



Draft Technical Memorandum

Prepared For: Savannah-Upper Ogeechee Water Planning Council and Georgia Environmental Protection Division

Prepared By: Jacobs JIG Planning Team

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Subject: Municipal and Industrial Water and Wastewater Forecasts
Section 4 Supplemental Document
Savannah-Upper Ogeechee Regional Water Plan

Introduction

Forecasts of water and wastewater demand, along with the resource assessments, form the basis for water planning in the Savannah-Upper Ogeechee Region. The State Water Plan requires the preparation of water and wastewater forecasts for the municipal, industrial, agricultural, and energy sectors in 10-year increments through 2050. This Technical Memorandum (TM) describes the methodology, the outreach process, and the resulting forecasts for the municipal and industrial sectors. Agricultural and energy water demand forecasts were developed by EPD and will be presented in separate TMs. The draft forecasts have been provided to the Council for the selection of management practices to address resource “gaps” or areas where the demand exceeds the capacity of the resources.

Municipal demands include the needs of residential, commercial, and light industrial water users. The industrial demands include the needs for the 13 major water using industries across the state. Both the municipal and industrial forecasts rely heavily on the population projections provided by the Georgia Office of Planning and Budget (OPB) and the employment projections provided by EPD with support from University of Georgia (UGA), which are summarized as inputs in this TM.

The forecasting methodology used by the Savannah-Upper Ogeechee Water Planning Region is consistent with the forecasting efforts in other water planning regions. Adjustments to the methodology to account for regional variation are specifically noted.

The sections in this TM include:

- feedback process for water and wastewater forecasts;
- municipal water demand forecasts;
- municipal wastewater flow forecasts;
- industrial water demand forecasts; and

- industrial wastewater flow forecasts.

Feedback Process for Water and Wastewater Forecasts

The water and wastewater forecasts outlined in this TM relied heavily on statewide data and calculation methodology. It was important to the Savannah-Upper Ogeechee Water Planning Council to ensure the statewide data was reflective of the conditions and water use within the region. An inclusive feedback process was designed to provide an opportunity for council members, local governments, and water and wastewater providers in the region to provide local data where available. Similarly, EPD worked with some of the large industries in the state to collect industry specific data where it was available.

EPD held two Municipal Ad Hoc Group meetings statewide in September 2009 (Macon and Augusta) to solicit feedback on the planned municipal and industrial forecasting methodologies. In addition to the EPD's outreach efforts, a feedback form, shown in Appendix A, was sent in October 2009 to the council members, local governments, and all water and wastewater providers in the Savannah-Upper Ogeechee Region to collect relevant water and wastewater data for this planning process. The municipalities that did not respond to the survey were contacted in December 2009 to ensure they understood the feedback form and process. The changes recommended as part of the feedback process are discussed in part and provided to major water providers in the region for review and comments, the following sections, as appropriate. Draft county forecast summary data sheet (Appendix B) was prepared and the refinement process continued through Spring and Summer of 2010 as feedback was provided. Two committees, an ad-hoc municipal committee and the Technical Committee of the Savannah-Upper Ogeechee Council also provided feedback throughout this planning process. Additionally, Chairman Cross appointed council members who were tasked with contacting stakeholders and local utilities to have them review the forecasts and either approve them or provide information for further revision. Members of these committees are listed in Appendix C.

EPD also conducted outreach from Fall 2009 through Spring 2010 to specific industries to gather information on their water uses to guide the development of these forecasts. Among the major industrial water users in the Savannah-Upper Ogeechee Region, the Georgia Mining Association worked closely with EPD in providing data for water and wastewater forecasts for the Kaolin industries.

Municipal Water Demand

Municipal water demands reflect the water needs for residential, commercial, and light industrial customers. The municipal category includes both customers who receive water from a public utility, and those who are self-supplied through private wells.

The baseline municipal water demands were estimated by multiplying the per capita water use by the population served. A plumbing code adjustment was applied to account for savings resulted from the Water Stewardship Act, enacted in July 2010. The baseline water demands were adjusted based on feedback received from the local governments and water providers to better reflect local conditions.

Per Capita Water Demands

The municipal water demands are estimated based on the per capita water use and the projected population. The initial per capita water demands for publicly-supplied municipal customers were calculated for each county by dividing the total water withdrawn by the estimated publicly-supplied population (Table 1). An initial per capita use rate of 75 gallons per capita per day (gpcd) was assigned to self-supplied water users, consistent with the USGS report. These initial per capita water demands were adjusted based on factors, such as wholesale and industrial customer demand, using the feedback process as outlined later in this Section.

Data Sources

Two primary data sources of data were used in calculating the initial county publicly supplied per capita water demand rates:

- *Water Use in Georgia by County for 2005 and Water Use Trends for 1980-2005* (by J. L. Fanning, and V.P. Trent, 2009 USGS publication). This data source is the most current summary of water use for every county in Georgia and was used state-wide.
- The Georgia EPD water withdrawal permit data base 1997-2007. This data base contains reported withdrawal quantities for both surface water and groundwater withdrawal permit in the state. This database was used to cross-reference and to identify discrepancies with the water withdrawal data reported by USGS.

Table 1. Municipal Publicly-Supplied Per Capita Water Demands

County	2005 Total Water Withdrawal (MGD) ¹	2005 Estimated Publicly Supplied Population ¹	Percentage of County Population Served	Initial Per Capita Water Demand (gpcd)	Adjustments (gpcd)		Adjusted 2005 Per Capita (gpcd)
					Wholesale	Industrial Use	
Banks	0.69	6,850	43%	101	N/A	N/A	101
Burke	1.11	8,390	36%	132	N/A	N/A	132
Columbia ²	12.55	90,710	87%	138	N/A	N/A	153
Elbert	1.84	10,200	49%	180	N/A	-78	102
Franklin	2.19	10,490	49%	208	-29	-15	164
Glascocock	0.08	1,090	40%	73	N/A	N/A	73
Hart	1.31	11,180	47%	117	52	-15	154
Jefferson	1.51	8,950	53%	169	N/A	N/A	169
Jenkins	0.42	4,150	48%	101	N/A	N/A	101
Lincoln	0.39	5,840	71%	67	N/A	N/A	67
Madison	0.42	3,921	14%	107	N/A	N/A	107
McDuffie	2.61	17,340	80%	151	N/A	-12	139
Oglethorpe	0.22	2,340	17%	94	N/A	N/A	94
Rabun	1.97	11,740	73%	168	N/A	N/A	168
Richmond	46.68	191,860	98%	243	N/A	-22	221
Screven	1.02	6,340	41%	161	N/A	N/A	161
Stephens	3.97	22,550	90%	176	-18	-14	144
Taliaferro	0.05	700	38%	71	N/A	N/A	71

Warren	0.23	3,420	56%	67	6	N/A	73
Wilkes	1.20	5,130	49%	234	N/A	-78	156

- Publicly-supplied population was estimated using the USGS publication, *Water Use in Georgia by County for 2005 and Water Use Trends for 1980-2005*, as well as local and EPD corrections.
- The year 2006 was selected as a base year for Columbia County based on the data provided by Columbia County Water Utility.

Baseline Demand Refinement

The water demand projections were refined based on feedback received from local water providers. The planning assumptions for each county including baseline per capita demand, percentage of publicly-supplied and self-supplied population, and future water projections were adjusted as appropriate.

Per capita adjustments for some counties included:

- Adjustments to the base year.** The baseline year of 2005 was adjusted for some counties to reflect a more representative water use year if data was provided to the council. The rationale for the change included water use policy changes such as conservation, a change in the county’s water delivery such as a new plant, or to use a year that better reflected average rainfall.
- Purchasing or selling of water on a wholesale basis to neighboring counties.** Adjustments were made to show the demand in the county where the water was used for wholesale agreements between counties. These changes affected the per capita demands of both the selling and purchasing counties.
- Large industrial customers served by municipal water treatment facilities.** Large industrial demands supplied by centralized municipal plants were moved into the industrial forecast so that the demands were more accurately forecasted using employment rather than population forecasts.

Population Projections

Population projections by county were prepared by the OPB, the state agency responsible for demographic data, with assistance from the UGA’s Carl Vinson Institute of Government – Applied Demography Program. OPB produced a set of scenarios, based on different growth assumptions, from which they selected a single 'most likely' growth scenario. Following release of draft population projections in June 2009, each regional water planning council was given an opportunity to evaluate and comment on these projections based on localized knowledge of their region’s population trends. The revised population projections were published by OPB in March 2010 and are used as the basis of demand forecasts.

The population projection for each county was separated into publicly-supplied and self-supplied populations. It was assumed that the 2005 percentage of publicly-supplied and self-supplied users by county remained consistent throughout the 40-year planning horizon. These population projections were adjusted as discussed in the Demand Refinement section.

The current and future percentages of the population served by public supply systems was adjusted as needed to reflect changes in water service strategy based on the feedback received. Table 1 shows the adjusted baseline population used to calculate the percent of county served by public water systems.

Plumbing Code

The 1992 National Energy Policy Act (NEPAct) reduced the maximum flush volume for toilets from 3.5 gallons per flush (gpf) to 1.6 gpf (Ultra Low Flow Toilet or ULFT). Additionally, when an older, higher flush-toilet is replaced, it will be replaced with an HET. The 1992 NEPAct resulted in significant reductions in water use in Georgia, and the Georgia Water Stewardship Act will increase the water use reductions over this 40-year planning period.

The per capita water demand described in the previous section reflects implementation of the NEPAct over the 13-year period of 1992-2005. The water demand reduction from the Georgia Water Stewardship Act's effects was estimated using the methodology described below:

- 1) The number of toilets by flush volume for each county was estimated using the U.S. Census Age of Housing Units information and the following timeline:
 - Toilets made prior to 1980 use an average of 5 gpf
 - Toilets made between 1980 and 1994 use an average of 3.5 gpf
 - Toilets made after 1994 use 1.6 gpf (ULFT)
- 2) The percentage of toilets that have already been replaced is assumed to be five percent.
- 3) The natural replacement rate for the remaining toilets installed prior to 2010 over the 40-year planning horizon was estimated to be two percent per year, which corresponds to a life of 50 years per toilet.

The water savings based on the natural replacement rate were estimated for each county based on the assumptions discussed above. Table 2 shows the estimated reduction of per capita water use rate in 10-year increments over the 40-year planning period for each county.

In June 2010, the Georgia Water Stewardship Act became Georgia law, lowering the maximum flush rates to 1.28 gpf (High Efficiency Toilet or HET) and requiring that after July 1, 2012, all new residential construction include HETs. Additional savings based on HET will be accounted as part of the management practices.

Table 2. Estimated Water Savings based on Plumbing Code

County	Water Savings (gpcd)				
	2010	2020	2030	2040	2050
Banks	0.0	1.3	2.4	3.3	4.0
Burke	0.0	1.6	3.0	4.1	5.0
Columbia	0.0	1.0	1.9	2.6	3.2
Elbert	0.0	2.1	3.9	5.3	6.5
Franklin	0.0	1.8	3.2	4.4	5.4
Glascock	0.0	2.0	3.6	4.9	6.0
Hart	0.0	1.9	3.4	4.6	5.6
Jefferson	0.0	2.0	3.6	5.0	6.1
Jenkins	0.0	2.1	3.9	5.3	6.4
Lincoln	0.0	2.5	4.5	6.2	7.5
Madison	0.0	1.5	2.8	3.8	4.7
McDuffie	0.0	1.8	3.4	4.6	5.6
Oglethorpe	0.0	1.6	2.8	3.9	4.7
Rabun	0.0	2.5	4.5	6.2	7.5
Richmond	0.0	2.1	3.8	5.2	6.3
Screven	0.0	2.0	3.6	5.0	6.1
Stephens	0.0	2.1	3.9	5.3	6.5
Taliaferro	0.0	2.8	5.1	7.0	8.5
Warren	0.0	2.1	3.9	5.3	6.4
Wilkes	0.0	2.4	4.3	5.9	7.2

Municipal Water Demand Forecasts

The publicly-supplied and self-supplied municipal water demand forecasts by county were calculated by multiplying the appropriate per capita water use by the appropriate population for each of the 10-year planning periods through 2050. The forecasted municipal annual average daily (AAD) water demands are presented for publicly-supplied and self-supplied categories in Tables 3 through 5.

Table 3. Publicly-Supplied Municipal Water Demand Forecasts by County (AAD-MGD)

County	Publicly-Supplied Water Demand Forecasts				
	2010	2020	2030	2040	2050
Banks	0.8	1.0	1.2	1.4	1.6
Burke	1.1	1.4	1.6	1.9	2.2
Columbia	15.7	20.8	26.7	32.0	37.6
Elbert	1.0	1.1	1.1	1.1	1.1
Franklin	1.8	2.3	3.0	3.6	4.3
Glascoock	0.0	0.0	0.0	0.0	0.0
Hart	1.3	2.0	2.9	3.9	5.0
Jefferson	1.5	1.4	1.4	1.3	1.2
Jenkins	0.7	0.7	0.7	0.7	0.7
Lincoln	0.4	0.5	0.5	0.5	0.6
Madison	1.5	2.0	2.8	3.5	4.3
McDuffie	2.5	3.0	3.5	4.0	4.5
Oglethorpe	1.2	1.7	2.3	2.9	3.5
Rabun	2.1	2.5	2.9	3.2	3.6
Richmond	43.8	46.7	49.4	51.7	53.9
Screven	1.0	1.2	1.3	1.4	1.4
Stephens	3.3	3.6	3.8	4.0	4.2
Taliaferro	0.0	0.0	0.0	0.0	0.0
Warren	0.2	0.3	0.4	0.4	0.5
Wilkes	0.8	0.8	0.8	0.8	0.8

Note: AAD-MGD = Annual Average Daily Demand reported in Million Gallons per Day

Table 4. Self-Supplied Municipal Water Demand Forecasts by County (AAD-MGD)

County	Self-Supplied Water Demand Forecasts				
	2010	2020	2030	2040	2050
Banks	0.8	1.0	1.2	1.4	1.6
Burke	1.1	1.4	1.6	1.9	2.2
Columbia	1.1	1.2	1.3	1.1	1.0
Elbert	0.8	0.8	0.7	0.7	0.7
Franklin	0.9	0.9	0.8	0.7	0.6
Glascoock	0.1	0.1	0.1	0.1	0.1
Hart	1.2	1.2	1.1	1.0	0.8
Jefferson	1.3	1.3	1.2	1.1	1.1
Jenkins	0.2	0.1	0.1	0.1	0.1
Lincoln	0.2	0.2	0.2	0.2	0.3
Madison	1.2	1.1	1.0	0.9	0.6
McDuffie	0.3	0.3	0.3	0.3	0.3
Oglethorpe	0.1	0.2	0.2	0.3	0.4
Rabun	0.4	0.4	0.5	0.5	0.6
Richmond	0.3	0.3	0.3	0.3	0.4

Screven	0.7	0.8	0.8	0.9	0.9
Stephens	0.2	0.2	0.2	0.1	0.1
Taliaferro	0.1	0.1	0.1	0.1	0.1
Warren	0.2	0.2	0.2	0.2	0.2
Wilkes	0.4	0.4	0.4	0.4	0.4

Note: AAD-MGD = Annual Average Daily Demand reported in Million Gallons per Day

Table 5. Total Municipal Water Demand Forecasts by County (AAD-MGD)

County	Municipal Water Demand Forecasts				
	2010	2020	2030	2040	2050
Banks	1.6	2.0	2.4	2.8	3.2
Burke	2.2	2.8	3.2	3.8	4.4
Columbia	16.8	22.0	28.0	33.1	38.6
Elbert	1.8	1.9	1.8	1.8	1.8
Franklin	2.7	3.2	3.8	4.3	4.9
Glascock	0.1	0.1	0.1	0.1	0.1
Hart	2.5	3.2	4.0	4.9	5.8
Jefferson	2.8	2.7	2.6	2.4	2.3
Jenkins	0.9	0.8	0.8	0.8	0.8
Lincoln	0.6	0.7	0.7	0.7	0.9
Madison	2.7	3.1	3.8	4.4	4.9
McDuffie	2.8	3.3	3.8	4.3	4.8
Oglethorpe	1.3	1.9	2.5	3.2	3.9
Rabun	2.5	2.9	3.4	3.7	4.2
Richmond	44.1	47.0	49.7	52.0	54.3
Screven	1.7	2.0	2.1	2.3	2.3
Stephens	3.5	3.8	4.0	4.1	4.3
Taliaferro	0.1	0.1	0.1	0.1	0.1
Warren	0.4	0.5	0.6	0.6	0.7
Wilkes	1.2	1.2	1.2	1.2	1.2

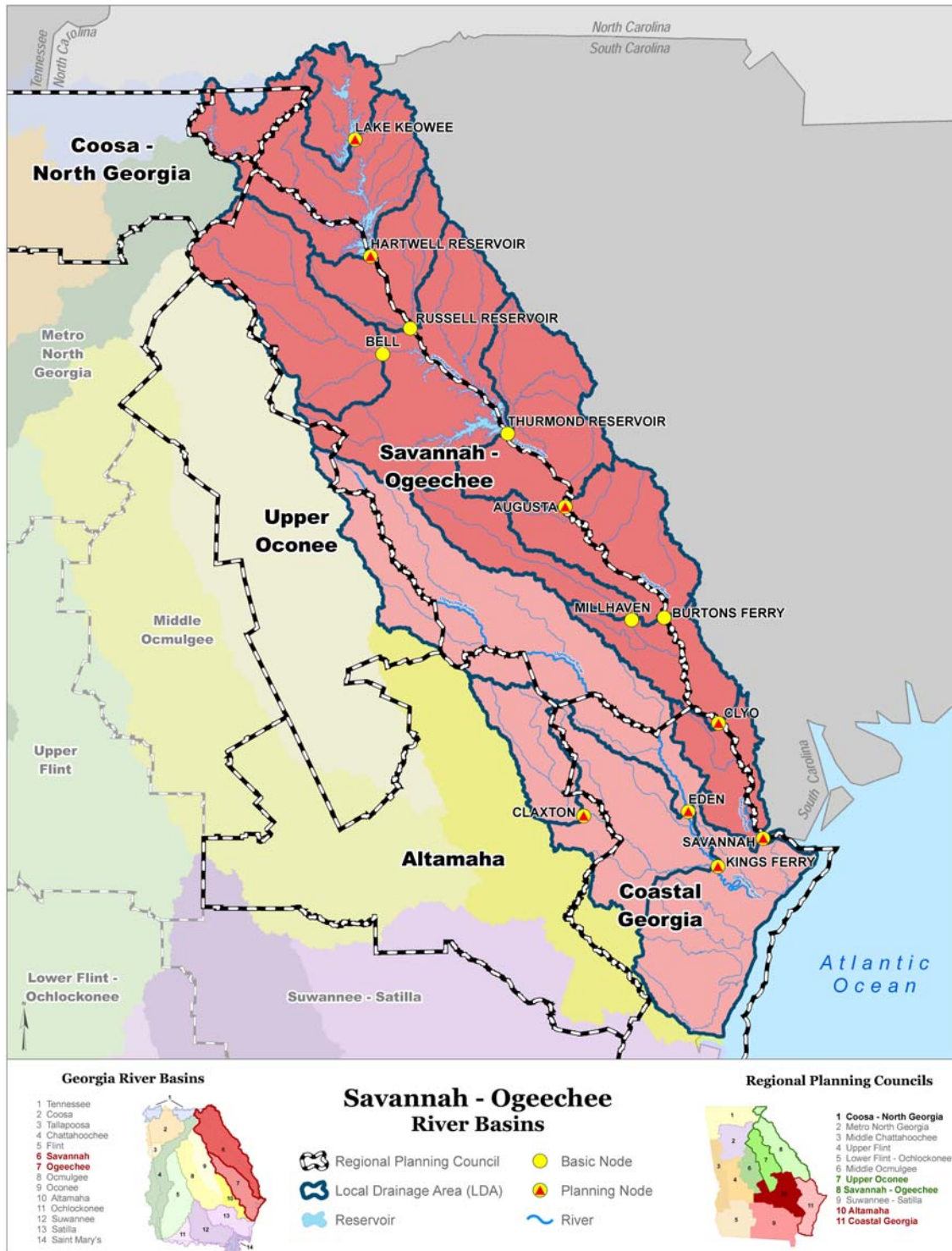
Note: AAD-MGD = Annual Average Daily Demand reported in Million Gallons per Day

Geographic Distribution for Resource Assessment Model Inputs

The municipal water demand forecasts were distributed geographically to assign the demands by county to watershed nodes and groundwater aquifers by water withdrawal location. EPD identified the watershed nodes, as shown in Figure 1, for the Savannah-Upper Ogeechee Water Planning Region.

Publicly-supplied water demand was distributed within each county based on the location of existing water withdrawals and the assumption that future water needs will be met from these locations. If a county received all of their water in the baseline year from a single groundwater aquifer or watershed node, it was assumed that they would continue to withdraw all of their future water needs from the same source.

Figure 1 – Savannah-Upper Ogeechee Watershed Nodes



If a county received water from multiple sources in a baseline year (groundwater, surface water, multiple surface water watershed nodes, or groundwater from multiple aquifers), the percentage of total water withdrawn from each source was calculated and held constant throughout the planning horizon.

For counties north of the Fall Line, the self-supplied demand is assumed to be provided from the Crystalline Rock aquifer. For the counties south of the Fall Line, it is assumed that the Cretaceous aquifer is used for self-supplied demand.

Municipal Wastewater Flow Forecasts

This section summarizes the methodology used to develop the wastewater flow forecasts for the Savannah-Upper Ogeechee Water Planning Council from 2010 to 2050 in 10-year intervals. Future wastewater flows are based on the projected water demands described in the previous section as well as flow factors described in this Section.

The wastewater generated in the Savannah-Upper Ogeechee region will be treated either by an Onsite Sewage Management Systems (OSSMSs or septic systems) or treated at a municipal wastewater treatment facility. The municipal wastewater treatment facility may discharge treated effluent to a Land Application System (LAS) or to a local water body (point discharge). This section outlines the specific methodologies used to calculate the overall wastewater flows to septic systems and those to centralized municipal wastewater treatment systems.

Wastewater flows to septic systems and wastewater treatment facilities were calculated using following equations.

Wastewater flows to septic systems

$$= [\text{Self-Supplied Water Demand}] * [\% \text{ Indoor Water Use}] \\ + [\text{Municipal Water Demand}] * [\% \text{ on septic}] * [\% \text{ Indoor Water Use}]$$

Wastewater flows to Municipal Wastewater Treatment Facilities

$$= [\text{Municipal Water Demand}] * [\% \text{ on sewer}] * [\% \text{ Indoor Water Use}] * [1 + \% \text{ Infiltration/Inflow}]$$

The wastewater flows to septic systems assume that the self-supplied water demand is served by septic system. A portion of the municipally-supplied water customers will also use a septic system. The following sections describe the factors used to calculate the future wastewater flows.

Indoor Water Use

Water used indoors (sinks, toilets, showers, etc.) is assumed to flow to a wastewater treatment system, whereas outdoor water use is assumed to flow to groundwater and/or a natural drainage system. The percent indoor water use is used to calculate the septic and centralized wastewater flows.

The percent indoor water use for each county was selected by comparing the population, water usage, and property age to those of counties and cities studied in the Georgia Water Use and Conservation Profiles (CH2M-Hill, March 2008). The percent indoor water use for the counties in the Savannah-Upper Ogeechee region was selected based on their similarity to the sample cities and counties in the study. Table 6 presents the percent indoor water use assigned to each county in the Savannah-Upper Ogeechee region.

Table 6. Percent Indoor Water Use by County

County	2010	2020	2030	2040	2050
Banks	77%	77%	77%	77%	77%
Burke	77%	77%	77%	77%	77%
Columbia	77%	77%	77%	77%	77%
Elbert	83%	83%	83%	83%	83%
Franklin	85%	85%	85%	85%	85%
Glascock	82%	82%	82%	82%	82%
Hart	85%	85%	85%	85%	85%
Jefferson	85%	85%	85%	85%	85%
Jenkins	77%	77%	77%	77%	77%
Lincoln	88%	88%	88%	88%	88%
Madison	83%	83%	83%	83%	83%
McDuffie	85%	85%	85%	85%	85%
Oglethorpe	88%	88%	88%	88%	88%
Rabun	85%	85%	85%	85%	85%
Richmond	85%	85%	85%	85%	85%
Screven	77%	77%	77%	77%	77%
Stephens	85%	85%	85%	85%	85%
Taliaferro	82%	82%	82%	82%	82%
Warren	88%	89%	91%	93%	95%
Wilkes	77%	77%	77%	77%	77%

The baseline percent indoor water use was held constant throughout the planning period, as it was assumed that the water use patterns would remain consistent over time. The water utilities and jurisdictions in the Savannah-Upper Ogeechee Region were provided with an opportunity to provide feedback on the percent indoor water use. No changes were requested for the Savannah-Upper Ogeechee Region.

Percent of Municipal Customers with Septic Systems

Septic systems or OSSMSs are maintained by the property owner for treatment of smaller volumes of wastewater. Most of the septic systems in the Savannah-Upper Ogeechee Region are associated with residential properties.

The percent of municipal customers on septic systems for the region was calculated based on the number of septic systems by county from the 1990 census, historic growth rate of septic systems, and information on the number of self-supplied versus publicly-supplied water customers in the 2005

USGS study. The percentage of municipal water customers using septic systems was estimated based on these data. This baseline percentage was held constant throughout the 40-year planning horizon unless a county requested an alternative scenario during the feedback process. Table 7 shows the percent of the publicly-supplied water customers by county served by septic system for the 2010-2050 planning period.

Table 7. Percent of Municipal Water Customers on Septic Systems by County

County	2010	2020	2030	2040	2050
Banks	100%	100%	100%	100%	100%
Burke	42%	42%	42%	42%	42%
Columbia	15%	14%	14%	13%	12%
Elbert	32%	32%	32%	32%	32%
Franklin	85%	85%	85%	85%	85%
Glascocock	100%	100%	100%	100%	100%
Hart	77%	80%	83%	86%	88%
Jefferson	33%	25%	17%	8%	0%
Jenkins	24%	24%	24%	24%	24%
Lincoln	77%	77%	77%	77%	77%
Madison	97%	75%	27%	13%	5%
McDuffie	55%	54%	53%	51%	50%
Oglethorpe	95%	86%	58%	35%	18%
Rabun	80%	80%	80%	80%	80%
Richmond	16%	16%	16%	16%	16%
Screven	44%	44%	44%	44%	44%
Stephens	66%	58%	49%	41%	33%
Taliaferro	27%	27%	27%	27%	27%
Warren	60%	57%	54%	50%	47%
Wilkes	28%	28%	28%	28%	28%

Note: Changes in percent of customers on septic systems for Columbia, Hart, Jefferson, Madison, McDuffie, Oglethorpe, Stephens, and Warren counties were based on feedback received.

Inflow and Infiltration

Inflow and Infiltration (I/I) refers to unintended stormwater and groundwater that enter the wastewater collection system through manhole covers (inflow), illegally connected downspouts (inflow), or leaks in aging pipes (infiltration). A 20 percent I/I factor was added to the wastewater flows treated at a centralized municipal treatment facility.

Septic System Flow Forecasts

Septic system flows were calculated by adding the indoor water use portion for self-supplied water customers to the indoor water use portion of demand for the publicly-supplied customers with a septic system. The resulting flows by county are shown in Table 8.

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

County	2010	2020	2030	2040	2050
Banks	1.2	1.5	1.8	2.1	2.4
Burke	1.2	1.5	1.7	2.0	2.4
Columbia	2.7	3.2	3.7	4.0	4.2
Elbert	0.9	0.9	0.9	0.9	0.8
Franklin	2.0	2.4	2.8	3.2	3.7
Glascock	0.1	0.1	0.1	0.1	0.1
Hart	1.9	2.4	3.0	3.6	4.5
Jefferson	1.5	1.4	1.2	1.1	0.9
Jenkins	0.2	0.2	0.2	0.2	0.2
Lincoln	0.4	0.5	0.5	0.6	0.6
Madison	2.1	2.2	1.5	1.1	0.7
McDuffie	1.5	1.7	1.8	2.0	2.1
Oglethorpe	1.1	1.4	1.4	1.2	0.9
Rabun	1.7	1.9	2.1	2.2	2.3
Richmond	6.1	6.5	6.9	7.2	7.5
Screven	0.9	1.0	1.1	1.1	1.2
Stephens	2.0	1.9	1.7	1.5	1.3
Taliaferro	0.1	0.1	0.1	0.1	0.1
Warren	0.3	0.3	0.3	0.3	0.4
Wilkes	0.5	0.5	0.5	0.5	0.5

Note: AAD-MGD = Annual Average Daily Flow reported in Million Gallons per Day

Wastewater Treatment Plant Flow Forecasts

The municipal wastewater flows to a treatment plant were calculated by multiplying the water demands (publicly supplied) by the percentage of indoor water use (presented in Table 6) and then multiplied by the percentage of area sewered. The percent of area sewered was calculated based on the percent of area served by septic system in Table 7. An I/I factor of 20 percent was added to these flows to develop wastewater flow forecasts.

The treated effluent from centralized facilities is either returned to rivers and streams as point discharges, or can be disposed of in land application systems (LAS). For each county, the ratio of point discharge versus LAS were calculated based on existing flows, and this ratio is kept constant throughout the planning period unless feedback (such as new wastewater treatment facilities or elimination of LAS) had been provided by local wastewater providers. Table 9 shows forecasted centralized wastewater flow by county to both point discharge and LAS facilities.

Table 9. Centralized Wastewater Flow by County (AAD - MGD)

County	2010		2020		2030		2040		2050	
	Point Discharge	LAS	Point Discharge	LAS	Point Discharge	LAS	Point Discharge	LAS	Point Discharge	LAS
Banks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burke	0.6	0.0	0.7	0.0	0.9	0.0	1.0	0.0	1.2	0.0
Columbia	11.9	0.4	15.9	0.6	20.6	0.7	24.9	0.9	29.5	1.1
Elbert	0.7	0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.8	0.0
Franklin	0.3	0.1	0.4	0.1	0.6	0.1	0.7	0.1	0.8	0.1
Glascocok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hart	0.0	0.2	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.4
Jefferson	1.0	0.0	1.1	0.0	1.2	0.0	1.2	0.0	1.2	0.0
Jenkins	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0
Lincoln	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Madison	0.1	0.0	0.5	0.0	2.0	0.0	3.0	0.0	4.0	0.0
McDuffie	1.1	0.1	1.3	0.1	1.6	0.1	1.9	0.1	2.2	0.1
Oglethorpe	0.1	0.0	0.3	0.0	1.0	0.0	2.0	0.0	3.0	0.0
Rabun	0.4	0.0	0.6	0.0	0.9	0.0	1.1	0.0	1.5	0.0
Richmond	37.7	0.0	40.1	0.0	42.4	0.0	44.4	0.0	46.3	0.0
Screven	0.5	0.0	0.6	0.0	0.7	0.0	0.7	0.0	0.7	0.0
Stephens	1.2	0.0	1.5	0.0	2.0	0.0	2.4	0.0	2.9	0.0
Taliaferro	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warren	0.1	0.0	0.1	0.0	0.2	0.0	0.2	0.0	0.3	0.0
Wilkes	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0

Note: AAD-MGD = Annual Average Daily Flow reported in Million Gallons per Day

Table 10 presents forecasted annual average daily wastewater flow for the Savannah-Upper Ogeechee Region. The wastewater providers in the region have been provided opportunities to refine the factors for wastewater forecasts, and the inputs received through 2010 have been incorporated into the forecasts.

Table 10. Total Wastewater Flow by County (AAD - MGD)

County	2010	2020	2030	2040	2050
Banks	1.2	1.5	1.8	2.1	2.4
Burke	1.8	2.2	2.6	3.0	3.5
Columbia	15.0	19.7	25.1	29.8	34.8
Elbert	1.6	1.6	1.6	1.6	1.6
Franklin	2.3	2.7	3.3	3.8	4.3
Glascock	0.1	0.1	0.1	0.1	0.1
Hart	2.2	2.8	3.5	4.2	5.1
Jefferson	2.5	2.5	2.4	2.3	2.1
Jenkins	0.7	0.7	0.7	0.7	0.6
Lincoln	0.5	0.6	0.6	0.7	0.7
Madison	2.2	2.7	3.5	4.1	4.7
McDuffie	2.6	3.1	3.5	4.0	4.5
Oglethorpe	1.2	1.7	2.4	3.2	3.9
Rabun	2.1	2.5	3.0	3.4	3.8
Richmond	43.8	46.7	49.3	51.6	53.8
Screven	1.4	1.6	1.8	1.8	1.9
Stephens	3.2	3.4	3.7	3.9	4.1
Taliaferro	0.1	0.1	0.1	0.1	0.1
Warren	0.4	0.5	0.5	0.6	0.7
Wilkes	1.0	1.0	1.0	1.0	1.0

Note: AAD-MGD = Annual Average Daily Flow reported in Million Gallons per Day

Geographic Distribution for Resource Assessment Model Inputs

As input data for resource assessments, wastewater flows to septic systems and wastewater treatment facilities were distributed geographically to watershed nodes. Septic system flows were distributed equally throughout each county and then assigned to nodes based on the percentage of the county area that was located within the node’s basin. Flows to wastewater treatment facilities were distributed based on information obtained from wastewater permits, with the assumption that future wastewater flows will be treated at existing facility locations unless specific information has been provided through the feedback process. If a county returned all of their wastewater flow in the baseline year to a single watershed node, it was assumed that they would continue to return all of their wastewater to the same node. If a county returned treated wastewater to multiple watershed nodes for the baseline year, the percentage of total wastewater discharged to each node was calculated. This percentage was held constant for each node throughout the planning period. Finally, the flows to wastewater treatment facilities were separated into flows to point discharge and flows to LAS for computer modeling purposes.

Industrial Water Demand Forecasts

Industrial water demand projections were calculated using the employment projections for 13 major industrial categories and the 2005 baseline water use. EPD provided employment projections for each major industrial category and water planning region. Other employment (such as retail, services, government, etc.) was included in the municipal demand estimates and, therefore, not considered in this methodology. As the employment projections were provided for the entire region, the water demand forecasts are presented by industry and not by county. The industrial water use was assigned to the nodes or aquifers based on the water usage reported by the permitted facilities, industry input, and data provided by municipal facilities supplying their water for the resource assessment models.

The major water-using industries are shown in Table 11. The water use for in the Savannah-Upper Ogeechee Region was based on the 2005 EPD industrial permits for each industry. Supplemental data from the 2005 USGS report or industrial sector feedback was also used.

The USGS references use the Standard Industrial Classification (SIC) codes to categorize businesses and industries, while other sources use the newer North American Industrial Classification System (NAICS) codes. Therefore, both SIC and NAICS codes were referenced to obtain and categorize industrial water use data.

A large portion of the industrial water use is primarily self-supplied water (i.e., industrial water users have stand-alone water withdrawal permits). However, major industries that obtain water from municipal water systems were identified, extracted from the municipal water use estimates as described in Municipal Water Demand section, and included in the industrial water demand estimates.

Additionally, any large industrial water use identified by municipal water providers was included in the industrial water use according to local feedback. The demands were assigned to a watershed or aquifer based on existing permitted industrial withdrawal locations and then summed to generate the total industrial demand by water resource.

Table 11. Major Industrial Water Users

Industry	SIC Code	NAICS Code	Industry	SIC Code	NAICS Code
Mining	14	212	Plastic and Rubber	30	326
Food	20	311/312	Stone and Clay	32	327
Textiles	22	313/314	Primary Metals	33	331
Apparel	23	315	Fabricated Metal Products	34	332
Paper	26	322	Electric Machinery	36	335
Chemicals	28	325	Automotive Manufacturing	37	336
Petroleum and Coal	29	324			

Data Sources

The existing Savannah-Upper Ogeechee Region’s industrial water use was estimated based on:

- 2005 EPD industrial permit data (reported withdrawal and discharges) for each industry
- *Water Use in Georgia by County for 2005 and Water Use Trends for 1980-2005* (by J. L. Fanning, and V.P. Trent, 2009 USGS publication) – the reported industrial water use in this report was used to cross check the EPD reported data
- Feedback from industrial sectors via Industrial Ad Hoc Group meetings held by EPD or direct communication with the industry representatives
- Feedback from municipal providers – large industrial water uses reported by municipal water providers were extracted and included in current industrial water use for forecasting purposes

Projection Methodology

The current (e.g., 2005 base period) industrial water use volume within a particular basin or aquifer unit was forecasted in direct proportion to the projected industrial employment growth for each of the major industrial categories. It is assumed that future growth for a given industry would tend to occur within the same basin or aquifer locations.

If requested by a specific industry sector, the employment projections were replaced by production numbers or a measure of growth specific to that industry. For example: on October 1, 2009, the Georgia Mining Association, submitted a letter to the EPD requesting an employment number revision and the use of their current and future water demands for the mining industry (NAICS 212). In addition to these industry-specific considerations, if an industry employment was projected to decline in the future, the current water use for the industry was held constant throughout the planning period. This assumption was made in part because a decline in employment may be tied to process improvements and may not reflect a decrease in water use for that industry.

Future industrial water use was calculated by multiplying the current water use (within a watershed or aquifer) by the industry-specific rate of growth for the Savannah-Upper Ogeechee Region (employment or production). Future projections for 10-, 20-, 30-, and 40-year horizons through 2050 for each major industrial sector's water demand within the Savannah-Upper Ogeechee Water Planning Region are presented in Table 12. Industrial growth was assumed to occur only at current industry locations. Hence, the industrial water demand within the region remained proportional throughout the watershed or aquifer.

Table 12. Estimated Industrial Water Demand (AAD - MGD)

Industry	SIC Code	NAICS Code	2010	2020	2030	2040	2050
Mining	14	212	0.4	0.7	1.1	1.5	1.5
Food	20	311/312	2.3	2.3	2.4	2.4	2.5
Textiles	22	313/314	2.8	2.8	2.8	2.8	2.8
Apparel	23	315	-	-	-	-	-
Paper	26	322	53.9	56.6	57.7	58.9	60.4
Chemicals	28	325	12.9	13.1	13.3	13.6	14.0
Petroleum and Coal	29	324	-	-	-	-	-
Plastic and Rubber	30	326	-	-	-	-	-
Stone and Clay	32	327	13.7	15.5	17.1	18.8	18.8
Primary Metals	33	331	0.1	0.1	0.1	0.1	0.1
Fabricated Metal Products	34	332	-	-	-	-	-
Electric Machinery	36	335	-	-	-	-	-
Automotive Manufacturing	37	336	-	-	-	-	-
Other	0	0	2.0	3.2	4.3	5.6	7.2

Note: AAD-MGD = Annual Average Daily Demand reported in Million Gallons per Day

Industrial Wastewater Flow Forecasts

The wastewater flows were calculated based on the industrial water demand and a calculated wastewater generation ratio outlined in this section. Industry-specific permitted water use data and industry-specific permitted wastewater flow data were used to estimate a ratio of wastewater flow to total permitted water demand for each industrial sector. The wastewater generation ratios for the Savannah-Upper Ogeechee Region are shown in Table 13.

Table 13. Estimated Wastewater Return Ratio by Industry

Industry	SIC Code	NAICS Code	Wastewater Return Ratio
Mining	14	212	0.61
Food	20	311/312	0.90
Textiles	22	313/314	0.86
Apparel	23	315	0.61
Paper	26	322	1.00
Chemicals	28	325	0.93
Petroleum and Coal	29	324	0.61
Plastic and Rubber	30	326	0.23
Stone and Clay	32	327	1.29
Primary Metals	33	331	0.61
Fabricated Metal Products	34	332	0.61
Electric Machinery	36	335	0.61
Automotive Manufacturing	37	336	0.61

Note: Wastewater Return Ratio (wastewater to water) was derived from a Memorandum from CDM to EPD titled *Industrial Wastewater Return Ratios*, dated October 16th, 2009

The wastewater return ratio was determined for each industrial category. These ratios were applied to water forecasts to determine future wastewater generation. The total wastewater generation per industry category was distributed to the appropriate watershed node. This distribution was based on EPD's permit database – point source discharges, land application systems, and municipal treatment plant discharge – with the assumption that future wastewater flows will be treated at the existing treatment location.

The industrial wastewater flow forecast estimated for each major industry sector within the Savannah-Upper Ogeechee Region is summarized in Table 14.

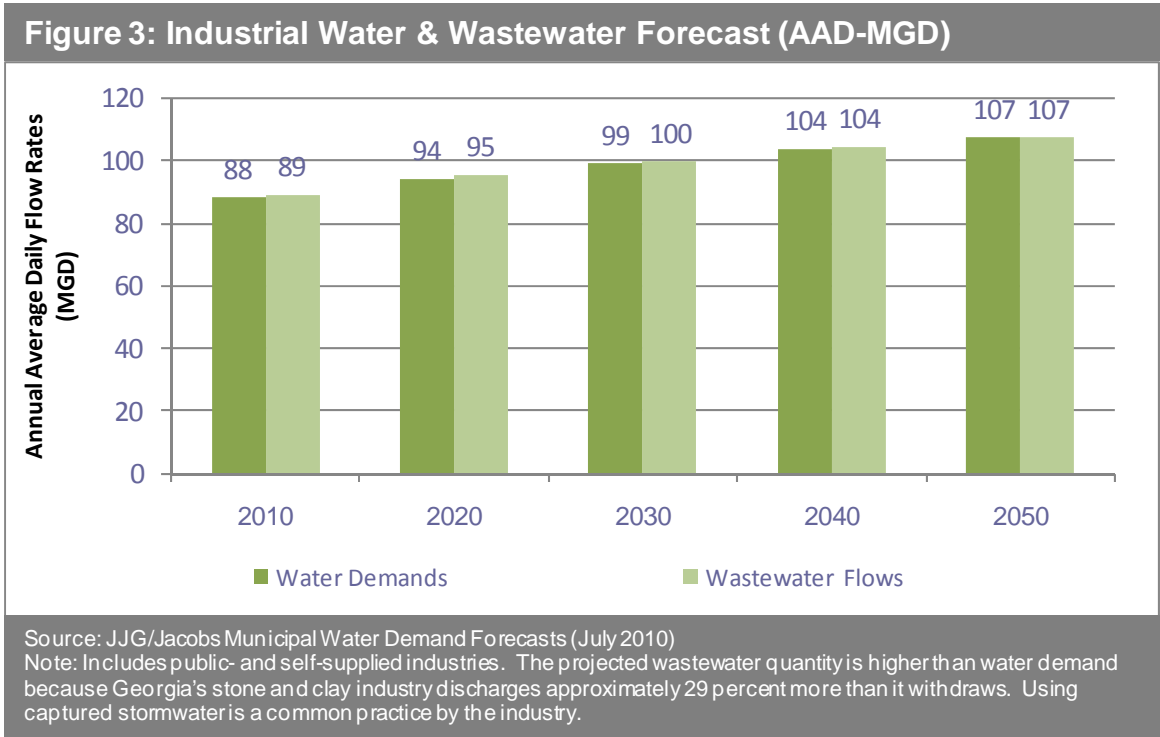
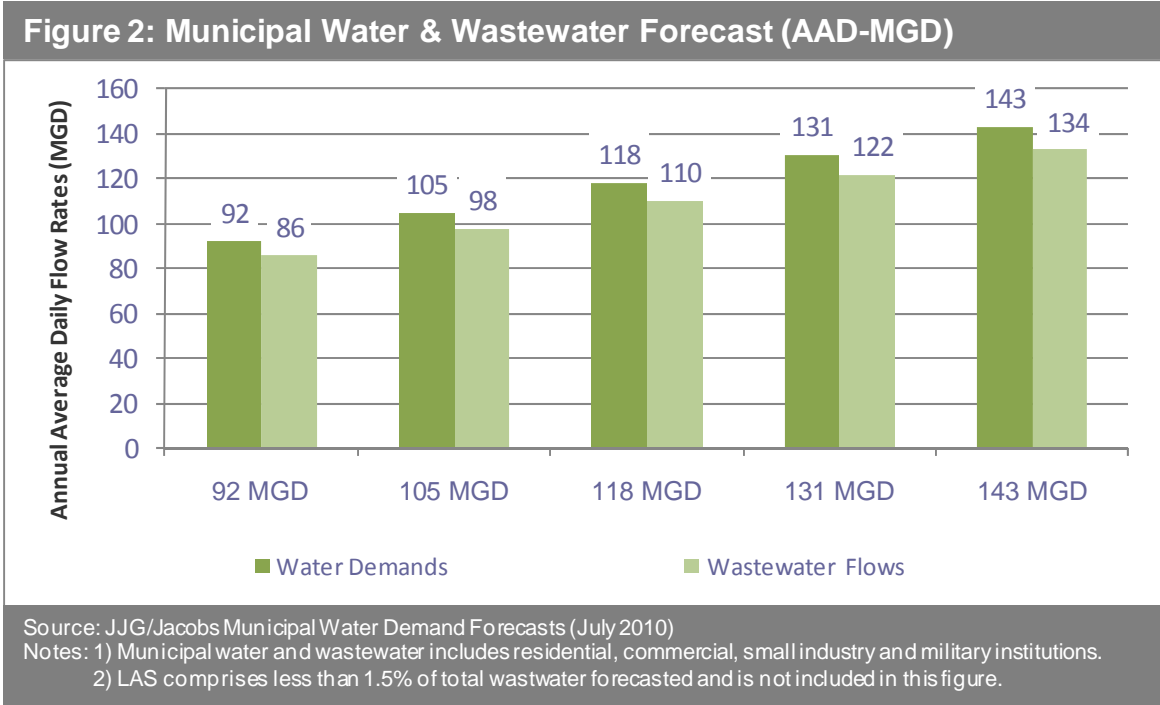
Table 14. Estimated Industrial Wastewater Flow (AAD - MGD)

Industry	SIC Code	NAICS Code	2010	2020	2030	2040	2050
Mining	14	212	0.4	0.7	1.1	1.5	1.5
Food	20	311/312	2.3	2.3	2.4	2.4	2.5
Textiles	22	313/314	2.8	2.8	2.8	2.8	2.8
Apparel	23	315	-	-	-	-	-
Paper	26	322	53.9	56.6	57.7	58.9	60.4
Chemicals	28	325	12.9	13.1	13.3	13.6	14.0
Petroleum and Coal	29	324	-	-	-	-	-
Plastic and Rubber	30	326	-	-	-	-	-
Stone and Clay	32	327	13.7	15.5	17.1	18.8	18.8
Primary Metals	33	331	0.1	0.1	0.1	0.1	0.1
Fabricated Metal Products	34	332	-	-	-	-	-
Electric Machinery	36	335	-	-	-	-	-
Automotive Manufacturing	37	336	-	-	-	-	-
Other	0	0	2.0	3.2	4.3	5.6	7.2

Note: AAD-MGD = Annual Average Daily Flow reported in Million Gallons per Day

Summary

From 2010 to 2050, municipal water demand for the Savannah-Upper Ogeechee Region is forecast to increase from 92 MGD to 143 MGD, and municipal wastewater flow is forecast to increase from 86 MGD to 134 MGD. For the same planning period, industrial water demand is estimated to increase from 88 MGD to 106 MGD, and industrial wastewater is estimated to increase from 89 to 105 MGD. Figures 2 and 3 show both forecasts for each 10-year interval. This data, as well as data from the resource assessments, will be used to address any potential gaps within the region.



APPENDICES

- Appendix A Municipal Water and Wastewater Forecasting Questionnaire for Public Water Providers
- Appendix B Municipal Water and Wastewater Forecasts by County
- Appendix C Municipal Ad Hoc Committee Members
 Technical Subcommittee Members

APPENDIX A

Municipal Water and Wastewater Forecasting Questionnaire for Public Water Providers

Instructions for Current Water Use Questionnaire
Georgia Statewide Water Planning
Municipal Water and Wastewater Forecasting

The following questionnaire is designed to aid in the development of future water needs in Georgia through year 2050. The demand projections, once completed, will be compared to available water resources (both surface water and groundwater) for the development of Georgia's regional water development and conservation plans (WDCP).

Please review the following questions carefully. The **preliminary** per capita water use rate was estimated based on the publicly-supplied water withdrawal and population reported in *Water Use in Georgia by County for 2005 and Water-Use Trends, 1980-2005* report by USGS. A summary table for preliminary per capita water use rate calculated for each county is provided for your review in a separate document. The following questions are designed to fine tune the per capita water use rate that will be used as the basis for future water demand projections. Jordan, Jones & Goulding is the planning contractor for the Savannah-Upper Ogeechee Water Planning Council and we will use the information you provide to us to fine tune the per capita water use rate for future demand forecast.

Questions? Please contact and return the questionnaire and any attachment to

Tai-Yi Su, P.E.
Project Manager
Jordan, Jones & Goulding, Inc.
taiyi.su@jig.com
678-333-0257

For more information on Georgia's regional planning, please visit
<http://www.georgiawaterplanning.org/index.php>

For more information on the Savannah-Upper Ogeechee Water Planning Region, please visit
<http://www.savannahupperogeechee.org/>

Current Water Use Questionnaire
Georgia Statewide Water Planning
Municipal Water and Wastewater Forecasting

Name of Water System: _____

Location: _____ County

Savannah-Upper Ogeechee Regional Water Planning Council

Contact Name: _____

Contact E-mail: _____

Phone #: _____

Please report both calendar year 2008 and year 2005 quantities.

1. Does the public supplier purchase water wholesale from outside the County boundary?
 - 1.1. If yes, how much? 2008 quantity _____ 2005 quantity _____
 - 1.2. If yes, do they plan to continue to purchase wholesale water in the future (through 2050)?
2. Does the public supplier sell water wholesale outside the County boundary?
 - 2.1. If yes, how much? 2008 quantity _____ 2005 quantity _____
 - 2.2. If yes, do they plan to continue to sell wholesale water in the future (through 2050)?
3. Does the public supplier sell water to individual customers outside the County boundary?
 - 3.1. If yes, how much? 2008 quantity _____ 2005 quantity _____
4. Does the public supplier have significant industrial or other non-residential customers?
 - 4.1. If yes, how much? 2008 quantity _____ 2005 quantity _____
 - 4.2. If yes, and industrial, what type of industry is it?
 - 4.3. Are there any known plans for future expansion?
5. Do you have a recent Water and Wastewater Master Plan that we should review?

Georgia Statewide Water Planning Municipal Water and Wastewater Forecasting

Please provide feedback on the following items from readily available information.
We understand that some of this information may not be readily obtainable.
However, any input you can provide will help improve the forecasts that would otherwise rely on standard assumptions that may not reflect your community's profile.

Return by **December 18, 2009** to TaiYi.Su@jg.com 678-333-0257
Include attachments, as necessary.

Name:	
Organization:	
Region:	
Email:	
Phone:	

WATER

Is your community expecting changes to transient population?
(i.e. Military Bases, Universities, Vacation Communities)

--

Would you like us to consider a forecasting base year other than 2005?

--

Do you have comments regarding municipal per capita water use rate for your County?
Large industrial customers or wholesale agreements may affect per capita rates.

--

Self-supplied per capita water use rate (if not 75 gpcd)

--

What % of your community do you expect to serve through public water systems in 2050?

--

WASTEWATER

What is your estimate for Indoor water use (%)?

--

What is the current and projected future (2050) % of population served by septic system?

--

What is your current Inflow/Infiltration % (if not 20%)? Do you expect any improvements by 2050?

--

APPENDIX B

Municipal Water and Wastewater Forecasts by County

Banks County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	17,589	38,797
Population Served by Public Supply ²	7,504	16,553
Percentage Served by Public Supply ²	43%	43%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.76	1.60
Self Supplied Water Demand ³	0.76	1.58
Total Municipal Water Demand	1.51	3.18

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.00	0%	0.00	0%
Septic Systems	1.16	100%	2.45	100%
Total Municipal Wastewater Produced	1.16		2.45	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Banks County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	16,055
Base Year Population Served by Public Supply	6,850

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Homer*	0.07	0.00
Banks County Board of Commissioners	0.00	0.62
Total:	0.07	0.62

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.69
Initial Public Per Capita Demand (gpcd) ¹	101
Adjusted Public Per Capita Demand (gpcd) ²	101

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	101	97
Self-Served per Capita Demand (gpcd)	75	71
Percentage served by Public Supply ¹	43%	43%
Surface Water Supply (% public supply)	90%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	100%	100%
Land Application System (% discharge) ⁶	N/A	N/A

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Burke County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	23,576	47,900
Population Served by Public Supply ²	8,490	17,249
Percentage Served by Public Supply ²	36%	36%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.96	1.88
Publicly Supplied Surface Water	0.16	0.32
Self Supplied Water Demand ³	1.13	2.15
Total Municipal Water Demand	2.25	4.34

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.60	33%	1.18	33%
Septic Systems	1.23	67%	2.36	67%
Total Municipal Wastewater Produced	1.83		3.54	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Burke County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	23,229
Base Year Population Served by Public Supply	8,390

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Girard*	0.02	0.00
Town of Midville*	0.06	0.00
Town of Sardis	0.07	0.00
City of Vidette*	0.01	0.00
City of Waynesboro	0.79	0.14
Total:	0.97	0.14

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.11
Initial Public Per Capita Demand (gpcd) ¹	132
Adjusted Public Per Capita Demand (gpcd) ²	132

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	132	127
Self-Served per Capita Demand (gpcd)	75	70
Percentage served by Public Supply ¹	36%	36%
Surface Water Supply (% public supply)	13%	14%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	42%	42%
Land Application System (% discharge) ⁶	1%	1%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Columbia County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	117,121	264,334
Population Served by Public Supply ²	102,339	251,117
Percentage Served by Public Supply ²	87%	95%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.19	0.45
Publicly Supplied Surface Water	15.47	37.18
Self Supplied Water Demand ³	1.11	0.95
Total Municipal Water Demand	16.77	38.58

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	12.28	82%	30.58	88%
Septic Systems	2.67	18%	4.21	12%
Total Municipal Wastewater Produced	14.95		34.79	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Columbia County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2006
Base Year Total Population	103,812
Base Year Population Served by Public Supply	90,710

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Columbia County Water System	0.00	12.37
City of Grovetown	0.13	0.00
City of Harlem	0.02	0.00
Total:	0.18	12.37

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	12.55
Initial Public Per Capita Demand (gpcd) ¹	153
Adjusted Public Per Capita Demand (gpcd) ²	153

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	153	150
Self-Served per Capita Demand (gpcd)	75	72
Percentage served by Public Supply ¹	87%	95%
Surface Water Supply (% public supply)	99%	99%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	15%	12%
Land Application System (% discharge) ⁶	3%	3%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Elbert County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	20,589	21,379
Population Served by Public Supply ²	10,097	11,834
Percentage Served by Public Supply ²	49%	55%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	1.03	1.13
Self Supplied Water Demand ³	0.79	0.65
Total Municipal Water Demand	1.82	1.78

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.69	43%	0.76	47%
Septic Systems	0.93	57%	0.85	53%
Total Municipal Wastewater Produced	1.62		1.61	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Elbert County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	20,799
Base Year Population Served by Public Supply	10,200

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Bowman*	0.09	0.00
City of Elberton	0.00	1.73
Total:	0.11	1.73

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Poultry Processing Plant	Industry	(0.80)
Total:		(0.80)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.84
Initial Public Per Capita Demand (gpcd) ¹	180
Adjusted Public Per Capita Demand (gpcd) ²	102

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	102	96
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	49%	55%
Surface Water Supply (% public supply)	94%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	83%	83%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	32%	32%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Franklin County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	22,346	36,346
Population Served by Public Supply ²	10,857	27,260
Percentage Served by Public Supply ²	49%	75%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.09	0.23
Publicly Supplied Surface Water	1.68	4.09
Self Supplied Water Demand ³	0.86	0.63
Total Municipal Water Demand	2.64	4.95

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.27	12%	0.66	15%
Septic Systems	2.02	88%	3.66	85%
Total Municipal Wastewater Produced	2.29		4.32	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Franklin County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	21,590
Base Year Population Served by Public Supply	10,490

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Canon	0.07	0.00
City of Carnesville	0.04	0.00
City of Franklin Springs	0.10	0.00
City of Lavonia	0.00	1.41
City of Royston	0.00	0.31
Franklin County Water System	0.26	0.00
Total:	0.47	1.72

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Truck Stops	Industrial	(0.16)
Stephens County	Purchase	0.31
Hart County as retail customers and Wholesale to HCWSA	Sales	(0.59)
Unknown	Sales	(0.02)
Total:		(0.46)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	2.19
Initial Public Per Capita Demand (gpcd) ¹	208
Adjusted Public Per Capita Demand (gpcd) ²	164

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	164	158
Self-Served per Capita Demand (gpcd)	75	70
Percentage served by Public Supply ¹	49%	75%
Surface Water Supply (% public supply)	79%	95%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	85%	85%
Land Application System (% discharge) ⁶	28%	11%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Glascock County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	2,854	3,080
Population Served by Public Supply ²	1,150	1,241
Percentage Served by Public Supply ²	40%	40%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	0.13	0.13
Total Municipal Water Demand	0.13	0.13

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.00	0%	0.00	0%
Septic Systems	0.11	100%	0.10	100%
Total Municipal Wastewater Produced	0.11		0.10	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Glascok County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	2,705
Base Year Population Served by Public Supply	1,090

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Gibson*	0.06	0.00
Town of Mitchell*	0.02	0.00
Total:	0.08	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.08
Initial Public Per Capita Demand (gpcd) ¹	73
Adjusted Public Per Capita Demand (gpcd) ²	73

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	73	67
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	40%	40%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	82%	82%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	100%	100%
Land Application System (% discharge) ⁶	N/A	N/A

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Hart County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	25,063	45,367
Population Served by Public Supply ²	8,521	34,025
Percentage Served by Public Supply ²	34%	75%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	1.32	5.04
Self Supplied Water Demand ³	1.23	0.79
Total Municipal Water Demand	2.56	5.83

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.30	14%	0.60	12%
Septic Systems	1.92	86%	4.45	88%
Total Municipal Wastewater Produced	2.22		5.05	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Hart County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	24,036
Base Year Population Served by Public Supply	11,180

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Bowersville*	0.03	0.00
City of Hartwell	0.00	1.19
Hart County Water and Sewer Authority	Purchase water	
Total:	0.12	1.19

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
From Franklin County, Royston, Lavonia and Canon	Purchase	0.59
BASF	Industrial	(0.18)
Total:		0.41

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.31
Initial Public Per Capita Demand (gpcd) ¹	117
Adjusted Public Per Capita Demand (gpcd) ²	154

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	154	148
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	47%	75%
Surface Water Supply (% public supply)	91%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	77%	88%
Land Application System (% discharge) ⁶	67%	58%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Jefferson County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	16,414	13,746
Population Served by Public Supply ²	8,679	7,269
Percentage Served by Public Supply ²	53%	53%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	1.46	1.18
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	1.30	1.05
Total Municipal Water Demand	2.77	2.24

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.99	39%	1.21	57%
Septic Systems	1.53	61%	0.90	43%
Total Municipal Wastewater Produced	2.52		2.11	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Jefferson County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	16,926
Base Year Population Served by Public Supply	8,950

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Avera*	0.02	0.00
Town of Bartow*	0.04	0.00
City of Louisville	0.76	0.00
Town of Stapleton*	0.04	0.00
City of Wadley	0.20	0.00
City of Wrens	0.45	0.00
Total:	1.51	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.51
Initial Public Per Capita Demand (gpcd) ¹	169
Adjusted Public Per Capita Demand (gpcd) ²	169

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	169	163
Self-Served per Capita Demand (gpcd)	169	163
Percentage served by Public Supply ¹	53%	53%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	33%	0%
Land Application System (% discharge) ⁶	1%	1%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Jenkins County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	8,556	8,176
Population Served by Public Supply ²	6,568	6,887
Percentage Served by Public Supply ²	77%	84%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.66	0.65
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	0.15	0.09
Total Municipal Water Demand	0.81	0.74

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.47	66%	0.46	71%
Septic Systems	0.24	34%	0.19	29%
Total Municipal Wastewater Produced	0.71		0.65	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Jenkins County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	8,729
Base Year Population Served by Public Supply	4,150

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Millen	0.42	0.00
Perkins Water Authority*	0.01	0.00
Total:	0.42	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.42
Initial Public Per Capita Demand (gpcd) ¹	101
Adjusted Public Per Capita Demand (gpcd) ²	101

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	101	95
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	77%	84%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	24%	24%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Lincoln County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	8,289	13,047
Population Served by Public Supply ²	5,898	9,284
Percentage Served by Public Supply ²	71%	71%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.39	0.55
Self Supplied Water Demand ³	0.18	0.25
Total Municipal Water Demand	0.57	0.80

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.09	18%	0.13	18%
Septic Systems	0.42	82%	0.59	82%
Total Municipal Wastewater Produced	0.51		0.72	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Lincoln County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	8,207
Base Year Population Served by Public Supply	5,840

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Lincolnton	0.00	0.38
Total:	0.01	0.38

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.39
Initial Public Per Capita Demand (gpcd) ¹	67
Adjusted Public Per Capita Demand (gpcd) ²	67

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	67	59
Self-Served per Capita Demand (gpcd)	75	67
Percentage served by Public Supply ¹	71%	71%
Surface Water Supply (% public supply)	97%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	88%	88%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	77%	77%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

McDuffie County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	22,448	37,393
Population Served by Public Supply ²	17,902	33,654
Percentage Served by Public Supply ²	80%	90%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	2.49	4.52
Self Supplied Water Demand ³	0.34	0.26
Total Municipal Water Demand	2.83	4.78

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	1.13	44%	2.31	52%
Septic Systems	1.46	56%	2.14	48%
Total Municipal Wastewater Produced	2.59		4.45	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

McDuffie County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	21,743
Base Year Population Served by Public Supply	17,340

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Dearing*	0.03	0.00
Thomson-McDuffie County Water Commission	0.00	2.58
Total:	0.03	2.58

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Carpet Manufacturing	Industry	(0.14)
Other Industrial	Industry	(0.06)
Total:		(0.20)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	2.61
Initial Public Per Capita Demand (gpcd) ¹	151
Adjusted Public Per Capita Demand (gpcd) ²	139

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	139	134
Self-Served per Capita Demand (gpcd)	75	70
Percentage served by Public Supply ¹	80%	90%
Surface Water Supply (% public supply)	99%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	55%	50%
Land Application System (% discharge) ⁶	6%	6%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Madison County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	29,111	50,948
Population Served by Public Supply ²	13,687	41,865
Percentage Served by Public Supply ²	47%	82%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	1.47	4.25
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	1.16	0.63
Total Municipal Water Demand	2.62	4.88

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.05	2%	4.00	85%
Septic Systems	2.13	98%	0.71	15%
Total Municipal Wastewater Produced	2.18		4.71	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Madison County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	27,289
Base Year Population Served by Public Supply	3,921

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Carlton*	0.02	0.00
City of Colbert*	0.09	0.00
Town of Comer	0.09	0.00
City of Danielsville	0.11	0.00
City of Ila*	0.02	0.00
Total:	0.42	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Feedback notes wholesale to 2.13 MGD by 2050, no buyer		
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.42
Initial Public Per Capita Demand (gpcd) ¹	107
Adjusted Public Per Capita Demand (gpcd) ²	107

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	107	102
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	47%	82%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	83%	83%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	97%	5%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Oglethorpe County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	14,940	44,221
Population Served by Public Supply ²	13,189	39,038
Percentage Served by Public Supply ²	88%	88%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	1.24	3.49
Self Supplied Water Demand ³	0.13	0.36
Total Municipal Water Demand	1.37	3.85

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.07	6%	3.00	78%
Septic Systems	1.14	94%	0.87	22%
Total Municipal Wastewater Produced	1.21		3.87	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Oglethorpe County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	13,609
Base Year Population Served by Public Supply	2,340

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Arnoldsville*	0.02	0.00
City of Crawford	0.00	0.13
City of Lexington*	0.04	0.00
Town of Maxeys*	0.02	0.00
Total:	0.09	0.13

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Feedback notes wholesale to 0.5 MGD by 2050, no buyer		
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.22
Initial Public Per Capita Demand (gpcd) ¹	94
Adjusted Public Per Capita Demand (gpcd) ²	94

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	94	89
Self-Served per Capita Demand (gpcd)	75	70
Percentage served by Public Supply ¹	17%	88%
Surface Water Supply (% public supply)	59%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	88%	88%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	95%	18%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Rabun County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	17,053	31,049
Population Served by Public Supply ²	12,445	22,659
Percentage Served by Public Supply ²	73%	73%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.05	0.10
Publicly Supplied Surface Water	2.03	3.54
Self Supplied Water Demand ³	0.35	0.57
Total Municipal Water Demand	2.43	4.20

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.42	20%	0.74	20%
Septic Systems	1.72	80%	2.96	80%
Total Municipal Wastewater Produced	2.14		3.70	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Rabun County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	16,087
Base Year Population Served by Public Supply	11,740

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Clayton	0.00	0.00
Town of Tallulah Falls*	0.01	0.00
City of Sky Valley Resort	0.03	0.30
Clayton-Rabun County Water & Sewer Authority	0.00	1.49
Total:	0.18	1.79

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.97
Initial Public Per Capita Demand (gpcd) ¹	168
Adjusted Public Per Capita Demand (gpcd) ²	168

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	168	160
Self-Served per Capita Demand (gpcd)	75	67
Percentage served by Public Supply ¹	73%	73%
Surface Water Supply (% public supply)	91%	97%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	80%	80%
Land Application System (% discharge) ⁶	1%	1%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

**Richmond County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	201,897	255,473
Population Served by Public Supply ²	197,866	250,372
Percentage Served by Public Supply ²	98%	98%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	6.13	7.54
Publicly Supplied Surface Water	37.69	46.33
Self Supplied Water Demand ³	0.30	0.35
Total Municipal Water Demand	44.12	54.22

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	37.66	86%	46.30	86%
Septic Systems	6.13	14%	7.51	14%
Total Municipal Wastewater Produced	43.79		53.81	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Richmond County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	195,769
Base Year Population Served by Public Supply	191,860

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Augusta-Richmond County Water System	0.00	0.00
Town of Blythe	0.08	0.00
Town of Hepzibah	0.34	0.00
Augusta-Richmond Utilities	5.99	40.27
Total:	6.41	40.27

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Augusta - Selected IUs	Industrial	(4.19)
Total:		(4.19)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	46.68
Initial Public Per Capita Demand (gpcd) ¹	243
Adjusted Public Per Capita Demand (gpcd) ²	221

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	221	215
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	98%	98%
Surface Water Supply (% public supply)	86%	86%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	16%	16%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

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Screven County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	15,480	21,743
Population Served by Public Supply ²	6,361	8,934
Percentage Served by Public Supply ²	41%	41%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	1.02	1.38
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	1.47	1.98
Total Municipal Water Demand	2.49	3.37

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.53	26%	0.71	26%
Septic Systems	1.48	74%	2.00	74%
Total Municipal Wastewater Produced	2.00		2.71	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

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Screven County
Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	15,430
Base Year Population Served by Public Supply	6,340

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Hiltonia*	0.07	0.00
Town of Newington*	0.03	0.00
City of Oliver*	0.03	0.00
City of Sylvania	0.81	0.00
Total:	1.02	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.02
Initial Public Per Capita Demand (gpcd) ¹	161
Adjusted Public Per Capita Demand (gpcd) ²	161

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	161	155
Self-Served per Capita Demand (gpcd)	161	155
Percentage served by Public Supply ¹	41%	41%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	44%	44%
Land Application System (% discharge) ⁶	1%	1%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

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**Stephens County
Municipal Water/Wastewater Forecast Summary¹**

Population Data

	2010	2050
Population	25,794	32,031
Population Served by Public Supply ²	23,210	30,429
Percentage Served by Public Supply ²	90%	95%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.08	0.08
Publicly Supplied Surface Water	3.26	4.10
Self Supplied Water Demand ³	0.19	0.11
Total Municipal Water Demand	3.53	4.29

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	1.17	36%	2.86	69%
Septic Systems	2.03	64%	1.27	31%
Total Municipal Wastewater Produced	3.20		4.13	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

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Stephens County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	25,060
Base Year Population Served by Public Supply	22,550

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Martin*	0.08	0.00
City of Toccoa	0.00	3.88
Total:	0.09	3.88

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Franklin County 2008	Sales	(0.23)
Habersham County 2008	Sales	(0.18)
N/A 2008	Industrial	(0.33)
Total:		(0.73)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	3.97
Initial Public Per Capita Demand (gpcd) ¹	176
Adjusted Public Per Capita Demand (gpcd) ²	144

Water Forecast³

	Baseline (2008)	2050
Publicly-Served per Capita Demand (gpcd)	144	137
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	90%	95%
Surface Water Supply (% public supply)	98%	98%

Wastewater Forecast³

	Baseline (2008)	2050
Indoor Water Use (% water use) ⁴	85%	85%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	66%	33%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Taliaferro County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	1,881	2,013
Population Served by Public Supply ²	721	772
Percentage Served by Public Supply ²	38%	38%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.00	0.00
Self Supplied Water Demand ³	0.09	0.08
Total Municipal Water Demand	0.09	0.08

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.00	0%	0.00	0%
Septic Systems	0.07	100%	0.07	100%
Total Municipal Wastewater Produced	0.07		0.07	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

Taliaferro County
Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	1,826
Base Year Population Served by Public Supply	700

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
City of Crawfordville*	0.05	0.00
Self Supplied Water Demand ³		
Total:	0.05	0.00

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Total:		0.00

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.05
Initial Public Per Capita Demand (gpcd) ¹	71
Adjusted Public Per Capita Demand (gpcd) ²	71

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	71	63
Self-Served per Capita Demand (gpcd)	75	66
Percentage served by Public Supply ¹	38%	38%
Surface Water Supply (% public supply)	0%	0%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	82%	82%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	27%	27%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Warren County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	5,871	6,886
Population Served by Public Supply ²	3,291	4,732
Percentage Served by Public Supply ²	56%	69%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.24	0.51
Self Supplied Water Demand ³	0.19	0.15
Total Municipal Water Demand	0.43	0.66

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.11	27%	0.30	45%
Septic Systems	0.30	73%	0.37	55%
Total Municipal Wastewater Produced	0.41		0.67	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

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Warren County Municipal Water/Wastewater Forecast Details

Base Data¹

Base Year	2005
Base Year Total Population	6,101
Base Year Population Served by Public Supply	3,420

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Town of Camak*	0.01	0.00
Town of Norwood*	0.02	0.00
City of Warrenton	0.00	0.20
Total:	0.03	0.20

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Unspecified	Purchase	0.020
Total:		0.020

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	0.23
Initial Public Per Capita Demand (gpcd) ¹	67
Adjusted Public Per Capita Demand (gpcd) ²	73

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	73	108
Self-Served per Capita Demand (gpcd)	75	69
Percentage served by Public Supply ¹	56%	69%
Surface Water Supply (% public supply)	87%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	88%	95%
Inflow/ Infiltration (% discharge)	25%	15%
Septic Systems (% publicly served population) ⁵	60%	47%
Land Application System (% discharge) ⁶	12%	4%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

Red text indicates adjustment due to feedback received

Wilkes County
Municipal Water/Wastewater Forecast Summary¹

Population Data

	2010	2050
Population	10,295	11,166
Population Served by Public Supply ²	5,051	5,478
Percentage Served by Public Supply ²	49%	49%

Municipal Water Demand Forecast (mgd - annual average daily demand)

Source	2010	2050
Publicly Supplied Ground Water	0.00	0.00
Publicly Supplied Surface Water	0.79	0.82
Self Supplied Water Demand ³	0.39	0.39
Total Municipal Water Demand	1.18	1.20

Municipal Wastewater Demand Forecast (mgd - annual average daily flow)

Treatment System	2010		2050	
	Flow	% of Total Flow	Flow	% of Total Flow
Centralized Treatment	0.53	53%	0.54	53%
Septic Systems	0.47	47%	0.47	47%
Total Municipal Wastewater Produced	1.00		1.01	

¹ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

² Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers

³ Self supplied water demand is assumed to come 100% from groundwater

Red text indicates adjustment due to feedback received

**Wilkes County
Municipal Water/Wastewater Forecast Details**

Base Data¹

Base Year	2005
Base Year Total Population	10,457
Base Year Population Served by Public Supply	5,130

Public Supply (mgd - annual average daily demand)¹

Utility	Groundwater	Surface Water
Rayle Water Association*	0.02	0.00
City of Tignall*	0.10	0.00
City of Washington	0.00	1.09
Total:	0.12	1.08

* Indicates no existing EPD permit

Adjustments to Public Supply (mgd - annual average daily demand)²

Adjustment	Type	Rate
Plastics Manufacturing	Industry	(0.25)
Paper Manufacturing	Industry	(0.15)
Total:		(0.40)

Publicly Supplied Per Capita Water Use Rates

Total 2005 Supplied Demand (MGD) ¹	1.20
Initial Public Per Capita Demand (gpcd) ¹	234
Adjusted Public Per Capita Demand (gpcd) ²	156

Water Forecast³

	Baseline (2005)	2050
Publicly-Served per Capita Demand (gpcd)	156	149
Self-Served per Capita Demand (gpcd)	75	68
Percentage served by Public Supply ¹	49%	49%
Surface Water Supply (% public supply)	90%	100%

Wastewater Forecast³

	Baseline (2005)	2050
Indoor Water Use (% water use) ⁴	77%	77%
Inflow/ Infiltration (% discharge)	20%	20%
Septic Systems (% publicly served population) ⁵	28%	28%
Land Application System (% discharge) ⁶	0%	0%

¹ Based on "Water Use in Georgia 2005" (USGS) or data provided by local providers and EPD permit database

² Based on feedbacks received from JIG survey Oct - Dec 2009

³ 2050 forecast "baseline" scenario, assumes "current management practices" trend will continue through planning period

⁴ Based on "Georgia Water Use and Conservation Profiles", 2008, CH2M Hill for EPD

⁵ Based on 1990 census data and 2002-2007 reported new septic tank system installed

⁶ Based on 2005 EPD permit database

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APPENDIX C

**Municipal Ad Hoc Committee Members
Technical Subcommittee Members**

SAVANNAH-UPPER OGEECHEE TECHNICAL SUBCOMMITTEE

Member	Sector	Affiliation
Tom Wiedmeier (Chair)	Municipal	Augusta-Richmond County Utilities Dept.
Patrick Goran	Municipal	Hart County Water & Sewer Authority
Donald Dye	Municipal	City of Toccoa
Tim McGill	Energy	Southern Company
Mike Eskew	Local Government	City of Washintgon

* Non-council members

SAVANNAH-UPPER OGEECHEE PLAN REVIEW SUBCOMMITTEE

Member	Sector	Affiliation
Bruce Azevedo (Chair)	Commerce	Business Owner/Consultant
Larry Guest	Local Government	City of Elberton
Tenia Workman	Agricultural	GA Golf Course Superintendents Association
Chris McCorkle	Agricultural	Business Owner/Consultant
Dan Fowler	Energy	Jefferson Energy Cooperative

* Non-council members

SAVANNAH-UPPER OGEECHEE INTERSTATE COORDINATION SUBCOMMITTEE

Member	Sector	Affiliation
Scott McGregor	Commerce	Columbia County

* Non-council members

SAVANNAH-UPPER OGEECHEE COUNTY CONTACT REPRESENTATIVES

Member	County	Member	County
Jerry Boling	Banks	Bruce Azevedo	Madison
Lee Webster	Burke	Charlie Newton	McDuffie
Ron Cross	Columbia	Bruce Azevedo	Oglethorpe
Eddie Madden	Elbert	Larry Walker	Rabun
Donald Dye	Franklin	Tom Wiedmeier	Richmond
Charlie Newton	Glascok	Stan Sheppard	Screven
Pat Goran	Hart	Donald Dye	Stephens
Thomas Jordan	Jefferson	N/A	Taliaferro
Robert Jenkins	Jenkins	Chris McCorkle	Warren
Patricia Goodwin	Lincoln	Mike Eskew	Wilkes

* Non-council members