



# Gap Analysis Technical Memorandum

Coastal Georgia Regional Water Planning Council

Cumberland Island

**Supplemental  
Material**  
**Coastal Georgia  
Regional  
Water Plan**  
February 2020

**CDM  
Smith**

*Cumberland Island  
photo courtesy of the Georgia Department  
of Industry, Trade & Tourism*

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# Section 1

## Introduction

In February 2008, the Georgia General Assembly adopted the Georgia Comprehensive State-wide Water Plan (Plan) dated January 8, 2008. The Plan established the Regional Planning process that was officially kicked off in March 2009. The Coastal Georgia Regional Water Planning Council (Coastal Georgia Council) is one of the 11 planning regions established throughout the state. The Coastal Georgia Council is charged with several tasks including: 1) reviewing and considering water and wastewater forecasts for the region through the year 2050 and resource assessment prepared by EPD; and 2) identification of management practices to help meet forecasted demands and address regional needs. The Coastal Georgia Council boundaries are shown in **Figure 1-1**.



Figure 1-1: Coastal Georgia Council Boundary

The purpose of this technical memorandum is to compare the water and wastewater demand forecasts to the available resources. Areas where future demands exceed the estimated capacity of the resource have a gap that may be addressed through water management practices as part of the larger regional water planning effort. This technical memorandum summarizes:

- Water and wastewater forecasts for regional surface and groundwater resources;
- Identification of known existing permit capacity in relationship to forecasts;
- Estimated sustainable yield of the prioritized aquifers used in the Coastal Georgia Region in relationship to forecasts;
- Estimated surface water availability in relationship to the forecasts while maintaining the instream flow regime; and
- Water quality considerations.

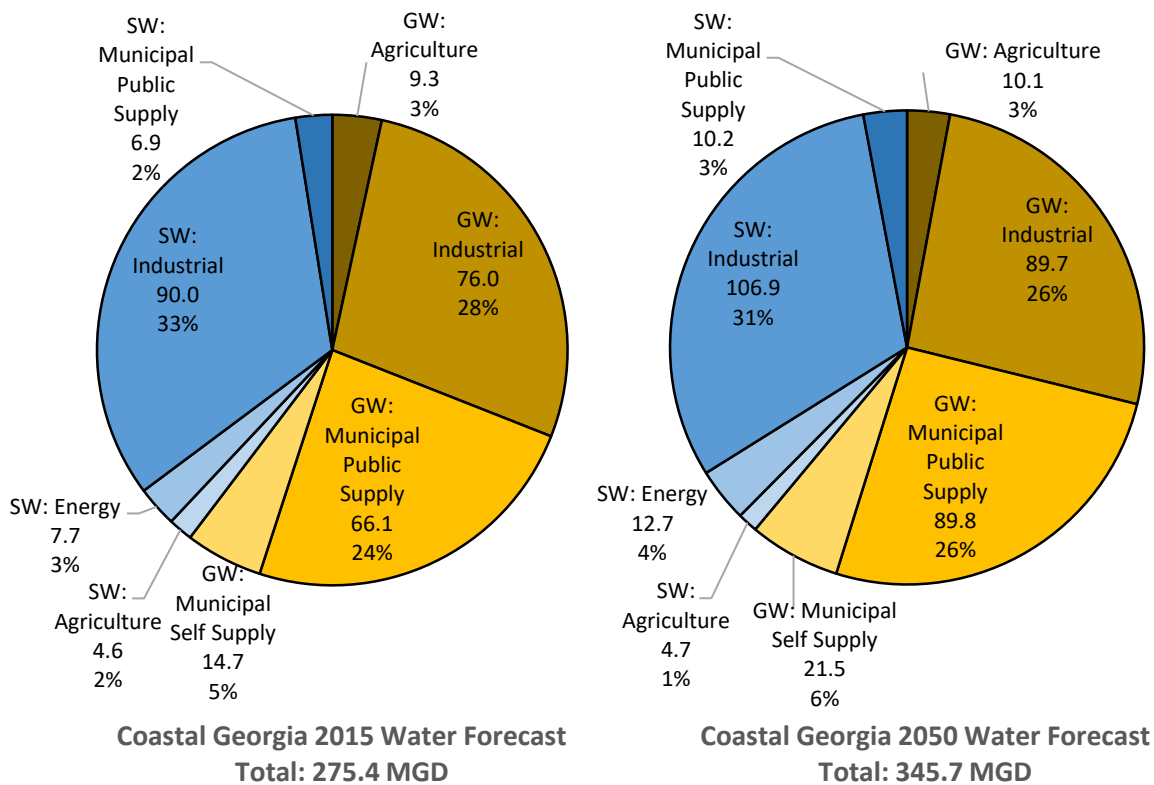
## Section 2

# Water and Wastewater Forecast Overview

Water and wastewater forecasts have been developed beginning in 2015 and extending to 2050 for the 9 counties within the region. The major water and wastewater sectors include: municipal (domestic and commercial), industrial, agricultural, and energy (thermoelectric power production). A brief summary is provided in this document, but for more detail concerning the forecast methodology and development see the Water and Wastewater Forecasting Technical Memorandum for the Coastal Georgia Council. Additionally, in the attached Appendix, municipal water and wastewater forecasts at the county level are compared to existing permitted capacities.

## 2.1 Water Demand Summary

**Figure 2-1** shows the aggregated county water forecasts for the Coastal Georgia Council region (the Coastal Georgia Region) in 2015 and 2050. Overall, the regional forecasted water need is expected to increase by 70.4 mgd. The forecasts are associated with a water source, either surface water (SW) shown in blue or groundwater (GW) shown in yellow/brown as well as the sector associated with the demand. The consumptive demand rather than total withdrawals from the energy sector are included. The agricultural demands represent dry year conditions (75<sup>th</sup> percentile demands).



**Figure 2-1: Coastal Georgia Regional Water Forecast by Sector and Supply Source**

### 2.1.1 Groundwater Forecasts and Comparison to Groundwater Permits

Out of the 70.4 mgd increase in total water need by 2050, 45.0 mgd is projected to come from groundwater sources. **Table 2-1** shows the breakdown of this groundwater forecast by prioritized aquifer. Note that almost all groundwater is forecast to come from the Floridan aquifer.

**Table 2-1: Regional Groundwater Forecast by Aquifer (MGD)**

Aquifer	2015	2050	Difference
Brunswick	4.7	6.7	2.0
Cretaceous	0.1	0.2	0.1
Floridan	161.3	204.3	43.0
<b>Total</b>	<b>166.1</b>	<b>211.1</b>	<b>45.0</b>

**Table 2-2** shows the portion of the groundwater forecast for publicly-supplied municipal use. The existing permitted capacity by county is shown as well as any gap between the permitted capacity and the 2050 forecast. All counties within the Coastal Georgia Region are subject to the Coastal Georgia Water and Wastewater Permitting Plan for Managing Salt Water Intrusion as described further in Section 3.

**Table 2-2: Municipal Groundwater Forecast versus Groundwater Permitted Capacity**

County	2015 Public Groundwater Demand Forecast (AAD – MGD)	2050 Public Groundwater Demand Forecast (AAD – MGD)	Existing Permitted Capacity (AAD – MGD)	Additional Permitted Capacity Needed in 2050 (AAD – MGD) <sup>2</sup>
Bryan <sup>1</sup>	3.1	7.1	6.3 (2025)	0.8
Bulloch	8.0	11.7	6.6	5.1
Camden	4.8	5.7	12.9	-
Chatham <sup>1,4</sup>	29.3	38.7	28.3 (2025)	10.4
Effingham <sup>1,4</sup>	2.2	4.0	4.0 (2025)	-
Glynn	9.8	12.7	22.6	-
Liberty <sup>1</sup>	7.5	7.8	12.0 (2025)	-
Long	0.7	1.5	0.6	0.9
McIntosh	0.9	0.6	1.4	-

- 1) Counties in the Red Zone or Yellow Zone have planned permitted withdrawal reductions through 2025 for Floridan Aquifer permits, gaps are based on these more restrictive values.
- 2) Analysis does not account for demands in one county that may be met by permits from another county.
- 3) Values provided are average annual demands in millions of gallons per day (AAD-MGD).
- 4) Chatham and Effingham counties also have forecasted surface water demand and supply

### 2.1.2 Surface Water Forecasts

For the Coastal Georgia Region, surface water is utilized to meet agricultural demands, energy sector water demands, industrial water demand and some municipal supply in Chatham and Effingham counties. Total surface water demands are expected to increase by 25.4 mgd by 2050

as shown in **Table 2-3**. Counties with the largest projected growth in surface water usage include Chatham and Effingham counties.

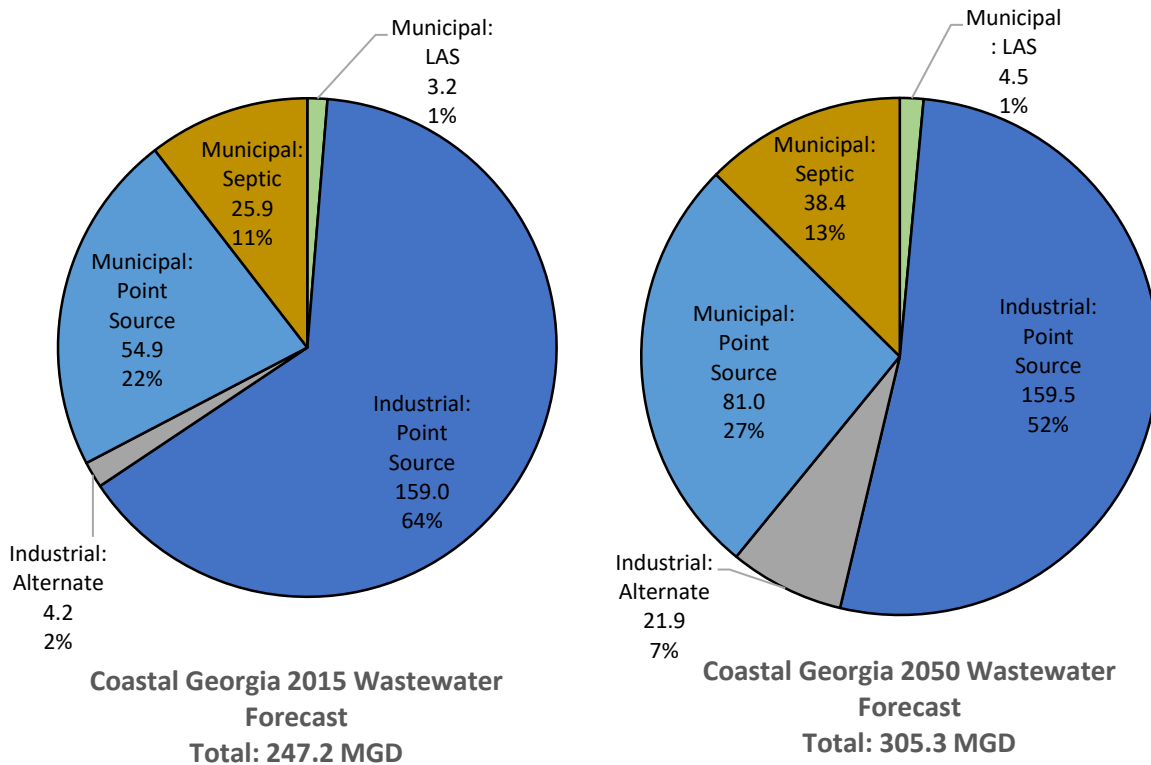
**Table 2-3: Regional Surface Water Forecast per Sector (MGD)**

Sector	2015	2050	Difference
Agricultural	4.6	4.7	0.1
Energy	7.7	12.7	5.0
Industrial Alternate Forecast*	90.0	106.9	16.9
Municipal	6.9	10.2	3.3
<b>Total</b>	<b>109.3</b>	<b>134.6</b>	<b>25.4</b>

\* The baseline industrial forecast shows an increase of only 0.5 mgd over the planning period.

## 2.2 Wastewater Forecast Summary

**Figure 2-2** shows the aggregated county wastewater forecasts for the Coastal Georgia Region in 2015 and 2050. Overall, the regional forecasted wastewater flows are expected to increase by approximately 40 MGD under baseline industrial forecasts and 58 MGD under the alternate industrial forecast.



**Figure 2-2: Coastal Georgia Regional Wastewater Forecast by Discharge Method and Sector**



### 2.2.1 Comparing Wastewater Forecasts to Permitted Capacity

About 24% of the total regional wastewater flow is directed to municipal centralized treatment with ultimate discharge either directly to streams (point source) or through land application systems (LAS). This includes municipal wastewater as well as industrial wastewater that is treated and discharged through municipal centralized treatment facilities. **Table 2-4** shows the wastewater forecasts and permitted capacity for these municipal facilities summarized by county. The difference between the existing permitted capacity and the 2050 forecast is also listed for each county in terms of either surplus or gap. Bryan is the only county projected to have potential infrastructure needs by 2050. The attached Appendix has a detailed listing of existing permitted wastewater facilities per county.

**Table 2-4: 2050 Municipal Wastewater Forecast versus Existing Permitted Capacity (MGD)**

County	Point Source (PS)			Land Application Systems (LAS)		
	2050 Forecast <sup>1</sup>	Permitted Capacity	2050 Surplus or Gap (-)	2050 Forecast <sup>1</sup>	Permitted Capacity	2050 Surplus or Gap (-)
Bryan	5.3	4.4	-1.0	0.37	0.44	0.07
Bulloch	7.5	10.0	2.5	0.2	7.6	7.4
Camden	4.9	9.3	4.4	1.0	1.7	0.7
Chatham	44.0	48.0	4.0	1.6	4.3	2.7
Effingham	2.0	3.3	1.3	0.9	2.8	1.9
Glynn	14.8	20.0	5.3	0.0	0.0	0.0
Liberty	2.2	7.7	5.5	0.4	0.7	0.3
Long	0.1	0.2	0.2	0.0	0.0	0.0
McIntosh	0.2	0.6	0.5	0.0	0.0	0.0
<b>Total</b>	<b>81.0</b>	<b>103.5</b>	<b>22.5</b>	<b>4.5</b>	<b>17.6</b>	<b>13.0</b>

<sup>1</sup> Includes industrial wastewater expected to be treated at municipal facilities.

## Section 3

# Groundwater Availability

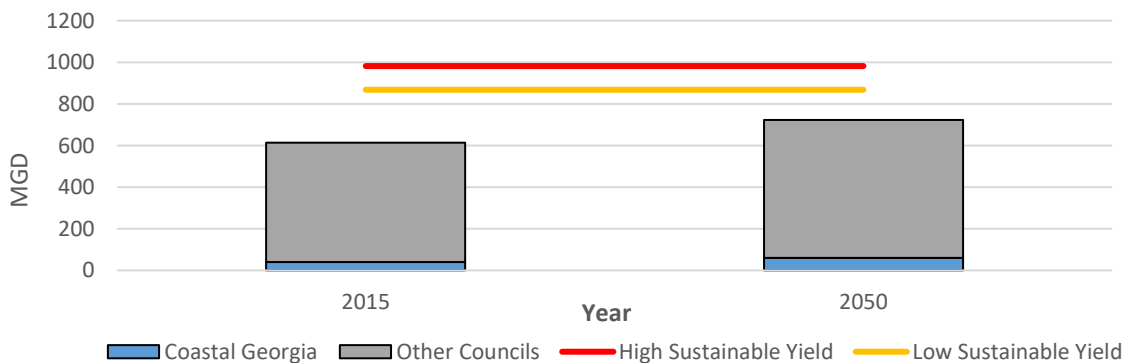
A Groundwater Availability Resource Assessment was performed by CDM Smith in March 2010 with updated information on the Cretaceous aquifer provided in September 2012. This resource assessment evaluated the estimated sustainable yield of a group of prioritized aquifers. Sustainable yield is the estimated amount of water that can be withdrawn from the modeled area of an aquifer without reaching specific thresholds of local or regional impacts. A separate analysis was performed in 2016 to investigate the capacity of the Floridan aquifer to replace agricultural surface water withdrawals in the Canoochee River Basin.

### 3.1 Floridan Aquifer

Groundwater from the Floridan aquifer is a vital resource for the Coastal Georgia Region. Overall, water from the Floridan aquifer is used to meet 59% of the 2015 water demand for the whole region. This section provides a description of the estimated range of sustainable yield for the aquifer as well as a discussion of the potential for salt water intrusion.

#### 3.1.1 Sustainable Yield

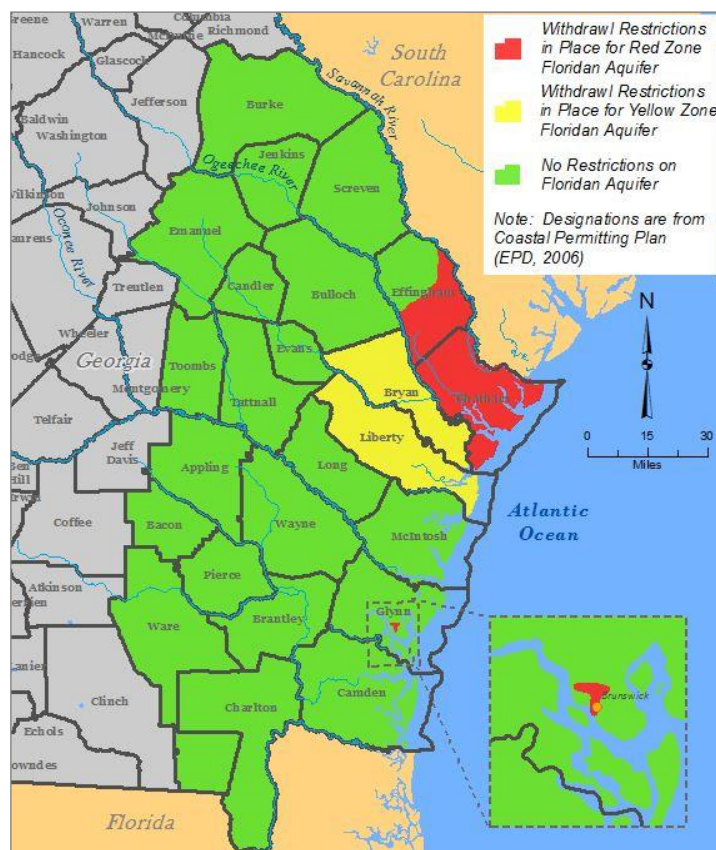
Within the groundwater resource assessment, an estimated range of sustainable yield of 868 to 982 mgd was determined for the Floridan aquifer in south-central Georgia and the eastern Coastal Plain of Georgia. This modeled area encompasses more than just the Coastal Georgia region. Other regions utilizing portions of the modeled Floridan aquifer include: Altamaha, Middle Ocmulgee, Suwannee-Satilla, Savannah-Upper Ogeechee, Upper Oconee, Lower Flint-Ochlockonee, and Upper Flint. **Figure 3-1** shows the forecasted demand for all regions utilizing the modeled portion of the Floridan aquifer. The portion of the demand coming from the Coastal Georgia region is highlighted. This includes the demand from only the modeled portion of the aquifer which encompasses Bryan, Bulloch, Liberty, and Long counties in the Coastal Georgia Region. Demands are projected to remain under the estimated range of sustainable yield for this aquifer.



**Figure 3-1: Floridan Aquifer (South Central Georgia & Eastern Coastal Plain) Forecasted Groundwater Demand**

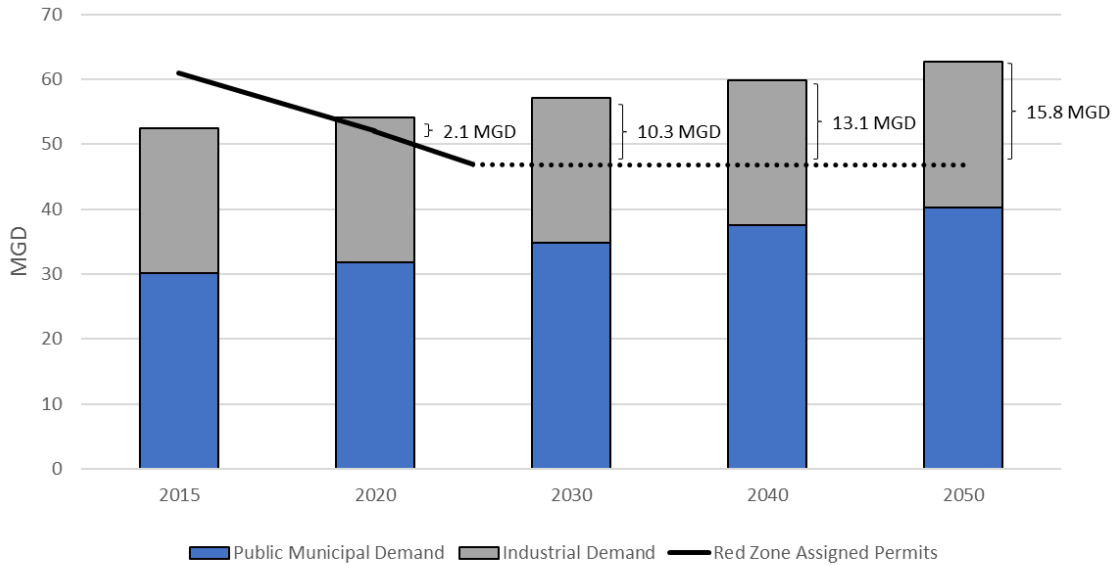
### 3.1.2 Salt Water Intrusion

For the Coastal Georgia Region, the most significant groundwater issue is salt water intrusion and all counties are subject to the Coastal Georgia Water and Wastewater Permitting Plan for Managing Salt Water Intrusion (Coastal Permitting Plan) as shown in **Figure 3-2**. The Coastal Permitting Plan specifies that no additional withdrawals beyond current allowable levels be permitted from the Floridan Aquifer in the Red Zone including all of Chatham County, the southern portion of Effingham County, and a small portion of Glynn County near Brunswick due to concerns regarding salt water intrusion. Both Bryan and Liberty Counties are in the Yellow Zone where there are also limitations on how much additional Floridan Aquifer withdrawals may be allowed in these counties. The remaining counties that are subject to the Coastal Permitting Plan do not have pumping restrictions but do have water conservation requirements related to groundwater withdrawals.



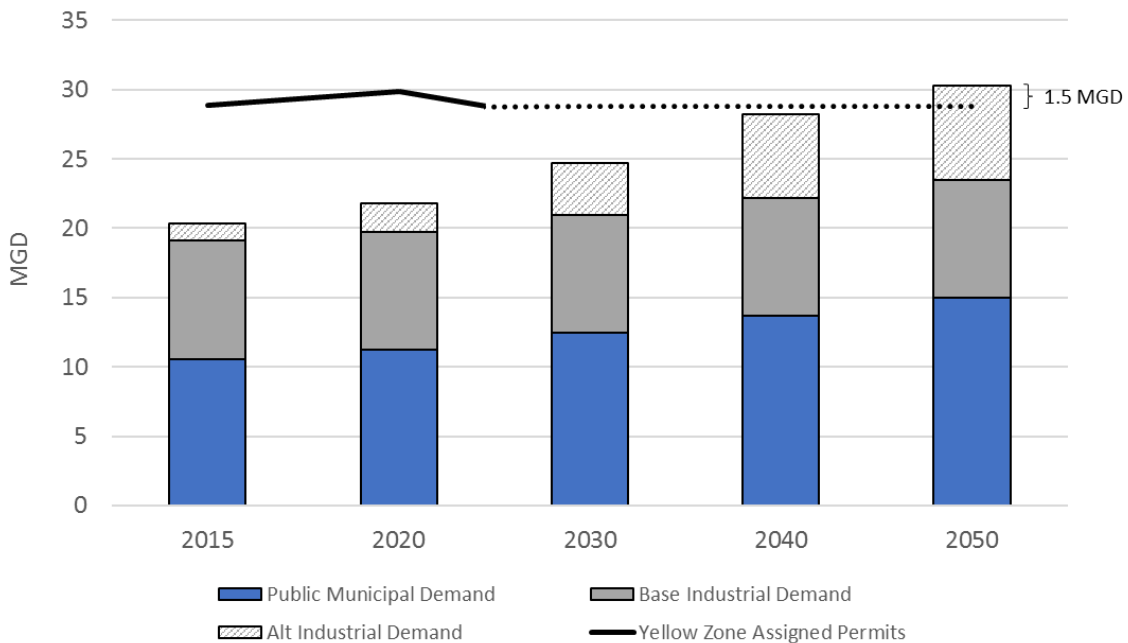
**Figure 3-2: Sub-Regions Associated with the Coastal Permitting Plan**

Future water supply needs in the Red and Yellow Zones will need to come from sources other than new permits or increases to existing groundwater permits from the Floridan Aquifer. As shown in **Figure 3-3**, projected Floridan aquifer demands within the Chatham/Effingham Red Zone are expected to exceed permitted withdrawal limits starting in 2020 by 1.9 MGD and increasing to 15.6 MGD by 2050. Current permitted withdrawal limits within the Chatham/Effingham Red Zone are planned to decrease in 2020 and again in 2025 as shown by the solid black line in the figure.



**Figure 3-3: Red Zone Floridan Aquifer Permits versus Projected Demand**

Bryan and Liberty Counties are in the Yellow Zone where there is uncertainty regarding how much additional withdrawal of groundwater from the Floridan Aquifer may occur in the future. **Figure 3-4** shows the assigned permits and future projected demand within the Yellow Zone. Demand is not projected to exceed the permitted withdrawal limits until 2050. Within the Yellow Zone, the permitted withdrawal limits are expected to increase slightly in 2020 before dropping back down in 2025 as represented by the solid black line in the figure.



**Figure 3-4: Yellow Zone Floridan Aquifer Permits versus Projected Demand**

## 3.2 Cretaceous Aquifer

Utilization of the Cretaceous aquifer is negligible for the Coastal Georgia Region. There is a small amount (0.1 mgd) utilized for municipal self-supply in Bulloch County. Within the groundwater resource assessment, an estimated range of sustainable yield of 347 to 445 mgd was determined for the modeled portion of the Cretaceous aquifer. Regions utilizing portions of the modeled Cretaceous aquifer include: Altamaha, Middle Ocmulgee, Savannah-Upper Ogeechee, Suwannee-Satilla, Upper Oconee, and Upper Flint. Demands are projected to remain under the estimated range of sustainable yield for this aquifer.

## 3.3 Brunswick Aquifer

The Brunswick aquifer was not one of the modeled aquifers as a part of the resource assessment. Utilization of the Brunswick aquifer makes up about 2% of the total water use in the Coastal Georgia Region. Demands from this aquifer are for the following uses:

- Agricultural use in Bulloch, Chatham, Long and McIntosh Counties (0.3 mgd);
- Industrial use in Glynn County (0.04 mgd);
- Municipal public supply use in Chatham, Glynn, and Long Counties (4.0 mgd); and
- Municipal self-supply use in Camden, Chatham, Glynn, and Long Counties (0.4 mgd).

## Section 4

# Surface Water Availability

The Surface Water Availability Resource Assessment estimates the availability of surface water to meet current and future water needs as well as the needs of instream and downstream users. The Surface Water Availability Resource Assessment methodology and modeling results are presented in full in the *Synopsis Report: Surface Water Availability Resource Assessment* (May 2017).

### 4.1 Surface Water Planning Node Summary

There are several surface water planning nodes located within and near the Coastal Georgia Region. The modeling analysis conducted at these nodes under the Surface Water Availability Resource Assessment indicated the following under current and future conditions (bolded nodes are located within the planning region boundaries):

- **Clyo (Savannah River) – No potential surface water gaps**
- **Savannah (Savannah River) - No potential surface water gaps**
- **Eden (Ogeechee River) – Potential surface water gaps under current and future conditions**
- **Kings Ferry (Ogeechee River) – Potential surface water gaps under current and future conditions**
- Claxton (Canochee River) - Potential surface water gaps under current and future conditions
- **Doctortown (Altamaha River) – No potential surface water gaps**
- **Gross (Saint Mary’s River) - No potential surface water gaps**

While the Claxton node is not located in the region, a portion of the local drainage area (LDA) or watershed of the node falls within the Coastal Georgia Region. The location of the planning nodes and the portion of the Coastal Georgia Region that is within the LDA of a node with a potential surface water gap is shown in **Figure 4-1**.

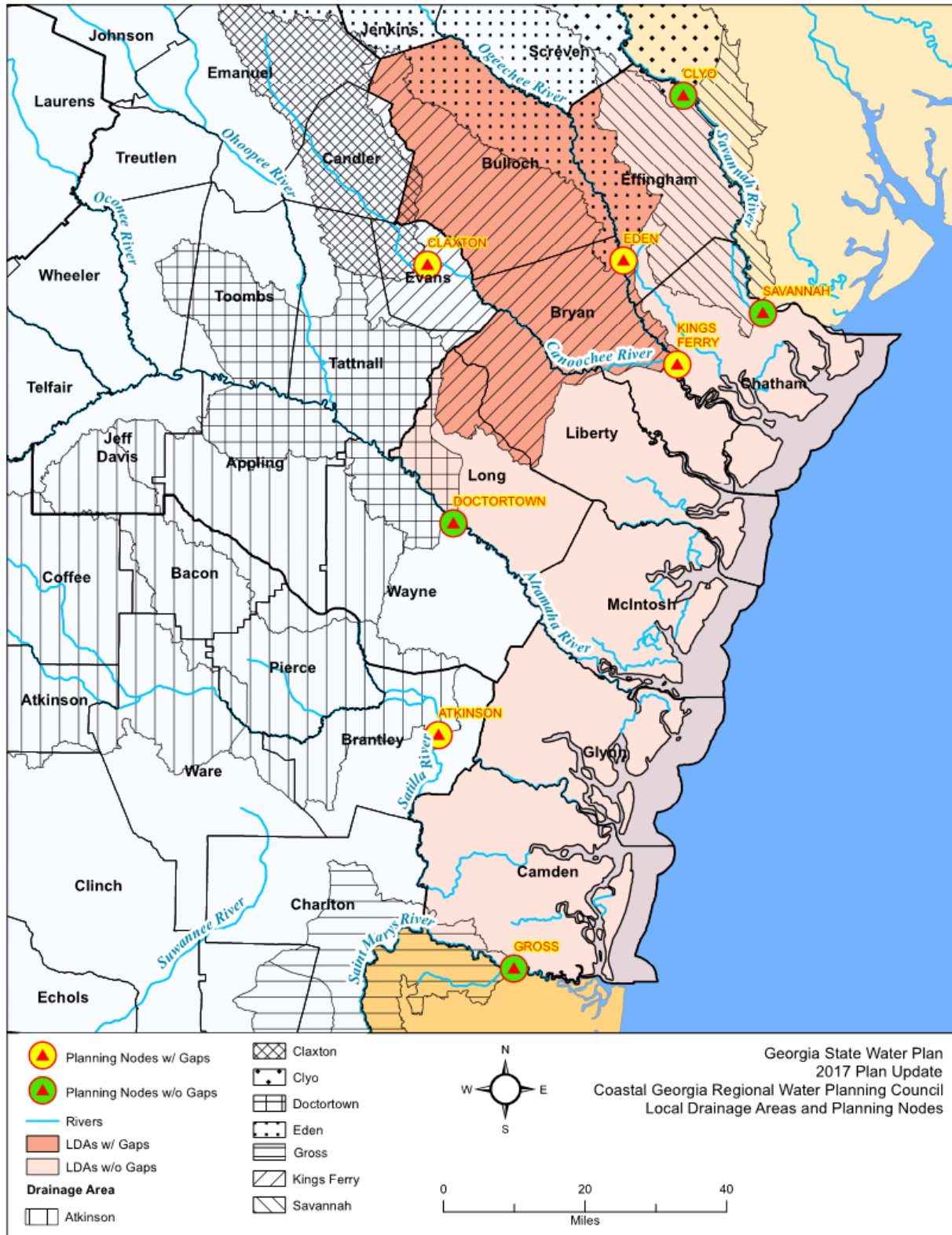


Figure 4-1: Potential Surface Water Gap Summary

## 4.2 Detailed Potential Gap Analysis

Modeled surface water gaps are driven by both net consumption (withdrawal minus returns) and year to year variation in river flows. In wet years, the region is less likely to experience any potential gaps to instream needs. In dry years, the potential gaps are likely to be more frequent, larger, and for longer duration. **Table 4-1** provides a quantification and frequency of modeled potential surface water gaps. The majority of the modeled potential gaps were shorter in duration (1-7 days and 8 -14 days potential gap events).

The following subsections then provide a more detailed look at the potential gaps at each planning node. Each subsection provides a comparison of the potential gaps under current demands and projected 2050 future demands. The potential gaps are then compared against the forecasted surface water demands for the Councils and counties within the local drainage area of each node.

**Table 4-1: Characteristics of Modeled 2050 Potential Surface Water Gaps**

Gap Event Duration	Number of Gap Events (% of Total Gap Events) <sup>1</sup>		Total Gap Days (% of Total Days) <sup>2</sup>		Average Daily Flow Deficit per Event	Average Cumulative Flow Deficit per Event
<b>Claxton Node</b>						
1-7 days	139	(51.7%)	482	(1.8%)	3 cfs (2 MGD)	13 cfsd (8 MG)
8-14 days	55	(20.4%)	598	(2.2%)	5 cfs (3 MGD)	56 cfsd (36 MG)
15-30 days	39	(14.5%)	851	(3.1%)	6 cfs (4 MGD)	123 cfsd (80 MG)
>30 days	36	(13.4%)	2181	(8.0%)	6 cfs (4 MGD)	335 cfsd (218 MG)
Totals	269	(100.0%)	4112	(15.0%)		
<b>Eden Node</b>						
1-7 days	44	(61.1%)	178	(0.6%)	11 cfs (7 MGD)	52 cfsd (34 MG)
8-14 days	12	(16.7%)	114	(0.4%)	15 cfs (10 MGD)	150 cfsd (98 MG)
15-30 days	10	(13.9%)	222	(0.8%)	29 cfs (19 MGD)	633 cfsd (411 MG)
>30 days	6	(8.3%)	388	(1.4%)	28 cfs (18 MGD)	1,795 cfsd (1,167 MG)
Totals	72	(100.0%)	902	(3.3%)		
<b>Kings Ferry Node</b>						
1-7 days	40	(58.0%)	137	(0.5%)	20 cfs (13 MGD)	82 cfsd (530MG)
8-14 days	9	(13.0%)	98	(0.4%)	41 cfs (27 MGD)	468 cfsd (302 MG)
15-30 days	13	(18.8%)	291	(1.1%)	57 cfs (37 MGD)	1,264 cfsd (817 MG)
>30 days	7	(10.1%)	413	(1.5%)	75 cfs (49 MGD)	4,363 cfsd (2,820 MG)
Totals	69	(100.0%)	939	(3.4%)		

<sup>1</sup> The total number of modeled gap events is presented for each duration range, as well as the percentage in that duration range to the total number of all modeled gap events.

<sup>2</sup> The total number of days within the modeling period (1939-2013) in which a potential gap occurred is presented, as well as the percentage of that total to the total number of days analyzed in the modeling period.



### 4.2.1 Potential Gaps at Claxton Node

The Claxton Node is located on the Canoochee River near Claxton, Georgia. Surface water withdrawals and discharges in the local drainage area for this node includes municipal returns and agricultural use. **Table 4-2** provides an overview of the potential gaps at the Claxton node under current conditions and future conditions. **Table 4-3** shows the Regional Water Planning Councils and counties within the local drainage area of the node, the forecasted surface water demand and the potential gaps for comparison.

A separate analysis was performed in 2016 to investigate the capacity of the Floridan aquifer to replace agricultural surface water withdrawals in the Canoochee River Basin. Analysis showed that groundwater withdrawals from the Floridan aquifer at existing surface water irrigation locations outside of the Gulf Trough area could be increased up to a total withdrawal of 10.5 mgd without impacting the estimated sustainable yield of the aquifer. This could contribute to reduction of current or future potential surface water gaps in the Canoochee River at the Claxton node.

**Table 4-2: Potential Surface Water Gaps at Claxton Node**

Scenario	Duration of Gap (% of total days)	Average Flow Deficit	Long-term Average Flow	Maximum 1-Day Gap	Corresponding Flow Regime
Current Demands	21	6 cfs / 4 MGD	448 cfs / 290 MGD	16 cfs / 10 MGD	16 cfs / 10 MGD
Future (2050) Demands	15	5 cfs / 3 MGD	452 cfs / 292 MGD	15 cfs / 10 MGD	15 cfs / 10 MGD

**Table 4-3: Claxton Planning Node Surface Water Forecast and Summary of Potential Gaps by Region**

Councils and Associated Counties That Are Within in the Local Drainage Area with Potential Gaps	Total 2050 Forecasted Surface Water Demand at Planning Node Summarized by Sector (MGD)	2050 Potential Gap Information: Average Daily Flow Deficit per Gap Event Summarized by Planning Node		2050 Forecasted Surface Water Withdrawals Summarized by Planning Council (MGD)
		1-7 Day Duration	8 - 14 Day Duration	
<b>Canoochee River</b>				
Altamaha – Candler, Emanuel, Evans, Tattnall	Agriculture: 4.98	2 MGD (3 cfs)	3 MGD (5 cfs)	4.98
Coastal Georgia - Bulloch	Agriculture: 0.27	51.7% of all potential gap events	20.4% of all potential gap events	0.27
Savannah Upper Ogeechee - Jenkins	Agriculture: 0.02			0.02
<b>Total:</b>				<b>5.26</b>

### 4.2.2 Potential Gaps at Eden Node

The Eden node is located on the Ogeechee river near Eden, Georgia. Surface water withdrawals and discharges in the local drainage area for this node includes municipal demands and returns, industrial returns, and agricultural use. **Table 4-4** provides an overview of the potential gaps at the Eden node under current conditions and future conditions. **Table 4-5** shows the Regional Water Planning Councils and counties within the local drainage area of the node, the forecasted surface water demand and the potential gaps for comparison.

**Table 4-4: Potential Surface Water Gaps at Eden Node**

Scenario	Duration of Gap (% of total days)	Average Flow Deficit	Long-term Average Flow	Maximum 1-Day Gap	Corresponding Flow Regime
Current Demands	6	16 cfs / 10 MGD	2,207 cfs / 1,426 MGD	35 cfs / 23 MGD	139 cfs / 90 MGD
Future (2050) Demands	3	24 cfs / 16 MGD	2,213 cfs / 1,430 MGD	47 cfs / 30 MGD	102 cfs / 66 MGD

**Table 4-5: Eden Planning Node Surface Water Forecast and Summary of Potential Gaps by Region**

Councils and Associated Counties That Are Within in the Local Drainage Area with Potential Gaps	Total 2050 Forecasted Surface Water Demand at Planning Node Summarized by Sector (MGD)	2050 Potential Gap Information: Average Daily Flow Deficit per Gap Event Summarized by Planning Node		2050 Forecasted Surface Water Withdrawals Summarized by Planning Council (MGD)		
		1-7 Day Duration	8-14 Day Duration			
<b>Ogeechee River</b>						
Altamaha - Emanuel	Agriculture: 0.05	7 MGD (11 cfs)	10 MGD (15 cfs)	0.05		
Coastal Georgia – Bryan, Bulloch, Effingham	Agriculture: 1.29			1.29		
Savannah-Upper Ogeechee – Burke, Glascock, Jefferson, Jenkins, Screven, Taliaferro, Warren	Agriculture: 7.7			61.1% of all potential gap events	16.7% of all potential gap events	7.87
	Municipal Water: 0.17					1.42
Upper Oconee – Greene, Hancock, Washington	Agriculture: 1.42			1.42		
<b>Total:</b>				<b>10.64</b>		

### 4.2.3 Potential Gaps at Kings Ferry Node

The Kings Ferry node is located on the Ogeechee River at U.S. 17 in Georgia. Surface water withdrawals and discharges in the local drainage area for this node includes municipal returns and agricultural use. **Table 4-6** provides an overview of the potential gaps at the Kings Ferry node under current conditions and future conditions. **Table 4-7** shows the Regional Water Planning Councils and counties within the local drainage area of the node, the forecasted surface water demand and the potential gaps for comparison.

**Table 4-6: Potential Surface Water Gaps at Kings Ferry Node**

Scenario	Duration of Gap (% of total days)	Average Flow Deficit	Long-term Average Flow	Maximum 1-Day Gap	Corresponding Flow Regime
Current Demands	6	35 cfs / 23 MGD	3,634 cfs / 2,349 MGD	81 cfs / 52 MGD	422 cfs / 273 MGD
Future (2050) Demands	3	37 cfs / 24 MGD	3,658 cfs / 2,364 MGD	80 cfs / 52 MGD	247 cfs / 160 MGD

**Table 4-7: Kings Ferry Planning Node Surface Water Forecast and Summary of Potential Gaps by Region**

Councils and Associated Counties That Are Within in the Local Drainage Area with Potential Gaps	Total 2050 Forecasted Surface Water Demand at Planning Node Summarized by Sector (MGD)	2050 Potential Gap Information: Average Daily Flow Deficit per Gap Event Summarized by Planning Node		2050 Forecasted Surface Water Withdrawals Summarized by Planning Council (MGD)
		1-7 Day Duration	8-14 Day Duration	
<b>Ogeechee River</b>				
Altamaha – Candler, Emanuel, Evans, Tattnall	Agriculture: 8.12	13 MGD (20 cfs)  58.0% of all potential gap events	27 MGD (41 cfs)  13.0% of all potential gap events	8.12
Coastal Georgia – Bryan, Bulloch, Chatham, Effingham, Liberty, Long	Agriculture: 4.42			4.42
Savannah-Upper Ogeechee – Burke, Glascock, Jefferson, Jenkins, Screven, Taliaferro, Warren	Agriculture: 7.83			8.00
	Municipal: 0.17			
Upper Oconee – Greene, Hancock, Washington	Agriculture: 1.42			1.42
<b>Total:</b>				<b>21.96</b>

## Section 5

# Surface Water Quality

The Surface Water Quality (Assimilative Capacity) Resource Assessment estimated the capacity of Georgia’s surface waters to assimilate pollutants without unacceptable degradation of water quality. This section describes the relevant finding of the assessment for the Coastal Georgia Region.

### 5.1 Dissolved Oxygen Assimilative Capacity

One measure of the capacity of a stream to maintain its health and the health of the aquatic species living therein is the amount of residual dissolved oxygen (DO) in the waters of the stream. The Assimilative Capacity Resource Assessment drew upon water quality modeling tools to estimate the ability of streams and estuaries to assimilate pollutants under current and future conditions. The current conditions modeling incorporated all municipal and industrial wastewater facilities operating at their full permitted discharge levels (flow and effluent discharge limits as of 2014). The results for the Coastal Georgia Region at current permitted conditions are presented in **Table 5-1** and **Figure 5-1**.

**Table 5-1: Permitted Assimilative Capacity for DO in the Coastal Georgia Region**

Basin	Available Assimilative Capacity (Total Mileage)					Unmodeled	Modeled Miles in Council Region
	Very Good (≥1.0 mg/L)	Good (0.5 to <1.0 mg/L)	Moderate (0.2 to <0.5 mg/L)	Limited (>0.0 to <0.2 mg/L)	None or Exceeded (<0.0 mg/L)		
Altamaha	23	1	13	5	38	0	80
Ogeechee	84	133	133	4	10	0	364
Satilla	30	4	0	0	0	0	34
Savannah	0	0	0	0	0	21	21
St Marys	0	0	0	0	21	0	21

Source: GIS Files from the Updated Permitted Water Quality Resource Assessment; EPD, January 2017

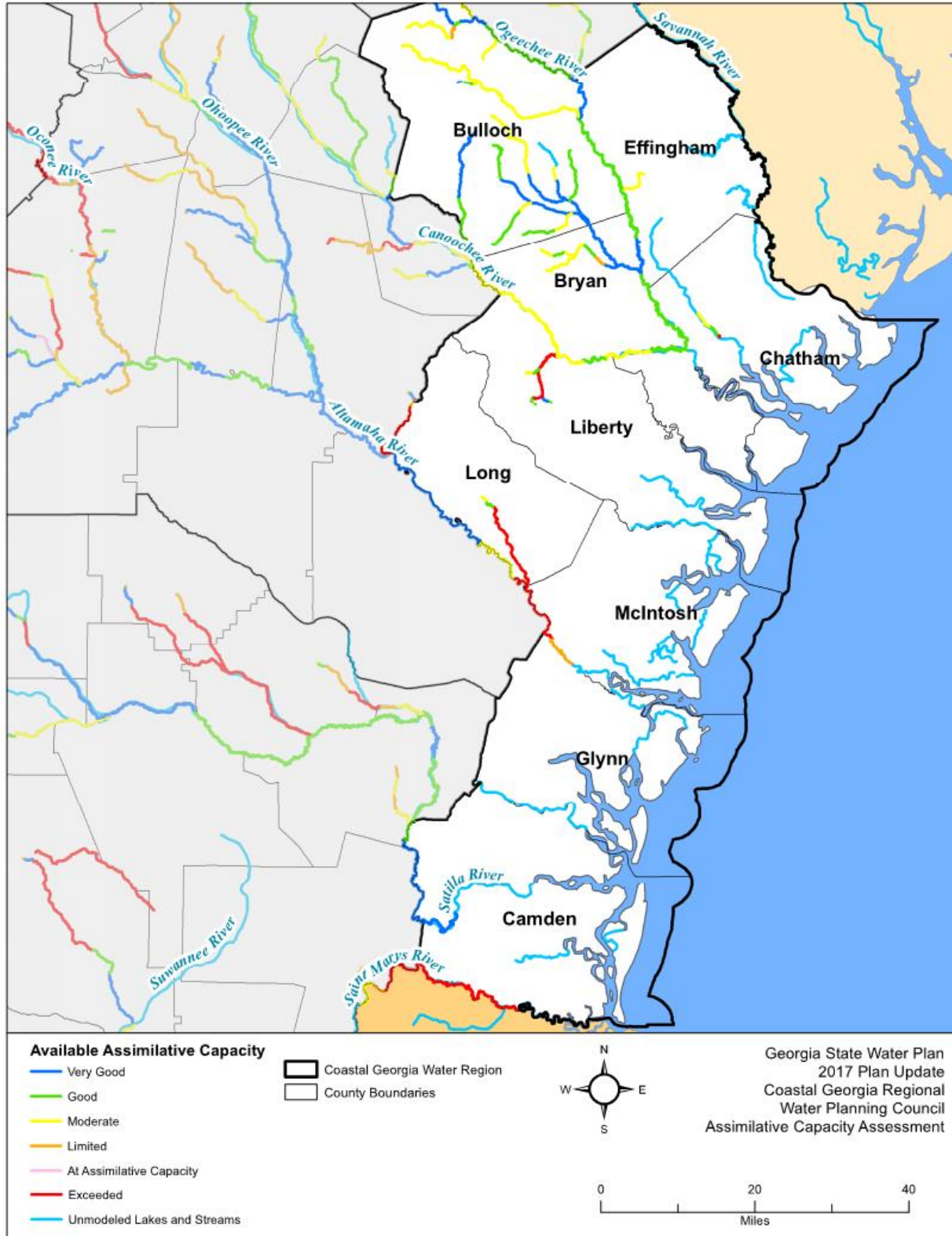


Figure 5-1: Results of DO Assimilative Capacity Assessment at Permitted Conditions

The stream segments at or exceeding their assimilative capacity within the Coastal Georgia Region are listed in **Table 5-2**.

**Table 5-2: Stream Segments with No or Exceeded Assimilative Capacity under Current Permitted Conditions**

Basin	Stream Segment	Length (miles)
Altamaha	Altamaha River - Doctors Creek to US Seaboard Coastal RR	9.0
	Altamaha River - Doctors Creek to US Seaboard Coastal RR	1.7
	Altamaha River - Penholoway Creek to Doctors Creek	3.2
	Beards Creek - 70' Contour to Altamaha River	10.5
	Doctors Creek - Doctors Creek to Altamaha River	8.2
	Jones Creek - Tributary to Doctors Creek	4.9
Ogeechee	Canoochee Creek - Taylors Creek to Canoochee River	4.4
	Little Ogeechee River - 0.5 miles DS Larchmont WPCP to EOM	0.3
	Taylors Creek - Mill Creek to US Rd Crossing	0.6
	Taylors Creek - Unnamed Trib to Canoochee Creek	3.9
	Taylors Creek - US Rd Crossing	0.0
	Taylors Creek - US Rd Crossing to Unnamed Trib	0.5
St. Marys	St Marys River - Folkston Proposed discharge to Hwy 17	20.5

## 5.2 Non-Point Source Pollution

Under Section 303(d) of the federal Clean Water Act, total maximum daily loads (TMDLs) are developed for waters that do not meet their designated uses. A TMDL represents the maximum pollutant loading that a water body can assimilate and continue meeting its designated use (i.e., not exceeding State water quality standards).

For the Coastal Georgia Region, there are 51 impaired stream reaches (total impaired length of 413 miles) and 2 impaired sounds (total impaired area of 8,960 acres) that are listed as impaired based on the 2014 list of impaired waters developed by EPD.

Of the impaired reaches in the region (note that a reach may be impaired for more than one parameter):

- 33% are impaired for low dissolved oxygen
- 33% are impaired for Fecal Coliform
- 13% are impaired for trophic-weighted residual mercury in fish tissue
- 7% are impaired for Fish Consumption Guidance
- 6% are impaired for Shell Fishing Ban
- 3% are impaired for pH
- 2% are impaired for Selenium
- 1% are impaired for Mercury
- <1% are impaired for Cadmium
- <1% are impaired for Biological (Fish Community)

A map of the impaired waters is provided in **Figure 5-2**. One impaired sound in the region is impaired for low dissolved oxygen, the other for Fish Consumption Guidance. TMDLs have been completed for 33 impaired stream reaches and the 2 impaired sounds.

## 5.3 Nutrient Loading

In addition to assimilative capacity modeling for DO, EPD completed nutrient (total nitrogen and total phosphorous) modeling for the watersheds in the Coastal Georgia Region. The watershed models evaluate point and non-point source nutrient loadings. Results are provided within the resource assessment for wet, dry and normal years. Example figures of nutrient loading for the Ogeechee River watershed under 2050 future conditions for a wet year are provided in **Figure 5-3** for total nitrogen and **Figure 5-4** for total phosphorus. There are currently no nutrient standards for total nitrogen and total phosphorus in the region.

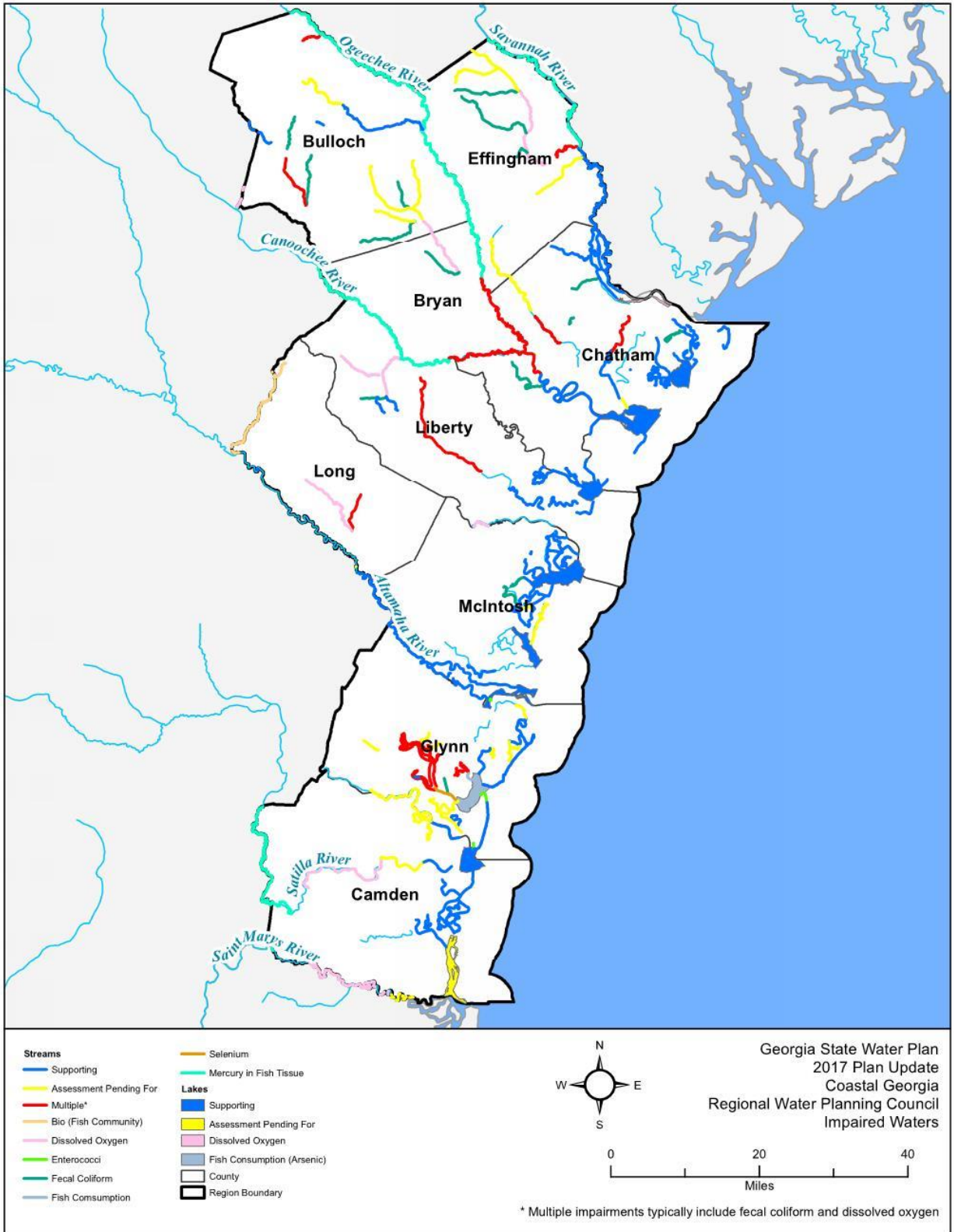


Figure 5-2: Impaired Water Bodies



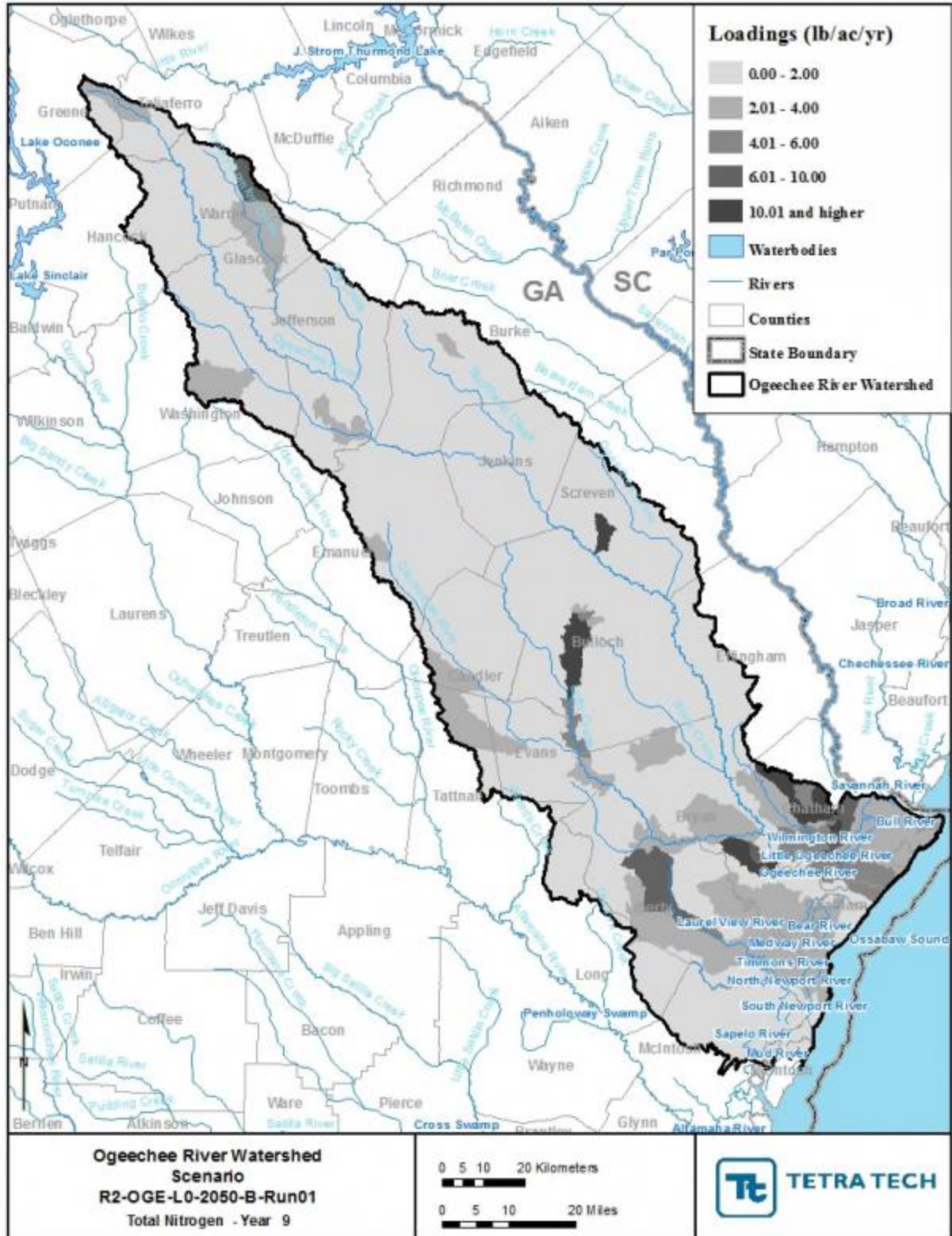


Figure 5-3: Total Nitrogen Loading for the Ogeechee River Watershed during Wet Year Future (2050) Conditions

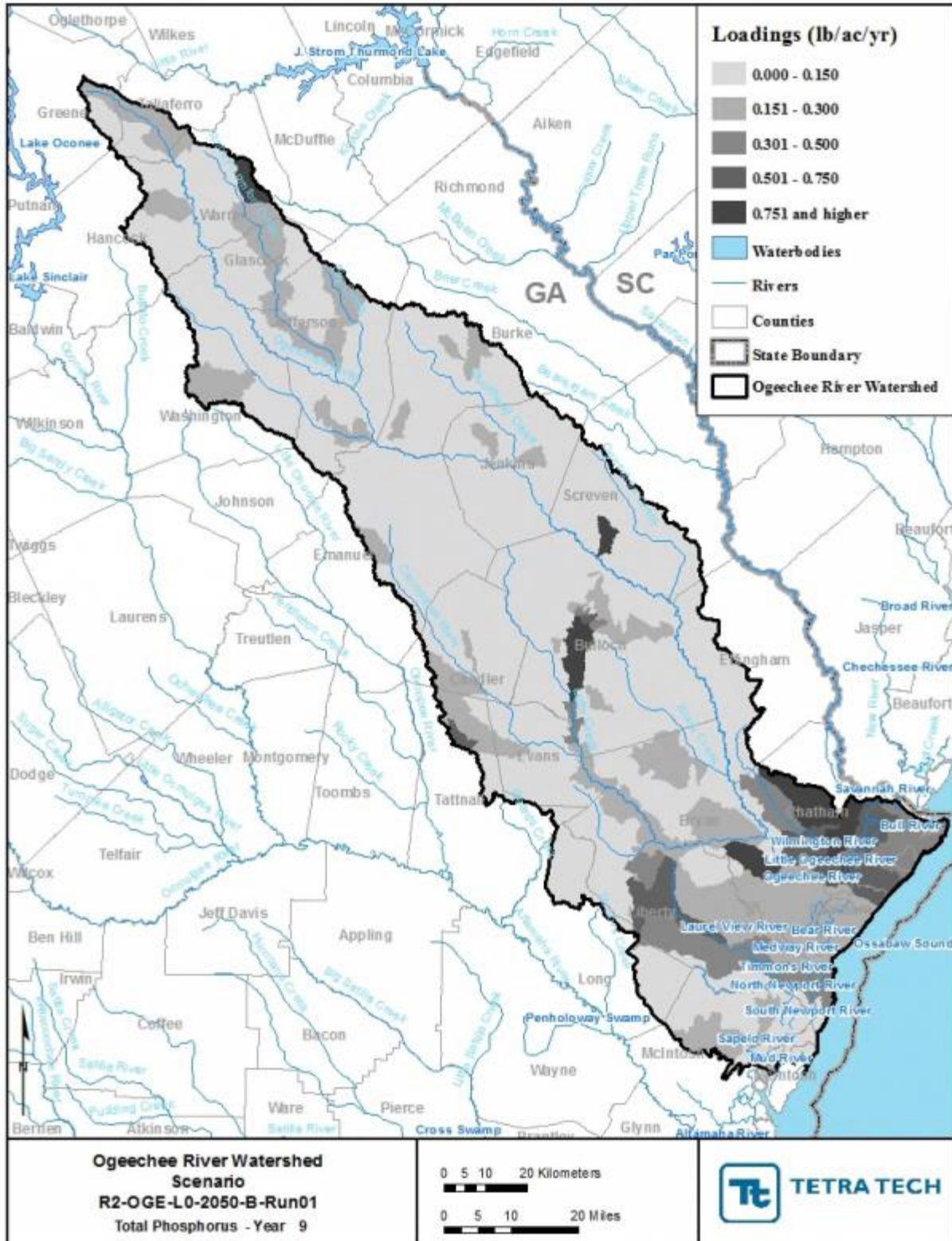


Figure 5-4: Total Phosphorus Loading for the Ogeechee River Watershed during Wet Year Future (2050) Conditions



## Section 6

### Gap Analysis Summary

This section summarizes the potential water resources issues in the Coastal Georgia Region.

**Table 6-1** summarizes the potential water resource issues and permitted capacity needs in the Coastal Georgia Region by County. Potential water resource issues include:

- Over the planning horizon, forecasted surface water demands within the Coastal Georgia Region are projected to cause potential gaps in surface water availability in the Ogeechee River at the Eden and Kings Ferry planning nodes as well as in the Canoochee River at the Claxton planning node.
- Regionally, there is sufficient groundwater to meet forecasted needs over the planning horizon but permitted groundwater reductions are being implemented in the Red and Yellow Zones due to salt water intrusion concerns.
- Water quality conditions indicate the potential need for improved wastewater treatment within the Altamaha and Ogeechee River basins.
- Addressing non-point sources of pollution and existing water quality impairments will be a part of addressing the region’s future needs.

**Table 6-1: Summary of Potential Water Resource Issues by County**

County	Municipal Water Permitted Capacity Need	Part of Drainage Area with Modeled Surface Water Gaps	Municipal Wastewater Permitted Capacity Need	Water Quality – DO Assimilative Capacity Issues
<i>Source</i>	<i>Table 2-2</i>	<i>Figure 4-1</i>	<i>Table 2-3</i>	<i>Figure 5-1</i>
Bryan	Yes	Yes	Yes	-
Bulloch	Yes	Yes	-	-
Camden	-	-	-	Yes
Chatham	Yes	Yes	-	-
Effingham	Yes	Yes	-	-
Glynn	-	-	-	-
Liberty	Yes	Yes	-	Yes
Long	Yes	Yes	-	Yes
McIntosh	Yes	-	-	Yes

- 1) "Yes" indicates a potential gap in the indicated county (for surface water, "yes" indicates part or all of the indicated county lies in the area contributing to a potential gap)
- 2) Permitted capacity need is based on the comparison of permitted municipal capacity versus 2050 forecasted demand.



## Appendix A

# Municipal Forecasts versus Permitted Capacity by County

Within this appendix, the water and wastewater forecasts at the county level are compared to existing permitted capacities for facilities located within the county. These county level results should not be interpreted at the facility/municipality level, as they do not account for demands in one county that may be met by permits from another county. Water and wastewater providers should review the information presented here and incorporate the general trends into their actual planning and permit needs.

## Bryan County

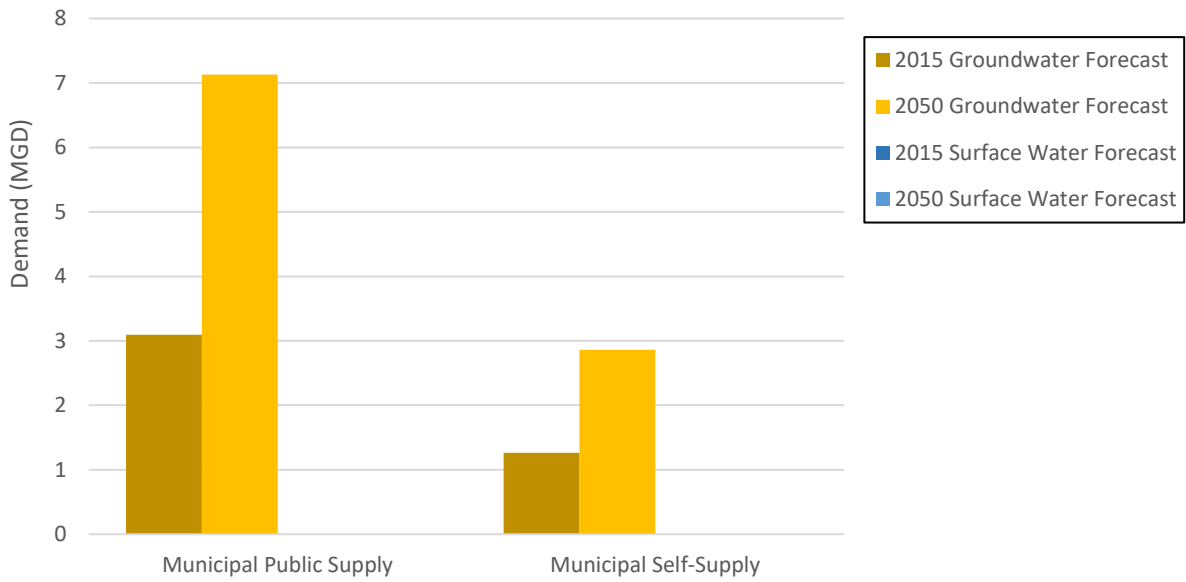
### Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	6.3	7.1	-0.8
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	4.4	5.3	-0.9
LAS (Land Application)	0.4	0.4	0

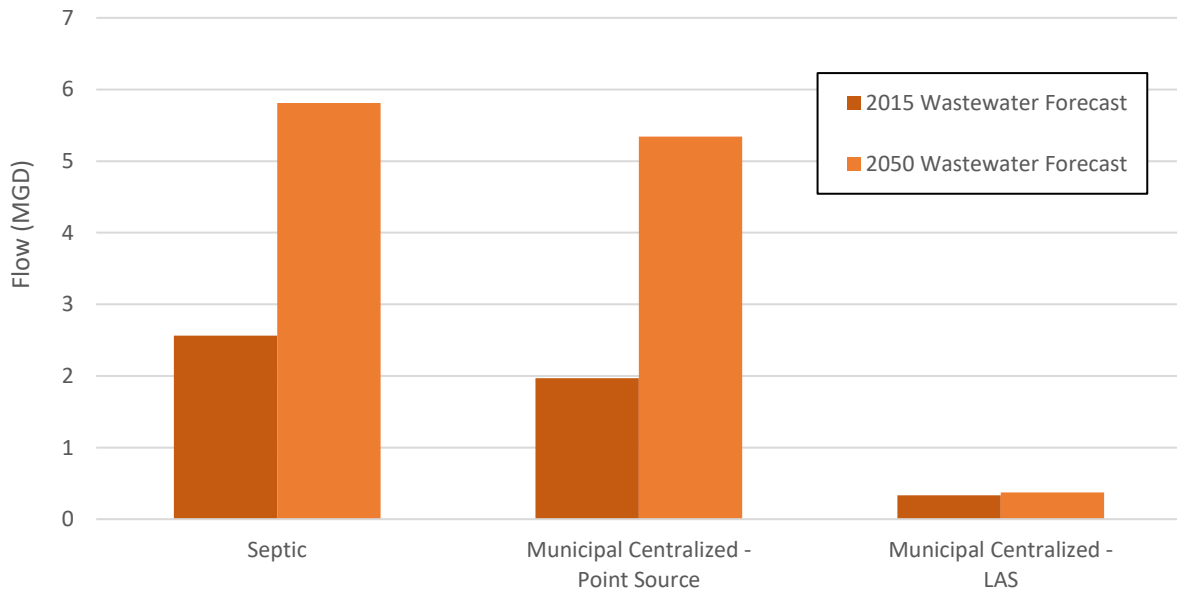
### List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits (2025)</b>			
Richmond Hill, City of	015-0001	1.650	Floridan Aquifer
Pembroke, City of	015-0002	0.270	Floridan Aquifer
Middle Georgia Water Company - Waterford Landing	015-0005	0.112	Floridan Aquifer
Bryan County Board of Commissioners - North System	015-0007	1.578	Floridan Aquifer
City of Richmond Hill	015-0008	1.511	Floridan Aquifer
South Atlantic Utilities - Buckhead Subdivision	015-0009	0.674	Floridan Aquifer
South Atlantic Utilities - Mill Hill, Strathy Hall I, Strathy Hall II	015-0010	0.167	Floridan Aquifer
South Atlantic Utilities - Cape Hardwicke	015-0011	0.155	Floridan Aquifer
South Atlantic Utilities - Black Creek/Hidden	015-0012	0.148	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
City of Pembroke WPCP	GA0038377	0.35	Tributary to Mill Creek
Richmond Hill	GA0037648	4.0	Elbow Swamp
Bryan County - Interstate Centre LAS	GAJ020229	0.04	LAS
Dunham Marsh Plantation	GAJ020011	0.062	LAS
South Bryan County LAS	GAJ020024	0.2	LAS
United States Army, Fort Stewart (Tac-X)	GAJ030332	0.035	LAS
Waterford Landing	GAJ030768	0.104	LAS

### Bryan County Municipal Water Demand Forecast



### Bryan County Municipal Wastewater Flow Forecast





# Bulloch County

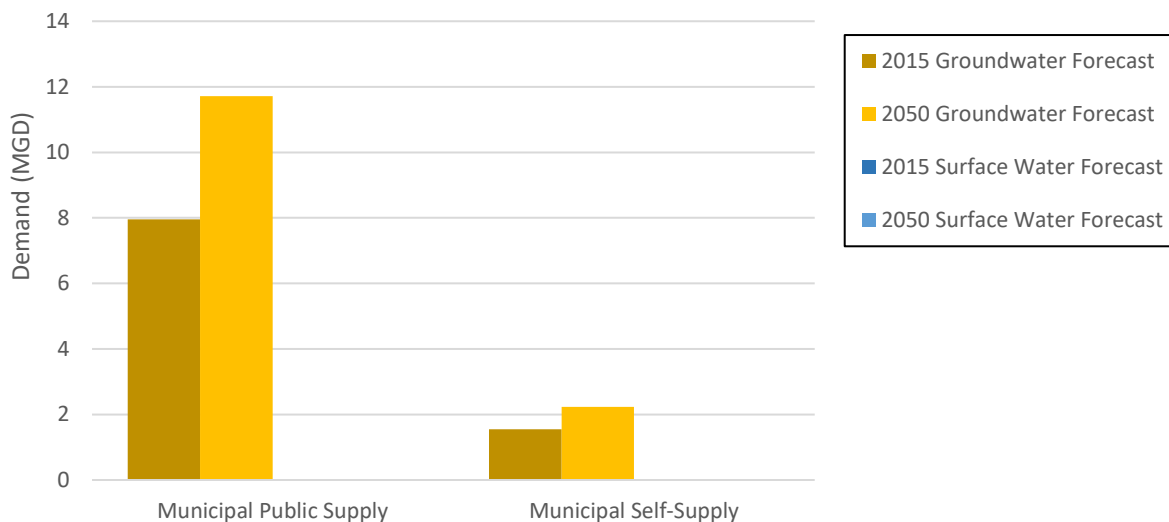
## Municipal Water and Wastewater Permits Compared to Forecasts

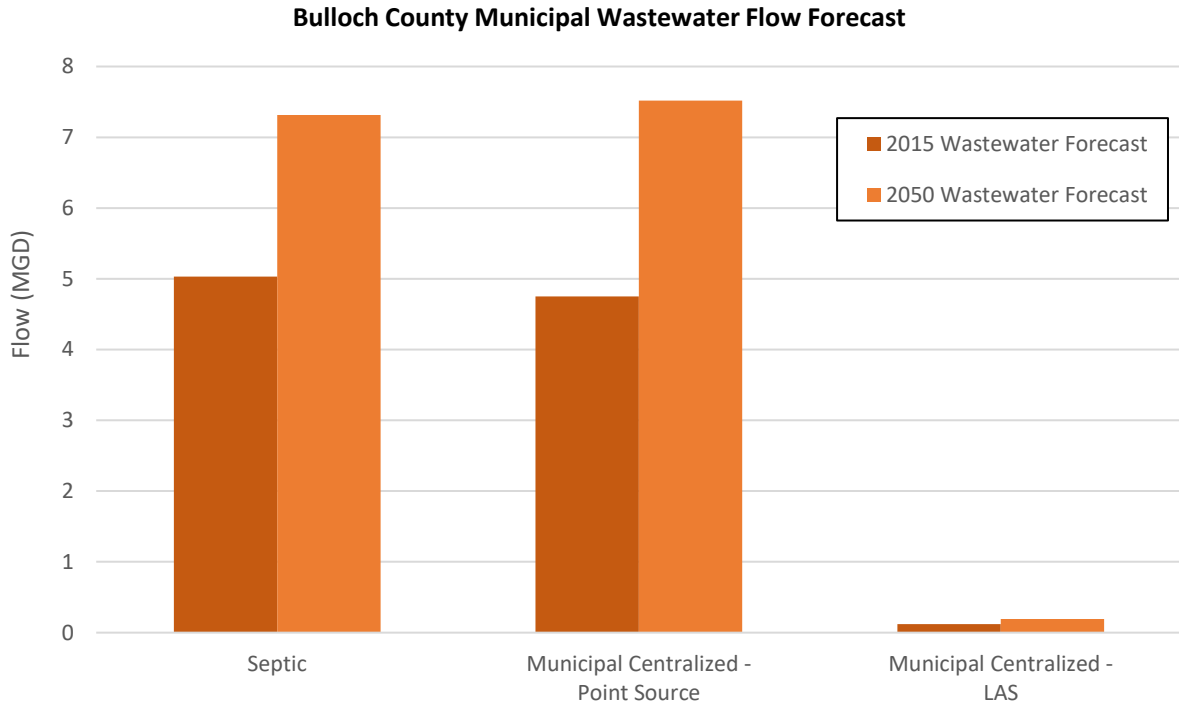
Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	6.6	11.7	-5.1
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	10	7.5	2.5
LAS (Land Application)	7.6	0.2	7.4

## List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits</b>			
Georgia Southern University	016-0001	0.503	Floridan Aquifer
Statesboro, City of	016-0002	5.875	Floridan Aquifer
Brooklet, Town of	016-0003	0.25	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
Statesboro WPCP	GA0023108	10	Little Lotts Creek
Bulloch Co Board of Education	GA0034061	0.019	Belcher Branch
Portal LAS	GAJ020041	0.1	LAS
Statesboro WPCP	GAJ020302	7.5	LAS

## Bulloch County Municipal Water Demand Forecast





## Camden County

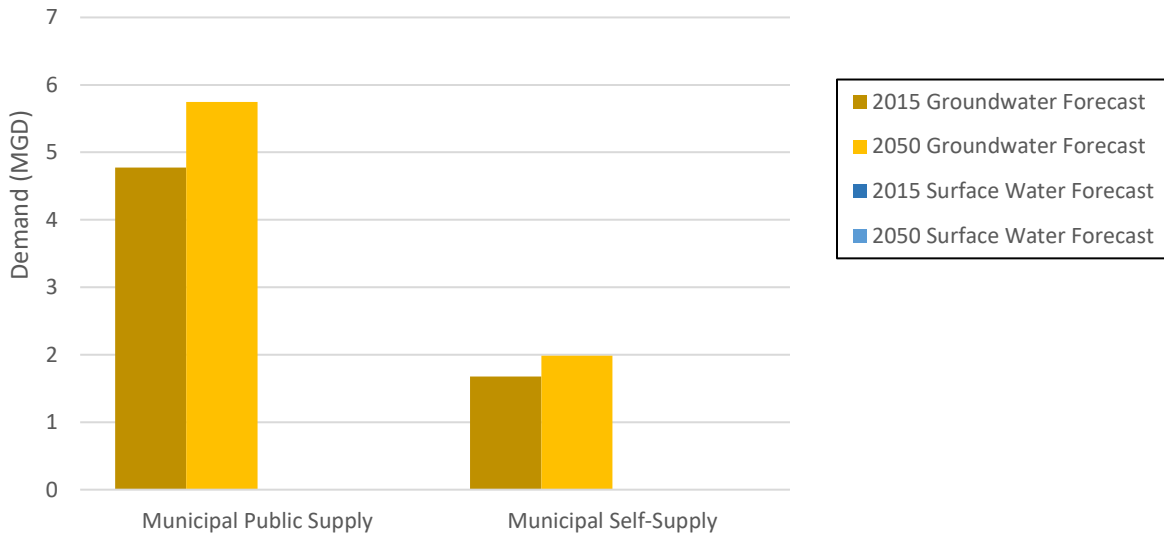
### Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	12.9	5.7	7.1
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	9.3	4.9	4.4
LAS (Land Application)	1.7	1.0	0.7

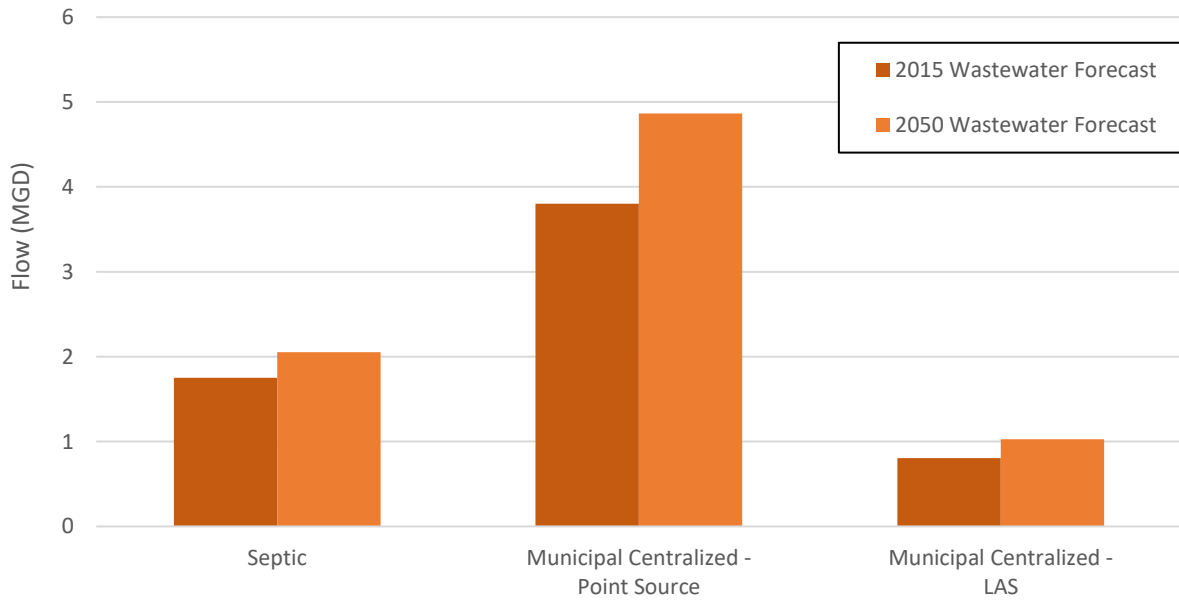
### List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits</b>			
Kingsland, City of	020-0001	3.0	Floridan Aquifer
St. Marys, City of	020-0002	5.0	Floridan Aquifer
Woodbine, City of	020-0006	0.8	Floridan Aquifer
Kings Bay Naval Submarine Base	020-0010	2.9	Floridan Aquifer
W&D Utilities	020-0013	1.0	Brunswick Aquifer
W&D Investments, Inc.	020-0014	0.15	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
Woodbine (City of) WPCP	GA0023701	0.368	Satilla River
Kingsland - Saint Marys WPCP	GA0037800	4.4	St. Mary's River
River Oaks MHP	GA0035599	0.008	Crooked Creek
Saint Marys - Scrubby Bluff WPCP	GA0037931	0.5	Casey Creek
Saint Marys - Point Peter WPCP	GA0039047	4.0	North River to St. Mary River
River Place Plantation LAS	GA03-984	0.1	LAS
Sanctuary Cove at St. Andrews Sound Urban WRF	GAJ030797	0.133	LAS
United States Department of the Navy, Naval Submarine Base	GAJ030751	1.5	LAS

### Camden County Municipal Water Demand Forecast



### Camden County Municipal Wastewater Flow Forecast



## Chatham County

### Municipal Water and Wastewater Permits Compared to Forecasts

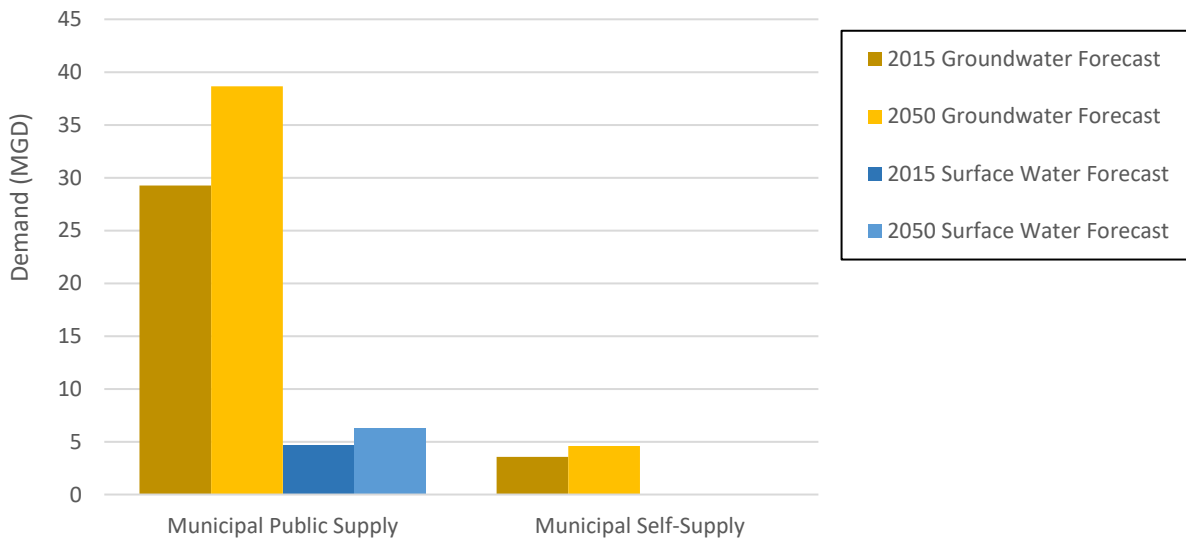
Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	28.3	38.7	-10.4
Surface Water	0	4.7	-4.7
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	48	44	4
LAS (Land Application)	4.3	1.6	2.7

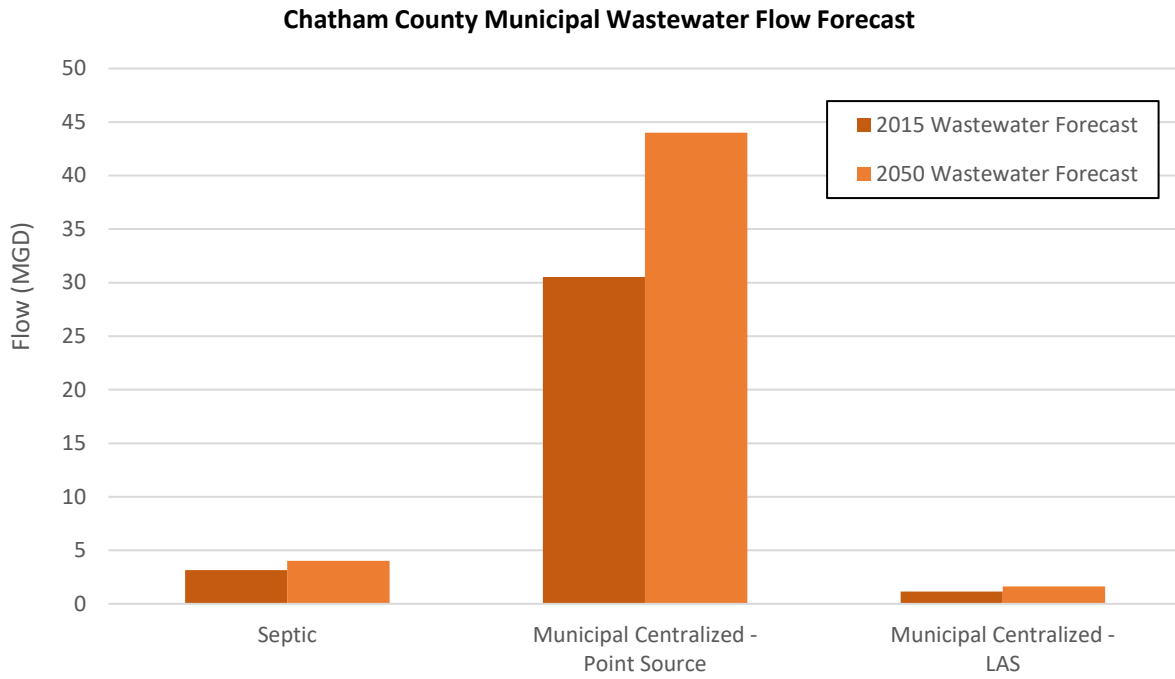
### List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits (2025)</b>			
Pooler, City of	025-0005	0.253	Floridan Aquifer
Garden City, City of	025-0007	1.030	Floridan Aquifer
City of Savannah	025-0018	17.962	Floridan Aquifer
Port Wentworth, City of	025-0021	0.242	Floridan Aquifer
Thunderbolt, Town of	025-0022	0.193	Floridan Aquifer
Memorial Health University Medical Center	025-0023	0.130	Floridan Aquifer
City of Tybee Island	025-0027	0.516*	Floridan Aquifer
Skidaway Island Utilities	025-0028	1.695	Floridan Aquifer
Hunter Army Airfield	025-0034	0.600	Floridan Aquifer
City of Bloomingdale	025-0035	0.173	Floridan Aquifer
Chatham County - Glen of Robin Hood & Montgomery Area	025-0040	0.569	Floridan Aquifer
Consolidated Utilities	025-0041	0.166	Floridan Aquifer
West Chatham County - Hunters Ridge	025-0045	0.078	Floridan Aquifer
Candler Hospital	025-0046	0.078	Floridan Aquifer
Skidaway Institute of Oceanography	025-0054	0.120	Floridan Aquifer
South Atlantic Utilities	025-0056	0.151	Floridan Aquifer
Consolidated Utilities, Inc.	025-0057	2.00	Brunswick Aquifer
Consolidated Utilities	025-0060	0.719	Floridan Aquifer
Coastal Georgia Water Company - Ogeechee Farms	025-0062	0.118	Floridan Aquifer
Chatham Water Company - Parkersburg	025-0063	0.328	Floridan Aquifer
South Atlantic Utilities - Scarborough Cove & Talahi Island Community	025-0064	0.137	Floridan Aquifer
Chatham Water Company - Burnside & Rio Vista Water System	025-0065	0.099	Floridan Aquifer
Pooler, City of	025-0066	0.880	Floridan Aquifer

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
South Atlantic Utilities – Harbour Creek Community Water System	025-0067	0.094	Floridan Aquifer
*The City of Tybee’s permit only drops to 0.516 if a new well targeting the Cretaceous aquifer is successful; otherwise, the permit will stay at 0.916 MGD.			
Existing Permitted Wastewater Facilities			
Garden Acres Estates WPCP	GA0049506	0.05	Hardin Canal to Salt Creek
Larchmont Estates	GA0034819	1.0	Little Ogeechee River
Pooler - Bloomingdale WPCP	GA0047066	3.3	Hardin Canal
Savannah - Georgetown WPCP	GA0046418	2.45	Ogeechee River
Savannah - Crossroads WPCP	GA0038326	3.0	St Augustine Cr Trib/March to Savannah RV
Garden City WPCP	GA0031038	2.0	Savannah Harbor
Savannah - President Street WPCP	GA0025348	27	Savannah Harbor
Savannah - Travis Field WPCP	GA0020427	1.5	Savannah Harbor
Tybee Island	GA0020061	1.15	Atlantic Ocean
Port Wentworth	GA0038814	2.0	Savannah River
Savannah Yacht Club	GA0033189	0.00825	Wilmington River
Savannah - Wilshire WPCP	GA0020443	4.5	Savannah Harbor
Chatham County - Pine Barren Road	GAJ020285	0.06	LAS
Savannah (City of) - Bacon Park WRF	GAJ040013	1.0	LAS
Savannah (City of) - Reuse	GAJ020198	2.0	LAS
Skidaway Island LAS	GAJ030941	1.25	LAS

**Chatham County Municipal Water Demand Forecast**





## Effingham County

### Municipal Water and Wastewater Permits Compared to Forecasts

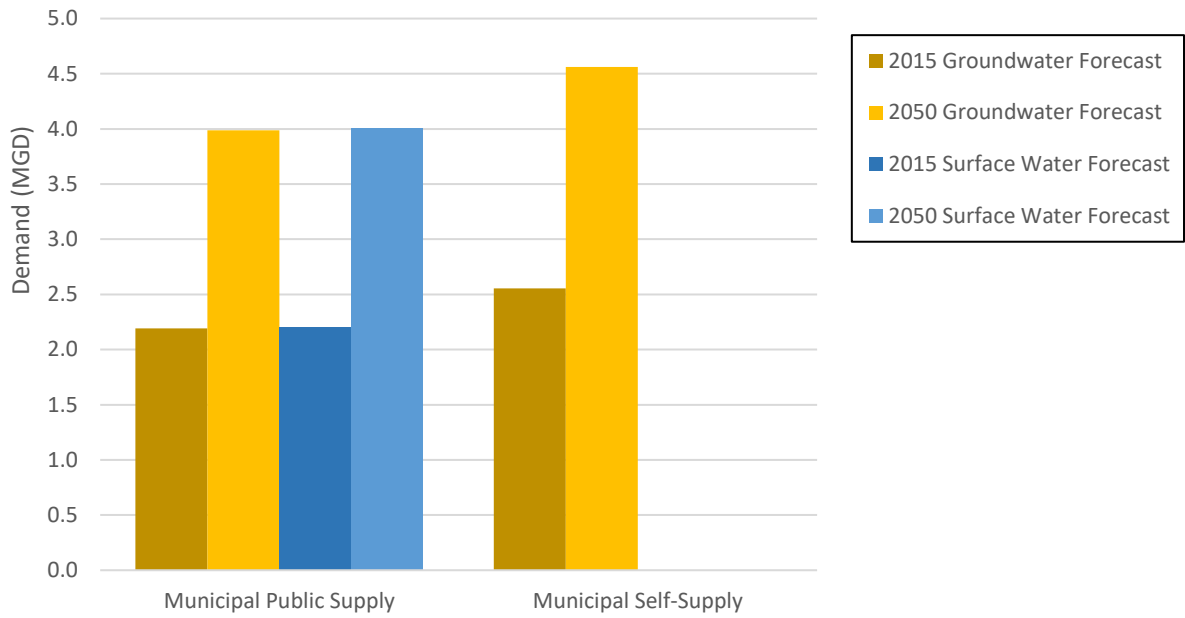
Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	4	4	0
Surface Water	50	4	46
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	3.3	2	1.3
LAS (Land Application)	2.8	0.9	1.9

### List of Individual Municipal Permits

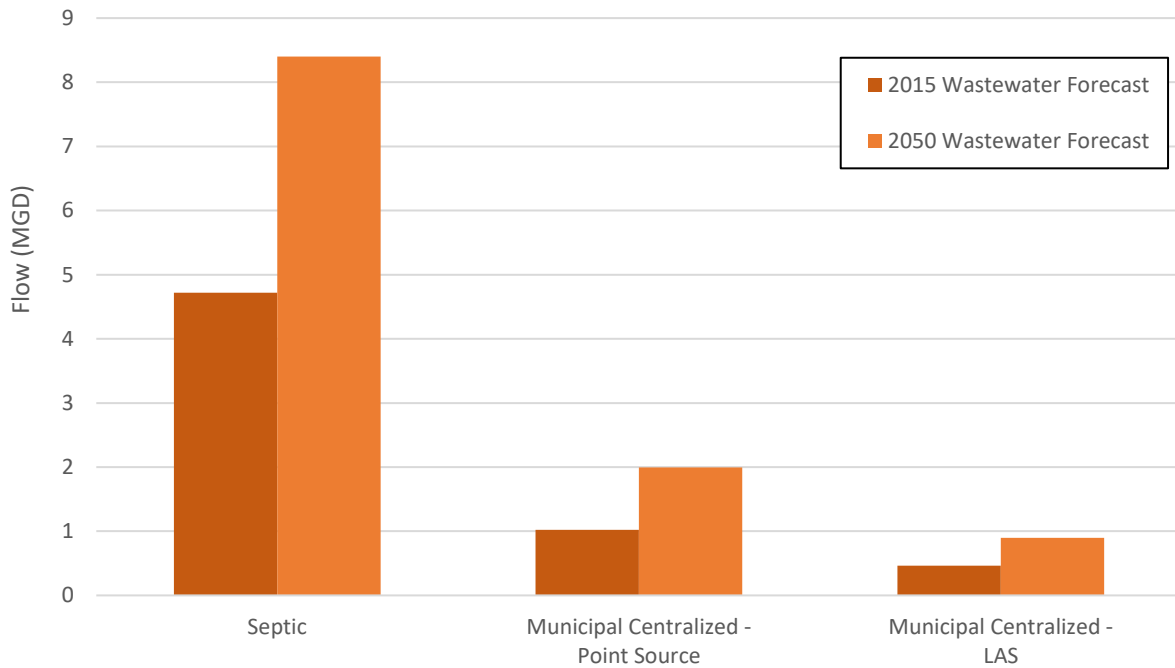
Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits (Red Zone permits show 2025 limits)</b>			
Savannah Ind. & Domestic Water	051-0115-01	50	Abercorn Creek
Rincon, City of	051-0001	0.499 (2025)	Floridan Aquifer
Guyton, City of	051-0005	0.72	Floridan Aquifer
Lost Plantation Golf Course	051-0008	0.04	Floridan Aquifer
Coastal Water & Sewerage Company	051-0010	0.096 (2025)	Floridan Aquifer
Effingham County Board of Commissioners	051-0011	0.335 (2025)	Floridan Aquifer
City of Springfield	051-0012	1.20	Floridan Aquifer
Lakeside Water Company, Inc.	051-0014	0.072 (2025)	Floridan Aquifer
Rincon, City of - Lower Floridan Aquifer	051-0015	0.779 (2025)	Floridan Aquifer
South Atlantic Utilities - Azalea Point / Barrister Crossing / Kingsley Plantation / Lonesome Oak CWS	051-0016	0.183 (2025)	Floridan Aquifer
South Atlantic Utilities - Goshen Villas Water System	051-0017	0.097 (2025)	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
SoEff WPCP discharge LAS	GAJ020016	0.75	Savannah
Springfield	GA0020770	1.5	Ebenezer Creek
Rincon	GA0046442	1.0	Sweigoffer Creek
Effingham County South WRF	GAJ020016	1.0	LAS
Effingham County-IDA WRF	GAJ020032	0.25	LAS
Guyton (City of) WPCP	GAJ040010	0.25	LAS
Springfield LAS	GA02-037	1.0	LAS
Stonegate Subdivision WPCP	GAJ030952	0.0405	LAS
Westwood Height & Mill Creek WPCP	GAJ020234	0.24	LAS



### Effingham County Municipal Water Demand Forecast



### Effingham County Municipal Wastewater Flow Forecast



## Glynn County

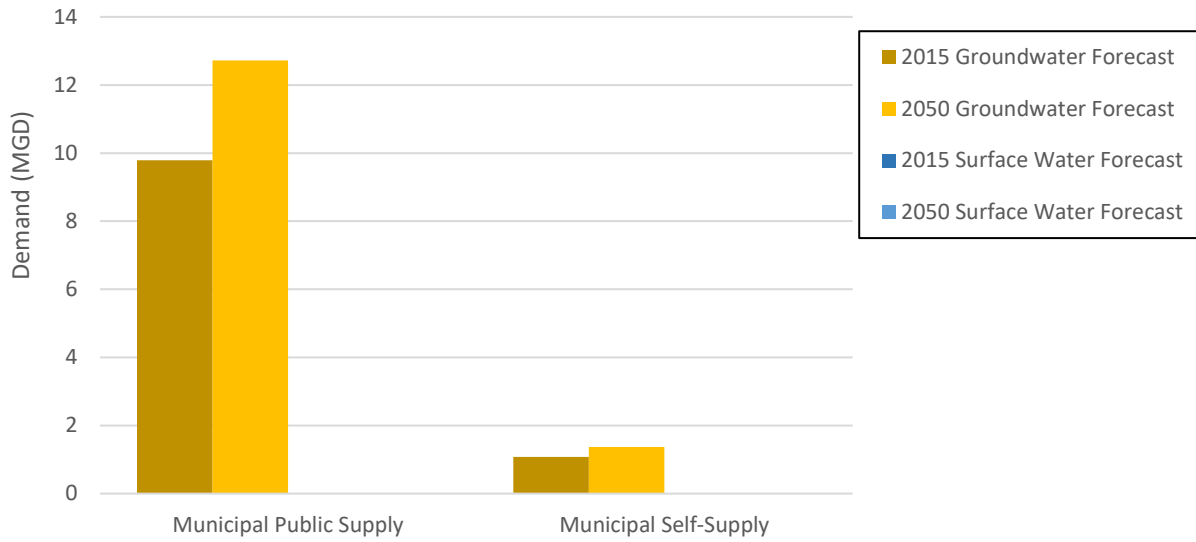
### Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	22.6	12.7	9.9
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	20	14.8	5.2
LAS (Land Application)	0	0	0

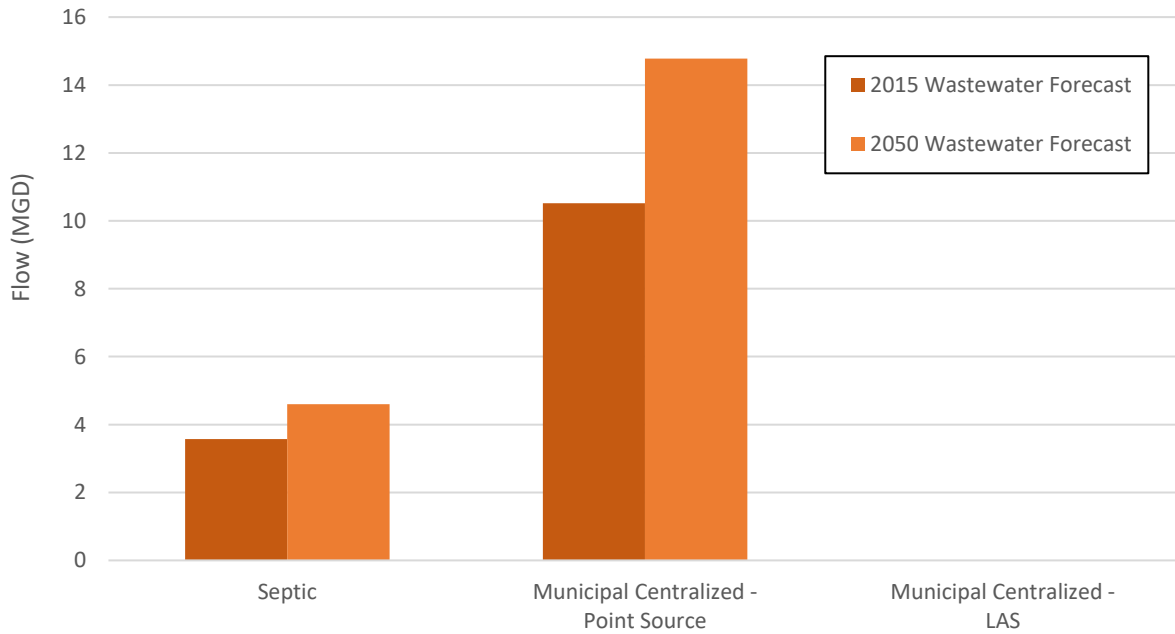
### List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits</b>			
Jekyll Island Authority - Public Water System	063-0002	1.85	Floridan Aquifer
Sea Island Company - Cloister Complex	063-0009	1.6	Floridan, Brunswick Aquifer
Glynn County Board of Commissioners - St. Simons Water & Sewer District	063-0010	4.35	Floridan Aquifer
Brunswick, City of - City System	063-0011	8.44	Floridan Aquifer
Georgia Ports Authority - Colonels Island	063-0019	0.15	Floridan Aquifer
Glynn County Water & Sewer - North Mainland	063-0023	0.35	Floridan Aquifer
Glynn County - I95 & US17 Interchange System	063-0025	1.3	Floridan Aquifer
Georgia Ports Authority	063-0026	0.2	Brunswick Aquifer
The Hampton Group	063-0027	0.5	Brunswick Aquifer
Glynn County Water and Sewer Department - Hampton Plantation	063-0031	0.17	Floridan Aquifer
Oak Grove Island Golf Investors, LLC	063-0032	0.55	Brunswick Aquifer
Brunswick - Glynn County Joint Water & Sewer Commission - Golden Isles	063-0038	2.0	Brunswick Aquifer
Glynn County - Fancy Bluff	063-0045	1.0	Brunswick Aquifer
Oak Grove Island, Ltd.	063-0046	0.162	Brunswick Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
Brunswick-Glynn County - Saint Simons Island WPCP	GA0021521	4.0	Dunbar Creek
Brunswick - Academy Creek WPCP	GA0025313	13.5	Academy Creek
Jekyll Island WPCP	GA0020508	1.0	Jekyll River
Brunswick - Exit 29 WPCP	GA0038938	1.5	Little Satilla River
Sterling Mobile Home Park	GA0034754	0.009	Unnamed tributary to Cowpen Creek
Brunswick Shady Acres Mobile Home Park	GA0022489	0.039	Cowpen Creek tributary to the Turtle River

### Glynn County Municipal Water Demand Forecast



### Glynn County Municipal Wastewater Flow Forecast



## Liberty County

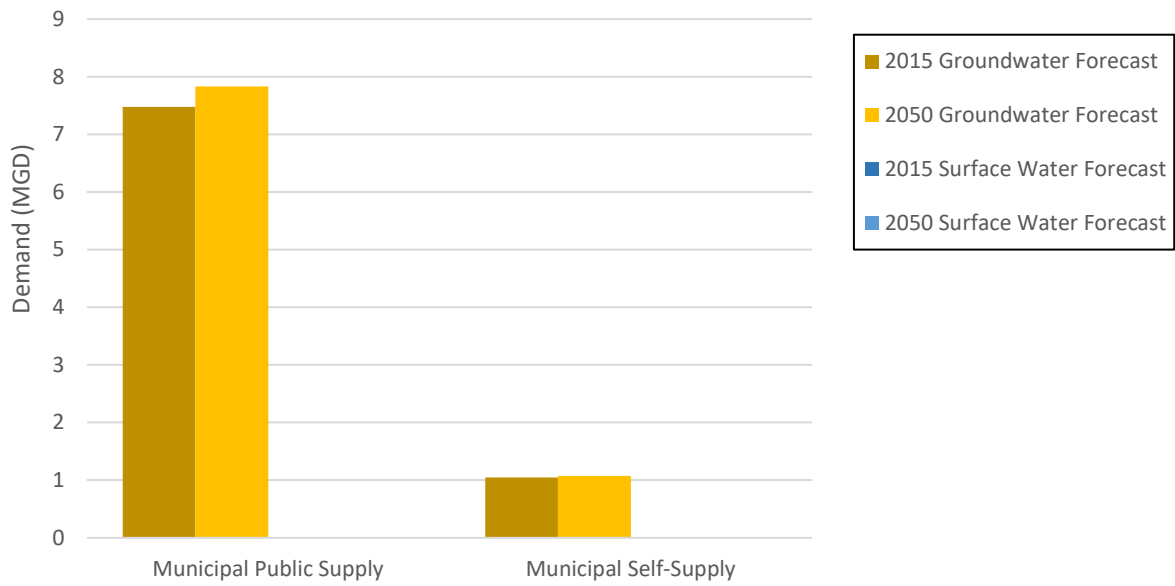
### Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	12.0	7.8	4.2
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	7.7	2.2	5.5
LAS (Land Application)	0.7	0.4	0.3

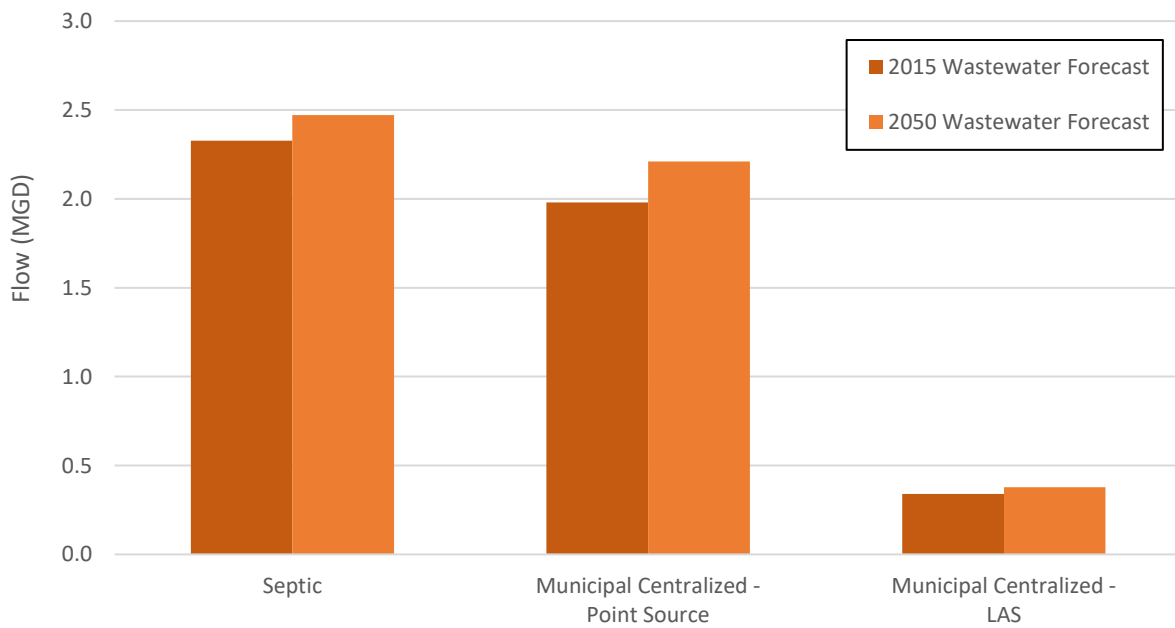
### List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits (2025)</b>			
Hinesville, City of	089-0002	3.854	Floridan Aquifer
Fort Stewart - Department of the Army	089-0003	4.077	Floridan Aquifer
Walthourville, City of	089-0004	0.145	Floridan Aquifer
Liberty County Development Authority	089-0005	1.060	Floridan Aquifer
Midway, City of	089-0006	0.289	Floridan Aquifer
City of Riceboro	089-0007	0.506	Floridan Aquifer
Liberty County Development Authority - Business Park	089-0008	0.30	Surficial and Brunswick Aquifer
Walthourville, City of - Miocene Aquifer	089-0010	0.70	Brunswick Aquifer
DPW Environmental Division - Fort Stewart	089-0011	0.740	Floridan Aquifer
South Atlantic Utilities - Lake George / Twin Rivers	089-0012	0.104	Floridan Aquifer
Chatham Water Co. – Isle of Wight	089-0013	0.193	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
Hinesville/Fort Stewart WPCP	GA0047180	7.15	Unnamed Tributary to Taylors Creek Tributary
Riceboro WPCP	GA0038491	0.35	Unnamed Tributary to Riceboro Creek
City of Hinesville - Peacock Creek WPCP	GA0038792	0.21	Rocky Comfort Creek Tributary
Dolphin Island WPCP	GAJ030710	0.0149	LAS
Fort Stewart, Evans Field	GAJ030325	0.05	LAS
Midway (City of) WPCP	GAJ020131	0.5	LAS
Midway Industrial Park WPCP	GA02-094	0.1	LAS
Village at Sunbury Subdivision WPCP	GAJ030933	0.013	LAS
Wright Army Airfield	GAJ030834	0.01	LAS

### Liberty County Municipal Water Demand Forecast



### Liberty County Municipal Wastewater Flow Forecast



# Long County

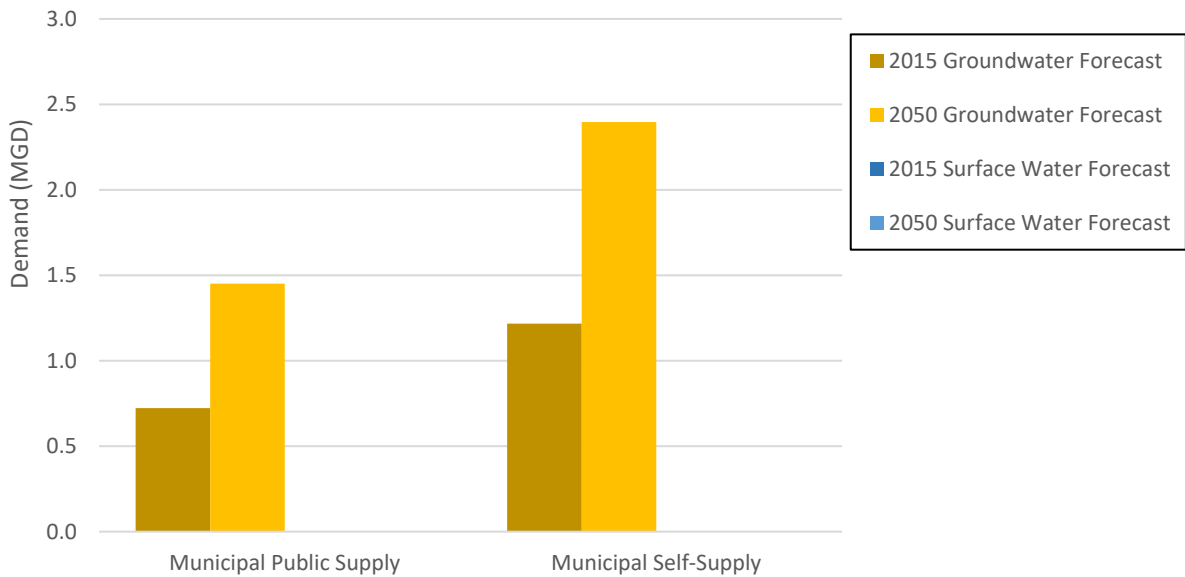
## Municipal Water and Wastewater Permits Compared to Forecasts

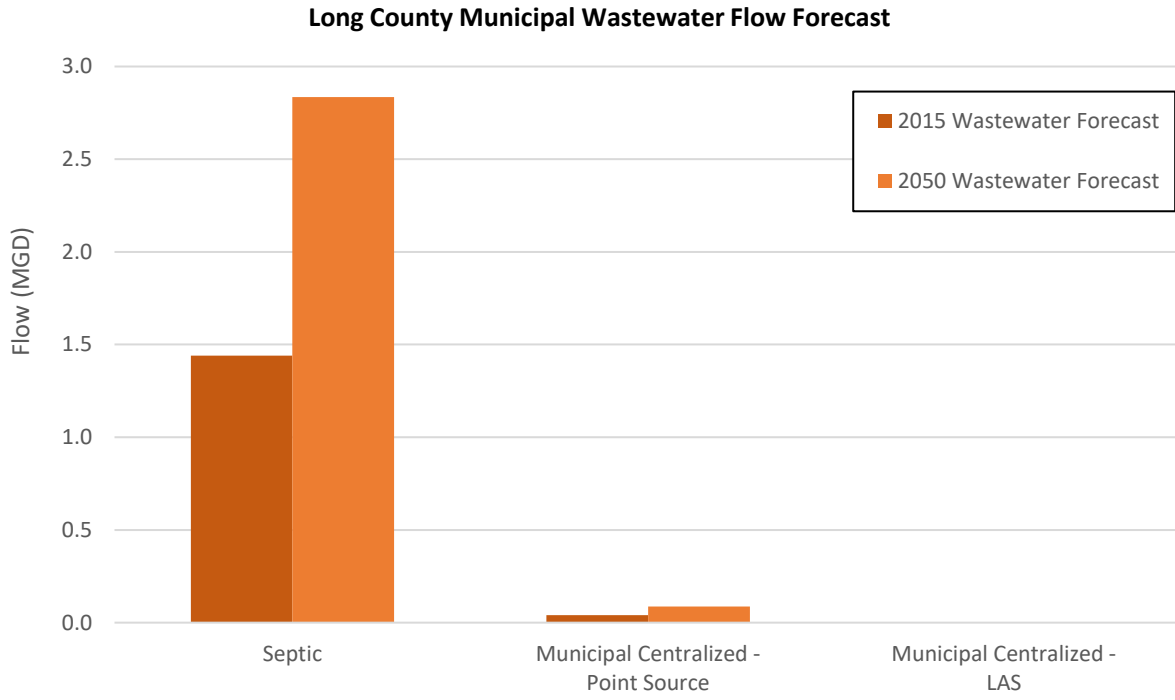
Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	0.6	1.5	-0.9
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	0.2	0.1	0.1
LAS (Land Application)	0	0	0

## List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits</b>			
Ludowici, City of	091-0002	0.6	Brunswick Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
Ludowici, City of WPCP	GA0049166	0.24	Fountain Branch

Long County Municipal Water Demand Forecast





## McIntosh County

### Municipal Water and Wastewater Permits Compared to Forecasts

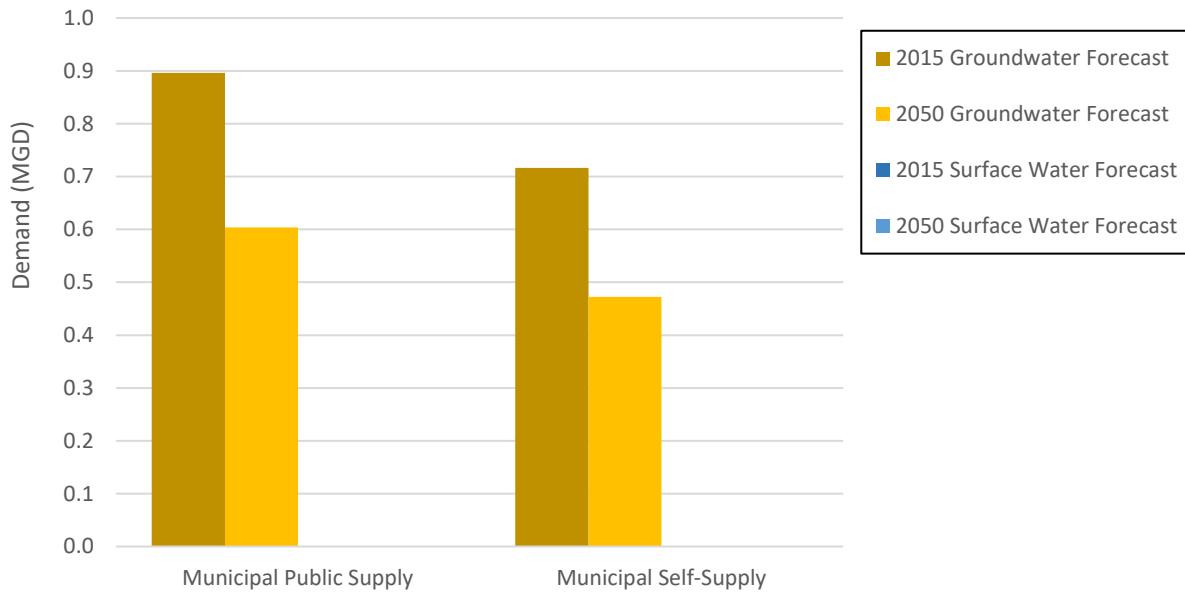
Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
<b>Municipal Water Demands (MGD)</b>			
Groundwater	1.4	0.6	0.8
Surface Water	0	0	0
<b>Municipal Wastewater (MGD)</b>			
NPDES (Point Source)	0.6	0.2	0.4
LAS (Land Application)	0	0	0

### List of Individual Municipal Permits

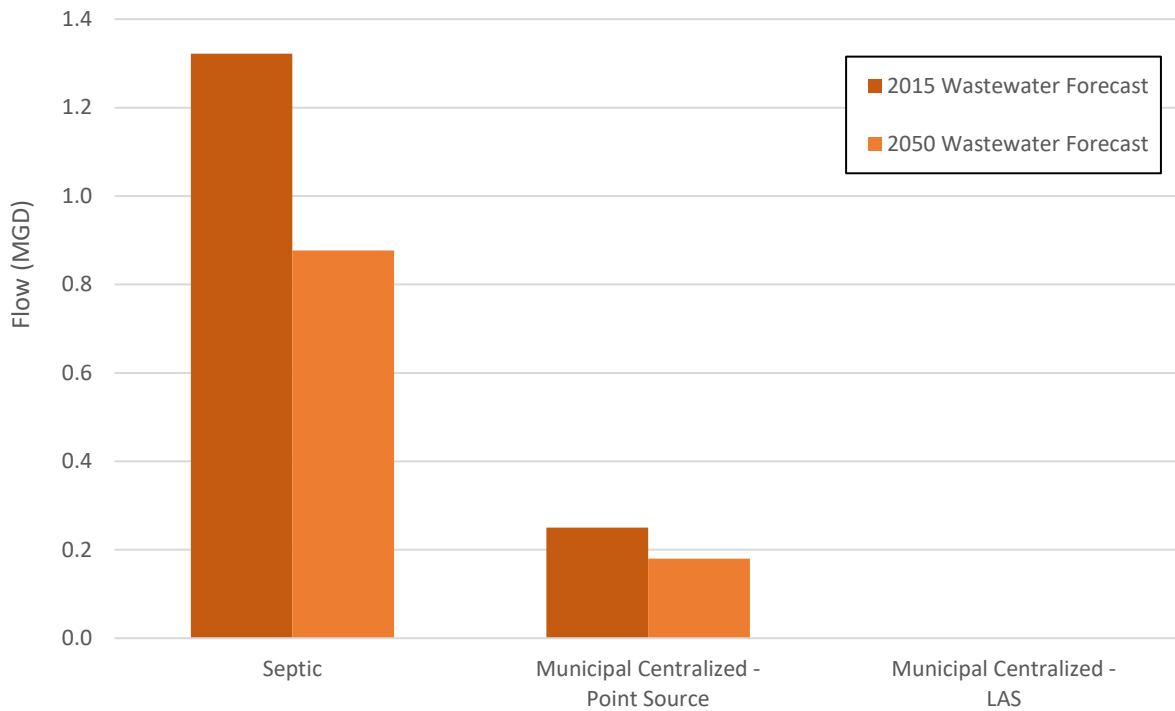
Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
<b>Existing Withdrawal Permits</b>			
Darien, City of	098-0001	0.59	Floridan Aquifer
McIntosh County Industrial Authority	098-0003	0.15	Floridan Aquifer
Darien, City of	098-0005	0.21	Brunswick Aquifer
McIntosh County Board of Commissioners - Crescent Community	098-0006	0.2	Floridan Aquifer
Middle Georgia Water Company - Southerland Bluff Plantation	098-0008	0.21	Floridan Aquifer
<b>Existing Permitted Wastewater Facilities</b>			
McIntosh County	GA0029874	0.03	Bellville Creek
Darien WPCP	GA0033529	0.6	Cathead Creek Tributary



### McIntosh County Water Demand Forecast



### McIntosh County Wastewater Flow Forecast



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