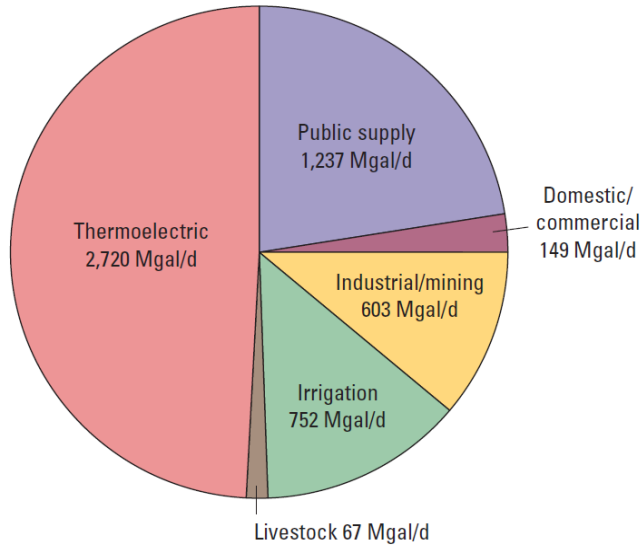




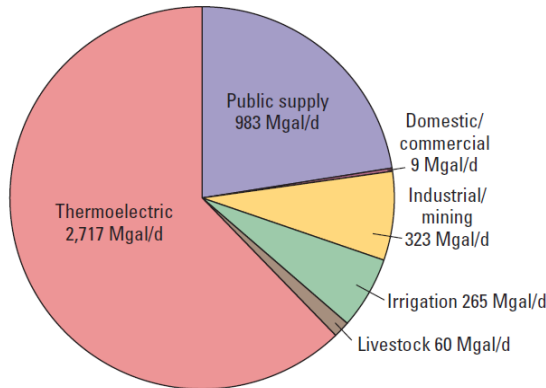
# Groundwater Use in Georgia

James L. Kennedy, Ph.D., P.G.  
Georgia Environmental Protection Division  
State Geologist

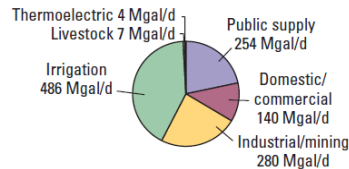
# 2005 Water Use in Georgia



Total water withdrawals—5,528 Mgal/d



Surface-water withdrawals—4,357 Mgal/d

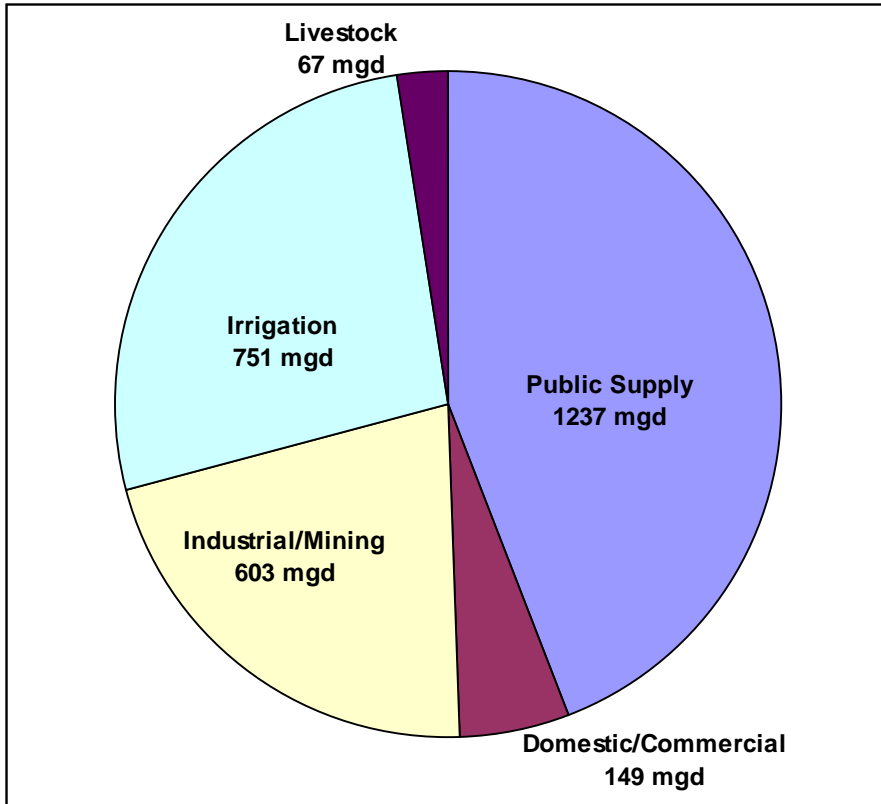


Ground-water withdrawals—1,171 Mgal/d

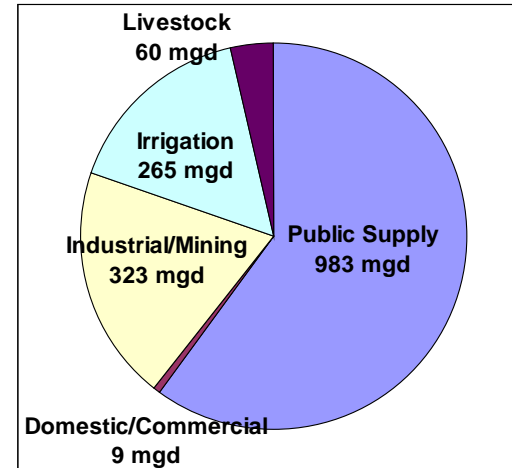
- Total Water Use – 5,528 million gallons per day (mgd)
- Surface Water Use – 4,357 mgd (78.8%)
- Groundwater Use – 1,171 mgd (21.2%)
- Thermoelectric was the largest use of water at 2,720 mgd (49.2% of total water use)
- All but 4 mgd of water for thermoelectric use was obtained from surface water
- Surface water withdrawals for thermoelectric use occurred in 15 Georgia counties



# Water Use in Georgia During 2005 Excluding Thermoelectric Water Use

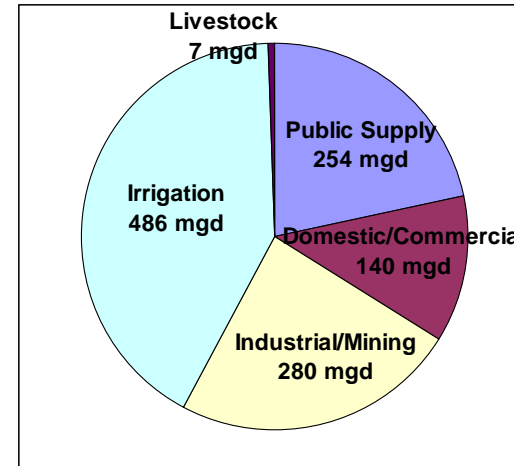


**Total Water Withdrawals –  
2,807 mgd**



**Surface Water  
Withdrawals**

**1,640 mgd  
(58.4%)**

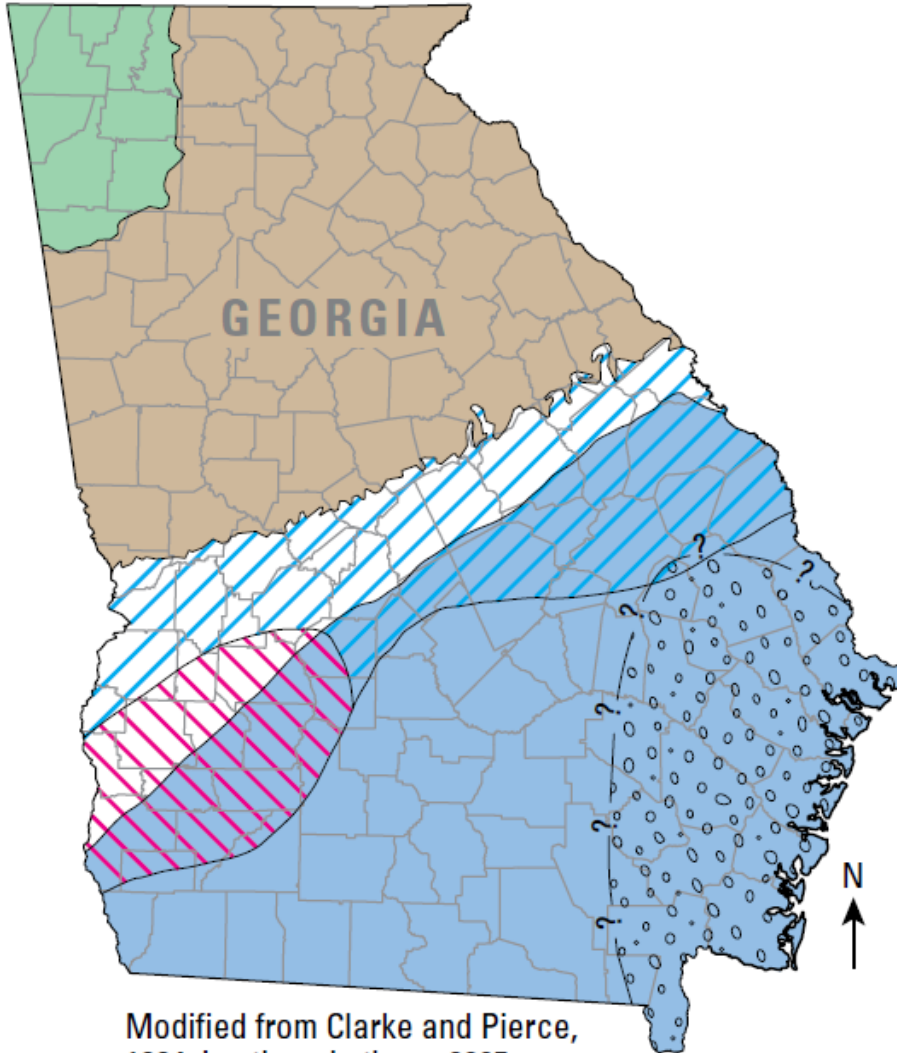


**Groundwater  
Withdrawals**

**1,167 mgd  
(41.6%)**

Data from USGS SIR 2009-5002






# Georgia's Aquifers




Modified from Clarke and Pierce, 1984; Leeth and others, 2005

## EXPLANATION


### Coastal Plain aquifers

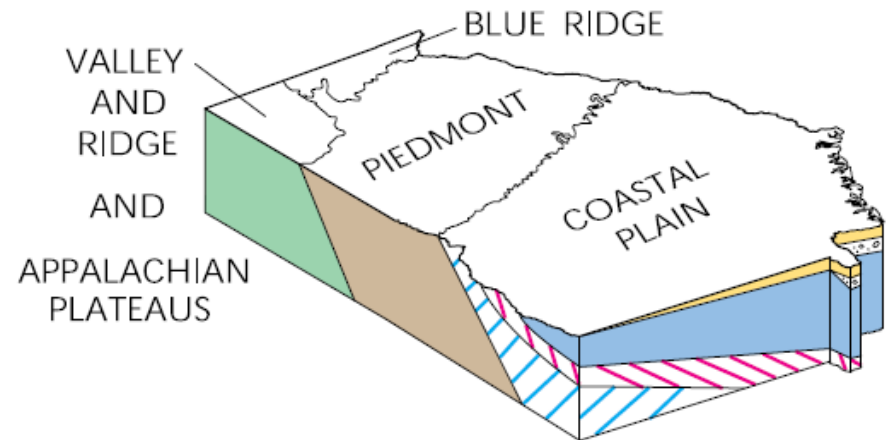
-  Surficial aquifer system (not a principal aquifer)
-  Brunswick aquifer system
-  Floridan aquifer system
-  Claiborne, Clayton, and Providence aquifers
-  Cretaceous aquifer system

### Piedmont and Blue Ridge aquifers

-  Crystalline-rock aquifers

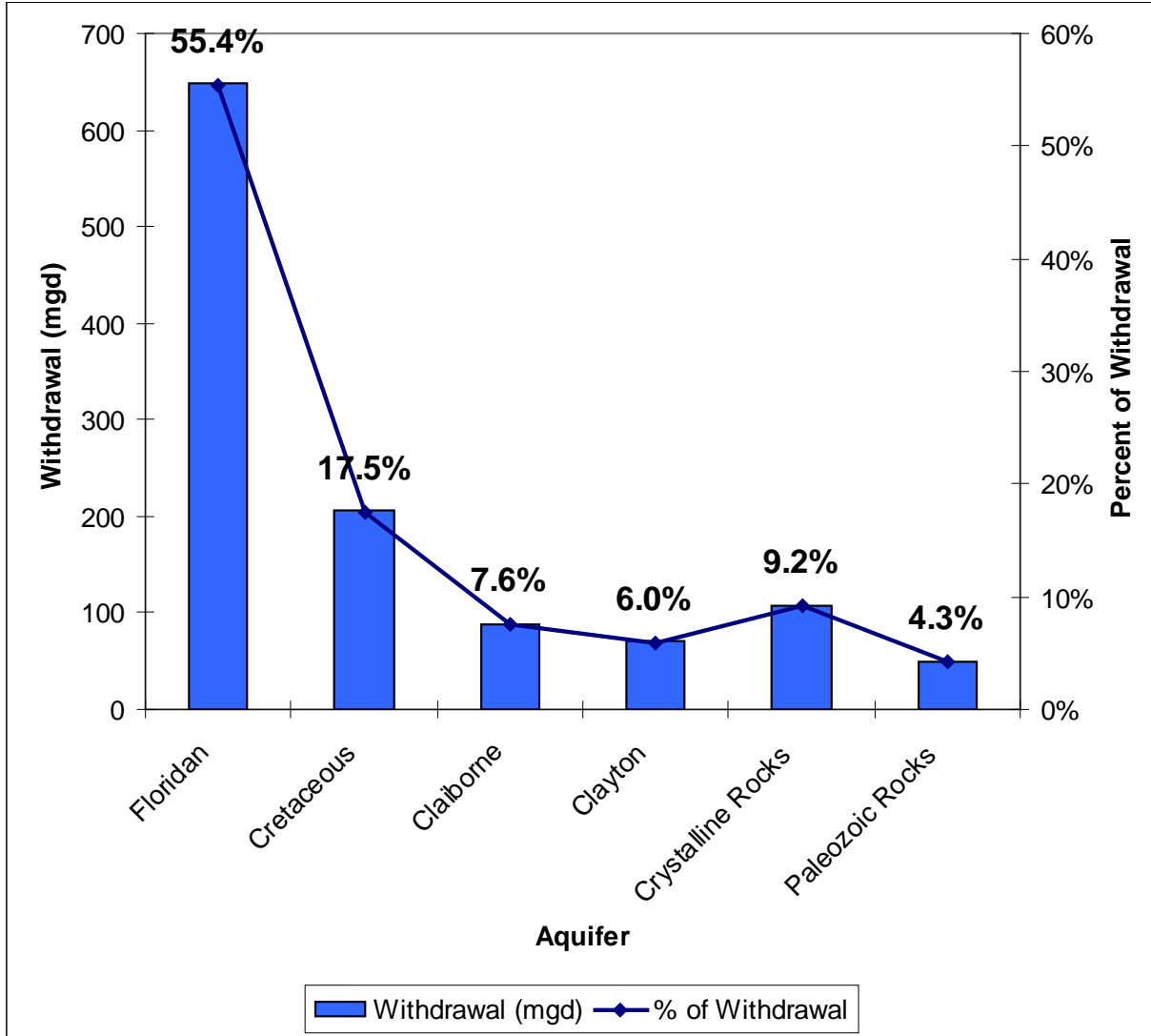
### Valley and Ridge and Appalachian Plateau aquifers

-  Paleozoic-rock aquifers





# 2005 Groundwater Use by Aquifer



- 86.5% of groundwater was withdrawn from Coastal Plain aquifers in southern Georgia (Floridan, Cretaceous, Claiborne, Clayton)
- 13.5% of groundwater was withdrawn from crystalline rock and Paleozoic rock aquifers in northern Georgia

Data from USGS SIR 2009-5002



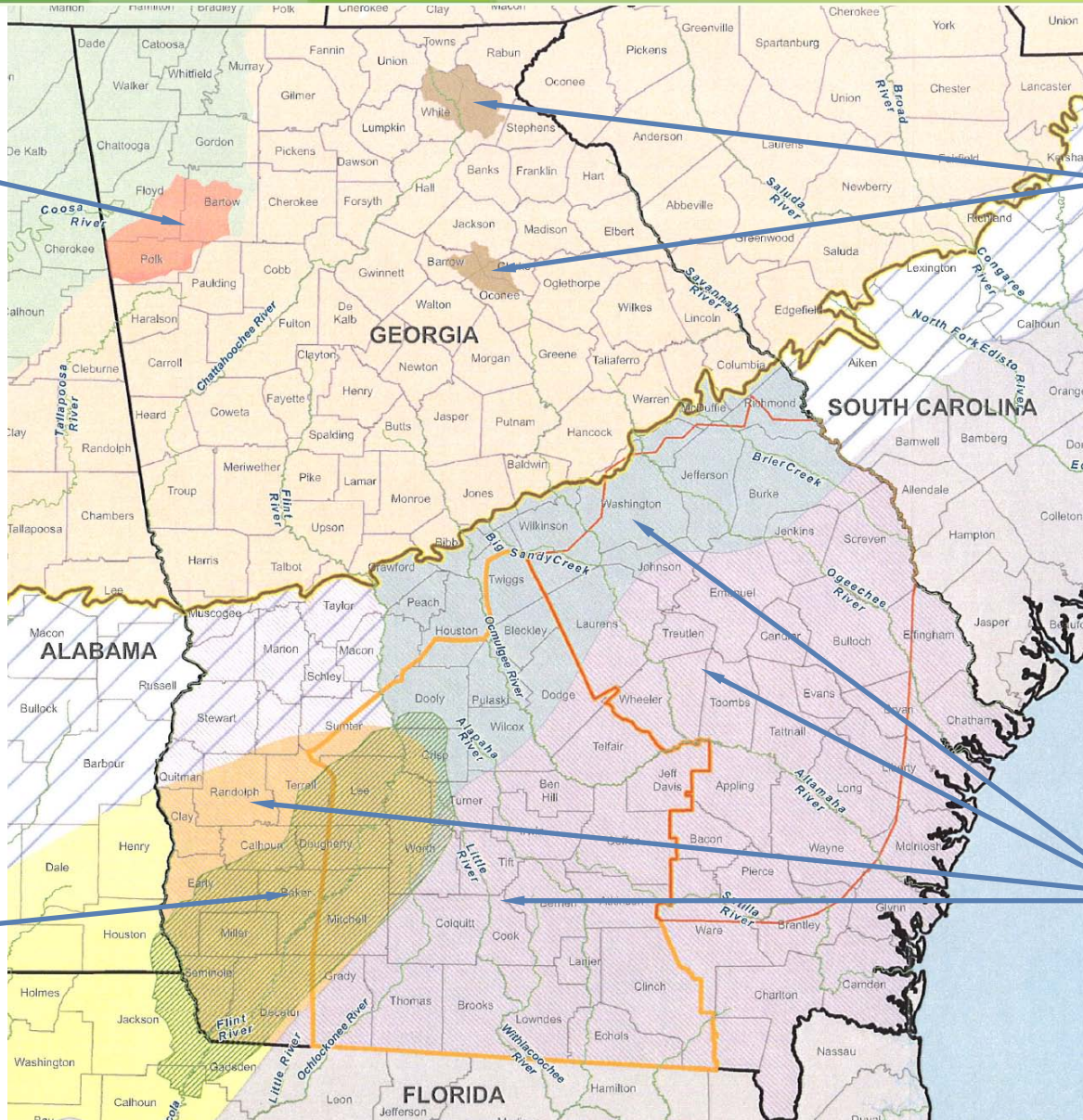
# Prioritized Aquifers for Determination of Sustainable Yields

**Paleozoic Rock Aquifer**

**Crystalline Rock Aquifer**

**Dougherty Plain Upper Floridan Aquifer**

**Coastal Plain Aquifers**

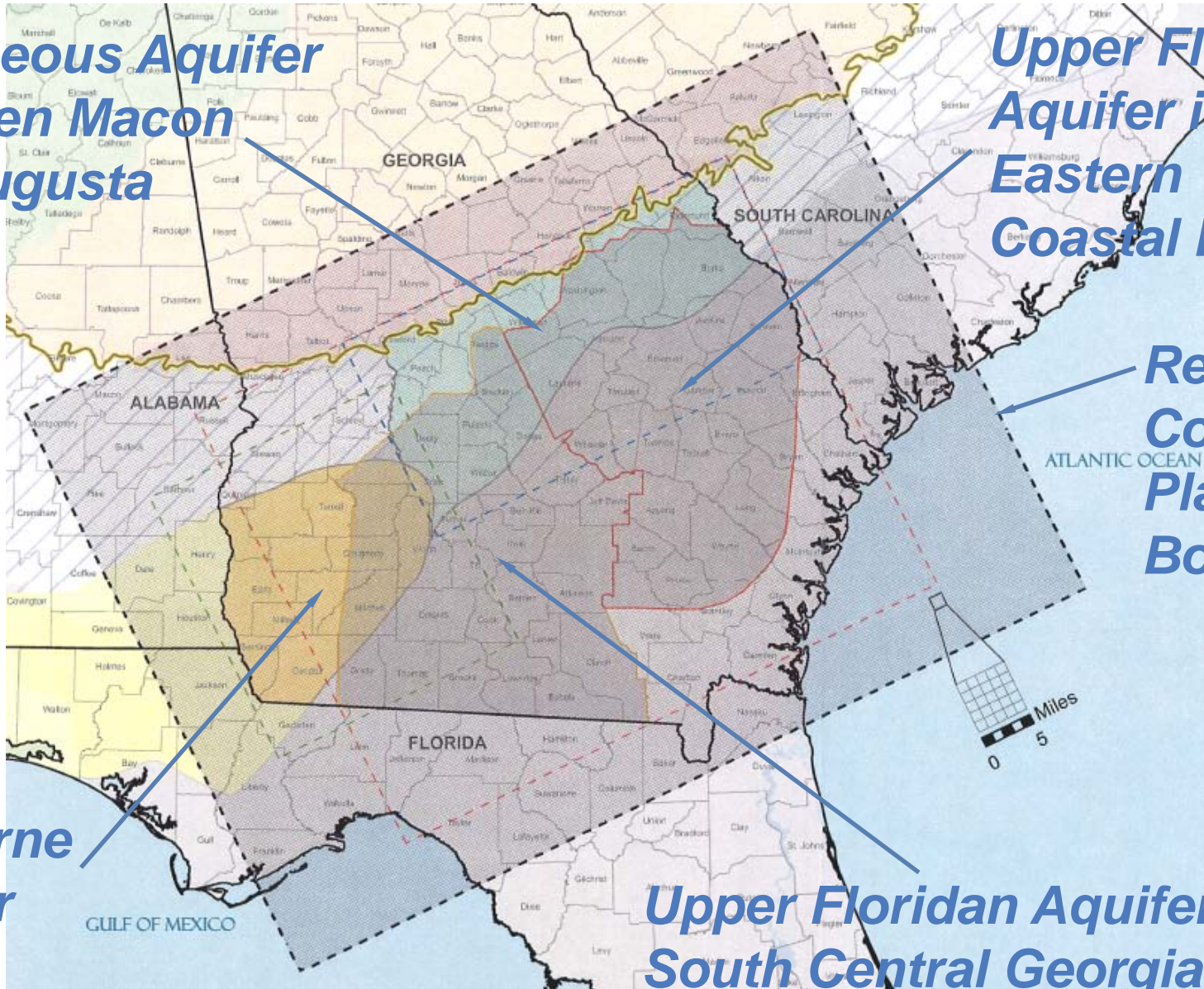




# Regional Coastal Plain Model and Aquifers Prioritized to Determine Sustainable Yield

**Cretaceous Aquifer  
Between Macon  
and Augusta**

**Upper Floridan  
Aquifer in the  
Eastern  
Coastal Plain**



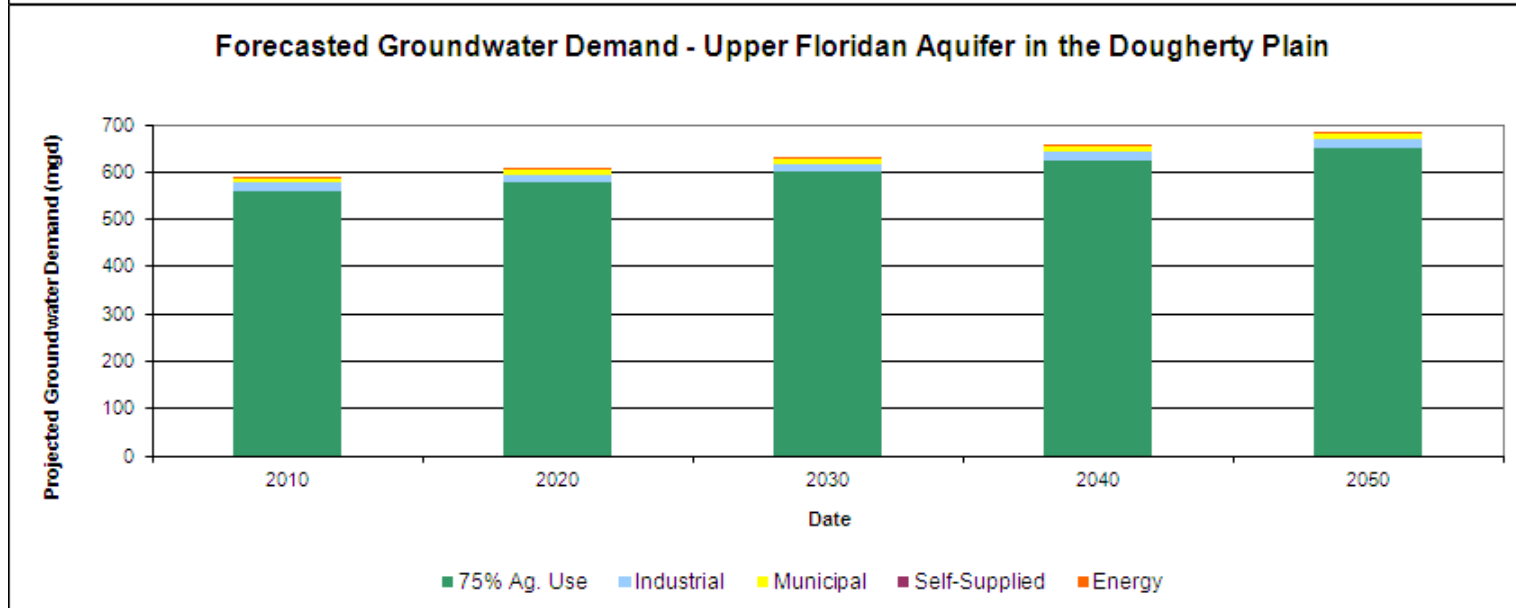
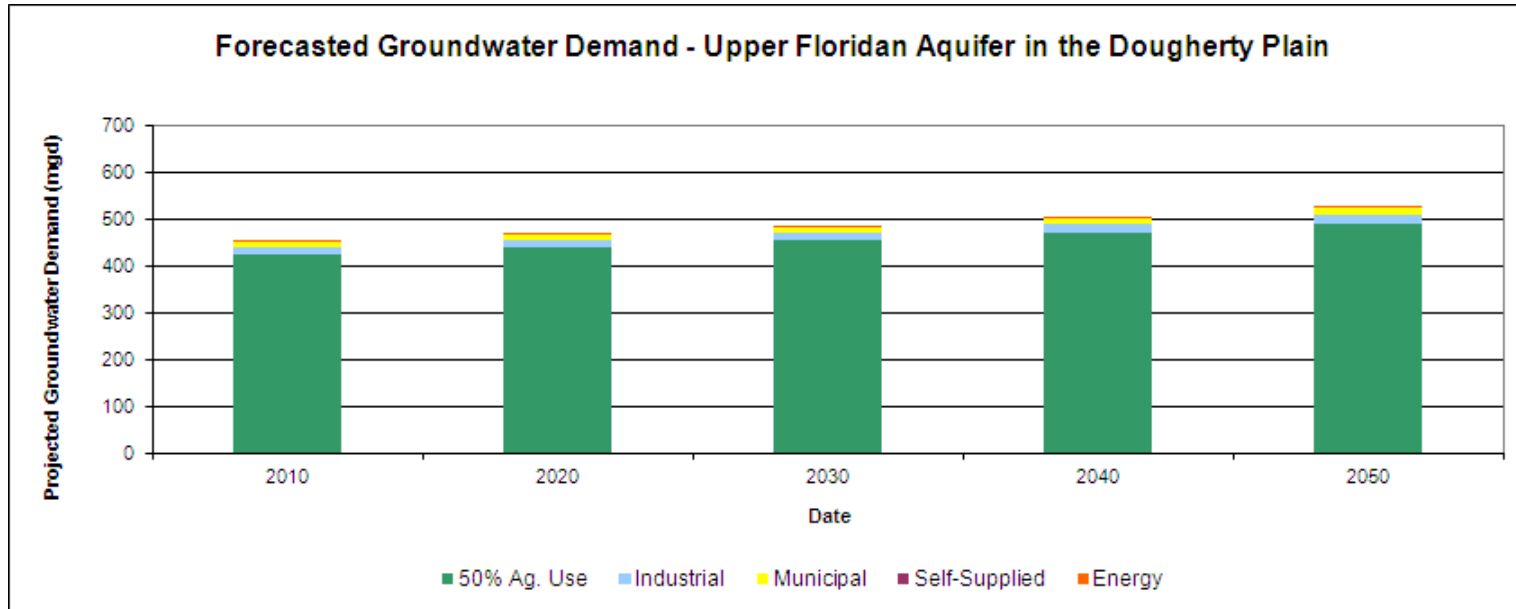
**Regional  
Coastal  
Plain Model  
Boundary**

**Claiborne  
Aquifer**

**Upper Floridan Aquifer in  
South Central Georgia**



# Forecasted Groundwater Demand by Use Category

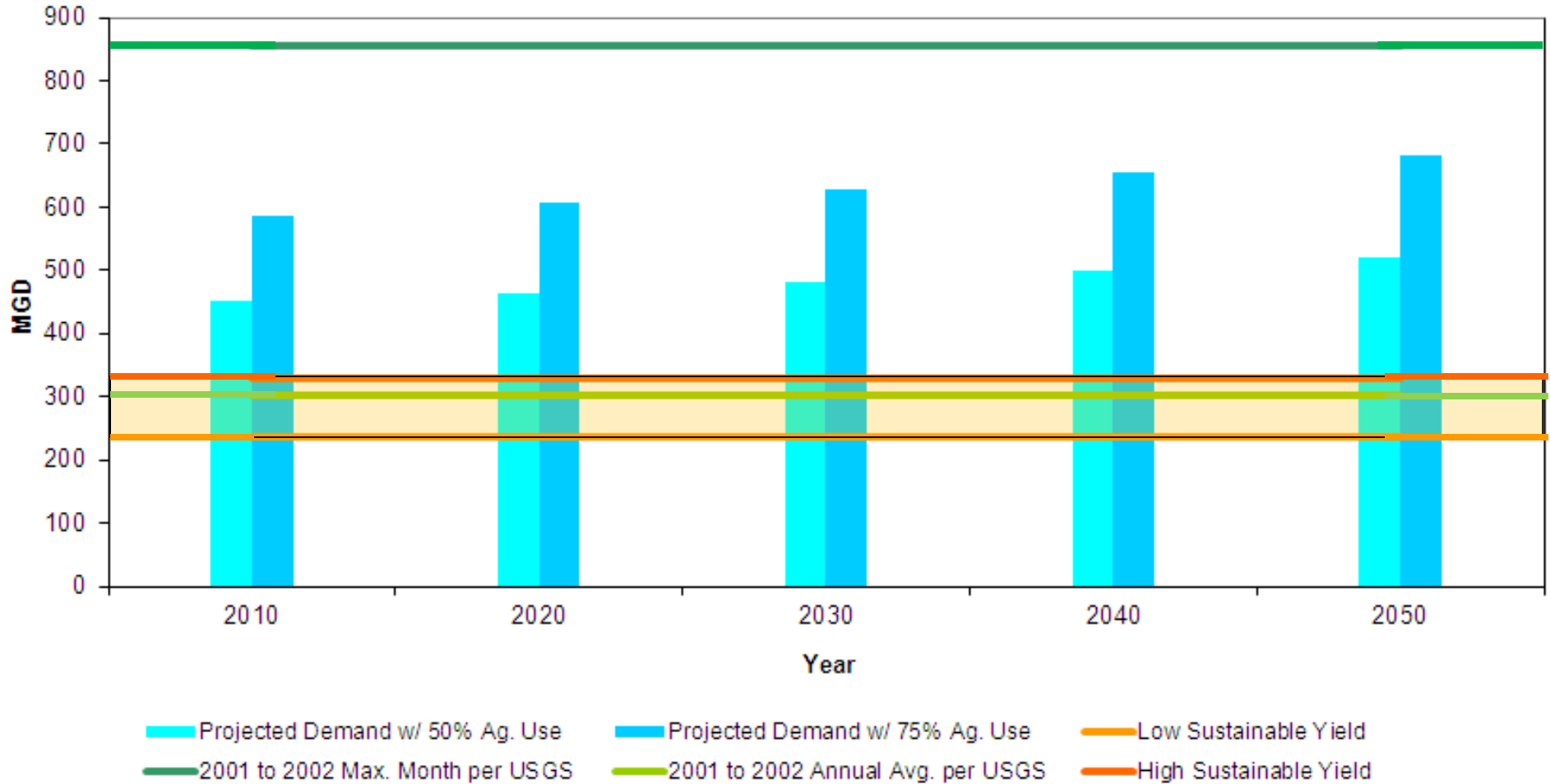






# Upper Floridan Aquifer in the Dougherty Plain

Forecasted Groundwater Demand - Upper Floridan Aquifer in the Dougherty Plain





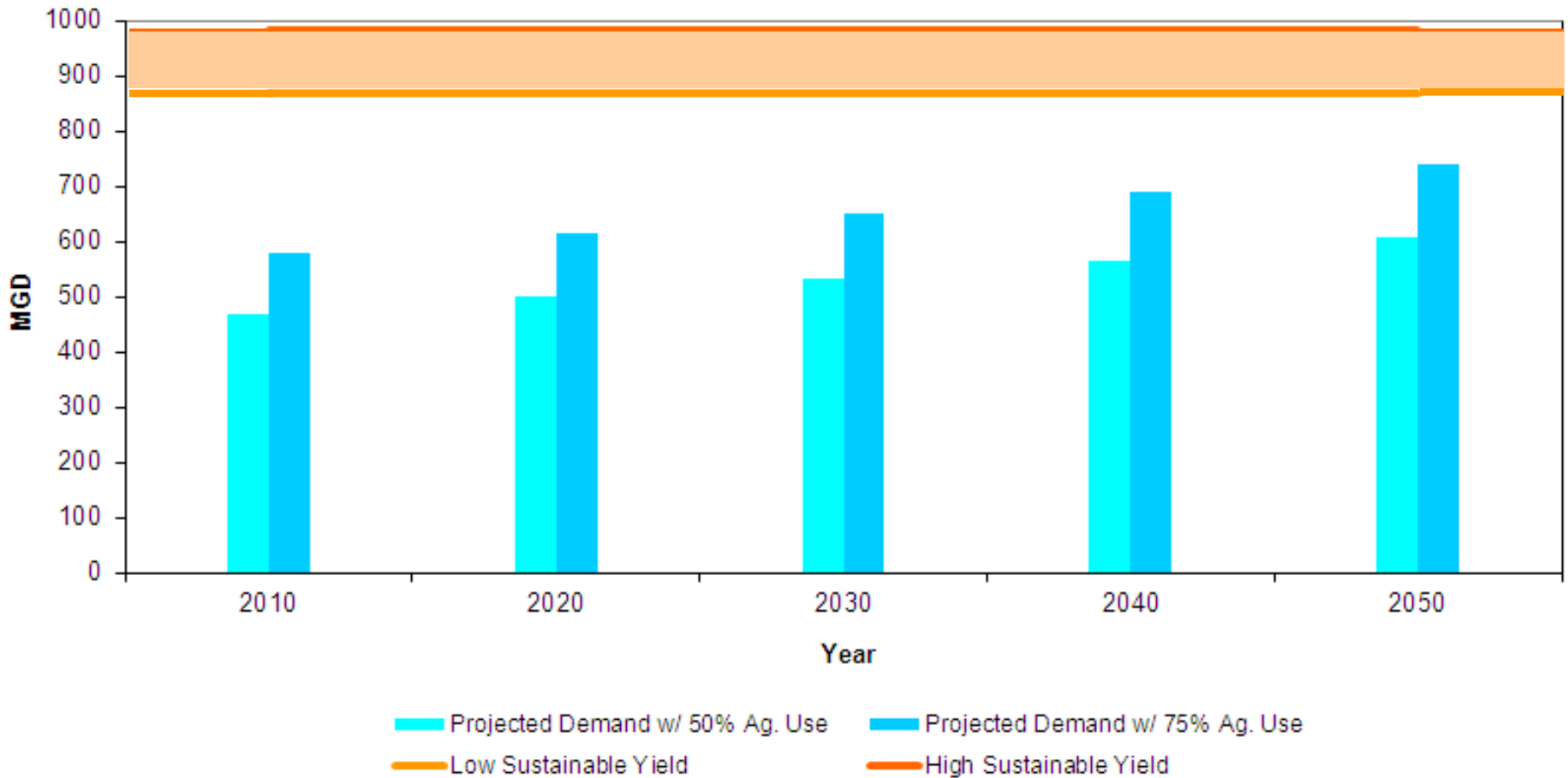
# *Dougherty Plain Sustainable Yield*

- Ranges of sustainable yield are different for different subbasins in the Dougherty Plain
- More groundwater may be available from the Upper Floridan aquifer in portions of the Dougherty Plain except in areas where groundwater withdrawals would greatly impact streamflows
- Impacts of groundwater withdrawals on streamflows must be considered when assessing the availability of additional groundwater from the Upper Floridan aquifer

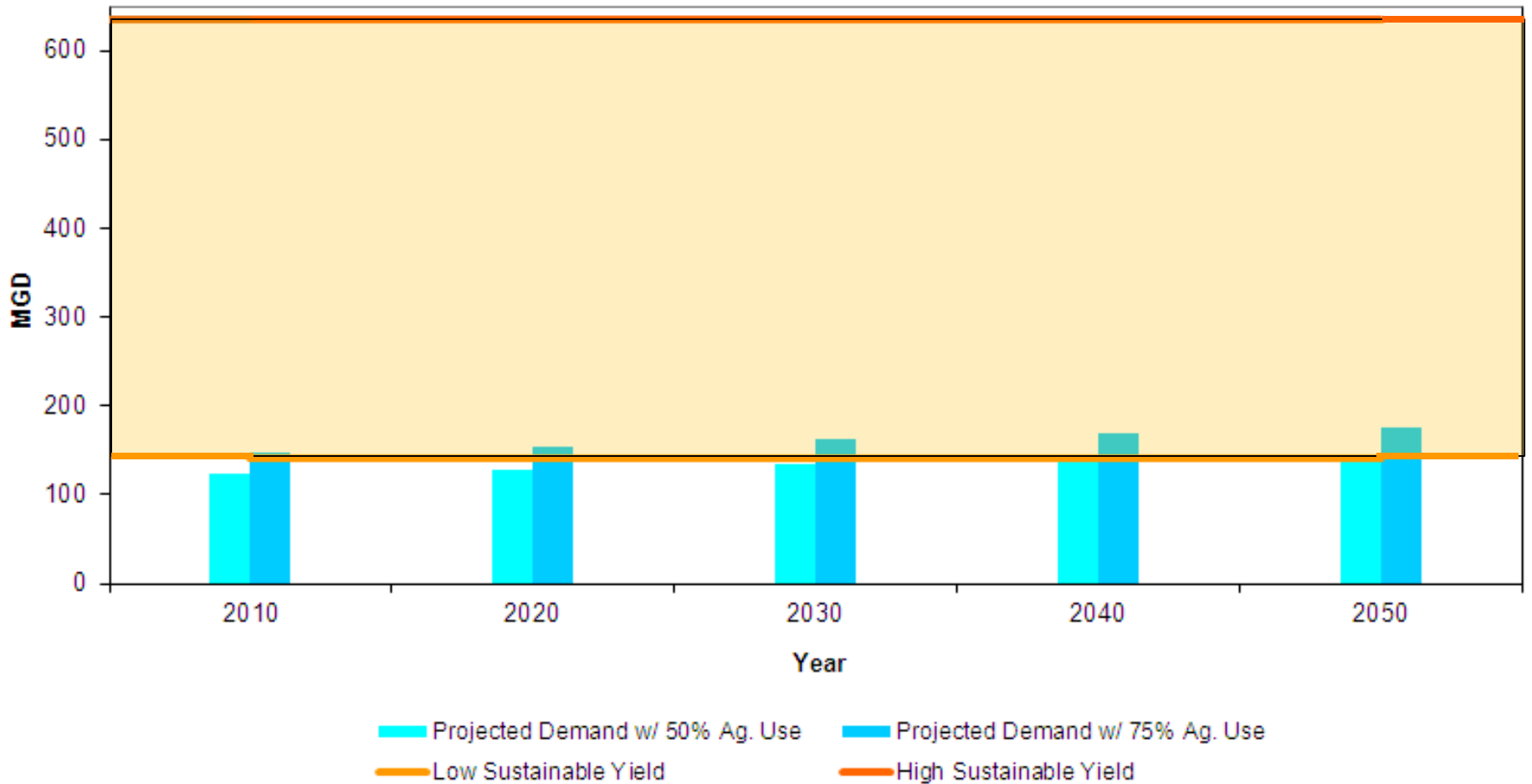


# Upper Floridan Aquifer in South-Central Georgia and the Eastern Coastal Plain

Forecasted Groundwater Demand - Upper Floridan Aquifer in South-Central Georgia & Eastern Coastal Plain

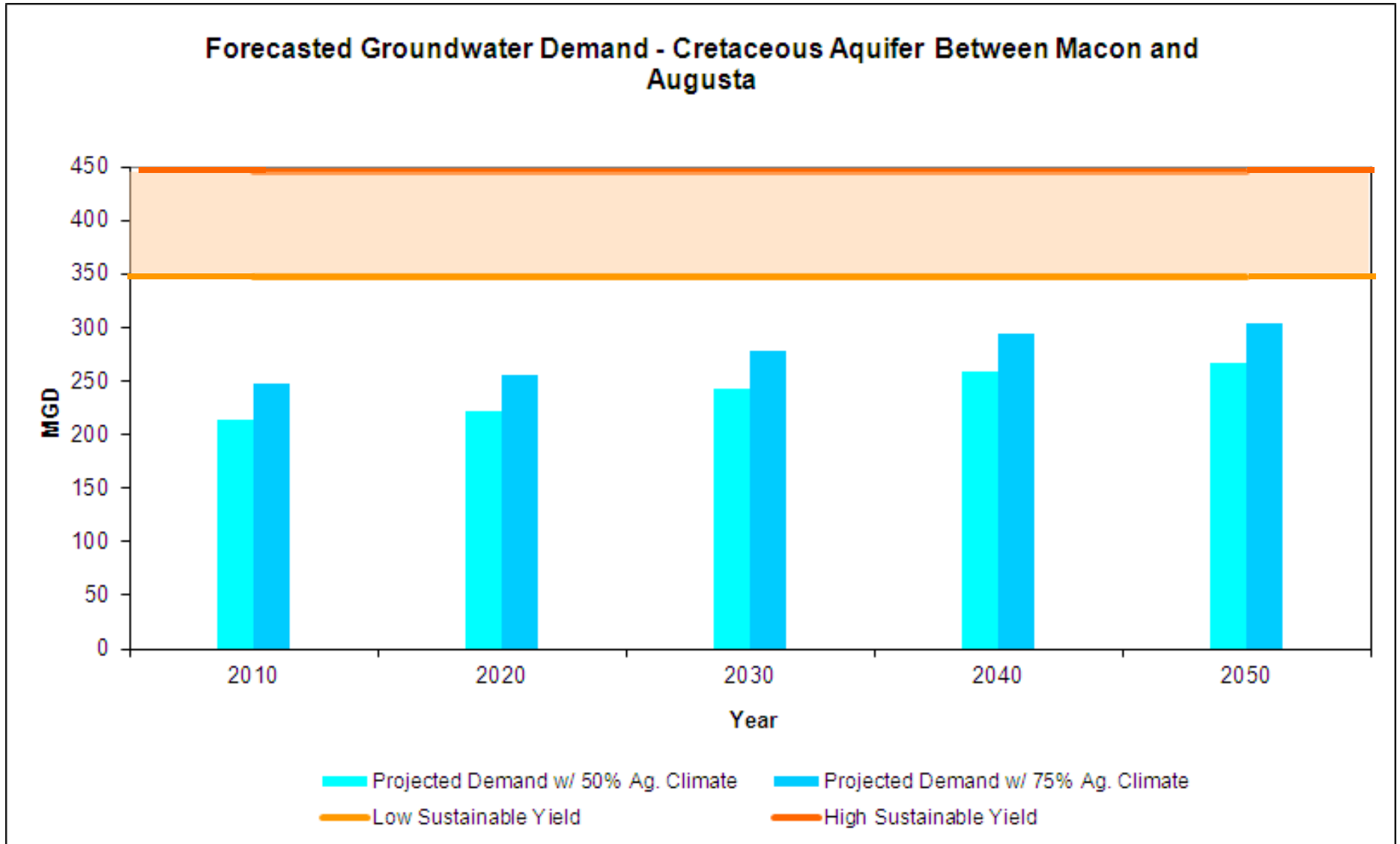


## Forecasted Groundwater Demand - Claiborne Aquifer



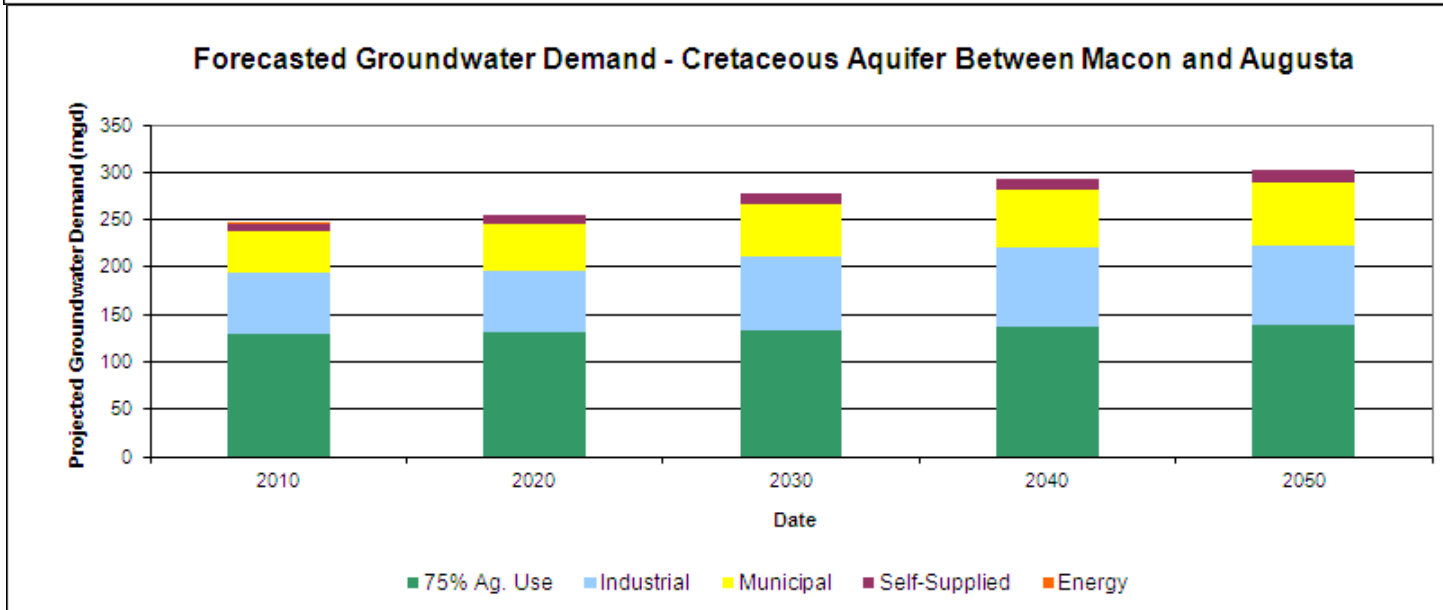
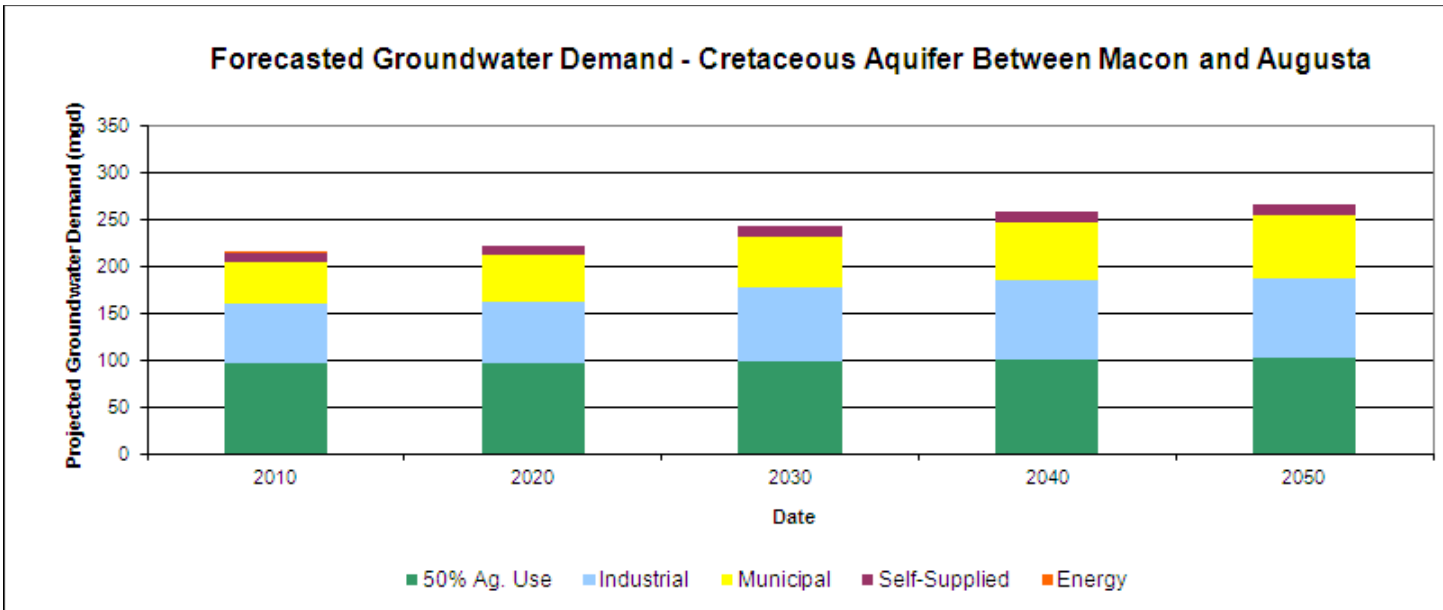


# Cretaceous Aquifer Between Macon and Augusta





# Forecasted Groundwater Demand by Use Category



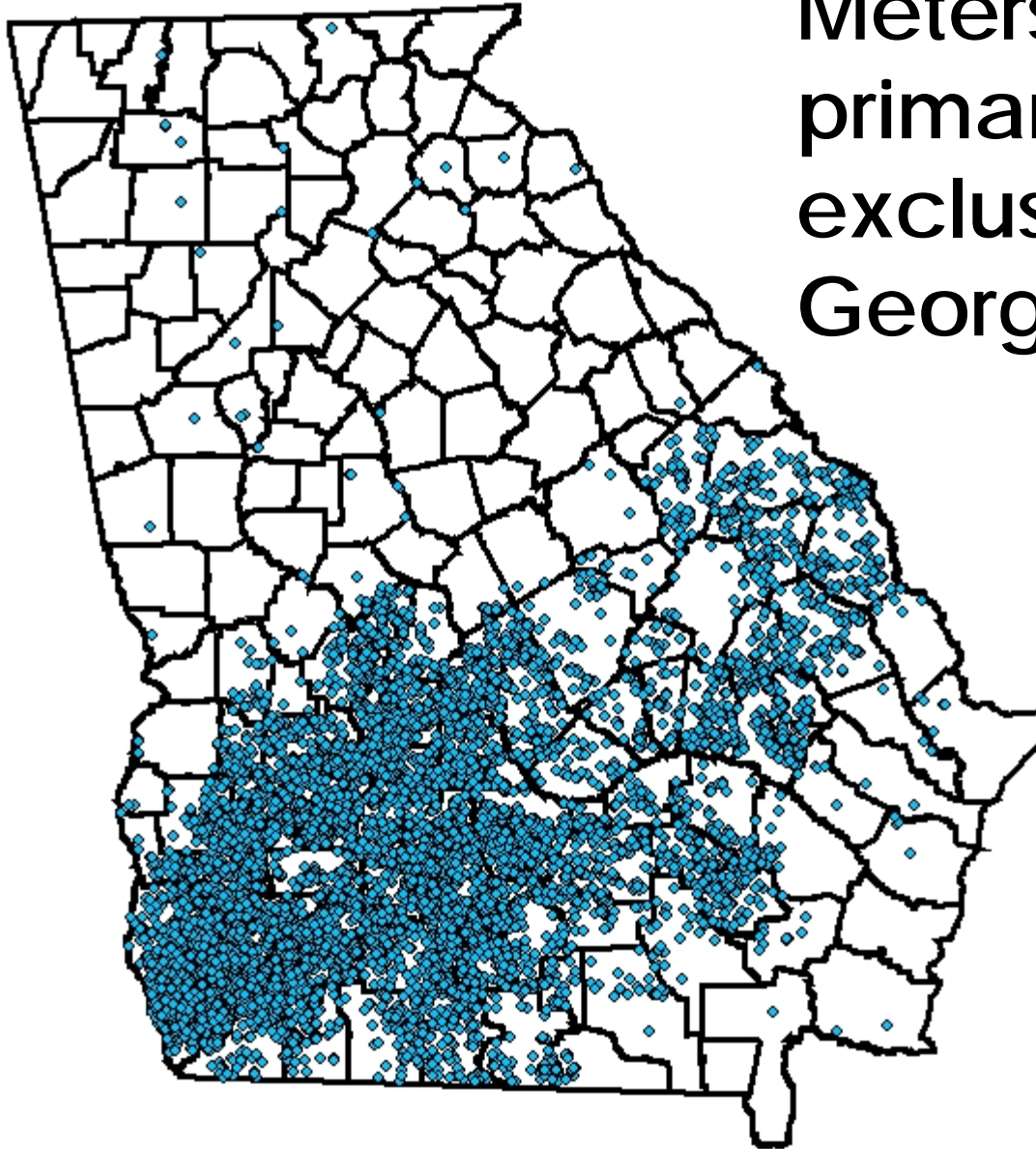


# Georgia Metering Program

- During 2003 the Georgia General Assembly granted jurisdiction to the Georgia Soil and Water Conservation Service to implement a program of measuring farm uses of water
- By year-end 2010 more than 10,000 annually-read and nearly 200 daily reporting, satellite-transmitted telemetry meters have been put on groundwater and surface water irrigation systems
- All new permits for agricultural groundwater or surface water withdrawals larger than 100,000 gallons per day require a meter now or in the future
- Meters are paid for by the owner of the withdrawal



# Well and Surface Water Meter Locations



Meters are located primarily but not exclusively in southern Georgia





# Meter Installations in Southern Georgia as of 2009

Source	Meter type	
	Annually reported	Telemetry
Middle and lower Chattahoochee and Flint River basins		
Groundwater	3,609	46
Surface water	748	35
<b>Subtotal</b>	<b>4,357</b>	<b>81</b>
Coastal region		
Groundwater	679	20
Surface water	378	16
<b>Subtotal</b>	<b>1,057</b>	<b>36</b>
Central south Georgia		
Groundwater	912	15
Surface water	659	16
<b>Subtotal</b>	<b>1,571</b>	<b>31</b>
<b>Total</b>	<b>6,985</b>	<b>148</b>



# *Evaluation of Metering Data*

- The U.S. Geological Survey applied quality assurance, statistical, and geostatistical methods to the annually reported and telemetry water meter data to verify the accuracy of the metered water-use values and the ability of the meter networks to represent irrigation volumes and depths
- The study identified spatial and temporal distributions of agricultural-irrigation pumpage
- Results of the study were published in USGS Scientific Investigations Report 2011-5126 by L.J. Torak and J.A. Painter