Georgia Water Supply Redundancy Study
Upper Oconee Water Planning Region
Georgia Environmental Finance Authority (GEFA)

Prepared for:

Georgia Environmental Finance Authority

Georgia Water Supply Redundancy Study

REVISION NO. 0

April 14, 2022

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Acronyms

ADD	Average Daily Demand
ASR	Aquifer Storage and Recovery
EPD	Environmental Protection Division
DIP	Ductile Iron Pipe
FERC	Federal Energy Regulatory Commission
GEFA	Georgia Environmental Finance Authority
GSWCC	Georgia Soil and Water Conservation Commission
MGD	Million Gallon(s) Per Day
MNGWPD	Metropolitan North Georgia Water Planning District
QWS	Qualified Water System(s)
RWP	Regional Water Plan
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
Wood	Wood Environment and Infrastructure Solutions, Inc.
WSIRRA	Water System Interconnection, Redundancy, and Reliability Act
WTP	Water Treatment Plant

1.0 Introduction

In May 2010, the Water System Interconnection, Redundancy, and Reliability Act (WSIRRA) was signed into law (Senate Bill 380). A main goal of the Act was to identify and increase interconnections and redundancies for the Metropolitan North Georgia Water Planning District (MNGWPD). With this Act, Georgia affirmed the importance of comprehensive water emergency planning and the value of effectively sharing our current water resources through well-considered redundancy and interconnection planning. While the Act did not apply to water planning regions outside of the MNGWPD, its concepts and framework are useful for emergency planning throughout Georgia.

The Georgia Environmental Finance Authority (GEFA), through the services of Wood Environment and Infrastructure Solutions, Inc. (Wood), conducted a study identifying opportunities for water supply redundancy for qualified water systems (QWS) located outside the MNGWPD. For the purposes of this report, a QWS is a public water system owned and operated by a city, county, or water authority that serves a total population (retail plus consecutive populations served) greater than 3,300 people. Some systems serving just below the population threshold of 3,300 are included as well. This report details the Upper Oconee Water Planning Region, which consists of 13 counties in central Georgia, as shown in Figure 1-1. GEFA identified 23 QWS within the Upper Oconee Planning Region, as shown in Figure 1-2.

1.1 Purpose

The purpose of the Water Supply Redundancy Study is to increase Georgia's water supply solvency and reliability. This study evaluates drinking water supply, demand, treatment, storage, distribution, and interconnectivity to identify redundant water supply sources capable of providing backup water supply for each QWS.

Emergency scenarios were evaluated consistent with similar emergency supply planning projects in the state, such as the GEFA Water System Interconnection, Redundancy and Reliability Act Emergency Supply Plan (CH2MHill, Jacobs, Lowe Engineers, 2011) for the MNGWPD. These emergency scenarios include:

- Failure of largest treatment facility within a planning region
- Short-term catastrophic failure of distribution system
- Short-term contamination of a raw water source
- Failure of an existing dam of a raw water source
- Water supply reduction due to drought

Potential interconnection and redundancy projects were identified and prioritized. Each planning-level potential project includes the steps required to modify a QWS's operation and infrastructure to share water with adjacent water providers. Wood developed a decision-based prioritization tool that summarizes the specific system deficiencies (in volumetric demand) for emergency situations and quantifies emergency supply goals. The prioritization tool highlights available emergency water supply and deficits under existing and future conditions. Potential projects were prioritized and recommended based on performance using weighted quantitative and qualitative criteria.

1.2 Study Approach

An overview of each step of the study approach is outlined below.

1.2.1 QWS Data Collection

A detailed questionnaire and data request list were developed to collect data from each QWS. The questionnaire included: general system data, water demand and usage, infrastructure and supply, and other planning information. QWS were contacted to conduct a follow-up interview. The results of the survey and interview were tabulated and reviewed. Study participation was optional. Some QWS opted not to participate or to partially participate. If data were unavailable or incomplete, professional reasoning was used to recommend a technically-sound approach for dealing with missing or incomplete data, including use of publicly available data.

1.2.2 Redundant Water Supply Sources

The collected survey data and additional information gathered from other sources, such as the Georgia Environmental Protection Division (EPD), regional water plans (RWPs), and the *GEFA Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs* (MACTEC, 2008) report served as the foundation to evaluate sources of water supply capable of providing redundant supply for each QWS. Such water sources include raw and potable water sources, interconnections between systems, and excess capacity of current allocations. These identified water supply sources were pre-screened for their potential to serve regional or multi-jurisdictional water needs. Where sufficient information was available, quantitative screening criteria were used to compare sites and, where quantitative information was not readily available, qualitative evaluation and professional reasoning were used for the initial screening. These locations and other nearby stream networks were examined at a planning-level scale, taking into consideration issues such as current and future hydrographs, low-flow conditions, stream capacity, downstream non-depletable flow requirements, water quality, pumping and transmission requirements, permitting requirements, treatment requirements, and cost.

1.2.3 Emergency Planning Benchmarks

The QWS average daily demand (ADD) obtained from the data collection process was used to quantify tiered emergency supply goals within each system. This method highlights where full supply of demand may not be available during some emergency scenarios although reduced critical needs can be met by another system. For consistency with the MNGWPD study, the following reliability targets were used:

- 100% ADD
- 65% ADD
- 35% ADD

It is assumed that the 35% and 65% reliability targets correspond to estimated usage associated with essential water needs. GEFA has identified customers with essential water needs as: hospitals, nursing home/assisted living facilities, correctional facilities, critical industry, and schools.

1.2.4 Water Supply Risk Evaluations

To carry out the preliminary screening, specific system deficiencies (in volumetric demand) of the emergency scenarios and supply goals within the focus area were calculated. The purpose of this is to highlight available emergency supply and deficits under existing and future conditions. The reliability targets were applied to each QWS under specified emergency situations to evaluate the capability of a QWS to supply sufficient water during that emergency. Deficiencies (in volumetric demand) from emergency situations were quantified for each QWS. In addition, the maximum deficit (Critical Scenario Deficit) was determined for each QWS.

1.2.5 Evaluation of Potential Projects

Potential redundancy projects were conceptualized for each QWS. These projects may include: infrastructure redundancy, new interconnections, and upgrades to existing interconnections. Planning-level costs were estimated for potential redundancy projects based on RSMeans (a construction cost estimating software), manufacturer prices, or the EPD *Supplemental Guidance for Planning Contractors: Water Management Practice Cost Comparison*. The EPD guidance document was developed to provide a state-wide reference tool for planning contractors to encourage consistency in relative cost estimates throughout the state and to support regional water planning council decision making (EPD, 2011).

1.2.6 Recommended Projects

Using a decision-based prioritization tool, absolute and weighted scores were calculated for each option. The options were then ranked using defined criteria (e.g., cost, environmental impacts). A sensitivity assessment was undertaken to test the influence of the category weightings on the rank outcome. Potential projects were then prioritized based on performance under these weighted quantitative and qualitative criteria.

2.0 QWS Data Collection

Detailed information about each QWS was obtained via a survey-based questionnaire, follow-up interviews, publicly available documents, information supplied by EPD, and data provided by the QWS.

2.1 Data Request

Each QWS was sent a standardized questionnaire approved by GEFA. The general categories are listed as follows:

- General system data (e.g., facility type, ownership type, and population served)
- Customer information (e.g., number of customers and critical facilities served)
- Water source information (e.g., source type and capacity, purchased water information, and water sales information)
- Permit conditions and limitations
- System infrastructure data (e.g., storage, treatment, and distribution system data)
- System interconnection data
- Future water supply planning considerations

Each QWS was also sent a data request list approved by GEFA, as follows:

- Master Plan
- Capital Improvement Plan
- Water Withdrawal Permits (both groundwater and surface water withdrawal)
- Public Water System Operating Permit(s)
- Surface Water and Groundwater Withdrawal Values (2015 through 2019)
- Sanitary Surveys (2015 through 2019)
- Water Sale Documents
- Emergency Planning Documents
- Mapping Information

2.2 Current and Future Conditions

For this study, 23 QWS in the Upper Oconee Water Planning Region were surveyed. Government, health care, services, manufacturing, retail, and construction are the primary economic sectors in the Upper Oconee Region. Land cover in the region is composed of approximately 55% forest, 19% row crops/pasture, 9% wetland, 8% urban, 2% open water, and 6% other (Upper Oconee Water Planning Council, 2017).

2.2.1 General System Information

Table 2-1 shows key general information about the 23 QWS. The QWS in this region serve primarily municipal customers, and to a lesser extent, industrial customers. Water for agricultural purposes is almost exclusively obtained from private sources, such as private wells. The Greensboro QWS serves the smallest total population and has one surface water source while the Upper Oconee Basin Water Authority QWS serves the largest total population and has 2 surface water sources.

Findings from data collection include the following general information about the Upper Oconee Region:

- 3 QWS use groundwater-only drinking water sources.

- 12 QWS use surface water-only drinking water sources.
- 1 QWS (Dublin) uses both surface water and groundwater as their drinking water source.
- 1 QWS (Statham) uses both surface water and a spring as their drinking water source.
- 6 QWS are purchase-only systems that do not have raw water sources.
- Distribution systems range from approximately 9 years old to more than 100 years old, with 8 systems more than 70 years old. Three QWS are of an unknown system age.
- The largest system customers are typically industries, educational facilities, correctional facilities, or critical care facilities (e.g., hospitals).
- 14 QWS reported regular water sales.
- 11 QWS regularly purchased water in 2015.
- 15 QWS have at least one backup power source/facility.
- Four systems reported current distribution system flow surplus capabilities.
- Three systems, Baldwin County, Eatonton-Putnam County, and Oconee County-Watkinsville are interconnected with a private water provider, Piedmont Water.
- The following system interconnections, including emergency interconnections, were reported:
    - Athens-Clarke County is interconnected with Oconee County-Watkinsville and Upper Oconee Basin Water Authority.
    - Baldwin County is interconnected with Milledgeville, Jones County, and Sinclair Water Authority.
    - Barrow County is interconnected with Upper Oconee Basin Water Authority, Auburn, Jackson County, Oconee County-Watkinsville, Gwinnett County, Statham, Winder, and Braselton.
    - Braselton is interconnected with Gwinnett County, Jackson County, Barrow County, and Hoschton.
    - Commerce is interconnected with Banks County-Mountain Creek, Jackson County, and Madison County.
    - Eatonton-Putnam County is interconnected with Sinclair Water Authority.
    - Jackson County is interconnected with Braselton, Hoschton, Jefferson, Barrow County, Commerce, and Upper Oconee Basin Water Authority.
    - Jefferson is interconnected with Jackson County.
    - Loganville is interconnected with Gwinnett County, Walton County, and Monroe.
    - Madison is interconnected with Bostwick, Rutledge, and Buckhead.
    - Milledgeville is interconnected with Baldwin County.
    - Monroe is interconnected with Walton County and Loganville.
    - Oconee County-Watkinsville is interconnected with Upper Oconee Basin Water Authority, Barrow County, Walton County, and Athens-Clarke County.
    - Sandersville is interconnected with Tennille.
    - Sinclair Water Authority is interconnected with Baldwin County and Eatonton-Putnam County.
    - Social Circle is interconnected with Walton County.
    - Sparta is interconnected with Hancock County.
    - Statham is interconnected with Barrow County and Winder.
    - Upper Oconee Basin Water Authority is interconnected with Barrow County, Jackson County, Oconee County-Watkinsville, and Athens-Clarke County.

- Walton County is interconnected with Newton County, Oconee County-Watkinsville, Gwinnett County, Monroe, Loganville, Social Circle, and Jersey.
- Winder is interconnected with Auburn, Barrow County, Statham, Walton County, and Hoschton.

Overall, data collected show that the QWS have a combined average treatment capacity of over 48 million gallons per day (MGD) and a combined peak operational capacity of over 78 MGD. The 23 QWS serve a total estimated direct population of approximately 415,400 people and a total estimated consecutive population of 134,500. For this report, a consecutive population is defined as the population benefited from a system's regular water sales to another water system. Note that combining the direct and consecutive population values may result in certain users being counted twice. For example, Barrow County regularly sells water to Braselton.

2.2.2 Mapping Data

Mapping data were requested of the QWS. Specifically, information was requested related to drinking water infrastructure, such as: pumping and treatment facilities, storage tanks (ground and elevated), pipelines, booster pumps, distribution systems, hydrants, elevation values, etc. Digital mapping data (specifically GIS format) were preferred. However, hydraulic computer models and hard copy/PDF maps were also accepted. If hard copy/PDF maps were manually digitized, priority was given to digitizing water lines on the edges of the QWS distribution system because identifying potential interconnection opportunities was a main objective.

Table 2-2 shows mapping data received from the 23 QWS. Six systems provided GIS data. Two systems provided CAD data. One system provided a hydraulic computer model. Hard copy/PDF maps were obtained from eight QWS. Hard copy maps were georeferenced and digitized based on known landmarks.

2.2.3 Reports and Documents

Several reports and documents were requested from each QWS, as detailed in Section 2.1.

Table 2-3 shows the reports and other documents received from the 23 QWS. The 23 QWS had documents available, with comprehensive plans, water loss audits, permits, and sanitary surveys being the most frequently provided documents. EPD supplied recent sanitary surveys and 2015 and 2019 water audits for many systems. The Georgia Department of Community Affairs website contained comprehensive plans for many QWS. Based on review of comprehensive plans and survey responses, future (post-2019) planned water infrastructure improvements include:

- A new supply well for Madison
- New storage tanks for Athens-Clarke County, Barrow County, Commerce, Dublin, Eatonton-Putnam County, Jefferson, Oconee County-Watkinsville, and Winder
- New generators for Athens-Clarke County, Jefferson, Madison, Sinclair Water Authority, and Social Circle
- Water line repair/replacement projects for Commerce, Loganville Athens-Clarke County, Baldwin County, Braselton, Dublin, and Sparta
- Expanded distribution systems for Athens-Clarke County, Baldwin County, Commerce, Dublin, Eatonton-Putnam County, and Greensboro
- General maintenance for Braselton, Eatonton-Putnam County, Jefferson, Social Circle, and Sparta

- Increased treatment capacity for Athens-Clarke County, Jefferson, Loganville, Madison, and Upper Oconee Basin Water Authority
- Water treatment plant rehabilitation and general pump updates for Athens-Clarke County, Dublin, Jefferson, and Loganville

3.0 Redundant Water Supply Sources

Water supply sources were evaluated for their potential ability to provide surplus water to a neighboring water system during an emergency. Such water sources include excess capacity of current permitted allocations, new water sources, and interconnections between systems. Factors potentially affecting source availability were also noted.

3.1 Excess Capacity from Existing Water Sources

Existing water source excess capacity was evaluated for availability during short-term, defined durations, which are often less than three days but no more than 120 days. Long-term, undefined durations, as detailed further in Section 5, do not apply to this region because this region does not obtain its raw water from the Allatoona Lake/Etowah River or Lake Lanier/Chattahoochee River systems. Therefore, existing water sources were only assessed for the 2015 and 2050 short-term, defined duration scenarios.

Table 3-1 presents the 2015 and 2050 peak day design capacity, ADD, and resultant excess capacity for each QWS, as well as current permitted peak withdrawal capacity. The ADD values exclude purchased water to portray the true net regional water need. Purchase-only QWS have no reported values because their demand is accounted for in the demand allocation of their supplier(s). Appendix A describes the peak day design capacity and ADD calculations.

Excess capacity for a groundwater QWS short-term, defined emergency scenario was calculated by subtracting the ADD (water withdrawal only, not including purchased water) from the peak day design capacity. For surface water QWS, the smaller of the peak day design capacity value and the peak permitted withdrawal value (24-hour maximum) was used for the excess capacity calculation. For this region, surface water withdrawal permit limits affect the excess capacity calculation for Athens-Clarke County, Madison (2050 excess capacity only), Milledgeville, and Sinclair Water Authority. The excess capacity evaluation has a few key assumptions. It relies on readily available interconnections with the appropriate capacities. It also assumes that a QWS can increase to above-average production to supply water to another QWS experiencing an emergency. This assumption may not be appropriate if local needs of the supplying QWS are above average during the same emergency, resulting in less available excess capacity. In addition, because QWS data for this water planning region were collected in 2021, the self-reported 2015 peak day design capacity may reflect capital improvements that a QWS implemented between 2015 and the time the QWS was surveyed for this current analysis.

As Table 3-1 shows, there is sufficient excess capacity from existing sources for short-term, defined emergency durations for 2015 for 17 of the 17 non-purchase-only QWS. As noted above, purchase-only QWS are reported in Table 3-1 and Table A-4 as “not applicable.” For 2015 demands, excess capacity is at least two times a given QWS’s 2015 ADD for five of the 17 QWS: Braselton, Milledgeville, Monroe, Oconee County-Watkinsville, and Statham. The 2015 excess capacity values range from 0.5 MGD (Oconee County-Watkinsville) to 22.6 MGD (Athens-Clarke County).

For 2050 demands, there is sufficient excess capacity for 13 of the 17 non-purchase-only QWS. Braselton has a deficit of 0.4 MGD, Oconee County-Watkinsville has a deficit of 3.7 MGD, Statham has a deficit of 0.2 MGD, and Winder has a deficit of 7.0 MGD. While it may be likely that these QWS would increase their peak day design capacity before the predicted ADD surpasses it, the potential lack of excess capacity highlights the need for increased capacity by 2050. Excess capacity is at least two times a given QWS’s 2050 ADD for four of the 17 QWS: Greensboro, Milledgeville, Sandersville, and Sparta. The 2050 excess

capacity values range from -7.0 MGD (Winder) to 11.4 MGD (Upper Oconee Basin Water Authority). The QWS' capacities were scaled to allow for a comparison of excess capacities. Appendix A describes and shows the excess capacity index calculations and values. Excluding the 2050 negative excess capacities, Winder's 2015 and Jefferson's 2050 scaled excess capacity sufficiency is the lowest relative to other Upper Oconee QWS.

3.2 Potential Water Sources and Storage Options

Potential additional water supply sources include groundwater, surface water, and surface water impoundments (e.g., dammed reservoirs). The Upper Oconee Water Planning Region is divided by the Georgia fall line (Figure 1-2), which separates the Piedmont geologic region from the Coastal Plain geologic region. The Piedmont geologic region is characterized by igneous and metamorphic rocks with clayey soils, while the Coastal Plain geologic region is characterized by sedimentary rocks with sandy soils.

3.2.1 Groundwater

Groundwater sources accounted for 6% of the region's 2010 water supply, whereas surface water sources accounted for 94% of the region's 2010 water supply. The 2010 groundwater withdrawal by category is as follows: 45% industrial, 28% agriculture, 14% domestic/self-supply, and 13% municipal (Upper Oconee Water Planning Council, 2017). Aquifer systems in the Upper Oconee Region include crystalline rock aquifers in the Piedmont geologic region and the Cretaceous, Gordon, and Floridan aquifers in the Coastal Plain geologic region. Figure 3-1 shows relevant aquifers in the Upper Oconee Region.

The RWP included a groundwater resource assessment of the Cretaceous, Floridan, and crystalline rock aquifers. Aquifer sustainable yield for the purposes of the resource assessment was defined as the amount of groundwater that can be withdrawn without reaching specific thresholds that indicate the potential for local or regional impacts. Impacts included localized aquifer drawdown, reduced stream baseflow, and long-term aquifer drawdown. Estimated sustainable yield for each aquifer was reported as a range, which reflects several computer model simulations with different assumptions. According to the RWP, total regional 2015 and estimated 2050 withdrawals from the Cretaceous, Floridan, and crystalline rock aquifers are below their estimated sustainable yields (Upper Oconee Water Planning Council, 2017). The RWP noted that local gaps may occur if withdrawal rates exceed sustainable yield.

Municipal groundwater withdrawals are from the Cretaceous, Floridan, and crystalline rock aquifers (CDM Smith, 2017). Most of the regional groundwater demand is driven by industrial and agriculture withdrawals from the Cretaceous and crystalline rock aquifers (CDM Smith, 2017). Municipal water demand projections increase from 2015 to 2050 by approximately 23.5 MGD. Additional municipal supply wells, other than replacement wells, may be needed in the Upper Oconee Region.

3.2.2 Surface Water

The 2010 surface water withdrawal by category is as follows: 92% energy, 4% municipal, 2% agriculture, and 2% industrial (Upper Oconee Water Planning Council, 2017). The Upper Oconee Region contains portions of the following major river basins: Oconee River Basin in the northern, central, and southern part of the region; Ogeechee River Basin in the far eastern part of the region; Altamaha River Basin in the southeastern part of the region; Ocmulgee River Basin in the far southwestern and far northwestern part of the region; and Savannah River Basin in the far northeastern part of the region. Figure 3-2 shows relevant river basins in the Upper Oconee Region. The Oconee River is the major river within the region. Lake Oconee and Lake Sinclair are major reservoirs in the Oconee River Basin within the region. Lake

Oconee and Lake Sinclair are owned by Georgia Power, which uses the reservoirs for hydropower generation and other utility uses (Upper Oconee Water Planning Council, 2017).

Surface water availability resource assessment models were conducted by EPD to evaluate consumptive demand and dry conditions on stream flows and lake storage. Potential gaps in terms of magnitude and duration were identified when a model fell below a threshold. Model results for 2015 and 2050 in the Oconee River Basin indicated that no potential gaps exist at the Penfield, Milledgeville, and Mount Vernon nodes. For context, the Penfield node is along the Oconee River at the Oconee County and Greene County line. The Milledgeville node is near Milledgeville, an Upper Oconee QWS, and the Mount Vernon node is near Mount Vernon in the Altamaha Water Planning Region. Four additional planning nodes are outside of the Upper Oconee Region but have upstream watershed areas within the region: Augusta node (Savannah River Basin), Jackson node (Ocmulgee River Basin), Lumber City node (Ocmulgee River Basin), and Eden (Ogeechee River Basin). Of these three planning nodes, model results for 2015 and 2050 indicated that only the Eden node had potential gaps. The RWP noted that local gaps may occur if withdrawal rates exceed sustainable yield. The Council identified conservation management and supply management practices to avoid future potential gaps. For example, Management Practices WC-1 through WC-10 and WS-1 through WS-7. The council also noted that in Lake Oconee and Lake Sinclair, future use of storage capacity for water supply would need to be approved by Georgia Power, EPD, and the Federal Energy Regulatory Commission (FERC).

Municipal surface water withdrawals are primarily from the Oconee River Basin, with smaller volumes from the Ocmulgee and Savannah River Basins (CDM Smith, 2017). Most of the regional surface water demand is driven by the energy sector, with significantly less demand from the industrial and municipal sectors. As municipal water demand projections increase from 2015 to 2050 by approximately 23.5 MGD, increased withdrawal from existing reservoirs and/or additional municipal supply reservoirs may be needed in the Upper Oconee Region.

3.2.3 New Reservoirs

Of all the potential water source and storage options, new reservoirs are the most environmentally sensitive, costly, and time-consuming (MACTEC, 2008). Specific new reservoirs were not identified by the Upper Oconee Water Planning Council, but the council noted the need to evaluate existing reservoir storage for potential expansion (Management Practice WS-1) as well as potentially construct new reservoirs (Management Practice WS-2) (Upper Oconee Water Planning Council, 2017).

In 2004, Jefferson filed a U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 Permit Application for the creation of Parks Creek Reservoir, which was approved in 2014 (USACE, 2016). Jefferson and Jackson County (QWS) are collaborating to advance the reservoir's construction. In Jefferson's 2019 comprehensive plan, the capital improvement program lists land acquisition, dam design, permitting, and construction steps from 2020 through 2025.

Figure 3-3 displays the potential water storage options identified in Section 3.2.3 through Section 3.2.6.

3.2.4 Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs

In the 2008 report *GEFA Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs*, MACTEC Engineering and Consulting, Inc., now Wood, and other consultants inventoried and surveyed drinking water supply reservoirs in Georgia (MACTEC, 2008). The effort focused on the potential to expand existing reservoirs via increasing dam heights and supplemental pumping from nearby streams. The report focused on the 78 counties above the Georgia fall line. Jackson, Barrow, Clarke, Walton, Oconee,

Morgan, Greene, and Putnam Counties are above the fall line, and parts of Baldwin and Hancock Counties are above the fall line, while Wilkinson, Washington, and Laurens Counties are below the fall line. Existing reservoirs were screened for expansion potential and 16 reservoirs were identified in the 2008 report for potential expansion. Three reservoirs within the Upper Oconee Region were identified as possible candidates.

The Yargo Lake Reservoir is located in Barrow County. The report estimated that the Yargo Lake Reservoir storage could increase by approximately 2.98 billion gallons by raising the pool elevation 20 feet. The reported noted that there were insufficient data to estimate the existing and final reservoir volumes. This reservoir is permitted as a municipal water supply source to Winder, a QWS in Barrow County. Winder uses this reservoir as an emergency water source. Given Winder's increased estimated future ADD and decreased estimated excess capacity (Table 3-1), increasing this reservoir's capacity is a possibility.

The Sandy Creek Reservoir is located in Clarke County. The report estimated that the Sandy Creek Reservoir could increase from 1.9 to 3.93 billion gallons of storage by raising the pool elevation 10 feet. This reservoir is not used by the Athens-Clarke County QWS as a water supply reservoir, although their distribution system is in the vicinity of it. Given Athens-Clarke County's increased estimated future ADD and decreased estimated excess capacity (Table 3-1), increasing this reservoir's capacity is a possibility.

The John T. Briscoe Reservoir is located in Walton County. The report estimated that the John T. Briscoe Reservoir could increase from 0.99 to 4.18 billion gallons of storage by raising the pool elevation 30 feet. This reservoir is permitted as a municipal water supply source to Monroe, a QWS in Walton County. Given Monroe's increased estimated future ADD and decreased estimated excess capacity (Table 3-1), increasing this reservoir's capacity is a possibility.

Figure 3-3 displays the potential water storage options identified in Section 3.2.3 through Section 3.2.6.

3.2.5 Georgia Soil and Water Conservation Commission Flood Control Dams

In the 2007 report *Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report* the Georgia Soil and Water Conservation Commission (GSWCC), Natural Resources Conservation Service, EPD, and consultants assessed existing watershed flood control dams that could be potentially modified to serve as water supply reservoirs (GSWCC, 2007). After 357 watershed dams were assessed, 166 were prioritized for further evaluation based on environmental impacts, infrastructure impacts, and potential water supply yield. Twenty watershed dams were initially selected for more detailed studies. Eight additional watershed dams were evaluated in areas where "demand would exceed supply in the near future" (GSWCC, 2009).

The Upper Oconee Region has 31 watershed dams: 13 in Jackson County, 6 in Barrow County, 3 in Clarke County, 1 in Oconee County, 3 in Greene County, and 5 in Putnam County. Of the region's watershed dams, 16 were part of the 166 prioritized watershed dams: Grove River 33, Middle Oconee-Walnut Creek 06, Middle Oconee-Walnut Creek 12, Middle Oconee-Walnut Creek 18, Sandy Creek 08, Sandy Creek 15, Sandy Creek 23, Barber Creek 06, Barber Creek 26, Marbury Creek 22, South Fork Little River 26, South Fork Little River 31, Rooty Creek 05, Rooty Creek 20, Rooty Creek 21, and Rooty Creek 27.

One watershed dam, Middle Oconee-Walnut Creek 06 in Jackson County, was identified in the 2007 report as part of the 20 high-potential water supply reservoirs. Two additional watershed dams were identified in the 2009 report as part of the 28 high-potential water supply reservoirs: Sandy Creek 08 in Jackson County and Barber Creek 06 in Barrow County. The GSWCC issued individual reports for each of

the 28 high-potential water supply reservoirs, and the three within the Upper Oconee Region are detailed below:

- Middle Oconee-Walnut Creek 06. Construction of a larger dam to raise the pool level would increase the impoundment's surface area to approximately 299 acres and the safe yield to approximately 3 MGD (Schnabel, 2007).
- Sandy Creek 08. Construction of a larger dam to raise the pool level would increase the impoundment's surface area to approximately 165 acres and the safe yield to approximately 1.3 MGD (Schnabel, 2009a).
- Barber Creek 06. Construction of a larger dam to raise the pool level would increase the impoundment's surface area to approximately 510 acres and the safe yield to approximately 4.9 MGD (Schnabel, 2009b).

Given that Jackson County (QWS) is a purchase-only QWS and other QWS in Jackson County have alternative water supply sources, the Middle Oconee-Walnut Creek 06 and Sandy Creek 08 watershed dams are not likely water supply reservoirs. Barber Creek 06 is between Winder and Statham. Given these QWS' increased estimated future ADDs and decreased estimated excess capacities (Table 3-1), Barber Creek 06 is a potential water supply reservoir.

Figure 3-3 displays the potential water storage options identified in Section 3.2.3 through Section 3.2.6.

3.2.6 Quarries

Abandoned rock quarries may serve as potential water storage reservoirs, particularly during emergency or drought scenarios. Quarry wall stability, rock permeability, and geographic proximity are important considerations for site selection. Because the Upper Oconee Water Planning Region is divided by the fall line, both the Piedmont and Coastal Plain geologic regions are present. Piedmont geologic region bedrock and soils are generally igneous or metamorphic in origin and impermeable (unless fractured). Coastal Plain geologic region bedrock and soils are generally sedimentary in origin and permeable. Therefore, hard-rock (igneous or metamorphic) and mineral quarries are present in the Piedmont geologic region, while sand and gravel quarries are present in the Coastal Plain geologic region.

A GIS investigation was performed to assess the availability of quarries as potential reservoirs. A 5-mile radius was drawn around QWS municipal boundaries. The water treatment plant (WTP) locations were used as the radius origin for County Authority QWS and Regional Authority QWS. Aerial imagery was visually inspected to identify quarries. In addition, publicly available online quarry inventories were checked.

In the Upper Oconee Region, several potential quarries were identified. USGS GIS data from *The State Geologic Map Compilation (SGMC) Geodatabase of the Conterminous United States* was used to identify quarry bedrock (Horton et al., 2017). In Jackson County, a seemingly active Vulcan Materials Company quarry exists approximately 5.5 miles northwest of downtown Jefferson and a seemingly active Martin Marietta quarry exists approximately 5 miles west-northwest of downtown Jefferson. The quarries' bedrock is undifferentiated granitic gneiss (Horton et al., 2017). Jackson County's (QWS) and Jefferson's distribution systems are in the vicinity of the quarries. In Barrow County, a seemingly active Martin Marietta quarry exists approximately 1.4 miles north of downtown Auburn and approximately 7.6 miles west of downtown Winder. The quarry's bedrock is amphibolite and granite gneiss / amphibolite (Horton et al., 2017). Barrow County's (QWS) distribution system may be in the vicinity of the quarry. In Clarke

County, a seemingly active quarry exists approximately 2 miles east of downtown Athens. The quarry's bedrock is biotite gneiss / feldspathic biotite gneiss (Horton et al., 2017). Athens-Clarke County's distribution system is in the vicinity of the quarry. In Hancock County, a seemingly active quarry exists approximately 2.6 miles east-northeast of downtown Sparta and a seemingly active quarry exists approximately 4.9 miles east-southeast of downtown Sparta. The quarries' bedrock is undifferentiated granite (Horton et al., 2017). Sparta's distribution system is in the vicinity of the quarry. Therefore, these quarries could serve as potential future water storage reservoirs.

Consideration should be given to the technical issues important for development and operation of a quarry that could serve as a water supply reservoir, including the potential for water seepage from the reservoir through the jointed and fractured rock mass and the stability of the rock quarry slopes, environmental permitting requirements, and water quality considerations.

Figure 3-3 displays the potential water storage options identified in Section 3.2.3 through Section 3.2.6.

3.2.7 Aquifer Storage and Recovery

Aquifer Storage and Recovery (ASR) involves injecting treated water into an aquifer and later recovering the stored water for beneficial reuse, such as for drinking water supply. ASR offers a redundant water supply that can be accessed if aquifer storage is sufficient. EPD oversees the permitting and regulation of ASR projects, and to-date, EPD has not received ASR applications nor is aware of ASR projects in Georgia (EPD, 2021a). Therefore, each QWS should individually consider the feasibility of ASR.

3.3 Return Flow Reuse

There are two types of potable water reuse. Indirect potable reuse uses an environmental buffer, such as a lake, river, or a groundwater aquifer, before the water is treated at a drinking water treatment plant (EPD, 2021b). The *Indirect Potable Reuse Guidance Document* dated March 2021 describes the decision framework EPD uses to evaluate potential indirect potable reuse projects. Direct potable reuse involves the treatment and distribution of water without an environmental buffer. Potable water reuse provides another option for expanding a region's water resource portfolio.

Drinking water treatment and wastewater treatment typically occur in the same or nearby locations. When implementing direct potable reuse, the proximity of both wastewater and drinking water treatment may present considerable cost saving opportunities for municipalities. Some direct potable reuse systems may require additional water quality or process performance monitoring and/or an engineered storage buffer. In addition, because direct potable reuse has not been widely implemented, there is a lack of consensus in the scientific community about its safety. Therefore, each QWS should individually consider the feasibility of direct potable reuse.

The Upper Oconee RWP lists two management practices in regards to return flow reuse: 1) WC-5: encourage non-potable reuse; and 2) WS-5: encourage indirect potable reuse (Upper Oconee Water Planning Council, 2017).

3.4 Current Interconnections Between Systems

Several QWS interconnections exist in the Upper Oconee Region. Twenty-one of 23 QWS indicated at least one interconnection with another public water system. Some of these interconnections are for regular water sales or purchases, while others are for emergencies and remain normally closed. If a QWS

has excess capacity, as explained in Section 3.1, the QWS may be able to supply water to another QWS experiencing an emergency.

Figure 3-4 displays the available mapping data for the water region. As Figure 3-4 shows, multiple QWS are currently interconnected with another QWS, and several QWS have the potential to interconnect, which will be further discussed in Section 6.

3.5 Factors Affecting Availability of Water Supply

The viability of redundant water supply sources relies on certain factors, such as conveyance infrastructure, geographical barriers, permitting requirements, and source water quality compatibility.

3.5.1 Conveyance Factors

The feasibility of conveying water is a major consideration when assessing the practicality of using unused water sources to supply emergency water. Conveyance of water between two QWS or from new water sources would require construction of new pumping and piping infrastructure. The associated costs are key concerns and depend heavily on the proximity of the water source(s) to the QWS to be supplied. In addition, interconnections may be limited by natural obstructions, such as topography and surface water bodies, as well as man-made obstructions, such as roads, railroads, and buildings.

With the exception of Greensboro, surface water systems are interconnected in the Upper Oconee Region. This is likely due to the cost and upkeep requirements of surface water reservoirs and WTPs compared to groundwater systems.

3.5.2 Water Withdrawal Permitting Factors

Any entity who withdraws, obtains, or utilizes groundwater in excess of 0.1 MGD must obtain a water withdrawal permit from EPD. Any entity who withdraws from, diverts from, or impounds waters of the state by more than 0.1 MGD on a monthly average basis must obtain a water withdrawal permit from EPD. The withdrawal permit identifies the permit expiration date, withdrawal purpose, withdrawal source, and standard conditions and special conditions for resource use. Table 3-1 shows the current peak permitted withdrawal limit for each QWS. For groundwater withdrawal permits, a daily peak can be above the permitted limit if the annual and monthly average withdrawals are below their respective limits. A short-term emergency water need met by excess capacity is likely to keep the QWS below their permitted values. If new water withdrawal sources are requested, they will be subject to EPD's permitting process and associated requirements, which will focus on the protection of both water quality and water quantity and take into consideration downstream impacts. The permit application may require a drought contingency plan, water conservation plan, a watershed protection plan, and/or reservoir management plan, where applicable. Therefore, water withdrawal permitting should be a key consideration when proposing new or expanded water withdrawal.

3.5.3 Water Quality Factors

Four of the 23 QWS in this region utilize groundwater sources and one QWS in this region utilizes a spring water source. Raw water treatment for these QWS is similar, although certain differences exist. Differences are mainly attributed to pumping from one of the multiple principal aquifer systems, which may differ in water quality compared to the other aquifers. Within an individual aquifer or spring, localized water chemistry and heterogeneity can be further responsible for raw water quality differences and, therefore, treatment differences.

Thirteen of the 23 QWS in this region utilize surface water sources. Raw water treatment for these QWS is more robust and varied compared to groundwater treatment. Differences are mainly attributed to pumping from one of the multiple surface water bodies. Factors that may affect surface water source quality include land use, potential pollutant sources, nutrient loading, and storm events within the water supply basin. If a new surface water source is proposed, a source water assessment plan may be required to evaluate its suitability.

Finished water quality should be accounted for when considering QWS interconnections such that blended water does not cause mineral precipitates, unpalatable water, or corrosion of the system infrastructure components. If interconnections are designed for water to flow in one direction, reverse flows can be another source of undesirable finished water quality. Reverse flows may resuspend settled particles or dislodge pipe scale.

4.0 Emergency Planning Benchmarks

Total demand and reliability target values were calculated for current usage (2015, immediate reliability target) and future usage (2050, long-range reliability target). The total ADD was first calculated for each QWS based on the 2015 EPD-validated water audit values. In the event a QWS is not in that dataset, as identified in Table 2-3, QWS-provided values are reported. Then, tiered reliability targets were applied to each QWS's total demand to highlight where full supply of demand may not be available during some emergency scenarios. Redundant water supply may supplement existing water sources to meet demand during these scenarios.

4.1 Calculating Total Demand

Current total ADD was calculated as follows:

Total Demand = Raw Water Withdrawal
\+ Purchased Water (within county)
\+ Purchased Water (outside county)

The individual values were obtained through the data collection process identified in Section 2.1. Table 4-1 shows 2015 total demand and the values that sum to total demand, as well as 2050 total demand. Note that 2050 total demand is reported the same as 2050 ADD (Water Withdrawal Only) for QWS that do not purchase water. Section 3.1 and Appendix A describe the methodology for obtaining 2015 and 2050 ADD, which are presented in Table 3-1. The same methodology for obtaining 2050 ADD was used to obtain values for purchase-only QWS, and those calculations are described in Appendix A and shown in Table A-2 and Table A-3. Purchased water values were reported by QWS, and aggregate volumes were checked against the 2015 EPD-validated water loss audit, as available. Where available, total water used (including non-revenue water) is reported rather than billed water.

Total demand is counted for customers both internal and external (i.e., other QWS to which water is sold) to a QWS. For example, Sinclair Water Authority withdrew 2.73 MGD in 2015, of which 1.82 MGD was provided to Baldwin County. This 1.82 MGD is also reported for Baldwin County, which is appropriate because both Sinclair Water Authority and Baldwin County require that amount of water to meet their total demand.

4.2 Reliability Targets

The WSIRRA states that an emergency plan should "evaluate risks and, where feasible, plan for a district-wide interconnection reliability target for immediate implementation of approximately 35% of the ADD and long-range district-wide interconnection reliability planning goal of approximately 65% of the ADD" (Senate Bill 380). These general targets provided preliminary benchmarks for emergency planning in the study and the current (i.e., year 2015) and long-range (i.e., year 2050) water demands that were calculated for each QWS. Therefore, for consistency with the MNGWPD study, the following reliability targets were used:

- 100% ADD (total demand)
- 65% ADD
- 35% ADD

The 35% and 65% reliability targets correspond to estimated usage associated with essential water needs. GEFA has identified customers with essential water needs as: hospitals, nursing home/assisted living facilities, correctional facilities, critical industries, and schools. It should be noted that demand includes both internal customers and external customers (i.e., other QWS to which water is sold).

Table 4-2 shows each reliability target applied to the 2015 and 2050 water demands. The reliability targets were not compared with actual QWS essential water needs; they were compared to the total ADD. QWS should verify what their essential water needs are as they may be less than the 35% and 65% reliability targets. If their essential water needs are greater than the 35% and 65% reliability targets, the QWS should plan to achieve higher targets for emergency scenarios.

5.0 Water Supply Risk Evaluations

Water supply risks and corresponding emergency scenarios were identified for a statewide effort. Therefore, not every risk and scenario apply to the Upper Oconee Region. To carry out the screening, specific system deficiencies (in volumetric demand) of the emergency scenarios and supply goals were calculated. Whereas Section 4 presented a general overview of the overall water availability under the reliability targets, Section 5 provides more specific information about how those reliability targets are applied to each QWS under emergency situations. The intent of Section 5 is to evaluate the capability of a QWS to supply sufficient water during a given emergency. Deficiencies from emergency situations were quantified for each QWS for current and future conditions. The maximum deficit (Critical Scenario Deficit) was determined for each QWS.

5.1 Emergency Scenarios

Table 5-1 shows the statewide water supply risks and emergency scenarios. Scenarios were assigned a duration and an evaluation selection criterion. Some of the QWS in the Upper Oconee Region treat groundwater at each withdrawal well. For the purposes of this study, an individual well that receives water treatment is classified as a WTP. Alternately, a groundwater QWS can be designed with two or more wells in parallel supplying raw water to one WTP, as is the case for Braselton. Water supply Risks A, B, C, D, G, and H are short-term defined durations, meaning less than 120 days, and often less than 3 days. Risks E and F are long-term undefined durations, meaning greater than 365 days and potentially having an indefinite duration.

Risks A through D are more traditional emergencies that are often addressed in an emergency response plan. These risks apply to systems that own drinking water infrastructure assets, whether they are pumps, WTPs, or distribution systems. These criteria were met for the QWS in this region, with exceptions for purchase-only QWS. Only Risks B and C applied to Baldwin County, Barrow County, Eatonton-Putnam County, Jackson County, Loganville, and Walton County.

Risks E and F apply to QWS that receive water directly from the Allatoona Lake/Etowah River or Lake Lanier/Chattahoochee River systems. These two risks relate to the tri-state water litigation. Because the QWS in this region are not part of the specified lake/river systems, Risks E and F did not apply to QWS in this region.

Risk G applies to surface water QWS that have a raw water supply from a dammed reservoir. In the Upper Oconee Region, Risk G applied to Commerce, Greensboro, Jefferson, Madison, Monroe, Sinclair Water Authority, Sparta, Statham, and the Upper Oconee Basin Water Authority.

Risk H was assessed for the most vulnerable surface water QWS during a drought scenario. Risk H is often addressed by local governments in a water conservation plan, which outlines consumer practices that are either encouraged (voluntary) or enforced. Further, EPD has drought management rules, consistent with rules and regulations of the State of Georgia Chapter 391-3-30, that require public water systems to follow drought response strategies and actions during specified levels of declared drought. It was assumed that available raw water supply for each QWS is 40% of ADD due to drought. The two screening criteria for Risk H are described below:

1. Small watersheds are defined as Hydrologic Unit Code (HUC)-10 watersheds less than 100 square miles (CH2M, Black & Veatch, 2017). The U.S. Department of Agriculture's Natural Resources

Conservation Service Geospatial Data Gateway was used to obtain GIS data. Specifically, the shapefile "10 Digit Watershed Boundary Dataset in HUC8" was used to calculate square mileage for HUC-10 watersheds.

2. Strahler Stream Order is a hierarchical method of categorizing streams by size. Strahler Stream Orders range from 1 (headwaters with no tributaries) to 12 (e.g., mouth of the Amazon River). For consistency with USGS literature about Georgia rivers (Elliott et al., 2014), major rivers in this study are defined as being Strahler Stream Order 6 or greater. The National Hydrography Dataset Plus, developed and maintained by the U.S. Environmental Protection Agency and USGS, is a collection of GIS and geospatial databases. It contains Strahler Stream Order as a "value added attribute," which was used to identify major rivers for the Upper Oconee Region.

To meet the Risk H criteria, a QWS would need to have 1) a dammed reservoir in small watershed; and/or 2) withdrawal is not from a major river. The second criterion was met for Athens-Clarke County and Social Circle. Therefore, Risk H applies to some surface water QWS in the Upper Oconee Region (see Appendix B for QWS-specific explanations).

5.2 Methodology

Water supply risk evaluations were performed to understand the capability of a QWS to supply sufficient water during a given emergency. WTP capacity and QWS demand values reported correspond to the values and concepts described in Sections 3 and 4. Note that the reliability target values were determined as described in Section 4.2. They are constants that do not depend on the emergency scenarios. The following process was performed for both 2015 and 2050 water supply risk evaluations.

Deficit was calculated as follows:

Deficit = Available Water Supply
- Reliability Target Demands

Where:

Available Water Supply = Peak Day Design Capacity
+ Maximum Possible Purchased Water Supply
+ Stored Water (Scenarios A1, B, D1, D2)
- Capacity Loss Due to Emergency

For a given QWS, each WTP peak day design capacity was identified as described in Appendix A. For surface water QWS, the smaller of the peak day design capacity value and the peak permitted withdrawal value (24-hour maximum) was used for the available water supply calculation. For this region, permit limits affected some available water supply calculations. The maximum possible purchased water supply (applicable to QWS with interconnections) and stored water (applicable only to Scenarios A1, B, D1, and D2) were then added. Other than water supply Risk C, each emergency scenario prescribes a situation that involves a QWS-wide capacity loss (e.g., critical asset failure). The available water supply is thus the capacity remaining after the loss was subtracted and the source, purchased, and stored water were added, as applicable.

The deficit for both 2015 and 2050 was then calculated by subtracting the reliability target demands from the available water supply. In the case of a negative deficit, meaning there is more available water supply than demand, the deficit is reported as zero.

5.3 Key Assumptions

Table 5-1 presents key assumptions specific to each scenario. The following key assumptions apply to all scenarios and the corresponding deficit calculations:

- Only one QWS-wide emergency occurs at a time (i.e., Scenarios A1 and C do not occur simultaneously).
- Only one region-wide emergency occurs at a time (i.e., both Commerce and Monroe do not experience an emergency) except for Risk H (drought).
- The 2050 available water supply accounts for additional capacity due to planned capital improvements. (Madison and the Upper Oconee Basin Water Authority provided an estimated increase in water capacity due to planned capital improvements.)
- Under an emergency scenario, QWS permit restrictions are followed.
    - For groundwater withdrawal permits, a daily peak can be above the permitted limit if the annual and monthly average withdrawals are below their respective limits. Scenario A2 (30 days) is the only applicable scenario in which monthly average emergency withdrawals may approach permit limits. All groundwater QWS in this region have backup equipment available, rendering no capacity loss for Scenario A2. Therefore, permit limits are assumed to be followed.
    - For surface water withdrawal permits, a daily peak must adhere to the 24-hour maximum withdrawal limit. If a longer emergency scenario requires a QWS to exceed their permitted withdrawal limit, QWS may do so given EPD approval. Under Water Quality Control Rule 391-3-6-.07(9)(b), systems may receive a temporary permit modification to exceed existing permitted withdrawal limits for emergencies lasting less than 180 days (Ga. Comp. R. & Regs. r. 391-3-6-.07).
- As applicable, a QWS indefinitely maintains its current infrastructure, backup power, and backup equipment.
- As applicable, a QWS indefinitely maintains its current permitted withdrawal limits and existing water sale/purchase contracts and interconnections.

5.4 Evaluation Results

Table 5-2 summarizes calculated deficits by QWS for 2015 and 2050. As noted above, Risks A, B, C, D, G, and H applied to the Upper Oconee Region. Six QWS had a 2015 total demand deficit (i.e., 100% ADD): Athens-Clarke County, Greensboro, Sinclair Water Authority, Sparta, Statham, and Upper Oconee Basin Water Authority. Athens-Clarke County's, Greensboro's, Sinclair Water Authority's, Sparta's, and Upper Oconee Basin Water Authority's capacity losses caused 65% ADD and 35% ADD deficits. Eight QWS had a 2050 total demand deficit: Athens-Clarke County, Barrow County, Eatonton-Putnam County, Greensboro, Sinclair Water Authority, Sparta, Statham, and Upper Oconee Basin Water Authority. Athens-Clarke County's, Greensboro's, Sinclair Water Authority's, Sparta's, Statham's, and Upper Oconee Basin Water Authority's capacity losses caused 65% ADD and 35% ADD deficits. Detailed available water supply and deficit calculations by QWS are provided in Appendix B. Figure 5-1 is a summary schematic of QWS 2050 ADD, deficits, and interconnections. This figure demonstrates QWS potential future water withdrawal and sharing.

Surface water QWS in the Upper Oconee Region perform less favorably when faced with the emergency scenarios because their often single WTP design lacks inherent redundancy. Chemical treatment

redundancy and unit process redundancy can be part of the WTP design, but Risk G is especially difficult to address for surface water QWS in this region. Sinclair Water Authority and Upper Oconee Basin Water Authority are wholesale water providers that lack incoming interconnections with adjacent systems. Therefore, Scenario G leaves these QWS with no available water supply.

Groundwater QWS in the Upper Oconee Region perform well when faced with the emergency scenarios because their multi-well, multi-WTP design offers inherent redundancy. South of the Georgia fall line, the overall flat topography of the region also allows for the QWS to have systemwide distribution systems positioned mainly within city limits rather than across multiple pressure zones. This means that if one WTP fails, large portions of a system will not be without water.

For QWS experiencing more than one deficit, the highest deficit with the longest duration scenario and/or relative likelihood scenario, or the Critical Scenario Deficit, was selected for further evaluation. The Critical Scenario Deficit, if applicable, is highlighted in gray in Table 5-2.

6.0 Evaluation of Potential Projects

The water supply risk evaluations estimated the immediate and long-range potential emergency deficits for each QWS in the Upper Oconee Region. As described in Section 5.4 and Table 5-2, eight Upper Oconee QWS have a 2050 deficit, and the Critical Scenario Deficit was selected for further evaluation. If a QWS does not have a Critical Scenario Deficit, the scenario(s) rendering a given QWS with the least available water supply was/were further evaluated. Potential conceptual-level redundancy projects were developed for a QWS based on their reduced water supply, available information, cost of implementation, and other criteria. These projects may include, but are not limited to, internal infrastructure redundancy, new interconnections, and upgrades to existing interconnections.

6.1 Potential Projects

Emergency scenarios affecting QWS, as detailed in Appendix B, were evaluated for the feasibility of a potential project to address capacity losses. The exception to this project recommendation criterion is for purchase-only QWS. It is recommended that purchase-only QWS, together with their supplier(s), evaluate where and when to upgrade infrastructure to meet their future total demand. Thus, not all QWS have recommended projects. This was done to prioritize logical, implementable projects for QWS with less available water supply relative to other QWS. The starting point for identifying a potential project is deciding if it will be an interconnection project (new or upgrade to existing) or internal infrastructure redundancy project. For potential projects, the following considerations were taken, as applicable:

- Potential environmental impacts
- Withdrawal permit impacts
- Water quality impacts
- Community impacts

The above four considerations are applicable to interconnection projects. Interconnection projects can address emergency scenarios A1, A2, B, D1, D2, G, and H. Depending on the project, the above four considerations are sometimes applicable to internal infrastructure redundancy projects. Table 6-1 identifies certain internal infrastructure redundancy projects for certain emergency scenarios.

For the Upper Oconee Region, five types of projects are recommended: 1) new interconnection, 2) upgrade to existing interconnection, 3) new well and groundwater WTP (which includes a backup generator) to supply internal infrastructure redundancy, 4) new backup generators to supply internal infrastructure redundancy, and 5) new raw water transmission main to supply internal infrastructure redundancy. New well and groundwater WTP projects support the Upper Oconee Water Planning Council's Management Practice WS-3: develop new groundwater wells (Upper Oconee Water Planning Council, 2017). Internal infrastructure redundancy projects highlight the potential for a future management practice: encourage public water systems to enhance their water supply redundancy and treatment/unit process redundancy. Table 6-2 shows the potential projects and provides the emergency scenarios addressed, maximum capacity added, and impact considerations.

Potential environmental impacts vary widely across project types. Designations and impacts by project type are detailed below.

- For interconnection projects, impacts due to excavation (for pipelines), stream crossings, and wetlands disturbance were considered, as applicable. The relative difficulty of permitting steps is implied for the following designations. A "low" designation was applied to a potential project if

known streams/wetlands are not likely affected and if offsite excavation is less than 200 feet. A "medium-low" designation was applied if known streams/wetlands are not likely affected and if offsite excavation is greater than 200 but less than 5,000 feet. A "medium-high" designation was applied if known streams/wetlands may be affected and/or if offsite excavation is greater than 200 but less than 5,000 feet. A "high" designation was applied if more than 5,000 feet of offsite excavation is needed and/or wetlands are likely affected and/or a stream crossing is likely needed. A list of threatened/endangered species was not compiled for each potential project. Prior to construction, a review of site-specific threatened/endangered species should be conducted. Cost and permitting requirements may increase if species or critical habitats are impacted.

- Existing interconnections that would be upgraded, without extensive pipe replacement, are assumed to be in the "low" potential environmental impact designation.
- For new well and WTP projects, impacts due to drilling, regional groundwater resource gaps, and excavation (for pipelines) were considered, as applicable. A "medium-low" designation was applied as the baseline due to drilling/excavation-related activities. Designations were applied for regional resource gaps by aquifer: "medium-low" was applied if no gaps were identified; "medium-high" was applied if aquifer withdrawals are within the aquifer's estimated sustainable yield; "high" was applied if aquifer withdrawals are above the aquifer's estimated sustainable yield. Designations were applied for excavation in the same way as interconnection projects.
- For backup generator projects, a "low" designation was applied; however, fuel storage, stormwater runoff control, and air permitting requirements should be considered. Cost and permitting requirements may increase depending on QWS-specific site conditions, electrical loading requirements, and electrical infrastructure layout.
- For new raw water transmission main projects, the same potential environmental impact designations as interconnection projects were applied.

Water withdrawal permit factors are described in Section 3.5.2. The QWS' 2050 ADD was compared to current peak permitted withdrawal limits (Table 3-1) to understand their ability to supply water to another QWS experiencing an emergency. Note that 24-hour maximum permitted withdrawal for surface water QWS and monthly average permitted withdrawal for groundwater QWS are higher than annual average permitted withdrawal. Using peak values is appropriate because of the short-term, defined duration scenarios considered. Jackson County and Barrow County are purchase-only QWS, while Oconee County-Watkinsville obtains most of its water supply from regular purchases. In order to reflect potential withdrawal permit and purchased water impacts for these QWS, the maximum possible purchased water value was used, plus the peak permitted withdrawal limit (applicable to Oconee County-Watkinsville), minus the amount purchased from the beneficiary QWS of a potential project. For example, Potential Project 2 allows water to flow from Oconee County-Watkinsville to Athens-Clarke County. Because Athens-Clarke County also supplies Oconee County-Watkinsville, the maximum possible purchased water value from Athens-Clarke County was subtracted from Oconee County-Watkinsville's total (all suppliers) maximum possible purchased water value. A "low" designation was applied to a potential project if permitted/purchased values would not limit the maximum capacity added. A "medium-low" designation was applied if combined values would limit the maximum capacity added by 1-49%, and a "medium-high" designation was applied if combined values would limit the maximum capacity added by 50-99%. A "high" designation was applied if combined values would completely limit the maximum capacity added.

Water quality factors are described in Section 3.5.3. A "low" designation was applied to a potential project if water treatment (e.g., treatment chemicals, chemistry, and processes) is compatible between QWS. For example, if chlorination and fluoridation, a common treatment scheme for groundwater systems, are used at both QWS. A "medium-low" designation was applied if one water treatment type differs between QWS, and a "medium-high" designation was applied if two water treatment types differ. A "high" designation was applied if water treatment significantly differs between QWS. For example, if three or more treatment types differ or if groundwater QWS and surface water QWS exchange water. If an interconnection project progresses beyond the planning-level evaluation discussed in this report, water chemistry analyses and hydraulic flow modeling should be conducted to assess both systems' abilities to exchange water.

Community impacts include excavation, easement/right of way acquisition, and multijurisdictional agreements. For the purposes of this project, easement/right of way considerations are included in approximated offsite excavation distances. A "low" designation was applied to a potential project if it occurs entirely on QWS property. A "medium-low" designation was applied if offsite excavation is less than 200 feet and/or a multijurisdictional agreement is needed. A "medium-high" designation was applied if offsite excavation is greater than 200 but less than 5,000 feet and/or a multijurisdictional agreement is needed. A "high" designation was applied if offsite excavation is more than 5,000 feet and/or a multijurisdictional agreement is needed.

6.1.1 Interconnections

Three interconnection projects were evaluated. QWS modifications for interconnection projects include connecting, metering, pumping, and operation and maintenance requirements of new pipelines, booster pump stations, and associated appurtenances. The maximum capacity added (in MGD) from a potential project is an important factor that depends on each specific project's details. Interconnection project pipe diameter, average system pressure, QWS future excess capacity, and maximum capacity added are detailed in Table 6-3. Additional information is provided below.

- Project 1 – Athens-Clarke County and Jackson County QWS water mains are within 100 linear feet and one interconnection option exists along U.S. Highway 441 at the county line. Athens-Clarke County's existing pipe diameters in the area of interest are 6 inches to 8 inches. Jackson County's existing pipe diameters in the area of interest are 8 inches. Approximately 100 feet of 8-inch diameter ductile iron pipe (DIP) are estimated for this project.
- Project 2 – Athens-Clarke County and Oconee County-Watkinsville QWS interconnected along U.S. Highway 441 at the county line. It is currently a 12-inch diameter, one-way interconnection into Oconee County-Watkinsville. To upgrade the interconnection, the existing control valve station and associated appurtenances would be updated to reverse flow through existing pipes. The upgrade would allow water to flow to Athens-Clarke County during an emergency.
- Project 6 – Statham and Barrow County QWS are interconnected along Pleasant Hill Church Road and along Highway 211. These are currently 6-inch diameter, one-way interconnections into Barrow County. To upgrade the interconnections, the existing control valve stations and associated appurtenances would be updated to reverse flow through existing pipes. The upgrade would allow water to flow to Statham from two locations during an emergency.

If a QWS' future excess capacity and/or permit withdrawal limits are less than the maximum capacity added, it was assumed that the QWS would increase its future supply.

The above-mentioned interconnection projects are not a comprehensive list of all possible interconnections. Per Table 2-2, mapping data were not available or not complete for all QWS. Therefore, only select interconnections are discussed where data are available.

6.1.2 Internal Infrastructure Redundancy

As shown in Table 6-2, Project 3 and Project 5 are new well and groundwater WTP projects to supply internal infrastructure redundancy. This project type can address emergency scenarios A1, A2, B, D1, D2, G, and H. QWS modifications for new well and WTP projects include the ability to site and manage a new well/WTP, connect treated water to the distribution system, and potentially increase permit limits. The maximum capacity added (in MGD) was estimated based on QWS-specific information. Greensboro and Sparta currently do not hold groundwater withdrawal permits and they would each need to obtain one. These QWS are also above the fall line. Therefore, a water pumping study would be needed to see if the local crystalline rock aquifer has sufficient yield for QWS needs. Because these QWS do not have a portable generator capable of powering the proposed new well/WTP, a generator was included in these potential projects.

Project 4 is a backup generator project, which is recommended based on QWS feedback. Although Risk G (dam failure scenario) is the Sinclair Water Authority's critical scenario deficit, limited QWS and publicly-available information made it infeasible to develop a meaningful potential project to address this deficit. Project 4 specifically addresses emergency scenario A1: power supply failure of the largest WTP. The QWS currently has a dual feed power system, which relies on a non-independent, external power source. A backup generator would give the QWS an independent power source. QWS modifications for generator projects include the ability to connect and store a backup generator. The maximum capacity added (in MGD) from a potential generator project was assumed to be the peak day design capacity of the WTP receiving the generator. Two 400-kilowatt generators are assumed to meet Sinclair Water Authority's peak day design capacity.

Project 7 is a new raw water transmission main for the Upper Oconee Basin Water Authority that will supply internal infrastructure redundancy in the event the Bear Creek Reservoir fails. This project type can address emergency Risk D and Risk G. The QWS holds permits to withdraw raw water from the Bear Creek Reservoir and Middle Oconee River. Currently, water is pumped from the Middle Oconee River into the reservoir, and from the reservoir into the WTP. This potential project adds a raw water transmission main from the Middle Oconee River to the WTP, bypassing the Bear Creek Reservoir. QWS modifications for new transmission main projects include connecting, metering, pumping, and operation and maintenance requirements of new pipelines and associated appurtenances. Approximately 1 mile of 42-inch diameter DIP is estimated for this project. The maximum capacity added (in MGD) was estimated as the maximum flow value through a 42-inch diameter pipe, assuming a flow velocity of 3 feet per second. This is because the capacity added would be limited by the pipe parameters rather than the WTP peak day design capacity. Therefore, this capacity is more accurately described as "capacity not lost" because the capacity added does not increase Upper Oconee Basin Water Authority's peak day design capacity.

6.2 Planning-Level Costs

Planning-level costs were estimated for potential redundancy projects in one of three ways: RSMeans (a construction cost estimating software), manufacturer prices, or the EPD *Supplemental Guidance for Planning Contractors: Water Management Practice Cost Comparison*. Estimated unit prices represent rough

order of magnitude project prices based on assumptions summarized in the following sections. A macro-level, approximate project timeframe in months was also scoped out for each project. For interconnection and raw water transmission main projects, it was assumed that multijurisdictional agreements and procurement would take 6 months, engineering design and hydraulic modeling would take 4 months, and procurement of materials and construction would take a minimum of 2 months. For new well and WTP projects, it was assumed that procurement and permitting would take approximately 6 months, engineering design and hydraulic modeling would take approximately 4 months, and drilling and construction would take a minimum of 2 months. For generator projects, it was assumed that procurement and installation would take approximately 6 months. Planning-level costs and macro-level timeframes are presented in Table 6-4.

6.2.1 Interconnections

Pipeline costs were estimated per linear foot of pipe. Manufacturer prices were obtained for several standard DIP sizes between 4 and 60 inches. Prices were adjusted to include a 20% mark-up for taxes and contractor overhead and profit. RSMeans was used to estimate excavation, backfill, and installation costs. Erosion control, sediment control, site clearing, and site grading considerations were also included. Construction mark-ups, including mobilization, temporary facilities, quality control testing, administration, and oversight, were 23% and applied to the subtotal construction unit prices. Additional mark-ups, including engineering design, permitting, and overall contingency, were 31% and applied to the subtotal construction unit prices and construction mark-ups. These cost estimates do not include land acquisition costs.

An underground concrete vault was assumed for interconnection locations such that valves can be manually opened/closed. RSMeans was used to estimate concrete vault construction, valves, water meters, and associated appurtenances. Mark-ups include installation mark-ups and overall contingency.

For upgrading existing interconnections, a value was estimated to encompass potential work involved based on engineering judgement. This value is consistent with the MNGWPD study, and the value will need to be adjusted based on site-specific information.

In addition to water head loss, operational pressure differences between interconnections may require a booster pump station or additional appurtenances to establish a functional interconnection. Therefore, hydraulic modeling is necessary to establish interconnection feasibility before a project can advance beyond this planning-level stage.

6.2.2 Internal Infrastructure Redundancy

New well and WTP costs were estimated from the EPD supplemental guidance document. The document provides unit costs for anticipated water management practices, of which "WS-3 New Groundwater Sources" and "WT-1 Water Treatment Plant (New)" were applicable (EPD, 2011). The middle-range cost was assumed to be representative for Greensboro's and Sparta's proposed new well and the low-range cost was assumed to be representative for their proposed new WTPs because of the relatively fewer treatment components for groundwater QWS. The 2011 costs were brought to 2021 dollars using the Engineering News-Record's Construction Cost Index. The unit costs were multiplied by the number of units (0.50 MGD for the maximum capacity added) and the sum appears as the additional cost in Table 6-4. Applicable pipeline and generator costs were also estimated for this project type.

The generators considered have a standby rating, meaning they can supply power for short-term, defined durations, as opposed to a prime rating, which is meant for power needs when a system is not regularly wired to the electrical grid. QWS-specific electrical loads and configurations are needed to accurately scale and cost a generator project. Therefore, a relationship between known QWS peak day design capacity and generator power was developed to estimate the generator power needed for a proposed project. Prices were then estimated based on generator power needed.

Applicable pipeline costs for new raw water transmission mains were estimated in the same way as interconnection projects.

7.0 Recommended Projects

Once potential projects were identified and planning-level costs were estimated, potential projects were then prioritized based on performance under weighted quantitative and qualitative criteria. Using a decision-based prioritization tool, absolute and weighted scores were calculated for each potential project. The options were then ranked using defined criteria (e.g., cost, potential environmental impacts). A sensitivity analysis was undertaken to test the influence of the criteria weightings on the project rank outcome. Ranking reflects projects that will most benefit the Upper Oconee Water Planning Region as a whole.

7.1 Prioritization Approach

Potential project prioritization was done to compare complex information among QWS. Quantitative and qualitative scoring criteria and weighting were selected to reflect the objectives of the redundancy study. Table 7-1 presents the scoring criteria and their weighting.

Scores were assigned either 1, 2, 3, or 4. A score of 1 implies a lower overall benefit of a potential project (e.g., relatively low maximum capacity added, high cost, and high impacts), while a score of 4 implies a higher overall benefit of a potential project (e.g., relatively high maximum capacity added, low cost, and low impacts). For interconnection projects, which may have the capacity to benefit multiple water systems, select criteria were assigned the average of the two interconnecting system scores, as applicable. These criteria include Criterion 4 (Added Capacity as a Percent of Total Demand), Criterion 7 (Potential System and Community Impacts), and Criterion 8 (Excess Capacity Index). For example, Project 1 (Athens-Clarke County - Jackson County interconnection) received a Criterion 4 score of 1 for Athens-Clarke County and 1 for Jackson County. The assigned score was the average of these individual scores, resulting in a score of 1. For Criterion 3 (Critical Scenario Duration), if no Critical Scenario Deficit exists and if multiple scenarios are addressed, the highest day duration of the scenarios addressed was used to assign a score. Criterion 8 (Excess Capacity Index) did not apply to Jackson County in Project 1 because Jackson County regularly operates as a purchase-only QWS, and therefore does not have an excess capacity, as defined in Section 3.1. Non-weighted values were summed and divided by the applicable number of criteria to obtain an absolute score. The larger the absolute score, the more beneficial the potential project.

Criterion weights were assigned either 1, 2, or 3, with 1 holding less decision weight and 3 holding the most decision weight. Initial weights were assigned based on professional judgement and later tested with a sensitivity analysis. Criterion scores were multiplied by criterion weights. Values were summed and divided by the applicable number of criteria to obtain a weighted score. The larger the weighted score, the more beneficial the potential project.

Table 7-2 shows each criterion metric and its corresponding assigned score for this region's potential projects, as well as their absolute and initial weighted scores. In addition, cost per 1 MGD yield and cost per individual supplied were calculated. Table 7-3 is a decision-making summary to present the decision metrics for each potential project. An initial manual rank was assigned to each potential project based on initial weighted scores. In the case of a tie, such as Project 3 and Project 5, the absolute score was considered, and in the case of a further tie, the lower cost per individual supplied broke the tie.

7.2 Sensitivity Analysis

A sensitivity analysis was conducted to test the influence of criterion weightings on the initial manual rank outcome. First, all criteria were assigned the highest weight (3). The effect of this weighting adjustment is equivalent to the absolute score because although it amplified score values, the rank outcome was the same. Second, one of the eight criteria was assigned the highest weight (3) with the remaining seven criteria assigned the lowest weight (1). The effects of these weighting variations are described in Appendix C. The sensitivity analysis results demonstrate that criteria are generally insensitive to weighting. Therefore, retaining initially assigned weights is appropriate.

7.3 Recommended Projects

With weighting reasonably assigned, as demonstrated by the sensitivity analysis results, the final manual ranks equal the initial manual ranks, which appear in Table 7-3. It is recommended that decision making priority be given to potential projects with higher rank order because the order accounts for the foremost quantitative and qualitative criteria pertinent to water supply redundancy.

Regarding interconnection projects, fair and equitable project cost allocation to each beneficiary can be achieved in several ways. First, if an interconnection primarily benefits one QWS (purchaser), that QWS will likely bear the majority of costs. The provider QWS will financially benefit if water is sold to the purchaser; thus, the provider may bear some of the costs. Second, if an interconnection primarily benefits one QWS but also adds redundancy for the provider QWS, the provider QWS may bear further costs, such as assisting with immediate costs and/or operation and maintenance costs. Third, if an interconnection mutually benefits both QWS, a cost allocation strategy would be appropriate. Such strategies can be based on QWS population served, ADD, added capacity as a percent of total demand, or other creative approaches.

7.4 Conclusion

The purpose of the Water Supply Redundancy Study is to increase Georgia's water supply solvency and reliability. This study evaluated drinking water supply, demand, treatment, storage, distribution, and interconnectivity to identify redundant water supply sources capable of providing backup water supply for each QWS.

Twenty-three QWS in the Upper Oconee Water Planning Region were evaluated for water supply redundancy. QWS data were collected, summarized, and evaluated for current and future conditions. Redundant water supply sources were explored, and water supply risk evaluations were conducted. Potential redundancy projects were conceptualized and costed for QWS left with notably reduced water supply during an emergency scenario. Potential projects were scored via a decision-based prioritization tool using weighted quantitative and qualitative criteria and subsequently ranked. Table 7-4 presents the potential projects sorted by final rank order. This study illustrated opportunities for improved QWS water supply redundancy and resiliency when faced with potential emergencies in the Upper Oconee Water Planning Region.

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TABLES

Table 2-1
Key General Information

County	Qualified Water System	Public Water System Identification Number	Estimated Population Directly Served[1]	Estimated Consecutive Population Served[2]	Raw Water Source(s)[3]	Regular Purchases 2015-2019[4]	Irregular / Emergency Purchases 2015-2019[4]	Regular Sales 2015-2019[4]	Irregular / Emergency Sales 2015-2019[4]
Clarke	Athens-Clarke County	GA0590000	120,000	1,000	Surface Water (3)	Upper Oconee Basin Water Authority	-	Oconee County-Watkinsville	-
Baldwin	Baldwin County	GA0090000	12,000	0	Wholesale Purchased	Sinclair Water Authority	-	-	-
Barrow	Barrow County[5]	GA0130031	14,000	10,800	Wholesale Purchased	Upper Oconee Basin Water Authority	-	Auburn Statham Oconee County-Watkinsville[7] Jackson County	Winder Braselton (2015-2018)
Jackson	Braselton	GA1570000	4,800	2,400	Groundwater Wells (5)	Gwinnett County Jackson County	Barrow County	Hoschton	-
Jackson	Commerce	GA1570001	7,000	1,000	Surface Water (1)	-	-	Madison County Maysville	-
Laurens	Dublin	GA1750002	16,200	0	Surface Water (1) Groundwater Wells (3)	-	-	-	-
Putnam	Eatonton-Putnam County	GA2370000	13,800	800	Wholesale Purchased	Sinclair Water Authority	-	Piedmont Water Company (2017-2019)	-
Greene	Greensboro	GA1330000	3,500	0	Surface (1)	-	-	-	-
Jackson	Jackson County	GA1570117	25,000	3,800	Wholesale Purchased	Barrow County Commerce Upper Oconee Basin Water Authority	-	Jefferson Hoschton Braselton	-
Jackson	Jefferson	GA1570003	10,100	0	Surface Water (1)	Jackson County	-	-	-
Walton	Loganville	GA1350006	13,300	0	Wholesale Purchased	Walton County Gwinnett County	-	-	-
Morgan	Madison	GA2110002	6,400	1800	Surface Water (2)	-	-	Bostwick Rutledge	Buckhead (2016, 2017)
Baldwin	Milledgeville	GA0090001	18,000	0	Surface Water (2)	-	-	-	-
Walton	Monroe	GA2970001	25,300	1200	Surface Water (2)	-	-	Walton County	-
Oconee	Oconee County-Watkinsville	GA2190000	21,900	1,100	Groundwater Wells (7)	Upper Oconee Basin Water Authority Barrow County Athens-Clarke County	-	Walton County	-
Washington	Sandersville	GA3030005	5,900	1,800	Groundwater Wells (6)	-	-	Tennille	-

Table 2-1
Key General Information

County	Qualified Water System	Public Water System Identification Number	Estimated Population Directly Served[1]	Estimated Consecutive Population Served[2]	Raw Water Source(s)[3]	Regular Purchases 2015-2019[4]	Irregular / Emergency Purchases 2015-2019[4]	Regular Sales 2015-2019[4]	Irregular / Emergency Sales 2015-2019[4]
Putnam	Sinclair Water Authority	GA2370087	0	25,800	Surface Water (1)	-	-	Baldwin County Eatonton-Putnam County	-
Walton	Social Circle	GA2970002	4,200	0	Surface Water (1)	Walton County	-	-	-
Hancock	Sparta	GA1410001	3,500	1,300	Surface Water (1)	-	-	Hancock County	-
Barrow	Statham	GA0130001	4,500	0	Surface Water (1) Spring (1)	-	Winder	-	-
Jackson	Upper Oconee Basin Water Authority	GA1570121	0	79,900	Surface Water (2)	-	-	Oconee County-Watkinsville Barrow County Jackson County Athens-Clarke County	-
Walton	Walton County	GA2970008	41,000	2,000	Wholesale Purchased[6]	Newton County Oconee County-Watkinsville Monroe Gwinnett County	-	Loganville Social Circle Jersey	-
Barrow	Winder	GA0130002	45,000	0	Surface Water (5)	-	Barrow County	-	Statham[8]

Notes:

Prepared by: LCT 04/23/21
Checked by: GJH 05/03/21

1. The population that the system directly sells water to, rounded to the nearest 100.
2. The population benefited from the system's sale to another system, rounded to the nearest 100.
3. The value in parentheses indicates the number of sources.
4. Purchases/sales are from/to other water systems.
5. Barrow County will be consolidated with the Barrow County BOC Transmission Main QWS during their next permit application. As such, they are consolidated.
6. Walton County plans to install a surface water treatment plant.
7. Oconee-County-Watkinsville is an emergency only source after 2019
8. Statham will regularly purchase water after 2019

Table 2-2
Mapping Data Received

			Level of Mapping Data Received					
County	**Qualified Water System**	**Estimated Population Directly Served[1]**	**No Mapping Data**	**Hard Copy/PDF Maps**	**Digital Mapping Data - GIS**	**Digital Mapping Data - CAD**	**Digital Mapping Data - Google Earth**	**Hydraulic Computer Model**
Clarke	Athens-Clarke County	120,000			◊			
Baldwin	Baldwin County	12,000		◊	◊			
Barrow	Barrow County	14,000	◊					
Jackson	Braselton	4,800		◊				
Jackson	Commerce	7,000			◊			◊
Laurens	Dublin	16,200	◊					
Putnam	Eatonton-Putnam County	13,800		◊				
Greene	Greensboro	3,500	◊					
Jackson	Jackson County	25,000			◊			
Jackson	Jefferson	10,100		◊				
Walton	Loganville	13,300			◊	◊		
Morgan	Madison	6,400		◊	◊			
Baldwin	Milledgeville	18,000	◊					
Walton	Monroe	25,300			◊			
Oconee	Oconee County-Watkinsville	21,900		◊				
Washington	Sandersville	5,900				◊		
Putnam	Sinclair Water Authority	0	◊					
Walton	Social Circle	4,200		◊				
Hancock	Sparta	3,500		◊				
Barrow	Statham	4,500	◊					
Jackson	Upper Oconee Basin Water Authority	0	◊					
Walton	Walton County	41,000	◊					
Barrow	Winder	45,000	◊					

Notes:

1. The population that the system directly sells water to, rounded to the nearest 100.

Prepared by: LCT 04/26/21
Checked by: GJH 05/03/21

Table 2-3
Reports and Documents Received

			Reports and Documents Received[3]								
County	**Qualified Water System**	**Estimated Population Directly Served[1]**	**Comprehensive / Capital Improvement Plan[2]**	**Permits**	**Sanitary Survey[4]**	**Water Sale / Purchase Agreements**	**Water Conservation Plan**	**Consumption / Withdrawal Reports**	**Insurance Services Office Report**	**2015 Water Loss Audit[4]**	**Emergency Response Plan**
Clarke	Athens-Clarke County	120,000	◊	◊	◊	◊	◊	◊		◊	◊
Baldwin	Baldwin County	12,000	◊		◊	◊	◊			◊	◊
Barrow	Barrow County	14,000	◊		◊					◊	
Jackson	Braselton	4,800	◊	◊	◊	◊	◊	◊		◊	◊
Jackson	Commerce	7,000	◊	◊	◊					◊	
Laurens	Dublin	16,200	◊	◊	◊					◊	◊
Putnam	Eatonton-Putnam County	13,800	◊	◊	◊	◊		◊		◊	◊
Greene	Greensboro	3,500	◊	◊	◊					◊	
Jackson	Jackson County	25,000	◊		◊	◊				◊	
Jackson	Jefferson	10,100	◊		◊					◊	
Walton	Loganville	13,300	◊	◊	◊	◊		◊		◊	
Morgan	Madison	6,400	◊	◊	◊		◊			◊	◊
Baldwin	Milledgeville	18,000	◊	◊	◊					◊	◊
Walton	Monroe	25,300	◊	◊	◊	◊	◊	◊		◊	◊
Oconee	Oconee County-Watkinsville	21,900	◊	◊	◊	◊	◊	◊		◊	◊
Washington	Sandersville	5,900	◊	◊	◊	◊	◊	◊		◊	
Putnam	Sinclair Water Authority	0		◊	◊						
Walton	Social Circle	4,200	◊	◊	◊	◊	◊	◊		◊	◊
Hancock	Sparta	3,500	◊	◊	◊		◊	◊		◊	◊
Barrow	Statham	4,500	◊	◊	◊					◊	
Jackson	Upper Oconee Basin Water Authority	0	◊	◊	◊	◊		◊			
Walton	Walton County	41,000	◊		◊					◊	
Barrow	Winder	45,000	◊	◊	◊	◊	◊			◊	

Notes:

Prepared by: LCT 04/26/21
Checked by: GJH 05/03/21

1. The population that the system directly sells water to, rounded to the nearest 100.
2. The Georgia Department of Community Affairs website contained comprehensive plans.
3. Some systems provided additional, potentially relevant documents.
4. EPD supplied recent sanitary surveys and 2015 water audits for many systems.

Table 3-1
Current and Future Excess Capacity

County	Qualified Water System (QWS)	Raw Water Source(s)[1]	2015 Peak Day Design Capacity (MGD)	2015 ADD (MGD) (Water Withdrawal Only)[2]	2015 Excess Capacity (MGD)	Current Peak Permitted Withdrawal (MGD)[3]	2050 Peak Day Design Capacity (MGD)[4]	2050 ADD (MGD) (Water Withdrawal Only)[5]	2050 Excess Capacity (MGD)
Clarke	Athens-Clarke County	Surface Water (3)	36.0	12.1	22.6	34.75[(7)]	36.0	27.6	7.1
Baldwin	Baldwin County	Wholesale Purchased	NA	NA	NA	NA	NA	NA	NA
Barrow	Barrow County	Wholesale Purchased	NA	NA	NA	NA	NA	NA	NA
Jackson	Braselton	Groundwater Wells (5)	1.0	0.3	0.7	1.12	1.0	1.3	-0.4
Jackson	Commerce	Surface Water (1)	4.0	1.5	2.5	4.5	4.0	1.5	2.5
Laurens	Dublin	Surface Water (1) Groundwater Wells (3)	6.8	2.6	4.2	7.5[(8)]	6.8	2.3	4.5
Putnam	Eatonton-Putnam County	Wholesale Purchased	NA	NA	NA	NA	NA	NA	NA
Greene	Greensboro	Surface Water (1)	1.6	0.6	1.0	3.3	1.6	0.4	1.2
Jackson	Jackson County	Wholesale Purchased	NA	NA	NA	NA	NA	NA	NA
Jackson	Jefferson	Surface Water (1)	2.3	1.1	1.1	5.3	2.3	1.9	0.3
Walton	Loganville	Wholesale Purchased	NA	NA	NA	NA	NA	NA	NA
Morgan	Madison	Surface Water (2)	3.5	1.18	2.3	3.5	3.9	1.4	2.1
Baldwin	Milledgeville	Surface Water (2)	12.5	3.3	9.1	12.44	12.5	3.1	9.4
Walton	Monroe	Surface Water (2)	10.0	2.4	7.6	26	10.0	5.2	4.8
Oconee	Oconee County-Watkinsville	Groundwater Wells (7)	0.7	0.1	0.5	2.8	0.7	4.3	-3.7
Washington	Sandersville	Groundwater Wells (6)	4.8	1.6	3.1	4.5	4.8	0.9	3.8
Putnam	Sinclair Water Authority	Surface Water (1)	6.0	2.7	3.3	9.5	6.0	2.7	3.3
Walton	Social Circle	Surface Water (1)	1.0	0.5	0.5	1.0	1.0	0.8	0.2
Hancock	Sparta	Surface Water (1)	2.0	0.8	1.2	2.0	2.0	0.2	1.8
Barrow	Statham	Surface Water (1) Spring (1)	1.1	0.2	0.9	1.143[(9)]	1.1	1.3	-0.2
Jackson	Upper Oconee Basin Water Authority	Surface Water (2)	21.0	7.2	13.8	79.0	26.5	15.1	11.4
Walton	Walton County	Wholesale Purchased[6]	NA	NA	NA	NA	NA	NA	NA

Table 3-1
Current and Future Excess Capacity

County	Qualified Water System (QWS)	Raw Water Source(s)[1]	2015 Peak Day Design Capacity (MGD)	2015 ADD (MGD) (Water Withdrawal Only)[2]	2015 Excess Capacity (MGD)	Current Peak Permitted Withdrawal (MGD)[3]	2050 Peak Day Design Capacity (MGD)[4]	2050 ADD (MGD) (Water Withdrawal Only)[5]	2050 Excess Capacity (MGD)
Barrow	Winder	Surface Water (5)	6.2	4.1	2.1	6.7	6.2	13.2	-7.0
Totals			**120.4**	**42.4**	**76.6**	**182.6**	**126.2**	**83.4**	**41.1**

Prepared by: LCT 08/12/21
Checked by: GJH 08/17/21

Notes:
ADD - average daily demand
NA - not applicable because these are purchase-only QWS
MGD - million gallons per day
1. The value in parentheses indicates the number of sources.
2. 2015 EPD-validated water loss audit values are reported. In the event a QWS is not in that dataset, as identified in Table 2-3, QWS-provided values are reported, as available.
3. Values for groundwater systems are MGD - monthly average; values for spring water and surface water systems are combined (if multiple permits) MGD - 24-hour max. Surface water permitted withdrawal values include withdrawals for immediate water treatment and for reservoir filling.
4. Madison indicated bringing an old well back online in 2022 (0.35 MGD). Upper Oconee Basin Water Authority indicated they are in the preliminary stages for a partial expansion which would render a plant capacity of 26.5 MGD.
5. Municipal and publicly-supplied industrial demand by county were allocated to each QWS.
6. Walton County plans to install a surface water treatment plant.
7. Athens-Clarke County has three surface water permits, but their combined withdrawals are not to exceed this overall limit.
8. 5.0 MGD is for surface water; 2.5 MGD is for groundwater.
9. Statham has a 1 MGD 24-hour maximum surface water permit and 0.143 MGD 24-hour maximum spring water withdrawal permit.

Table 4-1
Total Water Demands

County	Qualified Water System	2015 ADD (MGD) (Water Withdrawal Only)	2015 Regular Purchased Volume - Outside County (MGD)[1]	2015 Regular Purchased Volume - Inside County (MGD)[1]	2015 Total Demand (MGD)	2050 Total Demand (MGD)
Clarke	Athens-Clarke County	12.12	0[(2)]	0.00	12.12	27.65
Baldwin	Baldwin County	0.00	1.82	0.00	1.82	1.92
Barrow	Barrow County	0.00	1.97	0.00	1.97	7.22
Jackson	Braselton	0.29	0.40	0.71	1.40	1.33
Jackson	Commerce	1.46	0.00	0.00	1.46	1.55
Laurens	Dublin	2.61	0.00	0.00	2.61	2.30
Putnam	Eatonton-Putnam County	0.00	0.00	0.89	0.89	1.50
Greene	Greensboro	0.64	0.00	0.00	0.64	0.45
Jackson	Jackson County	0.00	0.02	2.80	2.82	5.42
Jackson	Jefferson	1.13	0.00	0.02	1.15	1.92
Walton	Loganville	0.00	0.16	0.99	1.15	2.62
Morgan	Madison	1.18	0.00	0.00	1.18	1.41
Baldwin	Milledgeville	3.32	0.00	0.00	3.32	3.07
Walton	Monroe	2.40	0.00	0.00	2.40	5.23
Oconee	Oconee County-Watkinsville	0.15	2.38	0.00	2.53	4.30
Washington	Sandersville	1.63	0.00	0.00	1.63	0.94
Putnam	Sinclair Water Authority	2.73	0.00	0.00	2.73	2.67
Walton	Social Circle	0.50	0.00	0.02	0.53	0.83
Hancock	Sparta	0.76	0.00	0.00	0.76	0.22
Barrow	Statham	0.23	0.00	0.07	0.30	1.29
Jackson	Upper Oconee Basin Water Authority	7.17	0.00	0.00	7.17	15.06
Walton	Walton County	0.00	4.27	0.14	4.41	8.49
Barrow	Winder	4.12	0.00	0.01	4.13	13.22
	Totals	**42.44**	**11.02**	**5.66**	**59.12**	**110.61**

Prepared by: LCT 08/12/21
Checked by: GJH 08/17/21

Notes:
ADD - average daily demand
NA - not applicable because these are purchase-only QWS
MGD - million gallons per day
1. Values were reported by QWS, and aggregate volumes were verified with the 2015 EPD-validated water loss audit, as available.
2. In 2015, Athens - Clarke County imported 2.44 MGD of raw water from the Upper Oconee Basin Water Authority. It is reported as 0 MGD in this table, which reports treated water purchases.

Table 4-2
Reliability Targets for Current and Future Demand

			2015 - Immediate Reliability Target			2050 - Long-Range Reliability Target		
County	**Qualified Water System**	**Public Water System Identification Number**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**
Clarke	Athens-Clarke County	GA0590000	12.12	7.88	4.24	27.65	17.97	9.68
Baldwin	Baldwin County	GA0090000	1.82	1.18	0.64	1.92	1.25	0.67
Barrow	Barrow County	GA0130031	1.97	1.28	0.69	7.22	4.69	2.53
Jackson	Braselton	GA1570000	1.40	0.91	0.49	1.33	0.87	0.47
Jackson	Commerce	GA1570001	1.46	0.95	0.51	1.55	1.00	0.54
Laurens	Dublin	GA1750002	2.61	1.70	0.91	2.30	1.50	0.81
Putnam	Eatonton-Putnam County	GA2370000	0.89	0.58	0.31	1.50	0.98	0.53
Greene	Greensboro	GA1330000	0.64	0.42	0.23	0.45	0.29	0.16
Jackson	Jackson County	GA1570117	2.82	1.83	0.99	5.42	3.53	1.90
Jackson	Jefferson	GA1570003	1.15	0.75	0.40	1.92	1.25	0.67
Walton	Loganville	GA1350006	1.15	0.75	0.40	2.62	1.70	0.92
Morgan	Madison	GA2110002	1.18	0.76	0.41	1.41	0.92	0.49
Baldwin	Milledgeville	GA0090001	3.32	2.16	1.16	3.07	2.00	1.08
Walton	Monroe	GA2970001	2.40	1.56	0.84	5.23	3.40	1.83
Oconee	Oconee County-Watkinsville	GA2190000	2.53	1.64	0.88	4.30	2.80	1.51
Washington	Sandersville	GA3030005	1.63	1.06	0.57	0.94	0.61	0.33
Putnam	Sinclair Water Authority	GA2370087	2.73	1.77	0.96	2.67	1.73	0.93
Walton	Social Circle	GA2970002	0.53	0.34	0.18	0.83	0.54	0.29
Hancock	Sparta	GA1410001	0.76	0.50	0.27	0.22	0.14	0.08
Barrow	Statham	GA0130001	0.30	0.20	0.11	1.29	0.84	0.45
Jackson	Upper Oconee Basin Water Authority	GA1570121	7.17	4.66	2.51	15.06	9.79	5.27
Walton	Walton County	GA2970008	4.41	2.87	1.54	8.49	5.52	2.97
Barrow	Winder	GA0130002	4.13	2.68	1.45	13.22	8.59	4.63
Totals			**59.1**	**38.4**	**20.7**	**110.6**	**71.9**	**38.7**

Prepared by: LCT 08/12/21
Checked by: GJH 08/17/21

Notes:
ADD - average daily demand
MGD - million gallons per day
1. Total demand (withdrawal plus purchases) is defined the same as 100% annual average day demand.

Table 5-1
Water Supply Risks and Emergency Scenarios

Water Supply Risk	Emergency Scenario	Type	Duration (Days)	Evaluation Selection Criteria	Key Assumptions
A. Failure of largest water treatment plant (WTP)	A1. Power supply failure of largest WTP	Short-term Defined Duration	1	QWS that receive water from a system-owned WTP	- Treatment capacity is based on the backup generator's capacity, if available. Otherwise, 80% of peak treatment is assumed. - In the event a QWS has a portable generator, it is assumed that generator is used at the largest WTP, per this scenario - 60% of QWS treated water storage is available at the beginning of the emergency.
	A2. Critical asset failure at largest WTP (e.g., loss of clearwell, loss of chemical treatment)	Short-term Defined Duration	30		- The longer duration excludes the availability of water storage supply. - Each WTP was evaluated for unit process redundancy and the ability to operate at a higher rate. - Critical assets for groundwater QWS include chemical treatment. Backup chemical feed equipment is required for WTPs installed after 1/1/1998.
B. Short-term catastrophic failure of a water distribution system	Critical transmission main failure from largest WTP or interconnection	Short-term Defined Duration	1	QWS with a distribution system	- 60% of QWS treated water storage is available at the beginning of the emergency.
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers a boil water notice	Short-term Defined Duration	3	QWS with a distribution system	- No capacity is lost - Water is non-potable
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Short-term Defined Duration	1	QWS that pump from a raw water source	- In the case of groundwater QWS, the aquifer supplying the largest WTP is assumed to be locally contaminated. - 60% of QWS treated water storage is available at the beginning of the emergency. - 60% of QWS raw water storage and clearwell storage is available at the beginning of the emergency.
	D2. Chemical contamination of largest raw water source	Short-term Defined Duration	1		- In the case of groundwater QWS, the aquifer supplying the largest WTP is assumed to be locally contaminated. - 60% of QWS treated water storage is available at the beginning of the emergency. - 60% of QWS raw water storage and clearwell storage is available at the beginning of the emergency.
E. Full unavailability of major raw water sources due to federal or state government actions	--	Long-term Undefined Duration	>365	QWS that use Lake Lanier/Chattahoochee River or Allatoona Lake/Etowah River as a raw water source	- Not currently applicable
F. Limited or reduced availability of major raw water sources due to federal or state government actions	--	Long-term Undefined Duration	>365	QWS that use Lake Lanier/Chattahoochee River or Allatoona Lake/Etowah River as a raw water source	- Not currently applicable

Table 5-1
Water Supply Risks and Emergency Scenarios

Water Supply Risk	Emergency Scenario	Type	Duration (Days)	Evaluation Selection Criteria	Key Assumptions
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Short-term Defined Duration	30	QWS that have a raw water supply from a dammed reservoir (not including Lake Lanier or Lake Allatoona)	- The longer duration excludes the availability of water storage supply.
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Short-term Defined Duration	120	QWS with reservoirs in small watersheds and no direct withdrawal from a major river	- Available raw water supply for each QWS is 40% of ADD due to drought.

Prepared by: GJH 11/10/20
Checked by: LCT 11/19/20

Notes:
ADD - average daily demand
QWS - qualified water system
WTP - water treatment plant

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Clarke	Athens-Clarke County	A1	37.3	12.1	7.9	4.2	0.0	0.0	0.0	37.8	27.7	18.0	9.7	0.0	0.0	0.0
		A2	**0.0**	**12.1**	**7.9**	**4.2**	**12.1**	**7.9**	**4.2**	**0.0**	**27.7**	**18.0**	**9.7**	**27.7**	**18.0**	**9.7**
		B	2.6	12.1	7.9	4.2	9.6	5.3	1.7	3.0	27.7	18.0	9.7	24.7	15.0	6.7
		C	34.8	12.1	7.9	4.2	0.0	0.0	0.0	34.8	27.7	18.0	9.7	0.0	0.0	0.0
		D1	23.0	12.1	7.9	4.2	0.0	0.0	0.0	23.4	27.7	18.0	9.7	4.2	0.0	0.0
		D2	23.0	12.1	7.9	4.2	0.0	0.0	0.0	23.4	27.7	18.0	9.7	4.2	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	21.1	12.1	7.9	4.2	0.0	0.0	0.0	27.3	27.7	18.0	9.7	0.3	0.0	0.0
Baldwin	Baldwin County	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	9.8	1.8	1.2	0.6	0.0	0.0	0.0	10.1	1.9	1.2	0.7	0.0	0.0	0.0
		C	8.7	1.8	1.2	0.6	0.0	0.0	0.0	9.0	1.9	1.2	0.7	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barrow	Barrow County	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	6.5	2.0	1.3	0.7	0.0	0.0	0.0	**5.9**	**7.2**	**4.7**	**2.5**	**1.3**	0.0	0.0
		C	9.2	2.0	1.3	0.7	0.0	0.0	0.0	8.3	7.2	4.7	2.5	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Jackson	Braselton	A1	5.0	1.4	0.9	0.5	0.0	0.0	0.0	5.0	1.3	0.9	0.5	0.0	0.0	0.0
		A2	3.9	1.4	0.9	0.5	0.0	0.0	0.0	3.9	1.3	0.9	0.5	0.0	0.0	0.0
		B	5.0	1.4	0.9	0.5	0.0	0.0	0.0	5.0	1.3	0.9	0.5	0.0	0.0	0.0
		C	3.9	1.4	0.9	0.5	0.0	0.0	0.0	3.9	1.3	0.9	0.5	0.0	0.0	0.0
		D1	5.0	1.4	0.9	0.5	0.0	0.0	0.0	5.0	1.3	0.9	0.5	0.0	0.0	0.0
		D2	5.0	1.4	0.9	0.5	0.0	0.0	0.0	5.0	1.3	0.9	0.5	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jackson	Commerce	A1	8.6	1.5	0.9	0.5	0.0	0.0	0.0	9.2	1.5	1.0	0.5	0.0	0.0	0.0
		A2	3.8	1.5	0.9	0.5	0.0	0.0	0.0	3.8	1.5	1.0	0.5	0.0	0.0	0.0
		B	4.6	1.5	0.9	0.5	0.0	0.0	0.0	5.2	1.5	1.0	0.5	0.0	0.0	0.0
		C	7.9	1.5	0.9	0.5	0.0	0.0	0.0	7.9	1.5	1.0	0.5	0.0	0.0	0.0
		D1	4.9	1.5	0.9	0.5	0.0	0.0	0.0	5.5	1.5	1.0	0.5	0.0	0.0	0.0
		D2	4.9	1.5	0.9	0.5	0.0	0.0	0.0	5.5	1.5	1.0	0.5	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	3.8	1.5	0.9	0.5	0.0	0.0	0.0	3.8	1.5	1.0	0.5	0.0	0.0	0.0
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Laurens	Dublin	A1	6.1	2.6	1.7	0.9	0.0	0.0	0.0	6.7	2.3	1.5	0.8	0.0	0.0	0.0
		A2	6.8	2.6	1.7	0.9	0.0	0.0	0.0	6.8	2.3	1.5	0.8	0.0	0.0	0.0
		B	3.4	2.6	1.7	0.9	0.0	0.0	0.0	4.0	2.3	1.5	0.8	0.0	0.0	0.0
		C	6.8	2.6	1.7	0.9	0.0	0.0	0.0	6.8	2.3	1.5	0.8	0.0	0.0	0.0
		D1	4.0	2.6	1.7	0.9	0.0	0.0	0.0	4.6	2.3	1.5	0.8	0.0	0.0	0.0
		D2	4.0	2.6	1.7	0.9	0.0	0.0	0.0	4.6	2.3	1.5	0.8	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Putnam	Eatonton-Putnam County	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	1.1	0.9	0.6	0.3	0.0	0.0	0.0	**1.4**	**1.5**	**1.0**	**0.5**	**0.1**	0.0	0.0
		C	3.4	0.9	0.6	0.3	0.0	0.0	0.0	3.4	1.5	1.0	0.5	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Greene	Greensboro	A1	0.7	0.6	0.4	0.2	0.0	0.0	0.0	0.7	0.4	0.3	0.2	0.0	0.0	0.0
		A2	**0.0**	**0.6**	**0.4**	**0.2**	**0.6**	**0.4**	**0.2**	**0.0**	**0.4**	**0.3**	**0.2**	**0.4**	**0.3**	**0.2**
		B	0.7	0.6	0.4	0.2	0.0	0.0	0.0	0.7	0.4	0.3	0.2	0.0	0.0	0.0
		C	1.6	0.6	0.4	0.2	0.0	0.0	0.0	1.6	0.4	0.3	0.2	0.0	0.0	0.0
		D1	1.0	0.6	0.4	0.2	0.0	0.0	0.0	1.0	0.4	0.3	0.2	0.0	0.0	0.0
		D2	1.0	0.6	0.4	0.2	0.0	0.0	0.0	1.0	0.4	0.3	0.2	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	0.0	0.6	0.4	0.2	0.6	0.4	0.2	0.0	0.4	0.3	0.2	0.4	0.3	0.2
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jackson	Jackson County	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	5.5	2.8	1.8	1.0	0.0	0.0	0.0	5.4	5.4	3.5	1.9	0.0	0.0	0.0
		C	16.9	2.8	1.8	1.0	0.0	0.0	0.0	16.6	5.4	3.5	1.9	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Jackson	Jefferson	A1	2.0	1.2	0.7	0.4	0.0	0.0	0.0	2.3	1.9	1.2	0.7	0.0	0.0	0.0
		A2	4.0	1.2	0.7	0.4	0.0	0.0	0.0	4.0	1.9	1.2	0.7	0.0	0.0	0.0
		B	2.0	1.2	0.7	0.4	0.0	0.0	0.0	2.3	1.9	1.2	0.7	0.0	0.0	0.0
		C	4.0	1.2	0.7	0.4	0.0	0.0	0.0	4.0	1.9	1.2	0.7	0.0	0.0	0.0
		D1	5.0	1.2	0.7	0.4	0.0	0.0	0.0	5.3	1.9	1.2	0.7	0.0	0.0	0.0
		D2	5.0	1.2	0.7	0.4	0.0	0.0	0.0	5.3	1.9	1.2	0.7	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	4.0	1.2	0.7	0.4	0.0	0.0	0.0	4.0	1.9	1.2	0.7	0.0	0.0	0.0
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Walton	Loganville	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	5.5	1.2	0.7	0.4	0.0	0.0	0.0	5.5	2.6	1.7	0.9	0.0	0.0	0.0
		C	7.5	1.2	0.7	0.4	0.0	0.0	0.0	7.5	2.6	1.7	0.9	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Morgan	Madison	A1	2.4	1.2	0.8	0.4	0.0	0.0	0.0	4.8	1.4	0.9	0.5	0.0	0.0	0.0
		A2	3.5	1.2	0.8	0.4	0.0	0.0	0.0	3.9	1.4	0.9	0.5	0.0	0.0	0.0
		B	2.4	1.2	0.8	0.4	0.0	0.0	0.0	2.8	1.4	0.9	0.5	0.0	0.0	0.0
		C	3.5	1.2	0.8	0.4	0.0	0.0	0.0	3.9	1.4	0.9	0.5	0.0	0.0	0.0
		D1	6.3	1.2	0.8	0.4	0.0	0.0	0.0	6.6	1.4	0.9	0.5	0.0	0.0	0.0
		D2	6.3	1.2	0.8	0.4	0.0	0.0	0.0	6.6	1.4	0.9	0.5	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	1.5	1.2	0.8	0.4	0.0	0.0	0.0	1.9	1.4	0.9	0.5	0.0	0.0	0.0
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Baldwin	Milledgeville	A1	18.3	3.3	2.2	1.2	0.0	0.0	0.0	18.4	3.1	2.0	1.1	0.0	0.0	0.0
		A2	15.7	3.3	2.2	1.2	0.0	0.0	0.0	15.8	3.1	2.0	1.1	0.0	0.0	0.0
		B	9.7	3.3	2.2	1.2	0.0	0.0	0.0	9.7	3.1	2.0	1.1	0.0	0.0	0.0
		C	15.7	3.3	2.2	1.2	0.0	0.0	0.0	15.8	3.1	2.0	1.1	0.0	0.0	0.0
		D1	7.6	3.3	2.2	1.2	0.0	0.0	0.0	7.7	3.1	2.0	1.1	0.0	0.0	0.0
		D2	7.6	3.3	2.2	1.2	0.0	0.0	0.0	7.7	3.1	2.0	1.1	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Walton	Monroe	A1	9.5	2.4	1.6	0.8	0.0	0.0	0.0	9.5	5.2	3.4	1.8	0.0	0.0	0.0
		A2	7.8	2.4	1.6	0.8	0.0	0.0	0.0	7.8	5.2	3.4	1.8	0.0	0.0	0.0
		B	8.7	2.4	1.6	0.8	0.0	0.0	0.0	8.7	5.2	3.4	1.8	0.0	0.0	0.0
		C	17.8	2.4	1.6	0.8	0.0	0.0	0.0	17.8	5.2	3.4	1.8	0.0	0.0	0.0
		D1	20.7	2.4	1.6	0.8	0.0	0.0	0.0	20.7	5.2	3.4	1.8	0.0	0.0	0.0
		D2	20.7	2.4	1.6	0.8	0.0	0.0	0.0	20.7	5.2	3.4	1.8	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	17.8	2.4	1.6	0.8	0.0	0.0	0.0	17.8	5.2	3.4	1.8	0.0	0.0	0.0
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oconee	Oconee County - Watkinsville	A1	14.0	2.5	1.6	0.9	0.0	0.0	0.0	14.4	4.3	2.8	1.5	0.0	0.0	0.0
		A2	14.0	2.5	1.6	0.9	0.0	0.0	0.0	13.1	4.3	2.8	1.5	0.0	0.0	0.0
		B	9.8	2.5	1.6	0.9	0.0	0.0	0.0	14.4	4.3	2.8	1.5	0.0	0.0	0.0
		C	13.1	2.5	1.6	0.9	0.0	0.0	0.0	8.6	4.3	2.8	1.5	0.0	0.0	0.0
		D1	14.0	2.5	1.6	0.9	0.0	0.0	0.0	14.4	4.3	2.8	1.5	0.0	0.0	0.0
		D2	14.0	2.5	1.6	0.9	0.0	0.0	0.0	14.4	4.3	2.8	1.5	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Washington	Sandersville	A1	5.4	1.6	1.1	0.6	0.0	0.0	0.0	5.4	0.9	0.6	0.3	0.0	0.0	0.0
		A2	4.8	1.6	1.1	0.6	0.0	0.0	0.0	4.8	0.9	0.6	0.3	0.0	0.0	0.0
		B	3.3	1.6	1.1	0.6	0.0	0.0	0.0	3.3	0.9	0.6	0.3	0.0	0.0	0.0
		C	4.8	1.6	1.1	0.6	0.0	0.0	0.0	4.8	0.9	0.6	0.3	0.0	0.0	0.0
		D1	4.2	1.6	1.1	0.6	0.0	0.0	0.0	4.2	0.9	0.6	0.3	0.0	0.0	0.0
		D2	4.2	1.6	1.1	0.6	0.0	0.0	0.0	4.2	0.9	0.6	0.3	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Putnam	Sinclair Water Authority	A1	6.0	2.7	1.8	1.0	0.0	0.0	0.0	6.0	2.7	1.7	0.9	0.0	0.0	0.0
		A2	6.0	2.7	1.8	1.0	0.0	0.0	0.0	6.0	2.7	1.7	0.9	0.0	0.0	0.0
		B	0.0	2.7	1.8	1.0	2.7	1.8	1.0	0.0	2.7	1.7	0.9	2.7	1.7	0.9
		C	6.0	2.7	1.8	1.0	0.0	0.0	0.0	6.0	2.7	1.7	0.9	0.0	0.0	0.0
		D1	1.2	2.7	1.8	1.0	1.5	0.6	0.0	1.2	2.7	1.7	0.9	1.5	0.5	0.0
		D2	1.2	2.7	1.8	1.0	1.5	0.6	0.0	1.2	2.7	1.7	0.9	1.5	0.5	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	**0.0**	**2.7**	**1.8**	**1.0**	**2.7**	**1.8**	**1.0**	**0.0**	**2.7**	**1.7**	**0.9**	**2.7**	**1.7**	**0.9**
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Walton	Social Circle	A1	2.2	0.5	0.3	0.2	0.0	0.0	0.0	3.0	0.8	0.5	0.3	0.0	0.0	0.0
		A2	1.1	0.5	0.3	0.2	0.0	0.0	0.0	1.1	0.8	0.5	0.3	0.0	0.0	0.0
		B	2.2	0.5	0.3	0.2	0.0	0.0	0.0	2.2	0.8	0.5	0.3	0.0	0.0	0.0
		C	2.1	0.5	0.3	0.2	0.0	0.0	0.0	2.1	0.8	0.5	0.3	0.0	0.0	0.0
		D1	2.3	0.5	0.3	0.2	0.0	0.0	0.0	2.3	0.8	0.5	0.3	0.0	0.0	0.0
		D2	2.3	0.5	0.3	0.2	0.0	0.0	0.0	2.3	0.8	0.5	0.3	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	1.3	0.5	0.3	0.2	0.0	0.0	0.0	1.5	0.8	0.5	0.3	0.0	0.0	0.0

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Hancock	Sparta	A1	2.6	0.8	0.5	0.3	0.0	0.0	0.0	2.6	0.2	0.1	0.1	0.0	0.0	0.0
		A2	2.0	0.8	0.5	0.3	0.0	0.0	0.0	2.0	0.2	0.1	0.1	0.0	0.0	0.0
		B	0.6	0.8	0.5	0.3	0.2	0.0	0.0	0.6	0.2	0.1	0.1	0.0	0.0	0.0
		C	2.0	0.8	0.5	0.3	0.0	0.0	0.0	2.0	0.2	0.1	0.1	0.0	0.0	0.0
		D1	1.1	0.8	0.5	0.3	0.0	0.0	0.0	1.1	0.2	0.1	0.1	0.0	0.0	0.0
		D2	1.1	0.8	0.5	0.3	0.0	0.0	0.0	1.1	0.2	0.1	0.1	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	**0.0**	**0.8**	**0.5**	**0.3**	**0.8**	**0.5**	**0.3**	**0.0**	**0.2**	**0.1**	**0.1**	**0.2**	**0.1**	**0.1**
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barrow	Statham	A1	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.3	1.3	0.8	0.5	1.0	0.6	0.2
		A2	**0.2**	**0.3**	**0.2**	**0.1**	**0.1**	0.0	0.0	**0.1**	**1.3**	**0.8**	**0.5**	**1.2**	**0.7**	**0.4**
		B	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.3	1.3	0.8	0.5	1.0	0.6	0.2
		C	1.2	0.3	0.2	0.1	0.0	0.0	0.0	1.1	1.3	0.8	0.5	0.2	0.0	0.0
		D1	0.6	0.3	0.2	0.1	0.0	0.0	0.0	0.5	1.3	0.8	0.5	0.8	0.4	0.0
		D2	0.6	0.3	0.2	0.1	0.0	0.0	0.0	0.5	1.3	0.8	0.5	0.8	0.4	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.1	1.3	0.8	0.5	1.2	0.7	0.4
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jackson	Upper Oconee Basin Water Authority	A1	0.0	7.2	4.7	2.5	7.2	4.7	2.5	0.0	15.1	9.8	5.3	15.1	9.8	5.3
		A2	21.0	7.2	4.7	2.5	0.0	0.0	0.0	26.5	15.1	9.8	5.3	0.0	0.0	0.0
		B	0.0	7.2	4.7	2.5	7.2	4.7	2.5	0.0	15.1	9.8	5.3	15.1	9.8	5.3
		C	21.0	7.2	4.7	2.5	0.0	0.0	0.0	26.5	15.1	9.8	5.3	0.0	0.0	0.0
		D1	2.4	7.2	4.7	2.5	4.8	2.3	0.1	2.4	15.1	9.8	5.3	12.7	7.4	2.9
		D2	2.4	7.2	4.7	2.5	4.8	2.3	0.1	2.4	15.1	9.8	5.3	12.7	7.4	2.9
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	**0.0**	**7.2**	**4.7**	**2.5**	**7.2**	**4.7**	**2.5**	**0.0**	**15.1**	**9.8**	**5.3**	**15.1**	**9.8**	**5.3**
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5-2
Deficit Summary

				2015 - Immediate Reliability Target			2015 - Deficits				2050 - Long-Range Reliability Target			2050 - Deficits		
County	**Qualified Water System**	**Scenario**	**2015 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**	**2050 Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
Walton	Walton County	A1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		A2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		B	12.5	4.4	2.9	1.5	0.0	0.0	0.0	12.1	8.5	5.5	3.0	0.0	0.0	0.0
		C	13.2	4.4	2.9	1.5	0.0	0.0	0.0	12.5	8.5	5.5	3.0	0.0	0.0	0.0
		D1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		D2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barrow	Winder	A1	21.1	4.1	2.7	1.4	0.0	0.0	0.0	21.1	13.2	8.6	4.6	0.0	0.0	0.0
		A2	10.0	4.1	2.7	1.4	0.0	0.0	0.0	15.9	13.2	8.6	4.6	0.0	0.0	0.0
		B	14.9	4.1	2.7	1.4	0.0	0.0	0.0	21.1	13.2	8.6	4.6	0.0	0.0	0.0
		C	16.2	4.1	2.7	1.4	0.0	0.0	0.0	15.9	13.2	8.6	4.6	0.0	0.0	0.0
		D1	22.0	4.1	2.7	1.4	0.0	0.0	0.0	22.0	13.2	8.6	4.6	0.0	0.0	0.0
		D2	22.0	4.1	2.7	1.4	0.0	0.0	0.0	22.0	13.2	8.6	4.6	0.0	0.0	0.0
		E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Notes:
ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant
1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.
= Critical Scenario Deficit

Table 6-1
Emergency Scenarios and Potential Internal Infrastructure Redundancy Projects

				Relevant Considerations		
Water Supply Risk	**Emergency Scenario**	**Internal Infrastructure Redundancy Project**	**Potential Environmental Impacts**	**Withdrawal Permit Impacts**	**Water Quality Impacts**	**Community Impacts**
A. Failure of largest water treatment plant (WTP)	A1. Power supply failure of largest WTP	Backup Generator	◊	-	-	-
	A2. Critical asset failure at largest WTP (e.g., loss of clearwell, loss of chemical treatment)	Unit Process Redundancy	-	-	-	-
B. Short-term catastrophic failure of a water distribution system	Critical transmission main failure from largest WTP or interconnection	-	-	-	-	-
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers a boil water notice	-	-	-	-	-
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	New Well/pumps New WTP New Surface Water Source Raw water transmission main	◊	◊	◊	◊
	D2. Chemical contamination of largest raw water source	New Well/pumps New WTP New Surface Water Source Raw water transmission main	◊	◊	◊	◊
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	New Well/pumps New WTP New Surface Water Source Raw water transmission main	◊	◊	◊	◊
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	New Well New WTP New Surface Water Source	◊	◊	◊	◊

Prepared by: GJH 02/11/21
Checked by: LCT 03/25/21

Notes:
ADD - average daily demand
WTP - water treatment plant

Table 6-2
Potential Projects and Details

							System Impacts		
County	**Qualified Water System**	**Project Number**	**Potential Project Description**	**Emergency Scenario(s) Addressed**	**Maximum Capacity Added (MGD)**	**Potential Environmental Impacts**	**Withdrawal Permit / Purchased Water Impacts**	**Water Quality Impacts**	**Community Impacts**
Clarke	Athens-Clarke County	1	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	A1, A2, B, D1, D2, H	1.13	Low: less than 200 ft excavation	Athens-Clarke County: low Jackson County: low	High[2]	Medium-low: excavation less than 200 feet; multijurisdictional agreement.
		2	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow[1]	A1, A2, B, D1, D2, H	2.54	Low: less than 200 ft excavation	Athens-Clarke County: NA Oconee County-Watkinsville: low	High[2]	Medium-low: excavation less than 200 feet; multijurisdictional agreement.
Baldwin	Baldwin County	-	No recommended project	-	-	-	-	-	-
Barrow	Barrow County	-	No recommended project	-	-	-	-	-	-
Jackson	Braselton	-	No recommended project	-	-	-	-	-	-
Jackson	Commerce	-	No recommended project	-	-	-	-	-	-
Laurens	Dublin	-	No recommended project	-	-	-	-	-	-
Putnam	Eatonton-Putnam County		No recommended project	-	-	-	-	-	-
Greene	Greensboro	3	New Well and WTP	A1, A2, B, D1, D2, G	0.50[(3)]	Medium-low: less than 200 ft excavation; no regional groundwater resource gaps for crystalline rock aquifer	NA[4]	Low	Medium-low: offsite excavation less than 200 ft
Jackson	Jackson County	1	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	B	1.13	Low: less than 200 ft excavation	Athens-Clarke County: low Jackson County: low	High[2]	Medium-low: excavation less than 200 feet; multijurisdictional agreement.
Jackson	Jefferson	-	No recommended project	-	-	-	-	-	-
Walton	Loganville	-	No recommended project	-	-	-	-	-	-
Morgan	Madison	-	No recommended project	-	-	-	-	-	-
Baldwin	Milledgeville	-	No recommended project	-	-	-	-	-	-
Walton	Monroe	-	No recommended project	-	-	-	-	-	-
Oconee	Oconee County-Watkinsville	-	No recommended project	-	-	-	-	-	-
Washington	Sandersville	-	No recommended project	-	-	-	-	-	-
Putnam	Sinclair Water Authority	4	New generators: WTP	A1	6.0	Low	NA	NA	Low
Walton	Social Circle	-	No recommended project	-	-	-	-	-	-
Hancock	Sparta	5	New Well and WTP	A1, A2, B, D1, D2, G	0.50[(3)]	Medium-low: less than 200 ft excavation; no regional groundwater resource gaps for crystalline rock aquifer	NA[4]	Low	Medium-low: offsite excavation less than 200 ft
Barrow	Statham	6	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow[5]	A1, A2, B, D1, D2, G	1.26	Low: less than 200 ft excavation	Statham: NA Barrow County: medium-low	High[2]	Medium-low: excavation less than 200 feet; multijurisdictional agreement.

Table 6-2
Potential Projects and Details

							System Impacts		
County	**Qualified Water System**	**Project Number**	**Potential Project Description**	**Emergency Scenario(s) Addressed**	**Maximum Capacity Added (MGD)**	**Potential Environmental Impacts**	**Withdrawal Permit / Purchased Water Impacts**	**Water Quality Impacts**	**Community Impacts**
Jackson	Upper Oconee Basin Water Authority	7	New raw water transmission main: 1 mile	D1, D2, G	18.7	High: more than 5000 ft excavation	NA	NA	High: more than 5000 ft excavation
Walton	Walton County	-	No recommended project	-	-	-	-	-	-
Barrow	Winder	-	No recommended project	-	-	-	-	-	-

Prepared by: GJH 10/13/21
Checked by: LCT 10/18/21

Notes:

ft - feet
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. This is currently a one-way interconnection into Oconee County-Watkinsville. The upgrade would reverse flow through an existing 8-inch diameter interconnection.
2. This designation is based on comparing the recepient's treatment to the suppliers' primary supplier: Upper Oconee Basin Water Authority.
3. This value was estimated based on QWS-specific information.
4. The system would need a new groundwater withdrawal permit.
5. These are currently one-way interconnections into Barrow County. The upgrade would reverse flow through two existing 6-inch diameter interconnections.

Table 6-3
Interconnection Project Capacity Added

Project Number	Potential Project Description	Water System Involved	Pipe Diameter (inches) [No. of Pipes]	Average Pressure (psi)	2050 Excess Capacity (MGD)	Maximum Capacity Added (MGD)[1]
1	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	Athens-Clarke County	8	120-127	7.1	1.13
		Jackson County	8	116-155	16.6[(2)]	1.13
2	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	Athens-Clarke County	12	120-127	7.1	2.54
		Oconee County-Watkinsville	12	101	3.9[(3)]	0.00
6	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	Statham	6 [x2]	80	-0.2	1.26
		Barrow County	6 [x2]	53-100	8.4[(2)]	0.00

Prepared by: GJH 10/13/21
Checked by: LCT 10/28/21

Notes:
MGD - million gallons per day
NA - not applicable
psi - pound-force per square inch

1. In the case of a project benefitting one system, the supplier's maximum capacity added is 0 MGD.
2. For purchase-only QWS, their suppliers' cumulative 2050 excess capacity is reported.
3. This system has a negative 2050 excess capacity, which was subtracted from their suppliers' cumulative 2050 excess capacity.

Table 6-4
Planning-Level Costs for Potential Projects

Project Number	Qualified Water System(s) Benefitted	Potential Project Description	Maximum Capacity Added (MGD)	Length of Pipes (ft)	Project Specifics [Number of Pipes]	Estimated Unit Cost ($)	Additional Cost Items	Additional Cost ($)	Total Estimated Cost ($)	Macro-Level Project Timeframe
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	1.13	100	8-inch diameter DIP	$ 170	(1) control valve station	$ 39,050	$ 56,100	12 months
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	2.54	-	12-inch diameter DIP	-	-	-	$ 50,000	12 months
3	Greensboro	New Well and WTP	0.50	175	6-inch diameter DIP	$ 140	(1) new groundwater source (1) new WTP (1) 200 KW generator	$ 2,106,300	$ 2,130,800	12 months
4	Sinclair Water Authority	New generators: WTP	6.00	-	-	-	(2) 400 KW generator	$ 274,000	$ 274,000	6 months
5	Sparta	New Well and WTP	0.50	175	6-inch diameter DIP	$ 140	(1) new groundwater source (1) new WTP (1) 200 KW generator	$ 2,106,300	$ 2,130,800	12 months
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	1.26	-	6-inch diameter DIP [x2]	-	-	-	$ 100,000	12 months
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	18.65	5280	42-inch diameter DIP	$ 1,320	-	-	$ 6,969,600	12 months

Prepared by: GJH 10/26/21
Checked by: LCT 10/28/21

Notes:
DIP - ductile iron pipe
ft - feet
gpm - gallons per minute
HP - horsepower
KW - kilowatts
MGD - million gallons per day
WTP - water treatment plant

Table 7-1
Potential Project Scoring Criteria Matrix

		Assigned Score				
	Criterion	**1**	**2**	**3**	**4**	**Weighting**
1	Systems Benefitted	One (Internal Project)	Mutually Benefits One Non-QWS	Mutually Benefits Two or More Non-QWS	Mutually Benefits Another QWS	1
2	Population Benefitted	<10,000	10,000 - 25,000	25,000 - 100,000	>100,000	3
3	Critical Scenario Duration (days)	1	3	30	120	1
4	Added Capacity as a Percent of Total Demand (%)	0-25%	26-50%	50-76%	>76%	2
5	Cost ($)	> $2,000,000	$1,000,000 - $2,000,000	$150,000 - $1,000,000	< $150,000	3
6	Potential Environmental Impacts	High	Medium-high	Medium-low	Low	3
7	Potential System and Community Impacts	High	Medium-high	Medium-low	Low	3
8	Excess Capacity Index	Positive Excess Capacity >0.5	Positive Excess Capacity <0.5	Negative Excess Capacity	No Excess Capacity	2

Prepared by: GJH 10/26/21
Checked by: LCT 10/28/21

Notes:
QWS - qualified water system

Table 7-2
Potential Project Criteria Scores and Weight Calculations

			1: Systems Benefitted		2: Population Benefitted		3: Critical Scenario Duration	
Project Number	**Water System(s) Benefitted**	**Potential Project Description**	**Water System(s) Benefitted**	**Score: Systems Benefitted**	**Population Benefitted**	**Score: Population Benefitted**	**Emergency Scenario(s) Addressed**	**Score: Critical Scenario Duration**
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	Athens-Clarke County Jackson County	4	149,800	4	A1, A2, B, D1, D2, H	4
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	Athens-Clarke County	1	121,000	4	A1, A2, B, D1, D2, H	4
3	Greensboro	New Well and WTP	Greensboro	1	3,500	1	A1, A2, B, D1, D2, G	3
4	Sinclair Water Authority	New generators: WTP	Sinclair Water Authority[1]	1	25,800	3	A1	1
5	Sparta	New Well and WTP	Sparta	1	4,800	1	A1, A2, B, D1, D2, G	3
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	Statham	1	4,500	1	A1, A2, B, D1, D2, G	3
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	Upper Oconee Basin Water Authority[1]	1	79,900	3	D1, D2, G	3

Notes:
MGD - million gallons per day
NA - not applicable
WTP - water treatment plant
1. This QWS is a wholesale water provider, benefitting other QWS. Because these are internal infrastructure redundancy projects, the benefits to other QWS are captured in the population benefitted.

Table 7-2
Potential Project Criteria Scores and Weight Calculations

			4: Added Capacity as a Percent of Total Demand					5: Cost	
Project Number	**Water System(s) Benefitted**	**Potential Project Description**	**Maximum Capacity Added (MGD)**	**2050 Total Demand (MGD)**	**Capacity as a Percent of Total Demand (%)**	**Individual Scores**	**Score: Added Capacity as a Percent of Total Demand**	**Cost ($)**	**Score: Cost**
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	1.13	Athens-Clarke County: 27.65 Jackson County: 5.42	Athens-Clarke County: 4% Jackson County: 21%	Athens-Clarke County: 1 Jackson County: 1	1	$ 56,100	4
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	2.54	Athens-Clarke County: 27.65	9%	-	1	$ 50,000	4
3	Greensboro	New Well and WTP	0.50	0.45	111%	-	4	$ 2,130,800	1
4	Sinclair Water Authority	New generators: WTP	6.00	2.67	225%	-	4	$ 274,000	3
5	Sparta	New Well and WTP	0.50	0.22	225%	-	4	$ 2,130,800	1
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	1.26	1.29	97%	-	4	$ 100,000	4
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	18.65	15.06	124%	-	4	$ 6,969,600	1

Notes:
MGD - million gallons per day
NA - not applicable
WTP - water treatment plant
1. This QWS is a wholesale water provider, benefitting other QWS. Becau

Table 7-2
Potential Project Criteria Scores and Weight Calculations

			6: Potential Environmental Impacts		7: Potential System and Community Impacts				
Project Number	**Water System(s) Benefitted**	**Potential Project Description**	**Potential Environmental Impacts**	**Score: Potential Environmental Impacts**	**Withdrawal Permit / Purchased Water Impacts**	**Water Quality Impacts**	**Community Impacts**	**Individual Scores**	**Score: Community Impacts**
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	Low	4	Athens-Clarke County: low Jackson County: low	High	Medium-low	Withdrawal: (4+4)/2 = 4 Water Quality: 1 Community: 3	2.67
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	Low	4	Oconee County-Watkinsville: low	High	Medium-low	Withdrawal: 4 Water Quality: 1 Community: 3	2.67
3	Greensboro	New Well and WTP	Medium-low	3	NA	Low	Medium-low	Water Quality: 4 Community: 3	3.5
4	Sinclair Water Authority	New generators: WTP	Low	4	NA	NA	Low	Community: 4	4
5	Sparta	New Well and WTP	Medium-low	3	NA	Low	Medium-low	Water Quality: 4 Community: 3	3.5
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	Low	4	Barrow County: medium low	High	Medium-low	Withdrawal: 3 Water Quality: 1 Community: 3	2.33
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	High	1	NA	NA	High	Community: 1	1

Notes:
MGD - million gallons per day
NA - not applicable
WTP - water treatment plant
1. This QWS is a wholesale water provider, benefitting other QWS. Becau

Table 7-2
Potential Project Criteria Scores and Weight Calculations

			8: Excess Capacity Index				Weighing Calculation								
Project Number	**Water System(s) Benefitted**	**Potential Project Description**	**2050 Excess Capacity Index**	**Individual Scores**	**Score: Excess Capacity Index**	**Absolute Score**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Weighted Score**
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	Athens-Clarke County: (-) Jackson County: NA	-	3	3.33	4	12	4	2	12	12	8	6	7.50
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	Athens-Clarke County: (-)	-	3	2.96	1	12	4	2	12	12	8	6	7.13
3	Greensboro	New Well and WTP	(+) > 0.5	-	1	2.19	1	3	3	8	3	9	10.5	2	4.94
4	Sinclair Water Authority	New generators: WTP	(+) < 0.5	-	2	2.75	1	9	1	8	9	12	12	4	7.00
5	Sparta	New Well and WTP	(+) > 0.5	-	1	2.19	1	3	3	8	3	9	10.5	2	4.94
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	Statham: none	-	4	2.92	1	3	3	8	12	12	7	8	6.75
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	(-)	-	3	2.13	1	9	3	8	3	3	3	6	4.50

Prepared by: GJH 10/26/21
Checked by: LCT 10/28/21

Notes:
MGD - million gallons per day
NA - not applicable
WTP - water treatment plant
1. This QWS is a wholesale water provider, benefitting other QWS. Becau

Table 7-3
Potential Project Decision-Making Summary

Project Number	Water System(s) Benefitted	Potential Project Description	Cost Per 1 MGD Yield ($/MGD)	Cost Per Individual Supplied ($/capita)	Absolute Score	Weighted Score	Manual Rank
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	$ 49,646	$ 0.37	3.33	7.50	1
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	$ 19,685	$ 0.41	2.96	7.13	2
3	Greensboro	New Well and WTP	$ 4,261,600	$ 608.80	2.19	4.94	6
4	Sinclair Water Authority	New generators: WTP	$ 45,667	$ 10.62	2.75	7.00	3
5	Sparta	New Well and WTP	$ 4,261,600	$ 443.92	2.19	4.94	5
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	$ 79,365	$ 22.22	2.92	6.75	4
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	$ 373,705	$ 87.23	2.13	4.50	7

Prepared by: GJH 10/26/21
Checked by: LCT 10/28/21

Notes:
WTP - water treatment plant

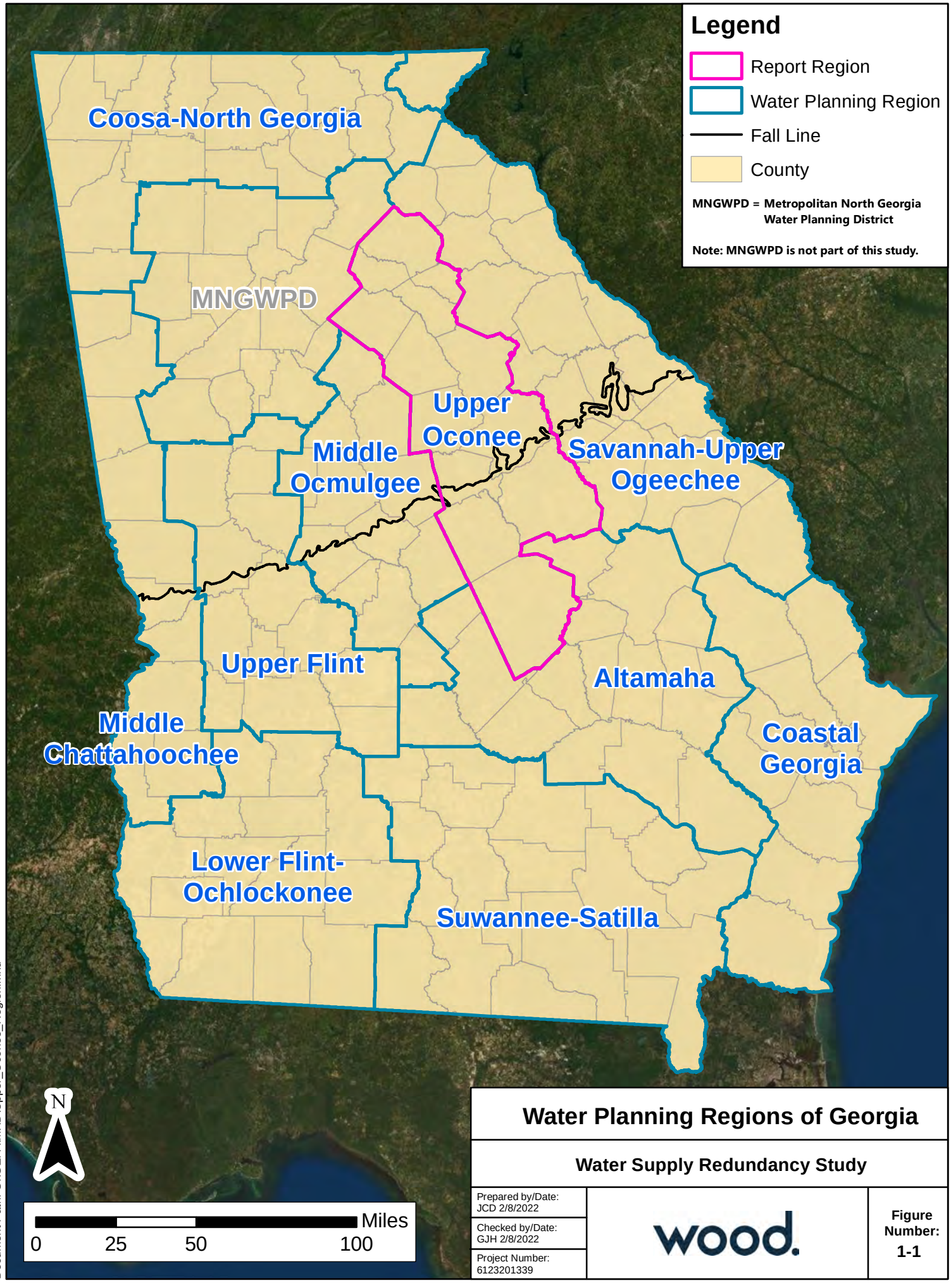
Table 7-4
Potential Projects Sorted by Final Rank Order

Project Number	Water System(s) Benefitted	Potential Project Description	Cost ($)	Final Rank
1	Athens-Clarke County Jackson County	Interconnection: Athens-Clarke County & Jackson County; U.S. Hwy 441 at county line	$ 56,100	1
2	Athens-Clarke County	Upgrade existing interconnection: Athens-Clarke County & Oconee County-Watkinsville; U.S. Hwy 441 at county line; ability to reverse flow	$ 50,000	2
4	Sinclair Water Authority	New generators: WTP	$ 274,000	3
6	Statham	Upgrade two existing interconnections: Statham & Barrow County; Pleasant Hill Church Road; Hwy 211; ability to reverse flow	$ 100,000	4
5	Sparta	New Well and WTP	$ 2,130,800	5
3	Greensboro	New Well and WTP	$ 2,130,800	6
7	Upper Oconee Basin Water Authority	New raw water transmission main: 1 mile	$ 6,969,600	7

Prepared by: GJH 10/26/21
Checked by: LCT 10/28/21

Notes:
WTP - water treatment plant

FIGURES

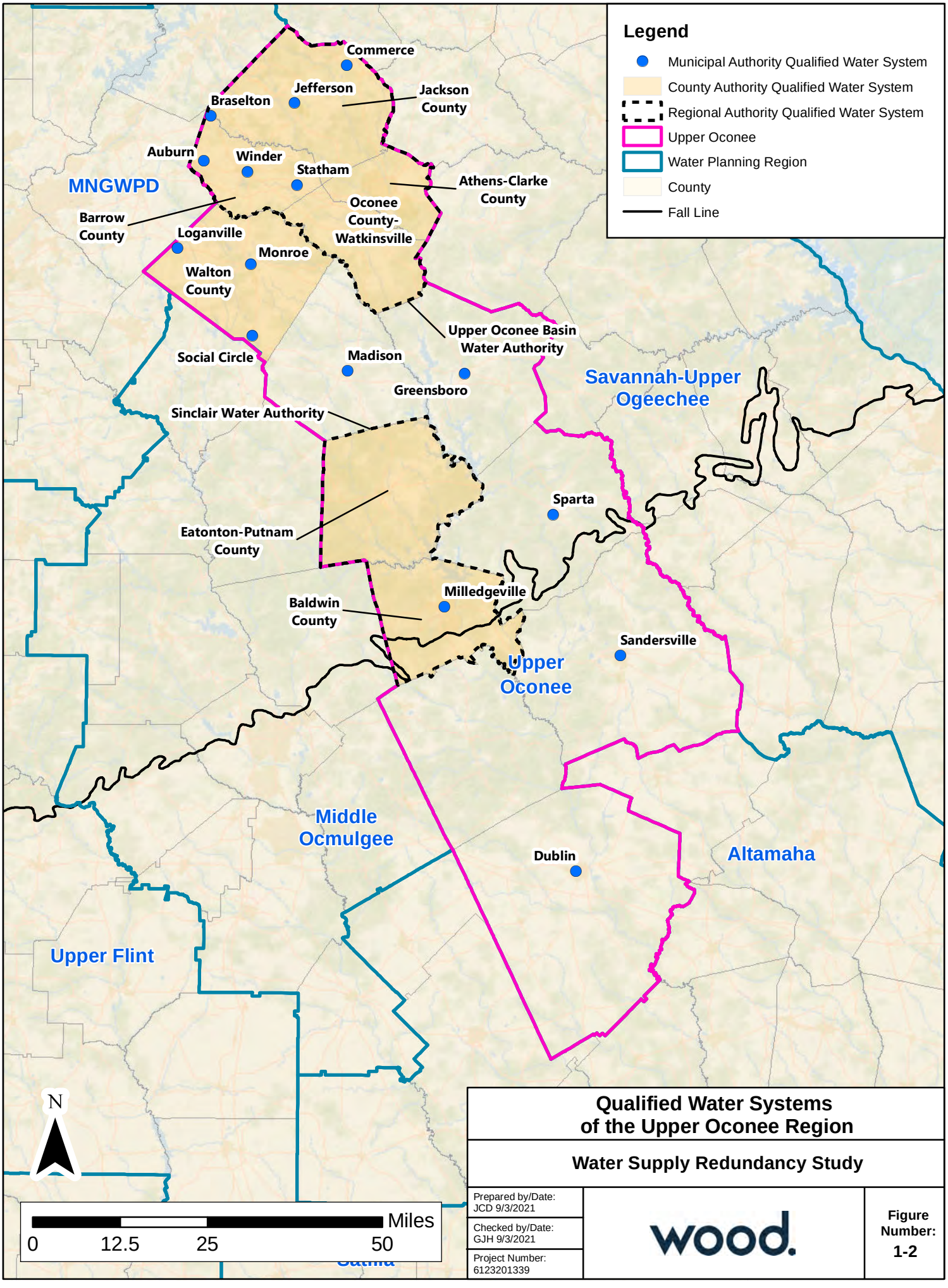


Water Planning Regions of Georgia

Water Supply Redundancy Study

Prepared by/Date: JCD 2/8/2022	wood.	Figure Number: 1-1
Checked by/Date: GJH 2/8/2022		
Project Number: 6123201339		

Document Path: G:\GEFA\MXD\Upper_Oconee_Region.mxd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Municipal Authority Qualified Water System
County Authority Qualified Water System
Regional Authority Qualified Water System
Upper Oconee
Water Planning Region
County
Fall Line
Commerce
Jefferson
Jackson County
Braselton
Auburn
Winder
Statham
Athens-Clarke County
MNGWPD
Oconee County-Watkinsville
Barrow County
Loganville
Monroe
Walton County
Upper Oconee Basin Water Authority
Social Circle
Madison
Greensboro
Savannah-Upper Ogeechee
Sinclair Water Authority
Sparta
Eatonton-Putnam County
Milledgeville
Baldwin County
Sandersville
Upper Oconee
Middle Ocmulgee
Dublin
Altamaha
Upper Flint
N
0
12.5
25
50
Miles
Qualified Water Systems of the Upper Oconee Region
Water Supply Redundancy Study
Prepared by/Date: JCD 9/3/2021
Checked by/Date: GJH 9/3/2021
Project Number: 6123201339
wood.
Figure Number: 1-2
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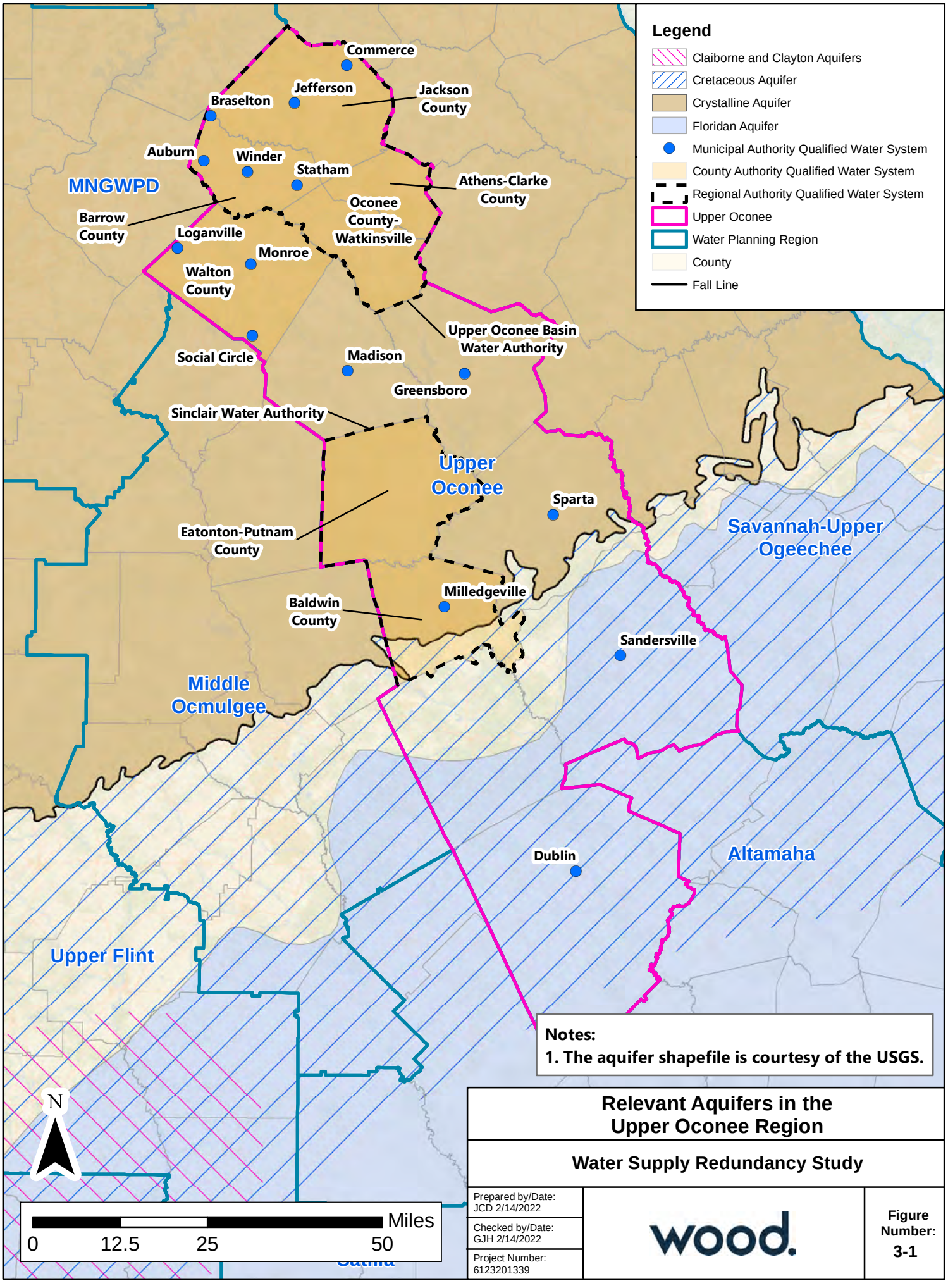

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Notes:
1. The aquifer shapefile is courtesy of the USGS.

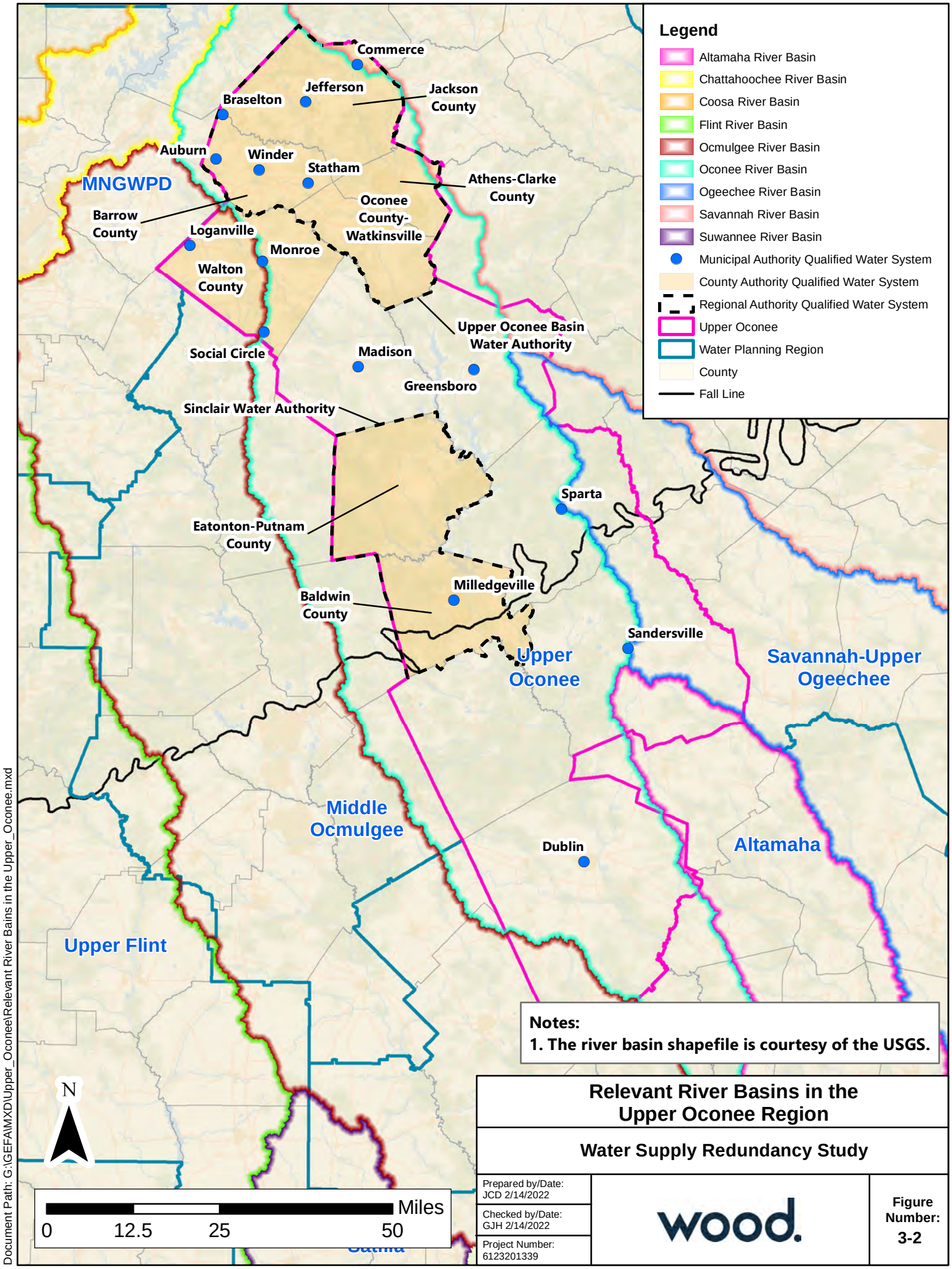
Relevant Aquifers in the Upper Oconee Region

Water Supply Redundancy Study

Prepared by/Date: JCD 2/14/2022	
Checked by/Date: GJH 2/14/2022	
Project Number: 6123201339	

wood.

Figure Number: 3-1



Notes:
1. The river basin shapefile is courtesy of the USGS.

Relevant River Basins in the Upper Oconee Region

Water Supply Redundancy Study

Prepared by/Date: JCD 2/14/2022	
Checked by/Date: GJH 2/14/2022	
Project Number: 6123201339	wood.
	Figure Number: 3-2

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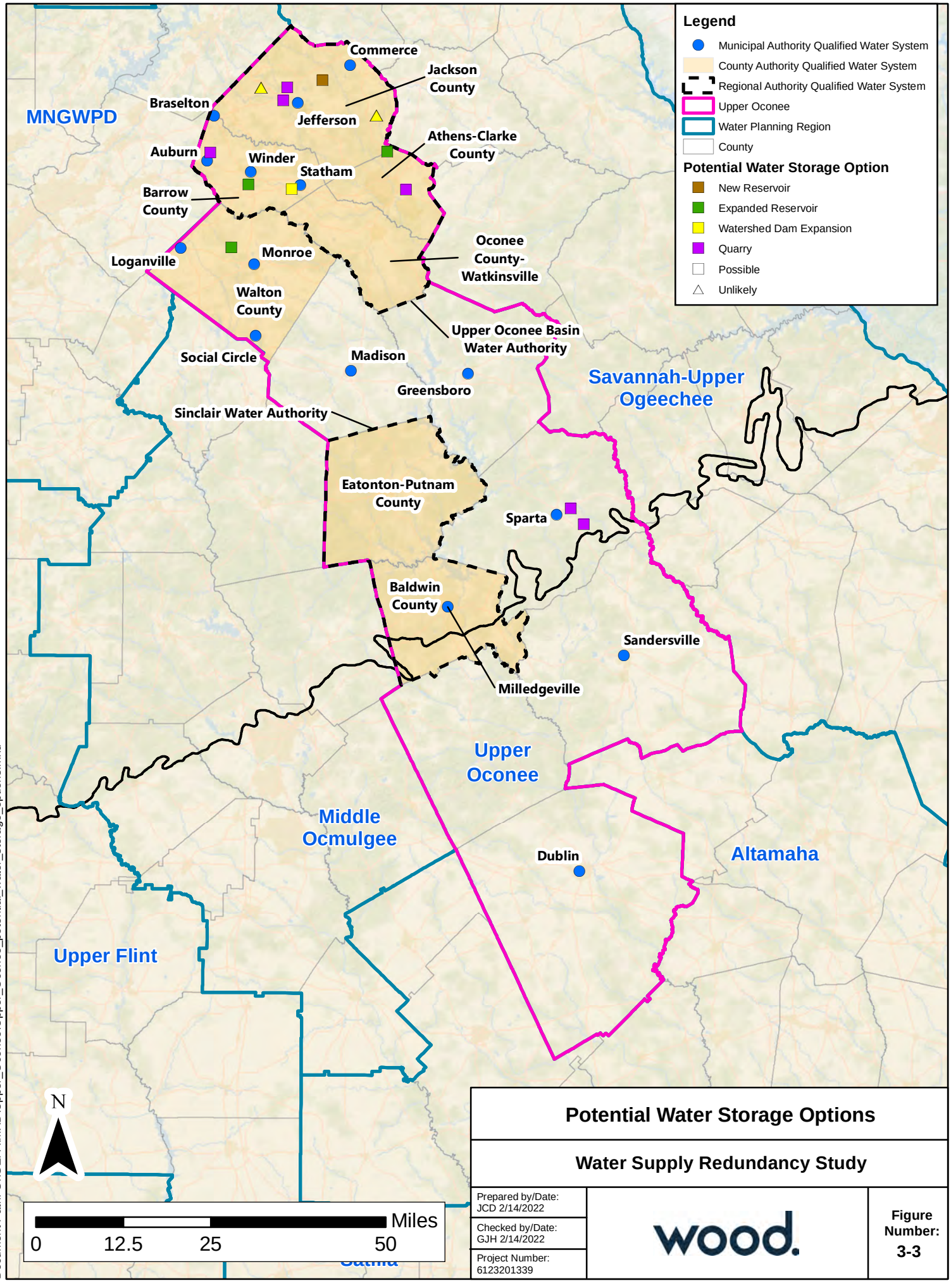

Legend
Municipal Authority Qualified Water System
County Authority Qualified Water System
Regional Authority Qualified Water System
Upper Oconee
Water Planning Region
County
Potential Water Storage Option
New Reservoir
Expanded Reservoir
Watershed Dam Expansion
Quarry
Possible
Unlikely
MNGWPD
Commerce
Jackson County
Braselton
Jefferson
Athens-Clarke County
Auburn
Winder
Statham
Barrow County
Loganville
Monroe
Oconee County-Watkinsville
Walton County
Upper Oconee Basin Water Authority
Social Circle
Madison
Greensboro
Savannah-Upper Ogeechee
Sinclair Water Authority
Eatonton-Putnam County
Sparta
Baldwin County
Sandersville
Milledgeville
Upper Oconee
Middle Ocmulgee
Dublin
Altamaha
Upper Flint
N
0
12.5
25
50
Miles
Potential Water Storage Options
Water Supply Redundancy Study
Prepared by/Date: JCD 2/14/2022
Checked by/Date: GJH 2/14/2022
Project Number: 6123201339
wood.
Figure Number: 3-3
Document Path: G:\GEFA\MXD\Upper_Oconee\Upper_Oconee_potential_water_storage_options.mxd

Notes:

1. Data are sourced as shown in Table 2-2.
2. Data are meant for planning purposes only, and do not reflect survey-grade accuracy.
3. In many cases, the entire extent of a given distribution system is not shown due to lack of data.

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Commerce

Jefferson

Braselton

Jackson County

Athens-Clarke County

Loganville

Monroe

Oconee County-Watkinsville

Walton County

Social Circle

Madison

Water System

- Athens-Clarke County
- Braselton
- Commerce
- Jackson County
- Jefferson
- Loganville
- Madison
- Monroe
- Oconee County-Watkinsville
- Social Circle
- Walton County
- Upper Oconee
- Water Planning Region

0 5 10 20 Miles

Available Mapping Data for Upper Oconee Region-North

Water Supply Redundancy Study

Prepared by/Date: JCD 10/13/2021	wood.	Figure Number: 3-4a
Checked by/Date: GJH 10/13/2021		
Project Number: 6123201339		

Document Path: G:\GEFA\MXD\Upper_Oconee_Interconnection_north.mxd

N

Notes:

1. Data are sourced as shown in Table 2-2.
2. Data are meant for planning purposes only, and do not reflect survey-grade accuracy.
3. In many cases, the entire extent of a given distribution system is not shown due to lack of data.

Eatonton-Putnam County

Sparta

Baldwin County

Sandersville

Water System

- Baldwin County
- Eatonton-Putnam County
- Sandersville
- Sparta
- Upper Oconee
- Water Planning Region

Miles

0 5 10 20

Available Mapping Data for Upper Oconee Region-South

Water Supply Redundancy Study

Prepared by/Date: JCD 9/3/2021	
Checked by/Date: GJH 9/3/2021	
Project Number: 6123201339	wood.

Figure Number: 3-4b

Document Path: G:\GEFA\MXD\Upper_Oconee_Interconnection_south.mxd

Notes:
1. The river basin shapefile is courtesy of the USGS.
2. The aquifer shapefile is courtesy of the USGS.
3. Interconnection lines are schematic to reflect interconnected systems. They do not reflect pipeline locations.

Water Planning Region
County
Interconnection
Crystalline Aquifer
Chattahoochee River Basin
Ocmulgee River Basin
Oconee River Basin
Ogeechee River Basin
Savannah River Basin

2050 Total Demand (MGD)
0 -1
1-2
2-5
5-10
> 10

Raw Water Source
Groundwater
Surface Water
Surface Water and Groundwater
Surface Water and Spring
Wholesale Purchase

2050 Deficit Type
None
100% ADD
65% ADD
35% ADD

Commerce
Jefferson
Braselton
Jackson County
Winder
Upper Oconee Basin Water Auth.
Statham
Athens-Clarke County
Barrow County
Oconee Co.-Watkinsville
Loganville
Monroe
Walton County
Social Circle
Madison
Greensboro

Banks County-Mountain Creek
Gwinett County
Newton County
Bostwick
Rutledge
Buckhead
Madison County

N

0 4 8 16 Miles

Document Path: G:\GEFA\MXD\Upper_Oconee\Upper_Oconee_QWS_key_data_north.mxd

Schematic of Key QWS Data for the Upper Oconee Region - North

Water Supply Redundancy Study

Prepared by/Date: JCD 3/28/2022	wood.	Figure Number: 5-1a
Checked by/Date: GJH 3/28/2022		
Project Number: 6123201339		

Notes:
1. The river basin shapefile is courtesy of the USGS.
2. The aquifer shapefile is courtesy of the USGS.
3. Interconnection lines are schematic to reflect interconnected systems. They do not reflect pipeline locations.

Eatonton-Putnam County

Sinclair Water Authority

Hancock County

Sparta

Baldwin County

Jones County

Milledgeville

Sandersville

Tennille

Dublin

Water Planning Region
County
Interconnection
Fall Line
Cretaceous Aquifer
Crystalline Aquifer
Floridan Aquifer
Altamaha River Basin
Ocmulgee River Basin
Oconee River Basin
Ogeechee River Basin
Savannah River Basin

2050 Total Demand (MGD)
0 -1
1-2
2-5
5-10
> 10

Raw Water Source
Groundwater
Surface Water
Surface Water and Groundwater
Wholesale Purchase

2050 Deficit Type
None
100% ADD
65% ADD
35% ADD

N

0 4 8 16 Miles

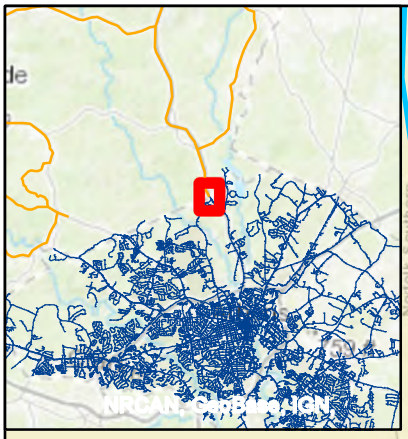
Document Path: G:\GEFA\MXD\Upper Oconee\Upper Oconee QWS key data south.mxd

Schematic of Key QWS Data for the Upper Oconee Region - South

Water Supply Redundancy Study

Prepared by/Date: JCD 3/28/2022	
Checked by/Date: GJH 3/28/2022	
Project Number: 6123201339	wood.

Figure Number: 5-1b



Notes:
1. Data are sourced as shown in Table 2-2.
2. Data are meant for planning purposes only, and do not reflect survey-grade accuracy.
3. In many cases, the entire extent of a given distribution system is not shown due to lack of data.

Jackson County

Potential Tie-in Region

Athens-Clarke County

N

0 200 400 800 Feet

Athens-Clarke County and Jackson County Pipes

Diameter (in)

6

8

Potential Tie-in Region

Athens-Clarke County and Jackson County Pipes

Water Supply Redundancy Study

Prepared by/Date: JCD 10/13/2021	wood.	Figure Number: 6-1
Checked by/Date: GJH 10/13/2021		
Project Number: 6123201339		

Document Path: G:\GEFA\MXD\Athens-Clarke County and Jackson County Pipes.mxd

Appendix A: Excess Capacity Calculations

Contents

List of Tables

Acronyms

ADD	Average Daily Demand
EPD	Environmental Protection Division
GEFA	Georgia Environmental Finance Authority
GPM	Gallons Per Minute
MGD	Million Gallon(s) Per Day
QWS	Qualified Water System(s)
RWP	Regional Water Plan
USGS	U.S. Geological Survey

1.0 Introduction

This appendix describes the peak day design capacity, average daily demand (ADD), and excess capacity index calculations.

2.0 Calculations

2.1 Peak Day Design Capacity

Peak day design capacity, defined as the maximum amount of water that can be pumped and treated within 24 hours, depends mostly on the water treatment plant configuration. For a groundwater-based qualified water system(s) (QWS), if water is treated at each well, then the peak day design value was calculated as the sum of each pump peak capacity (in gallons per minute [GPM] converted to million gallon(s) per day [MGD]). If water is treated at a single treatment plant after being pumped from multiple wells, then the peak day design value was calculated as the sum of each treatment plant's peak treatment capacity.

The 2050 peak day design capacity reflects current 2015 QWS peak day design capacity plus any capacity-expanding capital improvements identified by the QWS. For this water planning region, Madison indicated bringing an old well of 0.35 MGD online and the Upper Oconee Basin Water Authority indicated a treatment plant expansion to 26.5 MGD.

2.2 Average Daily Demand

The 2015 ADD (water withdrawal only, not including purchased water) was obtained from the Environmental Protection Division (EPD)-validated 2015 water loss audit data by dividing "volume from own sources (million gallons per year)" by 365 days to convert values to MGD. The Sinclair Water Authority and the Upper Oconee Basin Water Authority did not have 2015 water loss audit data. The 2015 ADD values for these two QWS were obtained during the data collection stage.

The 2050 ADD (water withdrawal or purchased water) for each QWS was estimated from each individual county's total municipal and industrial water demand projections. The region's *Water and Wastewater Forecasting Technical Memorandum* included 2050 population data and municipal water demand projections by county (CDM Smith, 2017). As defined by the Upper Oconee Regional Water Planning Council, the municipal sector includes public and private water withdrawal data for residences, commercial businesses, small industries, institutions, and military bases. County municipal water demand values were allocated to each QWS based on the QWS' current total population served, obtained during the data collection stage. Table A-1 shows population forecasts and 2050 municipal demand by county. QWS 2050 municipal demand estimates are shown in Table A-2.

Because the 2015 ADD values include industrial water use, it is necessary to incorporate the 2050 regional industrial demand projections into the 2050 ADD estimates. The Regional Water Plan (RWP) provided a total regional projection for industrial water use rather than projections by county. However, the U.S. Geological Survey (USGS) report *Estimated Use of Water in Georgia for 2015 and Water-Use Trends, 1985–2015* showed 2015 county-level withdrawals and use by category, including industrial (Painter, 2019). It also reported withdrawals by major public suppliers, and values for 15 of 23 QWS were used. For the other eight QWS, values either do not appear or they appear anomalous in the 2019 Painter report. For these eight QWS, 2015 total demand values from Table 4-1 are reported. This USGS report was used to calculate the municipally-supplied industrial use per county. The county industrial use was allocated to a QWS

based on the QWS water use as a percent of the county water use. The 2015 QWS-supplied industrial demand value was then divided by the 2015 RWP regional industrial value (62.0 MGD) to obtain a QWS-specific percent. This percent was then applied to the 2050 RWP regional industrial projection (86.9 MGD) to obtain the 2050 QWS-supplied industrial demand (MGD). Table A-3 shows 2015 withdrawal and use data by county and the estimated 2050 municipally-supplied industrial demand values for each QWS.

2.3 Excess Capacity Index

The QWS' capacities were scaled to allow for a comparison of excess capacities. The index was calculated, as applicable, for each QWS for 2015 and 2050 capacities using the following equation:

$$(1) \qquad Index = 1 - \frac{ADD}{Excess\ Capacity}$$

Where:

Excess Capacity = Peak Day Design Capacity - ADD

A comparison of indices provides insight into the magnitude of difference with respect to each QWS' excess capacity. The following index regimes exist, which depend upon the relationship between ADD and excess capacity. Excess capacity, in turn, depends on both ADD and peak day design capacity.

(a) If ADD is zero, the index is 1.
(b) If ADD is greater than zero and less than 50% of the peak day design capacity, the index is a positive value between 0 and 1.
    i. As ADD approaches 50% of the peak day design capacity, the index approaches zero.
    ii. The higher the index in this regime, the more excess capacity the QWS has relative to other QWS.
(c) If ADD is more than 50% but less than 100% of the peak day design capacity, the index is a negative value.
    i. As ADD approaches 100% of the peak day design capacity, the index approaches negative infinity.
    ii. In this regime, the closer the index is to zero, the more excess capacity the QWS has relative to other QWS.
(d) If ADD is more than peak day design capacity, excess capacity is negative. The index was not calculated for this regime because there is no excess capacity sufficiency.

Regime (a) above is not meaningful to this study because the ADD is not zero for the QWS in this region. Regime (b) is meaningful to the Upper Oconee QWS because some QWS' ADD is less than 50% of their peak day design capacity. Regime (c) is also meaningful to the Upper Oconee QWS because two QWS' 2015 ADD and five QWS' 2050 ADD exceed 50% but remain below 100% of their peak day design capacity. Regime (d) Applies to four QWS' 2050 ADD because their ADD exceeds their peak day design capacity.

Table A-4 shows the 2015 and 2050 peak day design capacity, ADD, resultant excess capacity, and calculated excess capacity index, as applicable, for each QWS. Braselton, Oconee County-Watkinsville, Statham, and Winder have no 2050 excess capacity sufficiency, as defined by Regime (d). The QWS with the lowest 2015 excess capacity sufficiency, as defined by Regime (c), is Winder. The next QWS with the lowest 2015 excess capacity sufficiency, as defined by Regime (c), is Social Circle. The QWS with the lowest

2050 excess capacity sufficiency, as defined by Regime (c), is Jefferson. The next four QWS with the lowest 2050 excess capacity sufficiency, as defined by Regime (c), are Social Circle, Athens-Clarke County, Upper Oconee Basin Water Authority, and Monroe.

References

CDM Smith, 2017. *Water and Wastewater Forecasting Technical Memorandum. Supplemental Material, Upper Oconee Regional Water Plan*. March 2017.

Painter, 2019. *Estimated Use of Water in Georgia for 2015 and Water-Use Trends, 1985–2015*. U.S. Geological Survey Open-File Report 2019–1086.

Table A-1
Population Forecasts and 2050 Municipal Demand by County

County	2015 Population Forecast[1]	2050 Population Forecast[1]	2050 Municipal Demand Forecast (MGD)[1]
Baldwin	46,457	48,990	6.2
Barrow	75,869	187,785	20.8
Clarke	123,489	154,917	24.6
Greene	16,446	16,122	2.1
Hancock	8,630	4,477	0.4
Jackson	63,492	114,473	11.6
Laurens	48,543	53,410	5.7
Morgan	18,108	22,877	2.5
Oconee	35,265	62,289	6.5
Putnam	21,533	21,692	2.2
Walton	89,098	163,301	17.2
Washington	20,686	19,131	2.4
Wilkinson	9,423	7,420	0.8
Totals	**577,039**	**876,884**	**103**

Prepared by: LCT 08/12/21
Checked by: GJH 08/16/21

Notes:
MGD - million gallons per day
1. Values are from the 2017 CDM Smith *Water and Wastewater Forecasting Technical Memorandum. Supplemental Material, Upper Oconee Regional Water Plan.*

Table A-2
2050 Municipal Demand Estimates

County	Qualified Water System (QWS)	Estimated Population Directly Served[1]	Estimated Consecutive Population Served[2]	Estimated Total Population	Serves Out-of-County Population	QWS Percent of County Population (%)[3]	QWS 2050 Municipal Demand Estimate (MGD)[4]
Clarke	Athens-Clarke County	120,000	1,000	121,000	◊	98%	24.10
Baldwin	Baldwin County	12,000	0	12,000		26%	1.60
Barrow	Barrow County	14,000	10,800	24,800	◊	33%	6.80
Jackson	Braselton	4,800	2,400	7,200		11%	1.32
Jackson	Commerce	7,000	1,000	8,000	◊	13%	1.46
Laurens	Dublin	16,200	0	16,200		33%	1.90
Putnam	Eatonton-Putnam County	13,800	800	14,600	◊	68%	1.49
Greene	Greensboro	3,500	0	3,500		21%	0.45
Jackson	Jackson County	25,000	3,800	28,800		45%	5.26
Jackson	Jefferson	10,100	0	10,100		16%	1.85
Walton	Loganville	13,300	0	13,300		15%	2.57
Morgan	Madison	6,400	1,800	8,200		45%	1.13
Baldwin	Milledgeville	18,000	0	18,000		39%	2.40
Walton	Monroe	25,300	1,200	26,500		30%	5.12
Oconee	Oconee County-Watkinsville	21,900	1,100	23,000	◊	65%	4.24
Washington	Sandersville	5,900	1,800	7,700		37%	0.89
Putnam	Sinclair Water Authority	0	25,800	25,800	◊	120%	2.64
Walton	Social Circle	4,200	0	4,200		5%	0.81
Hancock	Sparta	3,500	1,300	4,800		56%	0.22
Barrow	Statham	4,500	0	4,500		6%	1.23
Jackson	Upper Oconee Basin Water Authority	0	79,900	79,900	◊	126%	14.60
Walton	Walton County	41,000	2,000	43,000		48%	8.30
Barrow	Winder	45,000	0	45,000		59%	12.34
	Totals	**415,400**	**134,700**	**550,100**	**-**	**-**	**102.72**

Prepared by: LCT 08/12/21
Checked by: GJH 08/16/21

Notes:
MGD - million gallons per day
QWS - qualified water system
1. The population that the system directly sells water to, rounded to the nearest 100.
2. The population benefited from the system's regular sales to another system, rounded to the nearest 100.
3. 2015 county populations presented in Table A-1 and QWS estimated total populations are used to calculate these QWS-specific values.
4. 2050 county municipal demand forecasts presented in Table A-1 and QWS percent of county population values are used to calculate these QWS-specific values.

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Regional Water Plan - 2015 Regional Industrial Projection[1]	62.0 MGD
Regional Water Plan - 2050 Regional Industrial Projection[1]	86.9 MGD

Athens-Clarke County

Clarke County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.10	6.73	6.63
Commercial	0.00	2.85	2.85
Industrial	0.00	2.13	2.13
Water Loss	-	-	0.13
Inter-County Delivery	-	-	-2.20
		Total (MGD)	9.54
		Athens-Clarke County Public Supply (MGD)	11.33
		QWS's Percent of County's Public Supply (%)	119%
		QWS's Supplied Industrial Demand (MGD)	2.53
		2015 QWS Percent of Regional Industrial Demand (%)	4.08%
		2050 QWS Industrial Demand Estimate (MGD)	3.55

Baldwin County

Baldwin County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.29	2.08	1.79
Commercial	0.00	2.75	2.75
Industrial	0.02	0.55	0.53
Water Loss	-	-	1.25
Inter-County Delivery	-	-	-2.11
		Total (MGD)	4.21
		Baldwin County Public Supply (MGD)[3]	1.82
		QWS's Percent of County's Public Supply (%)	43%
		QWS's Supplied Industrial Demand (MGD)	0.23
		2015 QWS Percent of Regional Industrial Demand (%)	0.37%
		2050 QWS Industrial Demand Estimate (MGD)	0.32

Barrow County

Barrow County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	2.34	6.40	4.06
Commercial	0.00	0.74	0.74
Industrial	0.41	1.08	0.67
Water Loss	-	-	1.01
Inter-County Delivery	-	-	-2.07
		Total (MGD)	4.41
		Barrow County Public Supply (MGD)[3]	1.97
		QWS's Percent of County's Public Supply (%)	45%
		QWS's Supplied Industrial Demand (MGD)	0.30
		2015 QWS Percent of Regional Industrial Demand (%)	0.48%
		2050 QWS Industrial Demand Estimate (MGD)	0.42

Braselton

Jackson County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.88	4.86	3.98
Commercial	0.00	1.34	1.34
Industrial	0.52	1.02	0.50
Water Loss	-	-	3.70
Inter-County Delivery	-	-	2.59
		Total (MGD)	12.11
		Braselton Public Supply (MGD)	0.29
		QWS's Percent of County's Public Supply (%)	2%
		QWS's Supplied Industrial Demand (MGD)	0.01
		2015 QWS Percent of Regional Industrial Demand (%)	0.02%
		2050 QWS Industrial Demand Estimate (MGD)	0.02

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Commerce

Jackson County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.88	4.86	3.98
Commercial	0.00	1.34	1.34
Industrial	0.52	1.02	0.50
Water Loss	-	-	3.70
Inter-County Delivery	-	-	2.59
		Total (MGD)	12.11
		Commerce Public Supply (MGD)[3]	1.46
		QWS's Percent of County's Public Supply (%)	12%
		QWS's Supplied Industrial Demand (MGD)	0.06
		2015 QWS Percent of Regional Industrial Demand (%)	0.10%
		2050 QWS Industrial Demand Estimate (MGD)	0.08

Dublin

Laurens County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	1.73	3.69	1.96
Commercial	0.00	0.46	0.46
Industrial	11.54	11.89	0.35
Water Loss	-	-	0.77
Inter-County Delivery	-	-	0.00
		Total (MGD)	3.54
		Dublin Public Supply (MGD)	2.89
		QWS's Percent of County's Public Supply (%)	82%
		QWS's Supplied Industrial Demand (MGD)	0.29
		2015 QWS Percent of Regional Industrial Demand (%)	0.46%
		2050 QWS Industrial Demand Estimate (MGD)	0.40

Eatonton-Putnam Water Authority

Putnam County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.18	0.92	0.74
Commercial	0.00	0.26	0.26
Industrial	0.07	0.11	0.04
Water Loss	-		2.72
Inter-County Delivery	-	-	2.10
		Total (MGD)	5.86
		Eatonton-Putnam County Public Supply (MGD)[3]	0.89
		QWS's Percent of County's Public Supply (%)	15%
		QWS's Supplied Industrial Demand (MGD)	0.01
		2015 QWS Percent of Regional Industrial Demand (%)	0.01%
		2050 QWS Industrial Demand Estimate (MGD)	0.01

Greensboro

Greene County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.49	1.46	0.97
Commercial	0.00	0.14	0.14
Industrial	0.00	0.00	0.00
Water Loss	-	-	0.12
Inter-County Delivery	-	-	0.00
		Total (MGD)	1.23
		Greensboro Public Supply (MGD)	0.68
		QWS's Percent of County's Public Supply (%)	55%
		QWS's Supplied Industrial Demand (MGD)	0.00
		2015 QWS Percent of Regional Industrial Demand (%)	0.00%
		2050 QWS Industrial Demand Estimate (MGD)	0.00

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Jackson County

Jackson County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.88	4.86	3.98
Commercial	0.00	1.34	1.34
Industrial	0.52	1.02	0.50
Water Loss	-	-	3.70
Inter-County Delivery	-	-	2.59
		Total (MGD)	12.11
		Jackson County Public Supply (MGD)[3]	2.82
		QWS's Percent of County's Public Supply (%)	23%
		QWS's Supplied Industrial Demand (MGD)	0.12
		2015 QWS Percent of Regional Industrial Demand (%)	0.19%
		2050 QWS Industrial Demand Estimate (MGD)	0.16

Jefferson

Jackson County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.88	4.86	3.98
Commercial	0.00	1.34	1.34
Industrial	0.52	1.02	0.50
Water Loss	-	-	3.70
Inter-County Delivery	-	-	2.59
		Total (MGD)	12.11
		Jefferson Public Supply (MGD)	1.23
		QWS's Percent of County's Public Supply (%)	10%
		QWS's Supplied Industrial Demand (MGD)	0.05
		2015 QWS Percent of Regional Industrial Demand (%)	0.08%
		2050 QWS Industrial Demand Estimate (MGD)	0.07

Loganville

Walton County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	1.89	6.61	4.72
Commercial	0.00	1.29	1.29
Industrial	0.00	0.14	0.14
Water Loss	-		2.99
Inter-County Delivery	-	-	-4.46
		Total (MGD)	4.68
		Loganville Public Supply (MGD)[3]	1.15
		QWS's Percent of County's Public Supply (%)	25%
		QWS's Supplied Industrial Demand (MGD)	0.03
		2015 QWS Percent of Regional Industrial Demand (%)	0.06%
		2050 QWS Industrial Demand Estimate (MGD)	0.05

Madison

Morgan County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.77	1.33	0.56
Commercial	0.01	0.42	0.41
Industrial	0.02	0.23	0.21
Water Loss	-	-	0.16
Inter-County Delivery	-	-	0.00
		Total (MGD)	1.34
		Madison Public Supply (MGD)	1.28
		QWS's Percent of County's Public Supply (%)	96%
		QWS's Supplied Industrial Demand (MGD)	0.20
		2015 QWS Percent of Regional Industrial Demand (%)	0.32%
		2050 QWS Industrial Demand Estimate (MGD)	0.28

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Milledgeville

Baldwin County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.29	2.08	1.79
Commercial	0.00	2.75	2.75
Industrial	0.02	0.55	0.53
Water Loss	-	-	1.25
Inter-County Delivery	-	-	-2.11
		Total (MGD)	4.21
		Milledgeville Public Supply (MGD)	3.80
		QWS's Percent of County's Public Supply (%)	90%
		QWS's Supplied Industrial Demand (MGD)	0.48
		2015 QWS Percent of Regional Industrial Demand (%)	0.77%
		2050 QWS Industrial Demand Estimate (MGD)	0.67

Monroe

Walton County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	1.89	6.61	4.72
Commercial	0.00	1.29	1.29
Industrial	0.00	0.14	0.14
Water Loss	-		2.99
Inter-County Delivery	-	-	-4.46
		Total (MGD)	4.68
		Monroe Public Supply (MGD)	2.61
		QWS's Percent of County's Public Supply (%)	56%
		QWS's Supplied Industrial Demand (MGD)	0.08
		2015 QWS Percent of Regional Industrial Demand (%)	0.13%
		2050 QWS Industrial Demand Estimate (MGD)	0.11

Oconee County-Watkinsville

Oconee County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.87	2.49	1.62
Commercial	0.00	0.86	0.86
Industrial	0.00	0.04	0.04
Water Loss	-	-	2.17
Inter-County Delivery	-	-	-2.47
		Total (MGD)	2.22
		Oconee County-Watkinsville Public Supply (MGD)[3]	2.53
		QWS's Percent of County's Public Supply (%)	114%
		QWS's Supplied Industrial Demand (MGD)	0.05
		2015 QWS Percent of Regional Industrial Demand (%)	0.07%
		2050 QWS Industrial Demand Estimate (MGD)	0.06

Sandersville

Washington County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.62	1.23	0.61
Commercial	0.00	1.06	1.06
Industrial	12.49	12.53	0.04
Water Loss	-	-	0.29
Inter-County Delivery	-	-	0.00
		Total (MGD)	2.00
		Sandersville Public Supply (MGD)	1.58
		QWS's Percent of County's Public Supply (%)	79%
		QWS's Supplied Industrial Demand (MGD)	0.03
		2015 QWS Percent of Regional Industrial Demand (%)	0.05%
		2050 QWS Industrial Demand Estimate (MGD)	0.04

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Sinclair Water Authority

Putnam County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.18	0.92	0.74
Commercial	0.00	0.26	0.26
Industrial	0.07	0.11	0.04
Water Loss	-		2.72
Inter-County Delivery	-	-	2.10
		Total (MGD)	5.86
		Sinclair Water Authority Public Supply (MGD)	3.26
		QWS's Percent of County's Public Supply (%)	56%
		QWS's Supplied Industrial Demand (MGD)	0.02
		2015 QWS Percent of Regional Industrial Demand (%)	0.04%
		2050 QWS Industrial Demand Estimate (MGD)	0.03

Social Circle

Walton County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	1.89	6.61	4.72
Commercial	0.00	1.29	1.29
Industrial	0.00	0.14	0.14
Water Loss	-		2.99
Inter-County Delivery	-	-	-4.46
		Total (MGD)	4.68
		Social Circle Public Supply (MGD)	0.51
		QWS's Percent of County's Public Supply (%)	11%
		QWS's Supplied Industrial Demand (MGD)	0.02
		2015 QWS Percent of Regional Industrial Demand (%)	0.02%
		2050 QWS Industrial Demand Estimate (MGD)	0.02

Sparta

Hancock County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.06	0.51	0.45
Commercial	0.00	0.55	0.55
Industrial	0.00	0.00	0.00
Water Loss	-	-	0.20
Inter-County Delivery	-	-	0.00
		Total (MGD)	1.20
		Sparta Public Supply (MGD)	0.97
		QWS's Percent of County's Public Supply (%)	81%
		QWS's Supplied Industrial Demand (MGD)	0.00
		2015 QWS Percent of Regional Industrial Demand (%)	0.00%
		2050 QWS Industrial Demand Estimate (MGD)	0.00

Statham

Barrow County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	2.34	6.40	4.06
Commercial	0.00	0.74	0.74
Industrial	0.41	1.08	0.67
Water Loss	-	-	1.01
Inter-County Delivery	-	-	-2.07
		Total (MGD)	4.41
		Statham Public Supply (MGD)	0.28
		QWS's Percent of County's Public Supply (%)	6%
		QWS's Supplied Industrial Demand (MGD)	0.04
		2015 QWS Percent of Regional Industrial Demand (%)	0.07%
		2050 QWS Industrial Demand Estimate (MGD)	0.06

Table A-3
2015 Withdrawal and Use Data by County and 2050 Industrial Demand Estimates

Upper Oconee Basin Water Authority

Jackson County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	0.88	4.86	3.98
Commercial	0.00	1.34	1.34
Industrial	0.52	1.02	0.50
Water Loss	-	-	3.70
Inter-County Delivery	-	-	2.59
		Total (MGD)	12.11
		Upper Oconee Basin Water Authority Public Supply (MGD)	7.95
		QWS's Percent of County's Public Supply (%)	66%
		QWS's Supplied Industrial Demand (MGD)	0.33
		2015 QWS Percent of Regional Industrial Demand (%)	0.53%
		2050 QWS Industrial Demand Estimate (MGD)	0.46

Walton County

Walton County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	1.89	6.61	4.72
Commercial	0.00	1.29	1.29
Industrial	0.00	0.14	0.14
Water Loss	-		2.99
Inter-County Delivery	-	-	-4.46
		Total (MGD)	4.68
		Walton County Public Supply (MGD)[3]	4.41
		QWS's Percent of County's Public Supply (%)	94%
		QWS's Supplied Industrial Demand (MGD)	0.13
		2015 QWS Percent of Regional Industrial Demand (%)	0.21%
		2050 QWS Industrial Demand Estimate (MGD)	0.18

Winder

Barrow County[2]	2015 Total Withdrawal (MGD)	2015 Total Use (MGD)	2015 Total Publicly Supplied (MGD)
Domestic	2.34	6.40	4.06
Commercial	0.00	0.74	0.74
Industrial	0.41	1.08	0.67
Water Loss	-	-	1.01
Inter-County Delivery	-	-	-2.07
		Total (MGD)	4.41
		Winder Public Supply (MGD)	4.15
		QWS's Percent of County's Public Supply (%)	94%
		QWS's Supplied Industrial Demand (MGD)	0.63
		2015 QWS Percent of Regional Industrial Demand (%)	1.02%
		2050 QWS Industrial Demand Estimate (MGD)	0.88

Prepared by: LCT 08/12/21
Checked by: GJH 08/16/21

Notes:
MGD - million gallons per day
QWS - qualified water system
1. Values are from the 2017 CDM Smith *Water and Wastewater Forecasting Technical Memorandum. Supplemental Material, Upper Oconee Regional Water Plan.*
2. Values in the box with thick borders are from Painter, 2019: *Estimated Use of Water in Georgia for 2015 and Water-Use Trends, 1985–2015.*
3. Values do not appear or they appear anomalous in the 2019 Painter report; rather, 2015 Total Demand values from Table 4-1 are reported.

Table A-4
Excess Capacity Index Values

County	Qualified Water System (QWS)	2015 Peak Day Design Capacity (MGD)	2015 ADD (MGD) (Water Withdrawal Only)[1]	2015 Excess Capacity (MGD)	2015 Excess Capacity Index	2050 Peak Day Design Capacity (MGD)[2]	2050 ADD (MGD) (Water Withdrawal Only)[3]	2050 Excess Capacity (MGD)	2050 Excess Capacity Index
Clarke	Athens-Clarke County	36.0	12.1	22.6	0.46	36.0	27.6	7.1	-2.89
Baldwin	Baldwin County	NA	NA	NA	NA	NA	NA	NA	NA
Barrow	Barrow County	NA	NA	NA	NA	NA	NA	NA	NA
Jackson	Braselton	1.0	0.3	0.7	0.58	1.0	1.3	-0.4	-
Jackson	Commerce	4.0	1.5	2.5	0.43	4.0	1.5	2.5	0.37
Laurens	Dublin	6.8	2.6	4.2	0.38	6.8	2.3	4.5	0.49
Putnam	Eatonton-Putnam County	NA	NA	NA	NA	NA	NA	NA	NA
Greene	Greensboro	1.6	0.6	1.0	0.33	1.6	0.4	1.2	0.61
Jackson	Jackson County	NA	NA	NA	NA	NA	NA	NA	NA
Jackson	Jefferson	2.3	1.1	1.1	0.001	2.3	1.9	0.3	-4.58
Walton	Loganville	NA	NA	NA	NA	NA	NA	NA	NA
Morgan	Madison	3.5	1.2	2.3	0.49	3.9	1.4	2.1	0.32
Baldwin	Milledgeville	12.5	3.3	9.1	0.64	12.5	3.1	9.4	0.67
Walton	Monroe	10.0	2.4	7.6	0.68	10.0	5.2	4.8	-0.09
Oconee	Oconee County-Watkinsville	0.7	0.1	0.5	0.71	0.7	4.3	-3.7	-
Washington	Sandersville	4.8	1.6	3.1	0.48	4.8	0.9	3.8	0.75
Putnam	Sinclair Water Authority	6.0	2.7	3.3	0.17	6.0	2.7	3.3	0.20
Walton	Social Circle	1.0	0.5	0.5	-0.01	1.0	0.8	0.2	-3.96
Hancock	Sparta	2.0	0.8	1.2	0.38	2.0	0.2	1.8	0.87
Barrow	Statham	1.1	0.2	0.9	0.73	1.1	1.3	-0.2	-
Jackson	Upper Oconee Basin Water Authority	21.0	7.2	13.8	0.48	26.5	15.1	11.4	-0.32
Walton	Walton County	NA	NA	NA	NA	NA	NA	NA	NA
Barrow	Winder	6.2	4.1	2.1	-0.98	6.2	13.2	-7.0	-
	Totals	**120.4**	**42.4**	**76.6**	**-**	**126.2**	**83.4**	**41.1**	**-**

Prepared by: LCT 08/12/21
Checked by: GJH 08/17/21

Notes:
ADD - average daily demand
MGD - million gallons per day
1. 2015 EPD-validated water loss audit values are reported. In the event a QWS is not in that dataset, as identified in Table 2-3, QWS-provided values are reported, as available.
4. Madison indicated bringing an old well back online in 2022 (0.35 MGD). Upper Oconee Basin Water Authority indicated they are in the preliminary stages for a partial expansion which would render a plant capacity of 26.5 MGD.
3. Municipal and publicly-supplied industrial demand by county were allocated to each QWS.

Appendix B: Water Supply Deficit Calcuations

Table B-1a
Athens-Clarke County Emergency Scenario Evaluation: 2015

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]						
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**J.G. Beacham WTP**	**Middle Oconee River**	**North Oconee River**	**Maximum Possible Purchased Water (MGD)[4]**	**Water Storage (MGD)[5]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	36.00	16.00	34.75	NA	2.55	37.30	0.00	37.30
	A2. Critical asset failure at largest WTP[2]	0.1	30	36.00	16.00	34.75	NA	NA	34.75	34.75	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	36.00	16.00	34.75	NA	2.55	37.30	34.75	2.55
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	36.00	16.00	34.75	NA	NA	34.75	0.00	34.75
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	36.00	16.00	34.75	16.24	6.75	57.74	34.75	22.99
	D2. Chemical contamination of largest raw water source	0.1	1	36.00	16.00	34.75	16.24	6.75	57.74	34.75	22.99
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable					
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable					
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[6]					Not Applicable					
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[7]	0.1	120	36.00	16.00	34.75	16.24	NA	21.08	NA	21.08

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. J.G. Beacham WTP has a backup generator able to supply full treatment capacity, rendering no capacity loss at the largest WTP.
2. J.G. Beacham WTP met chemical but not unit process redundancy, rendering full capacity loss at this WTP.
3. For surface water supply, the smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation. Their combined withdrawal value cannot exceed 34.75 MGD.
4. Athens-Clarke County purchases raw water from the Upper Oconee Basin Water Authority. They are currently allocated 34.75 MGD in raw water, but are limited by infrastructure.
5. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
6. Their on-site raw water sources are not dammed river impoundments.
7. The Lower North Oconee River and Lower Middle Oconee River are Strahler Stream Order 4 and 5, respectively, at the withdrawal point (not major rivers). Purchased water is available because their supplier would not suffer from Risk H.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-1b
Athens-Clark County Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	37.30	12.12	7.88	4.24	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	0.00	12.12	7.88	4.24	12.12	7.88	4.24
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.55	12.12	7.88	4.24	9.57	5.33	1.69
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	34.75	12.12	7.88	4.24	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	22.99	12.12	7.88	4.24	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	22.99	12.12	7.88	4.24	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	21.08	12.12	7.88	4.24	0.00	0.00	0.00

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-1c
Athens-Clarke County Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]						
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**J.G. Beacham WTP**	**Middle Oconee River**	**North Oconee River**	**Maximum Possible Purchased Water (MGD)[4]**	**Water Storage (MGD)[5]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	36.00	16.00	34.75	NA	3.00	37.75	0.00	37.75
	A2. Critical asset failure at largest WTP[2]	0.1	30	36.00	16.00	34.75	NA	NA	34.75	34.75	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	36.00	16.00	34.75	NA	3.00	37.75	34.75	3.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	36.00	16.00	34.75	NA	NA	34.75	0.00	34.75
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	36.00	16.00	34.75	16.24	7.20	58.19	34.75	23.44
	D2. Chemical contamination of largest raw water source[5]	0.1	1	36.00	16.00	34.75	16.24	7.20	58.19	34.75	23.44
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable					
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable					
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[6]					Not Applicable					
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[7]	0.1	120	36.00	16.00	34.75	16.24	NA	27.30	NA	27.30

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

1. J.G. Beacham WTP has a backup generator able to supply full treatment capacity, rendering no capacity loss at the largest WTP.
2. J.G. Beacham WTP met chemical but not unit process redundancy, rendering full capacity loss at this WTP.
3. For surface water supply, the smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation. Their combined withdrawal value cannot exceed 34.75 MGD.
4. Athens-Clarke County purchases raw water from the Upper Oconee Water Authority.
5. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. The QWS plans to replace a 0.5 MG tank with a 1.25 MG tank.
6. Their on-site raw water ponds are not dammed river impoundments.
7. The Lower North Oconee River and Lower Middle Oconee River are Strahler Stream Order 4 and 5, respectively, at the withdrawal point (not major rivers). Purchased water is available because their supplier would not suffer from Risk H.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-1d
Athens-Clark County Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	37.75	27.65	17.97	9.68	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	0.00	27.65	17.97	9.68	27.65	17.97	9.68
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	3.00	27.65	17.97	9.68	24.65	14.97	6.68
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	34.75	27.65	17.97	9.68	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	23.44	27.65	17.97	9.68	4.21	0.00	0.00
	D2. Chemical contamination of largest raw water source	23.44	27.65	17.97	9.68	4.21	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	27.30	27.65	17.97	9.68	0.35	0.00	0.00

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-1e
Athens-Clarke County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
1	GA1570121 - Upper Oconee Basin Water Authority	Tallahassee Road at remote valve station	36	3	21.206	13.706	1.218	13.706	13.8	11.4
2	GA1570121 - Upper Oconee Basin Water Authority	Tallahassee Road at remote valve station	30	3	14.726	9.518	1.218	9.518		

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.

Table B-2a
Baldwin County Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	8.74	4.53	13.27	3.43	9.85
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1.0	3	8.74	NA	8.74	0.00	8.74
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-2b
Baldwin County Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	9.85	1.82	1.18	0.64	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	8.74	1.82	1.18	0.64	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-2c
Baldwin County Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	8.99	4.53	13.52	3.43	10.10
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1.0	3	8.99	NA	8.99	0.00	8.99
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-2d
Baldwin County Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	10.10	1.92	1.25	0.67	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	8.99	1.92	1.25	0.67	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-2e
Baldwin County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)	Individual System Excess Capacity[2] 2015	Individual System Excess Capacity[2] 2050
3	GA0090001 - Milledgeville[3]	Swint Avenue and S. Wayne St. - US 441 S.	10	5	2.727	1.763	0.000	1.763	5.317	5.567
4	GA0090001 - Milledgeville[3]	US 441 N.	10	5	2.727	1.763	0.000	1.763		
5	GA0090001 - Milledgeville[3]	Frank Bone	10	5	2.727	1.763	0.000	1.763		
6	GA0090001 - Milledgeville[3]	Hwys 22/24 East	10	5	2.727	1.763	0.000	1.763		
7	GA0090001 - Milledgeville[3]	Hwy 49 and Frank Bone Road	10	5	2.727	1.763	0.000	1.763		
8	GA2370087 - Sinclair Water Authority	3789 Hwy. 105	18	3	5.301	3.426	1.820	3.426	3.271	3.333

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
3. Milledgeville was formerly an emergency only purchase, but is now being used regularly due to increased demand. They purchase approximately 0.460 MGD as of 2019.

Table B-3a
Barrow County Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	9.21	3.36	12.57	6.09	6.48
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	9.21	NA	9.21	0.00	9.21
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-3b
Barrow County Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target			Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)			
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	6.48	1.97	1.28	0.69	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	9.21	1.97	1.28	0.69	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-3c
Barrow County Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	8.35	3.66	12.01	6.09	5.92
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	8.35	NA	8.35	0.00	8.35
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. Barrow plans to add 0.5 MG tank.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-3d
Barrow County Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.92	7.22	4.69	2.53	1.30	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	8.35	7.22	4.69	2.53	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Table B-3e
Barrow County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
9	GA1350004 - Gwinnett County[4]	Hwy 124	8	5	1.745	1.128	0.000	1.128	179.200	140.317
10	GA0130001 - Statham	Hwy 211 at Hwy 82	6	5	0.982	0.635	0.000	0.635	0.866	-0.194
11	GA0130001 - Statham	Pleasant Hill Church Road	6	5	0.982	0.635	0.000	0.635		
12	GA0130034 - Barrow County Transmission Main BOC[5]	Bethlehem Church Road	8	5	1.745	1.128	0.984	1.128	13.834	11.442
13	GA0130034 - Barrow County Transmission Main BOC[5]	Glenn Jackson Road at Jordan Cofer Road	24	3	9.425	6.091	0.984	6.091		

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. The excess capacity is estimated utilizing the current and projected peak day design capacities (248 MGD) as well as the current (68.8 MGD) and projected (107.68 MGD) ADD found within the 2017 Ch2M and Black and Veatch *Water Resource Management Plan: Metropolitan North Georgia Water Planning District.*
5. Barrow County plans to absorb this system during their next permit application. This system is functionally a part of Barrow County already and represents the purchases from the Upper Oconee Basin Water Authority, whose excess capacity is reported here.

Table B-4a
Braselton Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Plant #201 (Well 101)	Plant #203 (Well 103)	Plant #209 (Wells 109, 110, 111)					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
	A2. Critical asset failure at largest WTP[2]	0.1	30	0.06	0.06	0.85	2.95	NA	3.92	0.00	3.92
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.0	3	0.06	0.06	0.85	2.95	NA	3.92	0.00	3.92
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
	D2. Chemical contamination of largest raw water source	0.1	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought						Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The largest WTP does not have a backup generator, rendering full capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-4b
Braselton Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	4.97	1.40	0.91	0.49	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.92	1.40	0.91	0.49	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	4.97	1.40	0.91	0.49	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.92	1.40	0.91	0.49	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.97	1.40	0.91	0.49	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.97	1.40	0.91	0.49	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-4c
Braselton Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Plant #201 (Well 101)	Plant #203 (Well 103)	Plant #209 (Wells 109, 110, 111)					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
	A2. Critical asset failure at largest WTP[2]	0.1	30	0.06	0.06	0.85	2.95	NA	3.92	0.00	3.92
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.0	3	0.06	0.06	0.85	2.95	NA	3.92	0.00	3.92
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
	D2. Chemical contamination of largest raw water source	0.1	1	0.06	0.06	0.85	2.95	1.89	5.81	0.85	4.97
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought						Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The largest WTP does not have a backup generator, rendering full capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-4d
Braselton Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	4.97	1.33	0.87	0.47	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.92	1.33	0.87	0.47	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	4.97	1.33	0.87	0.47	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.92	1.33	0.87	0.47	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.97	1.33	0.87	0.47	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.97	1.33	0.87	0.47	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-4e
Braselton Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
14	GA0130031 - Barrow County[4]	Unknown	Unknown	Unknown	Unknown	Unknown	0.399	0.700	193.901	151.759
15	GA1350004 - Gwinnett County[5]	State Route 124	12	5	3.927	2.538	0.000	0.625	179.200	140.317
16	GA1350004 - Gwinnett County[5]	Intersection of Thomson Mill Rd and Duncan's Lake Dr. NE	12	5	3.927	2.538	0.000	0.625		
17	GA1570117 - Jackson County[6]	Cooper Bridge Road	12	5	3.927	2.538	0.356	0.500	196.441	154.213
18	GA1570117 - Jackson County[6]	Lewis Braselton Blvd	8	5	1.745	1.128	0.356	0.500		

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen. Braselton's values were taken from their Water Conservation Plan
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. Barrow County is a wholesale purchase system which utilizes Gwinnett County, Statham, and Barrow County Transmission Main BOC/Upper Oconee Basin Water Authority as water sources. The cumulative excess capacity for the systems is listed here, while Table B-3e shows individual system values. Barrow County would act as a passthrough system.
5. The excess capacity is estimated utilizing the current and projected peak day design capacities (248 MGD) as well as the current (68.8 MGD) and projected (107.68 MGD) ADD found within the 2017 Ch2M and Black and Veatch *Water Resource Management Plan: Metropolitan North Georgia Water Planning District.*
6. Jackson County is a wholesale purchase system which utilizes Barrow County, Commerce, and the Upper Oconee Basin Water Authority as water sources. The cumulative excess capacity for the systems is listed here. Jackson County would act as a passthrough system.

Table B-5a
Commerce Emergency Scenario Evaluation: 2015

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Commerce WTP**	**Reservoir 51 (Grove River Reservoir)**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	4.03	4.50	3.84	0.78	8.65	0.00	8.65
	A2. Critical asset failure at largest WTP[2]	0.1	30	4.03	4.50	3.84	NA	7.87	4.03	3.84
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	4.03	4.50	3.84	0.78	8.65	4.03	4.62
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	4.03	4.50	3.84	NA	7.87	0.00	7.87
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	4.03	4.50	3.84	1.05	8.92	4.03	4.89
	D2. Chemical contamination of largest raw water source	0.1	1	4.03	4.50	3.84	1.05	8.92	4.03	4.89
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	4.03	4.50	3.84	NA	7.87	4.03	3.84
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has a backup generator able to supply full treatment capacity, rendering no capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Grove River Reservoir is their only raw water source.
6. Grove Creek is in Hydrologic Unit Code-10 "Hudson River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-5b
Commerce Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	8.65	1.46	0.95	0.51	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.84	1.46	0.95	0.51	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	4.62	1.46	0.95	0.51	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	7.87	1.46	0.95	0.51	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.89	1.46	0.95	0.51	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.89	1.46	0.95	0.51	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	3.84	1.46	0.95	0.51	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-5c
Commerce Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Commerce WTP	Reservoir 51 (Grove River Reservoir)					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	4.03	4.50	3.84	1.38	9.25	0.00	9.25
	A2. Critical asset failure at largest WTP[2]	0.1	30	4.03	4.50	3.84	NA	7.87	4.03	3.84
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	4.03	4.50	3.84	1.38	9.25	4.03	5.22
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	4.03	4.50	3.84	NA	7.87	0.00	7.87
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	4.03	4.50	3.84	1.65	9.52	4.03	5.49
	D2. Chemical contamination of largest raw water source	0.1	1	4.03	4.50	3.84	1.65	9.52	4.03	5.49
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	4.03	4.50	3.84	NA	7.87	4.03	3.84
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has a backup generator able to supply full treatment capacity, rendering no capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. Commerce plans to add a 1 MG tank.
5. Grove River Reservoir is their only raw water source.
6. Grove Creek is in Hydrologic Unit Code-10 "Hudson River," which is more than 100 square miles.

Relative likelihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-5d
Commerce Deficits: 2050

			2050 - Long-Range Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	9.25	1.55	1.00	0.54	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.84	1.55	1.00	0.54	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.22	1.55	1.00	0.54	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	7.87	1.55	1.00	0.54	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	5.49	1.55	1.00	0.54	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	5.49	1.55	1.00	0.54	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	3.84	1.55	1.00	0.54	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-5e
Commerce Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
19	GA1570117 - Jackson County[4]	Hwy 334	16	3	4.189	2.707	0.000	2.707	196.441	154.213
20	GA1570117 - Jackson County[4]	Wheeler Cemetery Road	8	5	1.745	1.128	0.000	1.128		

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. Jackson County is a wholesale purchase system which utilizes Barrow County, Commerce, and the Upper Oconee Basin Water Authority as water sources.
The cumulative excess capacity for the systems is listed here, while Table B-9e has individual values. Jackson County would act as a passthrough system.

Table B-6a
Dublin Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Ground-water WTP	Surface Water WTP	Oconee River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.00	4.80	5.00	NA	1.35	8.15	2.10	6.05
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.00	4.80	5.00	NA	NA	6.80	0.00	6.80
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.00	4.80	5.00	NA	1.35	8.15	4.80	3.35
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.00	4.80	5.00	NA	NA	6.80	0.00	6.80
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.00	4.80	5.00	NA	1.95	8.75	4.80	3.95
	D2. Chemical contamination of largest raw water source	0.1	1	2.00	4.80	5.00	NA	1.95	8.75	4.80	3.95
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable									
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[4]	Not Applicable									

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The Surface Water WTP has a backup generator able to supply 2.7 MGD capacity, rendering partial capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
4. Oconee River is in Hydrologic Unit Code-10 "Big Creek-Oconee River," which is greater than 100 square miles. The Strahler Stream Order at the withdrawal point is 7 (a major river).

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-6b
Dublin Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	6.05	2.61	1.70	0.91	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	6.80	2.61	1.70	0.91	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	3.35	2.61	1.70	0.91	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	6.80	2.61	1.70	0.91	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	3.95	2.61	1.70	0.91	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	3.95	2.61	1.70	0.91	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-6c
Dublin Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Ground-water WTP	Surface Water WTP	Oconee River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.00	4.80	5.00	NA	1.95	8.75	2.10	6.65
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.00	4.80	5.00	NA	NA	6.80	0.00	6.80
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.00	4.80	5.00	NA	1.95	8.75	4.80	3.95
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.00	4.80	5.00	NA	NA	6.80	0.00	6.80
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.00	4.80	5.00	NA	2.55	9.35	4.80	4.55
	D2. Chemical contamination of largest raw water source	0.1	1	2.00	4.80	5.00	NA	2.55	9.35	4.80	4.55
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[4]						Not Applicable				

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The Surface Water WTP has a backup generator able to supply 2.7 MGD capacity, rendering partial capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
4. Oconee River is in Hydrologic Unit Code-10 "Big Creek-Oconee River," which is greater than 100 square miles. The Strahler Stream Order at the withdrawal point is 7 (a major river).
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible
5. Oconee River is in Hydrologic Unit Code-10 "Big Creek-Oconee River," which is greater than 100 square miles. The Strahler Stream Order at the withdrawal point is 7 (a major river).

Table B-6d
Dublin Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	6.65	2.30	1.50	0.81	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	6.80	2.30	1.50	0.81	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	3.95	2.30	1.50	0.81	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	6.80	2.30	1.50	0.81	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.55	2.30	1.50	0.81	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.55	2.30	1.50	0.81	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-7a
Eatonton-Putnam County Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	3.43	1.14	4.57	3.43	1.14
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	3.43	NA	3.43	0.00	3.43
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-7b
Eatonton-Putnam County Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	1.14	0.89	0.58	0.31	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.43	0.89	0.58	0.31	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-7c
Eatonton-Putnam County Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	3.43	1.44	4.87	3.43	1.44
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	3.43	NA	3.43	0.00	3.43
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. Eatonton-Putnam County plans to add a 0.5 MG tank.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-7d
Eatonton-Putnam County Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	1.44	1.50	0.98	0.53	0.06	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.43	1.50	0.98	0.53	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-7e
Eatonton-Putnam County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)	Individual System Excess Capacity[2] 2015	Individual System Excess Capacity[2] 2050
21	GA2370087 - Sinclair Water Authority	Located at booster station	18	3	5.301	3.426	0.893	3.426	3.271	3.333

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.

Table B-8a
Greensboro Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Greensboro WTP	Lake Oconee					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.60	3.30	NA	0.66	2.26	1.60	0.66
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.60	3.30	NA	NA	1.60	1.60	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.60	3.30	NA	0.66	2.26	1.60	0.66
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.60	3.30	NA	NA	1.60	0.00	1.60
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.60	3.30	NA	0.96	2.56	1.60	0.96
	D2. Chemical contamination of largest raw water source	0.1	1	1.60	3.30	NA	0.96	2.56	1.60	0.96
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	1.60	3.30	NA	NA	1.60	1.60	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Oconee is their only source of water.
6. The Oconee River is in Hydrologic Unit Code-10 "Greenbrier Creek-Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-8b
Greensboro Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.66	0.64	0.42	0.23	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	0.00	0.64	0.42	0.23	0.64	0.42	0.23
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.66	0.64	0.42	0.23	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.60	0.64	0.42	0.23	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.96	0.64	0.42	0.23	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	0.96	0.64	0.42	0.23	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	0.64	0.42	0.23	0.64	0.42	0.23
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-8c
Greensboro Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Greensboro WTP**	**Lake Oconee**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.60	3.30	NA	0.66	2.26	1.60	0.66
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.60	3.30	NA	NA	1.60	1.60	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.60	3.30	NA	0.66	2.26	1.60	0.66
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.60	3.30	NA	NA	1.60	0.00	1.60
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.60	3.30	NA	0.96	2.56	1.60	0.96
	D2. Chemical contamination of largest raw water source	0.1	1	1.60	3.30	NA	0.96	2.56	1.60	0.96
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	1.60	3.30	NA	NA	1.60	1.60	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Oconee is their only source of water.
6. The Oconee River is in Hydrologic Unit Code-10 "Greenbrier Creek-Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-8d
Greensboro Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.66	0.45	0.29	0.16	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	0.00	0.45	0.29	0.16	0.45	0.29	0.16
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.66	0.45	0.29	0.16	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.60	0.45	0.29	0.16	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.96	0.45	0.29	0.16	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	0.96	0.45	0.29	0.16	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	0.45	0.29	0.16	0.45	0.29	0.16
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-9a
Jackson County Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	16.88	2.34	19.22	13.71	5.52
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	16.88	NA	16.88	0.00	16.88
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-9b
Jackson County Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.52	2.82	1.83	0.99	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	16.88	2.82	1.83	0.99	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-9c
Jackson County Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	16.61	2.34	18.95	13.53	5.43
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	16.61	NA	16.61	0.00	16.61
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-9d
Jackson County Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.43	5.42	3.53	1.90	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	16.61	5.42	3.53	1.90	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-9e
Jackson County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)	Individual System Excess Capacity[2] 2015	Individual System Excess Capacity[2] 2050
19	GA1570001 - Commerce	Hwy 334	16	3	4.189	2.707	0.000	2.707	2.541	2.454
20	GA1570001 - Commerce	Wheeler Cemetery Road	8	5	1.745	1.128	0.000	1.128		
22	GA0130031 - Barrow County[3]	Unknown	6	5	0.982	0.635	0.020	0.635	193.901	151.759
23	GA1570121 - Upper Oconee Basin Water Authority	South of intersection of GA Hwy 330 and Savage Road	36	3	21.206	13.706	2.083	13.706	13.834	11.442

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
3. Barrow County is a wholesale purchase system which utilizes Gwinnett County, Statham, and Barrow County Transmission Main BOC/Upper Oconee Basin Water Authority as water sources. The cumulative excess capacity for the systems is listed here, while Table B-3e shows individual system values. Barrow County would act as a passthrough system.

Table B-10a
Jefferson Emergency Scenario Evaluation: 2015

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]							
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**City of Jefferson WTP**	**Parks Creek Reservoir**	**North Oconee River[4]**	**Big Curry Creek Reservoir**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[5]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.26	5.30	4.00	2.25	1.75	0.30	4.31	2.26	2.05
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.00	4.01
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.26	5.30	4.00	2.25	1.75	0.30	4.31	2.26	2.05
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.00	4.01
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.26	5.30	4.00	2.25	1.75	0.96	4.97	0.01	4.96
	D2. Chemical contamination of largest raw water source	0.1	1	2.26	5.30	4.00	2.25	1.75	0.96	4.97	0.01	4.96
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.05	30	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.01	4.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP does not have a backup generator, rendering full capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. This raw water source is for filling the Parks Creek Reservoir.
5. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
6. The raw water sources are in Hydrologic Unit Code-10 "Upper North Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-10b
Jefferson Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.05	1.15	0.75	0.40	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	4.01	1.15	0.75	0.40	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.05	1.15	0.75	0.40	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	4.01	1.15	0.75	0.40	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.96	1.15	0.75	0.40	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.96	1.15	0.75	0.40	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	4.00	1.15	0.75	0.40	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-10c
Jefferson Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]							
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**City of Jefferson WTP**	**Parks Creek Reservoir**	**North Oconee River[4]**	**Big Curry Creek Reservoir**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[5]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.26	5.30	4.00	2.25	1.75	0.60	4.61	2.26	2.35
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.00	4.01
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.26	5.30	4.00	2.25	1.75	0.60	4.61	2.26	2.35
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.00	4.01
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.26	5.30	4.00	2.25	1.75	1.26	5.27	0.01	5.26
	D2. Chemical contamination of largest raw water source	0.1	1	2.26	5.30	4.00	2.25	1.75	1.26	5.27	0.01	5.26
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.05	30	2.26	5.30	4.00	2.25	1.75	NA	4.01	0.01	4.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP does not have a backup generator, rendering full capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. This raw water source is for filling the Parks Creek Reservoir.
5. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. Jefferson plans to install a 0.5 MG tank.
6. The raw water sources are in Hydrologic Unit Code-10 "Upper North Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-10d
Jefferson Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.35	1.92	1.25	0.67	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	4.01	1.92	1.25	0.67	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.35	1.92	1.25	0.67	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	4.01	1.92	1.25	0.67	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	5.26	1.92	1.25	0.67	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	5.26	1.92	1.25	0.67	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	4.00	1.92	1.25	0.67	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-10e
Jefferson Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
24	GA1570114 - Jackson County[4]	Galilee Church Road	8	5	1.745	1.128	0.020	1.745	196.441	154.213

Prepared by: LCT 08/18/21
Checked by:

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. Jackson County is a wholesale purchase system which utilizes Barrow County, Commerce, and the Upper Oconee Basin Water Authority as water sources.
The cumulative excess capacity for the systems is listed here. Jackson County would act as a passthrough system.

Table B-11a
Loganville Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]				Not Applicable			
	A2. Critical asset failure at largest WTP[2]				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	7.48	0.69	8.17	2.71	5.47
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	7.48	NA	7.48	0.00	7.48
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-11b
Loganville Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.47	1.15	0.75	0.40	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	7.48	1.15	0.75	0.40	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-11c
Loganville Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]				Not Applicable			
	A2. Critical asset failure at largest WTP[2]				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[1]	0.1	1	7.48	0.69	8.17	2.71	5.47
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice[2]	1	3	7.48	NA	7.48	0.00	7.48
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-11d
Loganville Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	5.47	2.62	1.70	0.92	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	7.48	2.62	1.70	0.92	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-11e
Loganville Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)[2]	Maximum Possible Purchased Water (MGD)[3]	Individual System Excess Capacity[4] 2015	Individual System Excess Capacity[4] 2050
25	GA1350004 - Gwinnett County[5]	3937 Atlanta Highway	10	5	2.727	1.763	0.081	1.763	179.200	140.317
26	GA1350004 - Gwinnett County[5]	Lawrenceville Road/Brand Road	10	5	2.727	1.763	0.081	1.763		
27	GA2970008 - Walton County[6]	3448 Atlanta Highway	10	5	2.727	1.763	0.990	1.250	204.083	148.054
28	GA2970001 - Monroe	Ila Road	16	3	4.189	2.707	0.000	2.707	7.603	4.775

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The 2015 purchased value from GA1350004 - Gwinnett County was split between those two interconnections.
3. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
4. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
5. The excess capacity is estimated utilizing the current and projected peak day design capacities (248 MGD) as well as the current (68.8 MGD) and projected (107.68 MGD) ADD found within the 2017 Ch2M and Black and Veatch *Water Resource Management Plan: Metropolitan North Georgia Water Planning District.*
6. Walton County is a wholesale purchase system which utilizes Monroe, Newton County, Oconee County-Watkinsville, and Gwinnett County as water sources. The cumulative excess capacity for the systems is listed here. Walton County would act as a passthrough system.

Table B-12a
Madison Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]		Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Madison WTP	Lake Oconee WTP	Hard Labor Creek	Lake Oconee					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.50	2.00	1.50	2.00	NA	0.93	4.43	2.00	2.43
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.50	2.00	1.50	2.00	NA	NA	3.50	0.00	3.50
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.50	2.00	1.50	2.00	NA	0.93	4.43	2.00	2.43
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.50	2.00	1.50	2.00	NA	NA	3.50	0.00	3.50
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	1.50	2.00	1.50	2.00	NA	4.78	8.28	2.00	6.28
	D2. Chemical contamination of largest raw water source[5]	0.1	1	1.50	2.00	1.50	2.00	NA	4.78	8.28	2.00	6.28
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	1.50	2.00	1.50	2.00	NA	NA	3.50	2.00	1.50
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. There are no backup generators rendering full capacity loss at the largest WTP.
2. Meets both chemical and unit process redundancy rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Each of the plants' sources feeds a raw water storage pond which then feeds the plant.
6. Hard Labor Creek and Lake Oconee at their withdrawal points are in Hydrologic Unit Code-10 "Hard Labor Creek" and "Lower Apalachee River," respectively, which are more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-12b
Madison Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.43	1.18	0.76	0.41	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.50	1.18	0.76	0.41	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.43	1.18	0.76	0.41	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.50	1.18	0.76	0.41	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	6.28	1.18	0.76	0.41	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	6.28	1.18	0.76	0.41	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	1.50	1.18	0.76	0.41	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-12c
Madison Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)			Peak Permitted Withdrawal (MGD-24-hour maximum)[3]						
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Madison WTP Well (new)**	**Madison WTP**	**Lake Oconee WTP**	**Hard Labor Creek**	**Lake Oconee**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	0.35	1.50	2.00	1.50	2.00	NA	0.93	4.78	0.00	4.78
	A2. Critical asset failure at largest WTP[2]	0.1	30	0.35	1.50	2.00	1.50	2.00	NA	NA	3.85	0.00	3.85
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	0.35	1.50	2.00	1.50	2.00	NA	0.93	4.78	2.00	2.78
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	0.35	1.50	2.00	1.50	2.00	NA	NA	3.85	0.00	3.85
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	0.35	1.50	2.00	1.50	2.00	NA	4.78	8.63	2.00	6.63
	D2. Chemical contamination of largest raw water source	0.1	1	0.35	1.50	2.00	1.50	2.00	NA	4.78	8.63	2.00	6.63
E. Full unavailability of major raw water sources due to federal or state government actions	--							Not Applicable					
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--							Not Applicable					
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	0.35	1.50	2.00	1.50	2.00	NA	NA	3.85	2.00	1.85
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]							Not Applicable					

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. There are plans to install a backup generator able to supply full capacity at the Lake Oconee WTP.
2. Meets both chemical and unit process redundancy rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Each of the plants' sources feeds a raw water storage pond which then feeds the plant.
6. Hard Labor Creek and Lake Oconee at their withdrawal points are in Hydrologic Unit Code-10 "Hard Labor Creek" and "Lower Apalachee River," respectively, which are more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-12d
Madison Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target			Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)			
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	4.78	1.41	0.92	0.49	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	3.85	1.41	0.92	0.49	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.78	1.41	0.92	0.49	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	3.85	1.41	0.92	0.49	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	6.63	1.41	0.92	0.49	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	6.63	1.41	0.92	0.49	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	1.85	1.41	0.92	0.49	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-13a
Milledgeville Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Lamar F. Ham WTP	James E. Baugh WTP	Oconee River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	8.64	3.88	12.44	3.27	2.61	18.32	0.00	18.32
	A2. Critical asset failure at largest WTP[2]	0.1	30	8.64	3.88	12.44	3.27	NA	15.71	0.00	15.71
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	8.64	3.88	12.44	3.27	2.61	18.32	8.64	9.68
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	8.64	3.88	12.44	3.27	NA	15.71	0.00	15.71
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	8.64	3.88	12.44	3.27	4.41	20.12	12.52	7.60
	D2. Chemical contamination of largest raw water source[5]	0.1	1	8.64	3.88	12.44	3.27	4.41	20.12	12.52	7.60
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[6]	Not Applicable									
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[7]	Not Applicable									

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The Lamar F. Ham WTP has a backup generator able to supply full capacity, rendering no capacity loss at the largest WTP.
2. The Lamar F. Ham WTP met chemical and unit process redundancy, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. As a conservative measure, it was assumed that both withdrawal points along the Oconee River would experience contamination.
6. Their raw water sources are not dammed river impoundments.
7. The Oconee River is in Hydrologic Unit Code-10 "Fishing Creek - Oconee River," which is greater than 100 square miles. The Strahler Stream Order at the withdrawal points is 7 (a major river).

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-13b
Milledgeville Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	18.32	3.32	2.16	1.16	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	15.71	3.32	2.16	1.16	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	9.68	3.32	2.16	1.16	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	15.71	3.32	2.16	1.16	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	7.60	3.32	2.16	1.16	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	7.60	3.32	2.16	1.16	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-13c
Milledgeville Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Lamar F. Ham WTP	James E. Baugh WTP	Oconee River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	8.64	3.88	12.44	3.33	2.61	18.38	0.00	18.38
	A2. Critical asset failure at largest WTP[2]	0.1	30	8.64	3.88	12.44	3.33	NA	15.77	0.00	15.77
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	8.64	3.88	12.44	3.33	2.61	18.38	8.64	9.74
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	8.64	3.88	12.44	3.33	NA	15.77	0.00	15.77
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	8.64	3.88	12.44	3.33	4.41	20.18	12.44	7.74
	D2. Chemical contamination of largest raw water source[5]	0.1	1	8.64	3.88	12.44	3.33	4.41	20.18	12.44	7.74
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[6]	Not Applicable									
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[7]	Not Applicable									

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has a backup generator able to supply full capacity, rendering no capacity loss at the largest WTP.
2. The WTP met chemical and unit process redundancy, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. As a conservative measure, it was assumed that both withdrawal points along the Oconee River would experience contamination.
6. Their raw water sources are not dammed river impoundments.
7. The Oconee River is in Hydrologic Unit Code-10 "Fishing Creek - Oconee River," which is greater than 100 square miles. The Strahler Stream Order at the withdrawal points is 7 (a major river).

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-13d
Milledgeville Deficits: 2050

			2050 - Long-Range Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	18.38	3.07	2.00	1.08	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	15.77	3.07	2.00	1.08	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	9.74	3.07	2.00	1.08	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	15.77	3.07	2.00	1.08	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	7.74	3.07	2.00	1.08	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	7.74	3.07	2.00	1.08	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-13e
Milledgeville Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)	Individual System Excess Capacity[2] 2015	Individual System Excess Capacity[2] 2050
3	GA0090000 - Baldwin County[3]	Swint Avenue and S. Wayne St. - US 441 S.	10	5	2.727	1.763	0.000	1.763	3.271	3.333
4	GA0090000 - Baldwin County[3]	US 441 N.	10	5	2.727	1.763	0.000	1.763		
5	GA0090000 - Baldwin County[3]	Frank Bone	10	5	2.727	1.763	0.000	1.763		
6	GA0090000 - Baldwin County[3]	Hwys 22/24 East	10	5	2.727	1.763	0.000	1.763		
7	GA0090000 - Baldwin County[3]	Hwy 49 and Frank Bone Road	10	5	2.727	1.763	0.000	1.763		

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
3. Baldwin County is a wholesale purchase system which utilizes Milledgeville and the Sinclair Water Authority as water sources. The Sinclair Water Authority's excess capacity is listed here. Baldwin County would act as a passthrough system.

Table B-14a
Monroe Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]		Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				City of Monroe WTP	John T. Briscoe Reservoir on Beaverdam Creek	Alcovy River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	10.00	16.00	10.00	7.78	1.71	19.49	10.00	9.49
	A2. Critical asset failure at largest WTP[2]	0.1	30	10.00	16.00	10.00	7.78	NA	17.78	10.00	7.78
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	10.00	16.00	10.00	7.78	0.93	18.71	10.00	8.71
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	10.00	16.00	10.00	7.78	NA	17.78	0.00	17.78
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	10.00	16.00	10.00	7.78	2.91	20.69	0.00	20.69
	D2. Chemical contamination of largest raw water source[5]	0.1	1	10.00	16.00	10.00	7.78	2.91	20.69	0.00	20.69
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	10.00	16.00	10.00	7.78	NA	17.78	0.00	17.78
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable									

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP only has a backup generator for the high service pumps. Water can be pumped from the clearwells into the distribution system, but that is all. Clearwell storage is included here for that reason.
2. Meets chemical, but not unit process redundancy rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Both the John T. Briscoe Reservoir and the Alcovy River can feed into the WTP, rendering no capacity loss for this scenario.
6. Both raw water sources are in Hydrologic Unit Code-10 "Upper Alcovy River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-14b
Monroe Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	9.49	2.40	1.56	0.84	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	7.78	2.40	1.56	0.84	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	8.71	2.40	1.56	0.84	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	17.78	2.40	1.56	0.84	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	20.69	2.40	1.56	0.84	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	20.69	2.40	1.56	0.84	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	17.78	2.40	1.56	0.84	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-14c
Monroe Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]		Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				City of Monroe WTP	John T. Briscoe Reservoir on Beaverdam Creek	Alcovy River					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	10.00	16.00	10.00	7.78	1.71	19.49	10.00	9.49
	A2. Critical asset failure at largest WTP[2]	0.1	30	10.00	16.00	10.00	7.78	NA	17.78	10.00	7.78
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	10.00	16.00	10.00	7.78	0.93	18.71	10.00	8.71
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	10.00	16.00	10.00	7.78	NA	17.78	0.00	17.78
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	10.00	16.00	10.00	7.78	2.91	20.69	0.00	20.69
	D2. Chemical contamination of largest raw water source[5]	0.1	1	10.00	16.00	10.00	7.78	2.91	20.69	0.00	20.69
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable									
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	10.00	16.00	10.00	7.78	NA	17.78	0.00	17.78
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable									

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP only has a backup generator for the high service pumps. Water can be pumped from the clearwells into the distribution system, but that is all. Clearwell storage is included here for that reason.
2. Meets chemical, but not unit process redundancy rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Both the John T. Briscoe Reservoir and the Alcovy River can feed into the WTP, rendering no capacity loss for this scenario.
6. Both raw water sources are in Hydrologic Unit Code-10 "Upper Alcovy River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-14d
Monroe Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	9.49	5.23	3.40	1.83	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	7.78	5.23	3.40	1.83	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	8.71	5.23	3.40	1.83	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	17.78	5.23	3.40	1.83	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	20.69	5.23	3.40	1.83	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	20.69	5.23	3.40	1.83	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	17.78	5.23	3.40	1.83	0.00	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-14e
Monroe Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
28	GA1350006 - Loganville[4]	Ila Road	16	3	4.189	2.707	0.000	2.707	196.5	143.3
29	GA2970008 - Walton County[5]	Hwy 78	6	5	0.982	0.635	0.000	0.635		
30	GA2970008 - Walton County[5]	Gratis Road	6	5	0.982	0.635	0.000	0.635		
31	GA2970008 - Walton County[5]	Bold Springs Road	6	5	0.982	0.635	0.000	0.635		
32	GA2970008 - Walton County[5]	Criswell Road	6	5	0.982	0.635	0.000	0.635		
33	GA2970008 - Walton County[5]	Jersey Road	6	5	0.982	0.635	0.000	0.635	196.5	143.3
34	GA2970008 - Walton County[5]	Old Monroe-Madison Road	6	5	0.982	0.635	0.000	0.635		
35	GA2970008 - Walton County[5]	Hwy 11 North	6	5	0.982	0.635	0.000	0.635		
36	GA2970008 - Walton County[5]	Hwy 83 Good Hope Road	6	5	0.982	0.635	0.000	0.635		

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. Loganville is a wholesale purchase system which utilizes Gwinnett County, Walton County, and Monroe as water sources.
   The cumulative excess capacity for Gwinnett is listed here as Walton County is reported separately in this table. Loganville would act as a passthrough system.
5. Walton County is a wholesale purchase system which utilizes Monroe, Newton County, Oconee County-Watkinsville, and Gwinnett County as water sources.
   The cumulative excess capacity for the systems, excluding Monroe, is listed here. Walton County would act as a passthrough system.
   Newton County: 2015 excess capacity is 16.8 MGD; 2050 excess capacity is 3.0 MGD.
   Gwinnett County: 2015 excess capacity is 179.2 MGD; 2050 excess capacity is 140.3 MGD.
   Oconee County-Watkinsville: 2015 excess capacity is 0.5 MGD; no 2050 excess capacity.

Table B-15a
Oconee County - Watkinsville Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)				Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				WTP 205 (Hillcrest Well)	WTP 216 (Oconee Crossing Well)	WTP 122 (Silverleaf Well)	All Other WTPs[5]					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	0.29	0.09	0.07	0.21	12.44	1.20	14.29	0.29	14.00
	A2. Critical asset failure at largest WTP[2]	0.1	30	0.29	0.09	0.07	0.21	12.44	1.20	14.29	0.29	14.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[4]	0.1	1	0.29	0.09	0.07	0.21	12.44	1.20	14.29	4.50	9.79
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	0.29	0.09	0.07	0.21	12.44	NA	13.09	0.00	13.09
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	0.29	0.09	0.07	0.21	12.44	1.20	14.29	0.29	14.00
	D2. Chemical contamination of largest raw water source	0.1	1	0.29	0.09	0.07	0.21	12.44	1.20	14.29	0.29	14.00
E. Full unavailability of major raw water sources due to federal or state government actions	--			Not Applicable								
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--			Not Applicable								
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment			Not Applicable								
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought			Not Applicable								

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The largest WTP does not have a backup generator, rendering partial capacity loss.
2. Backup equipment is unavailable, rendering full capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
4. The most impactful critical asset failure would be the loss of the finished water connection with the Upper Oconee Basin Water Authority. The maximum flow has been utilized for capacity loss.
5. The QWS has seven WTPs. All but the largest three are summarized in one column.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-15b
Oconee County - Watkinsville Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	14.00	2.53	1.64	0.88	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	14.00	2.53	1.64	0.88	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	9.79	2.53	1.64	0.88	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	13.09	2.53	1.64	0.88	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	14.00	2.53	1.64	0.88	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	14.00	2.53	1.64	0.88	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-15c
Oconee County - Watkinsville Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)				Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				WTP 205 (Hillcrest Well)	WTP 216 (Oconee Crossing Well)	WTP 122 (Silverleaf Well)	All Other WTPs[5]					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[2]	0.5	1	0.29	0.09	0.07	0.21	12.44	1.65	14.74	0.29	14.45
	A2. Critical asset failure at largest WTP[3]	0.1	30	0.29	0.09	0.07	0.21	12.44	NA	13.09	0.00	13.09
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)[4]	0.1	1	0.29	0.09	0.07	0.21	12.44	1.65	14.74	0.29	14.45
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	0.29	0.09	0.07	0.21	12.44	NA	13.09	4.50	8.59
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	0.29	0.09	0.07	0.21	12.44	1.65	14.74	0.29	14.45
	D2. Chemical contamination of largest raw water source	0.1	1	0.29	0.09	0.07	0.21	12.44	1.65	14.74	0.29	14.45
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable					
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable					
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable					
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought						Not Applicable					

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The largest WTP does not have a backup generator, rendering partial capacity loss.
2. Backup equipment is unavailable, rendering full capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. The QWS indicated a new 0.75 MG storage tank.
4. The most impactful critical asset failure would be the loss of the finished water connection with the Upper Oconee Basin Water Authority. The maximum flow has been utilized for capacity loss.
5. The QWS has seven WTPs. All but the largest three are summarized in one column.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-15d
Oconee County - Watkinsville Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	14.45	4.30	2.80	1.51	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	13.09	4.30	2.80	1.51	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	14.45	4.30	2.80	1.51	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	8.59	4.30	2.80	1.51	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	14.45	4.30	2.80	1.51	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	14.45	4.30	2.80	1.51	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/23/21
Checked by: GJH 08/31/21

Table B-15e
Oconee County-Watkinsville Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)[2]	Maximum Possible Purchased Water (MGD)[3]	Individual System Excess Capacity[4] 2015	Individual System Excess Capacity[4] 2050
37	GA1570121 - Upper Oconee Basin Water Authority	Jefferson Ave, Bogart, GA	24	3	9.425	6.091	2.367	4.500	13.834	11.442
38	GA0130031 - Barrow County[5]	Hwy 53 at Barrow - Oconee County Line	8	5	1.745	1.128	0.005	1.000	193.901	151.759
39	GA0130031 - Barrow County[5]	Dove Creek Road at Barrow - Oconee County Line	8	5	1.745	1.128	0.005	1.000		
40	GA0130031 - Barrow County[5]	Barber Creek Road at Oconee - Barrow County Line	12	5	3.927	2.538	0.005	1.000		
41	GA0590000 - Athens - Clarke County	Hwy 441 at ACC - Oconee Line	12	5	3.927	2.538	0.000	2.538	22.629	7.100
42	GA0590000 - Athens - Clarke County	Simonton Bridge Road at Oconee - ACC Line	10	5	2.727	1.763	0.000	1.763		
43	GA0590000 - Athens - Clarke County	Jennings Mill Road at Oconee - ACC Line	6	5	0.982	0.635	0.000	0.635		

Prepared by: LCT 08/20/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The 2015 purchased value from GA0130031 - Barrow County was split between those three interconnections.
3. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
4. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
5. Barrow County is a wholesale purchase system which utilizes Gwinnett County, Statham, and Barrow County Transmission Main BOC/Upper Oconnee Basin Water Authority as water sources.
The cumulative excess capacity for the systems is listed here, while Table B-3e shows individual system values. Barrow County would act as a passthrough system.

Table B-16a
Sandersville Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				North Station WTP	South Station WTP	Ferncrest WTP					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.30	1.30	2.16	NA	0.66	5.41	0.00	5.41
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.30	1.30	2.16	NA	NA	4.75	0.00	4.75
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.30	1.30	2.16	NA	0.66	5.41	2.16	3.25
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.30	1.30	2.16	NA	NA	4.75	0.00	4.75
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.30	1.30	2.16	NA	1.65	6.40	2.16	4.24
	D2. Chemical contamination of largest raw water source	0.1	1	1.30	1.30	2.16	NA	1.65	6.40	2.16	4.24
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought						Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a backup generator able to supply full capacity at Ferncrest WTP, rendering no capacity loss at the largest WTP.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-16b
Sandersville Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	5.41	1.63	1.06	0.57	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	4.75	1.63	1.06	0.57	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	3.25	1.63	1.06	0.57	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	4.75	1.63	1.06	0.57	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.24	1.63	1.06	0.57	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.24	1.63	1.06	0.57	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-16c
Sandersville Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				North Station WTP	South Station WTP	Ferncrest WTP					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.30	1.30	2.16	NA	0.66	5.41	0.00	5.41
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.30	1.30	2.16	NA	NA	4.75	0.00	4.75
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.30	1.30	2.16	NA	0.66	5.41	2.16	3.25
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.30	1.30	2.16	NA	NA	4.75	0.00	4.75
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.30	1.30	2.16	NA	1.65	6.40	2.16	4.24
	D2. Chemical contamination of largest raw water source	0.1	1	1.30	1.30	2.16	NA	1.65	6.40	2.16	4.24
E. Full unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--						Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment						Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought						Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a backup generator able to supply full capacity at Ferncrest WTP, rendering no capacity loss at the largest WTP.
2. Backup equipment is available, rendering no capacity loss.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-16d
Sandersville Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	5.41	0.94	0.61	0.33	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	4.75	0.94	0.61	0.33	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	3.25	0.94	0.61	0.33	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	4.75	0.94	0.61	0.33	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	4.24	0.94	0.61	0.33	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	4.24	0.94	0.61	0.33	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-17a
Sinclair Water Authority Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Sinclair Water Authority WTP	Lake Sinclair					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	6.00	9.50	NA	0.00	6.00	0.00	6.00
	A2. Critical asset failure at largest WTP[2]	0.1	30	6.00	9.50	NA	NA	6.00	0.00	6.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	6.00	9.50	NA	0.00	6.00	6.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	6.00	9.50	NA	NA	6.00	0.00	6.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	6.00	9.50	NA	1.20	7.20	6.00	1.20
	D2. Chemical contamination of largest raw water source	0.1	1	6.00	9.50	NA	1.20	7.20	6.00	1.20
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	6.00	9.50	NA	NA	6.00	6.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a dual feed power system able to supply full capacity, rendering no capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Sinclair is their only source of water.
6. Lake Sinclair is in Hydrologic Unit Code-10 "Oconee River - Lake Sinclair," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-17b
Sinclair Water Authority Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target			Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)			
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	6.00	2.73	1.77	0.96	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	6.00	2.73	1.77	0.96	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.00	2.73	1.77	0.96	2.73	1.77	0.96
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	6.00	2.73	1.77	0.96	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	1.20	2.73	1.77	0.96	1.53	0.57	0.00
	D2. Chemical contamination of largest raw water source	1.20	2.73	1.77	0.96	1.53	0.57	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	2.73	1.77	0.96	2.73	1.77	0.96
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-17c
Sinclair Water Authority Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Sinclair Water Authority WTP**	**Lake Sinclair**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	6.00	9.50	NA	0.00	6.00	0.00	6.00
	A2. Critical asset failure at largest WTP[2]	0.1	30	6.00	9.50	NA	NA	6.00	0.00	6.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	6.00	9.50	NA	0.00	6.00	6.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	6.00	9.50	NA	NA	6.00	0.00	6.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	6.00	9.50	NA	1.20	7.20	6.00	1.20
	D2. Chemical contamination of largest raw water source	0.1	1	6.00	9.50	NA	1.20	7.20	6.00	1.20
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	6.00	9.50	NA	NA	6.00	6.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a dual feed power system able to supply full capacity, rendering no capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Sinclair is their only source of water.
6. Lake Sinclair is in Hydrologic Unit Code-10 "Oconee River - Lake Sinclair," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-17d
Sinclair Water Authority Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Long-Range Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	6.00	2.67	1.73	0.93	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	6.00	2.67	1.73	0.93	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.00	2.67	1.73	0.93	2.67	1.73	0.93
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	6.00	2.67	1.73	0.93	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	1.20	2.67	1.73	0.93	1.47	0.53	0.00
	D2. Chemical contamination of largest raw water source	1.20	2.67	1.73	0.93	1.47	0.53	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	2.67	1.73	0.93	2.67	1.73	0.93
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-18a
Social Circle Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD) Social Circle WTP	Peak Permitted Withdrawal (MGD-24-hour maximum)[3] Alcovy River	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.00	1.00	1.13	1.05	3.18	1.00	2.18
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.00	1.00	1.13	NA	2.13	1.00	1.13
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.00	1.00	1.13	1.05	3.18	1.00	2.18
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.00	1.00	1.13	NA	2.13	0.00	2.13
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.00	1.00	1.13	1.14	3.27	1.00	2.27
	D2. Chemical contamination of largest raw water source	0.1	1	1.00	1.00	1.13	1.14	3.27	1.00	2.27
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]					Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	0.1	120	1.00	1.00	1.13	NA	1.34	-	1.34

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss.
2. Meets chemical, but not unit process redundancy rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. They do not withdraw water from an impounded river.
6. The Alcovy River is Strahler Stream Order 4 at the withdrawal point (not a major river). Purchased water is assumed to be available.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-18b
Social Circle Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.18	0.53	0.34	0.18	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	1.13	0.53	0.34	0.18	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.18	0.53	0.34	0.18	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	2.13	0.53	0.34	0.18	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	2.27	0.53	0.34	0.18	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	2.27	0.53	0.34	0.18	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	1.34	0.53	0.34	0.18	0.00	0.00	0.00

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-18c
Social Circle Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Social Circle WTP**	**Alcovy River**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.00	1.00	1.13	1.05	3.18	0.20	2.98
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.00	1.00	1.13	NA	2.13	1.00	1.13
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.00	1.00	1.13	1.05	3.18	1.00	2.18
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.00	1.00	1.13	NA	2.13	0.00	2.13
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.00	1.00	1.13	1.14	3.27	1.00	2.27
	D2. Chemical contamination of largest raw water source	0.1	1	1.00	1.00	1.13	1.14	3.27	1.00	2.27
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]					Not Applicable				
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	0.1	120	1.00	1.00	1.13	NA	1.46	-	1.46

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS plans to obtain backup power, so 20% capacity loss was assumed.
2. Meets chemical, but not unit process redundancy rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. They do not withdraw water from an impounded river.
6. The Alcovy River is Strahler Stream Order 4 at the withdrawal point (not a major river). Purchased water is assumed to be available.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-18d
Social Circle Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.98	0.83	0.54	0.29	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	1.13	0.83	0.54	0.29	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	2.18	0.83	0.54	0.29	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	2.13	0.83	0.54	0.29	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	2.27	0.83	0.54	0.29	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	2.27	0.83	0.54	0.29	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	1.46	0.83	0.54	0.29	0.00	0.00	0.00

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-18e
Social Circle Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
44	GA2970008 - Walton County[4]	Highway #11	8	5	1.745	1.128	0.024	1.128	204.083	148.054

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
4. Walton County is a wholesale purchase system which utilizes Monroe, Newton County, Oconee County-Watkinsville, and Gwinnett County as water sources.
   The cumulative excess capacity for the systems is listed here. Walton County would act as a passthrough system.
   Newton County: 2015 excess capacity is 16.8 MGD; 2050 excess capacity is 3.0 MGD.
   Gwinnett County: 2015 excess capacity is 179.2 MGD; 2050 excess capacity is 140.3 MGD.
   Oconee County-Watkinsville: 2015 excess capacity is 0.5 MGD; no 2050 excess capacity.
   Monroe: 2015 excess capacity is 7.6 MGD; 2050 excess capacity is 4.8 MGD.

Table B-19a
Sparta Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD) Sparta WTP	Peak Permitted Withdrawal (MGD-24-hour maximum)[3] Lake Sinclair	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.00	2.00	NA	0.60	2.60	0.00	2.60
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.00	2.00	NA	NA	2.00	0.00	2.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.00	2.00	NA	0.60	2.60	2.00	0.60
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.00	2.00	NA	NA	2.00	0.00	2.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.00	2.00	NA	1.05	3.05	2.00	1.05
	D2. Chemical contamination of largest raw water source	0.1	1	2.00	2.00	NA	1.05	3.05	2.00	1.05
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	2.00	2.00	NA	NA	2.00	2.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a backup generator able to supply full capacity, rendering no capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Sinclair is their only source of water.
6. Lake Sinclair is in Hydrologic Unit Code-10 "Shoulderbone Creek," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-19b
Sparta Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.60	0.76	0.50	0.27	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	2.00	0.76	0.50	0.27	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.60	0.76	0.50	0.27	0.16	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	2.00	0.76	0.50	0.27	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	1.05	0.76	0.50	0.27	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	1.05	0.76	0.50	0.27	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	0.76	0.50	0.27	0.76	0.50	0.27
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-19c
Sparta Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Sparta WTP	Lake Sinclair					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	2.00	2.00	NA	0.60	2.60	0.00	2.60
	A2. Critical asset failure at largest WTP[2]	0.1	30	2.00	2.00	NA	NA	2.00	0.00	2.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	2.00	2.00	NA	0.60	2.60	2.00	0.60
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	2.00	2.00	NA	NA	2.00	0.00	2.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	2.00	2.00	NA	1.05	3.05	2.00	1.05
	D2. Chemical contamination of largest raw water source	0.1	1	2.00	2.00	NA	1.05	3.05	2.00	1.05
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.05	30	2.00	2.00	NA	NA	2.00	2.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The QWS has a backup generator able to supply full capacity, rendering no capacity loss.
2. Backup equipment is available, rendering no capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Lake Sinclair is their only source of water.
6. Lake Sinclair is in Hydrologic Unit Code-10 "Shoulderbone Creek," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-19d
Sparta Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	2.60	0.22	0.14	0.08	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	2.00	0.22	0.14	0.08	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.60	0.22	0.14	0.08	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	2.00	0.22	0.14	0.08	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	1.05	0.22	0.14	0.08	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	1.05	0.22	0.14	0.08	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	0.22	0.14	0.08	0.22	0.14	0.08
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-20a
Statham Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]		Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Statham WTP	Oak Street Spring WTP	NRCS Reservoir #6 on Barber Creek	Oak Street Spring					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.00	0.10	1.00	0.143	0.15	0.18	1.43	1.00	0.43
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.00	0.10	1.00	0.143	0.15	NA	1.25	1.00	0.25
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.00	0.10	1.00	0.143	0.15	0.18	1.43	1.00	0.43
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.00	0.10	1.00	0.143	0.15	NA	1.25	0.00	1.25
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.00	0.10	1.00	0.143	0.15	0.36	1.61	1.00	0.61
	D2. Chemical contamination of largest raw water source	0.1	1	1.00	0.10	1.00	0.143	0.15	0.36	1.61	1.00	0.61
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	1.00	0.10	1.00	0.143	0.15	NA	1.25	1.00	0.25
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss at the largest WTP.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. There could be a failure at Reservoir #6.
6. The withdrawal point for Reservoir #6 is in Hydrologic Unit Code-10 "Lower Middle Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-20b
Statham Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.43	0.30	0.20	0.11	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	0.25	0.30	0.20	0.11	0.05	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.43	0.30	0.20	0.11	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.25	0.30	0.20	0.11	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.61	0.30	0.20	0.11	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	0.61	0.30	0.20	0.11	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.25	0.30	0.20	0.11	0.05	0.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-20c
Statham Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)		Peak Permitted Withdrawal (MGD-24-hour maximum)[3]		Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				Statham WTP	Oak Street Spring WTP	NRCS Reservoir #6 on Barber Creek	Oak Street Spring					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	1.00	0.10	1.00	0.14	0.00	0.18	1.28	1.00	0.28
	A2. Critical asset failure at largest WTP[2]	0.1	30	1.00	0.10	1.00	0.14	0.00	NA	1.10	1.00	0.10
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	1.00	0.10	1.00	0.14	0.00	0.18	1.28	1.00	0.28
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	1.00	0.10	1.00	0.14	0.00	NA	1.10	0.00	1.10
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	1.00	0.10	1.00	0.14	0.00	0.36	1.46	1.00	0.46
	D2. Chemical contamination of largest raw water source	0.1	1	1.00	0.10	1.00	0.14	0.00	0.36	1.46	1.00	0.46
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	1.00	0.10	1.00	0.14	0.00	NA	1.10	1.00	0.10
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss at the largest WTP.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. There could be a failure at Reservoir #6.
6. The withdrawal point for Reservoir #6 is in Hydrologic Unit Code-10 "Lower Middle Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-20d
Statham Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.28	1.29	0.84	0.45	1.01	0.56	0.17
	A2. Critical asset failure at largest WTP	0.10	1.29	0.84	0.45	1.19	0.74	0.35
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.28	1.29	0.84	0.45	1.01	0.56	0.17
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1.10	1.29	0.84	0.45	0.19	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.46	1.29	0.84	0.45	0.83	0.38	0.00
	D2. Chemical contamination of largest raw water source	0.46	1.29	0.84	0.45	0.83	0.38	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.10	1.29	0.84	0.45	1.19	0.74	0.35
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-20e
Statham Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)	Maximum Possible Purchased Water (MGD)[2]	Individual System Excess Capacity[3] 2015	Individual System Excess Capacity[3] 2050
45	GA0130002 - Winder	Atlanta Highway	4	5	0.436	0.282	0.071	0.150	2.081	-7.021

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day
1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
3. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.

Table B-21a
Upper Oconee Basin Water Authority Emergency Scenario Evaluation: 2015

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Upper Oconee Basin Water Authority WTP**	**Bear Creek Reservoir**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[4]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	21.00	79.00	NA	0.00	21.00	21.00	0.00
	A2. Critical asset failure at largest WTP[2]	0.1	30	21.00	79.00	NA	NA	21.00	0.00	21.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	21.00	79.00	NA	0.00	21.00	21.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	21.00	79.00	NA	NA	21.00	0.00	21.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	21.00	79.00	NA	2.40	23.40	21.00	2.40
	D2. Chemical contamination of largest raw water source	0.1	1	21.00	79.00	NA	2.40	23.40	21.00	2.40
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	0.05	30	21.00	79.00	NA	NA	21.00	21.00	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]					Not Applicable				

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss at the largest WTP.
2. The WTP met chemical redundancy and unit process redundancy.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. A failure of the Bear Creek Reservoir would result in full loss of water.
6. Their reservoir is in Hydrologic Unit Code-10 "Lower Middle Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-21b
Upper Oconee Basin Water Authority Deficits: 2015

			2015 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.00	7.17	4.66	2.51	7.17	4.66	2.51
	A2. Critical asset failure at largest WTP	21.00	7.17	4.66	2.51	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.00	7.17	4.66	2.51	7.17	4.66	2.51
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	21.00	7.17	4.66	2.51	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	2.40	7.17	4.66	2.51	4.77	2.26	0.11
	D2. Chemical contamination of largest raw water source	2.40	7.17	4.66	2.51	4.77	2.26	0.11
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	7.17	4.66	2.51	7.17	4.66	2.51
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-21c
Upper Oconee Basin Water Authority Emergency Scenario Evaluation: 2050

				Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[4]					
Risk	**Scenario**	**Relative Liklihood**	**Duration (Days)**	**Upper Oconee Basin Water Authority WTP[3]**	**Bear Creek Reservoir**	**Maximum Possible Purchased Water (MGD)**	**Water Storage (MGD)[5]**	**Total Possible Water Supply (MGD)**	**Capacity Loss (MGD)**	**Available Water Supply (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	26.50	79.00	NA	0.00	26.50	26.50	0.00
	A2. Critical asset failure at largest WTP[2]	0.1	30	26.50	79.00	NA	NA	26.50	0.00	26.50
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	26.50	79.00	NA	0.00	26.50	26.50	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	26.50	79.00	NA	NA	26.50	0.00	26.50
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	0.5	1	26.50	79.00	NA	2.40	28.90	26.50	2.40
	D2. Chemical contamination of largest raw water source	0.1	1	26.50	79.00	NA	2.40	28.90	26.50	2.40
E. Full unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--					Not Applicable				
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[6]	0.05	30	26.50	79.00	NA	NA	26.50	26.50	0.00
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[7]					Not Applicable				

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has no backup generator, rendering full capacity loss at the largest WTP.
2. The WTP met chemical redundancy and unit process redundancy.
3. The QWS plans a two phase expansion of the WTP. The first phase increases the capacity from 21 MGD to 26.5 MGD.
4. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
5. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
6. A failure of the Bear Creek Reservoir would result in full loss of water.
7. Their reservoir is in Hydrologic Unit Code-10 "Lower Middle Oconee River," which is more than 100 square miles.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-21d
Upper Oconee Basin Water Authority Deficits: 2050

			2050 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	0.00	15.06	9.79	5.27	15.06	9.79	5.27
	A2. Critical asset failure at largest WTP	26.50	15.06	9.79	5.27	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.00	15.06	9.79	5.27	15.06	9.79	5.27
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	26.50	15.06	9.79	5.27	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	2.40	15.06	9.79	5.27	12.66	7.39	2.87
	D2. Chemical contamination of largest raw water source	2.40	15.06	9.79	5.27	12.66	7.39	2.87
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	0.00	15.06	9.79	5.27	15.06	9.79	5.27
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-22a
Walton County Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]				Not Applicable			
	A2. Critical asset failure at largest WTP[2]				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	13.24	1.80	15.04	2.54	12.50
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	13.24	NA	13.24	0.00	13.24
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-22b
Walton County Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP				Not Applicable			
	A2. Critical asset failure at largest WTP				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	12.50	4.41	2.87	1.54	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	13.24	4.41	2.87	1.54	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-22c
Walton County Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[3]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]				Not Applicable			
	A2. Critical asset failure at largest WTP[2]				Not Applicable			
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	12.49	2.10	14.59	2.54	12.05
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	12.49	NA	12.49	0.00	12.49
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source				Not Applicable			
	D2. Chemical contamination of largest raw water source				Not Applicable			
E. Full unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--				Not Applicable			
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment				Not Applicable			
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought				Not Applicable			

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. It was assumed the largest interconnection is lost.
2. It was assumed that the interconnections can supply full capacity.
3. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. Walton plans to add a 0.5 MG tank.

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-22d
Walton County Deficits: 2050

			2050 - Immediate Reliability Target					
Risk	**Scenario**	**Available Water Supply (MGD)**	**Total Demand (MGD)[1]**	**65% ADD (MGD)**	**35% ADD (MGD)**	**Total Demand Deficit (MGD)**	**65% ADD Deficit (MGD)**	**35% ADD Deficit (MGD)**
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	Not Applicable						
	A2. Critical asset failure at largest WTP	Not Applicable						
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	12.05	8.49	5.52	2.97	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	12.49	8.49	5.52	2.97	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	Not Applicable						
	D2. Chemical contamination of largest raw water source	Not Applicable						
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-22e
Walton County Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)[2]	Maximum Possible Purchased Water (MGD)[3]	Individual System Excess Capacity[4] 2015	Individual System Excess Capacity[4] 2050
29	GA2970001 - Monroe	Hwy 78	6	5	0.982	0.635	0.018	0.635	7.603	4.775
30	GA2970001 - Monroe	Gratis Road	6	5	0.982	0.635	0.018	0.635		
31	GA2970001 - Monroe	Bold Springs Road	6	5	0.982	0.635	0.018	0.635		
32	GA2970001 - Monroe	Criswell Road	6	5	0.982	0.635	0.018	0.635		
33	GA2970001 - Monroe	Jersey Road	6	5	0.982	0.635	0.018	0.635		
34	GA2970001 - Monroe	Old Monroe-Madison Road	6	5	0.982	0.635	0.018	0.635		
35	GA2970001 - Monroe	Hwy 11 North	6	5	0.982	0.635	0.018	0.635		
36	GA2970001 - Monroe	Hwy 83 Good Hope Road	6	5	0.982	0.635	0.018	0.635		
46	GA2170097 - Newton County	Alcovy Road	12	5	3.927	2.538	1.393	2.538	16.775	2.962
47	GA2170097 - Newton County	Hwy 138	10	5	2.727	1.763	1.393	1.763		
48	GA2170097 - Newton County	Flat Rock Road	16	3	4.189	2.707	1.393	2.707		
49	GA2190000 - Oconee County-Watkinsville	Oconee Co Line Hwy 78	6	5	0.982	0.635	0.089	0.635	0.505	-3.653
50	GA1350004 - Gwinnett County[5]	Rosebud Road	4	5	0.436	0.282	0.0002	0.282	179.200	140.317
51	GA1350004 - Gwinnett County[5]	Ozora Road	4	5	0.436	0.282	0.0002	0.282		

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The 2015 purchased value from GA2970001 - Monroe was split between those eight interconnections. The 2015 purchase value from GA2170097 - Newton County was split between those two interconnections.
3. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
4. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
5. The excess capacity is estimated utilizing the current and projected peak day design capacities (248 MGD) as well as the current (68.8 MGD) and projected (107.68 MGD) ADD found within the 2017 Ch2M and Black and Veatch *Water Resource Management Plan: Metropolitan North Georgia Water Planning District.*

Table B-23a
Winder Emergency Scenario Evaluation: 2015

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				City of Winder WTP	Little Mulberry River	Mulberry River	Mulberry River, Laurel Lane Reservoir, Lake Yargo, and Cedar Creek					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	6.20	4.50	12.60	6.70	9.98	4.89	21.07	0.00	21.07
	A2. Critical asset failure at largest WTP[2]	0.1	30	6.20	4.50	12.60	6.70	9.98	NA	16.18	6.20	9.98
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	6.20	4.50	12.60	6.70	9.98	4.89	21.07	6.20	14.87
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	6.20	4.50	12.60	6.70	9.98	NA	16.18	0.00	16.18
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	6.20	4.50	12.60	6.70	9.98	5.82	22.00	0.00	22.00
	D2. Chemical contamination of largest raw water source[5]	0.1	1	6.20	4.50	12.60	6.70	9.98	5.82	22.00	0.00	22.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	Not Applicable										
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has a backup generator, rendering no capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage.
5. Redundant water sources can supply full capacity to the WTP, rendering no capacity loss.
6. Fort Yargo Reservoir is in Hydrologic Unit Code-10 "Apalachee River-Upper," which is more than 100 square miles.
This acts as a redundant source for their primary withdrawal, Mulberry River, which is Strahler Stream Order 4 at the withdrawal point (not a major river).

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Table B-23b
Winder Deficits: 2015

Risk	Scenario	Available Water Supply (MGD)	2015 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	21.07	4.13	2.68	1.45	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	9.98	4.13	2.68	1.45	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	14.87	4.13	2.68	1.45	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	16.18	4.13	2.68	1.45	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	22.00	4.13	2.68	1.45	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	22.00	4.13	2.68	1.45	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-23c
Winder Emergency Scenario Evaluation: 2050

Risk	Scenario	Relative Liklihood	Duration (Days)	Peak Day Design Capacity (MGD)	Peak Permitted Withdrawal (MGD-24-hour maximum)[3]			Maximum Possible Purchased Water (MGD)	Water Storage (MGD)[4]	Total Possible Water Supply (MGD)	Capacity Loss (MGD)	Available Water Supply (MGD)
				City of Winder WTP	Little Mulberry River	Mulberry River	Mulberry River, Laurel Lane Reservoir, Lake Yargo, and Cedar Creek					
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP[1]	0.5	1	6.20	4.50	12.60	6.70	9.70	5.19	21.09	0.00	21.09
	A2. Critical asset failure at largest WTP[2]	0.1	30	6.20	4.50	12.60	6.70	9.70	NA	15.90	6.20	9.70
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	0.1	1	6.20	4.50	12.60	6.70	9.70	5.19	21.09	6.20	14.89
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	1	3	6.20	4.50	12.60	6.70	9.70	NA	15.90	0.00	15.90
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source[5]	0.5	1	6.20	4.50	12.60	6.70	9.70	6.12	22.02	0.00	22.02
	D2. Chemical contamination of largest raw water source[5]	0.1	1	6.20	4.50	12.60	6.70	9.70	6.12	22.02	0.00	22.02
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable										
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment[5]	Not Applicable										
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought[6]	Not Applicable										

Notes:

ADD - average daily demand
MGD - million gallons per day
NA - not applicable
QWS - qualified water system
WTP - water treatment plant

1. The WTP has a backup generator, rendering no capacity loss.
2. Meets chemical, but not unit process redundancy, rendering full capacity loss.
3. The smaller of the peak day design capacity and the peak permitted withdrawal value was selected for the total possible water supply calculation.
4. Scenarios A1 and B include treated water storage; Scenarios D1 and D2 include raw (non-reservoir) and treated water storage. The QWS plans to add a 0.5 MG storage tank.
5. Redundant water sources can supply full capacity to the WTP, rendering no capacity loss.
6. Fort Yargo Reservoir is in Hydrologic Unit Code-10 "Apalachee River-Upper," which is more than 100 square miles.
   This acts as a redundant source for their primary withdrawal, Mulberry River, which is Strahler Stream Order 4 at the withdrawal point (not a major river).

Relative liklihood scale: 1 = high; 0.5 = medium; 0.1 = low; 0.05 = negligible

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-23d
Winder Deficits: 2050

Risk	Scenario	Available Water Supply (MGD)	2050 - Immediate Reliability Target					
			Total Demand (MGD)[1]	65% ADD (MGD)	35% ADD (MGD)	Total Demand Deficit (MGD)	65% ADD Deficit (MGD)	35% ADD Deficit (MGD)
A. Failure of largest water treatment facility	A1. Power supply failure of largest WTP	21.09	13.22	8.59	4.63	0.00	0.00	0.00
	A2. Critical asset failure at largest WTP	15.90	13.22	8.59	4.63	0.00	0.00	0.00
B. Short-term catastrophic failure of a water distribution system	Critical asset failure (transmission main)	21.09	13.22	8.59	4.63	0.00	0.00	0.00
C. Short-term contamination of a water supply within distribution system	Contamination of distribution system triggers issuance of boil water notice	15.90	13.22	8.59	4.63	0.00	0.00	0.00
D. Short-term contamination of a raw water source	D1. Biological contamination of largest raw water source	22.02	13.22	8.59	4.63	0.00	0.00	0.00
	D2. Chemical contamination of largest raw water source	22.02	13.22	8.59	4.63	0.00	0.00	0.00
E. Full unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
F. Limited or reduced unavailability of major raw water sources due to federal or state government actions	--	Not Applicable						
G. Failure of an existing dam that impounds a raw water source	Dam failure for largest impoundment	Not Applicable						
H. Water supply reduction due to drought	Raw water supply available is 40% of ADD due to drought	Not Applicable						

Notes:

ADD - average daily demand
MGD - million gallons per day
QWS - qualified water system
WTP - water treatment plant

1. Total demand (withdrawal plus purchases) is defined the same as 100% ADD.

Prepared by: LCT 08/24/21
Checked by: GJH 08/31/21

Table B-23e
Winder Interconnections

Existing Incoming Interconnections

Number	System	Description	Diameter (in)	Maximum Velocity (fps)[1]	Maximum Flow (cfs)	Maximum Flow (MGD)	Capacity Already Purchased (MGD)[2]	Maximum Possible Purchased Water (MGD)[3]	Individual System Excess Capacity[4] 2015	Individual System Excess Capacity[4] 2050
45	GA0130001 - Statham	Atlanta Highway	4	5	0.436	0.282	0.000	0.282	0.866	-0.194
51	GA0130000 - Auburn[5]	Carl Cedar Hill Road	6	5	0.982	0.635	0.000	0.635	unknown	unknown
52	GA0130031 - Barrow County[6]	Kilcrease Road	6	5	0.982	0.635	0.001	0.635	193.901	151.759
53	GA0130031 - Barrow County[6]	Manning Gin Road	6	5	0.982	0.635	0.001	0.635		
54	GA0130031 - Barrow County[6]	53/316	8	5	1.745	1.128	0.001	1.000		
55	GA0130031 - Barrow County[6]	Carl Beth Road	6	5	0.982	0.635	0.001	0.635		
56	GA0130031 - Barrow County[6]	Carl Bethlehem/81	12	5	3.927	2.538	0.001	1.000		
57	GA0130031 - Barrow County[6]	Carl Bethlehem	10	5	2.727	1.763	0.001	1.763		
58	GA0130031 - Barrow County[6]	Freeman Brock	8	5	1.745	1.128	0.001	1.000		
59	GA1570002 - Hoschton[5]	Covered Bridge Road	6	5	0.982	0.635	0.000	0.635	unknown	unknown
60	GA2970008 - Walton County[7]	81/Apalachee River	10	5	2.727	1.763	0.000	1.763	204.083	148.054

Prepared by: LCT 08/18/21
Checked by: GJH 08/31/21

Notes:
in - inches
fps - feet per second
cfs - cubic feet per second
MGD - million gallons per day

1. The maximum velocity is assumed to be 3 fps for pipe diameters greater than or equal to 16 inches and 5 fps for pipe diameters less than or equal to 12 inches.
2. The 2015 purchased value from GA0130031 - Barrow County was split between those seven interconnections.
3. The QWS reported a maximum possible purchased water value. The more conservative value was chosen.
4. The maximum possible purchased water is limited by the provider's ADD, permit limits, and their peak design capacity. The provider's excess capacity is listed here, if available, and can also be found in Table 3-1.
5. The excess capacity values are unknown.
6. Barrow County is a wholesale purchase system which utilizes Gwinnett County, Statham, and Barrow County Transmission Main BOC/Upper Oconnee Basin Water Authority as water sources.
   The cumulative excess capacity for the systems is listed here, while Table B-3e shows individual system values. Barrow County would act as a passthrough system.
7. Walton County is a wholesale purchase system which utilizes Monroe, Newton County, Oconee County-Watkinsville, and Gwinnett County as water sources.
   The cumulative excess capacity for the systems is listed here. Walton County would act as a passthrough system.

Appendix C: Sensitivity Analysis

Contents

Acronyms

GEFA	Georgia Environmental Finance Authority
QWS	Qualified Water System(s)

1.0 Introduction

This appendix describes the sensitivity analysis that was conducted to test the influence of criterion weightings on the initial manual rank outcome.

2.0 Sensitivity Analysis

As described in Section 7.1 of the report, scores were assigned either 1, 2, 3, or 4 using a methodology shown in Table 7-1. Criterion weights were initially assigned either 1, 2, or 3 based on professional judgement.

To conduct the sensitivity analysis, scenarios were considered to test the influence of criterion weightings on the rank outcome. In the case of a tie, the absolute score was considered, and in the case of a further tie, the lower cost per individual supplied broke the tie. First, all criteria were assigned the highest weight (3). The effect of this weighting adjustment is equivalent to the absolute score because although it amplified score values, the rank outcome was the same. Second, one of the eight criteria was assigned the highest weight (3) with the remaining seven criteria assigned the lowest weight (1). The effects of these weighting variations are described below:

1. Systems Benefitted weight = 3; all other criteria weights = 1
    a. Project 6 improved rank by one rank.
    b. Project 4 worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect and is likely driven by other factors.
2. Population Benefitted weight = 3; all other criteria weights = 1
    a. Project 7 improved rank by two ranks.
    b. Projects 3 and 5 each worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect. Higher priority is given to projects that benefit larger populations. Projects 3, 5, and 7 adjusted rank according to this interpretation.
3. Critical Scenario Duration (days) weight = 3; all other criteria weights = 1
    a. Project 6 improved rank by one rank.
    b. Project 4 worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect. Project 4 addresses a shorter critical scenario duration than Project 6, so these projects switched rank order.
4. Added Capacity as a Percent of Total Demand (%) weight = 3; all other criteria weights = 1
    a. Project 4 improved rank by one rank.
    b. Project 6 improved rank by three ranks.
    c. Projects 1 and 2 each worsened rank by two ranks.
    d. All other projects maintained rank.
    e. Interpretation: this weighting adjustment yielded a noticeable effect. Higher priority is given to projects that yield a higher added capacity as a percent of total demand. The projects that worsened rank had a score of 1.

5. Cost ($) weight = 3; all other criteria weights = 1
    a. Project 6 improved rank by one rank.
    b. Project 4 worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect. Project 4 is more expensive than Project 6, so these projects switched rank order.
6. Potential Environmental Impacts weight = 3; all other criteria weights = 1
    a. Project 6 improved rank by one rank.
    b. Project 4 worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect and is likely driven by other factors.
7. Potential System and Community Impacts weight = 3; all other criteria weights = 1
    a. Project 4 improved rank by one rank.
    b. Project 2 worsened rank by one rank.
    c. All other projects maintained rank.
    d. Interpretation: this weighting adjustment yielded a small effect. Project 4 has a higher score compared to Project 2, so these projects switched rank order.
8. Excess Capacity Index weight = 3; all other criteria weights = 1
    a. Projects 6 and 7 each improved rank by two ranks.
    b. Projects 2, 3, 4, and 5 each worsened rank by one rank.
    c. Project 1 maintained rank.
    d. Interpretation: this weighting adjustment yielded a noticeable effect. Higher priority is given to projects that benefit QWS with lower relative excess capacities. Except for Projects 1 and 2, the projects that improved rank had a score of 3 or higher.

The sensitivity analysis results demonstrate that criteria are generally insensitive to weighting. Therefore, retaining initially assigned weights is appropriate.