

Innovating Drought Communications in North Carolina through Decision-Maker Engagement

Corey Davis

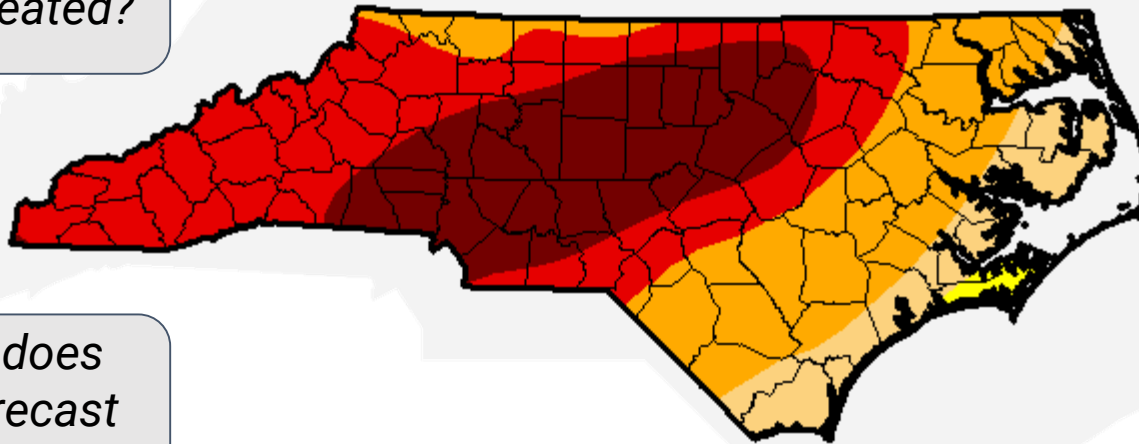
Applied Climatologist
State Climate Office of North Carolina

Project Background

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 Background

Goal: Provide *relevant*, *accessible*, and *actionable* drought-related information to decision makers in the *agriculture*, *forestry*, and *water resources* sectors

Official Title: *“Innovating Approaches to Drought Communications with North Carolina Decision Makers”*

Code Name: *Project Nighthawk*

Project Team: Rebecca Ward (NCSCO), Kirsten Lackstrom (CISA)

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



Project Nighthawk Phases

Fall 2018

Summer 2020

Phase 1

Identify

Refine priorities for new products with project partners and target audiences

Phase 2

Develop

Develop tailored information and communication prototypes

Phase 3

Evaluate & Refine

Assess prototypes with stakeholder assessment and engagement, refine and enhance information and communication deliverables

Phase 4

Implement & Integrate

Integrate and implement communication strategies

Phase 5

Evaluate

Evaluate project activities and outcomes

Water Resources Sector

Initial Project Survey

Sectoral Webinar

WRR Annual Conference

Agriculture/Forestry Sectors

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Agriculture/Forestry and Water Resources Sectors

Combined Follow-Up Webinar

Final Project Survey

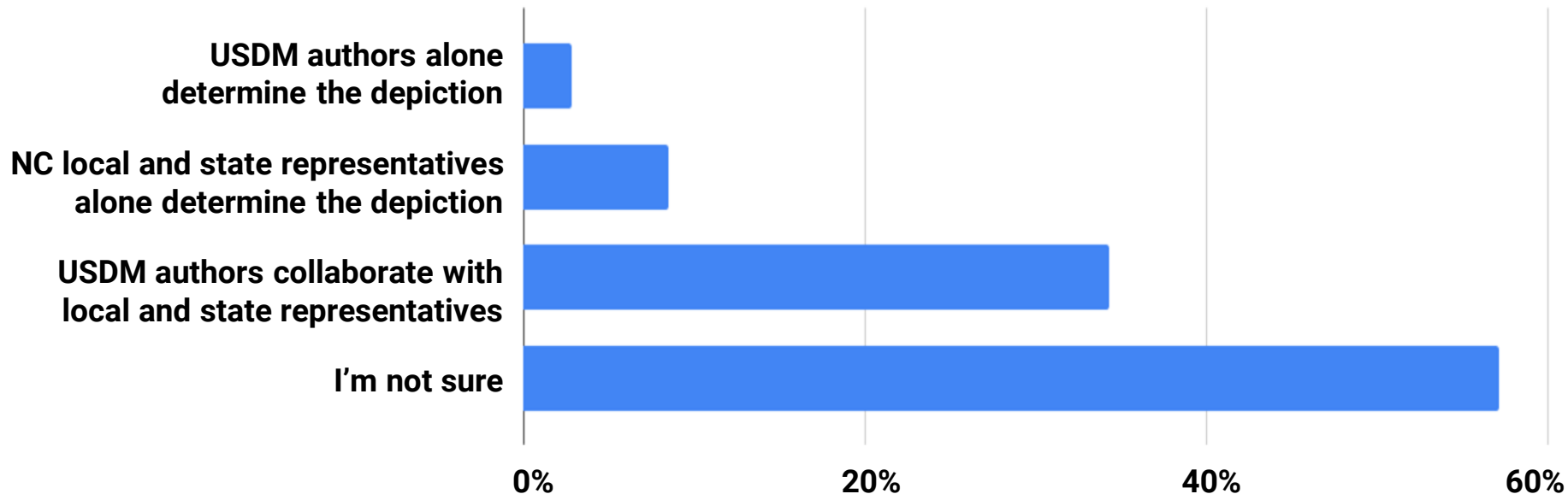
Key Project Tasks

Pre-Project Surveys

- In Sep. 2018, we sent **501 survey invitations** to representatives from our target sectors
 - NC Cooperative Extension agents & specialists
 - NC Forest Service regional & district foresters
 - Managers of large public water systems
- **140 surveys** were fully or partially completed (28% response rate)

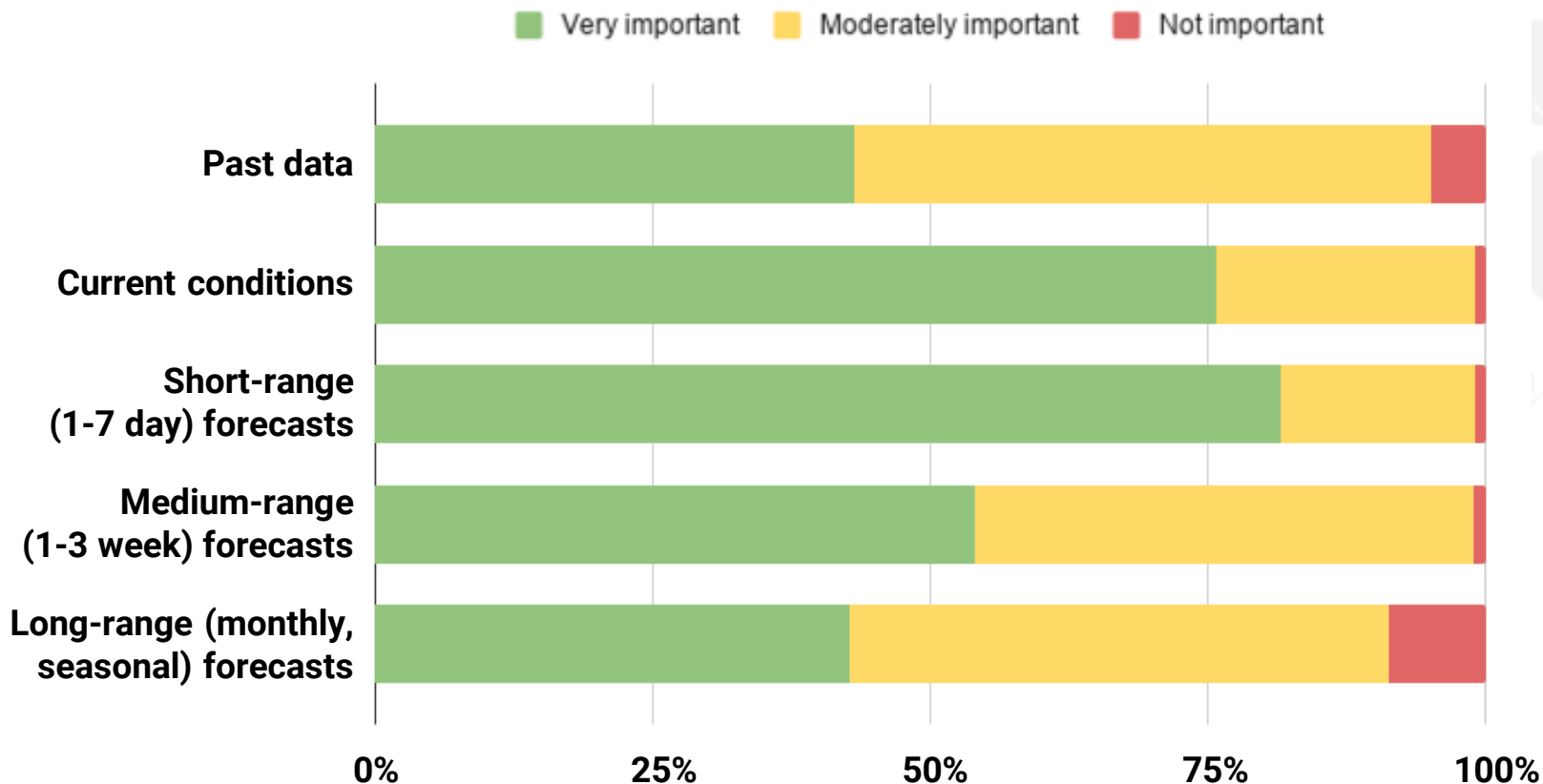
Drought Monitoring

To your knowledge, how is the US Drought Monitor's depiction of conditions in North Carolina determined?



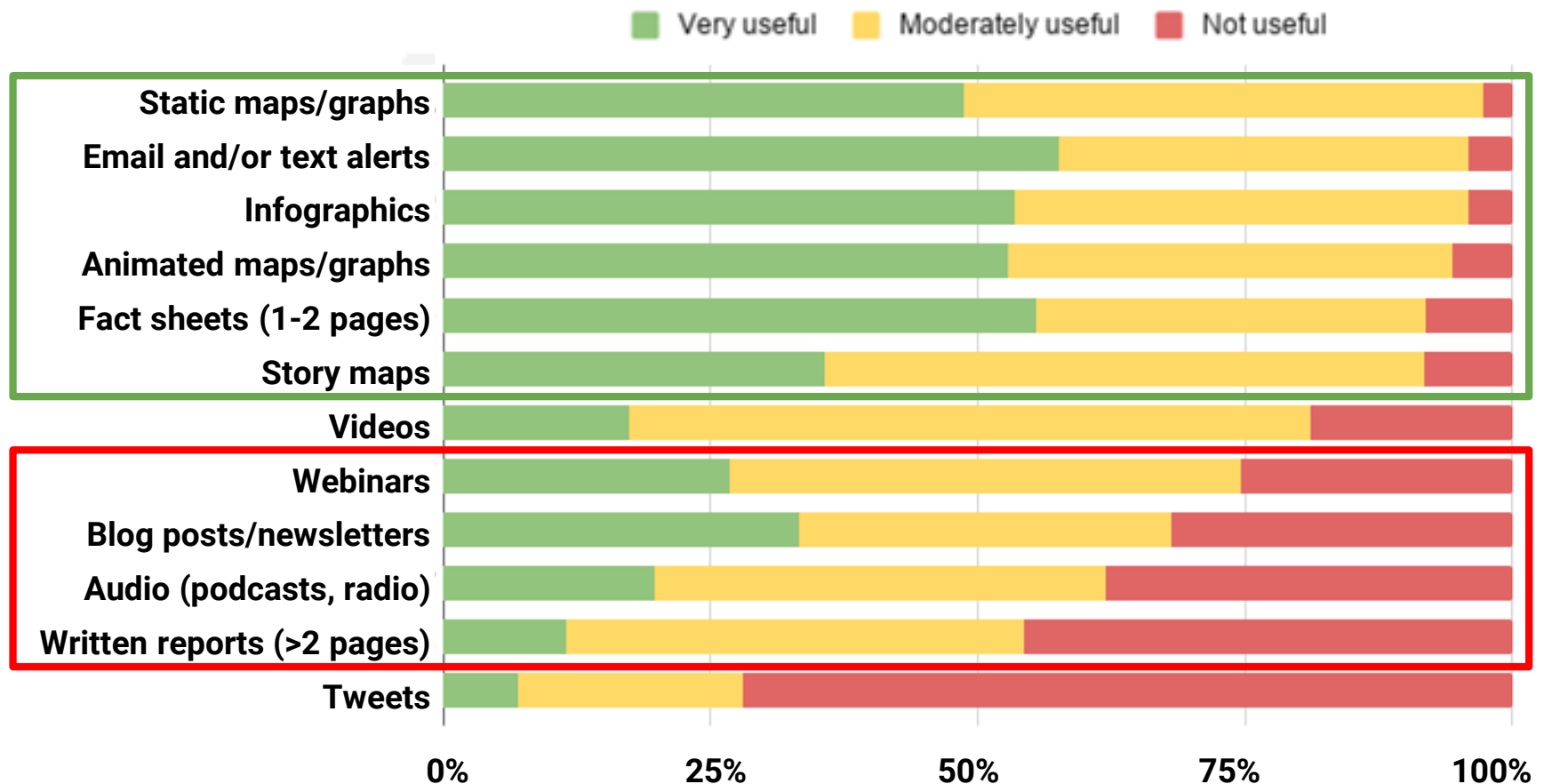
Information Timescales

For your sector, how important are the following types of weather, climate, and drought info.?



Communications Formats

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



Story Map on ncdrought.org

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.

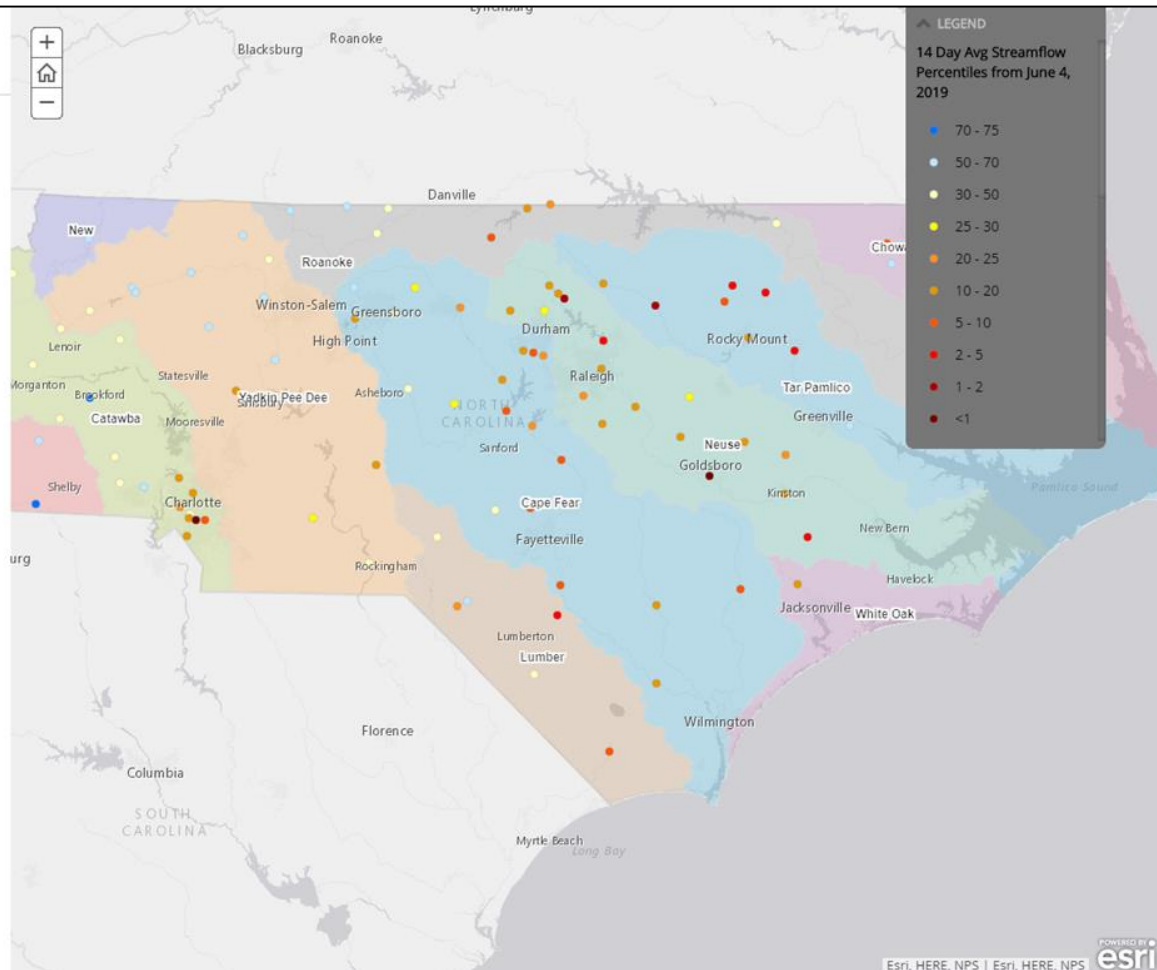
The NC DMAC examines streamflows over multiple periods to identify short- to long-term patterns in hydrologic conditions. For example, a 7-day averaging period would indicate how streamflow levels are responding to more-recent weather events, while 28-day average streamflows are used to gauge longer-term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



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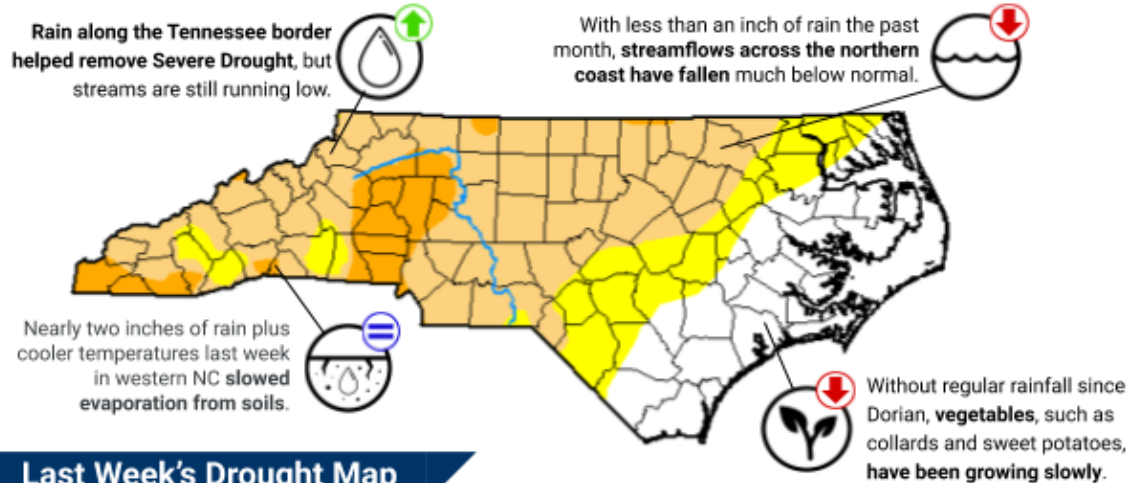
Weekly Drought Updates

North Carolina Drought Update

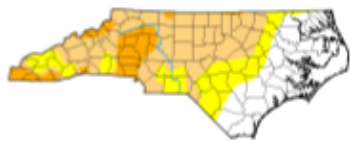
For the week ending October 15, 2019

This Week's Drought Monitor of North Carolina Map

From the US Drought Monitor, authored by Richard Heim (National Centers for Environmental Information) with input from the North Carolina Drought Management Advisory Council (ncdrought.org)



Last Week's Drought Map



A PRODUCT OF PROJECT NIGHTHAWK
<https://climate.ncsu.edu/nighthawk>

Statewide Condition Summary

What's Changed? Last week's rain brought **drought improvement** in the northern Mountains, but parts of the southern Piedmont and northern Coastal Plain missed out and are now in Moderate Drought.

What's New? While **Wednesday's rains brought additional relief**, they came after the US Drought Monitor's Tuesday morning data cutoff. Their impacts will be reflected on next week's map.

What's Next? Rain chances continue with a coastal low on Sunday and a cold front on Tuesday. Most areas can expect at least 0.75 inches in total.

Statewide Coverage By Category

	Abnormally Dry (D0)	Moderate (D1)	Severe (D2)	Extreme (D3)	Exceptional (D4)
Coverage This Week	18.01%	47.58%	9.64%	0.00%	0.00%
(Change Since Last Week)	(-2.10%)	(+7.19%)	(-1.19%)		

Short-Range Outlooks

Short-Range Outlooks for North Carolina

Week 1: December 5 to 11

Forecast Confidence



Cloud cover on Sunday could limit our high temperatures, and uncertainty remains about how much precipitation we see on Monday and Tuesday.



Rain Early Next Week: Moisture moving in from the south on Monday and a cold frontal passage on Tuesday will bring rainfall across the state. The Mountains could see 2 to 3 inches while the coast may see half an inch.



Warming Up This Weekend: Winds shifting from northerly to easterly will steadily increase our highs from the 50s on Saturday to the 60s on Monday. Temperatures will fall back into the 40s after the cold front moves through.



Week 2: December 12 to 18

Forecast Confidence



Some forecast models show Arctic air moving into the US Midwest. If that air mass reaches farther south, temperatures could be colder than expected.



More Weekend Rain: Another batch of Gulf moisture may move in ahead of a cold front, with rain possible beginning on Saturday, Dec. 14 and potentially lasting through the weekend.



Seasonable, Then Cooler: We should begin the week with near-normal highs in the 50s before the weekend cold front brings a shot of colder air, with overnight lows possibly dropping into the 20s by Tuesday and Wednesday.

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Forecast guidance from the NWS Climate Prediction Center and the GFS and CMC computer models

Weeks 3 and 4: Dec. 19 to Jan. 1

Forecast Confidence



This variable pattern is difficult to predict weeks in advance. Cold air outbreaks are unlikely, but otherwise a wide range of conditions are possible.



Warmer Weather on the Way?: With the subtropical jet stream potentially shifting farther north by late December, our temperatures could become above normal overall.



A Drier Pattern: If the jet stream does shift, that would push the main storm track northward as well, keeping us from seeing as many storm systems. However, cold fronts could still clip the state and bring some rainfall.

Warmer by Late December?



Forecast guidance from the NWS Climate Prediction Center and the Climate Forecast System model



<http://climate.ncsu.edu/nighthawk>



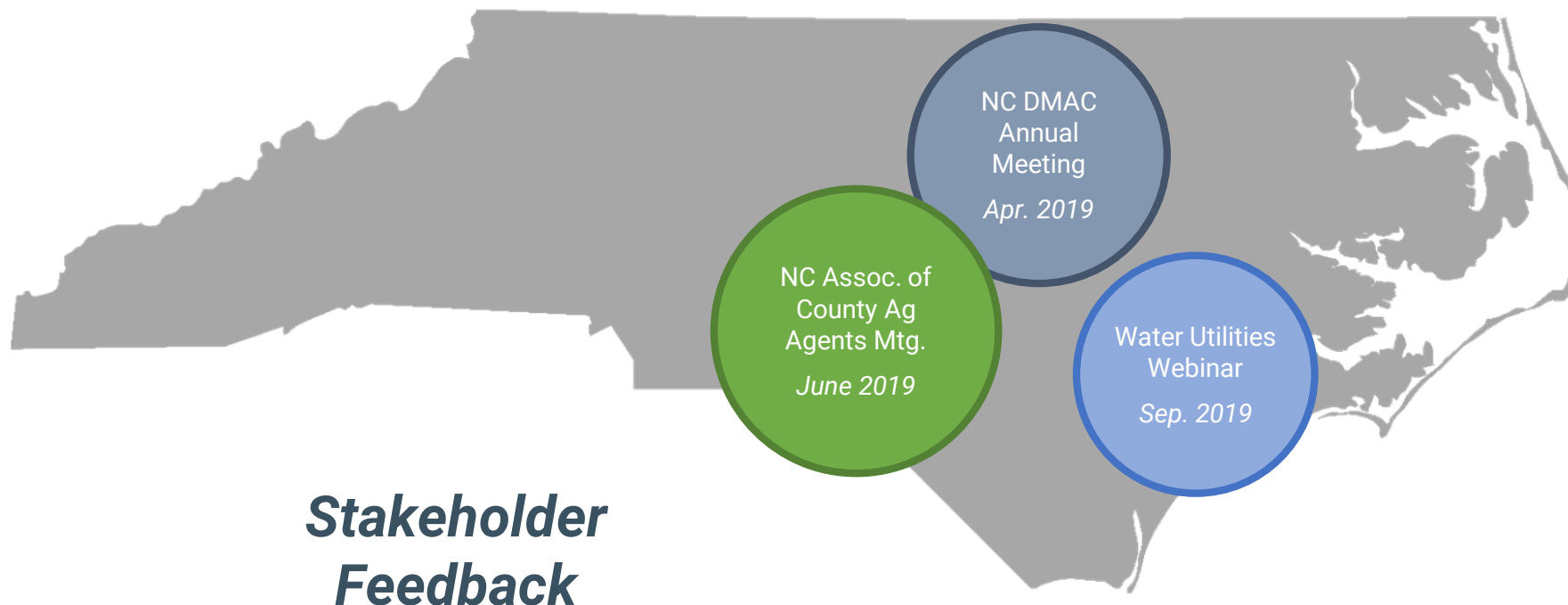
Sector Engagement



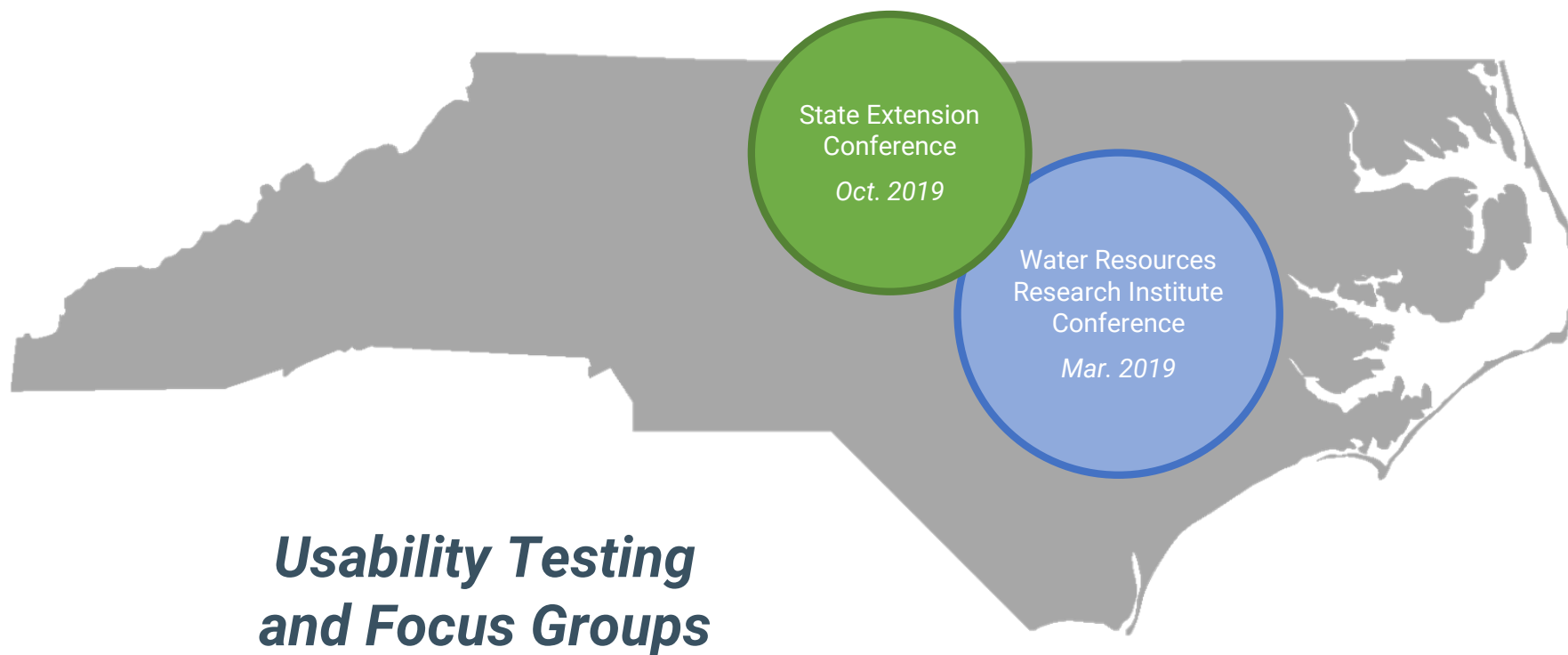
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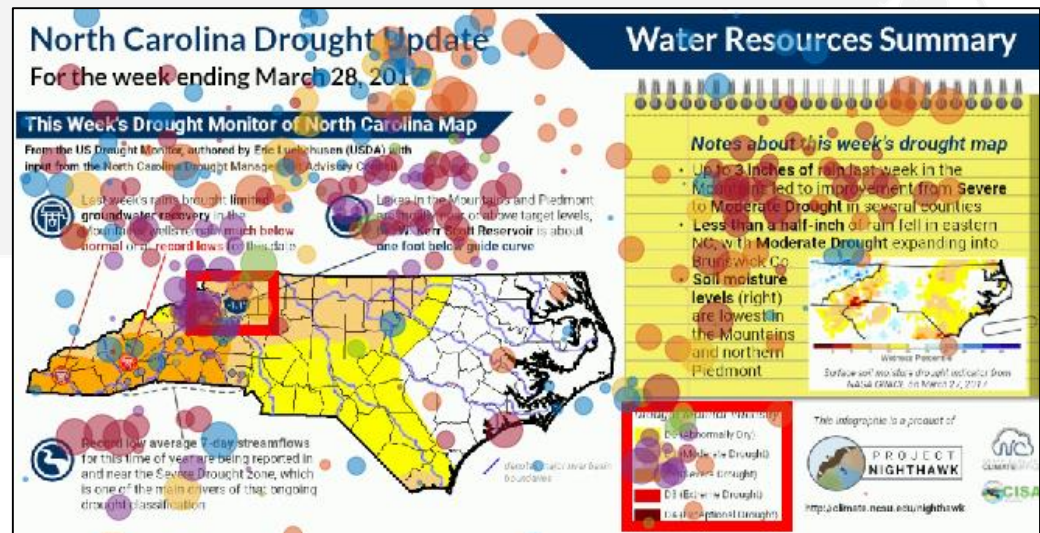
Sector Engagement



Usability Testing

- Two eye tracking studies have collected quantitative usability data

- *Where are users looking, and for how long?*
- *How do they use these products to complete tasks?*



How Are These Being Used?

Answering
questions from
the media

In outreach to
homeowners,
growers, and the
community

Providing
justification of
overtime and hazard
pay for fire fighting

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Key Project Tasks

Primary Takeaways

- Don't just create; **evaluate!**
- ***Translate technical information***, but know where to stop
- ***Know your audience***
 - When will they use your products, and for what purpose?
 - Consider a variety of formats to meet their needs

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- *NOAA-OAR-CPO-2018-2005133 (SARP grant)*
- *NA16OAR4310163 (RISA grant)*



SARP
Sectoral Applications
Research Program



RISA
Regional Integrated
Sciences and Assessments



Thank you!

<https://climate.ncsu.edu/nighthawk>