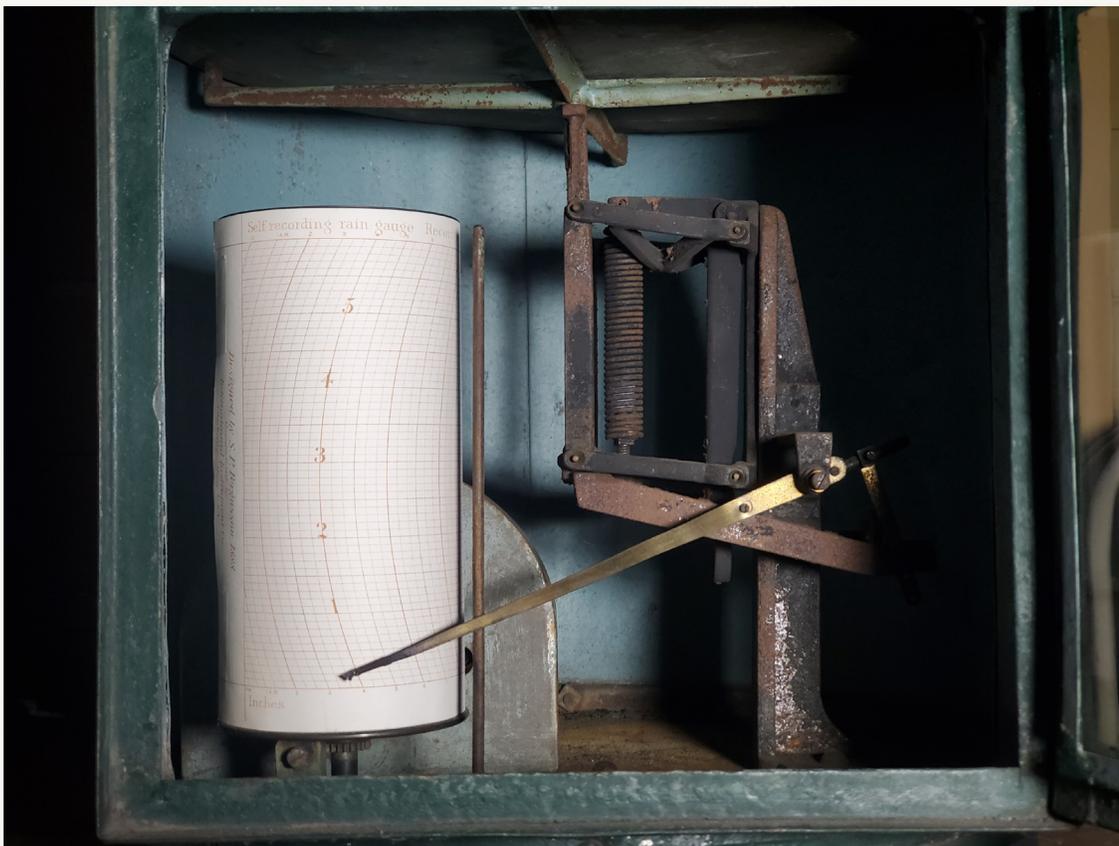


# Rain Measurements

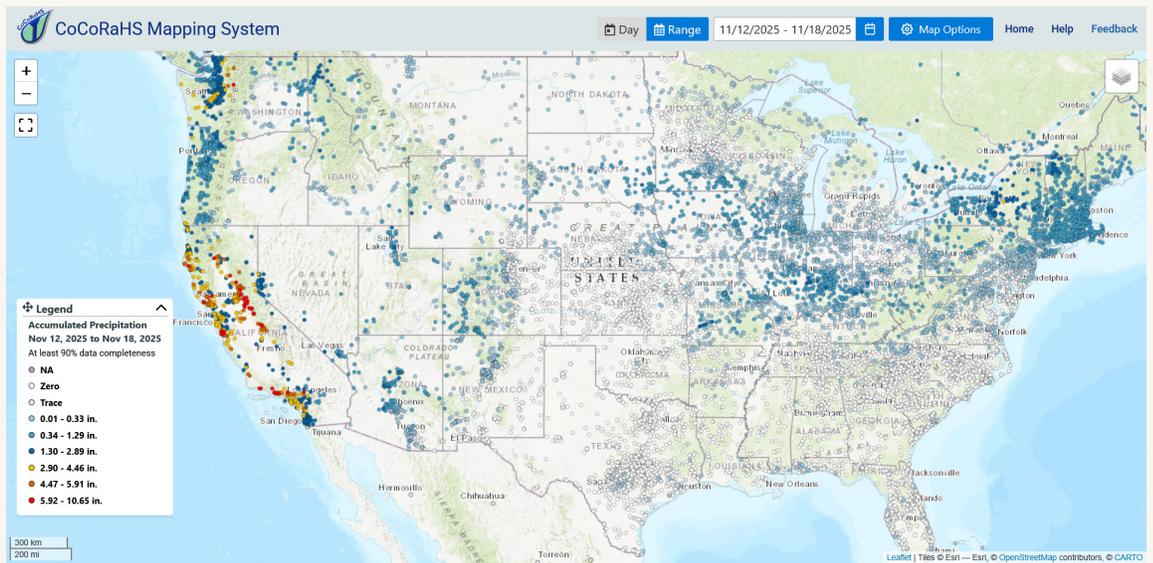
Routine weather observations are important for understanding climate change, extreme weather events, and prolonged weather patterns, like severe drought. The Ladd Observatory maintained rooftop weather stations for many decades starting in the 1890s. This was before the National Weather Service began.



The chart recorder of Ladd Observatory's rain gauge from the 1890s. The weight of the precipitation stretches a spring, which moves a pen upwards. The chart contains a clock which turns the drum once per week. This leaves a mark on the paper indicating when it rained, and how much. Photo by the author.

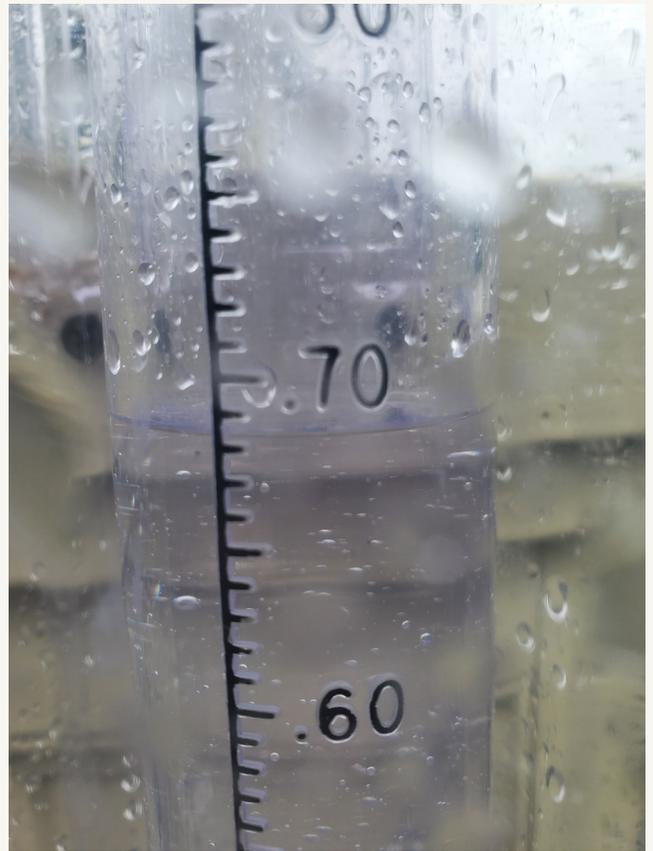
Partnerships between scientists and members of the community are referred to as Citizen Science projects. Some scientific research requires more information than professional scientists can reasonably, and cost effectively, collect. Volunteers augment this by contributing observations.

One project is called the Community Collaborative Rain, Hail and Snow Network, or CoCoRaHS for short. It began in 1998 after a devastating flash flood in Fort Collins, Colorado. The severity of the flood, and the variation in rainfall at nearby locations, surprised meteorologists. The Climate Center at Colorado State University appealed to members of the community to make measurements of rainfall using low cost rain gauges. They regularly report measurements using a form on a website. Volunteers in Rhode Island began contributing observations in 2008. The network of volunteers throughout the United States and Canada submit over ten thousand measurements each day.



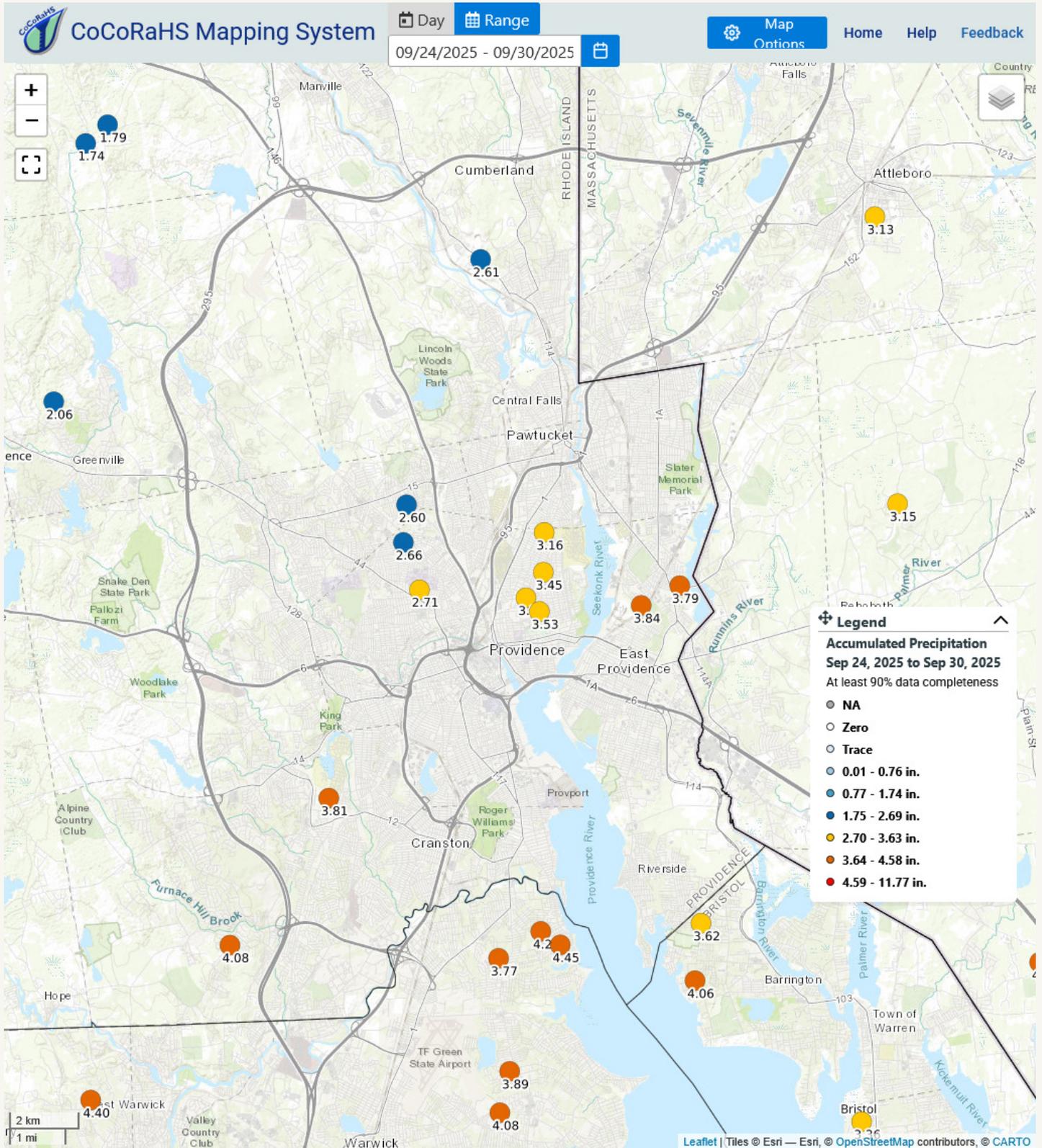
Weekly total precipitation for mid November 2025. There was moderate rain in New England; parts of California experienced extreme rainfall. Credit: CoCoRaHS volunteers.

We installed a rain gauge on the roof of Ladd Observatory in September of 2025. We submit our observations each week. The graduated cylinder in the rain gauge allows making precise measurements to 1/100th of an inch. During the month of October, we recorded 3.84” of precipitation. This is typical for Rhode Island. In the absence of storms like hurricanes and nor’easters the state receives about 4” per month. The amount of rainfall doesn’t vary much from month to month in the Northeast. (On the West Coast, winter is the wet season, and summer is the dry season.)



The graduated cylinder of the rain gauge showing 0.68” of precipitation. Photo by the author.

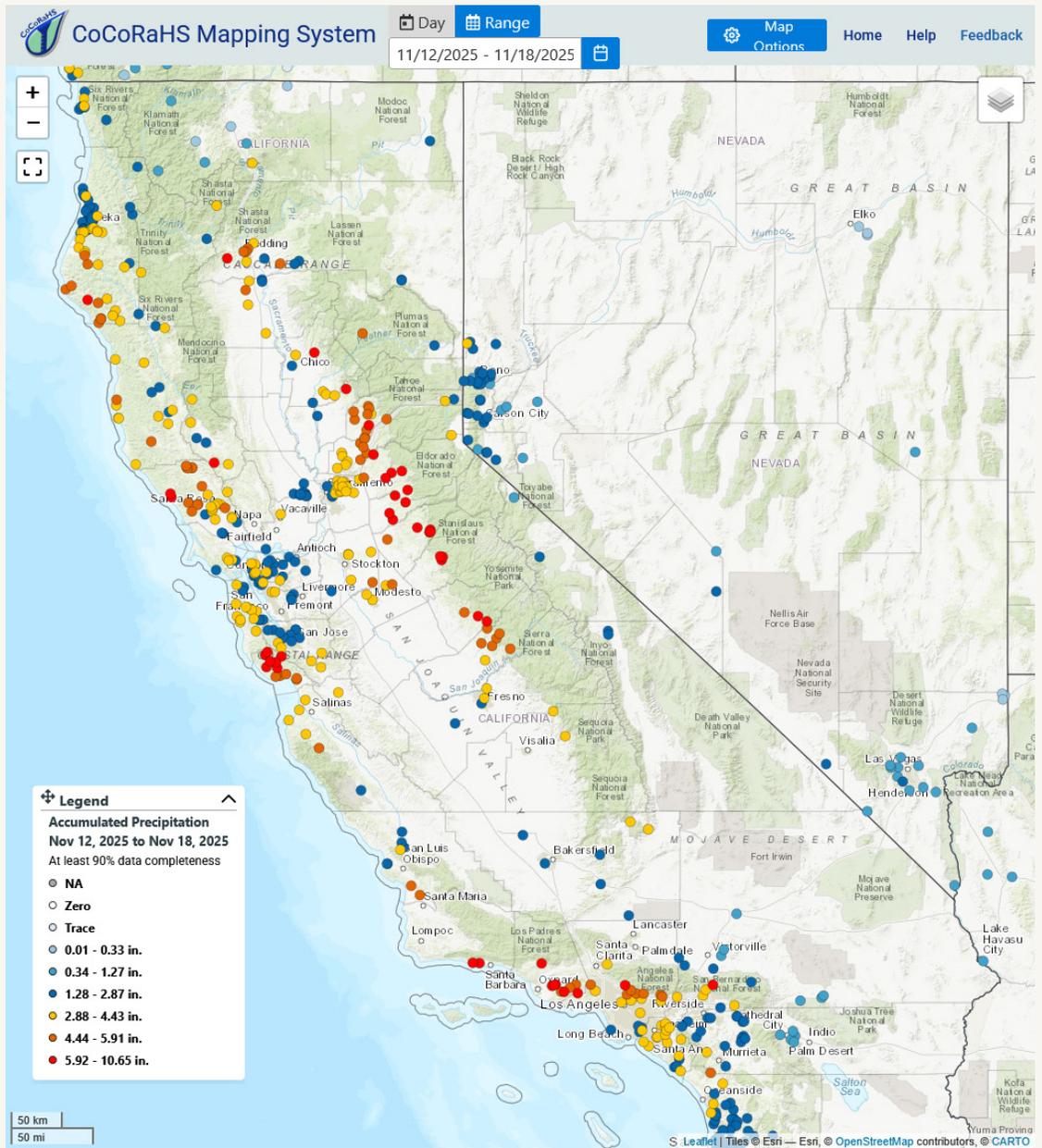
The exact amount of rainfall at nearby locations can be significantly different. The National Weather Service weather station at TF Green Airport, about 8 miles south of Ladd, received about 4” of rain during the last week of September. Greenville, about 8 miles northwest of Ladd, received about 2” during the same period. Observers on the East Side of Providence, including at Ladd, recorded about 3.5” of rain. This rainfall resulted in nearly a month’s precipitation in just one week. During the first week of October there was no rain.



Rainfall measurements in the Providence area during the last week of September 2025. The reports are color coded from blue (less rain) to orange (more rain.) Ladd is one of the four yellow dots at center. Credit: CoCoRaHS volunteers.

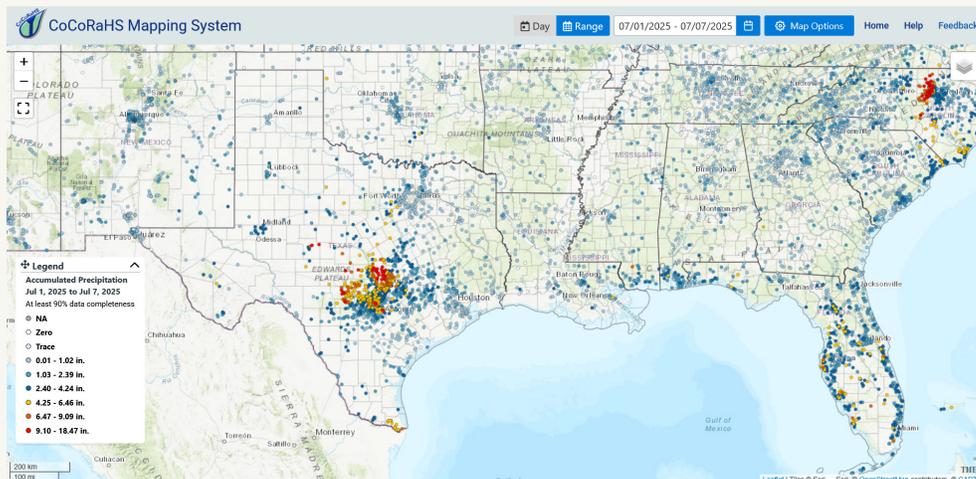
California has been experiencing a megadrought – a decades-long lack of significant precipitation. Despite this, the West Coast sometimes experiences torrential downpours, a phenomenon that meteorologists call an atmospheric river. This occurs when there is a narrow band of concentrated water vapor in the lower atmosphere that moves from the ocean to the coast. It results in intense rain when it reaches land. This can cause flooding and mudslides. A recent event happened in mid-November 2025. Some areas received 3 to 8 inches in a single week; in other, nearby areas, far less.

Another extreme rain event occurred in Texas Hill Country during early July 2025. Some areas received more than a half foot of rain; other areas nearly a foot and a half. This led to widespread flash flooding.



California locations that received the greatest rainfall during November 2025 were at the eastern edge of the San Joaquin Valley and isolated places on the coast. Credit: CoCoRaHS volunteers.

There are a limited number of National Weather Service stations. Precipitation in a single area can vary quite a bit between locations that are several miles apart. Supplementing the NWS measurements with those from volunteer observers allows for a much better understanding of how extreme rain can impact local communities differently. For more information on how to participate, visit: [cocorahs.org](http://cocorahs.org)



— Michael L. Umbricht

Extreme rainfall in Texas during the first week of July 2025. Credit: CoCoRaHS volunteers.