Project Background

Goal: Provide *relevant*, *accessible*, and *actionable* drought-related information to decision makers tailored to specific sectors

Official Title: "Innovating Approaches to Drought Communications with North Carolina Decision Makers"

Code Name: Project Nighthawk

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











Informed Consent

More information at http://climate.ncsu.edu/nighthawk

INNOVATING APPROACHES TO DROUGHT COMMUNICATIONS WITH NORTH CAROLINA DECISION MAKERS

Background | Why Nighthawk? | Objectives | Timeline | Our Partners | Funding Source | Contact Us For Participants

Questions?



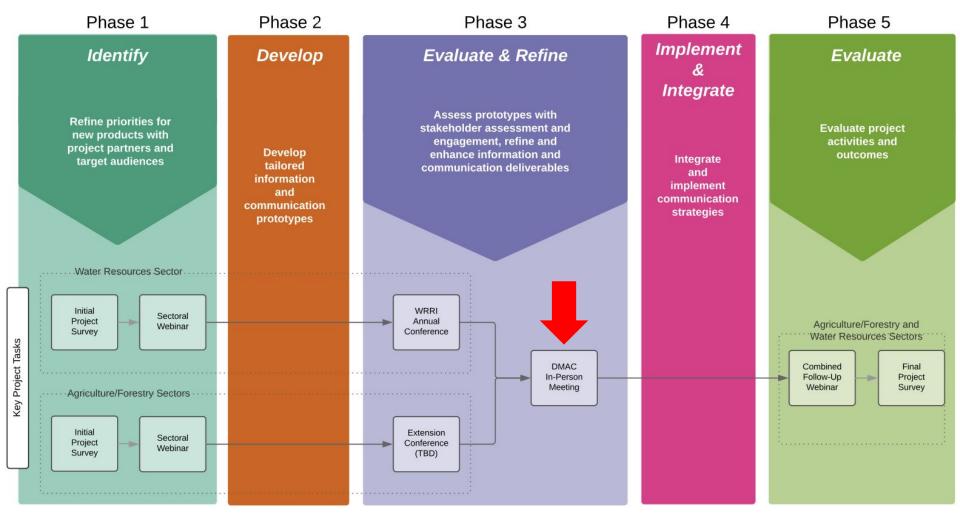






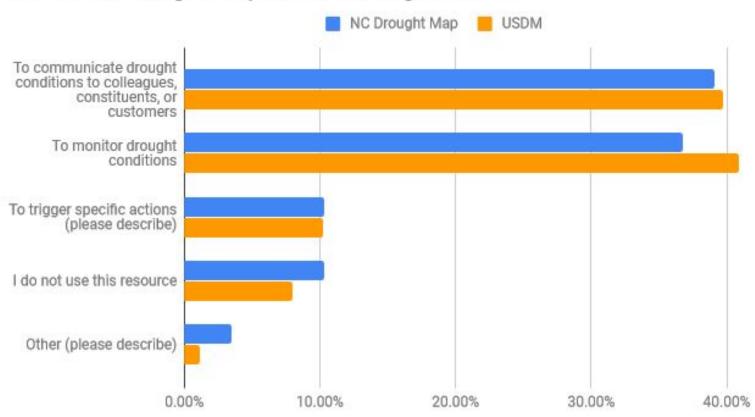
Project Nighthawk Phases

Fall 2018 Summer 2019



Selected Survey Results (Ag/Forestry)

Use of NC Drought Map and US Drought Monitor







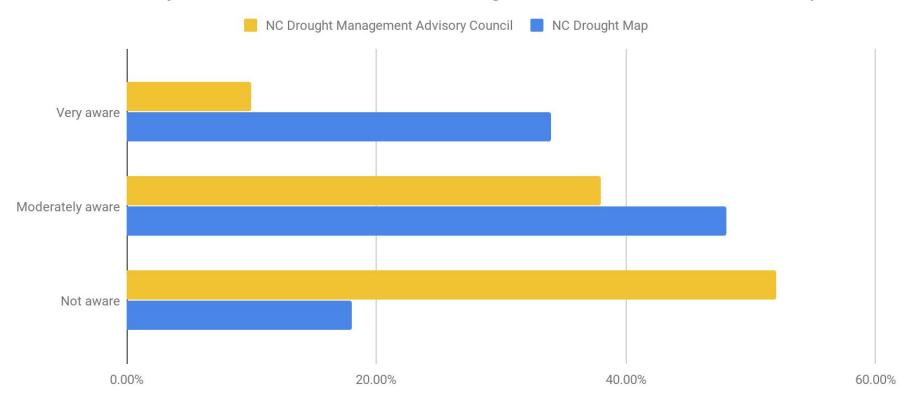




50.00%

Selected Survey Results (Ag/Forestry)

How aware are you of the NC DMAC and US Drought Monitor of North Carolina Map?





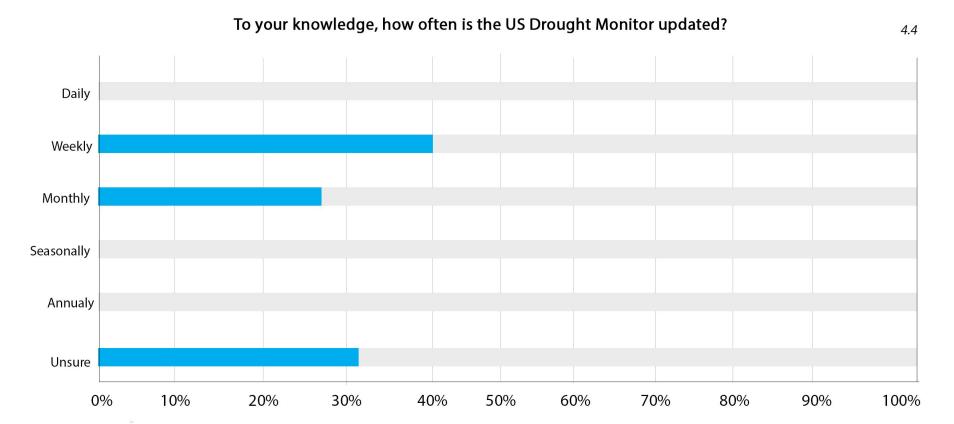






Selected Survey Results (Water Res.)





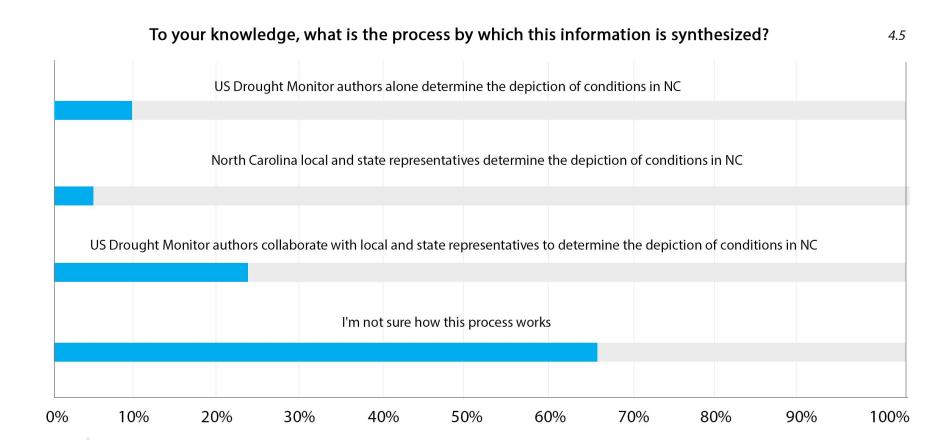








Selected Survey Results (Water Res.)











Phase 1 Takeaways

- The drought monitoring process needs more transparency
 - Who in NC is contributing to these maps?
 - What is the reasoning behind map changes?
- Users prefer partially translated information in a variety of formats
 - Including email alerts, factsheets, & infographics
 - Content both pushed to them and web-accessible









Prototypes and Ideas for Today's Discussion

- 1. Weekly drought overviews
- 2. "About the DMAC" resources
- 3. Possible updates to ncdrought.org











Weekly Drought Overviews

Goal: Provide insights into the DMAC and USDM discussions for release alongside each week's map

Components:

- Blog post summaries
- Email alerts/notifications
- Infographics









Blog Post Example

Moderate Drought Expands Across the Piedmont

Pasted on November 9, 2017 by Corey Davis

Another dry week in central and eastern North Carolina has led to expansion of Abnormally Dry and Moderate Drought conditions on the US Drought Monitor.

The multi-agency North Carolina Drought Management Advisory Council (NC DMAC) reviewed recent conditions on Tuesday afternoon and provided input to the US Drought Monitor author, including recommendations for the following changes on this week's map:

- . Moderate Drought (D1) conditions were added to parts of Rockingham, Guilford Randolph and Stanly counties in the central Piedmont, including the cities of Greensboro, Asheboro, and Reidsville
- . Moderate Drought was also expanded to cover northern Wake County in the
- · Abnormally Dry (D0) conditions were introduced into Lenoir County, including

These changes were based on a number of objective indicators that show the increase in dinmess armost the state:

A Lack of Rainfall

Precipitation was largely limited to the Mountains over the past 7 days. A shower over Rockingham County brought about half an inch of rain to Reidsville, but it was still yet another below-normal week. Elsewhere in the Piedmont and Coastal Plain, most locations received no rain at all.



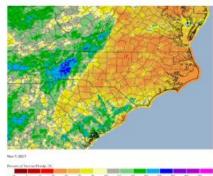
Total precipitation from November 1-7, 2017; from the Integrated Water Portal



This week's US Drought Monitor map for North Carolina

A Sharp Precipitation Divide

Wet in the west and dry in the east has been the recent trend across North Carolina, Over the past 60 days, much of the Mountains has received abovenormal rainfall - including from the remnants of Hurricane Irma - while parts of the Piedmont and Coastal Plain have seen just 25 to 50% of their normal



Percent of normal precipitation for the 60 days ending on November 7, 2017; from the Integrated Water Portal

A Lack of Rainfall

Precipitation was largely limited to the Mountains over the past 7 days. A shower over Rockingham County brought about half an inch of rain to Reidsville, but it was still yet another below-normal week. Elsewhere in the Piedmont and Coastal Plain most locations received no rain at all.



Total precipitation from November 1-7, 2017; from the Integrated Water Portal

Struggling Streams

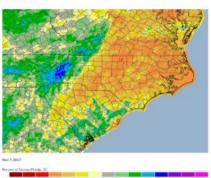
The lack of recent rainfall has caused streamflows to decline, especially in the northern and central Piedmont. Monitoring sites along the Cape Fear River at Lillington, Pittsboro, and Gibsonville have all had their 28-day average streamflows drop into the much below normal range.

28-Day Average Streamflow Levels



A Sharp Precipitation Divide

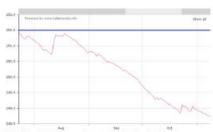
Wet in the west and dry in the east has been the recent trend across North Carolina. Over the past 60 days, much of the Mountains has received abovenormal rainfall - including from the remnants of Hurricane Irma - while parts of the Piedmont and Coastal Plain have seen just 25 to 50% of their normal



Percent of normal precipitation for the 60 days ending on November 7, 2017; from the Integrated Water Portal

Lakes Levels Lowering

Reservoirs across the Piedmont are also feeling the effects of the recent dry weather. Falls Lake, Jordan Lake, and Kerr Lake have all fallen more than two feet below their target levels, according to the US Army Corps of Engineers. That decline began in the late summer but has accelerated recently due to the lack of rainfall, especially in the upper Cone Fear River basin.



Falls Lake levels (pink) compared to targets (blue line) since late July; from www.l.akal.avals.infn









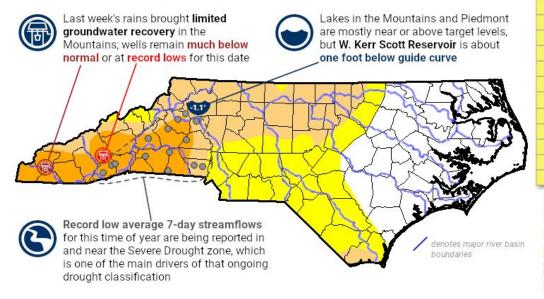
Infographic Examples

North Carolina Drought Update

For the week ending March 28, 2017

This Week's Drought Monitor of North Carolina Map

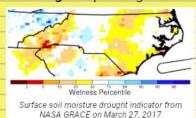
From the US Drought Monitor, authored by Eric Luebehusen (USDA) with input from the North Carolina Drought Management Advisory Council



Water Resources Summary



- Up to 3 inches of rain last week in the Mountains led to improvement from Severe to Moderate Drought in several counties
- Less than a half-inch of rain fell in eastern NC, with Moderate Drought expanding into Brunswick Co.
- Soil moisture levels (right) are lowest in the Mountains and northern Piedmont



Drought Monitor Intensity:

D0 (Abnormally Dry)

D1 (Moderate Drought)

D2 (Severe Drought)

D3 (Extreme Drought)

D4 (Exceptional Drought)

This infographic is a product of

















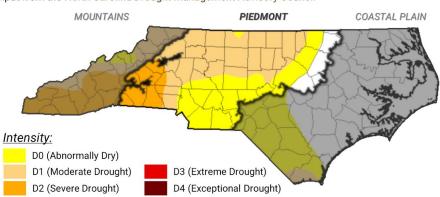
Infographic Examples

North Carolina Drought Update

For the week ending March 28, 2017

This Week's Drought Monitor of North Carolina Map

From the US Drought Monitor, authored by Eric Luebehusen (USDA) with input from the North Carolina Drought Management Advisory Council



Last Week's Drought Map



This infographic is a product of

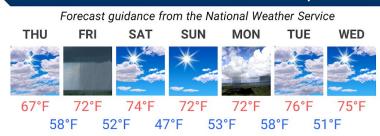


http://climate.ncsu.edu/nighthawk

Piedmont Summary

- The northern Piedmont remains in Moderate
 Drought as streamflows and soil moisture levels continue to decline
- After a week with little to no rainfall, the southeastern Piedmont is still Abnormally Dry, but is being monitored for further degradation
- Reservoirs across the region remain at or near normal levels

Weather Outlook for the Week of Thu., Mar. 30



Friday: A cold front will bring a chance of rain, mainly in the northern counties. **Monday:** Pop-up showers and thunderstorms are possible in the afternoon.









Infographic Examples

North Carolina Drought Update For the month of March 2017

Drought Monitor of NC Map, Released Mar. 28, 2017

From the US Drought Monitor, authored by Eric Luebehusen (USDA) with input from the North Carolina Drought Management Advisory Council

Current Coverage and Changes Since Feb. 28

Abnormally Dry (D0)



(-28.17%)

25.83% (+15.08%)

Moderate (D1)

Severe (D2)

13.35% (-2.42%)

DROUGHT

0.00%

Extreme (D3) Exc

Exceptional (D4)



0.00%

Mountains improve, but drought persists

Severe Drought was upgraded to Moderate Drought in parts of the Mountains that received up to 3 inches of rain last week, including northern Haywood and Swain counties.

However, Severe Drought remains in the southern Mountains, which have seen precipitation deficits of 4 or more inches over the past 3 months and continue to have near-record low monthly streamflow levels.

Moderate Drought expands eastward Due to below-normal rainfall over

Due to below-normal rainfall over the past 1 to 3 months, streamflows have dropped much below normal in many areas, leading to drought development in the northern Piedmont and in Brunswick County

Northern coast no longer Abnormally Dry

A wet start to March replenished soil moisture and groundwater levels, especially north and east of Rocky Mount

This infographic is a product of



http://climate.ncsu.edu/nighthawk











■USGS

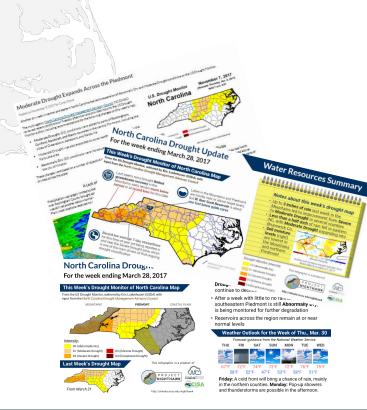


7-day average streamflows

from Mar. 22 to 28 V

Drought Overviews - Logistics

- Short-term: create and share with a pilot group?
- Long-term: Who would "own" and create these?
- Where would these "live"?
 - Websites (SCONC, DMAC, others?)
 - Social Media (whose account?)













"About the DMAC" Resources

Goal: Provide background information about the NC DMAC and its history, membership, and weekly drought monitoring process

Possible Approaches:

- Infographics
- Story maps
- Updated content for ncdrought.org









"About the DMAC" Resources



A main purpose of the DMAC is to provide cons accurate information on drought conditions in the state to the U.S. Drought Monitor, the Environmental Management Commission, the Secretary of the Department of Environment

1998-2003 Drought



2007-2008 Drough













The US Drought Monitor was created in 1999; the Drought Monitoring Council began offering USDM authors local and state-level input. **Drought Monitoring Council is Recognized** The NC General Assembly gives the Drought Monitoring Council an official statutory base and changes its name to ti Drought Management A (DMAC) to reflect its broad extends beyond monitoring

Formation of NC Drought Monitoring Council

agency coordination, is created in 1992

Creation of the US Drought Monitor

The Chair of the Council is

Department of Environme

designated by the Departr

A new statute charged the

official state drought advis technical data to address

The General Assembly beg

Council to submit an annu

the Secretary, the Governo

Environmental Review Cor

includes a review of the Co

The NC legislature passed

improving drought prepar

which included defining th

membership, Various grou

send a representative to s

due to their expertise in a

drought monitoring.

ecommendations to impr

Annual Reports

New Participants

The Drought Monitoring Council, an inter

Monitoring Drought with Technical __



Droughts, at their core, are caused by an imbalance between the supply of water and the demand for that water. North Carolina's supply of water originates as precipitation. Comparing how much precipitation fell over the past week, month, season, or even year to the average over that same time period provides an indication of the supply side of the water supply-demand balance.

The NC DMAC uses information from gauges across North Carolina that regularly measure the levels of surface water and VVVV groundwater supplies as

guidance for hydrological drought and drought impacts.
Precipitation that runs off the surface eventually makes it way to surface water supplies (streams, rivers, and lakes) to be used by plants, animals, people, and industry. Humans have also constructed dams, creating man-made lakes for purposes like adequate water supply and flood control. These dams are maintained by various entities, such as federal, state, or local governments, utilities, or even private landowners.

Precipitation that enters the soil provides moisture for plants roots. If that water continues to filter into the soil it eventually reaches underground aquifers, becoming groundwater. Groundwater wells provide drinking water for many North Carolina residents, and some groundwater flows into rivers and lakes, becoming surface water.

Temperatures - and whether they are wa

or cooler than normal - give an indication

atmosphere's demand for water through

evapotranspiration (the combination of

evaporation and transpiration). We expect

to be quite a bit of evapotranspiration in the

warmer months, but a stretch of unusua weather can lead to more-than-typical am of water leaving the surface for the atmos

If that water doesn't return as precipitation

water supply-demand balance might shift



Forest fires are part of North Carolina's climate, but these can become more frequent or severe during times o drought. Reports of forest fire incidence and acreage provide information about drought impacts to forested lands.

Technical Information (continued)

Monitoring Drought with

Reports of conditions from citizen scientists as part of the CoCoRaHS Condition Monitoring program provide a baseline understanding of moisture conditions that aren't specific to any one sector. Among the unique types of impacts that these reports include are impacts to backyards and wildlife.



Public water supplies are typically managed to be resilient to drought, impacted. Often, utilities and municipalities will institute voluntary or measures to mitigate a drought's impacts. Keeping tabs on these yield a drought is having in different parts of the state. The quality of water well when water levels decline. Monitoring water quality provides info





Expected drought impacts may change based on the current season. For example, drought conditions in the spring might impact the germination of seeds whereas drought in the fall may impact wild fire

Precipitation falling within the bo the Cape Fear highlighted in grebasins can experience very differ

What type of drought (or non-

conditions have we experience ecent past? If we've experien several years of wetter-than-r

conditions, it might take longs to enter into a drought

because soil moisture and

groundwater levels are higher







The drought designations used by the NC DMAC match the US Drought Monitor These designations follow a 5-point scale that ranges from Abnormally Dry to Exceptional Drought. The NC DMAC may recommend advought designation the additional that the U.S. Drought Monitor if the U.S. Drought Monitor to different from that of the U.S. Drought Monitor in Designate the U.S. Drought Monitor Designate Designa

The lowest designation, D0, indicates areas that might be going into or coming out of drought. Examples of impacts include slowing growth of crops (going into drought) or lingering water deficits (coming out of

Moderate Drought

The lease severe drought designation is Moderate Drought, or D1. Some examples of impacts include damage to crops, declining stream, reservoir, or well levels, and voluntary water-use restrictions requested.

Severe Drought

When a Severe Drought designation is issued, examples of drought impacts include crop or pasture losses, widespread water shortages and water use

Extreme Drought

As conditions worsen into an Extreme Drought, types of impacts include major crop and pasture losses as well as widespread water shortages or water use

Exceptional Drought

The most severe drought designation is an Exceptional Drought, D4. Places with this drought designation may experience exceptional and widespread crop and pasture losses. Shortages of water in reservoirs streams, and wells that water emergencies are also possible in an Exceptional Drought



What's my

designation?









"About the DMAC" Resources

Resource Development:

- SCONC can create "static" products as part of Project Nighthawk
 - Who from the DMAC is willing to review them?

Getting the Message Out:

- How can we share these?
 - Who can share? Share with whom?
- Where should these ultimately "live"?











Project Nighthawk Next Steps

Phase 4

Implement & Integrate

Integrate and implement communication strategies

- Revise prototypes based on Phase 3
 feedback
- Complete "About the DMAC" resources and share for review
- Begin testing Weekly Drought Updates, assuming weekly drought calls resume
 - Seeking representatives from each sector to receive these and share feedback

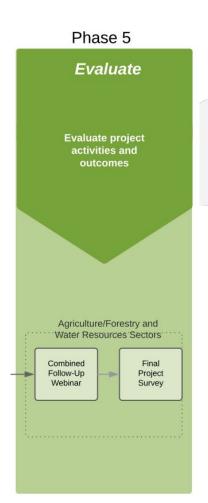








Project Nighthawk Next Steps



- This summer and fall, we'll evaluate what we've done
- Seeking additional feedback opportunities for ag, forestry, and water resources
 - Could you recommend any conferences or events to attend for your sector?













https://climate.ncsu.edu/nighthawk







