

Improving Drought Communications in North Carolina

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North Carolina State Climate Office



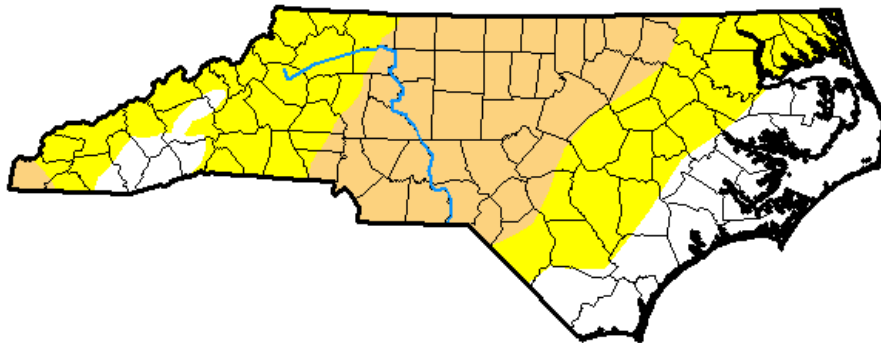
TV Meteorologist
@GreenScreenGuy



No change in the official drought status in NC. Curious since we've had decent rain/snow events lately. Sometimes I'm not convinced these reports are given the most care week by week.

U.S. Drought Monitor
North Carolina

January 23, 2018
(Released Thursday, Jan. 25, 2018)
Valid 7 a.m. EST



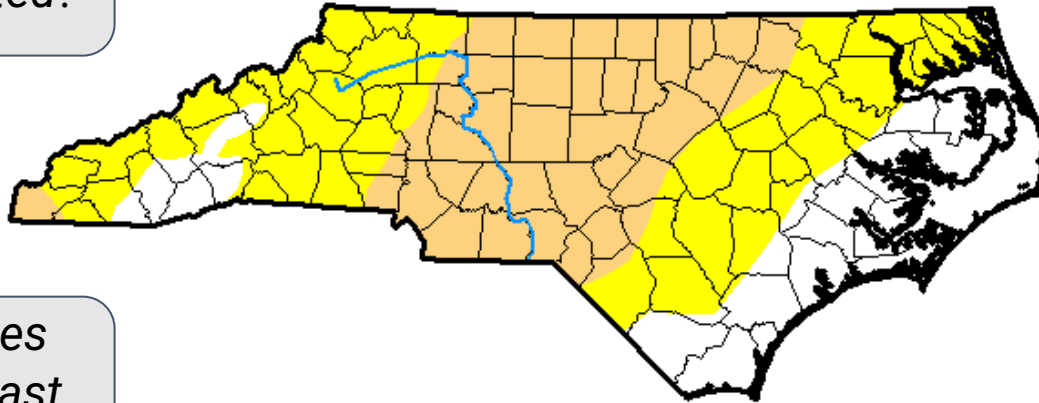
Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	21.57	78.43	36.05	0.00	0.00	0.00
Last Week <i>01-16-2018</i>	21.57	78.43	35.34	0.00	0.00	0.00
3 Months Ago <i>10-24-2017</i>	55.65	44.35	9.98	0.00	0.00	0.00
Start of Calendar Year <i>01-02-2018</i>	15.67	84.33	35.34	0.00	0.00	0.00
Start of Water Year <i>09-26-2017</i>	84.27	15.73	0.00	0.00	0.00	0.00
One Year Ago <i>01-24-2017</i>	72.76	27.24	12.43	2.91	0.01	0.00

How was this map created?

Who is discussing drought in NC, and how often?

How is this affecting my sector?



What does the forecast show?

*Why doesn't this map reflect conditions I'm seeing in **my** area?*

How can I find out about local conditions?

Project Objectives

Identify info. needs



Develop resources



Evaluate and refine



Communicate!

Project Nighthawk



The common nighthawk. Photo by Andy Reago and Chrissy McClarren, shared under CC BY 2.0.



SARP
Sectoral Applications
Research Program



Our Target Sectors



Agriculture

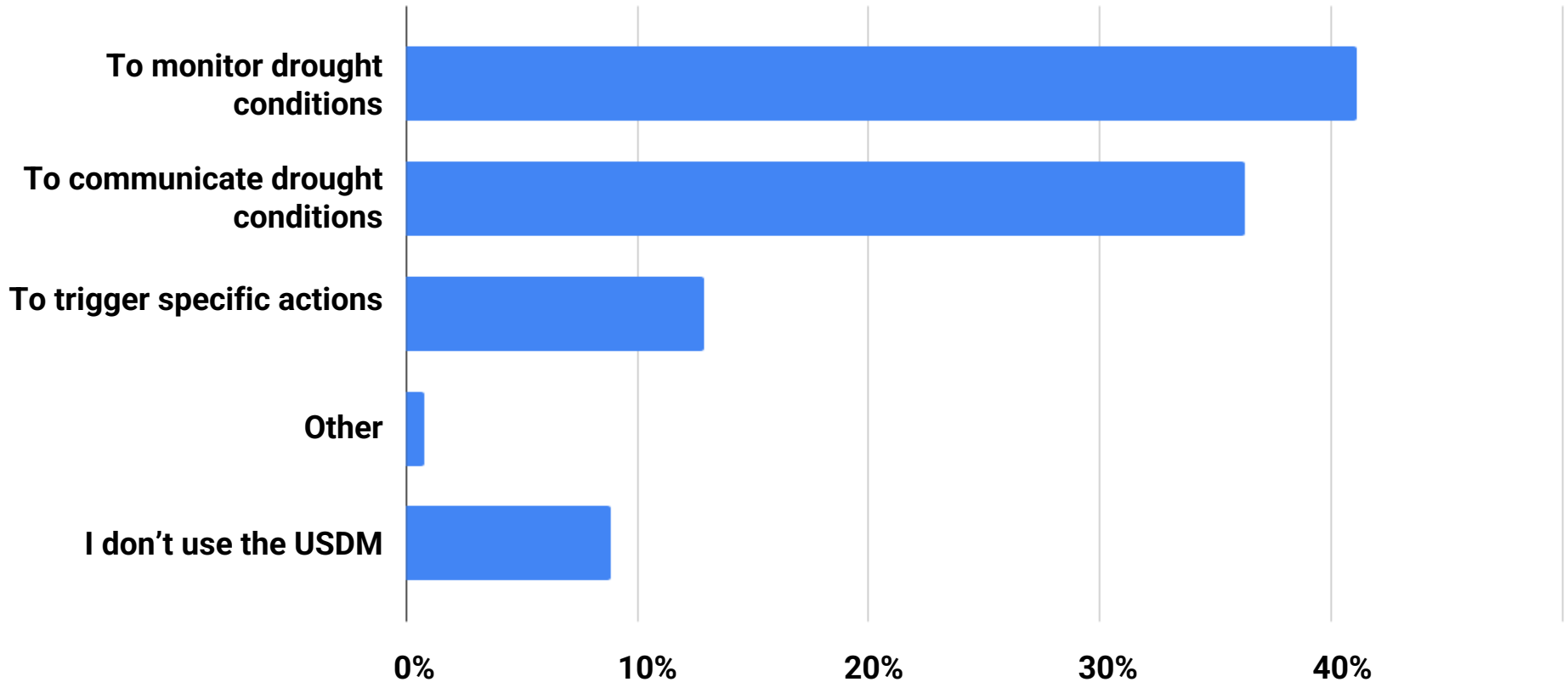
Forestry



Water Resources

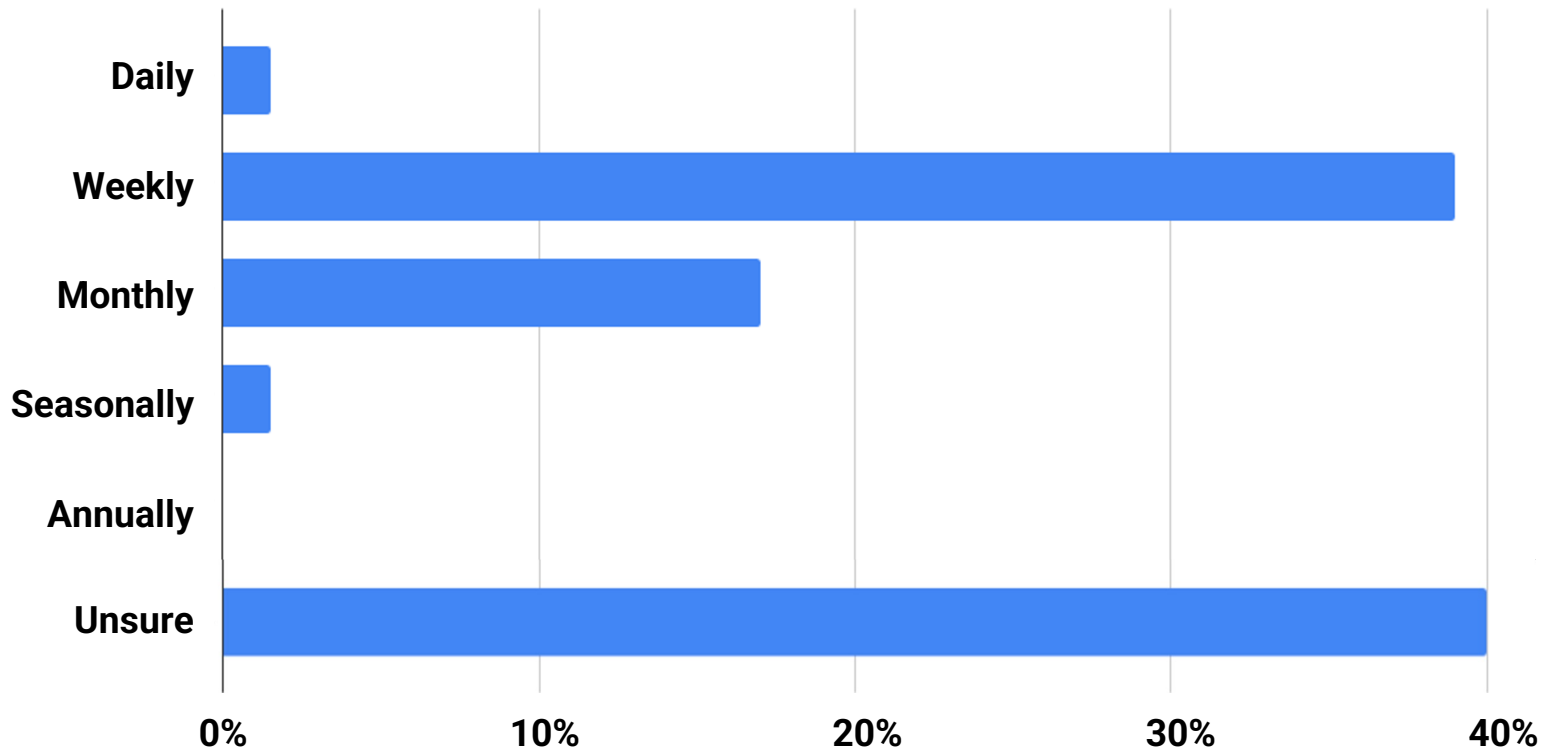
Initial Survey Results

For what purposes or decisions do you use the US Drought Monitor?



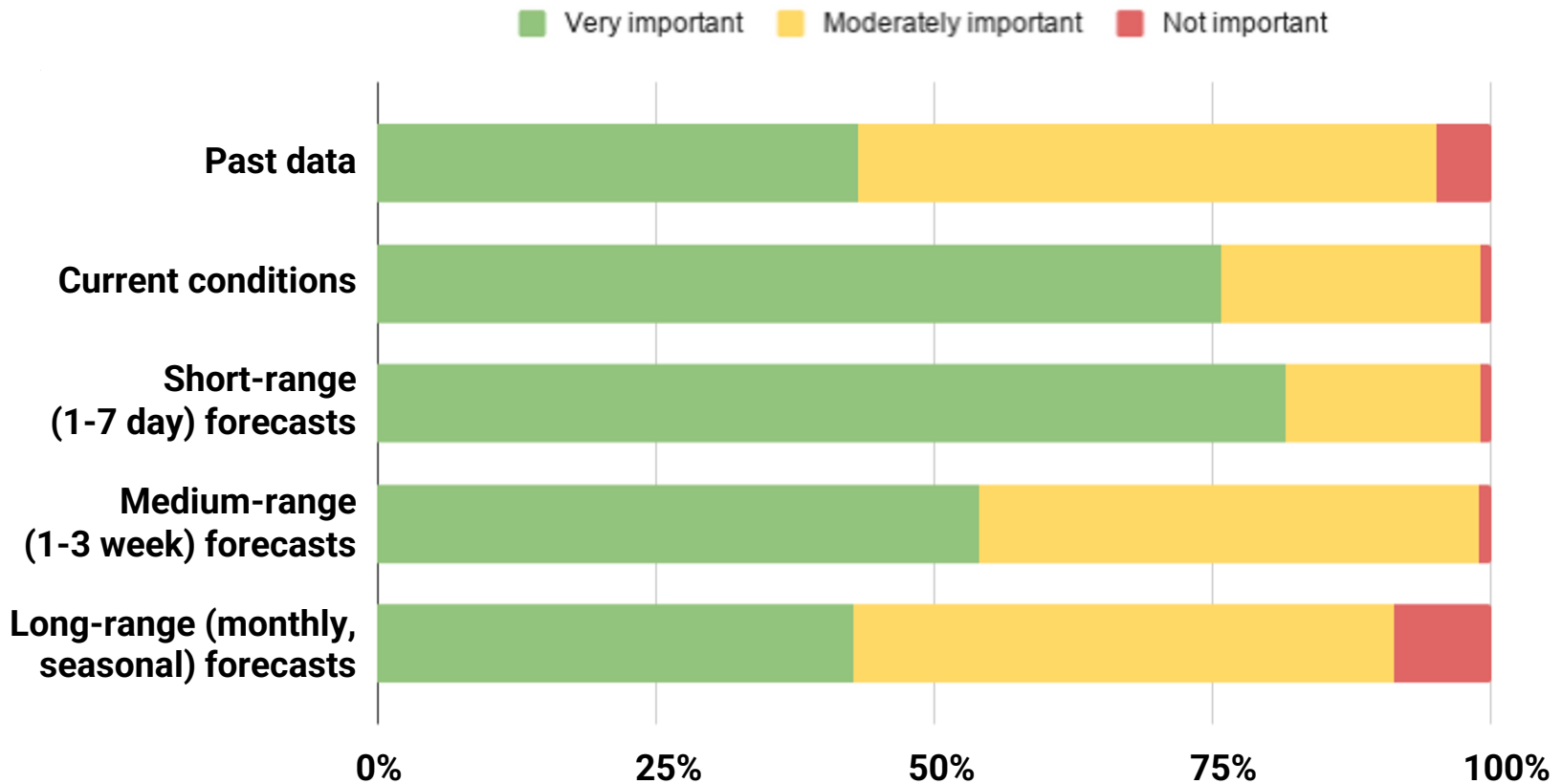
Initial Survey Results

To your knowledge, how often is the US Drought Monitor updated?



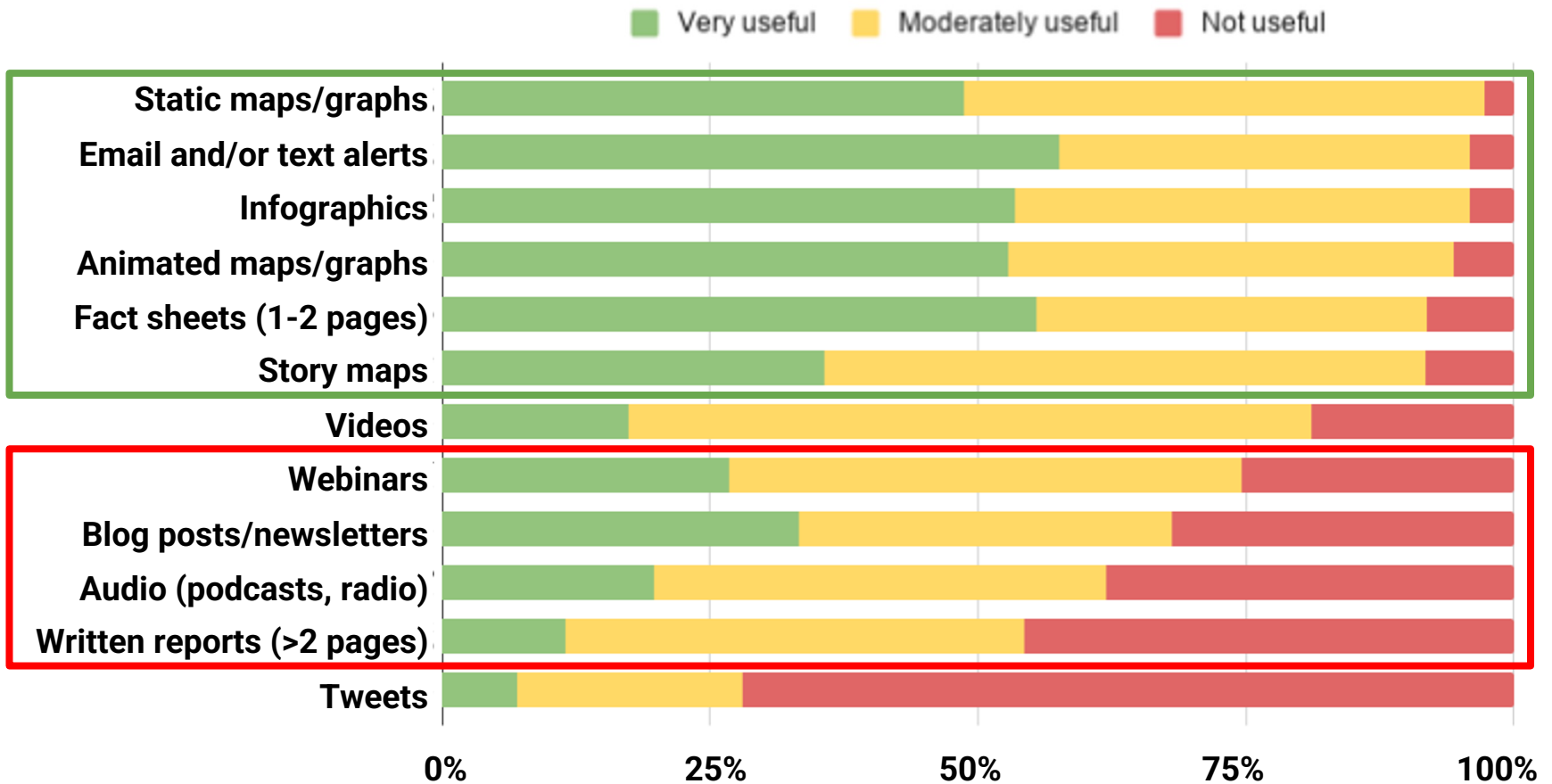
Initial Survey Results

For your sector, how important are the following types of info.?



Initial Survey Results

Please rate how useful each drought information format is for you.



Drought Process Story Map

A Story Map



DMAC Weekly Process

Water

The DMAC assesses hydrologic conditions using streamflow, groundwater, and surface reservoir levels from across the state. These data are explored in conjunction with historical information for the given month or day, as well as any water management actions that may influence them.

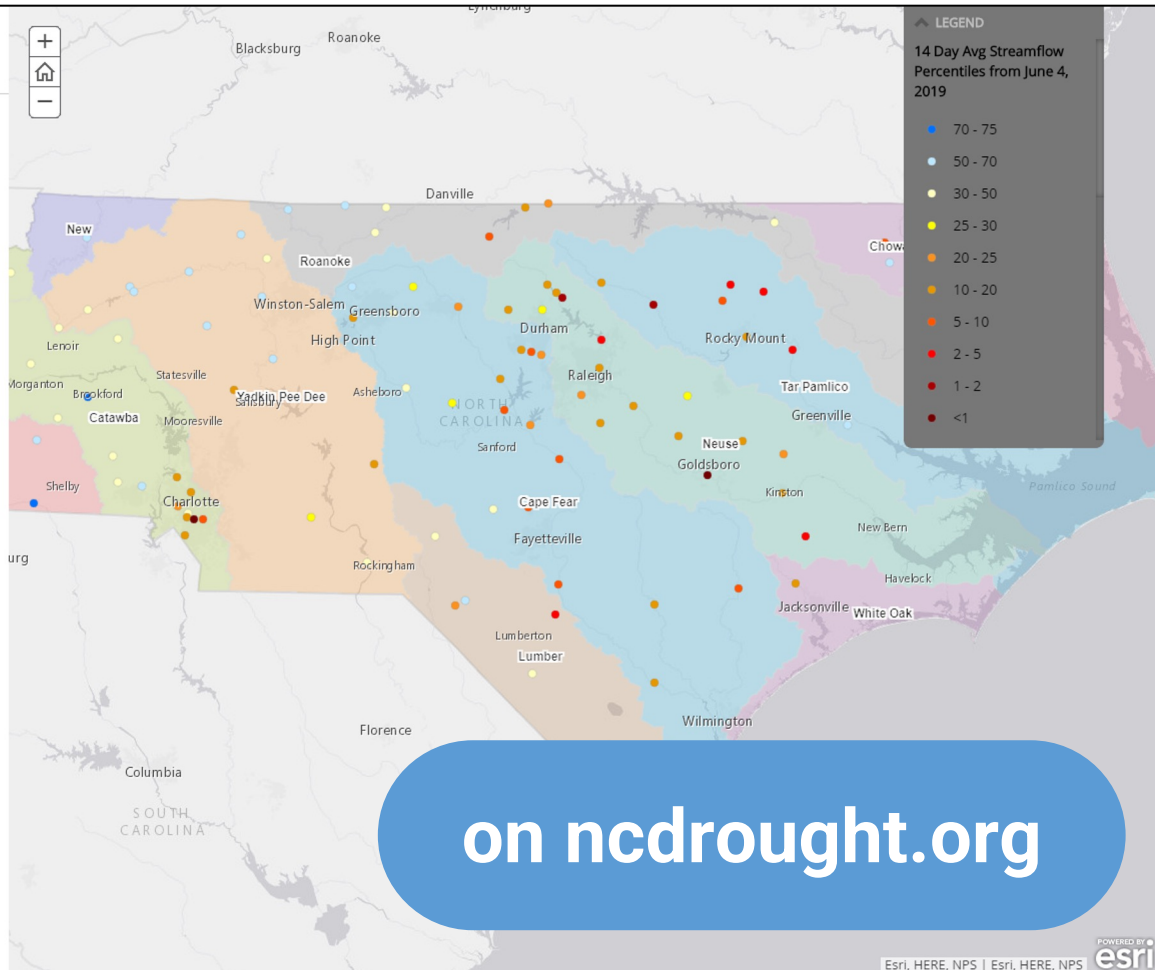
The NC DMAC examines streamflows over multiple periods to identify short- to long-term patterns in hydrologic conditions. For example, a 7-day averaging period would indicate how streamflow levels are responding to more-recent weather events, while 28-day average streamflows are used to gauge longer-term trends in hydrologic status.

The **United States Geological Survey (USGS)** provides information about streamflow and groundwater levels and percentiles. Percentiles place current values within a historical context, facilitating drought assessment. The map to the right shows 14-day averaged streamflow percentiles for USGS gauges. In general, values around 25-75 are considered "near normal," values below 25 are considered "below normal," and anything below 10 would be considered "much below normal." Notice how much of eastern North Carolina has streamflows that are less than the 25th percentile, with a few places below the 10th percentile, indicating below and much below normal conditions at this timescale.

The **NC Department of Environmental Quality (DEQ), Division of Water Resources (DWR)**, alongside USGS, monitors groundwater levels across the state and shares this information with the DMAC. These data are combined with other hydrologic information, such as streamflow levels, to calculate estimates for baseflow.

Much of western and central North Carolina rely on surface reservoirs (man-made lakes) for water supply. Several groups provide reservoir operations information to the NC DMAC.

Chief among these is the **US Army Corps of Engineers (USACE)**, a federal agency under the Department of Defense. Within North Carolina, the USACE manages five dams and four river basins.



Weekly Update Infographics

North Carolina Drought Update

For the assessment period ending August 2, 2022

This Week's Drought Monitor of North Carolina Map

From the US Drought Monitor, authored by Curtis Riganti (National Drought Mitigation Center) with input from the North Carolina Drought Management Advisory Council (ncdrought.org)



Soybean progress is ahead of the 5-year average, but some corn continues to struggle with the heat and a dry start to summer.



Parts of northeastern NC had more than 3 inches of rain last week to reverse their summer drying trend.



Last week's rainfall boosted Lake James and Lake Norman to within 0.6 feet of their target levels.



The 7-day average streamflows have fallen below normal seasonal levels throughout the Sandhills.

Last Week's Drought Map



This infographic was created by



Statewide Condition Summary

What's Changed? Weekend rains improved Moderate Drought (D1) in the northern Coastal Plain, but Abnormal Dryness (D0) has expanded in some Piedmont counties.

What's New? Many drought-affected areas saw at least two inches of rain last week. However, parts of the southern Piedmont and Sandhills had less than half an inch, which combined with the hot weather has led to declining streamflows and drying lawns and vegetation.


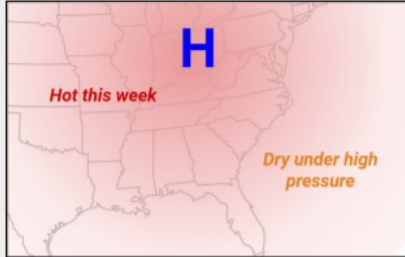
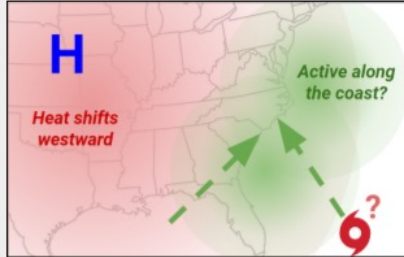


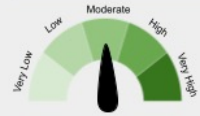




What's Next? Pop-up showers this weekend will bring some rain, but coverage will be spotty at best. The highest totals of up to an inch are expected in the west, while some eastern areas may see little to no rainfall.

Statewide Coverage By Category

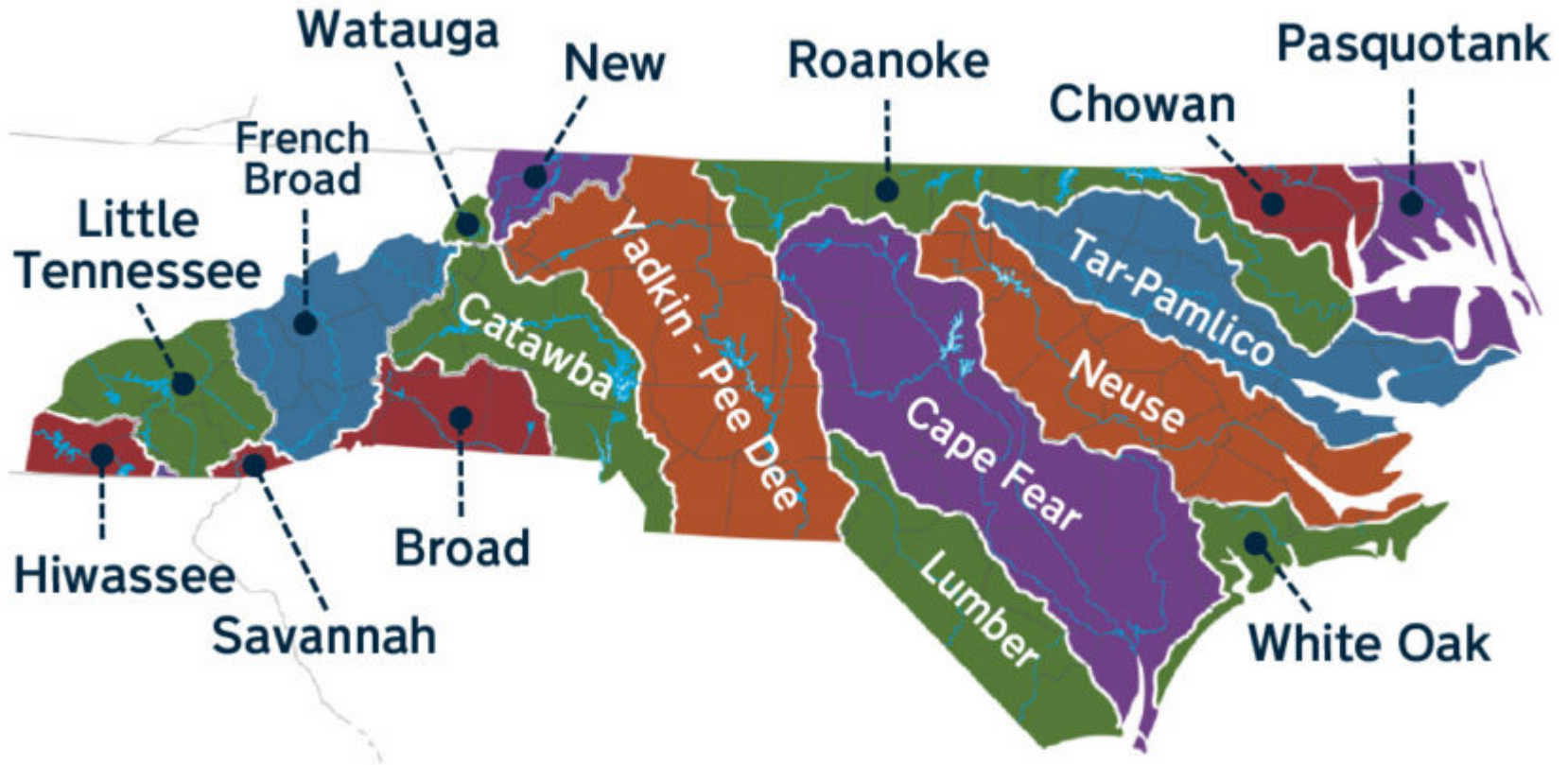
Category	Coverage This Week	Change Since Last Week
D0: Abnormally Dry	44.44%	+3.18%
D1: Moderate Drought	1.63%	-4.82%
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Weather Outlooks

Short-Range Outlook for North Carolina

Week 1: July 28 to Aug. 3, 2022	Week 2: August 4 to 10, 2022	Weeks 3-4: August 11 to 24, 2022
		
<p>A Hot Start 🌡️➡️🌡️➡️🌡️</p> <p>Offshore high pressure will ramp up temperatures today and Friday, with daytime highs reaching the mid to upper 90s. Rain and clouds this weekend will mean cooler temperatures, but they'll be short-lived as we warm up into the low 90s again by Tuesday.</p>	<p>Heating Up Again 🌡️</p> <p>Large-scale high pressure will build across the eastern two-thirds of the country, elevating our temperatures back into the upper 90s. This stubborn upper-level high won't move quickly, so a period of sustained above-normal temperatures is possible.</p>	<p>Not as Hot, But Still Warm 🌡️</p> <p>High pressure and the hottest weather should move back across the Midwest by mid-month. That would help our temperatures back off a bit, although they may still be a few degrees above normal. Our average August highs are in the mid to upper 80s.</p>
<p>A Wet Weekend Ahead ☁️💧🌧️</p> <p>A front approaching from the northwest will stall across North Carolina this weekend and bring widespread showers and storms, with rainfall totals of 1 to 4 inches. Rain chances will decrease by Monday evening as the front lifts to our north.</p>	<p>Likely a Dry Week? ☀️🚫</p> <p>High pressure overhead should block any further frontal passages and suppress our chances of pop-up showers and thunderstorms. However, some forecasts show showers in the Carolinas early next weekend to the south of the building high pressure.</p>	<p>Wetter in the East? 🌧️?🌧️?</p> <p>As the heart of high pressure shifts away from us, the doors could be open again to weather systems moving in, especially as we near the peak of Atlantic hurricane season. Areas along the coast currently have the best chances to end August on a wet note.</p>
<p style="text-align: center;">Forecast Confidence</p>  <p>There is some uncertainty about when the front will move out, but models are in good agreement about the overall event timing.</p>	<p style="text-align: center;">Forecast Confidence</p>  <p>Models are in consensus about widespread warmth, but have weaker guidance for the rainfall forecast across the Southeast US.</p>	<p style="text-align: center;">Forecast Confidence</p>  <p>Some forecasts show a strong signal for wet weather at the coast, but the pattern could change over the next two weeks.</p>
<p>This infographic is based on forecast and outlook guidance from the National Weather Service. For more information, visit www.weather.gov.</p>  	<p>Author: Corey Davis (NCSO) cndavis@ncsu.edu</p>	<p style="text-align: center;">  </p> <p style="text-align: right;">Supported by: </p>

Basin-Level Water Summaries



Water Supply Dashboard

Triangle Water Supply



New IoW Tool

Disclaimer: This tool is best viewed in Chrome, Firefox, Microsoft Edge, and Safari.

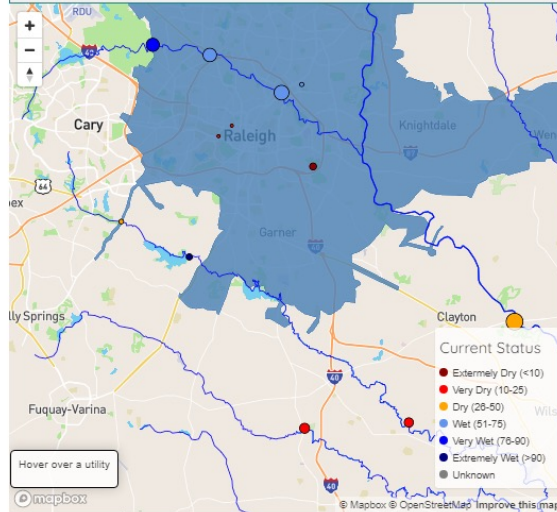
To get started, select a utility from the map, drop down menu, or type an address.
 Next, select different tabs on the right to learn more about water supply conditions.
 The help icons provide more details to understand each tab.

Data Last Updated: Jul 25, 2022

Select a utility on the map, in the drop down menu, or by typing in an address:

Turn Map Layers On and Off

Utility	County	River Basin	Sub-Basin	Water Source	Rivers
Stream Gages	Reservoirs	Wells	Weather Stations	Drought	Precip 7-day Observ
Precip 7-day %Normal	QPF 7-day Forecast	Precip 6-10 Day Forecast	Temp 6-10 Day Forecast		



My Utility Demand Data **Surface Water** Rain & Drought Ground-water

Select a stream gauge or reservoir to see plot



Recent Streamflow Conditions for Raleigh City
 25% of sites with data were Moderately Wet on Jul-24

Watershed	Extremely Dry	Very Dry	Moderately Dry	Moderately Wet	Very Wet	Extremely Wet
Neuse River (Wake Forest)	1	0	0	0	0	0
Little River (Zebulon)	0	0	0	0	0	0
Smith Creek (Wake Forest Reservoir)	0	0	0	0	0	0
Falls Lake	1	0	1	2	1	0
Swift Creek (Lake Benson)	0	0	1	0	0	1
TOTAL	2	0	2	2	1	1

Work Since Nighthawk



North Carolina Drought Management Advisory Council

North Carolina Drought Update

For the assessment period ending August 2, 2022

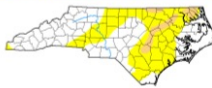
This Week's Drought Monitor of North Carolina Map

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- Soybean progress is ahead of the 5-year average, but some corn continues to struggle with the heat and a dry start to summer.
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Last Week's Drought Map



Last week's rainfall boosted Lake James and Lake Norman to within 0.6 feet of their target levels.

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This infographic was created by NORTH CAROLINA CLIMATE OFFICE

Statewide Condition Summary

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What's New? Many drought-affected areas saw at least two inches of rain last week. However, parts of the southern Piedmont and Sandhills had less than half an inch, which combined with the hot weather has led to declining streamflows and drying lawns and vegetation.

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Short-Range Outlook for North Carolina

Week 1:
July 28 to Aug. 3, 2022

Hot Thursday and Friday

Shower and storms this weekend

Week 2:
August 4 to 10, 2022

Hot this week

Dry under high pressure

Weeks 3-4:
August 11 to 24, 2022

Heat shifts westward

Active along the coast?

A Hot Start ☀️🔥🔥🔥
Offshore high pressure will ramp up temperatures today and Friday, with daytime highs reaching the mid to upper 90s. Rain and clouds this weekend will mean cooler temperatures, but they'll be short-lived as we warm up into the low 90s again by Tuesday.

A Wet Weekend Ahead ☁️🌧️🌧️
A front approaching from the northwest will stall across North Carolina this weekend and bring widespread showers and storms, with rainfall totals of 1 to 4 inches. Rain chances will decrease by Monday evening as the front lifts to our north.

Forecast Confidence
 There is some uncertainty about when the front will move out, but models are in good agreement about the overall event timing.

Heating Up Again 🌞
Large-scale high pressure will build across the eastern two-thirds of the country, elevating our temperatures back into the upper 90s. This stubborn upper-level high won't move quickly, so a period of sustained above-normal temperatures is possible.

Likely a Dry Week? ☀️🚫
High pressure overhead should block any further frontal passages and suppress our chances of pop-up showers and thunderstorms. However, some forecasts show showers in the Carolinas early next weekend to the south of the building high pressure.

Forecast Confidence
 Models are in consensus about widespread warmth, but have weaker guidance for the rainfall forecast across the Southeast.

Not as Hot, But Still Warm 🌞
High pressure and the hottest weather should move back across the Midwest by mid-month. That would help our temperatures back off a bit, although they may still be a few degrees above normal. Our average August highs are in the mid to upper 80s.

Wetter in the East? 🌧️❓
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Author: NORTH CAROLINA CLIMATE OFFICE



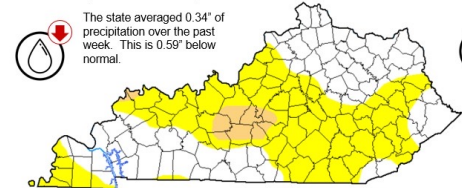
Sharing With Other States

Kentucky Drought Update

For the assessment period ending June 21, 2022

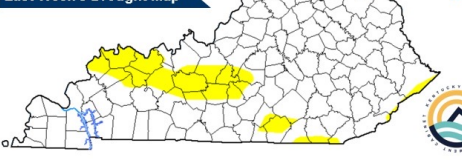
This Week's Drought Monitor of Kentucky Map

From the US Drought Monitor, authored by Adam Hartman, NOAA/NWS/INCEP/CPC



- The state averaged 0.34" of precipitation over the past week. This is 0.59" below normal.
- Corn and Soybean conditions remained steady with 75% or more in the good to excellent categories. Pasture and tobacco conditions have begun to decline.
- The USDA depicts 34% of topsoil is short or very short. An increase of 18% from last week.
- The majority of USGS stream gauges are now reporting below normal streamflows with a few are reporting much below normal flows (<10th percentile).

Last Week's Drought Map



Report Drought Impacts

<https://arcs.is/0KITGe0>

Developed in conjunction with

Statewide Condition Summary

What's Changed? The US Drought Monitor has introduced Moderate Drought (D1) to west central Kentucky and at the Kentucky/Indiana/Illinois border. There was also a large expansion of D0.

What's New? Last week's hot and humid conditions gave way to more comfortable conditions over the weekend. The associated cold front brought strong storms and much needed rainfall to parts of the state while others remained dry.

What's Next? More heat is expected this week, but with less humidity which will increase evapotranspiration rates. Scattered storms will be possible Wednesday, but outlooks continue to advertise higher chances for above normal temperatures and below normal precipitation through the Fourth of July.

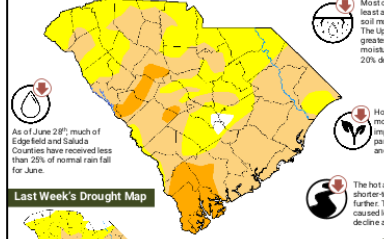
Statewide Coverage By Category

Category	Coverage This Week	Change Since Last Week
D0: Abnormally Dry	53.61%	+40.08%
D1: Moderate Drought	13.53%	+13.53%
D2: Severe Drought	0.00%	0.00%
D3: Extreme Drought	0.00%	0.00%
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U.S. Drought Monitor Update for South Carolina

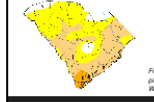
Assessment Period Ending June 28, 2022

This week's USDM authored by Curtis Bigazzi (NDMC), with input from local, state, and federal partners based in South Carolina.



- Most of the state has seen at least a 12% decline in relative soil moisture through June. The Upstate has seen the greatest drop in relative soil moisture, reaching up to a 20% decline this month.
- Hot and dry conditions this month have led to widespread impacts to agriculture, particularly in corn production and pasture conditions.
- The hot and dry conditions have caused shorter-term streamflows to decline further. These conditions have also caused longer-term streamflows to decline as well.

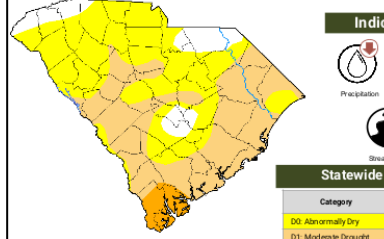
Last Week's Drought Map



U.S. Drought Monitor Update for South Carolina

Last Week's Drought Map June 21, 2022

This week's USDM authored by Adam Hartman (NOAA), with input from local, state, and federal partners based in South Carolina.



Indicator Conditions

- Precipitation
- Soil Moisture
- Agriculture
- Streamflow
- Reservoir Levels

Statewide Coverage By Category

Category	Categorical Coverage This Week	Change Since Last Week
D0: Abnormally Dry	56.38%	-8.99%
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Statewide Condition Summary

What's Changed? Expansion of abnormally dry (D0), moderate drought (D1), and severe drought (D2) conditions in portions of the state. As of this week, more of the state is classified in D1 than D0 conditions.

What's New? Over the past week, the state received between 0.00" and 0.50" with localized amounts reaching 3.00". However, most of the state received less than 0.25" over the past week. D0, D1, and D2 conditions were expanded this week due to the deteriorating conditions. D0 conditions were expanded in areas with below normal precipitation for June and declining soil moisture values. D1 areas were expanded in areas with 2-month precipitation deficits and soil moisture deficits. D2 was added in areas in the Midlands where 30-day precipitation deficits range from 3.00" to 5.00" and 60-day precipitation deficits range from 2.00" to 6.00", causing severe soil moisture deficits.

What's Next? A more summer-like pattern will set up across the region through Tuesday, with temperatures in the upper 80s to low 90s and overnight lows in the 70s. The increased moisture will help in the development of afternoon thunderstorms each day. However, widespread rain totals will be less than half an inch with localized higher amounts. Given the current forecast, dry (D0), along with drought (D1 and D2) conditions, will continue to persist in the state.

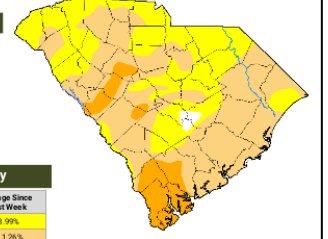
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*Plus sign on 'Change Since Last Week' indicates expansion of category area, minus sign indicates reduction of category area.

Current Drought June 28, 2022

This week's USDM authored by Curtis Bigazzi (NDMC), with input from local, state, and federal partners based in South Carolina.



For questions, please contact Elliot Wickham (ewickham@dyr.sc.gov), SC Water Resources Climatologist for the SC DNR.

<https://go.ncsu.edu/drought-template>

Recommendations

- Understand who is using drought information
 - and for what purposes

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- Understand who is using drought information – and for what purposes
- Consider sharing regular updates with them via avenues they already use
- Translate technical details, but don't oversimplify
- Collect feedback and evaluate usefulness early and often

Usage Examples

“I use these to **explain why the drought map looks like it does** to those unfamiliar with the NC DMAC/USDM procedures for determining the drought status.”

“**Graphics always help.**”

Answering questions from the media and the public. “The content is relevant, well-organized, and in plain language.”

In **outreach** to homeowners, growers, industry associations, & the community. “I reference this info. in a monthly newsletter our director sends out.”

“So [my supervisors] **have a better understanding** as to why we are having high fire danger/fire occurrence and subsequent **overtime and hazard pay.**”

“Having the information coming from an outside **subject matter expert** carries more weight...”

Questions? Suggestions?

Contact Me!

Corey Davis

cndavis@ncsu.edu