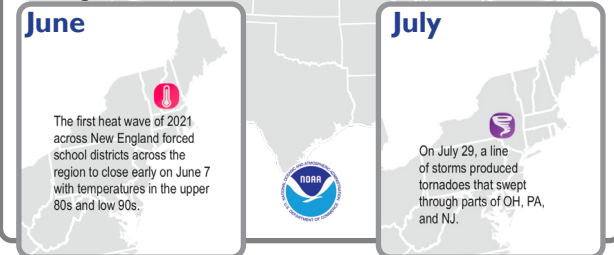


National Significant Events – June–August 2021

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

On Aug 22, Henri made landfall in RI as a strong tropical storm and brought 5- to 9-inch rainfall totals to parts of NY, NJ, and PA. Many locations experienced flash flooding, evacuations, road closures, and water rescues.



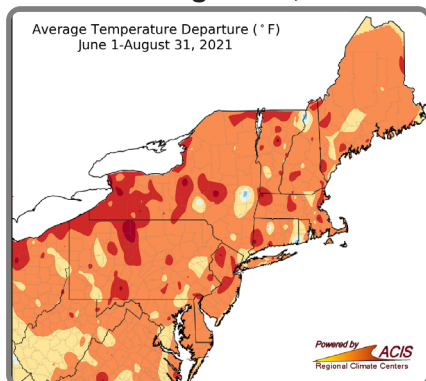
The contiguous U.S. had its hottest summer on record with an average temperature of 74.0°F, 2.6°F above the 20th-century average. Average temperatures for June, July, and August were 4.2°F above average (record warm), 1.9°F above average (13th warmest), and 1.9°F above average (14th warmest), respectively. Globally, it was the fifth-warmest June, the warmest July, the sixth-warmest August, and the fourth-warmest summer. The contiguous U.S. had its eighth wettest summer with 9.48 inches of precipitation, 1.16 inches above average. June, July, and August precipitation were exactly average, 0.58 inches above average (sixth wettest), and 0.47 inches above average (14th wettest), respectively.

Highlights for the Northeast

- Abnormal dryness and **drought expanded** during **June**. Conditions **eased** in some areas but **persisted** in other areas in **July** and **August**.
- It was the **hottest June** for Massachusetts, New Hampshire, Rhode Island, and sites such as Boston, MA, and Portland, ME. Sites such as Newark, NJ, and Concord, NH, [set/tied their records](#) for **greatest number of June days** with a high of at least 95°F. It was the **hottest August** for New Hampshire and Vermont and sites such as Buffalo and Syracuse, NY. Some sites had their **greatest number of August and/or summer days** with a low of 70°F or higher. Boston had its **hottest summer**.
- During **summer**, there were **many severe weather and flash flooding events**. For instance, [19 tornadoes touched down](#) on **July 29**, with Bucks and Philadelphia counties (PA) seeing their **first F3/EF-3 tornado** since 1950. Another tornado led the local National Weather Service office to issue its **first-ever “particularly dangerous situation”** tornado warning.
- On several **July** days, parts of the Northeast experienced **poor air quality** and [hazy skies](#) due to smoke from western U.S. and Canada **wildfires**.
- It was the **wettest July on record** for Massachusetts, New York, and sites such as Worcester, MA; Concord, NH; Binghamton, NY; and Huntington, WV. The **number of days with precipitation** was also **record-setting** at some sites. Huntington also had its **wettest summer** on record.
- In July, **Tropical Storm Elsa** dropped heavy rain on the region. In August, back-to-back tropical systems, **Fred and Henri**, produced heavy rain, **significant flooding**, and multiple **tornadoes**.
- For **more information** on the events above, see **Regional Impacts**.

Regional Climate Overview – June–August 2021

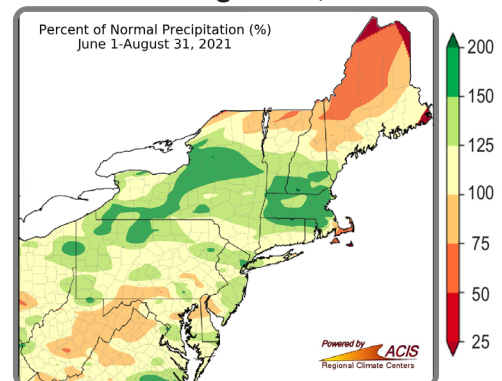
Temperature Departure from Normal (°F) June 1–August 31, 2021



Climate normals based on 1991–2020 data; rankings based on 1895–2021.

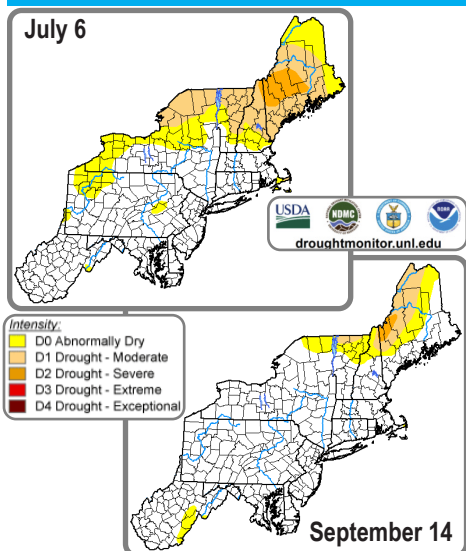
The Northeast had its **sixth-hottest summer** at 1.5°F above normal. This summer was among the 20 hottest for all 12 states. It was the **fourth-hottest June** at 2.5°F above normal. This June was among the 20 hottest for 11 states, with three being **record hot**. **July** was 1.0°F cooler than normal, in the **middle third** of all years. However, Delaware had its 14th warmest July. It was the **second-hottest August** at 3.0°F above normal. This August was among the 20 hottest for all states, with two being **record hot**.

Precipitation Percent of Normal (%) June 1–August 31, 2021



The Northeast had its **10th-wettest summer** with 116% of normal rainfall. This summer was among the 20 wettest for seven states. **June** rainfall was 75% of normal, in the **driest third** of all years. This June was among the 20 driest for three states. It was the **second-wettest July** with 154% of normal rainfall. Nine states had one of their 20 wettest Julys, with two being **record wet**. West Virginia had its 15th-driest July. It was the **20th-wettest August** with 122% of normal rainfall. It was among the 20 wettest Augusts for four states.

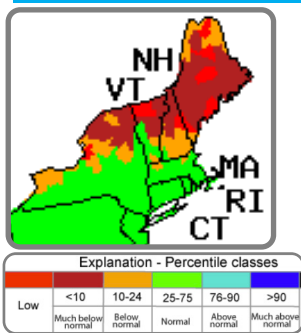
Regional Climate Overview – June–August 2021



Drought in the Northeast

As of **June 1**, the [U.S. Drought Monitor](#) showed 3% of the Northeast in moderate drought and 37% as abnormally dry. During **June**, **severe drought** was introduced and **moderate drought** and **abnormal dryness** expanded in New England and New York. The [July 6 U.S. Drought Monitor](#) showed 4% of the Northeast in severe drought, 18% in moderate drought, and 19% as abnormally dry. Many areas saw **plentiful rainfall** during **July**, alleviating dryness; however, **drought persisted** in far northern New England, New York, and Cape Cod, which missed out. The [August 3 U.S. Drought Monitor](#) showed 2% of the Northeast in severe drought, 8% in moderate drought, and 18% as abnormally dry. During **August**, **dryness persisted** in Cape Cod and northern parts of New York and New England. **Dryness** temporarily expanded in southern parts of the region in early August but **eased** by month's end due to heavy rainfall, particularly from tropical systems Fred and Henri. The [September 7 U.S. Drought Monitor](#) showed 2% of the Northeast in severe drought, 9% in moderate drought, and 6% as abnormally dry. During the first half of **September**, wet weather helped **improve drought and abnormally dry conditions** in parts of the Northeast. For current conditions, see the [Northeast DEWS Dashboard](#).

Regional Impacts and Updates – June–August 2021



June average streamflow.
Credit: USGS.

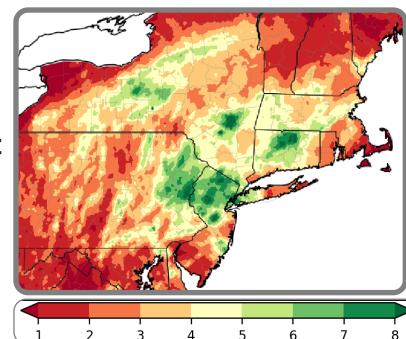
Summer Precipitation

Drought and abnormal dryness expanded during **June** in New York and New England. **Daily low streamflow and/or groundwater level records** were [set in several areas](#). Some wells in Maine and Vermont **ran dry**, and **water restrictions** continued for dozens of New England locations. Some farmers reported [water shortages](#) and crop losses. **Increased wildfire risk** continued in northern New England, with [more fires than usual](#). Some training sessions for Vermont firefighters were [delayed in order to save water](#), while New Hampshire officials [purchased new equipment](#) and [performed controlled burns](#) to **prevent and fight wildfires**. The dry conditions allowed **large populations of caterpillars to proliferate**, further taxing drought-stressed trees, and contributed to an [outbreak of browntail moth caterpillars](#) in Maine.

There were several **extreme rainfall events** in **July**. On **July 8**, **significant flash flooding** in the New York City area **inundated subway stations**, submerged roads, and led to [multiple water rescues](#).

Tropical Storm Elsa dropped up to 6 inches of rain from **July 8–10**, with the **greatest totals** in Maine and Connecticut, where [flash flooding occurred](#). Elsa produced **two tornadoes** and straight-line winds of up to 100 mph [in New Jersey](#). On **July 12**, a **Flash Flood Emergency** was declared for southeastern Pennsylvania and western New Jersey when up to 10 inches of rain fell in a few hours. **Floodwaters swamped buildings** and [feet of water covered roads](#), stranding vehicles and leading to water rescues. This July was among the 10 wettest on record for some sites, with a few being **record wet**. Some sites saw their **greatest number of July days** with measurable rainfall and/or at least an inch of rain, which also [ranked among the greatest](#) on record for all months. Some [northern New England farmers](#) went from dealing with **drought conditions** to **overly wet conditions**. The rain [reduced the need for irrigation](#) and mitigated **fire danger**. **Drought, low streamflow, and below-normal groundwater levels** persisted in northern New York, interior northern New England, and [Cape Cod](#), where less rain fell. In mid-July, daily **record low streamflow** was [measured in northern New Hampshire](#), while daily **record high flows** were measured in southern New Hampshire.

August was [wetter than normal](#) for many areas, due in part to tropical systems [Fred and Henri](#). From **August 18–19**, the remnants of **Tropical Storm Fred** and a frontal system dropped **4–8 inches of rain** on [parts of New York](#), Connecticut, and Pennsylvania, resulting in flash flooding. A **Flash Flood Emergency** was declared for [Steuben County, NY](#). Fred's remnants spawned **10 weak tornadoes**, [seven of which](#) were in Pennsylvania. **Henri** moved through the region from **August 21–24**, making **landfall** as a tropical storm in **Westerly, RI**, on August 22. The storm dropped **5–9 inches of rain** on parts of southeastern New York, New Jersey, and eastern Pennsylvania. Central Park saw 1.94 inches of rain in an hour and its **wettest two-day period for August** with 7.12 inches. [Multiple locations](#) experienced **flash flooding, which was significant** in [northern/central New Jersey](#). In southern New England, Henri's winds gusted to 70 mph and its remnants spawned three tornadoes. The Northeast also saw several other instances of severe weather and flash flooding during August, resulting in a few deaths and injuries. However, **dryness persisted** in parts of New York, Cape Cod, and northern New England, where below-normal streamflow and [groundwater levels](#), **record low** in some cases, continued.

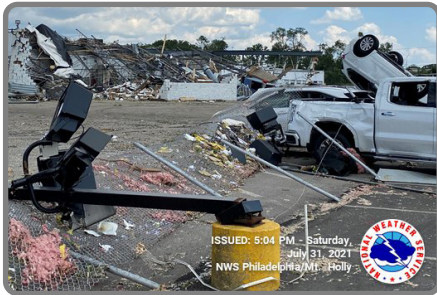


Rainfall totals from Fred and Henri.
Credit: NRCC

Regional Impacts and Updates – June–August 2021

June Heat

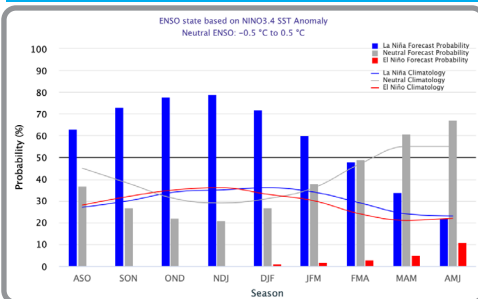
June 5–9 was **unusually warm**, setting many daily maximum and high minimum temperature records, causing schools to [send students home early](#) and contributing to **poor emergence of some seed potatoes** in northern Maine. **June 26–30** was **even hotter**. On June 30, Newark, NJ, had its **hottest June day** with a high of 103°F, beating the previous record of 102°F recorded a day earlier, while Boston, MA, tied its hottest June temperature of 100°F. It was the **first time on record** that Portland, ME, had three consecutive days with a high of at least 95°F during June, tying the site's all-time streak. In addition, sites including Syracuse, NY; Harrisburg, PA; Concord, NH; and Dulles Airport, VA, set/tied their **warmest minimum temperatures for June**.



July Tornadoes

On **July 1**, the region saw **four tornadoes**, including two in Washington, D.C., which was [an unusual occurrence](#). On **July 29**, severe storms produced 13 tornadoes in Pennsylvania, six in New Jersey, and one in Maryland. The **strongest tornado**, a rare EF-3 in southeastern Pennsylvania, caused [substantial structural damage](#), destroyed cars, and injured five people (picture left). An EF-2 tornado in Ocean County, NJ, [damaged multiple homes](#) and resulted in minor injuries. Pennsylvania saw **three times as many tornadoes** in a single day than it typically [averages for July](#). New Jersey's six tornadoes was the [second most tornadoes in a day](#) for the state. New Jersey saw nine tornadoes in July, the **most for any month since 1950** and tying as the third highest annual total on record.

Regional Outlook – Autumn 2021



ENSO

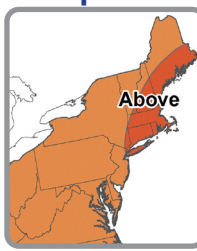
During August, **ENSO-neutral conditions** continued in the equatorial Pacific Ocean. NOAA's [Climate Prediction Center indicates](#) a transition to La Niña is likely during the next few months, with a 70% to 80% chance of La Niña during winter 2021–22.

Atlantic Hurricane Season

	2021 Atlantic Season Updated Outlook	1991-2020 Average Season	2021 Atlantic Season Outlook from May
Number of Named Storms	15-21	14	13-20
Number of Hurricanes	7-10	7	6-10
Number of Major Hurricanes	3-5	3	3-5

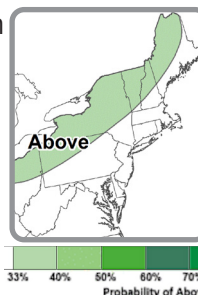
[NOAA's updated 2021 Atlantic hurricane season outlook](#) from early August indicates an **above-average season is most likely**, with 15–21 named storms, of which 7–10 could become hurricanes, including 3–5 major hurricanes. Factors such as warm sea surface temperatures, reduced vertical wind shear, and an enhanced west Africa monsoon favor an above-average season. There have already been 14 named storms this season, "with Hurricane Elsa becoming the **earliest 5th named storm on record**." The [13th named storm](#), Mindy, formed on September 8, **well ahead of the average date of October 24**. The season runs from June 1–November 30, peaking from mid-August–late October. For more information on the hurricane outlook, see the NOAA Eastern Region [webinar recording from August 2021](#).

Temperature and Precipitation



Normal October–December average temperatures range from the low 30s in far northern New England to the upper 40s in the region's southeastern corner. [NOAA's Climate Prediction Center \(CPC\)](#) favors **above-normal temperatures** for the entire Northeast for **October–December** (map above).

Above-normal precipitation is favored for the interior Northeast for **October–December** (map below), which [could ease dryness](#) in northern New England. **Equal chances** of below-, near-, or above-normal precipitation were forecast for the rest of the region. Normal October–December precipitation ranges from less than 9 inches in western New York and eastern West Virginia to more than 15 inches in northern New York and parts of northern New England.



Northeast Partners

- [National Oceanic and Atmospheric Administration](#) offices including:
- [NESDIS/National Centers for Environmental Information](#)
- [NWS, Eastern Region](#)
- [NWS, Climate Prediction Center](#)
- [NWS, National Operational Hydrologic Remote Sensing Center](#)
- [NMFS, Fisheries Science Centers and Regional Office, Atlantic](#)
- [NOS, Office for Coastal Management](#)
- [NOS, National Centers for Coastal Ocean Science](#)
- [OAR, Climate Program Office and Geophysical Fluid Dynamics Lab](#)
- [OAR, National Sea Grant Office](#)
- [NOAA's North Atlantic and Great Lakes Regional Collaboration Teams](#)
- And the following other offices:
- [Northeast Regional Climate Center](#)
- [National Integrated Drought Information System Consortium of Climate Risk in the Urban Northeast](#)
- [Cooperative Institute for the North Atlantic Research](#)
- [Northeast Region State Climatologists](#)
- [Mid-Atlantic RISA](#)