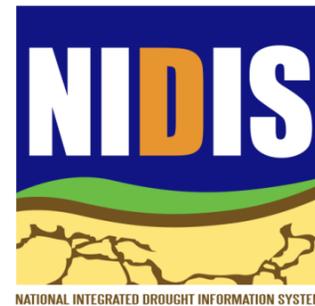


What Can Citizen Scientists Tell Us about Drought?

Amanda Brennan, Kirstin Dow, Benjamin Haywood, Kirsten Lackstrom
American Meteorological Society Annual Meeting
January 13, 2016
New Orleans, LA



RISA
Regional Integrated Sciences
and Assessments



Today's Talk

- What citizen scientists can tell us about the impacts of drought by monitoring onset, intensification, and recovery
- Best management practices for citizen science engagement, as it relates to drought impacts monitoring and reporting



Best
Management
Practices



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, fire)
- Capturing more information about drought onset and recovery



Community Collaborative Rain, Hail & Snow Network

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

Home | States | View Data | Maps | My Data Entry | Login

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

Main Menu

- Home
- About Us
- Join CoCoRaHS
- Contact Us
- Donate

Resources

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- [CoCoRaHS Blog](#)
- [Web Groups](#)

CoCoRaHS March Madness 2015
March 1–31, 2015
 How many new volunteers can you recruit in your state?

6,914 daily precipitation reports received today as of 3/12/2015 1:50 PM EDT

Daily Precipitation (inches x.xx) USA 3/12/2015

0.0
Trace
0.00 - 0.31
0.32 - 0.62
0.63 - 1.56
1.56 - 3.73
3.74 - 5.60
5.61 - 6.23

JOIN CoCoRaHS

TRAINING SLIDE-SHOWS

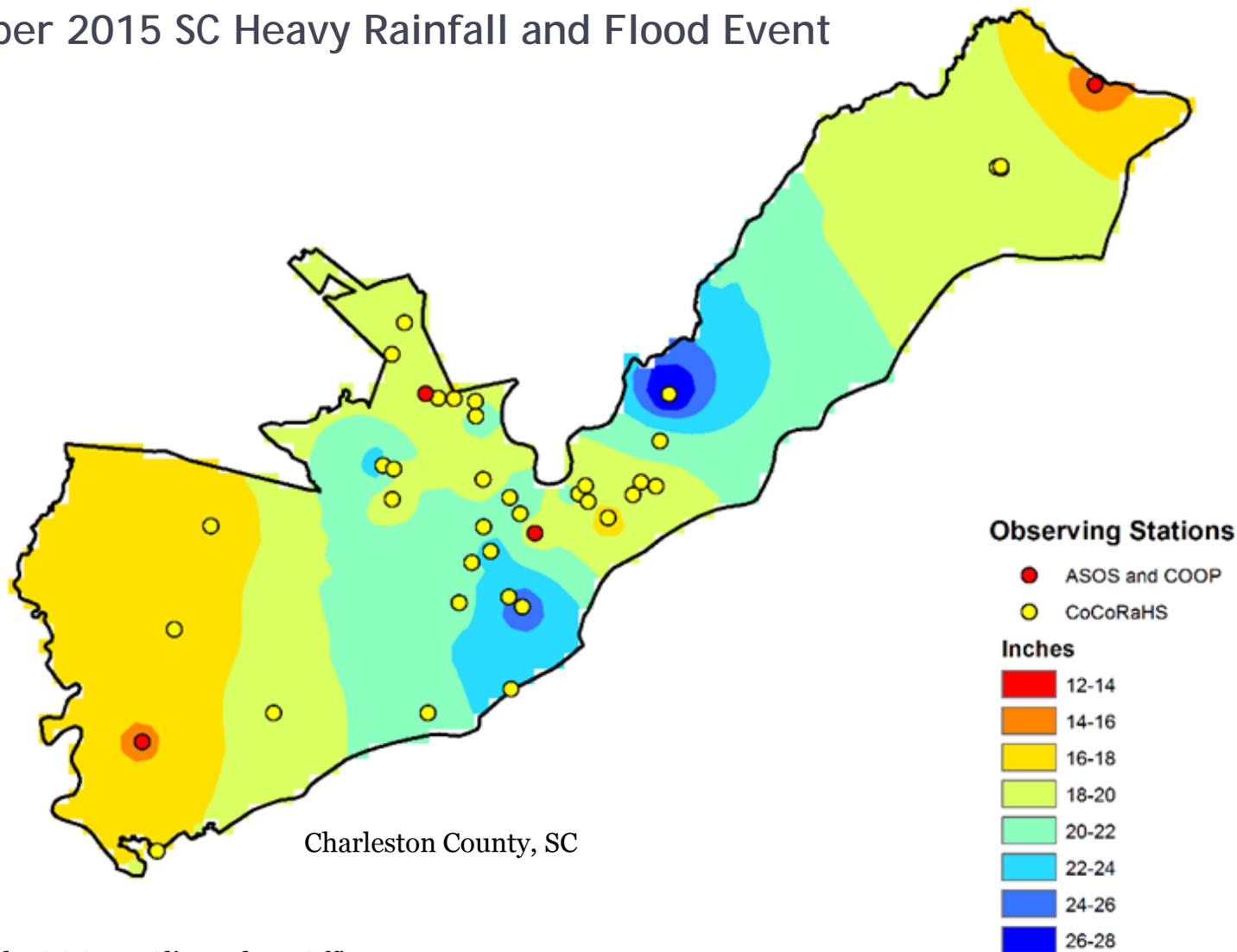
Things to know about...

- **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)

CoCoRaHS Precip Data Fills the Gaps

October 2015 SC Heavy Rainfall and Flood Event



Weekly Condition Monitoring

Connecting weather and climate to the environment

- Regular observations help to identify:
 - Early signs of drought
 - Intensification of impacts
 - When conditions begin to improve
 - Any lingering impacts



Drought Impact Report Form Submit Data Reset

Station Number : SC-RC-56

Station Name : Columbia 0.5 NE

The significance of drought is tied directly to the impacts that it causes. Identifying and documenting impacts as they first appear and as they continue is essential for comprehensive drought monitoring. Please refer to the [CoCoReHS training slide show](#) for reporting drought impacts.
** indicates required field*

Duration
Drought is a gradual, slow-moving phenomenon. The start date is an approximation. End dates are not required.

Impact Start Date

End Date

Condition Monitoring
 Condition Monitoring Report

A **Condition Monitoring Report** allows a regular observer to describe normal conditions that are likely to change during drought, to create a basis for comparison. Please check Condition Monitoring Report if that's what you are submitting. If you aren't sure, please leave it unchecked. [More information on categories of drought impacts and reports.](#)

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 categories of drought impacts and condition monitoring reports.](#)

If an amount of money is associated with the impact, please consider providing that information in the box to the right of the category. Including a dollar amount means you agree to allow it to be used as a summary statistic.

<input type="checkbox"/> Agriculture	\$ <input type="text"/>
<input type="checkbox"/> Business And Industry	\$ <input type="text"/>
<input type="checkbox"/> Energy	\$ <input type="text"/>
<input type="checkbox"/> Fire	\$ <input type="text"/>
<input type="checkbox"/> Plants And Wildlife	\$ <input type="text"/>
<input type="checkbox"/> Relief Response	\$ <input type="text"/>
<input type="checkbox"/> Society And Public Health	\$ <input type="text"/>
<input type="checkbox"/> Tourism And Recreation	\$ <input type="text"/>
<input type="checkbox"/> Water Supply And Quality	\$ <input type="text"/>

Condition Monitoring Report Components

- Report Date
- Check Box
- Description
- Selected categories of information included in the report
- Economic data

Sample Condition Monitoring Reports



Photo courtesy of observer Pat Momich

Madison County, NC – March 8, 2015

This has been a week of extremes – from a high of 73° to a low of 18° with a covering of snow and ice. The good news is that **definite signs of spring** are finally appearing. Song sparrows are starting to sing. Crocuses are blooming. And, best of all, **wood frogs have returned to our pond and laid eggs**. This is late. According to my records over 10 years, the average date for wood frogs coming to the pond is February 18.

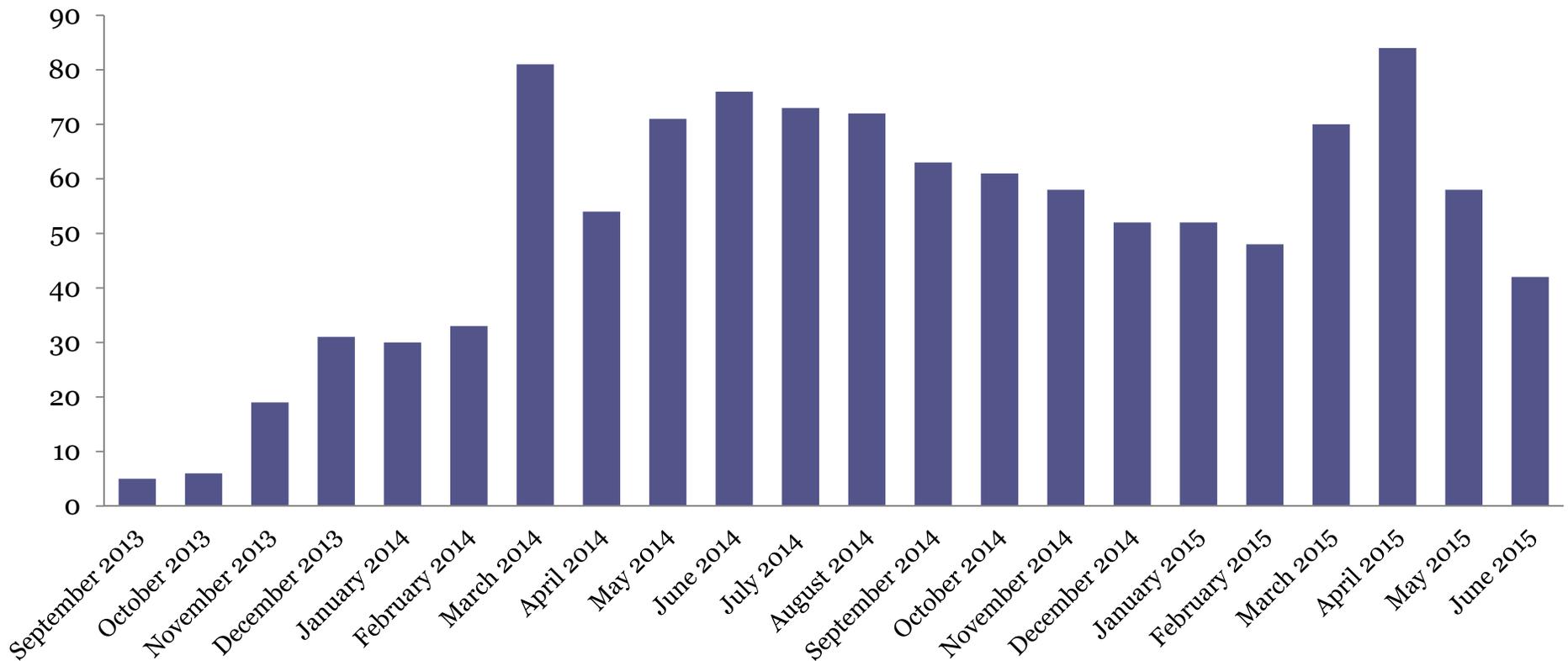
Buncombe County, NC – November 30, 2015

We continue in the **all or nothing weather pattern**. 6" rain, a week of unseasonably warm and dry, 2" 15 days warm and dry and a quick 2 day cool down, and now 2+ precip again. **In between the rain it has been alarming how quickly the streams and creeks go back to below normal levels**. Birds are emptying the feeders quickly, and I am still seeing snakes, groundhogs and one bear sighting. We ate our thanksgiving dinner on the porch. sunsets and sunrises have been spectacular. **Tourists** are enjoying the warm dry spells for hiking and shopping. **Farmers** are shaking their heads! **Most everyone has a sniffle-seasonal whiplash!**

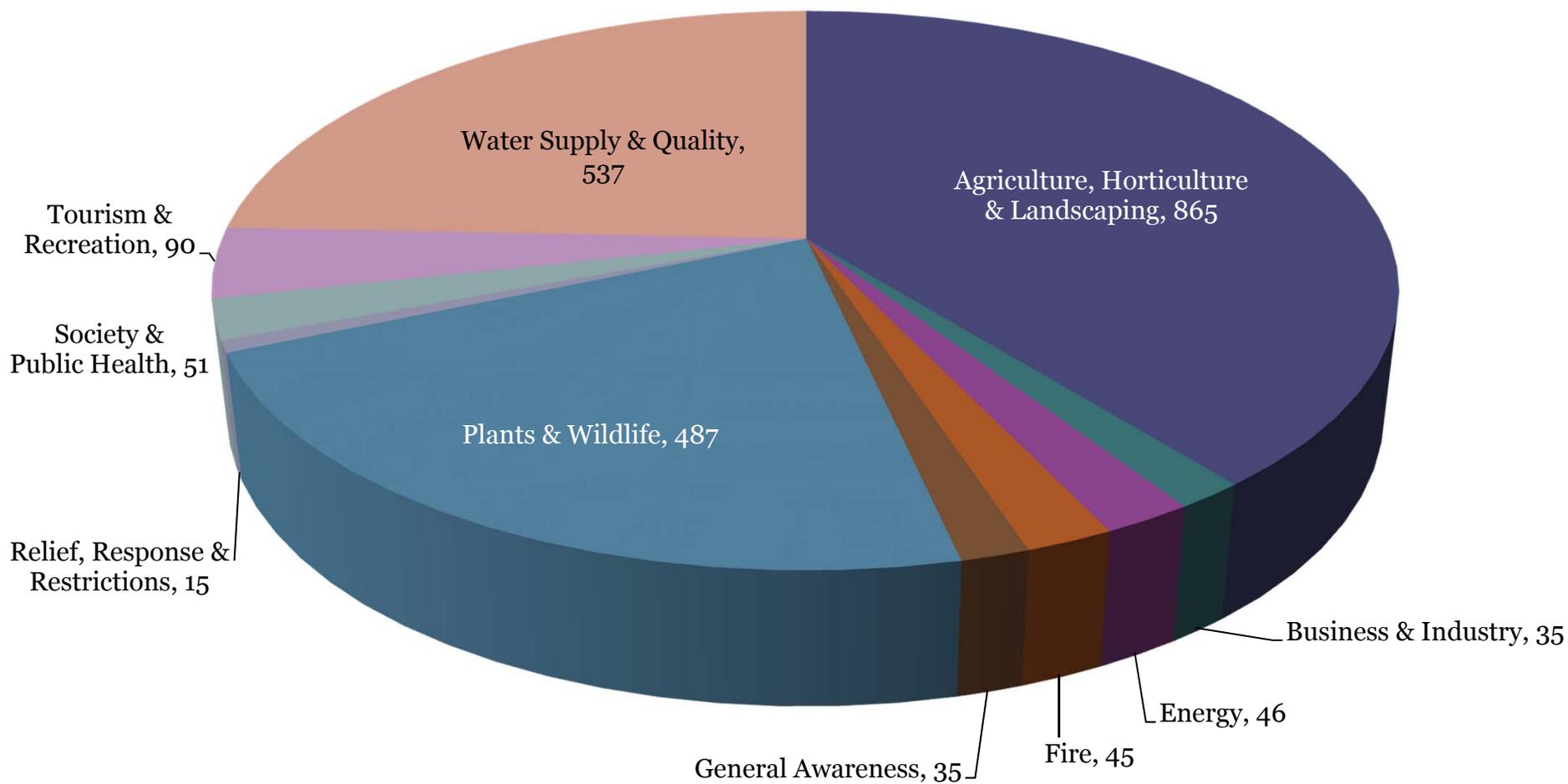
Condition Monitoring Report Breakdown

# of reports submitted, Sept 1, 2013 – June 30, 2015	1,154
# of observers who submitted reports	66
# of coded reference to all coding categories	13,512

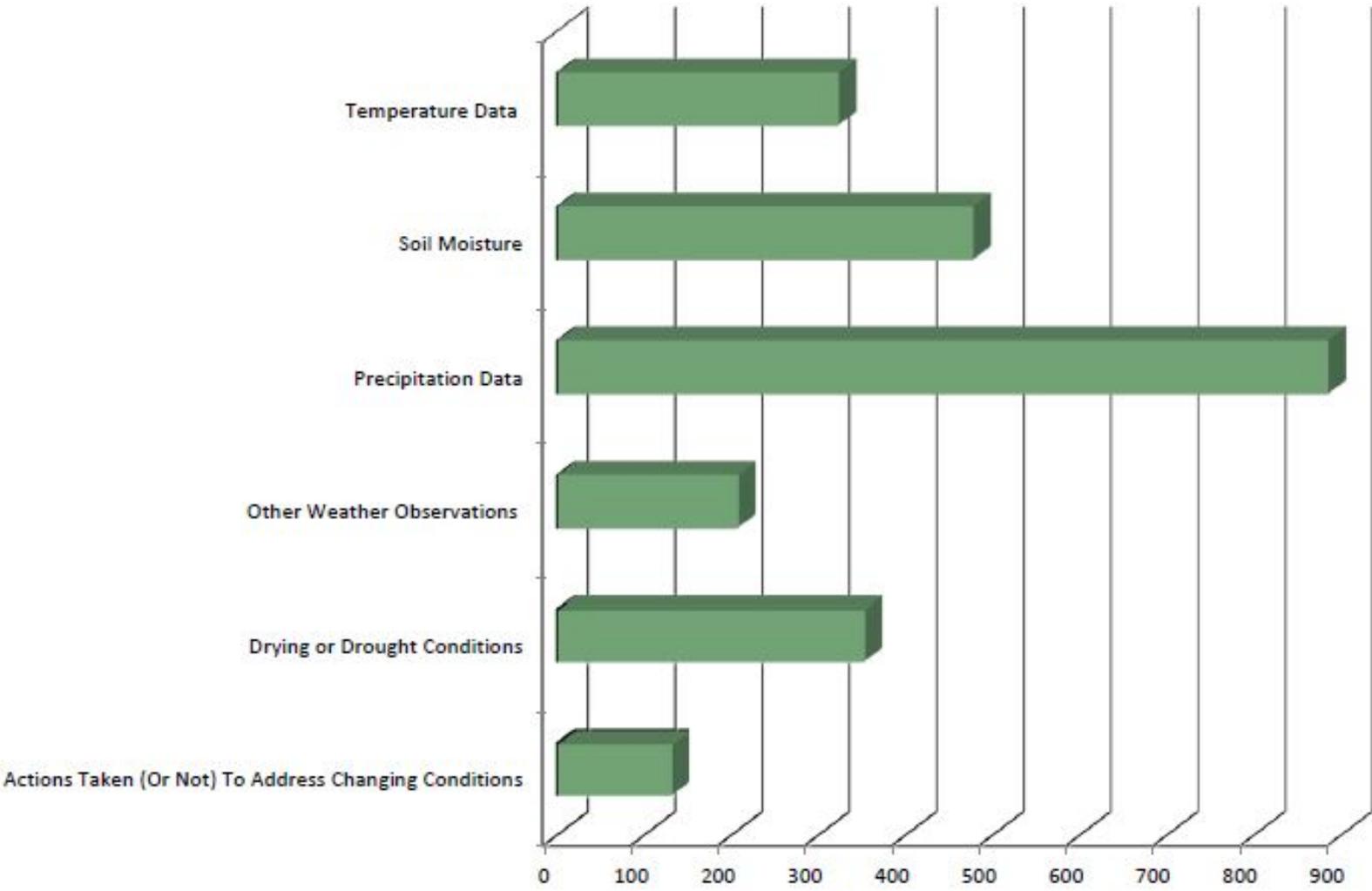
Number of Reports Submitted Each Month



Coded by Drought Impact Categories

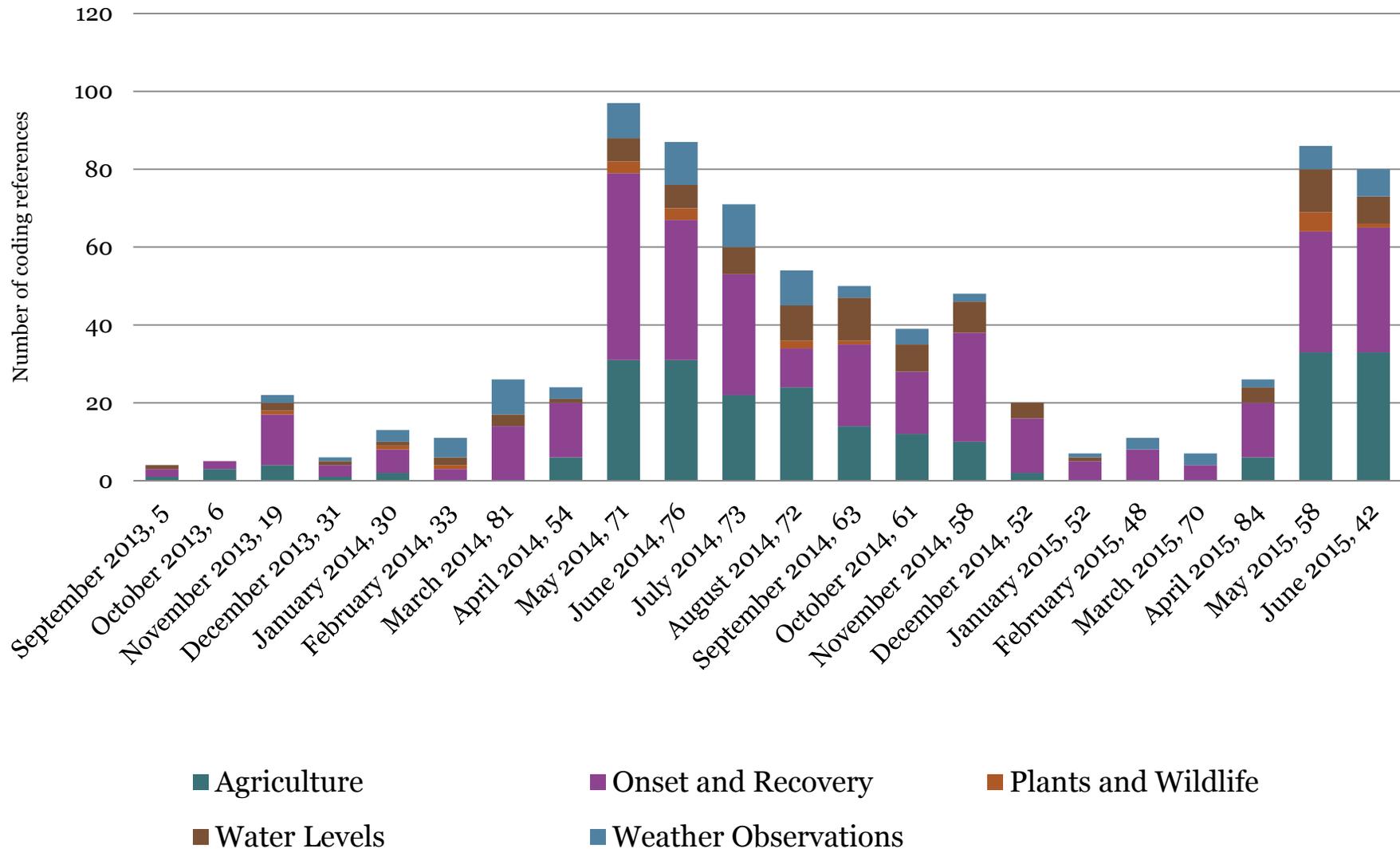


Other Report Content



² Other weather observations include: cloudiness, dew, fair weather, fog, frost, humidity, sunny, and wind.

References to Dry Conditions



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

Evaluation Component

Citizen science engagement



3 online surveys circulated to volunteers over the 1-year project commitment period to better understand:

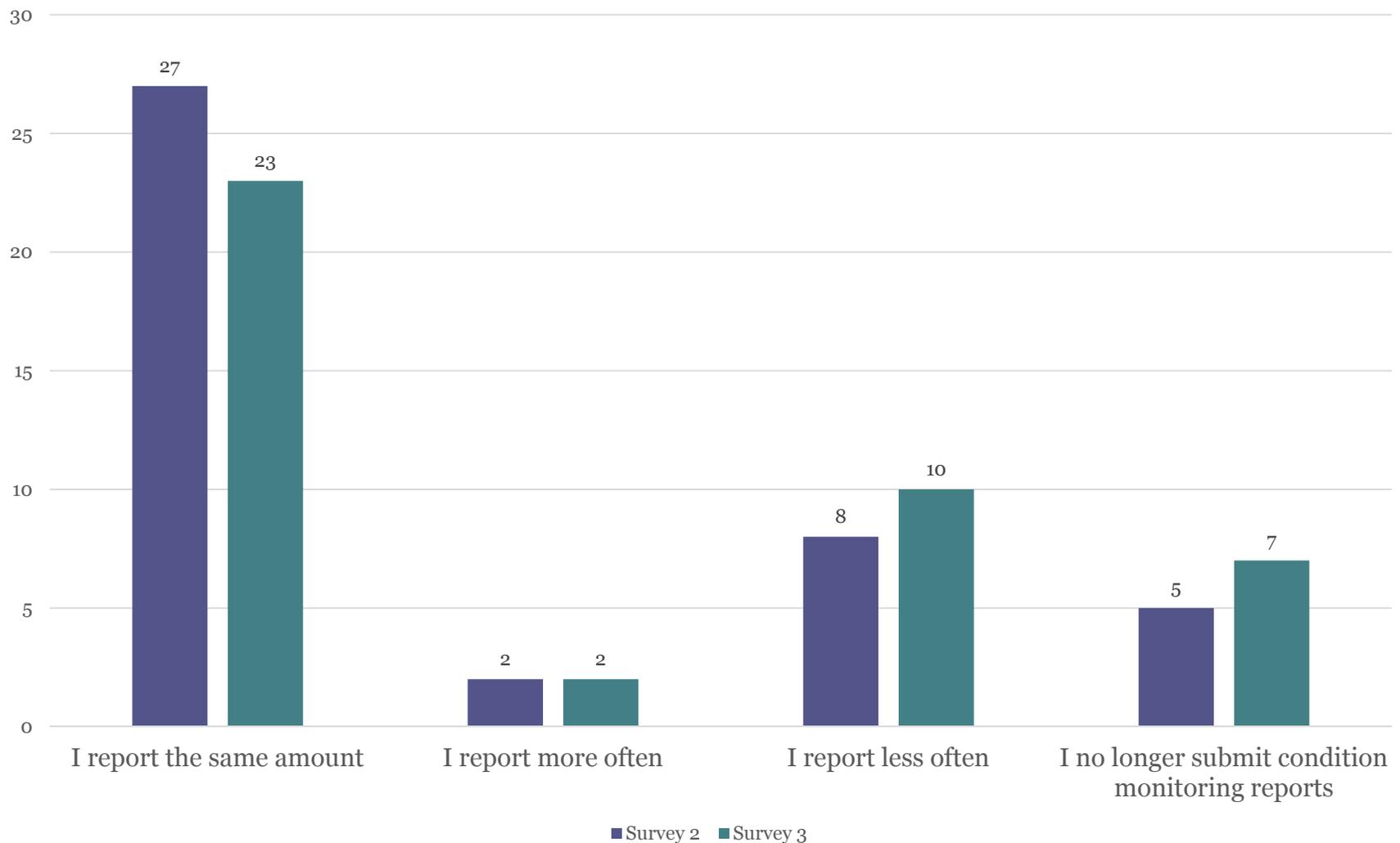
- How useful education materials, trainings, the blog, and newsletter are for volunteers?
- How and why reporting frequency changes over time?
- What type of learning volunteers experience?
- What personal goals are achieved through volunteering?

Participant Feedback Surveys

Recruitment Period	Survey #1	Survey #2	Survey #3
September – December 2013 (n=31)	January 2014 45%	June 2014 52%	November 2014 45%
January – Mid-April 2014 (n=19)	June 2014 74%	November 2014 68%	May 2015 63%
Late April – June 2014 (n=35)	September 2014 58%	January 2015 43%	June 2015 49%

* Circulate surveys to everyone who agreed to participate (n), although not everyone who signed up submits regular condition monitoring reports.

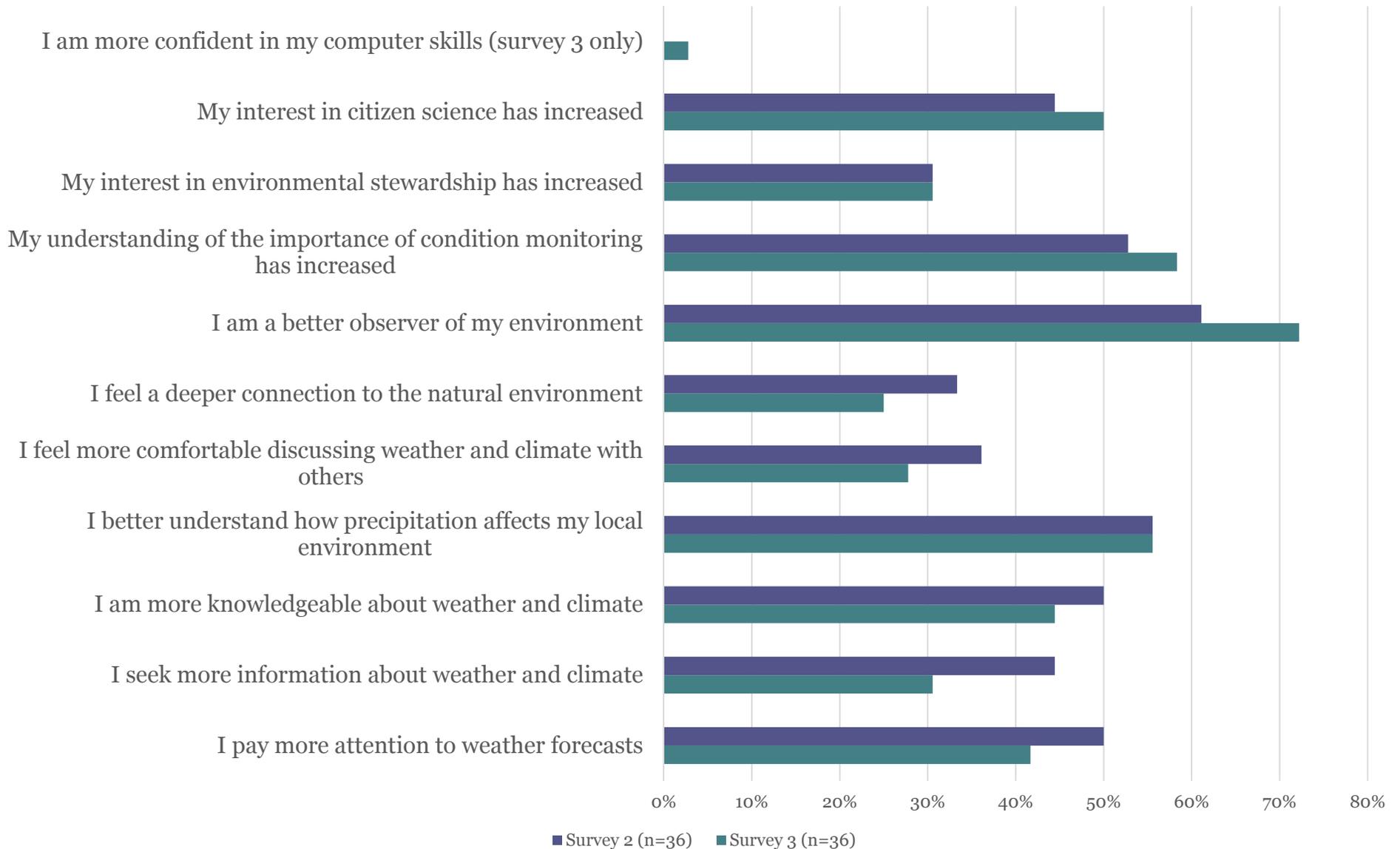
How has the frequency of your reporting changed since you first started condition monitoring?



If you report the same or more often, what kept you interested?



What changes have you experienced as a result of participating in the project?



Condition Monitoring: Phase 2

- Conducted usability tests with observers as we work to incorporate a quantitative metric to the condition monitoring report form.

Severely dry	Moderately dry	Mildly dry	Near normal	Mildly wet	Moderately wet	Severely wet
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>				

Thank You!

Questions or Comments?

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