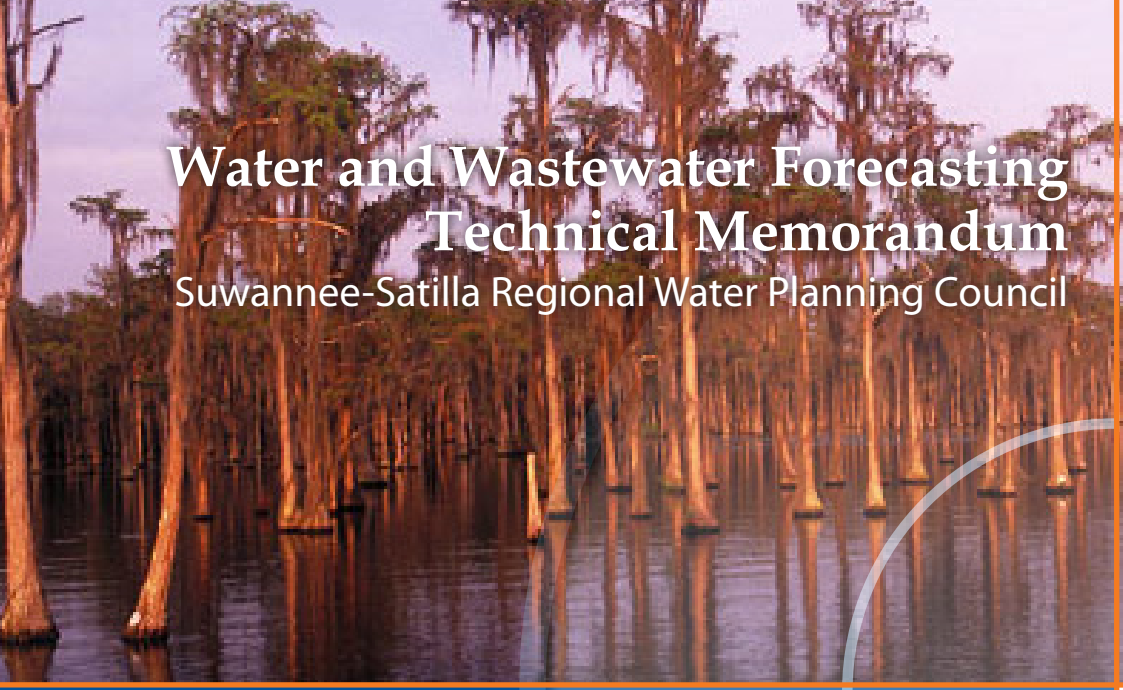

Water and Wastewater Forecasting Technical Memorandum

Suwannee-Satilla Regional Water Planning Council

Banks Lake, Lanier County

Supplemental Material

Suwannee-Satilla Regional Water Plan

March 2017

CDM Smith

Banks Lake, Lanier County
photo courtesy of the Georgia Department of Industry, Trade & Tourism

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Section 1
Introduction

Municipal and Industrial Water and Wastewater Forecasts were originally developed for the Suwannee-Satilla Regional Water Planning Council as part of the Georgia Comprehensive Statewide Water Management Plan (CSWMP) in 2011. Agricultural and Energy water needs were also identified and forecasted during the 2011 planning process. As part of the 5-year review and revision of that plan, all of these forecasts, except Industrial water and wastewater forecasts, have been updated. This Technical Memorandum describes how the original forecasts have been updated to account for changes in population and water use that have occurred since the original forecasts were produced.

Throughout this report, the prior Regional Planning process that occurred in 2009 – 2011 is referred to as "Round 1." Thus, the current (2016) update is referred to as "Round 2".

The basic approach to updating the forecasts starts with the same methodology used in developing the original forecasts, which are described in various Technical Memoranda, which were included as supplemental materials to the 2011 Suwannee-Satilla Regional Water Plan.[1] The purpose of this Technical Memorandum is to describe where modifications to the original forecast methodology were made and to provide the revised forecast values.

1.1 General Methodology

The basic methodology for forecasting water demand is to estimate demand separately for each major water use sector. For each sector, water demand is estimated using a 'driver' multiplied by the 'rate of use'. The driver is defined as a countable unit that can be projected in future years, such as number of people, number of employees in a business, acres irrigated or megawatts of power. The rate of use is defined as the quantity of water used by the driving unit per unit of time, such as gallons per person per day, gallons per day per acre, or gallons per megawatt produced.

The planning process examines and forecasts water demand for four major sectors:

- **Municipal** – this sector includes domestic, commercial, and low water use industries
- **Industrial** – this sector includes higher water use industries
- **Agricultural** – this sector includes major crops such as cotton, corn, peanuts, soybean, pecans, specialty crops, and nursery and horticulture; a snapshot of major livestock water use and golf course water use

[1] See "Water and Wastewater Forecasting Technical Memorandum," dated May 2011 (available at http://www.suwanneesatilla.org/documents/Suwannee-SatillaForecastTM050211.pdf);

"Statewide Energy Sector Water Demand Forecast" Technical Memorandum, dated October 29, 2010 (available at http://www.georgiawaterplanning.org/pages/forecasting/energy_water_use.php);

and Agricultural Water Use forecast prepared by Dr. Jim Hook et al. (available at http://www.georgiawaterplanning.org/pages/forecasting/agricultural_water_use.php)

- **Energy** – this sector includes thermoelectric power generation

1.2 Population Update

State and County population projections are provided by the Governor's Office of Planning and Budget (OPB). These projections are used consistently throughout the state for multiple purposes such as transportation planning and allocation of education funds. The Georgia Environmental Protection Division (EPD) is required to use these population projections in statewide water planning. The 2010 Census statewide population count was lower than had been projected for 2010 in the Round 1 projections, although this trend of lower population than projected does not hold true for all counties. The prior forecast had the State's population growing at an annual rate of 1.69% while the new forecast grows at an annual rate of only 1.05% as shown in **Figure 1-1**.

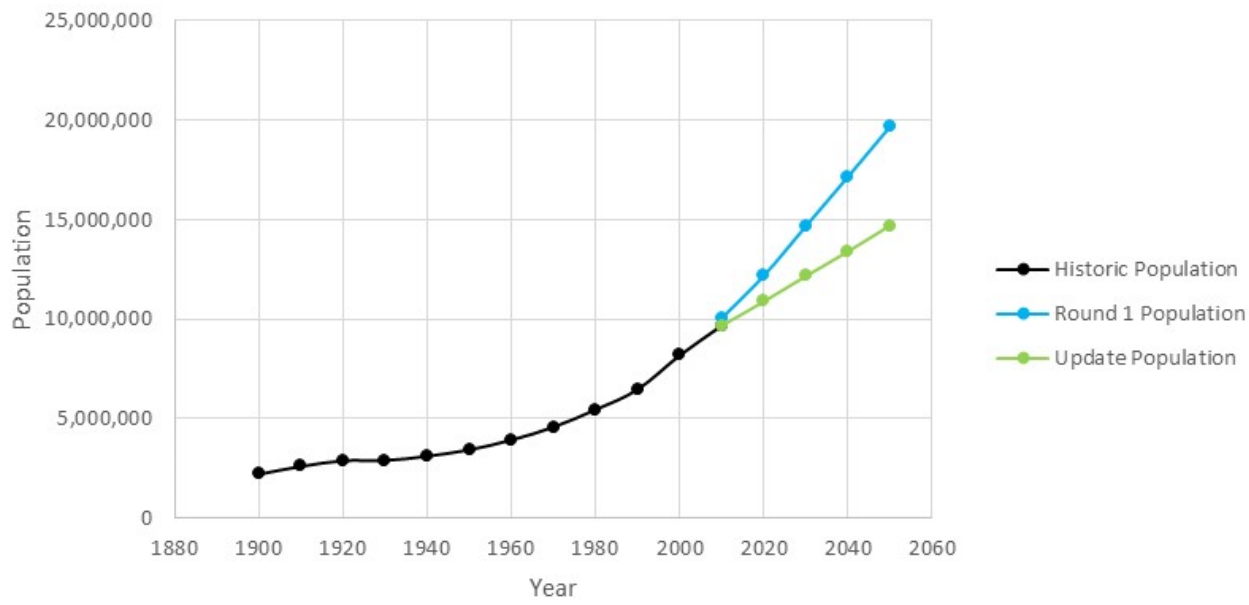


Figure 1-1
Georgia's Historic Population and Growth Projections

While the trend of a lower population in 2010 than projected was seen statewide, each county had its own individual trend. For the region as a whole, the population obtained from the 2010 Census data was 0.8 percent higher than the Round 1 projection. However, lower growth rates moving forward are predicted leading to a projected population in 2050 that is 23 percent less than the previous estimates as shown in **Figure 1-2**. The new population projections (OPB, 2015) by county are shown in **Table 1-1**.

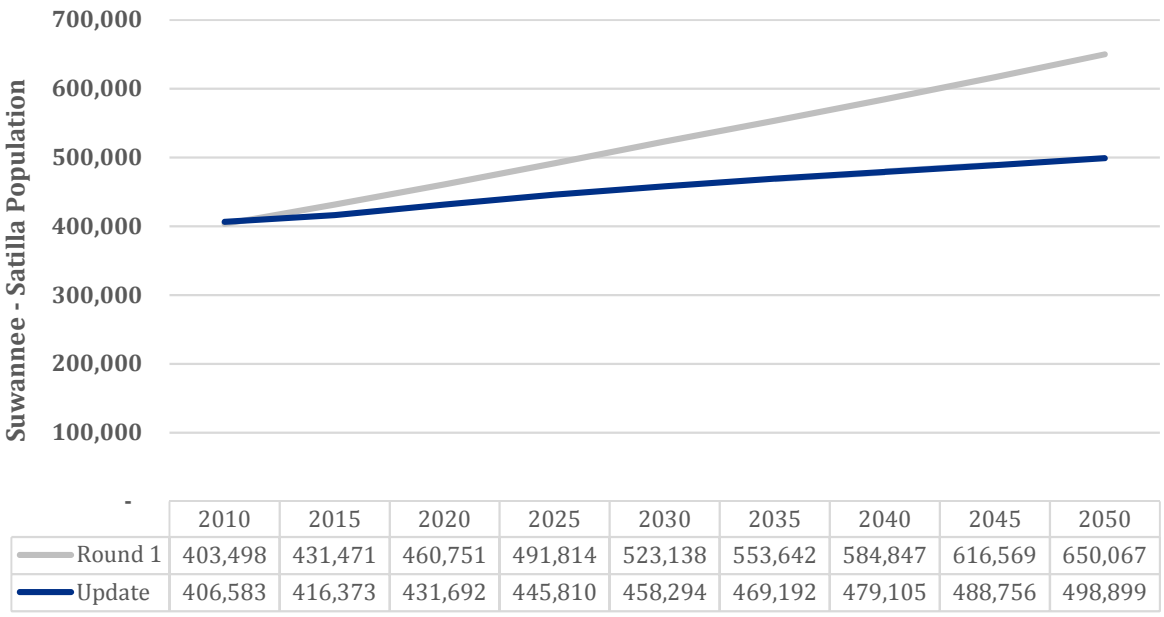


Figure 1-2
Suwannee-Satilla Population Projections

Table 1-1 Population Projections per County

County	2015	2020	2025	2030	2035	2040	2045	2050
Atkinson	8,340	8,443	8,484	8,460	8,376	8,243	8,082	7,910
Bacon	11,437	11,986	12,518	13,017	13,462	13,859	14,257	14,686
Ben Hill	17,691	18,116	18,506	18,864	19,174	19,426	19,662	19,957
Berrien	19,022	18,911	18,683	18,304	17,748	17,055	16,271	15,446
Brantley	18,517	19,054	19,498	19,775	19,854	19,783	19,637	19,462
Brooks	15,464	15,287	14,985	14,556	14,031	13,475	12,927	12,424
Charlton	13,411	13,798	14,162	14,472	14,720	14,902	15,040	15,182
Clinch	6,848	6,964	7,034	7,042	6,992	6,910	6,821	6,747
Coffee	43,907	45,604	47,236	48,748	50,132	51,489	52,917	54,465
Cook	17,268	17,764	18,228	18,635	18,950	19,188	19,395	19,604
Echols	4,090	4,154	4,180	4,184	4,161	4,104	4,019	3,916
Irwin	9,428	9,409	9,330	9,183	8,984	8,768	8,550	8,347
Lanier	10,712	11,447	12,142	12,845	13,573	14,310	15,032	15,752
Lowndes	116,023	123,740	131,190	138,246	145,139	152,066	159,094	166,258
Pierce	19,384	20,528	21,746	22,997	24,216	25,452	26,764	28,211
Tift	40,979	42,638	44,135	45,499	46,740	47,863	48,886	49,902
Turner	7,940	7,470	7,025	6,579	6,109	5,626	5,161	4,736
Ware	35,911	36,381	36,728	36,889	36,832	36,586	36,241	35,894
Total	**416,373**	**431,692**	**445,810**	**458,294**	**469,192**	**479,105**	**488,756**	**498,899**

Section 2
Municipal Water Forecasting

This section describes the methodology and results of municipal water demand forecasts for the Suwannee-Satilla Planning Region.

2.1 Methodology

The county level municipal water demand includes both public-supplied (i.e., utility) water demand and self-supplied (i.e., private well) water demand. The self-supplied water is associated with groundwater use, while the public-supply water is associated with either surface water or groundwater use as indicated by permit data. Each county has an average weighted per capita water use value that was derived from an analysis of all reporting utilities within each county, and then vetted through the regional councils in Round 1. The following sections describe updates to the previous methodology used to produce the revised forecasts.

2.1.1 Percent Change in Gallons per Capita per Day

The Georgia EPD reviewed withdrawal data and estimated population served data reported by permitted municipal water systems from the years 2010 through 2014. GA EPD then calculated adjustment factors for each County's public-supplied municipal per capita water use rate. For each county, a per capita value for each year 2010-2014 was calculated based on actual withdrawal and estimated population served data for that county. The percent rate of change was calculated for each year interval (2010 to 2011, 2011 to 2012, 2012 to 2013, 2013 to 2014), and the average of those four values was calculated as the per capita water use adjustment factor.

These adjustment factors were applied to the gpcd values used in Round 1 to derive the 2015 gpcd values for each county. If no data were available to EPD, the prior gpcd value was used as the 2015 value. Of the counties with available data, roughly two-thirds had a decrease in gpcd while about one third showed an increase in gpcd. Note that a decrease in gpcd could be due to conservation and water loss control efforts during this time period, or other factors such as an increase in population with less increase in water use, or a drop in water use (e.g., loss of industrial customer) with the same population. **Table 2-1** shows the gpcd adjustment factor applied to the Round 1 gpcd for each county in the region.

The self-supplied value of 100 gpcd for each county remains unchanged from Round 1.

Table 2-1. Per Capita Demand Values by County, gpcd

County	Round 1 Per Capita	2015 Adjustment Factor	Round 2 Adjusted Per Capita
Atkinson	112	-1%	111
Bacon	170	4%	177
Ben Hill	180	-2%	177
Berrien	131	-3%	128
Brantley	93	3%	96
Brooks	137	7%	147
Charlton	123	4%	128
Clinch	148	-6%	140
Coffee	153	-9%	139
Cook	142	-8%	131
Echols	96	0%	96
Irwin	152	-3%	148
Lanier	153	-6%	143
Lowndes	133	-3%	129
Pierce	127	3%	131
Tift	156	-2%	153
Turner	140	0%	140
Ware	114	-5%	109

2.1.2 Plumbing Code Adjustment Factor

In Round 1, the gpcd for each county was reduced over time due to the effects of plumbing codes based upon the age of housing stock in each county. Over time, as new houses are built with more efficiency fixtures, the county average gpcd will decrease. Previously a reduction (adjustment) was calculated for each county starting with zero in 2010 (the base year in Round 1) and increasing over time. For the update, these plumbing code adjustments were reset to zero in 2015 with the difference in the adjustment factor between 2010 and 2014 subtracted from the adjustment factor for all remaining years. The revised plumbing code adjustment was then applied to both public-supplied and self-supplied water demand. **Table 2-2** shows the municipal public-supplied gpcd value over time for each county.

Table 2-2. Adjusted Public-Supplied GPCD

County	2015	2020	2025	2030	2035	2040	2045	2050
Atkinson	110.8	109.5	108.3	107.0	105.7	104.5	103.2	101.9
Bacon	177.3	175.9	174.5	173.0	171.6	170.2	168.8	167.4
Ben Hill	176.5	175.2	173.8	172.5	171.2	169.8	168.5	167.1
Berrien	127.7	126.4	125.2	123.9	122.7	121.5	120.2	119.0
Brantley	95.8	94.7	93.5	92.4	91.2	90.1	88.9	87.8
Brooks	146.7	145.4	144.1	142.9	141.6	140.3	139.1	137.8
Charlton	128.4	127.2	126.0	124.8	123.6	122.5	121.3	120.1
Clinch	139.7	138.4	137.1	135.8	134.5	133.2	131.9	130.6
Coffee	138.6	137.4	136.2	135.1	133.9	132.7	131.6	130.4
Cook	131.2	129.9	128.6	127.3	126.1	124.8	123.5	122.2
Echols	96.0	94.9	93.7	92.6	91.4	90.3	89.1	88.0
Irwin	147.8	146.5	145.2	143.9	142.7	141.4	140.1	138.8
Lanier	143.3	142.2	141.1	140.0	138.8	137.7	136.6	135.4
Lowndes	128.9	127.8	126.7	125.5	124.4	123.2	122.1	121.0
Pierce	130.6	129.3	128.1	126.8	125.5	124.3	123.0	121.7
Tift	153.5	152.2	150.9	149.6	148.4	147.1	145.8	144.5
Turner	140.1	138.7	137.4	136.0	134.6	133.3	131.9	130.5
Ware	108.7	107.2	105.7	104.3	102.8	101.4	99.9	98.4

2.2 Municipal Water Forecasting Results

Table 2-3 shows the forecasted municipal water demand in millions of gallons per day (MGD) (public-supplied and self-supplied) by county in the Suwannee-Satilla region. The total regional demand is shown graphically in **Figure 2-1** along with a comparison of the Round 1 estimates. Region-wide the municipal forecast is lower than in Round 1 due to the combination of lower population projections and lower per capita water use values.

Table 2-3 Average Annual Municipal Water Demand Forecast by County (MGD)

County	2015	2020	2025	2030	2035	2040	2045	2050	% Change
Atkinson	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	-13%
Bacon	1.4	1.5	1.5	1.6	1.6	1.6	1.7	1.7	18%
Ben Hill	2.8	2.9	2.9	3.0	3.0	3.0	3.0	3.0	6%
Berrien	2.1	2.1	2.1	2.0	1.9	1.8	1.7	1.6	-25%
Brantley	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	-3%
Brooks	1.9	1.8	1.8	1.7	1.6	1.5	1.5	1.4	-26%
Charlton	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	5%
Clinch	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	-9%
Coffee	5.1	5.2	5.4	5.5	5.6	5.7	5.8	5.9	15%
Cook	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	5%
Echols	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-12%
Irwin	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	-18%
Lanier	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	37%
Lowndes	14.4	15.2	16.0	16.7	17.3	18.0	18.6	19.3	34%
Pierce	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	34%
Tift	5.7	5.8	6.0	6.1	6.2	6.3	6.4	6.5	14%
Turner	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	-45%
Ware	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.5	-10%
Total	**50.2**	**51.5**	**52.7**	**53.6**	**54.4**	**55.0**	**55.5**	**56.1**	**12%**

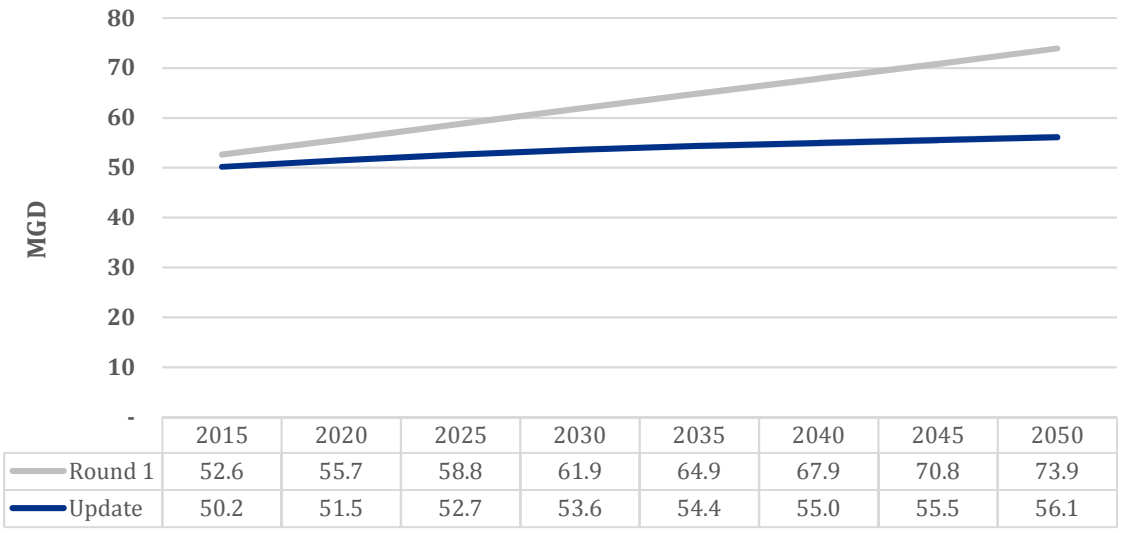


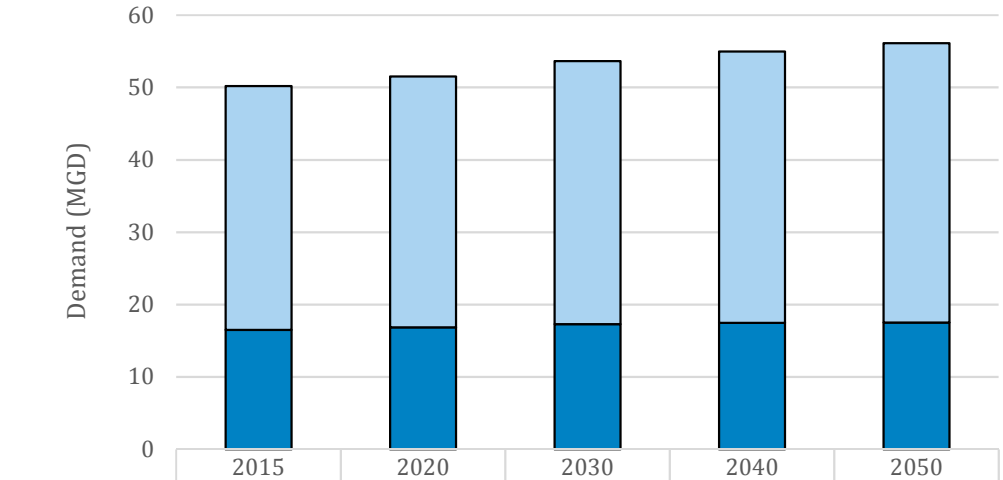
Figure 2-1
Forecasted Municipal Water Demand for Suwannee-Satilla Planning Council

2.3 Municipal Water Forecast Allocations

As noted above, the municipal water demand for each county is the summation of the public-supplied and self-supplied water demand estimates for each county. The percent of county population that is public-supplied and self-supplied has not been updated from Round 1. This split of county population was derived from USGS estimates, and were vetted through the regional council review process. **Figure 2-2** shows the split between self-supply versus public-supply for the region.

As in Round 1, it is assumed that all self-supplied (i.e., domestic residential) water use is from groundwater. The allocation of public-supplied municipal water among surface water and groundwater sources was determined in Round 1 by an analysis of surface water and groundwater permitted water withdrawals for municipal use by county. The percent of county public-supply municipal water by surface water and groundwater are retained from Round 1 and used to allocate the updated county municipal water demand by sources. Furthermore, the allocation of surface water by stream node (for the surface water models) and groundwater by aquifer (for the groundwater models) maintains the same proportions as in Round 1.

Thus the updated county municipal water demand forecasts are allocated among surface water nodes and groundwater aquifers for analysis with other components of the state water plan update. For the Suwannee-Satilla region, all municipal water is groundwater from the Floridan aquifer, as shown in **Figure 2-3**.



	2015	2020	2030	2040	2050
Public Supply	33.7	34.7	36.3	37.5	38.6
Self-Supply	16.5	16.9	17.3	17.5	17.5

Figure 2-2
Self-Supply Versus Public-Supply of Municipal Water Demand

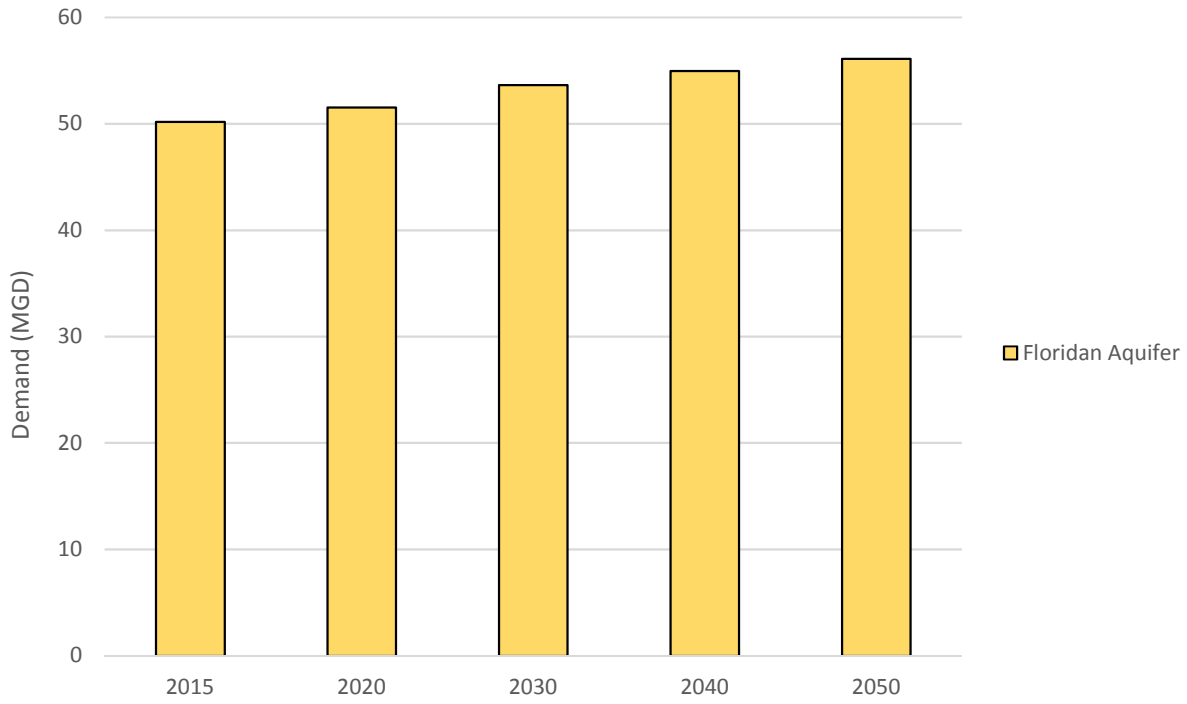


Figure 2-3
Municipal Water Demand for Suwannee-Satilla Planning Council by Aquifer and Basin

Section 3
Municipal Wastewater Forecasting

This section describes the methodology and results of the update of the municipal wastewater demand forecasts for the Suwannee-Satilla Planning Region.

3.1 Methodology

Within the previous analysis (i.e., Round 1), the municipal water demand served as the basis for estimating the municipal wastewater flows for each county with a portion of the water demand assumed to be indoor use that entered the centralized wastewater treatment system. While self-supplied water demand was assumed to go to a septic system, public-supplied water in each county had a proportion going to septic and a portion to centralized treatment. A percentage was then added to centralized flows for inflow and infiltration (I/I) that occurs on the way to the treatment facility. The centralized flow estimate was then allocated between point discharge (NPDES) and land application systems (LAS).

For the update, the Georgia EPD provided an analysis of 2014 NPDES permitted discharges by county and a recommended methodology for the municipal wastewater forecast update.

- The percent of county total wastewater flow that is septic is retained from Round 1. Any percentage change over time is from council member input in Round 1.
- Future septic flow by county is estimated from the Round 1 septic flow forecast times the percent change in county population between the Round 1 and Round 2 population projections for the county.
- Future septic flows are allocated to watersheds and stream nodes based on the same percent of county area in watersheds as in Round 1.
- The sum of annual average 2014 NPDES point discharges by county are adjusted by the change in percent of county that is septic/centralized over time (if applicable), and increased/decreased over time with the rate of change in the new county population projections to derive the new point discharge forecast for the county.
- The updated point discharge for the county is allocated to watersheds and stream nodes based on the permit locations of the 2014 NPDES flows in the county.
- The sum of annual average2014 land application system (LAS) flows by county are adjusted by the change in percent of county that is septic/centralized over time (if applicable), combined with 2014 subsurface flows (if any), and increased/decreased over time with the rate of change in the new county population projections to derive the new LAS + subsurface forecast for the county.

- The updated LAS + subsurface flow forecast for the county is allocated to watersheds and stream nodes based on the permit locations of the 2014 LAS (and subsurface) flows in the county.
- County centralized flow is the sum of the point source discharges and LAS + subsurface discharges.
- County total wastewater flow is the sum of the centralized and septic flows.

3.2 Results

Table 3-1 shows the forecasted municipal wastewater generated per County in the Suwannee-Satilla region. The total regional wastewater generated is then shown graphically in **Figure 3-1** broken down between septic treatment and centralized treatment that is discharged via a point source or land application. **Figure 3-2** gives a snapshot of the how the generated wastewater is discharged per watershed for 2015.

Table 3-1 Total Wastewater Generated in Suwannee-Satilla Planning Region per County (MGD)

County	2015	2020	2030	2040	2050	% Change 2015 to 2050
Atkinson	0.9	0.9	0.9	0.9	0.8	-10%
Bacon	1.3	1.3	1.4	1.5	1.6	24%
Ben Hill	4.2	4.3	4.5	4.6	4.7	11%
Berrien	1.3	1.3	1.2	1.1	1.0	-25%
Brantley	1.5	1.5	1.5	1.5	1.4	-3%
Brooks	2.1	2.1	1.9	1.8	1.6	-23%
Charlton	1.6	1.6	1.7	1.7	1.7	8%
Clinch	0.7	0.7	0.7	0.7	0.6	-5%
Coffee	6.5	6.7	7.2	7.5	7.9	21%
Cook	3.1	3.2	3.3	3.4	3.5	12%
Echols	0.3	0.3	0.3	0.3	0.3	-12%
Irwin	1.1	1.1	1.1	1.0	0.9	-15%
Lanier	1.2	1.2	1.4	1.5	1.6	40%
Lowndes	13.3	14.2	15.8	17.2	18.7	41%
Pierce	2.1	2.2	2.4	2.6	2.8	37%
Tift	7.4	7.7	8.2	8.6	8.9	20%
Turner	1.2	1.2	1.0	0.9	0.7	-42%
Ware	6.0	6.1	6.1	6.0	5.9	-2%
Total	**55.7**	**57.6**	**60.6**	**62.7**	**64.7**	**16%**

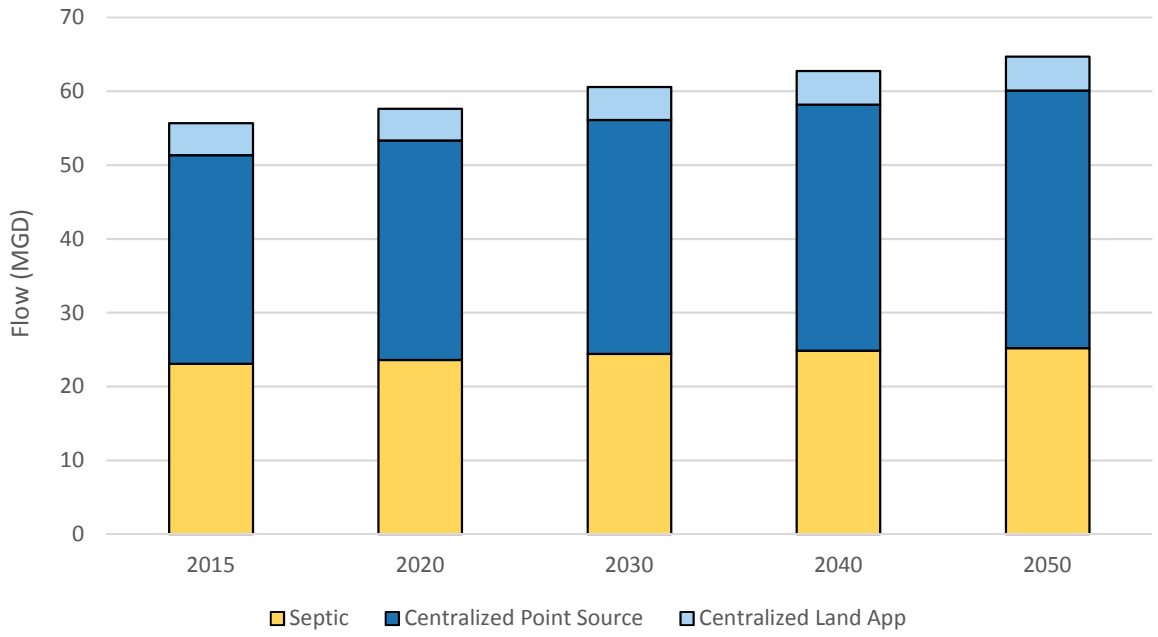


Figure 3-1
Total Wastewater Generated Suwannee-Satilla Planning Region by Type

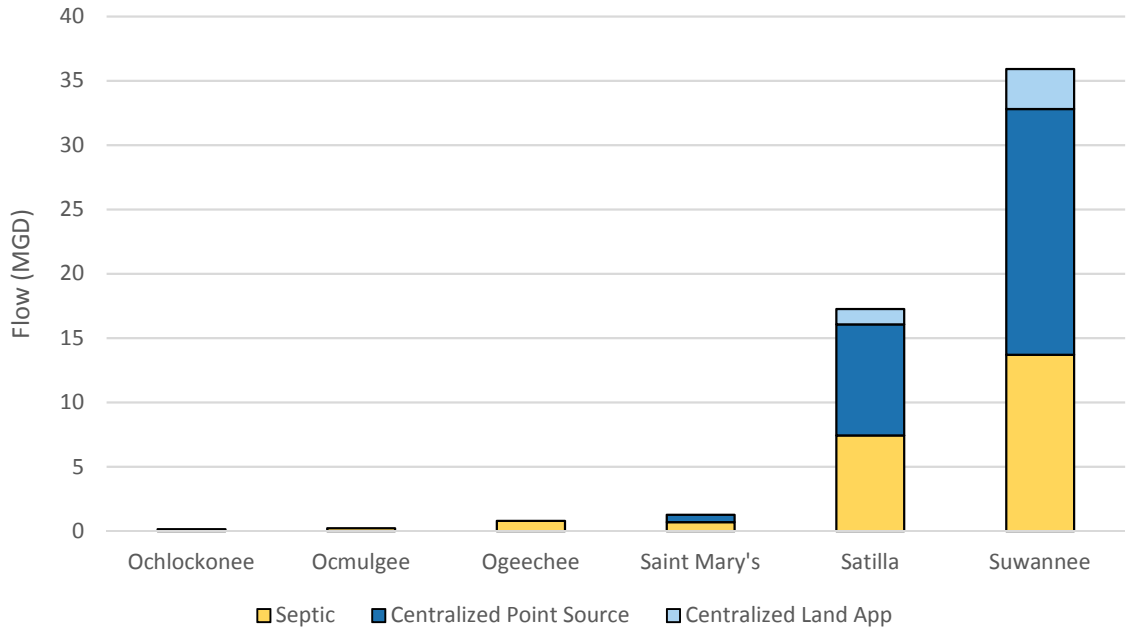


Figure 3-2
2015 Snapshot of Wastewater Discharge Type per Watershed

Section 4
Industrial Forecasting

This section describes the methodology and results of industrial water and wastewater demand forecasts for the Suwannee-Satilla Planning Region.

4.1 Methodology

The industrial water and wastewater forecasts were not updated from those produced in Round 1 other than any significant issues or changes that individual Planning Councils believed should be incorporated. For the Suwannee-Satilla Planning Council, no changes were decided to be incorporated at this time.

The original methodology forecasted industrial water demand based on employment projections per industry with the 2010 water use multiplied by the expected employment growth rate into the future for that type of industry. The industrial wastewater flow was then estimated from a wastewater to water ratio developed for each industrial category.

In the Suwannee-Satilla region, the Council elected to also develop an alternate forecast that included additional growth for future industries that may locate to the region. The Council recommended inclusions of a 5 MGD increase in forecasted industrial demand by 2050 which represents a 30 percent increase over the baseline forecast. This additional demand is assumed to come from the Floridan aquifer but it was not assigned to a specific county.

4.2 Results

4.2.1 Industrial Water Forecasts

Table 4-1 shows the (Round 1) industrial water demand by county as well as the percent increase in demand between 2015 and 2050 for the baseline forecast. **Table 4-2** shows the same water demand broken down by industry with estimates for both the baseline and alternate forecasts. All additional demand for the alternate forecast was assigned to the 'other industrial' category. Industrial water demand in the region is currently supplied 93 percent from ground water and 7 percent from surface water.

Table 4-1 Baseline Industrial Water Demand Forecast per County (MGD)

County	2015	2020	2030	2040	2050	% Change 2015 to 2050
Atkinson	0.15	0.15	0.15	0.15	0.15	0%
Bacon	0.35	0.35	0.36	0.37	0.38	8%
Ben Hill	0.35	0.39	0.4	0.41	0.42	17%
Berrien	0.04	0.04	0.04	0.04	0.04	0%
Brantley	1.02	1.02	1.03	1.05	1.08	6%
Brooks	0.14	0.14	0.15	0.15	0.16	13%
Charlton	0.03	0.03	0.03	0.03	0.03	0%
Clinch	0.04	0.04	0.04	0.04	0.05	20%
Coffee	2.34	2.49	2.56	2.62	2.69	13%
Cook	0.40	0.43	0.47	0.51	0.55	27%
Echols	0	0	0	0	0	0%
Irwin	0	0	0	0	0	0%
Lanier	0	0	0	0	0	0%
Lowndes	9.47	9.84	10.07	10.3	10.58	10%
Pierce	0.07	0.07	0.08	0.08	0.09	28%
Tift	0	0	0	0	0	0%
Turner	0	0	0	0	0	0%
Ware	0.58	0.61	0.66	0.7	0.76	24%
Total	**15.0**	**15.6**	**16.0**	**16.5**	**17.0**	12%

Table 4-2 Baseline and Alternate Industrial Water Demand Forecast per Industry (MGD)

Industry	2015	2020	2030	2040	2050
Other Industrial: Baseline	1.375	1.45	1.57	1.68	1.8
Other Industrial: Alternate	0.55	1.10	2.32	3.61	5.00
Mining	1.02	1.02	1.03	1.05	1.08
Food - Food Manufacturing	2.41	2.56	2.63	2.69	2.76
Textiles - Textile Mills	0.28	0.28	0.28	0.28	0.28
Textiles - Textile Product Mills	0.145	0.17	0.17	0.18	0.18
Apparel	0.15	0.15	0.15	0.15	0.15
Paper	8.43	8.77	8.96	9.17	9.41
Chemicals	1.03	1.05	1.08	1.11	1.14
Fabricated Metal Products	0.04	0.04	0.04	0.04	0.05
Electrical Machinery	0.09	0.1	0.11	0.11	0.11
TOTAL: Baseline	**15.0**	**15.6**	**16.0**	**16.5**	**17.0**
TOTAL: Alternate	**15.5**	**16.7**	**18.3**	**20.1**	**22.0**

Note: The following categories have zero forecast water demand in the Suwannee-Satilla Region: Food - Beverage and Tobacco, Petroleum, Rubber, Stone and Clay, Primary Metals, and Automotive Manufacturing

4.2.2 Industrial Wastewater Results

Table 4-3 provides the baseline forecast of industrial wastewater generated per County while **Table 4-4** give the wastewater demand by discharge method for the baseline forecast and **Table 4-5** provides similar information for the alternate forecast. The majority of industrial wastewater in the Planning Region is discharged via a permitted point source for the industrial facility.

Table 4-3 Baseline Industrial Wastewater Generation Forecast per County (MGD)

County	2015	2020	2030	2040	2050	% Change 2015 to 2050
Atkinson	0.09	0.09	0.09	0.09	0.09	0%
Bacon	0.21	0.21	0.22	0.23	0.23	9%
Ben Hill	0.24	0.26	0.26	0.27	0.28	14%
Berrien	0.02	0.02	0.02	0.02	0.02	0%
Brantley	0.62	0.62	0.63	0.64	0.66	6%
Brooks	0.08	0.09	0.09	0.09	0.1	20%
Charlton	0.02	0.02	0.02	0.02	0.02	0%
Clinch	0.02	0.02	0.03	0.03	0.03	33%
Coffee	2.23	2.37	2.43	2.49	2.55	13%
Cook	0.25	0.26	0.29	0.31	0.34	26%
Echols	0.00	0	0	0	0	0%
Irwin	0	0	0	0	0	0%
Lanier	0	0	0	0	0	0%
Lowndes	9.61	9.98	10.21	10.45	10.73	10%
Pierce	0.04	0.04	0.05	0.05	0.05	20%
Tift	0	0	0	0	0	0%
Turner	0	0	0	0	0	0%
Ware	0.35	0.37	0.4	0.43	0.46	24%
Total	**13.8**	**14.4**	**14.7**	**15.1**	**15.6**	**11.4%**

Table 4-4 Baseline Industrial Wastewater Generation Forecast by Discharge Method (MGD)

Discharge Method	2015	2020	2030	2040	2050
Industrial – Point Source	10.02	10.38	10.61	10.85	11.14
Industrial – LAS	0.24	0.25	0.26	0.27	0.27
Total Industrial Discharge	**10.26**	**10.63**	**10.87**	**11.12**	**11.41**
Industrial to Municipal POTW – Point Source	3.5	3.7	3.84	3.97	4.12
Industrial to Municipal POTW – LAS	0.03	0.03	0.03	0.03	0.03
Total Industrial to Municipal Publicly Owned Treatment Plant (POTW)	**3.53**	**3.73**	**3.87**	**4**	**4.15**

Table 4-5 Alternate Industrial Wastewater Generation Forecast by Discharge Method (MGD)

Discharge Method	2015	2020	2030	2040	2050
Industrial – Point Source	10.02	10.38	10.61	10.85	11.14
Industrial – LAS	0.24	0.25	0.26	0.27	0.27
Total Industrial Discharge	**10.26**	**10.63**	**10.87**	**11.12**	**11.41**
Industrial to Municipal POTW – Point Source	3.82	4.34	5.19	6.08	7.06
Industrial to Municipal POTW – LAS	0.03	0.05	0.09	0.12	0.16
Total Industrial to Municipal Publicly Owned Treatment Plant (POTW)	**3.85**	**4.39**	**5.28**	**6.20**	**7.22**

Section 5
Agricultural Water Forecasting

This section describes the methodology and results of agricultural water demand forecasting for the Suwannee-Satilla Planning Region.

5.1 Methodology

Agricultural water demand forecasts were originally developed, and recently updated, by the Georgia Water Planning & Policy Center at Albany State University (GWPPC), with support from the University of Georgia's (UGA) College of Agricultural and Environmental Sciences. GWPPC was contracted by Georgia Environmental Protection Division (GAEPD) to prepare estimates of current and future use of water by the agricultural sector in Georgia. The basic methodology involved estimating the projected irrigated area for each crop type and multiplying that area by the predicted monthly irrigation need in inches per each crop type. The proportion of irrigation water derived from different water source types was also considered. The projections cover row and orchard crops as well as most vegetable and specialty crops accounting for more than 95 percent of Georgia's irrigated land. Additionally, estimates of current use are made for animal agriculture, horticultural nurseries and greenhouses, as well as golf courses.

Metered observations were utilized from the 2010-2013 growing seasons and then projected into the future demand years using methods consistent with Round 1. To address potential climate extremes, a range of agricultural demand scenarios were considered. The 75th percentile of water demand was selected to represent dry year conditions when higher irrigation demands are expected. For planning purposes, GWPPC used the 75th percentile values for each region to represent a more conservative scenario than the median value. It is the 75th percentile demands that are presented in this report.

5.2 Results

Table 5-1 shows the forecasted agricultural water needs by county in the Suwannee-Satilla region. The Suwannee-Satilla region as a whole is expected to see an increase of 14 percent in agricultural water demand by 2050. **Figure 5-1** shows the agricultural demands split by basin for surface water and aquifer for groundwater with the same data also provided in **Table 5-2**. Currently 76 percent of the agricultural demand in the Suwannee-Satilla region is met from groundwater.

Table 5-1 Suwannee-Satilla Agricultural Demand Forecast by County (MGD)

County	2015	2020	2030	2040	2050	Percent Increase 2015 to 2050
Atkinson	8.5	8.6	8.9	9.1	9.2	8%
Bacon	7.2	7.4	7.9	8.3	8.7	21%
Ben Hill	8.1	8.2	8.4	8.5	8.6	6%
Berrien	20.2	21.1	22.7	24.2	25.6	26%
Brantley	0.65	0.66	0.69	0.71	0.73	12%
Brooks	25.0	25.5	26.6	27.5	28.3	14%
Charlton	0	0	0	0	0	0%
Clinch	3.9	4.0	4.3	4.6	4.8	24%
Coffee	14.5	14.6	15.0	15.2	15.3	6%
Cook	15.4	15.6	16.2	16.6	17.1	11%
Echols	2.9	3.0	3.1	3.1	3.2	9%
Irwin	29.8	30.3	31.3	31.8	32.4	9%
Lanier	5.4	5.7	6.3	6.8	7.4	37%
Lowndes	10.0	10.5	11.7	12.8	14.0	40%
Pierce	8.3	8.5	8.8	9.0	9.2	11%
Tift	19.9	20.2	20.9	21.4	22.0	10%
Turner	25.8	26.2	27.2	27.9	28.6	11%
Ware	5.1	5.3	5.5	5.8	6.0	16%
Total	**210.6**	**215.6**	**225.6**	**233.4**	**241.1**	**14%**

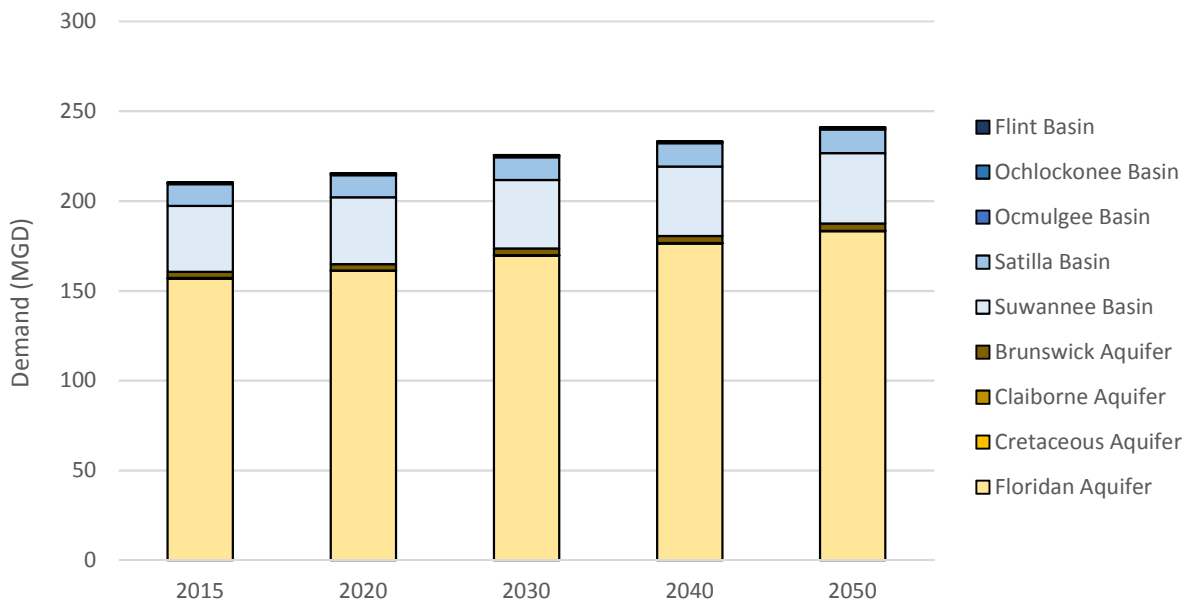


Figure 5-1
Agricultural Water Demand by Source Water Type

Table 5-2 Suwannee-Satilla Agricultural Demand Forecast per Source (MGD)

Source Water Type	Basin/Aquifer	2015	2020	2030	2040	2050	Percent Increase 2015 to 2050
Surface Water	Flint	0.35	0.35	0.36	0.36	0.36	4%
	Ochlockonee	0.070	0.070	0.071	0.072	0.072	4%
	Ocmulgee	0.72	0.72	0.73	0.74	0.74	3%
	Satilla	12.12	12.34	12.71	12.93	13.15	8%
	Suwannee	36.75	37.19	38.18	38.70	39.22	7%
	Sub Total	**50.0**	**50.7**	**52.1**	**52.8**	**53.5**	**7%**
Groundwater	Brunswick	3.42	3.53	3.73	3.90	4.08	19%
	Claiborne	0.13	0.13	0.14	0.14	0.14	4%
	Cretaceous	0.06	0.07	0.07	0.07	0.08	23%
	Floridan	156.94	161.18	169.64	176.44	183.25	17%
	Sub Total	**160.6**	**164.9**	**173.6**	**180.6**	**187.5**	**17%**
	Total	**210.6**	**215.6**	**225.6**	**233.3**	**241.1**	**14%**

Section 6
Energy Water Forecasting

This section describes the methodology and results of energy sector water demand for the Suwannee-Satilla Planning Region.

6.1 Methodology

Demands forecasted in this section are associated with future energy sector utilities (NAICS 22) power generation. Water demands associated with power generation by facilities with other industry codes are captured as part of the municipal and industrial water demand forecasts discussed in previous sections.

The analysis covers both water withdrawal requirements and water consumption associated with energy generation. Information related to water withdrawals is an important consideration in planning for the water needed for energy production. However, water consumption is the more important element when assessing future resources because a large volume of water is typically returned to the environment following the energy production process.

Water requirements for thermoelectric power generation facilities are estimated based on future energy demands along with the water requirements and consumption rates in gallons per megawatt-hour (MWh) for different power generating configurations. For a full discussion of the original forecast methodology see the 2010 technical memorandum "Statewide Energy Sector Water Demand Forecast" or the "Update of GA Energy Needs & Generating Facilities" memorandum. The following updates to the original methodology were incorporated into the current estimates:

- Projections of the statewide energy demand were updated using the new population projections with the relationship between population and energy demand the same as previously estimated.
- The list of existing facilities, facilities under construction, and planned and permitted new facilities was updated. In addition, some prior facilities were retired from service or converted from one generating configuration to another configuration.
- The same water withdrawal and consumptive use factors (gallons per MWh) by generating configuration were maintained as previously developed.
- To meet the future energy demand, the energy generation of existing facilities is increased over time to a predetermined maximum sustainable generating capacity based on the generation configuration. As additional capacity is needed in the future, "new" capacity is added to the most likely to be developed generating configurations, but the "new" generating capacity is not assigned geographically to any specific region within the state.

- The estimated future generating capacity of existing facilities, and associated water requirements, is allocated to regions based on the location of the existing facilities.

6.2 Results

Table 6-1 shows that there is no forecast energy production demand in the Suwannee-Satilla region.

Table 6-1 Suwannee-Satilla Forecasted Energy Sector Demands (MGD)

Demand Type	2015	2020	2030	2040	2050
Withdrawals	0	0	0	0	0
Consumption	0	0	0	0	0

Within the previous statewide analysis, the generating capacity of the existing and planned facilities was not able to meet the projected statewide power needs through 2050 and additional generating capacity was assumed to be developed beyond 2020. Additional generating capacity may be needed to meet the statewide power need estimate. However, the water requirements associated with the potential new capacity are minimal; less than 20 MGD withdrawals and less than 10 MGD consumption, statewide. Thus, no future water demands for currently unassigned power generation facilities have been added to the estimates for the Suwannee-Satilla region within this update. Projections for the need of new energy capacity are less than estimated previously because: (a) population projections are lower, (b) high water-using facilities have been retired, and (c) the types of generating facilities likely to be constructed in the future to meet the additional need have lower water use requirements.

Section 7
Regional Summary

This section summarizes the water and wastewater forecasts within the region for all the sectors combined.

7.1 Water Demand Summary

The full regional water demand including municipal, industrial, agricultural and energy uses are summarized in the figures and tables of this section. **Figure 7-1** shows the regional water demand per basin for surface water withdrawals and per aquifer for groundwater withdrawals while **Figure 7-2** shows the regional water demand per sector. **Table 7-1** provides a breakdown of the demand types and withdrawal locations per County. The summary values include the alternative forecast for industrial water demand.

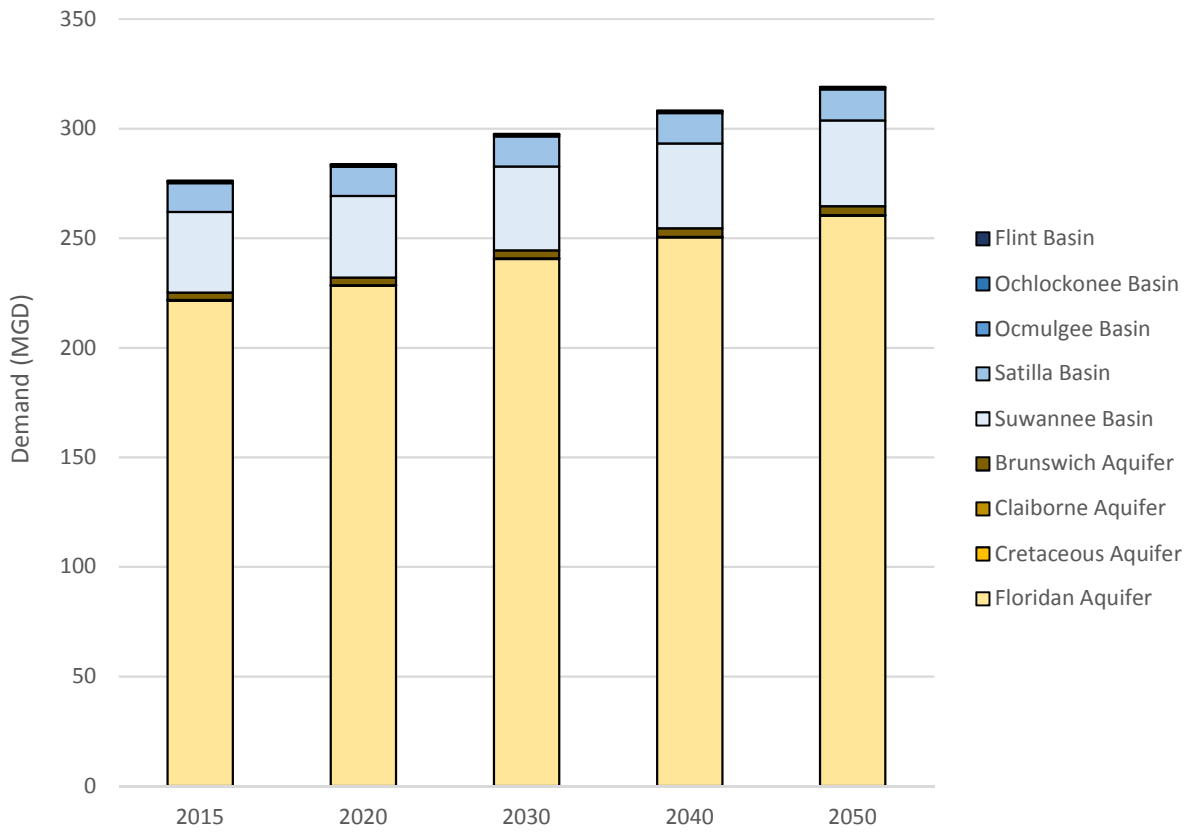


Figure 7-1
Regional Water Demand by Basin and Aquifer

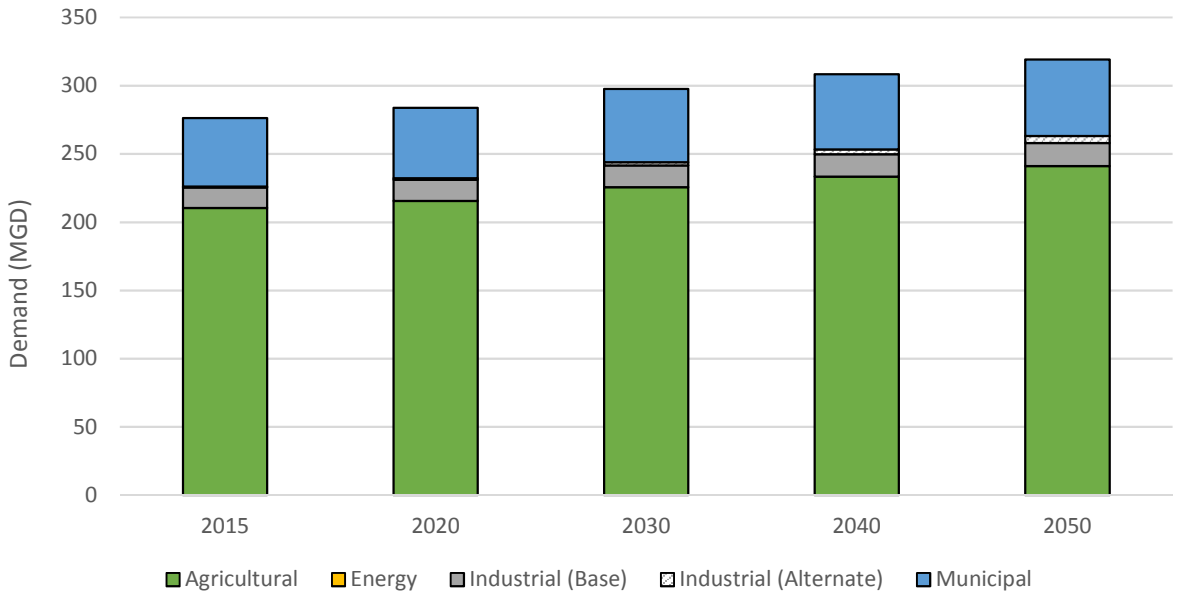


Figure 7-2
Regional Water Demand by Sector

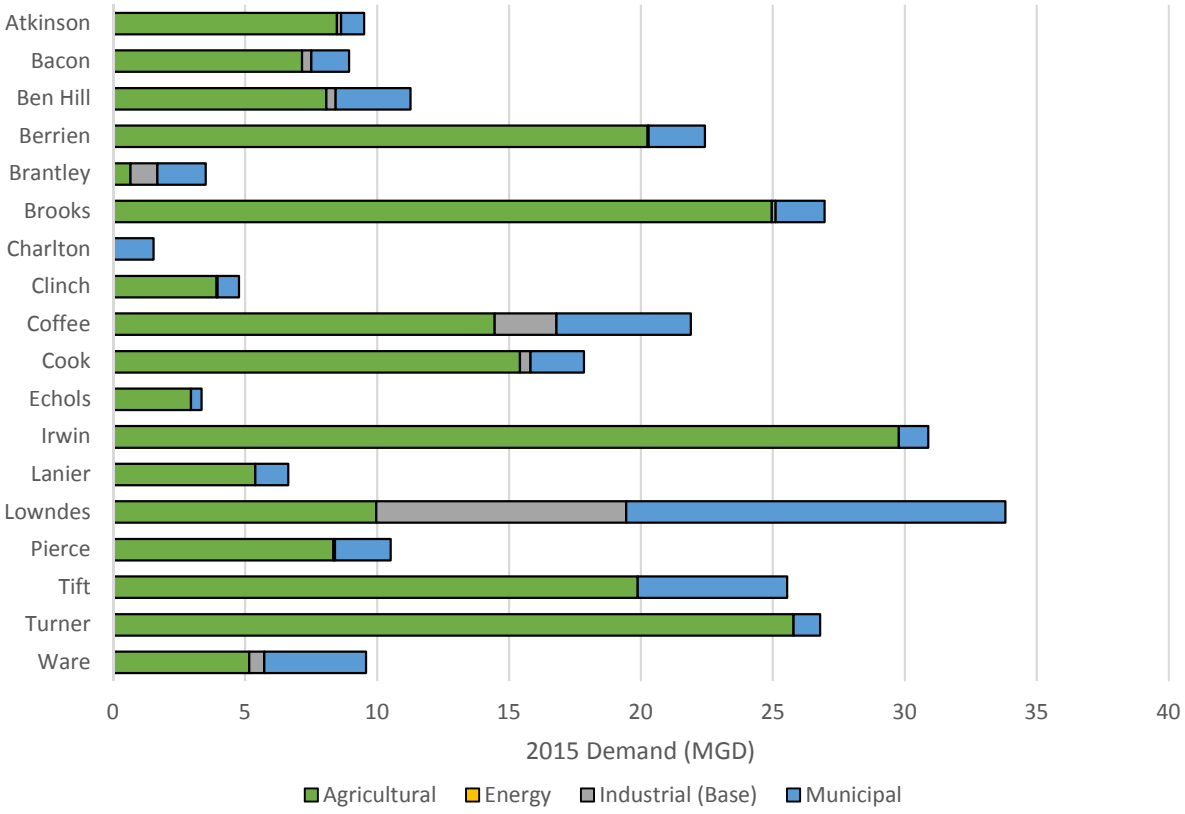


Figure 7-3
County Water Demand by Sector for 2015

Table 7-1 Summary of Water Demand per County (MGD)

County	Sector	Aquifer/Node	2015	2020	2030	2040	2050
Atkinson	GW Agricultural	Floridan, Brunswick	7.38	7.53	7.77	7.88	8.00
	GW Industrial	Floridan	0.15	0.15	0.15	0.15	0.15
	GW Municipal Public Supply	Floridan	0.43	0.43	0.42	0.40	0.38
	GW Municipal Self Supply	Floridan	0.44	0.44	0.43	0.41	0.38
	Groundwater Total		8.41	8.55	8.77	8.85	8.91
	SW Agricultural	Waycross, Statenville	1.10	1.12	1.16	1.17	1.19
	Total		9.51	9.67	9.93	10.02	10.10
Bacon	GW Agricultural	Floridan, Brunswick	6.06	6.27	6.67	7.00	7.34
	GW Industrial	Floridan	0.35	0.35	0.36	0.37	0.38
	GW Municipal Public Supply	Floridan	0.66	0.69	0.73	0.77	0.80
	GW Municipal Self Supply	Floridan	0.77	0.80	0.84	0.87	0.89
	Groundwater Total		7.84	8.11	8.60	9.01	9.41
	SW Agricultural	Atkinson, Offerman, Waycross	1.10	1.14	1.21	1.27	1.33
	Total		8.93	9.24	9.81	10.28	10.74
Ben Hill	GW Agricultural	Floridan	6.09	6.17	6.35	6.44	6.54
	GW Industrial	Floridan	0.35	0.39	0.4	0.41	0.42
	GW Municipal Public Supply	Floridan	2.47	2.51	2.57	2.60	2.63
	GW Municipal Self Supply	Floridan	0.37	0.38	0.38	0.38	0.38
	Groundwater Total		9.28	9.45	9.70	9.84	9.98
	SW Agricultural	Statenville, Lumber City, Alapaha, Waycross	1.99	2.00	2.03	2.03	2.03
	Total		11.27	11.44	11.72	11.87	12.01
Berrien	GW Agricultural	Floridan, Brunswick	15.05	15.77	17.23	18.53	19.84
	GW Industrial	Floridan	0.04	0.04	0.04	0.04	0.04
	GW Municipal Public Supply	Floridan	1.10	1.08	1.02	0.93	0.83
	GW Municipal Self Supply	Floridan	1.04	1.02	0.97	0.88	0.77
	Groundwater Total		17.23	17.92	19.26	20.38	21.48
	SW Agricultural	Bemiss, Statenville, Alapaha	5.19	5.29	5.50	5.64	5.77
	Total		22.43	23.21	24.76	26.02	27.25
Brantley	GW Agricultural	Floridan, Brunswick	0.50	0.51	0.53	0.54	0.56
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	0.25	0.25	0.25	0.25	0.24
	GW Municipal Self Supply	Floridan	1.59	1.62	1.64	1.60	1.54
	Groundwater Total		1.84	1.87	1.90	1.85	1.78
	SW Agricultural	Atkinson, DS-Atkinson	0.15	0.16	0.16	0.16	0.17
	SW Industrial	Atkinson	1.02	1.02	1.03	1.05	1.08
	Surface Water Total		1.17	1.18	1.19	1.21	1.25
	Total		3.51	3.56	3.61	3.61	3.58

Table 7-1 Summary of Water Demand per County (MGD)

County	Sector	Aquifer/Node	2015	2020	2030	2040	2050
Brooks	GW Agricultural	Floridan, Brunswick	24.18	24.75	25.84	26.67	27.51
	GW Industrial	Floridan	0.14	0.14	0.15	0.15	0.16
	GW Municipal Public Supply	Floridan	0.97	0.95	0.89	0.81	0.73
	GW Municipal Self Supply	Floridan	0.88	0.86	0.80	0.72	0.65
	Groundwater Total		26.18	26.70	27.68	28.36	29.05
	SW Agricultural	Pinetta, Quitman, DS-None	0.78	0.79	0.81	0.81	0.82
	Total		26.96	27.50	28.48	29.17	29.88
Charlton	GW Industrial	Floridan	0.03	0.03	0.03	0.03	0.03
	GW Municipal Public Supply	Floridan	0.71	0.73	0.75	0.75	0.75
	GW Municipal Self Supply	Floridan	0.79	0.80	0.82	0.82	0.82
	Total		1.53	1.56	1.60	1.61	1.60
Clinch	GW Agricultural	Floridan, Cretaceous, Brunswick	3.75	3.88	4.13	4.39	4.65
	GW Industrial	Floridan	0.04	0.04	0.04	0.04	0.05
	GW Municipal Public Supply	Floridan	0.45	0.46	0.45	0.44	0.42
	GW Municipal Self Supply	Floridan	0.36	0.36	0.36	0.34	0.32
	Groundwater Total		4.60	4.73	4.98	5.20	5.44
	SW Agricultural	Fargo, DS-Fargo	0.17	0.17	0.18	0.19	0.20
	Total		4.77	4.91	5.16	5.39	5.63
Coffee	GW Agricultural	Floridan, Brunswick	8.98	9.09	9.32	9.40	9.49
	GW Industrial	Floridan	2.34	2.49	2.56	2.62	2.69
	GW Municipal Public Supply	Floridan	2.53	2.60	2.74	2.84	2.95
	GW Municipal Self Supply	Floridan	2.57	2.63	2.75	2.83	2.92
	Groundwater Total		16.41	16.82	17.36	17.70	18.06
	SW Agricultural	Waycross, Lumber City, Statenville	5.48	5.56	5.71	5.78	5.85
	Total		21.89	22.38	23.07	23.48	23.91
Cook	GW Agricultural	Floridan, Brunswick	12.78	13.00	13.53	13.93	14.33
	GW Industrial	Floridan	0.4	0.43	0.47	0.51	0.55
	GW Municipal Public Supply	Floridan	1.29	1.31	1.35	1.36	1.36
	GW Municipal Self Supply	Floridan	0.74	0.76	0.77	0.77	0.77
	Groundwater Total		15.21	15.50	16.12	16.57	17.01
	SW Agricultural	Bemiss, Pinetta	2.63	2.65	2.70	2.72	2.74
	Total		17.84	18.14	18.82	19.29	19.74

Table 7-1 Summary of Water Demand per County (MGD)

County	Sector	Aquifer/Node	2015	2020	2030	2040	2050
Echols	GW Agricultural	Floridan, Brunswick	2.56	2.61	2.68	2.74	2.79
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	0.08	0.08	0.08	0.08	0.08
	GW Municipal Self Supply	Floridan	0.32	0.32	0.32	0.30	0.28
	Groundwater Total		2.97	3.02	3.08	3.12	3.16
	SW Agricultural	Jennings, Statenville	0.39	0.39	0.40	0.41	0.41
	Total		3.35	3.41	3.48	3.53	3.57
Irwin	GW Agricultural	Floridan	19.00	19.37	20.11	20.58	21.05
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	0.52	0.51	0.49	0.46	0.43
	GW Municipal Self Supply	Floridan	0.59	0.58	0.55	0.52	0.48
	Groundwater Total		20.11	20.46	21.16	21.56	21.96
	SW Agricultural	Statenville, Alapaha, Waycross	10.78	10.91	11.17	11.26	11.35
	Total		30.89	31.37	32.33	32.82	33.31
Lanier	GW Agricultural	Floridan, Brunswick	4.87	5.15	5.71	6.23	6.74
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	0.60	0.63	0.70	0.77	0.83
	GW Municipal Self Supply	Floridan	0.65	0.69	0.76	0.82	0.89
	Groundwater Total		6.12	6.47	7.16	7.82	8.46
	SW Agricultural	Statenville, Jennings, Bemiss, DS-Fargo	0.51	0.53	0.58	0.61	0.65
	Total		6.63	7.01	7.74	8.43	9.11
Lowndes	GW Agricultural	Floridan, Brunswick	8.68	9.24	10.37	11.46	12.56
	GW Industrial	Floridan	9.47	9.84	10.07	10.3	10.58
	GW Municipal Public Supply	Floridan	12.35	13.05	14.32	15.47	16.60
	GW Municipal Self Supply	Floridan	2.02	2.13	2.33	2.50	2.67
	Groundwater Total		32.53	34.27	37.09	39.73	42.41
	SW Agricultural	Jennings, Pinetta, Bemiss	1.28	1.30	1.34	1.38	1.42
	Total		33.81	35.57	38.44	41.11	43.82
Pierce	GW Agricultural	Floridan	7.23	7.38	7.66	7.85	8.05
	GW Industrial	Floridan	0.07	0.07	0.08	0.08	0.09
	GW Municipal Public Supply	Floridan	0.71	0.74	0.82	0.88	0.96
	GW Municipal Self Supply	Floridan	1.40	1.46	1.59	1.72	1.85
	Groundwater Total		9.40	9.65	10.14	10.53	10.95
	SW Agricultural	Atkinson, Offerman, Waycross	1.11	1.13	1.16	1.17	1.19
	Total		10.51	10.78	11.30	11.71	12.14

Table 7-1 Summary of Water Demand per County (MGD)

County	Sector	Aquifer/Node	2015	2020	2030	2040	2050
Tift	GW Agricultural	Floridan, Brunswick	12.90	13.14	13.67	14.07	14.46
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	4.50	4.64	4.87	5.04	5.16
	GW Municipal Self Supply	Floridan	1.17	1.20	1.25	1.28	1.29
	Groundwater Total		18.56	18.98	19.79	20.38	20.91
	SW Agricultural	Pinetta, Bemiss, Alapaha	6.97	7.06	7.26	7.38	7.50
	Total		25.54	26.05	27.05	27.76	28.41
Turner	GW Agricultural	Floridan, Claiborne, Cretaceous	16.74	17.08	17.86	18.47	19.08
	GW Industrial	Floridan	0	0	0	0	0
	GW Municipal Public Supply	Floridan	0.74	0.69	0.59	0.50	0.41
	GW Municipal Self Supply	Floridan	0.27	0.25	0.21	0.18	0.14
	Groundwater Total		17.74	18.01	18.67	19.14	19.63
	SW Agricultural	Alapaha, Pinetta, Albany	9.05	9.12	9.32	9.42	9.52
	Total		26.79	27.13	27.99	28.56	29.15
Ware	GW Agricultural	Floridan, Brunswick	3.83	3.97	4.17	4.37	4.56
	GW Industrial	Floridan	0.58	0.61	0.66	0.7	0.76
	GW Municipal Public Supply	Floridan	3.32	3.32	3.27	3.15	3.00
	GW Municipal Self Supply	Floridan	0.54	0.54	0.53	0.51	0.48
	Groundwater Total		8.26	8.43	8.63	8.73	8.80
	SW Agricultural	Waycross, Fargo, Atkinson	1.32	1.35	1.37	1.39	1.41
	Total		9.58	9.78	10.01	10.12	10.21
Unspecified	GW Industrial Alternate	Floridan	0.6	1.1	2.3	3.6	5.0
Planning Region Total Groundwater Demand			**225.3**	**232.1**	**244.5**	**254.5**	**264.6**
Planning Region Total Surface Water Demand			**51.0**	**51.7**	**53.1**	**53.8**	**54.6**
Planning Region Total Demand			**276.3**	**283.8**	**297.6**	**308.4**	**319.2**

7.2 Wastewater Summary

The full regional wastewater forecasts including municipal and industrial discharges are summarized in the figures and tables of this section. **Figure 7-4** shows the wastewater discharges per basin while **Figure 7-5** shows the forecasted discharge per method. **Table 7-2** provides a summary of the discharge type per watershed model node. The summaries utilize the baseline forecast for industrial discharges.

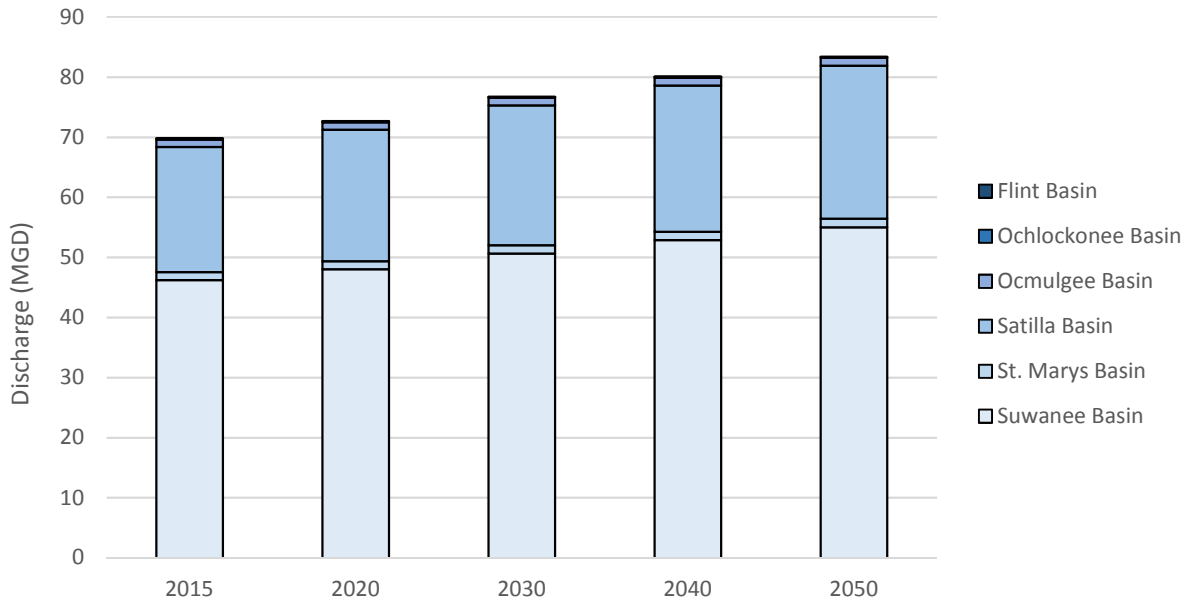


Figure 7-4
Regional Wastewater Discharge per Basin

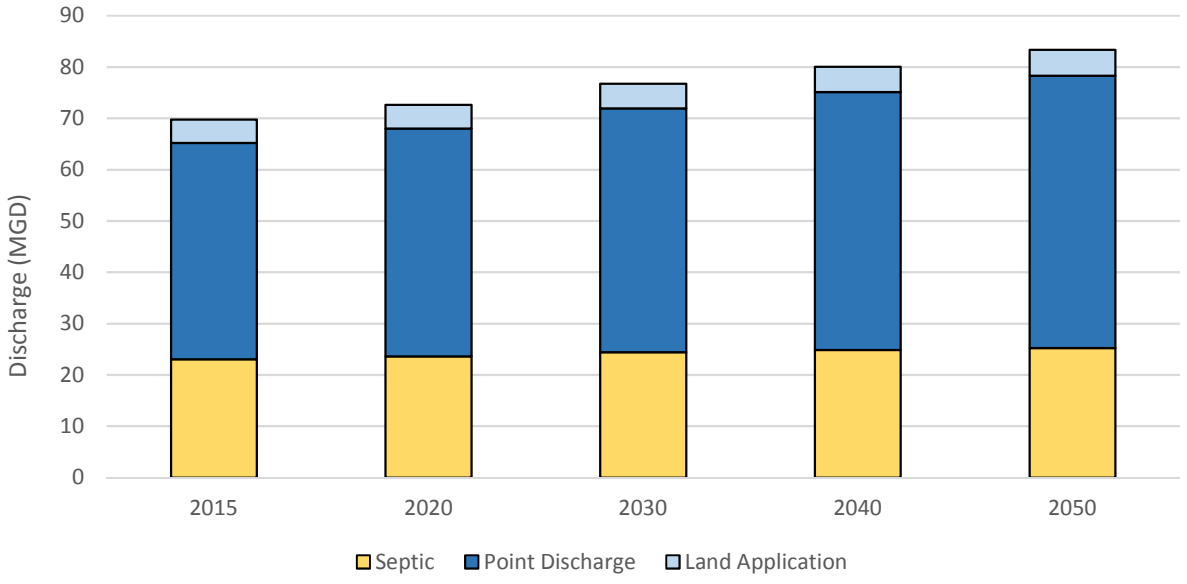


Figure 7-5
Regional Wastewater Discharge per Method

Table 7-2 Summary of Regional Wastewater Flows at Applicable Nodes (MGD)

Node	Discharge Type	2015	2020	2030	2040	2050
Alapaha	Land Application	0.05	0.05	0.04	0.03	0.03
	Point Discharge	0.89	0.83	0.74	0.64	0.55
	Septic	1.10	1.10	1.07	1.03	0.98
	Total	2.04	1.98	1.85	1.70	1.56
Albany	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.04	0.03	0.03	0.02	0.02
	Total	0.04	0.03	0.03	0.02	0.02
Atkinson	Land Application	0.63	0.53	0.54	0.54	0.54
	Point Discharge	6.33	7.03	7.74	8.37	9.02
	Septic	2.47	2.56	2.71	2.82	2.93
	Total	9.43	10.12	10.99	11.73	12.49
Bemiss	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	7.48	8.08	8.85	9.54	10.20
	Septic	2.09	2.13	2.17	2.18	2.16
	Total	9.57	10.21	11.02	11.71	12.36
DS-Atkinson	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.85	0.87	0.88	0.86	0.83
	Total	0.85	0.87	0.88	0.86	0.83
DS-Concord2	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.15	0.15	0.14	0.13	0.11
	Total	0.15	0.15	0.14	0.13	0.11
DS-Fargo	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.47	0.47	0.47	0.45	0.43
	Total	0.47	0.47	0.47	0.46	0.44
DS-Pinetta	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.01	0.01	0.01	0.01	0.01
	Total	0.01	0.01	0.01	0.01	0.01
Fargo	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.38	0.39	0.40	0.39	0.39
	Septic	1.24	1.25	1.24	1.21	1.17
	Total	1.62	1.64	1.64	1.60	1.55

Table 7-2 Summary of Regional Wastewater Flows at Applicable Nodes (MGD)

Node	Discharge Type	2015	2020	2030	2040	2050
Gross	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.59	0.61	0.64	0.66	0.67
	Septic	0.40	0.41	0.41	0.42	0.41
	Total	0.98	1.01	1.05	1.07	1.09
Jennings	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	3.11	3.31	3.61	3.90	4.20
	Septic	1.98	2.08	2.27	2.44	2.61
	Total	5.08	5.38	5.88	6.34	6.81
Lumber City	Land Application	0.16	0.16	0.17	0.17	0.18
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	1.04	1.06	1.09	1.11	1.12
	Total	1.20	1.22	1.26	1.28	1.30
Maccleny	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.32	0.32	0.32	0.32	0.31
	Total	0.32	0.32	0.32	0.32	0.31
Offerman	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.36	0.38	0.40	0.43	0.45
	Total	0.36	0.38	0.40	0.43	0.45
Pinetta	Land Application	2.62	2.72	2.88	2.99	3.10
	Point Discharge	14.09	14.62	15.48	16.31	17.19
	Septic	4.67	4.82	5.08	5.27	5.45
	Total	21.39	22.16	23.43	24.56	25.74
Quitman	Land Application	0.00	0.00	0.00	0.00	0.00
	Point Discharge	0.00	0.00	0.00	0.00	0.00
	Septic	0.31	0.30	0.28	0.25	0.23
	Total	0.31	0.30	0.28	0.25	0.23
Statenville	Land Application	0.68	0.69	0.67	0.65	0.62
	Point Discharge	3.22	3.34	3.50	3.64	3.77
	Septic	1.82	1.86	1.91	1.93	1.94
	Total	5.73	5.88	6.08	6.22	6.33
Waycross	Land Application	0.45	0.47	0.50	0.53	0.56
	Point Discharge	6.01	6.23	6.54	6.81	7.11
	Septic	3.77	3.84	3.95	4.00	4.05
	Total	10.22	10.53	10.99	11.34	11.72
Grand Total		**69.8**	**72.7**	**76.7**	**80.0**	**83.3**

Section 8
References

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