Drought Management Strategies

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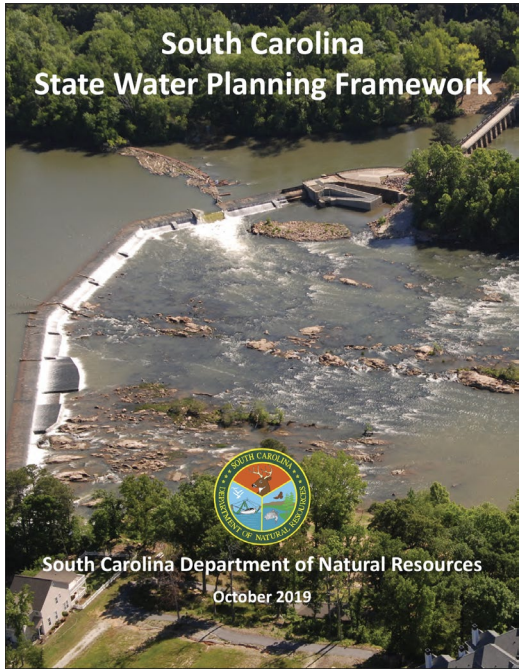

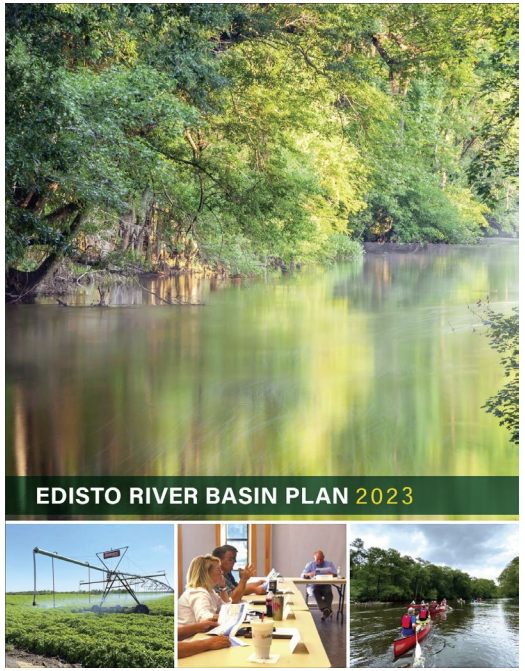

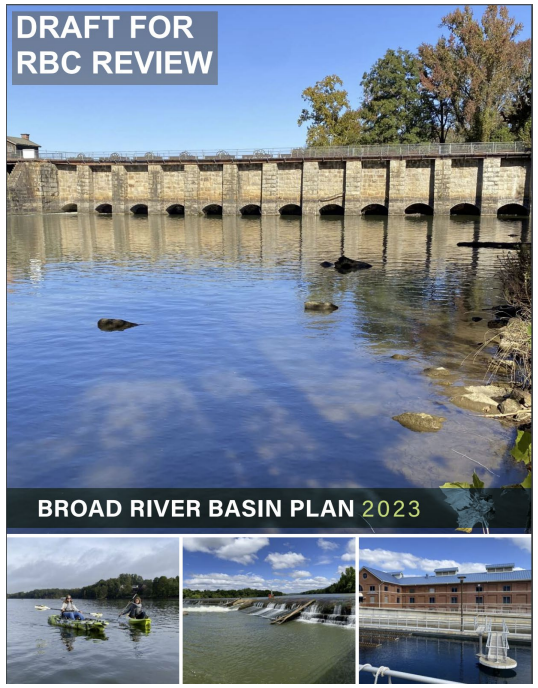

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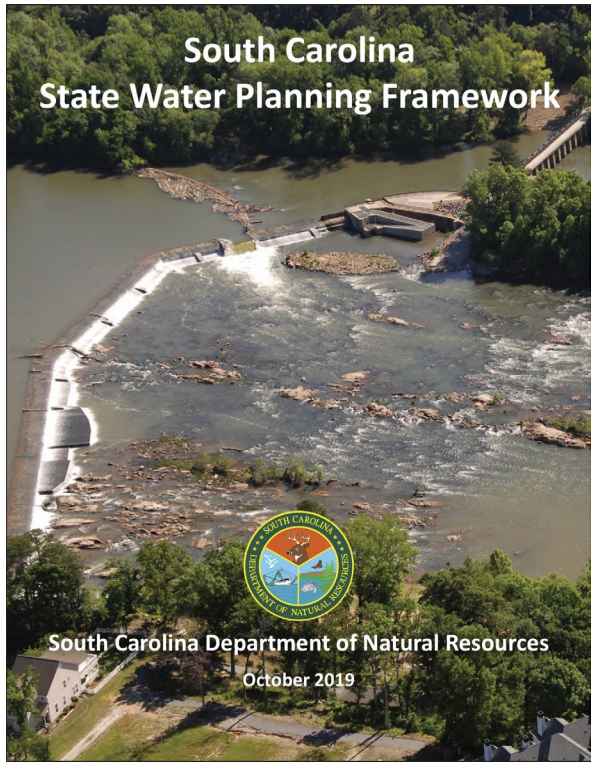
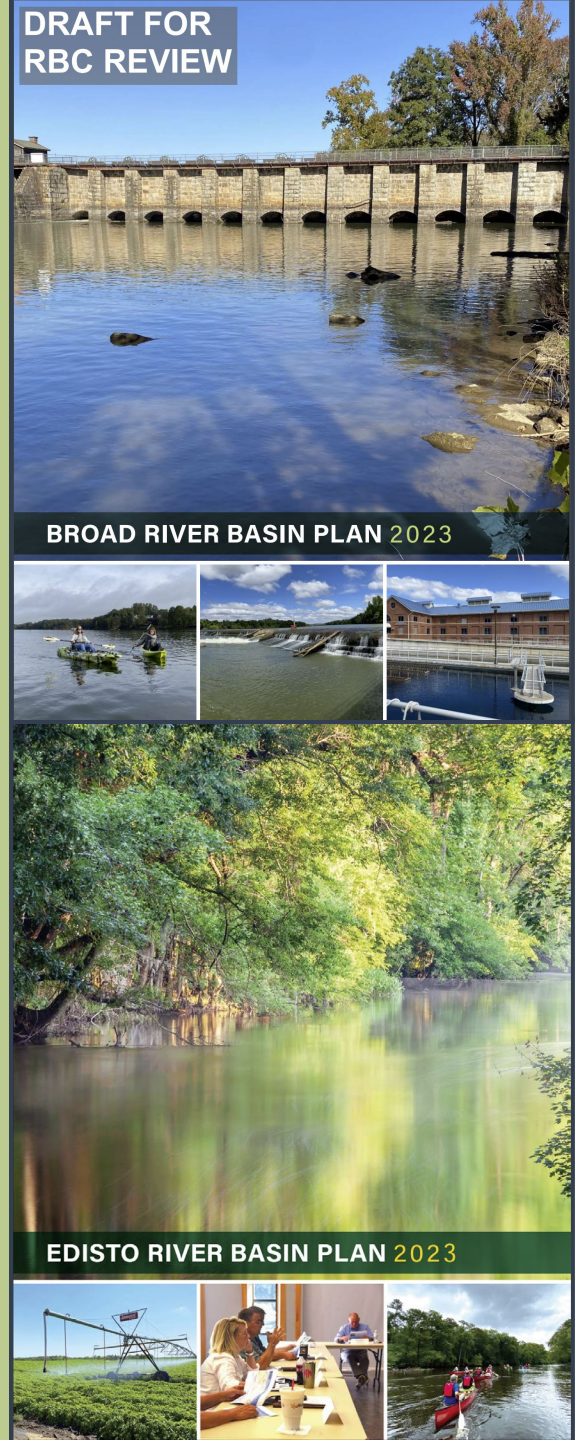
The River Basin Planning Process is Drought Management



*"A collection of water management strategies supported by a summary of data and analyses designed to ensure the surface water and groundwater resources of a river basin will be available for all uses for years to come, even under **drought** conditions."*

Plan Chapters that Count towards Drought Management Strategies



Chapter 6: Water Management Strategies

Chapter 7: Water Management Recommendations

Chapter 8: Drought Response

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Chapter 6: Water Management Strategies

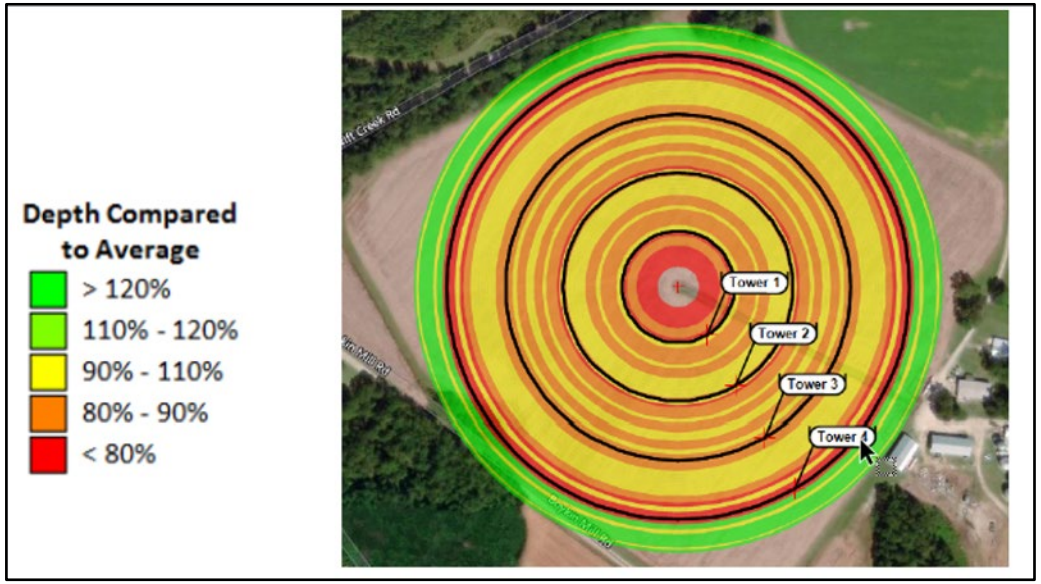
Demand-side strategies vs supply-side strategies

Agricultural strategies & municipal strategies

Chapter 6: Water Management Strategies

Demand-side Agricultural

- Water audits and nozzle retrofits
- Irrigation scheduling
- Soil management
- Crop variety, crop type, and crop conversion
- Irrigation equipment changes



Clemson Extension: Center Pivot Irrigation Test Program
https://www.clemson.edu/extension/water/programs/center-pivot-irrigation-test.html

Chapter 6: Water Management Strategies

Demand-side Municipal

- Conservation pricing structures
- Toilet rebate program
- Landscape irrigation program and codes
- Leak detection and water loss control program
- Car wash recycling ordinances
- Residential water audits
- Water efficiency standards for new construction
- Reclaimed water programs
- Time-of-day water limit
- Public education of water conservation*
- Water waste ordinance*

* *Not included in Broad RBC Plan for municipal strategies*

Chapter 6: Water Management Strategies

Supply-side Edisto Basin

- Conjunctive use
- Offline reservoir storage and small impoundments
- Groundwater pumping from less used different aquifers

Color Code

Potential Moderate/High Adverse Effect	Potential Low Adverse Effect	Likely Neutral Effect (either no effect, or offsetting effects)	Potential Low Positive Effect	Potential Moderate/High Positive Effect

Water Management Strategy	Strategy Type	Consistency with Regulations	Reliability of Water Source	Environmental Impacts and Benefits[1]	Socioeconomic Effects	Potential Interstate or Interbasin Effects	Other Water Quality Considerations
Conjunctive Use	Supply-side	Consistent – Wells that withdraw more than 3 MGD on average are required to apply for a permit under CUA requirements	Expected High reliability but depends on the reliability of the groundwater supply which varies by location and depth of well. There are currently no major cones of depression in the Edisto River basin	**Impacts:** Low anticipated impacts – Expected to be temporary, but extensive and prolonged pumping may draw down groundwater levels potentially leading to aquifer compaction, reduction in well yield, and land subsidence **Benefits:** May increase flow in streams during low flow periods	Moderate anticipated effects – The cost of drilling a new groundwater supply well will vary with local conditions and depth. The effect on a specific operation will depend on its size and financial capacity. Cost is also associated with conveyance and treatment infrastructure to allow switching and or blending of the primary and conjunctive sources.	No anticipated effects	Low to moderate anticipated impacts – Extent of impact depends on quality of local groundwater. Acidic groundwater may not be ideal for crop growth. Hard groundwater may reduce life or irrigation equipment from mineral precipitation
Small Impoundment	Supply-side	Consistent	Medium to high reliability – Reliability depends on climatological factors like precipitation, evaporation, contributing streamflow, and seepage to groundwater	**Impacts:** Medium to high anticipated impacts – Construction of impoundments may disturb existing stream habitat. Reductions in streamflow may adversely impact aquatic species. **Benefits**: Small impoundments may create new habitat	Medium anticipated effects – Costs of design, construction, and any permitting will be borne by the developer. Depending on dam size and classification, permitting requirements may be significant. Costs of inspections and maintenance in keeping with regulations and best management practices	No anticipated effects	Moderate anticipated impacts – Small impoundments may impact water quality of streams due to reduced streamflow. Algae growth may also be a concern

Chapter 6: Water Management Strategies

Supply-side Broad Basin

- Adjust reservoir operations
- Lee nuclear generating station offline storage Season
- Distribution of Gaston Shoals allocation – Gaffney
- Renegotiated Gaston Shoals allowance with FERC licensee – Gaffney
- Raise dam height of Lake Whelchel – Gaffney
- Quarry storage – Gaffney
- New Broad River intake – Gaffney
- Connection to SWS – Gaffney
- New reservoir on King’s Creek – Gaffney
- New regional Reservoir – Gaffney

Chapter 6: Water Management Strategies

Supply-side Broad Basin

Color Code

Potential Moderate/High Adverse Effect	Potential Low Adverse Effect	Likely Neutral Effect (either no effect, or offsetting effects)	Potential Low Positive Effect	Potential Moderate/High Positive Effect

Water Management Strategy	Strategy Type	Consistency with Regulations	Reliability of Water Source	Environmental Impacts and Benefits[1]	Socioeconomic Effects	Potential Interstate or Interbasin Effects	Other Water Quality Considerations
Quarry – Gaffney	Supply	Would require additional state and federal permits for withdrawal, construction, water quality certification, and disposal permits if a new water treatment facility is built.	Strategy has potential to satisfy Gaffney's projected demands through 2070 provided there is sufficient diversion flow or groundwater flow before filling the quarry prior to drought.	**Impacts:** Moderate to high anticipated impacts – Impact of reservoir water levels on groundwater flow must be assessed. Potential impacts of associated pipeline construction on environment and species.	No to low anticipated effects – Construction would initially create jobs but operational staffing would be unchanged from current conditions.	No anticipated effects	Low to high anticipated impacts – water quality impacts to streams from diversions to reservoir should be evaluated. Design must consider potential for contamination from surrounding groundwater and soil.
New Broad River Intake – Gaffney	Supply	Consistent. Would require new surface water withdrawal permit from SCDHEC.	Strategy has potential to satisfy Gaffney's projected demands through 2070.	**Impacts:** Low anticipated impacts – Downstream flows would be minimally impacted by a new withdrawal. Minimum flows may be reduced by 15%, but impact to 1st and 2nd percentile flows would be practically negligible.	No to low anticipated effects – Construction would initially create jobs but operational staffing would be unchanged from current conditions.	No anticipated effects	Low anticipated impacts – water quality impacts to streams from reduced flow should be evaluated for flows at the 1st percentile level and lower.
Connection to SWS – Gaffney	Supply	Consistent.	Strategy may increase resilience and reduce average shortage and frequency of shortage but does not significantly reduce risk of shortage by 2070 when SWS has less excess supply.	**Impacts:** Low anticipated impacts – Downstream flows could be impacted from an increase in withdrawals from SWS's reservoirs to meet Gaffney's additional needs.	Low to moderate anticipated effects – Use of SWS water by Gaffney has potential to deplete SWS supplies prior to drought. Operating rules must be developed to avoid impacts to SWS, which may decrease benefit to Gaffney.	No anticipated effects	Low anticipated impacts – water quality impacts in SWS's reservoirs as a result of changes in drawdown and in downstream streams as a result of altered flow regimes should be evaluated.

Chapter 7: Water Management Strategies Recommendations

Edisto

Table 7-2. Agricultural water management strategy prioritization.

Water Management Strategy	Prioritization
Water Audits and Nozzle Retrofits	1
Irrigation Equipment Changes	2
Soil Management and Cover Crops	3
Irrigation Scheduling	4
Crop Variety, Crop Type, and Crop Conversion	5
Future Technologies	-

Table 7-3. Municipal water management strategy prioritization.

Water Management Strategy	Prioritization
Conservation Pricing Structures	Toolbox of strategies. Priority varies by utility.
Toilet Rebate Program	
Landscape Irrigation Program and Codes	
Leak Detection and Water Loss Control Program	
Car Wash Recycling Ordinances	
Water Waste Ordinance	
Public Education of Water Conservation	
Residential Water Audits	
Water Efficiency Standards for New Construction	
Reclaimed Water Programs	
Time-of-Day Watering Limit	

Broad

Table 7-2. Agricultural water management strategy prioritization.

Water Management Strategy	Prioritization
Water Audits and Nozzle Retrofits	Toolbox of strategies. Priority varies by operation.
Irrigation Scheduling	
Soil Management	
Crop Variety, Crop Type, and Crop Conversion	
Irrigation Equipment Changes	

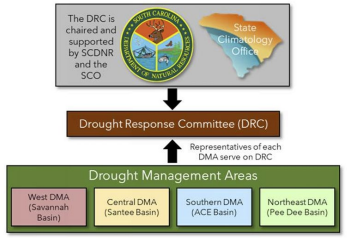
Table 7-1. Municipal demand-side water management strategies.

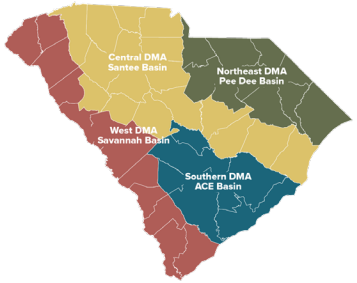
Water Management Strategy	Prioritization
Public Education of Water Conservation	Toolbox of strategies. Priority varies by utility.
Conservation Pricing Structures	
Residential Water Audits	
Landscape Irrigation Program and Codes	
Water Efficiency Standards for New Construction	
Leak Detection and Water Loss Control Program	
Reclaimed Water Programs	
Car Wash Recycling Ordinances	
Time-of-Day Watering Limit	

Chapter 8: Drought Management Strategies

Communication

SC Drought Response Committee (DRC)





The River Basin Council (RBC)

The Communicator (conduit)

- The Chair/Vice Chair of the Council, or an RBC member that is already on the DRC.
- Responsible for communicating RBC input to the DRC during meeting.
- Responsible for communicating DRC decisions and declarations to the RBC.

Chapter 8: Drought Management Strategies

Edisto Basin

Edisto at Givhan's Ferry

Low Flow Management Strategy

To incrementally reduce surface water withdrawals so that water users, including the most down stream users, still have access to water under conditions that may arise during severe and extreme drought.

Takes effect when flow at Givhan's Ferry is less than 20% of long-term flow (based on 7-day average flow).

This approach applies to surface water users whose peak monthly withdrawal has exceeded 60 million gallons/month in any of the last 12 months

- This approach will capture 92 percent of the volumetric withdrawals from the river but will exclude the lower 86% of small withdrawers.

Chapter 8: Drought Management Strategies

Broad Basin

Recommendations:

1. Water utilities review and update their drought management plan and response ordinance every 5 years or more frequently if conditions change.

2. When updating their drought management plans, water utilities look for opportunities to develop response actions that are consistent with those of neighboring utilities.

3. Water utilities coordinate, to the extent practical, their drought response messaging.

4. The RBC encourages water utilities in the basin to consider drought surcharges on water use during severe and/or extreme drought phases.

5. When drought occurs, water users and those with water interests should submit their drought impacts observations through the Conditions Monitoring Observer Reports (CMOR).

Example 1: The ICWD may, at its option, implement the following excessive use rate schedule for water for its residential customers during severe and extreme drought phases:

Tier	Water Usage (gallons per month)	Rate
I	0-5,000	Regular water rate
II	5,000-12,000	Two times the regular water rate
III	Over 12,001	Three times the regular water rate

Drought Plans in Other River Basins

Edisto	
Number of Public Water Systems	22
Number of Drought Plans from 2003	19
Number of Drought Plans Updated	3

Upper Savannah	
Number of Public Water Systems	27
Number of Drought Plans from 2003	20
Number of Drought Plans Updated	6

Broad	
Number of Public Water Systems	12
Number of Drought Plans from 2003	5*
Number of Drought Plans Updated	6

Pee Dee	
Number of Public Water Systems	19
Number of Drought Plans from 2003	17
Number of Drought Plans Updated	2†

Saluda	
Number of Public Water Systems	14
Number of Drought Plans from 2003	10
Number of Drought Plans Updated	4

Year of most updated plan by basin	
Upper Savannah	2009
Pee Dee	2012†
Edisto	2021
Broad & Saluda	2023

Updating Local Level Drought Plans

Things for water systems to consider:

1. When was the plan last updated?
2. Is the listed point of contact still valid?
3. Are water supplies (source and amount) still the same?
4. If you provide wholesale water, does the customer's plan account for your drought plan; or if you buy wholesale water, does your plan account for your provider's drought plan?
5. Are water demands still the same?
6. Are plan triggers (metrics and data points) still valid, and do triggers include DRC declarations?
7. Are water reductions (gal/day or gal/month) at different drought levels effective for supply conservation?
8. Are violation fees effective for getting noncompliant customers to reduce water demands?
9. Does your plan state that it will notify DNR (drought@dnr.sc.gov) when there are changes to enacted conservation levels (worsening **and** improving)?

Thank you!

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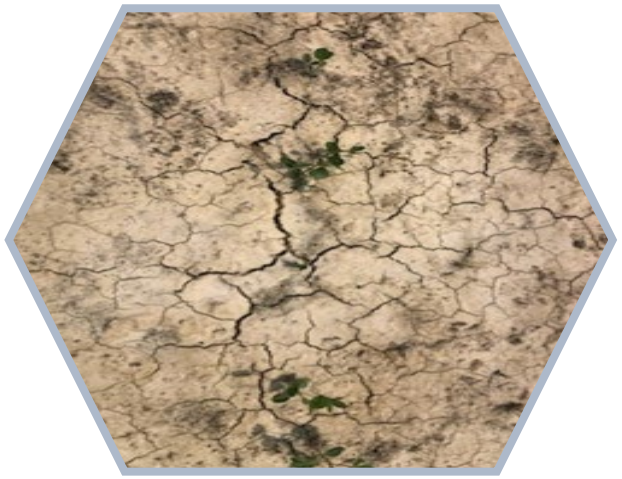

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