Mapping Drought Monitoring Reports to Improve Access & Usability

The CoCoRaHS Citizen Science Condition Monitoring Program

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Key information needs identified by drought decision makers:

- 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

- 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)

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
Phase 1: 2013 - 2015

Current Condition Monitoring Reports

Caswell County, NC – March 12, 2017
Moderately Dry
Another roller coaster weather week in NC. T-shirt temperatures to where’s my coat? Snow flurries for some this morning. Since the water is so low and the ground dry, fire advisories have been issued. On nice days there is much activity on the lake. Fields readied for crops, flowers blooming. Lake level is very slowly dropping, now 410.3’. If this was prime growing season I would be extremely concerned. Maybe the predicted rain this week will help.

Craven County, NC – March 13, 2017
Mildly Dry
We just have not had much precipitation in several weeks. It has been warmer than average here; so many things are blooming very early. This could be near catastrophic for bee forage this next week when the temperatures will fall below freezing for many hours several nights in a row. This could kill off the nectar producing blossoms.
**Extreme Event Condition Monitoring Reports**

**Brunswick County, NC – October 15, 2016**  
*Severely Wet*

No direct impact on me, but numerous people in the southeast portion of the state are severely impacted by the aftermath of Hurricane Matthew. Roads are blocked, farmers’ fields are inundated, homes are under water, beaches are eroded. Has the water supply been impacted by agricultural runoff? Testing stations are inaccessible due to flooding.

**Macon County, NC – October 30, 2016**  
*Severely Dry*

0.16 inches of rainfall this month. Extreme drought conditions in Macon, Clay, and Cherokee counties, with major crop and pasture loss. Worst drought conditions since 2011. Streams and rivers remain low, and many springs are completely dry. Our fall wildfire season typically runs from mid-October to mid-December. Extreme caution with fires is needed. Two wildfires burning in Macon County today. Black Hawk helicopters from Franklin have been in use.

**Report Analysis**

- Qualitative coding
- Drought impact categories
- Other report content (e.g., temp & precip data, soil moisture, etc.)
- Spatial and temporal elements
References to wet and dry conditions

Relative Dry Conditions by County

Proportion of dry condition references

These maps display the proportion of dry condition references across various counties. The proportions are aggregated to the county level.
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 Interview Results

- The more precipitation data points, the better.
- Condition monitoring reports add context to precipitation measurements.
- Reports can provide additional context to traditional qualitative indices that are already used.
- Decision context determines what types of report information are useful (e.g., plant stress shows early signs of dryness, water levels show continued dryness).
Visualization and Communications Feedback

- 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
Next Steps

- Volunteer recruitment and engagement
  - Communications
  - Online feedback surveys

- Report analysis
  - How do volunteer scale bar selections compare to other, objective drought indices

- Decision maker feedback
  - Utilize the web map through the spring and summer
  - Share feedback about how the information may have been useful

- Going national
  - Report form available to all CoCoRaHS observers throughout the U.S.
  - National web map under development
  - Regional scale bar guidance

Interested in Contributing or Providing Feedback?

- Sign up as a CoCoRaHS Volunteer
  - Visit www.cisa.sc.edu/cocorahs.html to learn more about the project
    - Training and educational materials
    - Volunteer information form
  - Sign up to be a CoCoRaHS volunteer at www.cocorahs.org

- Web Map Evaluation
  - Access the web map and view condition monitoring reports
  - Participate in a follow-up conversation to let us know how you used the report information