# COCORAHS


**The CoCoRaHS Network – Citizen Scientists measuring precipitation at their location . . . filling in the gaps!**

NRCC– April 2025

Data is free to download and use.  Maps are available for anyone to view

CoCoRaHS

Community Collaborative Rain, Hail & Snow Network

Are you a federal, state, or local official? Someone in private industry? An engineer, environmental planner, emergency manager, water manager? Someone working in sustainability?

# If so, CoCoRaHS is worth looking at

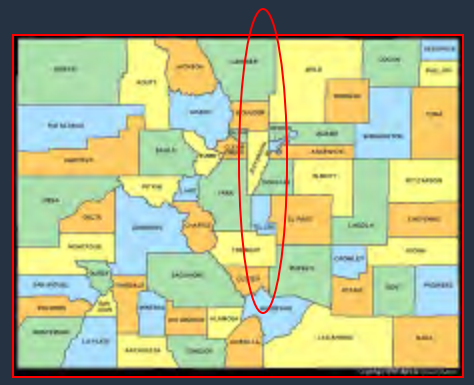






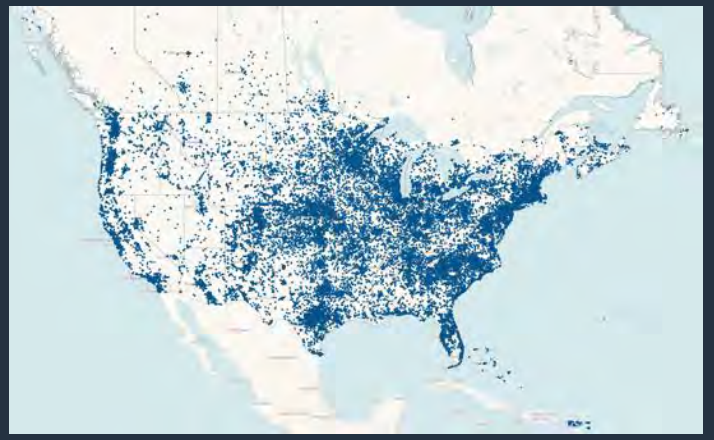

# COCORAHS WAS BORN IN RESPONSE TO THE 1997 FORT COLLINS, COLORADO FLOOD


# 1998

A few dozen volunteers
in Northern Colorado

# Today

27,400+ volunteers in all
50 states, Canada, Puerto Rico,
the U.S. Virgin Islands, the Bahamas and Guam

# Rainfall data

CoCoRaHS has become the largest source of daily precipitation measurements in the United States


# Snowfall data

CoCoRaHS Volunteers measure both snowfall depth (new and accumulated) as well as the water content of the snow (SWE)

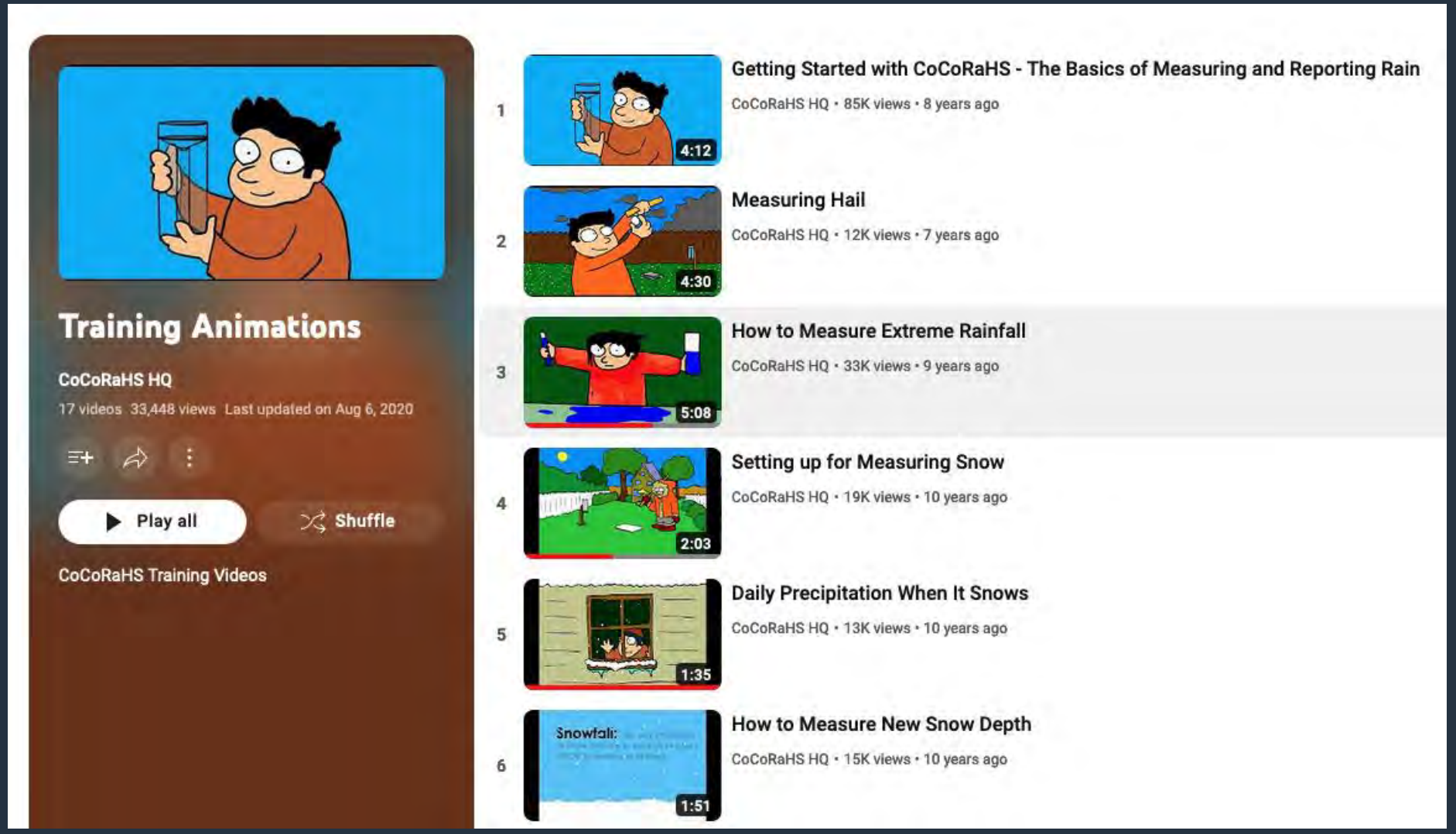

# Hail data

CoCoRaHS has become one of the largest repositories of hail data in the United States

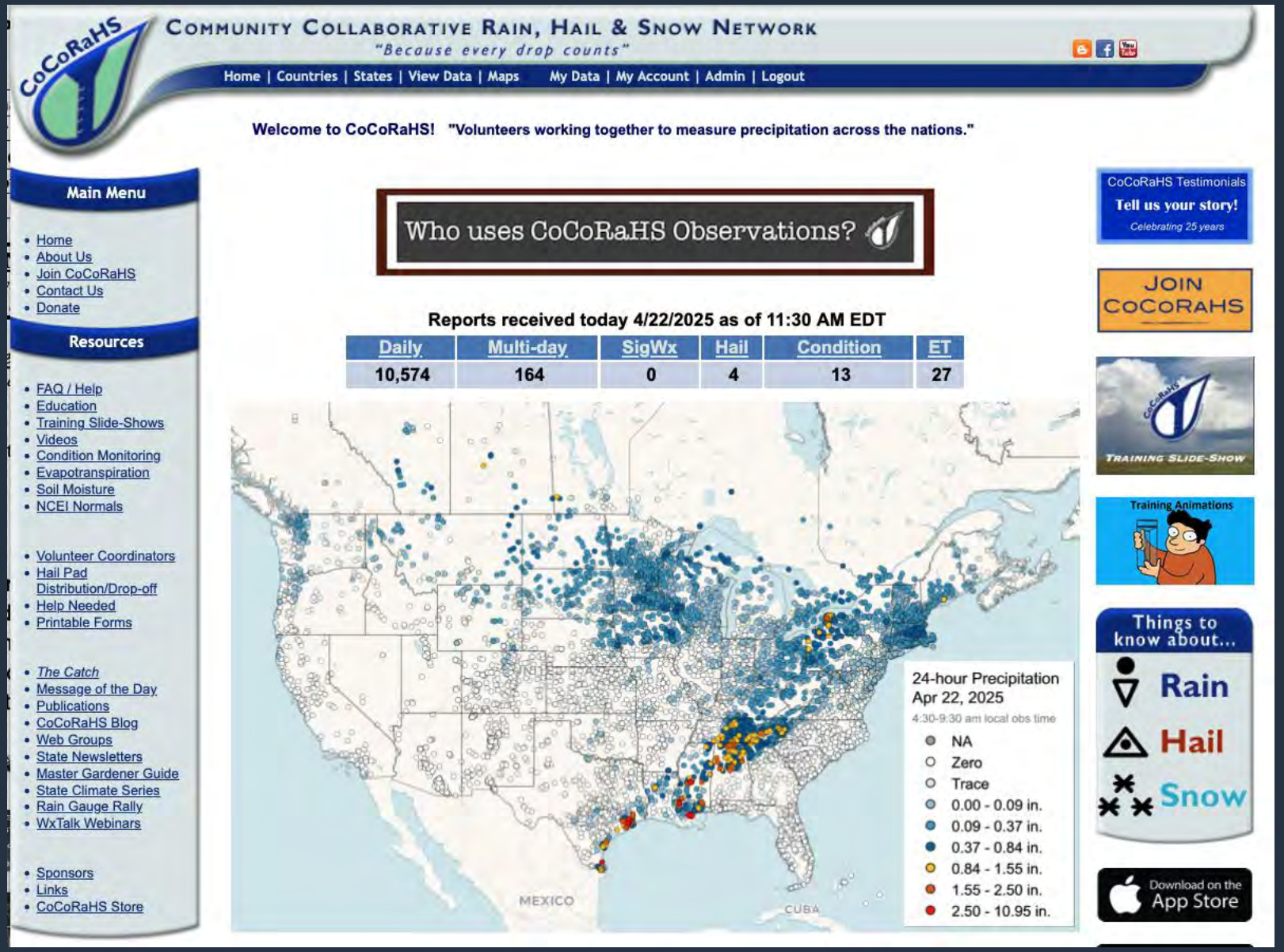
# THE NETWORK IS MADE UP OF VOLUNTEERS OF ALL AGES AND BACKGROUNDS

Observers are trained and take daily 24-hour measurements of precipitation at their location.

# EASY ON-LINE TRAINING



# THE COCORAHS WEBSITE www.cocorahs.org




Packed full of helpful features for the volunteer observer

# The 4″ diameter high-capacity plastic rain gauge

Cost approximately
$42.00 (U.S.)

- Gauge measures to 0.01″
- Holds 11.30″ of precipitation

# TROPO PRECIPITATION GAUGE

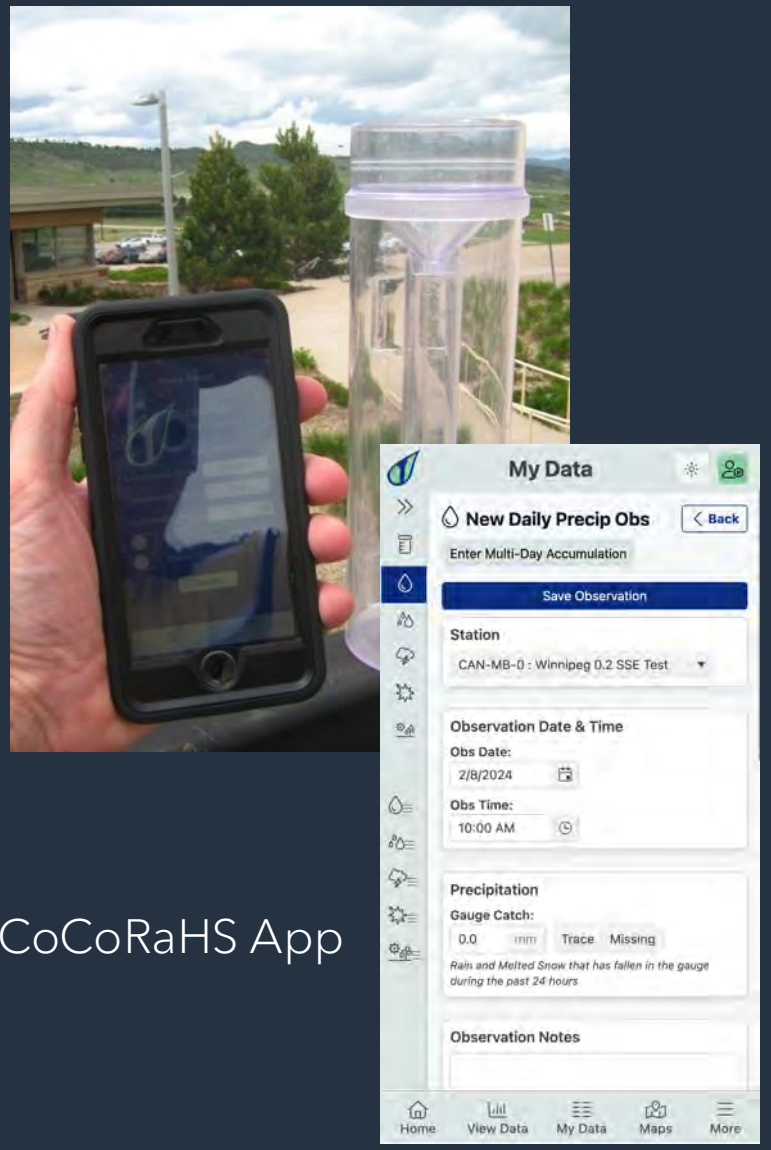
Cost approximately
$69.00  includes shipping

CLIMALYTIC™
INSTRUMENTS, LLC

https://climalytic.com/tropo

The next generation 4-inch all-weather professional precipitation gauge that meets the accuracy and specification requirements of CoCoRaHS.

# OBSERVERS REPORT 24-HOUR PRECIPITATION EACH MORNING ~7AM




The CoCoRaHS App

My Data Entry : Daily Precipitation Report Form

**24-Hour Precipitation Report Form** Submit Reset

**Station Number :** CO-LR-610

**Station Name :** Fort Collins 3.5 SW

* Denotes Required Field

8/1/2023 *Observation Date

For observations spanning more than 24 hours

Enter Multi-Day Accumulation

7:00 AM *Observation Time

0.59 in. *Gauge Catch: Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours, or T for trace, or NA for unknown.

**Observation Notes:** (This will be available to the public)

Strong Thunderstorms between 7-9PM. Heavy rain for a brief period. Branches down. Continuous lightning. Dog was afraid . . . and so was I!

**24-hr Snowfall**

NA in. **Snowfall:** Accumulation of new snow in inches to the nearest tenth

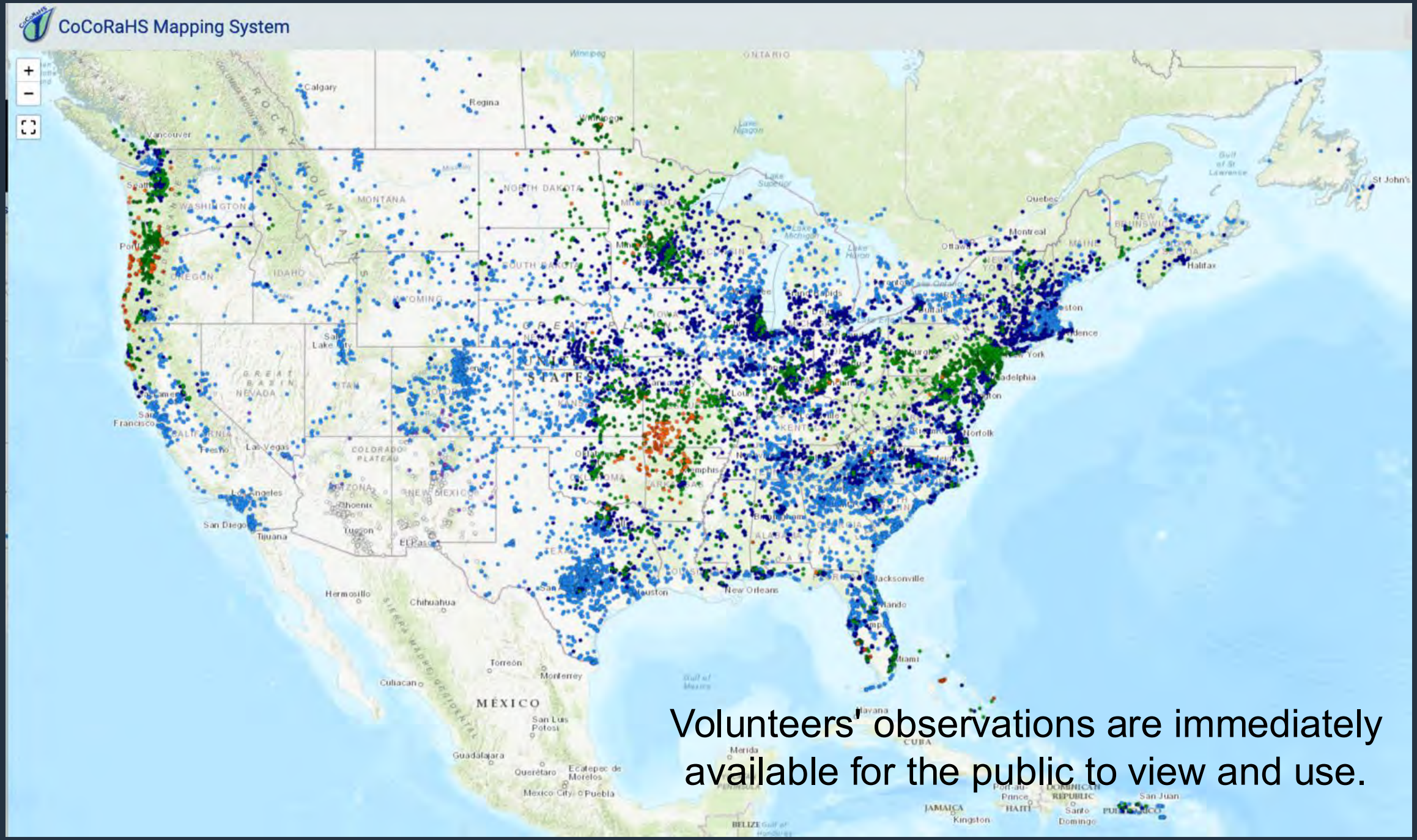
NA in. **Snowfall SWE:** Melted value from core to the nearest hundredth

**Snowpack (Total Snow and Ice on Ground at Observation Time)**

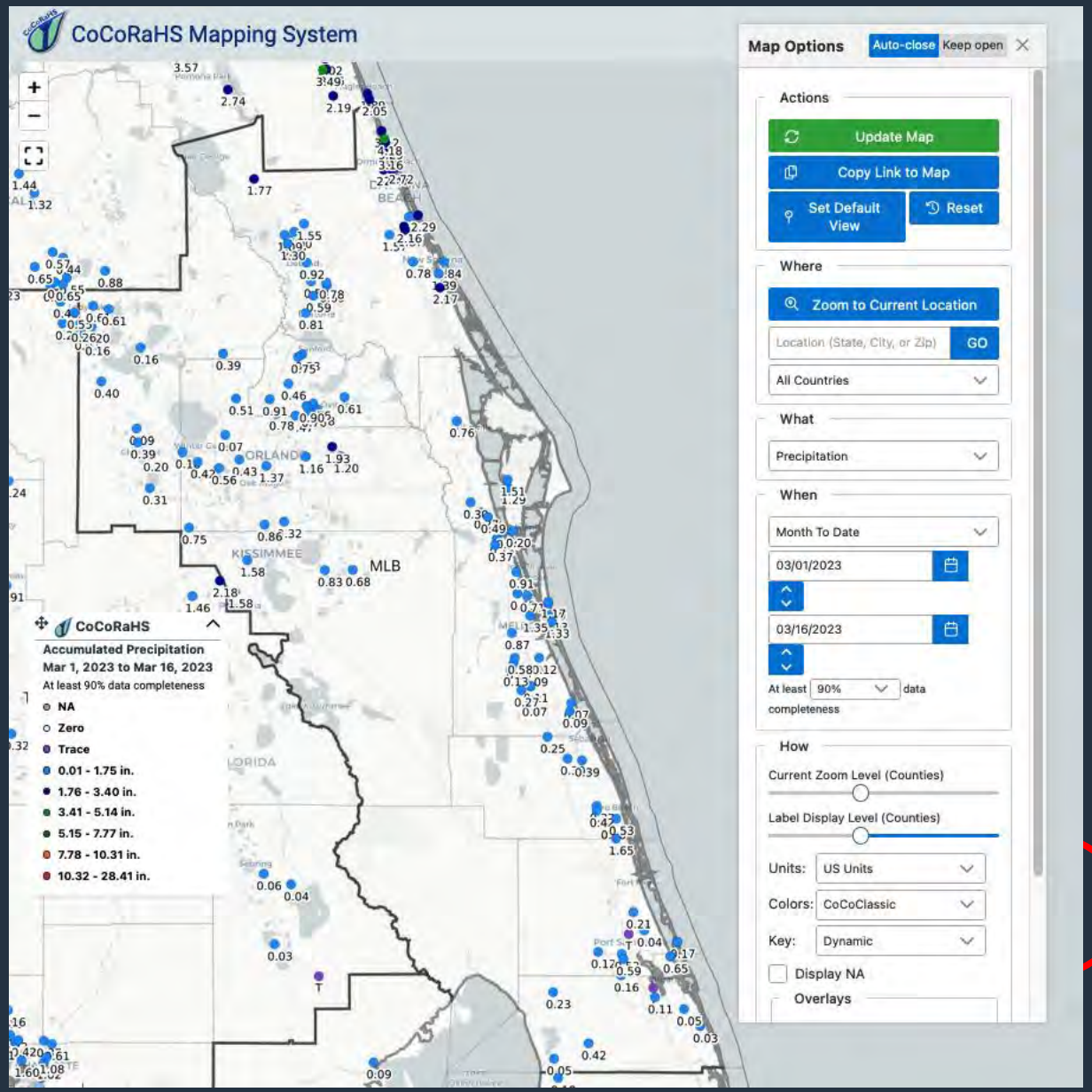
NA in. **Snowpack Depth:** Total snow and ice (new and old) in inches to the nearest half inch

NA in. **Snowpack SWE:** Melted value from core to the nearest hundredth

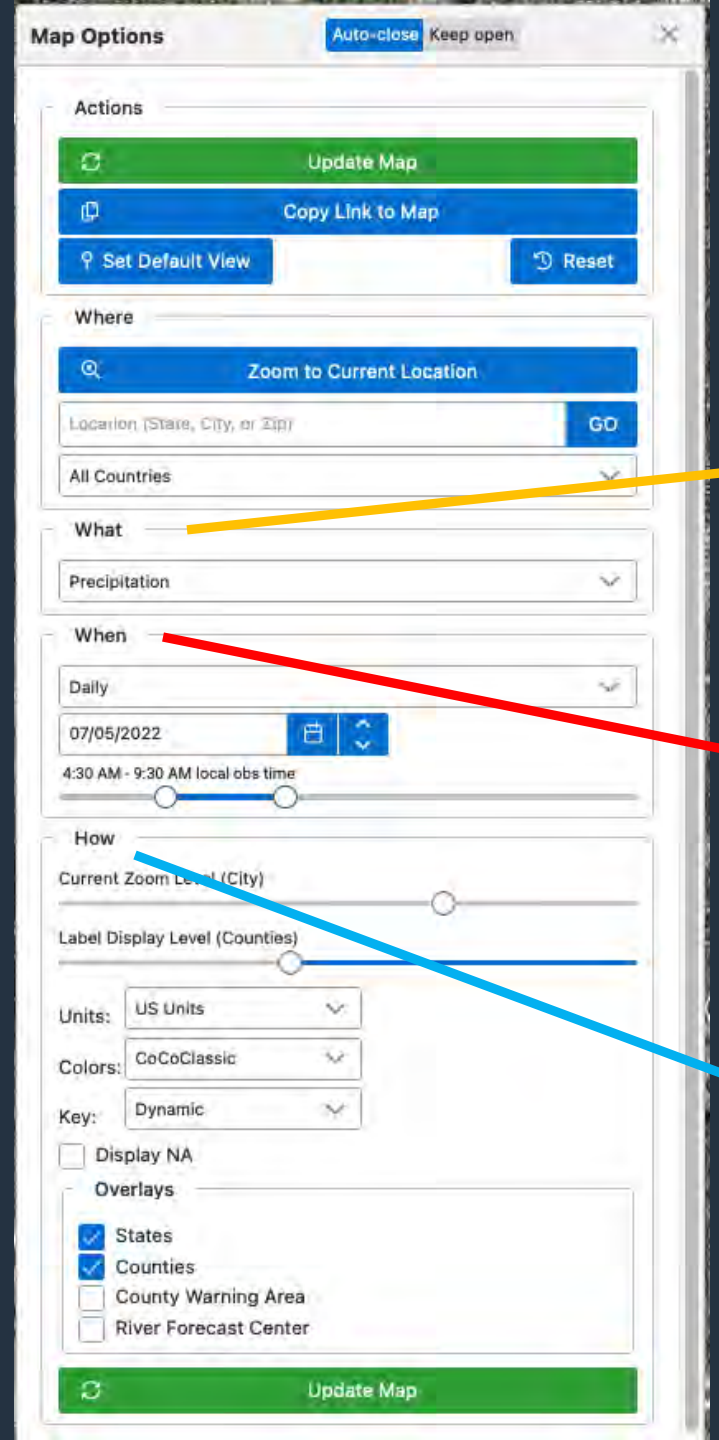
On-line form

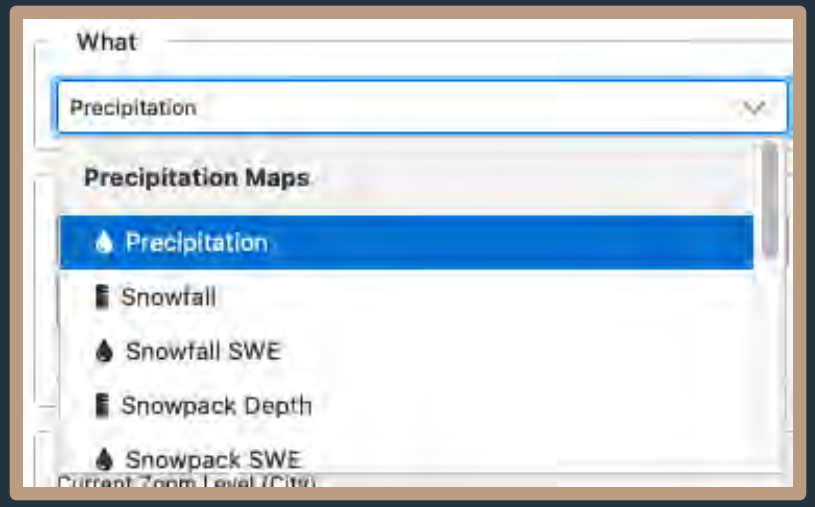

CoCoRaHS Mapping System
Volunteers' observations are immediately available for the public to view and use.

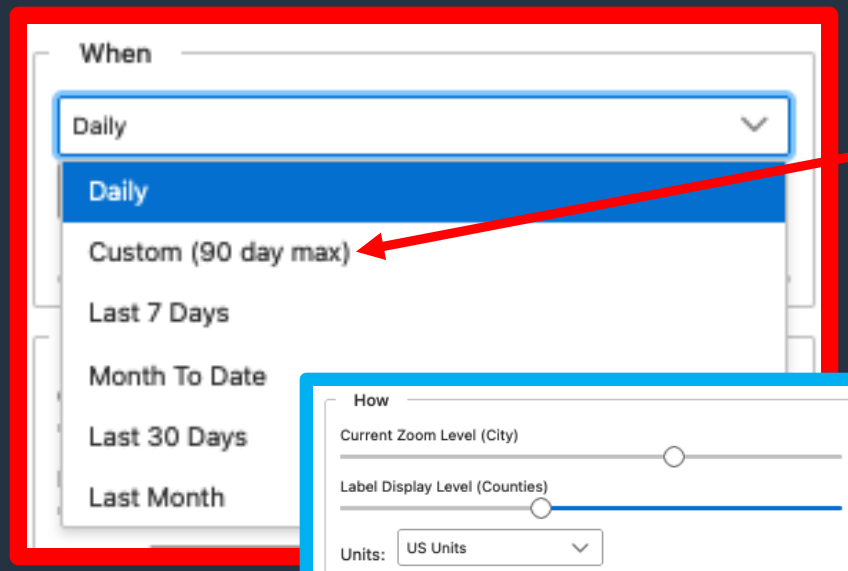
# INTERACTIVE MAPPING SYSTEM



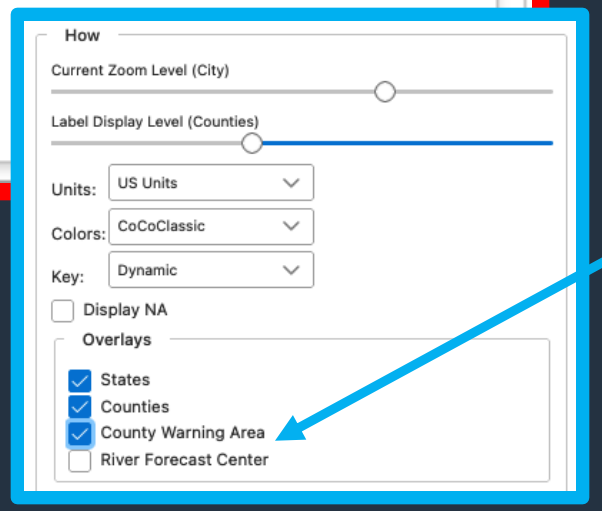

Zoom down to the street level



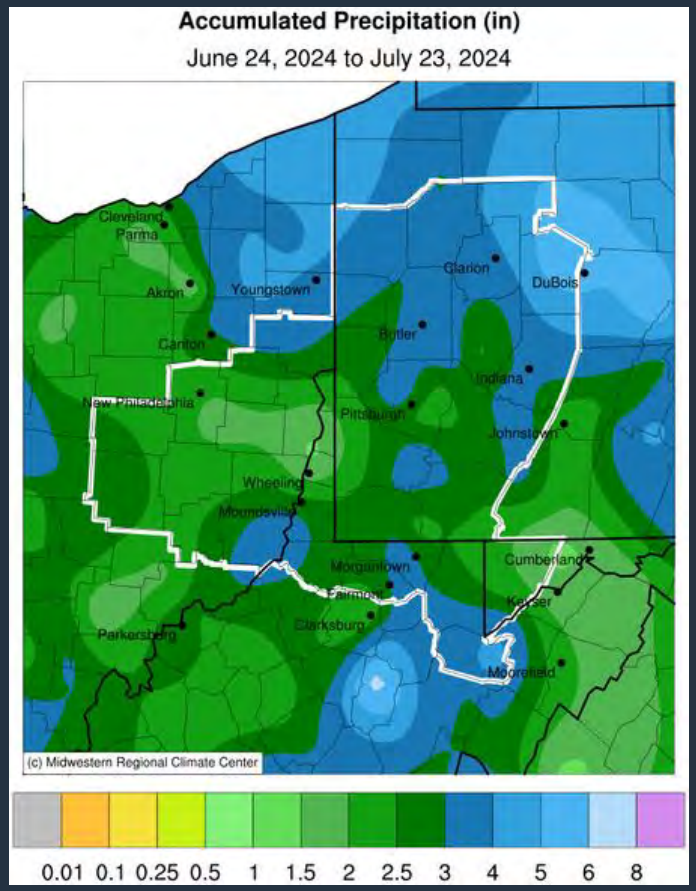

The growing season



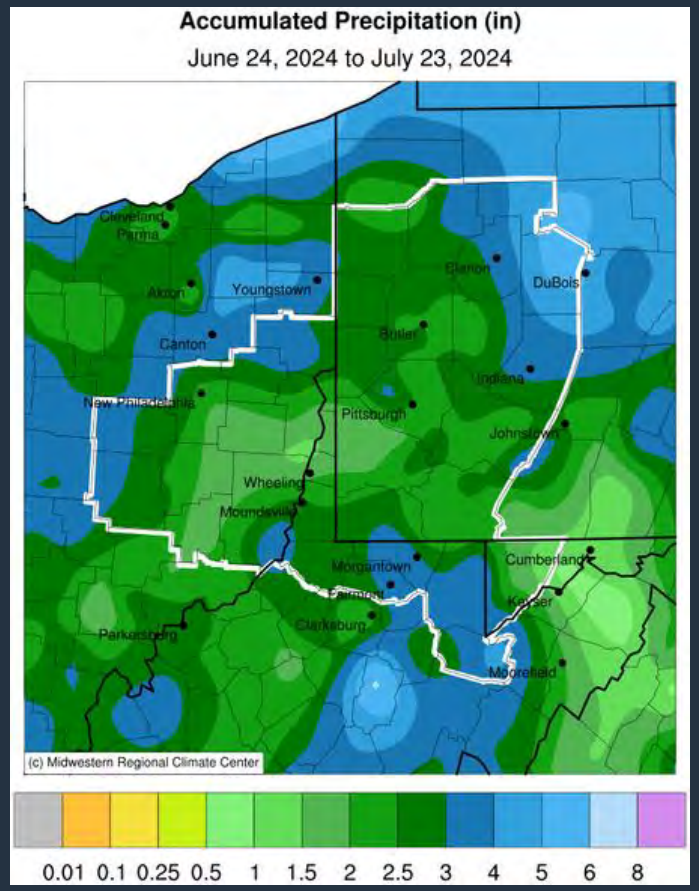

County Warning Area

# COCORAHS HELPS PROVIDE A FINER MESH OF DATA BY SUPPLEMENTING OTHER NETWORKS (LIKE COOP).

*"It's like increasing the number of pixels on your digital camera. You get a much clearer picture of what fell where!"*




Without CoCoRaHS data




With CoCoRaHS data

# STATE PRECIPITATION RECORDS AND COCORAHS

CAPITAL WEATHER GANG

## This Baltimore suburb's seven feet of rain sets a new state record for Maryland in 2018

By Ian Livingston
March 26, 2019 at 2:03 p.m. EDT

Rescue workers make their way to people stranded on the top floor of a building during a torrential storm May 27, 2018 in Ellicott City, Md. One

Last week, the National Oceanographic and Atmospheric Administration's State Climate Extremes Committee met and voted in favor of declaring Catonsville's seven feet of rain a new Maryland state record for annual precipitation.

The measurement was made by volunteer weather observer Tom Atkins, a participant in the CoCoRaHS network. CoCoRaHS stands for Community Collaborative Rain, Hail & Snow Network and is composed of thousands of citizen scientists who gather precipitation data, many in their backyards.

### Maryland

- LOCATION: Catonsville 1.2 NW (MD-BL-39)
- YEAR: Calendar Year 2018
- PRECIPITATION TOTAL: 84.56

### New Jersey

LOCATION: West Milford Twp 3.2 NE (NJ-PS-16)
- YEAR: Calendar Year 2011
- PRECIPITATION TOTAL: 90.65”

### Kansas

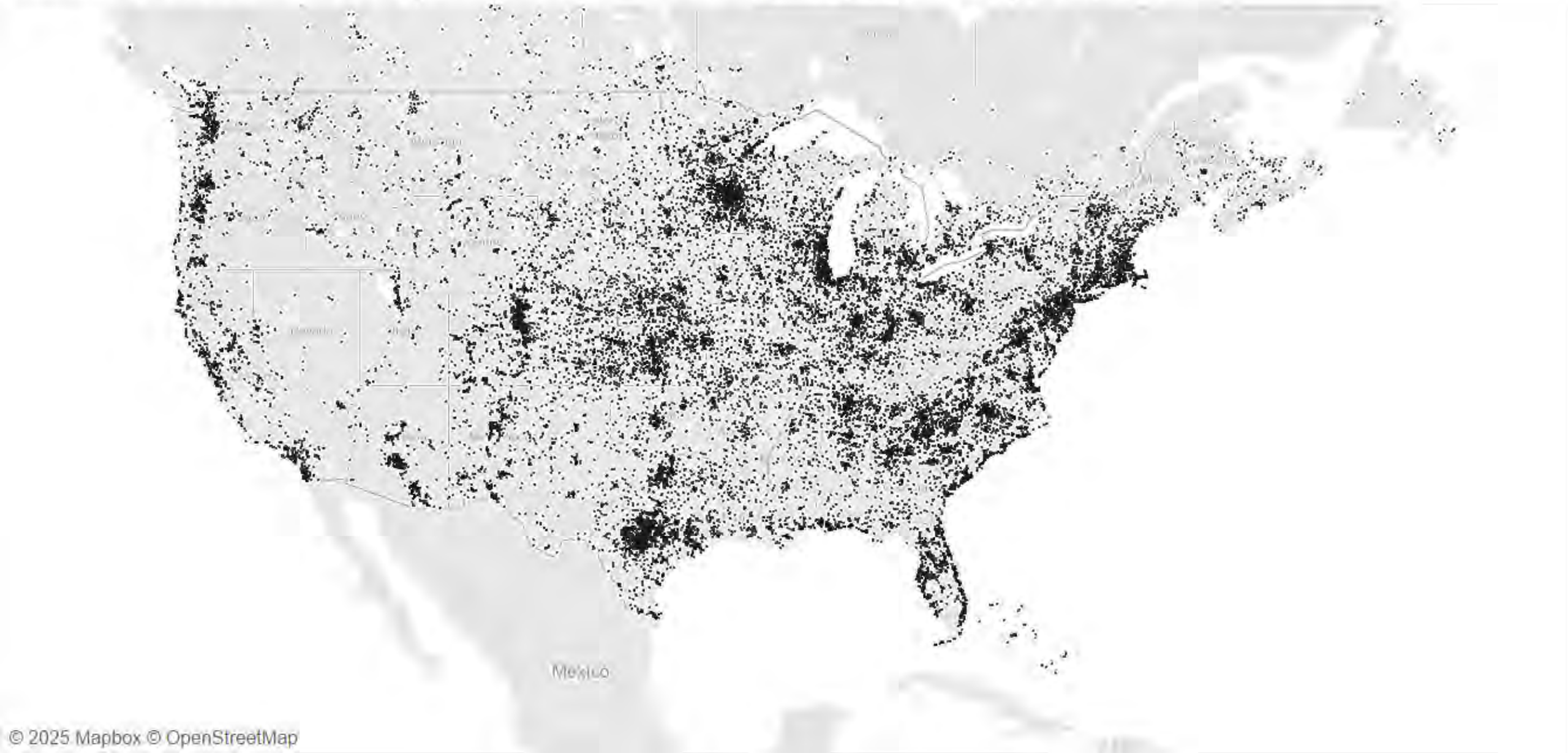
Location: Farlington 0.8 NNE (Farlington, KS)
- Date: 1 January – 31 December 2019
- Value: 75.33 inches

### Delaware

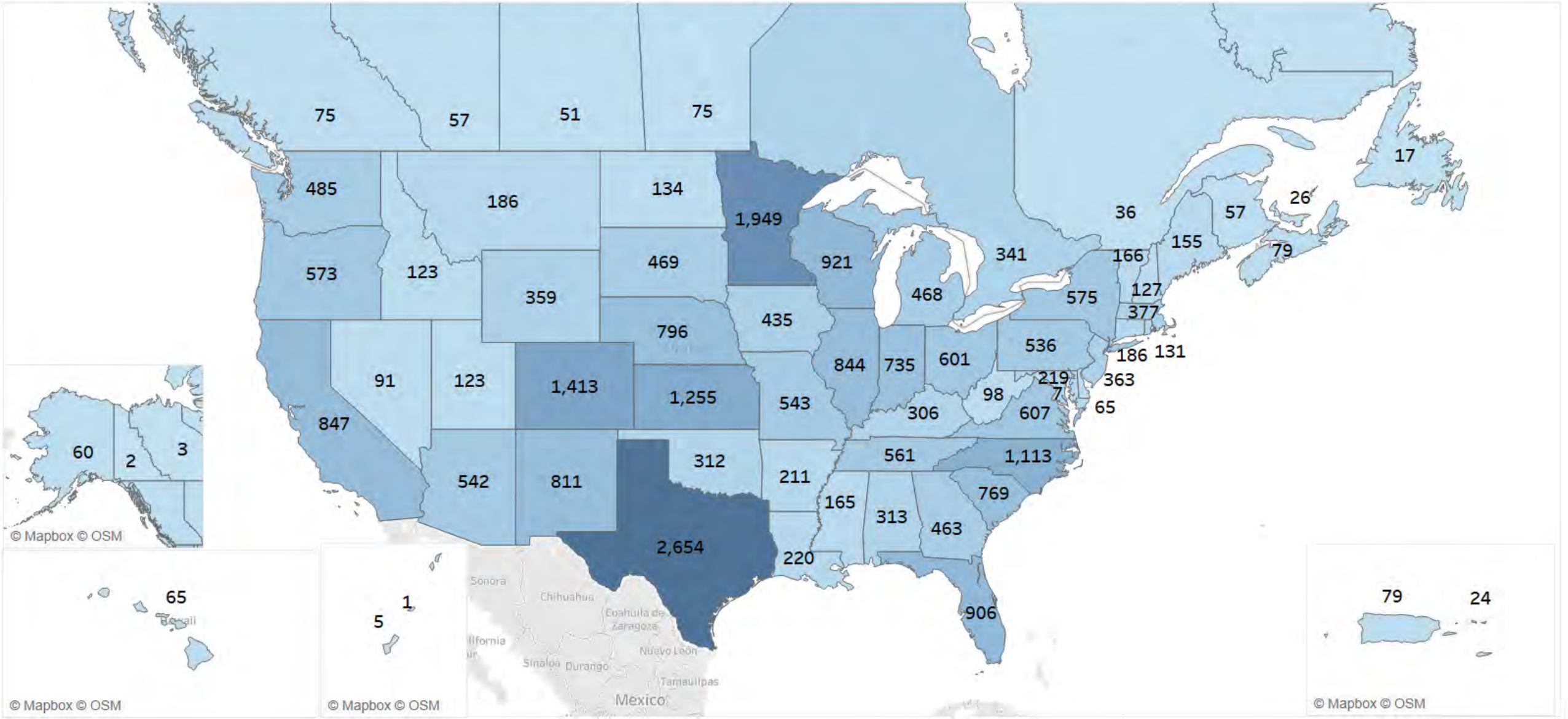
Location: Greenwood 2.9 SE
- Site Type: CoCoRaHS Observer
- Daily Snow Depth Record: 28 inches
- Date: February 7, 2010

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL ENVIRONMENTAL SATELLITE DATA
AND INFORMATION SERVICE
NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
151 PATTON AVE ROOM 120
ASHEVILLE NC 28801-5001

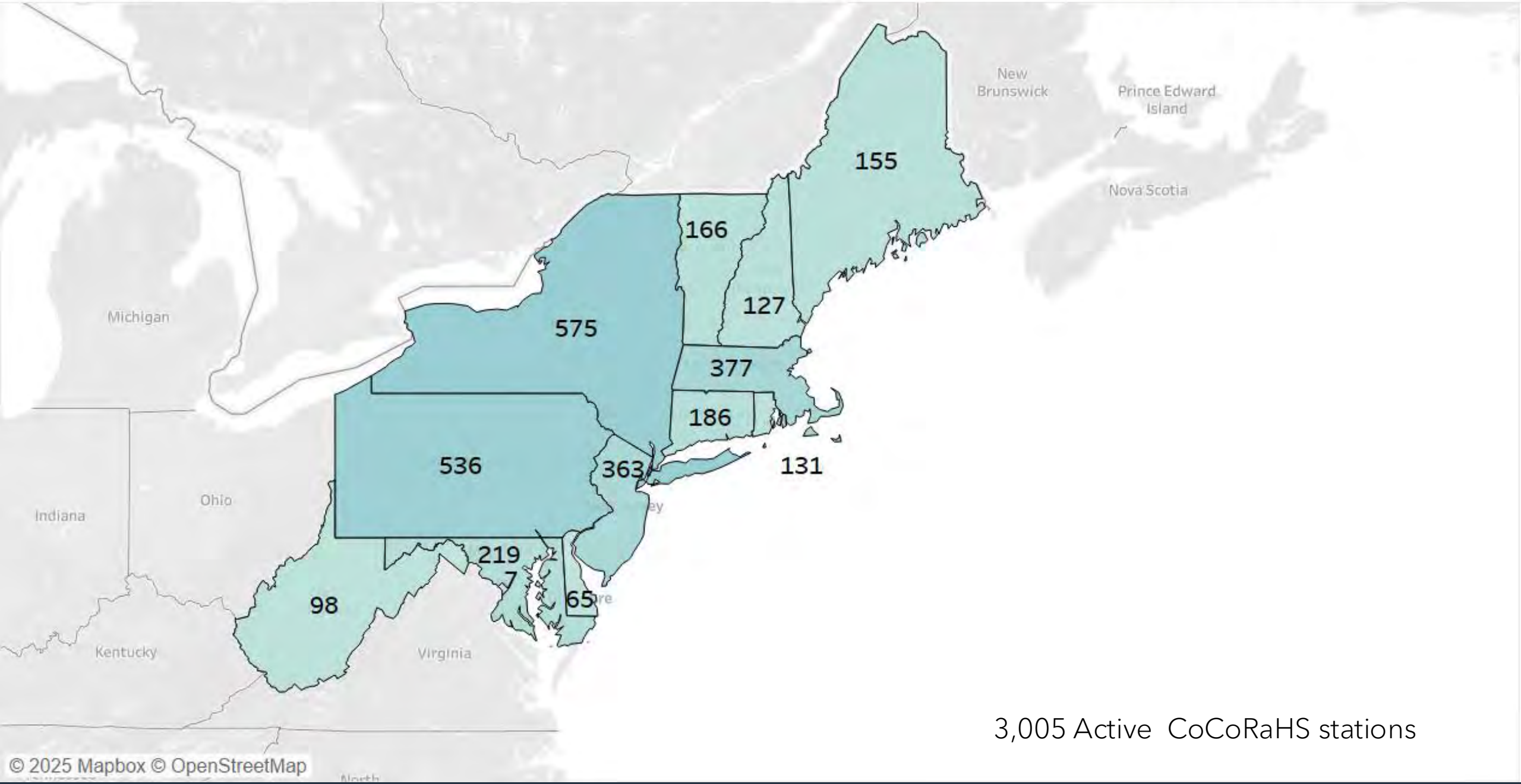
# Active Stations. Last Report Date between Apr 13, 2024 - Apr 12, 2025



# Active Stations. Last Report Date between April 13, 2024 - April 12, 2025

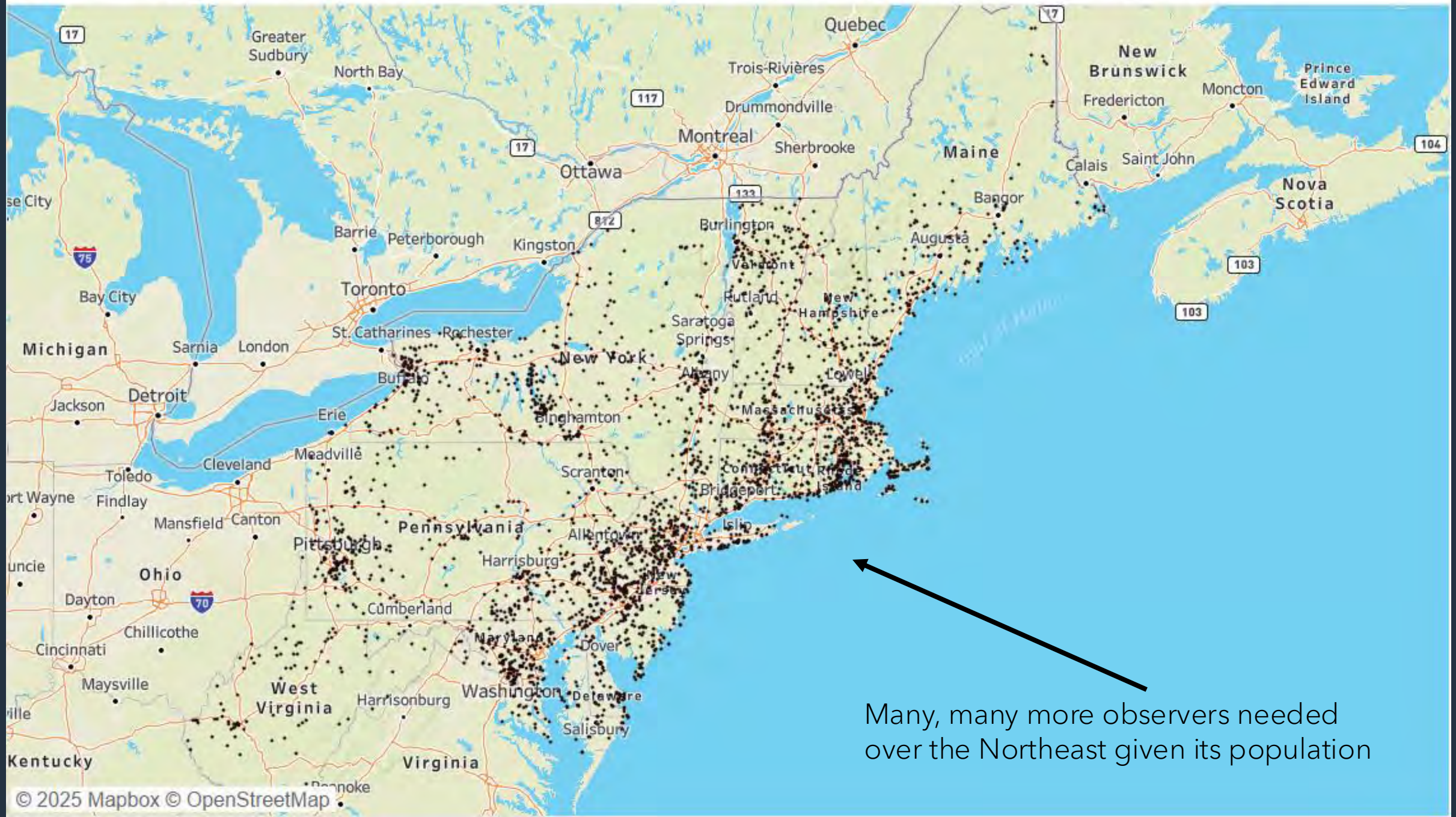


# Count of Active Stations - Last Report Date between April 13, 2024 - April 12, 2025



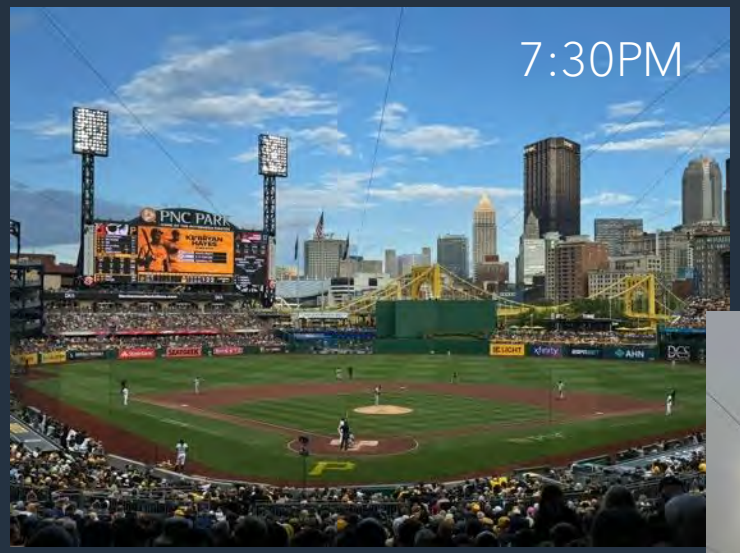

3,005 Active CoCoRaHS stations

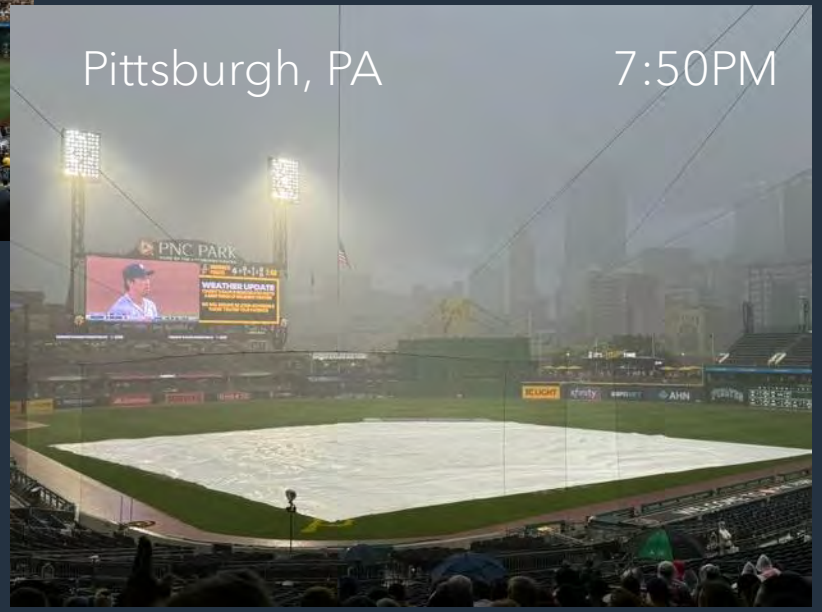
Northeast Region. Active Stations. Last Obs Date between Apr 13, 2024 - Apr 12, 2025




Many, many more observers needed over the Northeast given its population

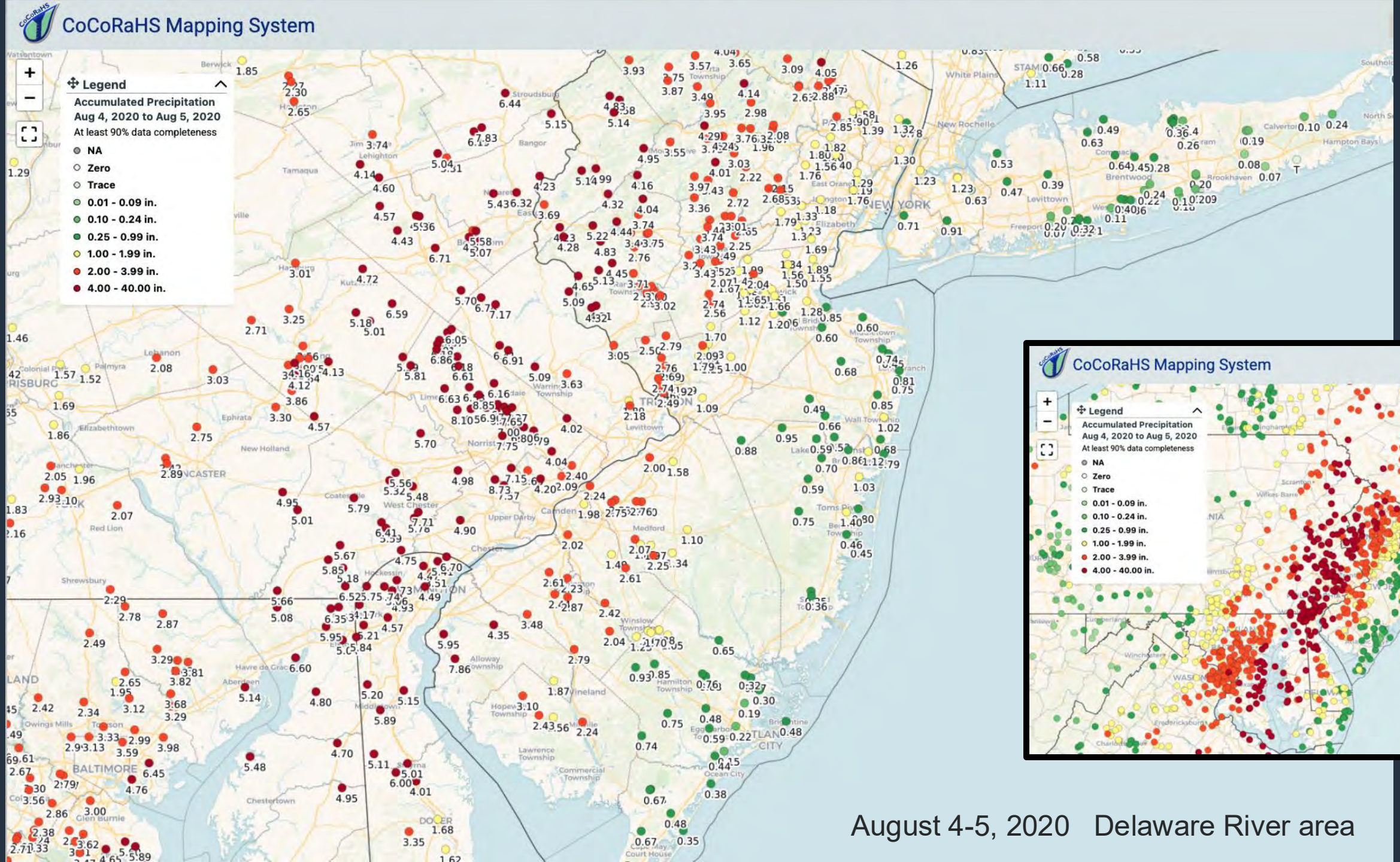
# Some significant events since 2020




CoCoRaHS
Community Collaborative Rain, Hail & Snow Network

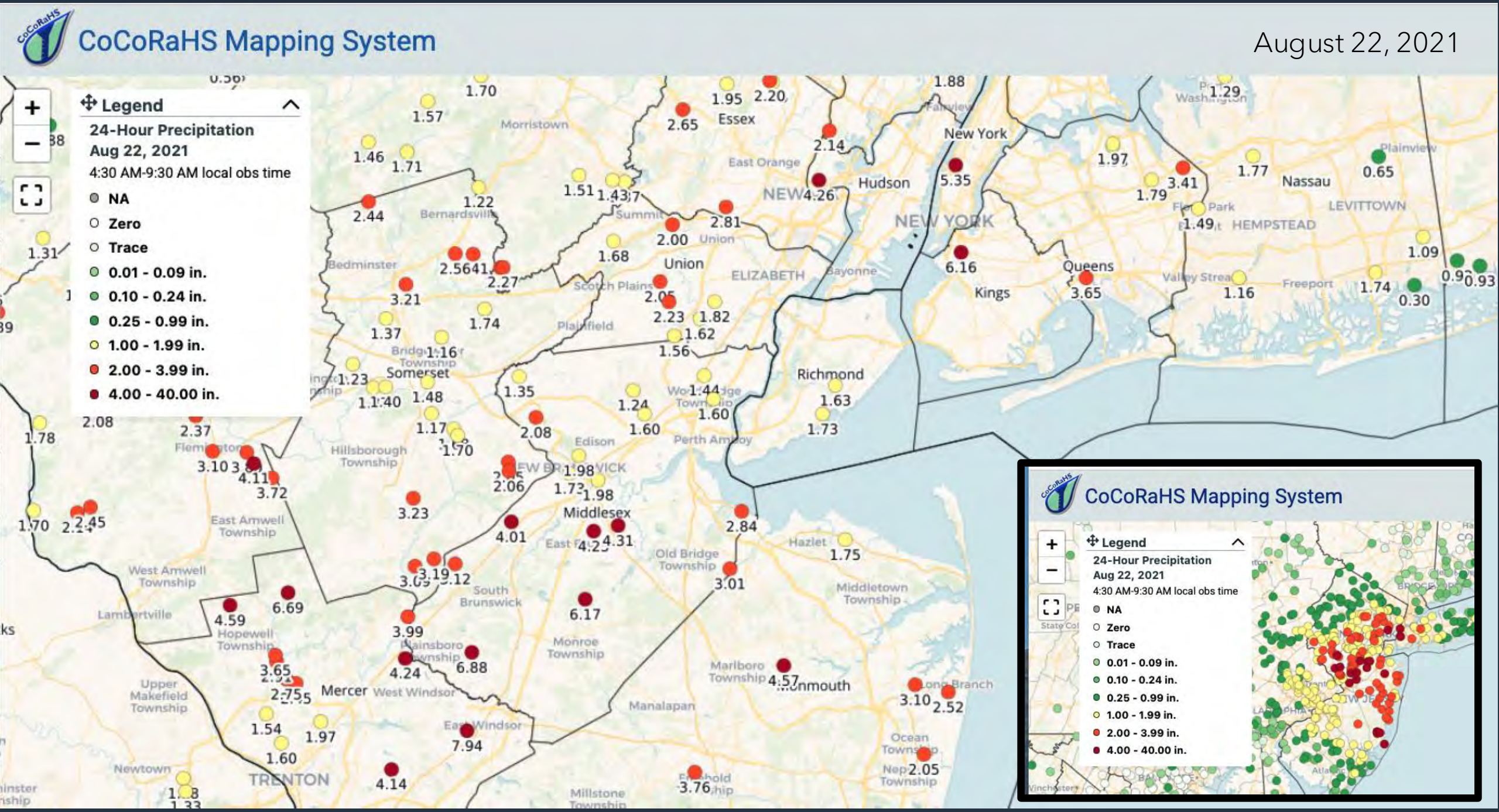
Observations over New England, NY, PA, DE, MD and WV

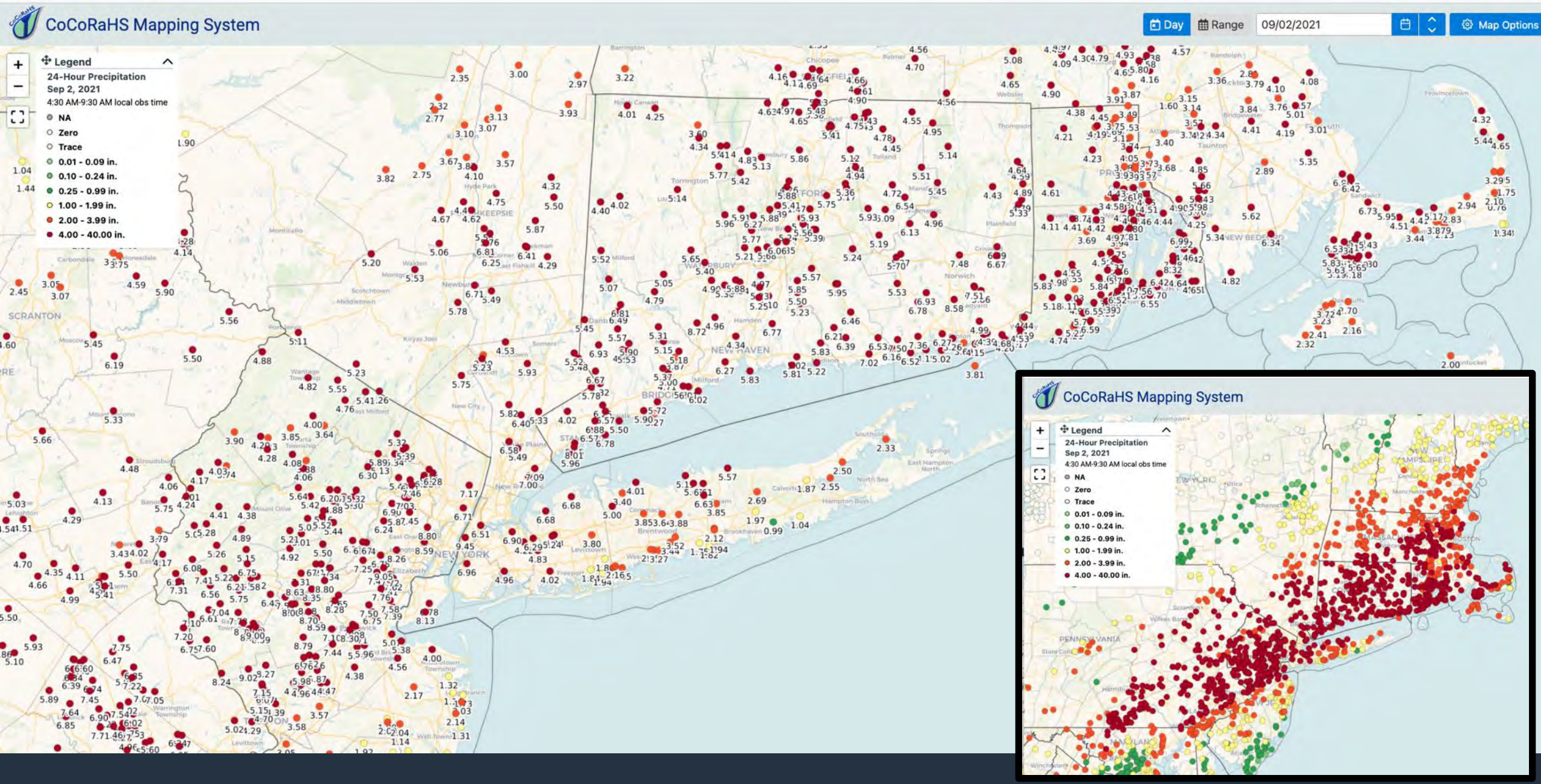




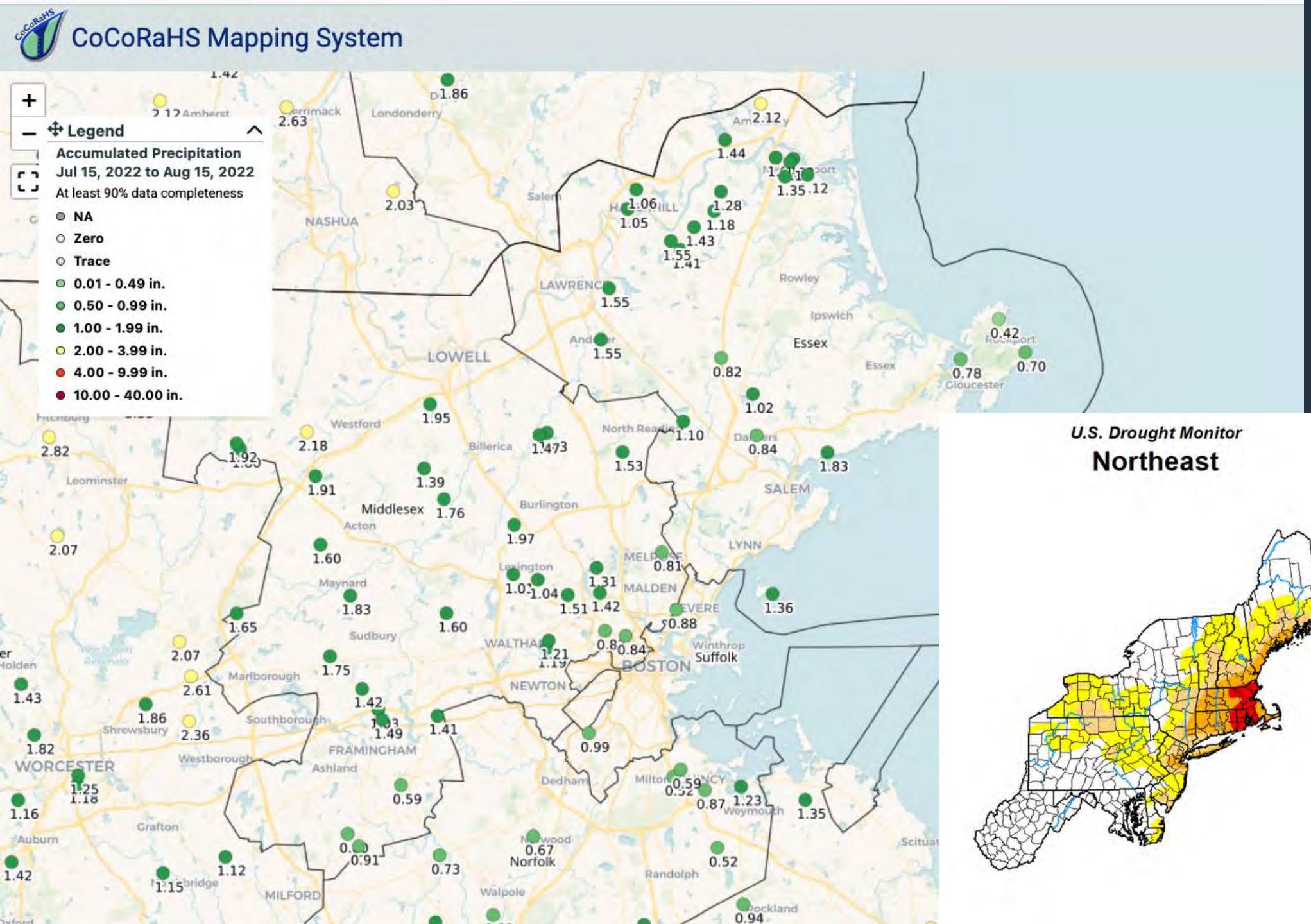


August 4-5, 2020 Delaware River area


CoCoRaHS Mapping System
August 22, 2021
Legend
24-Hour Precipitation
Aug 22, 2021
4:30 AM-9:30 AM local obs time
NA
Zero
Trace
0.01 - 0.09 in.
0.10 - 0.24 in.
0.25 - 0.99 in.
1.00 - 1.99 in.
2.00 - 3.99 in.
4.00 - 40.00 in.
Morristown
Essex
New York
Hudson
East Orange
NEWARK
NEW YORK
Nassau
LEVITTOWN
HEMPSTEAD
Queens
Kings
Bernardsville
Bedminster
Summit
Union
ELIZABETH
Bayonne
Scotch Plains
Plainfield
Somerset
Bridgewater Township
Hillsborough Township
Edison
Richmond
Perth Amboy
Middlesex
East Amwell Township
West Amwell Township
Lambertville
Hopewell Township
Mercer
West Windsor
South Brunswick
Old Bridge Township
Hazlet
Middletown Township
Monroe Township
Manalapan
Marlboro Township
Monmouth
Long Branch
Ocean Township
Upper Makefield Township
Newtown
TRENTON
Millstone Township
Freeport
Valley Stream
Plainview
Washington
CoCoRaHS Mapping System
Legend
24-Hour Precipitation
Aug 22, 2021
4:30 AM-9:30 AM local obs time
NA
Zero
Trace
0.01 - 0.09 in.
0.10 - 0.24 in.
0.25 - 0.99 in.
1.00 - 1.99 in.
2.00 - 3.99 in.
4.00 - 40.00 in.




September 2, 2021. Remnant rains of Hurricane Ida. The US Open Tennis Tournament was going on Wednesday night when the floods came. 6" of rain in 3 hours. Northeastern cities are not built for that.

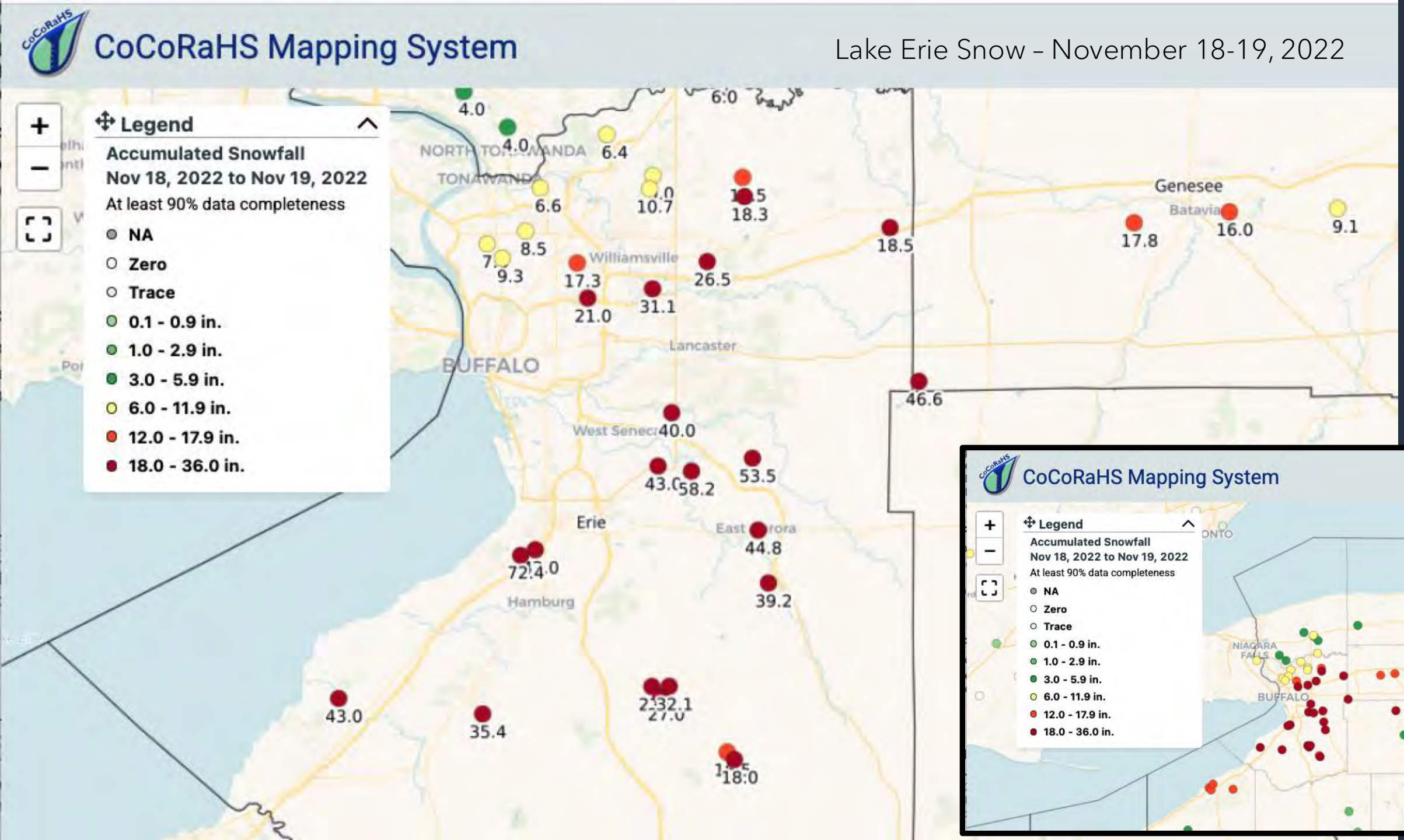



# Drought around Boston 2022

Usually around 3.25” in July and August

# CoCoRaHS Mapping System

## Lake Erie Snow – November 18-19, 2022



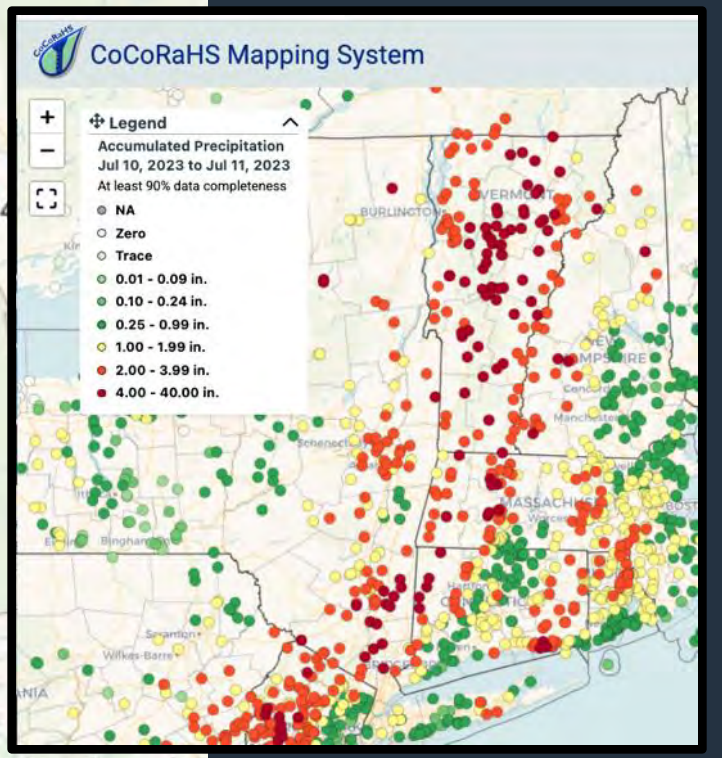
# CoCoRaHS Mapping System

## The Great Vermont Flood of 10-11 July 2023

**Legend**

**Accumulated Precipitation**
**Jul 10, 2023 to Jul 12, 2023**
At least 90% data completeness

- NA
- Zero
- Trace
- 0.01 - 0.42 in.
- 0.43 - 1.34 in.
- 1.35 - 2.43 in.
- 2.44 - 3.57 in.
- 3.58 - 4.84 in.
- 4.85 - 8.10 in.

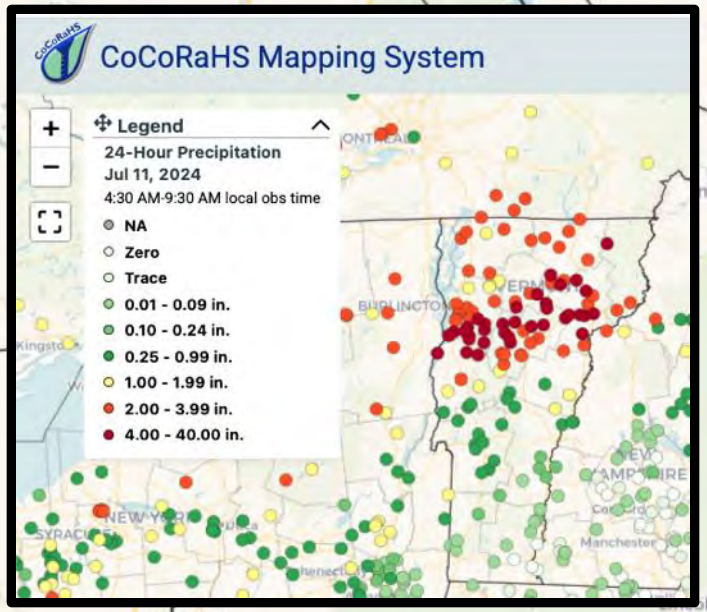
CoCoRaHS Mapping System

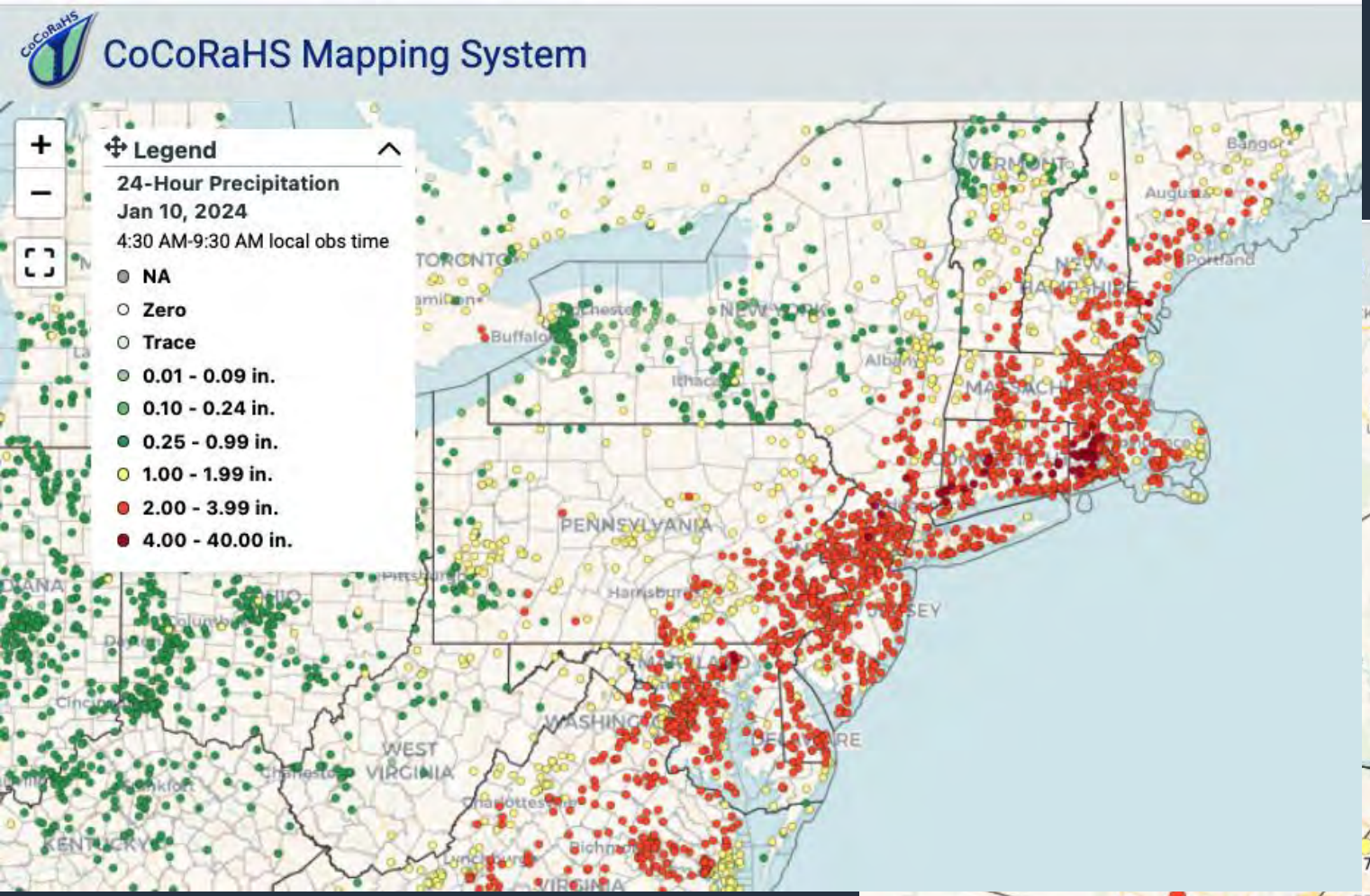
# The Significant Flooding and Severe Weather Event of 10-11 July 2024 Remnants of Tropical Cyclone Beryl

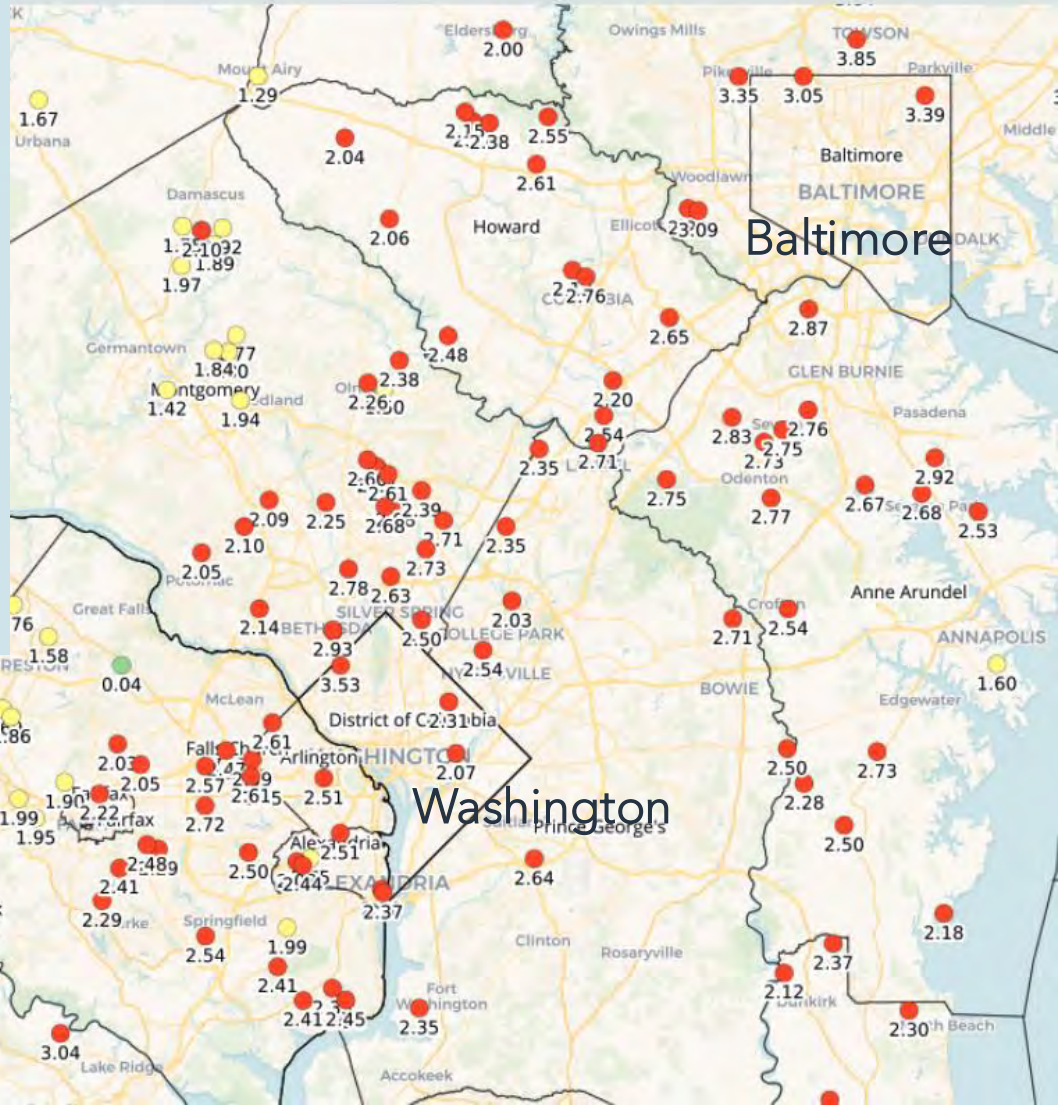
Legend

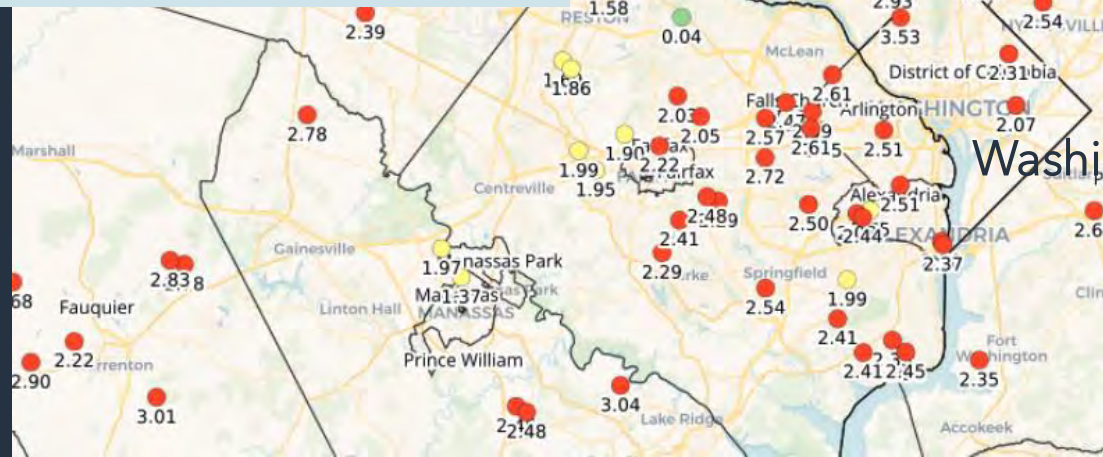
24-Hour Precipitation
Jul 11, 2024
4:30 AM-9:30 AM local obs time

- NA
- Zero
- Trace
- 0.01 - 0.15 in.
- 0.16 - 0.71 in.
- 0.72 - 1.47 in.
- 1.48 - 2.53 in.
- 2.54 - 3.84 in.
- 3.85 - 19.37 in.

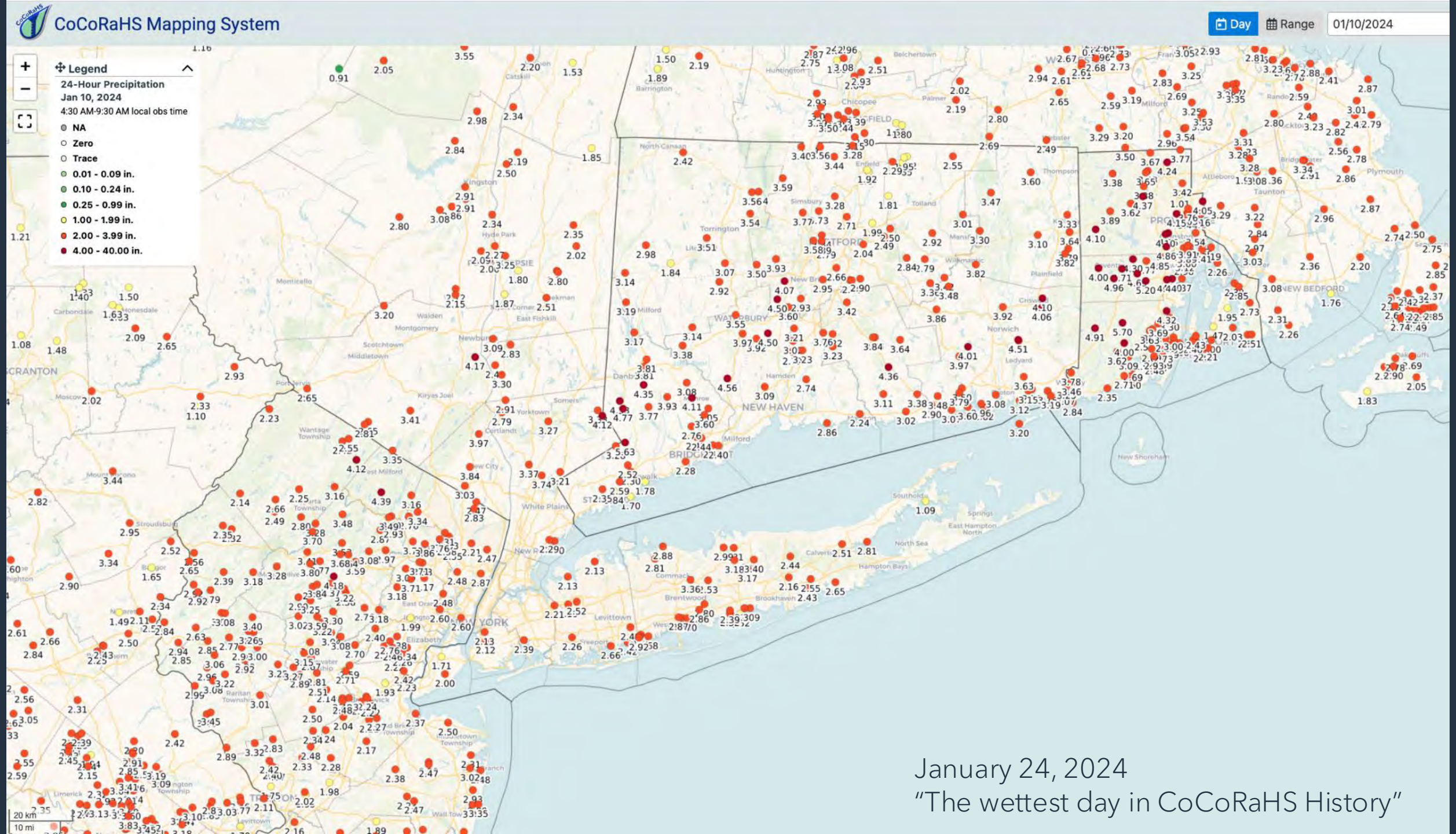




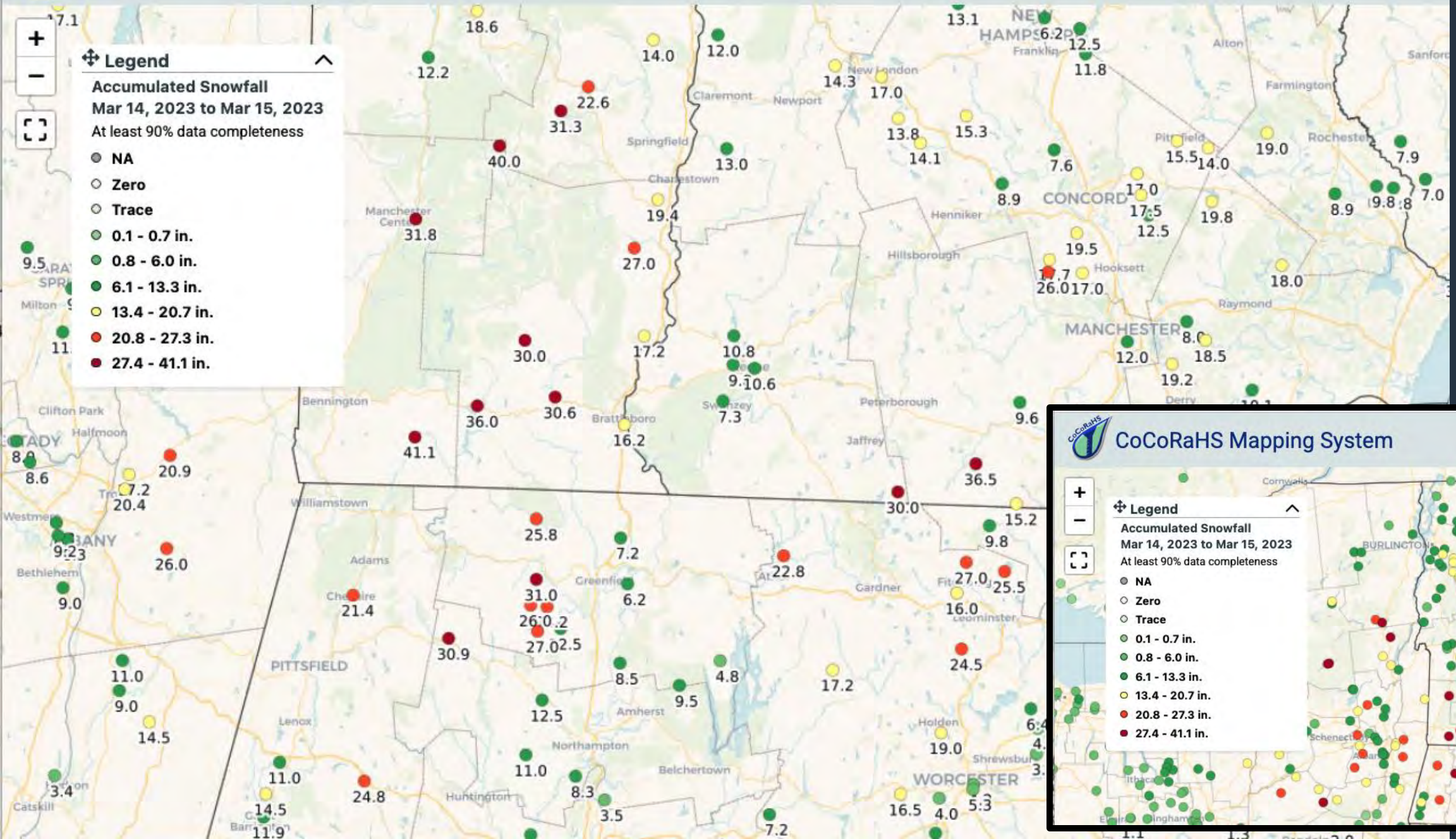

January 24, 2024
"The wettest day in CoCoRaHS History"

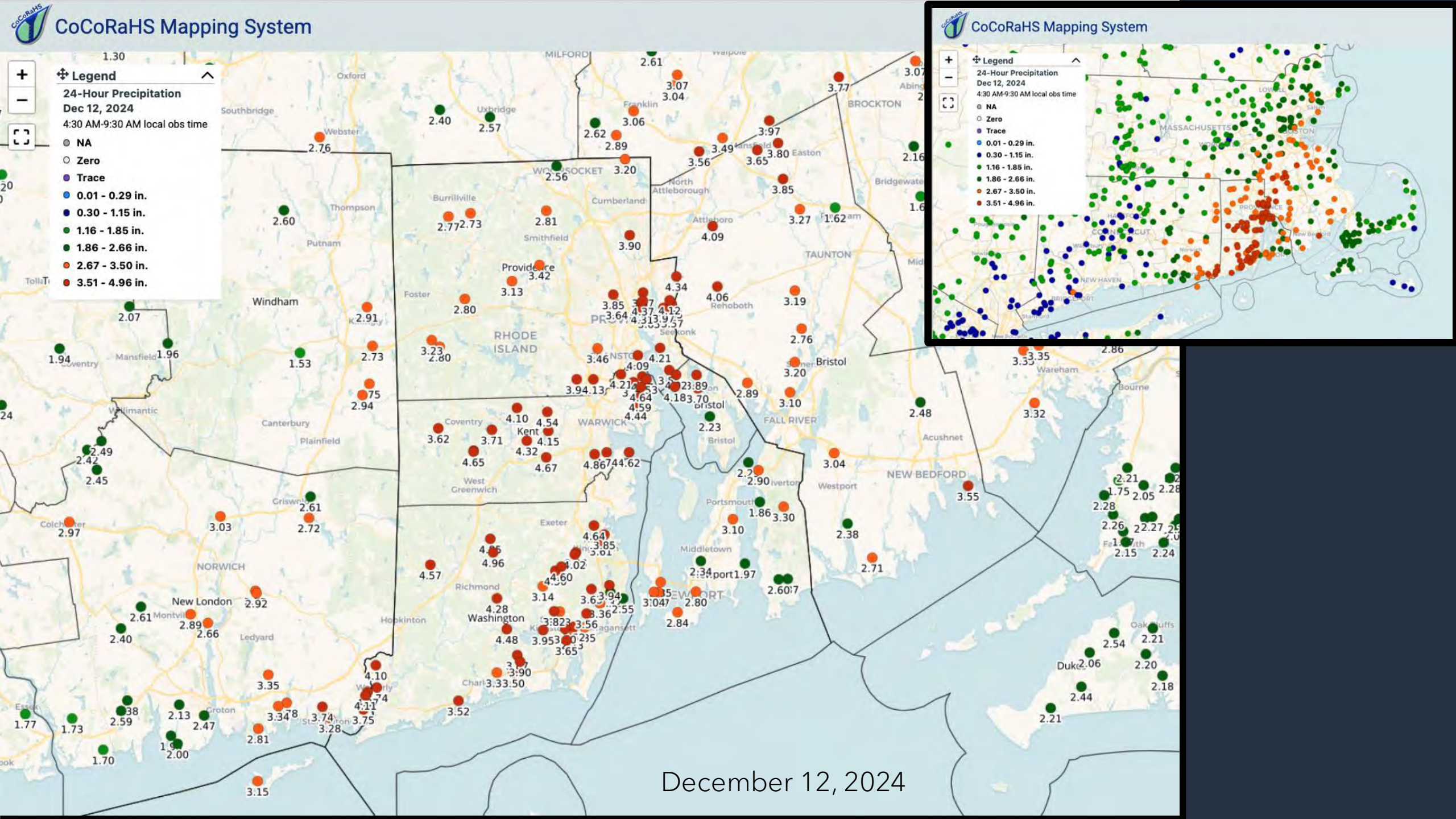



January 24, 2024
"The wettest day in CoCoRaHS History"

# CoCoRaHS Mapping System

## Snowfall – March 13-14, 2024



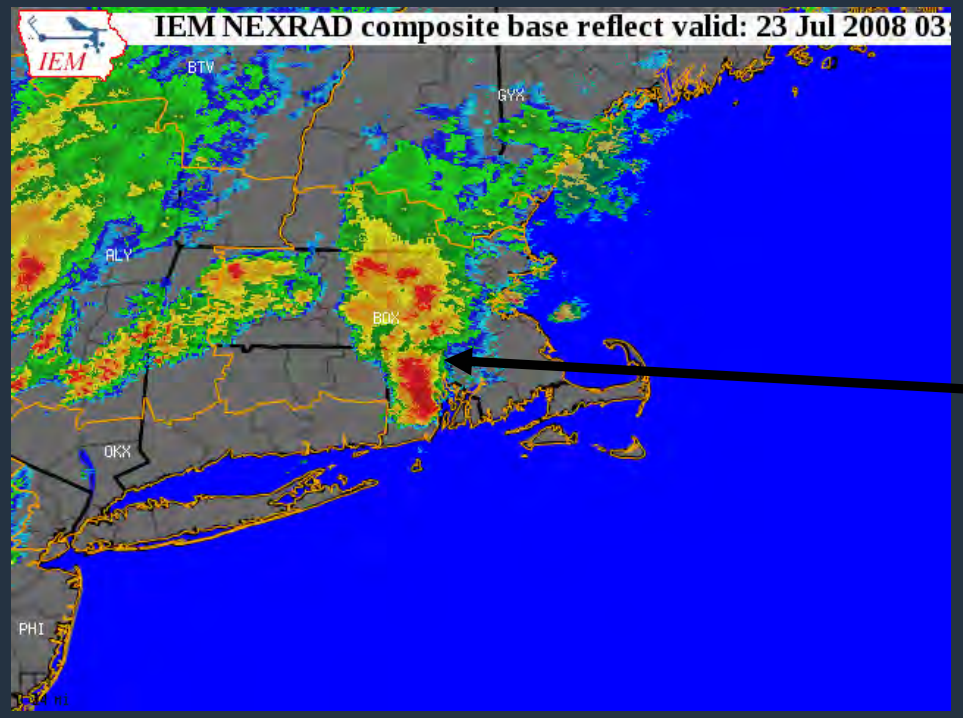

CoCoRaHS Mapping System
Legend
24-Hour Precipitation
Dec 12, 2024
4:30 AM-9:30 AM local obs time
NA
Zero
Trace
0.01 - 0.29 in.
0.30 - 1.15 in.
1.16 - 1.85 in.
1.86 - 2.66 in.
2.67 - 3.50 in.
3.51 - 4.96 in.
December 12, 2024

# OTHER REPORTS

# COCORAHS SIGNIFICANT WEATHER REPORTS

Real-Time advanced warning to the National Weather Service regarding potential flash flooding

REAL-TIME HAIL REPORTS AS WELL

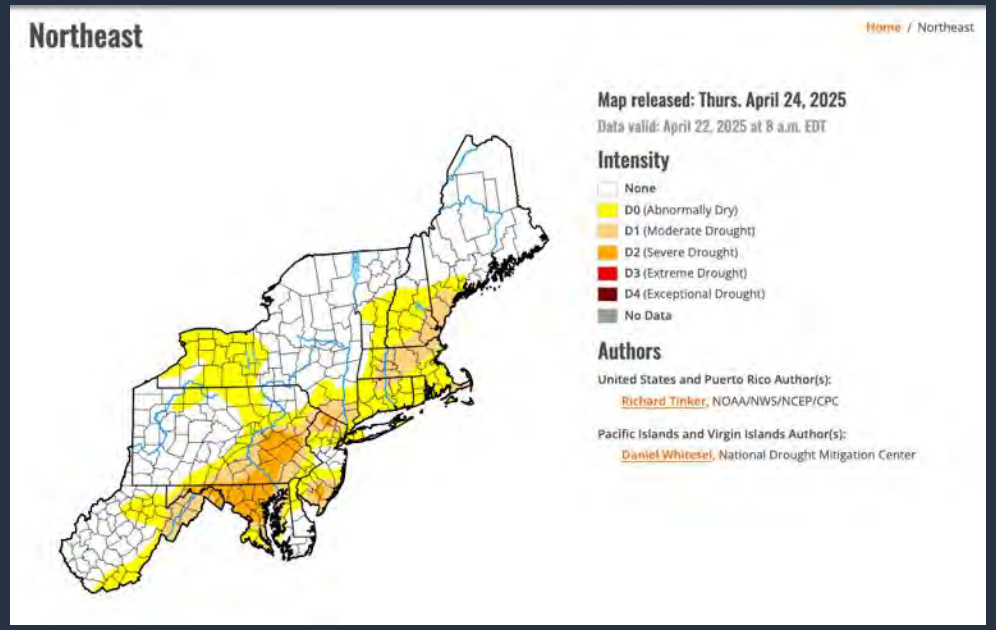



**View Data : View Significant Weather Report**

| Significant Weather Report | |
|---|---|
| Station Number: | RI-WS-1 |
| Station Name: | Hope Valley 3.7 S |
| Date: | 7/23/2008 3:15 PM |
| Submitted | 7/23/2008 3:23 PM |
| Notes: | |
| Taken at Registered Location: | True |
| Precip Duration Minutes: | 15 |
| New Precip Amount: | 1.00 |
| Total Precip Amount: | NA |
| New Snow Depth: | NA |
| Total Snow Depth: | NA |
| Flooding: | No |

*July 23, 2008 – A CoCoRaHS observer in Hope Valley, RI provided an intense rainfall report which led to the issuance of a timely Flash Flood Warning. Life threatening urban flooding was reported in Warwick and Providence at the start of the evening rush hour, where several cars were stranded in more than 2 feet of water, requiring people to be rescued. Lead time would have been much less without the CoCoRaHS report.* - Joe Dellicarpini, NWS Norton, MA

# WHEN IT DOESN'T RAIN – DROUGHT AWARENESS AS PART OF CONDITION MONITORING

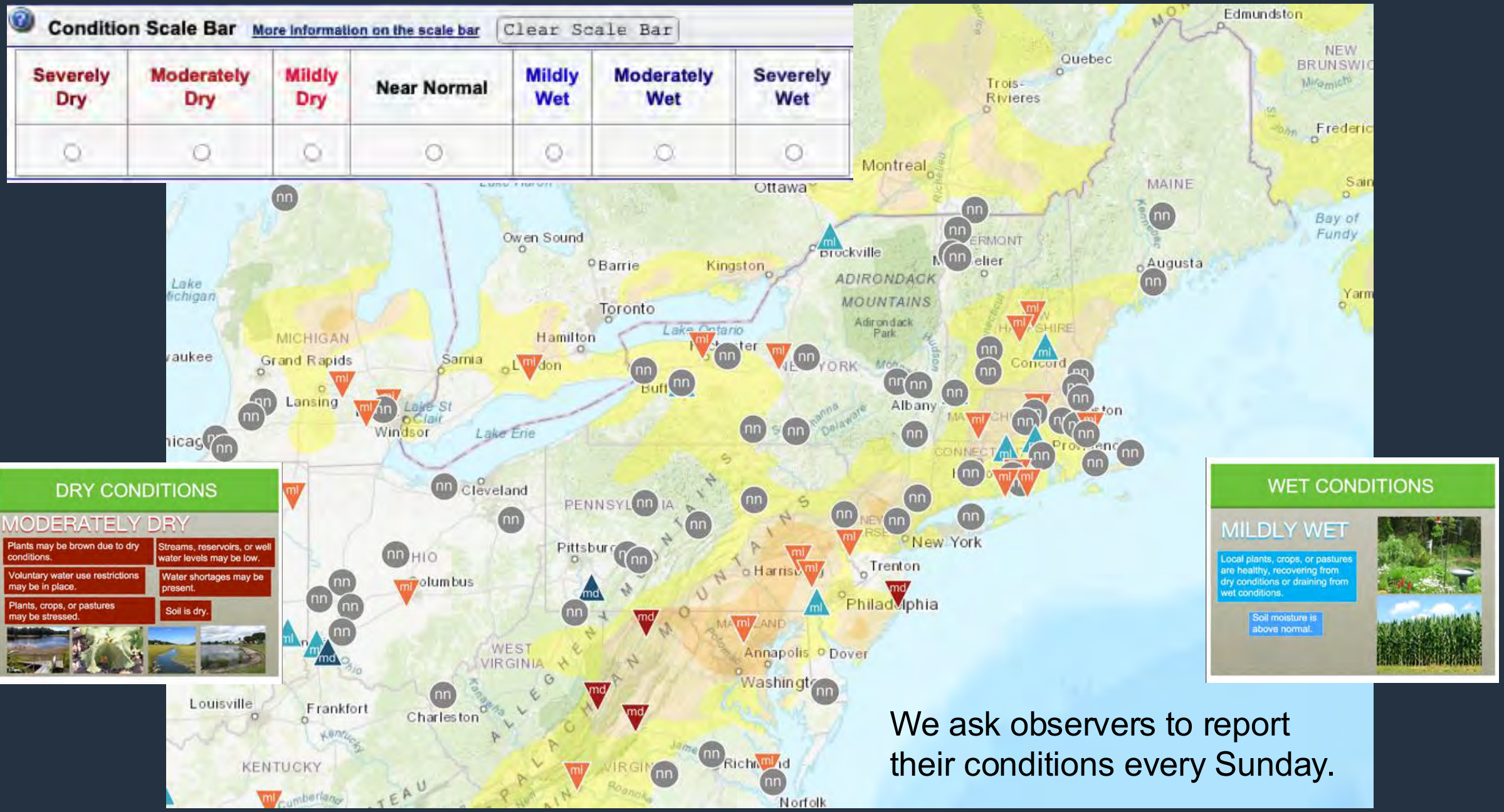

**COWS GIVING POWDERED MILK?**

*CoCoRaHS Drought Impacts*

Report how drought is impacting you when you report your daily CoCoRaHS observation

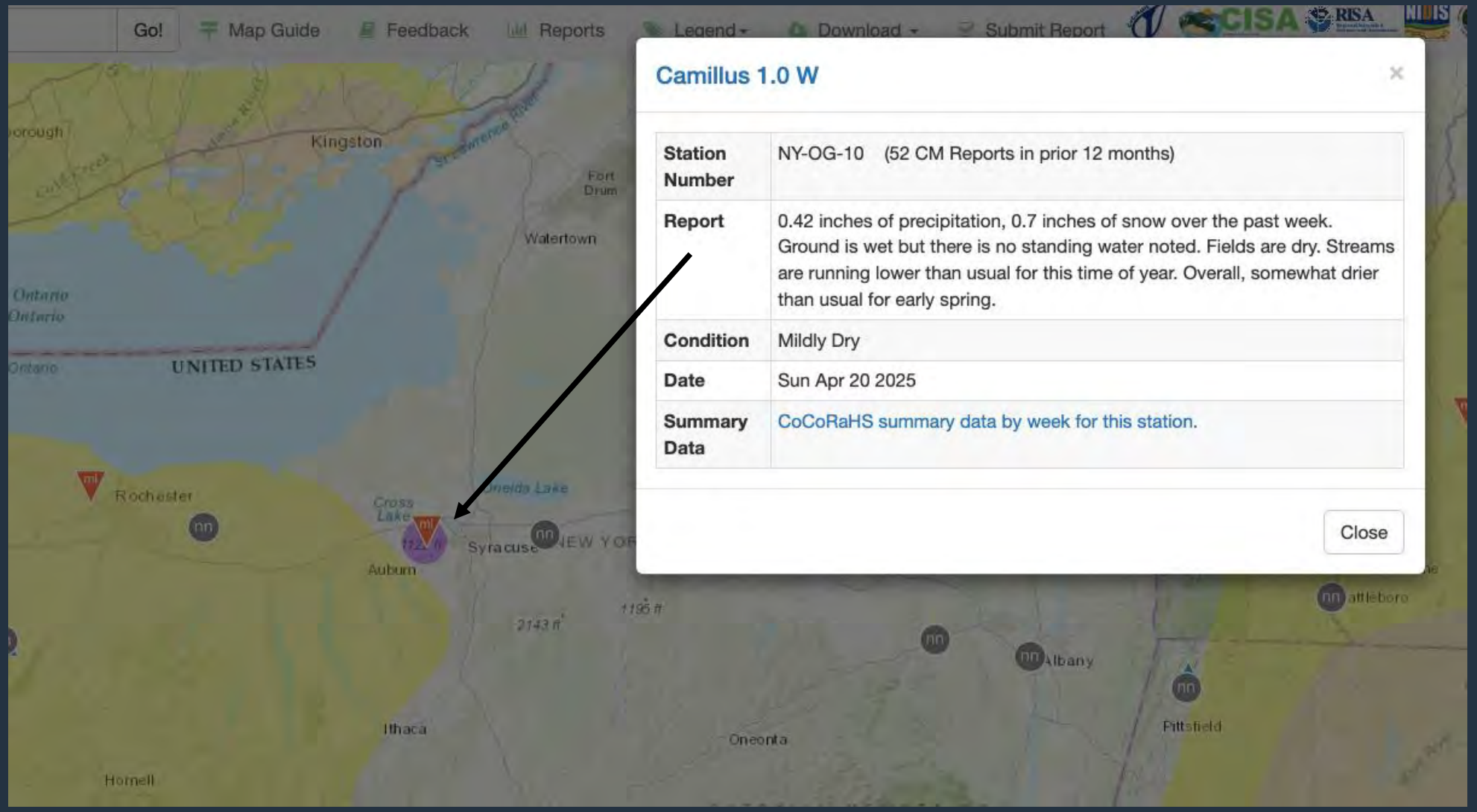
# CONDITION MONITORING REPORTING

## Early Drought Detection




We ask observers to report their conditions every Sunday.

# Informative anecdotal reports



# Guidance for Reporting

## Condition Monitoring Reporting Guide: Northeast

### Regional Background

While the climate of the Northeast is mostly humid continental, with warm summers and no specific "dry season" or "wet season," coastal areas will generally have greater annual precipitation. Southern areas are generally milder than northern areas. Proximity to the coast and the Great Lakes is a critical factor in local weather; these bodies of water typically moderate temperatures of nearby locations. Areas downwind of the Great Lakes commonly receive high winter snowfalls. Elevation also plays an important role in temperature and precipitation patterns.

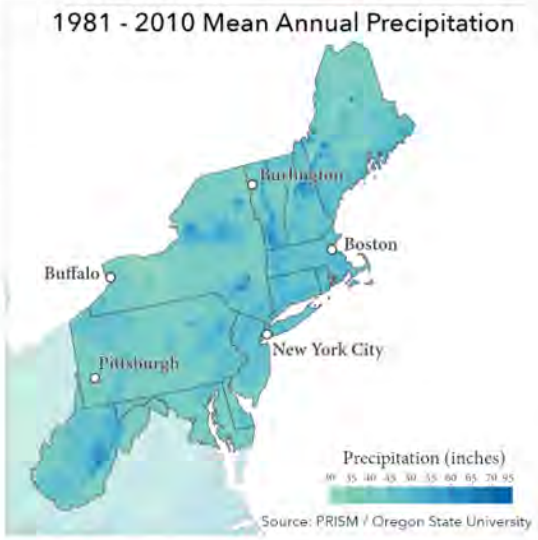
### Reporting Reminders

- Use "Severe" categories sparingly: overuse of these labels can make it hard for researchers to identify the hardest hit areas.
- Sometimes, minor events may still have major human impacts, or vice versa. Don't worry if your precipitation measurements seem to conflict with the severity reflected in your reports: differentiating between magnitude and human impact is valuable to researchers and decision makers!
- While heat and drought often go together, be careful to note that impacts of heat (e.g., wilting plants) are not necessarily indicative of drought conditions.
- Droughts don't end instantly. Rain after long droughts may mean *less dry* conditions, but not necessarily a reset to "Near Normal" conditions. Think *long term*.
- In addition to rain measurements, notes on a storm's duration, power outages, road closures, and other such impacts are helpful to include.

### Average Monthly Climate Data

These climate charts represent normal monthly precipitation and temperature in your region. Pick a city near you and use the data as a baseline for your "near normal" conditions. Explore these resources for climate data in other locations:

- National Drought Mitigation Center
- NOAA National Centers for Environmental Information
- NOAA Regional Climate Centers
- American Association of State Climatologists





## What to Look For

The following tables provide examples of the types of conditions you might observe during different wet or dry periods. **These lists are designed as an aid.** The first table shows the condition monitoring scale bar categories and the types of conditions that correspond to those categories. The second table organizes different types of conditions and impacts by sectors and areas of interest. Be sure to note any other observations that you think may relate to dry or wet conditions.

| SEVERELY WET | MODERATELY WET | MILDLY WET | NEAR NORMAL | MILDLY DRY | MODERATELY DRY | SEVERELY DRY |
|---|---|---|---|---|---|---|
| • **Use this category sparingly**<br>• Wet conditions have persisted for several weeks<br>• Major flooding<br>• Soil is saturated | • Wet conditions have persisted for a few weeks, or there has been a major rainfall event<br>• Standing water and minor flooding<br>• Soil is very damp | • Frequent precipitation for several days<br>• Standing water is common<br>• Soil moisture is above normal | • Observed conditions normal for this time of year<br>• **This should be your default entry** | • Dry conditions have persisted for a few weeks<br>• Soil is somewhat dry | • Dry conditions have persisted for several weeks<br>• Lakes and rivers are low<br>• Water use restrictions start<br>• Soil is very dry | • **Use this category sparingly**<br>• Dy conditions have persisted for months<br>• Soil is completely dry<br>• Water is scarce<br>• State of Emergency |

| | WET | DRY |
|---|---|---|
| Agriculture | Orchard fruit and berry yields perform well in wet conditions. Certain pests and mold issues will become more frequent. During intense or prolonged wet conditions, mud and standing water may delay or impede planting and harvesting processes. Crop yields may be reduced. | Crops may develop late, show stunted growth, or yield smaller harvests. Plantings and harvests may be delayed as a result! Orchard fruits and berries may be smaller in size. Honey and dairy outputs may be lower. New wells and irrigation equipment may need to be purchased. Livestock may be smaller or require supplemental water and feed. In the Northeast, Christmas tree shortages are common in dry years. |
| Business | Rainy and muddy conditions may delay construction and infrastructure projects. Flooding or snow may impede commutes, particularly in remote areas. Costs for transportation departments may increase due to snow removal and road salting. Urban areas with high densities of asphalt and concrete may flood easily, resulting in lost business hours. | Decreased demand may adversely affect tourism communities, local farms, and landscaping companies. Some sectors, such as well-drilling, may see benefits. |
| Energy | Hydropower output is likely to increase in prolonged rainy weather. Very intense precipitation, especially in winter, may increase the danger of power outages. | Dying tree limbs, heat, and subsiding soil are threats to electrical infrastructure and may increase the likelihood of power outages. Utility bills are likely to increase, especially in areas reliant on hydroelectric, coal, or nuclear plants. |
| Fire | U.S Forest Service fire danger ratings can be expected to be at or near minimum. It is common for prescribed burns to take place during wet conditions because they will be easier to contain. | Wildfires will be larger and more common, as reflected in increases in Fire Danger ratings from the U.S. Forest Service. Firefighting groups may release public statements or increase crew sizes. Fire season may begin earlier in the year (mid- to early Spring). |
| Plant &Wildlife | Heavy precipitation and saturated soil may cause trees to be easily uprooted. Wildlife likely to be more prevalent in wet conditions include wildflowers, mushrooms, mosses, mosquitoes, and ticks. Autumn colors and "leaf-peeper" season are likely to occur later in the season. | Scarcity of water and food may push animals to scavenge in residential areas. Deer may be scrawnier or more prone to disease. Changes in water level and temperature may result in fish kills. Lawns may start to brown or die. Mature, native trees will likely show signs of browning and drying if conditions are severe, possibly becoming more susceptible to pine beetles and other pests. |
| Relief & Response | Rain, snow, or fog may contribute to road closures. Emergency declarations or school closures for heavy rain or snowfall are an indicator of wet conditions. | Regulations on outdoor burning and the use of fireworks are common, even at low levels of drought. Governments and other agencies may issue statements encouraging voluntary conservation of water and energy. These will often become mandatory if drought worsens. |

## My Data Entry : Condition Monitoring Report Form

**Condition Monitoring Report Form** Submit Data Reset

**Station Number :** CO-LR-610

**Station Name :** Fort Collins 3.5 SW

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*

**Report Date** *

2/15/2018

**Condition Scale Bar** More information on the scale bar Clear 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. *

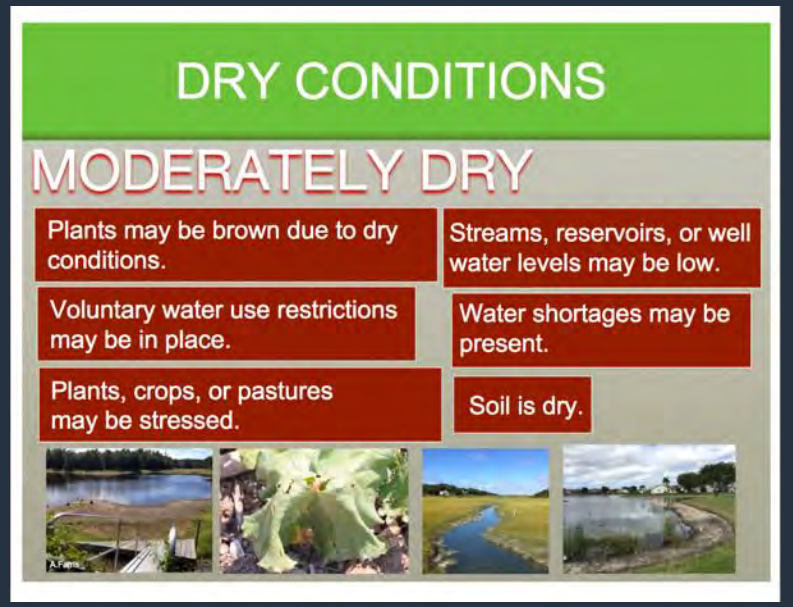
Our ponds are very low for this time of the year. The normal February snow and rains have been few and far between.

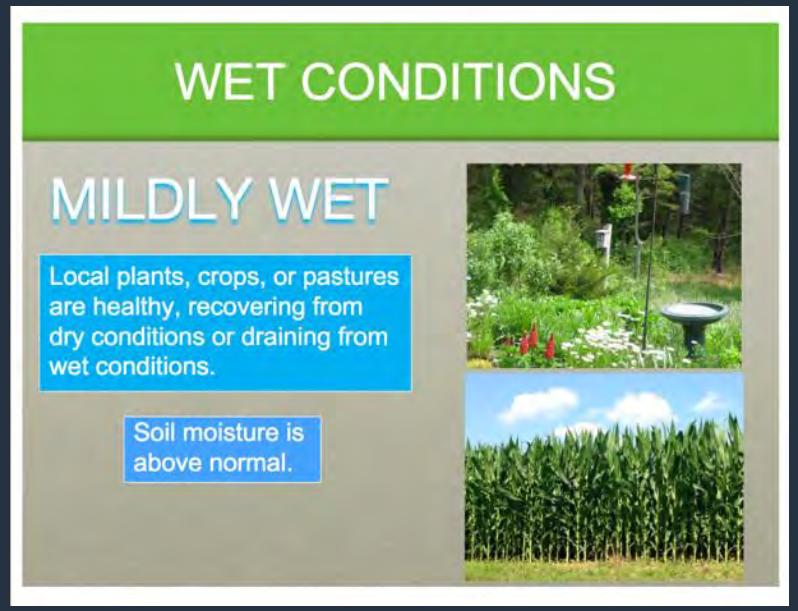
**Report Categories**

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 & Industry
- ☐ Energy
- ☐ Fire
- ☐ Plants & Wildlife
- ☐ Relief, Response & Restrictions
- ☐ Society & Public Health
- ☐ Tourism & Recreation
- ☐ Water Supply & Quality

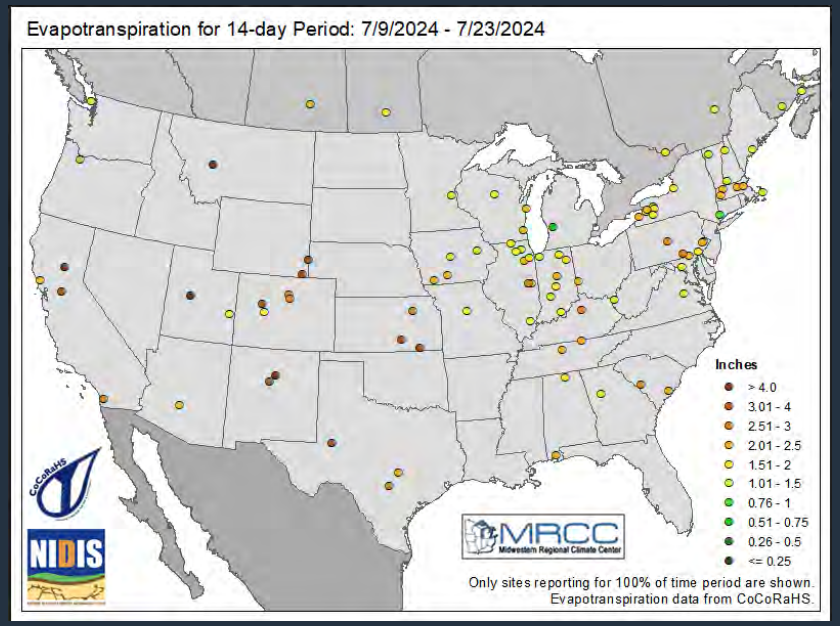
Submit Data Reset



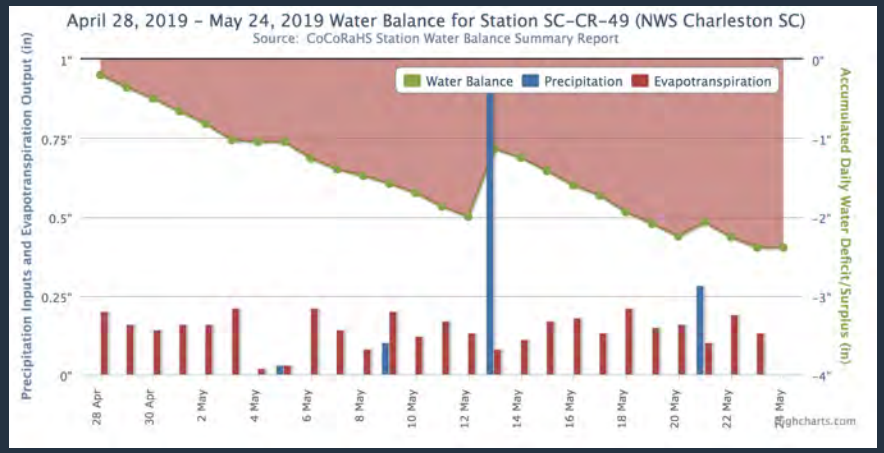




Easy to use forms . . . five extra minutes to file a report. Once a week!

# REFERENCE $ET_o$




Water balance




Measuring Reference Evapotranspiration $ET_o$

*"The 'up' side of the water cycle"*

*"Here at NWS-CHS we measure evapotranspiration (ET) and report it through CoCoRaHS. This year, we started reporting ET on 4/28. As you can see from the attached water balance chart, over this time period we have received 1.35" of rain with 3.74" of ET. That results in a net -2.39" over roughly a month."*

Blair Holloway
Lead Meteorologist
National Weather Service - Charleston, SC

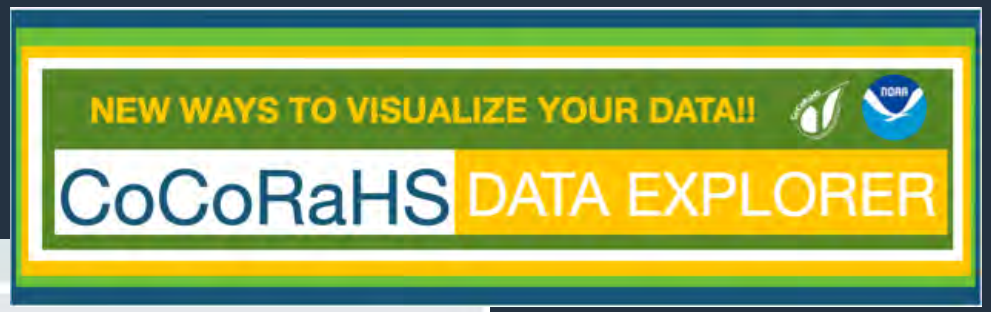
# WHAT'S NEW

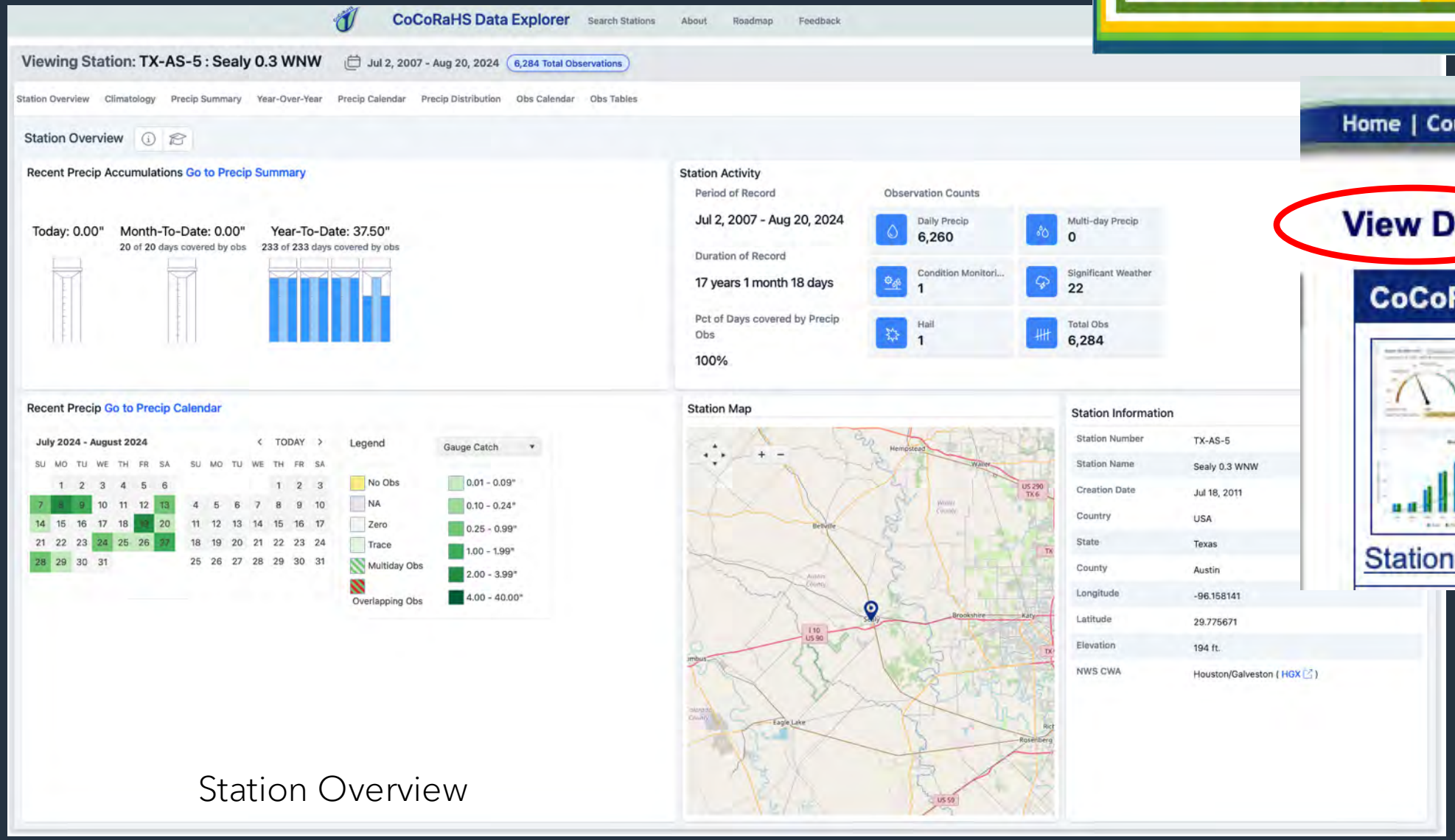
CoCoRaHS

Community Collaborative Rain, Hail & Snow Network

# CoCoRaHS Data Explorer

Customized for your individual station



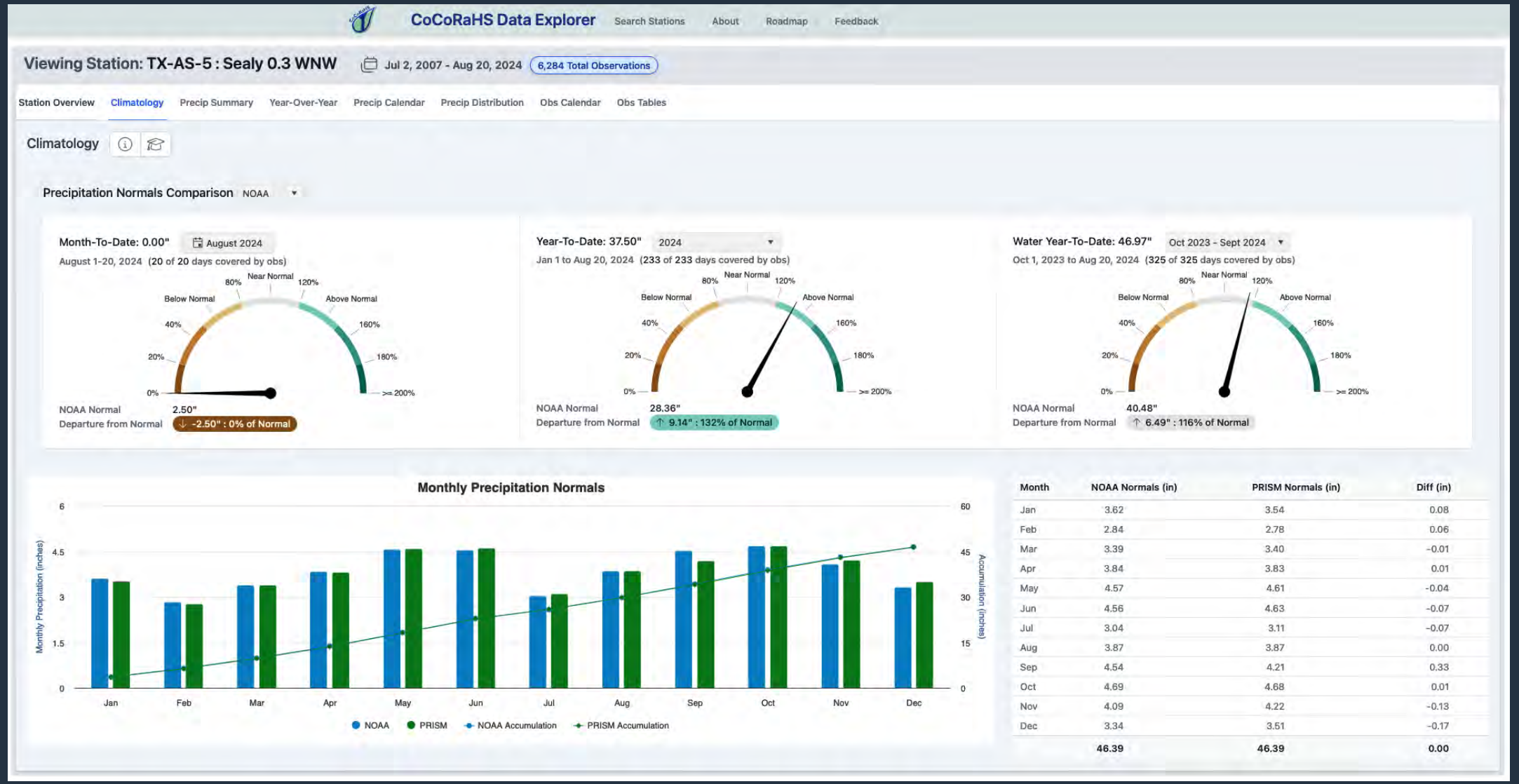





Station Overview

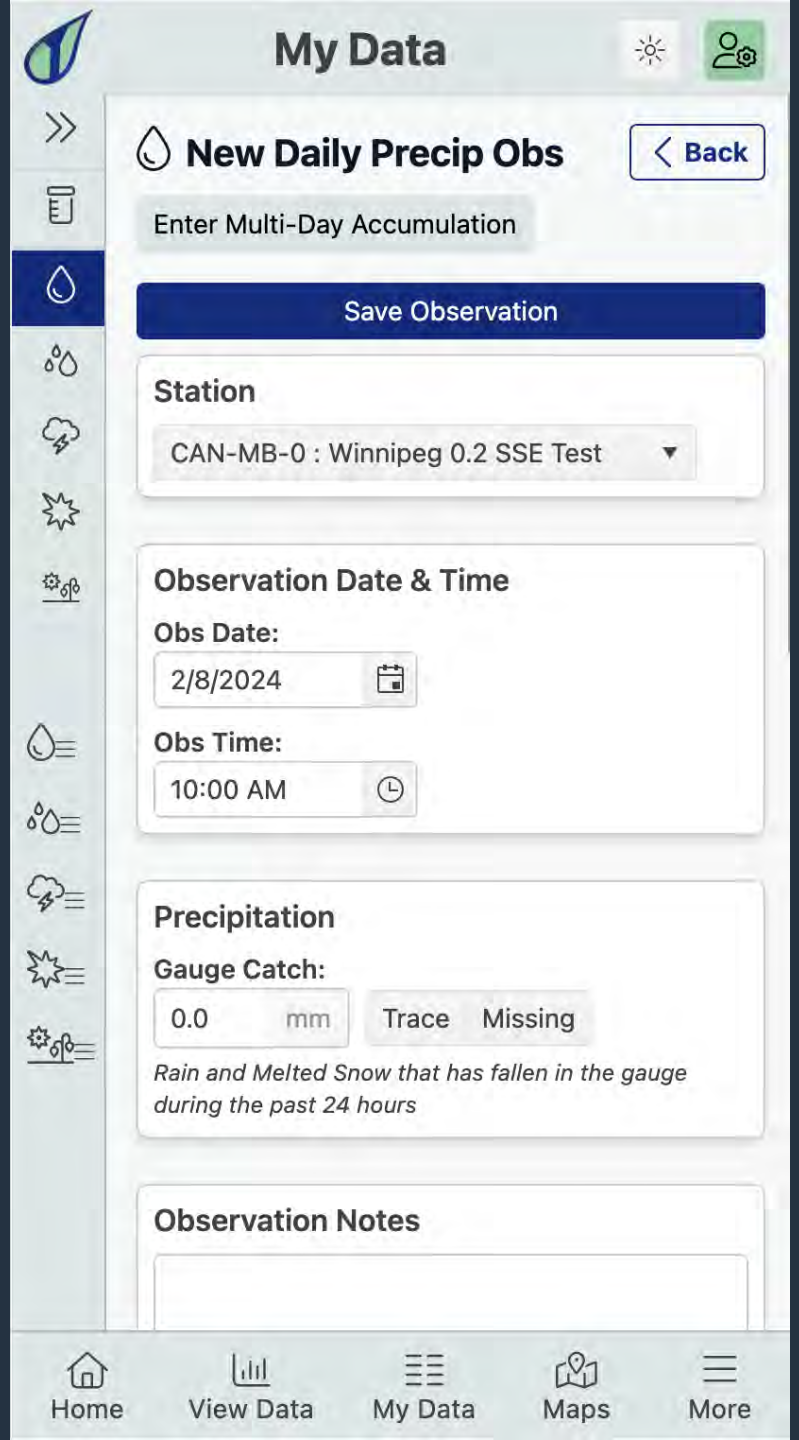
# Climatology plus six other tabs

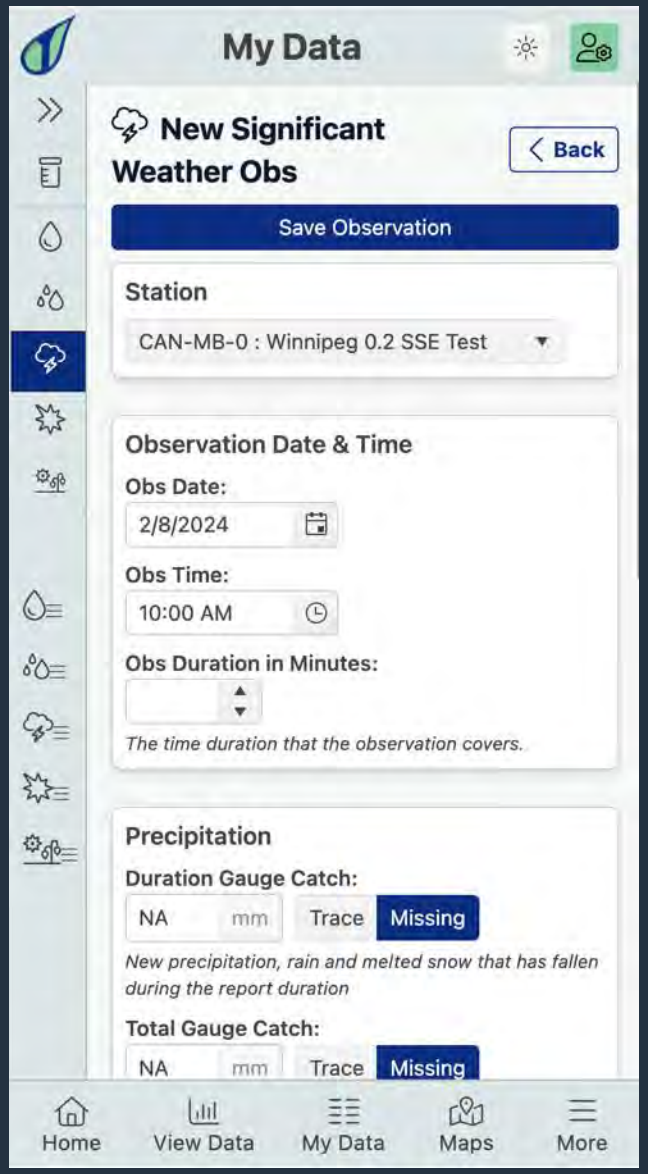
Precip summary
Year over year
Precip calendar
Precip distribution
Obs calendar
Obs tables

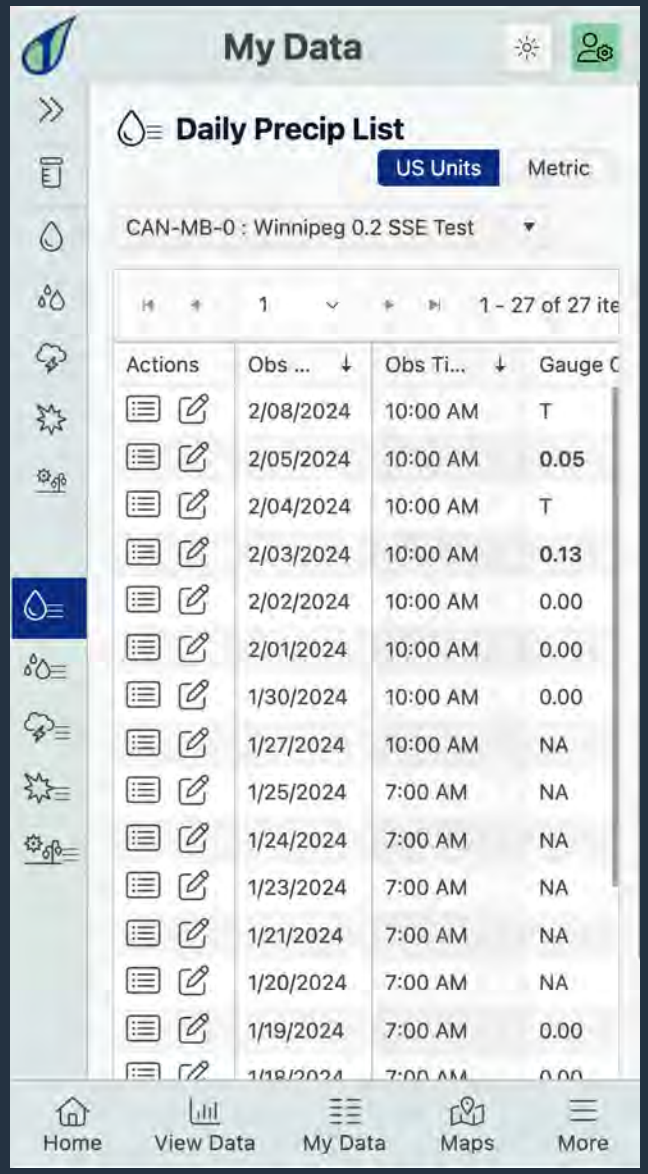



| Month | NOAA Normals (in) | PRISM Normals (in) | Diff (in) |
|---|---|---|---|
| Jan | 3.62 | 3.54 | 0.08 |
| Feb | 2.84 | 2.78 | 0.06 |
| Mar | 3.39 | 3.40 | -0.01 |
| Apr | 3.84 | 3.83 | 0.01 |
| May | 4.57 | 4.61 | -0.04 |
| Jun | 4.56 | 4.63 | -0.07 |
| Jul | 3.04 | 3.11 | -0.07 |
| Aug | 3.87 | 3.87 | 0.00 |
| Sep | 4.54 | 4.21 | 0.33 |
| Oct | 4.69 | 4.68 | 0.01 |
| Nov | 4.09 | 4.22 | -0.13 |
| Dec | 3.34 | 3.51 | -0.17 |
| | **46.39** | **46.39** | **0.00** |

# The NEW CoCoRaHS App



# How Can I become an Observer?

## Five easy steps

- Simply sign-up on the CoCoRaHS web page www.cocorahs.org

- Obtain a 4" plastic rain gauge (info available on web site)

- View the "training slide shows/animations" or attend a training session when offered

- Set-up the gauge in a "good" location at your place

- Start observing precipitation and report on-line daily

For more information visit: www.cocorahs.org

or contact: henry.reges@colostate.edu

# THANK YOU

# QUESTIONS?

Special thanks to Matt Spies for today's statistics
CT-FR-9