

# Broad River Basin Planning

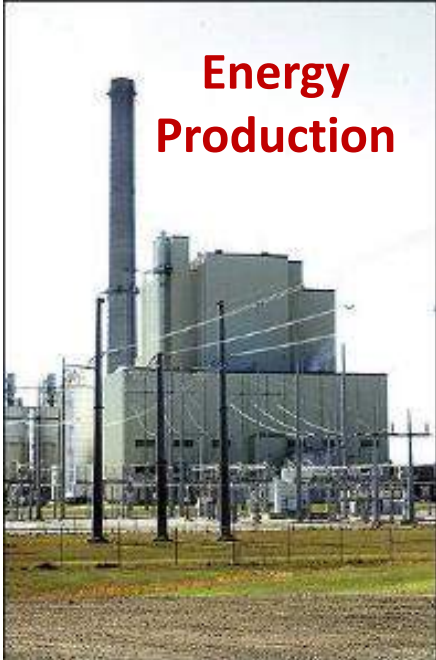
**Scott Harder**

Hydrology Section Chief

S.C. Department of Natural Resources  
Land, Water and Conservation Division



Broad River Basin Council – Meeting #1  
March 3, 2022



**Energy Production**



**Fishing**



**River Recreation**



**Public Water Supply**



**Wastewater dischargers**



**Manufacturing/industry**



**Agriculture**



**Fish and wildlife**

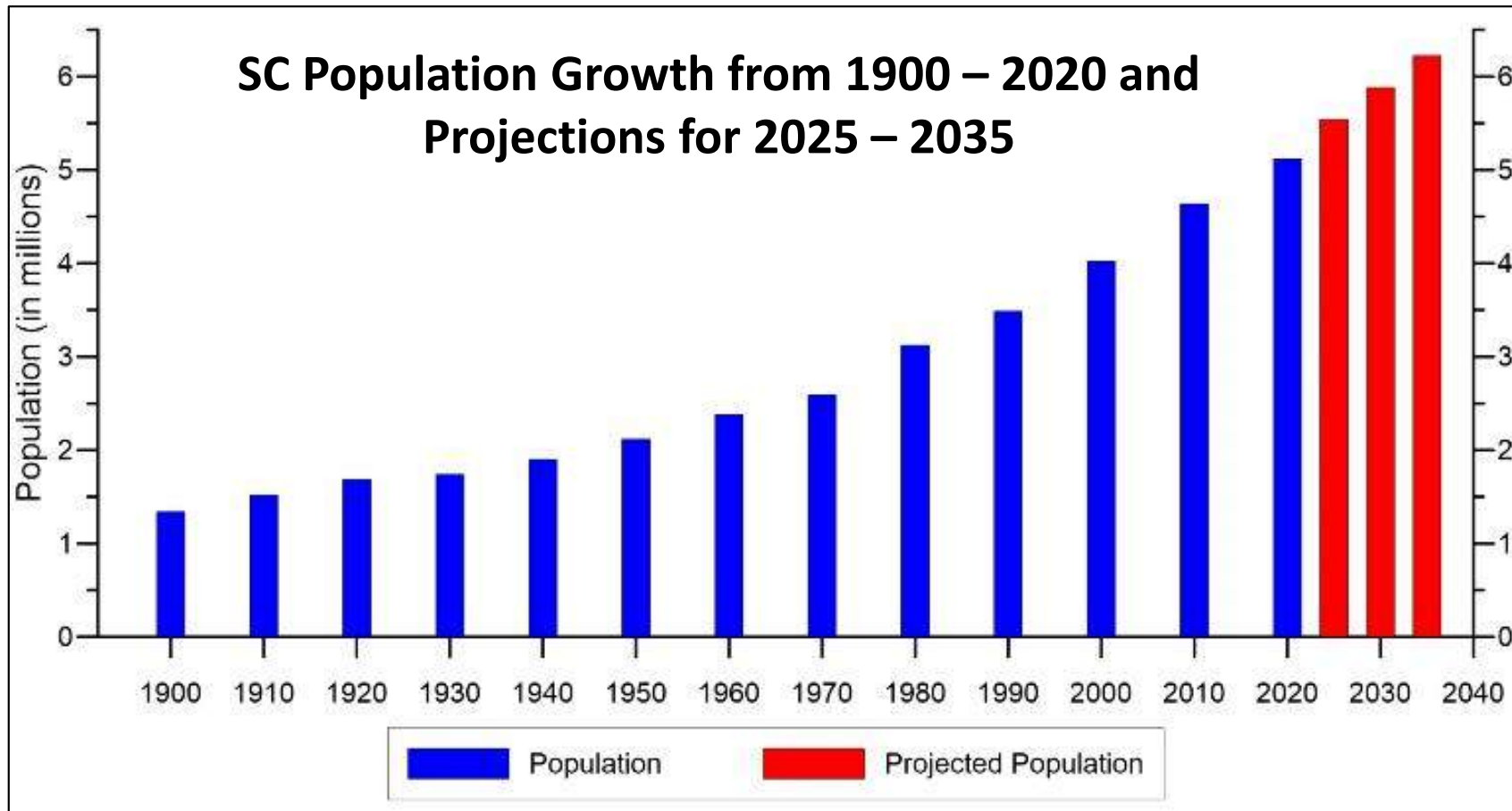


# Why State Water Planning?



## 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.

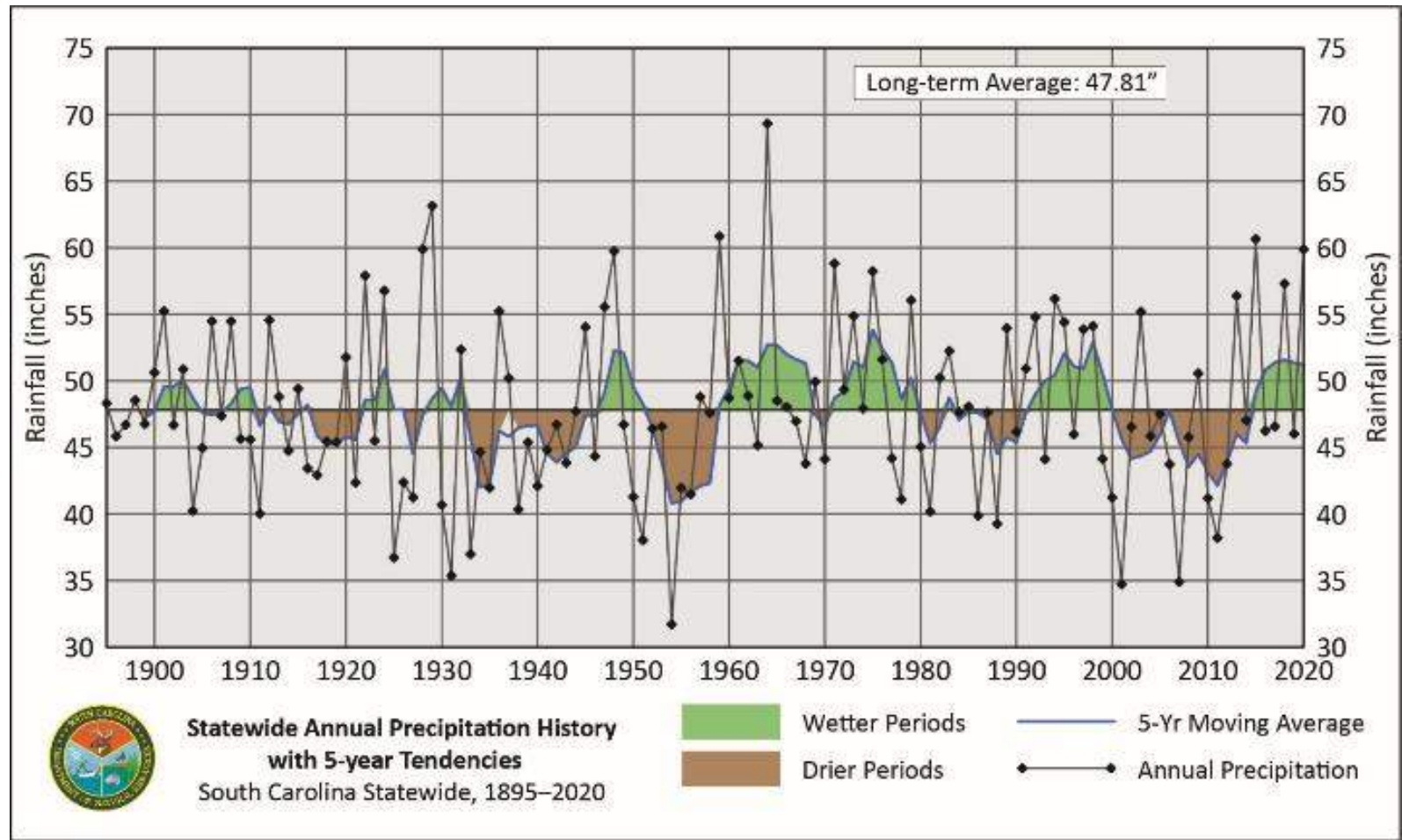




# Why State Water Planning?

## Drought

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



Statewide Average Annual Rainfall (inches) and 5-year Running Average <sup>4</sup>



# Why State Water Planning?



*Uncertainty in the nature of future droughts combined with increased water demands highlights the importance of comprehensive State and river basin planning*

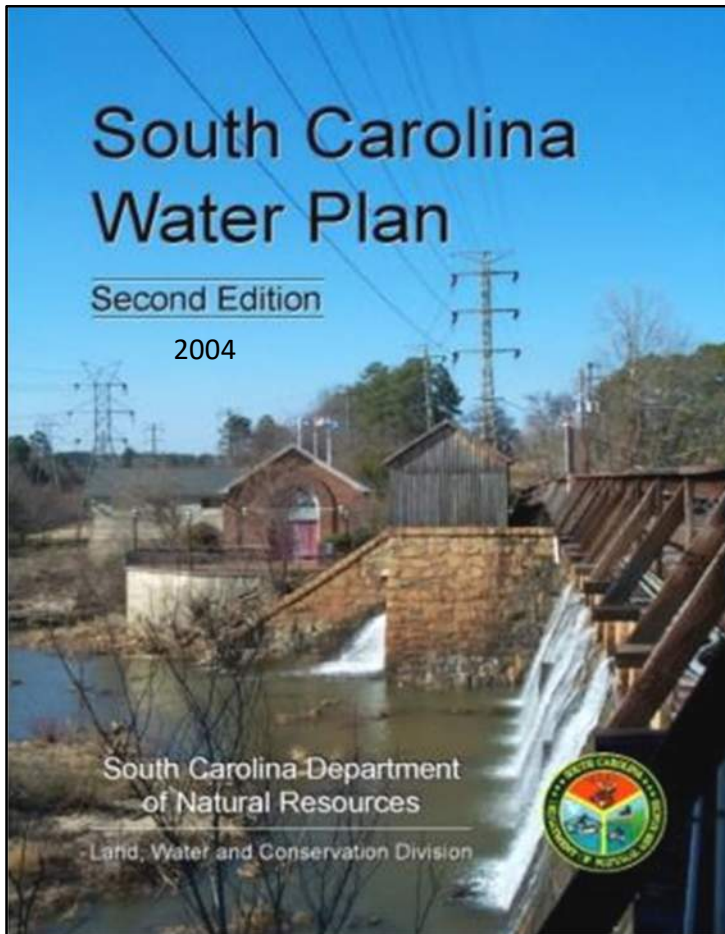
**Proactive Water Management, not Reactive!**



*Photos courtesy of National Drought Mitigation Center*



# A Brief History of State Water Planning

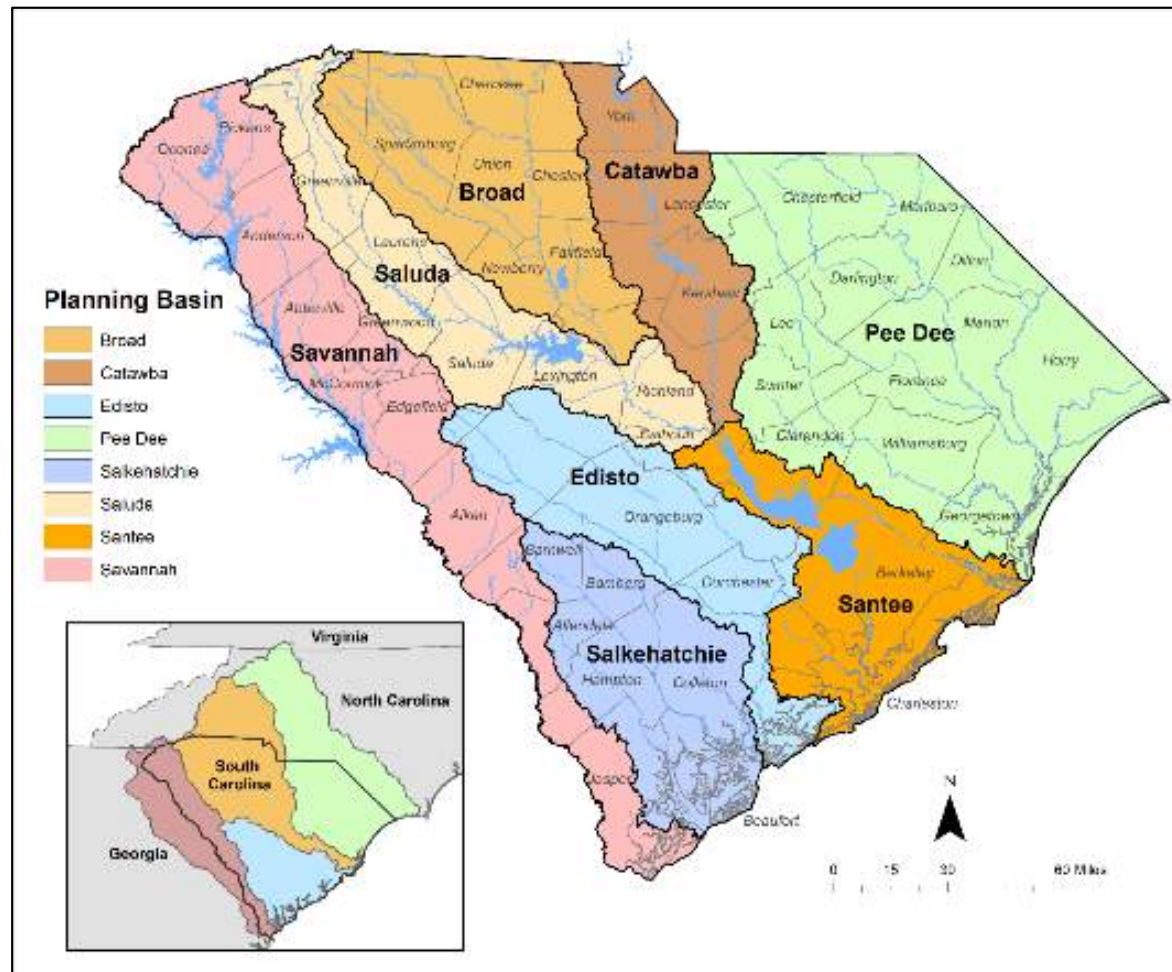


- SCDNR published the first edition of the State Water Plan in **1998**.
- In **2004**, SCDNR published the second edition of the South Carolina Water Plan incorporating lessons learned from the drought of 1998-2002.
- One recommendation was to develop a regional water plan for each major river basin in the State.
- **10 years later** – SCDNR and SCDHEC initiated the first step towards these regional water plans, now formally called *River Basin Plans*.

# South Carolina's Eight Planning Basins



- River Basin Plans will be developed for the State's 8 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).

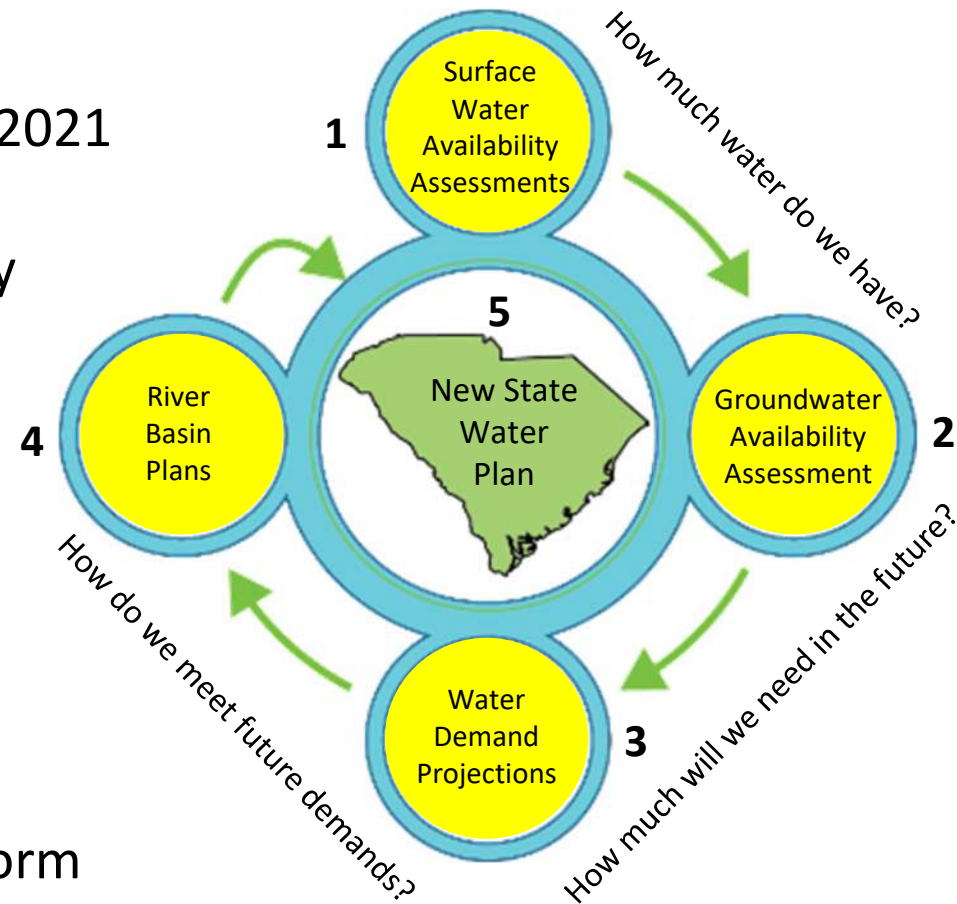
**3. Water Demand Projections** – methodology report completed in October 2019.

- Edisto basin projections completed in 2021.
- Projections for Broad basin in progress.

**4. River Basin Plans**

- Publication of South Carolina State Water Planning Framework.
- Edisto and Broad basin planning in progress.
- Pee Dee basin set to start this spring.

**5. State Water Plan** – River Basin Plans will form the foundation of a new State Water Plan.



## Cooperators:







# Stakeholder Participation



**Broad Basin SWAM Model Stakeholder Meeting**



**Edisto River Basin Council Field Trip**



**Edisto Basin Water Demand Projection Stakeholder Meeting**



**PPAC Meeting**



# Planning Process Advisory Committee



- Convened by SCDNR in March 2018.
- Purpose - develop a guidance document (Planning Framework) for developing River Basin Plans (Step 4) and for updating the State Water Plan (Step 5).
- South Carolina State Water Planning Framework (Planning Framework) was published in October 2019 after an 18-month process.
- PPAC continues to meet quarterly for planning oversight purposes.

## **PPAC Vision Statement:**

*“Reflecting our values of water as a shared resource with a shared responsibility, we will work together to develop and maintain an actionable State Water Plan balancing economic, environmental and social needs of South Carolina for generations to come.”*





# PPAC Committee Members



- Jeffery Allen** – Clemson University
- David Baize** – SCAWWA/WEASC
- David Bereskin** – 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](https://www.clemson.edu/public/water-assessment/State_Water_Planning_Process_Advisory_Committee.html)



<http://hydrology.dnr.sc.gov/ppac.html>



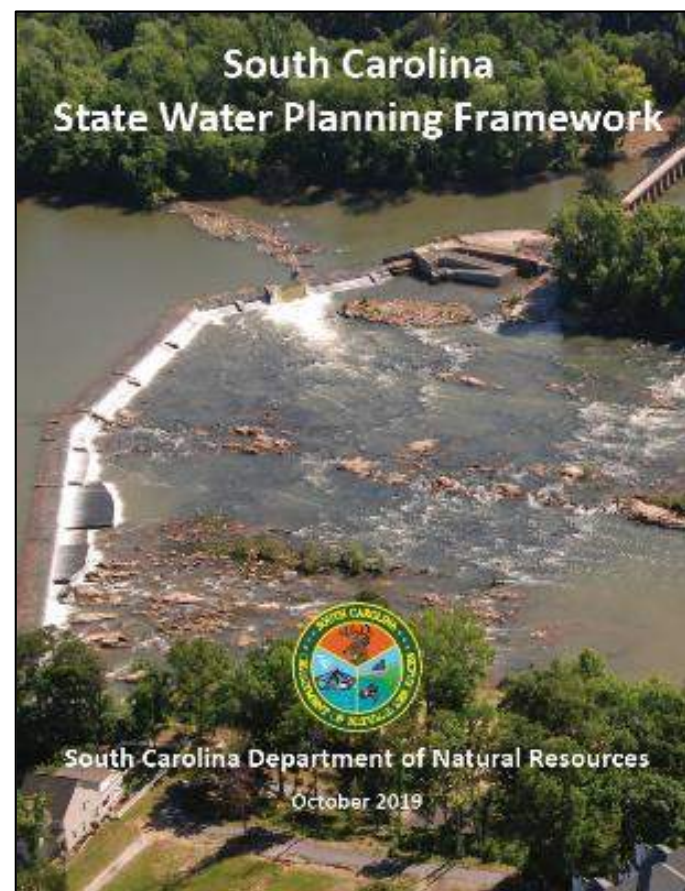


# Contents of Planning Framework



## 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



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

# 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!**



# Guiding Principles



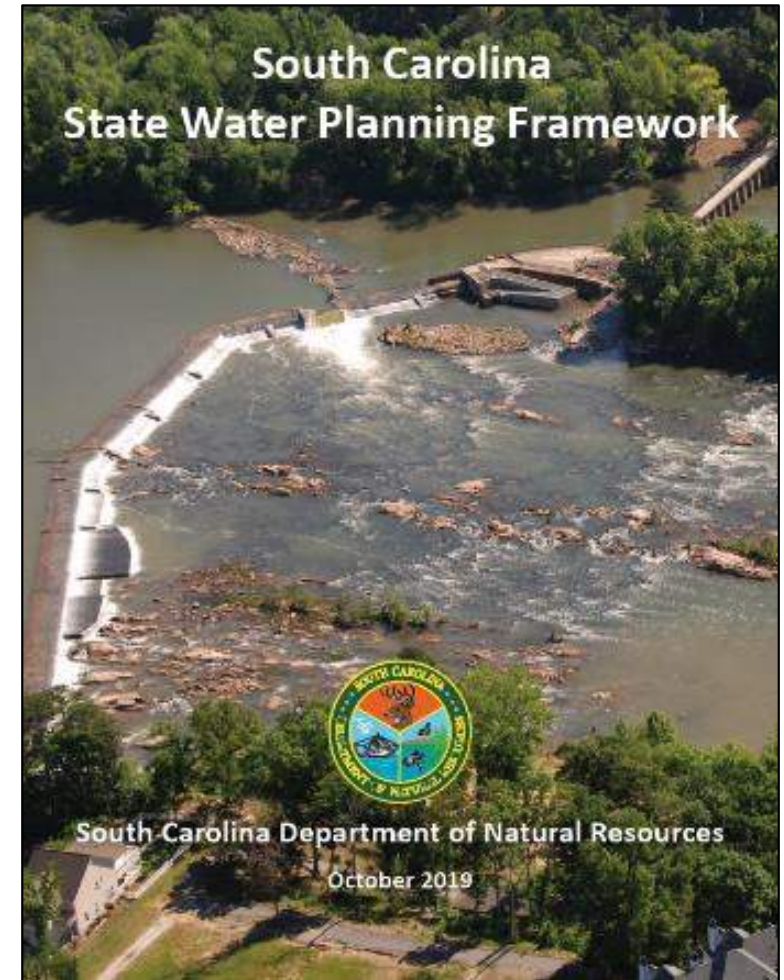
- Water is a limited natural resource and is a major factor for economic development and environmental protection.
- River Basin Plans should strive for the equitable use of water resources with the goal of ensuring water is available for all uses, when and where needed, throughout the Planning Horizon 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



- Covers a **50-year** Planning Horizon.
- Considers both surface water and groundwater resources.
- Current focus is on water *quantity* not water *quality*.
  - **Emphasis is 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

# How will the River Basin Plans be Developed?

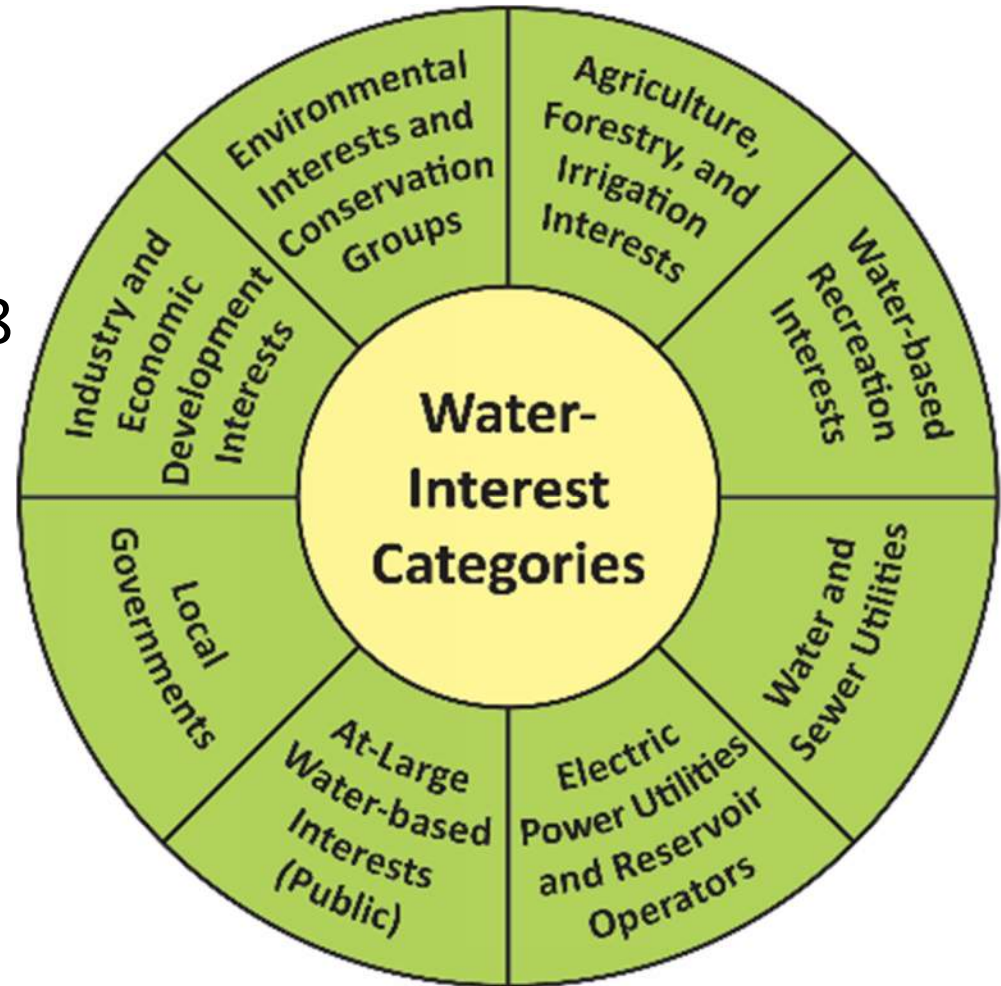




# River Basin Council (RBC)



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



***The Broad River Basin Plan will be developed over a 2-year period***



# Broad RBC Representation



## Interest Categories

- Agriculture, Forestry, and Irrigation (5)
- At-Large (3)
- Electric-Power Utilities (2)
- Environmental (3)
- Industry/Economic Development (2)
- Local Governments (1)
- Water and Sewer Utilities (5)
- Water-based Recreational (2)



## Organizations Represented

- Black's Peaches
- Cherokee County Development Board
- City of Clinton
- City of Columbia
- City of Columbia Parks
- Congaree Riverkeeper
- Dominion Energy SC, Inc.
- Duke Energy
- Gaffney Board of Public Works
- His Harvest Partners LLC
- Inman-Campobello Water District
- Milliken & Company
- Public
- SC Farm Bureau
- SC Rural Water Association
- Caroland Farms NPA
- Spartanburg Water
- The Nature Conservancy
- The SC River Guide
- Upstate Forever
- Weyerhaeuser Company
- York County

## Planning Team



Meeting Facilitation



Meeting Coordination  
and Public Outreach



Oversight and  
Education

Surface Water Technical  
Support Contractor  
(to be determined)



# RBC Roles and Responsibilities

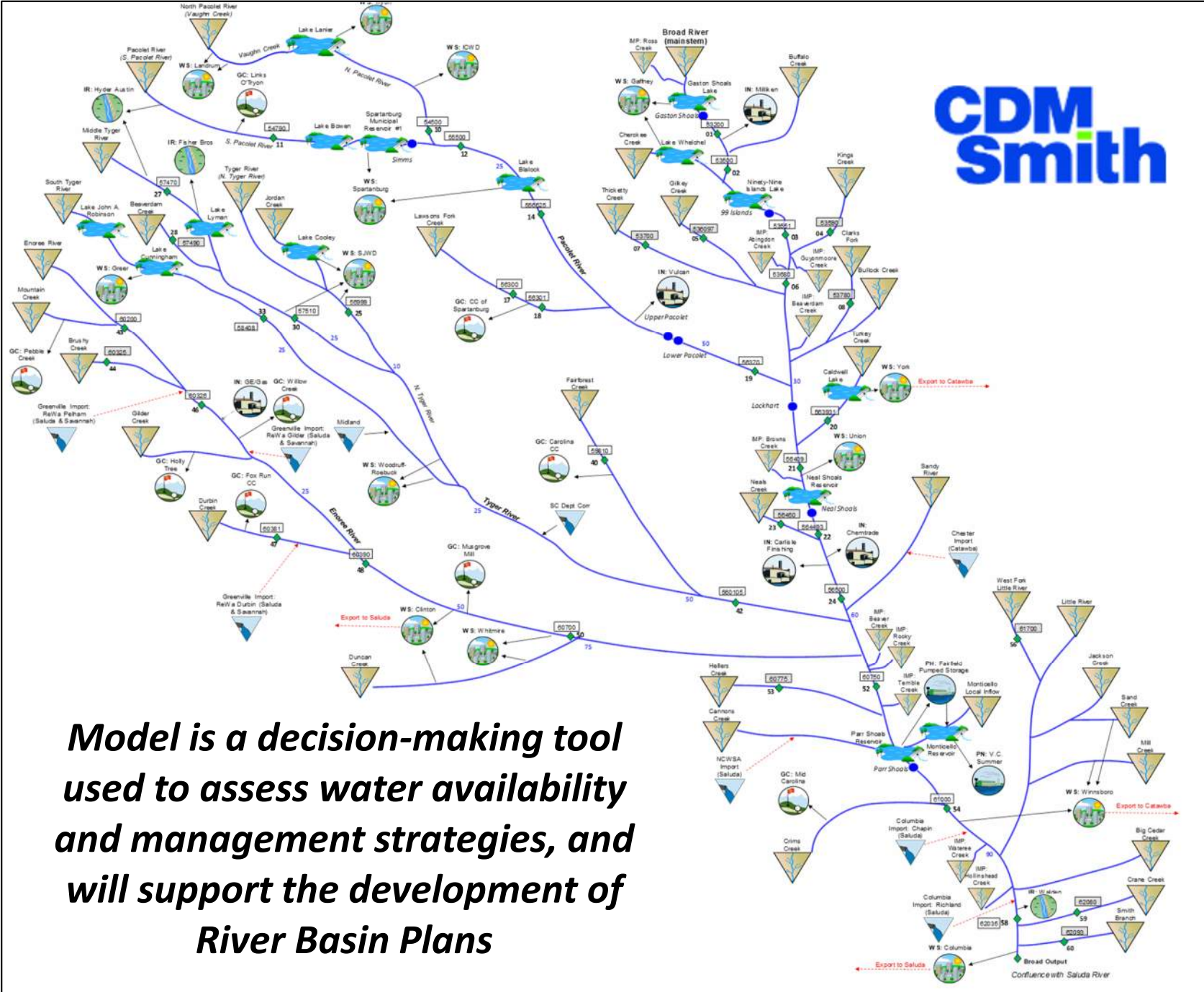


- Identify water shortages or conflicts using hydrologic models.
- Recommend strategies to mitigate or eliminate water use conflicts or water shortages.
- Help draft River Basin Plans.
- Communicate with stakeholders and the public on water planning activities.
- Coordinate with other formal water planning bodies (including those in North Carolina).
- 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.



Edisto River Basin Council<sup>21</sup>

# 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***



# Water Demand Projections – In Progress



- Water-demand methodology report released in October 2019 and available at:  
<http://hydrology.dnr.sc.gov/water-demand.html>.
- Projections will be used in SWAM model to assess future water availability and will support the development of River Basin Plans.
- Water-demand projections for the Broad basin are currently being developed.



US Army Corps  
of Engineers

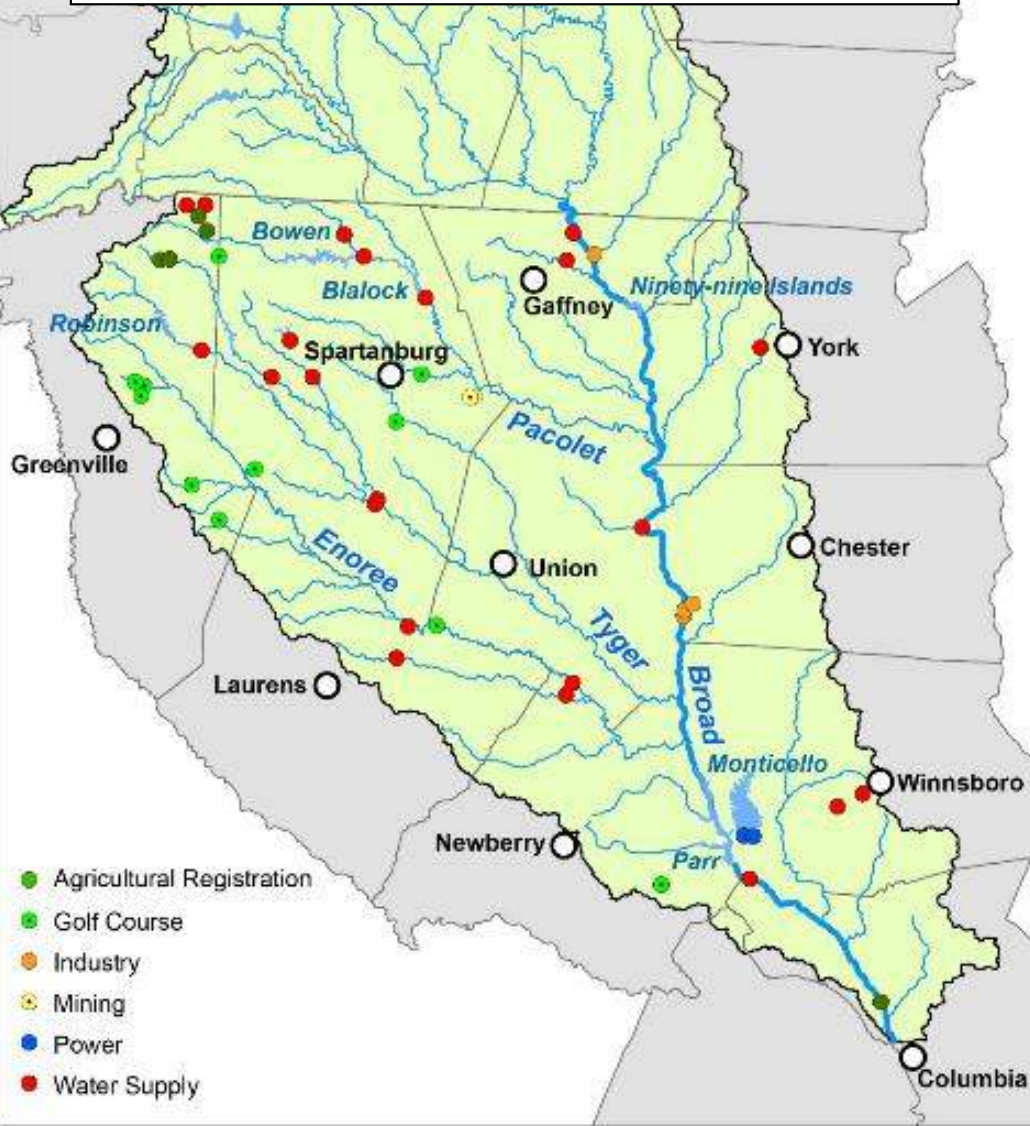


CLEMSON  
UNIVERSITY

# 2020 Reported Surface Water Withdrawals

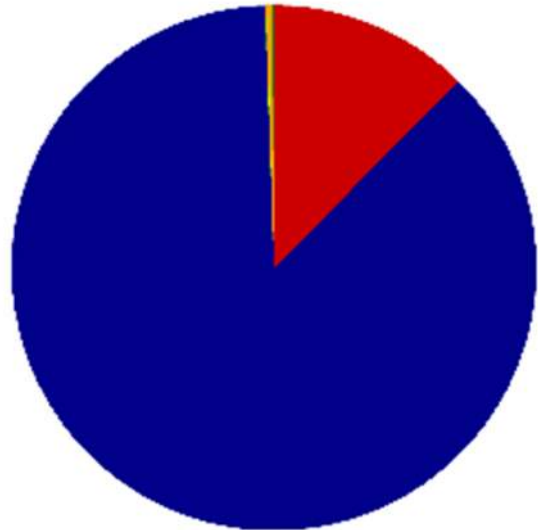


> 99% of total water withdrawals are from surface water



Thermoelectric: 87.0%    Water Supply: 12.4%

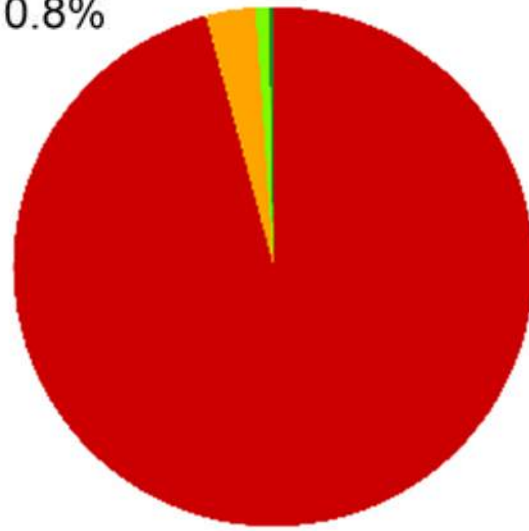
< 1% each:  
Agricultural Irrigation,  
Golf Course,  
Mining,  
Industry



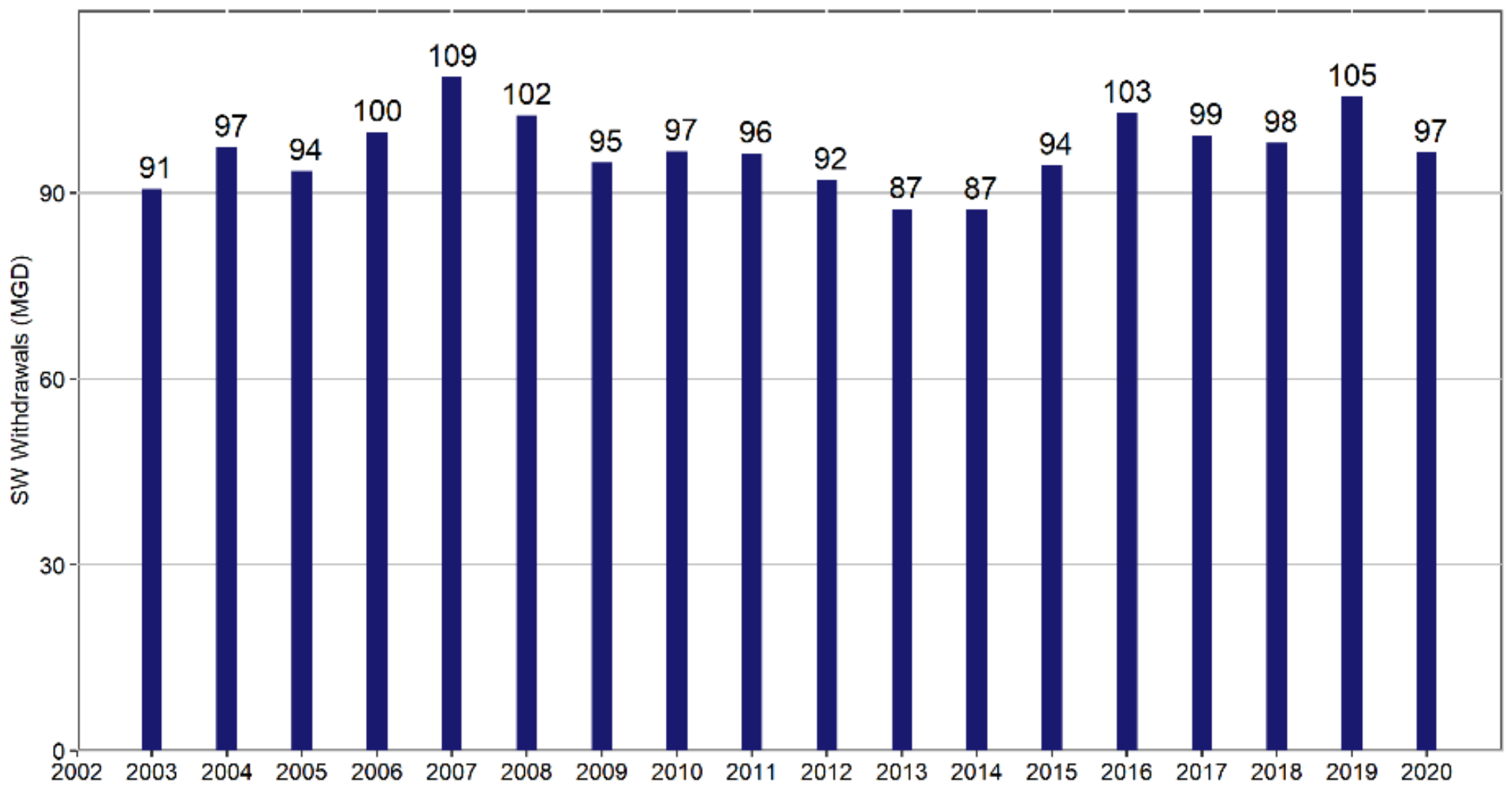
## Excluding Energy...

Water Supply: 95.8%    Industry: 3.0%  
Golf Course: 0.8%

Agricultural Irrigation (0.3%)  
Mining (0.04%)







Data source: SCDHEC Water Use Database





# RBC Support



*The Broad RBC will develop the plan with support from:*

- **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.
- Broad RBC should coordinate with any planning groups in North Carolina to the extent possible.



- 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



# Edisto Basin Planning



- First basin selected for implementing Planning Framework.
- Public kick-off meetings held in November 2019.
- First RBC meeting – June 2020.
- Completed 20 meetings – due to Covid, first 11 meetings were held virtually; in-person meetings began in May 2021.
- River Basin Plan scheduled for completion in summer 2022.



# SCDNR Hydrology Section Website



**Water Planning**

The SCDNR Hydrology Section is responsible for formulating and establishing a comprehensive water resources policy for the State of South Carolina.

**Overview**

The South Carolina Department of Natural Resources (SCDNR) is legislatively mandated through the South Carolina Water Resources Planning and Coordination Act (9-49-1-10, as amended) and the South Carolina Code of Laws (1976) to formulate and establish a comprehensive water resources policy or water plan for the State. The first edition of the South Carolina Water Plan was published in 1981 and was subsequently updated in 2008 to incorporate experiences and knowledge gained from the source-to-sea study of 1990-2007. The 2007 Water Plan highlighted the need for water planning on a regional level.

In 2019, SCDNR published the South Carolina State Water Planning Framework Planning Framework under the guidance of the Planning Process Advisory Committee (PPAC). The Planning Framework defines the process of developing regional water plans, now formerly called River Basin Plans, that will support the development of a new State Water Plan. River Basin Plans will be developed for the eight major river basins in the State – Broad, Catawba, Edisto, Pee Dee, Salkehatchie, Saluda, Santee, and Savannah. To support the development of the River Basin Plans, hydrology models have been developed for both the State's surface water and groundwater resources and will be used along with water demand projections to assess current and future water availability in the State.

**Public Notice: Two Public Meetings Have been Scheduled for March 21<sup>st</sup> and 22<sup>nd</sup> to Kick-off Pee Dee River Basin Planning Activities.**

For more information including times and locations visit the [Pee Dee Basin Planning](#) page.

**State and River Basin Planning Framework**

[Edisto Basin Planning](#)   [Broad Basin Planning](#)   [Pee Dee Basin Planning](#)   [Water Demand Projections](#)

<http://hydrology.dnr.sc.gov/water-planning.html>

**Broad Basin Planning**

Activities and reports on water planning in the Broad River basin.

**Overview**

River basin planning activities in the Broad basin have recently been initiated under the guidance of the [South Carolina State Water Planning Framework](#). Two public meetings were held on November 17<sup>th</sup> in Columbia, SC and on November 21<sup>st</sup> in Spartanburg, SC to kick-off planning activities [see below for meeting agendas and video recordings](#). An overview of the South Carolina State Water Planning Framework was provided and applications to serve on the Broad River Basin Council are currently under solicitation. Formal Council meetings are scheduled to begin in early 2022. Please visit this website for periodic updates and new information regarding Broad River basin planning activities.

**First Broad River Basin Council meeting (agenda) scheduled for March 3<sup>rd</sup>, 2022 at Spartanburg Community College's Tyger River Campus (1875 E. Main St., Duncan, SC, 29334).** The Council will meet in-person. The meeting may be attended virtually as well. Please contact Scott Hender ([shender@dnr.sc.gov](mailto:shender@dnr.sc.gov)) for virtual meeting access information.

SCDNR is currently accepting applications for the **Local Government, Industry and Economic Development, and Water-based Recreation** interest categories.

[Download Application](#)

**Broad Basin Planning Meetings**   **Broad River Basin Council**   **Broad SWAM Model Access**

**Broad Planning News**

- [First Broad River Basin Council Meeting Scheduled for March 3<sup>rd</sup>, 2022](#)
- [Public Meeting scheduled for November 17<sup>th</sup> and 21<sup>st</sup> to kick-off Broad River Basin Planning Activities](#)

[View more news](#)

**Hydrology Calendar**

**Upcoming events**

- [First Broad River Basin Council Meeting](#)  
Thursday, March 3, 2022 from 9:00AM - 12:00PM  
Spartanburg Community College's Tyger River Campus (2022)

<http://hydrology.dnr.sc.gov/broad-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



# River Basin Planning Examples

John Boyer, CDM Smith

# The Four Phases of River Basin Planning

## Phase 1

- Learn about the basins water resources
- Become familiar with rules and laws governing water use
- Evaluate water demand projections
- Become familiar with the modeling tools

## Phase 2

- Evaluate current and future water availability issues
  - Identify and quantify shortages, select surface water conditions, reaches of interest and groundwater areas of concerns



# The Four Phases of River Basin Planning

## Phase 3

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

## 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*

# The RBC Will Identify, Evaluate and Prioritize Water Management Strategies

**Water management strategies** mitigate/eliminate water shortages or increase water supply

- **Demand-side** strategies are intended to reduce water demand
- **Supply-side** strategies are intended to increase the amount of water available for use



# RBCs will make **Technical, Legislative and Process Recommendations** as part of the River Basin Plan

- **Technical**

- Need for additional data, decision-making tools
- Need for studies on specific topics/issues

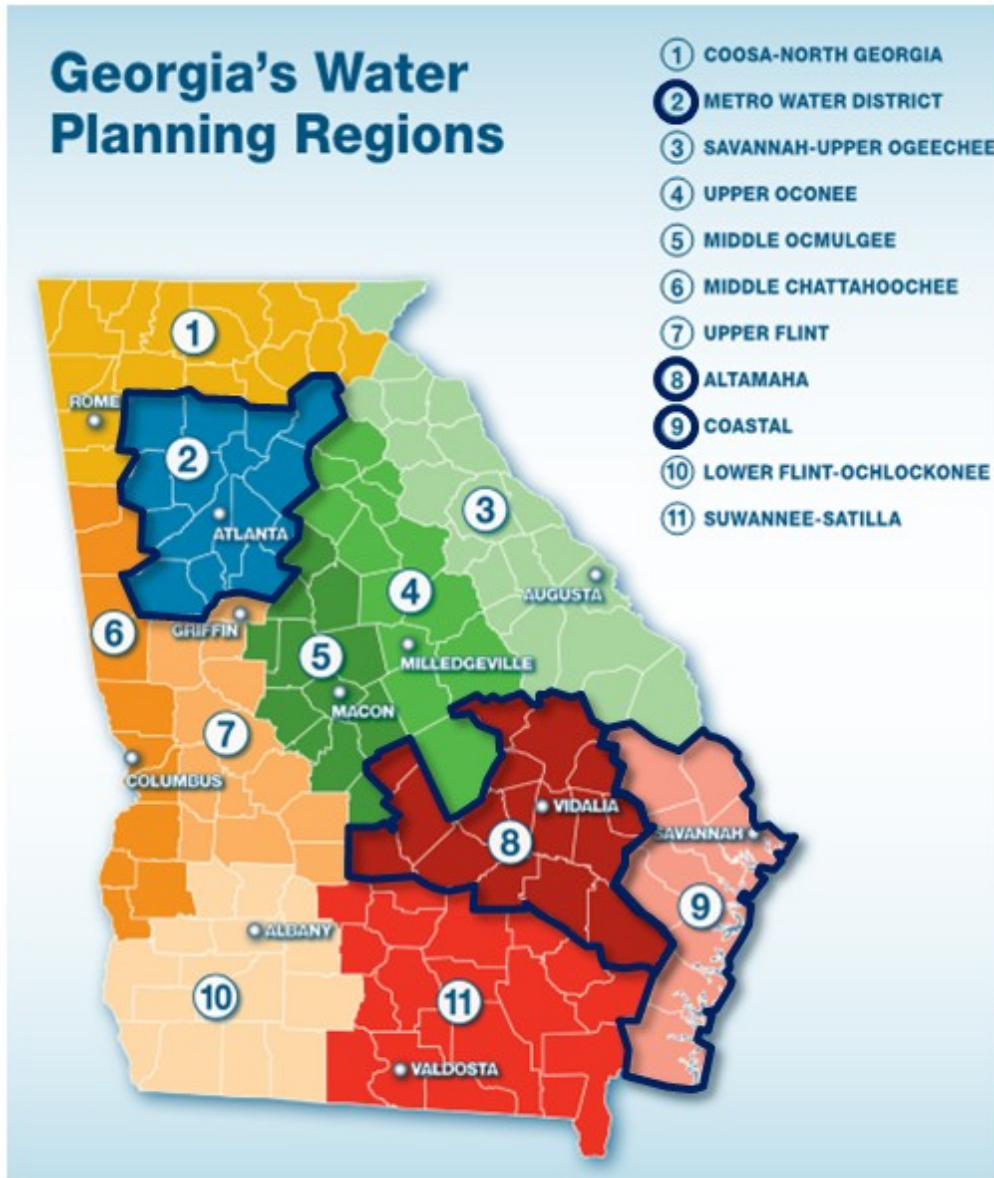
- **Policy, Legislative, or Regulatory**

- Revisions to existing laws and regulations
- New laws or regulations
- Recurring funding

- **Process**

- Changes to RBC membership, bylaws, procedures, etc.

# Examples - Regional Water Plans in Georgia



## Georgia's Regional Water Plans

<https://waterplanning.georgia.gov/regional-water-plans>

# Coastal Georgia Region

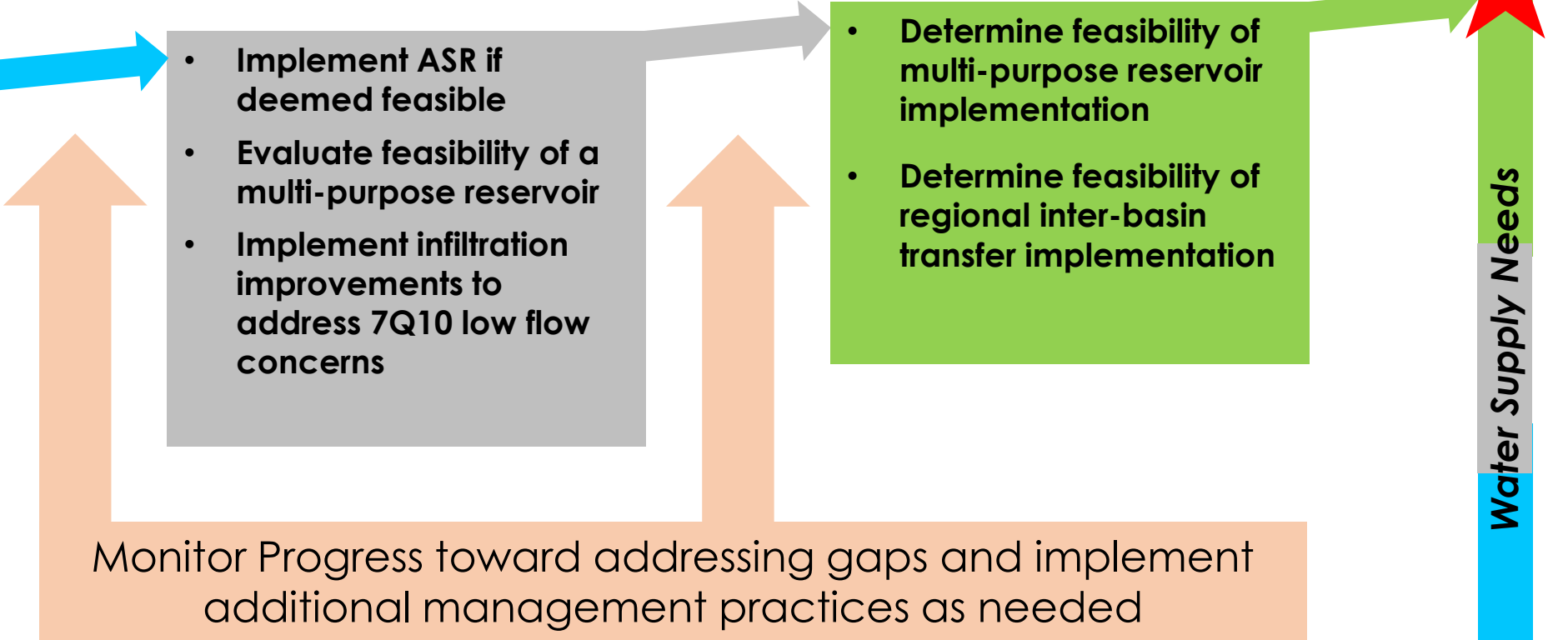
## Regional Water Plan Water Management Strategies and Recommendations

2050 Total Water Supply Needed

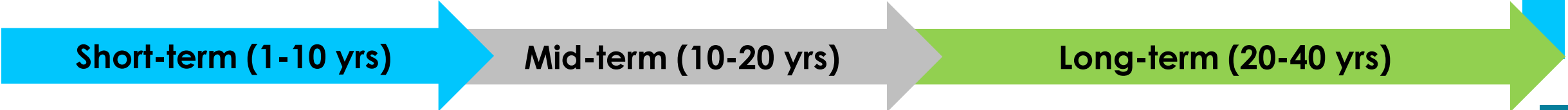
- Replace groundwater with surface water and/or with groundwater outside red and yellow zones
- Evaluate aquifer storage and recovery (ASR)
- Water conservation
- Evaluate potential to use existing storage to address 7Q10 low flow concerns

- Implement ASR if deemed feasible
- Evaluate feasibility of a multi-purpose reservoir
- Implement infiltration improvements to address 7Q10 low flow concerns

- Determine feasibility of multi-purpose reservoir implementation
- Determine feasibility of regional inter-basin transfer implementation



Monitor Progress toward addressing gaps and implement additional management practices as needed



Planning Period 2010 - 2050

# Upper-Flint

## Regional Water Plan Recommendations (examples)

### Technical and Information Needs

- Improve estimates and forecasts of water use by the energy sector to support regional water planning in Georgia.
- Complete a comprehensive assessment of baseline implementation of water conservation and water quality Best Management Practices by agricultural producers.

### Policy, Legislative and Regulatory

- The Council urges the General Assembly and state policymakers not to preclude interbasin transfer (IBT) as an option for future water management in the region.

### Technical and Process

- Recognize the critical need for better use of existing storage and for more storage in the Apalachicola-Chattahoochee-Flint (ACF) System and develop a plan for additional storage working with other councils in the ACF basin.