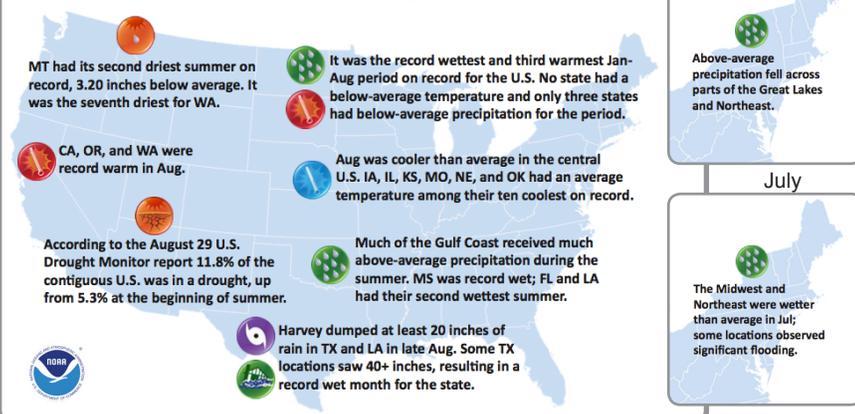
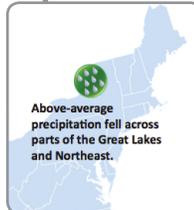


## National - Significant Events for June–August 2017

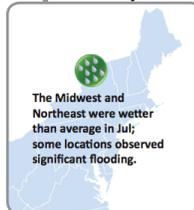
### U.S. Selected Significant Climate Anomalies and Events for August and Summer 2017



### June



### July



## Highlights for the Northeast

Summer precipitation was variable, with drought developing in Maine and extreme rain and flash flooding in other areas. See Regional Impacts for details.

During summer, the Northeast averages 28 tornadoes (based on NOAA's Storm Prediction Center data from 1989–2013). This summer, 38 tornadoes touched down in the region: 11 in Pennsylvania, 10 in New York, 7 in Maine, 4 in West Virginia, 3 in Maryland, 2 in New Jersey, and 1 in Delaware. See Regional Impacts for details.

Several records were set during summer.

- LaGuardia Airport, NY: tied its warmest June day on record with a high of 101°F on June 13
- Caribou, ME: tied its warmest June low temperature on record with a low of 69°F on June 19
- Erie, PA: wettest June on record with 8.46 inches
- Dulles Airport, VA: wettest July on record with 8.80 inches
- Harrisburg, PA: wettest July day on record with 4.71 inches on July 23

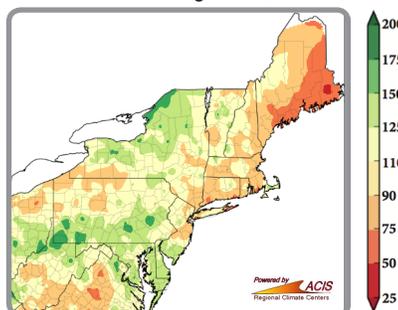
During summer 2017, sea surface temperatures (SSTs) across the Western North Atlantic were above normal, with the greatest anomalies of up to 2.7°F in an area 500 miles east of Georges Bank. SSTs this summer were not as warm as in summer 2016 when the extent and intensity of the warm waters was much greater.

The contiguous U.S. had its 15th warmest summer on record with an average temperature of 72.7°F, 1.3°F above the 20th century average. The U.S. had its 20th warmest June with an average temperature of 70.3°F, 1.9°F above average, and its 10th warmest July with an average temperature of 75.7°F, 2.1°F above average. August's average temperature of 72.0°F was 0.1°F below average. Globally, it was the third hottest June on record, the second hottest July, and the third hottest August. According to NOAA, August was "the 392nd consecutive month with a global temperature at least nominally above the 20th century average." The contiguous U.S. had its 16th wettest summer on record, receiving 9.19 inches of precipitation, 0.87 inches above average. June precipitation totaled 3.00 inches, 0.08 inches above average, while July precipitation totaled 2.74 inches, 0.04 inches below average. The U.S. had its seventh wettest August with 3.34 inches of precipitation, 0.70 inches above average.

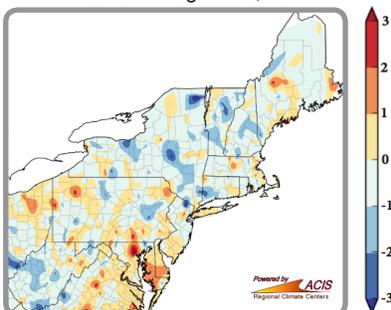
## Regional - Climate Overview for June–August 2017

### Temperature and Precipitation Anomalies

Percent of Normal Precipitation (%)  
June 1–August 31, 2017



Departure from Normal Temperature (°F)  
June 1–August 31, 2017



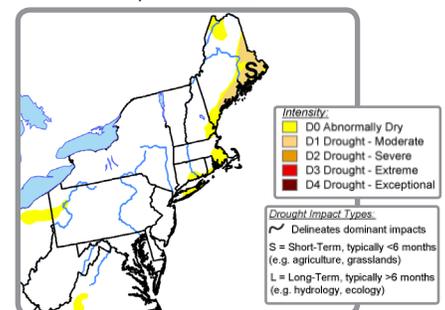
The Northeast received 107% of normal rainfall during summer. Seven of the twelve states were wetter than normal, with Delaware having its 13th wettest summer since 1895. June precipitation was 105% of normal, with six dry states and six wet states. Delaware and Maryland had their 7th and 19th driest Junes on record, respectively, while Vermont had its 8th wettest. The Northeast had its 18th wettest July with 120% of normal rainfall. This July ranked among the top 20 wettest for all six wetter-than-normal states. August precipitation was 92% of normal, with eight states seeing below-normal precipitation. Rhode Island had its 12th driest August on record, while Delaware had its 16th wettest.

Summer was 0.3°F colder than normal for the Northeast. Nine of the twelve states experienced below-normal temperatures. In June, the Northeast was 0.2°F warmer than normal. Nine states were warmer than normal, with Delaware having its 10th warmest June since 1895. The Northeast was 0.2°F warmer than normal in July. Six states were warmer than normal, with Maryland and Delaware ranking this July among their top 20 warmest on record. In August, the Northeast was 1.3°F colder than normal. It was the first time since March 2015 that all 12 states had a monthly average temperature that was colder than normal.

Normals based on 1981–2010

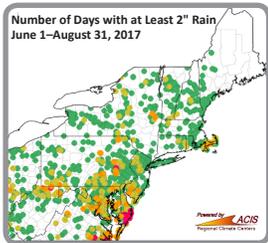
### Drought in the Northeast

U.S. Drought Monitor  
September 21, 2017



The U.S. Drought Monitor released on June 8 showed the Northeast was free of abnormal dryness and drought. However, abnormal dryness was introduced in southern portions of the region mid-month and in Maine and Long Island by early July. As of July 4, 3% of the Northeast was abnormally dry. During July, dryness eased in southern areas, but expanded in Maine, southeastern New Hampshire, and Long Island. Moderate drought was introduced in Maine in early August. As of August 3, 2% of the Northeast was in moderate drought and 8% was abnormally dry. During August, dry conditions expanded in parts of New England. By September 7, 5% of the Northeast was in moderate drought and 8% was abnormally dry.

## Regional - Impacts and Updates for June–August 2017



### Extreme Precipitation

During summer, there were multiple rainfall events across the region that [exceeded the 100-year return period](#), meaning rainfall of that magnitude has a 1% chance of occurring in a given year. For instance, on July 23, 4.27 inches of rain fell in one hour at the Harrisburg International Airport, PA. The daily total of 4.71 inches made it the site's fifth wettest day on record. Other examples include: 3.91 inches of rain in two hours in Centreville, MD, on July 17 and 6.78 inches of rain in 16 hours on July 24 in Hammond, NY. Though it did not exceed the 100-year return period, Atlantic City, NJ, had its second wettest July day on record with 5.41 inches of rain on July 29.

The downpours and wet conditions resulted in [flash flooding](#), which damaged numerous buildings and roads. For example, flooding caused at least [\\$4 million in damage to 67 roads](#) in New Hampshire and almost [400 homes had high water damage](#) in Marshall County, WV. Torrential rain caused the West Canada Creek near Kast Bridge, NY, to have its [ninth highest crest](#) on record on July 1. Agriculture was also affected. The wet conditions led to flooded and rutted fields, delayed hay harvest, [reduced wheat quality](#), stunted corn growth in wet fields, and an [increased diseases in fruits](#). In central New York, farmers were not able to get [thousands of acres of crops](#) planted in time. Runoff from the heavy rains contributed to high levels of bacteria along the southern New Jersey coastline, causing [15 beaches to close](#), as well as harmful algal blooms on multiple waterways including two of New York's [Finger Lakes](#). High water levels continued to cause flooding and erosion along the Lake Ontario and St. Lawrence River shorelines. In Sodus Point, NY, boats could not access the lake because docks and ramps were under water, leading to reduced [tourism revenue](#). Flooding damage was estimated to be up to \$2 million in Ogdensburg, NY, with some waterfront areas possibly [closed until next year](#). It was estimated that flooding caused [millions of dollars in damage](#) in Oswego, NY.



Left: Harmful algal bloom on Cayuga Lake, NY. Credit: Finger Lakes Land Trust/ Jeff Katris.

Right: Lake Ontario flooding in Sodus Point, NY. Credit: 2017 Coastal Flooding Survey Project. Cornell University and NY Sea Grant.



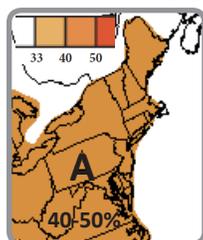
Above: EF-2 tornado damage in Erie County, NY, on July 20. Credit: NWS BUF.

### Severe Weather

In Maine, a state that averages only two tornadoes a year, the Gray National Weather Service office issued seven tornado warnings, their greatest number ever for any day or year. Five weak (EF-0 or EF-1) [tornadoes actually touched down](#), the most Maine has had in a single day. In mid-to late July, EF-2 tornadoes touched down in eastern Maryland and western New York, [severely damaging homes](#). The [New York tornado](#) also caused up to \$3 million (estimated) in damage at the Erie County Fairgrounds. The last EF-2 or stronger tornado in Maryland was in 2004 and in New York was in 2014. Clarion County, PA, had [six tornadoes](#) from January through mid-August 2017; however, between 1950 and 2016 the county only had eight tornadoes. Severe storms also produced straight line winds of up to 100 mph and large hail. The hail damaged crops in parts of the region.

## Regional - Outlook for Autumn 2017

### Temperature and Precipitation



A: Above-normal  
EC: Equal chances of above-, near-, or below-normal  
#: Probability of above-normal

Normal October–December average temperatures range from the low 30s in northern New England to the low 50s in the Mid-Atlantic. NOAA's [Climate Prediction Center](#) (CPC) is calling for an increased chance of [above-normal temperatures](#) (left map) for the Northeast for October–December.

The precipitation outlook calls for equal chances of below-, near-, or above-normal precipitation for the entire Northeast. Normal October–December precipitation ranges from less than 8 inches in portions of western New York and eastern West Virginia to more than 14 inches in portions of New England and southeastern and northern New York.

While ENSO-neutral conditions were in place as of mid-September, CPC said there is an [increasing chance \(55–60%\) of La Niña](#) during autumn and winter 2017–18.

The [U.S. Seasonal Drought Outlook](#) indicated that drought conditions are expected to ease in Maine due to "the approach of the cold season and a climatological increase in widespread storm activity."

### Atlantic Hurricane Season

	Through Sep. 20	Aug. 9 Outlook	Average Season
Number of Named Storms	13	14-19	12
Number of Hurricanes	6	5-9	6
Number of Major Hurricanes	4	2-5	3

NOAA's 2017 [Atlantic hurricane season outlook](#) called for an active season. Already by mid-September, there have been 13 named storms, close to the season average. The outlook updated on August 9 calls for 14–19 named storms, including 2–5 major hurricanes, slightly more than the May outlook. Factors contributing to the updated forecast include storm activity through early August, the decreased likelihood of El Niño, warmer-than-normal waters in the tropical Atlantic Ocean, and computer model forecasts. The Atlantic hurricane season runs from June 1 to November 30, with the peak of the season from mid-August to late October.

In mid-August, Hurricane Gert caused high waves, rough surf, and rip currents along the Northeast coastline. Two major hurricanes, Harvey and Irma, were record setting. Based on preliminary data, Hurricane Harvey dumped up to 51.88 inches of rain on southeastern Texas in late August, which could become the [all-time greatest rain total](#) from a single storm in the continental United States. In early September, Hurricane Irma maintained max winds of 185 mph for 37 hours, longer than any other cyclone across the globe according to [a report from Colorado State University](#). These two storms did not significantly impact the Northeast.

## Northeast Region Partners

National Oceanic and Atmospheric Administration  
[www.noaa.gov](http://www.noaa.gov)

National Centers for Environmental Information  
[www.ncei.noaa.gov](http://www.ncei.noaa.gov)

National Weather Service, Eastern Region  
[www.weather.gov](http://www.weather.gov)

NOAA Fisheries Science Centers and Regional Offices, Atlantic  
[www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

Office for Coastal Management  
[www.oceanservice.noaa.gov](http://www.oceanservice.noaa.gov)  
NOAA Research, Climate Program Office and Geophysical Fluid Dynamics Lab  
[www.research.noaa.gov](http://www.research.noaa.gov)

NOAA National Sea Grant Office  
[www.seagrant.noaa.gov](http://www.seagrant.noaa.gov)  
NOAA's North Atlantic and Great Lakes Regional Collaboration Teams  
[www.regions.noaa.gov](http://www.regions.noaa.gov)

Climate Prediction Center  
[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)  
National Operational Hydrologic Remote Sensing Center  
[www.nohrsc.noaa.gov](http://www.nohrsc.noaa.gov)

Northeast Regional Climate Center  
[www.nrcc.cornell.edu](http://www.nrcc.cornell.edu)

National Integrated Drought Information System  
[www.drought.gov](http://www.drought.gov)

Consortium on Climate Risk in the Urban Northeast  
[www.ccrun.org](http://www.ccrun.org)

Cooperative Institute for North Atlantic Research  
[www.cinar.org](http://www.cinar.org)

Northeast Region State Climatologists  
[www.stateclimate.org](http://www.stateclimate.org)

Mid-Atlantic RISA  
[www.midatlanticrisa.org](http://www.midatlanticrisa.org)