



Drought Management and Response Part 1

Agenda Item 4

Per the Planning Framework, the Specific Obligations of the RBC, with Support from the 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

Drought Monitoring in South Carolina

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Water Resource Climatologist

SC State Climatology Office

Drought Monitoring in South Carolina

South Carolina Drought Response Committee



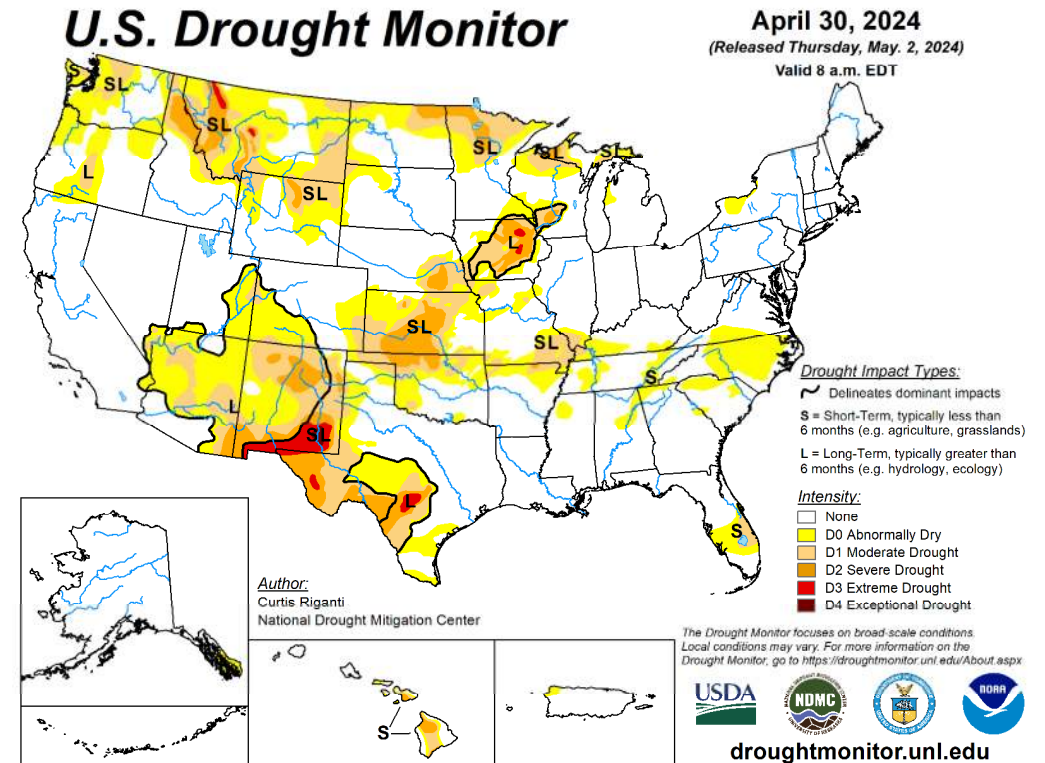
Current Status

Category	Number of Counties
Normal	46
Incipient	0
Moderate	0
Severe	0
Extreme	0

Number of Counties in Each Category

Latest Drought Committee Meeting: 01-11-2024

[Drought Conditions >>>](#) Find out more about current drought conditions, how drought status is determined in South Carolina, and view archived drought condition reports.



The SC Climate Office leads the drought monitoring efforts for the state

South Carolina Drought Response Committee (DRC)

Why: To carefully and closely monitor, conserve, and manage the State's water resources in the best interest of all South Carolinians.

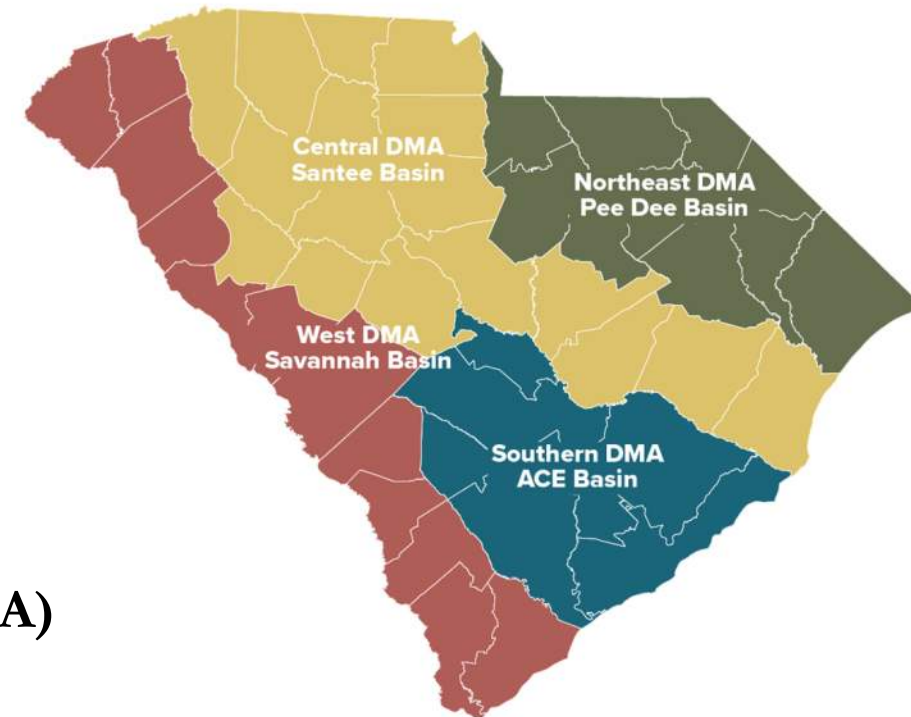
Who: Drought Response Committee and Department of Natural Resources – State Climatology Office

Statewide members

- Forestry Commission
- Department of Agriculture
- Emergency Management Division
- Department of Health and Environmental Control
- Department of Natural Resources

Local members (12 per DMA)

- Water Utilities
- Regional Council of Governments
- Power Generation Facilities
- Soil and Water Cons. Districts
- Agriculture
- Domestic User
- Industry



The DRC has 53 members

SCDNR

State Climatology
Office

South Carolina Drought Response Committee (DRC)

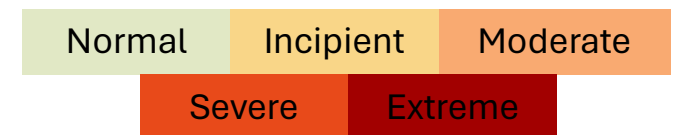
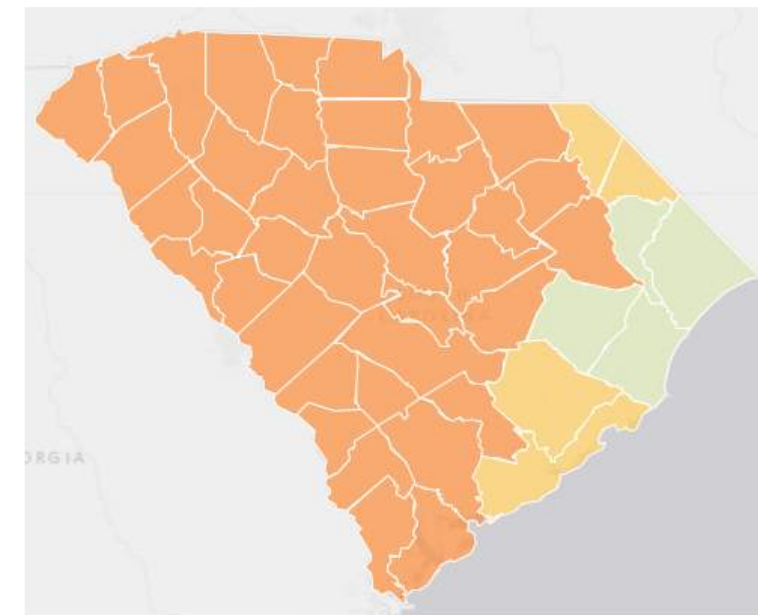
The DRC:

1. Meets as needed
2. Makes county-level designations for drought severity
 - Normal
 - Incipient
 - Moderate
 - Severe
 - Extreme
3. At severe and extreme levels will make recommendations for non-essential water curtailment for only public water suppliers

Public Water Suppliers:

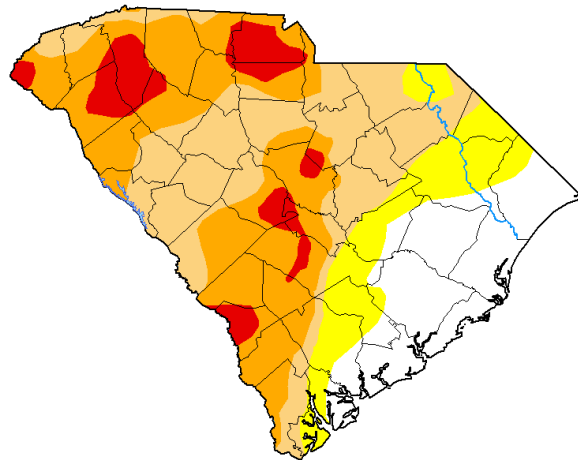
1. Are required to have local drought management plans and response ordinances for water conservation and may enact their plans based on DRC county-level drought designations.

SC Drought Declaration
Map by County
(10/17/2019)



DRC Indicators

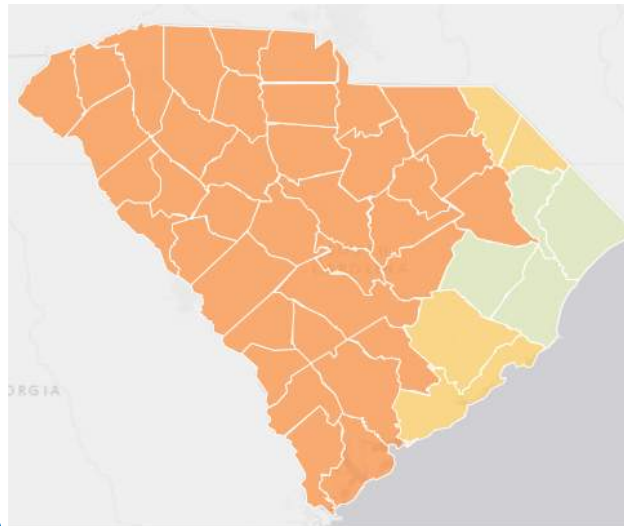
US Drought Monitor Map
10/15/2019



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

SC Drought Declaration Map
by County
(10/17/2019)



- Normal
- Incipient
- Moderate
- Severe
- Extreme

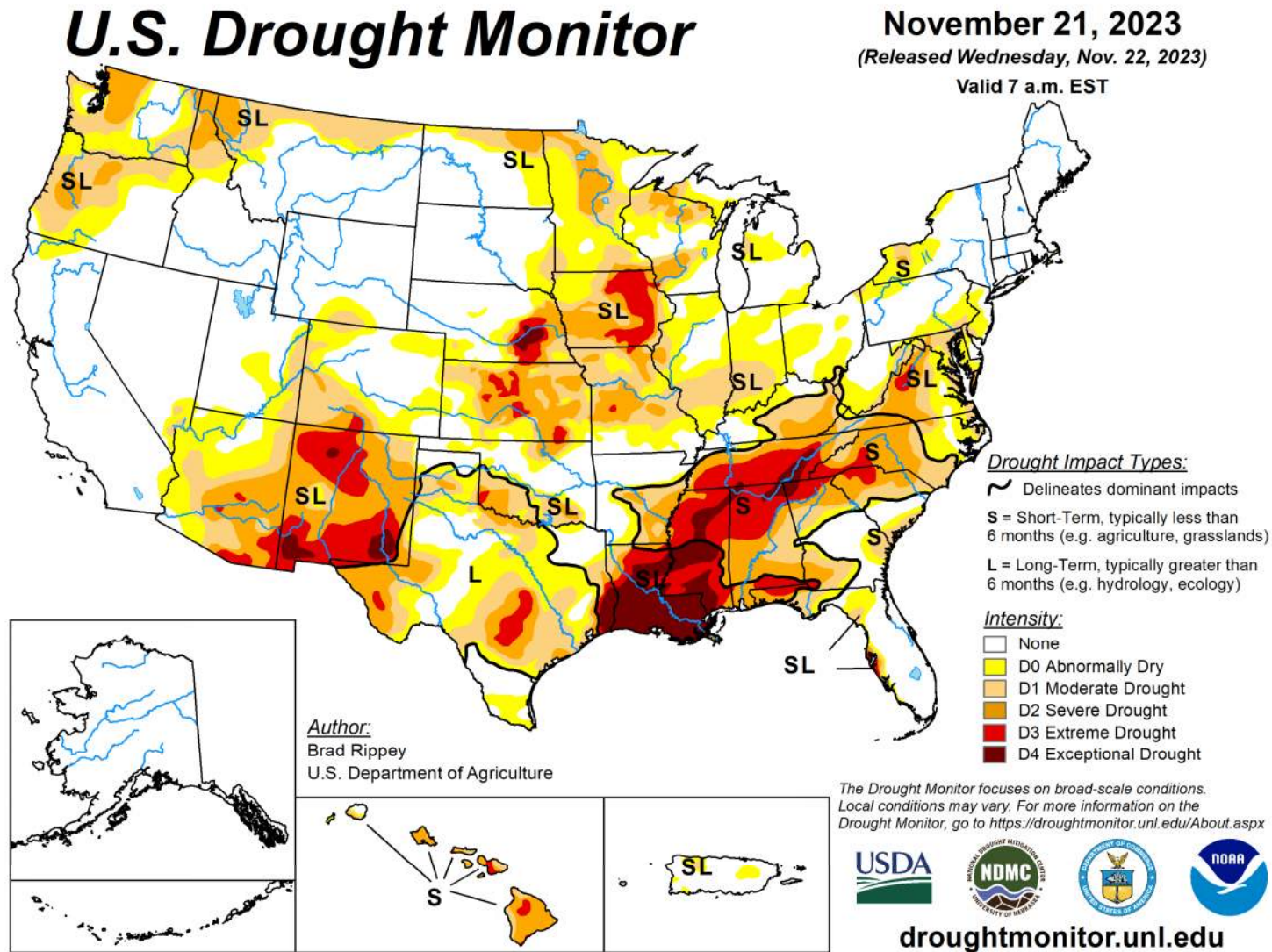
Indicators used
for SC DRC

- Palmer Drought Severity Index (PDSI)
- Crop Moisture Index (CMI)
- Standard Precipitation Index (SPI)
- Keetch-Byram Drought Index (KBDI)
- Average daily streamflow
- Groundwater Levels

DRC Indicators and Severity Levels

INDICATOR	DROUGHT PHASE			
	INCIPIENT	MODERATE	SEVERE	EXTREME
PALMER DROUGHT SEVERITY INDEX (PDSI)	-0.50 to -1.49	-1.50 to -2.99	-3.00 to -3.99	≤ -4.00
CROP MOISTURE INDEX (CMI)	0.00 to -1.49	-1.50 to 2.99	-3.00 to -3.99	≤ -4.00
STANDARD PRECIPITATION INDEX (SPI)	0.00 to -0.99	-1.00 to -1.49	-3.00 to -3.99	≤ -2.00
KEETCH-BYRUM DROUGHT INDEX (KBDI)	300 to 399	400 to 499	500 to 699	≥ 700
U.S. DROUGHT MONITOR (USDM)	D0	D1	D2	≥ D3
AVERAGE DAILY STREAMFLOW	111%-120% of the minimum flow for 2 consecutive weeks (CW)	101%-110% of the minimum flow for 2 CW	Between the minimum flow and 90% of the minimum flow for 2 CW	≤ 90% of the minimum flow for 2 CW
GROUNDWATER, STATIC LEVEL IN AQUIFER	between 11-20ft above trigger level for 2 consecutive months (CM)	between 1-10ft above trigger level for 2 CM	between trigger level and 10ft below for 2 CM	≤ 10ft below the trigger level for 2 CM

The United States Drought Monitor (USDM)



National product to map drought severity and extent

Aims to capture and depict all types of drought

Some programs use this product for agricultural aid

The USDM Process

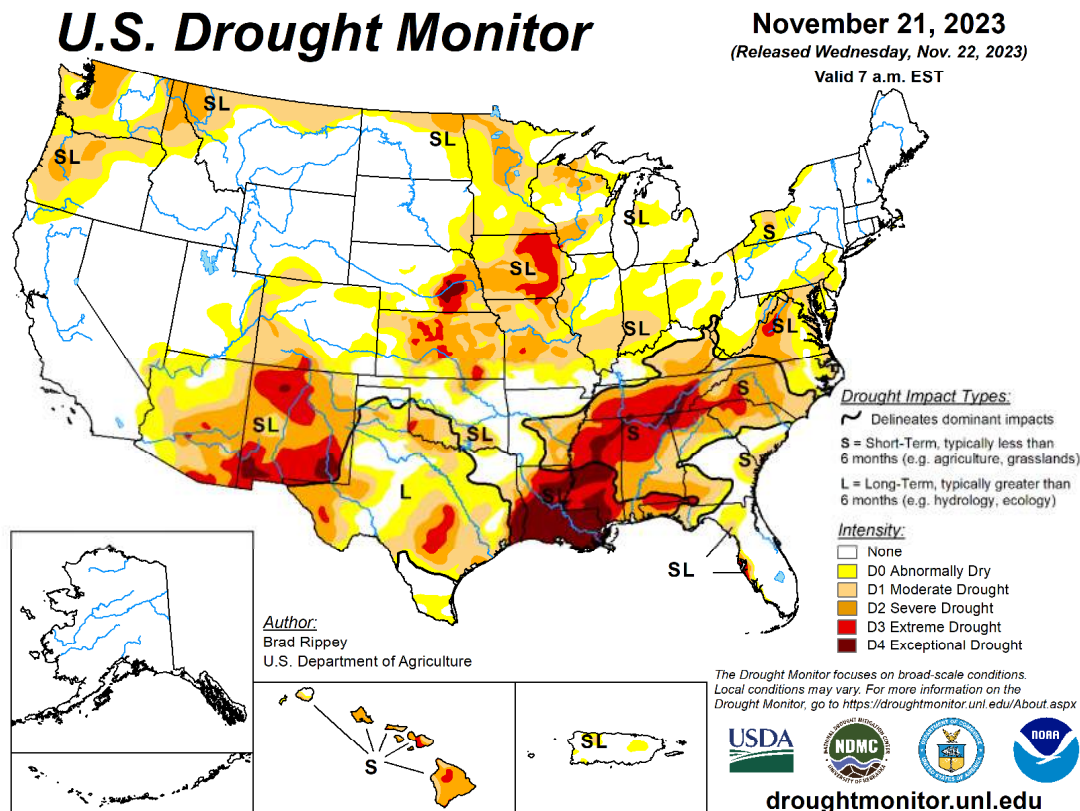
The map is updated each week by one author

All authors are part of federal entities

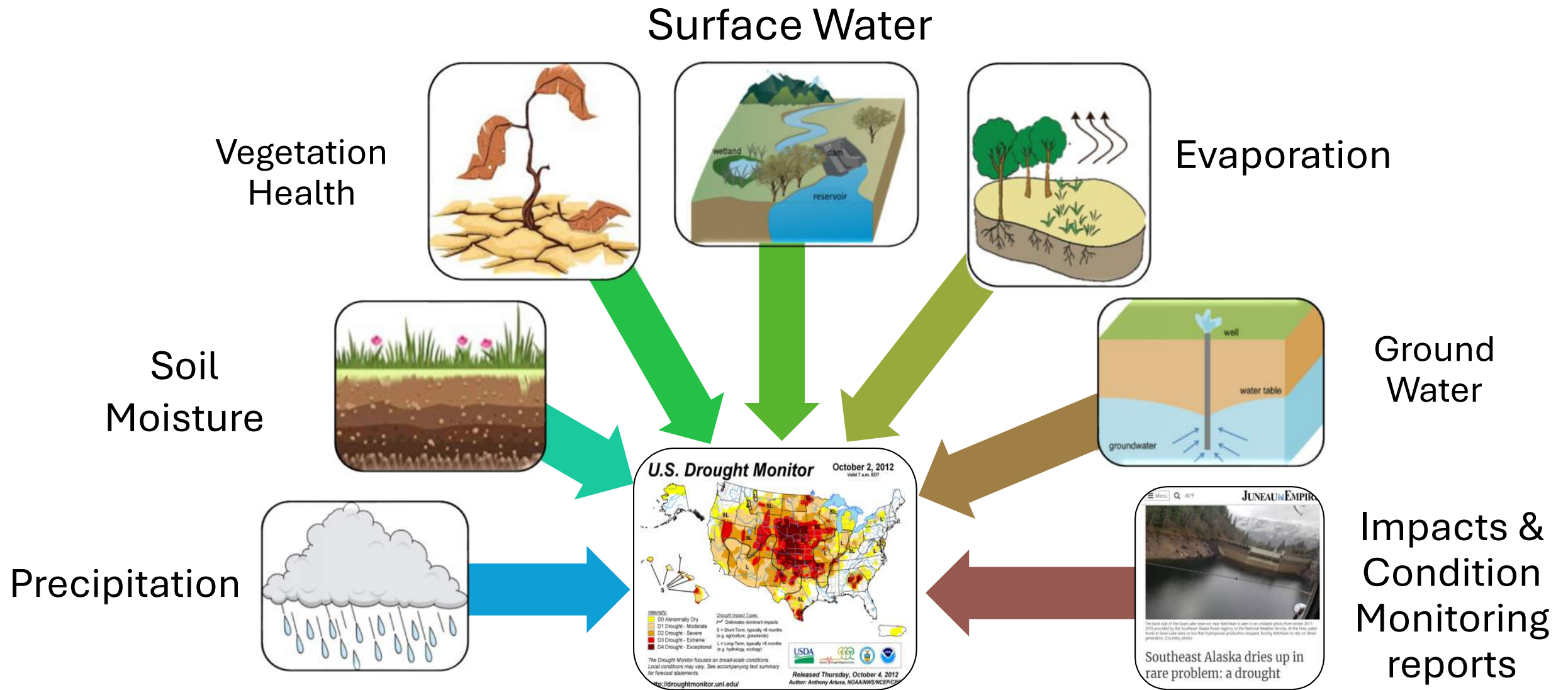
USDM categories are based on convergence of evidence from multiple data points & indicators

Most states provide input to help the author accurately depict local conditions

The author gets final say on what the map depicts



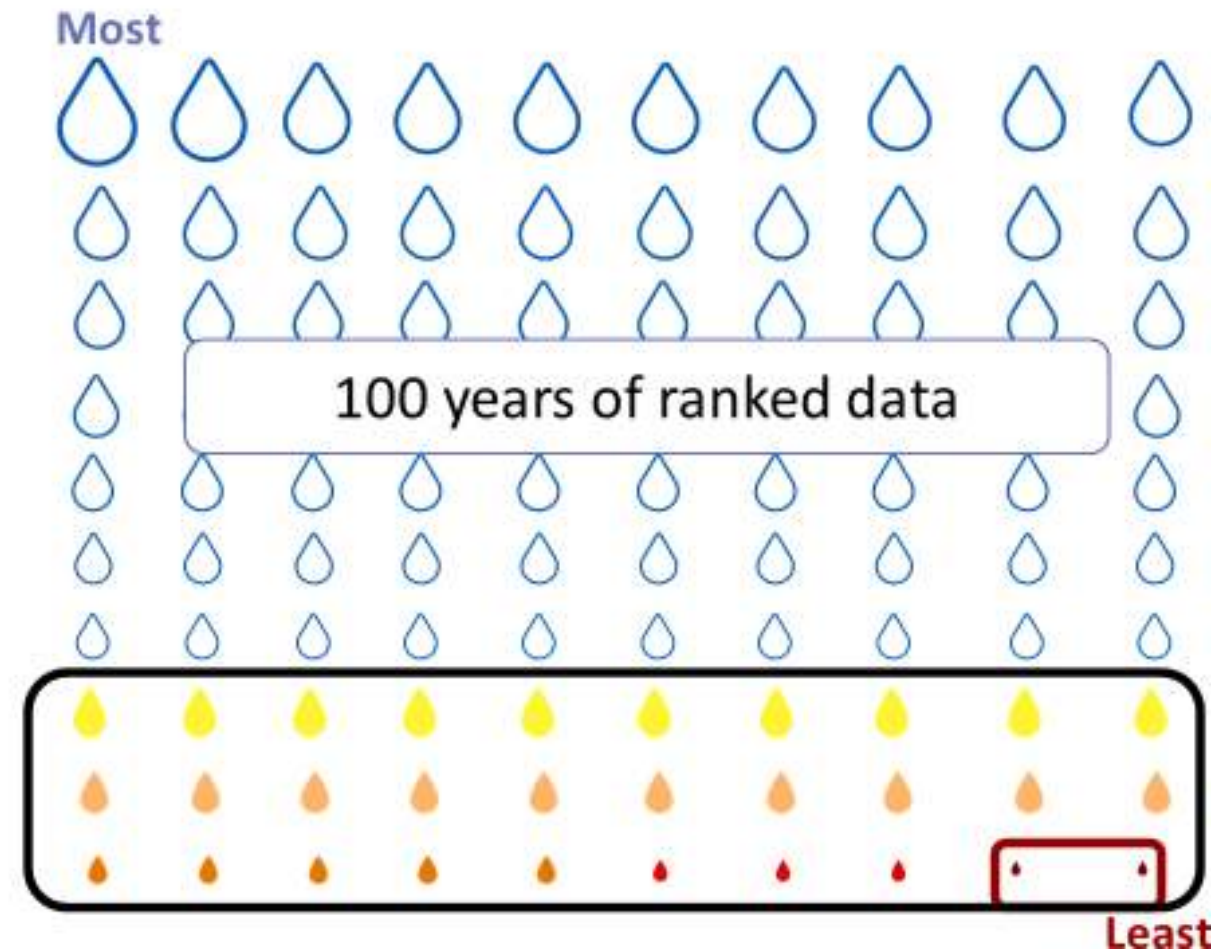
The USDM Process: Data



The USDM Process: Categories

Intensity is based on historical likelihood

		Percentile
Not Drought		None 31-100
	D0	Abnormally dry 21-30
	D1	Moderate drought 11 - 20
Drought	D2	Severe drought 6 - 10
	D3	Extreme drought 3 - 5
	D4	Exceptional drought 1 - 2



South Carolina and USDM: Weekly Data Review

Precipitation



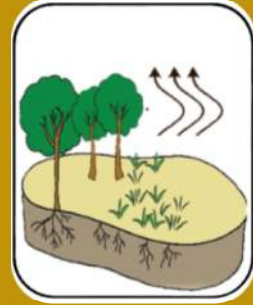
Timesteps:

- 14 days
- 30 days
- 60 days
- 90 days
- Others as needed

Data:

- Observed
- Departure of normal
- Percent of normal
- Standard Precipitation Index (SPI)

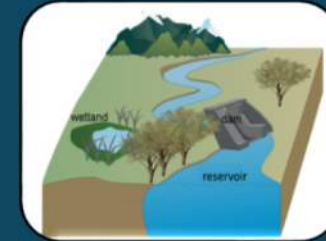
Evaporation



Data:

- Evaporative Demand Drought index (EDDI)
- Stand Precipitation Evaporation Index (SPEI) (see SPI)

Surface Water



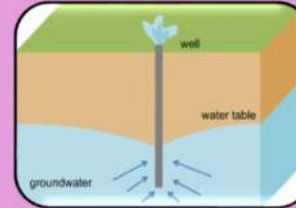
Timesteps:

- Real time
- Daily average
- 7-day average
- 14-day average
- 28-day average

Data:

- Flow values (cfs)
- Percentile rankings

Groundwater



provided by SCDNR hydrology each week, reflecting values in percentiles

Soil Moisture



Depth (remote sensed)

- 10cm
- 40cm
- 100cm
- 200cm

Data:

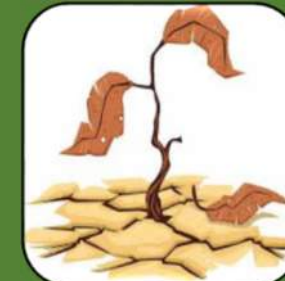
- Volumetric
- Relative
- Percentile

Reports



- CoCoRaHS Reports
- CMOR Reports
- FSA County Reports

Vegetation Health



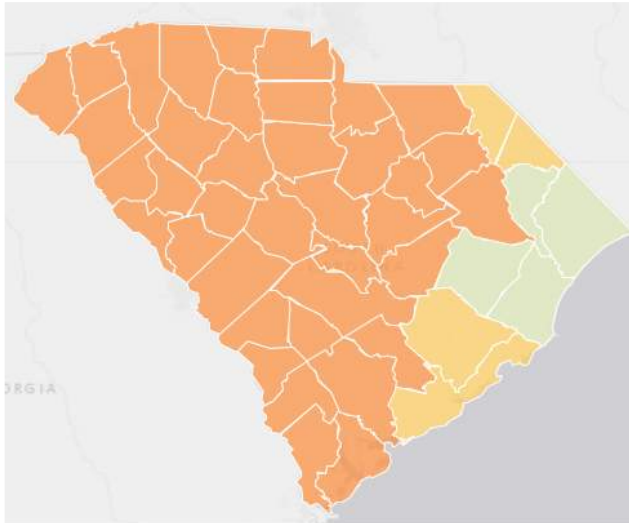
VegDRI, weekly product based on remotely sensed data

USDM vs SC DRC

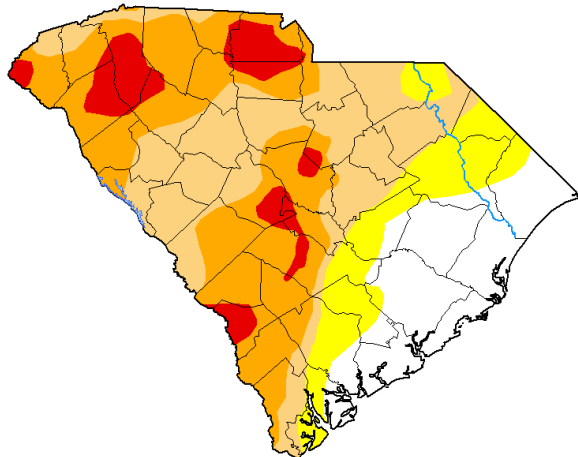
	USDM	SC DRC
Agency Leads	Authors are from Federal Agencies (NDMC, NOAA, and USDA)	Five State Agencies (DNR, DHEC, SCDA, EMD, SCFC)
Participants	Federal and State Agencies, as well as universities and other entities that monitor conditions	Local stakeholders (Water suppliers, agriculture, conservation districts, power generation, local gov.)
Frequency	Weekly product	Committee convenes as needed when conditions warrant discussion.
Severity Levels	Abnormally dry, Moderate, Severe, Extreme, & Exceptional Drought	Incipient, Moderate, Severe, and Extreme Drought
Allows for	Federal disaster declarations and loans for agriculture	Used to determine non-essential water use curtailment recommendations for public water suppliers in South Carolina.

Why the Maps Look Different?

**SC Drought
Declaration Map
by County
(10/17/2019)**



**US Drought
Monitor Map
10/15/2019**



Time:

- DRC map updated as needed
- USDM updated weekly

Indicators:

- Used indicators are similar, yet different
- Spatial and temporal variations
- DRC uses indicator thresholds, USDM uses percentile rankings
- DRC designations follow county lines, USDM designations follow data “polygons”

Process Outcomes

DRC:

1. County-level drought designations that can result in local public water systems enacting their drought management plans.
2. At severe and extreme levels will make recommendations for non-essential water curtailment for only public water suppliers

The outcomes of DRC process relates to public water suppliers.

USDM:

1. The (USDA) may use the USDM for agricultural aid depending on severity and temporal extent for the following programs:
 - Crop Insurance
 - Conservation Reserve Program Haying and Grazing
 - Emergency Conservation Program
 - Emergency Forest Restoration Program
 - Farm Loans
 - Environmental Quality Incentives Program
 - Emergency Watershed Program
 - Livestock Forage Program

The outcomes of USDM process relate to Agriculture.

Questions?

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