Gap Analysis Technical Memorandum

Altamaha Regional Water Planning Council

Little Ocmulgee State Park

Supplemental Material

Altamaha Regional Water Plan

January 2019

CDM Smith

Little Ocmulgee State Park
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 Altamaha Regional Water Planning Council (Altamaha Council) is one of the 11 planning regions established throughout the state. The Altamaha 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 Altamaha Council boundaries are shown in **Figure 1-1**.

Figure 1-1: Altamaha 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 Altamaha 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 16 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 please see the Water and Wastewater Forecasting Technical Memorandum for the Altamaha Council.

2.1 Water Demand Summary

Figure 2-1 shows the aggregated county water forecasts for the Altamaha Council region (the Altamaha Region) in 2015 and 2050. Overall, the regional forecasted water need is expected to increase by 32.8 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 (75th percentile demands).

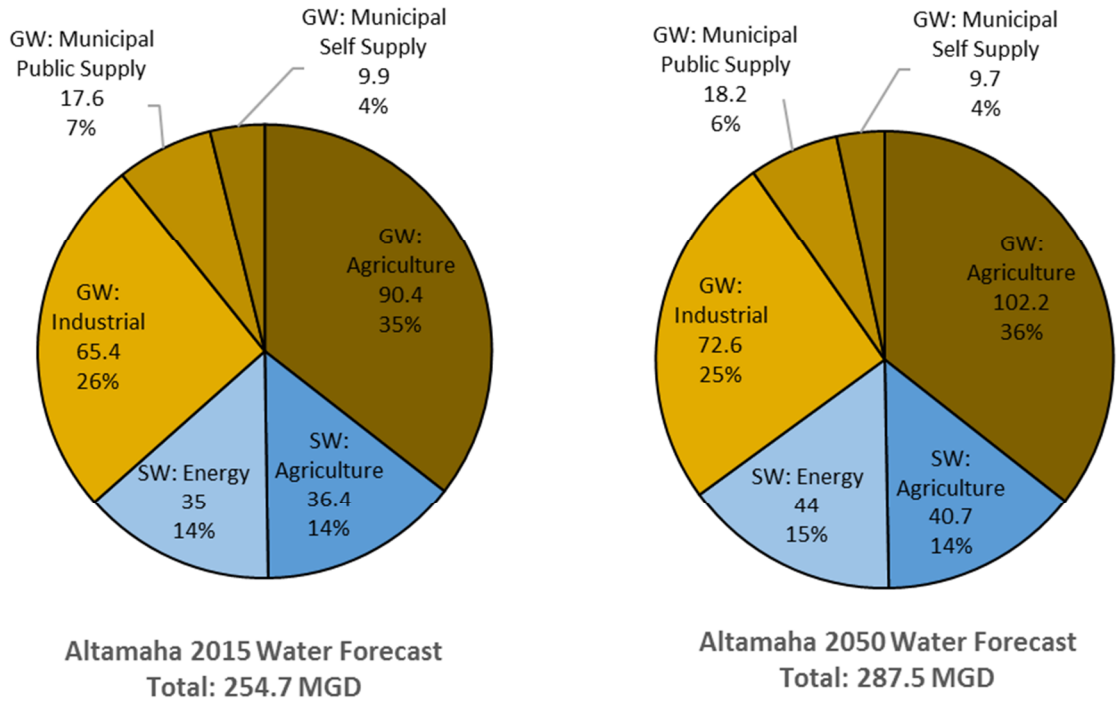

Figure 2-1: Altamaha Regional Water Forecast by Sector and Supply Source

2.1.1 Groundwater Forecasts and Comparison to Groundwater Permits

Out of the 32.8 mgd increase in total water need by 2050, 19.4 mgd is projected to come from groundwater sources. **Table 2-1** shows the breakdown of this groundwater forecast by aquifer. Groundwater demand has been assigned to prioritized aquifers, with Gordon aquifer demands assigned to the Floridan aquifer and Dublin aquifer demands assigned to the Cretaceous 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	0.57	0.61	0.03
Claiborne	0.079	0.082	0.003
Cretaceous	7.0	7.1	0.1
Floridan	175.7	195.0	19.3
Total	**183.3**	**202.7**	**19.4**

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.

Table 2-2: 2050 Municipal Forecast versus Groundwater Permitted Capacity

County	2015 Public Demand Forecast (AAD – MGD)	2050 Public Demand Forecast (AAD – MGD)	Existing Permitted Capacity (AAD – MGD)	Additional Permitted Capacity Needed in 2050 (AAD – MGD)*
Appling	0.93	1.04	1.40	-
Bleckley	0.64	0.64	2.15	-
Candler	0.47	0.46	0.90	-
Dodge	1.40	1.29	3.05	-
Emanuel	2.03	2.31	1.95	0.36
Evans	0.52	0.54	0.50	0.04
Jeff Davis	1.40	1.51	0.85	0.66
Johnson	0.50	0.43	0.85	-
Montgomery	0.62	0.55	0.80	-
Tattnall	1.23	1.39	3.37	-
Telfair	1.59	1.30	2.03	-
Toombs	2.70	2.96	5.00	-
Treutlen	0.40	0.35	0.65	-
Wayne	2.15	2.40	2.63	-
Wheeler	0.38	0.48	0.40	0.08
Wilcox	0.67	0.60	0.91	-

*Analysis does not account for demands in one county that may be met by permits from another county. Values provided are average annual demands in millions of gallons per day (AAD-MGD).

2.1.2 Surface Water Forecasts

For the Altamaha Region, surface water is utilized to meet agricultural demands and for cooling system needs at the Edwin I. Hatch nuclear power plant in Appling County. Total surface water demands are expected to increase by 13.3 mgd by 2050 (4.3 mgd from agricultural demands and 9 mgd from the energy sector). Surface water is utilized for agriculture within all counties in the Altamaha Region. Counties with the largest projected growth in agricultural surface water usage include Tattnall, Candler, Bleckley, and Toombs counties.

2.2 Wastewater Forecast Summary

Figure 2-2 shows the aggregated county wastewater forecasts for the Altamaha Region in 2015 and 2050. Overall, the regional forecasted wastewater flows are expected to increase by approximately 10 MGD.

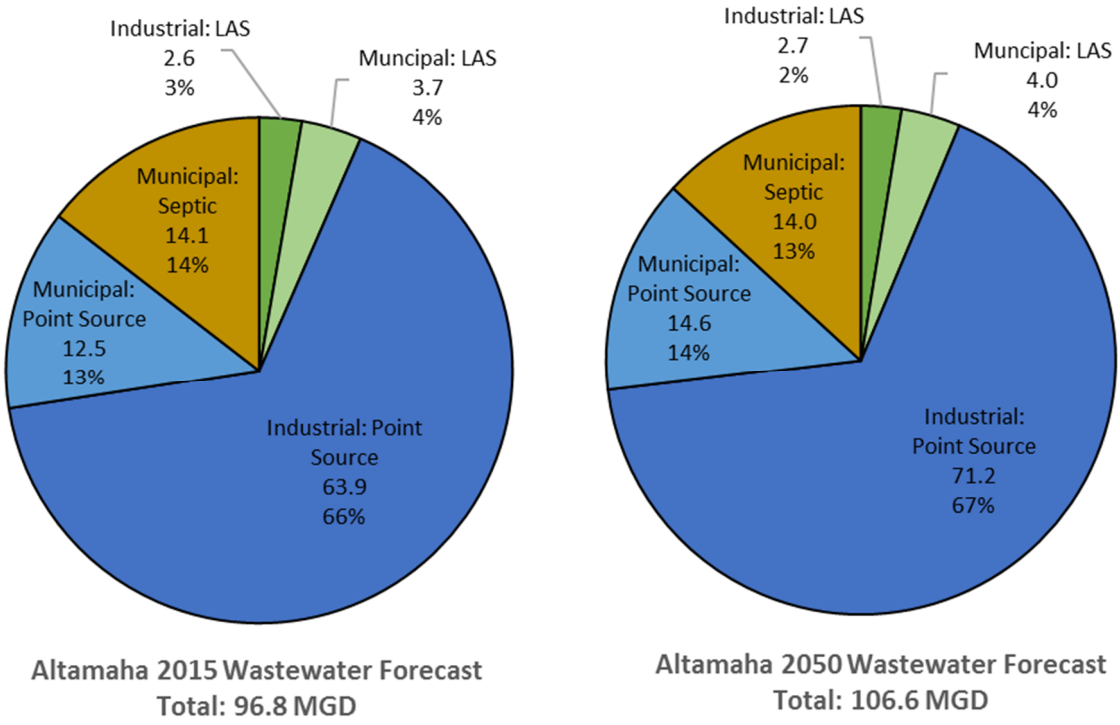

Figure 2-2: Altamaha Regional Wastewater Forecast by Discharge Method and Sector

2.2.1 Comparing Wastewater Forecasts to Permitted Capacity

About 17% 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 2-3** 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. There are currently no gaps predicted in meeting forecasted wastewater demands for the region.

Table 2-3: 2050 Municipal Wastewater Forecast versus Existing Permitted Capacity (MGD)

County	Point Source (PS)			Land Application Systems (LAS)		
	2050 Forecast[1]	Permitted Capacity	2050 Surplus or Gap (-)	2050 Forecast[1]	Permitted Capacity	2050 Surplus or Gap (-)
Appling	1.23	2.80	1.57	0	0	0
Bleckley	0.49	1.00	0.51	0	0	0
Candler	0	0	0	0.60	1.00	0.40
Dodge	0.64	1.80	1.16	0.32	0.50	0.18
Emanuel	2.87	3.01	0.14	0.29	1.00	0.71
Evans	0.05	0.52	0.47	0.05	0.22	0.17
Jeff Davis	0.84	1.50	0.66	0	0	0
Johnson	0.55	0.75	0.20	0	0	0
Montgomery	0.34	0.35	0.01	0.03	0.15	0.12
Tattnall	2.01	2.91	0.90	0.31	0.74	0.43
Telfair	0.55	1.30	0.75	0.70	1.80	1.10
Toombs	1.51	3.23	1.72	1.48	1.80	0.32
Treutlen	0.39	0.60	0.21	0	0	0
Wayne	2.36	2.50	0.14	0.14	0.18	0.04
Wheeler	0.59	1.04	0.45	0.09	0.21	0.13
Wilcox	0.20	0.67	0.47	0	0	0
Total	**14.62**	**23.96**	**9.35**	**4.00**	**7.59**	**3.59**

[1] 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 and Claiborne aquifers provided in September 2012. This resource assessment evaluated the estimated sustainable yield of a group of prioritized aquifers. Sustainable yield is the 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 specific to the Altamaha Region 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 Altamaha Region. Overall, water from the Floridan aquifer is used to meet 69% of the 2015 forecasted water demand for the whole region.

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 Altamaha region. Other water planning regions utilizing portions of the modeled Floridan aquifer include: Coastal Georgia, 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 Altamaha Region is highlighted. Demands are projected to remain under the estimated range of sustainable yield for this aquifer.

The local analysis of whether groundwater from the Floridan aquifer could be utilized to replace agricultural surface water withdrawals in the Canoochee River Basin 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. Within the Gulf Trough area, the properties of the Floridan aquifer are not as conductive to groundwater development. But based on this study, additional groundwater withdrawals are possible within the Canoochee River Basin and can contribute to reduction of current or future potential surface water gaps in the Canoochee River at the Claxton node (see Section 4.2.2 for more details).

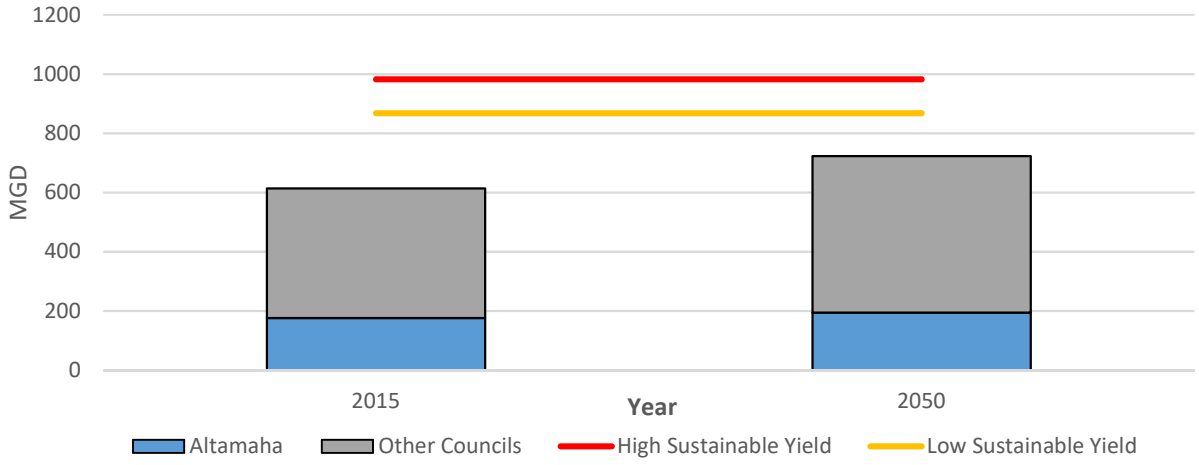

Figure 3-1: Floridan Aquifer in South Central Georgia & Eastern Coastal Plain Forecasted Groundwater Demand

3.2 Cretaceous Aquifer

Utilization of the Cretaceous aquifer within the Altamaha Region is fairly limited, accounting for only 3% of total water use in the region. 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. This modeled area encompasses Bleckley, Dodge, Emanuel, and Johnson counties for the Altamaha region. Other water planning regions utilizing portions of the modeled Cretaceous aquifer include: Middle Ocmulgee, Savannah-Upper Ogeechee, Suwannee-Satilla, Upper Oconee, and Upper Flint. **Figure 3-2** shows the forecasted demand for all regions utilizing the modeled portion of the Cretaceous aquifer. The portion of the demand coming from the Altamaha region is highlighted but only accounts for about 7 mgd. Demands are projected to remain under the estimated range of sustainable yield for this aquifer.

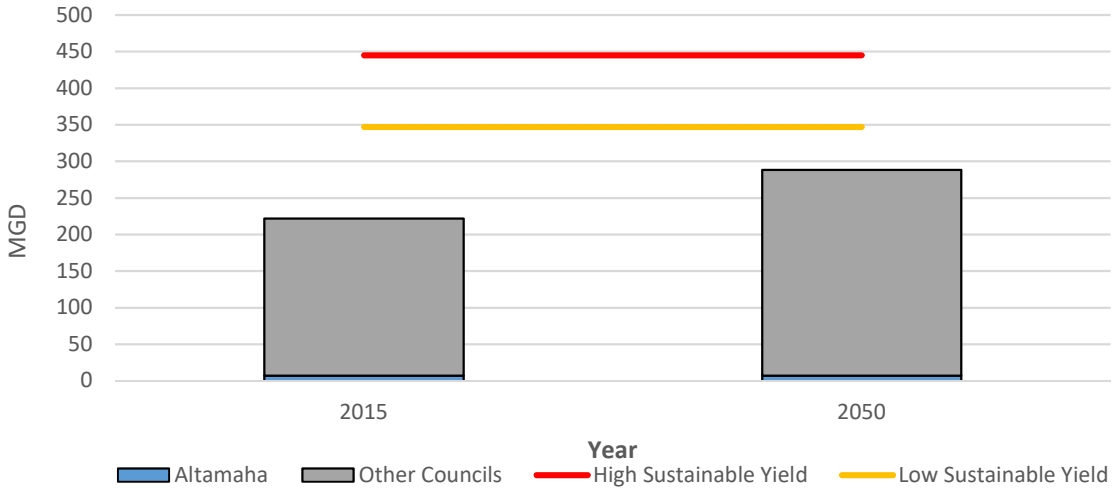

Figure 3-2: Cretaceous Aquifer Forecasted Groundwater Demand

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 only 0.2% of the total water use in the Altamaha Region. Demands from this aquifer are for agricultural water use within Bleckley, Candler, Wayne, and Wilcox counties. There is also some municipal self-supply (0.2 mgd) demands forecasted to come from the Brunswick aquifer in Wayne county.

3.4 Claiborne Aquifer

Utilization of the Claiborne aquifer is a negligible supply for the Altamaha Region. There are some small amounts utilized (<0.1 mgd) to meet agricultural demands in Dodge and Wilcox counties.

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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 Altamaha 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):

- **Claxton (Cannochee River) – Potential surface water gaps under current and future conditions.**
- 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.
- Atkinson (Satilla River) – Potential surface water gaps under current and future conditions.
- **Doctortown (Altamaha River) – No potential surface water gaps.**
- **Lumber City (Ocmulgee River) – No potential surface water gaps.**
- **Mount Vernon (Oconee River) – No potential surface water gaps.**
- Statenville (Alapaha River) - Potential surface water gaps under current and future conditions.

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

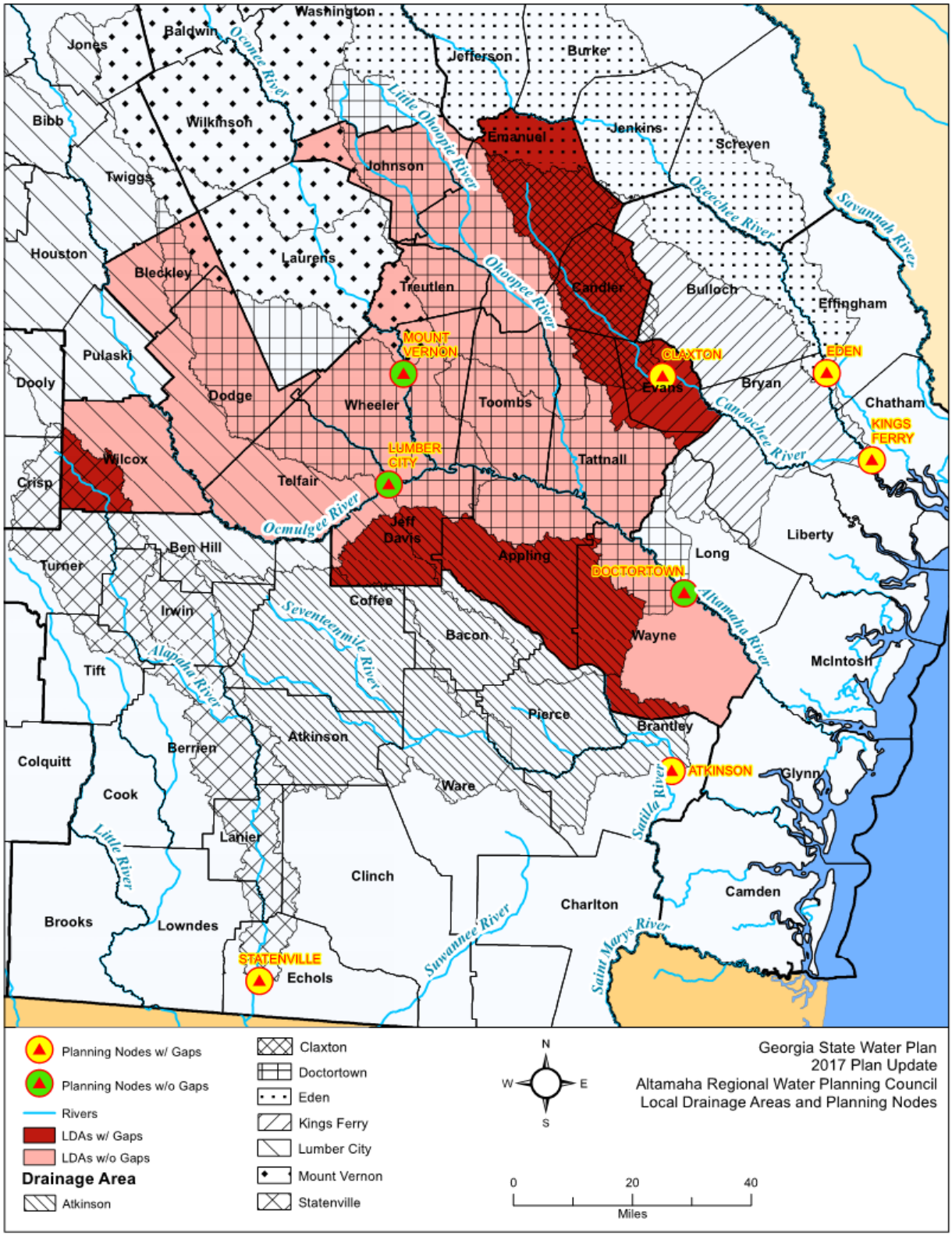

Figure 4-1: Potential Surface Water Gap Summary

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 for 2050. 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 potentials 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)[1]		Total Gap Days (% of Total Days)[2]		Average Daily Flow Deficit per Event	Average Cumulative Flow Deficit per Event
Atkinson Node						
1-7 days	43	(51.2%)	146	(0.5%)	9 cfs (6 MGD)	35 cfsd (23 MG)
8-14 days	11	(13.1%)	109	(0.4%)	16 cfs (10 MGD)	158 cfsd (103 MG)
15-30 days	17	(20.2%)	403	(1.5%)	21 cfs (14 MGD)	498 cfsd (324 MG)
>30 days	13	(15.5%)	608	(2.2%)	22 cfs (14 MGD)	1,031 cfsd (670 MG)
Totals	84	(100.0%)	1266	(4.6%)		
Claxton Node						
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%)		
Eden Node						
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%)		
Kings Ferry Node						
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%)		
Statenville Node						
1-7 days	91	(48.4%)	298	(1.1%)	9 cfs (6 MGD)	37 cfsd (24 MG)
8-14 days	37	(19.7%)	405	(1.5%)	21 cfs (14 MGD)	229 cfsd (149 MG)
15-30 days	27	(14.4%)	554	(2.0%)	26 cfs (17 MGD)	536 cfsd (348 MG)
>30 days	33	(17.6%)	2044	(7.5%)	38 cfs (25 MGD)	2,444 cfsd (1,589 MG)
Totals	188	(100.0%)	3301	(12.1%)		

[1] 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.

[2] 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 the Atkinson Node

The Atkinson node is located on the Satilla River in Atkinson, Georgia. Surface water withdrawals and discharges in the local drainage area for this node includes municipal returns, industrial demands, and agricultural use. **Table 4-2** provides an overview of the potential gaps at the Atkinson 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.

Table 4-2: Potential Surface Water Gaps at Atkinson Node

Scenario	Duration of Gap (% of total days)	Average Flow Deficit	Long-term Average Flow	Maximum 1-Day Gap	Corresponding Flow Regime
Current Demands	10	24 cfs / 16 MGD	2,208 cfs / 1,427 MGD	69 cfs / 45 MGD	118 cfs / 76 MGD
Future (2050) Demands	5	20 cfs / 13 MGD	2,236 cfs / 1,445 MGD	42 cfs / 27 MGD	85 cfs / 55 MGD

Table 4-3: Atkinson 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	
Satilla River				
Altamaha – Appling, Jeff Davis, Wayne	Agriculture: 2.82	6 MGD (9 cfs) 51.2% of all potential gap events	10 MGD (16 cfs) 13.1% of all potential gap events	2.82
Suwannee-Satilla – Atkinson, Bacon, Ben Hill, Brantley, Coffee, Irwin Pierce, Ware	Agriculture: 13.06 Industrial: 1.08			14.14
			Total:	**16.96**

4.2.2 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 agricultural withdrawals and municipal returns. **Table 4-4** provides an overview of the potential gaps at the Claxton 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.

As discussed in Section 3.1, there is an opportunity to replace agricultural surface water withdrawals within the local drainage area of the Claxton node with Floridan aquifer groundwater withdrawals to help reduce the estimated potential gaps. 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.

Table 4-4: 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 4-5: 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	
Canoochee River				
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
			Total:	**5.26**

4.2.3 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 4-6** provides an overview of the potential gaps at the Eden 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 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 4-7: 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	
Ogeechee River				
Altamaha - Emanuel	Agriculture: 0.05	7 MGD (11 cfs) 61.1% of all potential gap events	10 MGD (15 cfs) 16.7% of all potential gap events	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 Municipal Water: 0.17			7.87
Upper Oconee – Greene, Hancock, Washington	Agriculture: 1.42			1.42
			Total:	**10.64**

4.2.4 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 4-8** provides an overview of the potential gaps at the Kings Ferry node under current conditions and future conditions. **Table 4-9** 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 4-8: 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 4-9: 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	
Ogeechee River				
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 Municipal: 0.17			8.00
Upper Oconee – Greene, Hancock, Washington	Agriculture: 1.42			1.42
			Total:	**21.96**

4.2.5 Potential Gaps at Statenville Node

The Statenville node is located on the Alapaha River at Statenville, Georgia Surface water withdrawals and discharges in the local drainage area for this node includes municipal returns and agricultural use. **Table 4-10** provides an overview of the potential gaps at the Statenville node under current conditions and future conditions. **Table 4-11** 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 4-10: Potential Surface Water Gaps at Statenville Node

Scenario	Duration of Gap (% of total days)	Average Flow Deficit	Long-term Average Flow	Maximum 1-Day Gap	Corresponding Flow Regime
Current Demands	17	26 cfs / 17 MGD	1,047 cfs / 677 MGD	89 cfs / 58 MGD	100 cfs / 65 MGD
Future (2050) Demands	12	32 cfs / 21 MGD	1,058 cfs / 684 MGD	77 cfs / 50 MGD	77 cfs / 50 MGD

Table 4-11: Statenville 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	
Alapaha River				
Altamaha – Wilcox	Agriculture: 2.27	6 MGD (9 cfs) 48.4% of all potential gap events	14 MGD (21 cfs) 19.7% of all potential gap events	2.27
Suwannee-Satilla – Atkinson, Ben Hill, Berrien, Coffee, Echols, Irwin, Lanier, Tift, Turner	Agriculture: 19.45			19.45
Upper Flint – Crisp, Dooly	Agriculture: 3.99			3.99
			Total:	**25.71**

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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 Altamaha 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 Altamaha Region at current permitted conditions are presented in **Table 5-1** and **Figure 5-1**.

The current permitted conditions DO modeling incorporated municipal and industrial wastewater dischargers operating at their full permitted flow and effluent limits. EPD also provided the Altamaha Council with the results of current conditions DO modeling analysis in the Altamaha basin that incorporated actual wastewater discharge levels (annual average flow and effluent) from 2014. The results from that analysis are provided in **Figure 5-2** at the end of this subsection.

Table 5-1: Permitted Assimilative Capacity for DO in the Altamaha Region

Basin	Available Assimilative Capacity (Total Mileage)						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)	Unmodeled	
Altamaha	152	57	44	86	46	0	385
Ocmulgee	120	81	54	22	29	0	306
Oconee	15	11	1	28	25	0	80
Ogeechee	19	69	65	15	10	4	182
Suwannee	0	1	0	<1	9	0	11

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

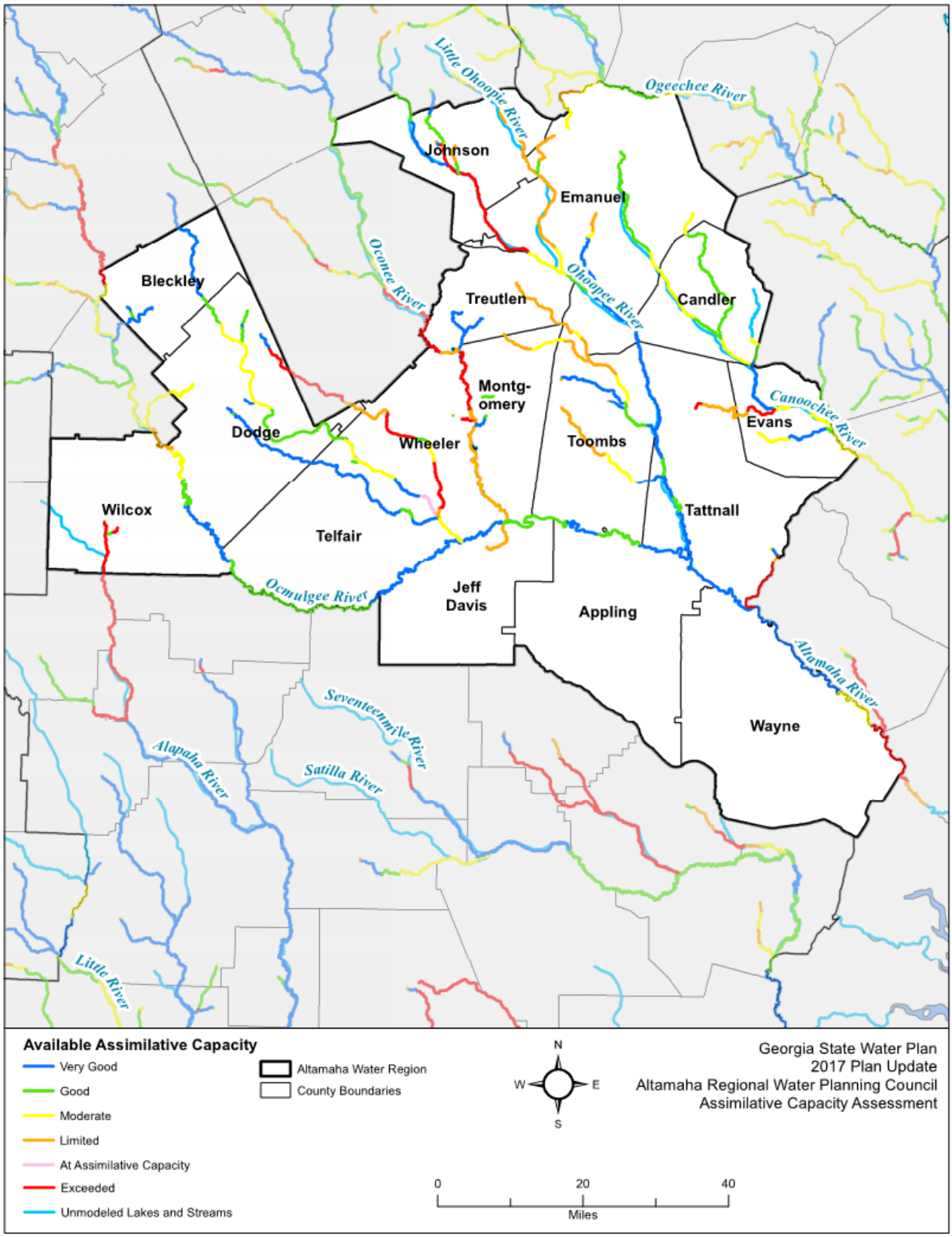


Figure 5-1: Results of DO Assimilative Capacity Assessment at Permitted Conditions

The stream segments at or exceeding their assimilative capacity within the Altamaha 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 - Penholoway Creek to Doctors Creek	3.2
	Beards Creek - 70' Contour to Altamaha River	10.5
	Beards Creek - Beards Creek	0.1
	Big Cedar Creek - Unnamed Trib to Ohoopee River	3.0
	Ohoopee River - Big Cedar Creek to Cypress Creek	2.1
	Ohoopee River - Cypress Creek to Neels Creek	5.0
	Ohoopee River - Hwy 80 to Hwy 221	6.9
	Ohoopee River - Neels Creek to Hwy 80	5.6
	Unnamed Tributary to Big Cedar Creek - Unnamed Trib to Bid Cedar Creek	0.9
Ocmulgee	Alligator Creek - 168' Elevation to Alamo WPCP	6.7
	Alligator Creek - 270' Contour to SR 46 (USGS02216028)	5.4
	Alligator Creek - Proposed Outfall to 100' Contour	9.3
	Little Ocmulgee River - SR 134 (USGS02216000) to Alligator Creek	5.5
	Ocmulgee River - Savage Creek to Shellstone Creek	2.7
Oconee	Oconee River - Flat Creek to Ochwalkee Creek	0.5
	"Oconee River - Red Bluff Creek to Flat Creek"	10.8
	Oconee River - Shady Field Landing to Route 46	2.7
	Oconee River - Shady Field Landing to Route 46	8.4
	Peterson Creek - Local Road to Oconee River	2.2
Ogeechee	Cedar Creek - Collins WPCP to Cypress Flat Creek	1.3
	Cedar Creek - Water Hole Creek to Canoochee River	5.0
	Tenmile Creek - Headwaters to DS SR 46	3.7
Suwannee	Alapaha River - Alapaha River to Trib X	2.9
	Alapaha River - Reynolds Creek to Unnamed Trib	1.1
	Alapaha River - Rochelle-Northwest WPCP to Reynolds Creek	0.6
	Alapaha River - Unnamed Trib to Alapaha River	3.4
	Unnamed Trib to Mill Creek - Rochelle Southeast WPCP to Hwy 112	1.2

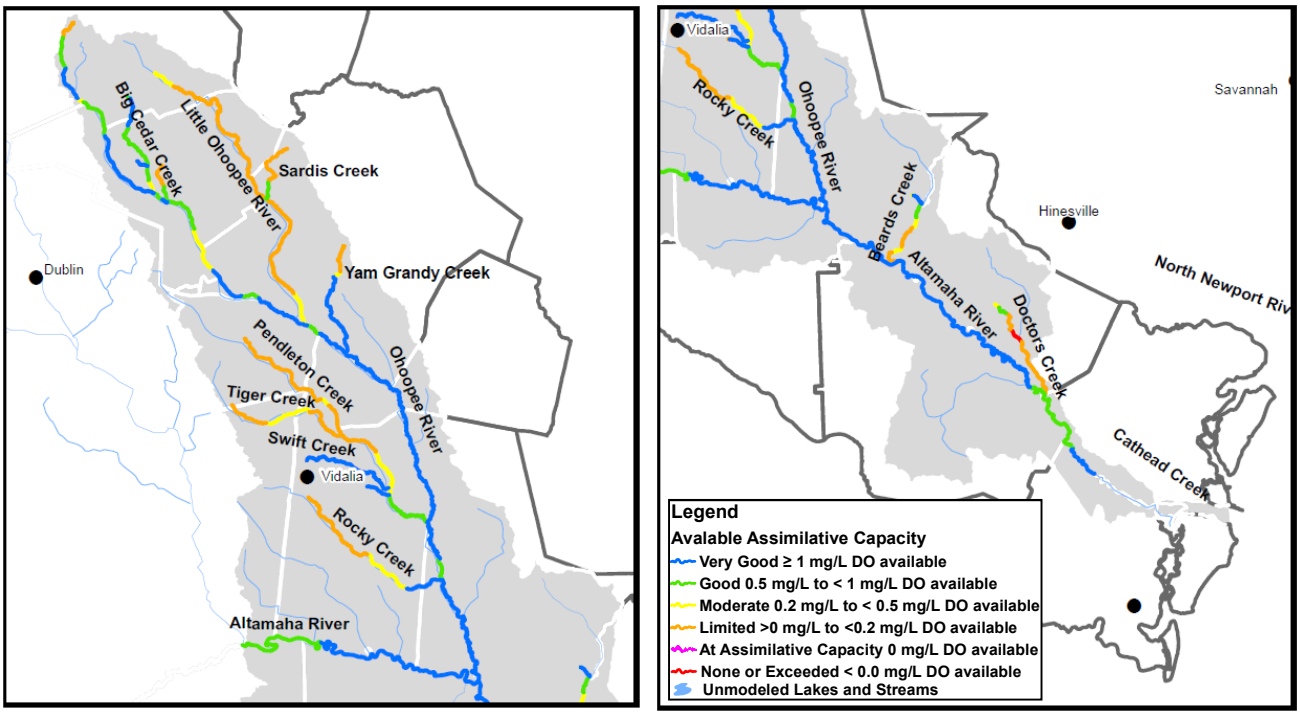


Figure 5-2: Results of Assimilative Capacity Assessment at Current (2014 Annual Average Discharge) Conditions in the Altamaha River Basin

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 Altamaha Region, there are 74 impaired stream reaches (total impaired length of 755 miles) and 2 impaired lakes (total impaired area of 390 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):

- 30% are impaired for low dissolved oxygen
- 40% are impaired for fecal coliform
- 17% are impaired for Biological (Fish Community)
- 10% are impaired for trophic-weighted residual mercury in fish tissue
- 2% are impaired for lead
- 1% are impaired for pH

A map of the impaired waters is provided in **Figure 5-3**. Both impaired lakes in the region are impaired for trophic-weighted residual mercury in fish tissue. TMDLs have been completed for 69 of the impaired stream reaches and 2 of the impaired lakes.

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 Altamaha 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 Altamaha River Watershed under 2050 future conditions for a wet year are provided in **Figure 5-4** for total nitrogen and **Figure 5-5** for total phosphorus. There are currently no nutrient standards for total nitrogen and total phosphorus in the region.

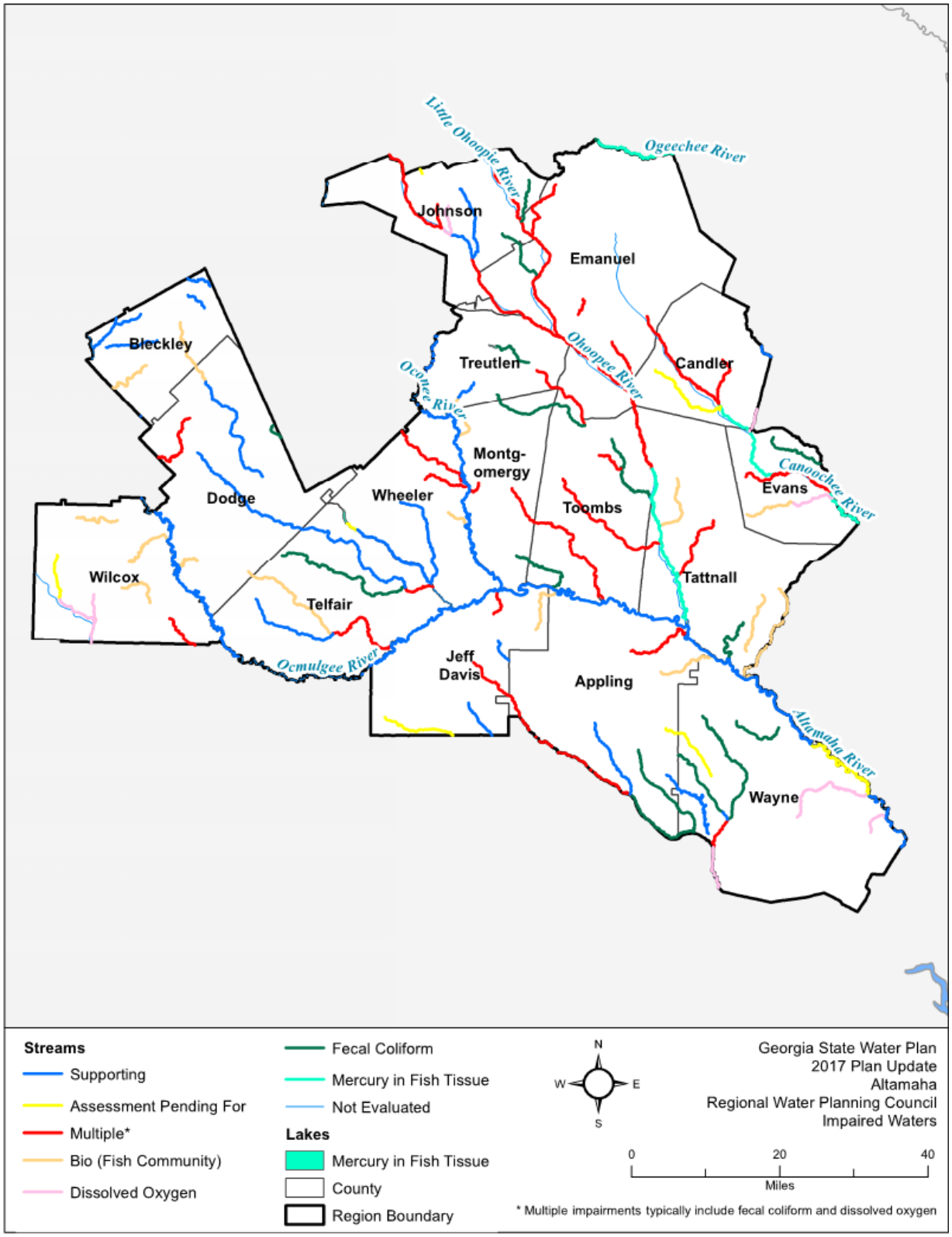


Figure 5-3: Impaired Water Bodies

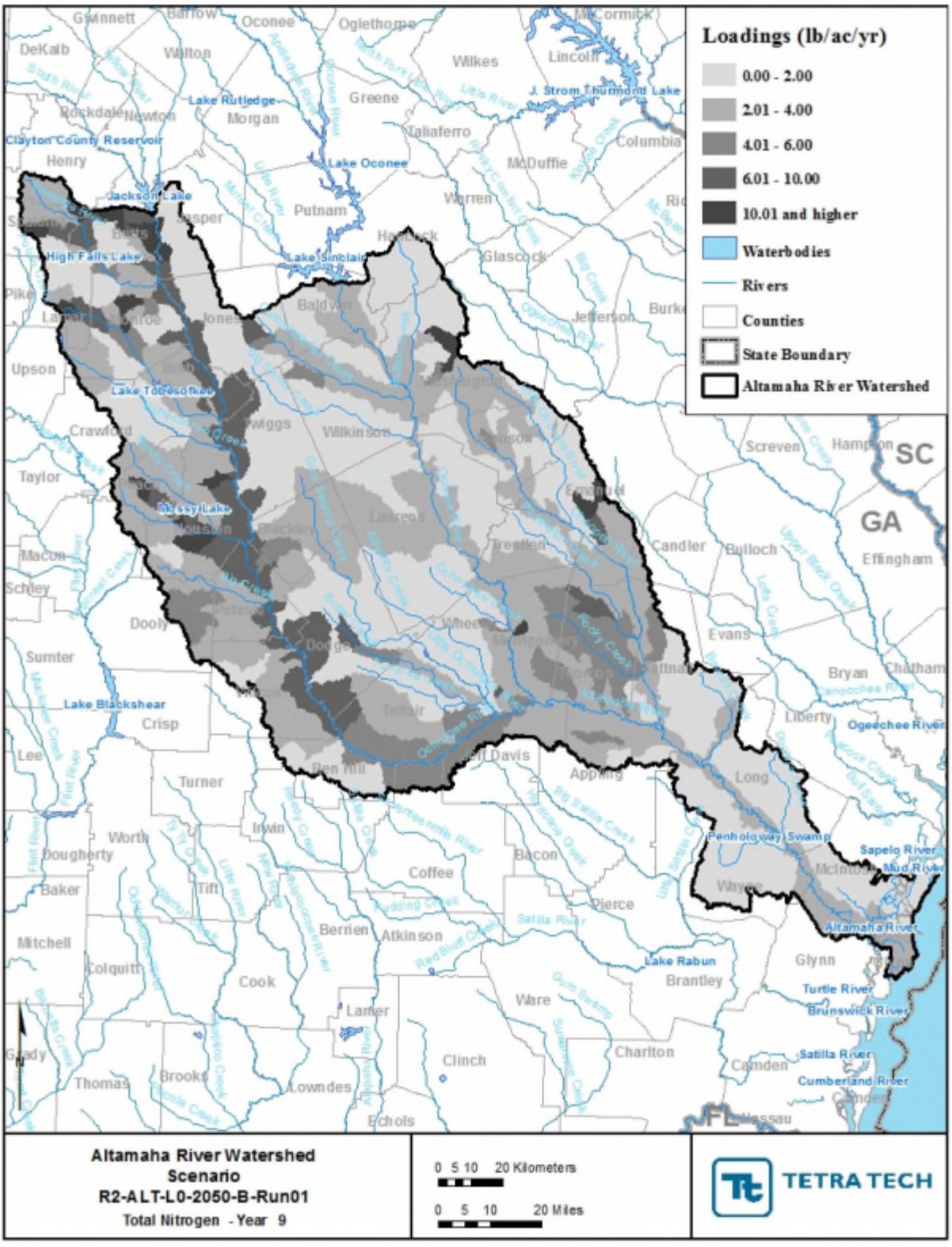


Figure 5-4: Total Nitrogen Loading for the Altamaha River Watershed during Wet Year Future (2050) Conditions

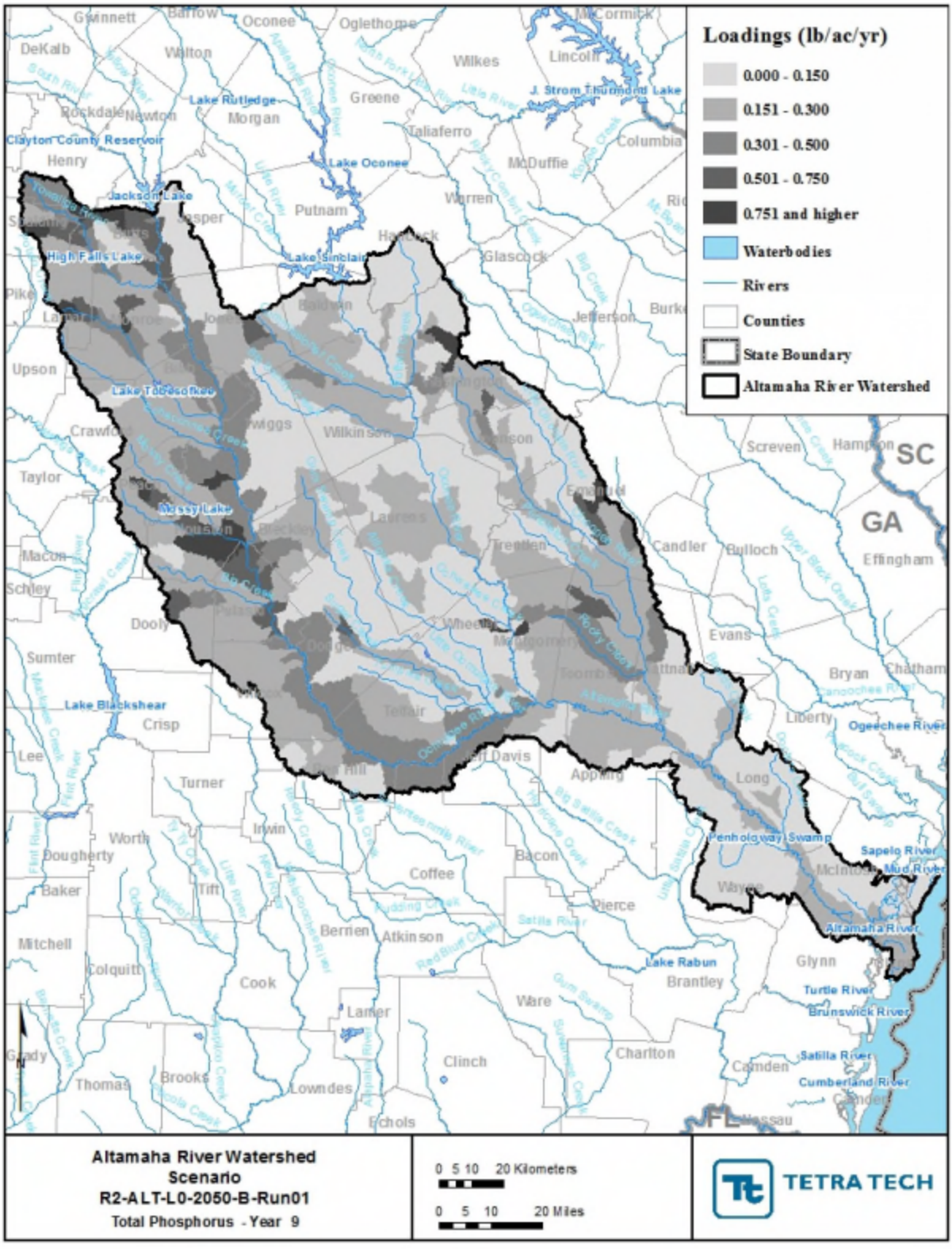


Figure 5-5: Total Phosphorus Loading for the Altamaha River Watershed during Wet Year Future (2050) Conditions

Section 6
Gap Analysis Summary

This section summarizes the potential water resources issues in the Altamaha Region. **Table 6-1** summarizes the potential water resource issues and permitted capacity needs in the Altamaha Region by county. Potential water resource issues include:

- Over the planning horizon, forecasted surface water demands within the Altamaha Region are projected to cause potential gaps in surface water availability in the Canoochee River at the Claxton planning node. Increased demand in the region may also add to potential surface water gaps downstream of the region on the Ogeechee River at the Eden and Kings Ferry planning nodes, the Satilla River at Atkinson node, and the Alapaha River at the Statenville node.
- At the regional level, for modeled aquifers, no groundwater resource shortfalls are expected to occur in the Altamaha Region over the planning horizon.
- Assimilative capacity assessments indicate the need for improved wastewater treatment in some facilities within the Altamaha, Ocmulgee, Ogeechee, and Suwannee 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
Source	*Table 2-2*	*Figure 4-1*	*Table 2-3*	*Figure 5-1*
Appling	-	Yes	-	-
Bleckley	-	-	-	-
Candler	-	Yes	-	-
Dodge	-	-	-	Yes
Emanuel	Yes	Yes	-	Yes
Evans	Yes	Yes	-	-
Jeff Davis	Yes	Yes	-	-
Johnson	-	-	-	Yes
Montgomery	-	-	-	-
Tattnall	-	Yes	-	Yes
Telfair	-	-	-	-
Toombs	-	-	-	-
Treutlen	-	-	-	Yes
Wayne	-	Yes	-	Yes
Wheeler	Yes	-	-	Yes
Wilcox	-	Yes	-	-

Notes:
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.

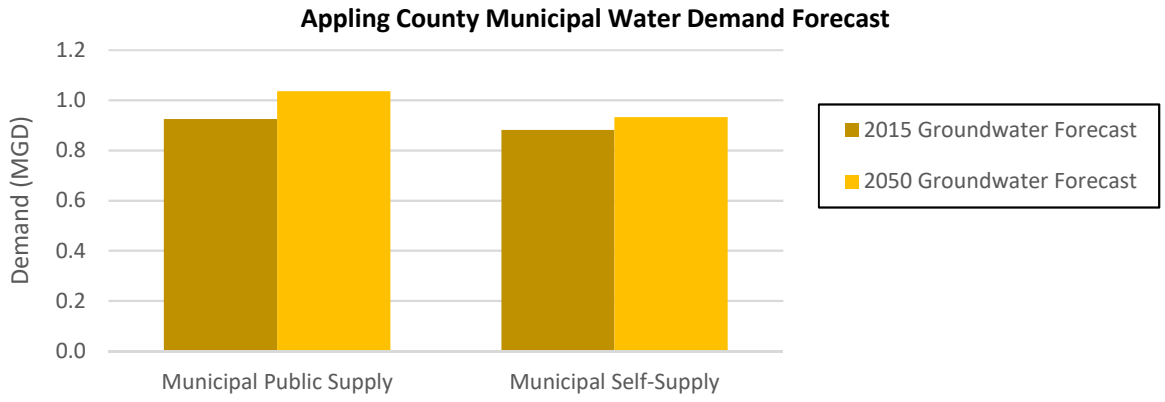
Appling County

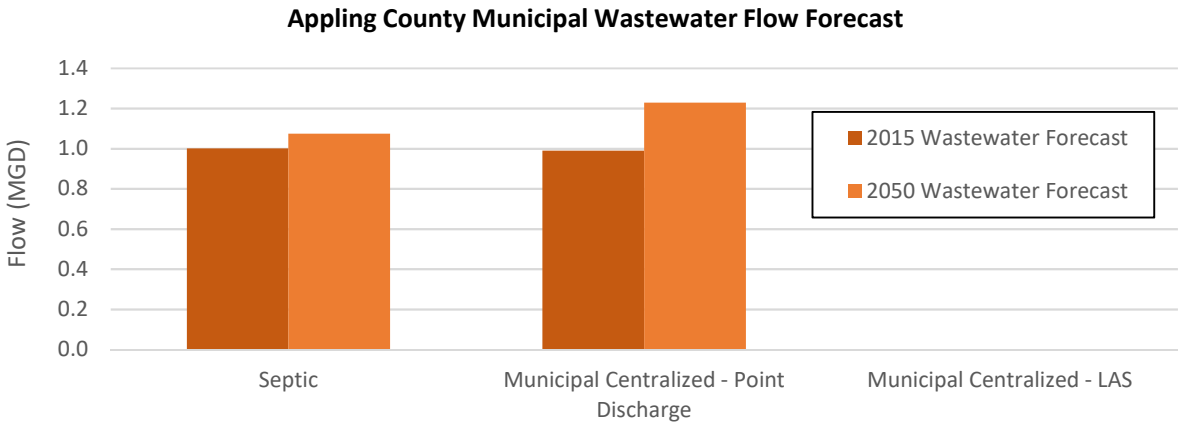
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	1.4	1.0	0.4
Surface Water	0	0	0.0
Municipal Wastewater (MGD)			
NPDES (Point Source)	2.8	1.2	1.6
LAS (Land Application)	0	0	0.0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Baxley, City of	001-0002	1.4	Floridan Aquifer
Existing Permitted Wastewater Facility			
Baxley WPCP	GA0038725	2.8	Altamaha River





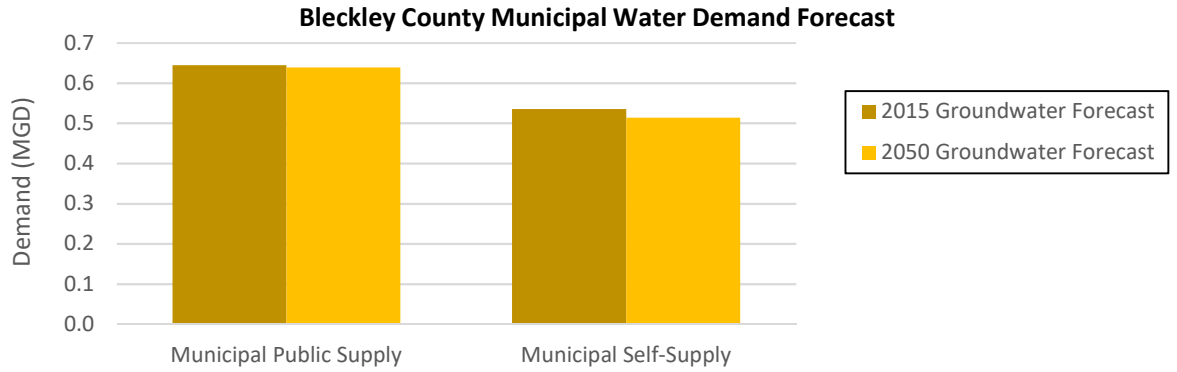
Bleckley County

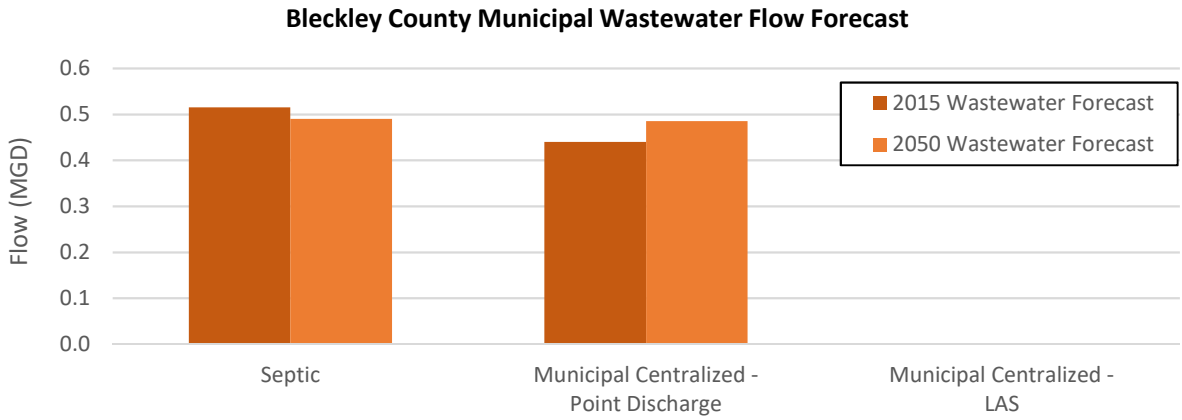
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	2.15	0.6	1.5
Surface Water	0	0	0.0
Municipal Wastewater (MGD)			
NPDES (Point Source)	1	0.5	0.5
LAS (Land Application)	0	0	0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Cochran, City of	012-0001	2.0	Floridan Aquifer
Middle Georgia College	012-0002	0.15	Florida, Claiborne Aquifer
Existing Permitted Wastewater Facility			
Cochran WPCP	GA0032107	1	Jordan Creek





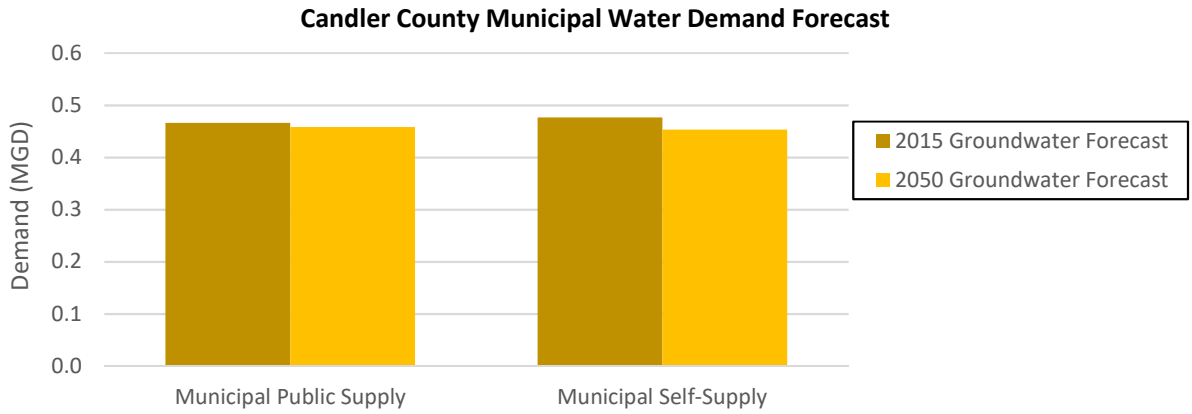
Candler County

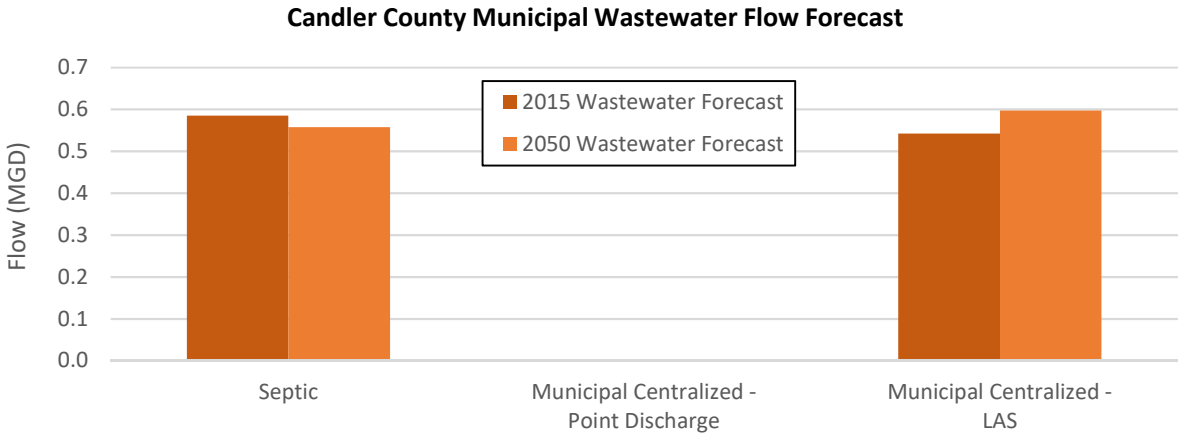
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.9	0.5	0.4
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0	0	0
LAS (Land Application)	1	0.1	0.9

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Metter, City of	021-0001	0.9	Floridan Aquifer
Existing Permitted Wastewater Facility			
Metter LAS	GA02-185	1	LAS





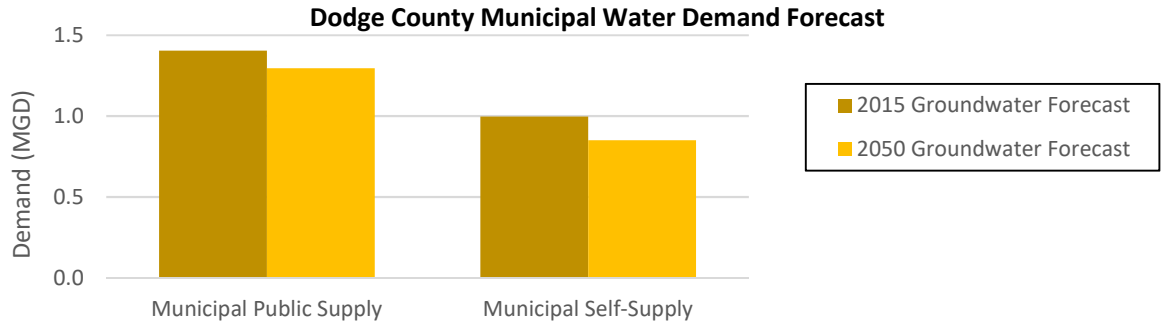
Dodge County

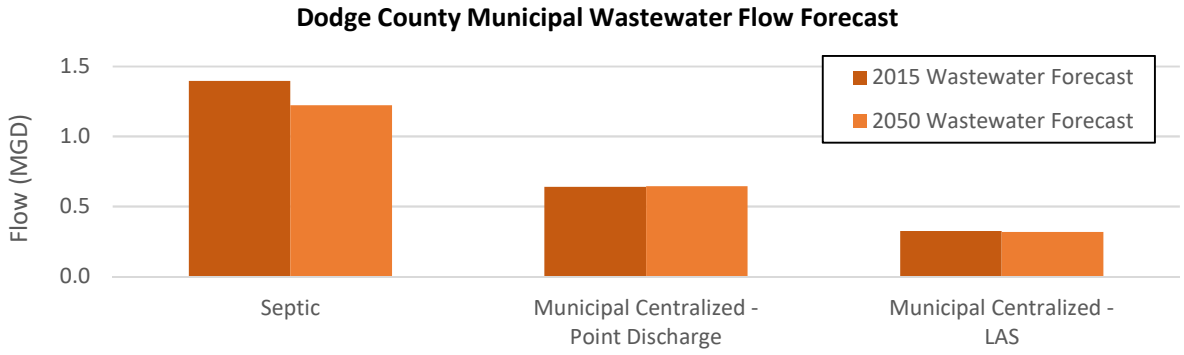
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	3.1	1.3	1.8
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	1.8	0.6	1.2
LAS (Land Application)	0.5	0.3	0.2

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Eastman, City of	045-0001	2.8	Floridan Aquifer
Chester, City of	045-0003	0.25	Floridan Aquifer
Existing Permitted Wastewater Facility			
Eastman South WPCP	GA0046485	1.8	Sugar Creek Tributary
Chester, City of (LAS)	GAJ020202	0.3	LAS
Milan LAS	GAJ020086	0.2	LAS





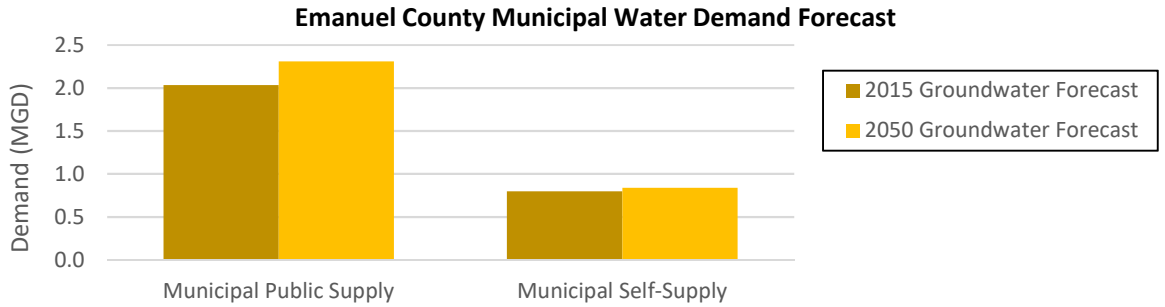
Emanuel County

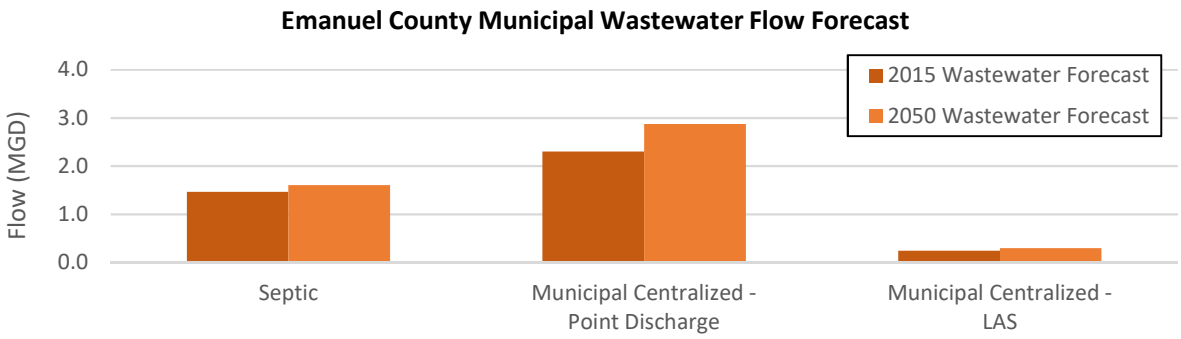
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	1.95	2.31	-0.36
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	3.01	0.6	2.4
LAS (Land Application)	1	0.1	0.9

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Swainsboro, City of	053-0001	1.7	Floridan Aquifer
Twin City, City of	053-0003	0.25	Floridan Aquifer
Existing Permitted Wastewater Facility			
Swainsboro WPCP (New)	GA0039225	3	Yam Grandy Creek
Scott Health & Rehabilitation WPCP	GA0031551	0.0067	Pendleton Creek
Stillmore LAS	GAJ020075	0.05	LAS
Swainsboro, City of (LAS)	GAJ020257	0.75	LAS
Twin City, City of (WPCP)	GA02-021	0.2	LAS





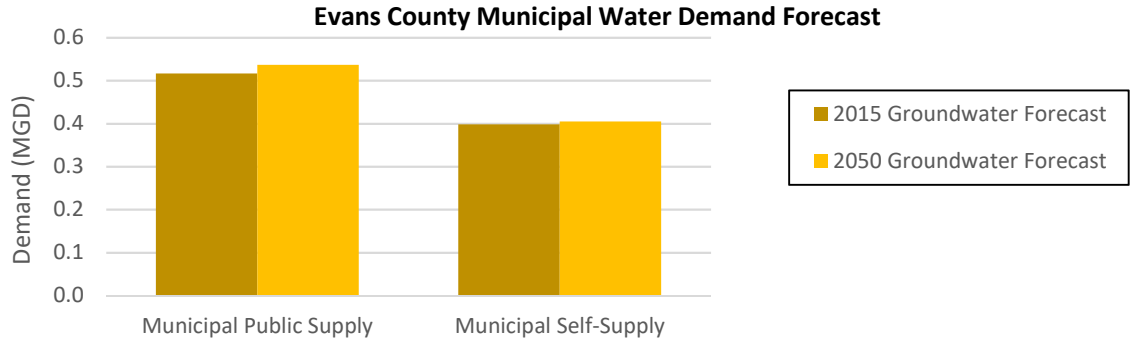
Evans County

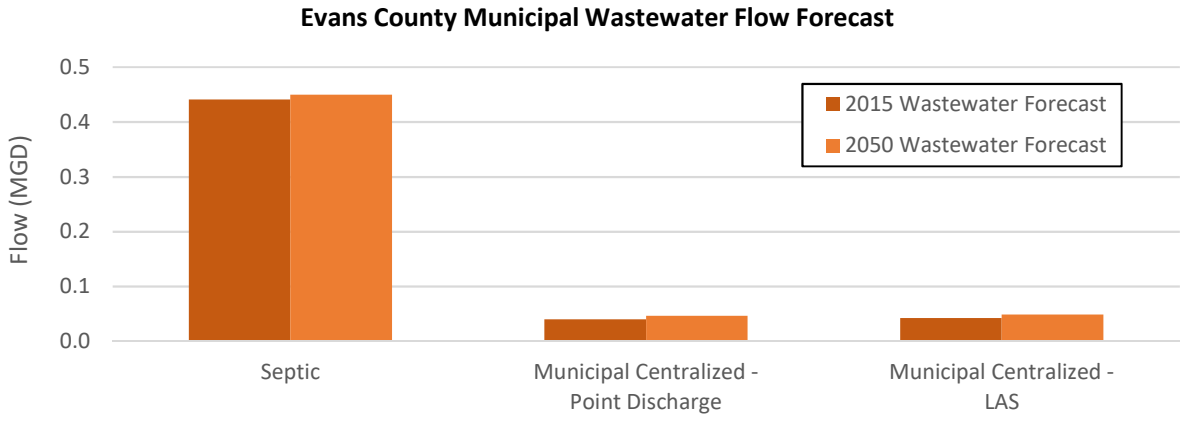
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.50	0.54	-0.04
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0.52	0	0.5
LAS (Land Application)	0.22	0	0.2

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Claxton, City of	054-0001	0.5	Floridan Aquifer
Existing Permitted Wastewater Facility			
Claxton WPCP	GA0038351	0.52	Unnamed Tributary to the Canoochee River
Camp Oliver	GAJ030624	0.07	LAS
Hagan, City of	GAJ020042	0.15	LAS





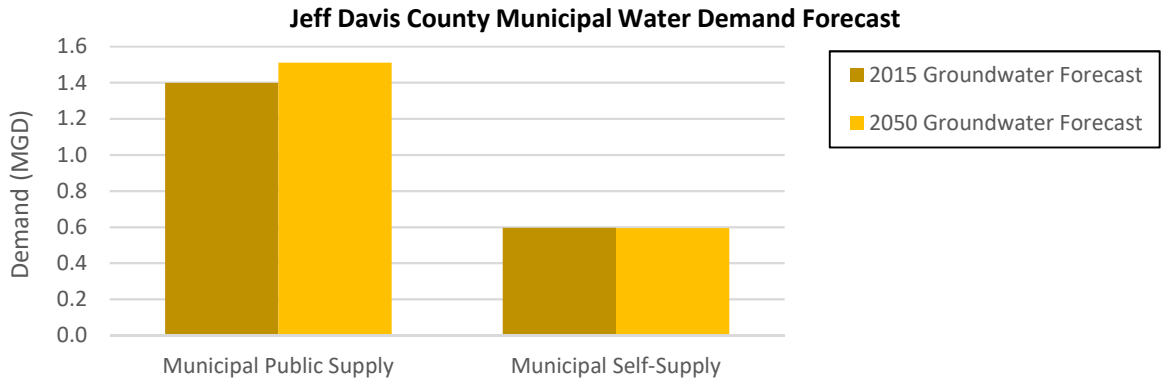
Jeff Davis County

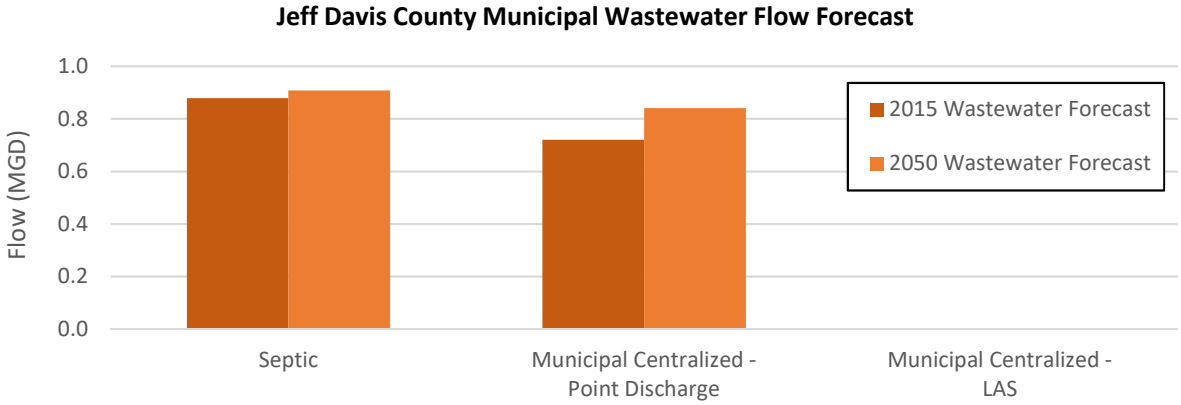
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.85	1.5	-0.7
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	1.5	0.8	0.7
LAS (Land Application)	0	0	0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Hazlehurst, City of	080-0002	0.85	Floridan Aquifer
Existing Permitted Wastewater Facility			
Hazlehurst Bully Creek WPCP	GA0036765	1.5	Ocmulgee River





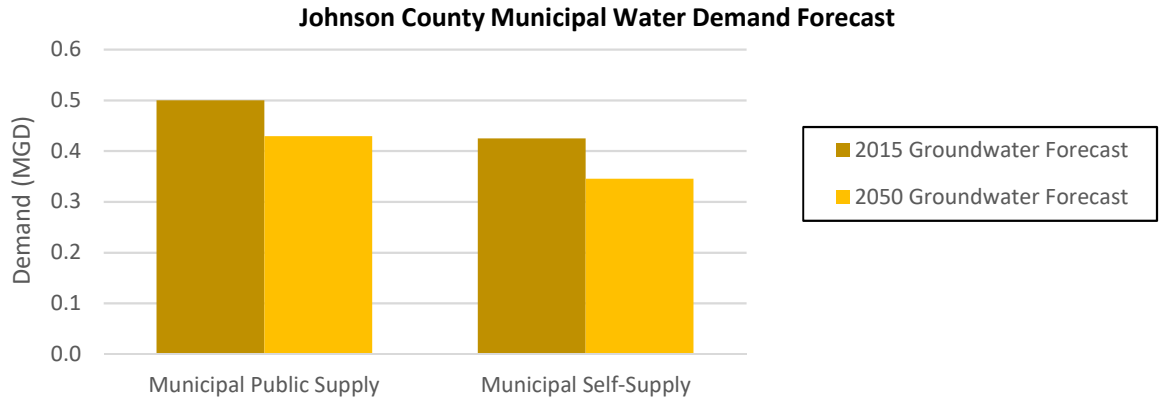
Johnson County

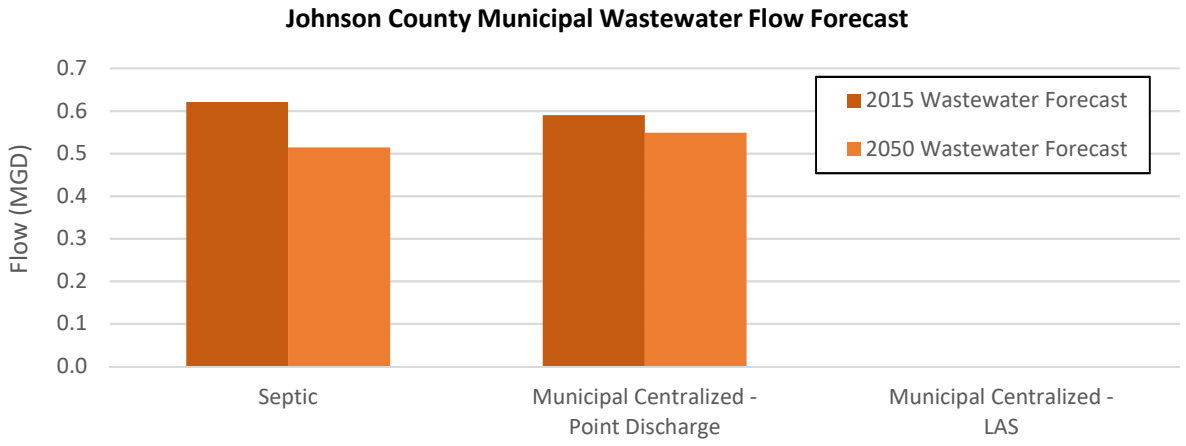
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.85	0.43	0.42
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0.75	0.5	0.2
LAS (Land Application)	0	0	0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Wrightsville, City of	083-0001	0.85	Cretaceous Aquifer
Existing Permitted Wastewater Facility			
Wrightsville WPCP	GA0032395	0.7452	Big Cedar Creek Tributary





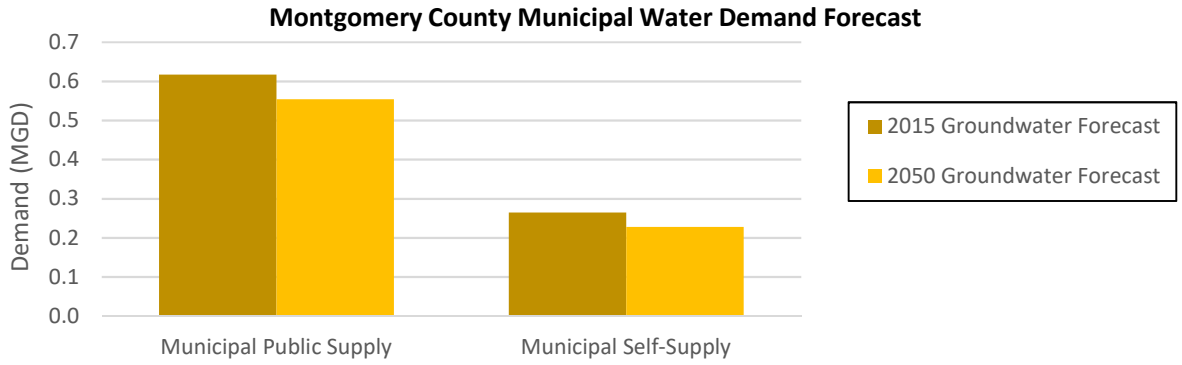
Montgomery County

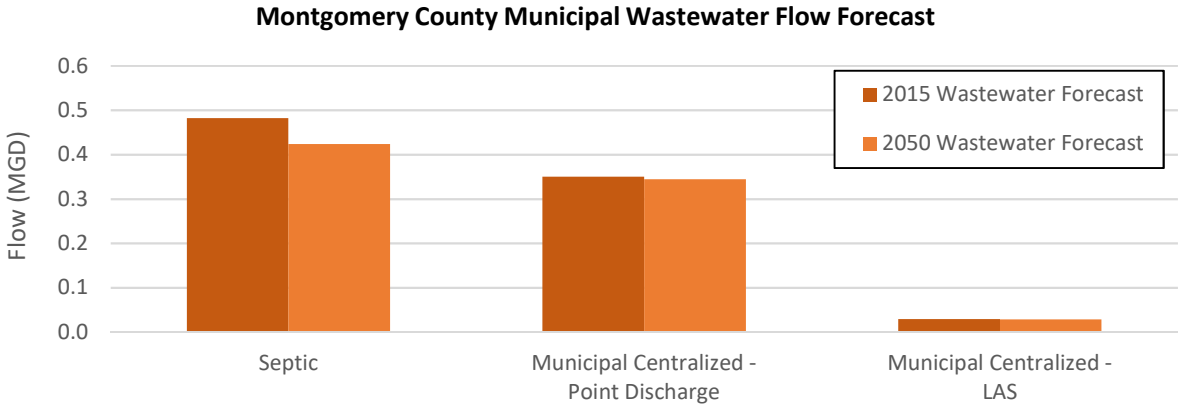
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.8	0.6	0.2
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0.35	0.34	0.0054
LAS (Land Application)	0.15	0.03	0.12

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Mount Vernon, City of	103-0001	0.8	Floridan Aquifer
Existing Permitted Wastewater Facility			
Mount Vernon	GA0033758	0.27	Limestone Creek
Ailey	GA0049247	0.08	Flat Creek Tributary
Uvalda LAS	GAJ020040	0.15	LAS





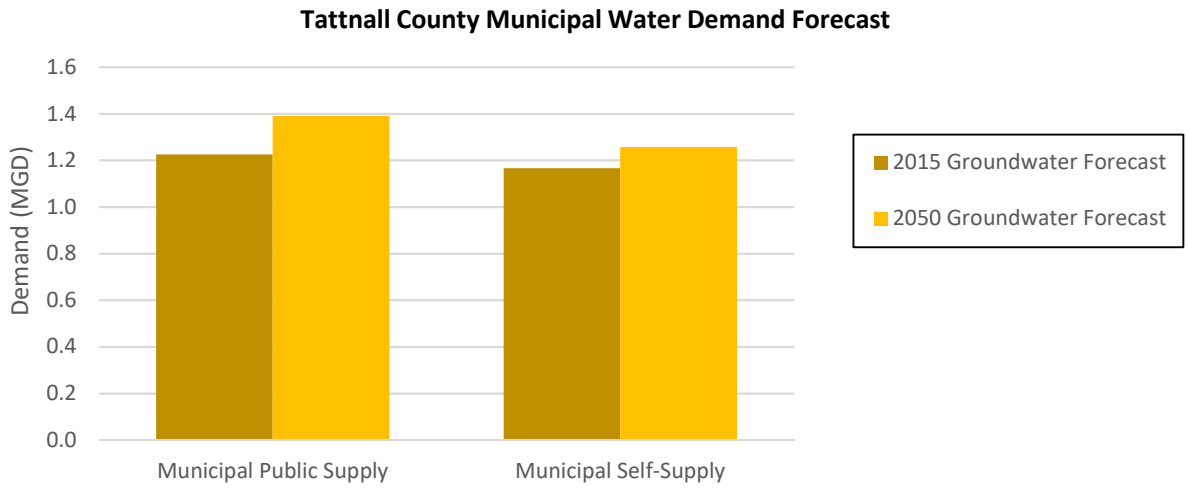
Tattnall County

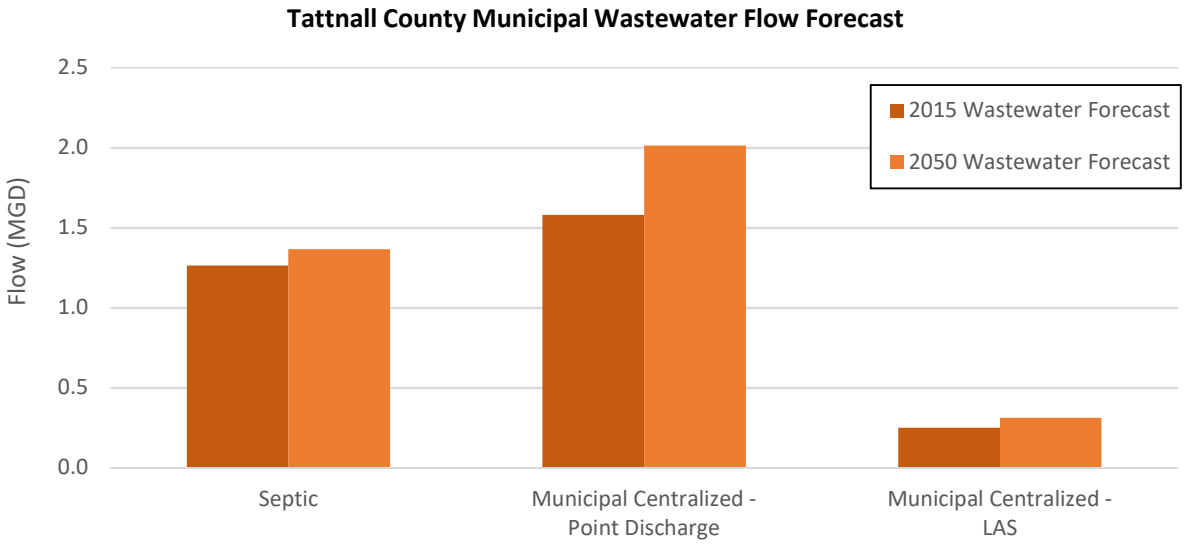
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	3.37	1.39	1.98
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	2.91	2.01	0.89
LAS (Land Application)	0.74	0.31	0.43

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Georgia Department of Corrections - Rogers Correctional Institute	132-0001	1.25	Floridan Aquifer
Glenville, City of	132-0002	1.12	Floridan Aquifer
Reidsville, City of	132-0003	1	Floridan Aquifer
Existing Permitted Wastewater Facility			
Collins Pond WPCP	GA0021091	0.06	Cypress Flat Creek tributary to Cedar Creek
Glenville WPCP	GA0037982	2	Brickyard Branch
Rogers State Prison WPCP	GA0022900	0.85	Ohoopee River
Collins WPCP	GAJ040012	0.06	LAS
DNR - Lynntown Road at Gordonia - Altamaha State Park	GAJ020255	0.18	LAS
Reidsville - Sherwood Forest WPCP	GAJ020058	0.5	LAS


Tattnall County Municipal Water Demand Forecast
Demand (MGD)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Municipal Public Supply
Municipal Self-Supply
2015 Groundwater Forecast
2050 Groundwater Forecast


Tattnall County Municipal Wastewater Flow Forecast
Flow (MGD)
2.5
2.0
1.5
1.0
0.5
0.0
Septic
Municipal Centralized - Point Discharge
Municipal Centralized - LAS
2015 Wastewater Forecast
2050 Wastewater Forecast

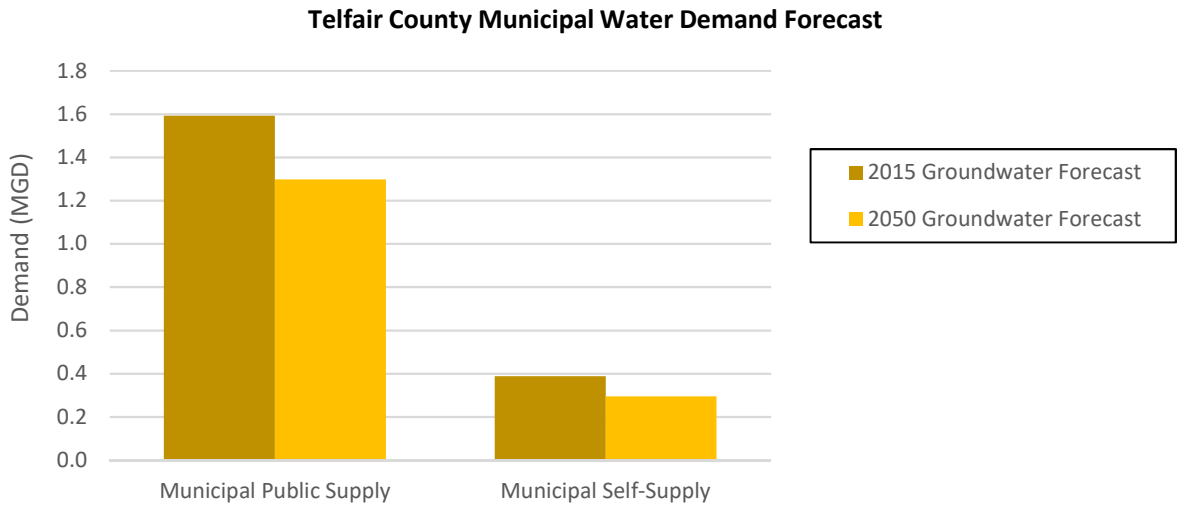
Telfair County

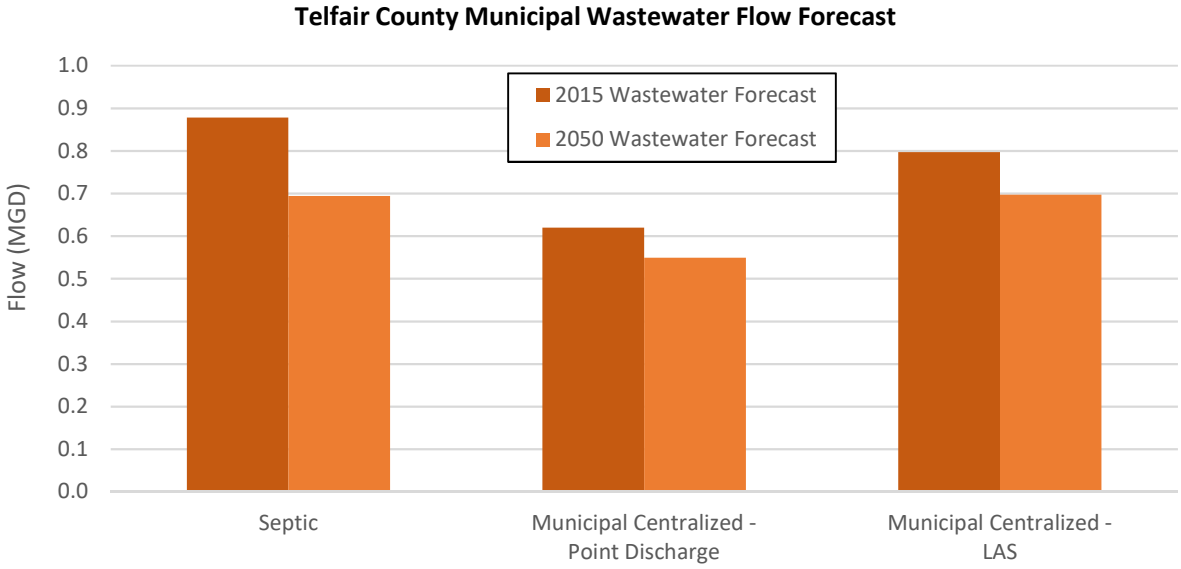
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	2.02	1.29	0.73
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	1.3	0.55	0.75
LAS (Land Application)	1.8	0.69	1.1

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
McRae, City of	134-0001	1	Floridan Aquifer
Lumber City, City of	134-0003	0.25	Floridan Aquifer
Helena, City of	134-0005	0.6	Floridan Aquifer
Milan, City of	134-0006	0.175	Floridan Aquifer
Existing Permitted Wastewater Facility			
Helena WPCP (HCR Discharge)	GA0048674	0.8	Ocmulgee River Tributary
Lumber City Pond	GA0050199	0.5	Ocmulgee River
McRae-Helena LAS	GAJ020248	1.75	LAS
Telfair State Prison	GAJ030842	0.045	LAS


Telfair County Municipal Water Demand Forecast
Demand (MGD)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Municipal Public Supply
Municipal Self-Supply
2015 Groundwater Forecast
2050 Groundwater Forecast


Telfair County Municipal Wastewater Flow Forecast
Flow (MGD)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Septic
Municipal Centralized - Point Discharge
Municipal Centralized - LAS
2015 Wastewater Forecast
2050 Wastewater Forecast

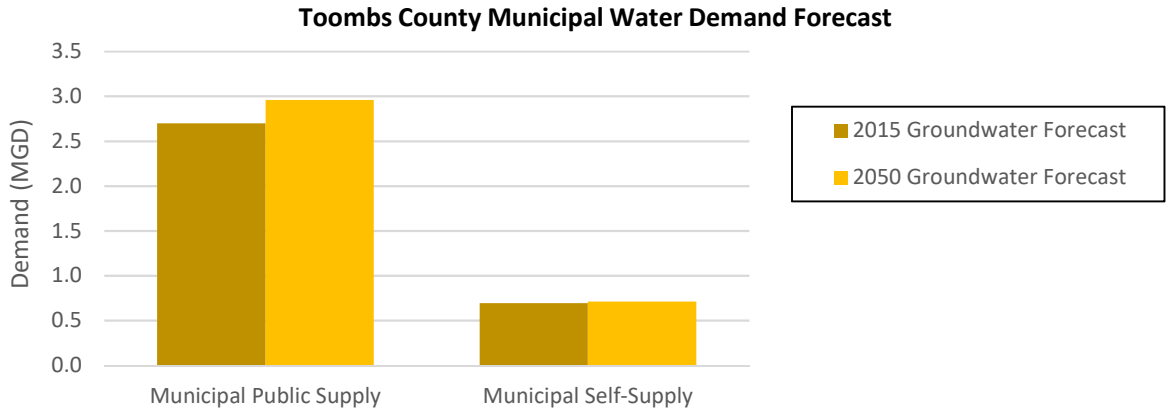
Toombs County

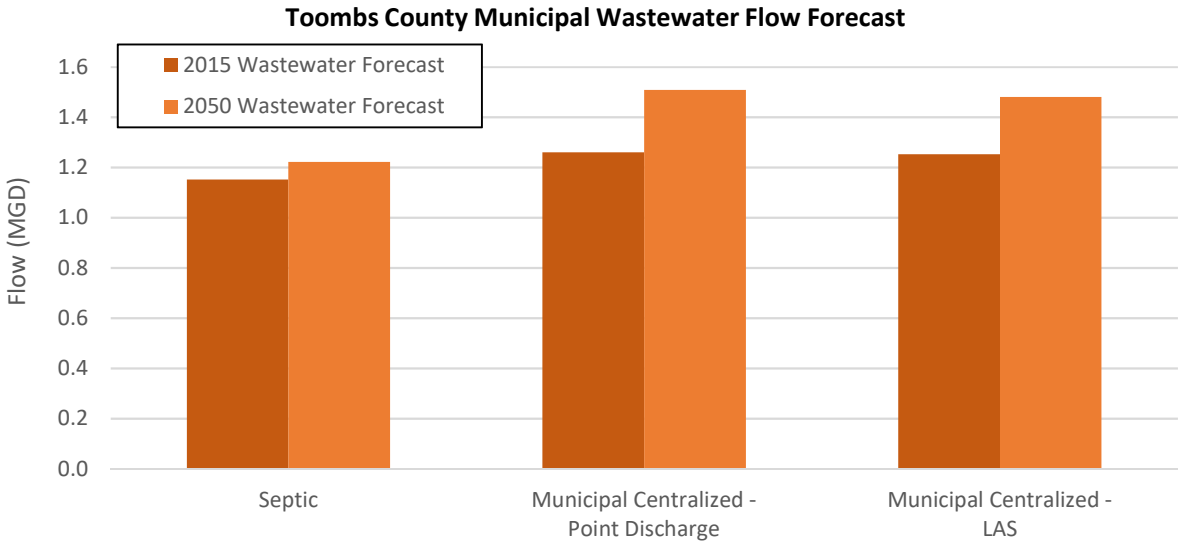
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	5	2.96	2.04
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	3.23	1.51	1.72
LAS (Land Application)	1.8	1.48	0.32

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Vidalia, City of	138-0001	4	Floridan Aquifer
Lyons, City of	138-0002	1	Floridan Aquifer
Existing Permitted Wastewater Facility			
Santa Claus WPCP	GA0050059	0.01	Unnamed Tributary to Rocky Creek
Lyons North WPCP	GA0033392	0.67	Rocky Creek
Lyons East WPCP	GA0033405	0.67	Swift Creek
Vidalia WPCP	GA0025488	1.88	Swift Creek
Vidalia - South WPCP (LAS)	GAJ020100	1.8	LAS


Toombs County Municipal Water Demand Forecast
Demand (MGD)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Municipal Public Supply
Municipal Self-Supply
2015 Groundwater Forecast
2050 Groundwater Forecast


Toombs County Municipal Wastewater Flow Forecast
Flow (MGD)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2015 Wastewater Forecast
2050 Wastewater Forecast
Septic
Municipal Centralized - Point Discharge
Municipal Centralized - LAS

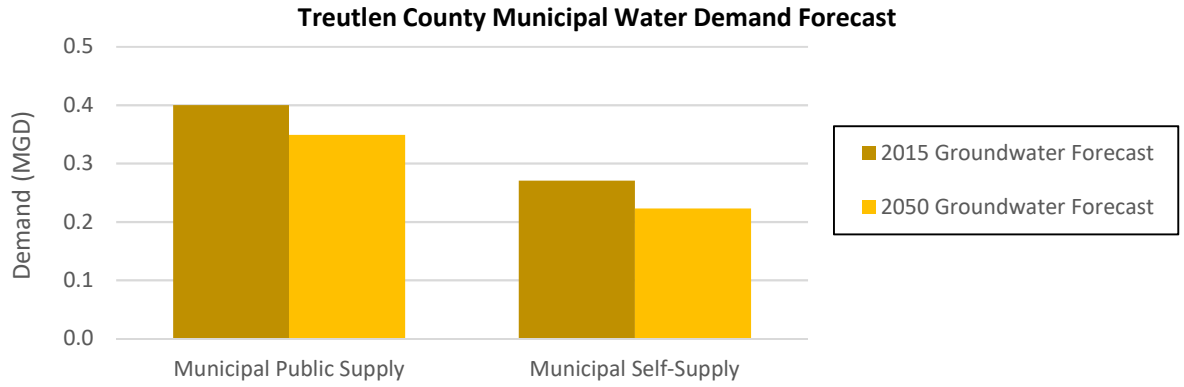
Treutlen County

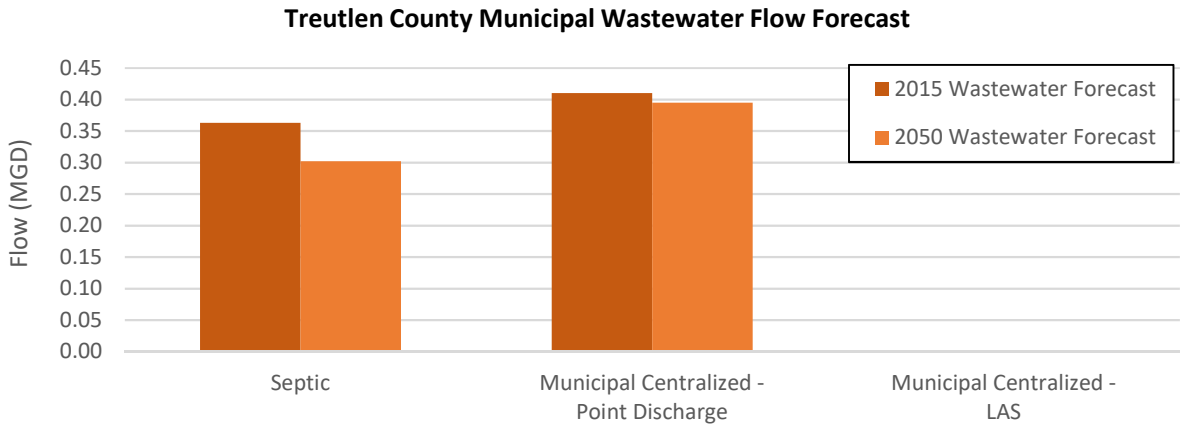
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.65	0.35	0.3
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0.6	0.39	0.21
LAS (Land Application)	0	0	0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Soperton, City of	140-0001	0.65	Floridan Aquifer
Existing Permitted Wastewater Facility			
Soperton, City of	GA0020826	0.6	Red Bluff Creek





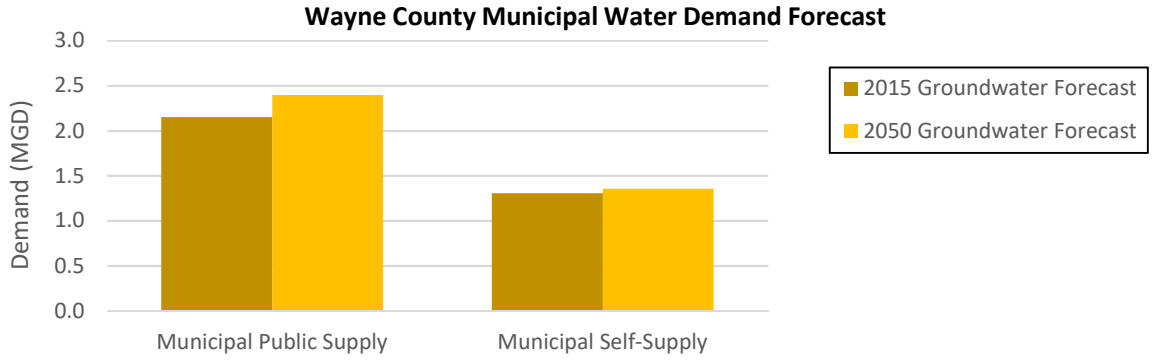
Wayne County

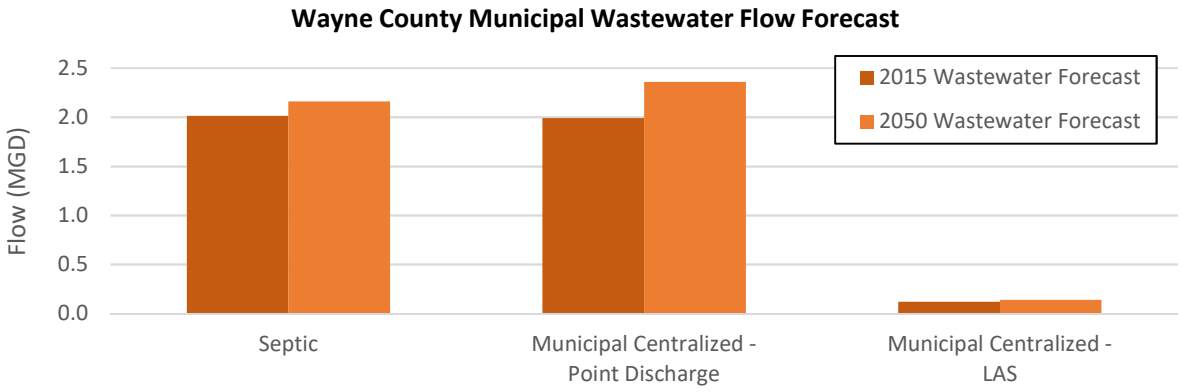
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	2.62	2.39	0.23
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	2.5	2.36	0.14
LAS (Land Application)	0.18	0.14	0.04

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Jesup, City of	151-0002	2.5	Floridan Aquifer
Screven, City of	151-0003	0.125	Floridan Aquifer
Existing Permitted Wastewater Facility			
Jesup WPCP	GA0026000	2.5	Altamaha River
Odum LAS	GAJ020027	0.075	LAS
Screven LAS	GAjJ020140	0.1	LAS





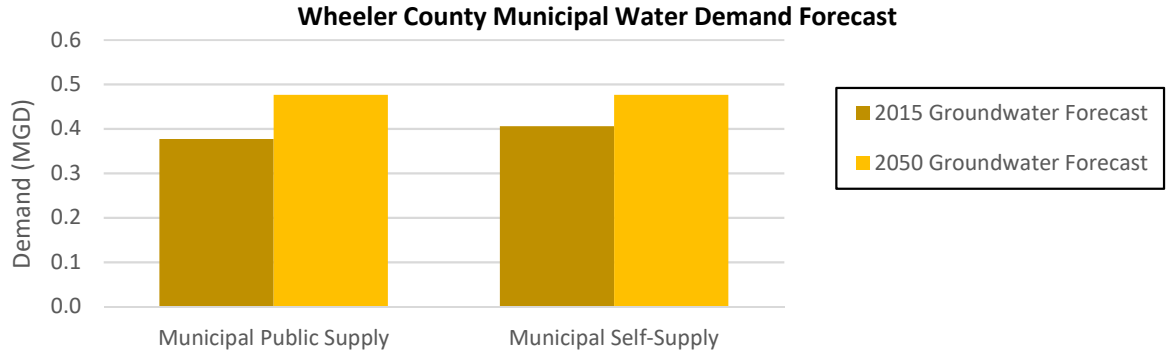
Wheeler County

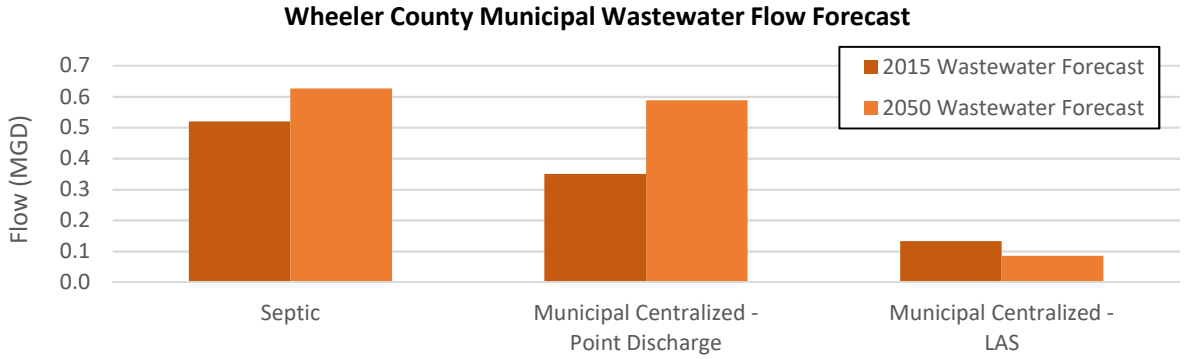
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.4	0.48	-0.076
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	1.04	0.24	0.8
LAS (Land Application)	0.21	0.085	0.125

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Glenwood, City of	153-0001	0.4	Floridan Aquifer
Existing Permitted Wastewater Facility			
Scotland Pond	GA0032344	0.18	Little Ocmulgee River
Alamo WPCP	GA0037753	0.75	Alligator Creek
Glenwood	GA0021377	0.11	Peterson Creek
Glenwood, City of (LAS)	GA02-301	0.21	LAS





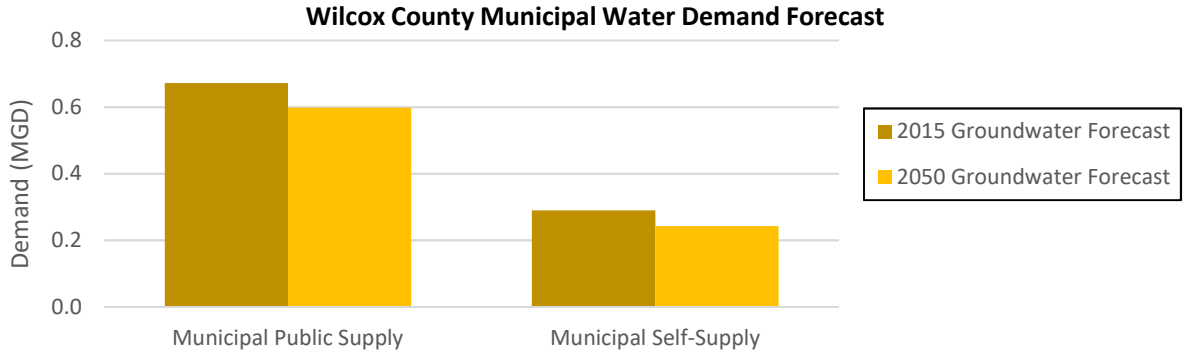
Wilcox County

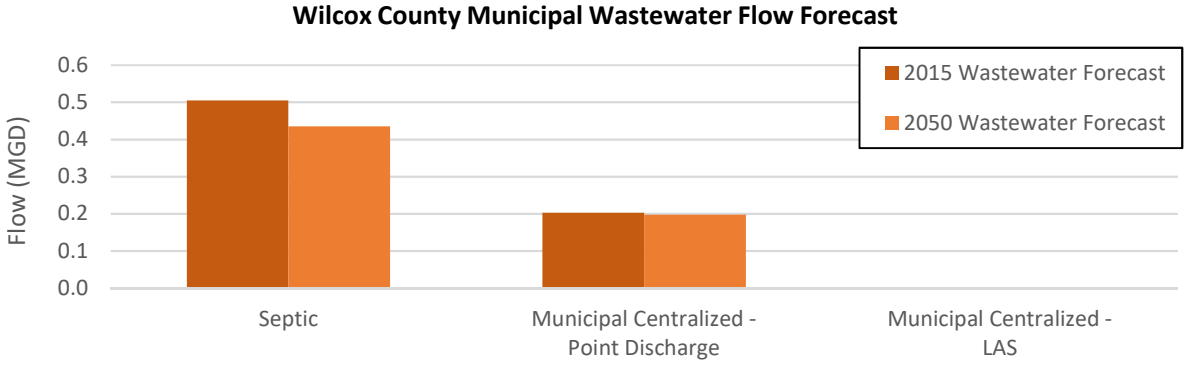
Municipal Water and Wastewater Permits Compared to Forecasts

Permit Type	Permit Limit (MGD)	2050 Forecast	Surplus (+) Shortage (-)
Municipal Water Demands (MGD)			
Groundwater	0.9	0.6	0.3
Surface Water	0	0	0
Municipal Wastewater (MGD)			
NPDES (Point Source)	0.67	0.19	0.48
LAS (Land Application)	0	0	0

List of Individual Municipal Permits

Permit Holder	Permit Number	Permit Limit (MGD)	Source / Receiving Stream
Existing Withdrawal Permits			
Rochelle, City of	156-0002	0.23	Floridan Aquifer
Abbeville, City of	156-0003	0.68	Floridan Aquifer
Existing Permitted Wastewater Facility			
Crossview Care Center WPCP	GA0034291	0.012	Cedar Creek
Abbeville WPCP	GA0047643	0.28	Ocmulgee River
Rochelle, City of - Southeast WPCP	GA0024236	0.04	Unnamed Creek to Mill Creek
Rochelle, City of - Northwest WPCP	GA0024244	0.336	Mill Creek Tributary





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