Upper Flint Council Meeting

March 16, 2022

GEORGIA WATER PLANNING

waterplanning.georgia.gov

Agenda

Objectives:

Check in with new members

Review and discuss water resource assessments

Discuss and consider adoption of revised vision statement and goals

10:30	Welcome, Agenda Review, Check-In with New Members
10:45	Chair's Report
10:55	American Rescue Plan Act: Water & Infrastructure Awards
11:00	Next Steps in Plan Development
11:10	Overview of Resource Assessments
11:20	Groundwater Availability Assessment
12:00	LUNCH
12:40	Vision and Goals
1:00	Surface Water Availability Assessment
1:50	Surface Water Quality Assessment
2:35	BREAK
2:45	Small Group Discussions: Incorporating Resource Assessments into Regional Water Plan
3:15	Resource Assessments Wrap-Up
3:20	EPD Report
3:30	Public Comment
3:40	Next Steps
3:45	ADJOURN

Introductions

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Upper Flint Council Members

Name	City	County
Brian Belcher	Ellaville	Schley
Barry Blount	Americus	Sumter
Michael Bowens	Vienna	Dooly
Gene Brunson	Reynolds	Taylor
Thomas Burnsed	Meansville	Pike
Donald Chase, Chair	Oglethorpe	Macon
Brad Ellis	Vienna	Dooly
Beth English	Vienna	Dooly
Steve Fry	Williamson	Pike
Adam L. Graft	Americus	Sumter
Rodney H. Hilley	Molena	Pike
Jack Holbrook (Alternate)	Preston	Webster
Terrell Hudson	Unadilla	Dooly
Raines Jordan, Vice Chair	Talbotton	Talbot
Brant Keller (Alternate)	Griffin	Spalding
Bob Melvin	Oglethorpe	Macon
Kenneth L. Murphy	Gay	Meriwether
Sen. Ed Harbison (Ex-Officio)		

Name	City	County
Lamar Perlis	Cordele	Crisp
Gary Powell	Buena Vista	Marion
Jim Reid	Americus	Sumter
Gordon Rogers	Talbotton	Talbot
Charles Rucks	Brooks	Spalding
Bill Sawyer	Ellaville	Schley County
Larry Smith	Montezuma	Macon
Marcus South	Thomaston	Upson
Randy L. Summerlin	Griffin	Spalding
Walter E. (Butch) Turner	Reynolds	Taylor
Brian Upson	Griffin	Spalding
George (Teel) Warbington (Alternate)	Vienna	Dooly
Rodney Wilson	Zebulon	Pike
Benjamin (Joel) Wood	Cordele	Crisp
Ben Haugabook		Macon

Chair’s Report

Presented by Chairman Chase

ARPA: Water and Infrastructure Awards

Mark Masters, GWPPC

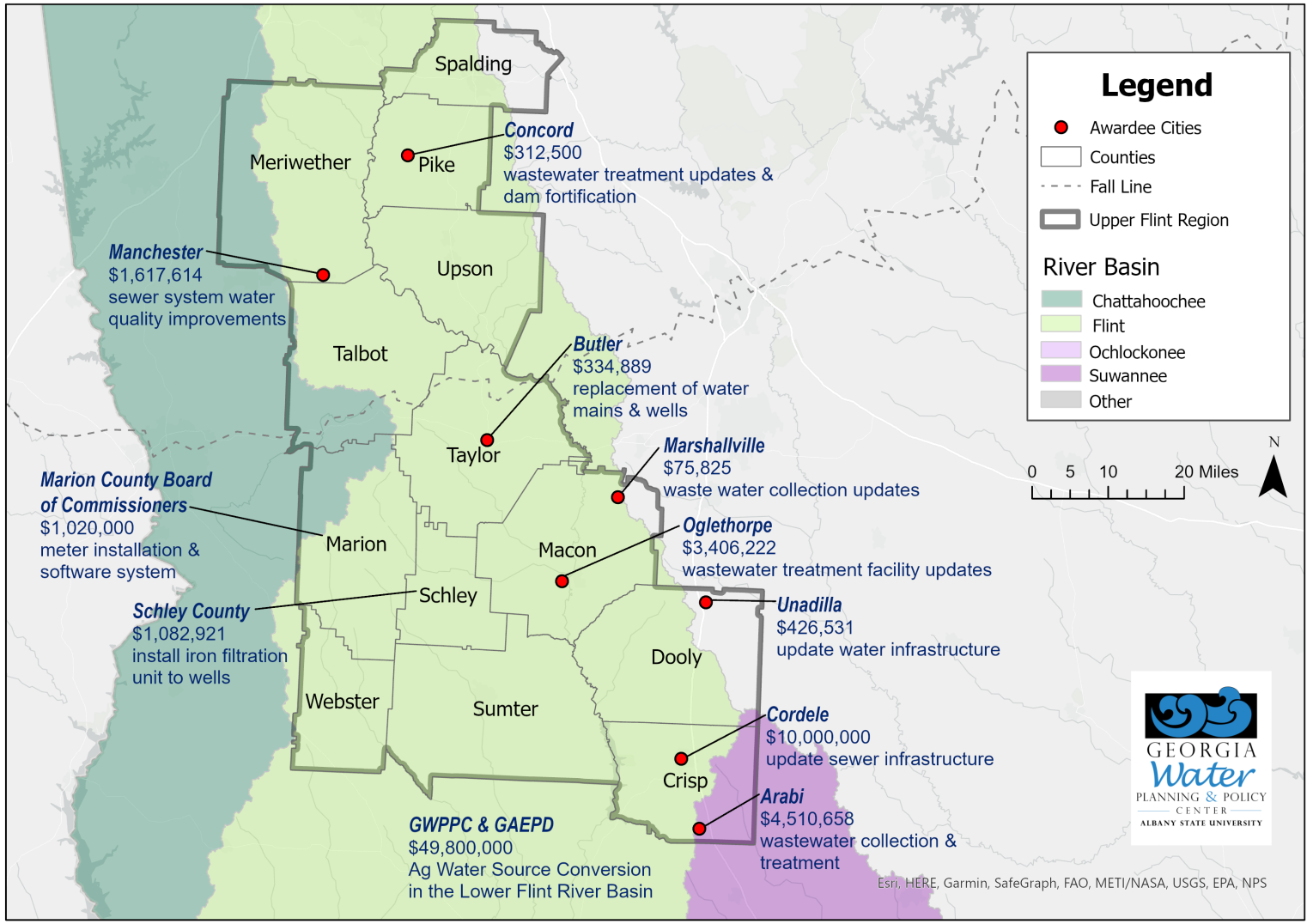
American Rescue Plan Water & Infrastructure Awards

Governor Kemp announced more than $422M in awards to reinforce water and sewer infrastructure in communities across the state (Feb 22, 2022)

These investments are aimed toward:

- Improving drinking water treatment
- Extending drinking water to high-need areas
- Improving drinking water infrastructure
- Improving wastewater treatment
- Improving biosolids management
- Improving sewer systems
- Securing water for future generations

Upper Flint Water Planning Region: Preliminary Awards
American Rescue Plan Act — Water & Sewer Infrastructure Grants



Agricultural Water Source Conversion for Streamflow Resilience

- $49.8 million preliminary award
- Primary Objective: Conversion of surface water withdrawals in the Lower Flint River Basin to deep groundwater sources
- Partnership:
  - Georgia Water Planning & Policy Center
  - Georgia Environmental Protection Division
  - Golden Triangle Resource Conservation & Development Council

GEORGIA Water
PLANNING & POLICY CENTER
ALBANY STATE UNIVERSITY

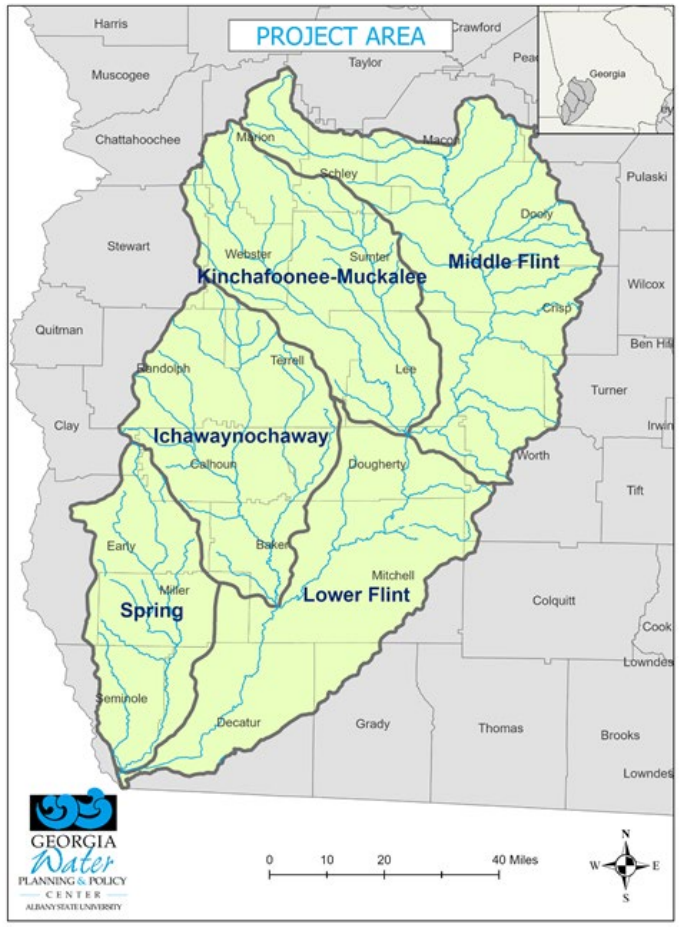
GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Golden Triangle RC&D
Resource Conservation and Development Council
Southwest Georgia

Project Activities

- Installation of 242 deep groundwater wells at sites of existing agricultural surface water withdrawals
- Conservation planning at each participating farm
- Environmental monitoring and assessment of groundwater aquifers and aquatic ecosystems
- Flow augmentation system improvements
- Stakeholder-driven water resources and endangered species management planning

How the Project Relates to Regional Water Planning



- Project directly implements recommendations for source water conversion of surface water withdrawals in the plans of the region's three Councils: **Upper Flint, Lower Flint-Ochlockonee, Middle Chattahoochee**
- Project implements several other recommendations in these three regional water plans addressing water conservation, endangered species, data collection, and other water resource management objectives
- Project was developed based on results of a Regional Water Management Plan Implementation Seed Grant on source water conversion feasibility in Ichawaynochaway Creek Basin by the GA Water Planning and Policy Center (2017)

Next Steps in Plan Development

Corinne Valentine, Black & Veatch

Regional Water Plan Update

Regional Water Plan Review and Revision Schedule

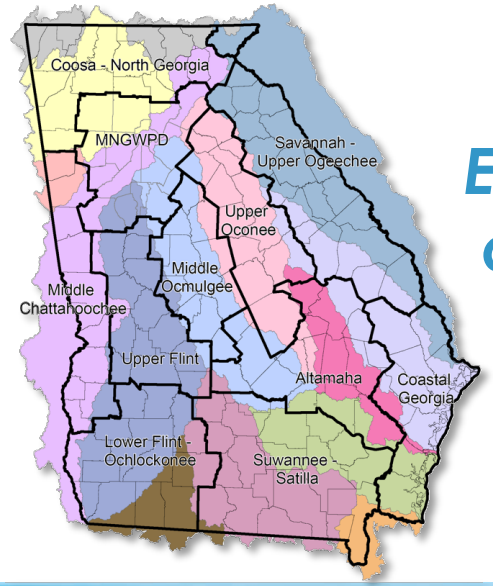
Meeting One
4th Quarter 2021

Meeting Two ★
1st Quarter 2022

Meeting Three
2nd Quarter 2022

Meeting Four
3rd Quarter 2022
Draft Plan

Meeting Five (Final)
4th Quarter 2022
Incorporate Comments



EPD targeted date of adoption of revised Regional Water Plan by December 2022

Regional Water Plan Update

Regional Water Plan Review and Re

Meeting One
4th Quarter 2021

Meeting Two
1st Quarter 2022

Meeting Three
2nd Quarter 20

(Final)
2022
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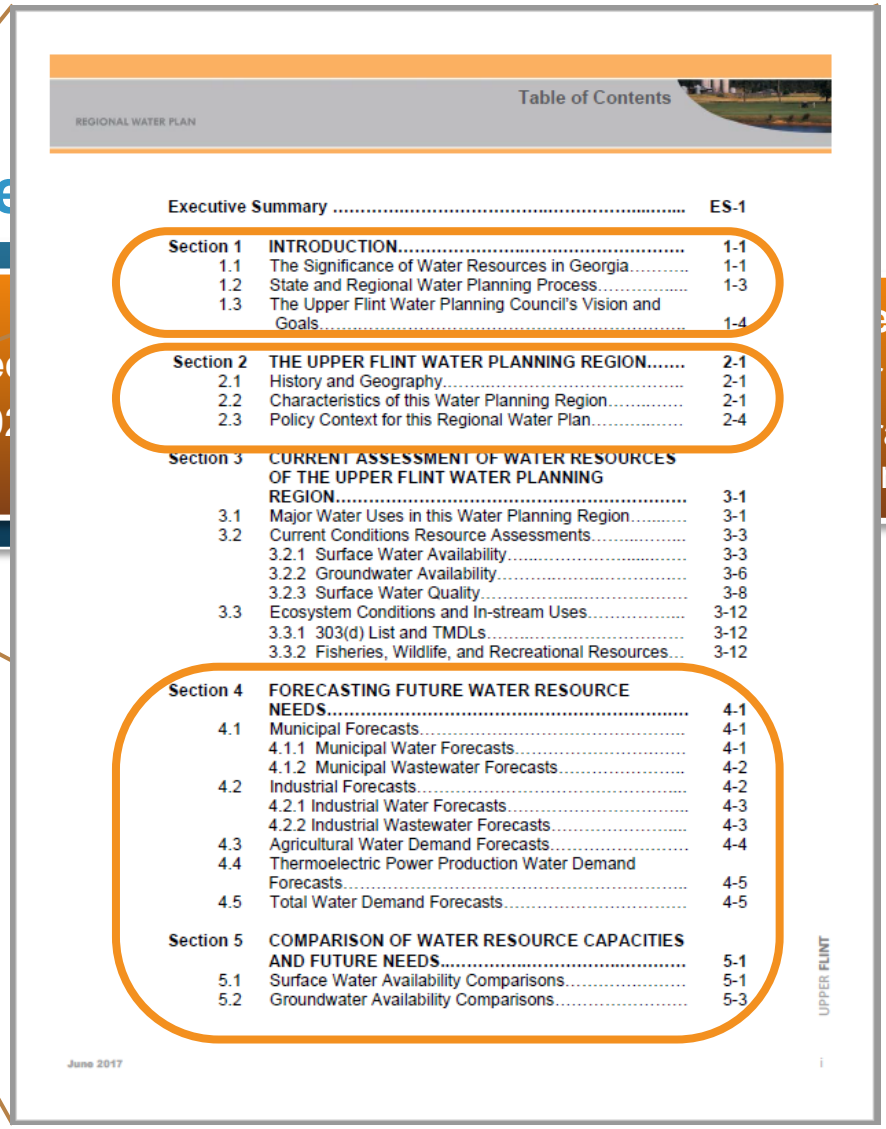

REGIONAL WATER PLAN

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June 2017

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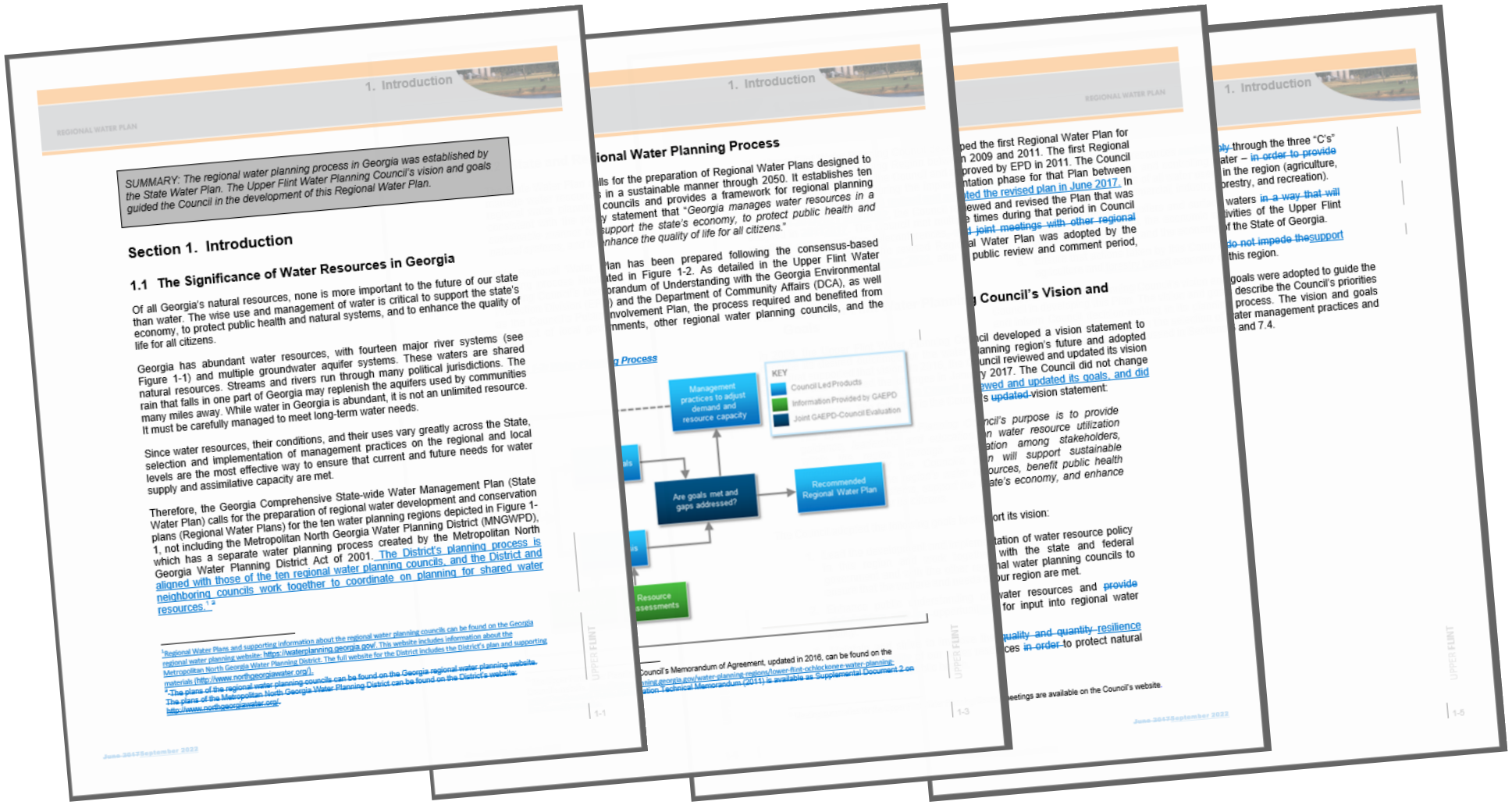
GEORGIA
WATER PLANNING

Regional Water Plan Update



1. Introduction

REGIONAL WATER PLAN

SUMMARY: The regional water planning process in Georgia was established by the State Water Plan. The Upper Flint Water Planning Council's vision and goals guided the Council in the development of this Regional Water Plan.

Section 1. Introduction

1.1 The Significance of Water Resources in Georgia

Of all Georgia's natural resources, none is more important to the future of our state than water. The wise use and management of water is critical to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens.

Georgia has abundant water resources, with fourteen major river systems (see Figure 1-1) and multiple groundwater aquifer systems. These waters are shared natural resources. Streams and rivers run through many political jurisdictions. The rain that falls in one part of Georgia may replenish the aquifers used by communities many miles away. While water in Georgia is abundant, it is not an unlimited resource. It must be carefully managed to meet long-term water needs.

Since water resources, their conditions, and their uses vary greatly across the State, selection and implementation of management practices on the regional and local levels are the most effective way to ensure that current and future needs for water supply and assimilative capacity are met.

Therefore, the Georgia Comprehensive State-wide Water Management Plan (State Water Plan) calls for the preparation of regional water development and conservation plans (Regional Water Plans) for the ten water planning regions depicted in Figure 1-1, not including the Metropolitan North Georgia Water Planning District (MNGWPD), which has a separate water planning process created by the Metropolitan North Georgia Water Planning District Act of 2001. The District's planning process is aligned with those of the ten regional water planning councils, and the District and neighboring councils work together to coordinate on planning for shared water resources.[1,2]

[1] Regional Water Plans and supporting information about the regional water planning councils can be found on the Georgia regional water planning website: https://waterplanning.georgia.gov/. This website includes information about the Metropolitan North Georgia Water Planning District. The full website for the District includes the District's plan and supporting materials (http://www.northgeorgiawater.org/).

[2] The plans of the regional water planning councils can be found on the Georgia regional water planning website. The plans of the Metropolitan North Georgia Water Planning District can be found on the District's website: http://www.northgeorgiawater.org/.

June 2017/September 2022

UPPER FLINT

1-1

1. Introduction

...ional Water Planning Process

...lls for the preparation of Regional Water Plans designed to ... in a sustainable manner through 2050. It establishes ten ... councils and provides a framework for regional planning ...y statement that "*Georgia manages water resources in a ... support the state's economy, to protect public health and ...nhance the quality of life for all citizens.*"

...lan has been prepared following the consensus-based ...ted in Figure 1-2. As detailed in the Upper Flint Water ...orandum of Understanding with the Georgia Environmental ...) and the Department of Community Affairs (DCA), as well ...nvolvement Plan, the process required and benefited from ...nments, other regional water planning councils, and the

...g Process

...Council's Memorandum of Agreement, updated in 2016, can be found on the ...ning.georgia.gov/water-planning-regions/lower-flint-ochlockonee-water-planning; ...ion Technical Memorandum (2011) is available as Supplemental Document 2 on

UPPER FLINT

1-3

...ped the first Regional Water Plan for ...n 2009 and 2011. The first Regional ...proved by EPD in 2011. The Council ...ntation phase for that Plan between ...ted the revised plan in June 2017. In ...iewed and revised the Plan that was ...e times during that period in Council ...d joint meetings with other regional ...al Water Plan was adopted by the ... public review and comment period,

...Council's Vision and

...cil developed a vision statement to ...anning region's future and adopted ...uncil reviewed and updated its vision ...y 2017. The Council did not change ...ewed and updated its goals, and did ...s updated vision statement:

...ncil's purpose is to provide ...n water resource utilization ...ation among stakeholders, ...n will support sustainable ...ources, benefit public health ...ate's economy, and enhance

...ort its vision:

...tation of water resource policy ... with the state and federal ...al water planning councils to ...ur region are met.

...water resources and provide ... for input into regional water

...quality and quantity resilience ...ces in order to protect natural

...eetings are available on the Council's website.

June 2017/September 2022

UPPER FLINT

1-5

1. Introduction

...ly through the three "C's" ...ater – in order to provide ... in the region (agriculture, ...restry, and recreation).

... waters in a way that will ...ivities of the Upper Flint ...f the State of Georgia.

...do not impede thesupport ... this region.

...goals were adopted to guide the ... describe the Council's priorities ... process. The vision and goals ...ater management practices and ... and 7.4.

Overview of Resource Assessments

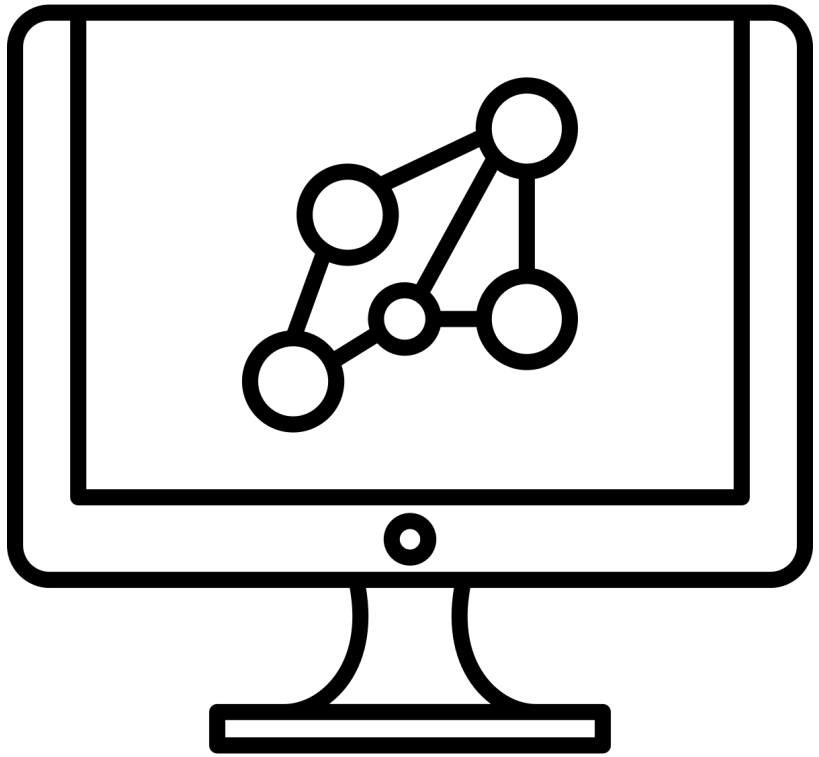
Kristin Rowles, GWPPC

Regional Water Planning Models

1. Groundwater Availability
2. Surface Water Availability
3. Surface Water Quality

We Use Models to Understand and Predict

- Model development builds on theory and data to **represent** a system.
- Model **calibration** adjusts a model to better represent the system (fit with observations).
- Model **validation** tests whether a model makes good predictions.
- Model **simulations** provide results that illustrate and predict how a system works.



Regional Water Planning Model Results

***Metrics** are used to evaluate the results relative to outcomes of interest.*

Surface Water Availability

Do we have enough water to…

- meet demands?
- assimilate wastewater?
- support recreation?

Groundwater Availability

How does groundwater use affect our aquifers?

Does groundwater use cause adverse impacts?

(to users, aquifers, instream flows)

Sustainable Yield

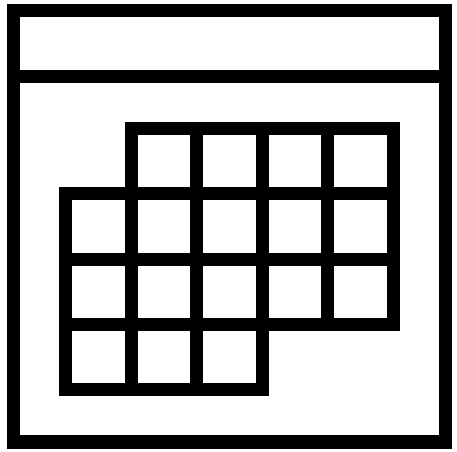
Surface Water Quality

Is water quality adequate to support uses?

(drinking water, recreation, fishing)

How do wastewater discharges affect water quality (dissolved oxygen)?

Regional Water Planning Models



Groundwater Availability

- Results are ready and will be presented today

Surface Water Availability

- Results will be shared at next meeting
- Today's focus is on how the model works and how we measure results (***metrics***)

Surface Water Quality

- Some model results will be shared today and some at the next meeting

Using the Resource Assessment Models

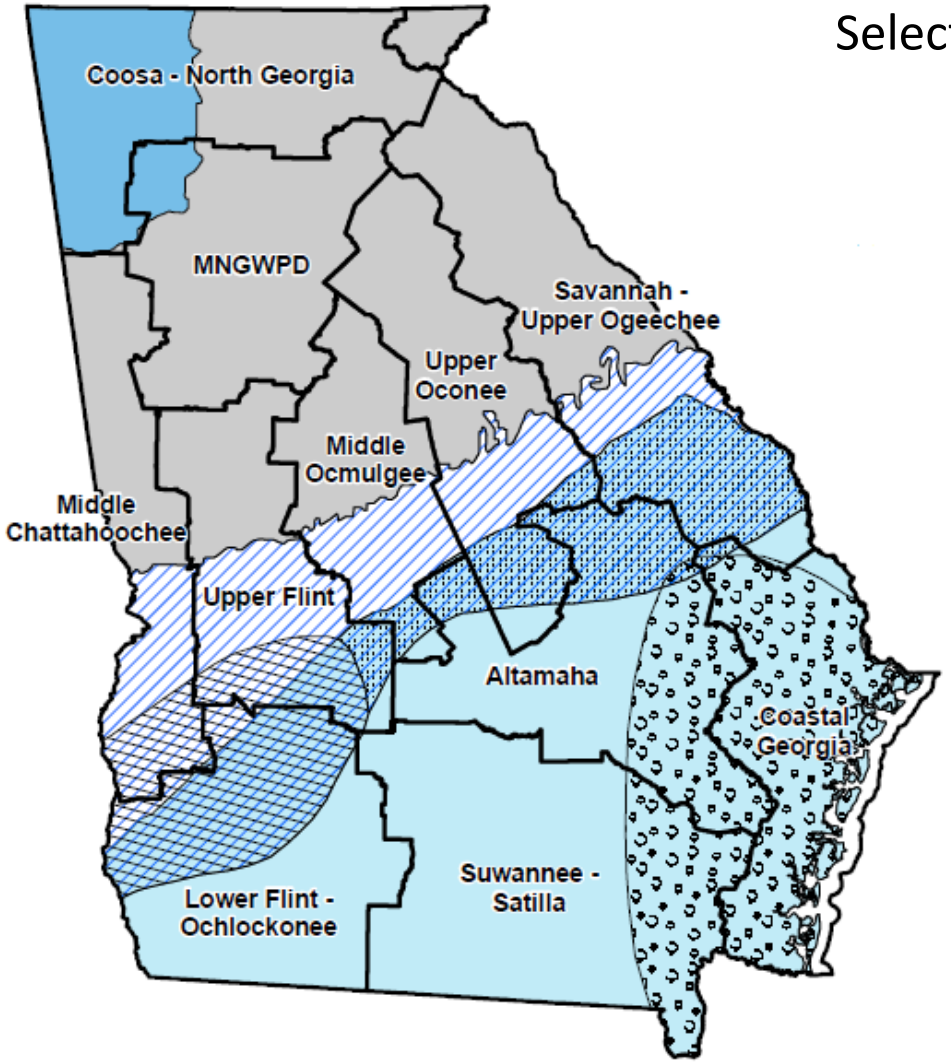
- How do the results explain the capacity of the region's water resources to meet demands (forecasts) and the Council's vision and goals?
- Do the results point to any concerns? How can the regional water plan address those concerns?
- What metrics do you find useful? Are there other metrics you would like to see?
- What other information do you need to understand the condition of the region's water resources?

ASK QUESTIONS

Groundwater Availability Assessment

Christine Voudy, GA EPD

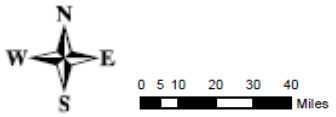
Water Planning Regions and Georgia's Aquifers



Select aquifers were prioritized for assessment.

Legend

- Water Planning Regions
- Brunswick Aquifer System
- Claiborne and Clayton Aquifers
- Cretaceous Aquifer System
- Crystalline-rock Aquifers
- Gordon Aquifer System
- Paleozoic-rock Aquifers
- Upper and Lower Floridan Aquifers



Georgia®

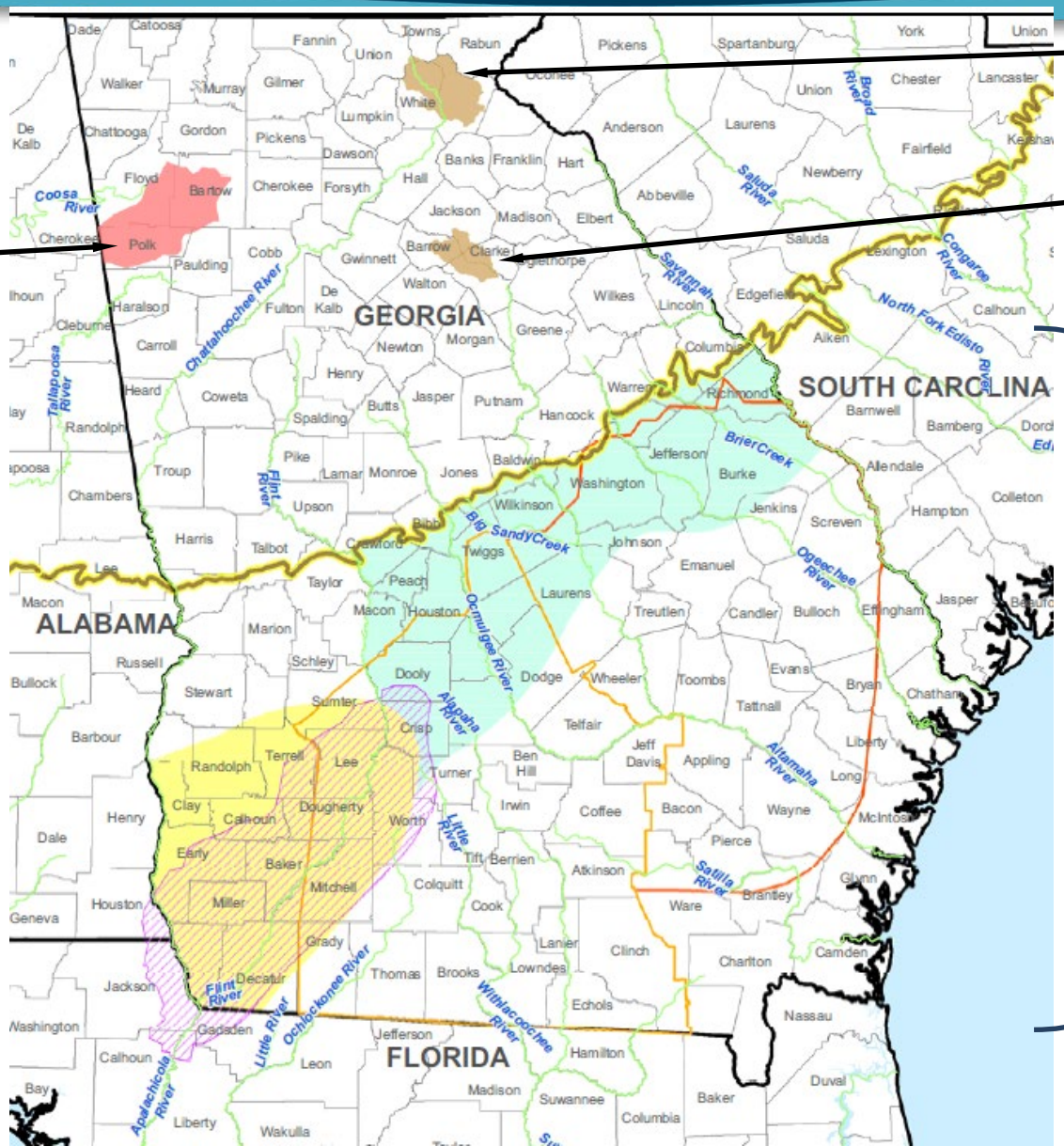
Sustainable Yield

- Amount of groundwater that can be withdrawn without causing unwanted results.
- Metrics were established
  - Drawdown between pumping wells not to exceed 30 ft.
  - Reduction in aquifer storage does not go beyond a new base level.
  - Groundwater recovers between periods of higher pumping.
  - No more than 40% reduction in stream baseflow
  - Groundwater levels do not go below top of confining layer.

Prioritized Aquifers Selected for Groundwater Resource Assessment

Ridge & Valley Region:

Paleozoic-rock Aquifer Study Basin



Blue Ridge & Piedmont Regions:

Crystalline-rock Aquifer Study Basins

Coastal Plain Region Aquifer Study Basins:

- ***Upper Floridan: Eastern Coastal Plain***
- ***Upper Floridan: South Central GA***
- ***Upper Floridan: Dougherty Plain***
- ***Cretaceous***
- ***Claiborne***

Crystalline Rock Aquifer – 2011 Plan

Water Budget Approach

- Most appropriate way to provide a planning level assessment of groundwater resource sustainability this region of the State.

- Is an accounting of water movement within the hydrologic cycle, both natural and artificial.
  - Net gw consumption = gw withdrawals – gw recharge

- By comparing net groundwater consumption to the sustainable yield criteria, estimates of net groundwater availability were developed.

Crystalline Rock Aquifer Study Basins

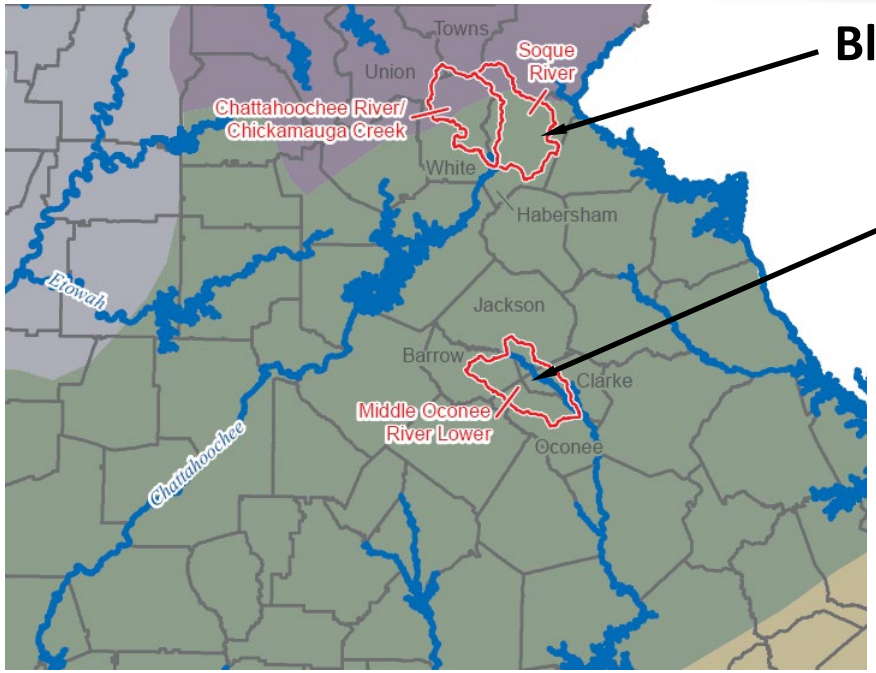
Estimated Range of Sustainable Yield

- Because the water budget focuses on streamflow as the primary estimator of recharge and groundwater availability a variant of the Tennant Method was used to estimate sustainable yield.

- Daily streamflow data from the period 1989 – 2008 were used to calculate the mean annual streamflow and baseflow and a range of streamflow and baseflow reduction amounts (40% to 60%) were evaluated.

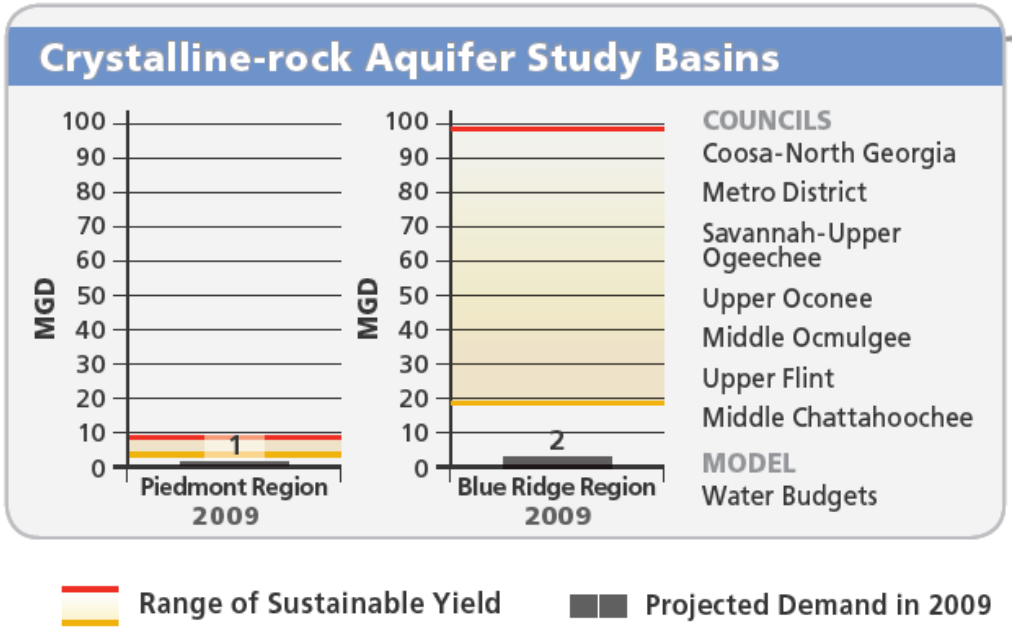
- The 50% mid-level streamflow was chosen as the criterion to estimate the net amount of groundwater available for use.

Crystalline Rock Aquifer
Water Budget Modeling Approach



Blue Ridge Region

Piedmont Region



Forecasted Demands Crystalline Rock Aquifer (Carroll, Haralson, Harris, Heard, and Troup Counties):

2020 – 0.9 MGD
2060 – 0.9 MGD

Regional Coastal Plain Model and Select Sub-Regional Model Domains – 2011 Plan

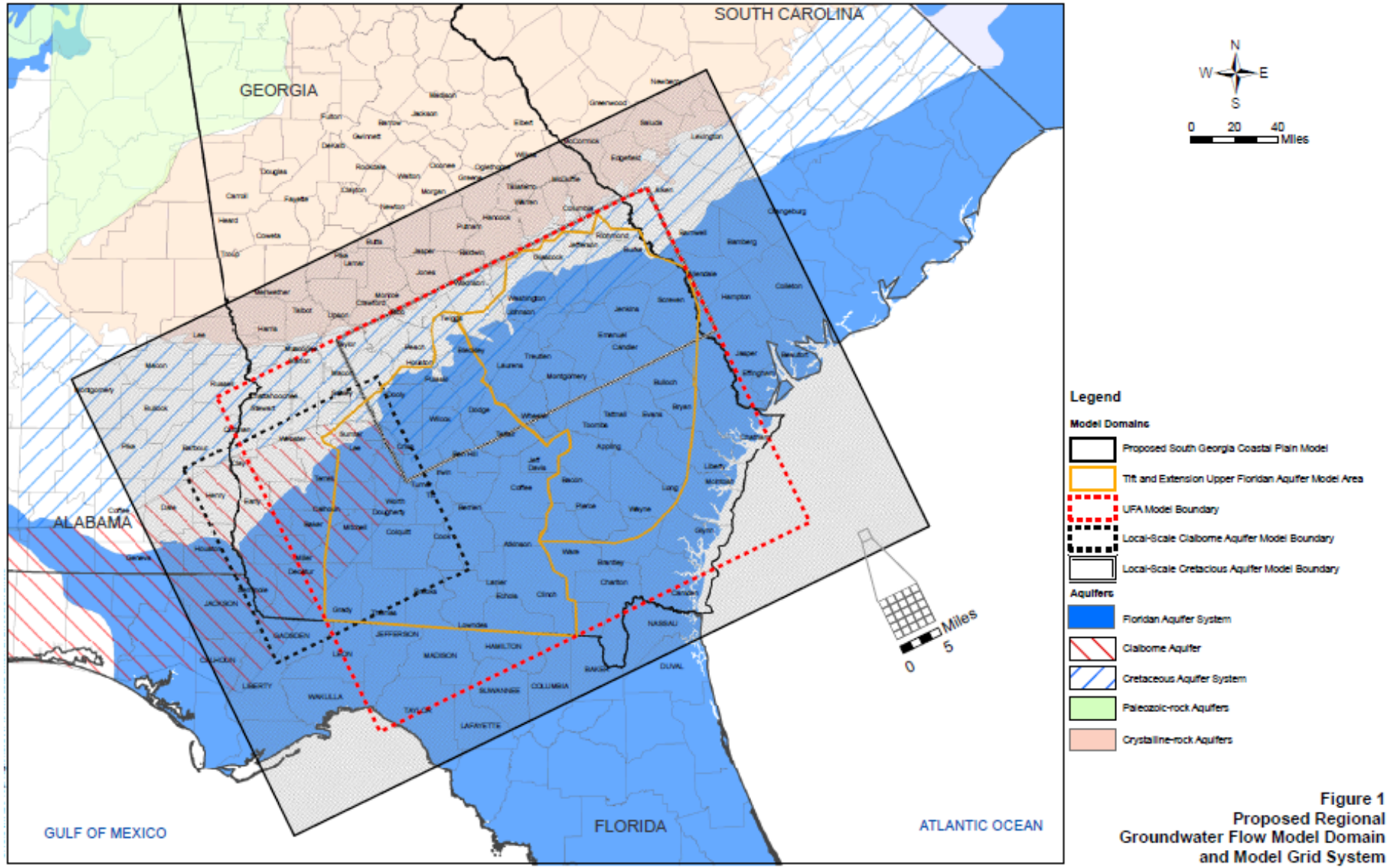


Figure 1
Proposed Regional Groundwater Flow Model Domain and Model Grid System

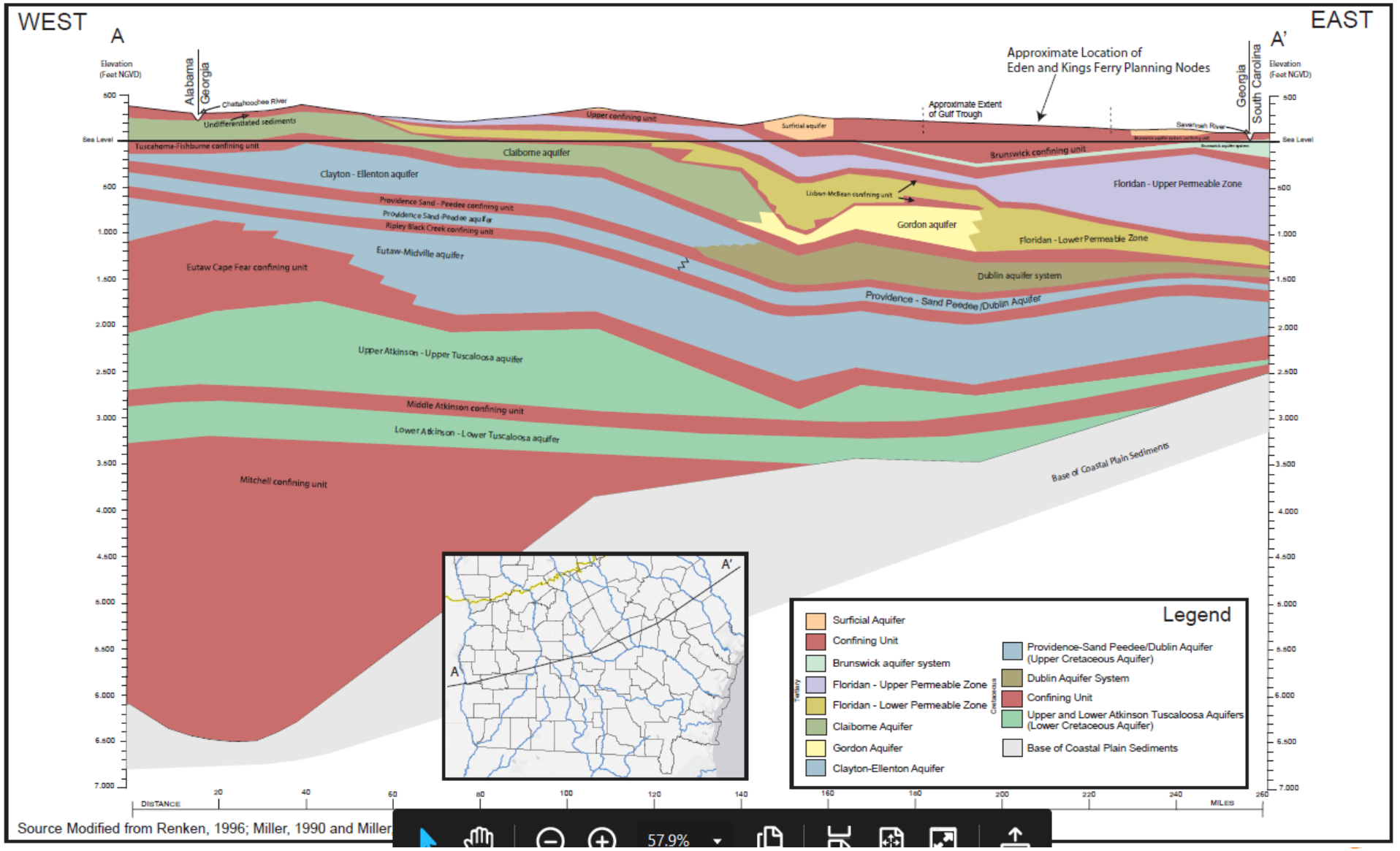
Regional Coastal Plain Model

- MODFLOW three-dimensional finite difference model.
- Seven model layers depict prioritized aquifers
  - Layer 1 - Surficial
  - Layer 2 – Floridan
  - Layer 3 – Claiborne
  - Layer 4 – Clayton
  - Layers 5-7 - Cretaceous Sand
    - Providence
    - Eutaw-Midville
    - Upper/Lower Atkinson
- Confining units between aquifer layers is represented as vertical leakance (negligible horizontal flow and vertical flow is calculated by the model)
- Grid spacing of model is 1-mile by 1-mile and all properties are centered.

Regional Coastal Plain Model

- Model was run in steady-state mode.
- Model depicts all permitted well locations and pumping rates within the Georgia Coastal Plain.
- Baseline withdrawals
  - Municipal and Industrial pumping rates were provided by EPD.
  - No pumping data available on Ag wells, so pumping rates were estimated based on USGS water use data from 2000 to 2005. These were estimated by County.
  - Included withdrawals from portions of aquifers in AL, FL, and SC within model domain.

Cross-Section of Hydrogeologic Units – Regional Coastal Plain Model



Source Modified from Renken, 1996; Miller, 1990 and Miller

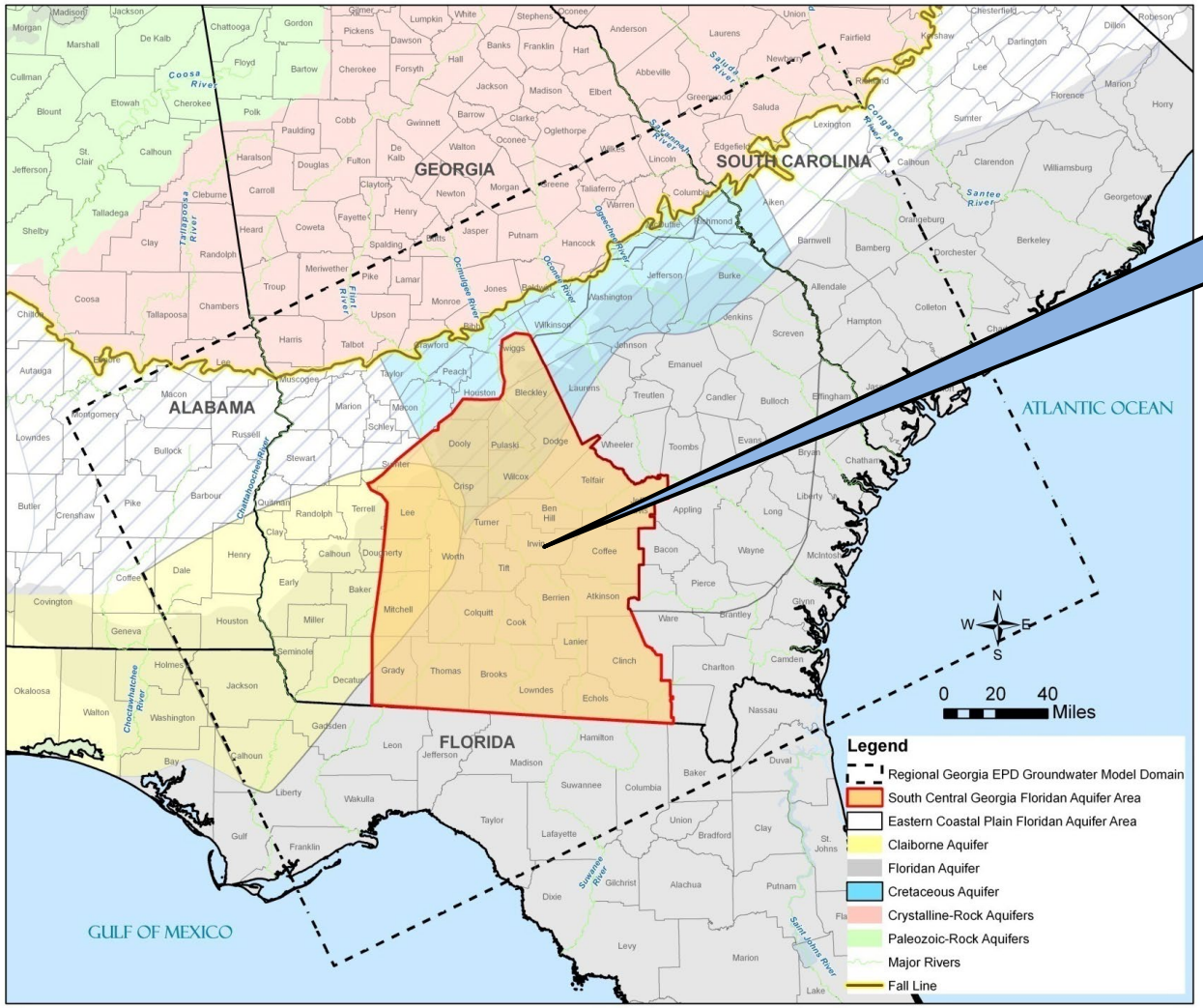
Round 1 - Sustainable Yield Estimates

- Low end – Uniformly increase simulated withdrawals from existing well locations until criteria is met.

- High end – Non-uniformly increase simulated withdrawals from existing and hypothetical wells until criteria is met.

- Sustainable yield assumes withdrawals from aquifer are increased while withdrawals from other aquifers held constant.

Upper Floridan Aquifer - South Central Georgia



Low End of SY = 622 mgd
High End of SY = 836 mgd

Upper Flint Current use and forecasted demands :
2020 – 25 mgd
2060 – 34 mgd

Aquifer-wide demand:
2020 – 488 mgd
2060 – 658 mgd

Upper Floridan Aquifer – Dougherty Plain

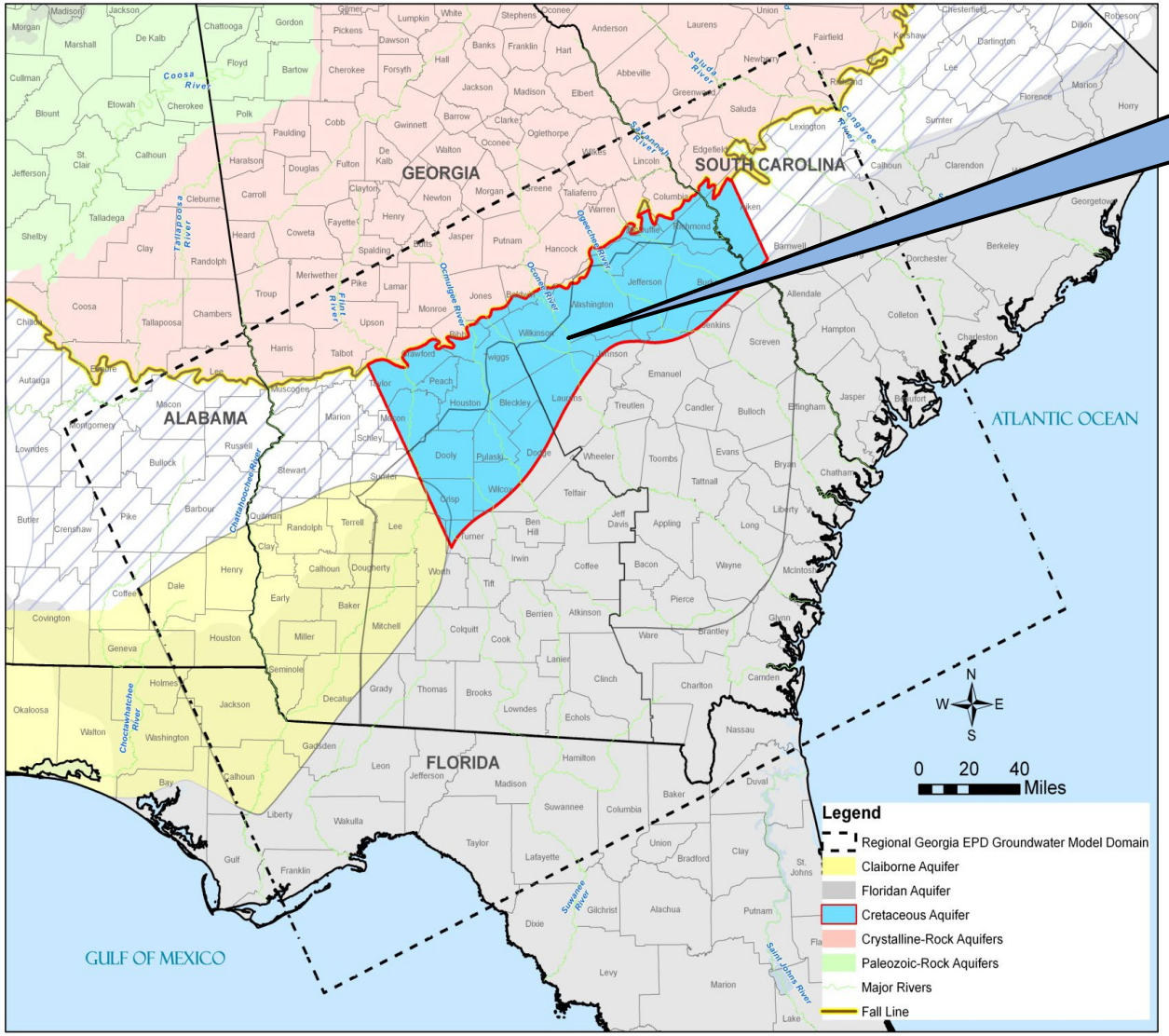
Low End of SY = 237 mgd
High End of SY = 328 mgd

Upper Flint Current use and forecasted demands (Crisp, Dooly, and Sumter):
2020 – 25 mgd
2060 – 34 mgd

Aquifer-wide demand:
2020 – 441 mgd
2060 – 576 mgd

Upper Floridan Aquifer in the Dougherty Plain

Cretaceous Aquifer Between Macon and Augusta

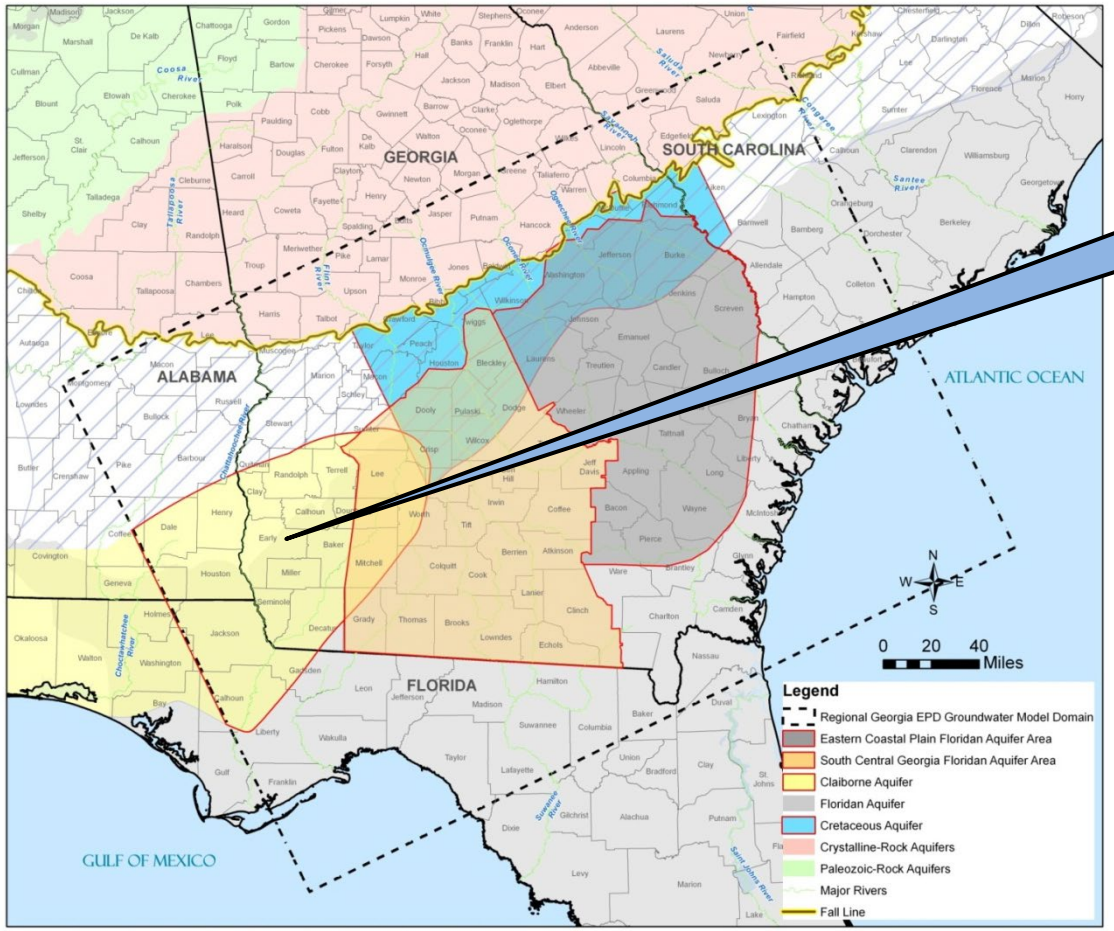


Low End of SY = 347 mgd
High End of SY = 445 mgd

Upper Flint Current use and forecasted demands (Crisp, Dooly, Macon and Taylor) :
2020 – 51 mgd
2060 – 72 mgd

Aquifer-wide demand:
2020 – 170 mgd
2060 – 227 mgd

Claiborne Aquifer – Georgia Coastal Plain



Claiborne Aquifer in Georgia's Coastal Plain

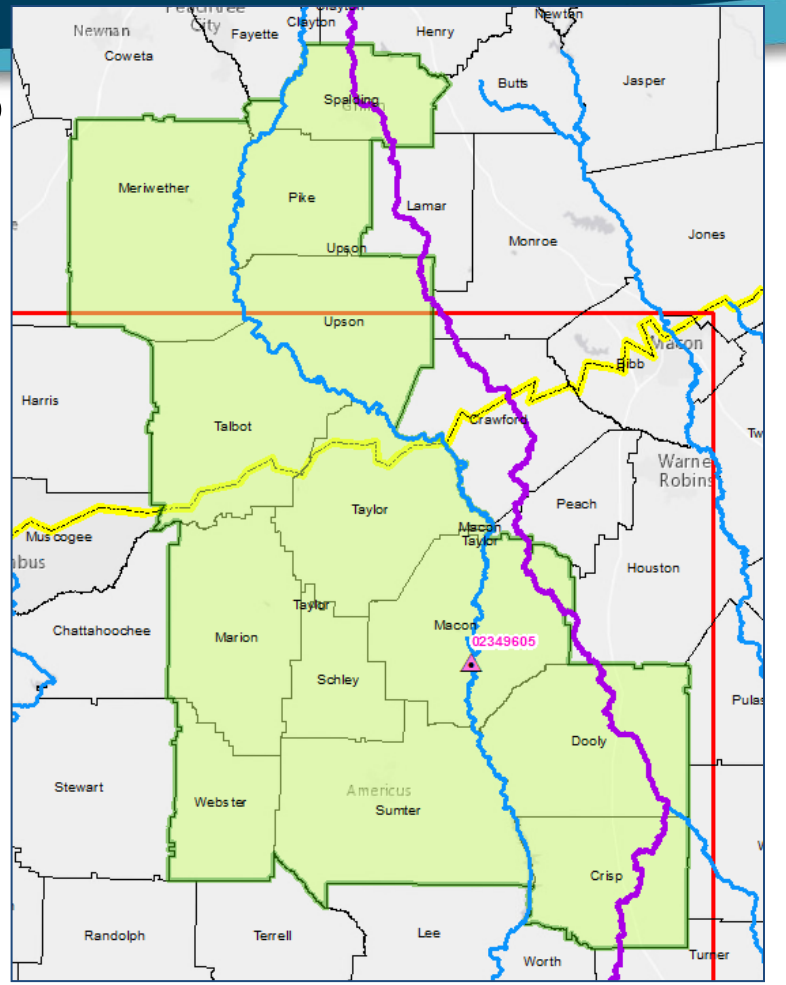
Low End of SY = 140 mgd
High End of SY = 635 mgd

Upper Flint Current use and forecasted demands (Crisp, Sumter, and Webster):
2020 – 55 mgd
2060 – 77 mgd

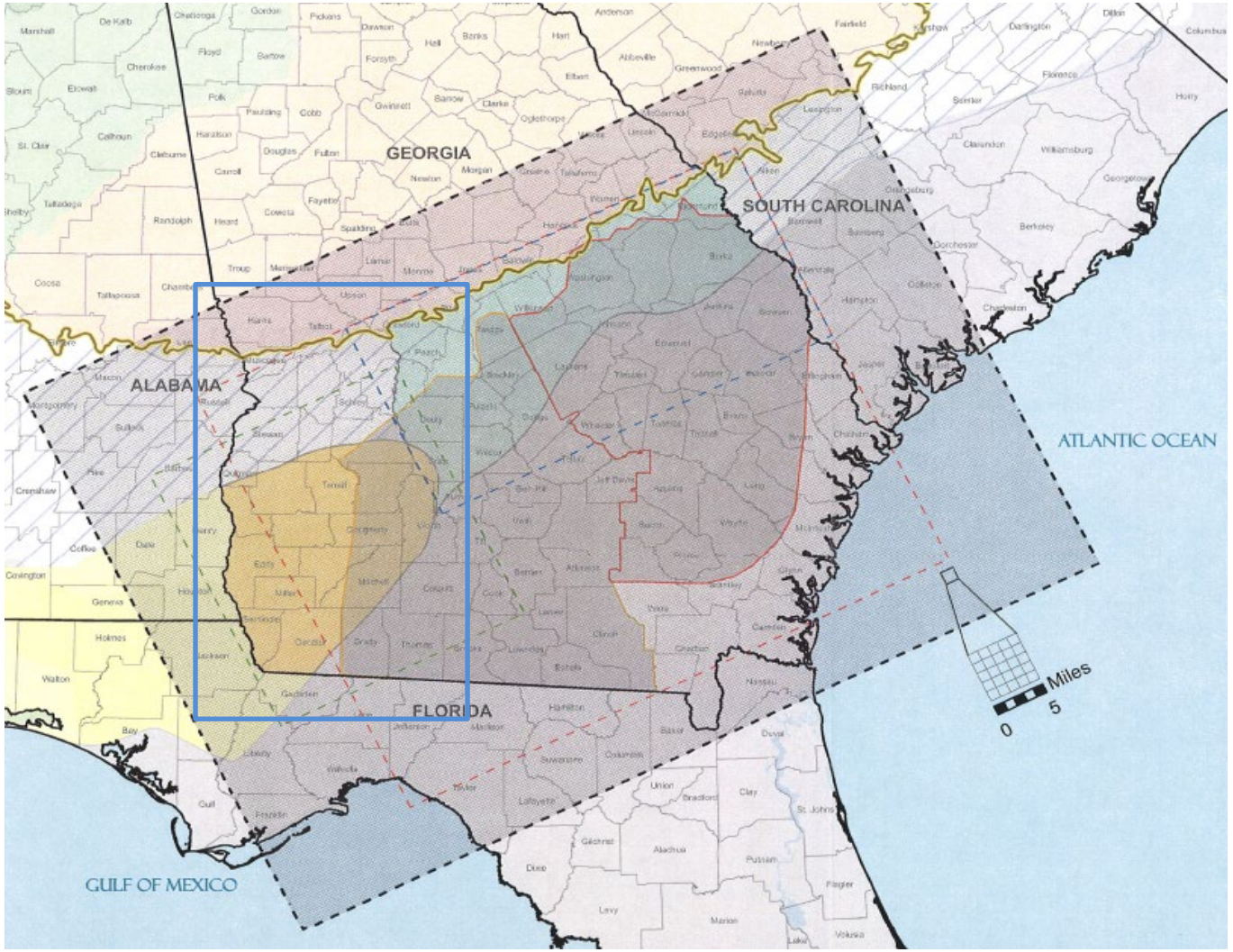
Aquifer-wide demand:
2020 – 71 mgd
2060 – 94 mgd

Analysis of Cretaceous Aquifer – 2017 Plan

- Assess capacity of the Cretaceous Sand aquifer to support replacement of surface water withdrawals in Upper Flint Planning Region with groundwater withdrawals.
- Steady-state analysis of sustainable yield of Cretaceous Aquifer System.
- SW Georgia Subregional Model Application.
- Sustainable Yield (SY) Criteria:
  - Maximum drawdown: 30 ft.
  - Maximum baseflow reduction: 40%
- Ran two scenarios to determine SY range
  - Scenario 1 (Low End) – Increase withdrawals at existing locations
  - Scenario 2 (High End) – Distributed pumping locations

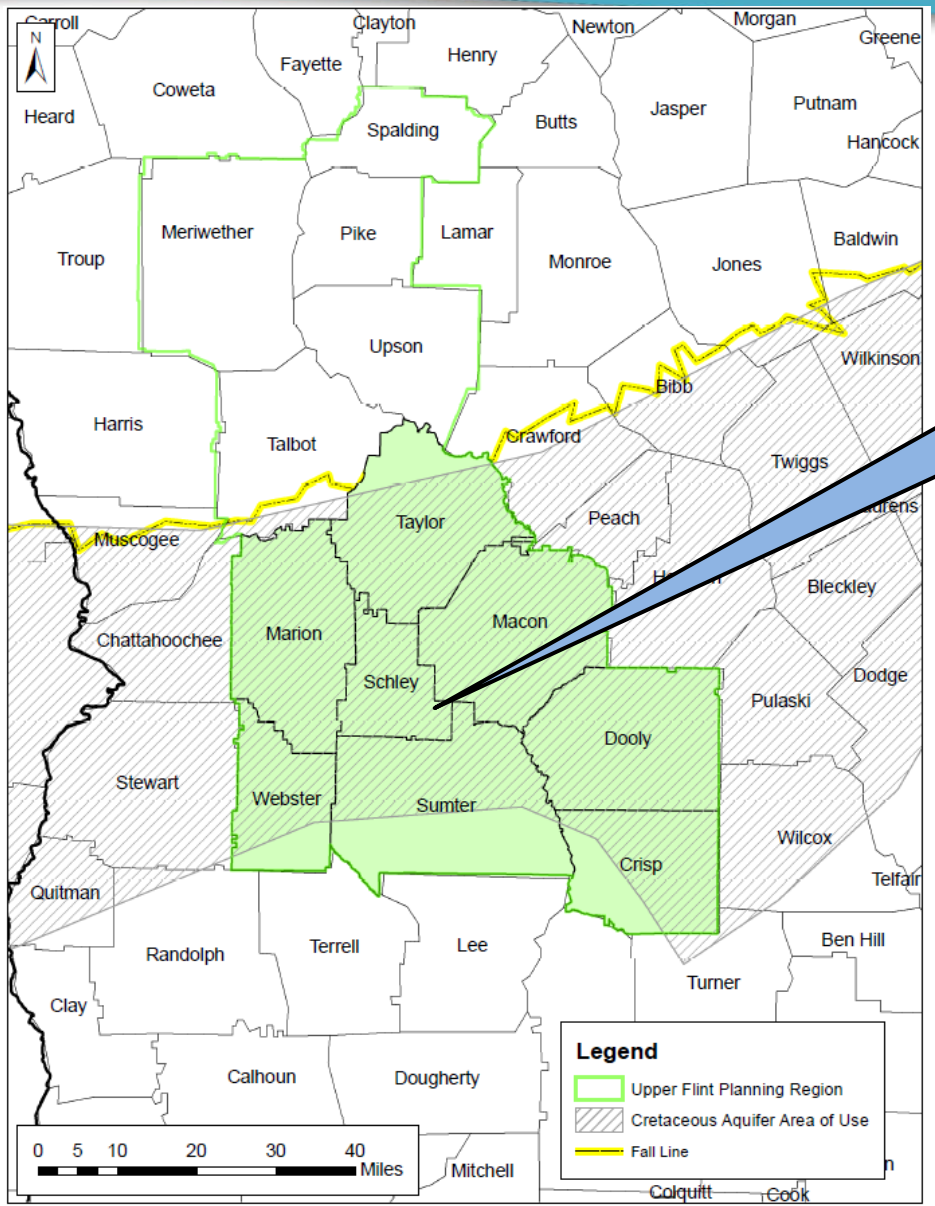


Southwest Georgia Subregional Model Domain



Approximate boundary of subregional model

Cretaceous Aquifer – Upper Flint Region



Low End of SY = 50 mgd
High End of SY = 201 mgd

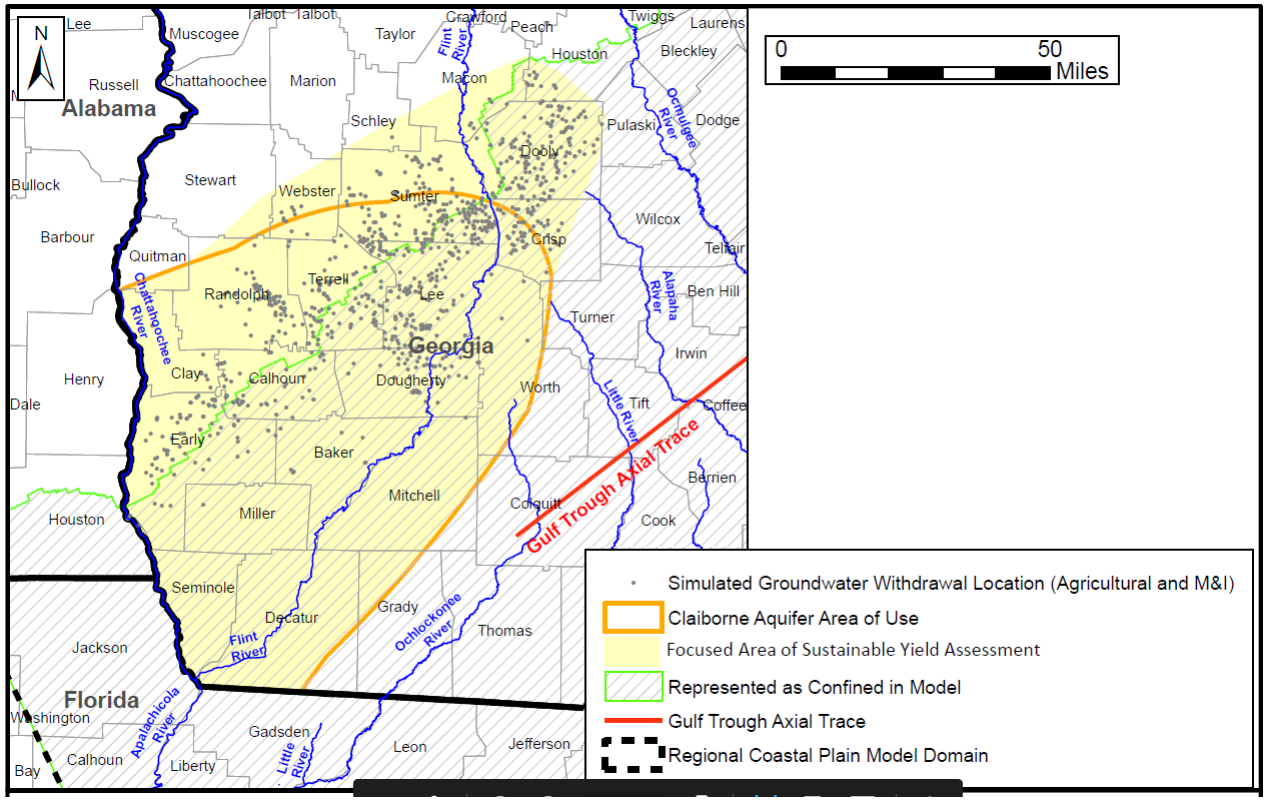
Current use and forecasted demands:

2020 – 51 mgd
2060 – 72 mgd

Groundwater Resource Assessment Updates for 2017 Plan

- Between 2016-2017:
  - Reduce finite difference grid cell size
    - From 1 mile^2 to 2,000 ft^2 for SW GA Subregional Model
    - From 1 mile^2 to 1,760 ft^2 for Regional Coastal Plain Model
  - Transmissivity values of Claiborne Aquifer were revised based on data collected during 2017 GEFA study.
    - Leakance of Claiborne Aquifer was adjusted as part of model calibration.
    - Leakance and transmissivity of Clayton Aquifer and Providence Sand were adjusted as part of the model calibration.
  - Expanded representation of river-groundwater interactions.
    - Expanded number of tributary streams represented in models.
  - Transient model inputs were developed with model calibration.
    - Represent hydrologic groundwater conditions for period from 2009-2012.
    - Metered Ag data were available for these years.

Claiborne Aquifer Updates



- New Area of Use defined for the Claiborne Aquifer.
  - Includes parts of Crisp, Dooly, Macon and Houston Counties.
- Refined model reassessed Sustainable Yield of Claiborne Aquifer.

Claiborne Aquifer Updated Sustainable Yields

Condition	Pumping from Claiborne Aquifer	Increased Pumping		Modeling Results			
				Max Drawdown	Reduced GW Contribution to River Baseflow		
	(mgd)	(mgd)	(%)	(ft)	Model-wide	Focused Area of SY Assessment	Flint River
Baseline	120						
Uniformly increased existing well pumping (low end of SY)	141	20	17%	30	< 1 %	< 2 %	< 1 %
Existing and new well pumping (high end of SY)	803	682	564%	30	7.5%	5.4%	24%

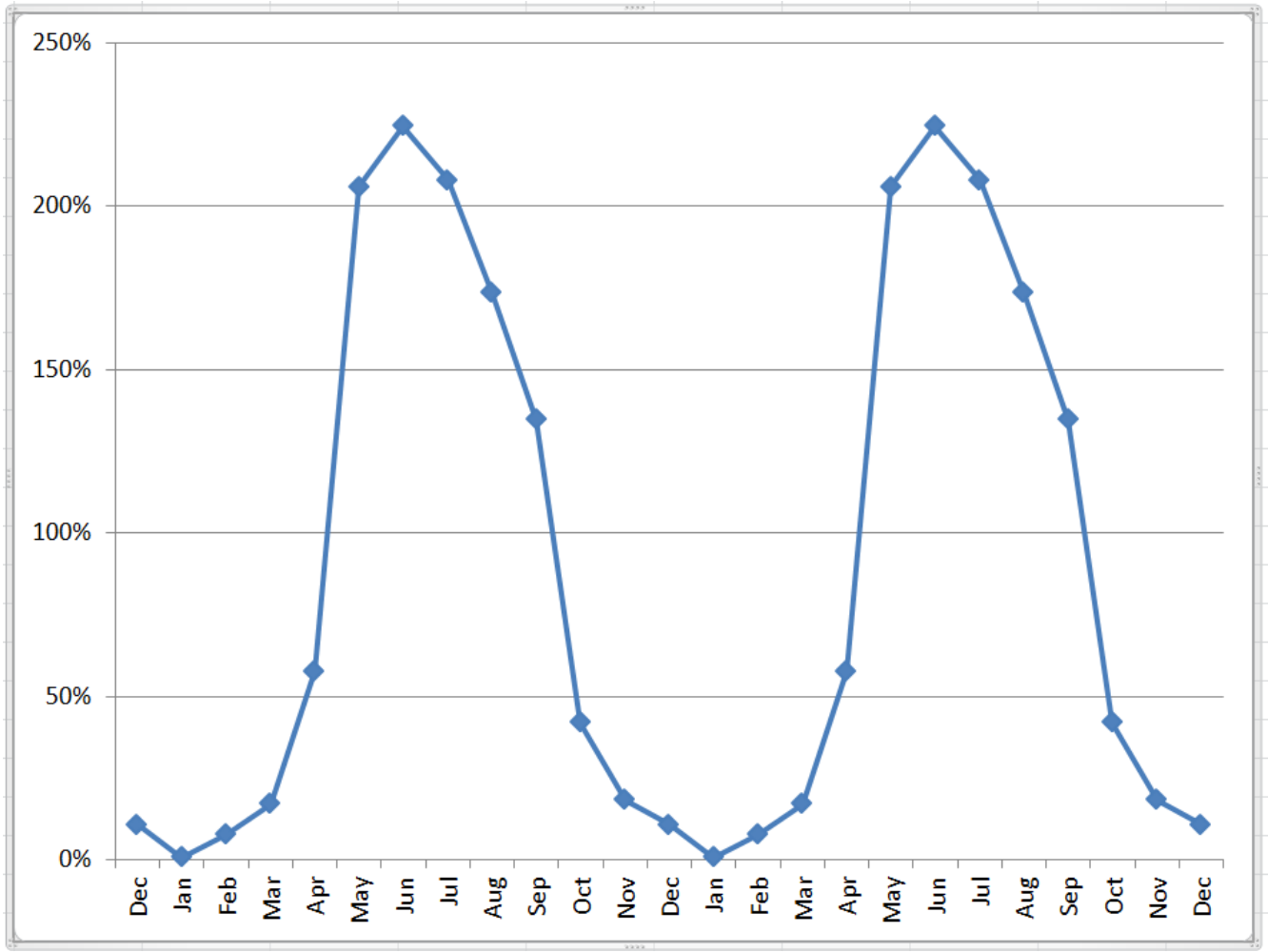
Claiborne Aquifer – High End Sustainable Yield

County	Simulated Baseline Groundwater Withdrawal Rate (mgd)	Simulated High End Groundwater Withdrawal Rate (mgd)	County	Simulated Baseline Groundwater Withdrawal Rate (mgd)	Simulated High End Groundwater Withdrawal Rate (mgd)
Baker	1.0	11.3	Miller	0.1	21.2
Calhoun	4.3	44.5	Mitchell	0.01	3.8
Clay	1.1	28.8	Pulaski	0	2.7
Colquitt	0	0.4	Quitman	0	4.2
Crisp	9.4	37.4	Randolph	9.1	87.4
Decatur	0	4.6	Schley	0.3	16.6
Dooly	15.6	83.1	Seminole	0	3.7
Dougherty	8.3	22.7	Stewart	0	11.4
Early	6.5	67.1	Sumter	32.3	116.5
Grady	0	1.2	Terrell	11.0	80.8
Houston	4.5	18.9	Turner	0	0.5
Lee	14.1	49.7	Webster	1.2	41.1
Macon	1.1	34.7	Worth	0.3	7.2
Marion	0	1.2			

Additional Groundwater Resource Assessment by Regional Planning Council Area

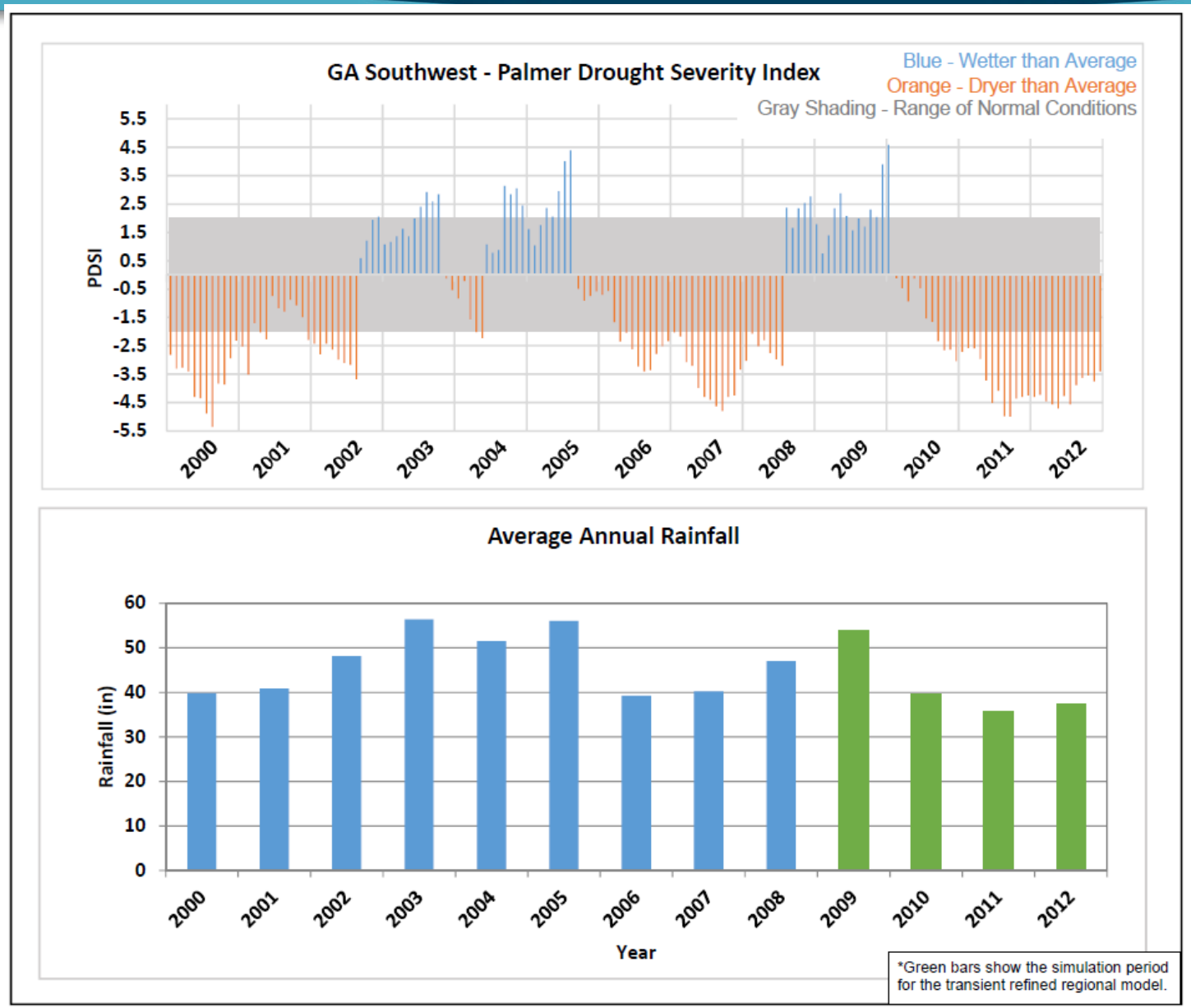
- Modeled increased groundwater withdrawals from prioritized aquifers within Upper Flint Council area.
- Modeling was done in areas where additional drawdowns from the withdrawals would not extend to rivers and drains in the aquifer outcrop areas.
- Model run in transient mode.
- Model simulations represent hydrologic groundwater conditions for period from 2009-2012.

Transient Well pumping irrigation rates

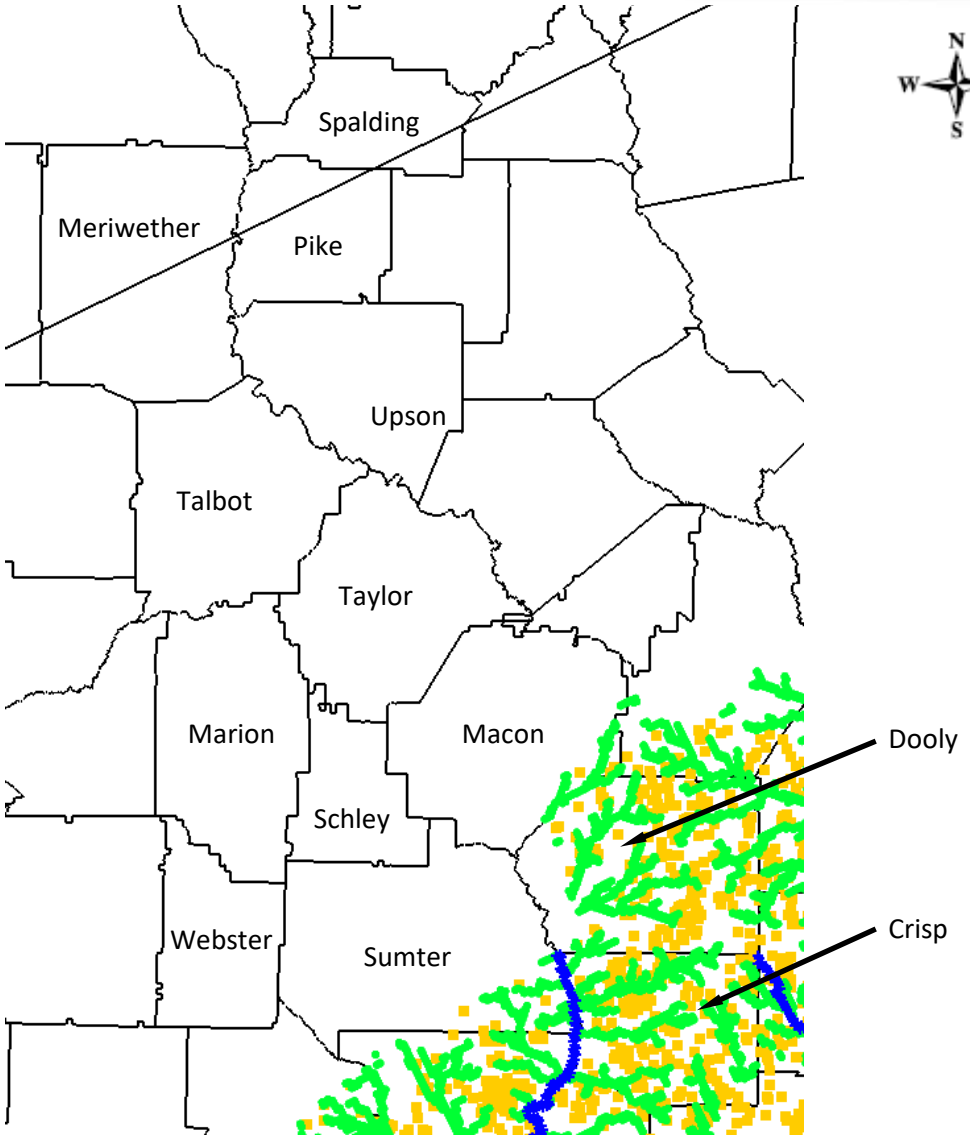


- Transient monthly pumping rate as a percentage of the 100% steady state pumping rate.

Annual precipitation of the four years chosen for the transient simulations

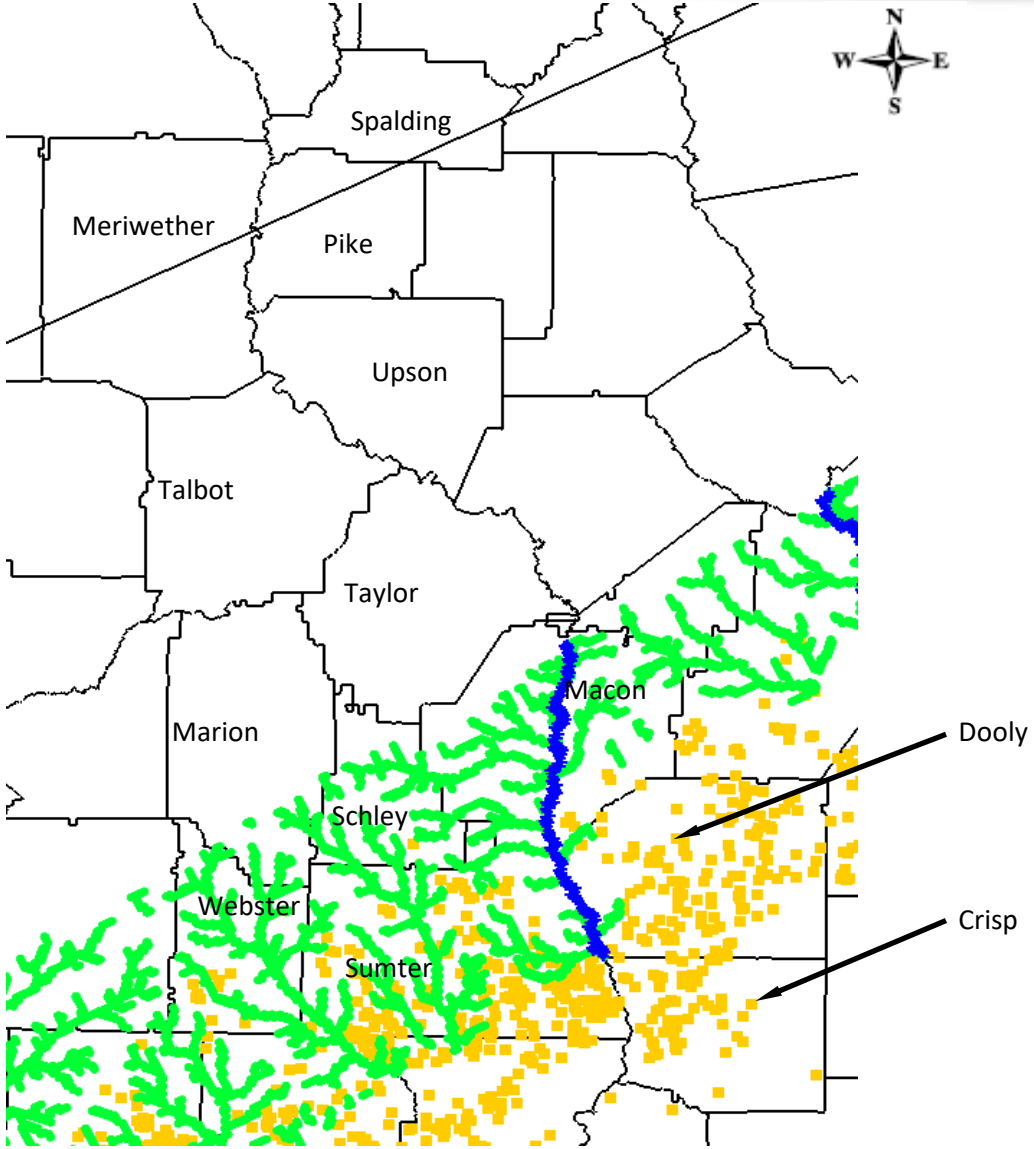


Floridan Aquifer Outcrop Area– Upper Flint



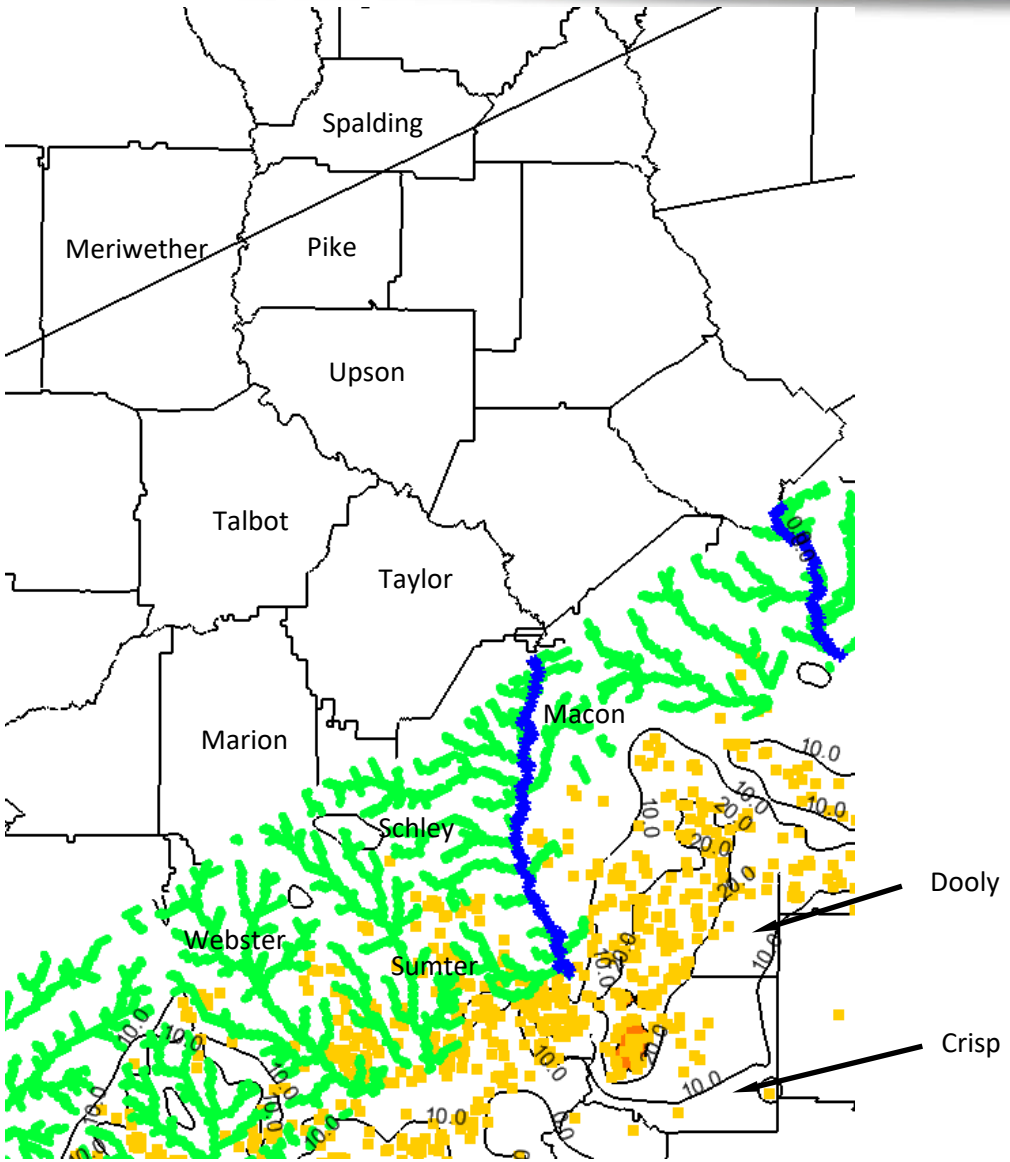
- Floridan wells in Dooly, Crisp and Sumter Counties in aquifer outcrop area.
- Did not simulate increased groundwater withdrawals from Floridan Aquifer wells.

Claiborne Aquifer Outcrop Area – Upper Flint



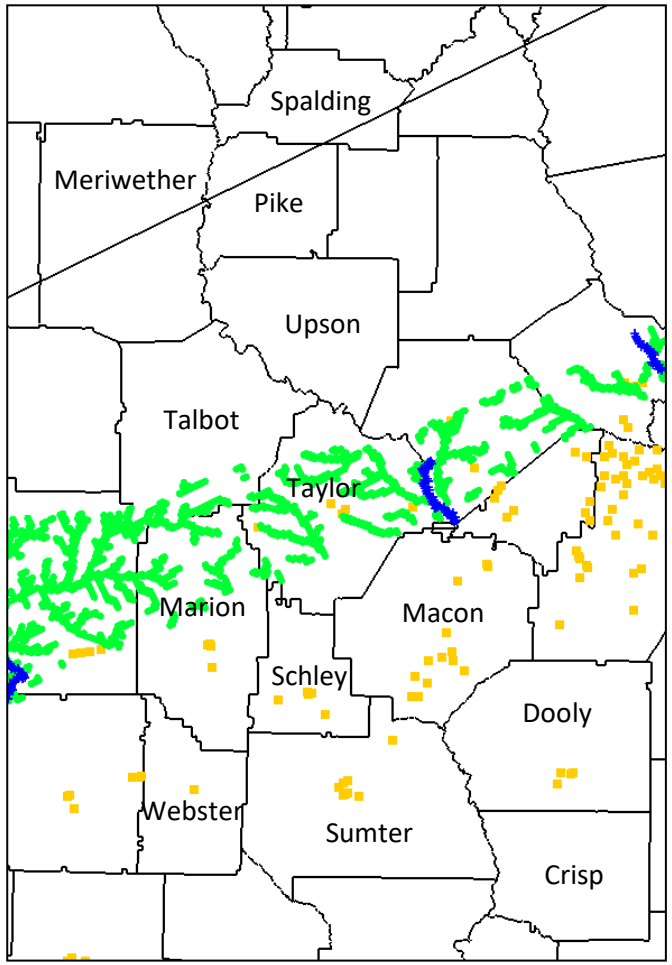
- Except in Dooly and Crisp Counties, Claiborne wells are within the aquifer outcrop area.
- Limited model simulations of increased groundwater withdrawals to Dooly and Crisp Counties.

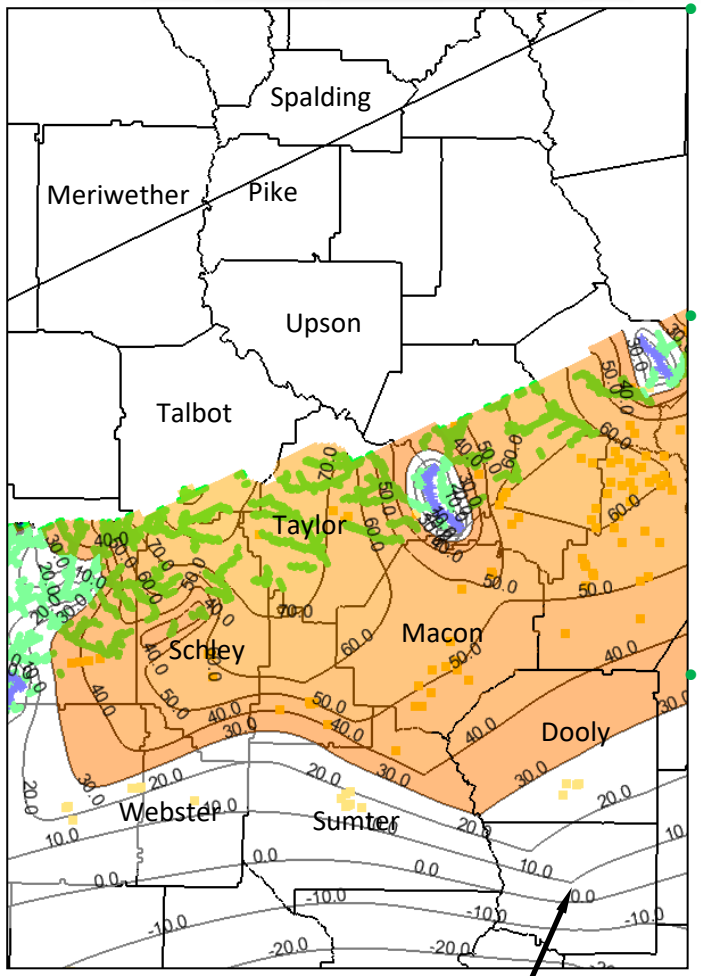
Claiborne Aquifer Increased Withdrawals



- Increased withdrawals until 30 ft drawdown metric met 2x the baseline (+25.19 mgd).
- Drawdown shown during peak growing season.
- Groundwater recovers during non-growing season.

Cretaceous Sand Aquifer (Layer 5) – Upper Flint



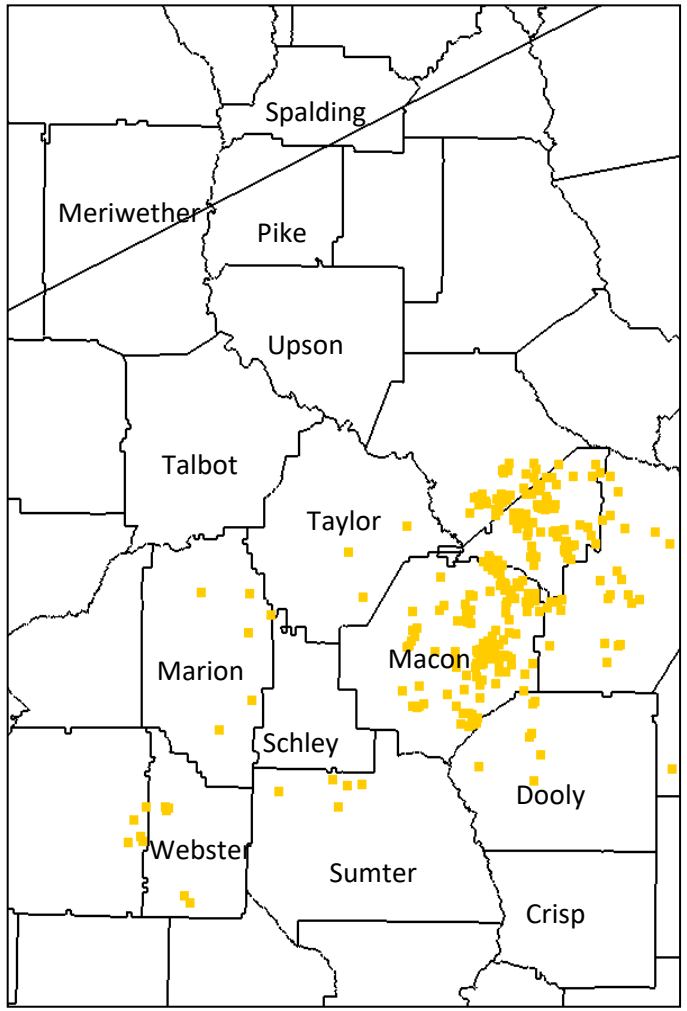


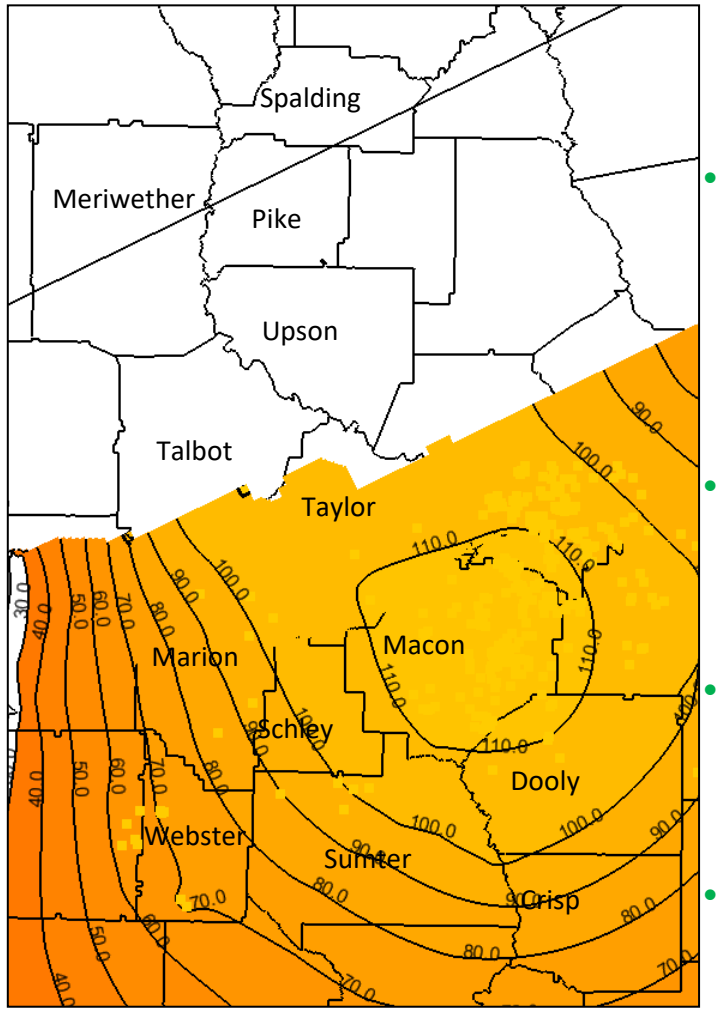
Except in Taylor County, Cretaceous Sand Aquifer wells (Layer 5) are outside the aquifer outcrop area.

Increased groundwater withdrawals from in all Counties with Cretaceous Sand aquifer wells except Taylor County.

Baseline pumping during peak growing season exceeded 30 ft drawdown and extended into outcrop area. 30 ft drawdown could also cause wells to go dry.

Cretaceous Sand Aquifer (Layer 6) – Upper Flint

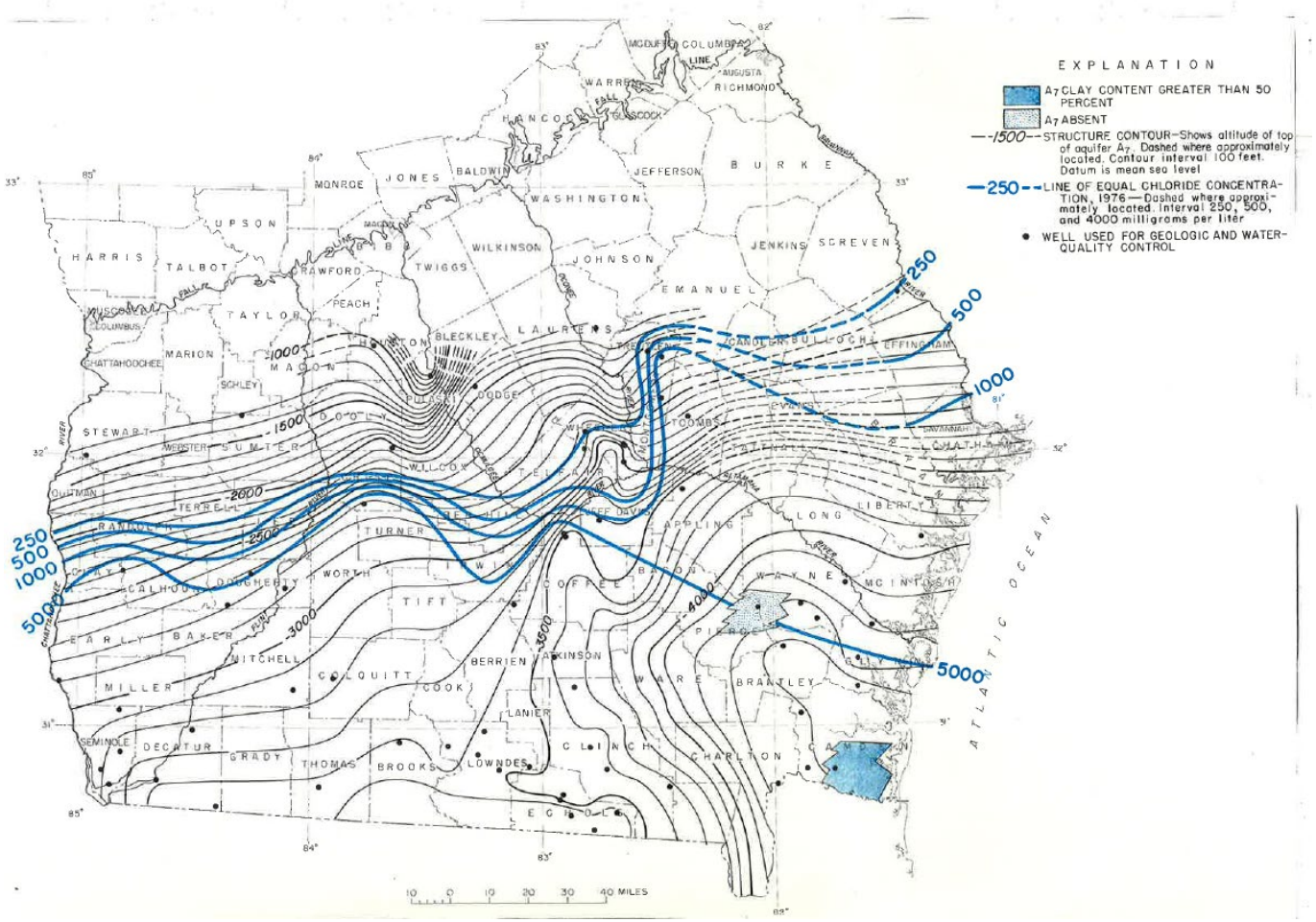




- None of the Layer 6 wells are within the outcrop area.
- Increased withdrawals until 30 ft drawdown metric met 2x baseline (+33.60 mgd).
- Drawdown shown during peak growing season.
- Groundwater did not fully recover during non-growing season.
- Greater than 30ft drawdown can cause wells to go dry.

Brackish groundwater in lower unit of Cretaceous Aquifer (Layer 7)

- Layer 7 of the Cretaceous Aq. has been mapped to have some brackish groundwater
- USGS defines brackish as Total Dissolved Solids (TDS) = 1,000 to 10,000 mg/L.
- Crisp County may have brackish water based on GGS Hydrologic Atlas 3.



Christine Voudy
Georgia Environmental Protection Division
(470) 607-2621
christine.voudy@dnr.ga.gov

Vision and Goals

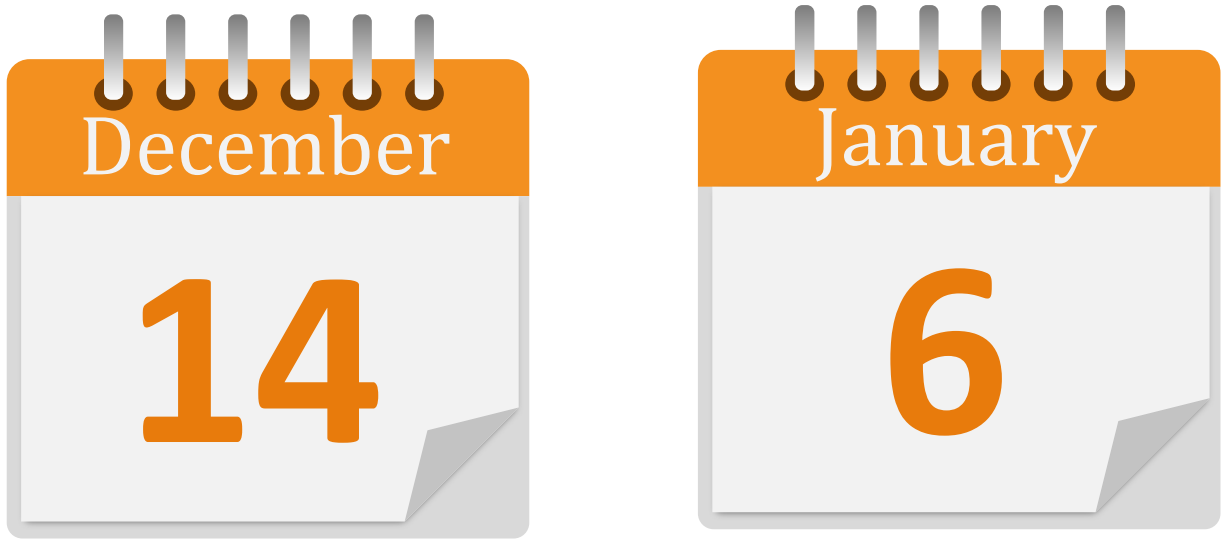
Committee Report

Upper Flint Council
Plan Review Committee

MEMBERS

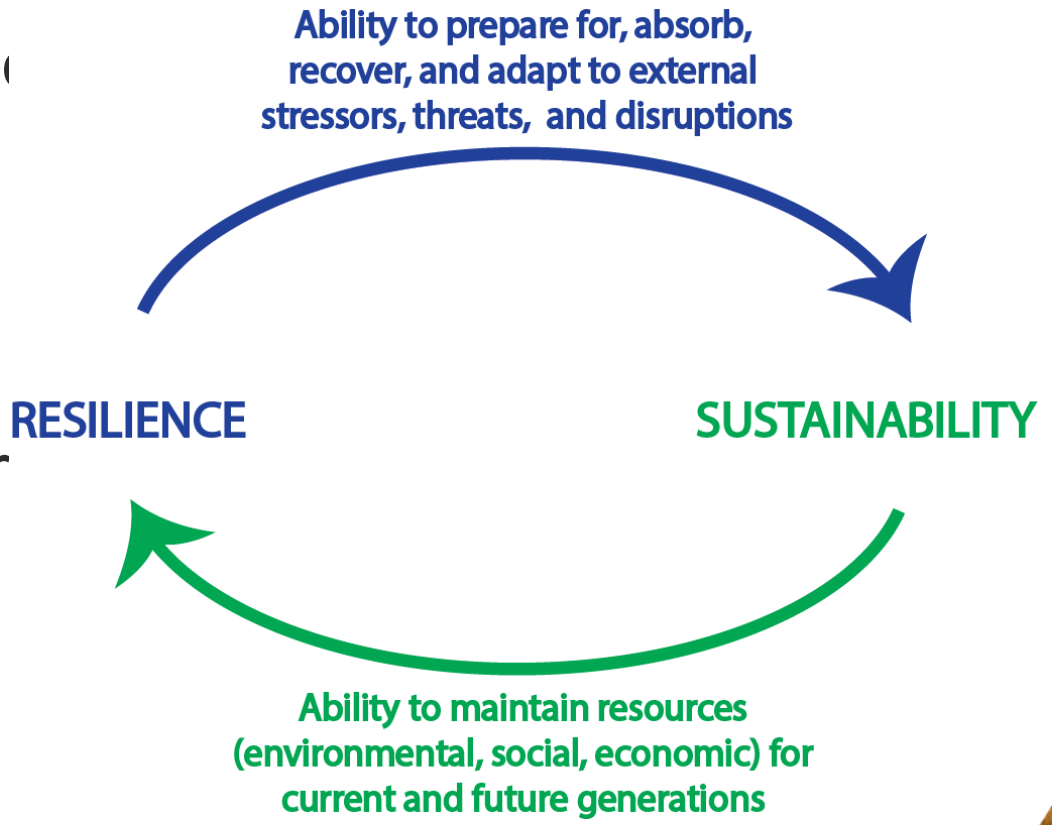
- Raines Jordan
- Adam Graft
- Brant Keller
- Gordon Rogers

Plan Review Meetings



Areas of Discussion

- Ideas suggested by Council members at N
  12 Council Meeting
  - Proactive/reactive
  - Wise stewardship
  - Restoration opportunities
- Specificity to Flint River Basin vs. All Water
  Resources in Region
  - Looked at plans from other Councils
- Resilience and Sustainability
  - Article and graphic on definition of these terms
- Readability edits



Upper Flint Region

PLAN REVIEW COMMITTEE RECOMMENDATION

Keep this as written.

(Dec 14, 2021)

Council's Vision:

The Upper Flint Water Planning Council's purpose is to provide guidance, leadership and education on water resource utilization within the region. Through cooperation among stakeholders, implementation of the Council's plan will support sustainable management of the region's water resources, benefit public health and natural ecosystems, support the State's economy, and enhance the quality of life for its citizens.

Upper Flint Region

PLAN REVIEW COMMITTEE RECOMMENDATION

Adopt edits marked below.

(Jan 6, 2022)

Council's Goals

1. **Lead the development and implementation of water resource policy** in this region and work together with the state and federal government and with the other regional water planning councils to ensure that the welfare and needs of our region are met.
2. **Enhance public understanding of water resources** and ~~provide stakeholders with an~~ opportunities for input into regional water policy.
3. **Maintain and strive to improve the ~~quality and quantity~~ resilience and sustainability of our water resources** ~~in order~~ to protect natural ecosystems and public health.
4. **~~Manage~~ Sustain water resources ~~sustainably~~ through the three "C's"** – conserving, capturing and controlling water – ~~in order to provide for~~ to support the needs of all water users in the region (agriculture, utilities, residential, commercial, industry, forestry, and recreation).
5. **Sustain the region's aquifers and surface waters** ~~in a way that will continue to~~ and support the economic activities of the Upper Flint Water Planning Region and the economy of the State of Georgia.
6. **Ensure that actions taken by this Council** ~~do not impede~~ support the agriculture and forestry-based economy of this region.

Upper Flint Region

PLAN REVIEW COMMITTEE RECOMMENDATION

Adopt as edited below (clean copy).

(Jan 6, 2022)

Council's Goals

1. **Lead the development and implementation of water resource policy** in this region and work together with the state and federal government and with the other regional water planning councils to ensure that the welfare and needs of our region are met.
2. **Enhance public understanding of water resources** and opportunities for input into regional water policy.
3. **Maintain and strive to improve the resilience and sustainability of our water resources** to protect natural ecosystems and public health.
4. **Sustain water resources through the three "C's"** – conserving, capturing and controlling water –to support the needs of all water users in the region (agriculture, utilities, residential, commercial, industry, forestry, and recreation).
5. **Sustain the region's aquifers and surface waters** and support the economic activities of the Upper Flint Water Planning Region and the economy of the State of Georgia.
6. **Ensure that actions taken by this Council** support the agriculture and forestry-based economy of this region.

Surface Water Availability Assessment

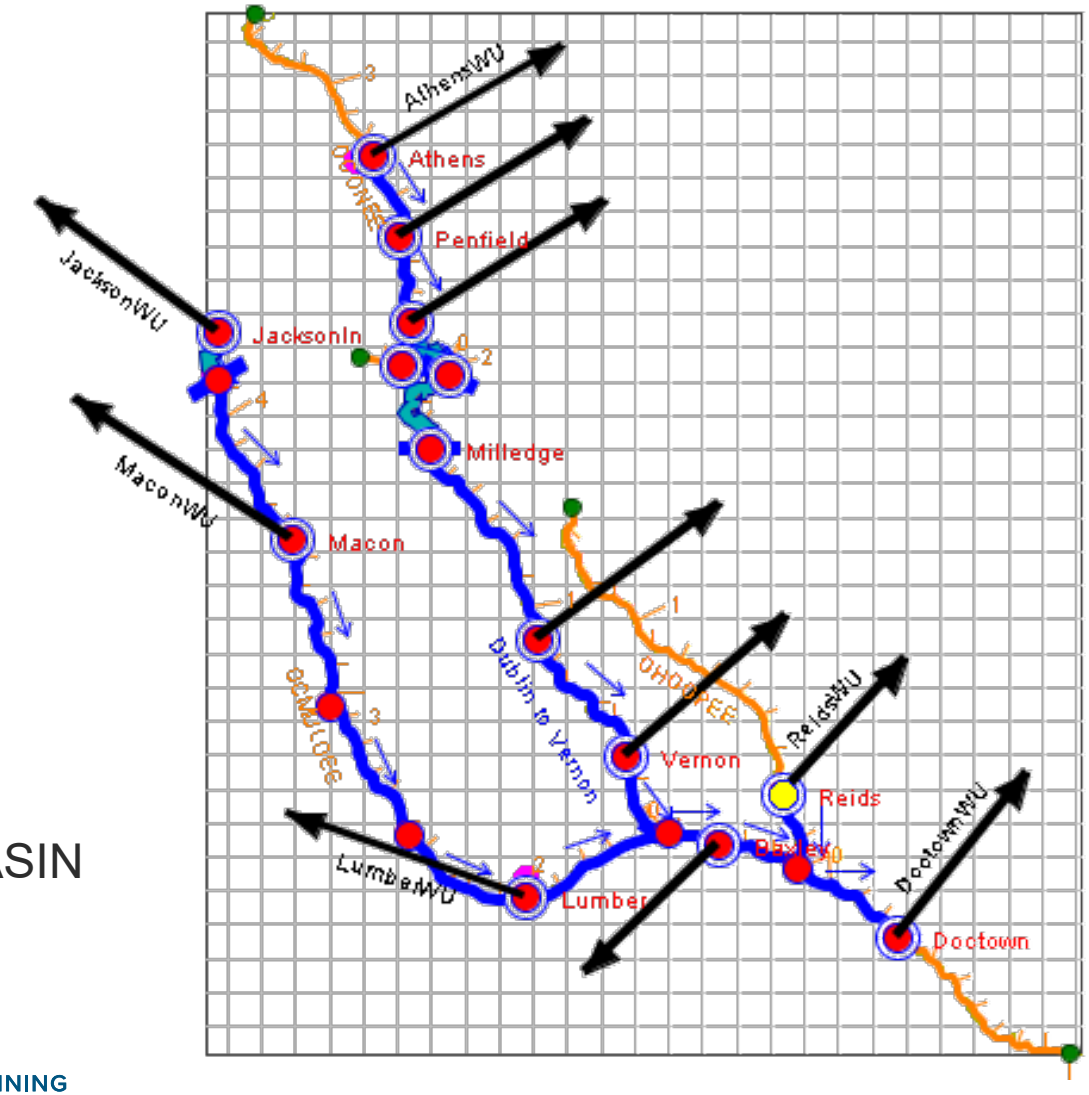
Wei Zeng & Jennifer Welte, GA EPD

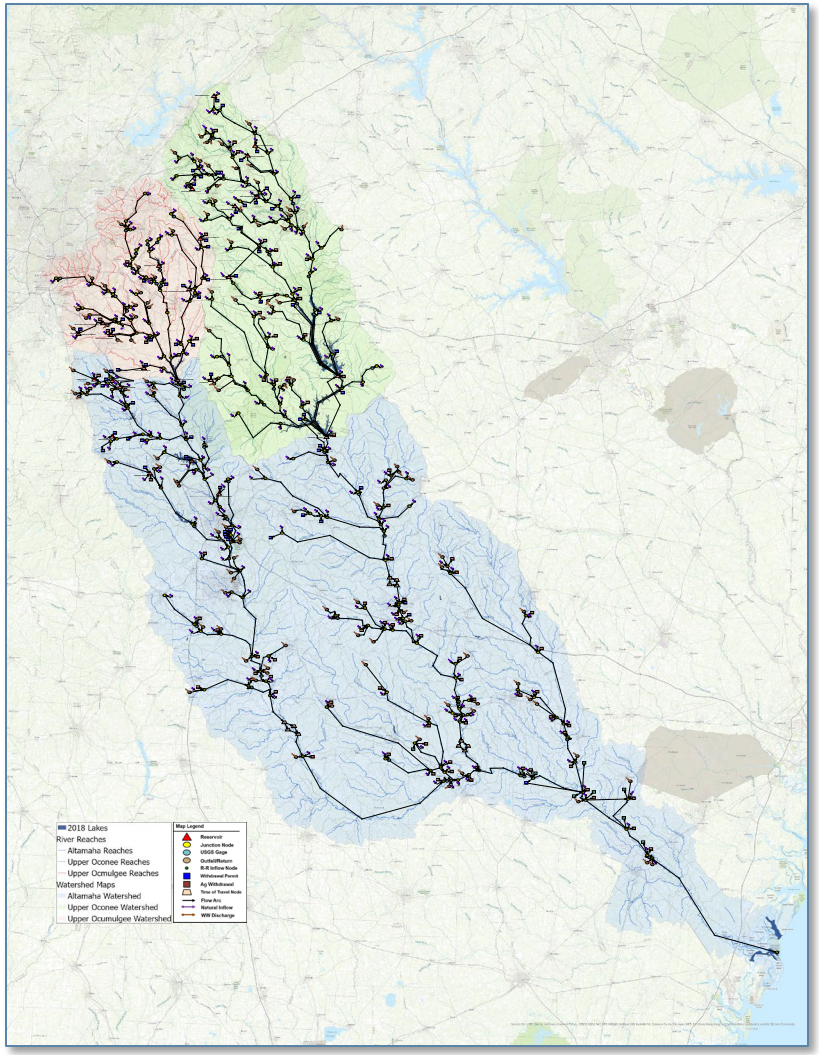
Kristin Rowles, GWPPC

Outline

- What is BEAM? (Basin Environmental Assessment Model)
- Model Metrics & Results
- Today's Examples – Oconee-Ocmulgee-Altamaha Basin (OOA)
- Apalachicola-Chattahoochee-Flint Basin (ACF) Results – Next Council Meeting

ResSim (Prior Model) and BEAM Schematics

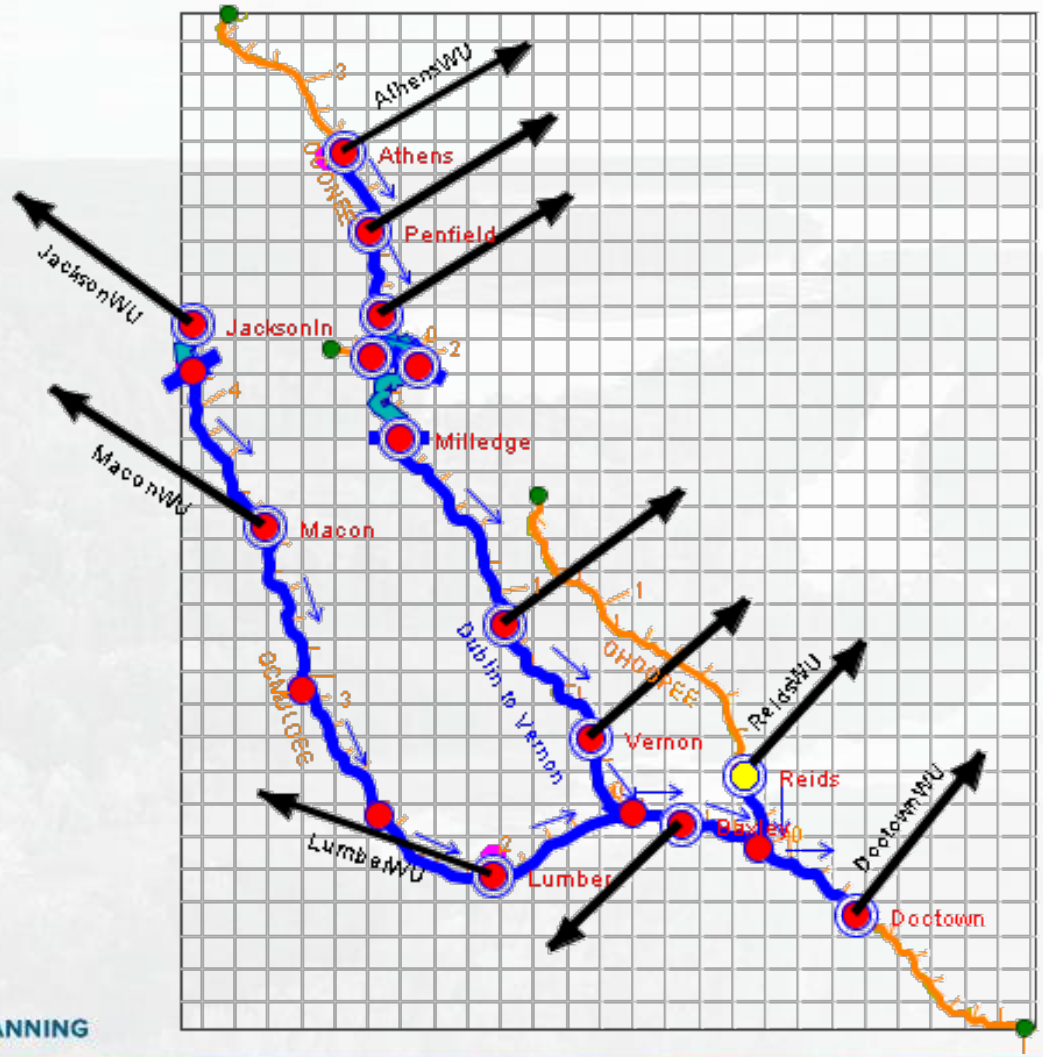


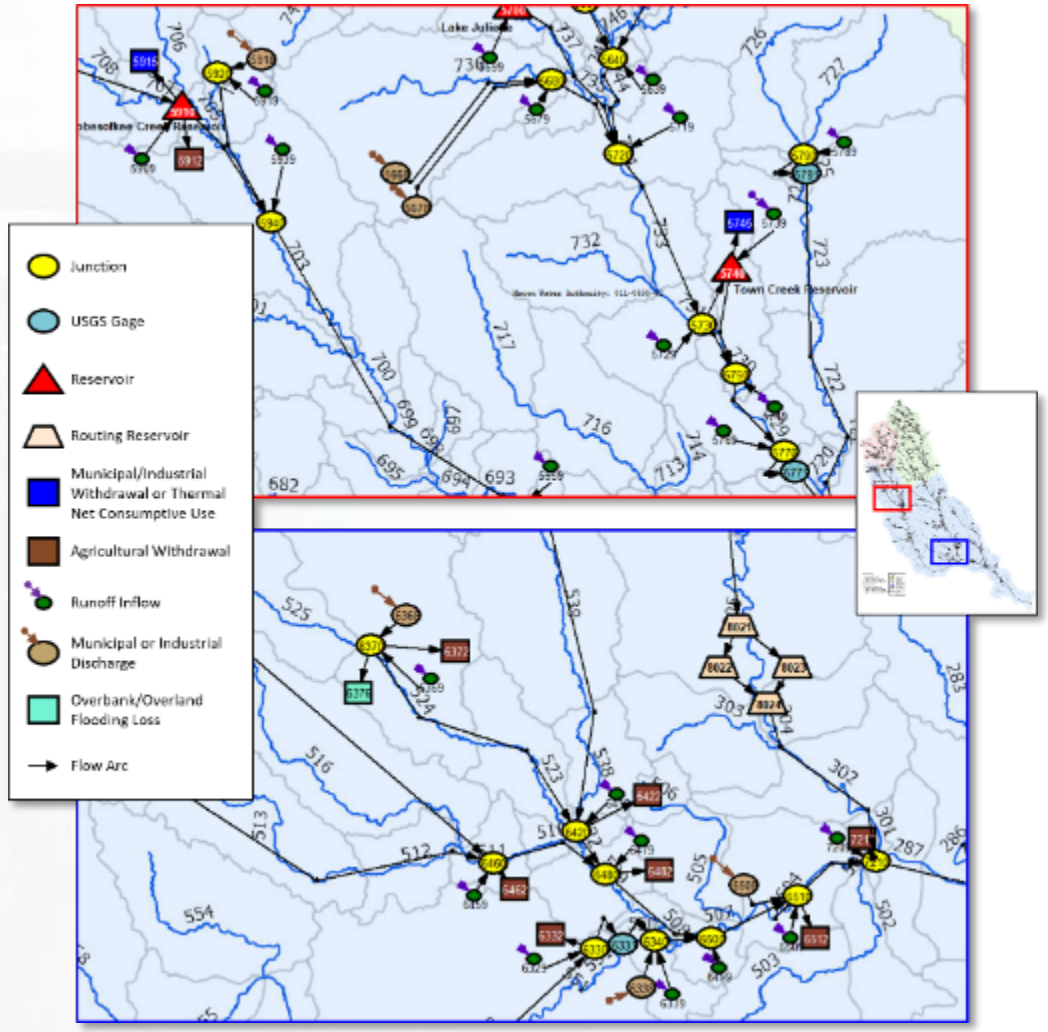


OOA BASIN

GEORGIA
WATER PLANNING

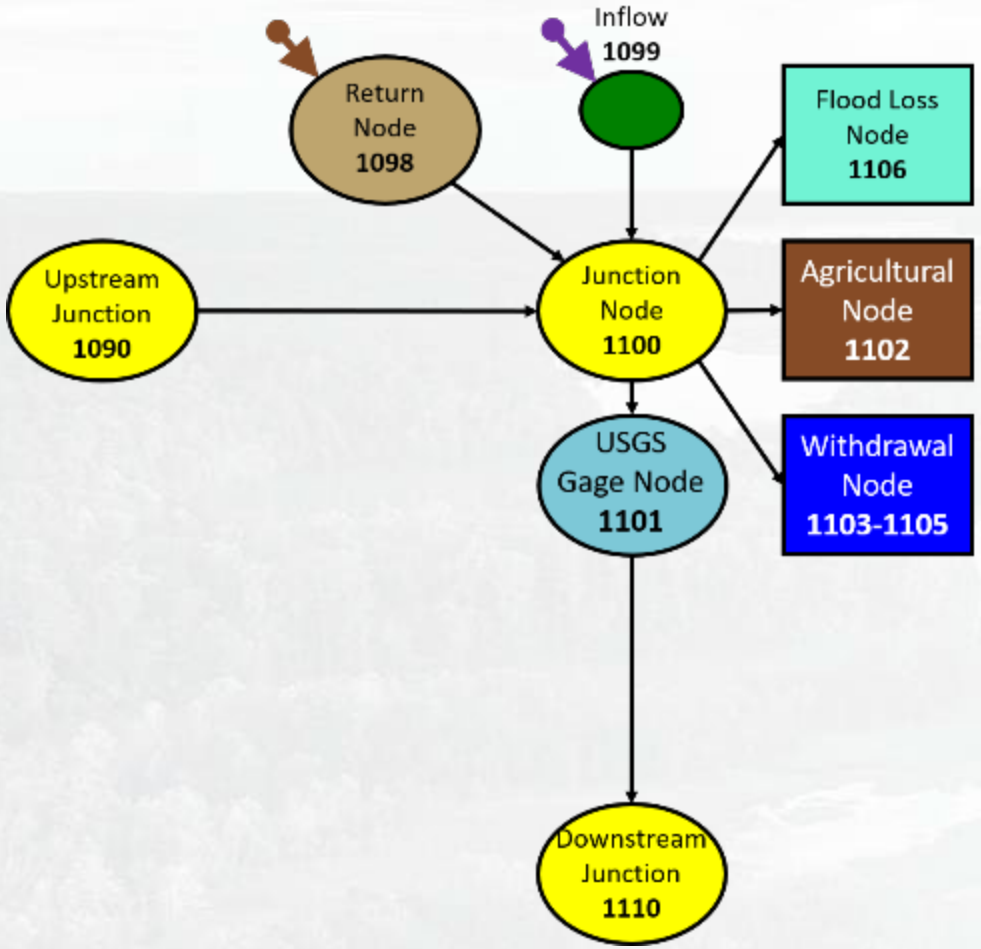
ResSim (Prior Model) and BEAM (Zoomed In) Schematics

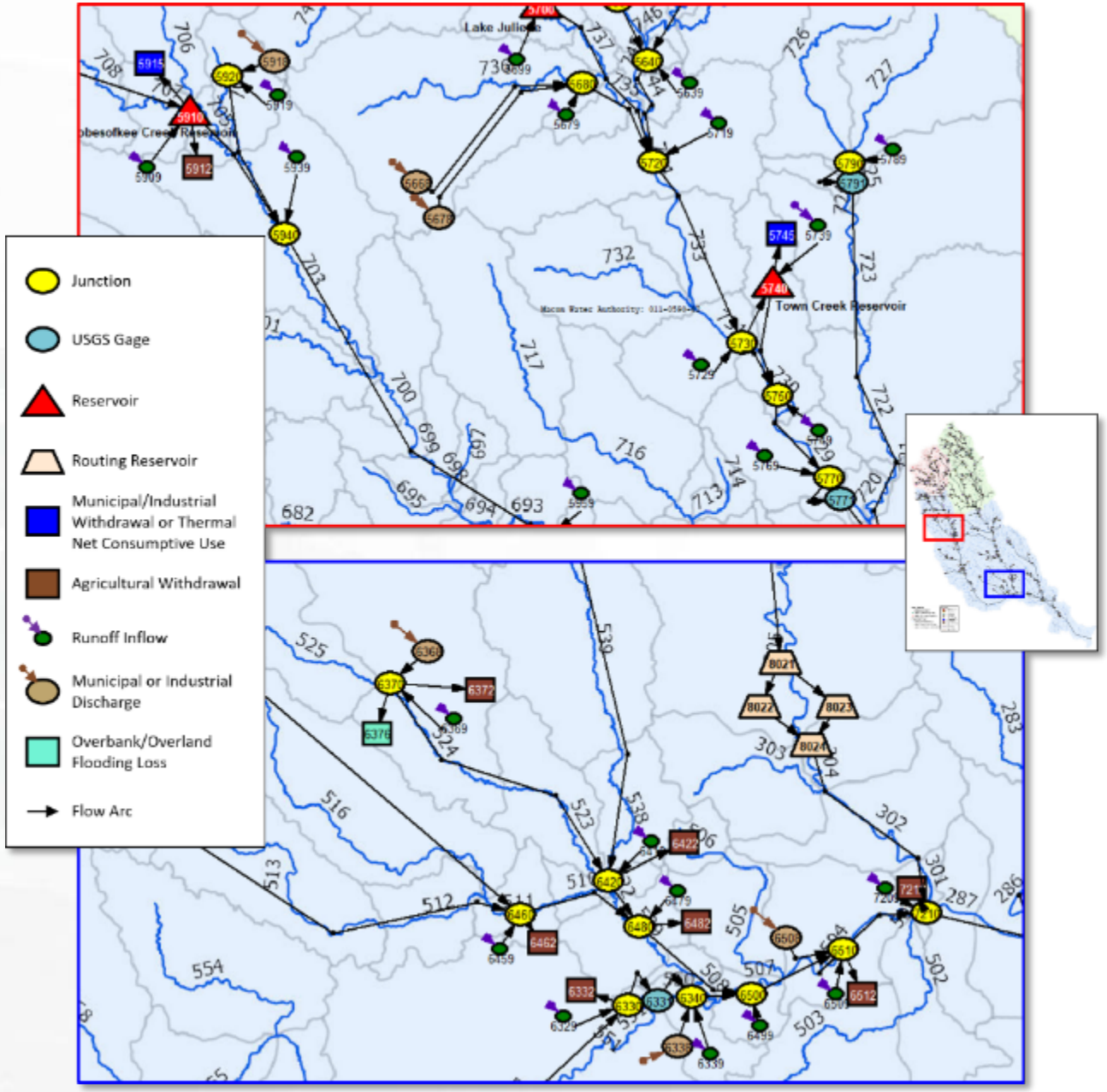




GEORGIA WATER PLANNING

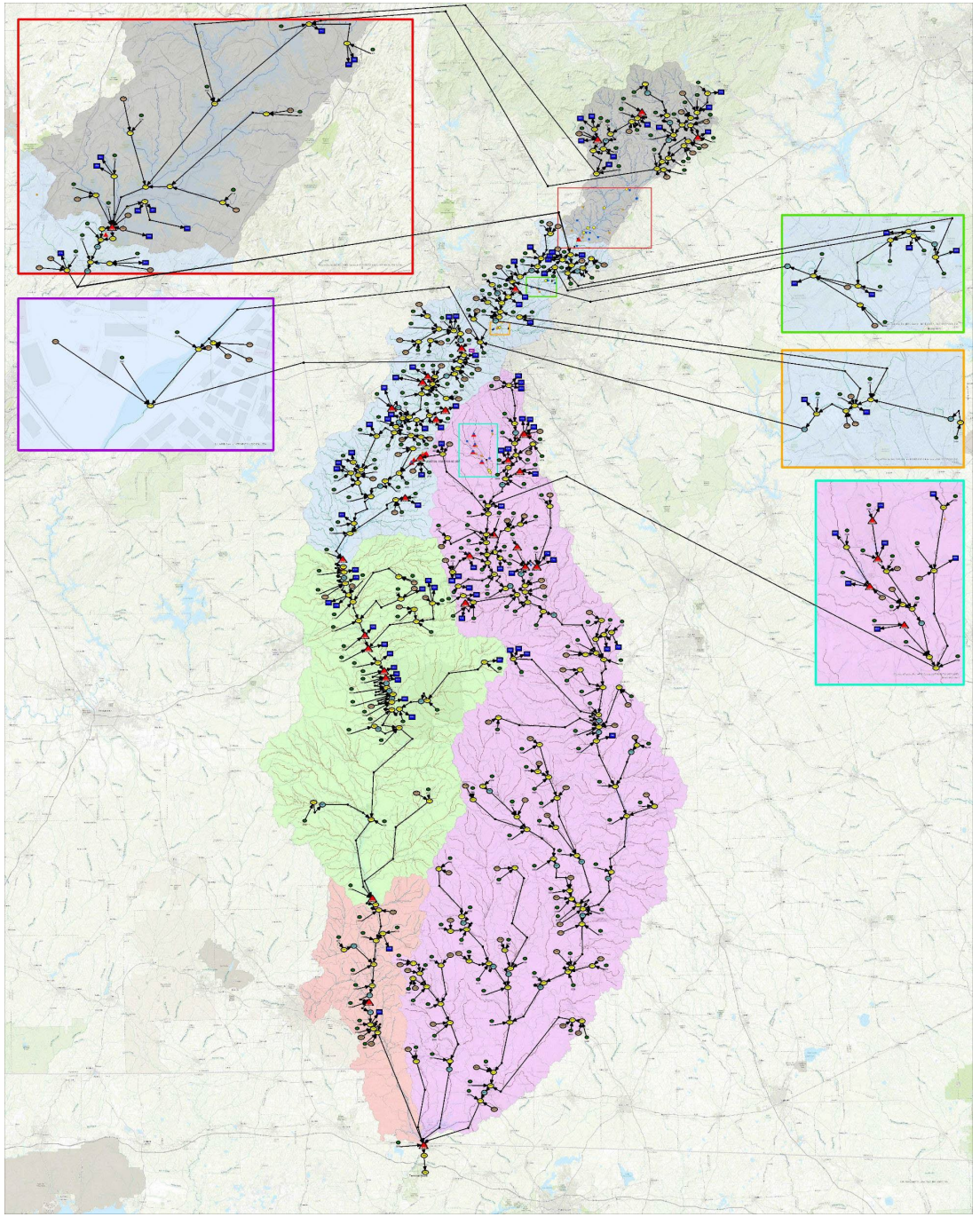
BEAM Node Types





GEORGIA WATER PLANNING

BEAM Schematic for the ACF



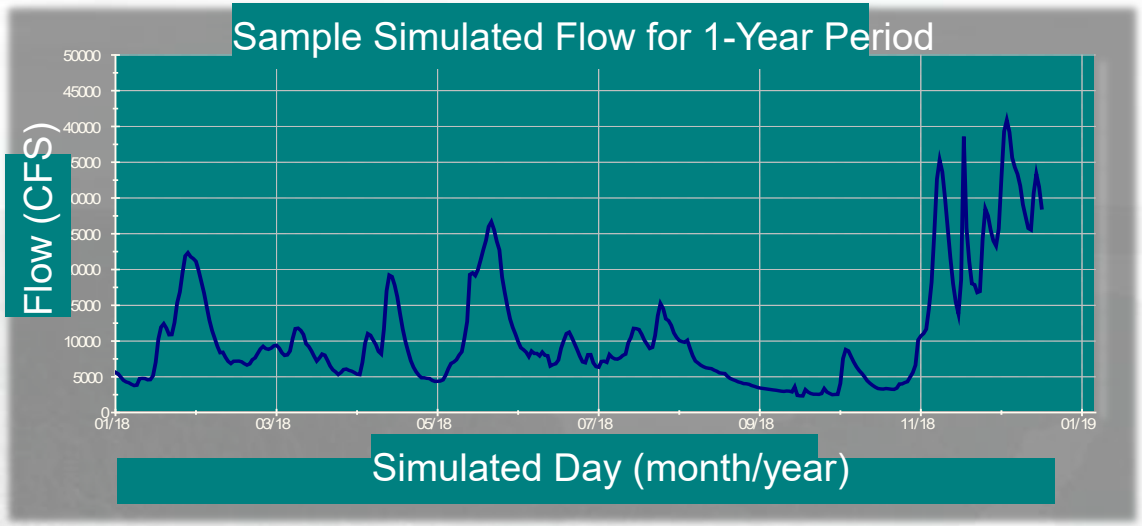
Baseline Conditions

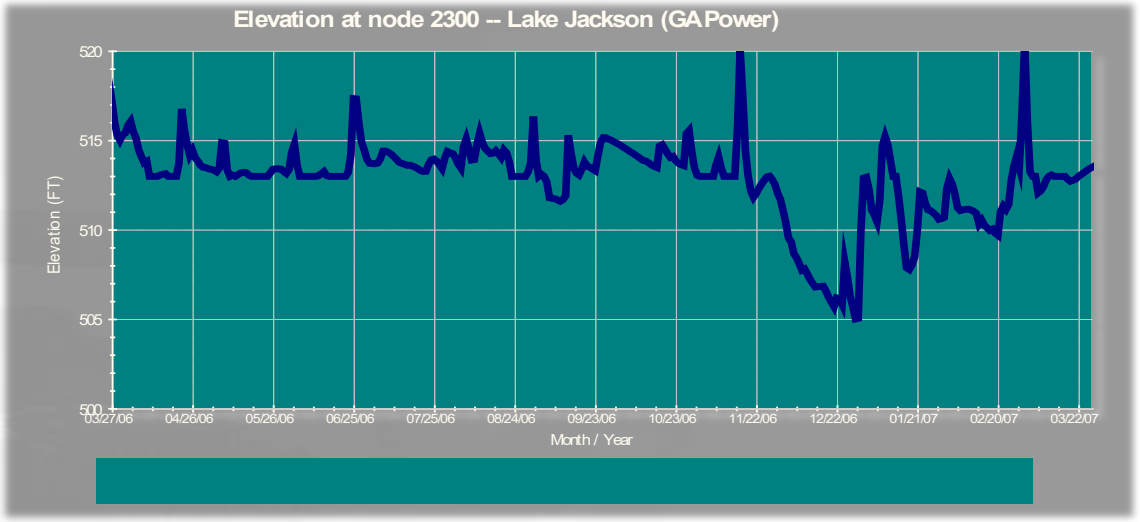
- Simulation Period (Hydrologic Conditions): 1939-2018
- Withdrawal and Discharge amount: average of period 2010-2018 (i.e., marginally dry conditions)
- Instream Flow Protection Thresholds: per permit conditions

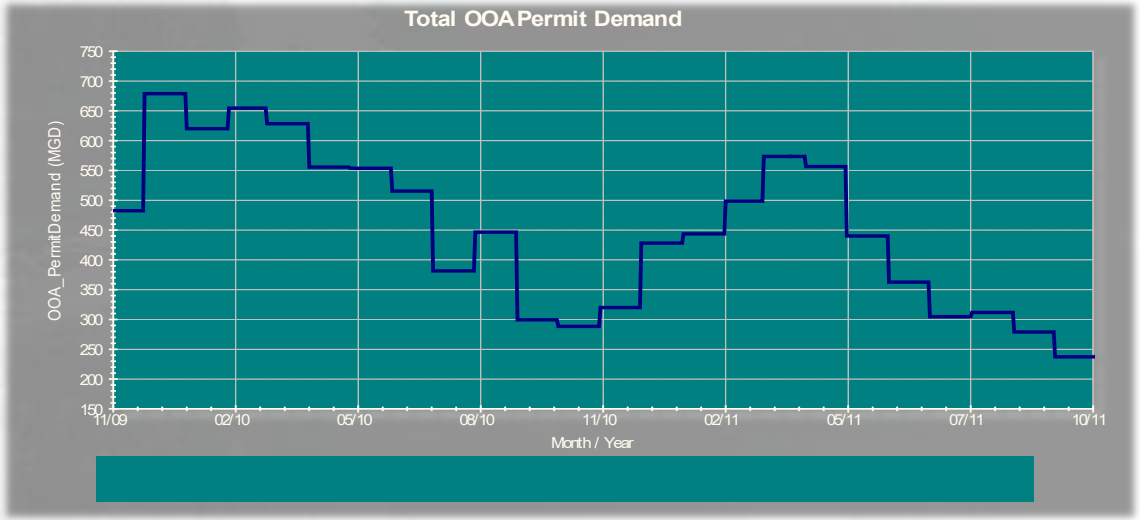
BASELINE model results will tell us how things are **now**.

They will give us a **basis for comparison** with future conditions or hypothetical conditions.

Sample Model Output







GEORGIA
WATER PLANNING

Approximate Schedule for BEAM by BASIN

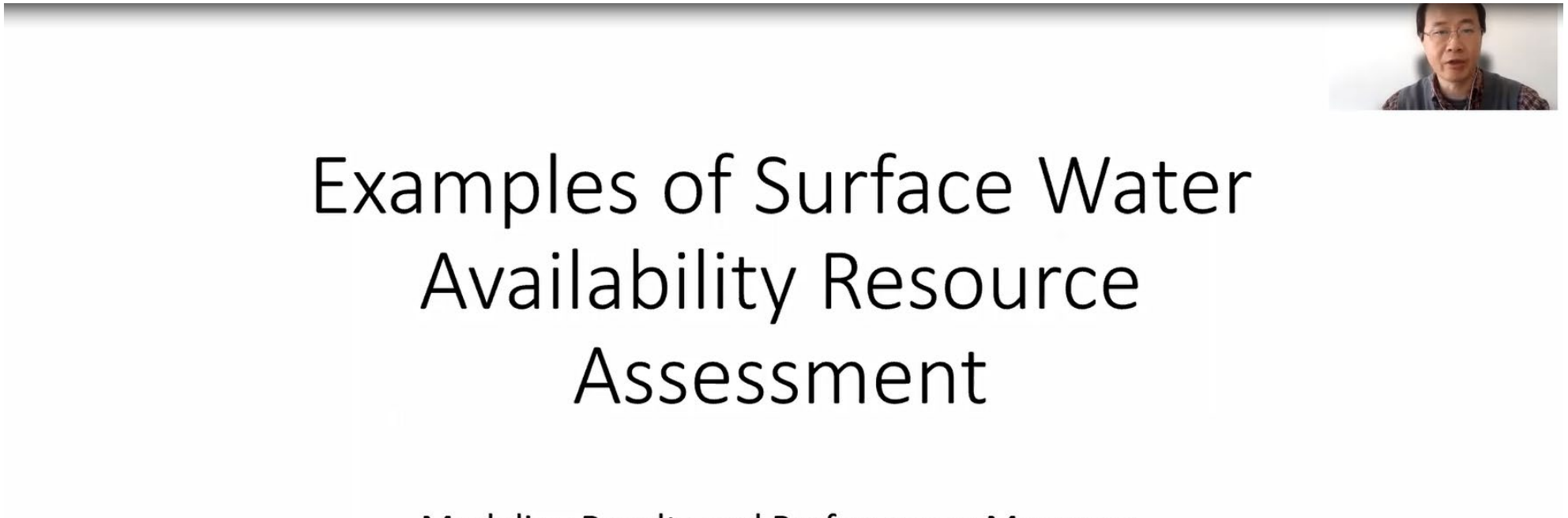
Basin	Abbreviation	Results Ready
Oconee-Ocmulgee-Altamaha	OOA	Now
Ochlockonee-Suwannee-Satilla-St. Mary's	OSSS	March
Savannah-Ogeechee	SO	April
Apalachicola-Chattahoochee-Flint	ACF	May
Alabama-Coosa-Tallapoosa	ACT	May

Video Overview

- **Metrics to Evaluate Surface Water Availability with the BEAM Model**
  - Water Supply
  - Wastewater Assimilation
  - Recreation
  - Fish Habitat

Examples in the video are in the OOA BASIN

Surface Water Availability Assessment



Upper Flint River Working Group

Upper Flint River Working Group Participants (updated 2021)

- Ben Emanuel | Director, Clean Water Supply | **American Rivers**
- Keisha Thorpe | Assistant General Manager for Operations | **Clayton County Water Authority**
- Lauren Chamblin | Program Manager | **Clayton County Water Authority**
- Jay Boren | Chief Executive Officer | **Coweta County Water Authority**
- Vanessa Tigert | Director | **Fayette County Water System**
- John Caldwell | Engineer | **Fayette County Water System**
- Gordon Rogers | Executive Director and Riverkeeper | **Flint Riverkeeper**
- Mike Thomas | Member Relations & Leadership Development, **Georgia Association of Water Professionals**; General Manager, Clayton County Water Authority, 2006-2018
- Brant Keller, Ph.D. | Director of Public Works and Utilities | **City of Griffin**
- Polly Sattler | Senior Sustainability Planner | **Hartsfield-Jackson Atlanta International Airport**; Flint Riverkeeper Board of Directors
- Steve Golladay, Ph.D. | Aquatic Biologist | **The Jones Center at Ichauway**
- Brandon Lovett | Director of Water Operations | **Newnan Utilities**
- Laura Craig, Ph.D. | Director of Natural Resources | **Princeton Hydro**
- Nick Kilburg | Director of Conservation and Outdoor Education | **Southern Conservation Trust**
- Laura Rack | Graduate Student | **University of Georgia Odum School of Ecology**
- Seth Wenger, Ph.D. | Director of Science | **University of Georgia River Basin Center**
- Mary Freeman, Ph.D. | Ecologist | **U.S. Geological Survey**
- L. Elliott Jones, Ph.D. | Retired U.S. Geological Survey hydrologist; Flint Riverkeeper Board of Directors
- Tim Thoms | Business owner; Fayette County resident

Upper Flint River Working Group

Hydrologic Indicators Presented at November 2021 Council Meeting (document in pre-meeting packet)

Indicator	Metric	Location
Recreational Opportunity (Canoe/Kayak), April to October	600 cfs	Carsonville
Shoal Habitat & Aquatic Life, June to October	500 cfs	Carsonville
Exceptionally Low Flows	100 cfs	Carsonville
Novel Drought Conditions: “Flash Drought”	Permit Thresholds	Public Water Utility Withdrawals

Surface Water Quality Assessment

Elizabeth Booth, GA EPD

Stephen Simpson, Black & Veatch

Outline

- How We Use Water Quality Information
  - Impaired Waters List
  - Modeling
- State Water Quality Criteria (Metrics) and Assessment
- Surface Water Quality Assessment Results

Water Quality Goals and Objectives

Ensure that water protects biota and human health and provides for recreation, ie Federal Clean Water Act “fishable” and “swimmable”

- Standards are the way that EPD meets these goals
- Designated uses determine specific standards
- If water quality does not meet established standards:
  - Listing as an impaired water ie (305(b)/303(d) list
  - Development of Total Maximum Daily Loads and Implementation Plans
  - Affects issuance of National Pollutant Discharge Elimination System permits
- Ongoing updating

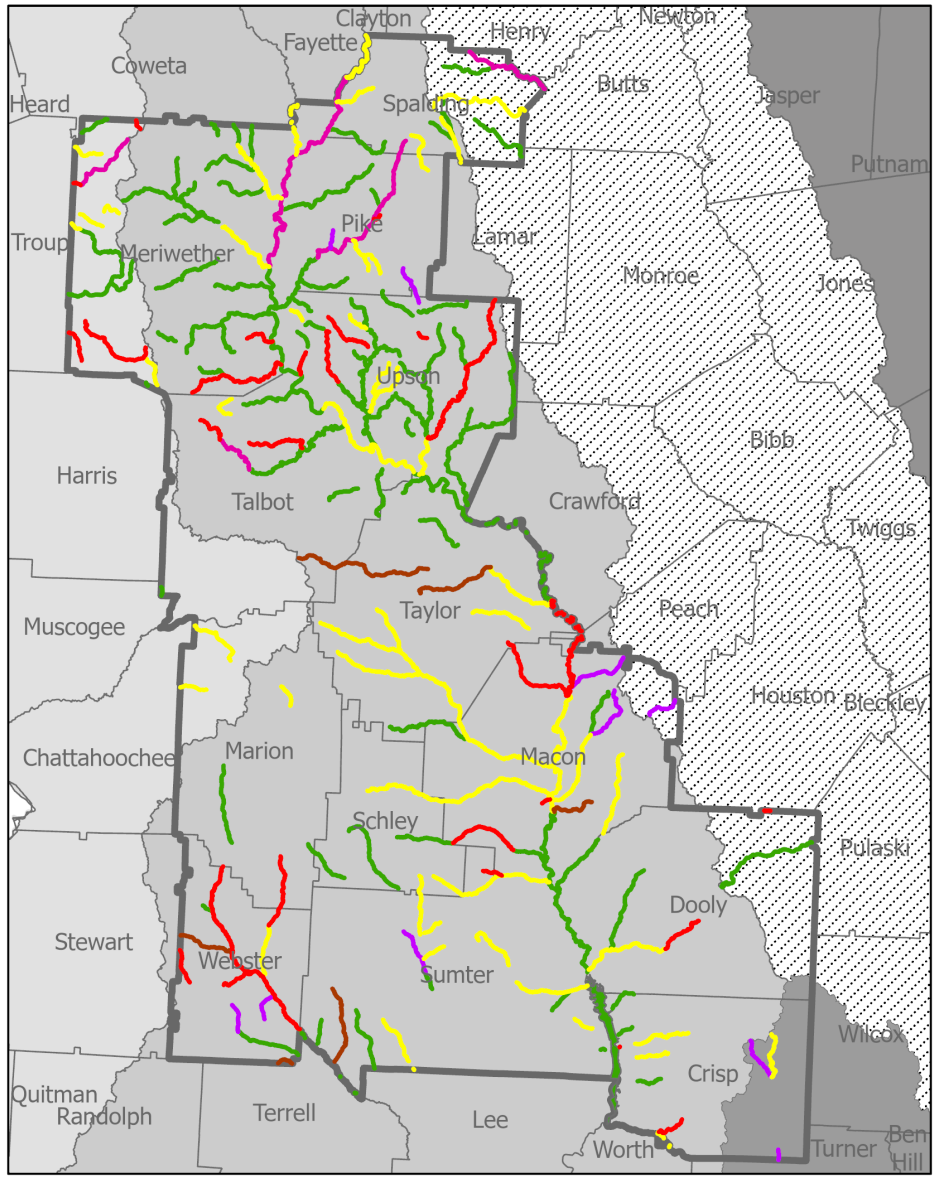
Improving Water Quality

- Georgia is required to conduct a Triennial Review of Water Quality Standards
  - Additional criteria
    - Biocides
    - Lakes Oconee and Sinclair Chlorophyll a
  - Revised criteria
    - Metals
    - Bacteria (Change from fecal coliform to E. coli)
  - Change in designated uses
    - Some nominated waterbodies approved; others to be reconsidered
- Water Quality Standard Approval process

Water Quality Planning

- Emerging issues
  - Harmful algal blooms
- Assessment of waterbodies statewide
  - Impairments
  - TMDL Implementation Plans to improve
- State Water Planning
  - Water Quality Resource Assessment
    - Existing conditions
    - Future conditions
- Future issues
  - Per- and Polyfluoroalkyl Substances (PFAS)

Surface Water Quality Assessment in the Upper Flint Water Planning Region
305(b) Report 2020



Legend

- Water Planning Region Boundary
- County Boundary

Water Quality Category

- 1
- 2
- 3
- 4a
- 4a, 5
- 4b
- 5

River Basin

- Chattahoochee
- Flint
- Ocmulgee
- Oconee

0 5 10 15 20 Miles

N

Category Definitions:

1. Data indicate that waters are supporting their designated use(s).
2. A waterbody has more than one designated use and data indicate that at least one designated use is being met, but there is insufficient evidence to determine whether all uses are being met.
3. There is insufficient data or other information to make a determination as to whether or not the designated use(s) is being supported.
4a. Data indicate that at least one designated use is not being supported, but TMDL(s) have been completed for the parameter(s) that are causing a water not to meet its use(s)
4b. Data indicate that at least one designated use is not being supported, but there are actions in place (other than a TMDL) that are predicted to lead to compliance with water quality standards
4c. Data indicate that at least one designated use is not being supported, but the impairment is not caused by a pollutant
5. Data indicate that at least one designated use is not being supported and TMDL(s) need to be completed for one or more pollutants. Waters in Category 5 make up the 303(d) list.

Water Quality Resource Assessment

Results under Current Conditions

Dissolved Oxygen Modeling

- **Current Conditions addressed in Plan Section 3.3.3**

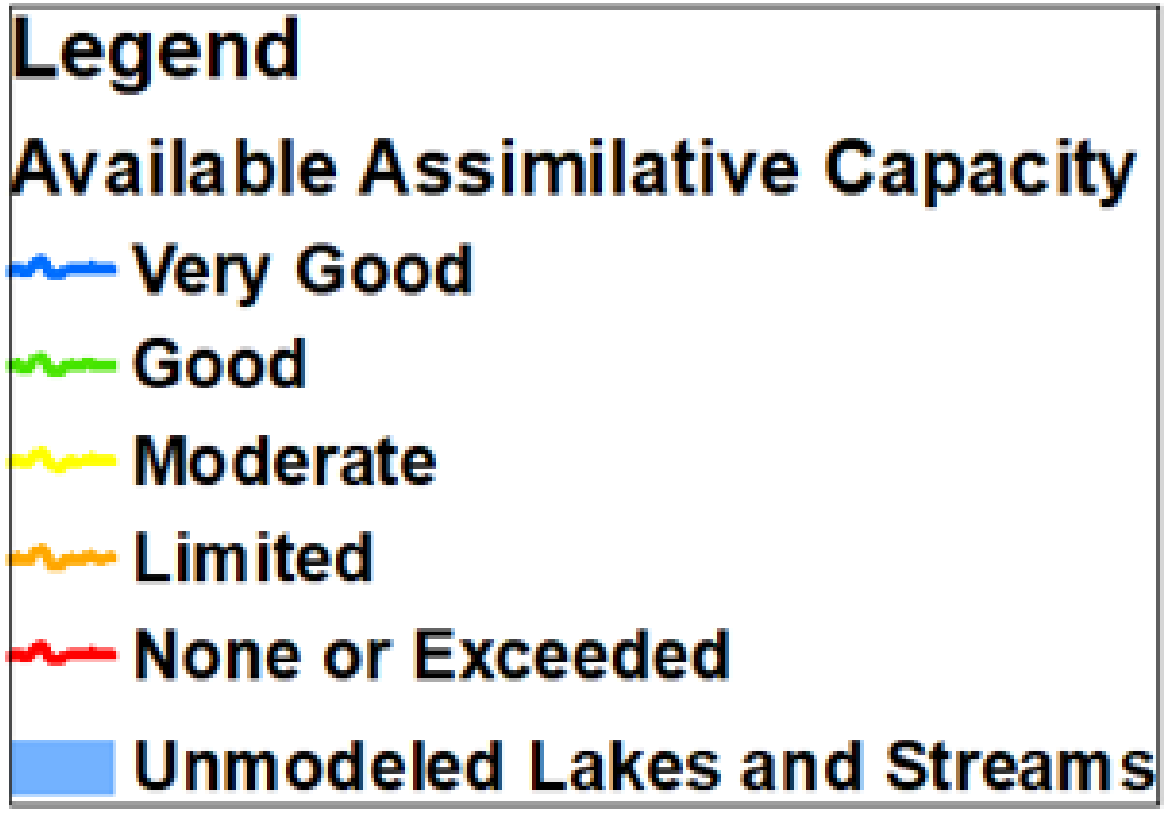
  Dissolved Oxygen Modeling

  Figure 3-5 shows the in-stream dissolved oxygen model results for current discharges given critical low flow (7Q10), high temperature conditions. The current conditions assimilative capacity analysis incorporated municipal and industrial wastewater facilities operating at their full permitted discharge levels (flow and effluent discharge limits as of ~~2014~~2019). Stream segments that were predicted by the model to exceed the available assimilative capacity are shown in red. Streams that modeled at the allowable DO levels are shown in pink, and those predicted to have very good DO levels relative to state water quality standards are shown in blue.

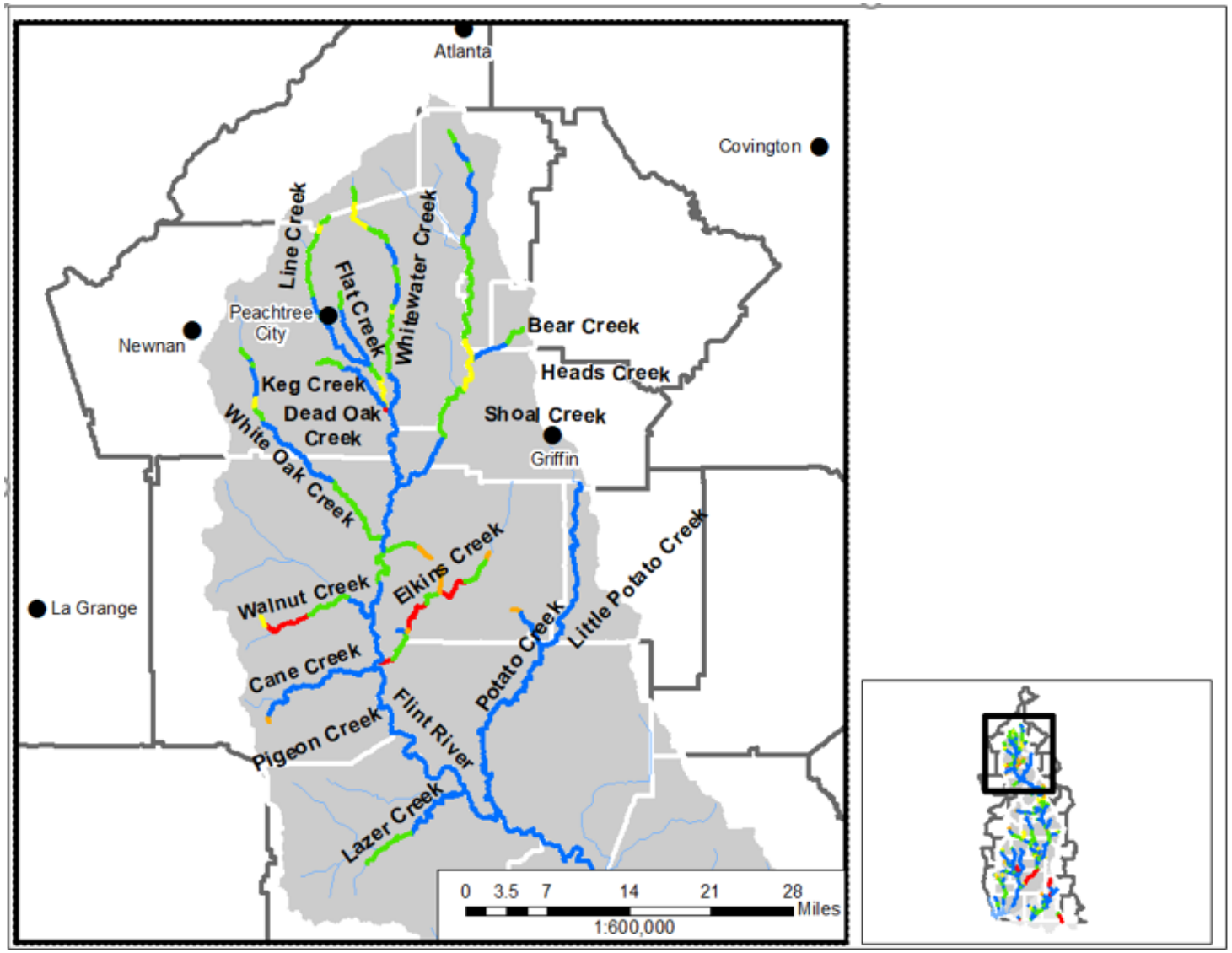
- **Future Conditions addressed in Plan Section 5.3**
  - **Results at next meeting**

Dissolved Oxygen Modeling

- **Current Conditions**
  - 2019 Permit Limits
- **DOSAG and Riv-1 Models:**
  - Dischargers at permit limits
  - High temp, low flow conditions
- **Assimilative Capacity**
  - How DO levels compare to water quality standard of 5.0 mg/L (or natural conditions)



Current DO Conditions: Upper Flint Basin



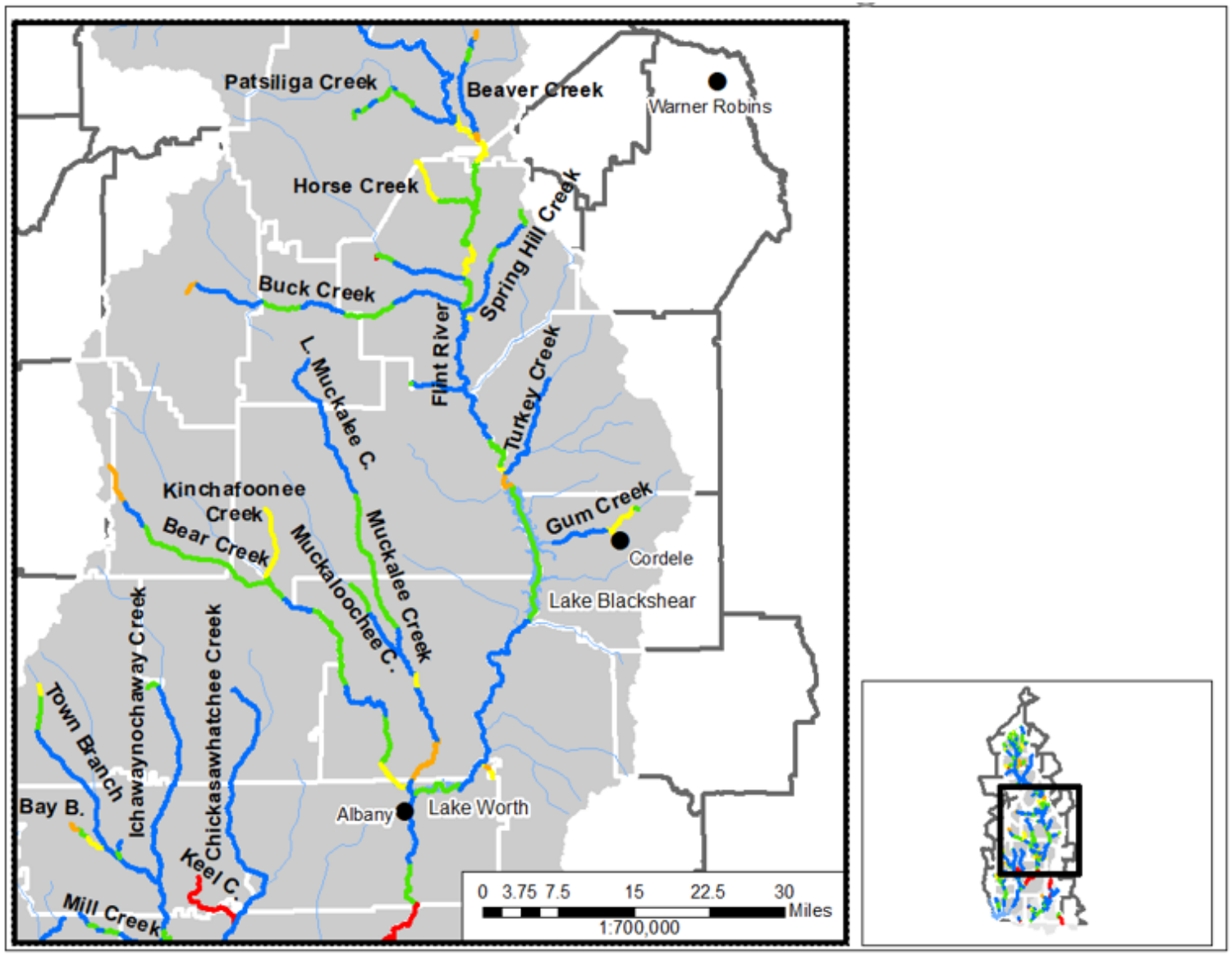
Legend

Available Assimilative Capacity

- Very Good
- Good
- Moderate
- Limited
- None or Exceeded
- Unmodeled Lakes and Streams

GEORGIA WATER PLANNING

Current DO Conditions: Middle Flint Basin



Legend

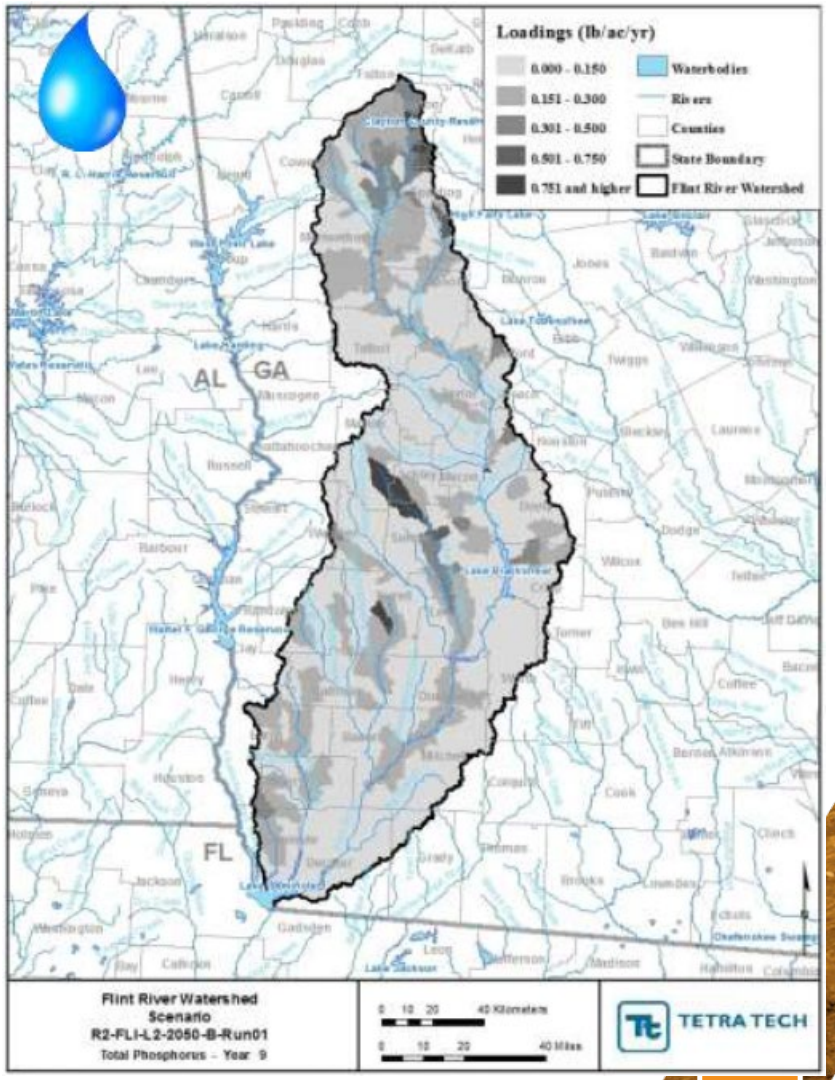
Available Assimilative Capacity

- Very Good
- Good
- Moderate
- Limited
- None or Exceeded
- Unmodeled Lakes and Streams

GEORGIA WATER PLANNING

Watershed Modeling: Nutrients

- Current (2008) and future (2050) landuse
- Meteorological information (2001-2012)
- Heat maps
  - Loadings – by subbasin – under representative wet and dry years
  - Total Nitrogen
  - Total Phosphorus
- Increases under dry year conditions
  - Point source-driven
- Increases under wet year conditions
  - Nonpoint source-driven (land uses)



Watershed Modeling: Nutrients

- **Current Conditions addressed in Plan Section 3.2.3**

Nutrients

"Watershed and lake models were run assuming current levels of water use and wastewater disposal and current land use profiles as inputs. These inputs accounted for nutrient loading from the contributing watershed over twelve years of recently observed hydrology. The model results indicated that in the Flint River Basin, nonpoint sources currently contribute, in general, more total nitrogen than point sources, whereas point sources contribute more total phosphorus than nonpoint sources.

. . .

One lake in the Upper Flint Water Planning Region was modeled: Lake Blackshear. The results indicated that in Lake Blackshear, current total phosphorus loading is primarily from point sources. At this time, nutrient standards have not been established for Lake Blackshear, and therefore, these results cannot be compared against nutrient standards. However, the results indicate how nutrient control efforts should be directed to manage current and future nutrient loading."

Watershed Modeling: Nutrients

- **Future Conditions addressed in Plan Section 5.3**

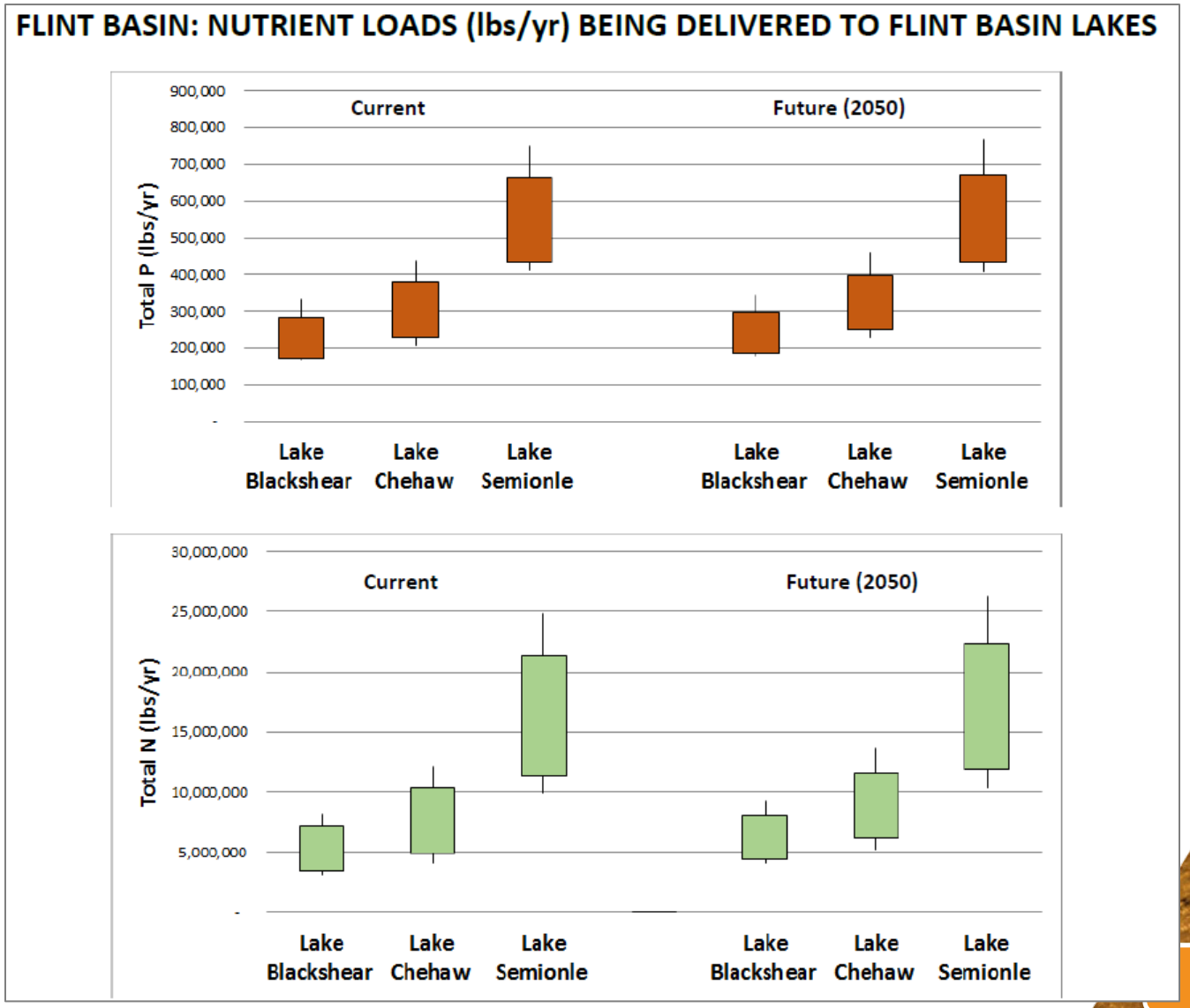
  "Watershed and lake models were also run at future (2050) conditions. The model results indicated that in the Flint River Basin, while nonpoint sources currently contribute more total nitrogen than point sources, future increases in total nitrogen loading will come more from point sources than nonpoint sources. The lake model results indicated that in Lake Blackshear, total phosphorus loading in the future will be primarily from point sources, as it is under current conditions.

  . . .

  As noted in Section 3.3, these lakes do not have established nutrient standards, and so, the lake model results cannot be compared against standards for these lakes. However, the model results are an indication of where management practices should be directed in order to control nutrient loading."

Lake Modeling: Chlorophyll a

- Plan Sections 3.2.3 and 5.3
- Lake models predict the algal response (chlorophyll a) to nutrient loads from the watershed models
- There are currently no applicable chlorophyll a lake standards



Small Group Discussions:

Incorporating Resource Assessments into Regional Water Plan

Using the Resource Assessments in the Regional Water Plan

- Understanding today's presentations

  Do you have questions? Need something explained a little more? What other information do you need to understand the region's water resource conditions?

- Assessment results

  Is there something in the results that you would like to discuss in relation to the Council's regional water plan? A concern? A recommendation? An information need?

- Metrics

  What metrics do you find useful? Are there other metrics you would like to see?

Resource Assessments Wrap-Up

Kristin Rowles, GWPPC

EPD Report

Johanna Smith, GA EPD

Public Comment

Next Steps

Next Steps

- **Next Meeting: May 13**
- **Plan Review Committee to review Sections 1, 2, and 4**
- **Inter-Regional Coordination**

Thank You

Upper Flint