

What Can Citizen Scientists Tell Us about Drought?

Using CoCoRaHS to Improve the Monitoring and Reporting of Drought Impacts

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2012 Carolina DEWS Scoping Workshop



Key information needs identified by workshop participants:

- Improved on-the-ground drought impacts monitoring and reporting
- Understanding impacts not captured by traditional drought indices (e.g., agriculture, water supply, fire)
- Capturing more information about drought onset , intensification, and recovery



Community Collaborative Rain, Hail & Snow Network

CoCoRaHS COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK
"Because every drop counts"

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Welcome to CoCoRaHS! "Volunteers working together to measure precipitation across the nations."

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What is your landscape's current CONDITION? WET? NORMAL? DRY?
 Tell us by submitting a "CoCoRaHS Condition Report"

7,789 daily precipitation reports received today as of 10/11/2016 3:25 PM EDT

Daily Precipitation (inches x.xx)
 USA
 10/11/2016

0.0
Trace
0.00 - 0.23
0.24 - 0.46
0.47 - 1.15
1.16 - 2.75
2.76 - 4.12
4.13 - 4.58

JOIN CoCoRaHS

TRAINING SLIDE-SHOWS

Things to know about...

- Rain**
- Hail**
- Snow**

- Daily precipitation measurements using the "official" 4" CoCoRaHS rain gauge
- Severe weather reports
- Drought impacts reports
 - Incorporated into the National Drought Impacts Reporter
- Online data entry (mobile apps also available)

Project Components



Weekly Condition Monitoring

Connecting weather and climate to the environment

CISA recruited volunteers to submit weekly condition monitoring reports in addition to their daily precipitation measurements.

Regular observations help to identify:

- The early signs of drought
- When conditions begin to improve
- Any lingering impacts



Volunteer Training & Engagement



- In-person trainings
- Webinars
- Training and informational materials
- Project webpage
 - www.cisa.sc.edu/CoCoRaHS.html
- Ongoing communications with participants
 - “Cuckoo for CoCoRaHS in the Carolinas” blog
 - <https://carolinascocorahs.blogspot.com/>
 - Monthly newsletter
 - Thank You postcards
 - Quarterly conference calls

Sample Reports

Pickens County, SC, September 18, 2015

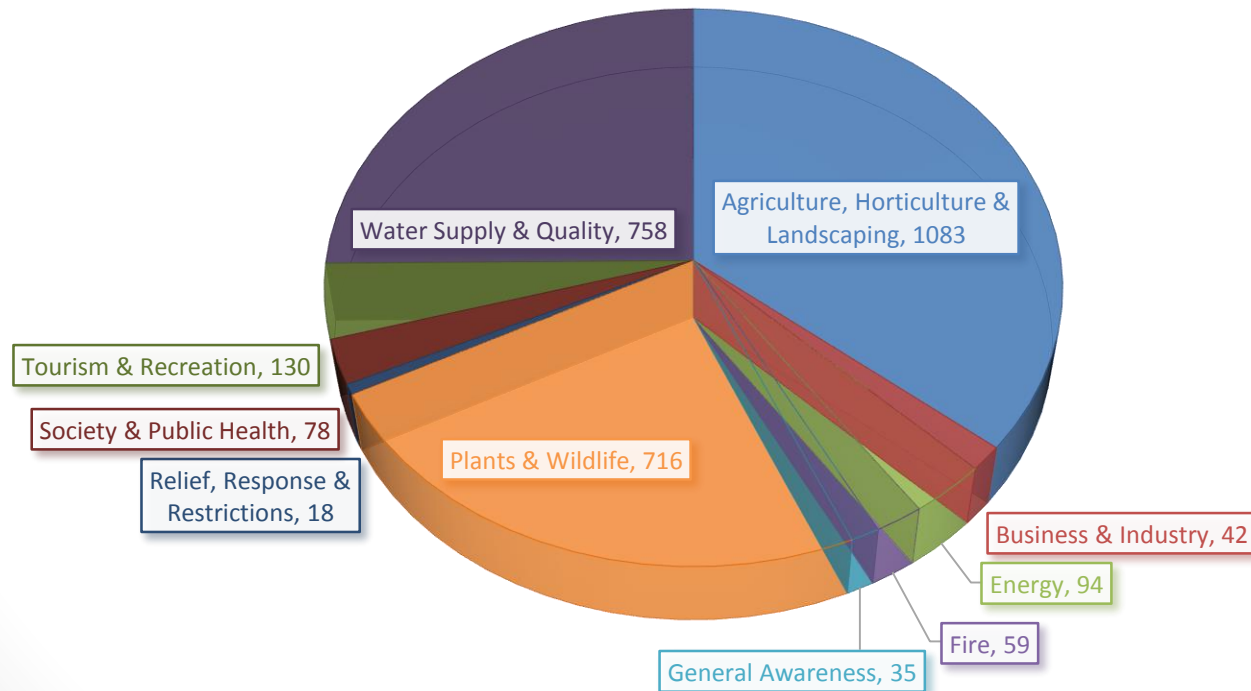
Dry conditions persist in the Easley area. Local streams are well below average. Ground is hard and difficult to dig. Some leaves are beginning to fall on top of the already dry grass.

Richland County, SC, October 18, 2015

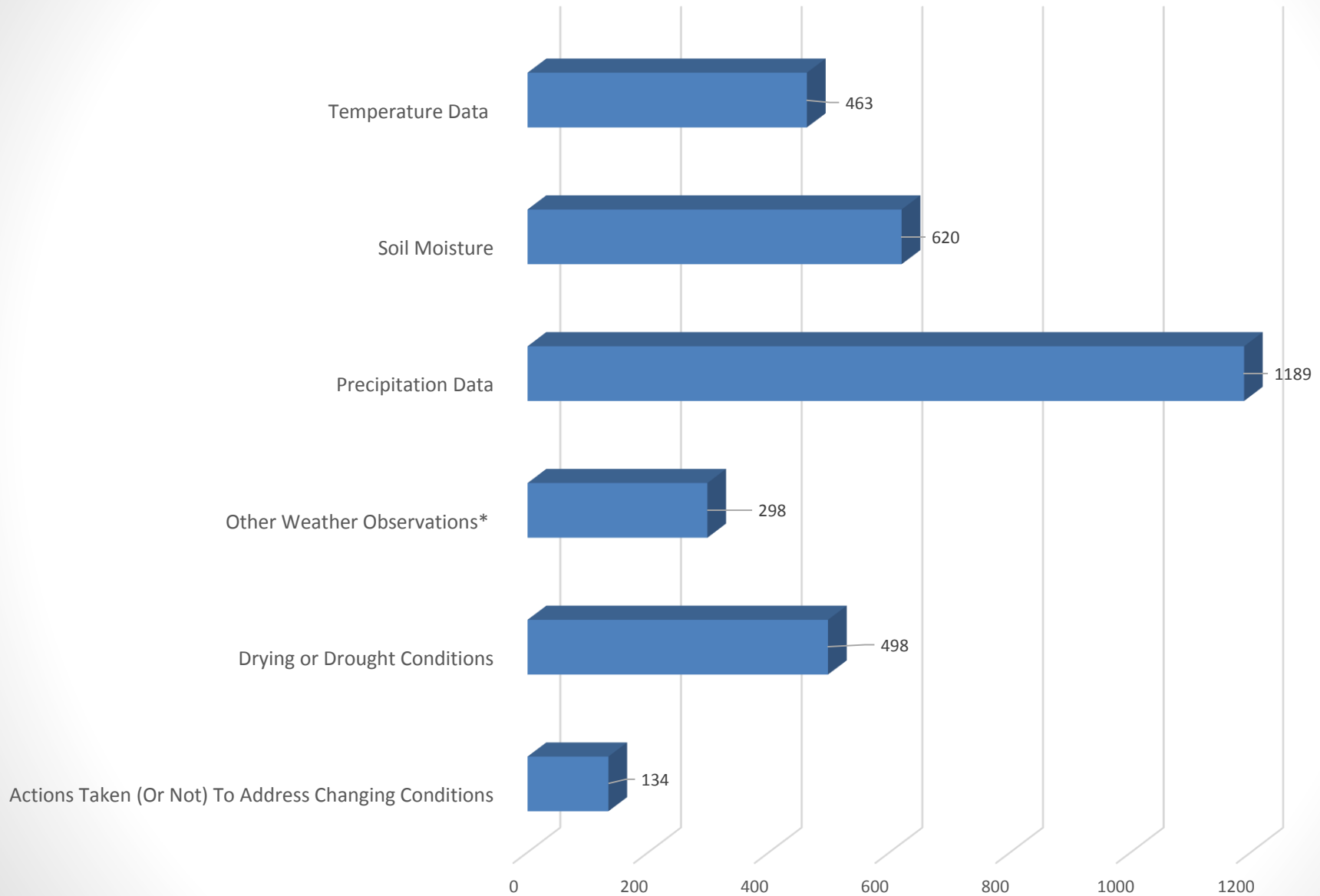
From Sep 22 to Oct 12 we've had 25.44 inches. The springs in our neighborhood have been "bleeding" since the heavy rain during the first weekend in October. This has slowed during the last few days.

Report Analysis

Condition Monitoring Report Information	
# of reports submitted, Sept 1, 2013 – December 31, 2015	1,572
# of observers who submitted reports	68
# of coded references to all coding categories	21,216
# of references to drought impact categories (e.g., agriculture, water quality and supply, recreation and tourism, etc.)	8,221

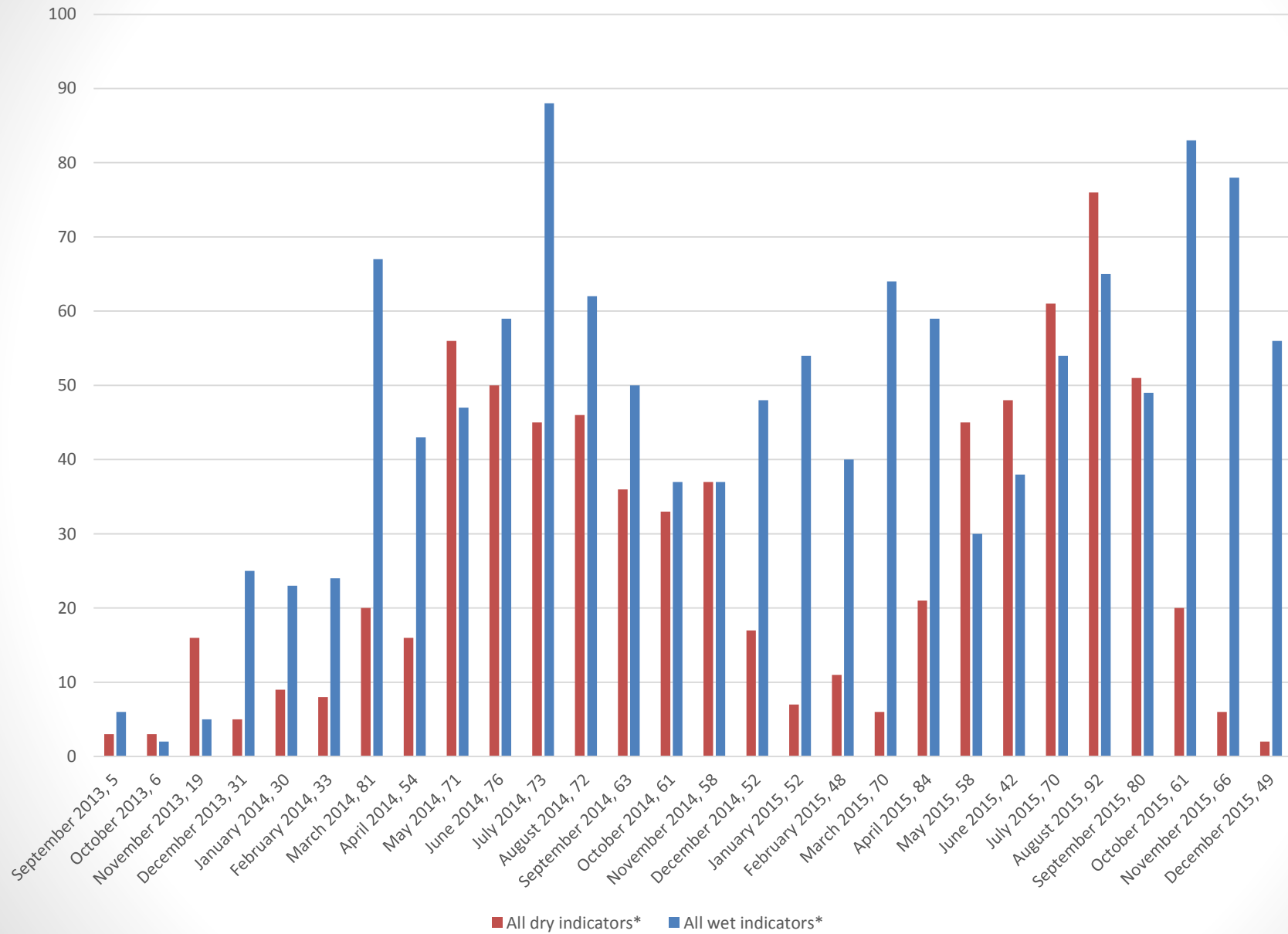


Other Report Content



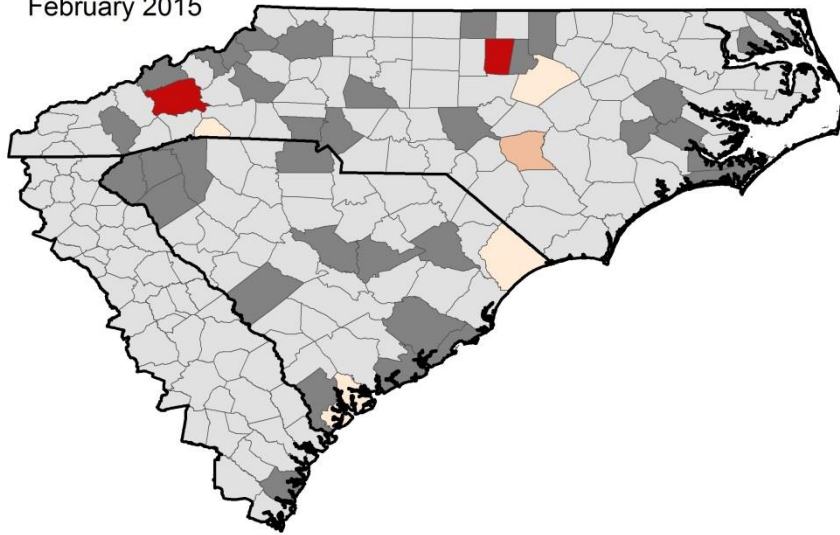
Other weather observations include: cloudiness, dew, fair weather, fog, frost, humidity, sunny, and wind.

References to wet and dry conditions

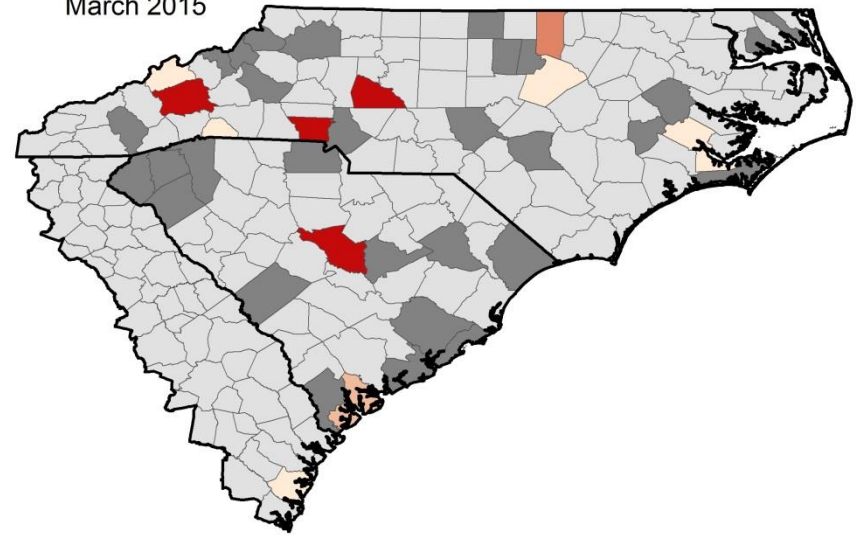


Relative Dry Conditions by County

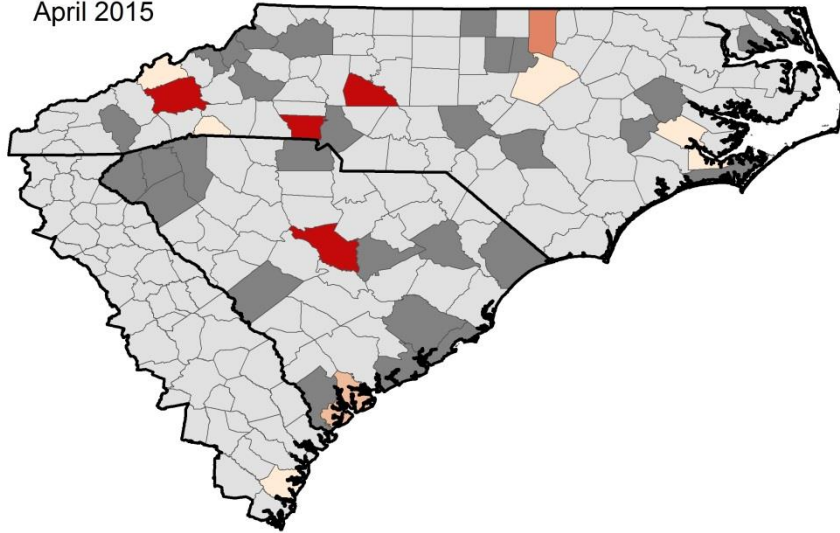
February 2015



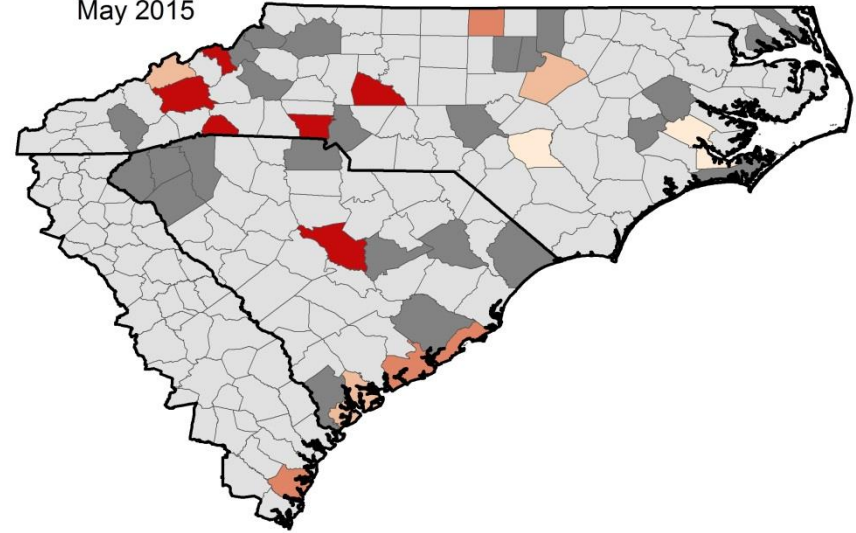
March 2015



April 2015

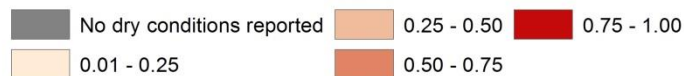


May 2015



These maps display the proportion of dry indicator references to the general condition references for corresponding indicator categories made by observers each month. The proportions are aggregated to the county level.

Proportion of dry condition references

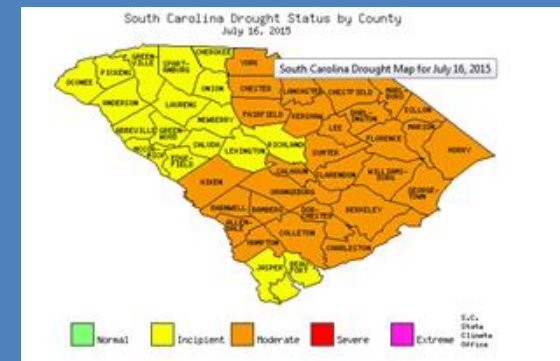
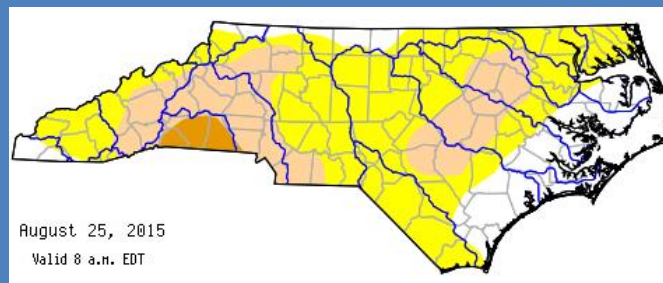
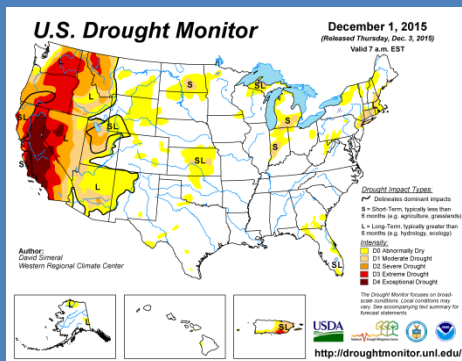


0 50 100 200 Miles

Map created by Sumi, July 2015 - data obtained from CISA and CoCoRaHS

Decision Maker Interviews

- December 2014-September 2015
- 11 interviews, 17 interviewees
 - NDMC – USDM authors (2), Drought Impact Reporter (1)
 - CoCoRaHS (2)
 - State Climate Offices – NC (2), SC (1)
 - NWS Forecast Offices (8)
 - York County Soil & Water Conservation District (1)

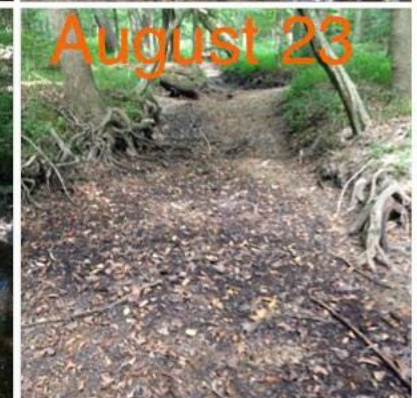


Summary of Findings

- Project confirmed the value of CoCoRaHS as a tool for condition monitoring
 - NC SCO currently uses reports for weekly drought monitoring
- Limitations and suggestions
 - Real-time “translation” of information and ongoing engagement with volunteers are resource-intensive
 - Limited drought conditions during study period
 - Difficult for many users to access information
 - Streamlined process to view and access reports

Summary of Findings: Visualization and Communication

- Charts, graphs and maps:
 - Provide a useful summary of the data
 - Could be used to help identify trends
 - Onset, recovery, transitions from one level to another
- Spatial scale and aggregation of information
 - County, hydrologic (HUC) boundaries are most useful
 - However, most observations report on backyard-household scale



My Data Entry : Condition Monitoring Report Form

Condition Monitoring Report FormSubmit DataReset

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
☐	☐	☐	☐	☐	☐	☐

Description

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

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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 DataReset

View Data : List Condition Monitoring Reports

Search Condition Monitoring Reports

Station Fields: ☐ Station Number ☐ Station Name

Location:

Category:

Date Range:

Start Date: End Date:

Searched: Stations in South Carolina. Report date on 10/11/2016.

Showing 8 Records.

Report Date ▲	Station Number	State	County	Scale Bar	Categories	Description	View
10/11/2016	SC-BF-10	SC	Beaufort	Severely Wet		It has been mildly dry this month, until last Friday when Hurricane Matthew hit. Recorded 10.63" of rain total. Mandatory evacuation. Returned last evening. Water everywhere, but then, it IS the lowcountry! We lost a full sized Japanese loquat tree, but other than that, very lucky. Our power was out only a short while unlike much of the rest of the area. Hilton Head Island is still evacuated. Next report in 2 weeks.	
10/11/2016	SC-CA-15	SC	Calhoun	Mildly Wet	Plants And Wildlife	This site is a xeric sandy bluff. It had 6.16 " of rain. There are a few springs flowing , but no standing water in the highlands on this site.	
10/11/2016	SC-HR-46	SC	Horry	Severely Wet	General Awareness	Ground is soggy still rom Hurricane Matthew	
10/11/2016	SC-LN-10	SC	Lancaster	Mildly Wet	Water Supply And Quality	Irrigation (via a lake reservoir)of 400 acres of common open space (Sun City Carolina Lakes)	
10/11/2016	SC-OC-30	SC	Oconee	Severely Dry	General Awareness	hadless than 1/4" in the last 2 weeks	
10/11/2016	SC-OC-42	SC	Oconee	Moderately Dry	Tourism And Recreation	the lake is down almost 5 feet	
10/11/2016	SC-PC-38	SC	Pickens	Moderately Dry	Plants And Wildlife	soil moisture in woods at a very low level.the soil under leaf litter totally dry	
10/11/2016	SC-SM-1	SC	Sumter	Moderately Wet	General Awareness	Ground is moderately to mildly wet from the effects of Hurricane Matthew and the previous month's rainfall. Grass remains quite green yet is slowing in growth. Pine trees	

Sample Condition Monitoring Reports

Greenville County, SC – Monday, October 10, 2016

We were "Severely Dry" before the 1.2 inches of gentle rain we received on Oct. 7. No rain since, so soil does have moisture from that rain. Bare packed garden soil is still moist on top at mid-day. Recovery of centipede grass in lawn seems to begin to show signs of recovery. The 1.2 inches of rain we had a few days ago was a slow gentle rain and the very dry soil soaked it all in with no apparent runoff. It was a very welcome rain. Irrigation of the garden has not resumed.

Scale Bar Level – Mildly Dry

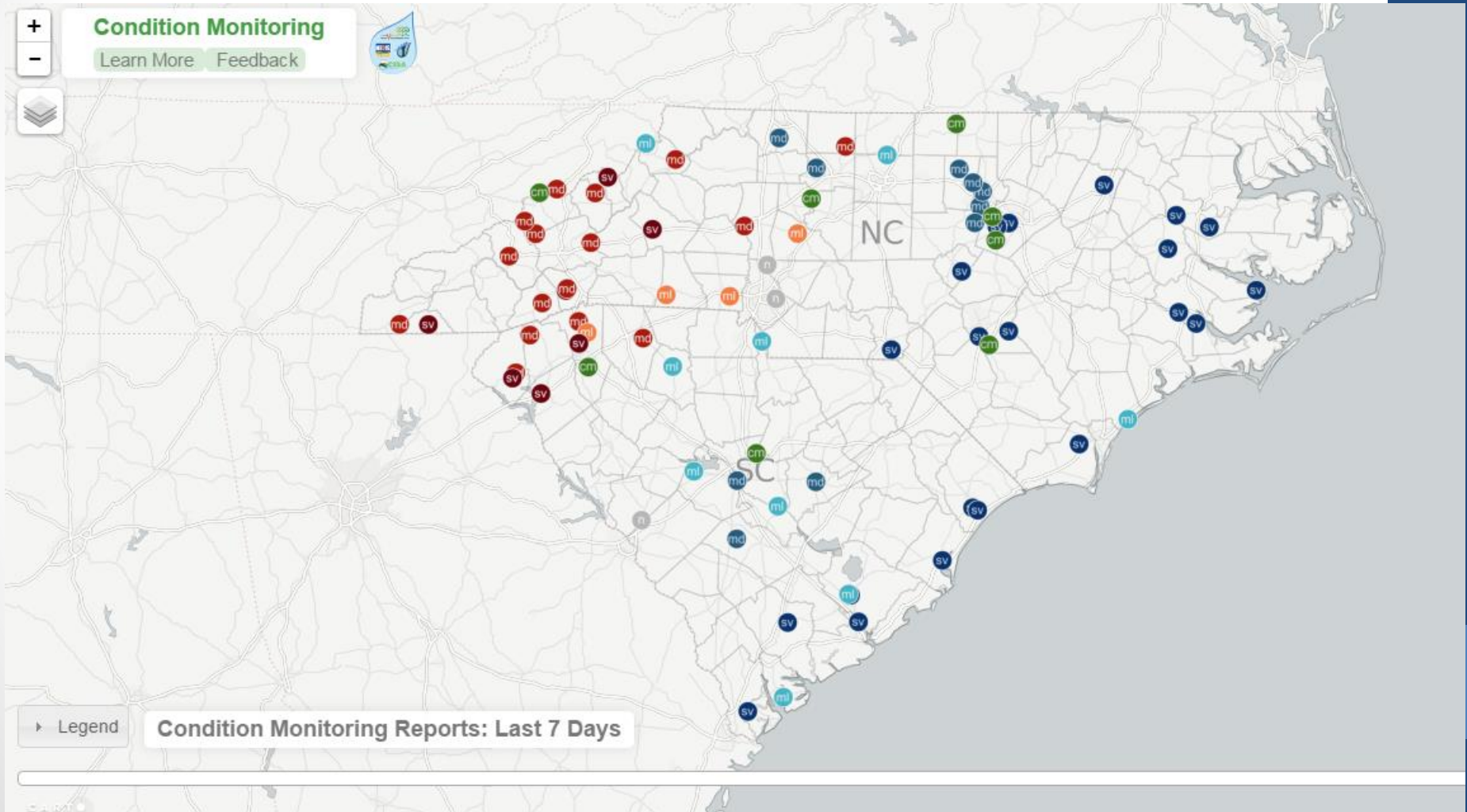
Beaufort County, SC – Tuesday, October 11, 2016

It has been mildly dry this month, until last Friday when Hurricane Matthew hit. Recorded 10.63" of rain total. Mandatory evacuation. Returned last evening. Water everywhere, but then, it IS the Lowcountry! We lost a full sized Japanese loquat tree, but other than that, very lucky. Our power was out only a short while unlike much of the rest of the area. Hilton Head Island is still evacuated. Next report in 2 weeks.

Scale Bar Level – Severly Wet

Condition Monitoring Web Map

www.cisa.sc.edu/map



Interested in Participating?

- Visit www.cisa.sc.edu/cocorahs.html
- Training and educational materials
- Volunteer information form
 - Return to afarris@sc.edu
- We will host a webinar training for new project volunteers on **Monday, October 17**
 - Contact Amanda Farris at afarris@sc.edu if you would like information to join the call.
- Please also let us know if you are interested in testing the web map and providing feedback about the project.

Thank You!

Questions or Comments?



RISA
Regional Integrated Sciences
and Assessments

