



Georgia's
State Water Plan

**Altamaha Regional Water Planning Council Meeting
April 1, 2021**

www.georgiawaterplanning.org

Council Meeting Agenda



Council Meeting Altamaha Regional Water Council Agenda - April 1, 2021

Objectives:

- 1) Receive updates on the Municipal, Energy and Industrial Water Demand Forecasts that will support the 2020-2022 Water Plan Update Cycle
- 2) Receive updates on the modeling approach for Surface Water Availability Resource Assessment
- 3) Receive updates on on-going Seed Grant Projects

- | | |
|------------------|--|
| 1:30 - 1:40 p.m. | Welcome and Introductions
Approve meeting minutes from September 24, 2020 Council Meeting
Approve meeting agenda |
| 1:40 - 1:45 p.m. | Updates from EPD (Jennifer Welte, Georgia EPD) |
| 1:45 - 2:45 p.m. | Updates on Demand Forecasting for the 2020-2022 Regional Water Plan Update Cycle
- Municipal Water Demand Forecast Update (Bill Davis, CDM Smith)
- Energy Water Demand Forecast Update (Bill Davis, CDM Smith)
- Industrial Water Demand Forecast Update (Bill Davis, CDM Smith) |
| 2:45 - 3:00 p.m. | Surface Water Availability Resource Assessment - Oconee-Ocmulgee-Altamaha Basin (Dr. Wei Zeng, Georgia EPD) |
| 3:00 - 3:15 p.m. | Seed Grant Updates (Dr. Gary Hawkins, University of Georgia / Danielle Honour, CDM Smith) |
| 3:15 - 3:30 p.m. | Discussion
Next Steps / Public Comments / Local Elected Official Comments
Wrap Up |
| 3:30 p.m. | Adjourn |



Council Business

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Council Business

- Welcome and Introductions
- Approve meeting summary from September 24, 2020 Council Meeting
- Approve meeting agenda



Updates from Georgia EPD

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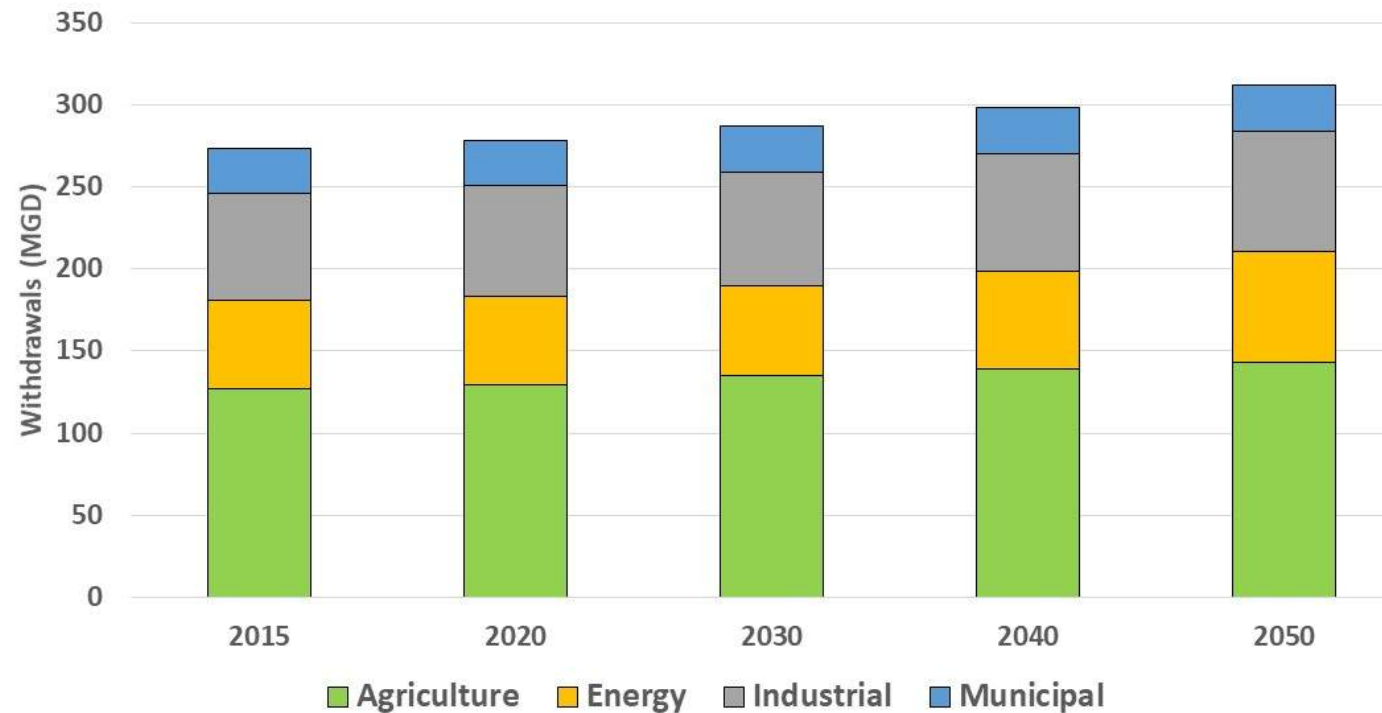


Updates on Demand Forecasting for the 2020-2022 Regional Water Plan Update Cycle

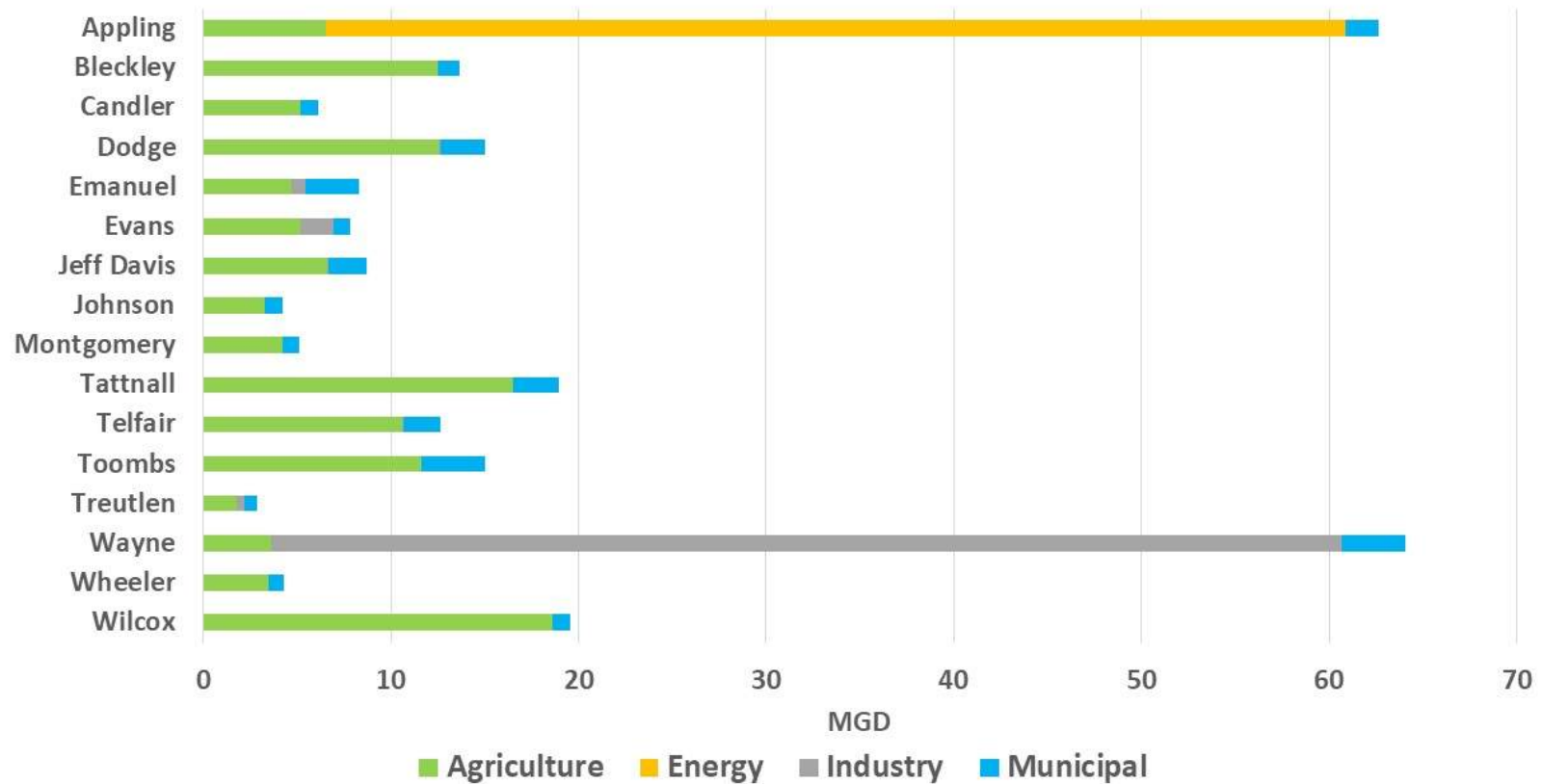
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Review of 2017 Demand Forecast for Altamaha

- Agriculture is 46% of total demand
- Energy demand increases 26% from 2015 to 2050
- Industrial demand increases 12% from 2015 to 2050
- Total demand increases 14% from 2015 to 2050



Review of 2017 Water Demands by County





Municipal Water Demand Forecast

www.georgiawaterplanning.org

Municipal Demand Forecast Update

- Forecast prepared by Black & Veatch team
<https://waterplanning.georgia.gov/forecasting/municipal-water-use>
- Revised population projections by county*
- Updated GPCD by county*
- Forecast was reviewed by Municipal Forecasting Stakeholder Group with representative from each Council

**Impacts Municipal Forecast*

DRAFT

MUNICIPAL WATER DEMAND AND WASTEWATER FLOW FORECASTING METHODS REPORT



PREPARED FOR

Regional Water Planning Councils

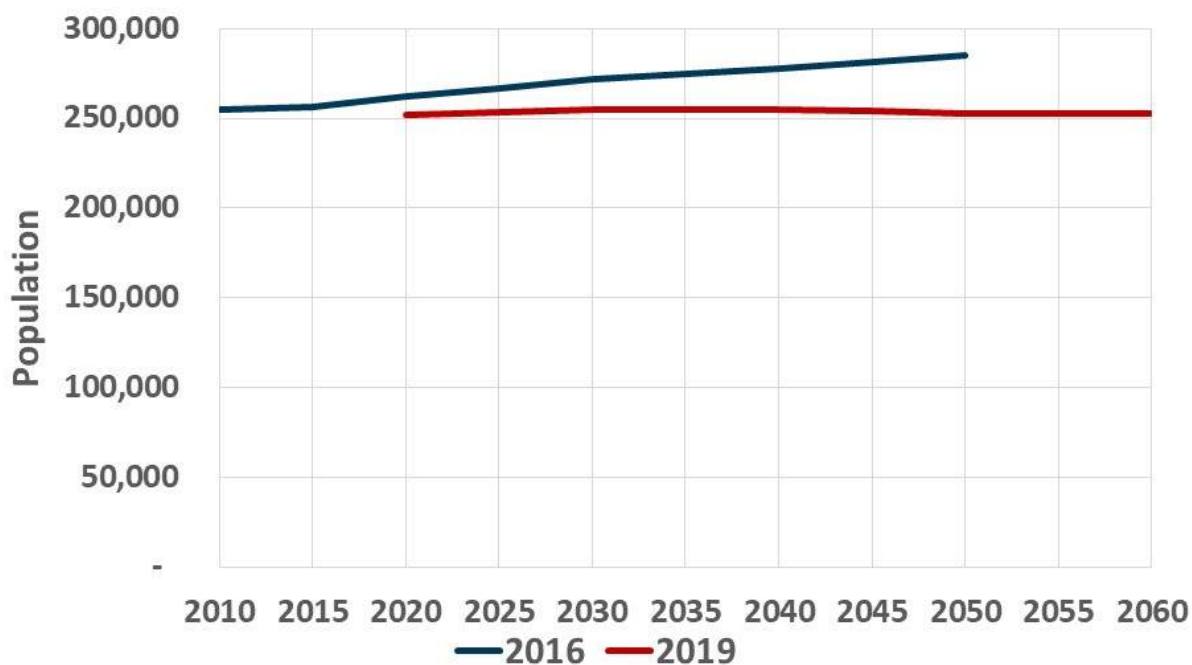
ON BEHALF OF

Georgia Environmental Protection Division

15 DECEMBER 2020

Altamaha Population Projections

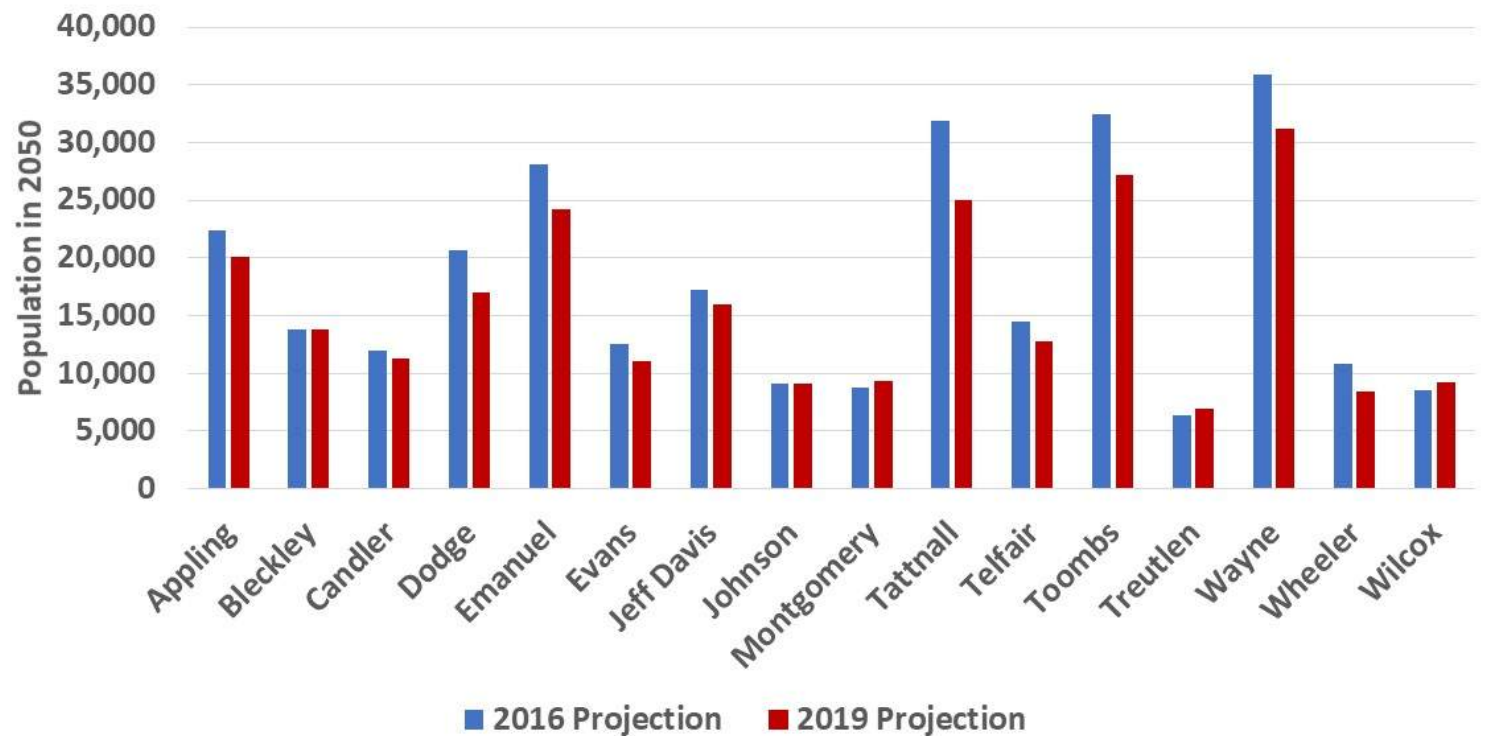
- 2017 RWP Update based on 2016 population projections from Office of Planning & Budget (OPB)
- 2020 Municipal Forecast Demand Update based on 2019 OPB population projections
- OPB 2020 projections became available in October 2020 and similar to 2019 projections



Altamaha Population Projections Comparison for 2050 by County

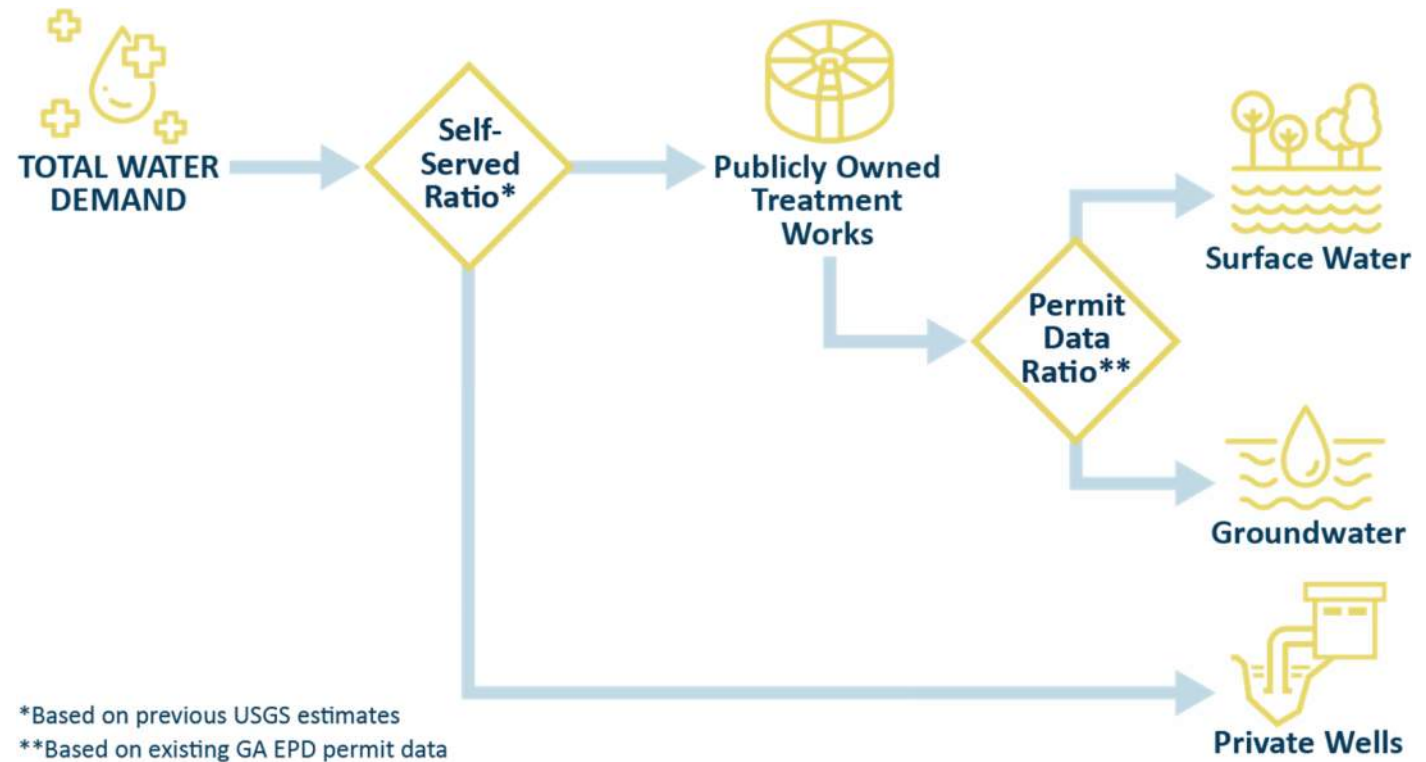
In 2050:

- 11 counties projected to have lower population
- 3 counties projected to have higher population
- 2 counties stay the same



County Water Demand Methodology

- Some % of county population is self-served (75 gpcd)
- Remainder of population is municipally-supplied
- Each county has unique municipal gpcd (weighted average)



Altamaha Region Percent Self Supplied

- 2020 % self-supplied taken from USGS 2015 data
- Percentages held constant for the future
- Self-supplied population assumed to use 75 GPCD (USGS)

County	2017 % Self-Supplied	2020 % Self-Supplied
Appling	63	67
Bleckley	56	58
Candler	58	39
Dodge	63	52
Emanuel	46	42
Evans	49	39
Jeff Davis	52	58
Johnson	58	56
Montgomery	39	57
Tattnall	60	62
Telfair	31	43
Toombs	33	32
Treutlen	54	64
Wayne	57	53
Wheeler	67	43
Wilcox	43	35

Altamaha Municipal Forecast GPCD

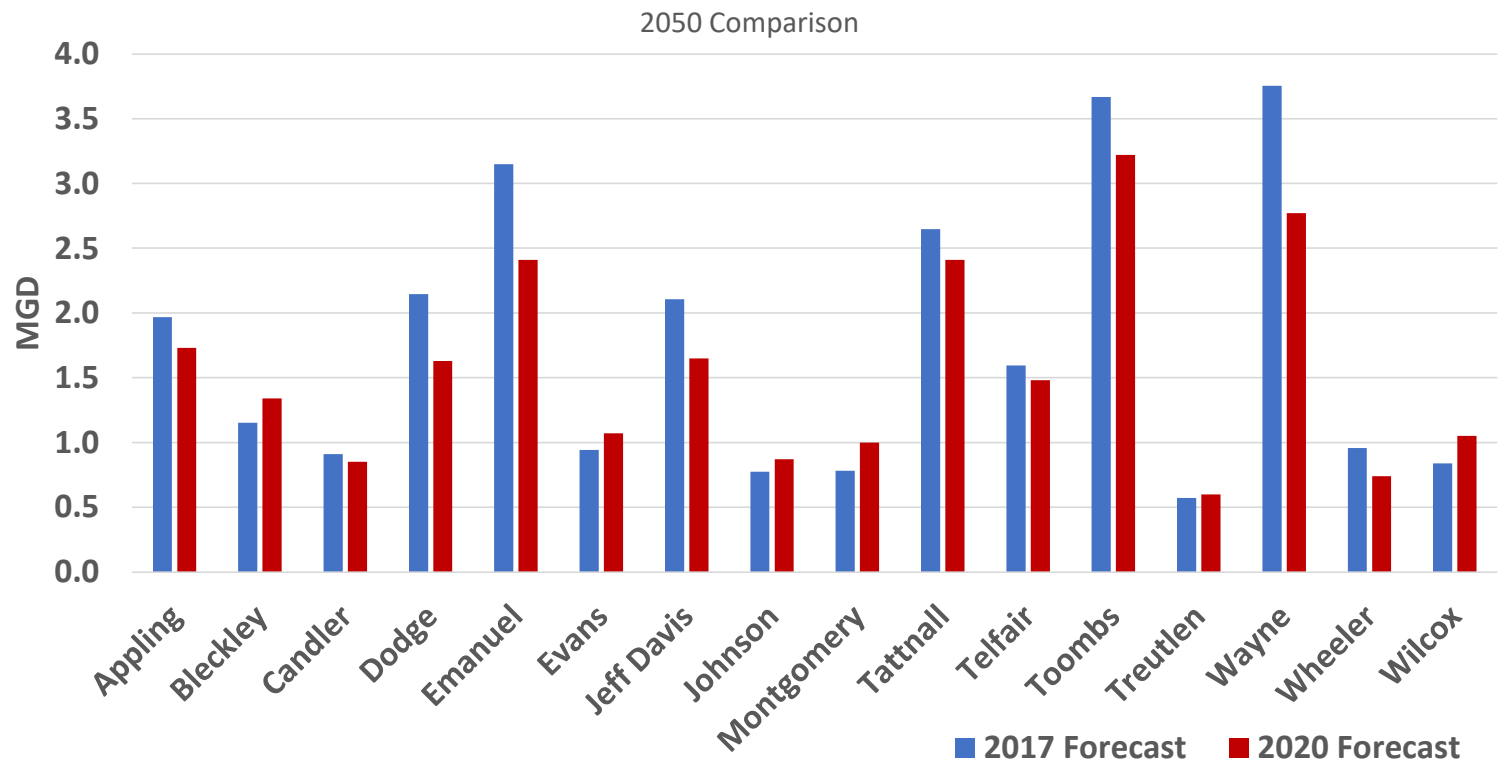
- Updated GPCD by county based on weighted average from 2015 – 2018 Water Loss Audits
- GPCD calculated from State Drinking Water Information System (SDWIS) data if Water Loss Audit data not available
- 8 counties have lower GPCD
- 8 Counties have higher GPCD

County	2017 GPCD	2020 GPCD	Change
Appling	133	129	—
Bleckley	113	136	+
Candler	99	90	—
Dodge	176	136	—
Emanuel	161	132	—
Evans	92	124	+
Jeff Davis	193	160	—
Johnson	122	140	+
Montgomery	112	166	+
Tattnall	118	152	+
Telfair	141	182	+
Toombs	146	151	+
Treutlen	128	127	—
Wayne	164	120	—
Wheeler	143	111	—
Wilcox	133	147	+

Altamaha Municipal Demand Forecast Comparison for 2050 by County

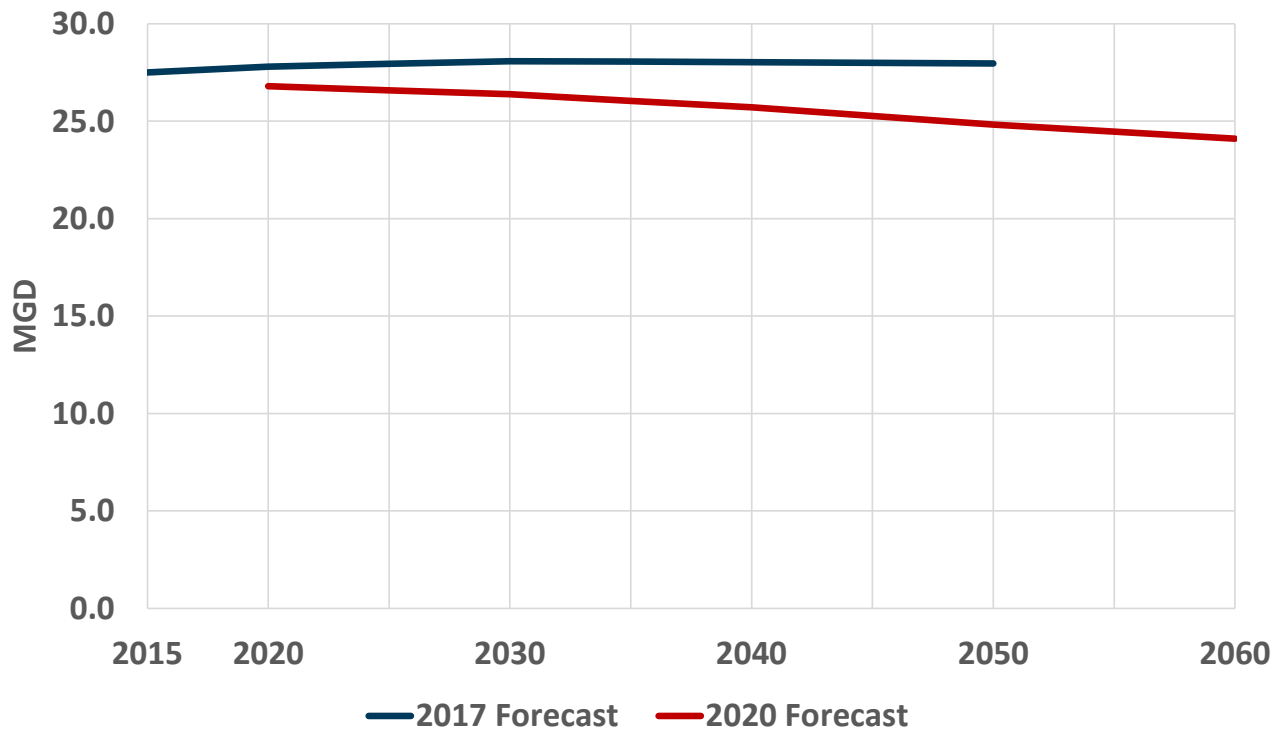
In 2050:

- 10 counties have lower demand
- 6 counties have higher demand



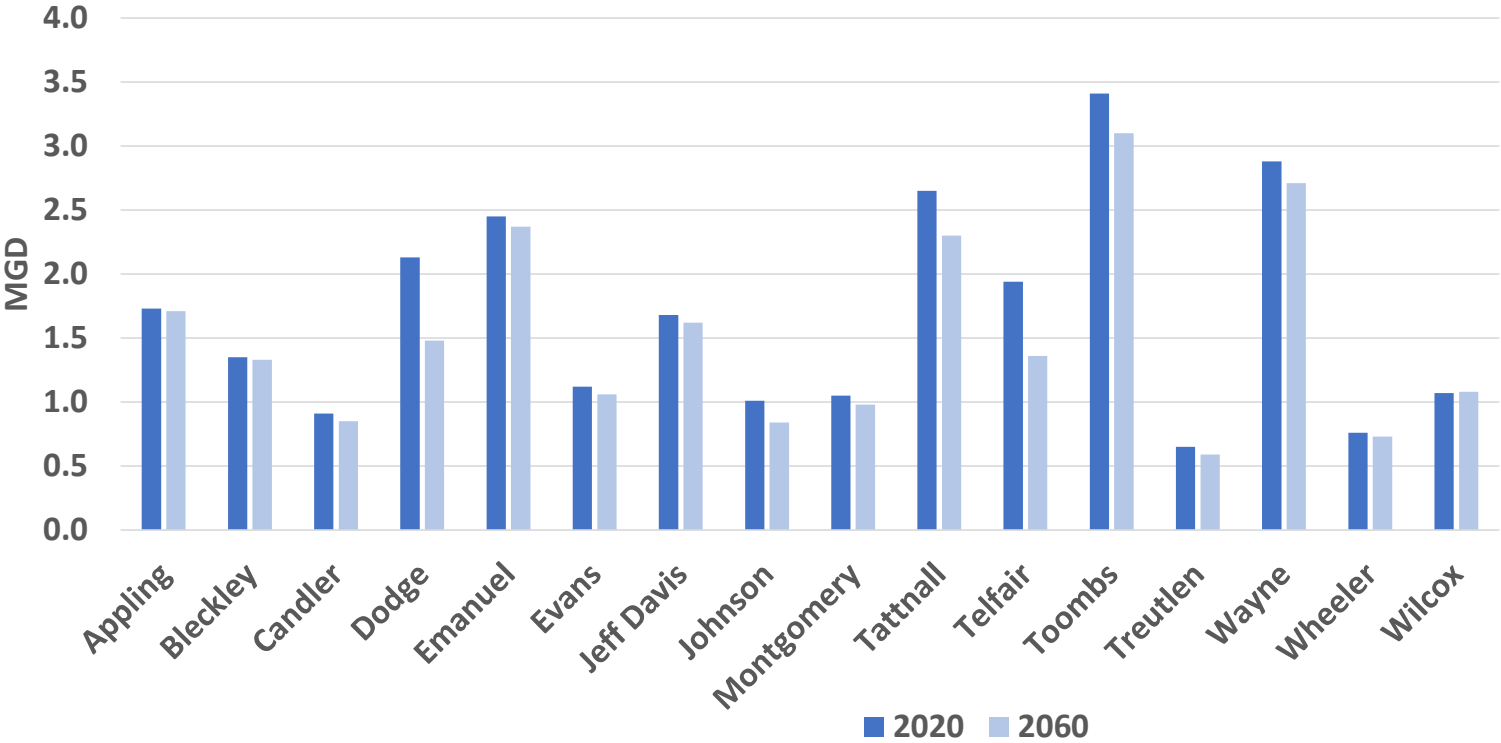
Altamaha Region Municipal Demand Forecast

- Current (2020) demand is lower than prior forecast
- Population projections are lower by 11% in 2050
- County average GPCD is lower in 50% of the counties



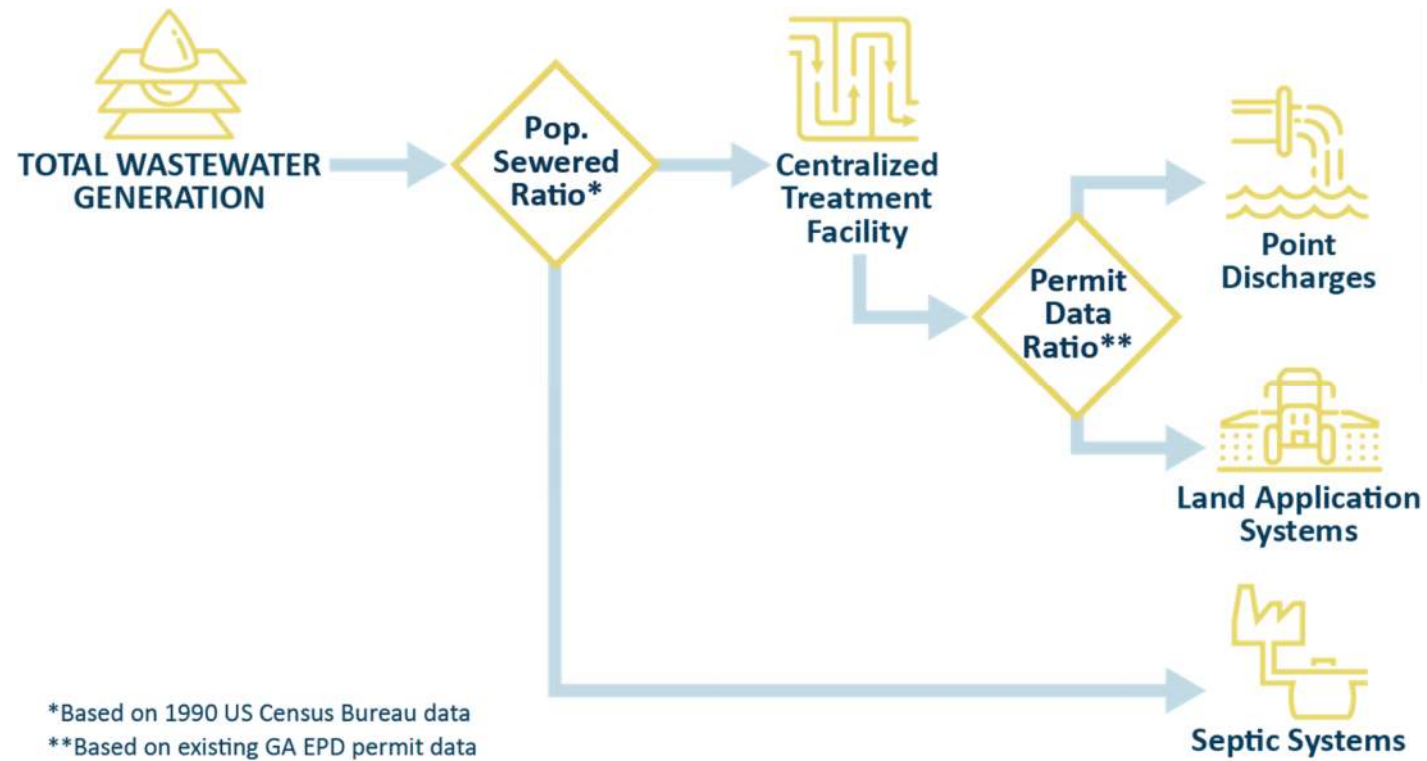
Altamaha 2020 Municipal Demand Forecast by County

The 2020 Municipal demand forecast shows a decline in demand in nearly all counties



Municipal Wastewater Methodology

- Septic flow based on % households on septic (80% of use)
- Used 2019 discharges by county
- Applied % change in population
- Maintain same ratio of Point and LAS



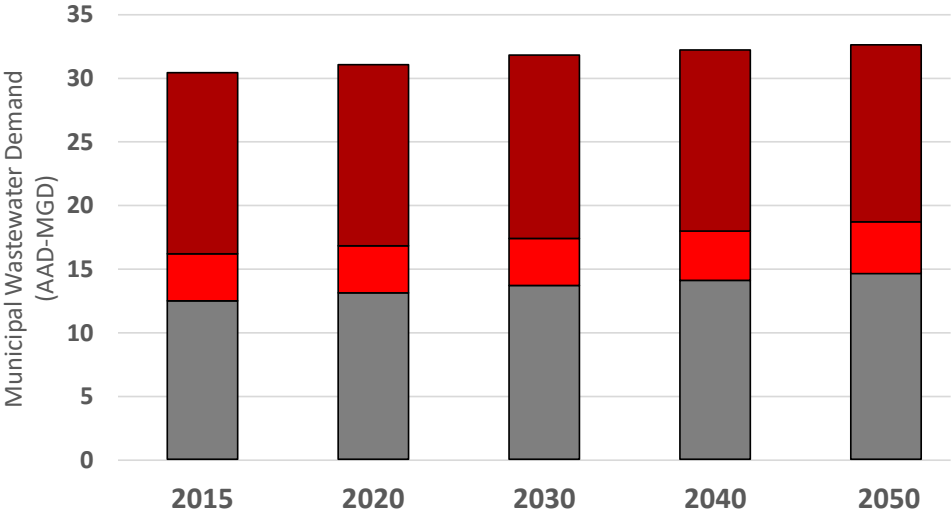
Municipal Wastewater – Septic

- County % population on septic systems
 - Held constant, unless specific input provided
- Values with asterisks are from the 1990 Census housing characteristics for Georgia
- Values w/o asterisks are from Georgia Dept. of Public Health data (through 2018)

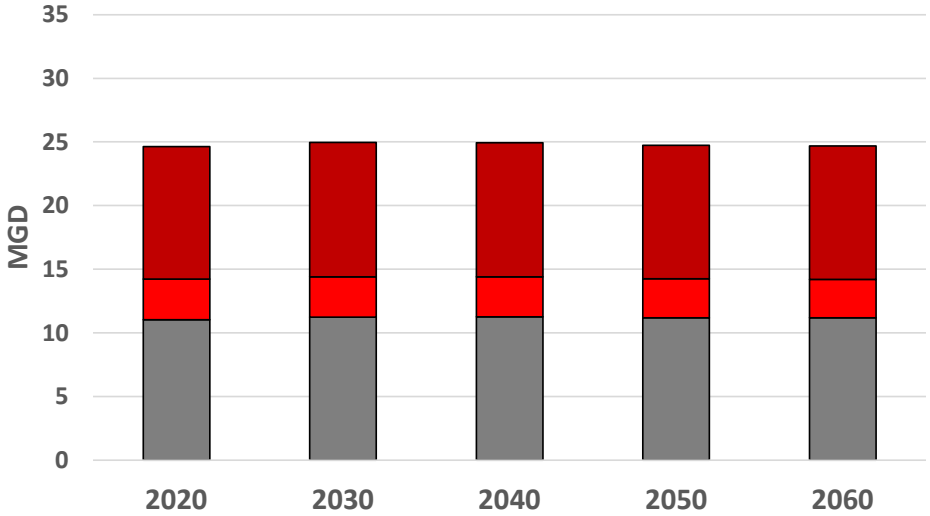
County	% Septic Users in 2020
Appling	71*
Bleckley	79
Candler	59*
Dodge	67*
Emanuel	59*
Evans	87
Jeff Davis	82
Johnson	74*
Montgomery	59*
Tattnall	77
Telfair	58
Toombs	71
Treutlen	57*
Wayne	59*
Wheeler	84
Wilcox	75

Altamaha Municipal Wastewater Forecast

2017 Forecast



2020 Forecast



■ Point ■ LAS ■ Septic



Energy Water Demand Forecast

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Energy Demand Forecast Update

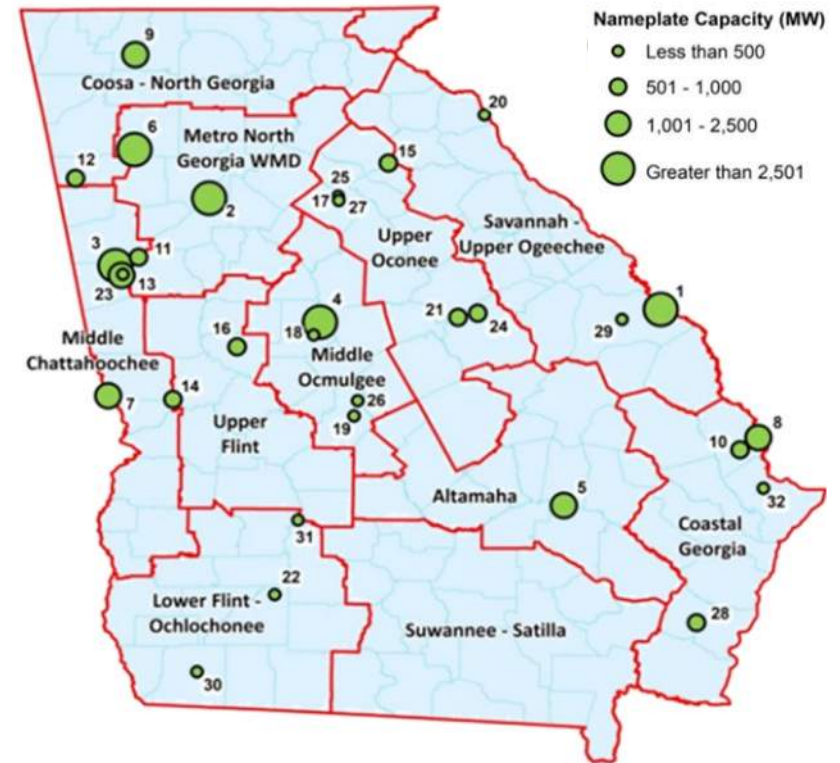
- Convened a stakeholder advisory group representing power companies in the State of Georgia
- Worked with stakeholder group to identify future sources of power generation
- <https://waterplanning.georgia.gov/forecasting/energy-water-use>

Participating Representatives from:

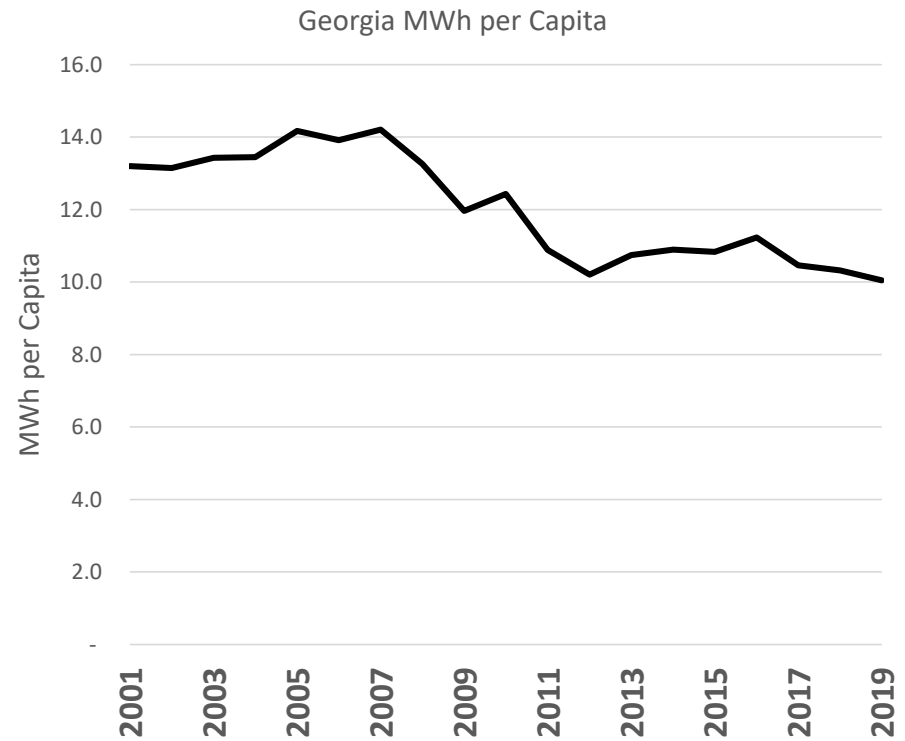
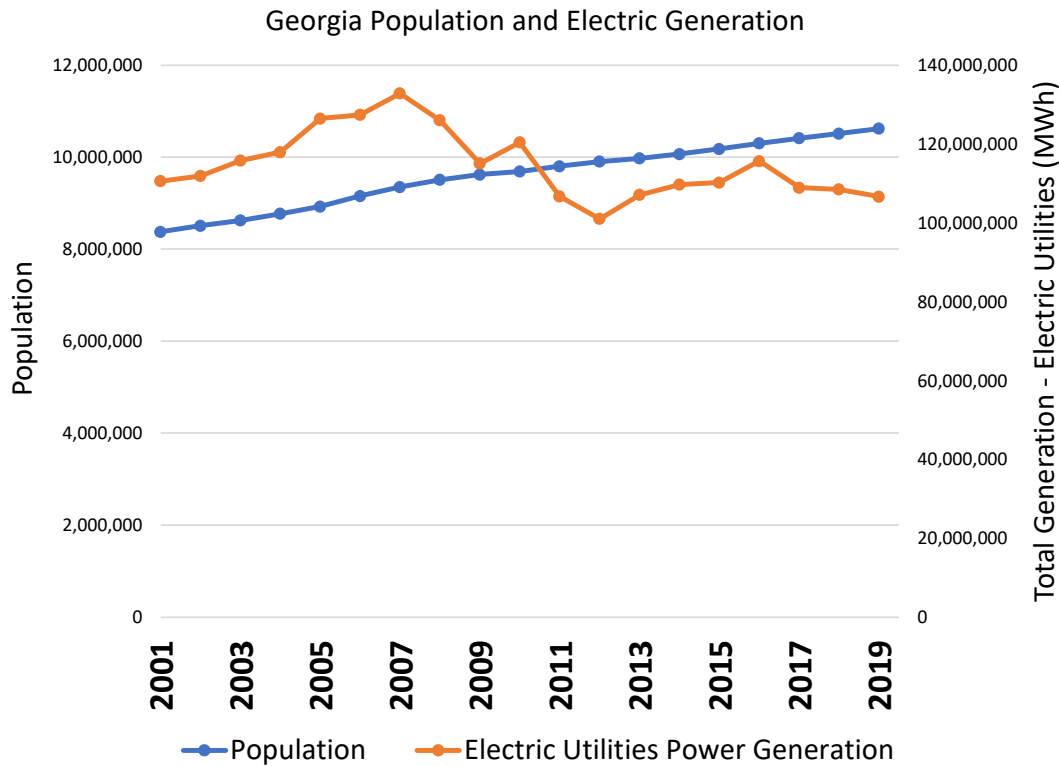
- Georgia Power / Southern Company
- Municipal Electric Authority of Georgia (MEAG)
- Oglethorpe Power Corporation
- Dalton Utilities
- Georgia Public Service Commission
- Georgia Environmental Finance Authority

Energy Demand Forecast Update Methodology

- Updated the list of active, retired and planned generating units
- Evaluated historic MWh per capita use
- Estimated need for power generation
- Estimated statewide generation by fuel type
- Applied water use factors by fuel type
- Identified water withdrawals and consumption by facility location

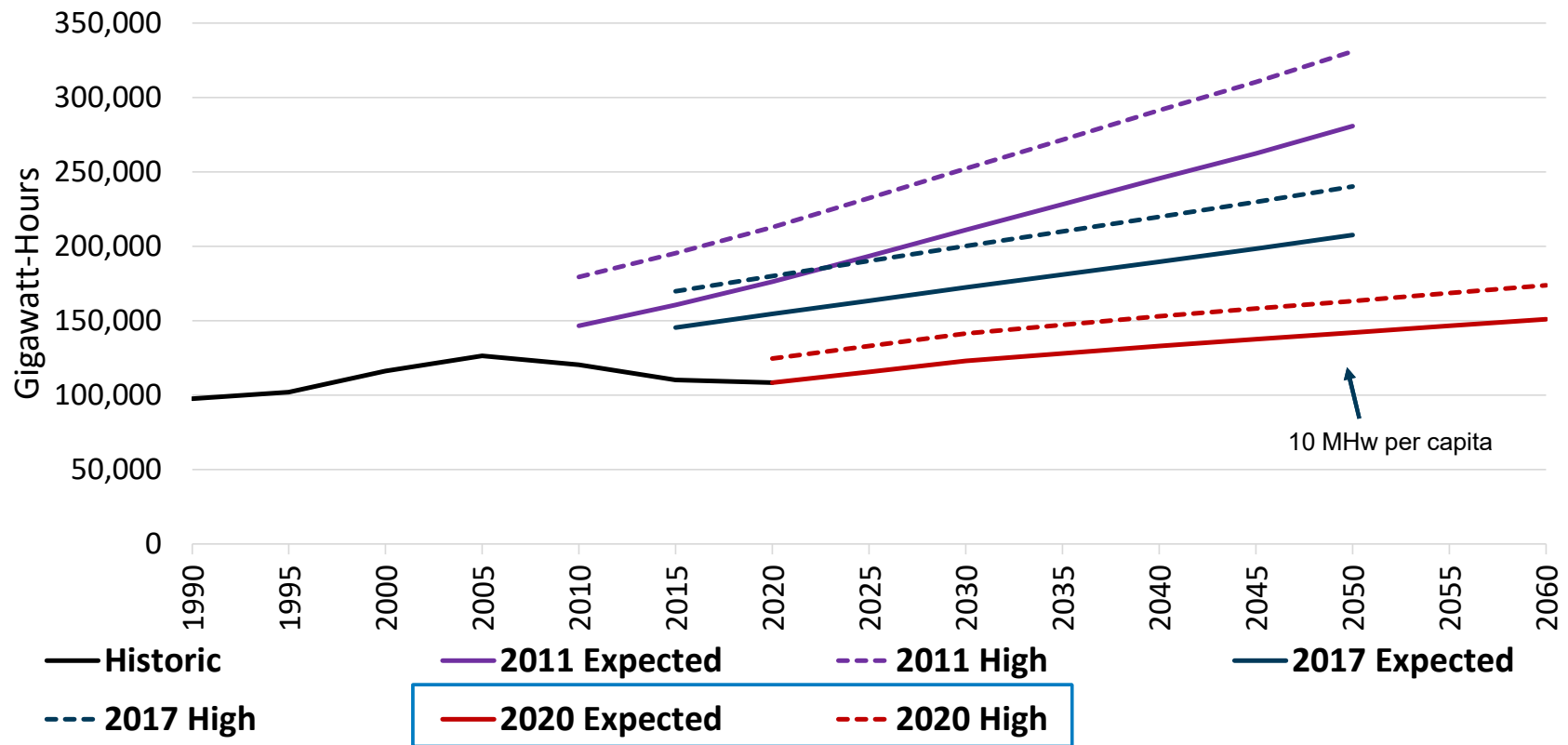


How Much Energy Do Georgians Use?



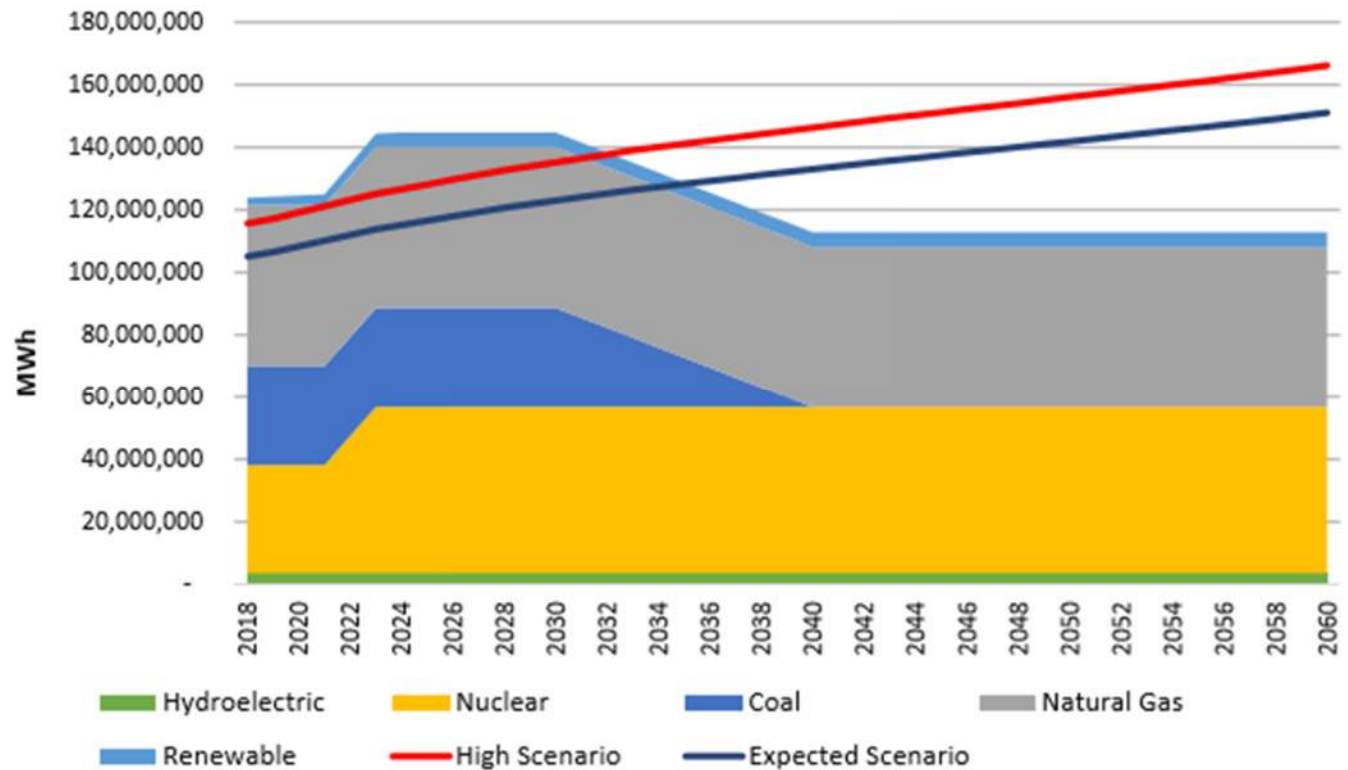
Source: US Census and EIA data for Georgia

How Much Power will Georgia Need?



Using Current Generating Capacity for the Future

- Nuclear generation (yellow) will increase with Vogtle 3&4
- Coal generation (blue) will be phased out in the future
- Both Natural Gas and Renewable assumed to increase to meet the need



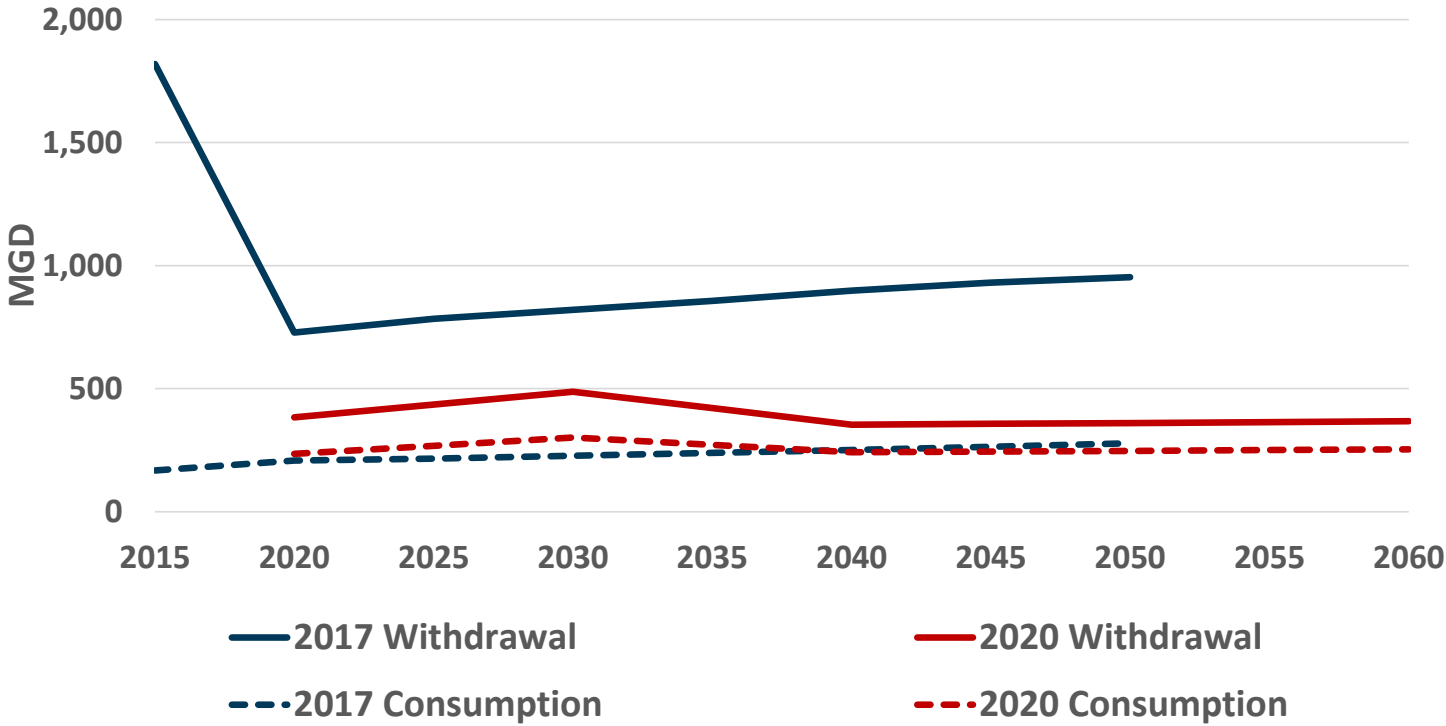
Water Use by Generation Configuration

POWER GENERATING CONFIGURATION	WATER WITHDRAWALS Gal/MWh	WATER CONSUMPTION Gal/MWh
Fossil Fuel/Biomass, Steam Turbine, Once-Through Cooling	41,005	0
Fossil Fuel/Biomass, Steam Turbine, Cooling Tower	1,153	567
Fossil Fuel/Biomass, Gas (Combustion) Turbine	0	0
Natural Gas, Combined-Cycle, Cooling Tower	225	198
Nuclear, Steam Turbine, Cooling Tower	1,372	880

Source: 2003-2007 Averages from EIA and EPD data for Georgia facilities

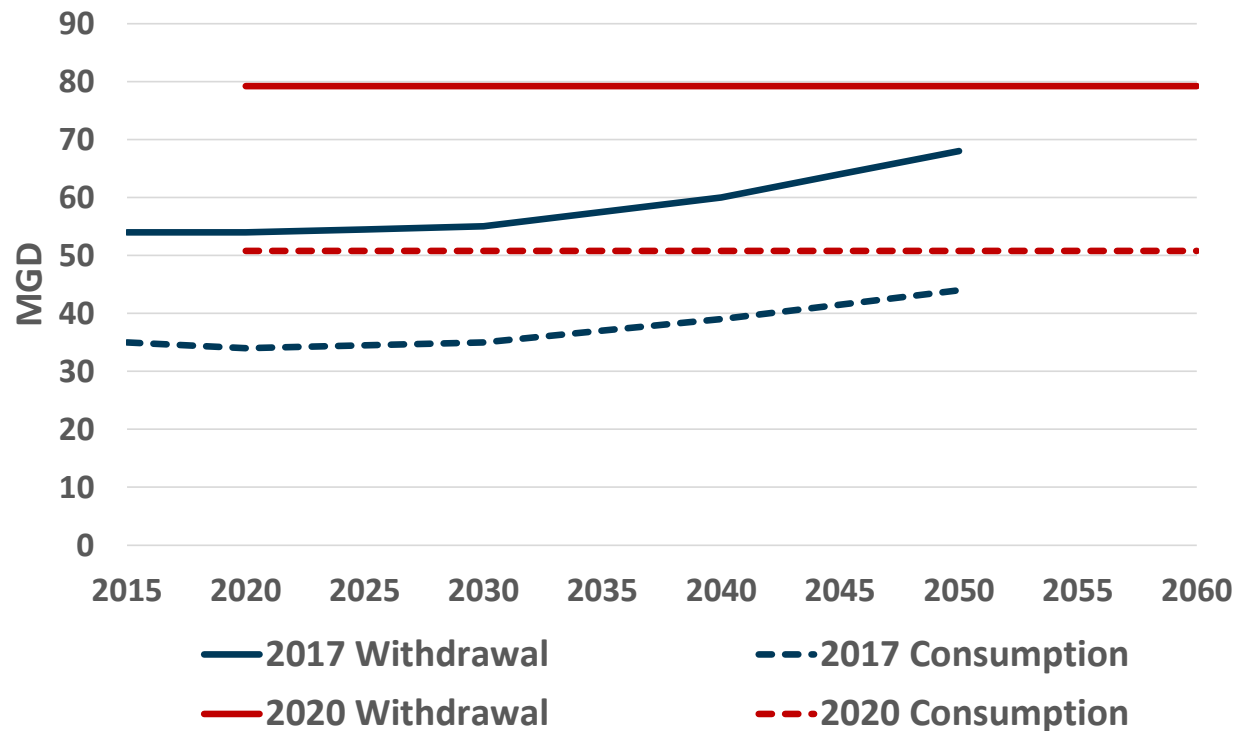
Statewide Energy Water Demand Forecast

- 2017 Forecast has high withdrawals for coal facilities now retired
- 2020 Need (MWh) is lower
- Water per MWh is more efficient



Altamaha Energy Water Demand Forecast

- Plant Hatch (nuclear) in **Appling County** is only thermoelectric generating facility in Altamaha Region
- Generation and water use are assumed to be steady in the 2020 forecast





Industrial Water Demand Forecast

www.georgiawaterplanning.org

Industrial Demand Forecast Update

- Updated forecasting methodology based on input from industry representatives from across the state
- No longer based on employment
- Convened industry experts into multiple advisory groups and developed separate estimates
- <https://waterplanning.georgia.gov/forecasting/industrial-water-use>

Industrial Sub-Sectors:

- Paper and Forest Products
- Food Processing
- Manufacturing
- Mining

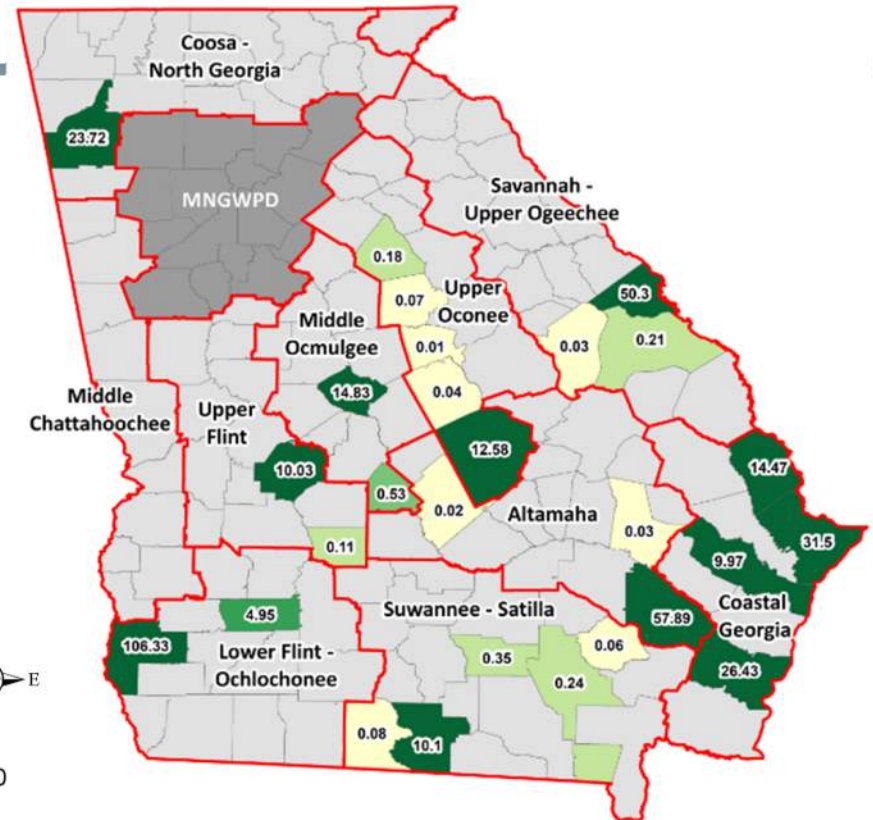
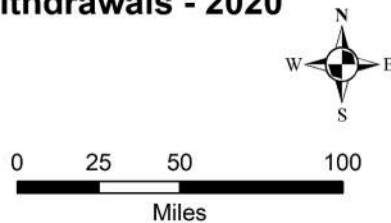
Industrial Stakeholder Advisory Group

- BASF
- Covia
- Georgia Association of Manufacturers
- Georgia Chemistry Council
- Georgia Department of Economic Development
- Georgia Mining Association
- Georgia Pacific
- Georgia Paper and Forest Products Association
- Georgia Poultry Federation
- Georgia Tech Research Institute
- Gerdau Steel
- Gulfstream Aerospace
- International Paper
- Irving Consumer Products
- Kamin
- Kia Motors
- Milliken and Company
- Mohawk Industries
- Office of Planning and Budget
- Packaging Corporation of America
- Rayonier Performance Fibers
- SAFT, Inc.
- Southwire
- Toyo Tire

Paper & Forest Products

- Water use to remain constant using the (2010 to 2019) 10-year average water withdrawals by location

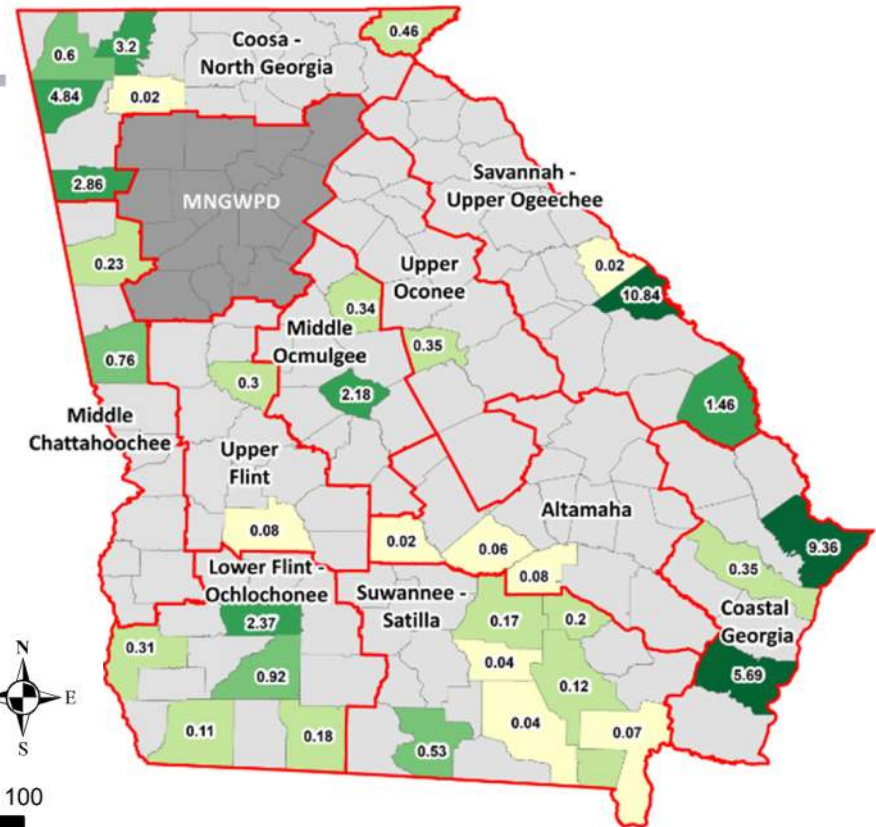
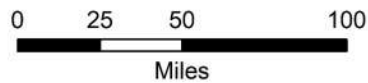
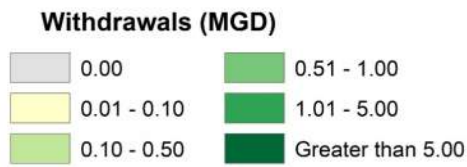
Paper & Forest Products Water Withdrawals - 2020



Manufacturing

- Water use to remain constant using the (2010 to 2019) 10-year average water withdrawals by location

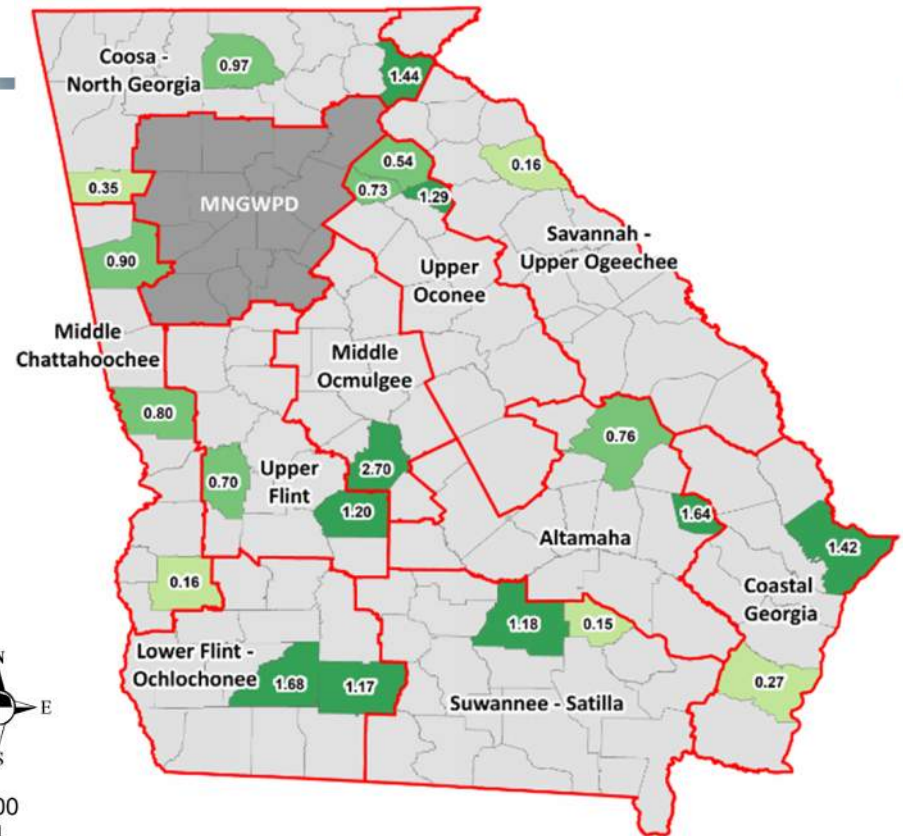
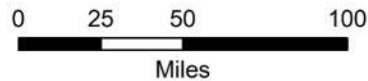
Manufacturing Water Withdrawals - 2020



Food Processing

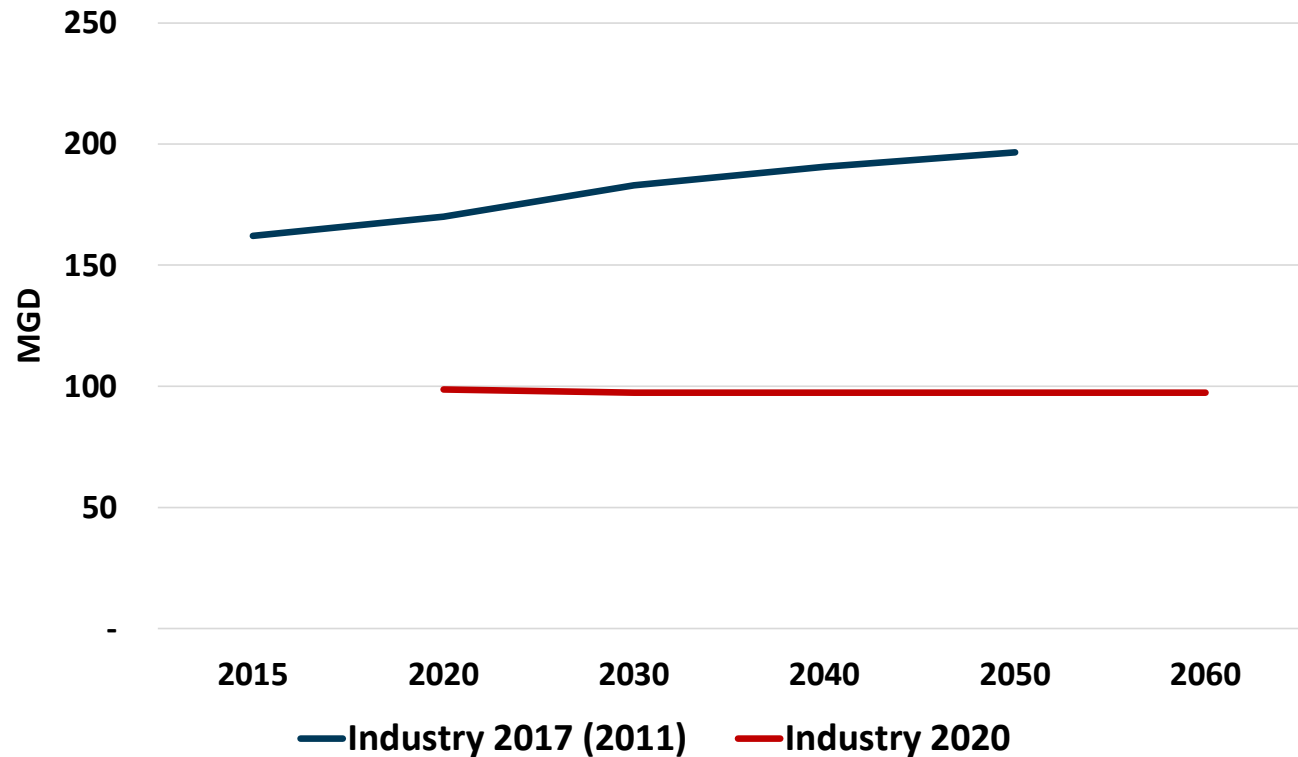
- Poultry processing projected to increase
- Non-poultry processing to remain constant at 10-year average water withdrawals

Food Processing Water Withdrawals - 2020



Altamaha - Industrial Forecast

- 2017 forecast is from 2011 RWP, and includes added buffer
- 2017 (2011) based on employment growth projections
- 2020 based on input from local industry experts

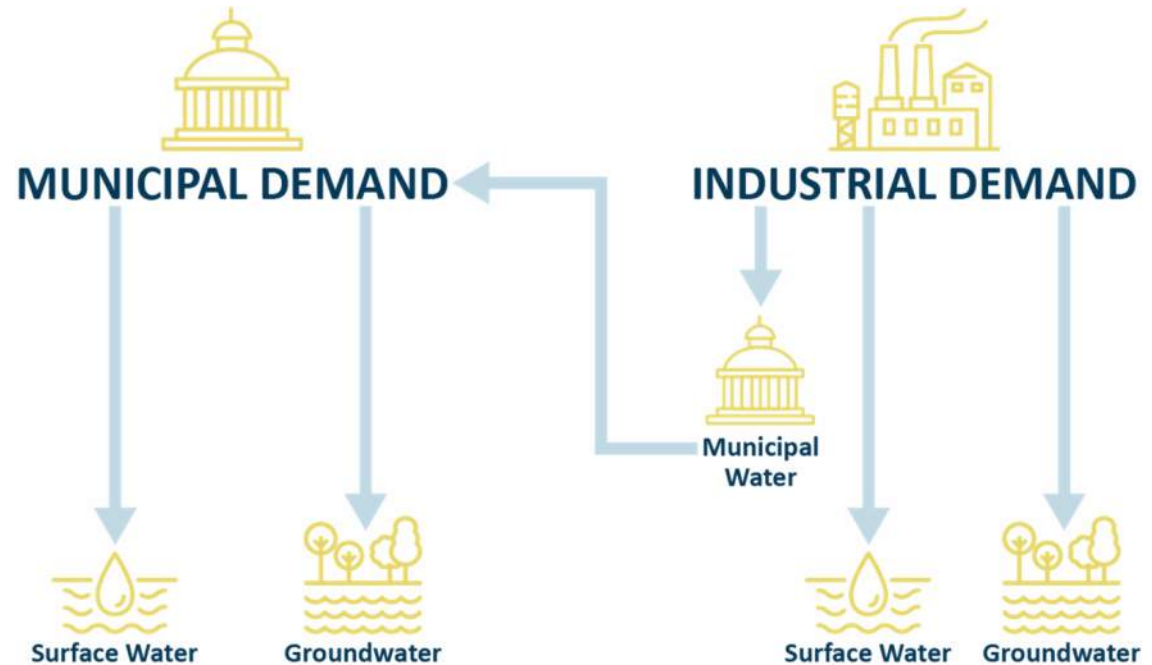


Coordination with Municipal Water Demand Forecast

- Shared information with municipal forecast team where municipal water use is identified and greater than 0.2 MGD

Are we double counting?

- If we add Municipal and Industrial demand, yes
- If we add surface water and groundwater demand, no





Georgia's
State Water Plan

Agricultural Water Demand Forecast

www.georgiawaterplanning.org

Water Demand Forecasting – Agricultural

- Georgia Water Planning & Policy Center at Albany State University, along with modeling support from UGA, will be updating this sector forecast
- Forecast includes irrigated land and other agricultural uses
- Estimates of irrigation water use informed by estimates of wetted acreage and irrigation use
- Forecasts informed by economic models that look at crop projections
- Agricultural forecast will be shared at the Council's next meeting



Surface Water Availability Resource Assessment

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Hazen



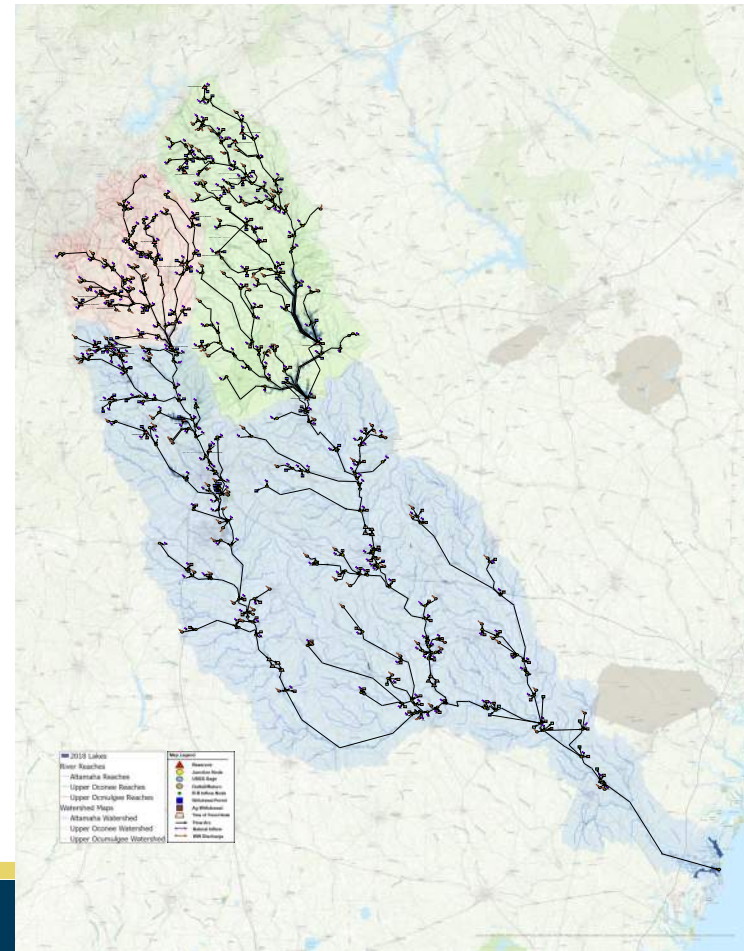
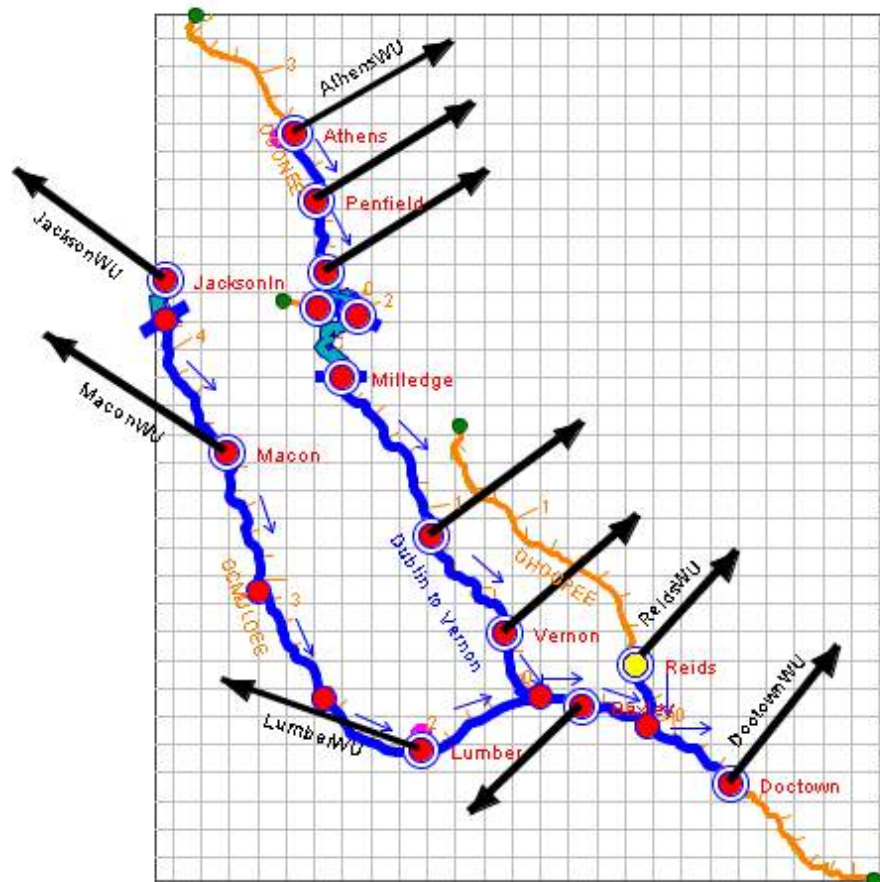
OOA BEAM Model Development

Surface Water Availability Resource Assessment:
Pilot Development for Oconee-Ocmulgee-Altamaha Basin

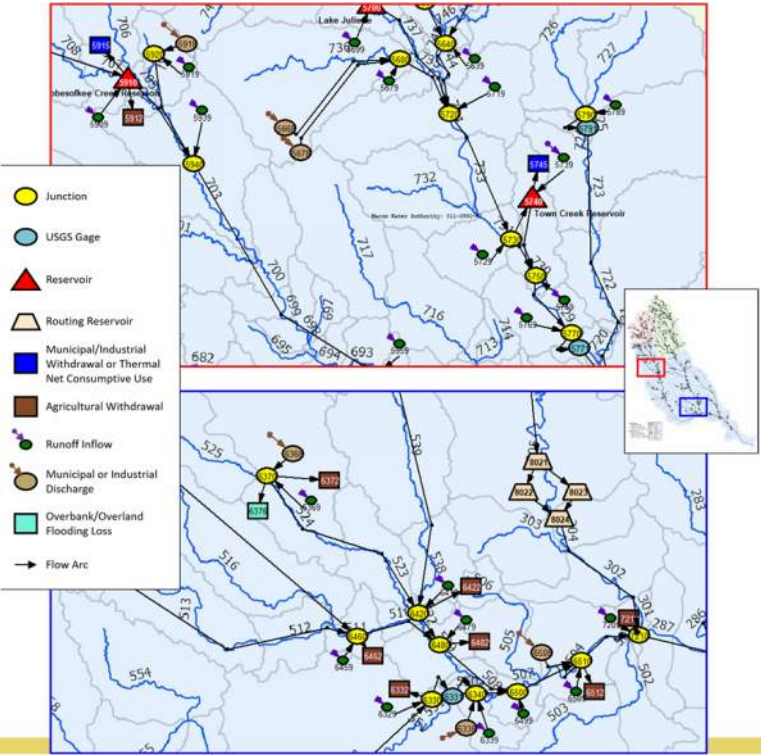
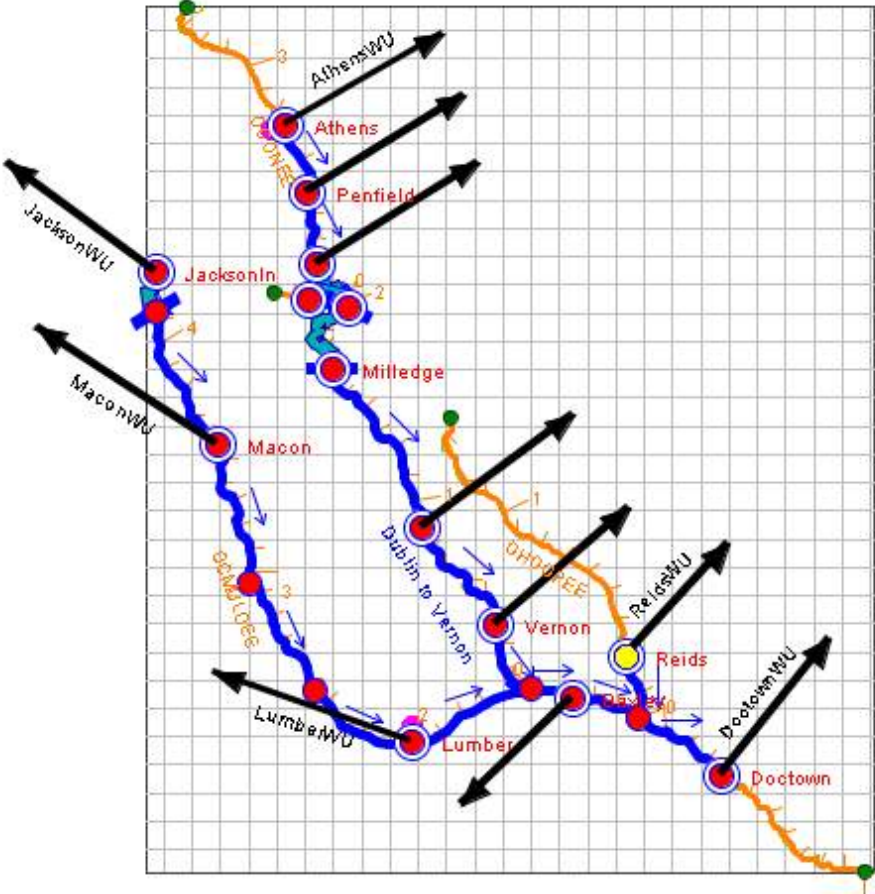
Outline

- **Basin Environmental Assessment Model (BEAM)**
 - **Model configuration**
 - **Features**
 - **Unimpaired Flow (UIF) development**
- Performance measure (performance metrics) and a hypothetical scenario
- How this affects planning and permitting

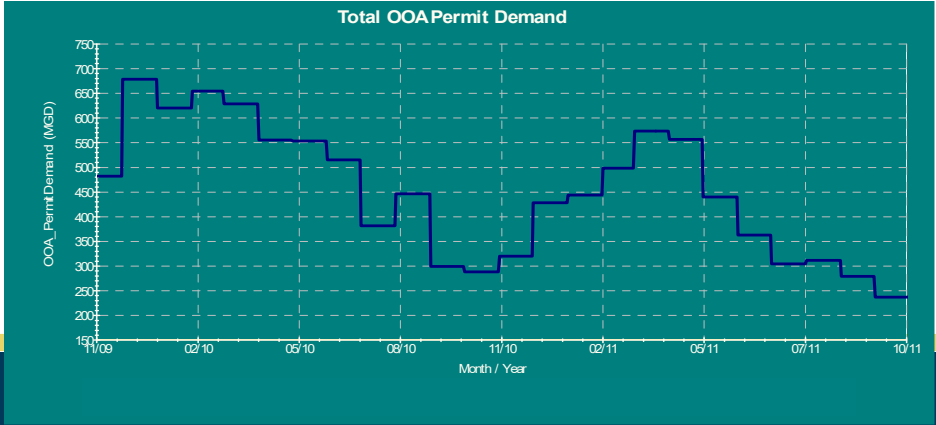
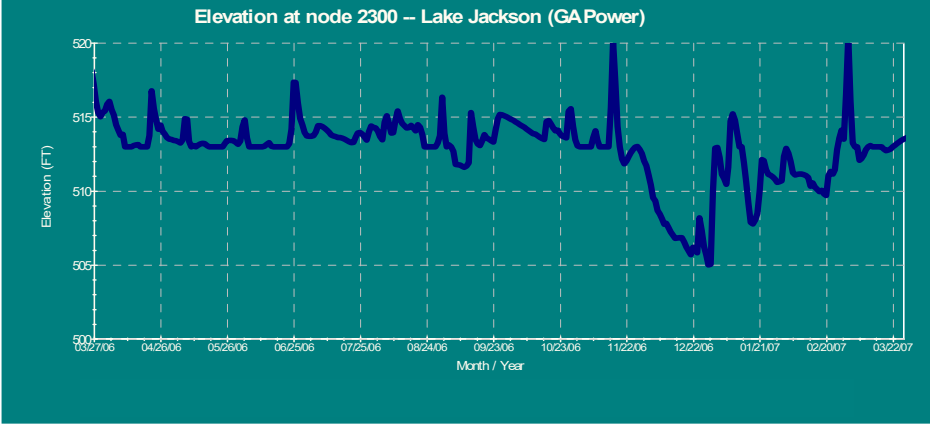
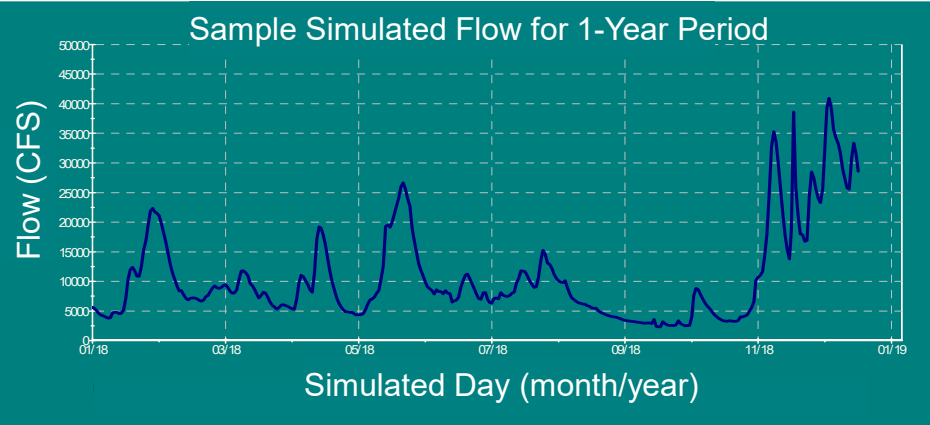
ResSim (Prior Model) and BEAM Schematics



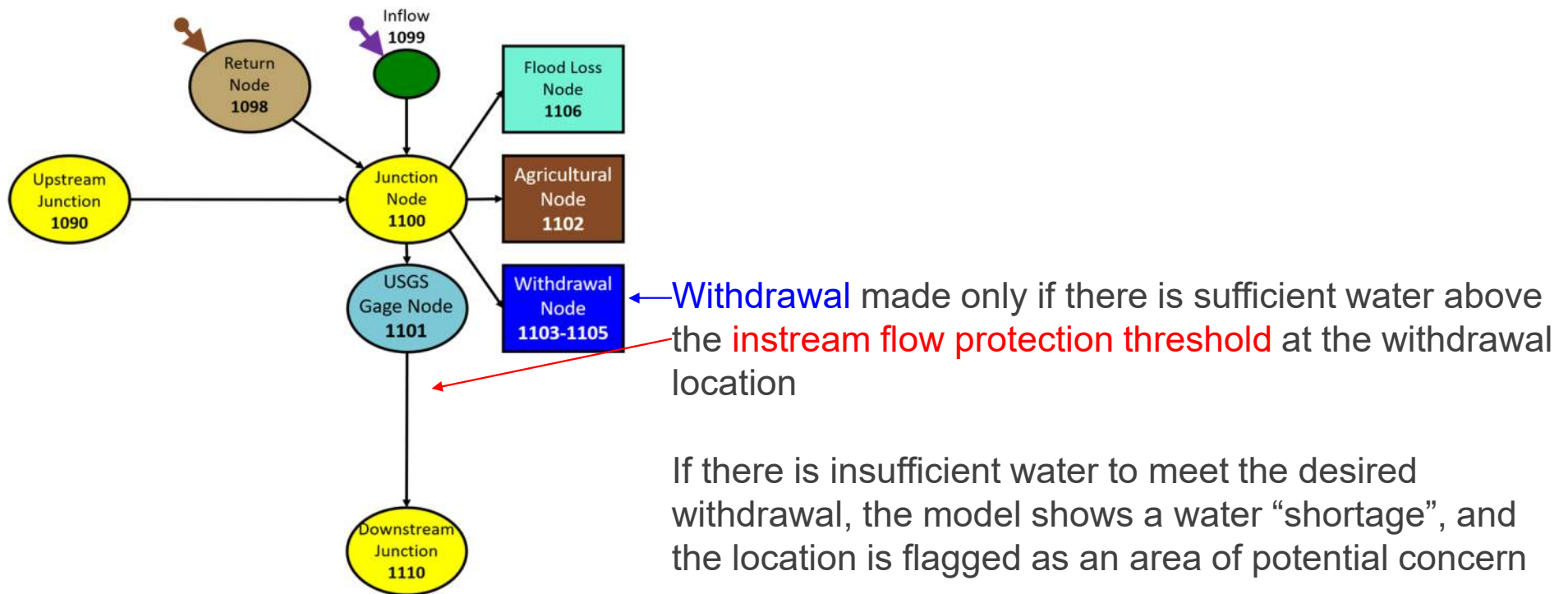
ResSim (Prior Model) and BEAM (Zoomed In) Schematics



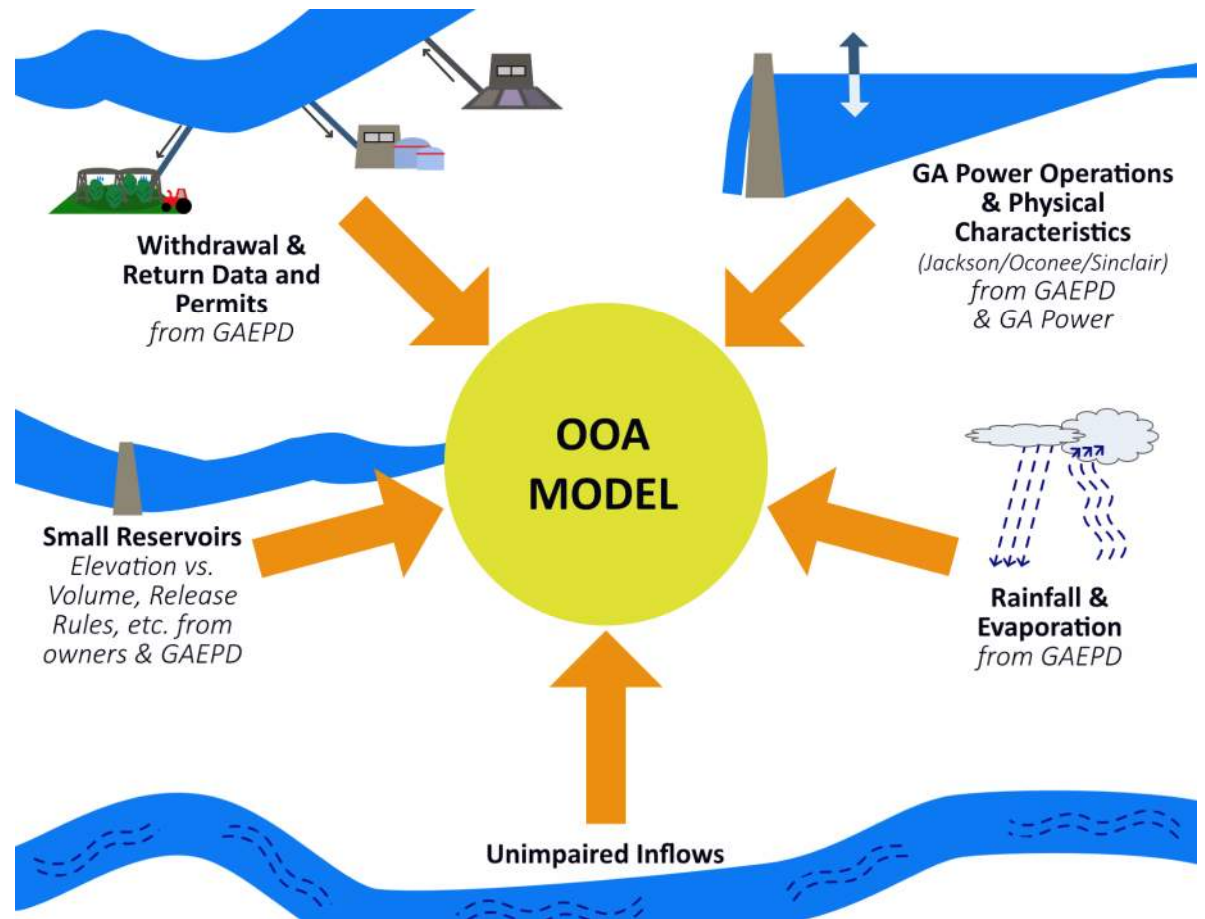
Sample Model Output



Instream Flow Protection Thresholds are Met *Before* Withdrawals are Made



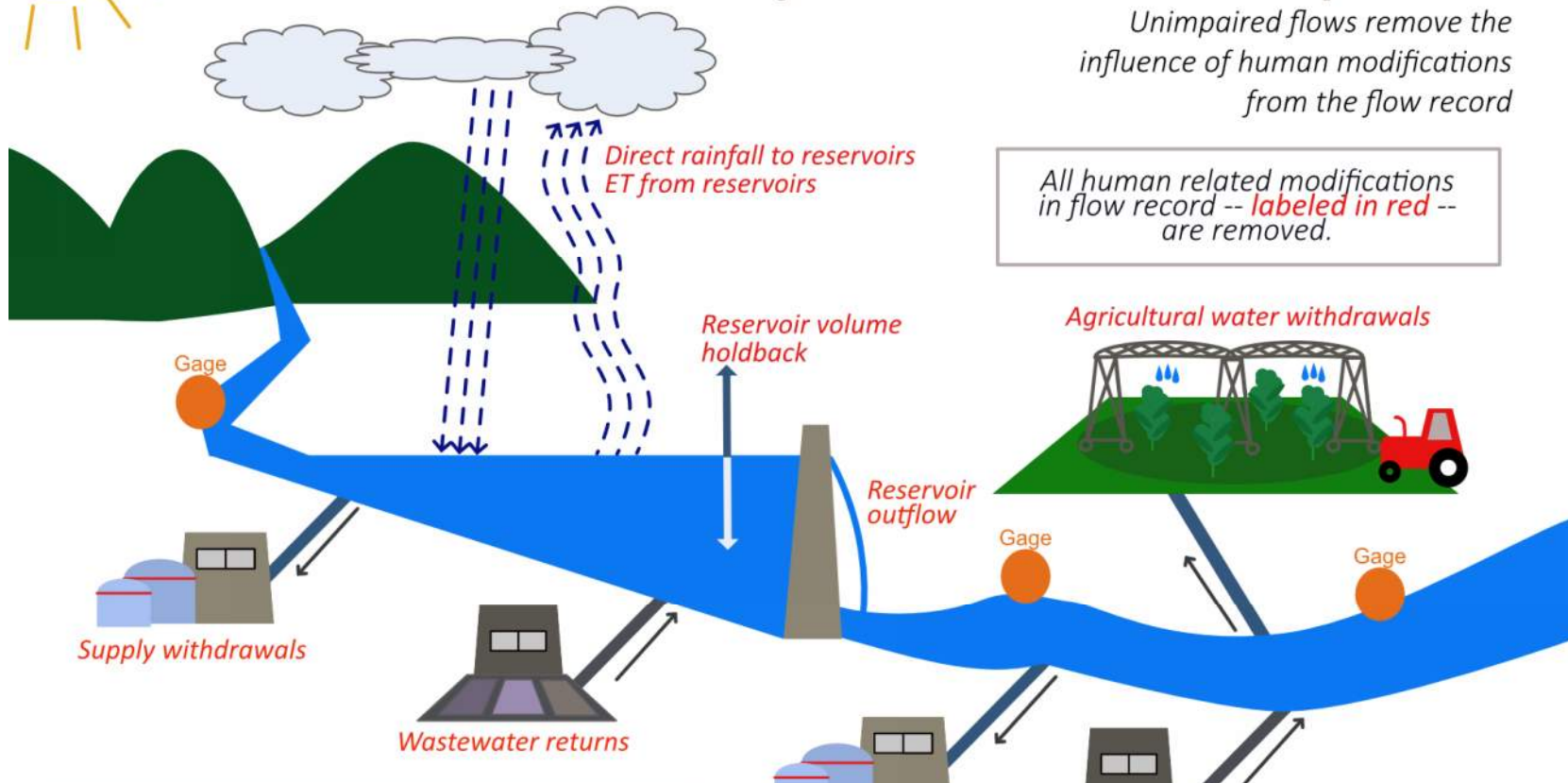
Input Data Sources



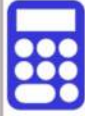


Unimpaired Flows Development

Unimpaired flows remove the influence of human modifications from the flow record



All human related modifications in flow record -- **labeled in red** -- are removed.

 Other adjustments: correct negative flows, rescale and balance gains between gages, disaggregate gains to daily resolution

Supply withdrawals
Wastewater returns

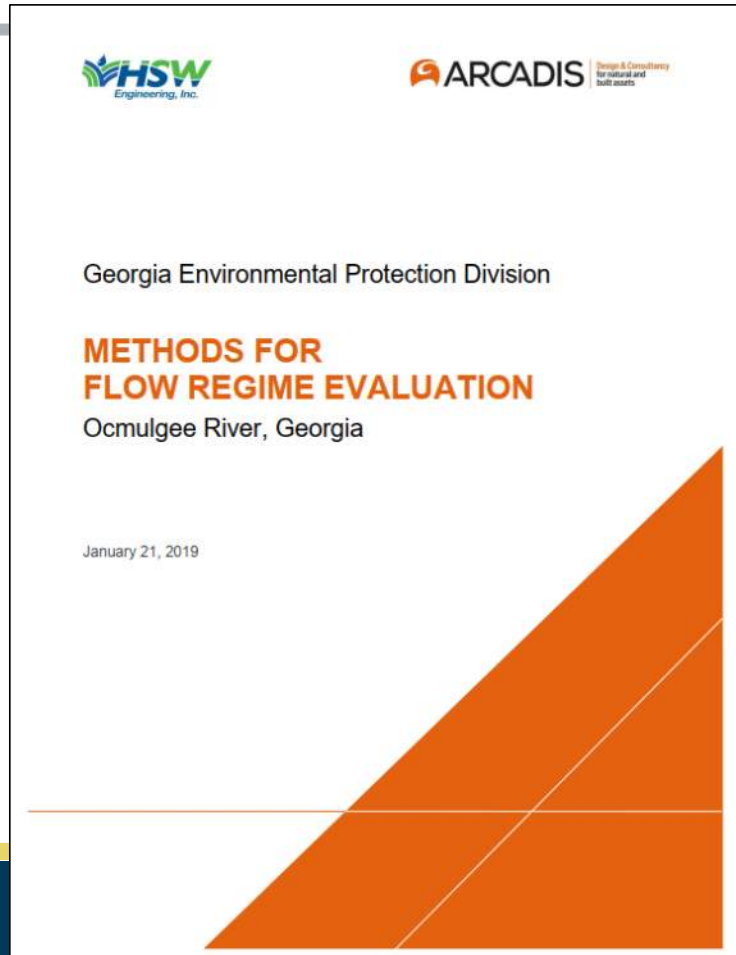
Outline

- Basin Environmental Assessment Model (BEAM)
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- **Performance measure (performance metrics) and a hypothetical scenario**
- How this affects planning and permitting

Performance Metrics for Today's Demonstration

- Water Supply
 - Number of days per year that flow falls below the regulatory flow requirement at a wastewater discharge location
 - Daily volume of desired withdrawal that cannot be taken from the river because of low flows
 - Daily reservoir elevation (reservoir drawdown)
 - Percent of months with minimum elevation below a threshold
- Ecological
 - Average monthly area of available habitat suitable for specific species of fish
 - Percent of years with sufficient floodplain inundation during spawning season
- Recreation
 - Number of days per year with sufficient river water level for boating
 - Percent of days with elevation below a recreational threshold
- Hydropower
 - Average annual peak generation (energy generated during “peak” hours)

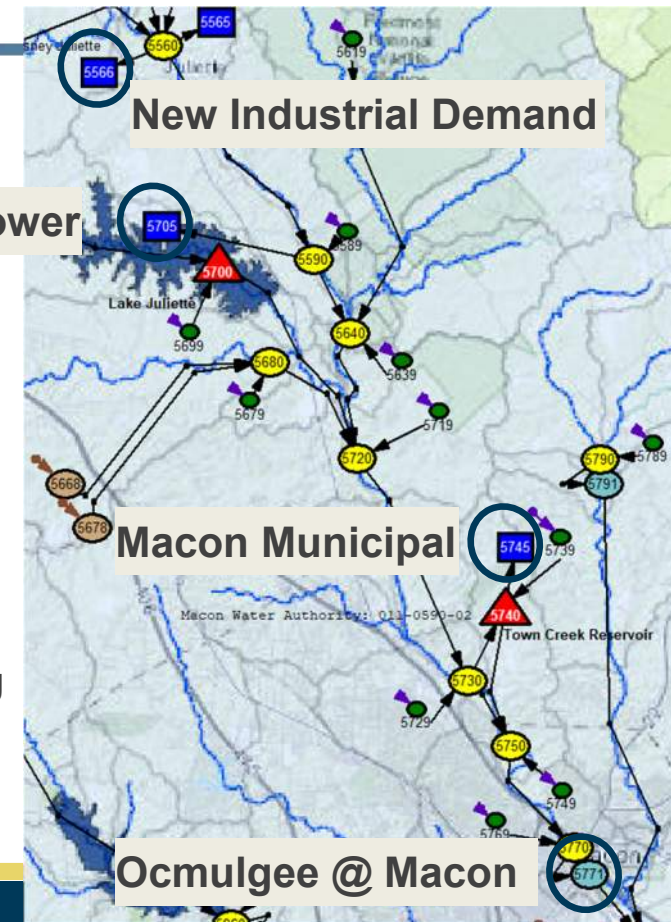
Pilot Study on Ocmulgee River Identified Potential Metrics



River service	Service metric
Recreation (Paddling)	Paddling during low water conditions (Stage < 6 feet)
Recreation (Boating)	Paddling during low water conditions (Stage < 7.5 feet)
Instream aquatic habitat	AWS index (Shallow Fast, Shallow Slow, Deep Fast)
	Macon site habitat area (Bhattacharjee, 2017)
Instream bottom and channel-side habitat	Frequency of exceeding wetted perimeter threshold Wetted perimeter (feet)
Floodplain wetland habitat	Wetland inundation area (square miles) Frequency of exceeding floodplain inundation threshold

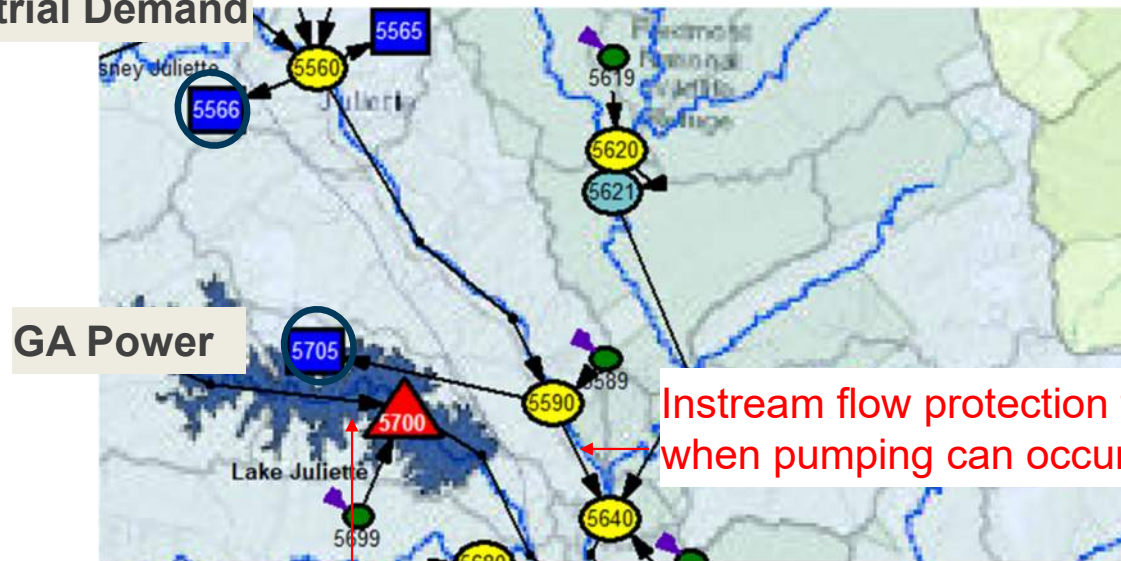
Ocmulgee Scenario: New Industrial Demand

- What would happen if a large (50 mgd) new industrial demand was added at Juliette, GA?
- Performance Metrics for downstream impacts
 - Impacts to downstream withdrawals
 - Volume of desired pumping that cannot be pumped from the river because of low flows
 - Daily reservoir levels at Town Creek Reservoir
 - Ocmulgee River at Macon PMs
 - Number of days per year with sufficient river level for boating
 - Instream Aquatic Habitat
 - Boating/Paddling



Pumping to Lake Juliette May Be Impacted By New Demand

New Industrial Demand



GA Power

Instream flow protection threshold limits when pumping can occur

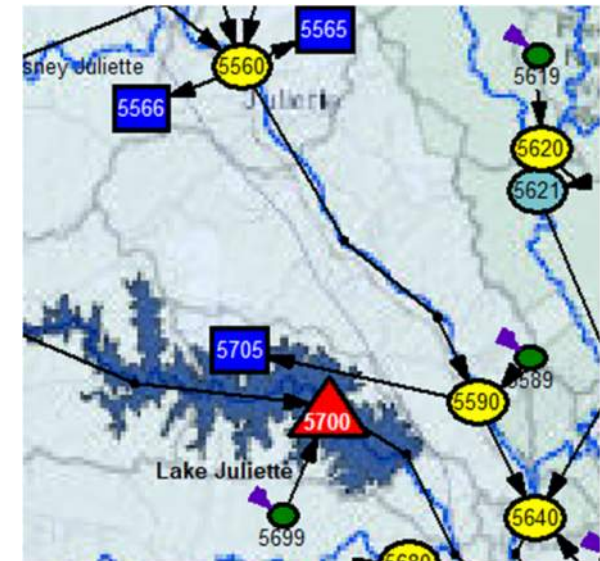
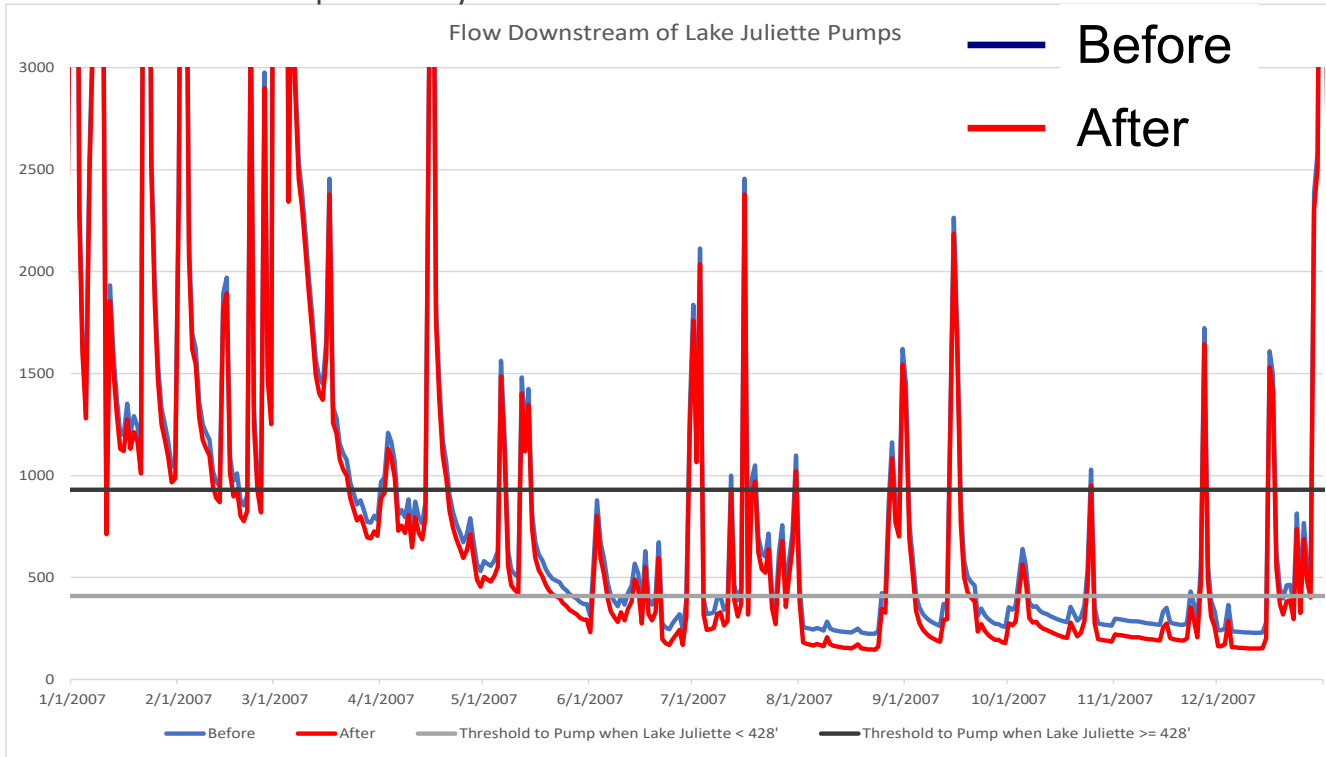
When the elevation at Lake Juliette falls below 428', the instream flow protection threshold is reduced (from 931 cfs to 410 cfs)

Outline

- Basin Environmental Assessment Model (BEAM)
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 - Unimpaired Flow (UIF) development
- Performance measure (performance metrics) and a hypothetical scenario
- **How this affects planning and permitting**

Ocmulgee River Flow Downstream of Pumps to Lake Juliette

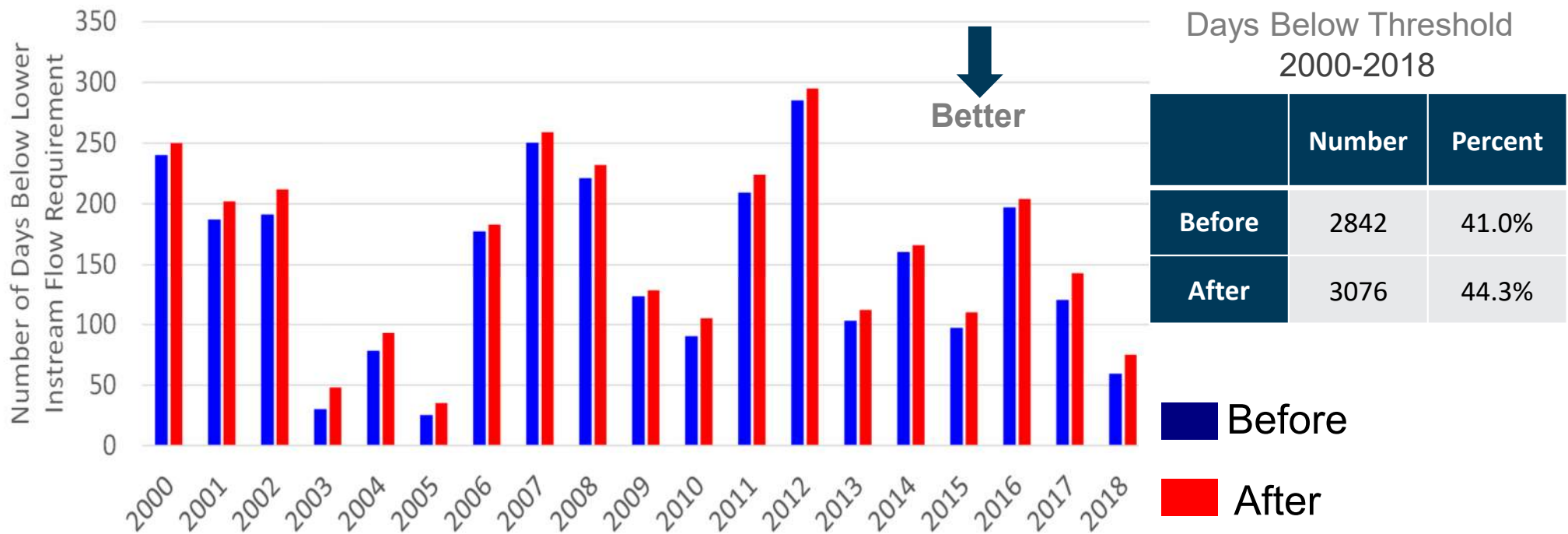
For Informational Purposes Only



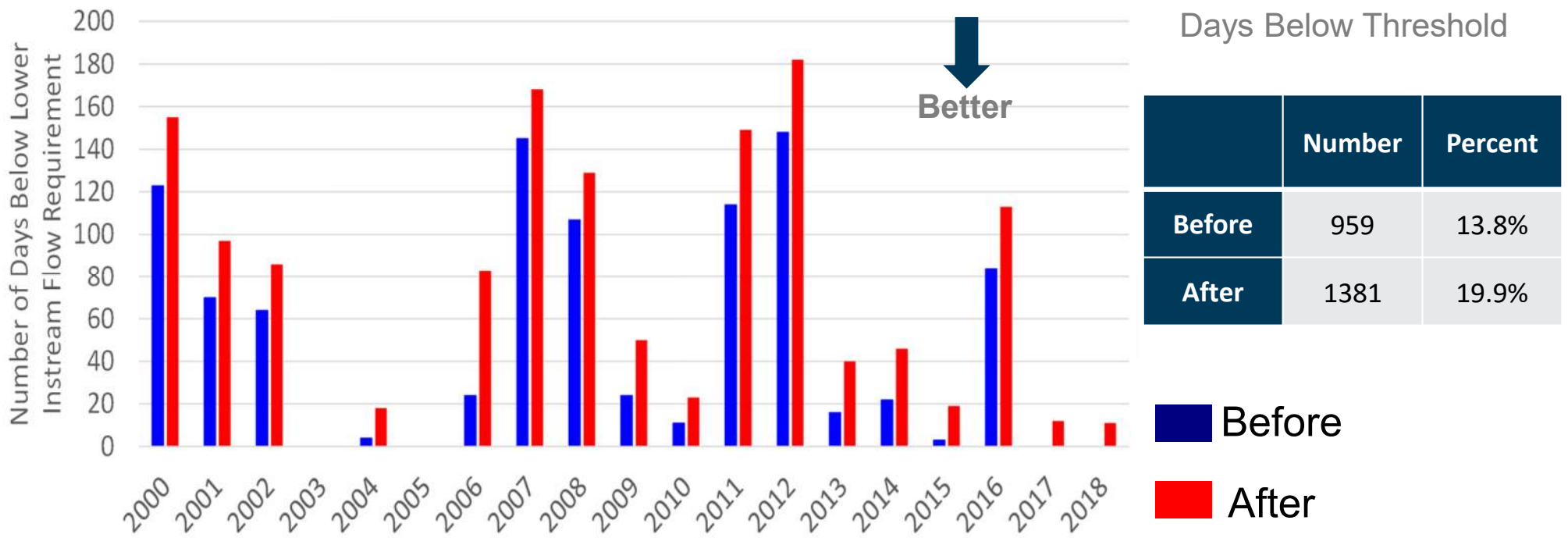
Streamflow threshold to pump when Lake Juliette $\geq 428'$

Streamflow threshold to pump when Lake Juliette $< 428'$

Number of Days Each Year Ocmulgee River Flow Downstream of Pumps is Less than 931 CFS

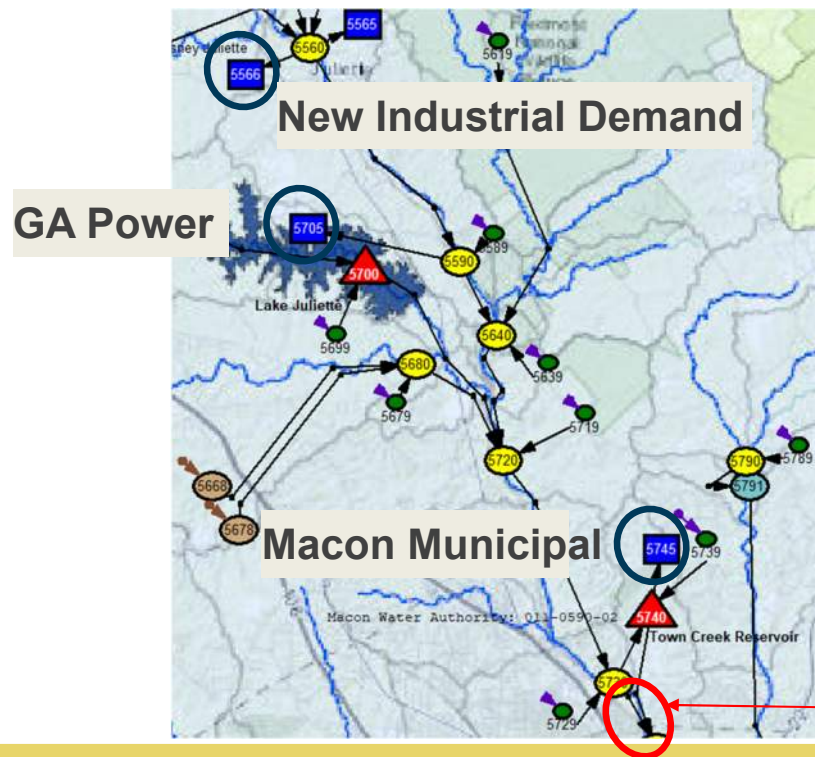


Number of Days Each Year Ocmulgee River Flow Downstream of Pumps is Less than 410 CFS



Pumping to Town Creek Reservoir May Be Impacted By New Demand

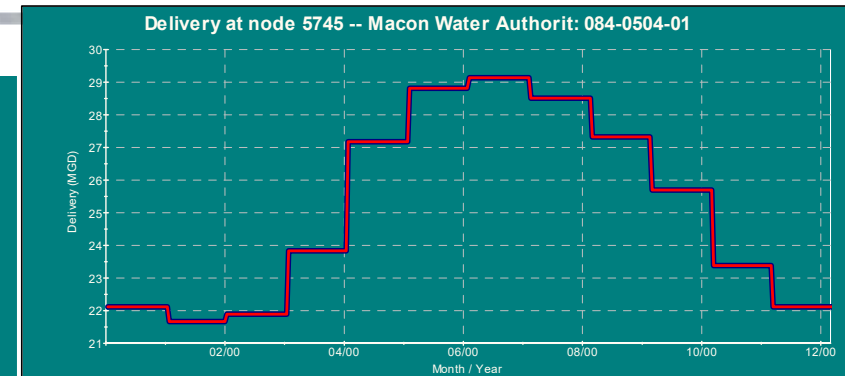
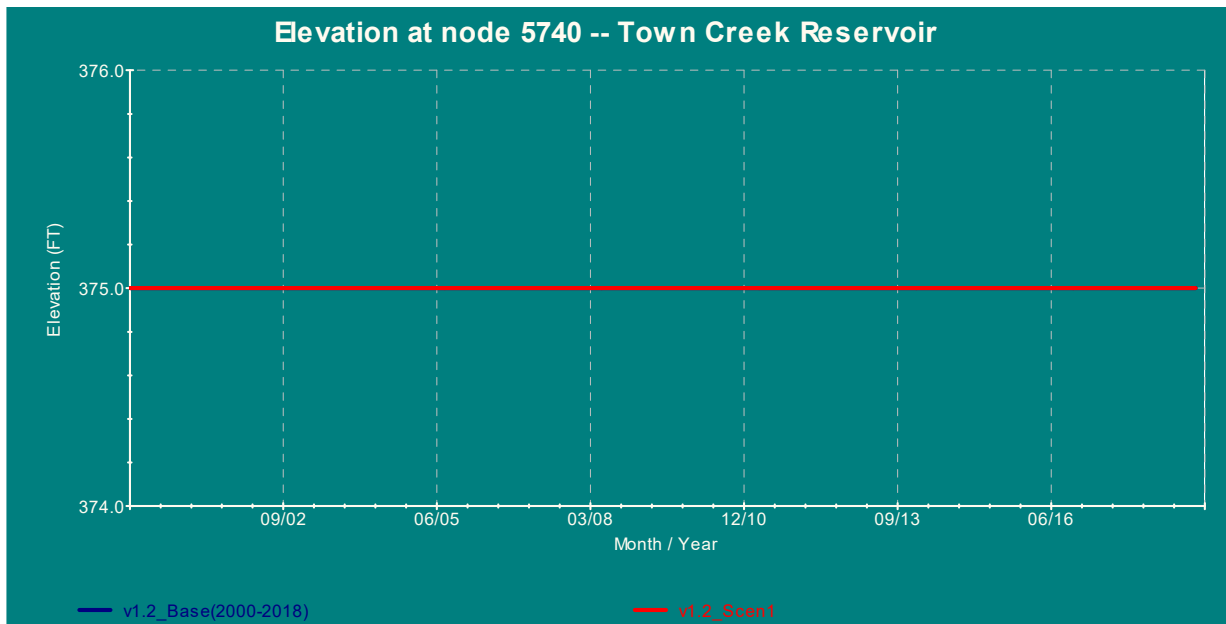
For Informational Purposes Only



Instream flow protection permit allows up to 35 MGD to be pumped any day (regardless of flows)

Ocmulgee Scenario: No Impacts to Town Creek Reservoir

For Informational Purposes Only



— Before
— After

- Pumping to reservoir is exempt from instream flow protection threshold if pumping is below 35 mgd

Using Flow to Create Boating/Paddling Performance Metric

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- Convert stream flow to stage

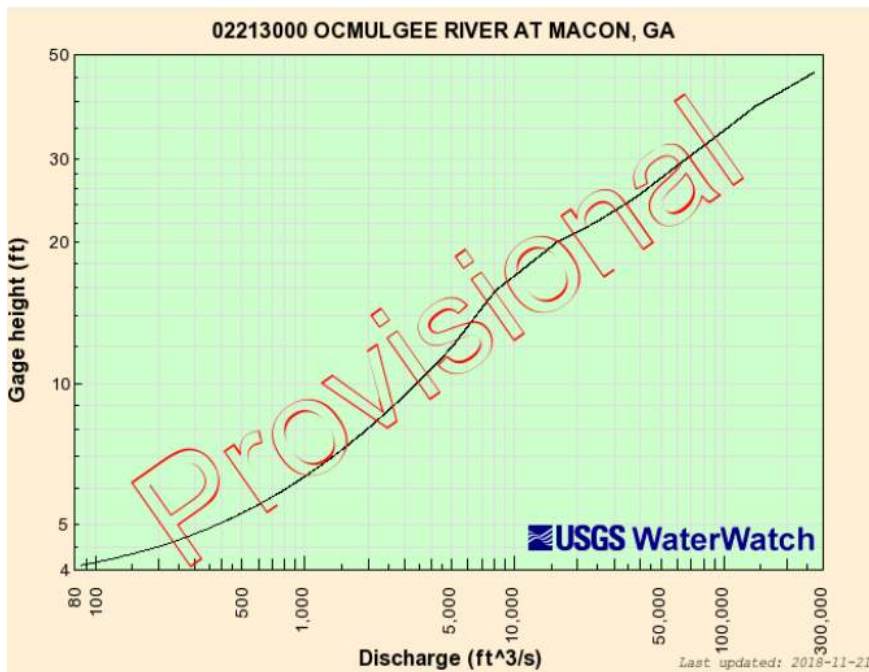
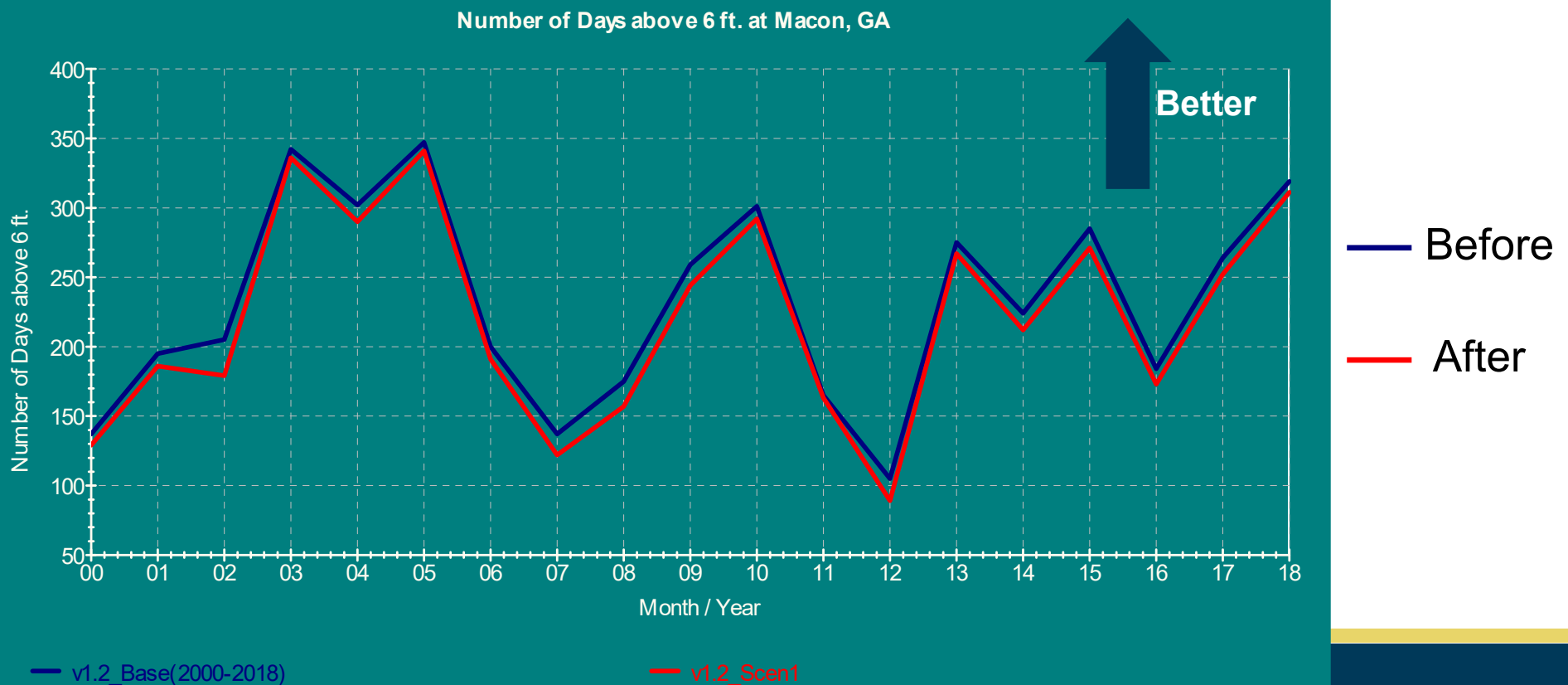


Table 11. Low-flow metrics for Ocmulgee River recreational boating

River Service	Metric	Source
Kayaking/canoeing	Amount of time that kayaking or canoeing is not ideal (i.e., gage height ≤ 6.0 feet) due to low water conditions	Personal communication with Kathleen O'Neal (Ocmulgee Outdoor Expeditions)
Boating	Amount of time that boating is not ideal (i.e., gage height ≤ 7.5 feet) due to low water conditions	Viable stage for kayaking/canoeing + 1.5 feet (average shaft length of short- and long-shaft small engines); (Iboats, 2009)

Performance Metric at Macon, GA for Boating

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Reach Habitat

- Shallow/Fast

- Species: Spottail Shiner and Bluehead Chub



https://en.wikipedia.org/wiki/Spottail_shiner

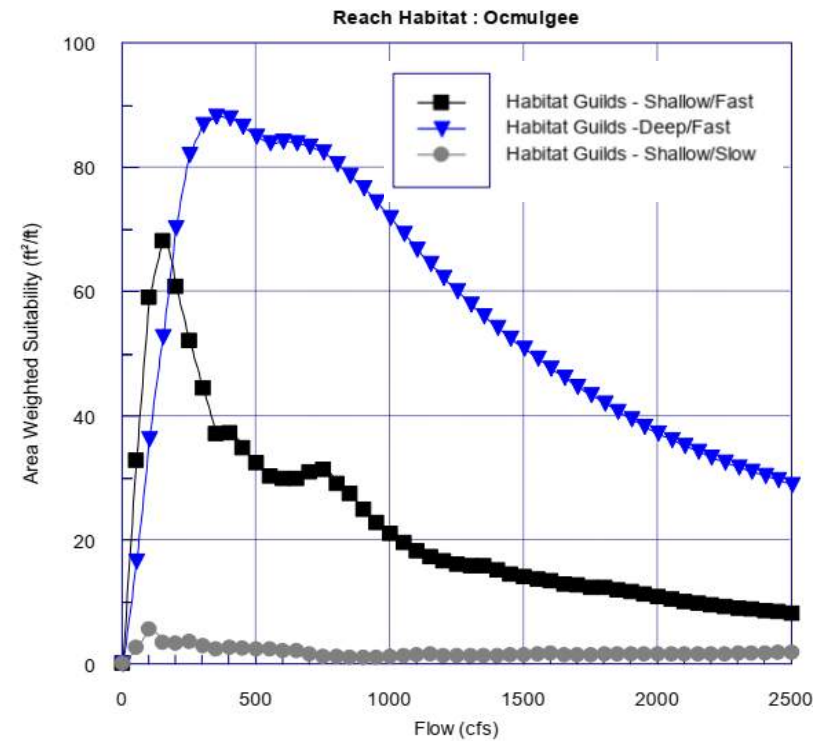
- Deep/Fast

- Species: Largemouth Bass



© Duane Bauer

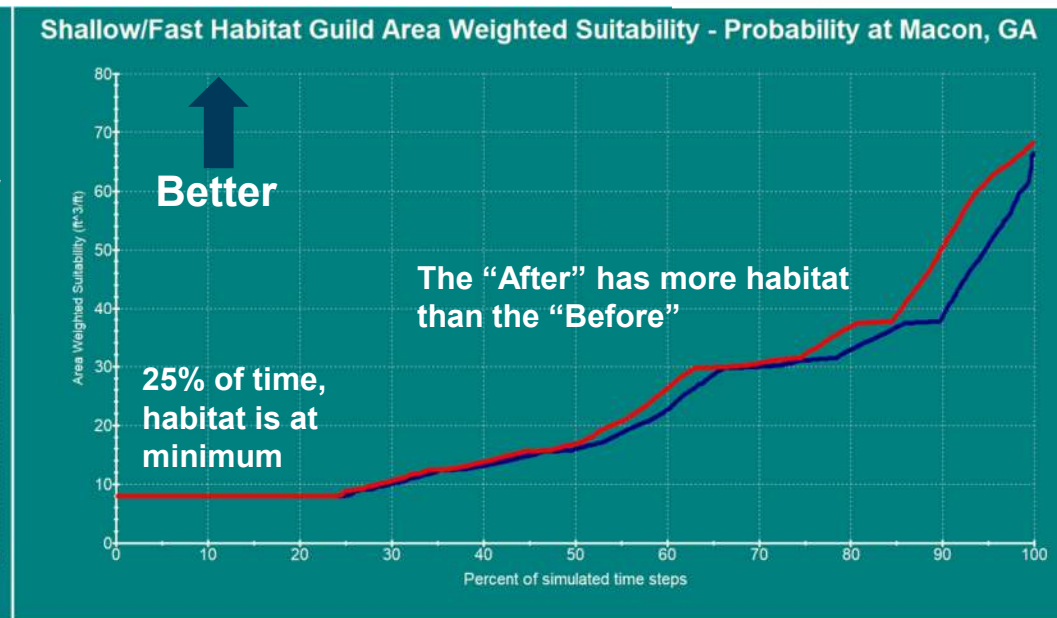
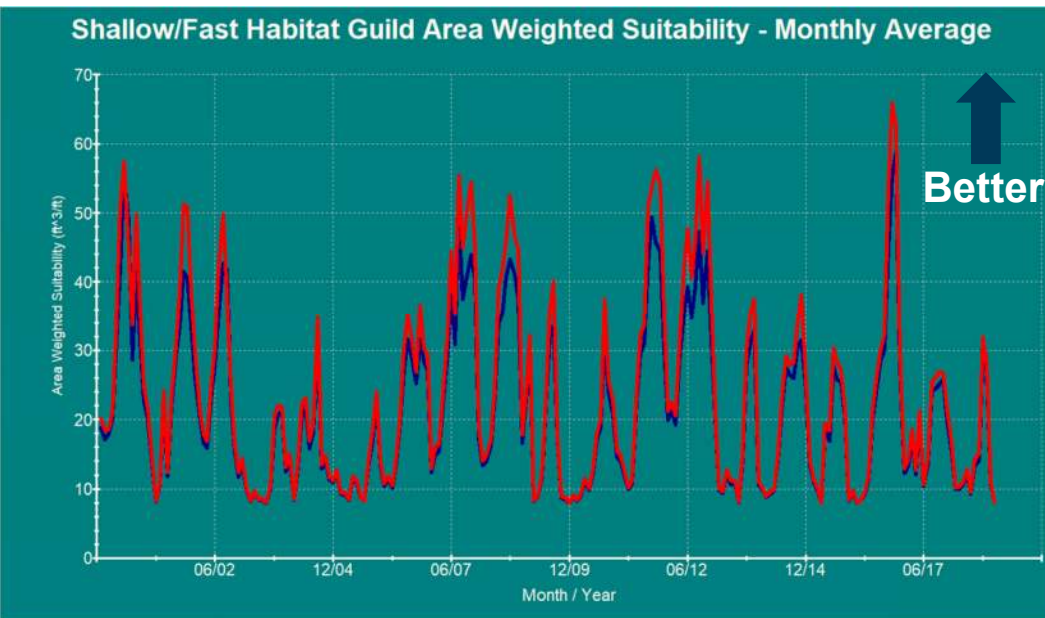
https://www.fws.gov/fisheries/freshwater-fish-of-america/largemouth_bass.html



Ocmulgee Scenario: Performance Metrics at Macon, GA



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— Before

— After

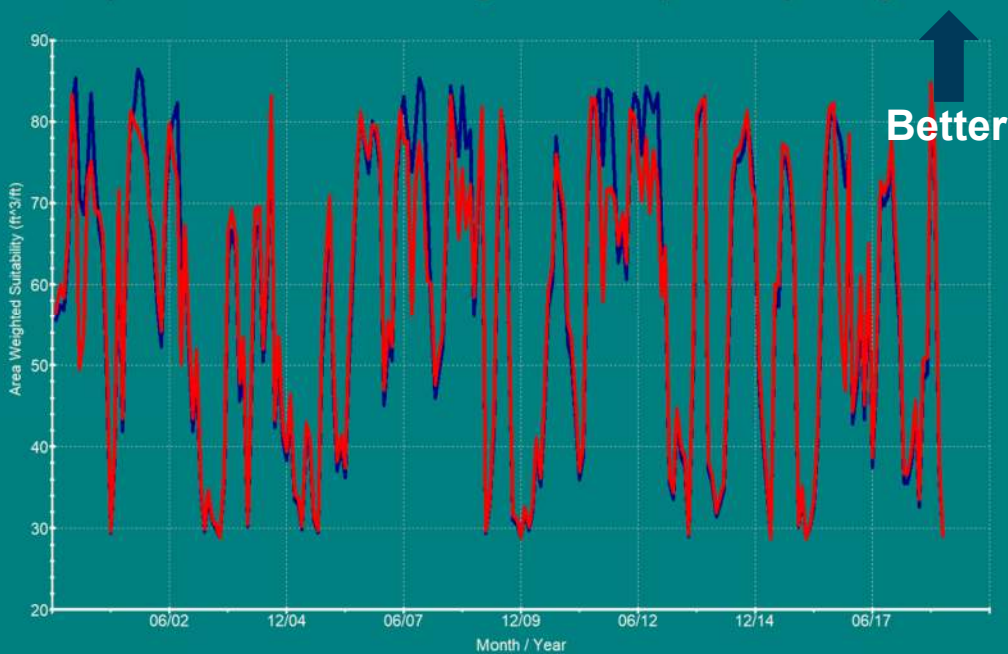
https://en.wikipedia.org/wiki/Spottail_shiner#/media/File:Notropis_hudsonius.jpg
https://www.inaturalist.org/guide_taxa/490641

Ocmulgee Scenario: Performance Metrics at Macon, GA

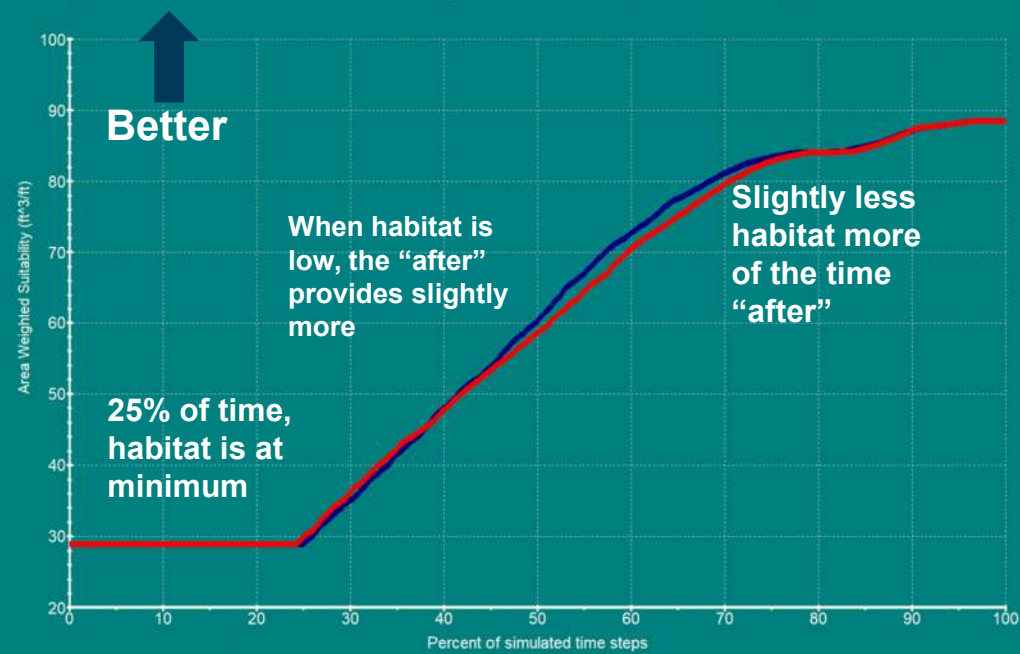


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Deep/Fast Habitat Guild Area Weighted Suitability - Monthly Average



Deep/Fast Habitat Guild Area Weighted Suitability - Probability at Macon, GA



— Before

— After

Questions?

Georgia Environmental Protection Division
Watershed Protection Branch
Water Supply Program

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404-463-2883

Acknowledging Hazen and Sawyer team for developing BEAM model
and for developing material for this presentation

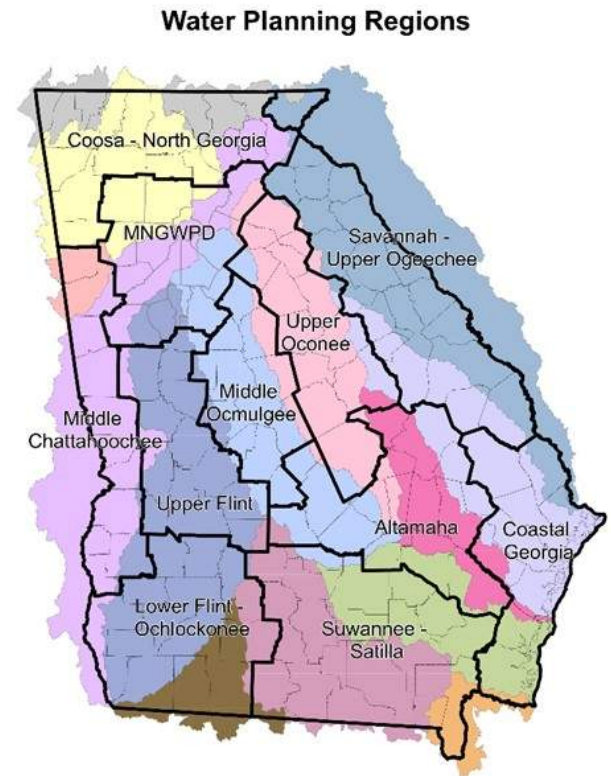


Seed Grant Updates

www.georgiawaterplanning.org

Ongoing EPD Regional Water Plan Seed Grant Funded Project Updates

- Seed Grant was awarded to Dr. Gary Hawkins (Crop and Soil Science Department, University of Georgia)
- Included three of the RWP Councils: Altamaha, Coastal and Suwannee-Satilla
- Implements two of the management practices common to all the RWPs and one management practice specific to our region
- Anticipated completion date is June 2021



Ongoing EPD Regional Water Plan Seed Grant Funded Project Updates

Water Plan Region	Management Practice	Description	Area Addressed
Coastal Altamaha Suwannee-Satilla	NPS-2 Research and Address Impairment Issues	Monitor and determine sources of nutrient-pollutant loading. Develop management programs to mitigate impairments.	Urban
Coastal Altamaha Suwannee-Satilla	NPSA-1 Soil Erosion Reduction Measures	Encourage implementation of conservation tillage and cover crops to reduce soil erosion.	Agriculture
Altamaha Suwannee-Satilla	WC-12 Application Efficiency Technologies	Encourage and improve use of crop water management technologies and techniques.	Agriculture

Ongoing EPD Regional Water Plan Seed Grant Funded Project Updates

- Pine Country RC&D in collaboration with University of Georgia (Dr. Hawkins) prepared an application to address Erosion and Nutrient Management Practices in the region
- Addresses multiple nonpoint source management practices in the RWP (NPSR-1, NPSA-2, NPSA-3 and NPSA-4)
- Project was recommended for funding – currently in the contracting process



Public Comments/Local Elected Official Comments

www.georgiawaterplanning.org



Next Steps

www.georgiawaterplanning.org

Thank You!

Questions? Comments? Need
More Information?

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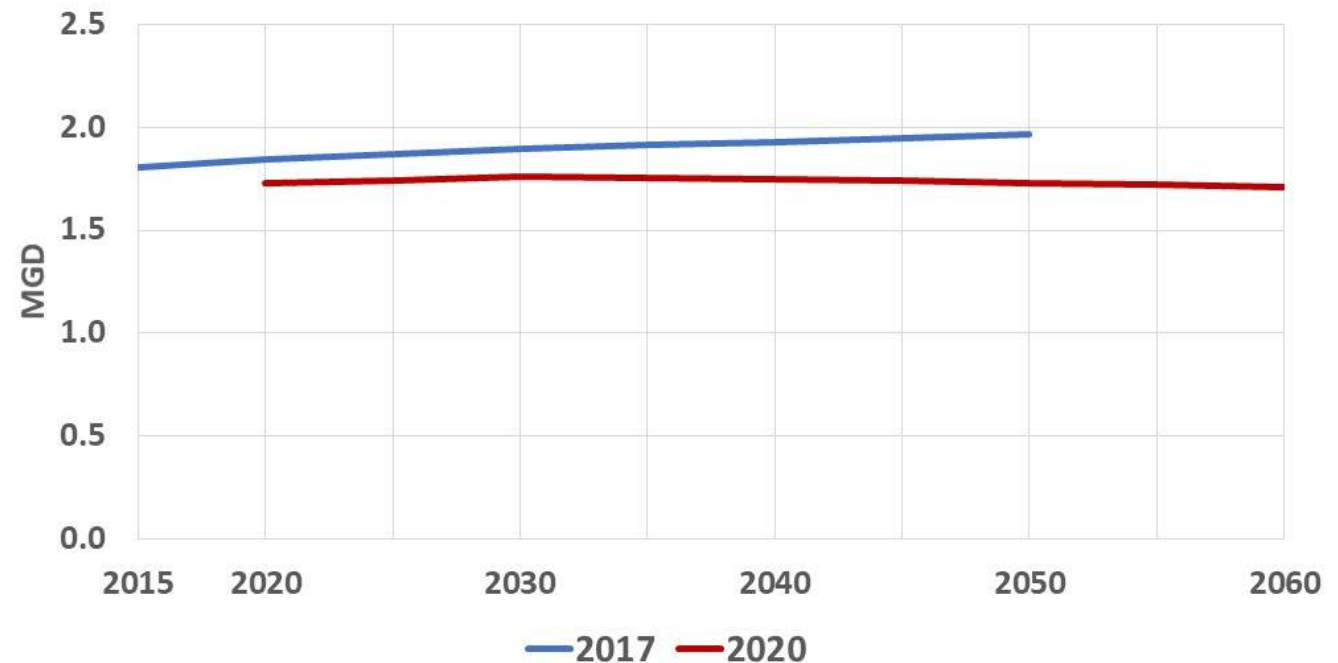


County Specific Municipal Forecasts

www.georgiawaterplanning.org

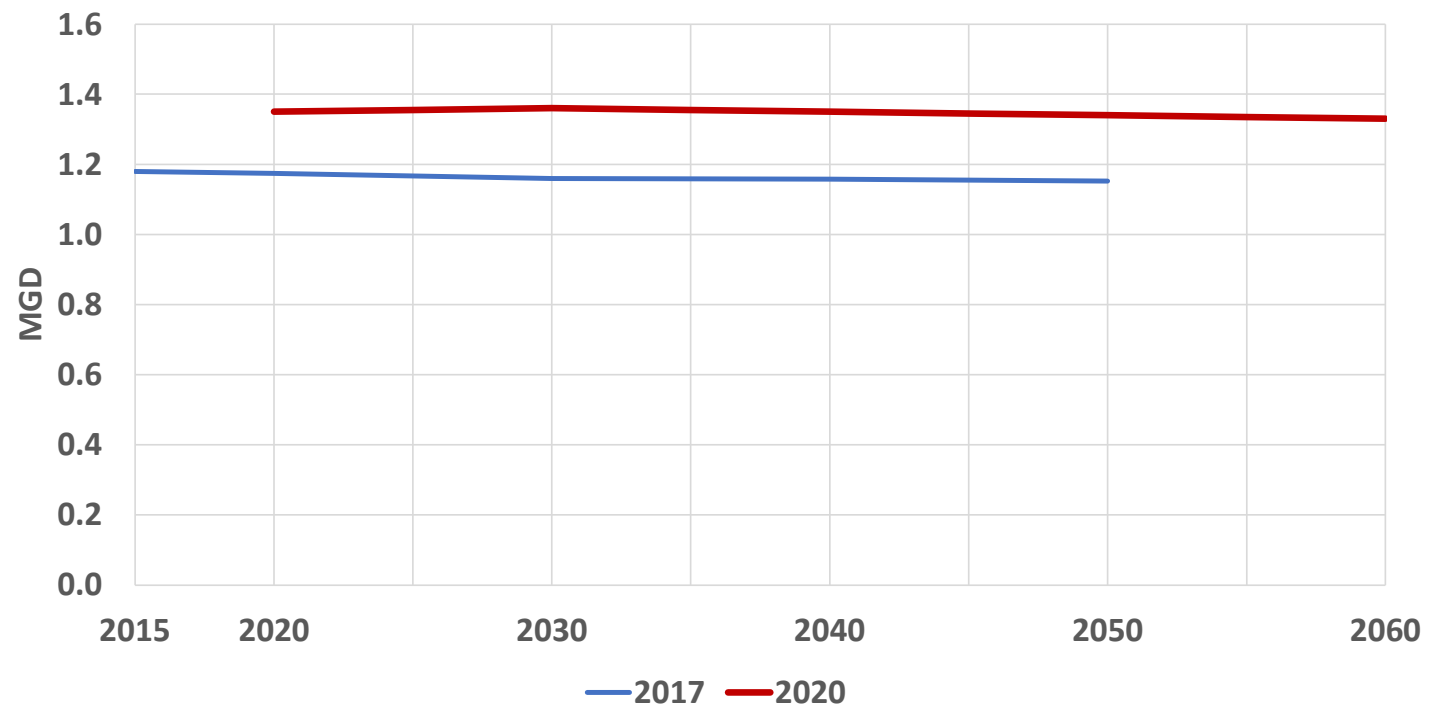
Appling County – Municipal Demand

- Lower population projection
- Slightly lower GPCD
- Results in lower municipal demand forecast



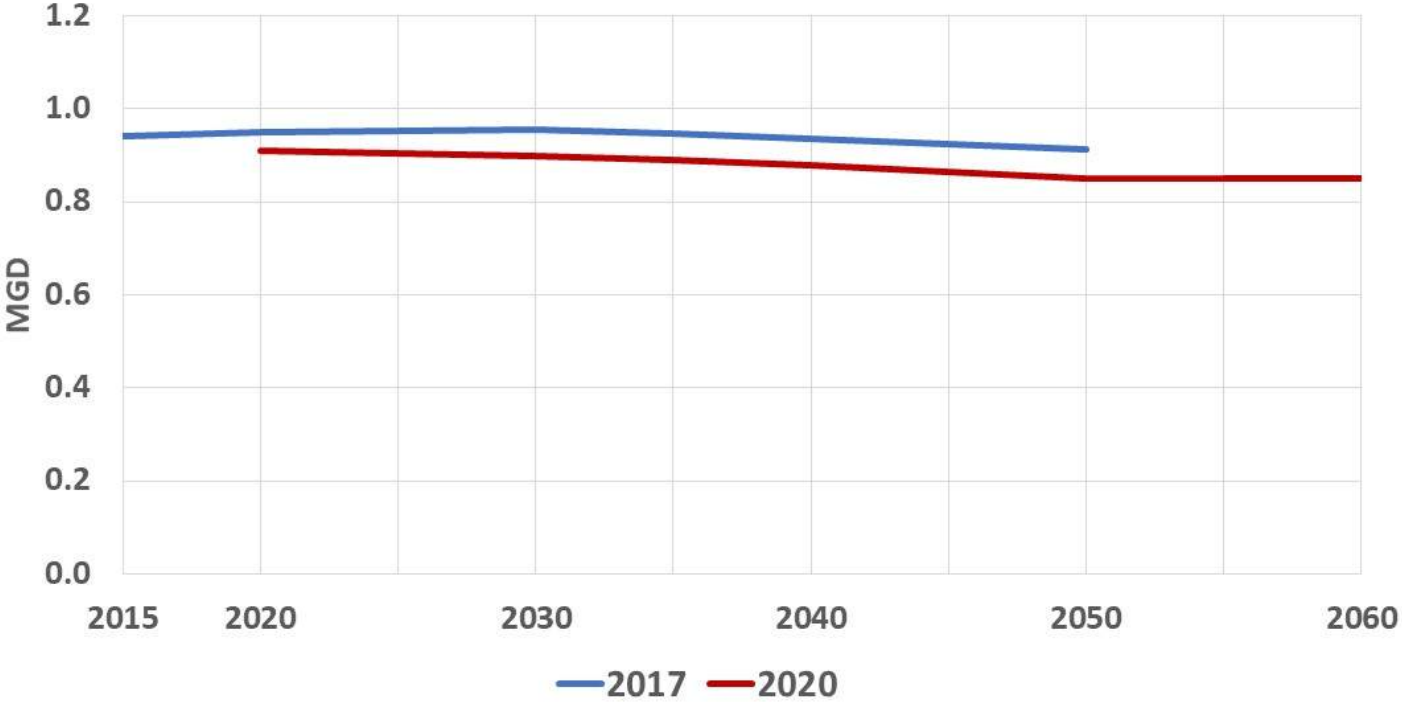
Bleckley County – Municipal Demand

- Slightly lower population projection
- Higher GPCD
- Results in a higher municipal demand forecast



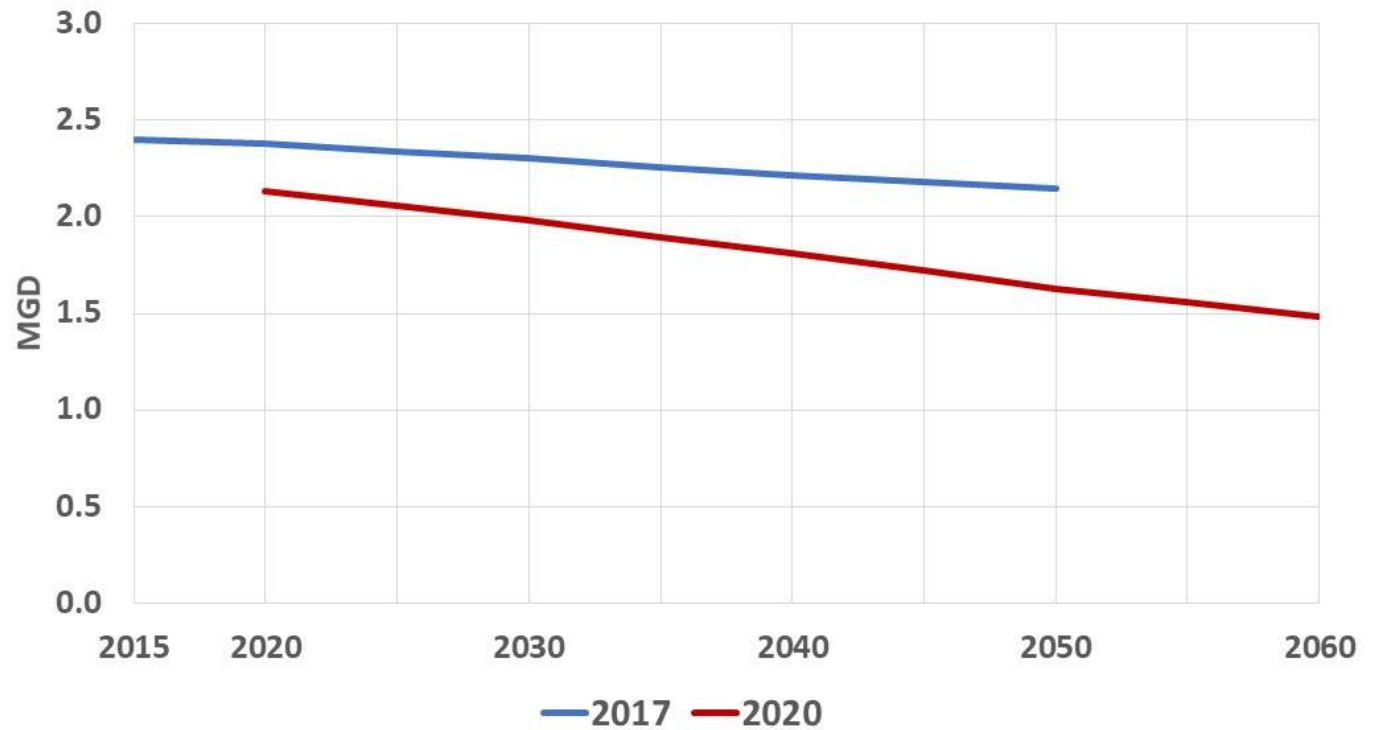
Candler County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in lower municipal demand forecast



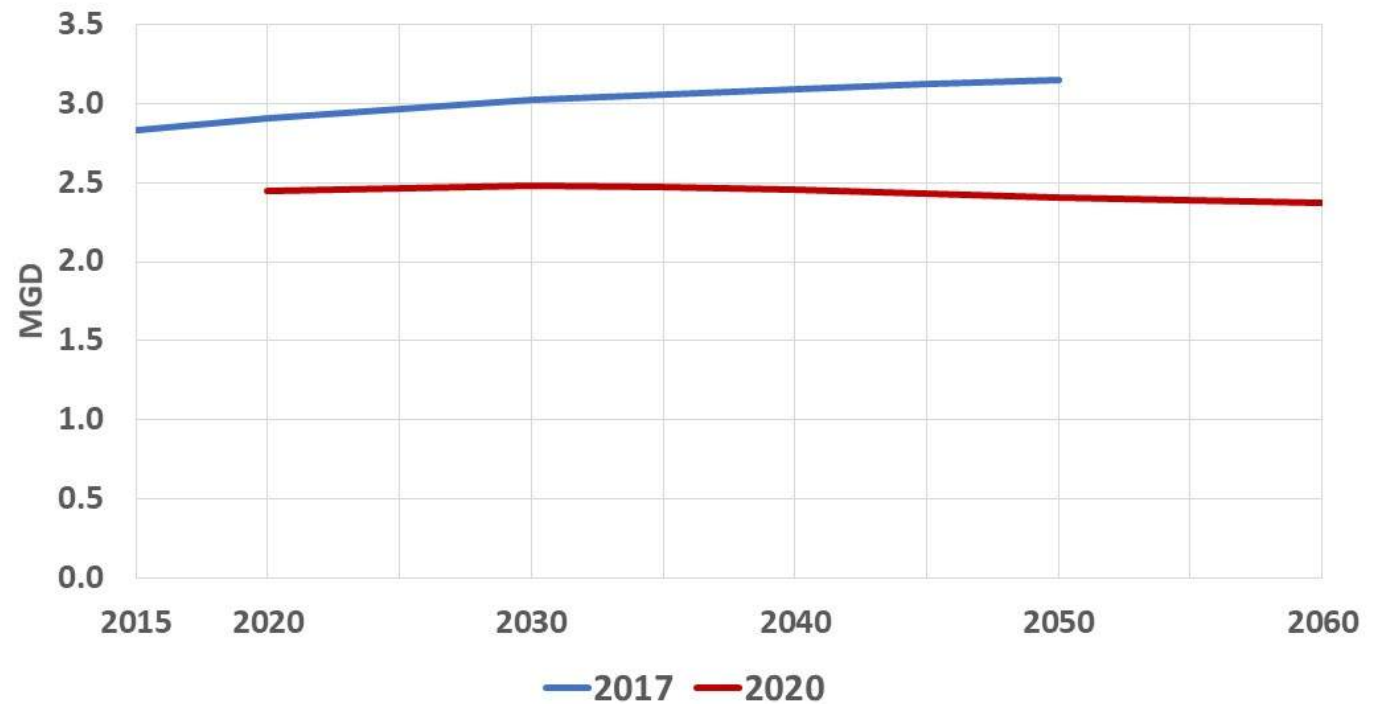
Dodge County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in a lower municipal demand forecast



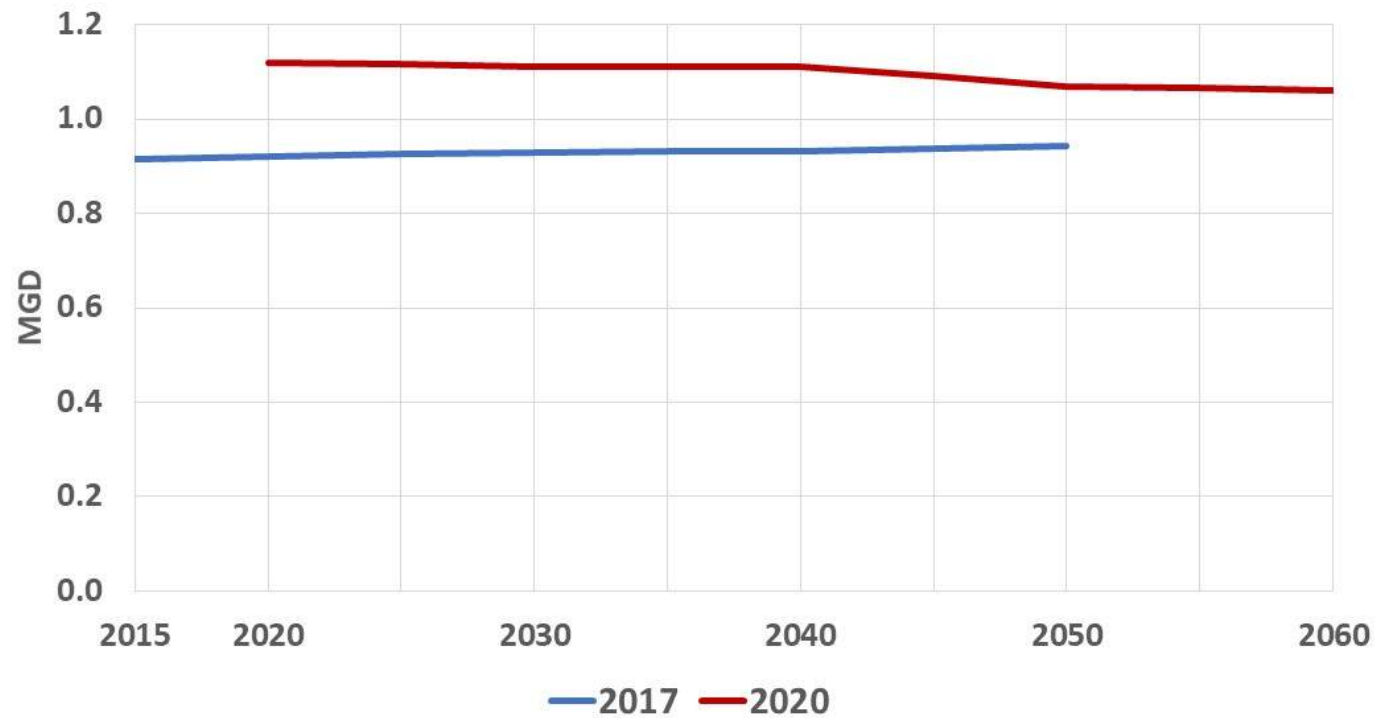
Emanuel County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in lower municipal demand forecast



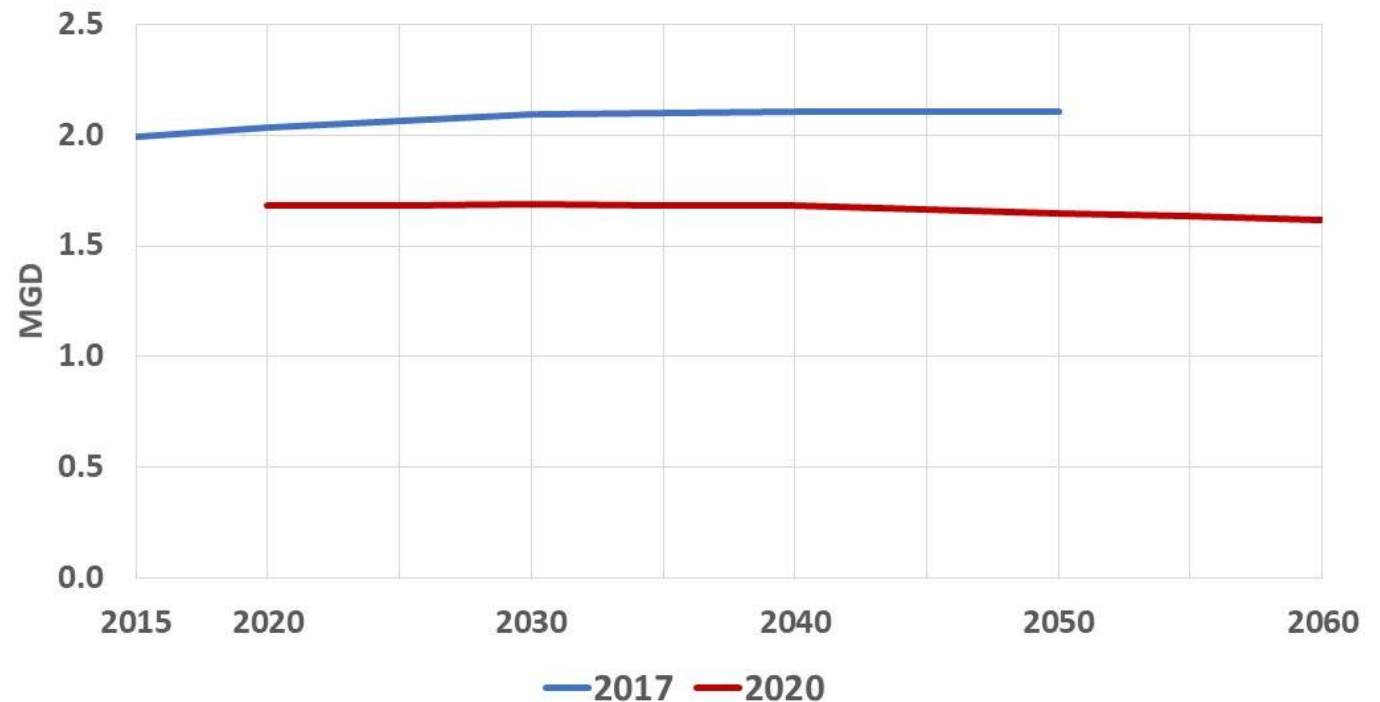
Evans County – Municipal Demand

- Lower population projection
- Higher GPCD
- Results in a higher municipal demand forecast



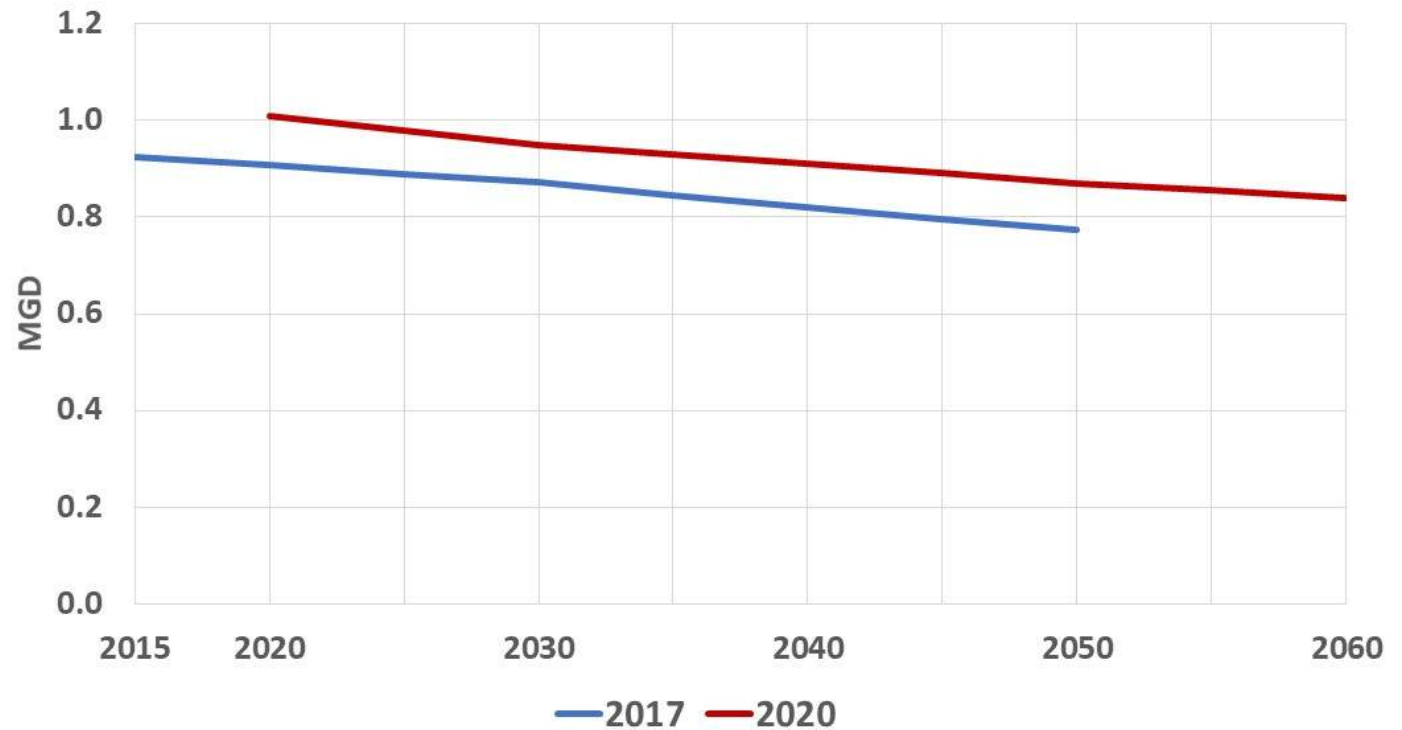
Jeff Davis County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in lower municipal demand forecast



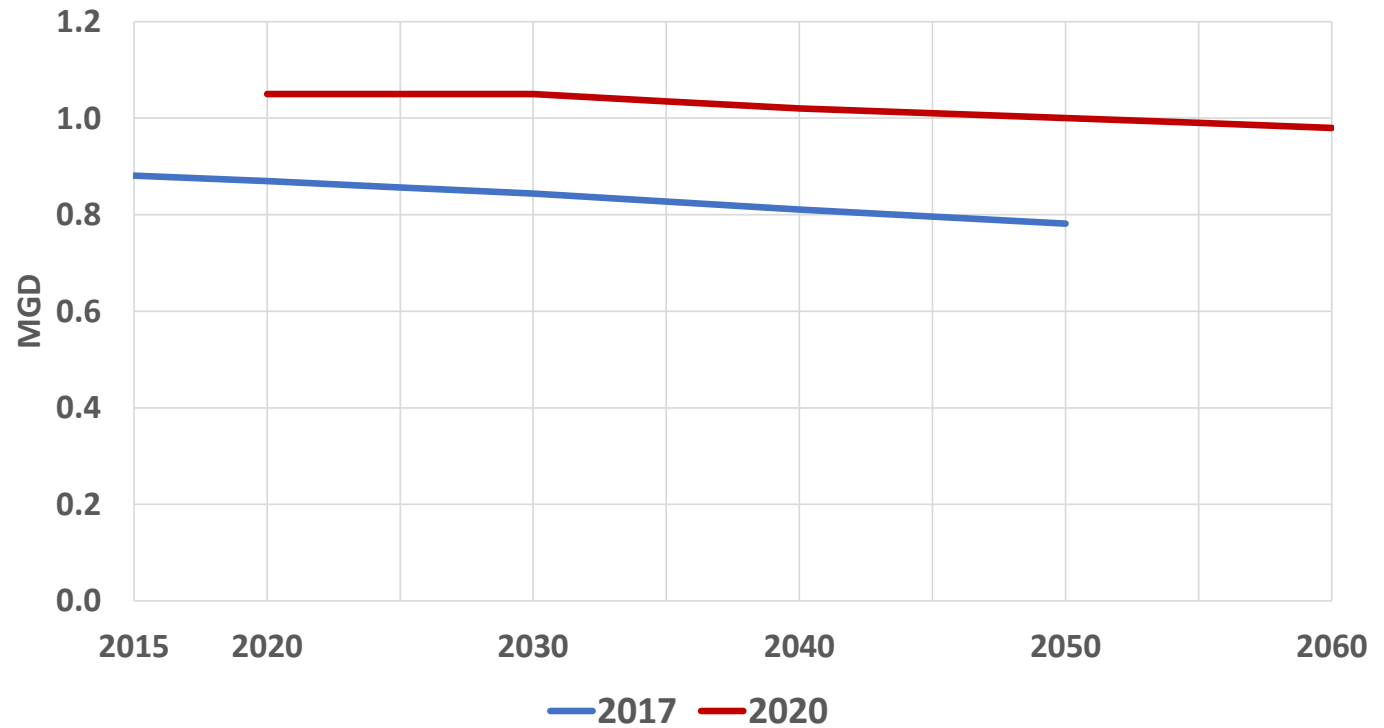
Johnson County – Municipal Demand

- Slightly higher population projection
- Higher GPCD
- Results in a higher municipal demand forecast



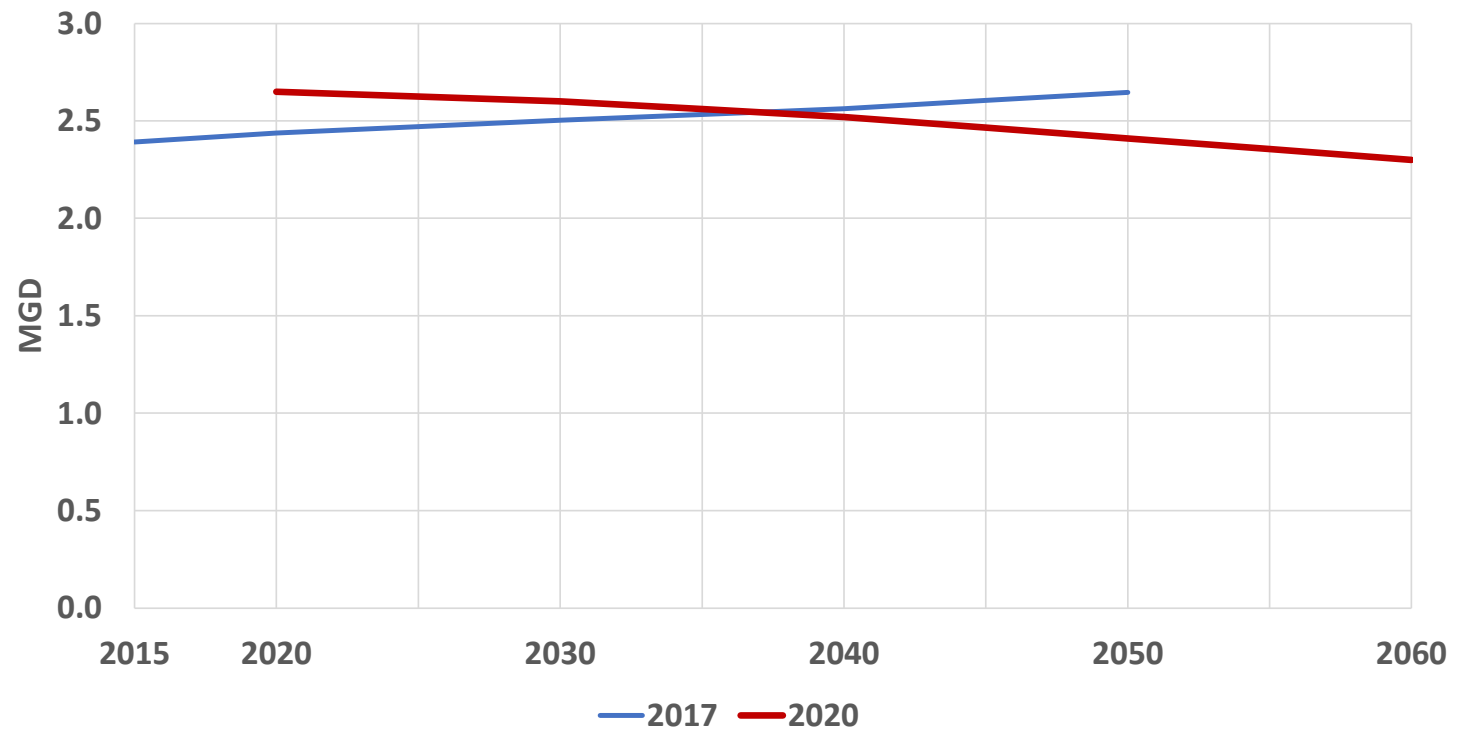
Montgomery County – Municipal Demand

- Higher population projection
- Higher GPCD
- Results in a higher municipal demand forecast



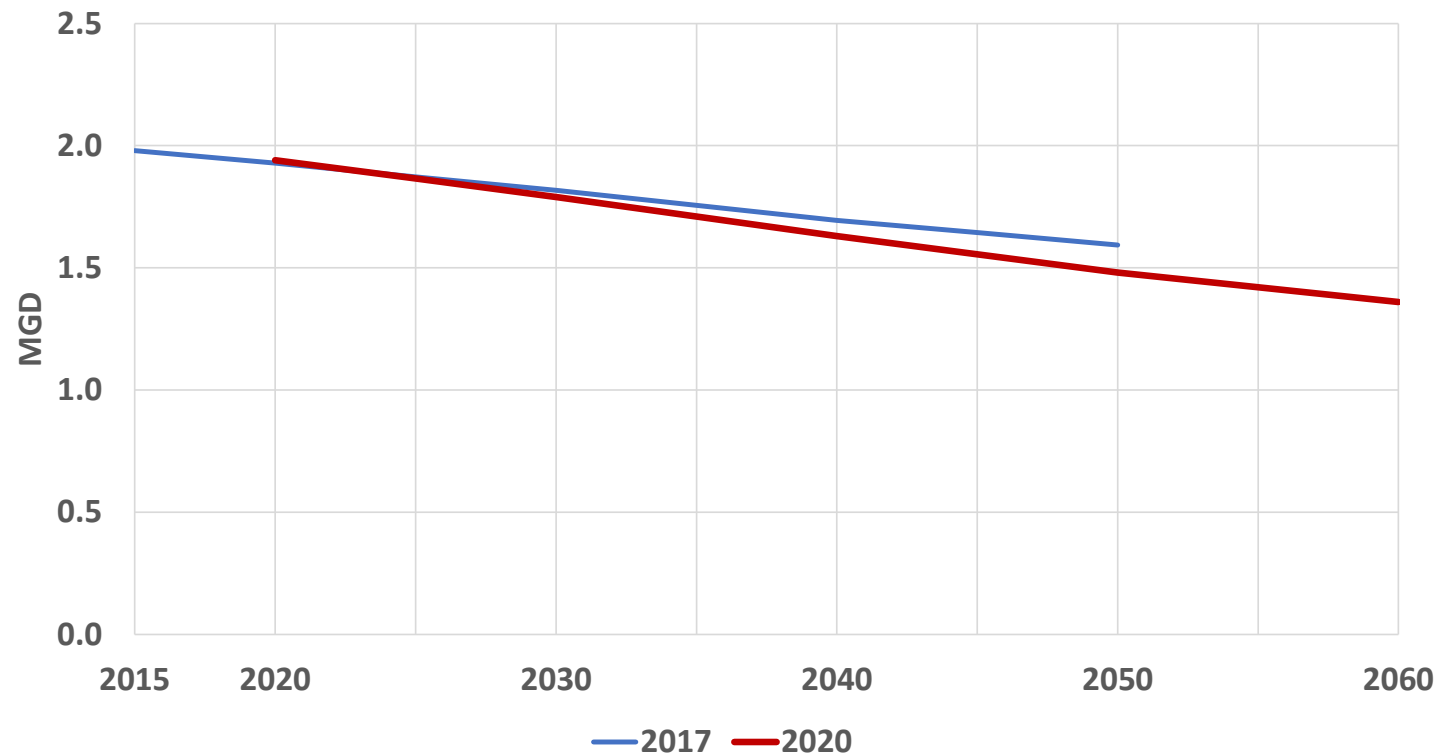
Tattnall County – Municipal Demand

- Lower population projection
- Higher GPCD
- Results in lower municipal demand forecast beyond about 2037



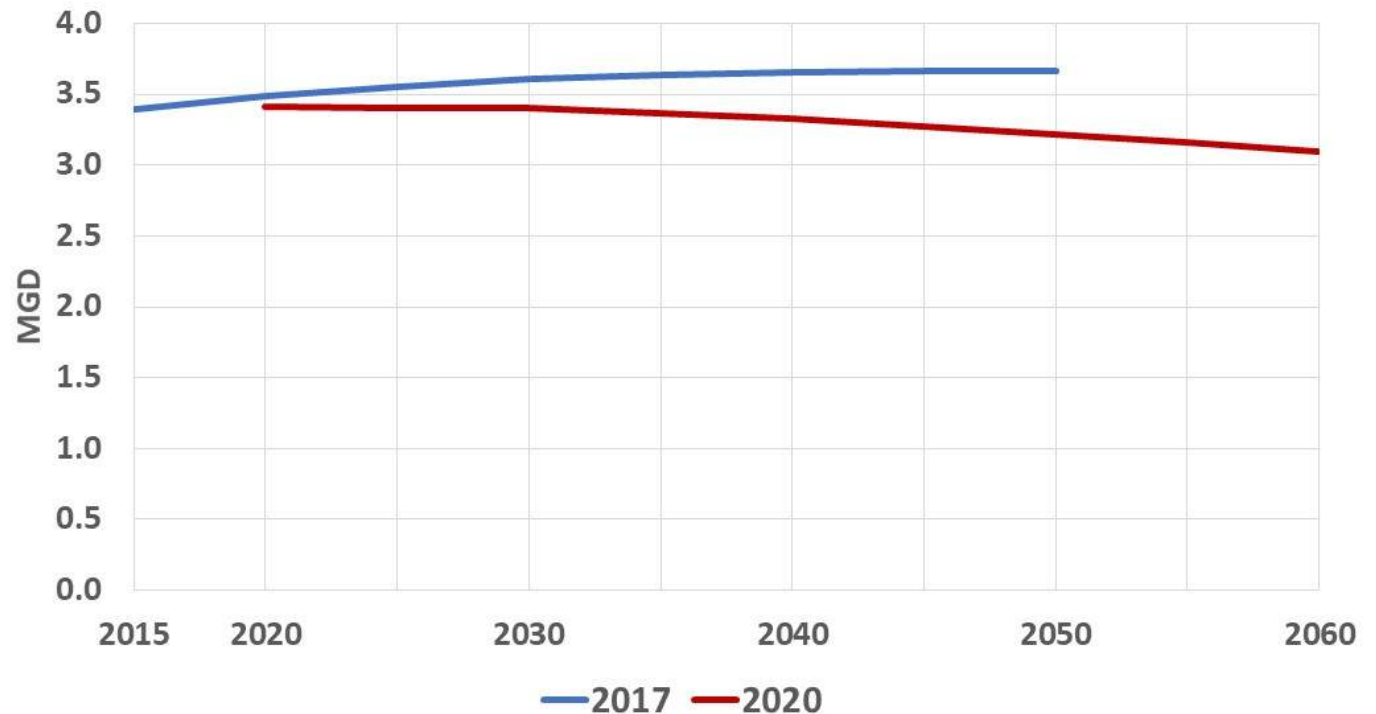
Telfair County – Municipal Demand

- Lower population projection
- Higher GPCD
- Results in a slightly lower municipal demand forecast



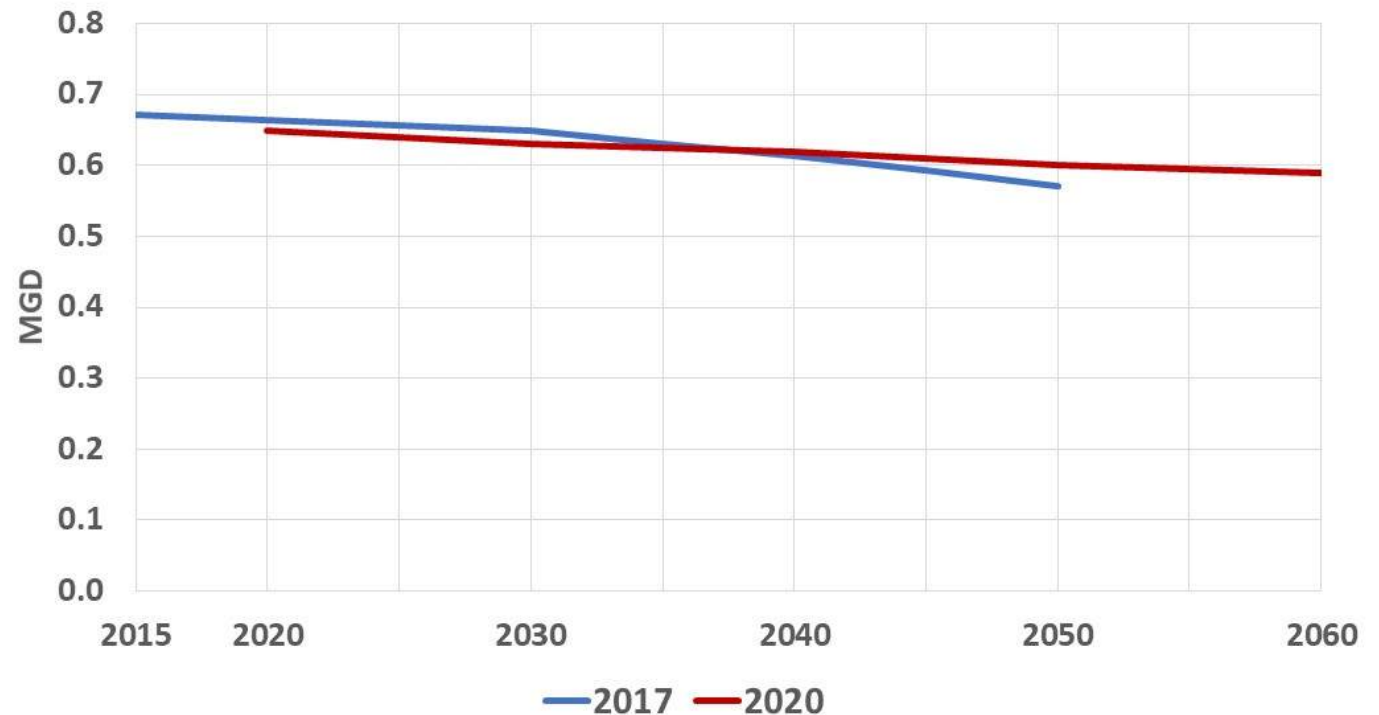
Toombs County – Municipal Demand

- Lower population projection
- Slightly higher GPCD
- Results in a lower municipal demand forecast



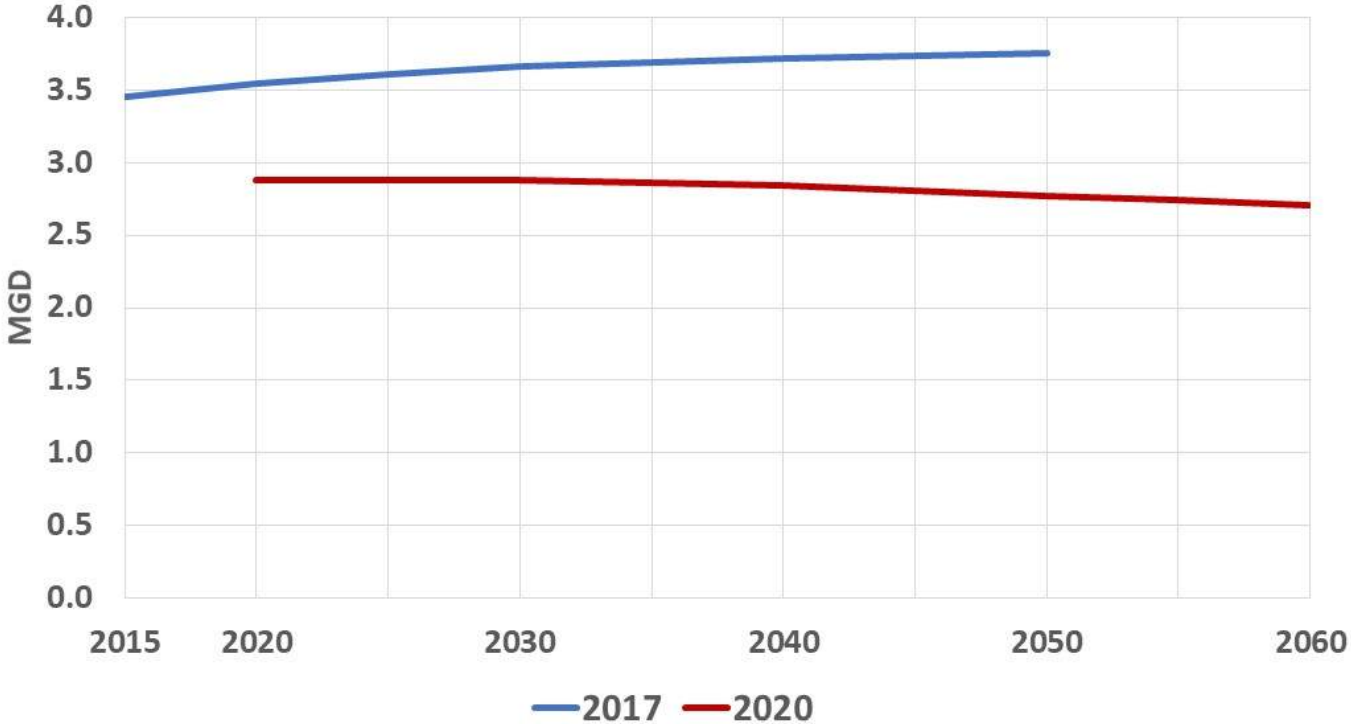
Treutlen County – Municipal Demand

- Higher population projection
- Slightly lower GPCD
- Results in a similar municipal demand forecast



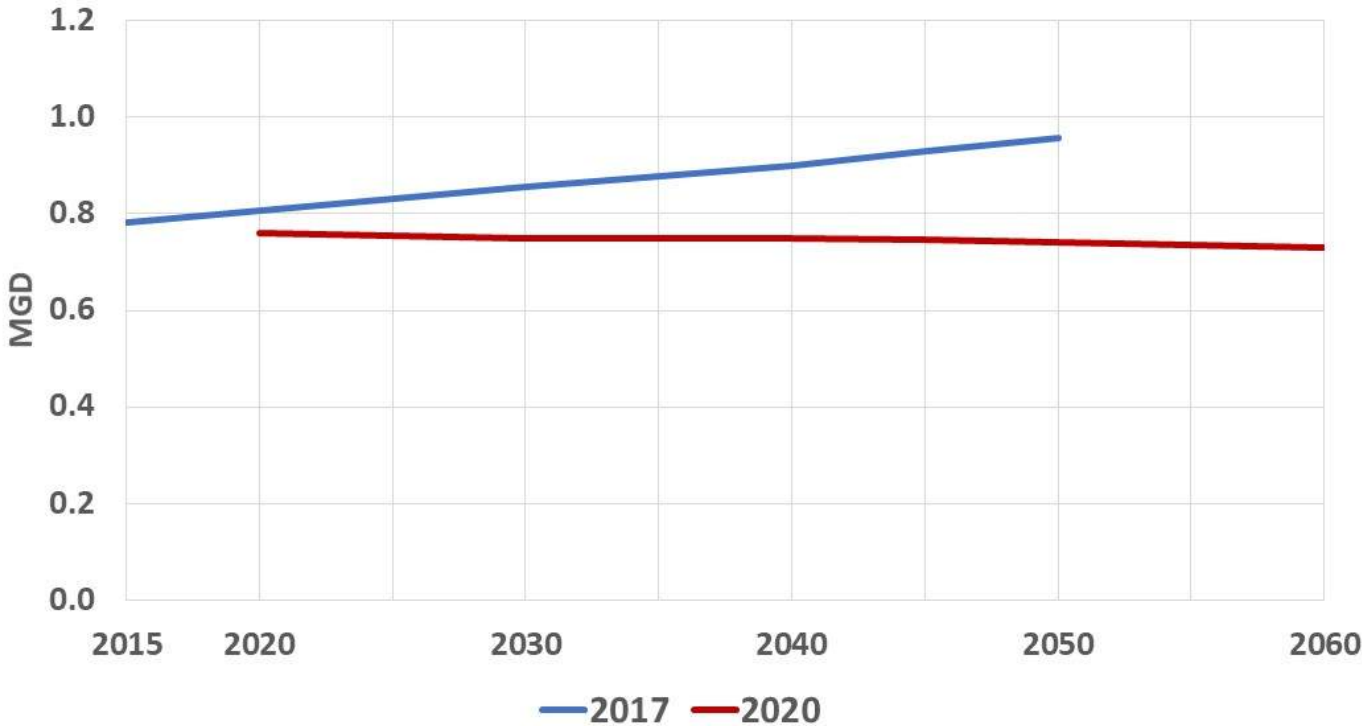
Wayne County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in a lower municipal demand forecast



Wheeler County – Municipal Demand

- Lower population projection
- Lower GPCD
- Results in a lower municipal demand forecast



Wilcox County – Municipal Demand

- Higher population projection
- Higher GPCD
- Results in a higher municipal demand forecast

