Introduction to Upper Savannah River Basin Planning

Upper Savannah River Basin Council – Meeting #1, July 26, 2023

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SC Department of Natural Resources

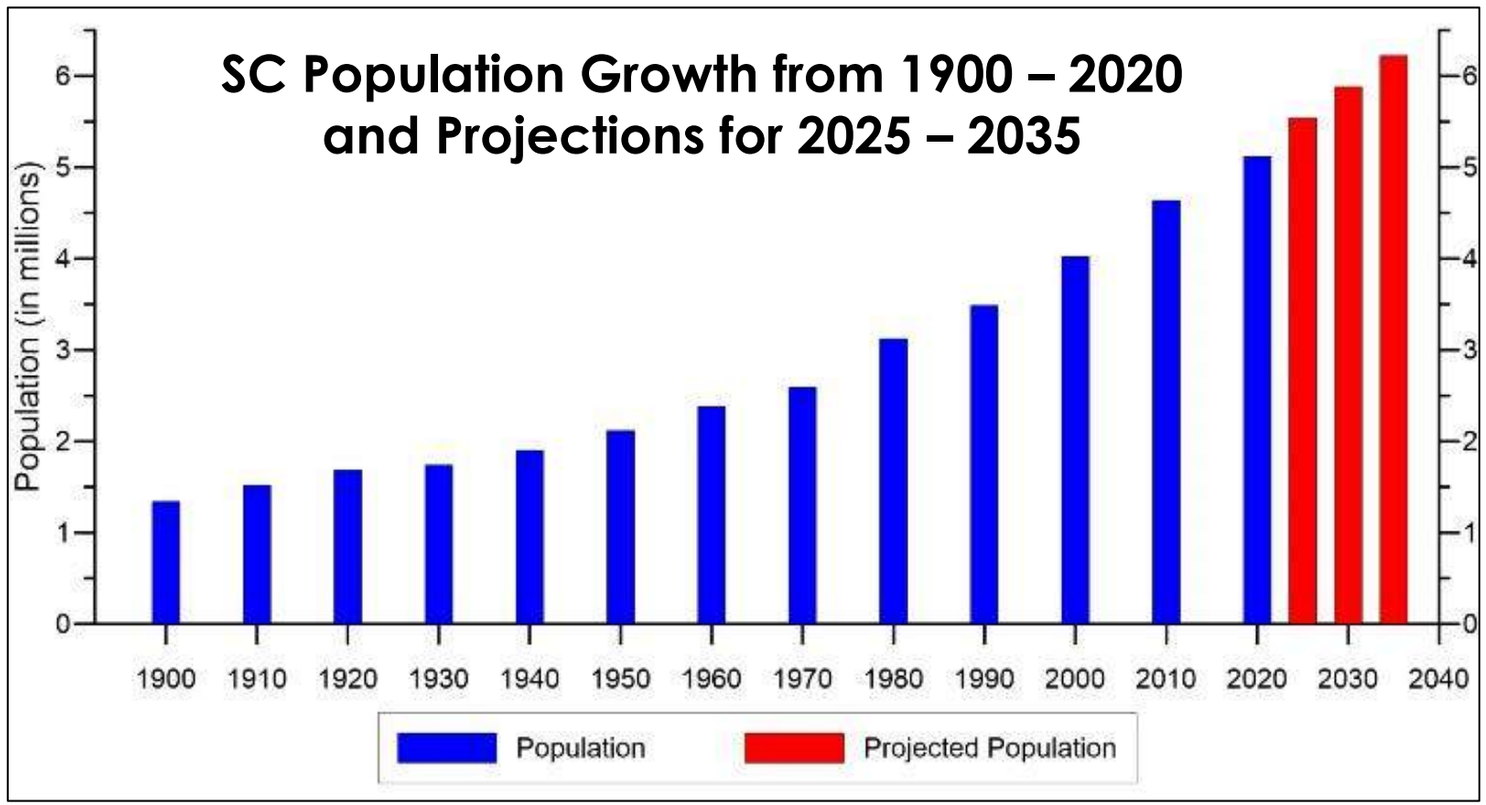
Agenda Item 5

Water Use in South Carolina

Why State Water Planning

Population Growth → Increased Water Demand

- From 1990 – 2020, SC population increased from **3.5** to **5.1** million and is forecasted to increase to **6.2** million by 2035.
- Our growing population may increase future water demands and may increase competition for our water supplies.

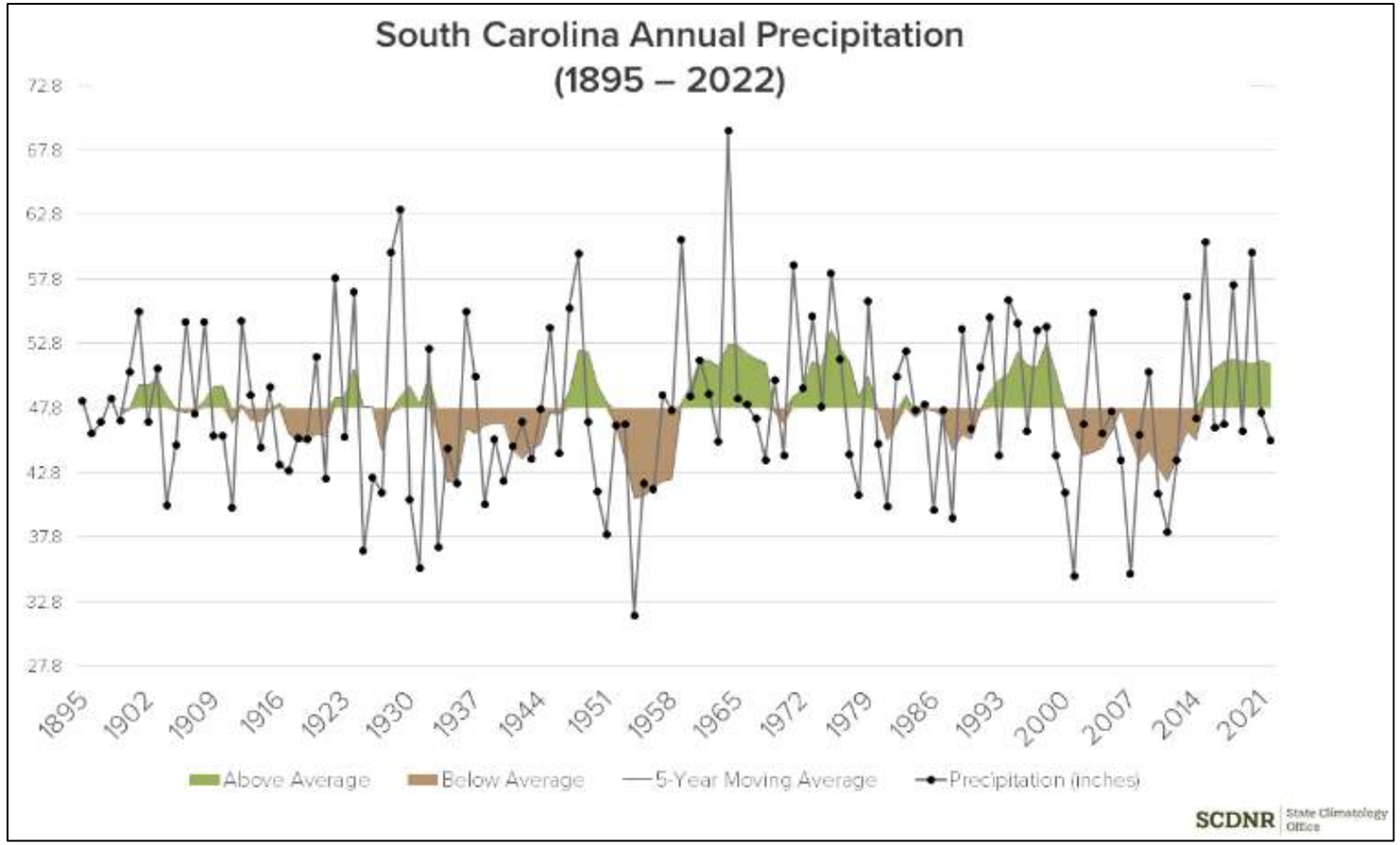


Data from the SC Office of Revenue and Fiscal Affairs, 2021, and U.S. Census Bureau, 2021.

Why State Water Planning?

Drought

SC generally has an abundance of water, but recent droughts (**1998-2002**, **2007-2008**, **2011-2012**, **2016**, **2019**, **2021**) have stressed the State's water resources.



Statewide Average Annual Rainfall (inches) and 5-year Running Average

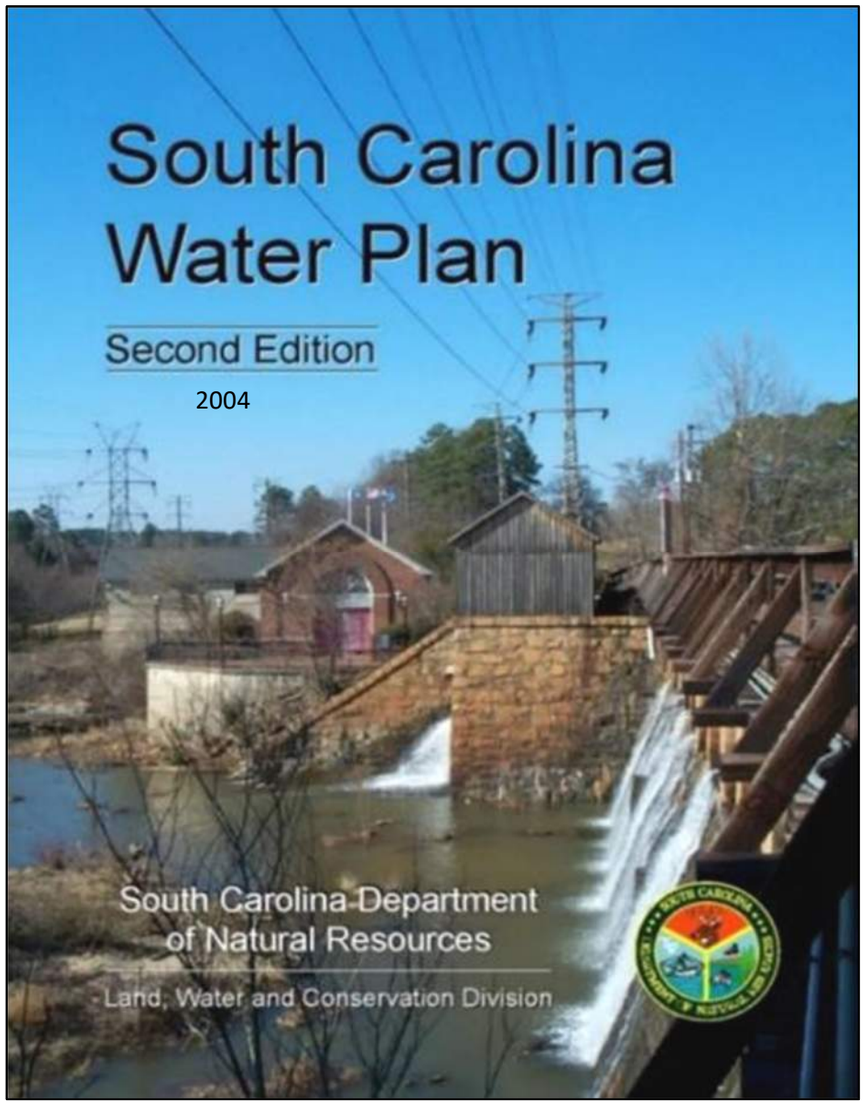
Why State Water Planning?

Tree-ring studies indicate the occurrence of more severe and longer-term droughts (Mega-droughts) over the past 400 years.

Uncertainty in future droughts + increased water demand = the need for comprehensive State and river basin planning.

Photos courtesy of National Drought Mitigation Center

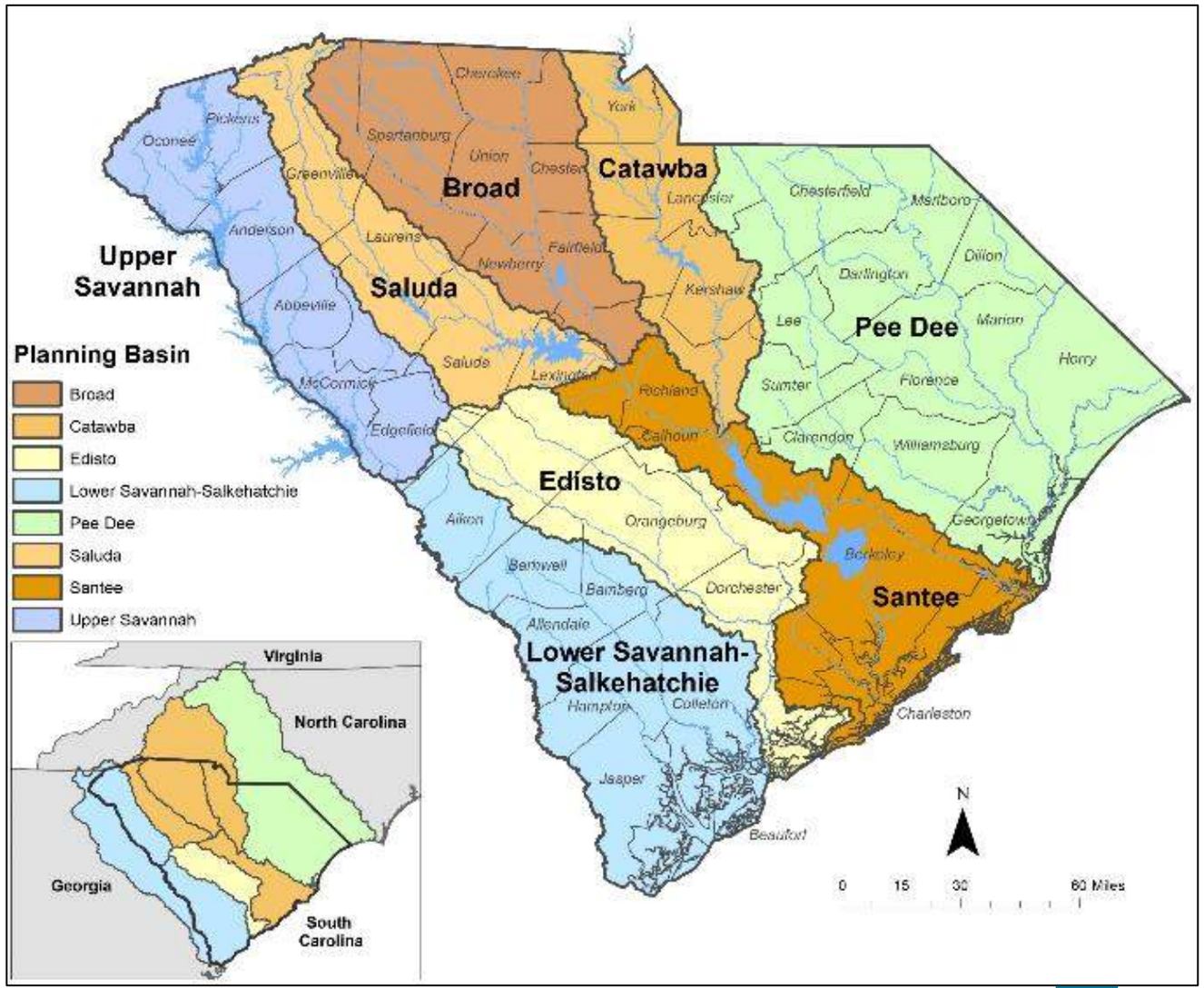
History of State Water Planning



- SCDNR is legislatively mandated to develop a State Water Plan.
- SCDNR published the first edition of the State Water Plan in 1998.
- In 2004, SCDNR published the second edition of the South Carolina Water Plan incorporating lessons learned from the drought of 1998-2002.
- One recommendation was to develop a regional water plan for each major river basin in the State.

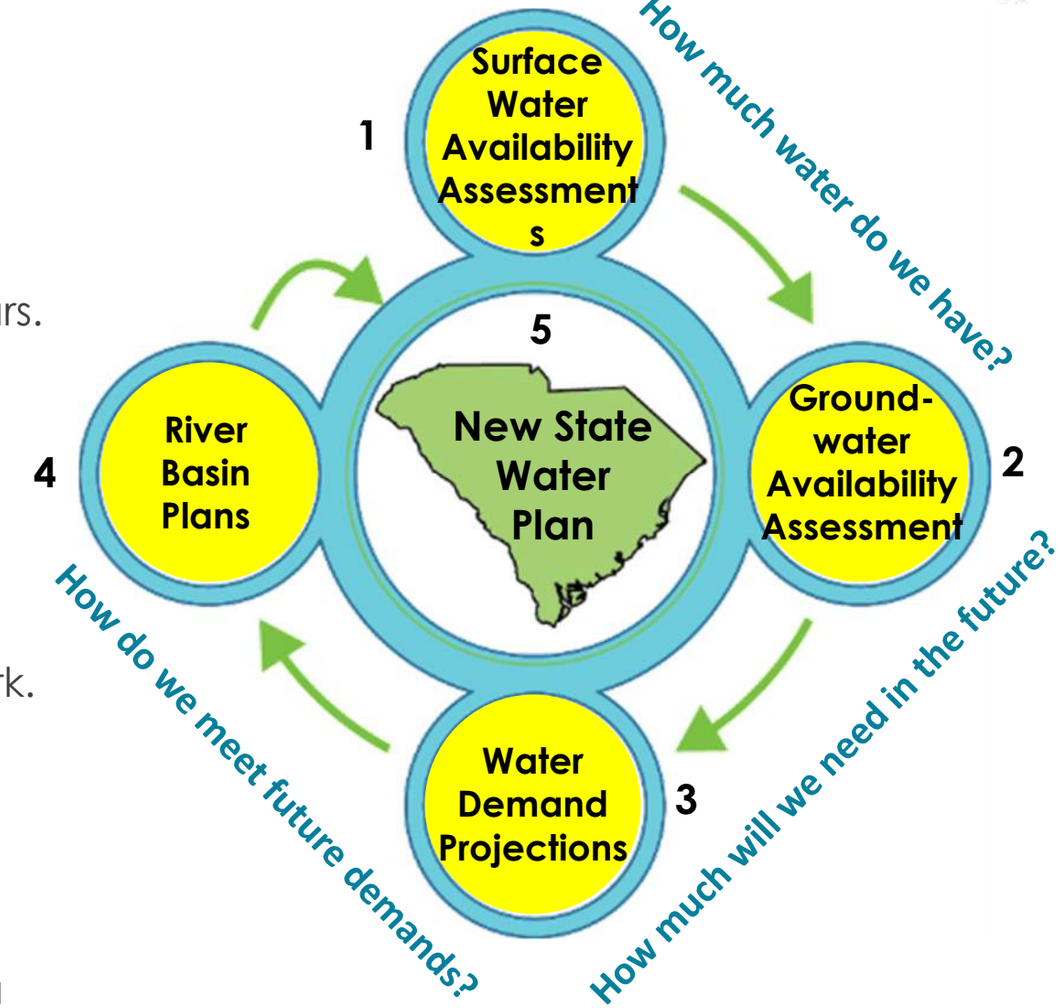
South Carolina's Eight Planning Basins

- River Basin Plans will be developed for the State's eight major river basins using a "bottom-up" approach where stakeholders in each basin lead the development of their basin plan.
- Collectively, the River Basin Plans will form the foundation of a new State Water Plan.



Five-step Process

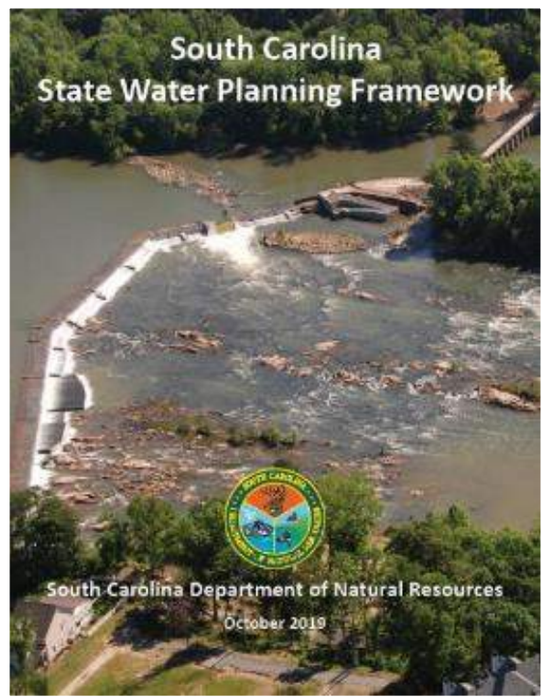
1. ***Surface Water Assessments*** – completed in 2017 for each basin (CDM Smith, Inc).
   - Several models recently updated.
2. ***Groundwater Assessment*** – completed in 2021 (USGS).
   - 3 regional models to be developed over the next several years.
3. ***Water Demand Projections*** – methodology report completed in October 2019.
   - Projections completed for Edisto and Broad basins.
   - Projections for Pee Dee and Saluda basins in progress.
4. ***River Basin Plans***
   - Publication of South Carolina State Water Planning Framework.
   - Broad, Saluda and Pee Dee basin planning in progress.
   - Upper Savannah basin is the 5th basin to begin planning activities.
   - Edisto River Basin Plan completed June 2023.
5. ***State Water Plan*** – River Basin Plans will form the foundation of a new State Water Plan.



Cooperators: dhec · US Army Corps of Engineers · CDM Smith · USGS science for a changing world · Clemson University · Brown and Caldwell

Planning Process Advisory Committee

- Convened by SCDNR in March 2018.
- Purpose - develop a guidance document (Planning Framework) for developing River Basin Plans and for updating the State Water Plan.
- South Carolina State Water Planning Framework (Planning Framework) was published in October 2019 after an 18-month process.



Planning Framework is available for review and download at: https://hydrology.dnr.sc.gov/water-planning-framework.html

PPAC Committee Members

Jeffery Allen	Clemson University
David Baize	SCAWWA/WEASC
David Bereskin/Jeff Boss	Greenville Water
Jesse Cannon	Santee Cooper
Fred Castles, III	Catawba-Wateree Water Management Group
Clay Duffie	Mt. Pleasant Waterworks (retired)
Steve Hamilton	The Dunes Golf and Beach Club
Erika Hollis	Upstate Forever
J.J. Jowers, Jr.	Bamberg County citizen, Edisto Engineers and Surveyors, Inc.
Eric Krueger	The Nature Conservancy
Jeff Lineberger	Duke Energy
Jill Miller	South Carolina Rural Water Association
Dean Moss, Jr.	Beaufort Jasper WSA (retired)
Myra Reece	South Carolina Department of Health and Environmental Control
Ken Rentiers	South Carolina Department of Natural Resources
Bill Stangler	Congaree Riverkeeper
Landrum Weathers	Farmer
Scott Willett	Anderson Regional Joint Water System
Charles Wingard	Walter P. Rawl and Sons, Inc.

For more information, visit:

https://www.clemson.edu/public/water-assessment/State_Water_Planning_Process_Advisory_Committee.html

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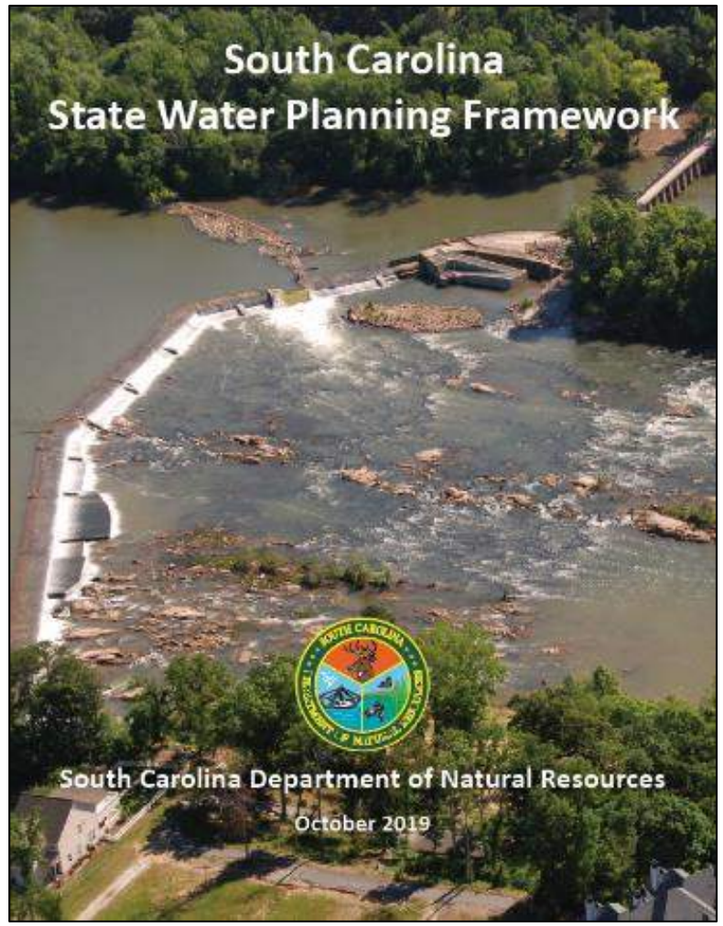
Contents of Planning Framework

Sections:

1. Executive Summary
2. Introduction
3. River Basin Planning Process
4. Methodologies for Evaluating Water Availability
5. River Basin Plan Table of Contents
6. River Basin Planning Process Implementation
7. River Basin Plan Implementation
8. State Water Plan

Appendix: River Basin Council Bylaws



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Stakeholder Participation

Edisto River Basin Council Field Trip

PPAC Meeting

Broad River Basin Council Meeting

Pee Dee River Basin Council Meeting

Edisto Basin Water Demand Projection Stakeholder Meeting

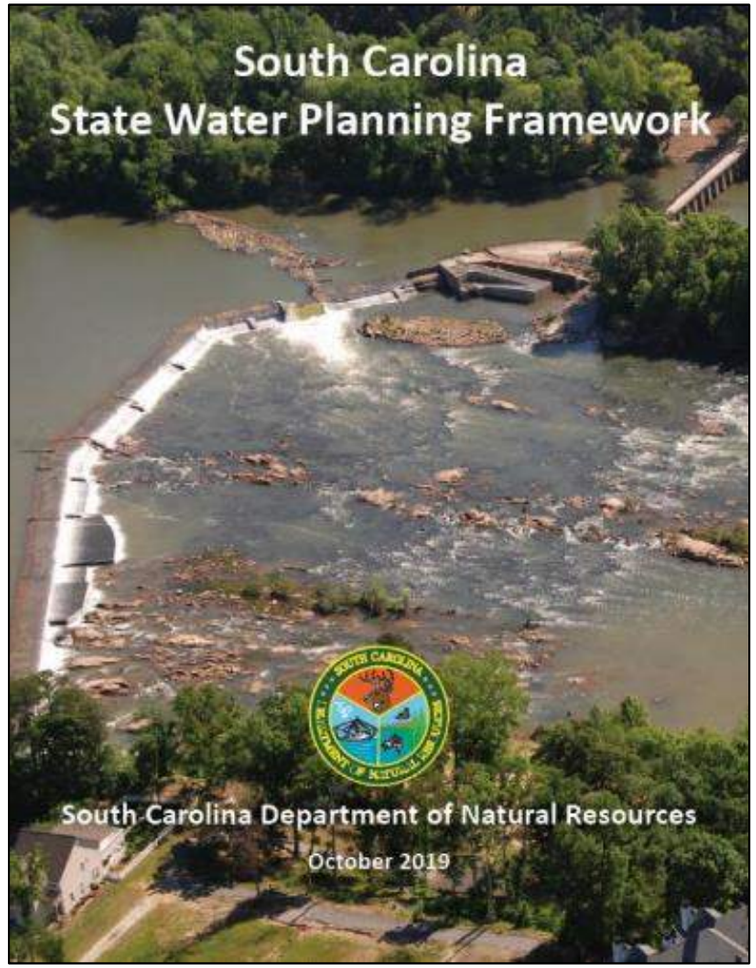
SWAM Model Stakeholder Meeting

What is a River Basin Plan?

What is a River Basin Plan?

A River Basin Plan answers four questions:

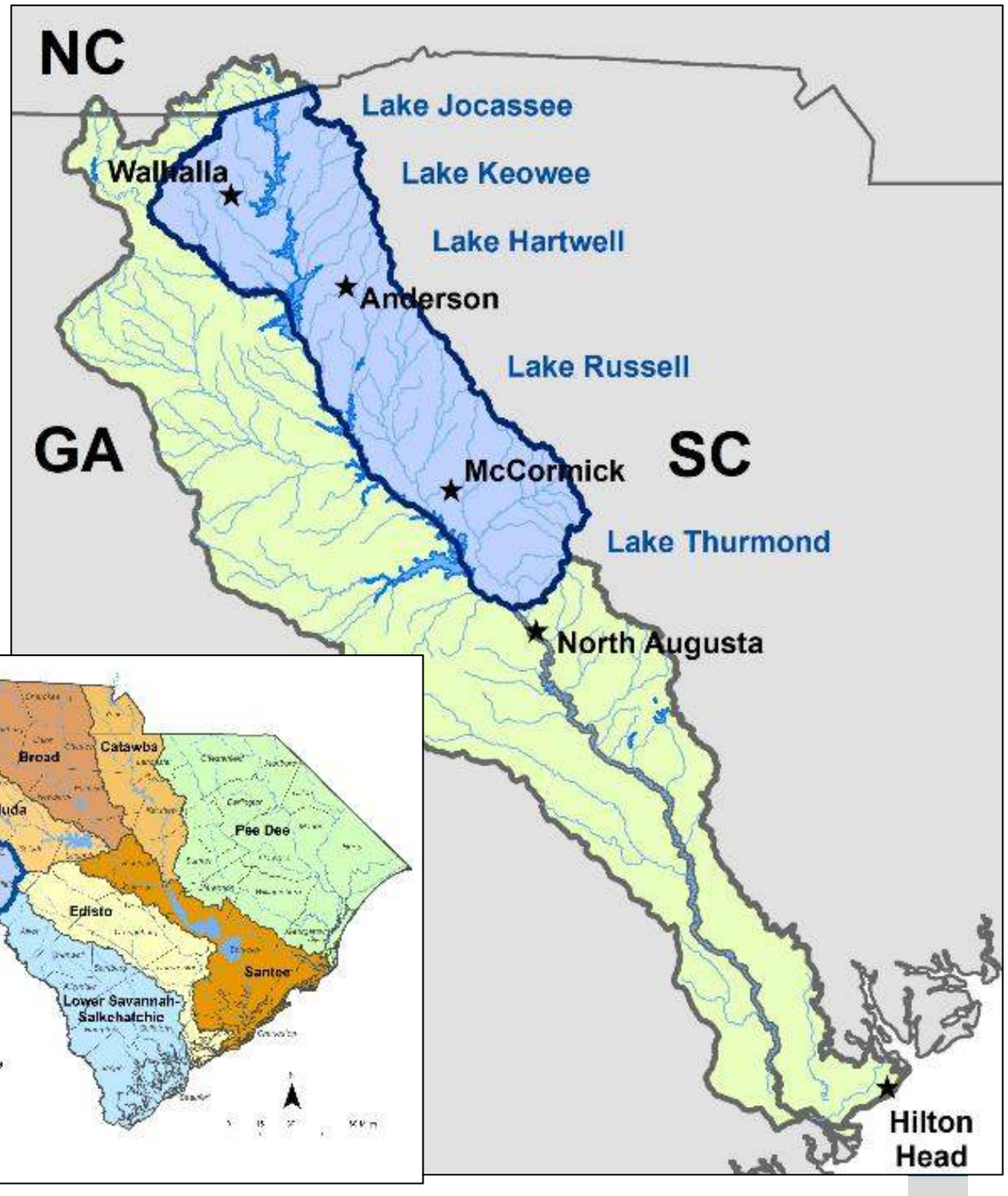
1. What is the basin's current available water supply and demand?
2. What are the current permitted and registered water uses?
3. What will be the basin's water demand over the Planning Horizon, and will the water supply meet the demand?
4. What water management strategies will be employed to ensure the supply meets or exceeds the projected demand over the Planning Horizon?



Proactive Water Management, not Reactive!

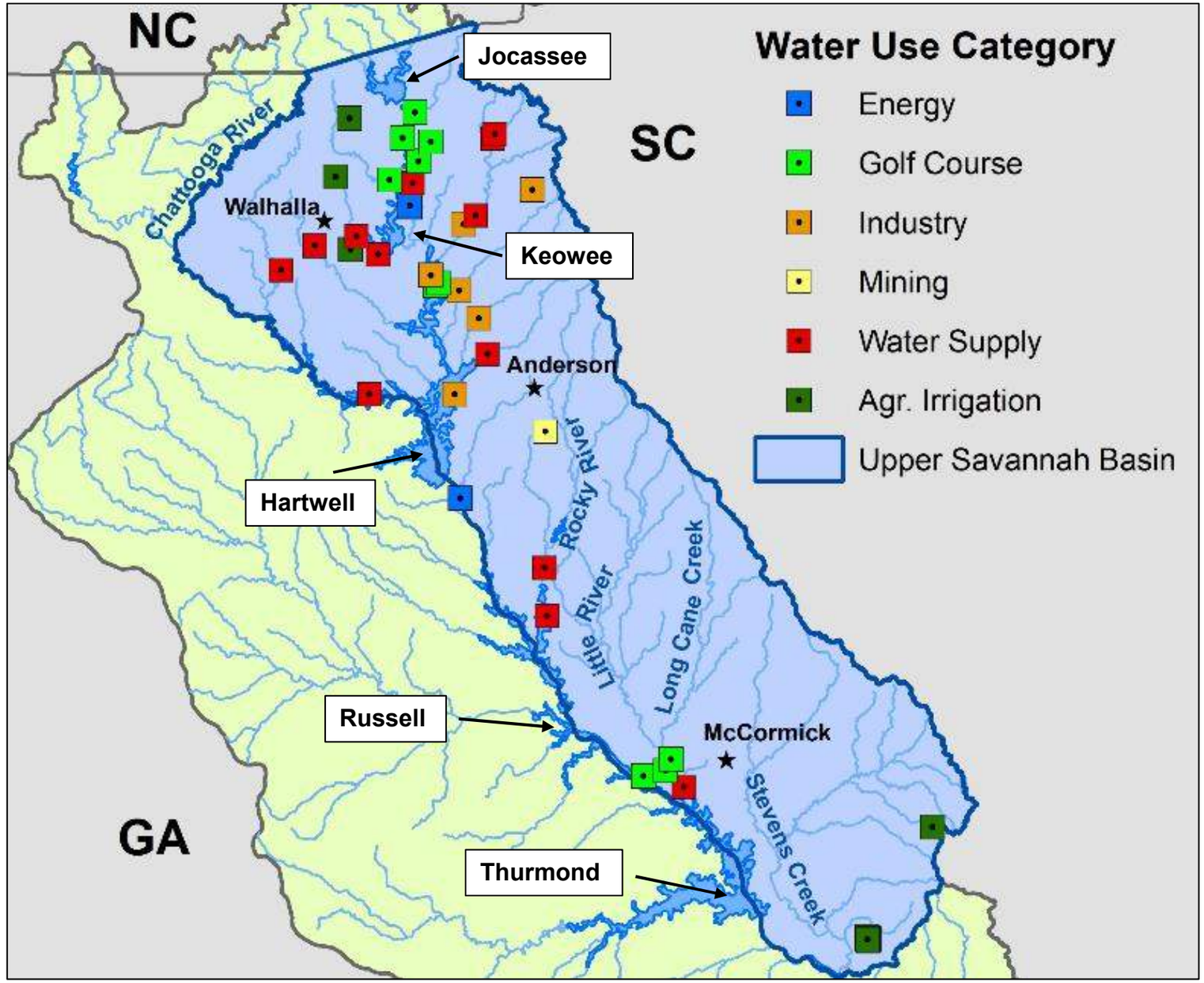
Savannah Basin Overview

- Length = 314 miles, with headwaters in the mountains of SC, GA, and NC.
- Spans 3 states – NC, GA, SC
- Area = 10,971 sq. mi.
  - GA – 5,821 sq. mi. (53.1%)
  - SC – 4,979 sq. mi. (45.4%)
  - NC – 171 sq. mi. (1.6%)
- Upper basin dominated by reservoirs operated by Duke Energy and the U.S. Army Corps of Engineers.



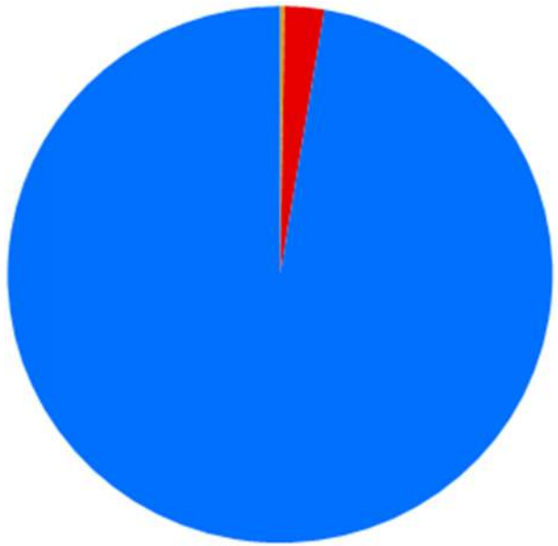
Upper Savannah Basin Water Use

- More than 99% of withdrawals are from surface water.
- Planning will focus primarily on the basin's surface water resources.



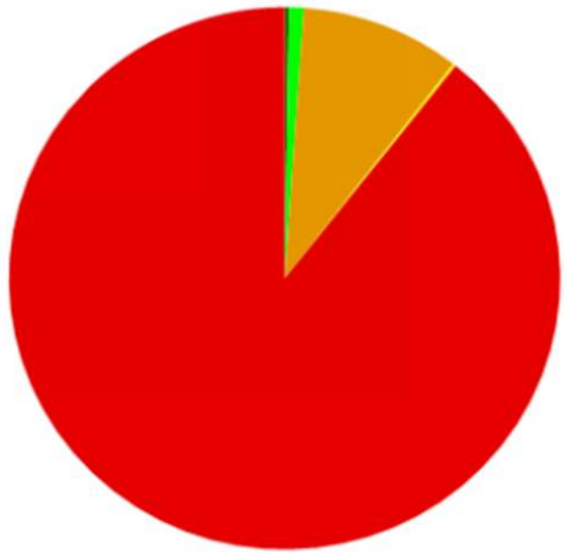
2022 SC Reported Water Withdrawals

Including Energy



- Thermoelectric (97.3%)
- Water Supply (2.3%)
- Industry (< 1%)
- Golf Course (< 1%)
- Agr. Irrigation (< 1%)
- Mining (< 1%)

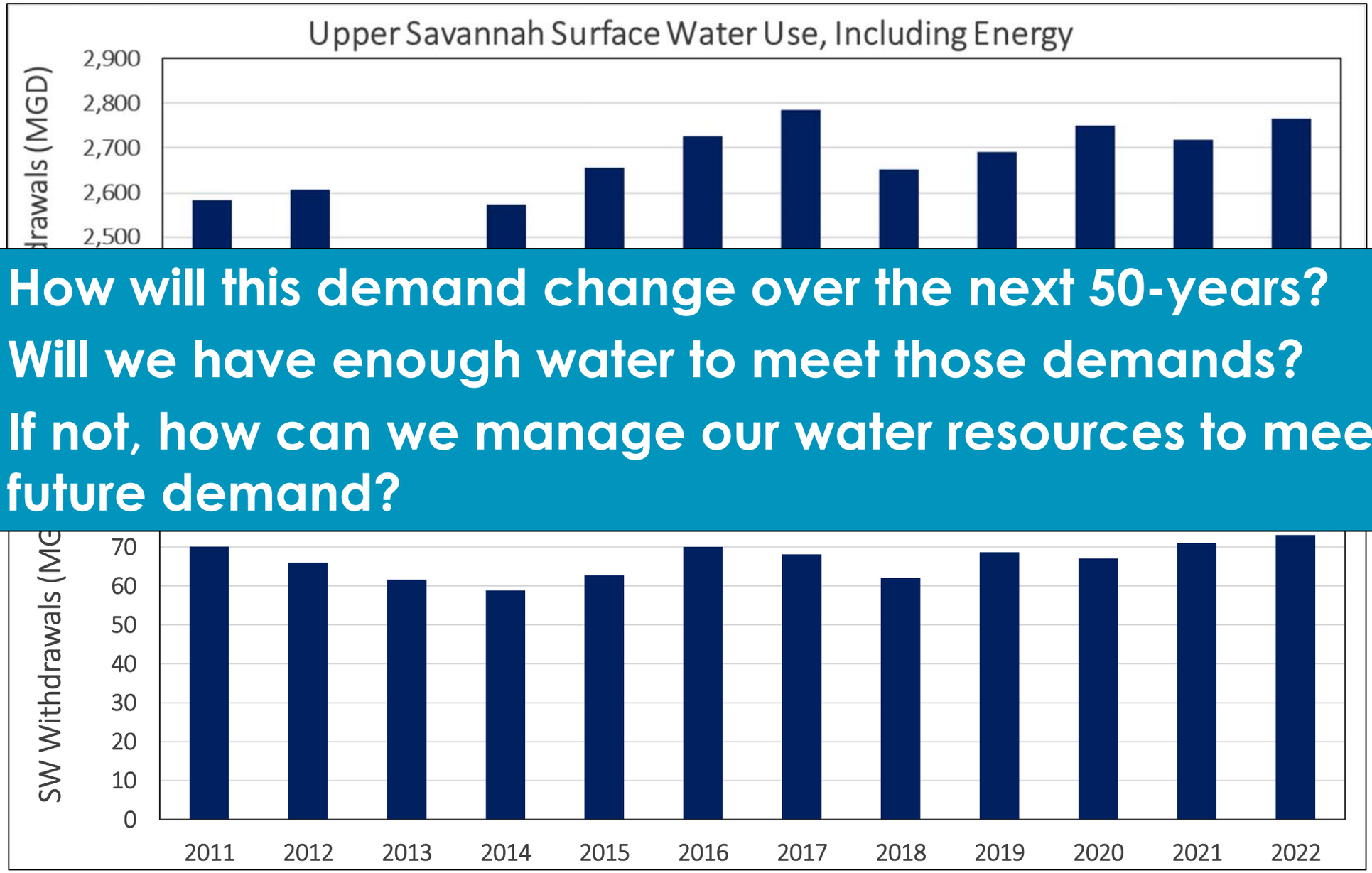
Excluding Energy



- Water Supply (88.2%)
- Industry (10.1%)
- Golf Course (1%)
- Agr. Irrigation (< 1%)
- Mining (< 1%)

Source: SCDHEC Water Use Database

Reported SC Surface Withdrawals (2011-2022)



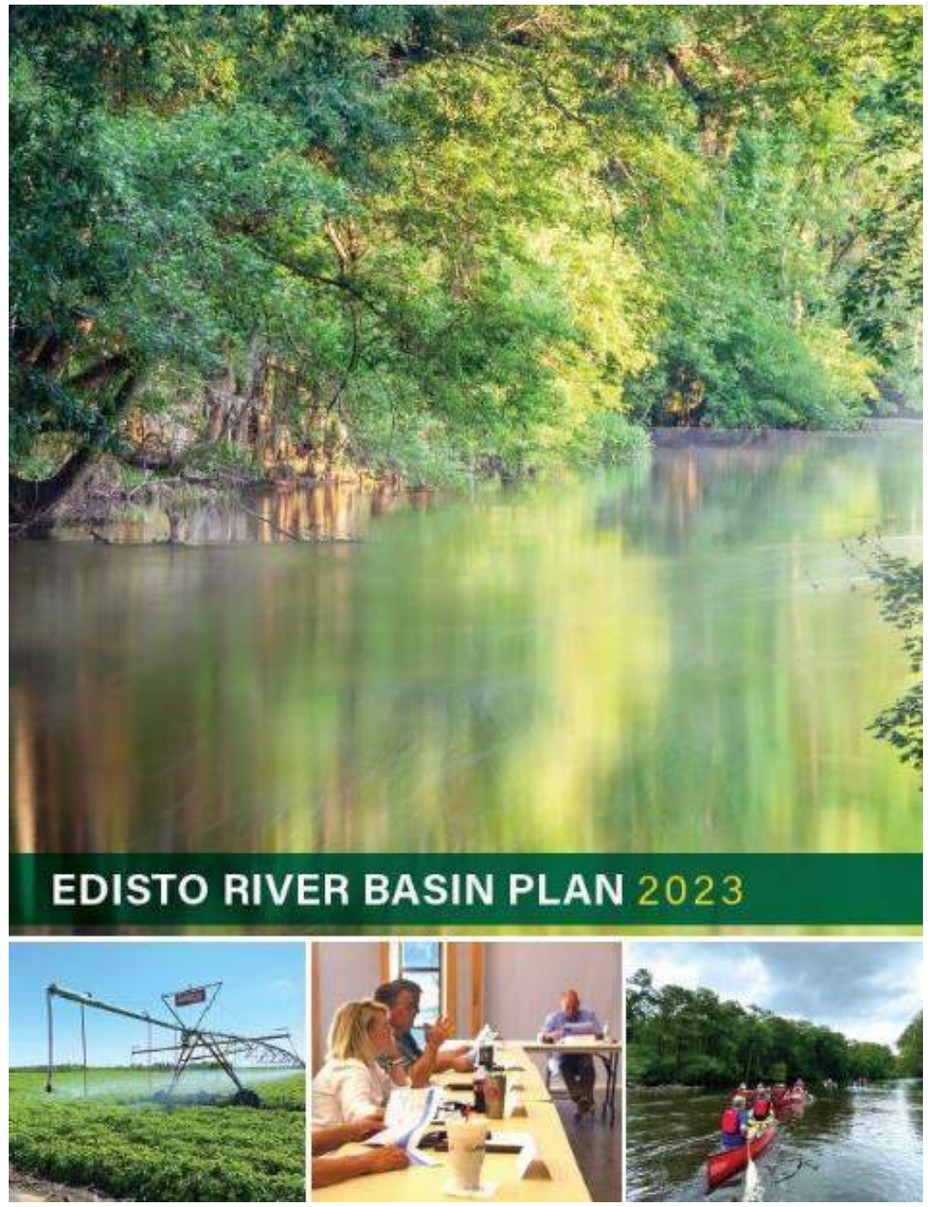
- How will this demand change over the next 50-years?
- Will we have enough water to meet those demands?
- If not, how can we manage our water resources to meet future demand?

Guiding Principles

- Water is a limited natural resource and is a major factor for economic development and environmental protection.
- River Basin Plans should strive for the equitable use of water resources with the goal of ensuring water is available for all uses, when and where needed, throughout the Planning Horizon and under drought conditions.
- River Basin Plans should protect the public's health and well-being and should balance social, economic, and environmental needs.

Features of a River Basin Plan

- **Stakeholder-developed.**
- Covers a **50-year** Planning Horizon.
- Considers both **surface water** and **groundwater** resources.
- Current focus is on water ***quantity*** not water ***quality*** with emphasis on drought conditions.
- **Not a regulatory document** but may include recommendations regarding State water policy, law, and regulations.
- Updated every 5-years – **water planning will be an ongoing process**.
- Supported by hydrologic data, models, and water-demand projections.

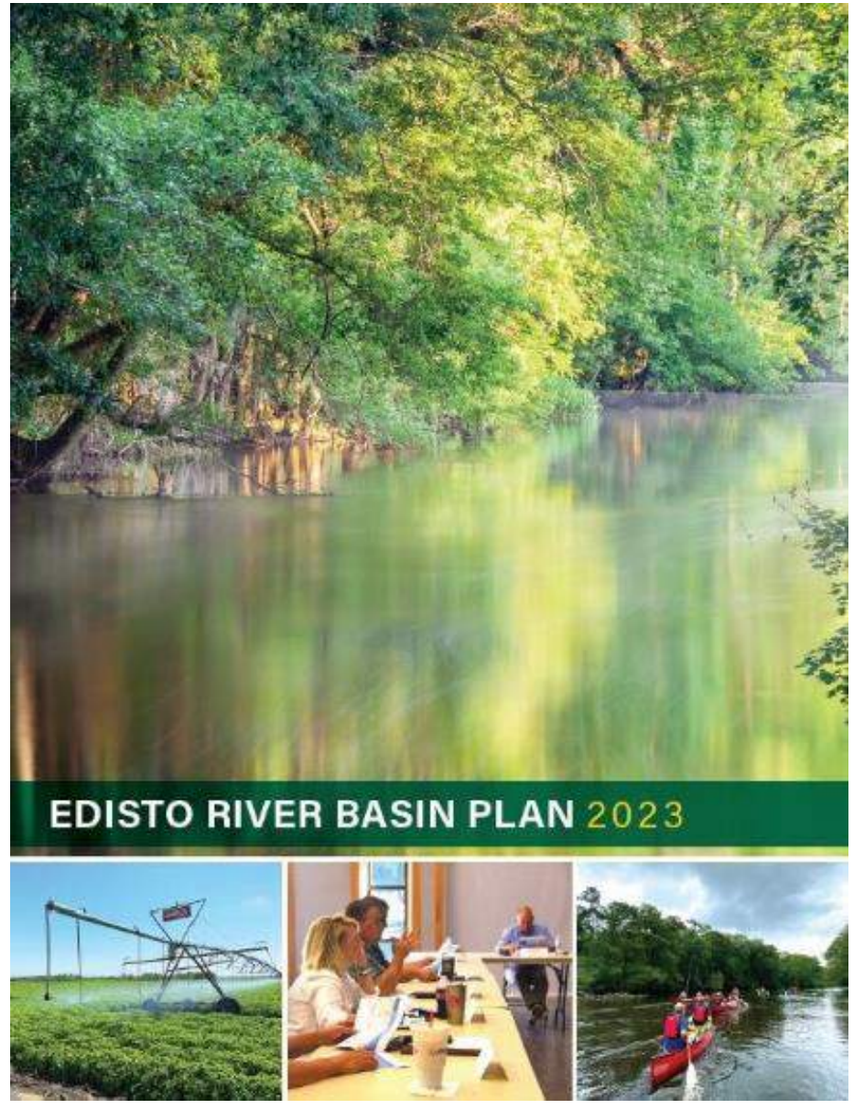


River Basin Plan Table of Contents

1. Introduction
2. Description of the Basin
3. Water Resources of the Basin
4. Current and Projected Water Demand
5. Comparison of Water Resource Availability and Water Demand
6. Water Management Strategies
7. Water Management Strategy Recommendations
8. Drought Response
9. Policy, Legislative, Regulatory, Technical, and Planning Process Recommendations
10. Implementation Plan

Edisto River Basin Plan

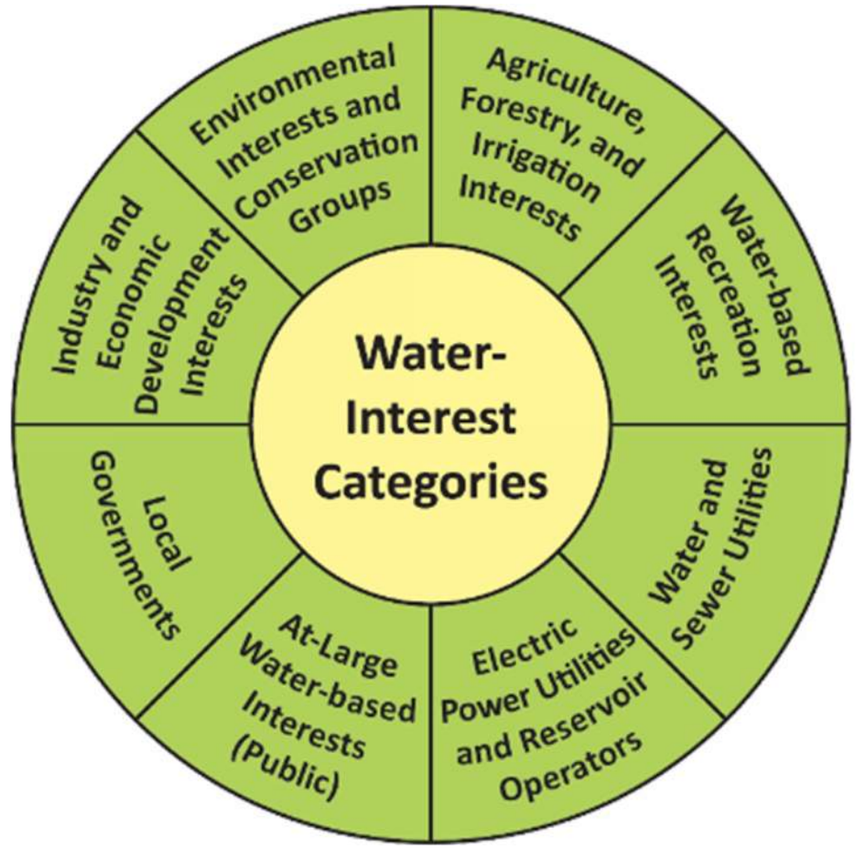
- Final Plan and Executive Summary available at: https://hydrology.dnr.sc.gov/edisto-river-basin-plan.html
- River Basin Plan completed in June 2023.



How will the River Basin Plan be Developed?

Planning Framework calls for the formation of a River Basin Council (RBC) in each planning basin

- **Stakeholder-led team** responsible for developing the River Basin Plan.
- **25-30** members representing **8 interest categories.**
- Governed by a set of Bylaws.
- **Consensus based** decision-making process.
- Chair and Vice-Chair elected by RBC.



River Basin Plans will be developed over a 2-year period

Upper Savannah River Basin Council

Planning Team

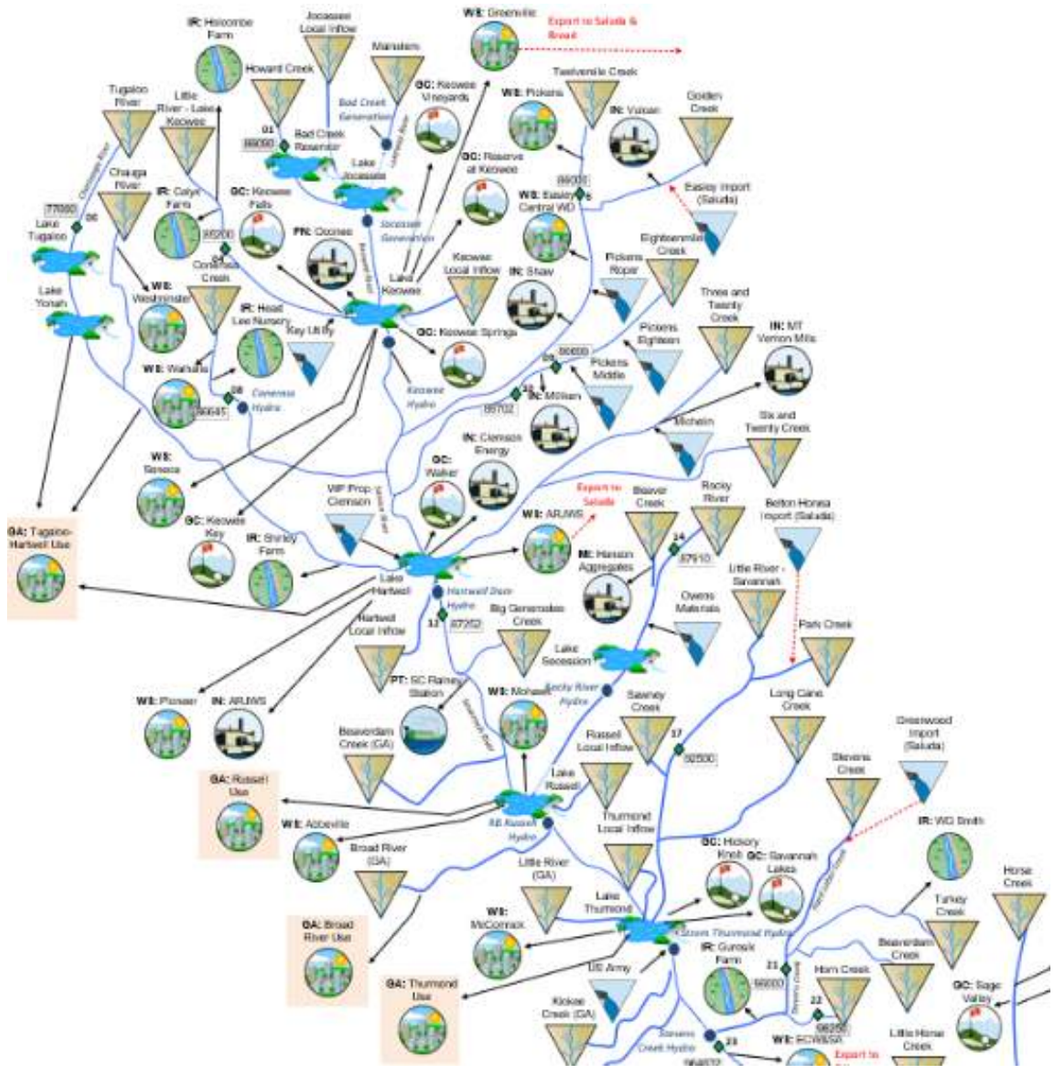
- Clemson
  - Coordination
  - Public Outreach
- CDM Smith
  - Facilitation
- SCDNR
  - Oversight
  - Education
- SCDHEC
  - Education

Name	Organization	Interest Category
Mack Beaty, IV	Beaty Farms	Agriculture, Forestry, and Irrigation
Chuck Connolly	Carolina's Golf Course Superintendent Association	
Daniel Milam	Milam Farms	
Jill Miller	SC Rural Water Association	At-Large
Dan Murph	Murph Investments, LLC	
Harold Shelley	Friends of the Savannah River Basin	
Tonya Winbush	Veterans of Foreign Wars/Adopt-A-Stream	
Carl Price	Santee Cooper - Rainey Station	Electric-Power Utilities
Alan Stuart	Duke Energy	
Tonya Bonitatibus	Savannah Riverkeeper	Environmental Interests
John Hains	Friends of Lake Keowee Society	
Katie Hottel	Upstate Forever	
Cole Rogers	Delux Construction, Inc.	Industry and Economic Development
Mark Warner	McCormick and Abbeville County Economic Development	
Will Williams	Western SC Economic Development Partnership	
Reagan Osbon	City of Westminster	Local Governments
Jon Batson	Anderson County	
Cheryl Daniels	McCormick CPW	Water and Sewer Utilities
Tim Hall	Abbeville Public Utilties	
Jeff Phillips	Greenville Water	
Melisa Ramey	Seneca Light and Water	
Scott Willett	Anderson Regional Joint Water System	
Billy Owens	Lake Hartwell Sail and Power Squadron	Water-Based Recreation

RBC Roles and Responsibilities

- Identify water shortages or conflicts using hydrologic models.
- Recommend strategies to mitigate or eliminate water use conflicts or water shortages.
- Help draft River Basin Plans.
- Communicate with stakeholders and the public on water planning activities.
- Recommend changes to water policy or legislation or to the water planning process.
- Update River Basin Plans every 5-years and amend the plans as needed.

Upper Savannah Surface Water Model (SWAM)



Model is a decision-making tool used to assess water availability and management strategies, and will support the development of River Basin Plans

https://hydrology.dnr.sc.gov/surface-water-models.html

Water Demand Projections

- Water-demand methodology report released in October 2019 and available at:
    - https://hydrology.dnr.sc.gov/water-demand.html.
- Projections will be used in surface water model to assess future water availability and will support the development of River Basin Plans.
- Water-demand projections for the Upper Savannah basin are currently being developed (Clemson/SCDNR).
- RBC will have opportunity to review and provide feedback on the Upper Savannah river basin's water-demand projections.

US Army Corps of Engineers

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RBC Support

- **Contractors** (solicited and hired by SCDNR):
  - Meeting Facilitation (CDM Smith, Inc.)
  - Meeting Coordination (Clemson University) – administrative and logistical support
  - Surface Water Modeling Technical support (TBD)
  - Public Outreach (Clemson University)
  - River Basin Plan report writing (CDM Smith, Inc.)
- **Other State and Federal Agencies**:
  - RBCs can request agencies to serve as Advisors.
  - Participate in RBC meetings and subcommittee meetings as requested.
- **RBCs can request input from other outside Advisors.**

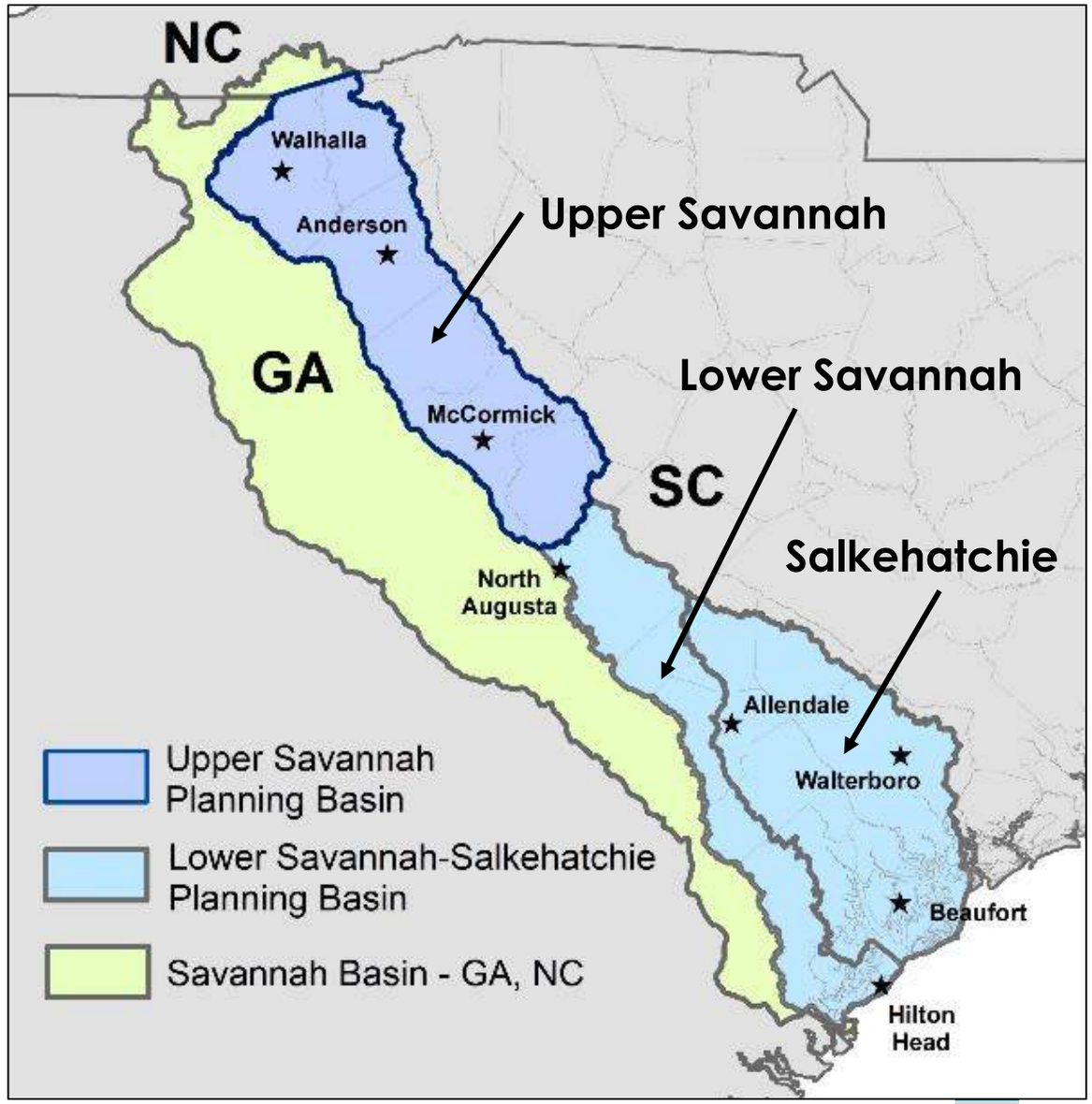
PPAC and SCDNR *will continue to provide oversight of the river basin planning process.*

Coordination with other Planning Bodies

- Planning Framework recognizes the existence of other formal water planning groups and drought management groups.
- Planning Framework emphasizes coordination with such groups and provides general guidelines.
- Inter-basin River Councils (IRCs):
  - Made up of RBC members from two or more basins.
  - A forum for adjoining basins to communicate and coordinate on mutual interests and to resolve conflicts.

Coordination with Lower Savannah-Salkehatchie RBC

- Lower Savannah and Salkehatchie basins are defined as one planning basin.
- Lower Savannah-Salkehatchie planning activities will begin approximately 3 months after the Upper Savannah (Fall 2023).
- An IRC will be formed between the Upper Savannah planning basin and the Lower Savannah-Salkehatchie planning basin.



Limitations of the Upper Savannah River Basin Planning Process

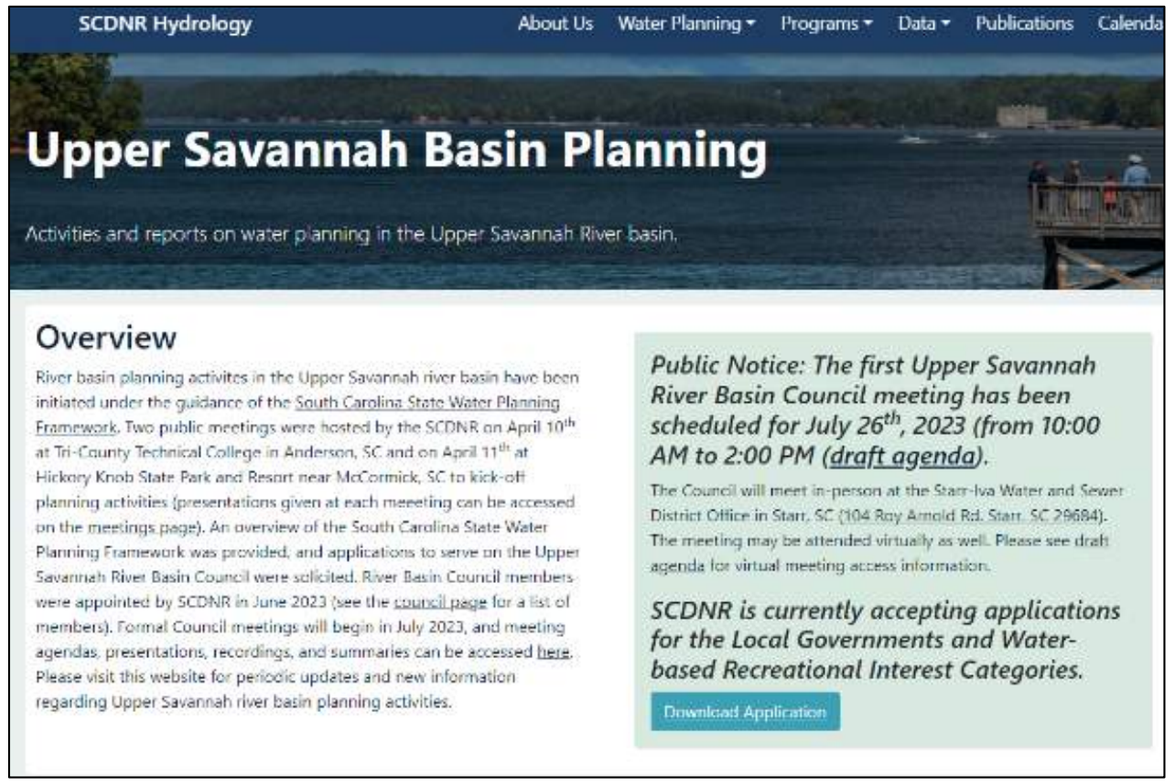
- Process is ***not*** intended as a forum to evaluate and provide alternatives to:
  - the USACE's Drought Management Plan – any future studies regarding the Drought Management Plan will be led by the USACE in a separate process.
  - Duke Energy Reservoir Operations – already evaluated and stipulated through the Federal Energy Regulatory Commission (FERC) licensing process.
- Planning will focus on demand-side water management strategies and supply-side strategies on tributaries.

Stakeholder/Public Participation Guidelines

- Guidelines for stakeholder and public participation described in Section 3.7 of Planning Framework.
- Public meetings (3 to 4 per basin):
  - Prior to first RBC meeting – "kickoff" meeting(s).
  - After *draft* River Basin Plan is released.
  - After *final* River Basin Plan is released.
- Draft River Basin Plan public review period (30 days).
- RBC meetings:
  - Open to the public.
  - Each meeting will include public comment period.

SCDNR Hydrology Website

https://hydrology.dnr.sc.gov/water-planning.html



https://hydrology.dnr.sc.gov/UppSav-basin-planning.html

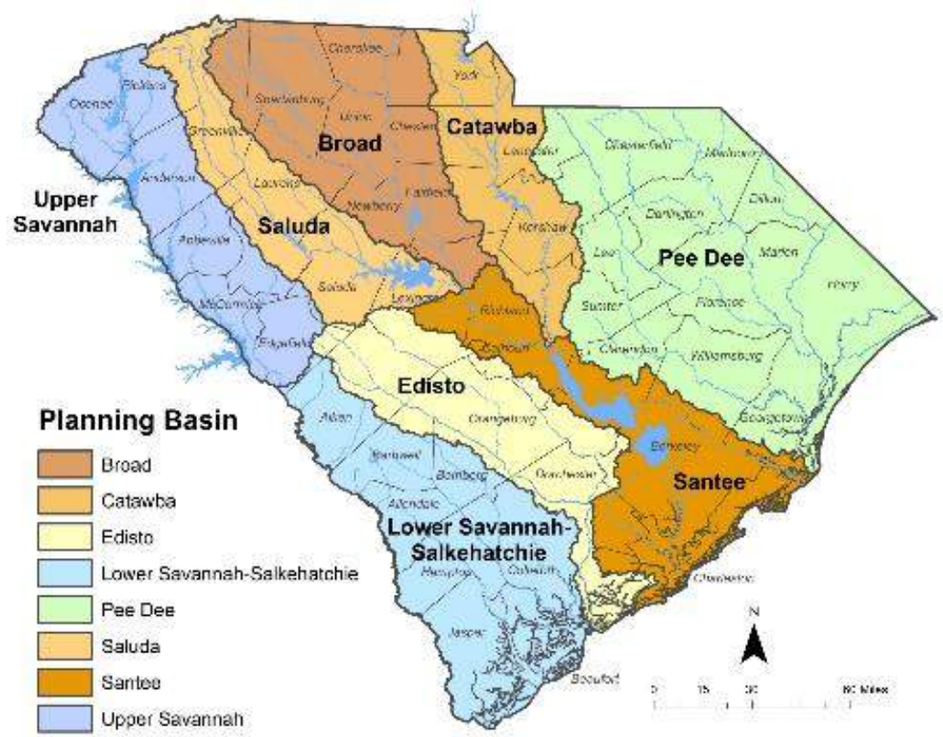
Site will host:

- Announcements/Calendar of Events
- Access to water planning documents – Planning Framework, technical reports
- RBC meeting materials – agendas, presentations, recordings

SC River Basin Planning: Status and Long-term Schedule

River Basin Planning Current Status

Basin	Status
Edisto	June 2020 – June 2023
Broad	March 2022 – present
Pee Dee	June 2022 – present
Saluda	March 2023 - present
Upper Savannah	June 2023 - present
Lower Savannah/ Salkehatchie	Scheduled to begin Fall 2023
Santee	Scheduled to begin Spring 2024
Catawba	CWWMG's Integrated Resource Plan in progress



State Water Plan - Schedule

Basin	2021	2022	2023	2024	2025	2026
Edisto						
Broad						
Pee Dee						
Catawba						
Saluda						
Upper Savannah						
Lower Savannah/ Salkehatchie						
Santee						
State Water Plan						

Questions?

Alex Pellet – PellettC@dnr.sc.gov
Scott Harder – HarderS@dnr.sc.gov

River Basin Planning Phases & Examples

John Boyer, CDM Smith

The Four Phases of the Planning Process

Phase 1	- Learn about the basin's water (and related) resources - Become familiar with rules and laws governing water use - Develop a vision statement and goals - Review water demand projections - Become familiar with the modeling tools

The focus of Phase 1 is on ***learning.***

What is expected of the RBC in Phase 1:

- Be inquisitive. Ask questions. Keep an open mind.
- Suggest and participate in field trips.
- Identify additional topics that the RBC should explore and learn.
- Select an alternate. Select a Chair & Vice Chair.

Phase 1 Examples from the Edisto, Broad, and Pee Dee

Information Topics Covered

- Summary of Current Water Use
- Population and Water Demand Projections
- Basin Climatology and SC Drought Response Act
- Surface Water Resources and Low Flow Characteristics
- Groundwater Resources
- Water Law
- Aquatic Resources and Flow-Ecological Health Relationships
- Overview of the Surface Water Models

Field trips

- **Edisto:** Walthers Farm, Edisto River Canoeing, Charleston Water System Intake, Aiken State Park Groundwater Monitoring

- **Broad:** Columbia canal and WTP, diversion dam and fish passage, Fairfeld Pumped Storage Facility, Parr Shoals Hydroelectric Facility, Lake Blalock Canoeing, Spartanburg Water System Advanced Oxidation System, Cooley Farms.

The Four Phases of the Planning Process

Phase 2	- Evaluate current and future water availability issues - Evaluate the safe yield of water supply reservoirs - Consider and evaluate flow-ecology relationships

Phase 2 answers the question "***is there enough water to meet current and future needs?***"

What is expected of the RBC in Phase 2:

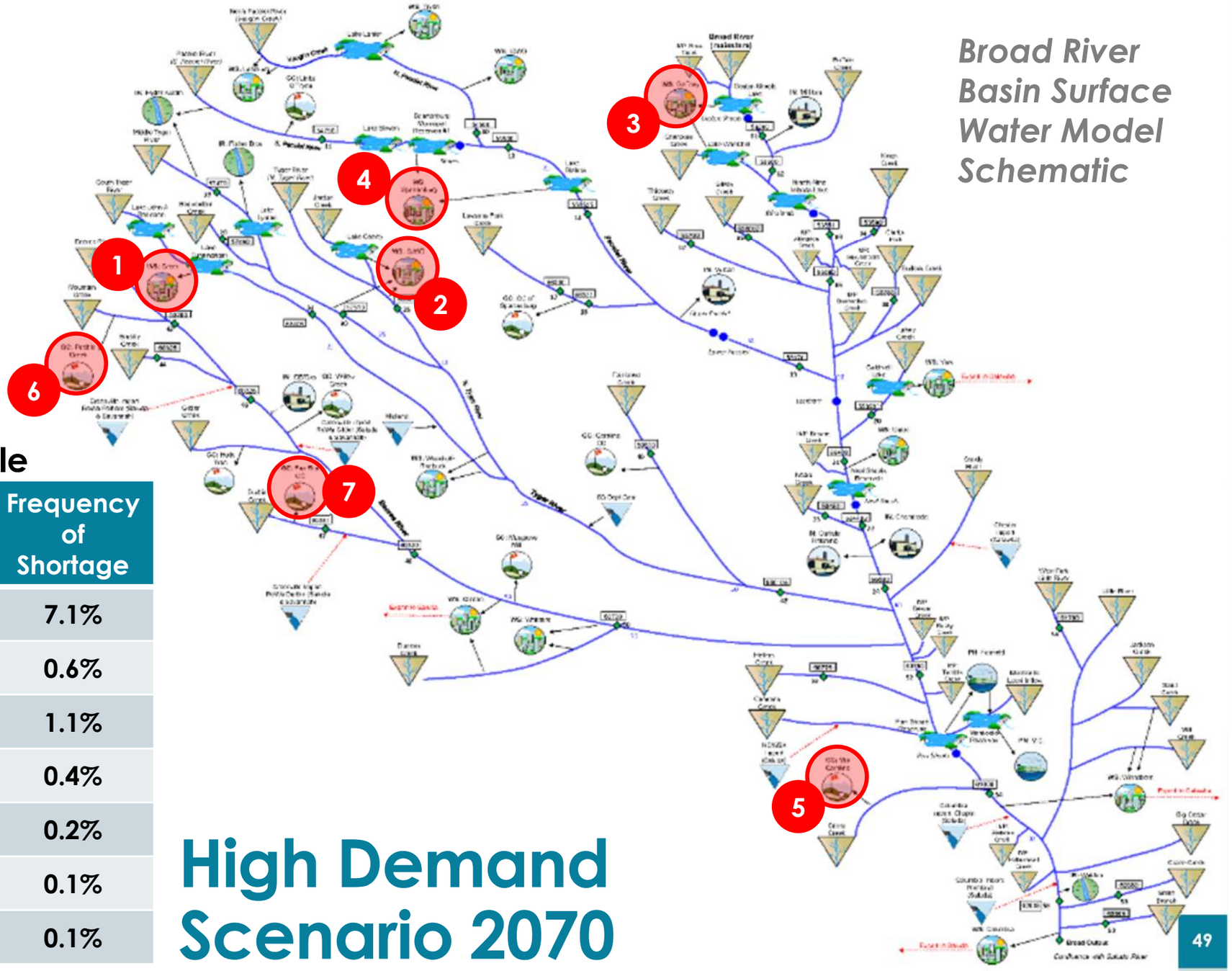
- Take a critical look at the surface water model inputs and outputs.
- Request additional analyses where warranted.

Phase 2 Example from the Broad

Evaluating future water availability issues

Surface Water Shortage Table

Map ID	Water User	Frequency of Shortage
1	WS: Greer	7.1%
2	WS: SJWD	0.6%
3	WS: Gaffney	1.1%
4	WS: Spartanburg	0.4%
5	GC: Mid Carolina	0.2%
6	GC: Pebble Creek	0.1%
7	GC: Fox Run	0.1%



Broad River Basin Surface Water Model Schematic

High Demand Scenario 2070

The Four Phases of the Planning Process

Phase 3	- Develop and evaluate **water management strategies** - Recommend and prioritize strategies

The focus of Phase 3 is on finding ***solutions.***

What is expected of the RBC in Phase 3:

- Provide direction to the modeling team on water management strategies to evaluate.
- Identify strategies that support a water conservation and water efficiency ethic.
- Recognize and consider the potential for changing conditions and select strategies appropriately.
- Begin reviewing and commenting on draft chapters of the Plan.

Phase 3 Example from the Broad

Evaluating water management strategies by modeling

"What if" Simulations…

- Water Utilities Drought Management Plans were triggered, and targeted demand reductions were achieved?
- Reservoir releases were optimized based on the (higher) projected demands (withdrawals)?
- Long-term reductions in per capita water demand were achieved through a portfolio of water conservation, water loss control, and water efficiency strategies?

Supply-Side Strategies Being Evaluated:

- Increasing dam height to increase reservoir storage
- Adding an off-line quarry for additional storage
- Adding a second intake and renegotiating average annual withdrawals allowed by FERC
- A new regional water supply reservoir

The Four Phases of the Planning Process

Phase 4	- Develop **legislative, policy, technical and planning process recommendations**
	- Prepare the **River Basin Plan that:**
	  - Includes an ***implementation plan***
	  - Identifies ***drought response initiatives***
	  - Considers ***public input***

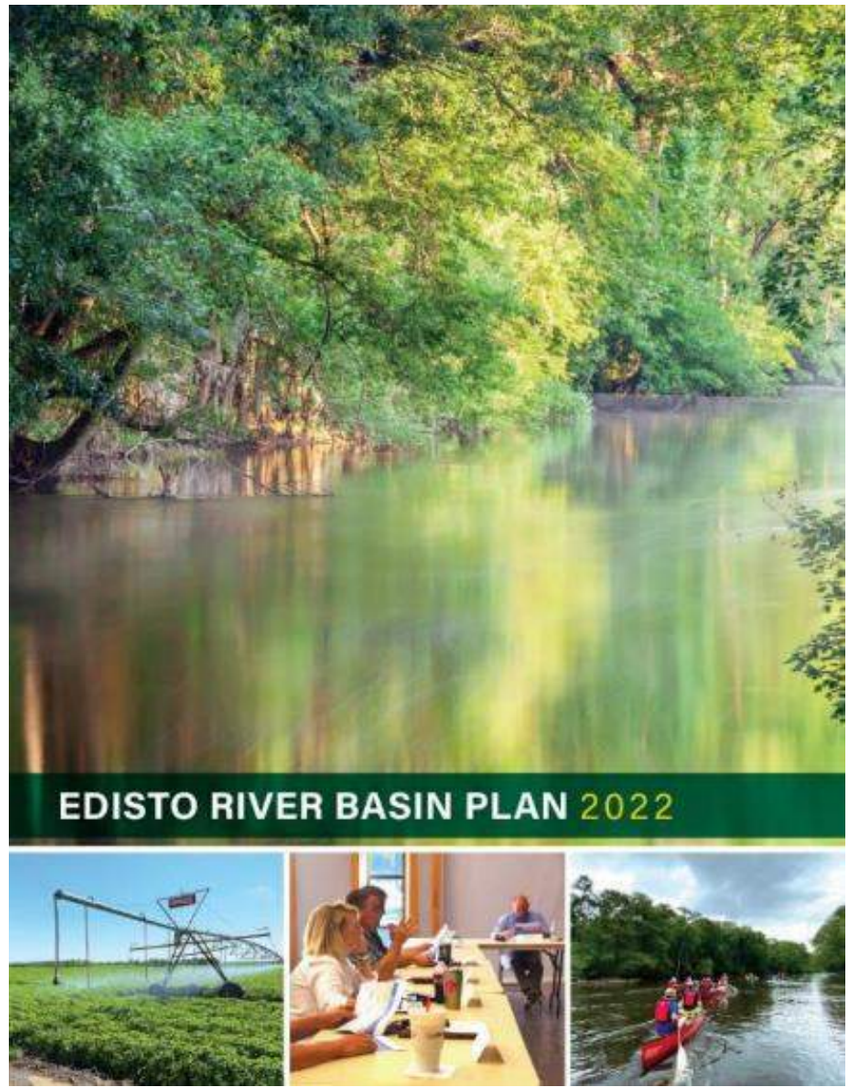
Phase 4 focuses on ***achieving consensus*** **and** ***writing the Plan.***

What is expected of the RBC in Phase 4:

- Make timely decisions and recommendations
- Review and comment on draft chapters of the Plan. Make sure the Draft Plan accurately represents your sector's water-related interests.
- Participate in public outreach

Phase 4 Example from the Edisto

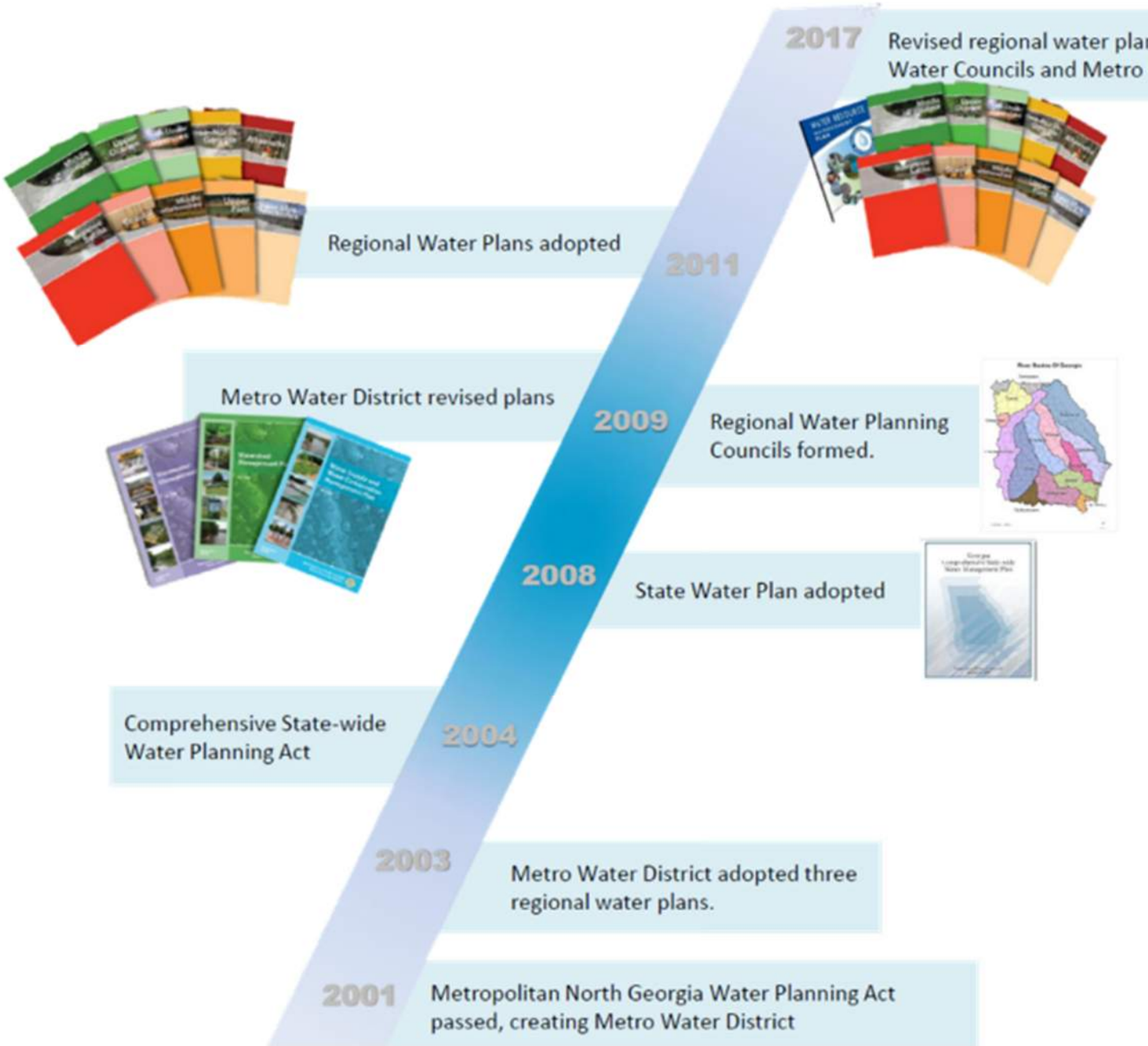
- **The Edisto RBC prepared a River Basin Plan that:**
  - Recommends **management strategies** to eliminate projected surface water shortages.
  - Recommends **monitoring and additional groundwater modeling** in identified Groundwater Areas of Concern.
  - Includes a **Low Flow Strategy** that aims to maintain a minimum amount of flow in the Edisto River during drought.
  - Includes a detailed **Implementation Plan** with specific short-term (5-year) and long-term strategies and actions to address six major objectives .
  - Includes **technical**, **policy**, **legislative**, **regulatory**, and **planning process recommendations**.



Important Things to Remember

- **River basin planning is an ongoing process.**
    - Not all stakeholder needs and desires can be addressed during the first phase of planning.
- **The process is not intended to resolve issues associated with South Carolina water laws and regulations.**
    - But, through discussion, RBC recommendations on policies and regulations can be documented and summarized for agency and legislature consideration.
- The process is intended to be **stakeholder-driven** and leverage the knowledge of those that use, recreate, and seek to protect the water resources of the basins.
- The process provides **transparency** and uses the best-available science and tools to assess water availability and identify strategies to meet water demands 50 years into the future.

Georgia Water Planning – Over Two Decades of Planning

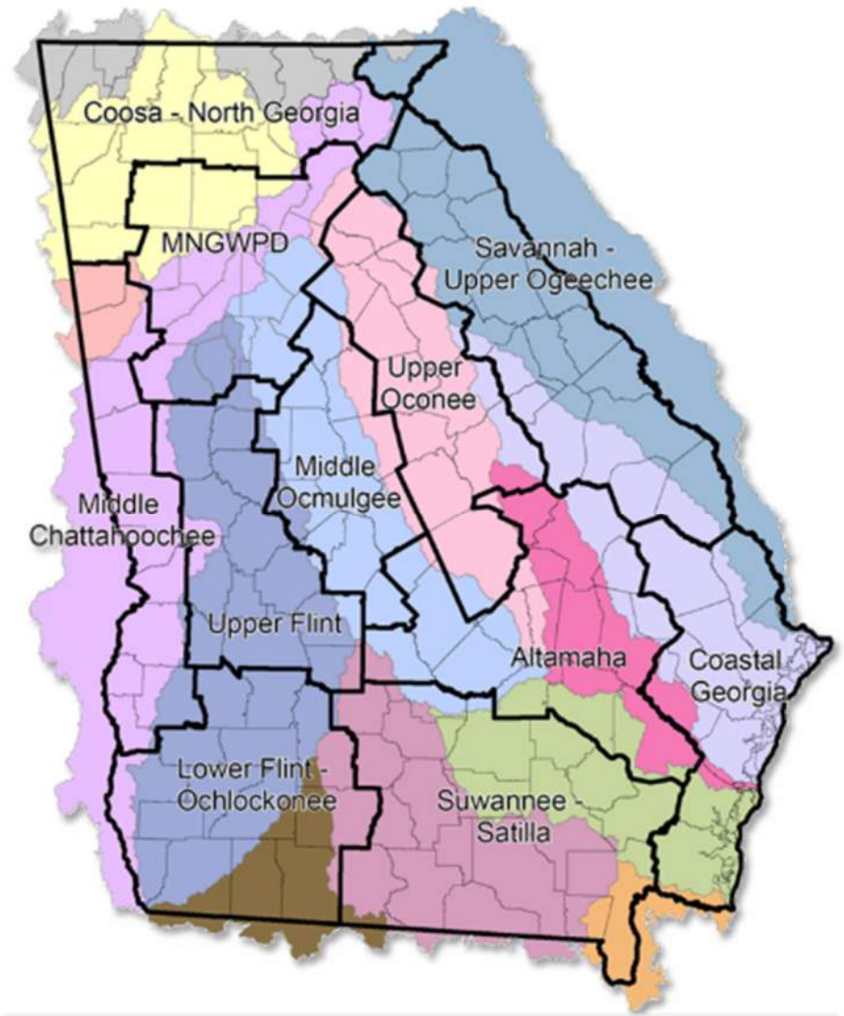


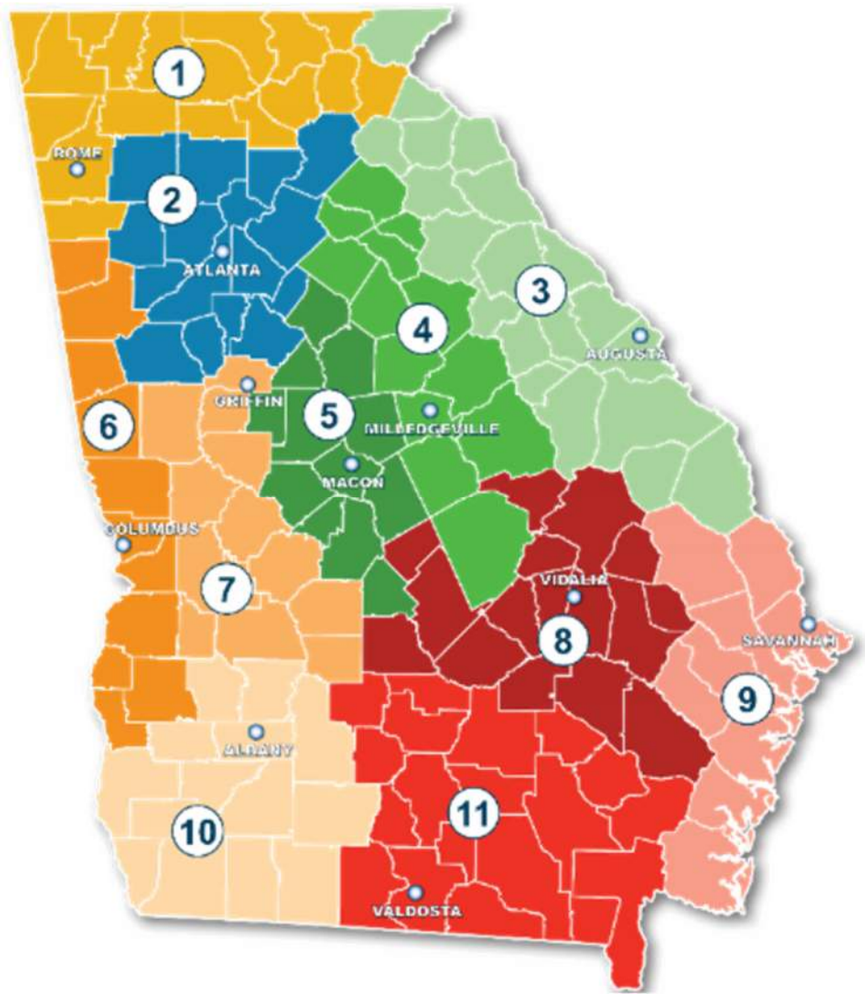
The 2023 Regional Water Plans were adopted by Georgia EPD's Director on June 29, 2023. The plan outlines near-term and long-term strategies to meet water needs through 2060

The 5-Year Review Cycles Focus on:

- Updated water demand and wastewater forecasts
- Update Surface Water and Ground Water Availability Resource Assessments (Quantity)
- Updated Surface Water Quality Availability Resource Assessment
- Refine Management Practices, if needed, to address water resource

Georgia Regional Water Councils





1. COOSA-NORTH GEORGIA
2. METRO WATER DISTRICT
3. SAVANNAH-UPPER OGEECHEE
4. UPPER OCONEE
5. MIDDLE OCMULGEE
6. MIDDLE CHATTAHOOCHEE
7. UPPER FLINT
8. ALTAMAHA
9. COASTAL
10. LOWER FLINT-OCHLOCKONEE
11. SUWANNEE-SATILLA

Snapshot of 2023 Georgia Resource Assessment Results

- **ATL, SS, SUO, UO** - At the regional level, for modeled aquifers, no groundwater resource challenges are expected to occur in the Altamaha Region over the planning horizon.

- **COA** - At the regional level, for modeled aquifers, there is sufficient groundwater to meet forecasted needs over the planning horizon; however, meeting the increase in demands in areas where groundwater supplies may be limited due to salt water intrusion is a significant challenge.

- **ALT -** Over the next 40 years, the modeling analysis indicates that forecasted surface water demand within the Altamaha Region may create potential challenges along the Altamaha River, Ohoopee River, Ocmulgee River, and Little Ocmulgee River

- **COA** - Over the next 40 years, the modeling analysis shows no potential surface water challenges in the region.

- **SUO - Over the next 40 years, the modeling analysis indicates that the water supply and instream flow needs in the region are not met hydrologically at 7 withdrawal locations and 13 discharge locations.**

- **SS** - Over the next 40 years, the modeling analysis indicates that forecasted surface water demand within the Suwannee- Satilla Region is projected to result in potential challenges in several Counties throughout the Region.

- **UO** - Over the next 40 years, the modeling analysis indicates potential challenges in meeting demand for water supply at withdrawal facilities in three counties: Barrow, Walton, and Wilkinson. .