

Heavy Precipitation Event in Louisiana Captured by USCRN

The U.S. Climate Reference Network (USCRN) station located in the Upper Ouachita National Wildlife Refuge near Monroe, LA, was near the center of a major multi-day heavy rain event in early March 2016 that caused severe flooding in much of northern Louisiana and portions of surrounding states. Beginning on March 8th at 6:50 PM local time, 13.17 inches (334.6 mm) of rain fell in a 24-hour period, a once in every 500-year return period event (Table 1). Interestingly, the largest one-hour total during the event was only 1.62 inches (41.2 mm), which is simply a once a year return period event. It was the steady and persistent rainfall over an extended period of time (Figure 1) that made the event so unusual; a literal atmospheric river of moisture from the tropics moved north into the region. The rain did not stop within that 24-hour period, but the rate did decrease later. After 7 days, a total of 18.20 inches (462.3 mm) was received, which was also a once every 500-year return period event.

| Duration | Date/Start (CST) | Amount (Inches) | Return Period (Years) |
|------------|------------------|-----------------|-----------------------|
| 5 Minutes | Mar 8 / 7:30 PM | 0.42 | 1 |
| 10 Minutes | Mar 8 / 7:30 PM | 0.73 | 1 |
| 15 Minutes | Mar 8 / 7:30 PM | 0.98 | 2 |
| 30 Minutes | Mar 8 / 7:25 PM | 1.33 | 1 |
| 60 Minutes | Mar 9 / 4:00 PM | 1.62 | 1 |
| 2 Hours | Mar 8 / 7:25 PM | 2.39 | 2 |
| 3 Hours | Mar 9 / 3:35 PM | 3.08 | 5 |
| 6 Hours | Mar 9 / 11:15 AM | 4.72 | 10 |
| 12 Hours | Mar 9 / 10:35 AM | 7.11 | 50 |
| 24 Hours | Mar 8 / 6:50 PM | 13.17 | 500 |
| 2 Days | Mar 8 / 12:15 PM | 16.30 | 500 |
| 3 Days | Mar 8 / 3:20 PM | 17.75 | 500 |
| 4 Days | Mar 8 / 5:30 PM | 18.12 | 500 |
| 7 Days | Mar 6 / 8:40 PM | 18.20 | 500 |

Table 1. The heaviest amounts of precipitation for periods of a given length during the event, and the expected return period for each based on local historical records.

From March 1-15, 2016, the precipitation total reached 18.34 inches (465.8 mm), which is the wettest month since the Monroe USCRN station was installed in January 2003. The second wettest month was October 2009, when 18.00 inches (457.3 mm) fell. Interestingly, tropical cyclones did not impact the station precipitation totals in either month. The climatological Spring of 2016 at Monroe is already the third wettest climatological Spring for the station, and that is only 15 days into the three-month season from March to May.

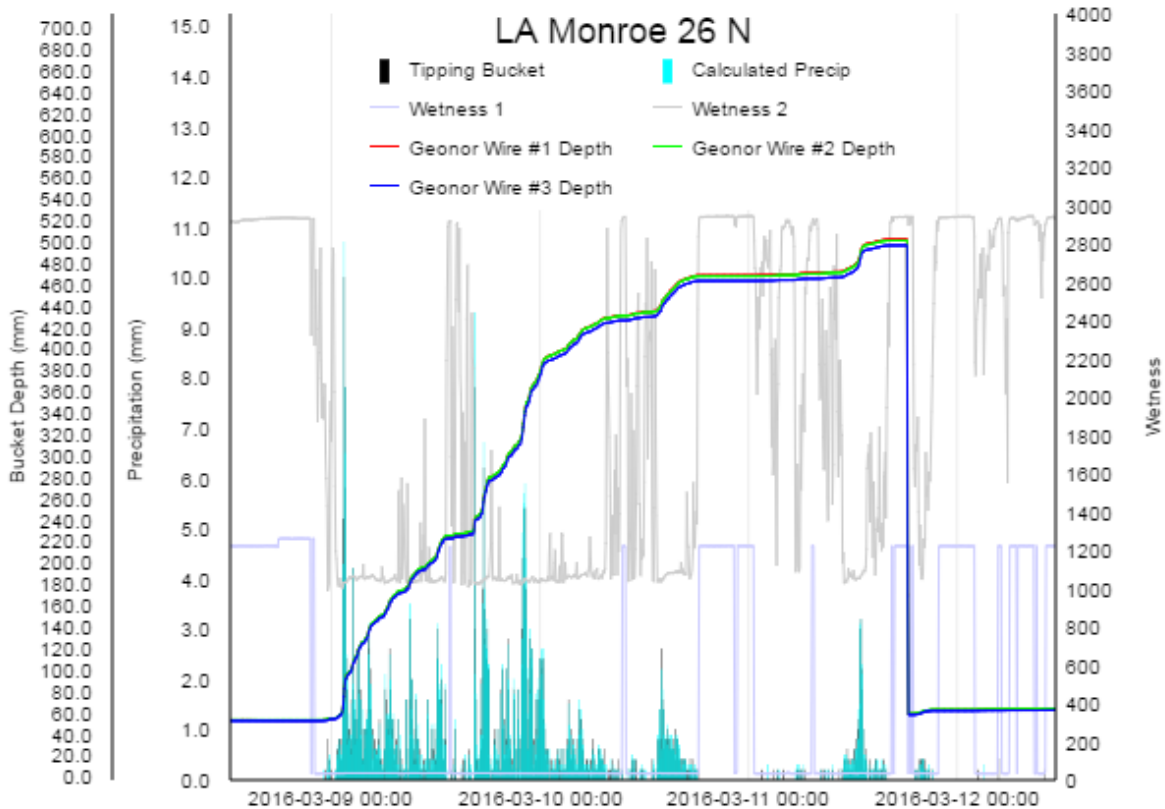


Figure 1. Precipitation accumulation in the LA Monroe 26 N weighing bucket gauge, with individual 5-minute values in light blue and the depth of precipitation in the gauge indicated by the rising solid trace. The gauge was drained during a break toward the end of the event to avoid overtopping the 600 mm capacity.

The USCRN station was located near the core of heaviest rain during this event (Figure 2), but several locations reported even larger precipitation totals. The Monroe Regional Airport measured 20.26 inches (514.6 mm) in four days, while a cooperative program observer nearby recorded 26.96 inches (684.8 mm) of rain in 6 days. This amount represented fully half of the normal annual precipitation being received in those 6 days, and was considered by experts to represent a one in one thousand year event. Many locations in Louisiana and southeastern Texas experienced record flooding, exceeding that seen in tropical storm landfalls. By mid-month, most rivers in northern Louisiana have started to recede, but the flood wave continued south, causing new flooding several days after the last drop of rain fell. The Sabine River, which separates Louisiana and Texas, reached record highs downstream from the Toledo Bend Dam, which released water at a record rate to avoid the dam being overtopped. The record flooding by the Sabine River (Figure 3) caused tremendous damage in Deweyville, TX, and cut off Interstate 10, the main east-west route through the region. A Major Disaster Declaration was issued on March 13 for the initial flooding in Louisiana, and this is expected to be expanded in geographic scope.

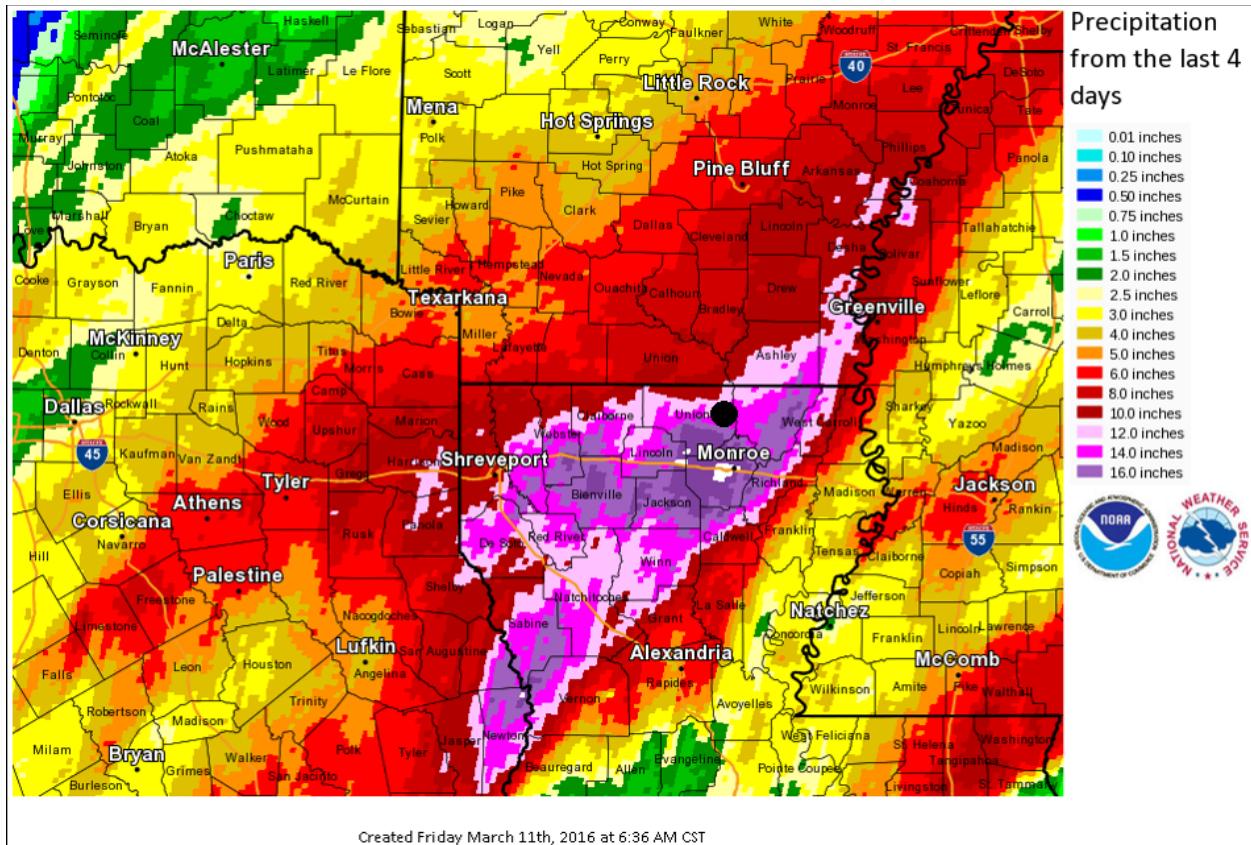


Figure 2. National Weather Service radar estimated precipitation totals for the event of March 8-11, 2016. The black dot is the location of USCRN stations LA Monroe 26 N.

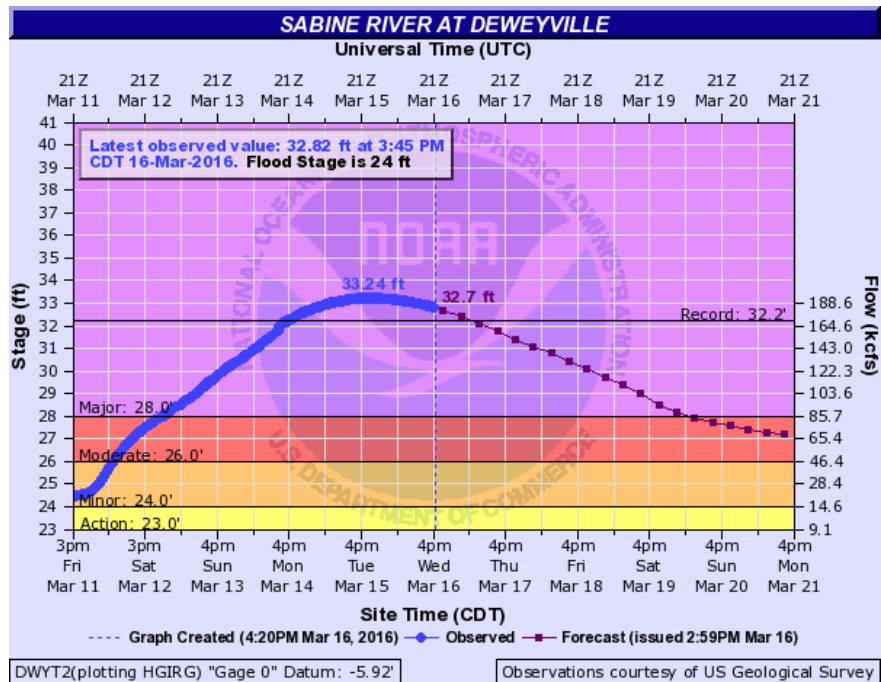


Figure 3. Record flooding at Deweyville, TX, on the Sabine River 4 days after the rain.