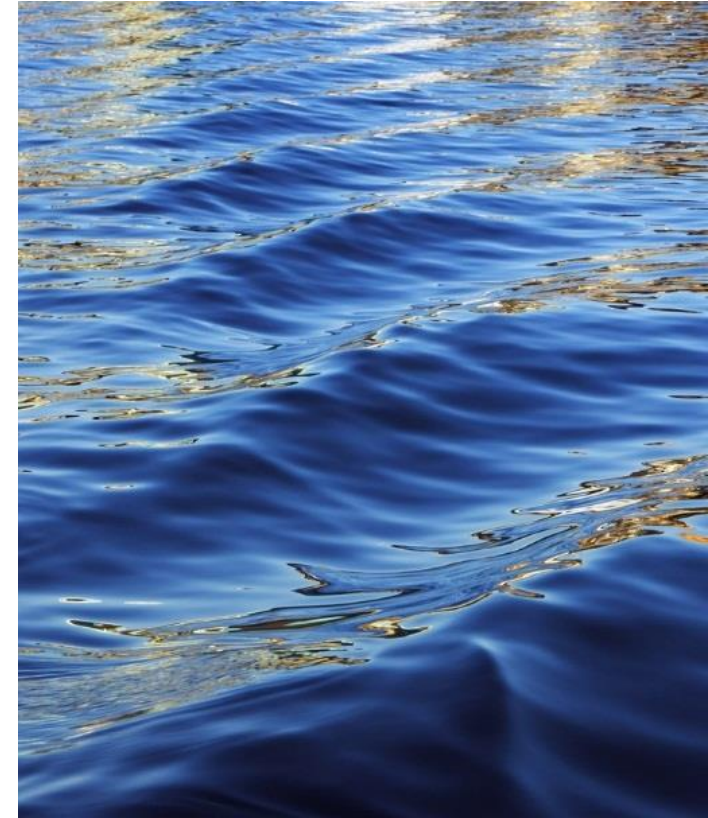


Condition Monitoring in the Carolinas

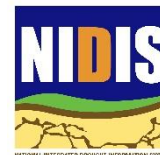
Exploring New Applications of Citizen
Science Observations to Support Regional
Forecasts and Decision-Making

Amanda Farris
Carolinas Integrated Sciences & Assessments (CISA)
A NOAA RISA Program

June 18, 2019

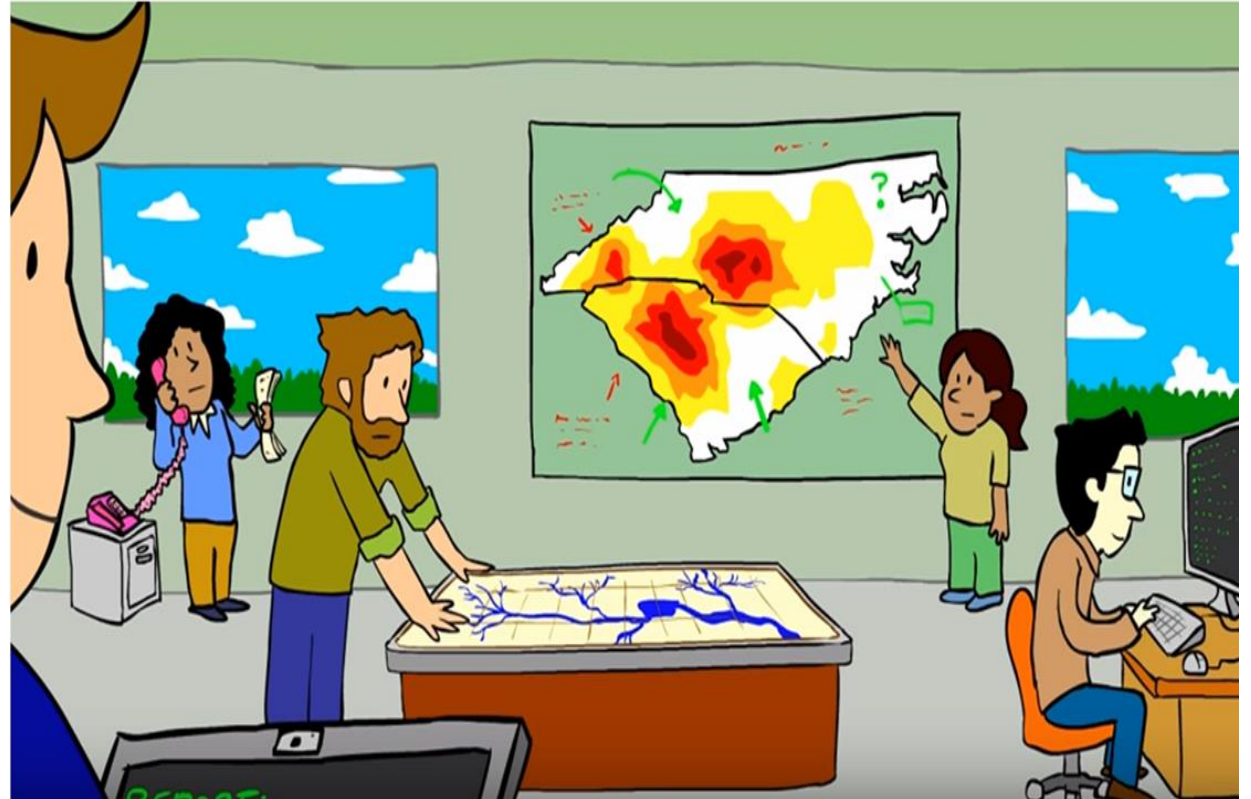


RISA
Regional Integrated Sciences
and Assessments



Overview

- Background on CoCoRaHS Condition Monitoring
- Report Content Analysis
- Current Applications
- Case Studies
- Goals
- Focus Group Discussion



Community Collaborative Rain, Hail, & Snow (CoCoRaHS) Network



- Volunteers regularly report weather conditions and impacts
- Provides baseline for comparison over time
 - Rather than 'one-and-done' reports which often aren't conducted until drought conditions are already severe
- Track the onset, intensification, and recovery of droughts

My Data Entry : Condition Monitoring Report Form

Condition Monitoring Report Form [Submit Data](#) [Reset](#)

Station : CO-LR-607 : Fort Collins 3.8 SSW

Condition monitoring reports are submitted on a regular (weekly, biweekly, monthly) basis to share information about the effects of local precipitation on the environment and society. By submitting reports on a regular basis, you create a baseline to see change through time, such as seasonal differences or changes caused by more or less precipitation. Please refer to the Condition Monitoring training slide show for more information.
* Indicates required field

Observation Date *
4/13/2016

Condition Scale Bar [More information on the scale bar](#)

Severely Dry	Moderately Dry	Mildly Dry	Near Normal	Mildly Wet	Moderately Wet	Severely Wet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Description
Please provide a description of how dry, normal or wet conditions are affecting you, your livelihood, your activities, etc. *

Report Categories
Please check at least one report category. If you check a category, please provide supporting information in the description. [More information on condition monitoring categories.](#)

- ☐ General Awareness
- ☐ Agriculture
- ☐ Business And Industry
- ☐ Energy
- ☐ Fire
- ☐ Plants And Wildlife
- ☐ Relief Response
- ☐ Society And Public Health
- ☐ Tourism And Recreation
- ☐ Water Supply And Quality

[Submit Data](#) [Reset](#)

Reporting Process

Step 1: Assess Condition

Observation Date *
4/13/2016

Condition Scale Bar [More information on the scale bar](#)

Severely Dry	Moderately Dry	Mildly Dry	Near Normal	Mildly Wet	Moderately Wet	Severely Wet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Description

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Condition Monitoring Report Form

Submit Data Reset

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- ☐ Society And Public Health
- ☐ Tourism And Recreation
- ☐ Water Supply And Quality

Submit Data Reset

Step 2: Report Impacts

Station Number	NC-WK-6
Report	The scattered thunderstorms we had this week contributed only 0.19 inches of rain to our neighborhood. The ground has turned very dry and we are seeing signs of considerable water stress in some of the vegetation. The day lily leaves are turning brown. The river birches have dropped a lot of dried leaves as a reaction to the low water levels. The stream has completely dried up and there is no water in it. The level of the pond has dropped well below the level of the exit so no water is flowing from the pond. The pond water is dark colored and there is a scum on the surface. We are seeing more of the bottom of the pond than we have seen in several years. The great blue heron is seen each day standing on the mud in the pond.
Condition	Moderately Dry
Date	Sat Jun 01 2019

My Data Entry : Condition Monitoring Report Form

Condition Monitoring Report Form [Submit Data](#) [Reset](#)

Station : CO-LR-607 : Fort Collins 3.8 SSW

Condition monitoring reports are submitted on a regular (weekly, biweekly, monthly) basis to share information about the effects of local precipitation on the environment and society. By submitting reports on a regular basis, you create a baseline to see change through time, such as seasonal differences or changes caused by more or less precipitation. Please refer to the Condition Monitoring training slide show for more information.
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Observation Date *
4/13/2016

Condition Scale Bar [More information on the scale bar](#)

Severely Dry	Moderately Dry	Mildly Dry	Near Normal	Mildly Wet	Moderately Wet	Severely Wet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Description
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- ☐ Water Supply And Quality

[Submit Data](#) [Reset](#)

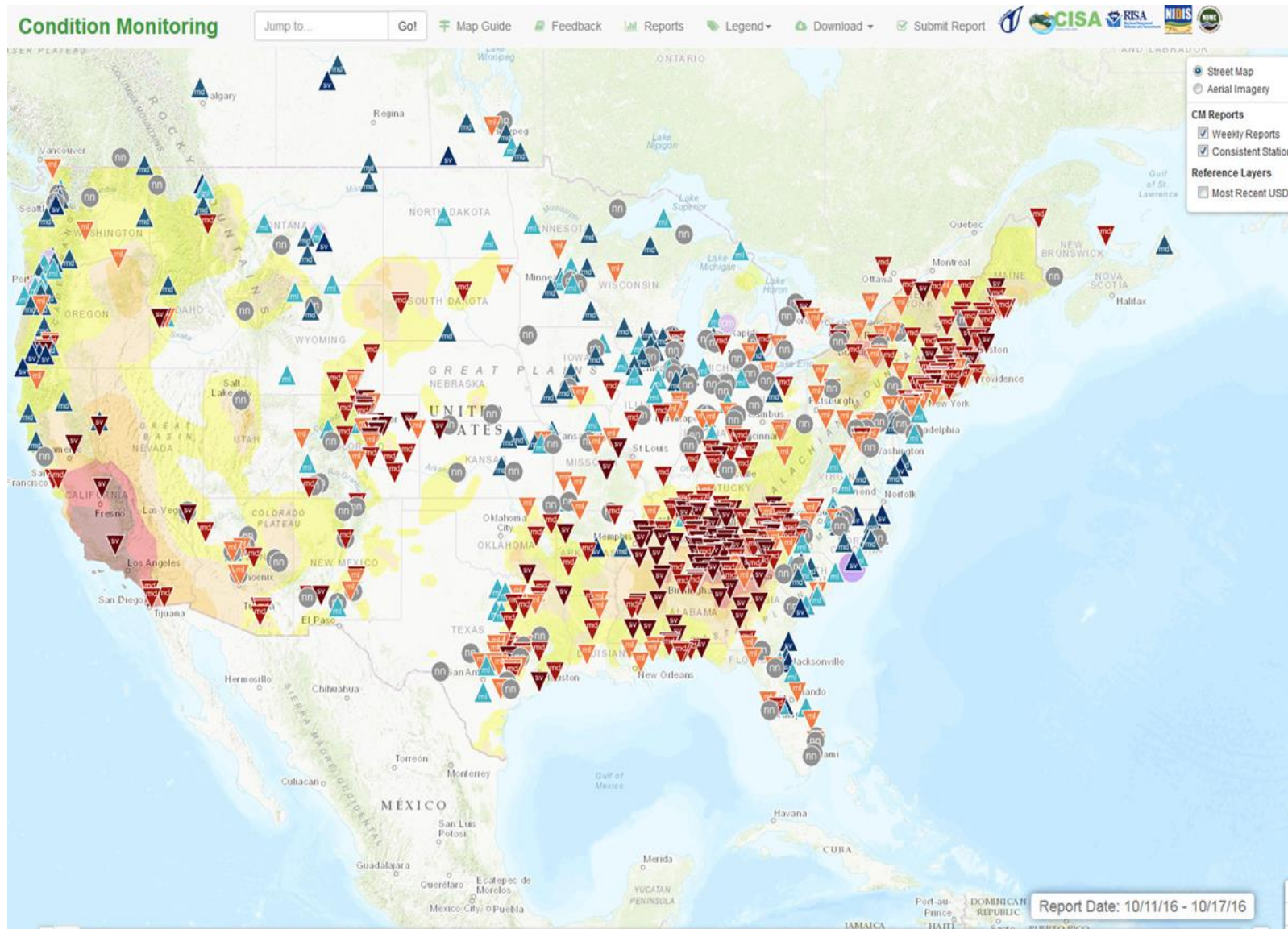
Step 3: Categorize Observations

Station Number	NC-WK-6
Report	The scattered thunderstorms we had this week contributed only 0.19 inches of rain to our neighborhood. The ground has turned very dry and we are seeing signs of considerable water stress in some of the vegetation. The day lily leaves are turning brown. The river birches have dropped a lot of dried leaves as a reaction to the low water levels. The stream has completely dried up and there is no water in it. The level of the pond has dropped well below the level of the exit so no water is flowing from the pond. The pond water is dark colored and there is a scum on the surface. We are seeing more of the bottom of the pond than we have seen in several years. The great blue heron is seen each day standing on the mud in the pond.
Condition	Moderately Dry
Date	Sat Jun 01 2019

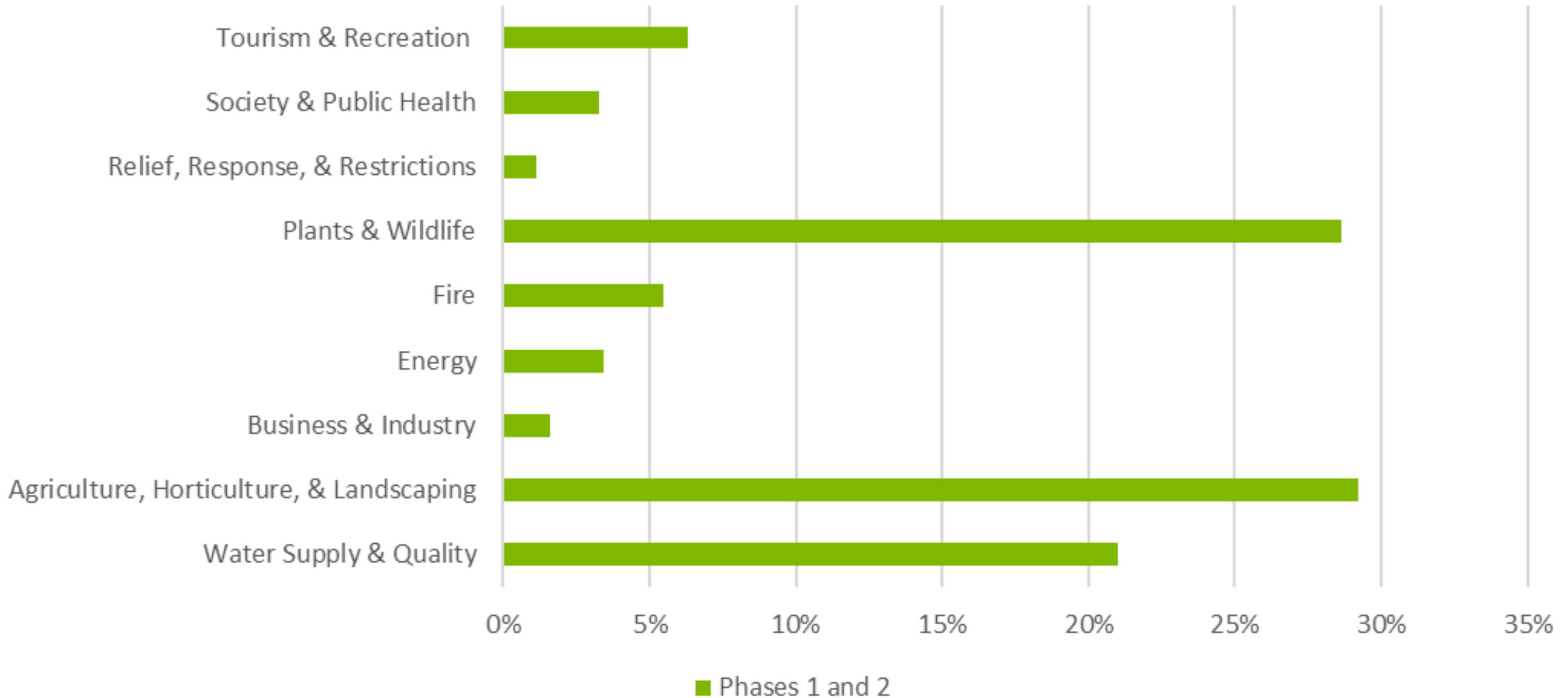
3

- ✓ General Awareness
- ✓ Plants & Wildlife
- ✓ Water Supply & Quality

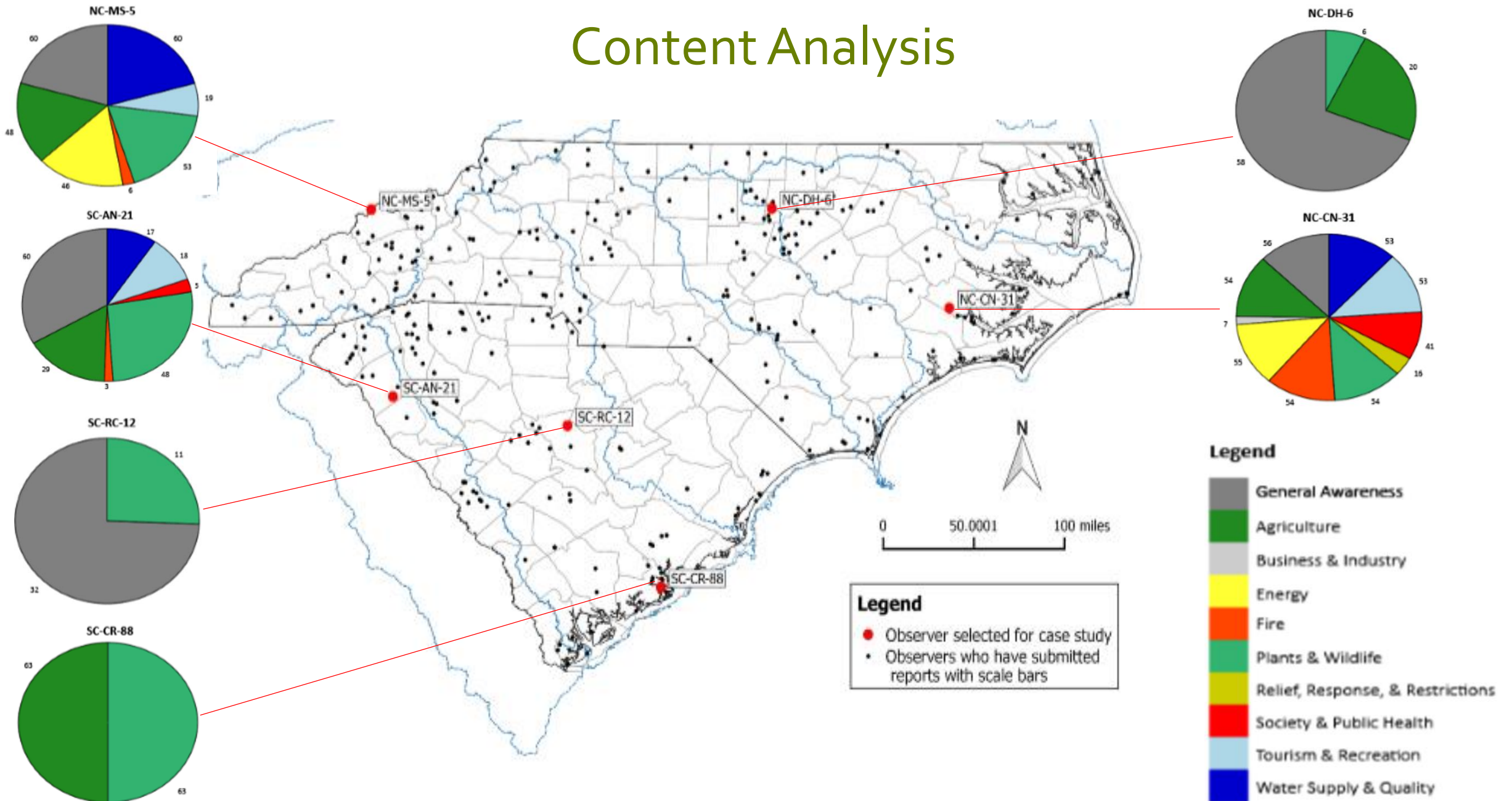
Interactive Web Map



Content Analysis

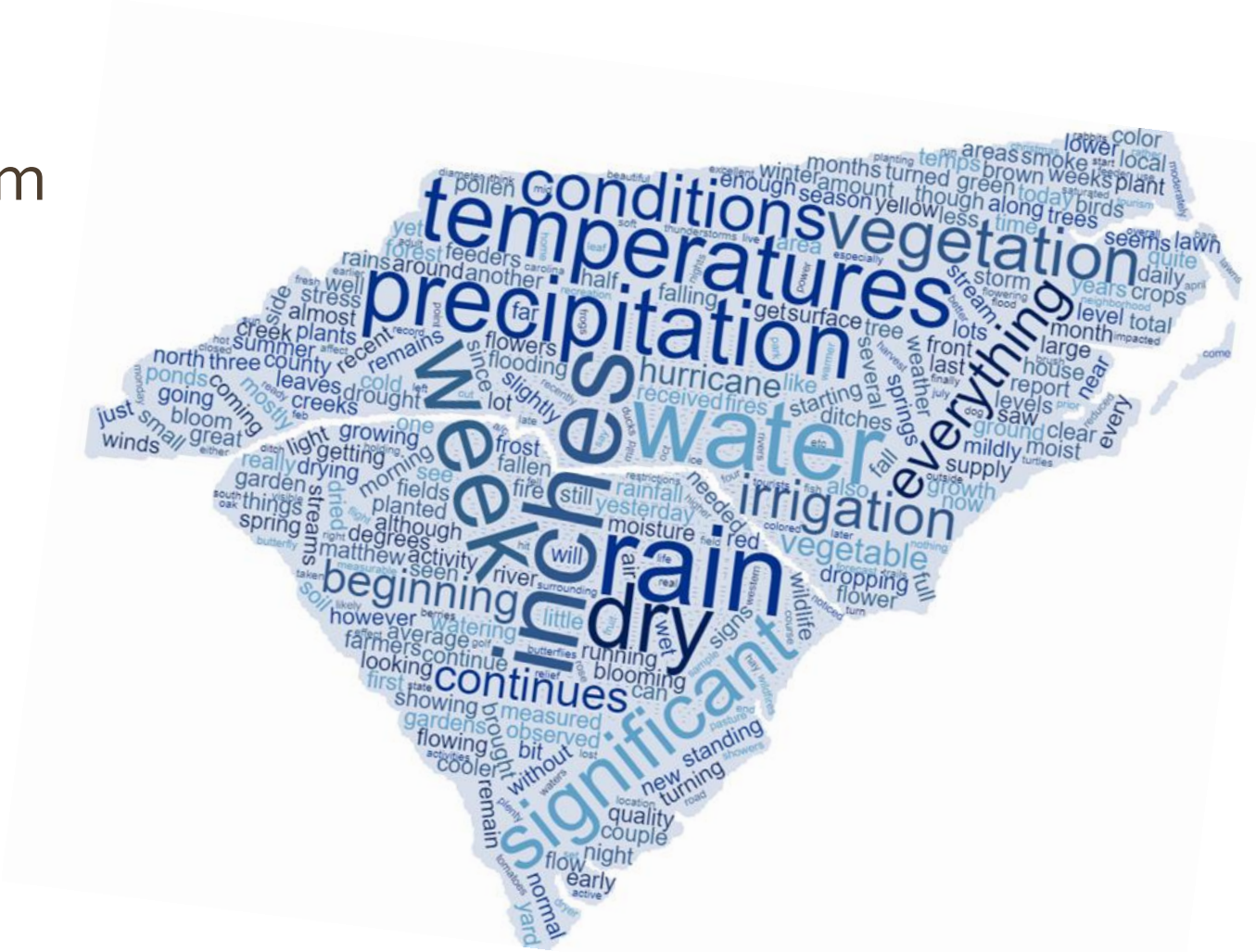


Content Analysis



Current Challenges in Condition Monitoring

- Observers may be basing their scale bar selections on short-term conditions
- Alternatively, observers may be paying attention to different factors, such as secondary or tertiary drought impacts, that cannot be captured with these weather-data-driven drought indices



Is subjective info valuable to decision making?

A “convergence of evidence” approach

“I think these reports are **indirectly validating** what we bring in as far as other data. And it gives you another perspective that is sometimes very hard to capture unless you have people, **boots on the ground** so to speak, talking with a lot of people to get that same kind of perspective.”

~ US Drought Monitor Author

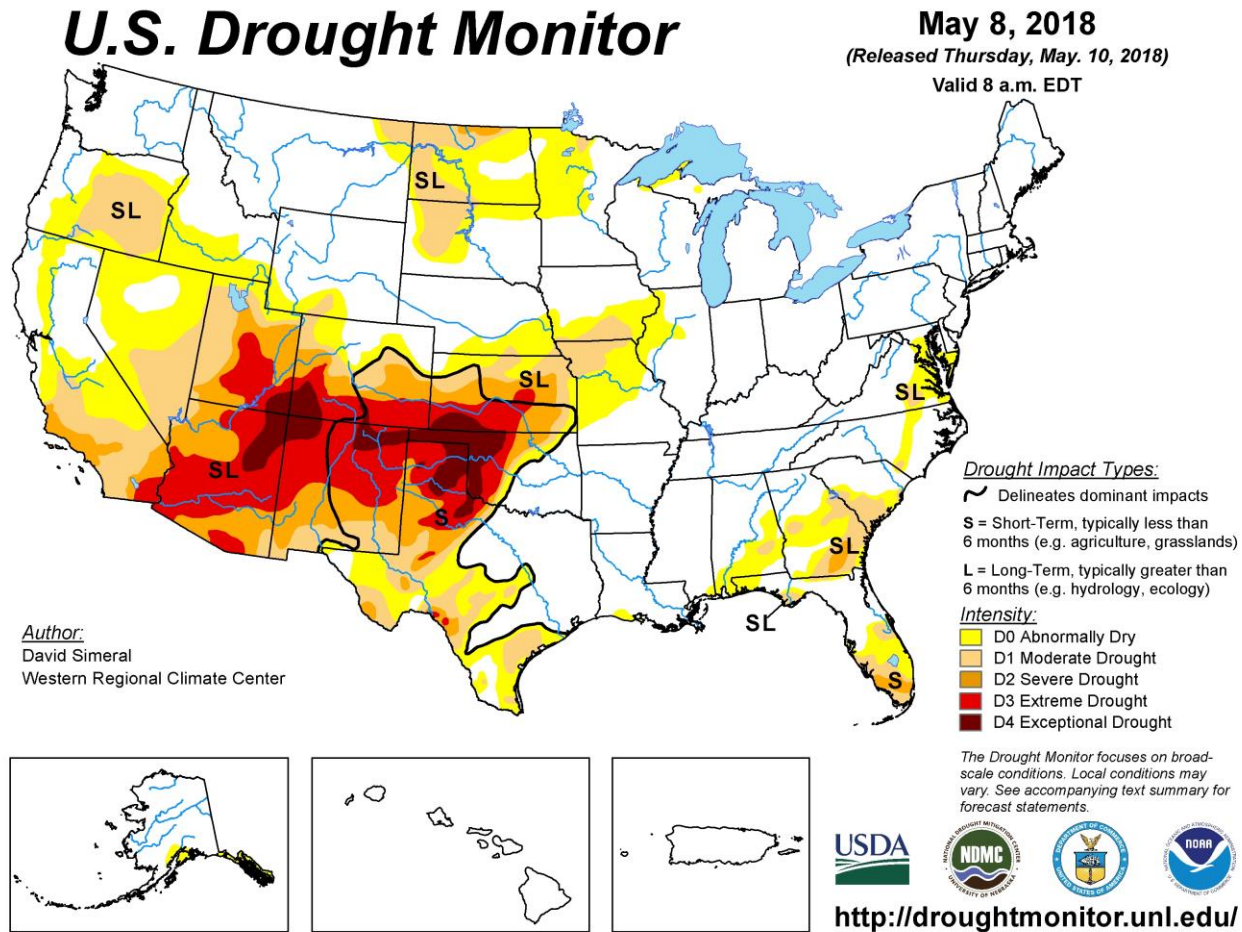
“To me, it goes back to the question, is ***some* information** that is a bit subjective **better than *no* information**? In my opinion, yes!

~ NC State Climate Office

“Although the process can be quite subjective, I rely on the observers to **provide the best condition [reports] based on their observations.**”

~ National Weather Service

Current Applications of Condition Monitoring Reports



- US Drought Monitor designations
- NC DMAC drought designations
- SC Drought Response Committee
- NWS Offices in the Carolinas

New Ways to Assess and Utilize Report Content

- **Reports don't just tell us about drought.** They also include information about:
 - Community impacts
 - Antecedent conditions
 - Transitional periods
 - Disaster recovery progress
 - Facility closures

Example: Typical Winter Entry



Source: Creative Commons, Dave Hitchborne (Flickr)

...This past week, Needle Ice was spotted protruding from the ground in patches along NC HWY 16 [...] Also noted light Hoar Frost on clover patches and some free-standing objects in the yard Thursday [...] Well water has had a brown tint to it for approximately the last month... was told by another well owner on Wednesday that it is because of the abundance of rain we have received lately. There has been little to no change in the coloration of what is coming out of water lines in the past several weeks. All deciduous trees have lost all of their leaves except for a few steadfast Oaks stubbornly retaining their copper foliage. Birds have been very busy storing food, consistently wiping out our 5 bird feeders within 2-3 days of being refilled...

-Maiden, NC (Dec 7, 2018)

Example: Hurricanes Florence Recovery

...The streams are all full with some minor flooding on fields and **one road in our town remains blocked by high water.** The soils are very soggy, bordering on treacherous footing in some places. The soggy soils did permit a few trees to come loose and fall in the winds, cutting power.

Following an 18 hour outage, power to our neighborhood has been fully restored ...

-Holly Springs, NC (Sep 15, 2018)



Example: 2016 Wildfire Season

Before

“About average temps, **windy, no rain for 8 days, less than 2" in Sept** and less than 1/2" so far this month. **It's Dry! roadside weeds dried up, unwatered lawns brown.** Fall seasonal crops diminished. ??Creeks are low, waterfalls, not worth the hike. My critter watering stations have a queue! Tourists love the warm dry weather as the leaves slowly begin to show color. **fire continues to be a concern as folks think about burning leaves”**

-Black Mountain, NC (Oct 15)

After

“Extreme drought, windy warm conditions continue with 6000 acres on fire. Air quality alert. Smoke event all over WNC. Praying for rain and for our first responders. Evacuations have **folks scrambling for housing for themselves and pets. Wildlife moving into neighborhoods fleeing the fires. Tourists causing traffic and disturbance coming to see the fires.** Local reservoir down 17". Praying for rain. farmers holding on. Voluntary water conservation in place in many communities. Community volunteer stepping up to help where we can..”

-Black Mountain, NC (Nov 11)

Next Steps

- Exploring new applications of CoCoRaHS condition reports
 1. Better Connect Report Content with Decision Maker Needs
 2. Improve Observer Guidance Documents:
 - Improve report quality and consistency
 - Account for regional variations in climate
 - Facilitate instruction of new volunteers