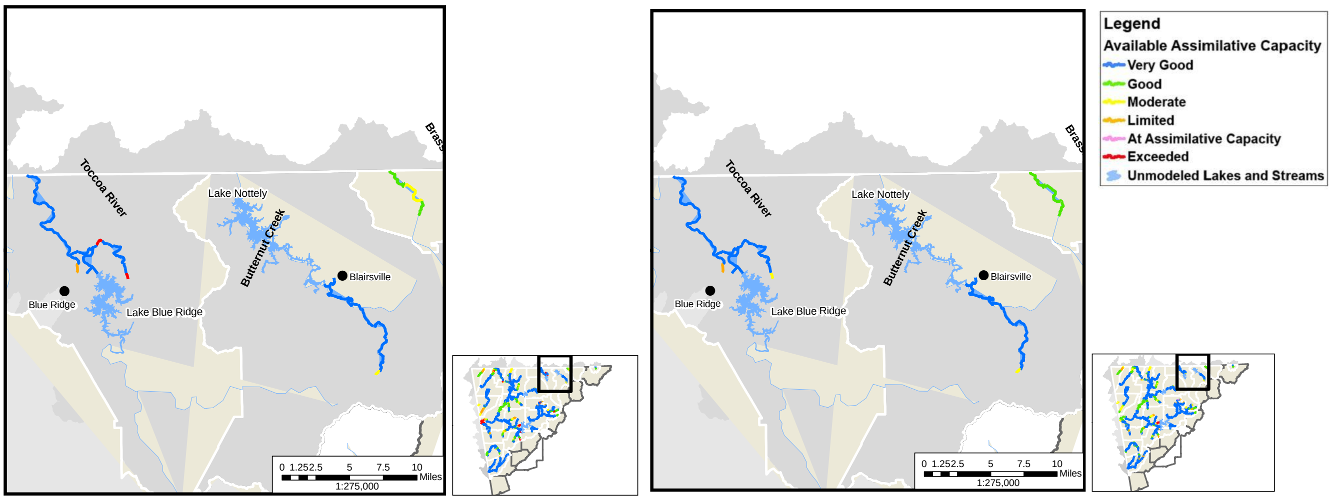
Dade, Walker, and Catoosa Counties 2020 **Dade, Walker, and Catoosa Counties 2060**



Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Figure 5-8: Permitted Surface Water Quality for Fannin, Union, and Towns Counties (Assimilative Capacity)

Fannin, Union, and Towns Counties 2020 **Fannin, Union, and Towns Counties 2060**

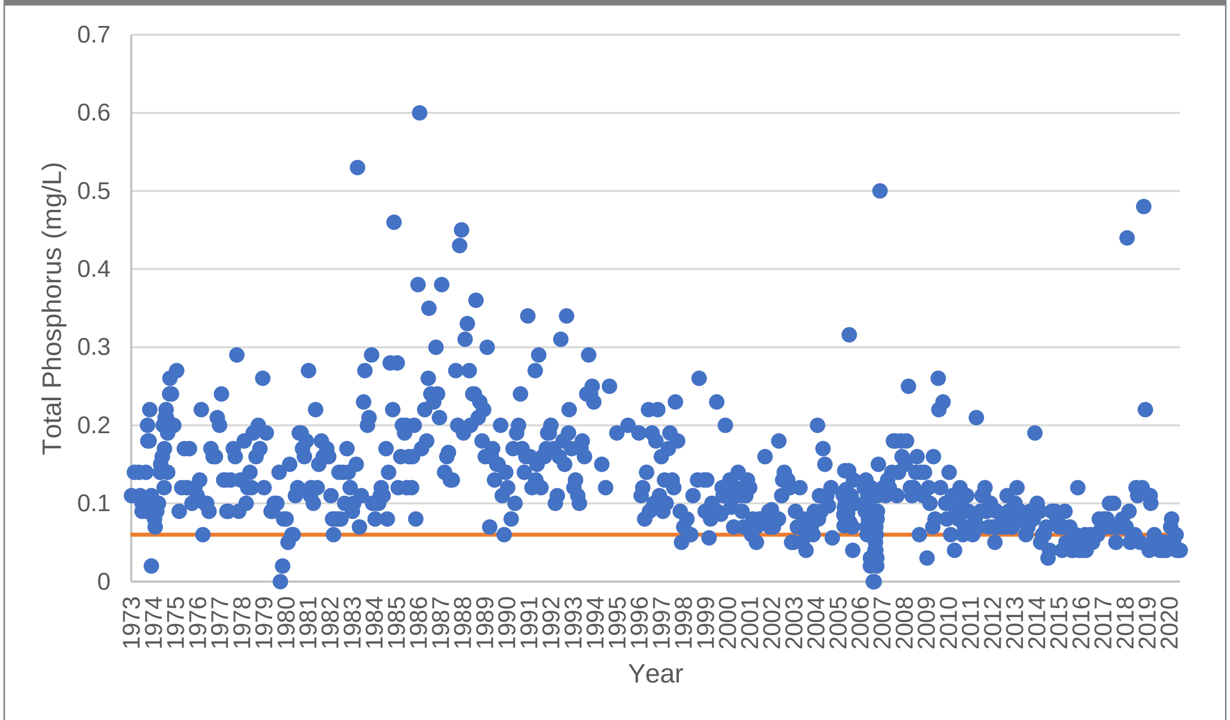


Note: The results shown are based on municipal and industrial facilities at their full permitted levels.
Very good: ≥ 1 mg/L available DO (that is, above DO standards)
Good: < 1.0 and ≥ 0.5 mg/L available DO
Moderate: < 0.5 and ≥ 0.2 mg/L available DO
Limited: < 0.2 and > 0 mg/L available DO
At Assimilative Capacity: 0 mg/L available DO
No assimilative capacity: < 0 mg/L available DO
Source: "Dissolved Oxygen Assimilative Capacity Resource Assessment Report" (2023)

Additional data needs to be collected to verify the modeling results before making any permitting decisions. GAEPD could modify the permits for facilities in the stream segments that are predicted to exceed or be at their assimilative capacity for DO to protect water quality. There are no NPDES facilities discharging to the segments of Lick Log Creek and Long Swamp Creek that are exceeding or at assimilative capacity.

During the 2017 Plan update, watershed-based modeling to evaluate nutrient loadings under 2050 conditions was completed for those watersheds contributing to the Coosa River at the Georgia-Alabama state line and Lake Allatoona on the Etowah River. No model updates were conducted for this plan update. There is a total phosphorus TMDL target of 0.06 mg/L for the Coosa River at the Georgia-Alabama state line. Monitoring data from 2014 to 2020 indicates that total phosphorus levels at the state line have consistently been at or below the 0.06 mg/L target aside from a few months in 2018, as shown in Figure 5-9.

Figure 5-9: Total Phosphorus Concentration – Coosa River at Georgia-Alabama State Line

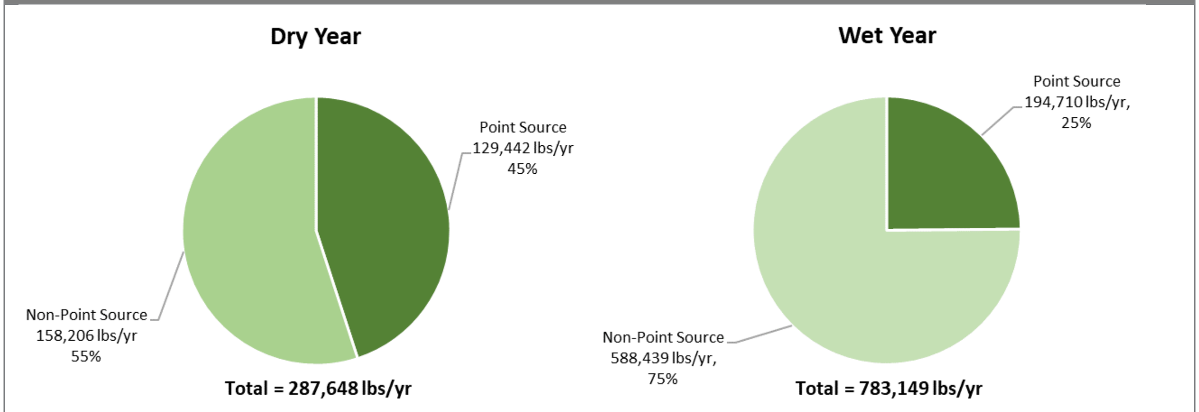


Source: EPD, February 2022

Under the modeled 2050 future conditions in the Coosa watershed, the nutrient contributions in pounds per year (lb/yr) during dry years are approximately 60 percent point sources and 40 percent nonpoint sources (Figure 5-10 and Figure 5-11). In a wet year, on the other hand, nonpoint sources contribute roughly 70 percent of the total loadings.

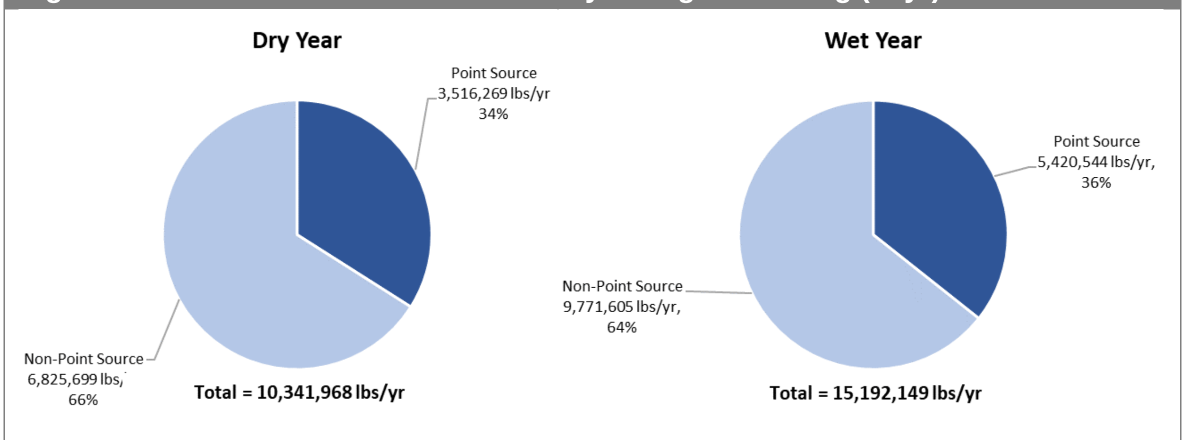
In addition, GAEPD is considering new water quality numerical nutrient criteria (NNC) for streams that likely will require additional reductions in nutrient loadings to maintain or meet the new standards.

Figure 5-10: Coosa Watershed – Tributary Phosphorus Loading (lb/yr)



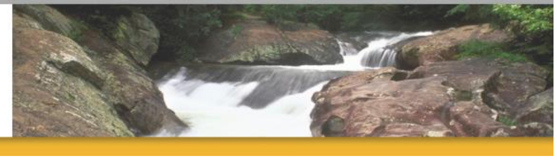
Note: Based on 2050 demands.
Source: 2017 Regional Water Plan

Figure 5-11: Coosa Watershed – Tributary Nitrogen Loading (lb/yr)



Note: Based on 2050 demands.
Source: 2017 Regional Water Plan

As described in Section 3.2.1, Lake Allatoona has different chlorophyll-a standards depending on the location within the lake. The TMDL includes significant nonpoint source reductions: an 85 percent reduction in urban nutrient loads, a 40 percent reduction in agricultural nutrient loads, and a 50 percent reduction in failing septic tanks (GAEPD, 2013). As part of the 2017 Plan update, additional modeling was completed over an 11-year period (2001 through 2011) to capture a range of annual rainfall conditions. The results of this modeling indicated that the proposed TMDL reductions will result in compliance with the chlorophyll-a standards in the Little River Arm, Etowah River Arm, Mid Lake, and Dam Pool modeling locations. The model indicated that the Allatoona Creek location of the lake would not meet the chlorophyll-a standard with the TMDL reduction in place. However, the Allatoona Creek tributary is



located outside of the CNG Region and would not be influenced by management practices implemented by local governments within the CNG Region.

5.4 Future Capacity Comparisons

This section compares the CNG Region's existing permitted water withdrawals (surface and groundwater), existing permitted wastewater discharges, and agricultural permits to the 2060 future forecasts to identify potential needs, shortages or surpluses at the county level. A comparison of industrial permits to the 2060 forecasts is not included; industrial needs have not changed significantly since the 2017 Plan update. Individual entities within counties may have varying needs or surpluses.

Comparing the existing municipal permitted monthly average withdrawal limit with the forecast annual average demands indicates that future municipal water supply needs in the CNG Region are met in all counties except Dawson and White, as shown in Table 5-3.

These estimates are only an indicator of potential future needs in permitted capacity and indicate areas where continued localized facility planning will be needed. Counties that do not have a potential 2060 water supply need identified may have water supply challenges not reflected in the table due to differences in water supply and permitted withdrawal limits at the utility level.

Table 5-3: Permitted Municipal Water Withdrawal Limits versus Forecasted Municipal Water Demands (MGD)

County	Existing Permitted Municipal Water Withdrawal Limits[a,b,e]	2020 Forecasted Municipal Water Demand[a,c]	2060 Forecasted Municipal Water Demand[a,c]	Potential 2060 Need[a,d]	Additional Capacity Available in 2060[a,d]
Catoosa	9.44	6.59	5.67	None	3.77
Chattooga	4.67	3.29	3.13	None	1.54
Dade	4.23	2.14	1.91	None	2.32
Dawson	6.50	2.06	6.52	(0.02)	None
Fannin	2.53	1.95	1.23	None	1.3
Floyd	23.90	12.19	10.04	None	13.86
Gilmer [f]	4.45	2.89	2.99	None	1.46
Gordon	27.80	9.95	11.00	None	16.8
Habersham[g]	10.25	6.21	8.64	None	1.61
Lumpkin	7.20	1.66	4.74	None	2.46
Murray	8.86	3.19	3.50	None	5.36
Pickens	5.84	3.79	5.05	None	0.79
Polk [h]	10.29	5.91	5.32	None	4.97

Table 5-3: Permitted Municipal Water Withdrawal Limits versus Forecasted Municipal Water Demands (MGD)					
County	Existing Permitted Municipal Water Withdrawal Limits[a,b,e]	2020 Forecasted Municipal Water Demand[a,c]	2060 Forecasted Municipal Water Demand[a,c]	Potential 2060 Need[a,d]	Additional Capacity Available in 2060[a,d]
Towns	2.54	1.45	2.54	None	None
Union	4.82	1.95	2.71	None	2.11
Walker	17.91	7.08	6.82	None	11.09
White	3.04	2.04	3.35	(0.31)	None
Whitfield [i]	54.30	26.69	27.50	None	26.8

[a]Water withdrawal values include surface water and groundwater withdrawals.

[b]Surface water and groundwater permitted withdrawal limits are based on the current Monthly Average Limit (in MGD) of each existing permit according to the "Municipal Water Demand and Wastewater Flow Forecasting Methods Report" from July 2021.

[c]Forecasted Municipal Water Demands include surface water demands, ground water demands, and water demands from major industrial sectors when supplied by municipal sources. Values are based on Annual Average Demand (in MGD).

[d]Based on differences between Permitted Withdrawal Limit and 2060 Forecasted Demand (in MGD). Values are estimates for future needs or additional capacity available.

[e]Includes the municipal withdrawal permit holders listed in the GAEPD database for each county.

[f]Gilmer County is forecasted to supply 1.01 MGD to the poultry industry in 2020 and 1.50 MGD in 2060.

[g]Habersham County is forecasted to supply 1.61 MGD to the poultry industry in 2020 and 2.74 MGD in 2060.

[h]Polk County is forecasted to supply 1.52 MGD to the poultry and manufacturing industries in 2020 and 1.75 MGD in 2060.

[i]Whitfield County is forecasted to supply 3.20 MGD to the carpet manufacturing industry in 2020 and 2060.

Sources: GAEPD approved spreadsheet of forecasted water demands and existing permit limits in the GAEPD "Municipal Water Demand and Wastewater Flow Forecasting Methods Report" from July 2021.

Based on a comparison of the future wastewater capacity needs with existing permitted capacity, municipal facilities in Catoosa, Dade, Fannin, Gilmer, Habersham, Lumpkin, Murray, Pickens, Towns, Union, Walker, and White counties would not meet 2060 demands with their currently permitted facilities, with Habersham County exhibiting the greatest shortage, as shown on Table 5-4. This comparison suggests that additional wastewater facility expansions or development of new facilities will be required to meet the projected future wastewater demands in those counties.

It should be noted that the shortage or surplus estimates were calculated by comparing the current permitted maximum monthly average discharge with the forecasted annual average wastewater flow. Therefore, these estimates are only an indicator of potential future shortages/surpluses in permitted treatment capacity and indicate areas where continued localized facility planning will be needed.

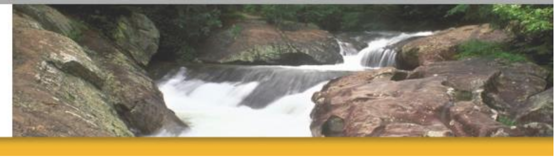


Table 5-4: Permitted Municipal Wastewater Discharge Limits versus Forecasted Municipal Wastewater Flows (MGD)

County	Existing Permitted Municipal Wastewater Discharge Limit[a,b]	2020 Forecasted Municipal Wastewater Flows[a,c]	2060 Forecasted Municipal Wastewater Flows[a,c]	Potential 2060 Need[a,d]	Additional Capacity Available in 2060[a,d]
Catoosa	-	0.01	0.01	(0.01)	None
Chattooga	7.17	5.74	5.96	None	1.21
Dade	>0.95	0.48	0.46	None	0.49
Dawson	1.99	0.59	1.84	None	0.15
Fannin	>1.11	0.39	0.26	None	0.85
Floyd[f]	20.22	5.62	5.07	None	15.15
Gilmer[e]	>2.50	1.72	1.59	None	0.91
Gordon	>16.17	5.52	6.42	None	9.75
Habersham[f]	5.08	4.00	5.80	(0.72)	None
Lumpkin	2.80	0.80	1.23	None	1.57
Murray	>3.00	1.68	1.92	None	1.08
Pickens	>1.12	0.77	1.03	None	0.09
Polk[g]	6.67	3.39	3.19	None	3.48
Towns	0.54	0.38	0.70	(0.16)	None
Union	0.51	0.36	0.55	(0.04)	None
Walker[j]	7.03	4.08	4.35	None	2.68
White	1.37	0.56	0.97	None	0.40
Whitfield[j]	>33.32	11.05	11.72	None	21.60
Total	**>111.56**	**47.14**	**53.07**	**NA[k]**	**NA[k]**

[a]Includes centralized systems such as point source discharges, LASs and subsurface systems, but not septic systems.
[b]Permitted Discharge Limits based on the Maximum Monthly Average Permit Limit in MGD of each permit.
[c]Forecasted Municipal Wastewater Flows include flow from industries that are served by municipal facilities. Values are based on the Annual Average Flow in MGD.
[d]Based on the difference between the existing Permitted Treatment Limit and 2060 Forecasted Flows in MGD.
[e]Gilmer County is estimated to provide 1.01 MGD of treatment capacity to the poultry industry in 2020 and 1.51 MGD in 2060.
[f]Habersham County is estimated to provide 1.53 MGD of treatment capacity to the poultry industry in 2020 and 2.61 MGD in 2060.
[g]Polk County is estimated to provide 0.27 MGD of treatment capacity to the poultry industry in 2020 and 0.46 MGD in 2060.
[k]NA means Not Applicable
Sources: Forecasted wastewater flows and GAEPD approved permit database.

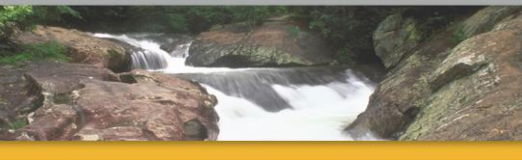


Table 5-5 lists the number of agricultural permits, the permitted agricultural acreage per crop, and the 2060 forecasted agricultural water demand. The 2060 agricultural water demands will be refined in the future when more information regarding usage becomes available.

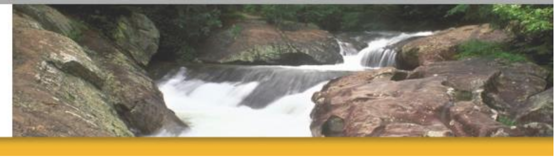
Table 5-5: Number of Permits, Permitted Agricultural Acreage and 2060 Forecasted Agricultural Water Demand (MGD)

County	Number of Permits[a]	Existing Permitted Agricultural Acreage[a]	2060 Forecasted Agricultural Water Demand[b,]
Catoosa	10	945	0.29
Chattooga	6	485	0.41
Dade	0	0	0.16
Dawson	6	306	0.46
Fannin	20	459	0.19
Floyd	44	4,728	2.38
Gilmer	8	316	0.71
Gordon	19	2,863	3.94
Habersham	20	1,497	1.09
Lumpkin	19	1,033	0.28
Murray	16	1,760	0.99
Pickens	3	170	0.37
Polk	8	395	0.60
Towns	1	90	0.08
Union	17	544	0.31
Walker	5	175	0.64
White	4	142	0.38
Whitfield	14	1,936	0.38
Total	**220**	**17,809**	**13.66**

Notes:

[a]Includes surface and ground water permits greater than 100,000 gallons/day. Permits listed include crop irrigation, golf courses, livestock watering, and nurseries. The first two columns (number of permits and permitted acreage) have not been verified and are from a GAEPD approved database.

[b]2060 Forecasted Agricultural Water Demand based on the 75th percentile scenario in MGD. This demand is comprised of crop irrigation, golf courses, livestock watering, and nurseries. Note that crop irrigation is the only demand that has a forecasted value. The other demands were not forecasted, so the current values for those demands are used for 2060 forecast. During the growing season and under critical drought conditions, the peak demand may exceed the presented values and present difficulties.



5.5 Summary of Potential Water Resource Challenges

Table 5-6 summarizes the water supply, wastewater assimilation, municipal water withdrawal capacity, municipal wastewater treatment capacity, and water quality challenges or needs/shortages based on the 2060 forecasts and Resource Assessments.

The water quality 303(d) issues column of Table 5-6 integrates the widespread 303(d) stream listings in the CNG Region (see Section 3.3.2) in addition to the watershed-based nutrient modeling for those watersheds contributing to the Coosa River at the Georgia-Alabama boundary and Lake Allatoona on the Etowah River. The most common water quality violations within the Region, in descending order, were due to high fecal coliform concentrations, impaired fish communities, polychlorinated biphenyls (PCBs) and impaired benthic macroinvertebrate communities.

Insufficient capacity or infrastructure shortages may have multiple solutions such as municipal facility expansions and/or the construction of new local or regional facilities. The intent of this document is to provide a global overview of the Region, but not to replace or undermine local capital improvement planning.

Table 5-6: Summary of 2060 Potential Challenges, Needs, or Shortages by CNG County

County	Water Supply Challenges (# Facilities) [a]	Wastewater Assimilation Challenges (# Facilities) [a]	Municipal Water Needs (MGD) [b]	Municipal Wastewater Needs (MGD) [b]	Agricultural Water Potential Shortages	Assimilative Capacity Challenges for Dissolved Oxygen (# Segments) [c]	Miles of 303(d) Not Supporting Reaches and (# Segments) [d]
	BEAM Results: Surface Water Availability Section 5.2	BEAM Results: Surface Water Availability Section 5.2	Future Withdrawal Capacity Table 5-3	Future Treatment Capacity Table 5-4	Future Capacity Table 5-5	Water Quality Section 5.3	Water Quality Section 3.3.2
Catoosa	Yes (1)						79 (14)
Chattooga	Yes (2)	Yes (2)					57 (12)
Dade	Yes (1)	Yes (1)			Yes		29 (6)
Dawson			Yes (0.02)				60 (9)
Fannin		Yes (1)					71 (14)
Floyd	Yes (3)	Yes (1)					198 (28)
Gilmer						Yes (1)	93 (22)
Gordon	Yes (1)	Yes (1)					112 (22)
Habersham				Yes (0.72)			46 (11)
Lumpkin							62 (12)
Murray		Yes (1)					62 (10)
Pickens	Yes (1)	Yes (1)				Yes (1)	48 (10)
Polk	Yes (1)	Yes (2)					25 (5)
Towns		Yes (1)		Yes (0.16)			35 (9)

Table 5-6: Summary of 2060 Potential Challenges, Needs, or Shortages by CNG County

County	Water Supply Challenges (# Facilities) [a]	Wastewater Assimilation Challenges (# Facilities) [a]	Municipal Water Needs (MGD) [b]	Municipal Wastewater Needs (MGD) [b]	Agricultural Water Potential Shortages	Assimilative Capacity Challenges for Dissolved Oxygen (# Segments) [c]	Miles of 303(d) Not Supporting Reaches and (# Segments) [d]
	BEAM Results: Surface Water Availability Section 5.2	BEAM Results: Surface Water Availability Section 5.2	Future Withdrawal Capacity Table 5-3	Future Treatment Capacity Table 5-4	Future Capacity Table 5-5	Water Quality Section 5.3	Water Quality Section 3.3.2
Union	Yes (1)	Yes (1)		Yes (0.04)			91 (26)
Walker	Yes (1)	Yes (1)					66 (14)
White			Yes (0.31)				39 (7)
Whitfield	Yes (2)						52 (15)
Total	**10 (14)**	**11 (13)**	**2 (0.33)**	**3 (0.92)**	**1**	**2 (2)**	**1224 (246)**

Notes:

[a] "Yes" indicates that there is at least one day of a water supply or wastewater assimilation challenge in the indicated county.

[b] A municipal "need" is where the current permitted water withdrawal capacity or wastewater discharge, respectively, is less than the future forecast demands.

[c] Potential challenges in assimilative capacity due to dissolved oxygen are for streams modeled to have "At Capacity," or "Exceeding Capacity."

[d] Includes only 303(d) reaches with not supporting status that are fully within each respective county. An additional 430 miles, or 50 stream reaches, are shared between two or more counties. Some reaches are shared with counties outside of the CNG region.

SECTION 6

Addressing Water Needs and Regional Goals

Section 6. Addressing Water Needs and Regional Goals

This section presents the management practices selected by the CNG Regional Water Planning Council to address the potential resource challenges, needs, or shortages identified in Section 5, and align with meet the Council's vision and goals described in Section 1. This section identifies short-term (2023-2027) and long-term (beyond 2027) actions and parties responsible to implement each management practice parties responsible for implementation, benchmarks to measure implementation progress, and recommendations to the State.

6.1 Identifying Water Management Practices

Management practices seek to address the CNG Region's likely resource challenges, needs, and shortages (as documented in Section 5) or other goals specified by the Council. In selecting the management practices, the Council considered its vision, goals, and the practices identified in existing plans. The Council coordinated management practice selection with local governments, water providers, and neighboring councils that share the water resources.

For the initial Regional Water Plan adopted in 2011, the Council conducted a comprehensive review of existing local and regional water management plans and relevant related documents to frame management practice selection. Where possible, management practices already planned for use or successfully in use in the Region formed the basis for the management practices selected by the Council. In subsequent updates, the existing plans and practices were revisited and considered in the context of Section 5, existing rules and regulations, and neighboring council plans.

Section Summary

In 2022, the Council updated its 2017 Management Practices to align with its vision and goals and address the potential resource challenges identified in Section 5.

The Council's updates include creating a new Administrative category, eliminating practices required by state law, regulations or rules, consolidating repetitive or similar practices, and reflecting current regional needs. The revised management practices include the following categories:

- *4 Administrative*
- *7 Water Quality*
- *4 Water Conservation*
- *3 Water Supply*
- *2 Wastewater*

Short-term (2022-2027) and long-term (beyond 2027) implementation actions and parties responsible are provided for each management practices. Local governments and utilities, and their corresponding Regional Commissions are responsible for most of the implementation actions; however, support for short-term activities, in particular, will be needed from various State entities. Benchmarks to assess progress and recommendations to the State are also presented in this section.

For this 2023 update to the Regional Water Plan, the Council conducted a review and assessment of the existing management practices that were adopted in 2017. Management practices were revised to provide clarity, remove redundancies with existing rules or regulations, and incorporate the Council's experience in the Region. A new "Administrative" management practice category was added to the original four categories of Water Quality, Water Conservation, Water Supply, and Wastewater. Additionally, new management practices were drafted and adopted in this updated Plan.

6.2 Selected Water Management Practices for the Region

The selected management practices are grouped by primary water resource area addressed and presented in Tables 6-1 through 6-5. The primary water resource areas or categories include:

- Administrative
- Water Conservation
- Water Supply
- Wastewater
- Water Quality

Tables 6-1 through 6-5 also identify the short- and long-term actions needed to implement the management practices and the corresponding responsible parties for each practice. The Council has defined short-term as occurring between 2023 and 2027 and long-term as year 2027 and beyond. It is assumed that all long-term activities would occur after the next 5-year Regional Water Plan update, allowing the Council to revisit these actions using an adaptive management approach. Based on Council feedback during the 2017 plan update, the Northwest Georgia and Georgia Mountains Regional Commissions will take the lead role in coordinating and assisting local governments and utilities in implementing the management practices.

While the bulk of implementation actions noted in this section are the responsibility of local governments, utilities, and their corresponding regional commissions, support for implementation will be needed from state entities such as the following:

- GAEPD
- GA Department of Community Affairs (DCA)
- Georgia Department of Public Health (DPH), Environmental Health Programs
- Georgia Environmental Finance Authority (GEFA).

This Regional Water Plan also assumes continued support from the Council in some capacity beyond its current 3-year appointment. Support from other organizations, such as the Association of County Commissioners of Georgia (ACCG), Georgia Green Industry (GGIA), Georgia Municipal Association (GMA), Georgia Rural Water

Association (GRWA), and Georgia Association of Water Professionals (GAWP) also will be needed to implement the management practices in an efficient, cost-effective manner. In the CNG region, the North Georgia Water Resources Partnership has been a key partner in providing technical support for implementation of the regional water plan and will continue to serve in this role in the future.

GAEPD is responsible for enforcement of the management practices through the following permit categories:

- Energy, Municipal, Golf Course and Agricultural Water Withdrawal and Drinking Water
- Municipal Wastewater Discharge
- Municipal and Construction Stormwater
- Safe Dams Program

6.2.1 Administrative Management Practices

The Council identified a need for an "Administrative" category that involves utility management topics that impact multiple categories of water resource management, such as financial measures, planning, and asset management. The administrative practices seek to promote and facilitate the "sustainable use of water resources," as stated within the Council's vision, through responsible utility management and intentional administrative structures.

Table 6-1 presents the four Administrative Management Practices developed by the Council and the short-term and long-term implementation actions. The Administrative Management Practices include:

1. Develop/Update Local Master Plans for Water, Wastewater, and Stormwater
2. Develop/Update System Maps
3. Develop/Update Asset Management Plans for Water, Wastewater, and Stormwater
4. Consider Promoting Utility Finance/Accounting Best Practices

The administrative management practices support all eight of the Council's goals and seek to reduce the water resource challenges documented in Table 5-6. While local utilities and governments are encouraged to implement all of the administrative management practices, each is encouraged to routinely review the practices to determine which are appropriate for implementation in their community. Utilities will be required to report on their implementation activities to the GAEPD as part of the permit renewal process.

Table 6-1: Administrative Management Practices

Council Goals Addressed	1, 2, 3, 4, 5, 6, 7, 8
Potential Challenges Addressed	Surface water availability, future permitted withdrawal capacity, future permitted treatment capacity, water quality (point and non-point source)

AD-1: Develop/Update Local Master Plans for Water, Wastewater, and Stormwater

Short-Term Implementation Actions

- Create local water, wastewater, and stormwater master plans (as applicable to the permit holder) with a 30-year planning horizon and review/consider updating at least every five years.
- Evaluate potential for regional partnerships in meeting future water supply needs.
- Evaluate cost-benefits of various water resources options to assess relationships between water, wastewater, stormwater, and energy.
- Identify new North Georgia Water Resources Partnership members to increase regional participation in plan development and implementation.
- During the planning process, consider advantages/need of advanced treatment technologies for new or upgraded water or wastewater treatment facilities.
- Develop short- and long-term policies for transitioning unsewered areas to sewered areas.
- Adopt a written emergency water supply plan and assess the need for interconnections to meet reliability targets.

Long-Term Implementation Actions

- Consider developing a plan and acceptable parameters for septage disposal to include future septic system areas, local requirements, critical areas, and overall septage disposal needs.
- Consider implementing utility resiliency protocols, including back-up generators at critical pump stations and lift stations.
- Consider risk and resiliency approach/adaptive management strategies for the water system, wastewater system, and stormwater system.
- Consider annual coordination meetings among entities within the same or in neighboring jurisdictions to support water resource resiliency.
- Review / update drought contingency plan every 5 years.

Responsible Parties

- Local governments and utilities
- Support from GAEPD, regional commissions, GEFA, GA DCA, GA DPH

AD-2: Develop/Update System Maps

Short-Term Implementation Actions

- Create water, wastewater, and stormwater infrastructure system maps in electronic format.

Long-Term Implementation Actions

- Consider linking water, wastewater, and stormwater infrastructure system maps with asset inventory and characteristic data for maintenance and management.
- Once electronic map of system infrastructure is complete, maintain maps via regular/routine updates as conditions change.

Responsible Parties

- Local governments and utilities

AD-3: Develop/Update Asset Management Plans for Water, Wastewater, and Stormwater

Short-Term Implementation Actions

- Develop a water system asset management program using EPD guidance.
- Implement rehabilitation program and document rehabilitation projects.
- Coordinate water asset management and leak detection programs.
- Implement asset management based on local government and utility needs.
- Establish and implement inspection and maintenance program.

Long-Term Implementation Actions

- Consider developing a wastewater or stormwater asset management program.
- Review existing staff certifications and secure additional training as needed.
- Prioritize rehabilitation projects and develop schedules and budgets.
- Consider reviewing and updating asset management plans at least every five years.

Responsible Parties

- Local governments and utilities, GAEPD

AD-4: Consider Promoting Utility Finance/Accounting Best Practices

Short-Term Implementation Actions

- Conduct annual planning and budgeting.

Long-Term Implementation Actions

- Consider promoting a full cost accounting system.
- Consider billing systems that compare past and current usage with customers (similar to power / gas bills).
- Consider a policy to meter private fire lines supplying new or substantially renovated commercial buildings.
- Encourage routine review of rate structures and capital recovery fees.

Responsible Parties

- Local governments and utilities

6.2.2 Water Conservation Management Practices

The State will need to practice water conservation in order to meet its long-term water needs. Conservation also helps ensure responsible use of a public resource.

Water conservation is a priority management practice, as stated in the State Water Plan and the State Water Conservation Implementation Plan (WCIP). The latter, published in March 2010, identified water conservation goals, benchmarks, and BMPs for the State's diverse water users (GAEPD, 2010b). The WCIP framed the following conservation tiers for each Council to use during management practice selection:

- Tier 1: Basic water conservation activities and practices that are currently required by statute or will soon be required in GAEPD's upcoming amended rules.
- Tier 2: Basic water conservation activities and practices that will be addressed in upcoming amended rules but not required of all permit applicants.
- Tier 3: Basic water conservation practices (for all water use sectors) that will not be addressed in current or upcoming amended rules.
- Tier 4: "Beyond basic" water conservation practices to be considered if a gap exists between current or future water supplies and demands for the region.

The Council identified four Water Conservation Management Practices:

1. Develop, update, and implement Water Conservation Education and Public Awareness Programs.
2. Encourage utilities to develop water conservation goals and programs to achieve goals.
3. Implement conservation rate structures.
4. Consider Developing Partnerships with Non-Utility Agencies Related to Cost-Sharing Programs and Agricultural Conservation-Oriented Activities.

These Water Conservation Management Practices support four of the Council's goals:

- Goal #3: Ensure that management practices support economic development and optimize existing water and wastewater infrastructure.
- Goal #4: Promote technologies that conserve, return, and recycle water; protect water quality; and ensure adequate capacity for water storage within the Region.
- Goal #6: Educate stakeholders in the Region on the importance of water resources, including water conservation, efficiency, pollution prevention, and source water protection.
- Goal #8: Develop an ongoing adaptive management approach to measure, share, and evaluate water use data and information.

The Water Conservation Management Practices address potential water supply challenges at fourteen facilities across the region and potential agricultural water shortages in Dade County. These challenges are discussed in Section 5 and summarized in Table 5-6.

Table 6-2 presents the Water Conservation Management Practices selected by the Council and the short-term and long-term implementation actions to support the Council's water conservation goals. Local utilities and governments will need to assess which management practices are appropriate for implementation in their community. Communities with resource assessment challenges, infrastructure needs, or shortages are encouraged to implement management practices to alleviate the challenge. Utilities will be required to report on their implementation activities to the GAEPD as part of the permit renewal process.

The industrial sector continues to implement water conservation practices that increase productivity while decreasing water use. Particularly in the CNG Region, the carpet industry has significantly reduced water usage per unit of carpet manufactured due to industry process improvements, increased efficiencies, and conservations efforts (GTMA, 2009).

Table 6-2: Water Conservation Management Practices	
Council Goals Addressed	3, 4, 6, 8
Potential Challenges Addressed	Surface water availability challenges for 14 facilities across the region, agriculture water shortages in Dade County
WC-1: Develop/Update/Implement Water Conservation Education and Public Awareness Programs	
Short-Term Implementation Actions	
• Perform public education, outreach, participation, and involvement activities. • Consider offering a residential water audit, if requested. • Distribute residential water audit guidelines. • Encourage voluntary residential water audits. • Encourage the use of landscaping practices that minimize water usage and prevent runoff, such as native vegetation that requires less water than nonnative vegetation.	
Long-Term Implementation Actions	
• Encourage use of trained irrigation specialists who understand irrigation application timing, levels of water needed by vegetation, as well as technologies and installation practices that increase water use efficiency of irrigation systems. • Encourage agricultural irrigation users to improve water efficiency of the irrigation systems. • Encourage/consider car wash best practices for recycling water, such as retrofits of older car washes to recycle if feasible.	

Responsible Parties

- GAEPD
- Regional Commissions
- Support from organizations such as the ACCG, GMA, GRWA, and GAWP.
- Local governments and utilities

WC-2: Encourage Utilities to Develop Water Conservation Goals and Programs to Achieve Goals

Short-Term Implementation Actions

- Encourage utilities to implement a water loss reduction program based on water audit results.

Long-Term Implementation Actions

- Consider a high-efficiency toilet rebate/replacement program.

Responsible Parties

- GA EPD
- Local governments and utilities

WC-3: Implement Conservation Rate Structures

Short-Term Implementation Actions

- Implement conservation pricing for residential customers to provide economic incentive for people to use less water in the region. Activities to implement may include:
    - Eliminate declining block rate structures.
    - Perform a rate and revenue analysis.
    - Use irrigation meter pricing (non-punitive).
    - Ensure adequate billing system functionality.
    - Review and update pricing.

Responsible Parties

- Local governments and utilities
- Support from GRWA and GAWP

WC-4: Consider Developing Partnerships with Non-Utility Agencies Related to Cost-Sharing Programs and Agricultural Conservation-Oriented Activities

Long-Term Implementation Actions

- Consider developing partnerships with external agencies, such as the NRCS and USDA local extension offices (EQIP programs).

Responsible Parties

- USDA
- UGA Extension Service

6.2.3 Water Supply Management Practices

Management practices that supplement water supply are an important part of addressing the potential water resource challenges for the Region. The Council identified three Water Supply Management Practices:

1. Identify / Evaluate Additional Water Supply Sources
2. Encourage Beneficial Reuse to Offset Potable Demands
3. Consider Local Ordinances or Minimum Development Standards Regarding Private Decentralized Water Systems

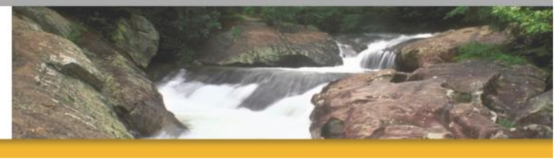
The Water Supply Management Practices support three of the Council's goals:

- Goal #1: Plan for appropriate levels of water storage, water sources, and long-term supply to meet anticipated need for local communities.
- Goal #3: Ensure that management practices support economic development and optimize existing water and wastewater infrastructure.
- Goal #4: Promote technologies that conserve, return, and recycle water; protect water quality; and ensure adequate capacity for water storage within the Region.

These Water Supply Management Practices seek to address potential water supply challenges documented in Table 5-6. Of the 18 counties in the Region, two are projected to have future needs in their permitted water withdrawal capacity. Potential challenges in surface water availability, in both duration and volume, were observed at 14 facilities within 10 counties in 2060, and there may be a future agricultural water shortage in Dade County.

Table 6-3 presents the Water Supply Management Practices and short-term and long-term implementation actions to address the water supply challenges. Local utilities and governments will need to assess which management practices are appropriate for implementation in their community. Communities with resource assessment challenges, infrastructure needs, or shortages are encouraged to implement management practices to alleviate the challenge. Utilities will be required to report on their implementation activities to the GAEPD as part of the permit renewal process.

Table 6-3: Water Supply Management Practices	
Council Goals Addressed	1, 3, 4
Potential Challenges Addressed	Surface water availability challenges for 14 facilities across the region, permitted water withdrawal capacity challenges in Dawson and White Counties, agriculture water shortages in Dade County
WS-1: Identify / Evaluate Additional Water Supply Sources	



Short-Term Implementation Actions

- Maximize existing reservoirs and facilities.
- Evaluate potential for Natural Resources Conservation Service (NRCS) impoundments to serve as water supply sources, as applicable.
- Identify where challenge(s) between available supply and demand will occur.

Long-Term Implementation Actions

- Consider investigating groundwater sources.
- Consider evaluating the feasibility of aquifer storage and recovery (ASR).
- Consider assessing the feasibility of new multi-purpose and/or regional reservoirs.
- Consider interconnections with other utilities.
- Consider coordinating with local industry on potential supply sources, such as repurposing quarries or locating groundwater wells up-dip of wet active mines.

Responsible Parties

- Local governments and utilities
- NRCS
- Regional Commissions
- North Georgia Water Resources Partnership
- DCA
- GAEPD

WS-2: Encourage Beneficial Reuse to Offset Potable Demands

Short-Term Implementation Actions

- Consider returning highly treated wastewater to water supply reservoirs.

Long-Term Implementation Actions

- Consider opportunities for reuse (indirect potable, non-potable, etc.).
- Consider promoting irrigation with high quality treated effluent in areas such as golf courses, parks, and residences. Encourage industries to use reclaimed water for processes such as cooling when feasible.

Responsible Parties

- Local governments and utilities
- Regional Commissions
- North Georgia Water Resources Partnership
- GAEPD

WS-3: Consider Local Ordinances or Minimum Development Standards Regarding Private Decentralized Water Systems

Short-Term Implementation Actions

• Consider developing and including requirements for private decentralized water systems in local ordinance or including in minimum development standard.
Responsible Parties
• Local governments and utilities • Regional Commissions • North Georgia Water Resources Partnership • GAEPD • DCA

6.2.4 Wastewater Management Practices

Wastewater management is important to enhance the quality of life for all communities and protect the water quality of natural systems. The Council identified two Wastewater Management Practices:

1. Consider development, update, and implementation of a local wastewater education and public awareness program, including Fats, Oils, and Grease (FOG)
2. Consider Local Ordinances or Minimum Development Standards Regarding Private Decentralized Wastewater Systems

These Wastewater Management Practices support three of the Council's goals:

- Goal #3: Ensure that management practices support economic development and optimize existing water and wastewater infrastructure.
- Goal #5: Promote properly managed wastewater discharges.
- Goal #6: Educate stakeholders in the Region on the importance of water resources, including water conservation, efficiency, pollution prevention, and source water protection.

The Wastewater Management Practices address potential assimilative capacity, wastewater treatment capacity, and water quality challenges described in Table 5-6. The Resource Assessments identified potential challenges with assimilative capacity, or the ability of Georgia's surface waters to absorb pollutants from treated wastewater and stormwater without degradation of water quality, for 13 facilities in the Region in 2060. Three counties, Habersham, Towns, and Union have projected wastewater infrastructure capacity shortages, and two stream segments in Gilmer and Pickens Counties have projected challenges with dissolved oxygen. All counties in the Region contain 303(d) listed impaired stream segments. These counties should consider implementation of the Wastewater Management Practices listed in Table 6-4 and a more rigorous implementation of the Water Quality Management Practices described in Section 6.2.5 to improve the quality of surface waters. The Resource Assessments also highlighted the need for nutrient load reductions to Lake Allatoona, Carters Lake, and Lake Weiss to address expected future water quality issues.

Table 6-4: Wastewater Management Practices	
Council Goals Addressed	3, 5, 6
Potential Challenges Addressed	Wastewater assimilation challenges (13 facilities in 11 counties), wastewater treatment capacity (3 counties), assimilative capacity for stream dissolved oxygen (2 counties), and 303d not supporting stream reaches (all counties)
WW-1: Consider development, update, and implementation of a local wastewater education and public awareness program, including Fats, Oils, and Grease (FOG)	
Short-Term Implementation Actions	
• Perform public education, outreach, participation, and involvement activities. • Develop and implement procedures for grease control and enforcement based on local entity needs. • Implement fats, oils, and grease (FOG) and disposable wipes education efforts.	
Responsible Parties	
• Local governments and utilities • North Georgia Water Resources Partnership • GAEPD	
WW-2: Consider Local Ordinances or Minimum Development Standards Regarding Private Decentralized Wastewater Systems	
Short-Term Implementation Actions	
• Consider developing and including requirements for private decentralized wastewater systems in local ordinance or including in minimum development standard.	
Responsible Parties	
• Local governments and utilities • Regional Commissions • North Georgia Water Resources Partnership • GAEPD	

6.2.5 Water Quality Management Practices

While significant progress has been made in managing pollution from point sources, Georgia's future growth will continue to be accompanied by conversion of land cover, more intensive land uses, and significant increases in the volume of pollutants discharged to waters from both point and nonpoint sources. The Council identified seven Water Quality Management Practices to address current and future water quality challenges:

1. Encourage Implementation of Nutrient Management Programs.
2. Promote Use of Forestry Best Management Practices and Stream Buffer Protection.
3. Encourage Consideration of Post-Development and Regional BMPs such as Regional Ponds and Natural Protection Systems.
4. Encourage Implementation of Local Stormwater Education, Public Awareness, and On-site BMPs.
5. Encourage Comprehensive Land Use Planning and Floodplain Management.
6. Support TMDL Implementation and Testing to De-list 303(d) Listed Streams.
7. Consider Water Quality Credit Trading or Non-Traditional NPDES Permitting.

The Water Quality Management Practices support four of the Council's goals:

- Goal #2: Minimize adverse impacts to local communities and adjacent regions, and, when practicable, enhance natural systems.
- Goal #4: Promote technologies that conserve, return, and recycle water; protect water quality; and ensure adequate capacity for water storage within the Region.
- Goal #6: Educate stakeholders in the Region on the importance of water resources, including water conservation, efficiency, pollution prevention, and source water protection.
- Goal #7: Identify practices that reduce nonpoint source pollution while controlling stormwater to protect and enhance water quality and ecosystems, particularly those in priority watersheds and listed streams.

The Water Quality Management Practices address potential challenges with assimilative capacity and water quality that are described in Table 5-6. The Resource Assessments identified potential challenges with assimilative capacity for 13 facilities in the Region in 2060. Two stream segments in Gilmer and Pickens Counties have projected challenges with dissolved oxygen. All counties in the Region contain 303(d) listed impaired stream segments, which illustrates the need for a focused effort on implementing the Water Quality Management Practices. Nutrient load reductions are also needed for those watersheds contributing to the Coosa River, Lake Allatoona, Weiss Lake, and Carters Lake.

Table 6-5 presents the seven Water Quality Management Practices and short-term and long-term implementation actions. Practices build on the existing TMDL and stormwater management activities already being performed by the Municipal Separate Stormwater Sewer System (MS4) or NPDES permittees within the Region. As of 2020, the current MS4 counties are Catoosa, Dawson, Floyd, Murray, Walker, and Whitfield Counties. Local utilities and governments need to assess which management practices are appropriate for implementation in their community. Communities with resource assessment challenges, infrastructure needs, or shortages are encouraged to implement management practices to alleviate the challenge. Utilities will be required to report on their implementation activities to the GAEPD as part of the permit renewal process.

Table 6-5: Water Quality Management Practices	
Council Goals Addressed	2, 4, 6, 7
Potential Challenges Addressed	Assimilative capacity for stream dissolved oxygen (2 counties), and 303d not supporting stream reaches (all counties)
WQ-1: Encourage Implementation of Nutrient Management Programs	
Short-Term Implementation Actions	
• Consider promoting application of fertilizer at rates that are used by plants to avoid excessive nutrient runoff. • Consider promoting use of cropland management practices such as conservation tillage, cover crops, field buffers, riparian forested buffers, land conversion (crop to forest), strip cropping, and nutrient management. • Consider promoting use of practices to reduce runoff carrying pollutants from animal waste; include practices to store/cover and compost manure.	
Long-Term Implementation Actions	
• Consider promoting development of a pollutant tracking mechanism. • Consider nutrient trading program.	
Responsible Parties	
• Local governments • Agricultural water users / farmers • Support from the UGA Extension Service • USDA, NRCS, GSWCC (Georgia Soil and Water Conservation Commission), GAEPD	
WQ-2: Promote Use of Forestry Best Management Practices and Stream Buffer Protection	
Short-Term Implementation Actions	
• Consider promoting BMPs to minimize runoff from silviculture operations such as streamside management zones, mechanical site preparation, and main haul roads (as adopted and enforced by the Georgia Forestry Commission).	

- Preserve and develop vegetated (often forested) corridors along streams to filter pollutants.

Long-Term Implementation Actions

- Investigate mechanisms for tracking erosion from forestry practices such as a notification program for land clearing/harvesting activities.

Responsible Parties

- Georgia Forestry Commission
- GAEPD
- GSWCC

WQ-3: Encourage Consideration of Post-Development and Regional BMPs such as Regional Ponds and Natural Protection Systems

Short-Term Implementation Actions

- Consider managing runoff from new development and redevelopment areas so that post-development runoff volume is no greater than pre-development runoff volume.
- Encourage site design practices that minimize environmental impacts, such as conservation subdivisions.

Long-Term Implementation Actions

- Draft sample conservation subdivision ordinances to be made publicly available by the CNG Council and Regional Commissions.
- Encourage local governments to work together to develop regional BMP plans.
- Consider constructing regional BMP facilities such as stormwater ponds and greenway networks for buffer restoration and water quality protection.

Responsible Parties

- Local governments
- Regional Commissions
- GAEPD

WQ-4: Encourage Implementation of Local Stormwater Education, Public Awareness, and On-site BMPs

Short-Term Implementation Actions

- Perform public education, outreach, participation, and involvement activities.
- Local governments consider developing practices to prevent pollutant runoff from their land.
- Consider stenciling stormwater manhole covers and stormwater sewer grates with words to the effect, “Drains to stream. Do not dump contaminants.”

Long-Term Implementation Actions

• Consider developing and implementing a program to educate public about measures they can take to minimize their impacts (nonpoint source) on water resources.
Responsible Parties
• Local governments • DCA • Regional Commissions • GAEPD
WQ-5: Encourage Comprehensive Land Use Planning and Floodplain Management
Short-Term Implementation Actions
• Adopt site plan review practices to prohibit or minimize development in the floodplain. • Refer to floodplain maps during the development review process. • Develop plans to identify environmentally sensitive areas, including protecting open space along riparian corridors, wetlands, and groundwater recharge areas to protect water resources.
Long-Term Implementation Actions
• Draft Model flood plain ordinances and make available through the Regional Commissions and the Council. • Include protection of endangered species, wetlands, aquifer recharge areas, and drinking water supplies.
Responsible Parties
• Local governments • DCA • GAEPD • GEMA (Georgia Emergency Maintenance Agency)
WQ-6: Support TMDL Implementation and Testing to De-list 303(d) Listed Streams
Short-Term Implementation Actions
• Perform regular sampling and laboratory testing in the Region's 303(d) impaired waters in an effort to remove them from the list. • Evaluate existing impaired waters, investigate potential pollutant sources, and participate in the TMDL development and implementation planning process.
Long-Term Implementation Actions
• Choose waterways to monitor and seek funding for impairment mitigation.
Responsible Parties
• GAEPD

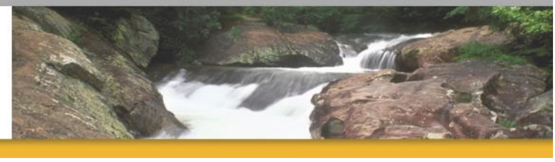
• Local governments and utilities
WQ-7: Consider Water Quality Credit Trading or Non-Traditional NPDES Permitting
Short-Term Implementation Actions
• Not applicable.
Long-Term Implementation Actions
• Evaluate the feasibility of point-to-point trading and nonpoint–to-point trading. • Evaluate the potential for non-traditional NPDES permitting to support nutrient reduction. • Identify and support opportunities for new non-traditional NPDES permitting.
Responsible Parties
• GAEPD • Local governments and utilities

6.3 Benchmarks

The State Water Plan guided the Council's selection of benchmarks that are specific, measurable, achievable, realistic, and time phased. The benchmarks prepared for the 2023 plan by the CNG Council were reviewed as part of this plan update. No changes were made; the recommended benchmarks are listed in Table 6-6. These benchmarks will be used to assess the effectiveness of the Regional Water Plan's implementation and to identify changes that need to be addressed during the 5-year Regional Water Plan update. As detailed below, the Council selected both qualitative and quantitative benchmarks that will be used to assess whether the management practices are reducing or eliminating challenges over time and allowing the Region to meet its vision and goals.

The short-term actions outlined in Tables 6-1 through 6-5 will serve as overall benchmarks, and it is recommended that progress be measured via an annual survey. The GAEPD and DCA will continue to coordinate the annual survey with the support of the Regional Commissions. GAEPD and DCA will track the results of these surveys for needed adaptation and adjustments to the CNG Regional Water Plan during the 5-year updates.

Table 6-6 also provides resource-specific benchmarks that allow a mechanism for tracking realistic and measurable progress over the long-term in addressing the water resource challenges or issues, described in Section 5. For example, because of the time it takes to develop or expand water and wastewater infrastructure, it is appropriate to measure overall progress during the 5-year Regional Water Plan update cycle by revisiting the infrastructure challenges summarized by County in the tables in Section 5. The resource benchmarks also build on existing measurement tools, such as the



biennial update of the Clean Water Act 305(b)/303(d) list of waters not meeting their designated uses.

Table 6-6: Resource Benchmarks for Management Practices

Category of Management Practice	Benchmark	Measurement Tools	Time Period
All Practices	Implement short-term actions	Annual Survey	Annual
Water Conservation	Maintain or Reduce Residential Per Capita Water Use	Update of Regional Water Plan Per Capita Water Use Estimates	Every 5 years
	Implementation of Recommended Water Conservation Management Practices	Survey via Annual Water Conservation Plan Progress Report	Annual
Water Supply Practices	Reduction in future facility / infrastructure challenges, or a deficit between existing permitted water withdrawals (surface and groundwater) and future demands	Update of Regional Water Plan Forecasts	Every 5 years
Wastewater Practices	Availability of permitted assimilative capacity in the major tributaries of the CNG Region	Resource Assessments	Every 5 years
	Reduction of the future wastewater facility shortages via expansions or development of new facilities to meet projected future wastewater demands	Update of Regional Water Plan Forecasts	Every 5 years
Water Quality Practices	Support of Designated Use	305(b)/303(d) List of Waters	Biennial
	Reduction in pollutant loads observed in the watershed modeling	Resource Assessments	Every 5 years
	Observed improvements in water quality monitoring results	GAEPD Online Water Quality Database[6]	Annual

6.4 Recommendations to the State

This section provides recommendations for actions by the State (Table 6-7) that support implementation of this Regional Water Plan.

[6] http://www.gaepd.org/Documents/EPDOnlineWaterQualityData.html

Table 6-7: Recommendations to the State

	Recommendation
Funding	Identify long-term funding mechanism, beyond grants, to assist responsible parties with implementation of water supply projects.
	Continue to promote use of the Regional Water Plan Seed Grant Funds and provide technical support to potential applicants.
	Fund innovative research strategies to address state-wide water resource challenges, such as treatment of emerging contaminants or detailed mapping and modeling of groundwater resources.
Coordination	The Regional Commissions should continue to serve as the clearinghouse and coordinator for ongoing CNG Council planning activities.
	Enhance the opportunity for ongoing CNG Council input during implementation of Regional Water Plan Management Practices and establish a process for involvement in the 5-year Regional Water Plan update.
	Maintain the North Georgia Water Resources Partnership for implementation and action on management practices.
	Improve coordination with organizations, such as the ACCG, GMA, GRWA, and GAWP, to develop templates and materials that each council, with the assistance of DCA or the regional commissions, can adapt for regional/local implementation.
	Support local monitoring and allow volunteer sampling data to be used to assess watershed conditions.
	Coordinate CNG planning efforts with downstream regions.
Policy / Programmatic	Develop a program to consistently meter and report agricultural water withdrawals.
	Provide support to study the effects of septic systems on water quality.
	Develop guidelines for appropriate use of interbasin transfers of water.
	Explore opportunities for Georgia to expand use of the Tennessee River as a water supply source.
	Support efforts to develop regional reservoir projects to meet both in-stream and off-stream needs.
	Develop regulatory framework/guidelines for aquifer storage recovery.
	Support efforts to give authority to enforce Regional Plans.
	Support and expand water quality monitoring programs.
Implementation	Develop or support BMP demonstration projects to evaluate their effectiveness in the CNG Region.
	Support and coordinate additional commercial water audits.
Next 5-Year Update	Continue to refine Resource Assessment models to report results at a finer resolution.
	Review the technical assumption that LAS is considered to be a consumptive use so that this can be correctly accounted for in the future.
	Partner with the counties to obtain better information on future forecasts of non-crop (and less than 100,000 gallons per day) uses through planning period.

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SECTION 7

Plan Collaboration and Alignment

Section 7. Plan Collaboration and Alignment

Section Summary

This section discusses studies and partnerships that are supporting implementation of management practices as well as alignment with other plans. Unlike the 2017 plan update, current funding guidance has not been included.

The Regional Water Plan should be updated every five years but can be amended sooner if additional needs (triggering events) are identified in the interim period.

This section describes CNG Council's collaboration and coordination with other entities, plans, and studies to develop and implement the management practices. Planning level cost estimates for implementation actions were not included in this plan update. Every five years, the Regional Water Plan should be reassessed and updated. The Regional Water Plan will be used to:

- Guide permitting decisions by GAEPD.
- Guide the awarding of Section 319(h) Nonpoint Source Implementation Grant funds from GAEPD.
- Guide the awarding of State grants and loans for water-related projects.

7.1 Implementation Status

In 2015, the Northwest Georgia Regional Commission (NWGRC) assisted the CNG Regional Water Planning Council in development of a progress report to document the status of implementation activities across the Region and to evaluate potential changes to the management practices and implementation schedule provided in Section 6 (NWGRC, 2015). Over the first 5 years of plan implementation, members of the CNG Council participated in monthly meetings with the North Georgia Water Resources Partnership (Partnership) to discuss implementation status of the ongoing technical studies funded by the Partnership and grants from GAEPD. Although not "official" Council meetings, these meetings served as opportunities to coordinate between local governments within the Region on key technical issues related to plan implementation.

For this plan update, the Council and NWGRC continued to collaborate on a less frequent basis, with regular support and updates from NWGRC at Council meetings.

The primary studies that have been either funded by the Partnership or GAEPD grants since 2011 include the following:

- **Nutrient Trading –** *Nutrient Trading in the Coosa Basin: A Feasibility Study* was completed by Brown and Caldwell in August 2013 and was funded by an EPA 319 (h) grant. The study evaluated the issues associated with setting up a point to nonpoint source nutrient trading framework. The study was conducted in an effort to reduce total phosphorus loads by 30 percent in the Coosa River, measured at the Georgia/Alabama state line, as required by the EPA's Lake Weiss TMDL for Nutrient Impairment (2008).

- **Redundancy and Emergency Interconnectivity Study** – The *Redundancy and Emergency Interconnectivity Study* was completed by Jacobs and Amec Foster Wheeler in April 2015 and was funded by a Regional Water Plan Seed Grant from GAEPD. The study evaluated the feasibility for using municipal water system interconnections for emergency water supply.

- **Water Transmission Grid Study** – The *Water Transmission Grid Study* was completed by Jacobs and Amec Foster Wheeler in April 2015 and was funded by a Regional Water Plan Seed Grant from GAEPD. This is a long-term planning study that evaluates the potential for developing a regional water transmission grid across multiple municipalities to meet future water demand beyond the year 2050. The document's high level plan for meeting water supply needs is intended to encourage water systems and stakeholders to consider regional implications when making local decisions.

- **North Georgia Agricultural Water Use Study** – The *North Georgia Agricultural Water Use Study* was completed by Tetra Tech in June 2015 and was funded by a Regional Water Plan Seed Grant from GAEPD. The study determines the amounts of agricultural water use in the CNG Region. Agricultural acreage and irrigation withdrawal data were used to estimate water use. These data came from a variety of sources, including the UGA Center for Agribusiness and Economic Development, the Natural Resources Spatial Analyst Laboratory, and GAEPD, among others. Water use was estimated for commercial crops, poultry, and livestock.

- **Soque River Nutrient Management Study** – The Partnership, NWGRC, Cities of Cornelia and Clarksville, and the Soque River Watershed Association are collaborating on a nutrient study to identify nutrient sources in the watershed and potential strategies for nutrient loading reductions in the future. Findings from this study will be used to improve water quality management practices around the Region in the future.

- **Dozier Creek, Dykes Creek, Woodward Creek, and Etowah River Watershed Management Plans** – The NWGRC and Limestone Valley Resource, Conservation, and Development Agency partnered to develop watershed management plans for four water bodies in the CNG Region in 2021 to improve water quality, manage stormwater, restore streambanks, and protect water resources. Future actions include applying for funds to implement the plans.

- **Impaired Stream Tool** – The NWGRC and GAEPD are collaborating to develop a tool to prioritize delisting impaired streams in the CNG Region and recommend implementation measures to delist these streams.

In 2014, the Partnership entered into a Memorandum of Understanding (MOU) with the Georgia Association of Water Professionals (GAWP) to allow for collaboration and development of educational and resource materials to facilitate implementation of the

Regional Water Plan. Through this partnership, the following resource documents were identified, and can be accessed through the GAWP website, www.gawp.org.

- Best Practice Master Planning Guidance and Resource Document
- A Guide to Asset Management for Small Water Systems
- Stormwater Program Guidance Manual for Small Local Governments

Updated studies will be needed for future plan updates, and seed grant funding or other sources should be used to keep the data and policies current.

7.2 Fiscal Implications of Selected Water Management Practices

Additional funding guidance has not been included as development of cost estimates for these management practices are variable and dependent on several factors including scope of work, market conditions, technological improvements and availability of supplies, equipment, and labor. Georgia EPD developed a "Supplemental Guidance for Planning Contractors: Water Management Practice Cost Comparison," last revised in April 2011, that provides guidance about the relative costs of various water management practices. Specific costs should be further evaluated and updated before being relied upon.

Limited implementation funding may be obtained through GAEPD's Seed Grant program, which specifically seeks to support and incentivize local governments and other water users as they undertake their Regional Water Plan implementation responsibilities.

7.3 Alignment with Other Plans

As discussed in Section 6, during the original plan development a review of regional and local plans served as the basis for the development of the Region's selected management practices. As a result, this Regional Water Plan is generally aligned and consistent with these efforts; however, the following sections describe ongoing efforts and/or differences that are worth noting and revisiting during future Regional Water Plan updates.

7.3.1 Alabama-Coosa-Tallapoosa (ACT) Basin Master Water Control Manual

The ACT Basin Master Water Control Manual is composed of a series of documents, a Master Water Control Manual and 9 individual reservoir manuals. Water control manuals describe the specific operations of the federal reservoir including storage and release schedules to meet the authorized uses of the project. The USACE approved an updated master water control manual for the ACT basin in April 2022. The updated water control manual details adjustments to reservoir operations to meet the authorized purposes based on various factors and conditions.[7]

In development of the updated resource assessments for the CNG Region, the GAEPD modeling team updated the hydrologic model used for the surface water availability resource assessment analysis in the basin to incorporate new water control manuals, forecasted water demands and wastewater flows, and additional facilities. The surface water availability resource assessment results differ from previous years with the updates and expanded level of detail.

7.3.2 Etowah Aquatic Habitat Conservation Plan (HCP)

In response to the number of imperiled aquatic species found in the Etowah watershed, the USFWS initiated, but never completed, the development of the Etowah Aquatic Habitat Conservation Plan (HCP). Many of the recommendations in the draft HCP were focused on improving water quality through reduction of point and nonpoint source loadings, reductions in sedimentation and erosion, and restoration or maintenance of hydrology. The recommendations in the 2011 plan and in this updated regional plan related to water quality and stormwater management will address many of the original HCP recommendations.

Information on imperiled aquatic species found in the entire Coosa North Georgia Planning Area is available in the GA Department of Natural Resources Statewide Wildlife Action Plan (https://georgiawildlife.com/WildlifeActionPlan). This plan is updated every ten years and is currently under revision.

7.3.3 Metropolitan North Georgia Water Planning District Plans

The Metro District was created by the Georgia General Assembly in 2001 to establish policy, create plans, and promote intergovernmental coordination within the 15-county metro Atlanta region, which includes more than 90 cities. While the Metro District is governed by separate authorizing legislation than the CNG Water Planning Region, the two are similar in some respects and the provisions of the 2008 State Water Plan apply to planning activities by both entities. There are, however, differences. For example, the Metro District is funded by State appropriations and per capita local government dues; it is governed by an elected/appointed Governing Board, which sets policy and direction. Metro District staffing is provided by the Atlanta Regional Commission Environmental Planning Division, while plans and policies are guided by the Board Executive and Finance Committees, the Technical Coordinating Committee, and the Basin Advisory Councils (Metro District, 2011).

Similar to the CNG Regional Water Plan, local governments and utilities are responsible for implementing the plans at the local level, but compliance with the Metro District Plan is directly enforced through the GAEPD's permitting process. While the CNG Regional Water Plan will guide GAEPD's future permitting decisions, local governments must be in compliance with the Metro District plans to receive a permit

[7] http://www.sam.usace.army.mil/Missions/Planning-Environmental/ACT-Master-Water-Control-Manual-Update/

for an increased water withdrawal, a new or increased discharge, or for an MS4 permit, with GAEPD being responsible for auditing local governments to determine compliance with the plans, including audit checklists and site visits.

The Metro District Plan is currently going through an update that will be completed in June 2023 in conjunction with the other 10 regional water plans. This update will result in an integrated water resources management plan that integrates water supply and conservation, wastewater and stormwater management components. The Metro District held several meetings during the five-year planning period to collaborate and coordinate management practice implementation with other regional water councils, including the CNG Council. Representatives from the Metro District also attended and presented at CNG Council meetings. Additionally, the Council was encouraged to review and submit comments to the Metro District on its draft plan. Changes to the Metro District plan include a planning level stormwater forecast, revised language in educational materials to view stormwater as an asset, changes to water loss audits, and revised standards for plumbing to improve water conservation.

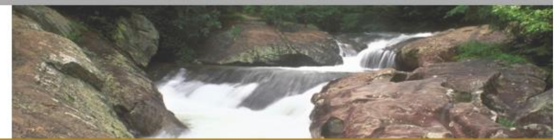
The primary points for potential ongoing collaboration relate to water supply and water quality management practices in the Chattahoochee River Basin and Lake Allatoona watersheds. Specifically, measures related to nonpoint source management are emphasized in the CNG plan to address the existing TMDLs for nutrients in Lake Allatoona and Lake Lanier. The water quality management practices focusing on post development stormwater controls, nutrient management programs, and forestry BMPs for sedimentation and erosion address feedback from the Metro District members regarding nonpoint source pollutant loading reductions to Lake Lanier.

7.3.4 Other Regional Planning Considerations

7.3.4.1 Water Supply Planning Considerations

Future development of water supplies in the CNG Region should continue to take into consideration the availability of water from the Tennessee River Basin. A significant portion of the Region is included in the Tennessee River watershed, and local entities should have access to water contributed to the river from watersheds within north Georgia. The CNG Council recognizes there are potential legal issues that would have to be addressed between Georgia and Tennessee to facilitate usage of the Tennessee River; however, the Council would like future planning efforts to address this alternative water source in more detail as needs arise.

Additionally, regional reservoir projects should continue to be evaluated to meet both in-stream and off-stream needs within the CNG region. Portions of the CNG Region, specifically in the Coosa basin, have the potential for development of new water supply reservoirs that may provide sufficient yield to supply water to areas outside of the CNG planning area. The CNG Council is not opposed to considering these options for meeting future water supply needs in Georgia; however, the Council would like to ensure that a complete and thorough evaluation is completed to verify that the CNG basin water resource needs (both in-stream and off-stream) are met. The CNG Water Supply Management Practices include a recommendation to assess the feasibility of



new multi-purpose and/or regional reservoirs that may be candidates for future expansion.

7.3.4.2 Total Maximum Daily Load (TMDL) Implementation

The State's TMDL process establishes the allowable pollutant loadings or other quantifiable parameters for a water body based on the relationship between pollutant sources and in-stream water quality conditions. This allows water quality-based controls to be developed to reduce pollution and restore and maintain water quality. Integration of the CNG Region's existing TMDL Implementation Plans was an important component considered during the development and selection of the management practices.

There are a number of streams segments in the CNG Region, including streams in every county, which are on the 303(d) list of impaired waterbodies and/or have existing TMDLs to address the identified impairments. As noted in Sections 3 and 5, the streams are primarily listed for fecal coliform, impaired fish communities, or fish consumption guidelines/commercial fishing ban due to legacy pollutants such as PCBs or metals. The updated water quality management practices include recommendations with greater emphasis on nutrient management programs, post-development stormwater controls, improved forestry BMP practice implementation, and increased monitoring of listed stream segments.

Since the original plan was developed in 2011, TMDLs have been finalized to address chlorophyll-a issues in Lake Allatoona (GAEPD, 2013), Carter's Lake (GAEPD, 2016), and Lake Lanier (GAEPD 2018). In each case, the local governments and utilities in the watersheds leading to these three lakes will need to implement measures to further reduce nutrient loadings in these watersheds.

The CNG Council, with support from the Partnership, has been studying options for cost effective nutrient reductions (see below) including water quality nutrient trading. Most recently, the Partnership developed a report on alternative nutrient permitting strategies in 2018 for the CNG and Savannah-Upper Ogeechee regions. The updated CNG plan includes management practices on stormwater and nutrient management and encourages consideration of water quality credit trading to begin to address the needed nutrient reductions to comply with the TMDL implementation plans for Lakes Allatoona, Carters Lake, and Lake Lanier.

7.3.4.3 Northwest Georgia Regional Water Resources Partnership

The Northwest Georgia Regional Water Resources Partnership was formed and endorsed by the Board of Directors of both the Coosa Valley and North Georgia Regional Commissions (known as RDCs at the time) in 2001 in recognition of the importance of watershed planning. Water withdrawal and discharge permit holders (government, water authority, industrial and private communities) and interested entities not holding water permits (governments, quasigovernmental agencies, environmental organizations, advocacy groups, and other interested entities) were invited to participate, and an executive committee of 12 members was elected from the membership. Many of the local governments, utilities and industries in the CNG region are full participating members of the Partnership. The goals of the Partnership include:

- Goal 1: Organize and increase our collective political influence on local, state and national levels.
- Goal 2: Combine our resources to develop and implement watershed assessments, water supply studies, and storm water management initiatives within the region including the Coosa, Tallapoosa, and Tennessee River Basins.
- Goal 3: Educate legislators, citizens, and ourselves on surface and ground water resources in the region.
- Goal 4: Obtain funding from a variety of sources for water related activities.
- Goal 5: Monitor, assess, and shape local, state, and national legislation on water related issues.
- Goal 6: Monitor the proposed ACT and ACF water compact agreement.
- Goal 7: Serve as a coordinating mechanism for all regional water related activities including development of the proposed State Comprehensive Water Resources Management Plan.

The Partnership was endorsed by the CNG Council as the technical support group for the Council in 2011 and has served as the primary entity supporting implementation of the regional water plan, as noted in Section 7.1.

7.3.4.4 PFAS Monitoring

Perfluoroalkyl substances (PFAS) are a family of synthetic chemicals with strong, elemental bonds of fluorine and carbon that are resistant to heat, water, and oil, which do not easily break down in the environment or in our bodies. Researchers have concluded with peer-reviewed studies that exposure to certain levels of PFAS chemicals, including PFOA, PFOS, PFBS, and GenX, may result in adverse health effects.

In March 2023, EPA announced a proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS including PFOA, PFOS, PFBS, GenX, as well as perfluorononanoic acid (PFNA) and perfluorohexane sulfonic acid (PFHxS). The proposed PFAS NPDWR does not require any action until it is finalized, which is anticipated by the end of 2023.

The proposed NPDWR includes draft Maximum Contaminant Levels (MCLs) of 4.0 parts per trillion each, for PFOA and PFOS, and a unitless Hazard Index level for the other 4 PFAS (PFBX, GenX, PFNA and PFHxS). More details on the proposed NPDWR can be found at EPA's website, https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.

PFAS Monitoring in the Coosa North Georgia Region: GAEPD started monitoring finished drinking water in the Coosa and neighboring Tennessee basins due to the documented presence of PFAS and PFAS sources in the Coosa basin. This data is available in the "Current and Future Monitoring" tab of the PFAS Story Map at GAEPD's website, https://epd.georgia.gov/pfoa-and-pfos-information.

GAEPD continues to encourage public water systems to initiate EPA's three recommended actions in response to health advisory exceedances: assess PFAS levels, inform consumers, and limit exposure. Public water systems in Georgia have used these three actions in response to previous PFAS health advisory exceedances, and these three actions remain effective. Overall, the lower the levels of PFAS, the lower the risk, but there is no one-size-fits-all approach to reduce exposure. Public water systems are primarily responsible for determining the most appropriate response to a health advisory exceedance, and GAEPD is available to provide technical assistance to public water systems with technical communication, review of proposed monitoring plans, and identification of treatment options and/or alternative water sources.

Public water systems with good, reliable monitoring data will be able to make informed decisions about treatment options and/or alternative water sources to meet the future regulatory limits that EPA plans to finalize by the end of 2023. GAEPD recommends that public water systems without sufficient monitoring data develop and implement a monitoring plan to better assess their PFAS levels.

7.4 Regional Water Plan Updates

Meeting current and future water needs will require periodic review and revision of Regional Water Plans. The rules associated with the State Water Plan provide that each Regional Water Plan will be subject to review by the appropriate regional water planning council every 5 years in accordance with guidance provided by the Director, unless otherwise required by the Director for earlier review. These reviews and updates will allow an opportunity for the Regional Water Plans to be adapted based on changed circumstances and new information that becomes available in the 5 years after GAEPD's adoption of these plans. These benchmarks will guide GAEPD during Regional Water Plan review.

7.5 Plan Amendments

This Regional Water Plan has been drafted to provide flexibility to adapt to changing circumstances. This Regional Water Plan will be amended on a 5-year basis as required unless additional needs (triggering events) are identified in the interim period.

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SECTION 8

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Section 8. Bibliography

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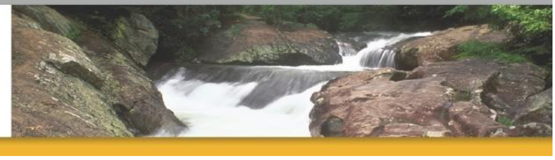
APPENDIX A

Summary of 2023 Coosa-North Georgia Regional Water Plan Revisions

Appendix A – Summary of Edits and Updates 2022 – 2023 Review and Revision

Section	Location	Change	Description
All	Throughout	Minor updates	• Revised text to improve clarity and grammar
ES	All	Section headings changes	• Changed the ES section headings and content to align with the report section headings
ES	Overview	Text updates	• Revised number and description of water resource categories • Revised number of management practices
ES	Table ES-1	Relocation and updates to Table ES-1	• Moved table from the end of the ES • Updated table to match the sections of the regional water plan
ES	Introduction	Significant text additions/ revisions	• Moved and consolidated text on the planning process • Updated vision statement and goals of the Council • Updated description of the CNG Council
ES	Table ES-2	Updates to Table ES-2	• Updated goals for the regional water plan
ES	Coosa-North Georgia Water Planning Region	Significant text revision/updates	• Created section to align with Section 2 • Updated number of municipalities and river basins • Added a brief description of the region to match Section 2.2
ES	Water Resources of the Coosa North Georgia Region	Significant text addition/updates	• Revised section heading to align with Section 3 • Added clarifying assumptions and background information • Moved text defining water resource assessments • Summarized existing condition results
ES	Forecasting Future Water Resource Needs	Minor text revisions/updates with population projections and forecasted demands	• Created section to align with Section 4 • Updated planning year from 2050 to 2060 • Updated population, water, and wastewater forecast data and discussion
ES	Figure ES-2	Updates to Figure ES-2	• Updated water demand and wastewater flow forecast data from 2015 to 2020 and 2050 to 2060
ES	Comparison of Water Resource Capabilities and Future Needs	Significant text addition/updates	• Revised section heading to align with Section 5 • Updated assessment year to be 2060 • Updated future resource assessments' results and discussion
ES	Table ES-3	Updates to Table ES-3	• Updated to 2060 potential challenges, needs, or shortages by county
ES	Addressing Water Needs	Significant text addition/updates	• Revised section heading to align with Section 6



Section	Location	Change	Description
	and Regional Goals		• Consolidated and updated management practice discussion • Added discussion of local review and implementation
ES	Plan Collaboration and Alignment	Significant text additions	• Revised section heading to align with Section 7 • Added details about plan collaboration with other entities and plans • Added details about the use of the Regional Water Plan
1	Section 1	Minor text revisions/updates	• Updated to include planning year 2060 and updated year for RWP update process • Updated the Coosa-North Georgia vision statement • Replaced “gaps” with “challenges”
1	Figure 1-1	Updates to Figure 1-1	• Updated with newer map of planning council locations
1	Section 1.1	Minor text revisions	• Revised text with minor edits
1	Section 1.2	Minor text revisions/updates	• Revised the years of the previous reports • Updated a reference to the figure • Replaced “gaps” with “challenges”
1	Figure 1-2	Updates to Figure 1-2	• Updated figure to reflect the current water planning process
1	Section 1.3	Minor text revisions/updates	• Revised word choice and flow • Updated report year to 2022 and updated the vision statement • Revised/updated the goals
2	Section 2.0	Minor text revisions/updates	• Revised/updated current number of municipalities and year of studies • Revised updated land use statistics and current populations
2	Section 2.1	Minor text revisions/updates	• Updated historical data from 1991 to 2020 • Updated references • Replaced “altitude” with “elevation”
2	Section 2.1.1	Minor text revision	• Updated the current number of municipalities in the Region
2	Table 2-1	Revisions to Table 2.1.1	• Added note referring to items in the table giving details about which municipality spans two counties
2	Figure 2-1	Updates to Figure 2-1	• Updated counties and cities in the CNG Region
2	Section 2.2.1	Minor text revisions/updates	• Updated with 2020 population data

Section	Location	Change	Description
2	Table 2-2	Revisions to reference in Table 2-2	• Updated references
2	Section 2.2.2	Minor text revisions/updates	• Updated references and employment data to year 2020 • Added information about current largest employment sectors
2	Section 2.2.3	Minor text revisions/updates	• Updated the land cover information using the 2019 data from USGS
2	Table 2-3	Updates to Table 2-3	• Updated with 2019 land cover data from USGS
2	Figure 2-3	Updates to Figure 2-3	• Updated with 2019 land cover data from USGS
2	Section 2.2.4	Minor Text revisions/updates	• Revised word choice
2	Table 2-4	Significant updates to Table 2-4	• Updated current CNG counties by RC
3	Section 3.0	Significant revisions/updates to text	• Revised water usage data, resource assessments' results, and references
3	Section 3.1	Significant revisions/updates to text	• Updated to reflect the most recent water usage data (2015) • Added detail to energy and agriculture descriptions
3	Figure 3-1 to 3-4	Updates to Figures 3-1 to 3-4	• Updated the most recent water usage data (2015)
3	Section 3.2	Minor text revisions/updates	• Added "Challenge" as an associated word with "gap" • Clarified that a "shortage" is associated with the current permitted water withdrawal or permitted capacity of a wastewater treatment facility
3	Section 3.2.1	Minor text revisions/updates	• Updated the dissolved oxygen results and number of modeled miles of streams • Updated TMDL descriptions for Lake Weiss and Lake Lanier • Improved word choice
3	Section 3.2.2	Significant text revisions/updates	• Replaced 2017 surface water availability discussion with new BEAM model methodology and results • Revised Surface Water Resource Assessment process • Edited description of Figure 3-5
3	Figure 3-5	Updates to Figure 3-5	• Updated facilities modeled in 2023 for the CNG region

Section	Location	Change	Description
3	Figure 3-6	Updates to Figure 3-6	• Added a figure of facilities with existing challenges according to modeling results
3	Table 3-1 in Section 3.3.1	Revisions to Table 3-1	• Removed five stream reaches: Blue Creek, Blackwell Creek, Chestnut Cove Creek, Pettit Creek, and Black's Creek to be in accordance with 2022 data • Replaced "Headwaters to Forest Service Road 17" with "Sugar Creek to Spring Creek" and changed classification to drinking water
3	Section 3.3.2	Minor text revisions/updates	• Revised the number of monitored and impaired streams miles and a description of stream segments' locations • Clarified that Lake Allatoona did not meet chlorophyll-a standards due to wet weather conditions between 2019 and 2021 • Updated the description of the data source for Figure 3-7 to be based on 2022 listings instead of 2014 listings
3	Figure 3-7	Updates to Figure 3-7	• Updated the impaired waters from the 2022 303d list
3	Section 3.3.3	Minor text revisions/updates	• Documented 2016 changes to the list of high priority waters • Revised the acres of land managed for conservation purposes or located in the Chattahoochee National Forest according to more recent sources • Changed the Georgia Nongame Conservation Section to the Georgia DNR Biodiversity Portal • Updated the number of species in the CNG Region that are rare, threatened, and endangered
3	Figure 3-8	Updates to Figure 3-8	• Updated 2016 high priority streams and watersheds
3	Section 3.3.4	Minor text revisions/updates	• Added details about the 2019 update to a study of the most threatened watersheds containing hotspots of imperiled aquatic biodiversity • Revised the estimated economic benefit of trout stream fishing
3	Figure 3-9	Updates to Figure 3-9	• Updated data from 2019 regarding Southeastern imperiled priority watersheds
4	Section 4.0	Minor text revisions/updates	• Updated current study years for water and wastewater forecasts and location of supplemental forecast documents • Revised section summary to reflect 2020 and 2060 forecasts

Section	Location	Change	Description
4	Section 4.1	Significant text addition	• Added descriptions of municipal, commercial, and residential water uses • Clarified the industries forecasted separately
4	Section 4.4.1	Significant text revisions/updates	• Added details about the development of population projection data • Updated regional population totals and growth rates
4	Table 4.1	Updates to Table 4.1	• Updated 2019 population forecasts from OPB for 2020 through 2060
4	Section 4.1.2	Significant text revisions/updates	• Provided detailed and updated explanations of the methodology for the municipal water demand forecast, including use of water loss audit data when available
4	Table 4-2	Updates to Table 4-2	• Updated municipal water demand forecast data
4	Figure 4-1	Updates to Figure 4-1	• Updated water demand forecast graph with forecasted data for 2020, 2030, 2040, 2050, and 2060
4	Section 4.1.3	Significant text rewrite/updates	• Provided detailed and updated explanations of the methodology for the municipal wastewater flow forecasts • Included clarifying details about municipal wastewater and historical data • Updated years and forecasted flows
4	Table 4-3	Updates to Table 4-3	• Updated municipal wastewater flow forecast data
4	Figure 4-2	Updates to Figure 4-2	• Updated wastewater flow forecast data
4	Section 4.2	Significant text rewrite/update	• Documented the updated basis of planning efforts revolving around permit information and representative input as opposed to employment data
4	Section 4.2.1	Significant text revisions/updates	• Added introductory information about EPD's industrial advisory group and assumptions for water withdrawals • Updated industrial demand forecast data
4	Figure 4-3	Updates to Figure 4-3	• Updated industrial water forecast data
4	Section 4.2.2	Significant text rewrite/update	• Updated industrial wastewater flow forecasting assumptions, methodology, and results
4	Figure 4-4	Updates to Figure 4-4	• Updated the industrial wastewater forecasts to 2060
4	Section 4.3	Minor text revisions/updates	• Updated agricultural forecast years and water demands to 2060 • Revised word choice • Removed text about the previous supplemental forecast document
4	Table 4-4	Updates to Table 4-4	• Added agricultural water forecasts for 2020 and 2060

Section	Location	Change	Description
4	Section 4.4	Significant text revisions/update	• Revised methodology description to reference consistency with 2017's approach and remove earlier comparisons • Clarified and compared the value and application of water withdrawal data and water consumption data • Revised discussion of Plant Hammond • Added two natural gas facilities
4	Table 4-5	Updates to Table 4-5	• Added energy sector water demand forecast from the 2020 memorandum
4	Section 4.5	Significant revisions/updates	• Explained decrease in forecasted water demands compared to 2017 totals • Updated trend discussion and regional totals for the water demand and wastewater flow forecasts
4	Figures 4-5 to 4-8	Updates to Figures 4-5 to 4-8	• Updated figures to reflect 2020 and 2060 forecasted data from the most recent forecasting technical memorandum
5	Section 5	Minor text revisions	• Replaced "gap" with "challenges" • Updated summary of future water resource needs with resource assessments' results
5	Section 5.1	Significant text updates	• Added a discussion of the geological challenges to quantifying a sustainable yield for the region and need for local assessments • Compared 2010 estimates of groundwater to the 2060 forecasted demands
5	Section 5.2	Significant text rewrite/updates	• Replaced 2017 surface water availability discussion with new BEAM model methodology and results
5	Figure 5-1	Updates to Figure 5-1	• Updated figure to display forecasted 2060 surface water available challenges
5	Section 5.3	Minor text revisions/updates	• Replaced the word "gaps" with "challenges" • Clarified the modeled instream dissolved oxygen conditions and assessed water body segments • Revised list of streams with assimilative capacity challenges • Updated figure references and numbering • Added a new category, "at assimilative capacity" • Discussed historical total phosphorus data at the Georgia-Alabama state line • Clarified that no new modeling is available for phosphorus and nitrogen loading

Section	Location	Change	Description
5	Figures 5-2 to 5-8	Updates to Figures 5-2 to 5-8	• Added 2020 and 2060 forecasted assimilative capacity results • Added a new category, "at assimilative capacity"
5	Figure 5-9	Replacement of figure	• Replaced 2017 total phosphorus modeling graph with a graph of historical total phosphorus levels
5	Figures 5-10 to 5-11	Correction to figure	• Modified footnote to include: "based on 2050 demands due to no new modeling" • Corrected a numerical error in the label for Figure 5-10's dry year, non-point category
5	Section 5.4	Significant text revisions/updates	• Modified the introduction of section content • Moved the discussion and table of permitted water withdrawal limits compared to forecasted municipal demands from another location in the 2017 plan and updated data • Added that local/utility-level challenges can be present even if the county does not show 2060 water supply challenges • Explained the exclusion of a comparison of industrial permits to 2060 forecasts • Revised existing municipal wastewater discharge capacities and comparison to forecasted needs
5	Table 5-3	Updates to Table 5-3	• Moved table and updated the existing permitted water withdrawal limits and forecasted demands for 2020 and 2060
5	Table 5-4	Updates to Table 5-4	• Added existing permitted discharge limits versus 2020 and 2060 forecasted flows
5	Table 5.5	Updates to Table 5.5	• Updated existing permits and acreage compared to 2060 forecasted demands • Updated table notes • Updated column title
5	Section 5.5	Significant text revisions/updates	• Replaced "gaps/shortages" with "water resource challenges" • Revised the water resource categories • Updated to 2060 data • Added reference to new table number and updated description
5	Table 5-6	Updates to Table 5-6	• Updated with 2060 potential challenges, needs or shortages summary data by county

Section	Location	Change	Description
			• Added surface water modeling results for wastewater assimilation challenges • Included the applicable quantity of impacted facilities, MGD, or stream segments in parenthesis after a "Yes" for a challenge
6	Section 6.0	Significant text revisions/updates	• Updated and refined section introduction and summary box • Added a brief discussion of implementation, which was moved from Section 7 in the 2017 plan to Section 6
6	Section 6.1	Significant text revisions/updates	• Consolidated explanation of management practices • Documented changes to the organization of management practices and decision factors in identifying water management practices
6	Section 6.2	Significant text revisions/updates	• Updated overview of the Council's recommended management practices • Integrated language about implementation of management practices, which was previously in Section 7 of the 2017 Plan
6	Section 6.2.1	Significant text addition	• Introduced a new administrative category for management practices • Detailed the applicable council goals • Presented the administrative management practices, challenges that the practices seek to address, implementation actions, and responsible parties
6	Tables 6-1 to 6-5	Revision of presentation of management practices	• Modified management practice tables to integrate elements that were previously split between tables in Sections 6 and 7 of the 2017 Plan, including council goals addressed, challenges addressed, management practices, implementation actions, and responsible parties
6	Section 6.2.2	Significant text additions/revisions	• Detailed the applicable council goals • Presented the water conservation management practices, challenges that the practices seek to address, implementation actions, and responsible parties • Removed conservation guidance process flow diagram • Moved a modified a statement about conservation practices in the carpet industry from previous Section 7
6	Section 6.2.3	Significant text addition	• Detailed the applicable council goals • Presented the water supply management practices, challenges that the practices seek to address, implementation actions, and responsible parties

Section	Location	Change	Description
6	Section 6.2.4	Significant text additions/revision	• Detailed the applicable council goals • Presented the wastewater management practices, challenges that the practices seek to address, implementation actions, and responsible parties
6	Section 6.2.5	Significant text revisions/updates	• Detailed the applicable council goals • Presented the water quality management practices, challenges that the practices seek to address, implementation actions, and responsible parties
6	Section 6.3	Significant text revisions/updates	• Moved benchmarks discussion that was previously in Section 8 • Clarified and refined language but did not update benchmarks
6	Table 6-6	Slight modifications to Table 6-6	• Moved table from previous Section 7 • Corrected acronym • Replaced “gaps” with “challenges, or a deficit” • Adjusted table formatting
6	Section 6.4	Minor text revisions/updates	• Moved discussion of “Recommendations to the State” from previous Section 7
6	Table 6-7	Updates to Table 6-7	• Added coordination item related to the North Georgia Water Resources Partnership • Removed policy item about water quality credit trading
7	Section 7	Significant text revisions/updates	• Changed section title • Removed discussion of management practice implementation actions and benchmarking • Clarified that planning level cost estimates were not included • Revised summary box to reflect new section structure
7	Section 7.1	Minor text revisions/updates	• Added two studies • Updated collaboration frequency with the Northwest Georgia Regional Commission
7	Section 7.2	Significant text updates	• Removed cost tables and related text • Added detail as to why funding guidance has not been included
7	Section 7.3.1	Minor text updates	• Revised master control manual date • Modified details of how the data was used for GAEPD hydrologic modeling
7	Section 7.3.2	Significant text revisions/updates	• Clarified that the Etowah Aquatic Habitat Conservation Plan was initiated but never completed

Section	Location	Change	Description
			• Provided a source for additional information
7	Section 7.3.3	Minor text revisions/updates	• Updated details about the Metro District and the council's collaboration
7	Section 7.3.4.1	Minor text revisions/updates	• Revised reference to the applicable water supply management practice
7	Section 7.3.4.2	Significant text revisions/updates	• Updated management practices relevant to nutrient reductions • Updated TMDL information for Lake Lanier • Added to details about a 2018 Partnership report on nutrient permitting strategies
7	Section 7.3.4.3	Significant text revisions/updates	• Removed previous studies and documents that were already discussed in Section 7.1
7	Section 7.3.4.4	Text revisions/updates	• Removed description of Lake Allatoona/Upper Etowah River Comprehensive Watershed Study, which could not be located publicly and has not been updated • Added a discussion of PFAS and emerging contaminants
7	Section 7.4	Text relocation	• Moved text from previous Section 8
7	Section 7.5	Text relocation	• Moved text from previous Section 8
8	Section 8	Text relocation and updates	• Section 8 changed from monitoring topics such as benchmarking, plan updates, and amendments to the bibliography, which was previously Section 9 • Included the 2017 Section 8 material in the current Section 7 material

APPENDIX B

Summary of Forecasts by County

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Catoosa	GW Agricultural	0.25	0.25	0.25	0.25	0.25
	GW Municipal Self-Supply	0.25	0.26	0.25	0.23	0.21
	Groundwater Total	0.49	0.50	0.49	0.47	0.45
	SW Agricultural	0.04	0.04	0.04	0.04	0.04
	SW Municipal Public Supply	6.59	6.89	6.65	6.21	5.67
	Surface Water Total	6.63	6.93	6.69	6.26	5.72
	Total	**7.12**	**7.43**	**7.18**	**6.73**	**6.17**

2020 Per Capita Water Demand Applied (gpcd)[1]: 98

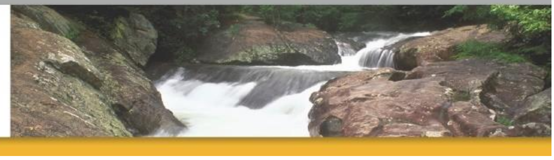
[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Catoosa	Centralized Point Source	0.01	0.01	0.01	0.01	0.01
	Septic	2.77	2.97	2.93	2.81	2.63
	Total	**2.78**	**2.98**	**2.94**	**2.82**	**2.64**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the "2023 Water and Wastewater Forecasting Technical Memorandum."



Forecasts

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Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Chattooga	GW Agricultural	0.41	0.41	0.41	0.41	0.41
	GW Municipal Public Supply	1.06	1.06	1.05	1.03	1.01
	GW Municipal Self-Supply	0.09	0.09	0.09	0.09	0.08
	Groundwater Total	1.57	1.57	1.55	1.52	1.51
	SW Municipal Public Supply	2.22	2.23	2.20	2.15	2.12
	SW Industrial	4.84	4.84	4.84	4.84	4.84
	Surface Water Total	7.06	7.07	7.04	6.99	6.96
	Total	**8.63**	**8.64**	**8.59**	**8.51**	**8.47**

2020 Per Capita Water Demand Applied (gpcd)[1]: 137

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Chattooga	Centralized Point Source	10.37	10.50	10.55	10.54	10.59
	Septic	0.96	0.99	0.99	0.99	1.00
	Land Application	0.03	0.03	0.03	0.03	0.03
	Total	**11.36**	**11.51**	**11.57**	**11.56**	**11.62**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the "2023 Water and Wastewater Forecasting Technical Memorandum."

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Dade	GW Agricultural	0.16	0.16	0.16	0.16	0.16
	GW Municipal Public Supply	0.08	0.08	0.08	0.07	0.07
	Groundwater Total	0.24	0.24	0.24	0.23	0.23
	SW Municipal Public Supply	2.06	2.03	1.96	1.88	1.83
	Surface Water Total	2.06	2.03	1.96	1.88	1.83
	Total	**2.30**	**2.27**	**2.19**	**2.11**	**2.06**

2020 Per Capita Water Demand Applied (gpcd)[1]: 129

[1]Weighted average per capita calculated using the water withdrawals from large and small systems and population served data provided by EPD. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Dade	Centralized Point Source	0.48	0.48	0.47	0.46	0.46
	Septic	0.80	0.80	0.79	0.77	0.77
	Total	**1.28**	**1.28**	**1.26**	**1.24**	**1.23**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Dawson	GW Agricultural	0.22	0.22	0.22	0.22	0.22
	GW Municipal Public Supply	0.21	0.31	0.41	0.52	0.66
	GW Municipal Self-Supply	0.58	0.49	0.40	0.32	0.24
	Groundwater Total	1.01	1.02	1.03	1.05	1.11
	SW Agricultural	0.22	0.23	0.23	0.23	0.24
	SW Municipal Public Supply	1.85	2.79	3.64	4.60	5.87
	Surface Water Total	2.08	3.02	3.87	4.84	6.10
	Total	**3.09**	**4.04**	**4.90**	**5.89**	**7.22**

2020 Per Capita Water Demand Applied (gpcd)[1]: 104

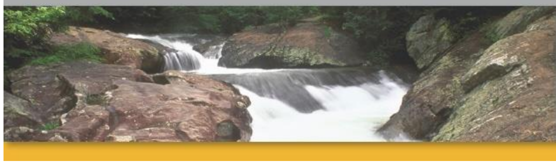
[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Dawson	Centralized Point Source	0.00	0.86	0.98	1.26	1.65
	Septic	1.35	1.78	2.16	2.61	3.22
	Land Application	0.59	0.09	0.11	0.15	0.19
	Total	**1.94**	**2.73**	**3.25**	**4.02**	**5.06**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”



Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Fannin	GW Agricultural	0.14	0.14	0.14	0.14	0.14
	GW Municipal Public Supply	0.09	0.09	0.07	0.06	0.05
	GW Municipal Self-Supply	0.76	0.76	0.65	0.54	0.47
	Groundwater Total	0.99	0.98	0.87	0.74	0.66
	SW Agricultural	0.05	0.05	0.05	0.05	0.05
	SW Municipal Public Supply	1.86	1.86	1.62	1.35	1.18
	Surface Water Total	1.91	1.91	1.67	1.40	1.23
	Total	**2.90**	**2.90**	**2.54**	**2.14**	**1.89**

2020 Per Capita Water Demand Applied (gpcd)[1]: 117

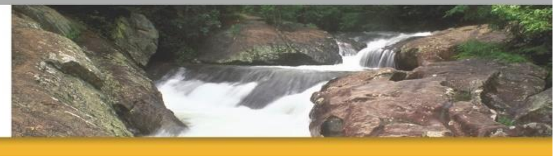
[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Fannin	Centralized Point Source	0.39	0.40	0.35	0.30	0.26
	Septic	1.34	1.36	1.20	1.01	0.90
	Total	**1.73**	**1.76**	**1.55**	**1.31**	**1.17**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”



Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Floyd	GW Agricultural	0.68	0.68	0.68	0.68	0.68
	GW Municipal Public Supply	0.84	0.87	0.82	0.76	0.69
	GW Municipal Self-Supply	0.39	0.39	0.37	0.33	0.30
	Groundwater Total	1.91	1.94	1.87	1.77	1.67
	SW Agricultural	1.45	1.53	1.58	1.64	1.70
	SW Municipal Public Supply	11.35	11.69	11.08	10.22	9.34
	SW Industrial	23.72	23.72	23.72	23.72	23.72
	Surface Water Total	36.52	36.94	36.39	35.59	34.77
	Total	**38.43**	**38.88**	**38.26**	**37.35**	**36.44**

2020 Per Capita Water Demand Applied (gpcd)[1]: 125

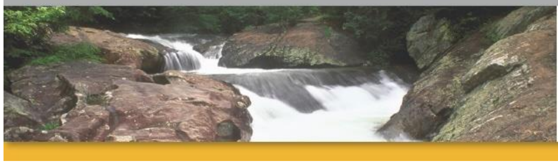
[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Floyd	Centralized Point Source	28.87	29.17	28.99	28.67	28.32
	Septic	2.69	2.83	2.75	2.59	2.43
	Total	**31.57**	**32.00**	**31.74**	**31.26**	**30.75**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the "2023 Water and Wastewater Forecasting Technical Memorandum."



Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Gilmer	GW Agricultural	0.71	0.71	0.71	0.71	0.71
	GW Municipal Self-Supply	1.23	1.26	1.14	1.01	0.92
	GW Industrial	1.42	1.42	1.42	1.42	1.42
	Groundwater Total	3.36	3.39	3.27	3.14	3.05
	SW Municipal Public Supply	2.89	3.03	3.09	3.04	2.99
	SW Industrial	1.01	1.08	1.30	1.43	1.50
	Surface Water Total	3.90	4.11	4.39	4.47	4.49
	Total	**7.25**	**7.49**	**7.66**	**7.60**	**7.53**

2020 Per Capita Water Demand Applied (gpcd)[1,2]: 120

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

[2]Adjusted to reflect municipally-supplied industrial demand.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[3]

County	Discharge Type	2020	2030	2040	2050	2060
Gilmer	Centralized Point Source	2.75	2.85	3.02	3.09	3.12
	Septic	1.65	1.73	1.60	1.45	1.35
	Total	**4.40**	**4.58**	**4.62**	**4.54**	**4.47**

[3]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Gordon	GW Agricultural	0.98	0.98	0.98	0.98	0.98
	GW Municipal Public Supply	2.07	2.16	2.23	2.26	2.29
	GW Municipal Self-Supply	0.17	0.18	0.18	0.18	0.18
	GW Industrial	0.02	0.02	0.02	0.02	0.02
	Groundwater Total	3.24	3.34	3.41	3.44	3.47
	SW Agricultural	2.87	2.83	2.88	2.92	2.96
	SW Municipal Public Supply	7.88	8.24	8.47	8.60	8.71
	Surface Water Total	10.75	11.07	11.35	11.52	11.68
	Total	**13.99**	**14.41**	**14.75**	**14.96**	**15.15**

2020 Per Capita Water Demand Applied (gpcd)[1]: 174

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Gordon	Centralized Point Source	5.67	5.99	6.23	6.40	6.56
	Septic	2.48	2.62	2.73	2.80	2.88
	Total	**8.14**	**8.61**	**8.96**	**9.20**	**9.44**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Habersham	GW Agricultural	0.90	0.90	0.90	0.90	0.90
	GW Municipal Public Supply	0.82	0.92	1.01	1.08	1.14
	GW Municipal Self-Supply	0.62	0.59	0.57	0.54	0.51
	Groundwater Total	2.35	2.41	2.48	2.52	2.56
	SW Agricultural	0.17	0.17	0.18	0.18	0.18
	SW Municipal Public Supply	5.39	5.99	6.61	7.07	7.49
	SW Industrial	1.61	1.96	2.37	2.60	2.74
	Surface Water Total	7.17	8.13	9.16	9.86	10.41
	Total	**9.52**	**10.55**	**11.64**	**12.38**	**12.97**

2020 Per Capita Water Demand Applied (gpcd)[1,2]: 119

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced to reflect conservation.

[2]Adjusted to reflect municipally-supplied industrial demand.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[3]

County	Discharge Type	2020	2030	2040	2050	2060
Habersham	Centralized Point Source	6.66	7.46	8.28	8.93	9.53
	Septic	2.02	2.17	2.31	2.45	2.62
	Land Application	0.01	0.01	0.01	0.02	0.02
	Total	**8.69**	**9.64**	**10.60**	**11.40**	**12.16**

[3]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Lumpkin	GW Agricultural	0.25	0.25	0.25	0.25	0.25
	GW Municipal Public Supply	0.27	0.39	0.50	0.62	0.76
	GW Municipal Self-Supply	1.85	1.81	1.76	1.72	1.68
	Groundwater Total	2.36	2.45	2.52	2.59	2.69
	SW Agricultural	0.03	0.03	0.03	0.03	0.03
	SW Municipal Public Supply	1.39	2.05	2.64	3.24	3.98
	Surface Water Total	1.42	2.08	2.67	3.27	4.01
	Total	**3.78**	**4.53**	**5.19**	**5.86**	**6.70**

2020 Per Capita Water Demand Applied (gpcd)[1]: 176

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Lumpkin	Centralized Point Source	0.78	0.88	0.98	1.08	1.20
	Septic	1.79	2.03	2.24	2.47	2.75
	Land Application	0.02	0.02	0.03	0.03	0.03
	Total	**2.59**	**2.93**	**3.24**	**3.57**	**3.98**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Murray	GW Agricultural	0.70	0.70	0.70	0.70	0.70
	GW Municipal Public Supply	1.46	1.51	1.55	1.57	1.60
	GW Municipal Self-Supply	0.75	0.73	0.71	0.69	0.67
	Groundwater Total	2.90	2.94	2.95	2.95	2.96
	SW Agricultural	0.28	0.28	0.29	0.29	0.30
	SW Energy - Withdrawals	2.90	2.90	3.82	4.23	4.63
	SW Municipal Public Supply	1.74	1.80	1.85	1.87	1.90
	Surface Water Total	4.92	4.99	5.96	6.40	6.84
	Total	**7.82**	**7.93**	**8.91**	**9.35**	**9.79**

2020 Per Capita Water Demand Applied (gpcd)[1]: 104

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Murray	Centralized Point Source	2.03	2.10	2.28	2.37	2.48
	Septic	2.00	2.09	2.17	2.22	2.29
	Total	**4.03**	**4.20**	**4.44**	**4.60**	**4.77**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Pickens	GW Agricultural	0.37	0.37	0.37	0.37	0.37
	GW Municipal Public Supply	1.41	1.66	1.74	1.79	1.88
	GW Municipal Self-Supply	0.40	0.39	0.38	0.37	0.36
	GW Industrial	2.88	2.88	2.88	2.88	2.88
	Groundwater Total	5.07	5.31	5.37	5.42	5.50
	SW Municipal Public Supply	2.38	2.79	2.92	3.01	3.16
	Surface Water Total	2.38	2.79	2.92	3.01	3.16
	Total	**7.44**	**8.10**	**8.30**	**8.43**	**8.66**

2020 Per Capita Water Demand Applied (gpcd)[1]: 132

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Pickens	Centralized Point Source	2.34	2.46	2.51	2.54	2.60
	Septic	1.74	2.03	2.13	2.22	2.34
	Land Application	0.02	0.02	0.02	0.02	0.02
	Total	**4.10**	**4.51**	**4.66**	**4.78**	**4.96**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Polk	GW Agricultural	0.60	0.60	0.60	0.60	0.60
	GW Municipal Public Supply	1.77	1.83	1.79	1.70	1.59
	GW Municipal Self-Supply	0.10	0.10	0.09	0.08	0.07
	GW Industrial	1.66	1.66	1.66	1.66	1.66
	Groundwater Total	4.12	4.18	4.14	4.04	3.93
	SW Energy - Withdrawals	1.39	1.39	1.83	2.02	2.22
	SW Municipal Public Supply	4.14	4.27	4.18	3.97	3.72
	SW Industrial	1.52	1.59	1.67	1.72	1.75
	Surface Water Total	7.05	7.25	7.68	7.72	7.69
	Total	**11.17**	**11.44**	**11.82**	**11.76**	**11.61**

2020 Per Capita Water Demand Applied (gpcd)[1,2]: 101

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

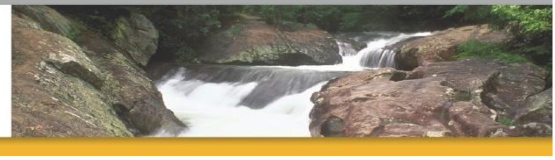
[2]Adjusted to reflect municipally-supplied industrial demand.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[3]

County	Discharge Type	2020	2030	2040	2050	2060
Polk	Centralized Point Source	5.51	5.69	5.76	5.70	5.59
	Septic	1.90	2.00	1.96	1.85	1.72
	Total	**7.41**	**7.69**	**7.71**	**7.55**	**7.31**

[3]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”



Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Towns	GW Agricultural	0.08	0.08	0.08	0.08	0.08
	GW Municipal Public Supply	0.19	0.20	0.23	0.27	0.32
	GW Municipal Self-Supply	0.14	0.15	0.17	0.20	0.24
	Groundwater Total	0.41	0.44	0.48	0.55	0.64
	SW Municipal Public Supply	1.27	1.39	1.56	1.83	2.21
	Surface Water Total	1.27	1.39	1.56	1.83	2.21
	Total	**1.67**	**1.82**	**2.04**	**2.38**	**2.86**

2020 Per Capita Water Demand Applied (gpcd)[1]: 139

[1]Weighted average per capita calculated using water withdrawals from large and small systems and population served data provided by EPD. Per capita demand for forecast years after 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Towns	Centralized Point Source	0.38	0.42	0.48	0.57	0.70
	Septic	0.65	0.73	0.83	0.99	1.21
	Total	**1.03**	**1.15**	**1.31**	**1.56**	**1.91**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Union	GW Agricultural	0.25	0.25	0.25	0.25	0.25
	GW Municipal Public Supply	0.46	0.54	0.56	0.59	0.65
	GW Municipal Self-Supply	0.03	0.03	0.03	0.03	0.04
	Groundwater Total	0.74	0.83	0.85	0.88	0.94
	SW Agricultural	0.06	0.06	0.06	0.06	0.06
	SW Municipal Public Supply	1.48	1.73	1.81	1.89	2.07
	Surface Water Total	1.54	1.79	1.87	1.94	2.13
	Total	**2.28**	**2.62**	**2.72**	**2.82**	**3.07**

2020 Per Capita Water Demand Applied (gpcd)[1]: 76

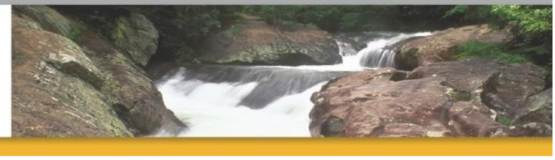
[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Union	Centralized Point Source	0.36	0.43	0.46	0.49	0.55
	Septic	1.36	1.62	1.73	1.85	2.08
	Total	**1.72**	**2.05**	**2.19**	**2.34**	**2.63**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”



Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Walker	GW Agricultural	0.64	0.64	0.64	0.64	0.64
	GW Municipal Public Supply	5.80	5.78	5.72	5.62	5.59
	GW Municipal Self-Supply	0.50	0.49	0.48	0.46	0.45
	Groundwater Total	6.93	6.91	6.84	6.72	6.68
	SW Municipal Public Supply	1.28	1.28	1.26	1.24	1.23
	SW Industrial	0.60	0.60	0.60	0.60	0.60
	Surface Water Total	1.88	1.88	1.86	1.84	1.83
	Total	**8.81**	**8.79**	**8.70**	**8.56**	**8.51**

2020 Per Capita Water Demand Applied (gpcd)[1]: 112

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
Walker	Centralized Point Source	4.15	4.24	4.30	4.33	4.42
	Septic	3.39	3.46	3.51	3.54	3.61
	Total	**7.54**	**7.70**	**7.81**	**7.87**	**8.03**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
White	GW Agricultural	0.38	0.38	0.38	0.38	0.38
	GW Municipal Public Supply	0.94	1.13	1.25	1.38	1.54
	GW Municipal Self-Supply	1.18	1.41	1.55	1.69	1.87
	Groundwater Total	2.50	2.92	3.18	3.45	3.78
	SW Municipal Public Supply	1.10	1.33	1.47	1.62	1.81
	Surface Water Total	1.10	1.33	1.47	1.62	1.81
	Total	**3.60**	**4.25**	**4.65**	**5.06**	**5.59**

2020 Per Capita Water Demand Applied (gpcd)[1]: 126

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[2]

County	Discharge Type	2020	2030	2040	2050	2060
White	Centralized Point Source	0.54	0.66	0.74	0.82	0.93
	Septic	1.66	2.03	2.28	2.54	2.88
	Land Application	0.03	0.03	0.04	0.04	0.05
	Total	**2.22**	**2.72**	**3.05**	**3.41**	**3.86**

[2]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”

Forecasts

The tables summarize the total county forecasts. Water withdrawals are separated by sector and source type: groundwater (GW) or surface water (SW). Industrial facilities that receive water from municipal sources are included in the municipal public supply forecasts. Sectors without water demands within the county are excluded.

Summary of Total County Water Demand by Source Type (AAD-MGD)

County	Sector	2020	2030	2040	2050	2060
Whitfield	GW Agricultural	0.38	0.38	0.38	0.38	0.38
	GW Municipal Self-Supply	0.37	0.37	0.37	0.36	0.35
	Groundwater Total	0.75	0.75	0.75	0.74	0.73
	SW Municipal Public Supply	26.69	27.30	27.70	27.69	27.50
	SW Industrial	3.20	3.20	3.20	3.20	3.20
	Surface Water Total	29.89	30.50	30.90	30.89	30.70
	Total	**30.64**	**31.25**	**31.65**	**31.63**	**31.42**

2020 Per Capita Water Demand Applied (gpcd)[1,2,3]: 228

[1]Weighted average per capita calculated using the available 2015-2018 Water Loss Audits. Per capita demand for forecast years beyond 2020 is reduced over time to reflect conservation.

[2]Adjusted to reflect municipally-supplied industrial demand.

[3]This per capita value is outside the typical range and more information is being sought from the water systems in Whitfield County.

Summary of Total County Wastewater Flow Forecasts by Discharge Type (AAF-MGD)[4]

County	Discharge Type	2020	2030	2040	2050	2060
Whitfield	Centralized Point Source	0.31	0.32	0.32	0.32	0.32
	Septic	3.72	3.86	3.96	4.00	4.02
	Land Application	10.88	11.18	11.42	11.51	11.54
	Total	**14.91**	**15.35**	**15.70**	**15.84**	**15.88**

[4]County wastewater flow forecasts represent total flows generated by the municipal, industrial, and energy sectors.

*For more information, refer to the “2023 Water and Wastewater Forecasting Technical Memorandum.”