



Development of Drought Response Strategies and Recommendations

John Boyer

Agenda Item 4

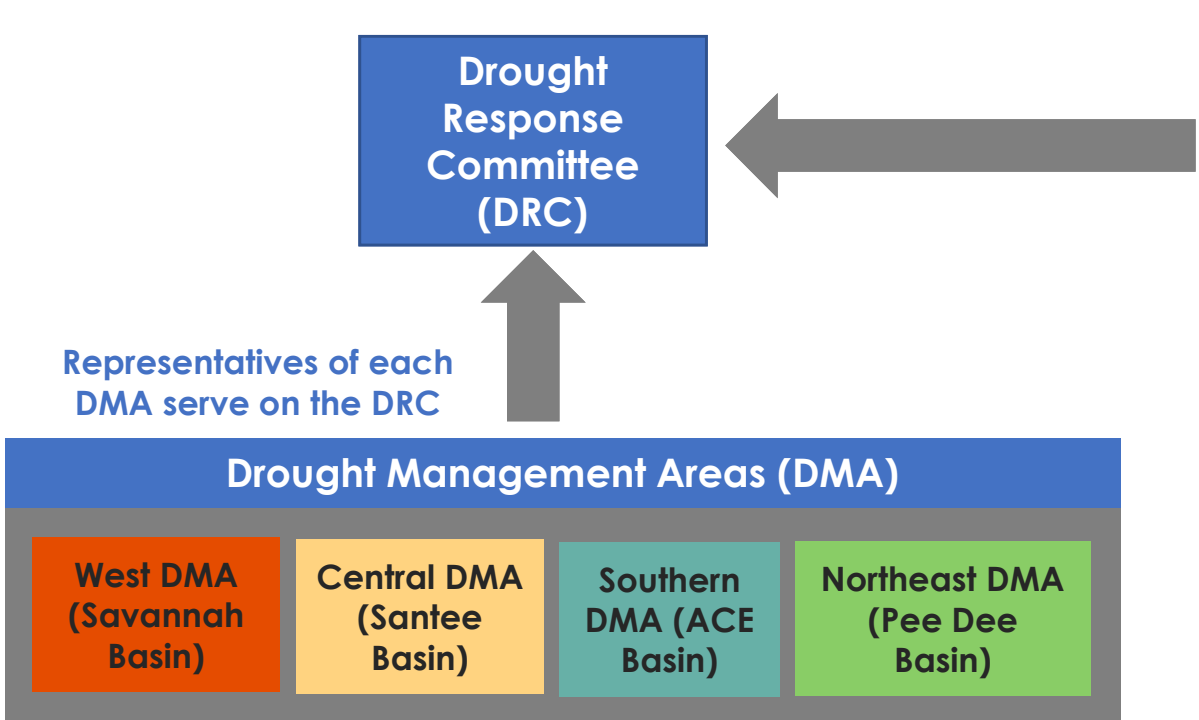
Per the Planning Framework, the Specific Drought Response-related Obligations of the RBC, with Support from SCDNR, are:

1. **Collecting** and **evaluating local hydrologic information** for drought assessment.
2. **Providing local drought information** and recommendations to the DRC regarding drought declarations.
3. **Communicating** drought conditions and drought declarations to the rest of the RBC, stakeholders, and the public.
4. **Advocating** for a coordinated, basin-wide response by entities with drought management responsibilities.
5. **Coordinating** with other drought management groups in the basin as needed.

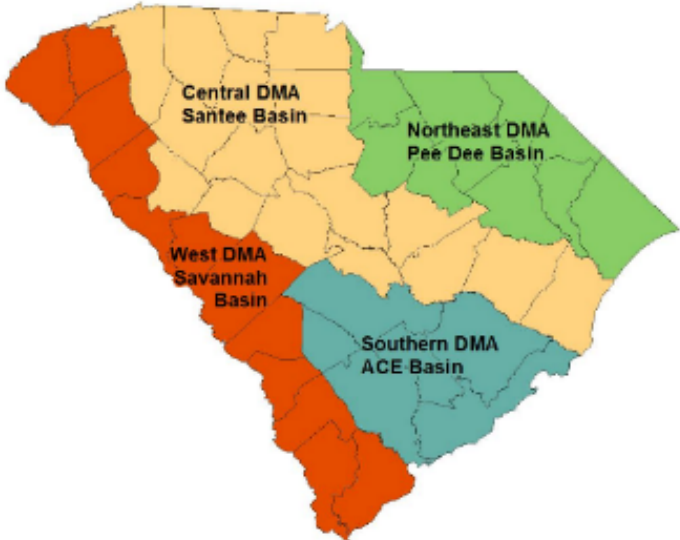
Planning Framework Outline for **Chapter 8. Drought Response**

1. Summarize **existing drought plans** and **drought advisory groups**
2. Summarize any **drought response initiatives** developed by the RBC
3. List **recommendations** on drought management or drought management strategies
4. Include a **communication plan** to inform stakeholders and the public on current drought conditions and activities regarding drought response

South Carolina Drought Response Committee



State Agency Members	
Committee Member	Agency
Mr. Ken Rentiers	SCDNR, LWC Division
Mr. David Thachik	SC Emergency Management Division
Mr. Joe Koon	SCDHEC
Mr. Darryl Jones	SC Forestry Commission
Mr. Chad Truesdale	SC Department of Agriculture



The DRC carefully and closely monitors, conserves, and manages the State's water resources in the best interest of all South Carolinians.



DROUGHT PLANNING GUIDEBOOK

A Resource for Water Systems
in the Palmetto State

Guidance for Reviewing and Updating Drought
Management Plans and Response Ordinances

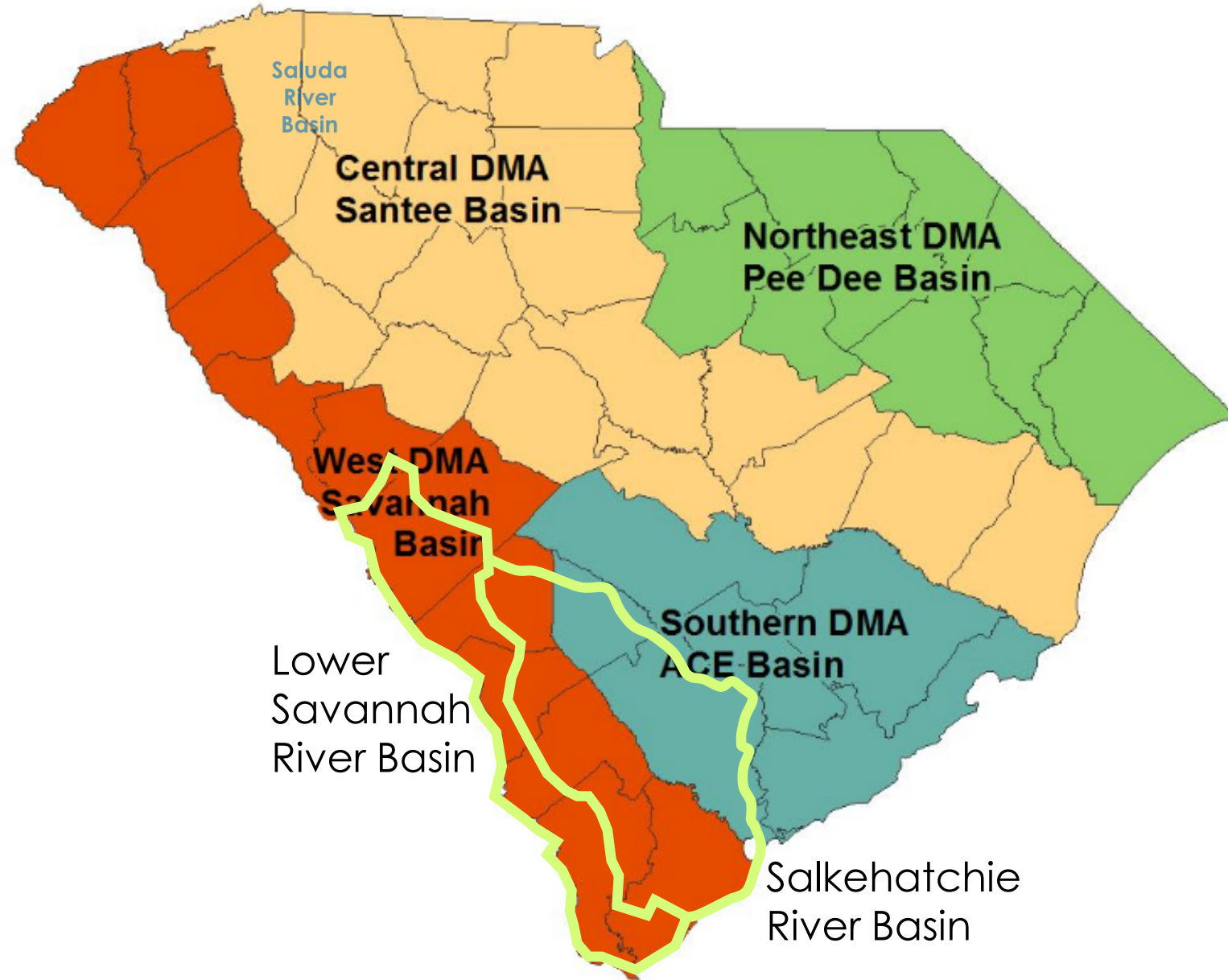
Presented by
The South Carolina State Climatology Office within the
S.C. Department of Natural Resources



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Drought Management Areas



Group	Committee Member	County
Agriculture	Reg Williams	Edgefield
Commission of Public Works	Cheryl Daniels	McCormick
Counties	Mark Warner	McCormick
Domestic User	Eric Carrier	Aiken
Industry	David Evans	Pickens
Municipalities	Vacant	
Power Generation Facilities	Preston Pierce	Oconee
Private Water Supplier	J. Scott Willett	Anderson
Public Service District	Chris Rasco	Anderson
Regional Council of Governments	Rick Green	Edgefield
Soil & Water Conservation Dist.	Yvonne Kling	Aiken
Special Purpose District	Brian Chemsak	Beaufort

West DMA

Group	Committee Member	County
Agriculture	James Traywick	Orangeburg
Commission of Public Works	Jason Thompson	Charleston
Counties	Vacant	
Domestic User	Christopher Sandifer - Appointment Pending	Bamberg
Industry	Vacant	
Municipalities	Eric Odom	Orangeburg
Power Generation Facilities	Matthew McCants	Berkeley
Private Water Supplier	Vacant	
Public Service District	Vacant	
Regional Council of Gov.	Ronald E. Mitchum	Charleston
Soil & Water Conservation Dist.	Marion L. Rizer	Colleton
Special Purpose District	Vacant	

Southern DMA



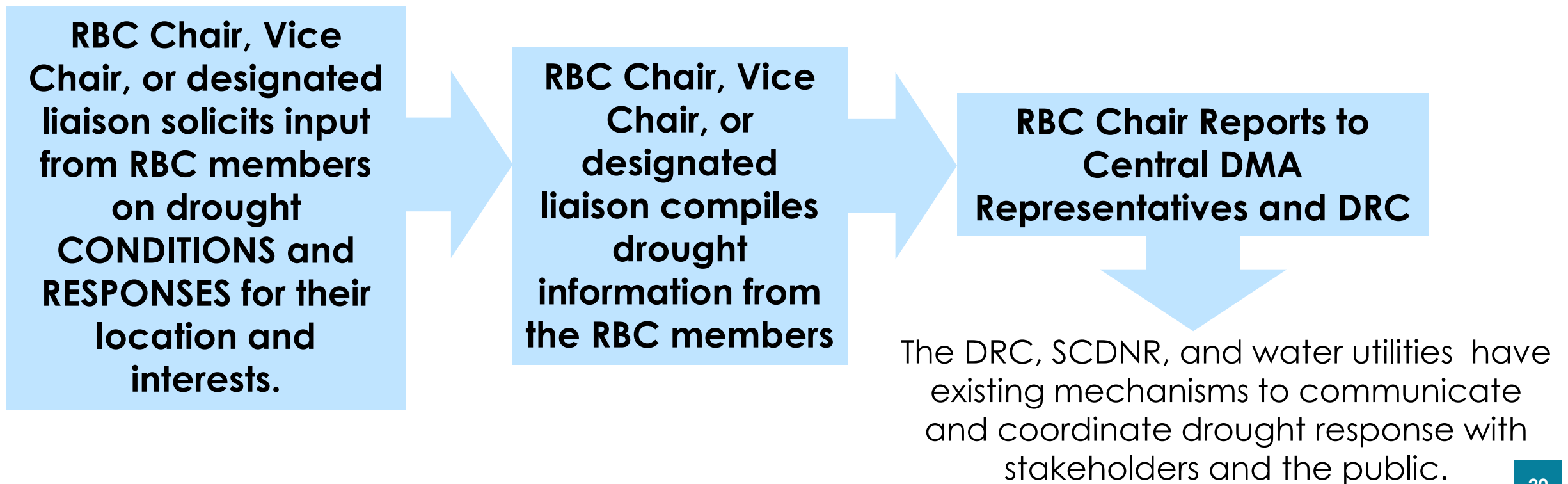
Drought Response – Communication Plan

1. How does the RBC want to **Communicate** to the rest of the RBC, the public, and stakeholders?

Drought Response – Communication Plan

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General approach adopted by the Edisto, Saluda, Broad, and Pee Dee RBCs:

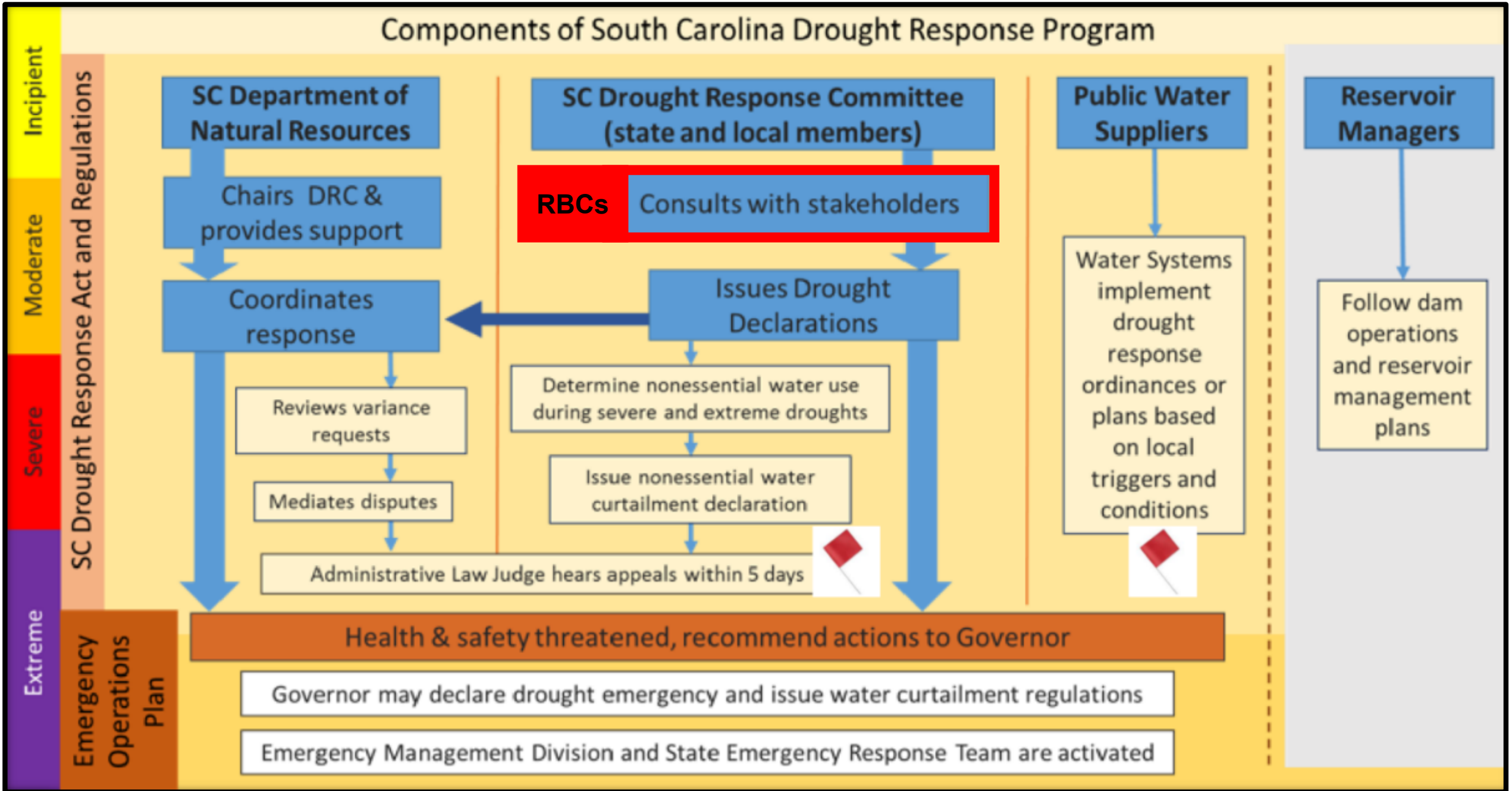


Drought Response – Communication Plan

1. How does the RBC want to **Communicate** to the rest of the RBC, the public, and stakeholders?

The Upper Savannah RBC discussed and agreed on recommending an approach which would eliminate the Drought Management Areas (DMAs), replacing them with the RBCs, or a subset of members representing each RBC. It was acknowledged that this would require a change to the SC Drought Response Act and supporting regulations.

Components of South Carolina Drought Response Program



From: Broad RBC Meeting #3, **Drought Response and Planning in South Carolina**, Elliot Wickham, Ph.D.



Drought Management and Response

2. Does the RBC want to develop any **drought management or response strategies** or make recommendations to adjust any existing strategies?

Example 1: Edisto RBC's Low Flow Management Strategy

The strategy serves to augment statewide and municipal drought management plans by triggering tiered withdrawal curtailment by the **largest surface water users** in the basin when Edisto River flow reaches certain low levels.

Incremental Percent Below 20% of Median Flow	Edisto River Flow Range (cfs) at Givhans Ferry		Reduction Goal for Surface Water Withdrawals
	Lower	Upper	
0-20%	266	332	20%
20-40%	199	266	40%
40-60%	133	199	60%
60-80%	66	133	80%
80-100%	0	66	100%



Example 2: CWWMG Low Inflow Protocol

Stage *	Water Use Reduction Actions		
	Licensee (Duke)	Public Water Suppliers	Owners of Large Water Intakes
0	Reduce Wylie Recreation Flow Releases	None	None
1	Reduce Project Flow Requirements	Implement voluntary water use restrictions, 2 day/wk irrigation, reduce vehicle washing GOAL: 3-5% water use reduction	Request voluntary reductions of customers/employees
2	Eliminate recreation flows, further reduce other Project Flow Requirements	Implement mandatory water use restrictions, 2 day/wk irrigation, eliminate vehicle washing GOAL: 5-10% water use reduction	Request voluntary reductions of customers/employees
3	Reduce releases to Critical Flows	Implement increased mandatory water use restrictions, 1 day/wk irrigation, limit other outdoor water uses GOAL: 10-20% water use reduction	Request voluntary reductions of customers/employees

** Triggers for each stage are based on a storage index, Drought Monitor 3-month avg, and 6-month average streamflows*

Example 3: Upper Savannah Basin Keowee-Toxaway Low Inflow Protocol

LIP Stage Triggers				
Stage	Trigger		US Drought Monitor ² (12-wk avg)	Streamflow (LTA versus previous 4 months) ³
0	Duke Energy Storage Index ¹ < 90% & USACE Storage Index ⁴ < 90%	and one of the following	>=0	< 85%
1	USACE in DP 1		1	< 75%
2	USACE in DP 2		2	< 65%
3	USACE in DP 3		3	< 55%
4	Duke Energy Storage Index < 25%		4	< 40%

Notes:

LTA - long-term average; DP - Drought Plan

¹ The Duke Energy Storage Index is based on the usable storage for Keowee, Jocassee, and Bad Creek as specified in the LIP

² The US Drought Monitor area-weighted average

³ Streamflow gages are composite averages of Twelvemile Creek near Liberty, SC; Chattooga River near Clayton, GA; French Broad River near Rosman, NC

⁴ USACE Storage Index includes usable storage for Hartwell, Russell, and Thurmond

Example 3: Upper Savannah Basin Keowee-Toxaway Low Inflow Protocol

LIP Stage	Duke Energy Storage Index ¹	Minimum Reservoir Elevation ft AMSL		Maximum Weekly Keowee Water Flow Release ac-ft (cfs)	Public Water Supplier Withdrawal Reductions
		Jocassee	Keowee		
0	85% <= Storage Index < 90%	1096	796	25,000 (1800)	na
	80% <= Storage Index < 85%			20,000 (1440)	
1	na	1092	795	18,750 (1350)	3-5% (goal)
2	na	1087	793	15,000 (1080)	5-10% (goal)
3	na	1083	792	10,000 (720)	10-20% (goal)
4	12% < Storage Index < 25%	1080	791.5	7,500 (540) ²	20-30%
	Storage Index < 12%		790	Leakage	

Notes:

¹ Storage Index includes remaining usable storage in Keowee, Jocassee, and Bad Creek

² No releases that would cause Keowee to fall below 791.5 ft AMSL

Example 3: Savannah Basin

USACE 2012/14 Drought Contingency Plan

Trigger Level	Time of Year	Drought Response
1	Jan 1 - Dec 31	IF BR index >10%, Target 4200 cfs (daily average) release at Thurmond Dam IF BR index <10%, Target 4000 cfs (daily average) release at Thurmond Dam
2	Feb 1 - Oct 31	IF BR index >10%, Target 4000 cfs (daily average) release at Thurmond Dam IF BR index <10%, Target 3800 cfs (daily average) release at Thurmond Dam
	Nov 1 - Jan 31	Target 3600 cfs (daily average) release at Thurmond Dam
3	Feb 1 - Oct 31	Target 3800 cfs (daily average) release at Thurmond Dam
	Nov 1 - Jan 31 (Feb 1 – Feb 28 w/NMFS approval)	Target 3100 cfs (daily average) release at Thurmond Dam
4	Feb 1 - Oct 31	Target 3600 cfs (daily average) release at Thurmond Dam
	Nov 1 - Jan 31 (Feb 1 – Feb 28 w/NMFS approval)	Target 3100 cfs (daily average) release at Thurmond Dam



Drought Response

3. Does the RBC want to develop **Recommendations** on drought management?

Drought Response Recommendations

1. The RBC recommends that water utilities review their drought management plan and response ordinance every 5 years and review and update every 10 years or more frequently if conditions change. Once updated, the plans should be submitted to the SCO for review. Changing conditions that could merit an update might include:

- Change in the source(s) of water
- Significant increase in water demand (such as the addition of a new, large wholesale customer)
- Significant change in the proportion of water used by one sector compared to another (e.g., residential versus commercial use)
- Addition (or loss) of another user relying on the same source of water
- New water supply agreement with a neighboring utility

This Recommendation was adopted by the LSS RBC

This recommendation was adopted by the Upper Savannah, Saluda, Broad, & Pee Dee RBCs

This recommendation was not considered by the Edisto RBC



Drought Response Recommendations

1. The RBC recommends that a state funding be made available to water utilities to support the review and update of drought management plans. Water utilities with limited financial and technical capability may benefit from technical assistance to identify appropriate drought triggers and response strategies.

This Recommendation was proposed by the LSS RBC and is subject to final review and approval.

Example Drought Response Recommendations

~~2. The RBC recommends that water utilities, when updating their drought management plan and response ordinance, look for opportunities to develop response actions that are consistent with those of neighboring utilities.~~ While triggers are likely to be unique to each water utility based on their source(s) of water, coordination of response actions identified in their ordinance, to the extent practical, supports consistent messaging through the basin, and helps avoid confusion between customers. Many water utilities in the Broad River basin already meet monthly to discuss and coordinate on various water issues. This standing meeting offers the opportunity to discuss drought response actions, and improve the consistency of those actions, where feasible.

This LSS RBC decided not to advance this as a recommendation in the Lower Savannah and Salkehatchie River basins.

This recommendation was adopted by the Upper Savannah, Broad, & Pee Dee RBCs

This recommendation was not considered by the Edisto RBC

This recommendation was not adopted by the Saluda RBC

This LSS RBC has not yet decided on this recommendation.

Example Drought Response Recommendations

3. The RBC recommends that water utilities coordinate, to the extent practical, their drought response messaging. Consistent and coordinated drought response messaging can be important, especially when there are drought conditions impacting the entire basin and possibly neighboring basins. Consistent and coordinated messaging can help to avoid confusion and provide efficiency. However, the Saluda RBC recognizes that coordinated and consistent messaging may not be possible when drought conditions are appreciably different across the basin, when utilities are in different stages of drought response, or when utilities' response strategies are different.

This recommendation was adopted by the Upper Savannah, Saluda, Broad, & Pee Dee RBCs

This recommendation was not considered by the Edisto RBC

This LSS RBC has not yet decided on this recommendation.

Example Drought Response Recommendations

4. The RBC encourages water utilities in the basin to consider drought surcharges on water use during severe and/or extreme drought phases. Drought surcharges, when used, are typically only implemented if voluntary reductions are not successful in achieving the desired reduction in water use. In some cases, water utilities have already built into their response ordinance the ability to implement drought surcharges during the severe and/or extreme drought phases.

This recommendation was adopted by the Upper Savannah, Saluda, and Broad RBCs

This recommendation included as part of a broader recommendation by the Pee Dee RBC that “value added collaboration be conducted among members and stakeholders to investigate ways to mitigate drought-related risks.

This recommendation was not considered by the Edisto RBC

This LSS RBC has not yet decided on this recommendation.

Example Drought Response Recommendations

5. When droughts occur, the RBC encourages water users and those with water interests to submit their drought impact observations through the **Condition Monitoring Observer Reports (CMOR)**. The CMOR system, maintained by the National Drought Mitigation Center (NDMC), provides supporting evidence in the form of on-the-ground information to help the authors of the U.S. Drought Monitor better understand local conditions. The U.S. Department of Agriculture (USDA) uses the Drought Monitor to trigger disaster declarations and determine eligibility for low-interest loans and some assistance programs. The SCO also reviews and uses the CMOR system in a variety of ways. CMORs can be submitted by clicking the “Submit a Report” button at the NDMC’s Drought Impacts Toolkit website.

Link to CMOR Site: [Condition Monitoring Observer Reports \(CMOR\) \(arcgis.com\)](https://arcgis.com)

This recommendation was adopted by the Upper Savannah, Saluda*, Broad, & Pee Dee RBCs

This recommendation was not considered by the Edisto RBC

**The Saluda RBC also developed recommendations about encouraging the State Climate Office to conduct outreach on use of the CMOR tool, encouraging the NRCS to promote its use, and encouraging use by the Adopt-a-Stream program.*



NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA

Hello John,

We are writing to thank you for submitting a Condition Monitoring Observer Report (CMOR), and to let you know that your photos and observations make a difference. U.S. Drought Monitor authors and state officials may consult CMOR reports along with other data to assess the location and intensity of drought. CMOR reports are a form of citizen science or crowdsourcing.

What does drought look like for you?



Dry corn in Clarendon County, South Carolina, July 10. This area is currently in D3, extreme drought, on the **U.S. Drought Monitor**.

If you are experiencing drought anywhere in the U.S. and need assistance, please visit **farmers.gov** to learn about and apply for relief programs.

Photos over time show contrast



A rancher submitted these photos from Culberson County, Texas, showing Wildhorse Creek in 2022, a wet year, left, and in early July 2024, a dry year, right. This year they are feeding cattle hay and supplements.

Submit from desktop or mobile

You can submit observations and photos from a computer or mobile device, and we have lots of videos and fact sheets to get you started.

