



# Development of Drought Management and Response Strategies and Recommendations

John Boyer

*Agenda Item 5*

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

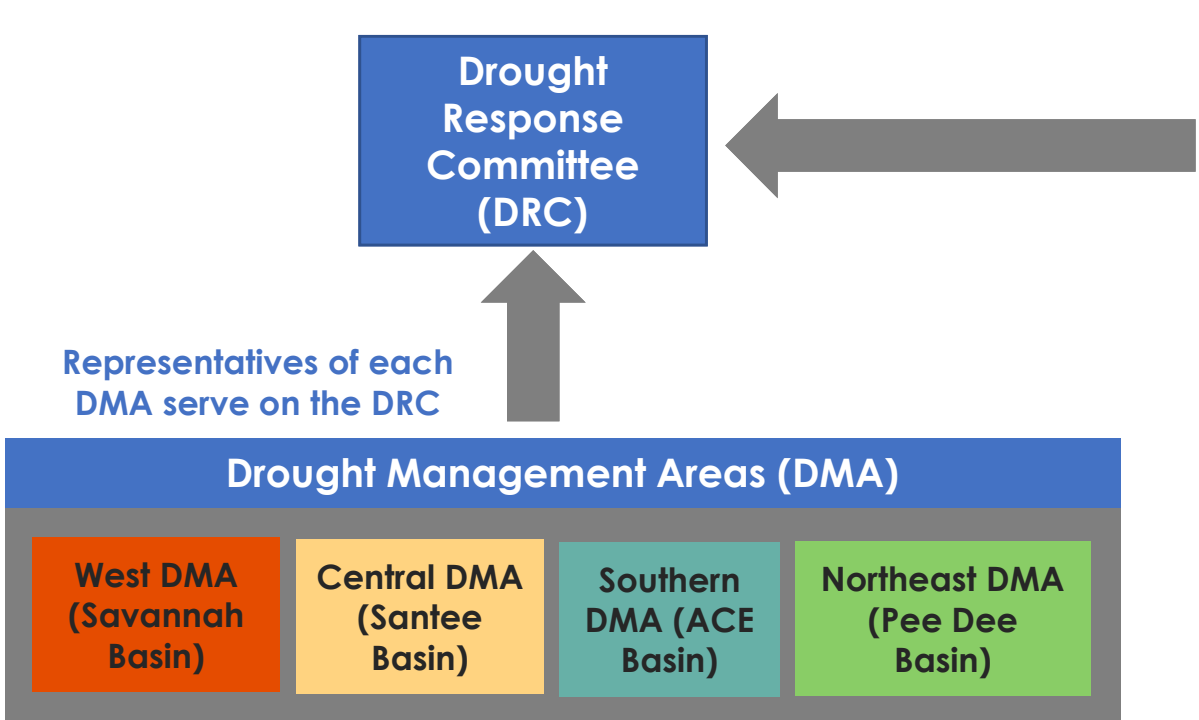
1. Collecting and evaluating local hydrologic information for drought assessment.
2. Providing local drought information and recommendations to the DRC regarding drought declarations.
3. Communicating drought conditions and drought declarations to the rest of the RBC, stakeholders, and the public.
4. 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**

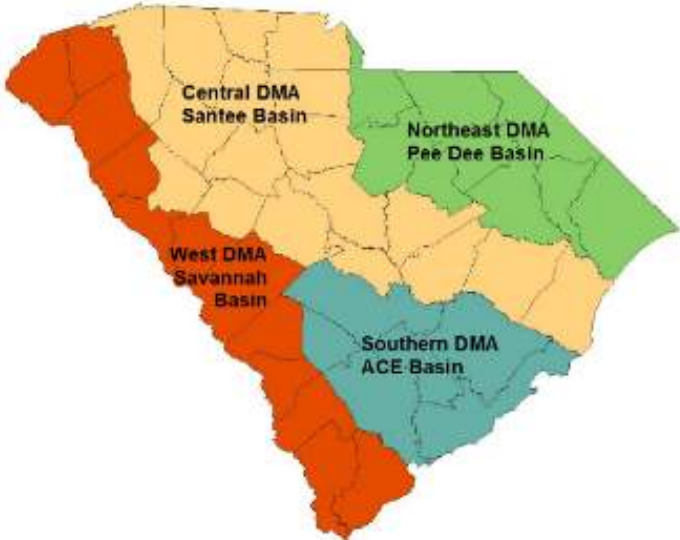
1. Summarize **existing drought plans** and **drought advisory groups**
2. Summarize any **drought response initiatives** developed by the RBC
3. List **recommendations** on drought management or drought management strategies
4. Include a **communication plan** to inform stakeholders and the public on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



# South Carolina Drought Response Committee

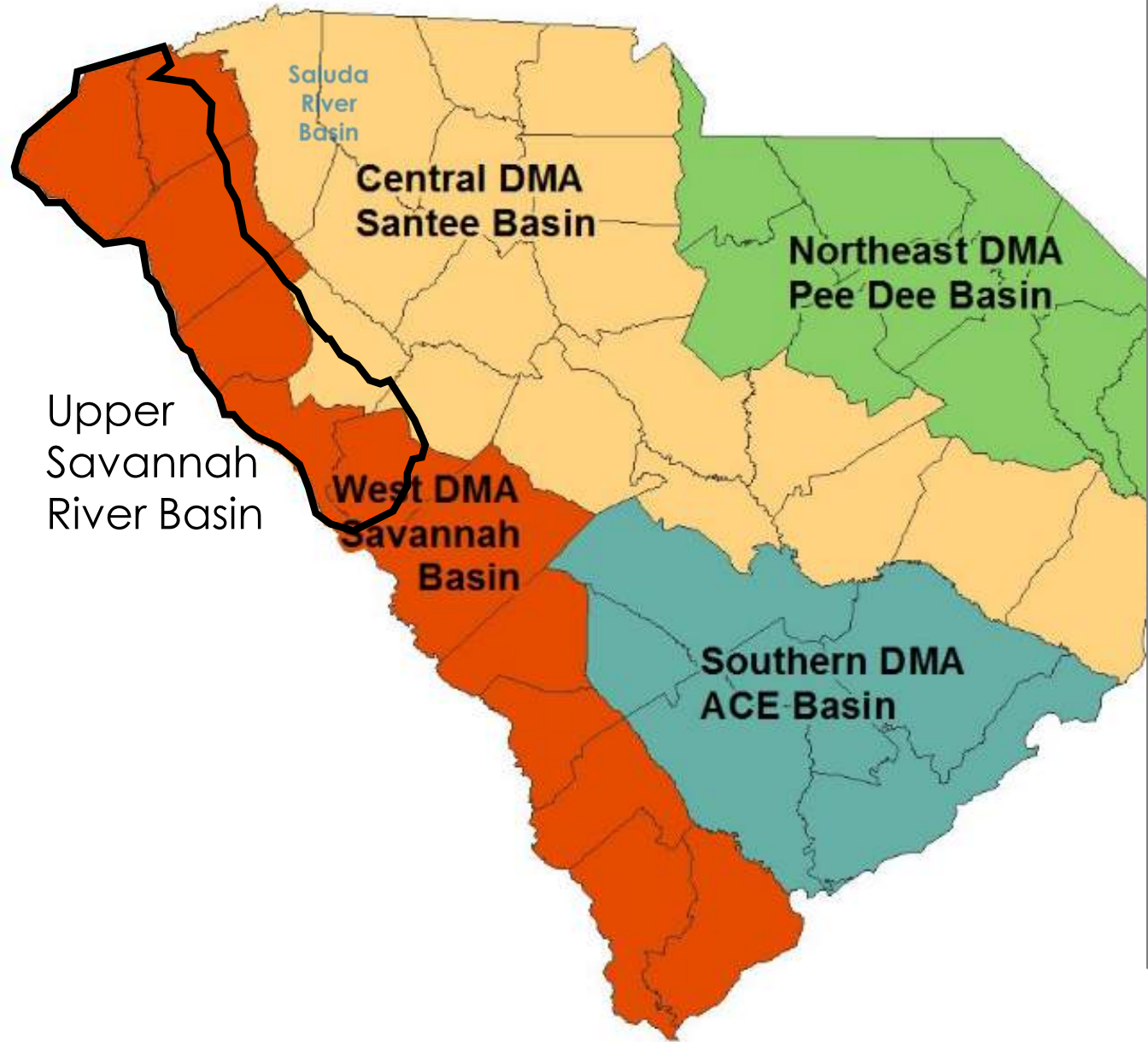


State Agency Members	
Committee Member	Agency
Mr. Ken Rentiers	SCDNR, LWC Division
Mr. David Thachik	SC Emergency Management Division
Mr. Joe Koon	SCDHEC
Mr. Darryl Jones	SC Forestry Commission
Mr. Chad Truesdale	SC Department of Agriculture



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

# Drought Management Areas

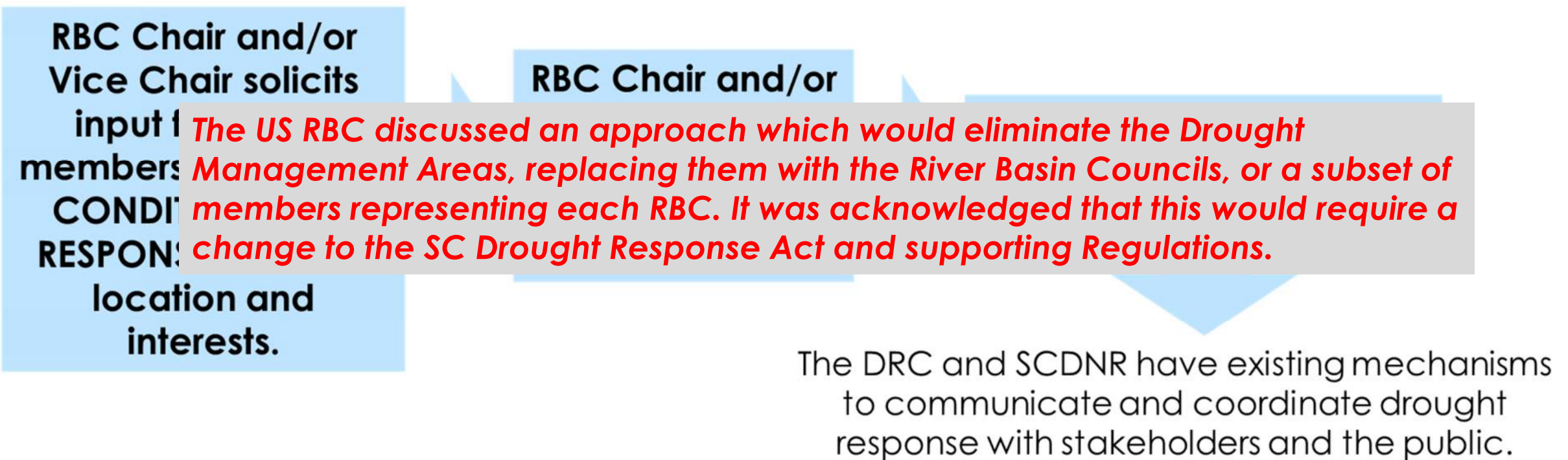


West Drought Management Area		
Group	Committee Member	County
Agriculture	Reg Williams	Edgefield
Commission of Public Works	<a href="#">Cheryl Daniels</a>	McCormick
Counties	<a href="#">Mark Warner</a>	McCormick
Domestic User	<a href="#">Eric Carrier</a>	Aiken
Industry	<a href="#">David Evans</a>	Pickens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

# Drought Response – Communication Plan

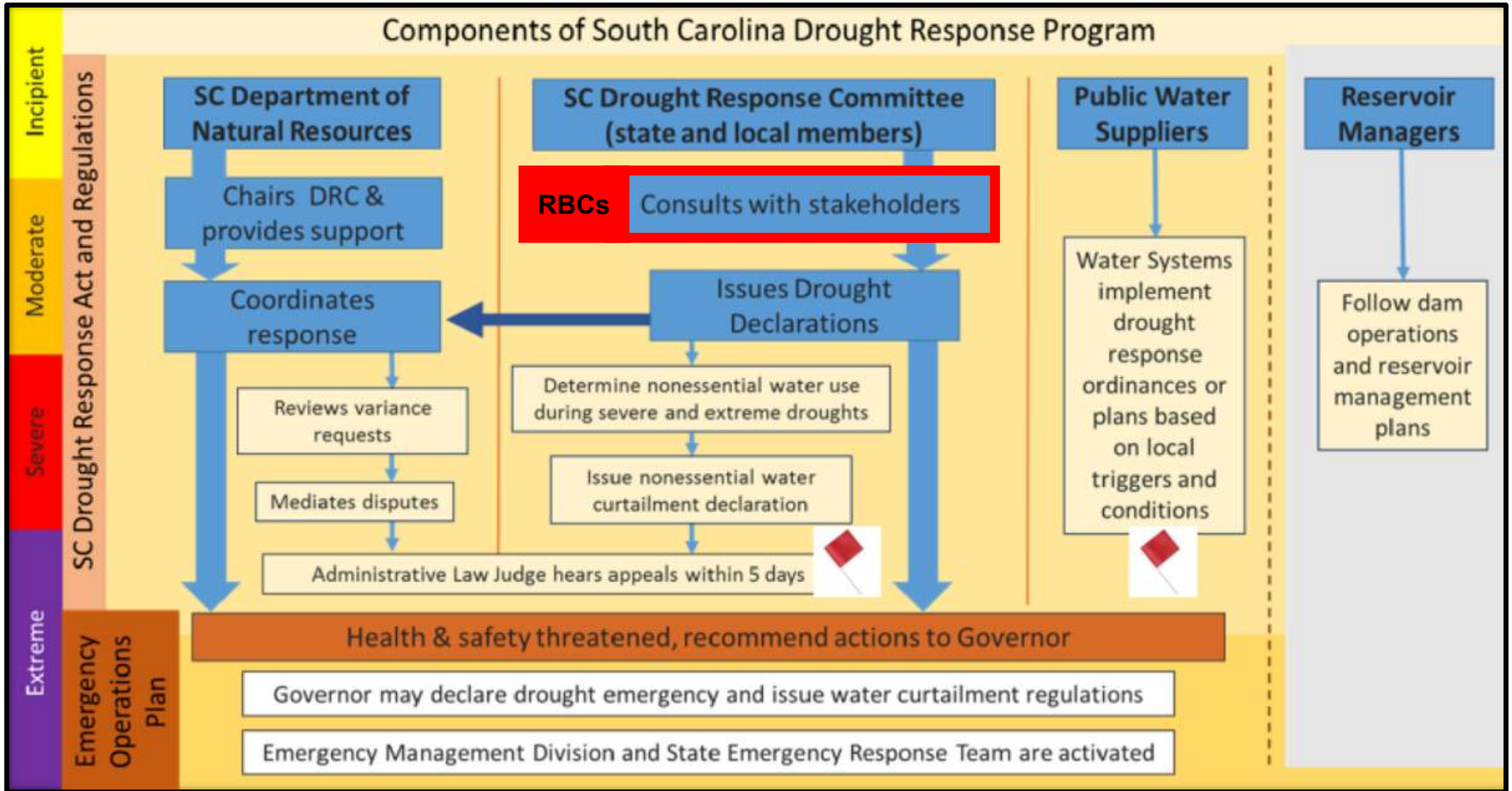
1. How does the RBC want to **Communicate** to the rest of the RBC, the public, and stakeholders?

*One suggested approach (to start a discussion)...*





# Components of South Carolina Drought Response Program





# 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?



# Keowee-Toxaway Low Inflow Protocol Triggers

LIP Stage Triggers				
Stage	Trigger		US Drought Monitor <sup>2</sup> (12-wk avg)	Streamflow (LTA versus previous 4 months) <sup>3</sup>
0	Duke Energy Storage Index <sup>1</sup> < 90% & USACE Storage Index <sup>4</sup> < 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				
<sup>1</sup> The Duke Energy Storage Index is based on the usable storage for Keowee, Jocassee, and Bad Creek as specified in the LIP				
<sup>2</sup> The US Drought Monitor area-weighted average				
<sup>3</sup> Streamflow gages are composite averages of Twelvemile Creek near Liberty, SC; Chattooga River near Clayton, GA; French Broad River near Rosman, NC				
<sup>4</sup> USACE Storage Index includes usable storage for Hartwell, Russell, and Thurmond				

# Keowee-Toxaway Low Inflow Protocol Parameters

LIP Stage	Duke Energy Storage Index <sup>1</sup>	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) <sup>2</sup>	20-30%
	Storage Index < 12%		790	Leakage	

Notes:

<sup>1</sup> Storage Index includes remaining usable storage in Keowee, Jocassee, and Bad Creek

<sup>2</sup> No releases that would cause Keowee to fall below 791.5 ft AMSL

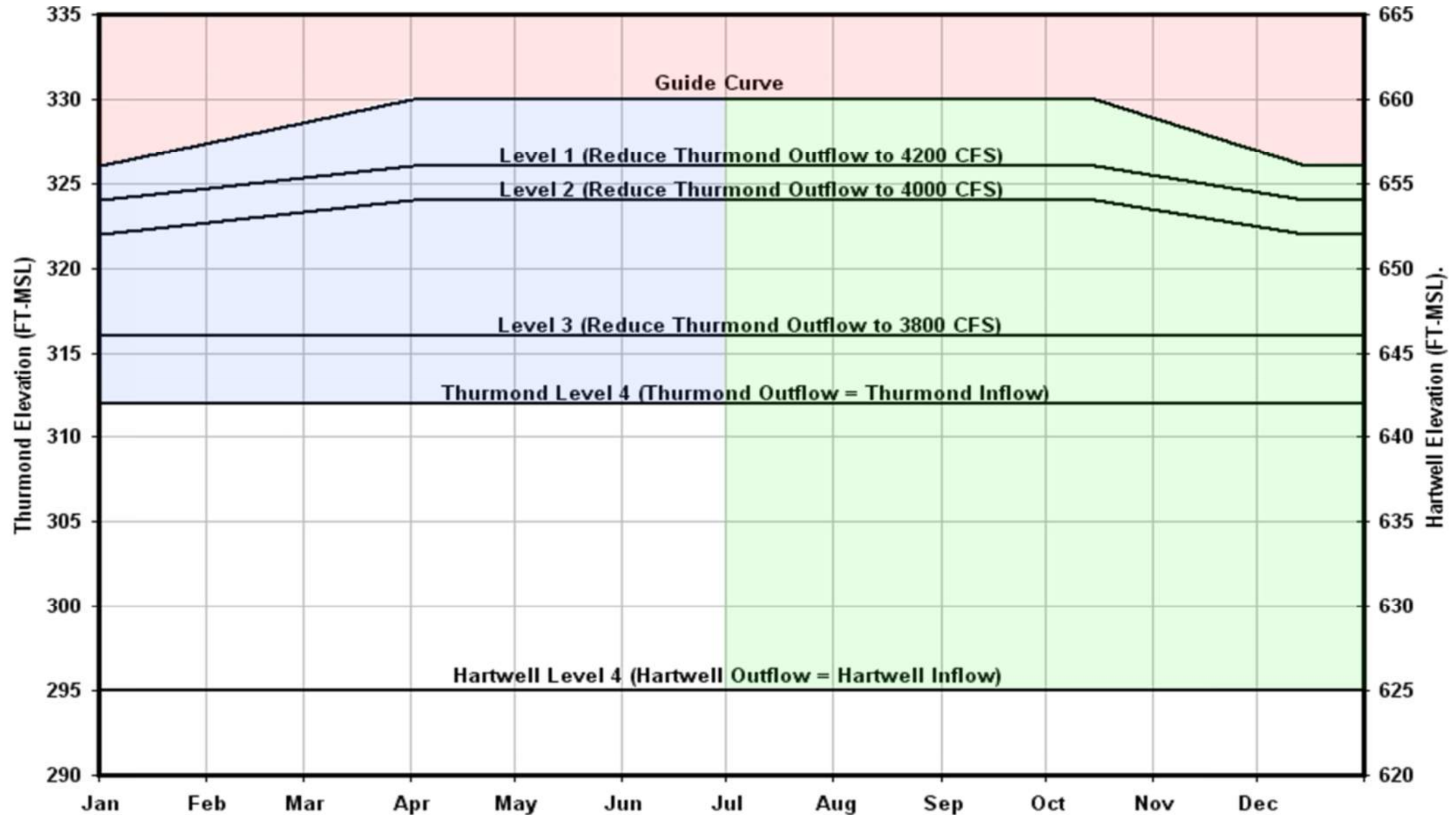
# USACE 2012/14 Drought Contingency Plan

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

Dates in red font represent changes in the 2012 DCP



# USACE Reservoirs Drought Trigger Action Levels





# Drought Response

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

# Example Drought Response Recommendations

**1. The RBC recommends that water utilities review and update their drought management plan and response ordinance every 5 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)
- New interbasin transfers
- 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

*The US RBC adopted this recommendation as written*





# 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.

*The US RBC adopted this recommendation as written*



# Example Drought Response Recommendations

3. The RBC recommends that water utilities coordinate, to the extent practical, consistent drought response messaging.

*The US RBC adopted this recommendation as written*

# 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 the Upper Savannah River basin, several water utilities have already built into their response ordinance the ability to implement drought surcharges during the severe and/or extreme drought phases. One example is detailed below: (McCormick)

*The US RBC adopted this recommendation as written*

## **For later technical recommendation consideration:**

*- Discourage decreasing block rate structures.*



# 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.

*The US RBC adopted this recommendation as written*