

National Significant Events – September–November 2018

Selected U.S. Significant Climate Anomalies and Events for November and Autumn 2018

Much of the East Coast was wetter than average for Nov. DE, MD, and MA were record wet.



September

Record warmth impacted parts of the East. DE, FL, MD, OH, and WV were record warm. 20 states had record warm overnight lows.



October

The first half of October was unusually mild, but the second half was cold. A rare tornado outbreak occurred in the Northeast on October 2.

The average autumn temperature for the contiguous U.S. was 0.2°F above the 20th century average. Average temperatures for September, October, and November were 2.9°F above average, 0.3°F below average, and 1.6°F below average, respectively. It was the fourth warmest September and the third coldest November. Globally, it was the sixth warmest September and the second warmest October. The contiguous U.S. had its second wettest autumn with precipitation 2.73 inches average. September, October, and November precipitation was 1.0 inch above average, 1.21 inches above average, and 0.41 inches above average, respectively. It was the third wettest September, the sixth wettest October, and the third wettest November.

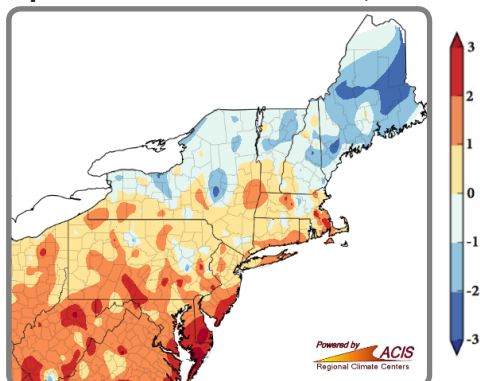
Highlights for the Northeast

- While Northern New York and northern New England experienced **dry conditions** during **autumn**, the rest of the region was **exceptionally wet**. In fact, the Northeast had its **wettest autumn** since 1895. Ten major climate sites also had a record wet autumn. 2018 is the wettest year on record for Baltimore, MD; Washington, D.C.; and Charleston, WV.
- Twenty-six **tornadoes** touched down in the Northeast during **October**, **which is very unusual**. See Regional Impacts for more details.
- The remnants of two **hurricanes**, Florence in September and Michael in October, brought heavy rain to the region. Totals from Florence were up to 6 inches, while Michael dumped 4-8 inches on parts of the Mid-Atlantic. The rain caused flooding and led to water rescues and some evacuations.
- An early season **winter storm** from **November 15–16** brought rain, ice, and up to 18 inches of snow to the region. Newark, NJ, and Kennedy Airport, NY, had their greatest 1-day November snowfall. It was Central Park, NY, and Newark's earliest 6+ inch snowstorm. Thundersnow occurred in southern New England. The storm caused major travel disruptions and contributed to a snowier-than-normal November for many areas, including Kennedy Airport, which was record snowy.
- An unseasonably cold air mass settled over the Northeast for the Thanksgiving holiday from **November 22–24**. Temperatures were as much as **35°F below normal**. These were some of the all-time coldest November temperatures on record for the Northeast. Six major climate sites had their **all-time coldest November temperature** on record.

Regional Climate Overview – September–November 2018

Temperature

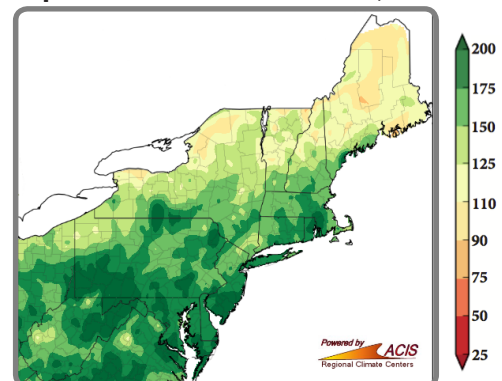
Departure from Normal (°F)
September 1–November 30, 2018



Autumn averaged out to be 0.3°F above normal for the Northeast. It was the third warmest **September** at 4.3°F above normal. Delaware, Maryland, and West Virginia were **record warm**. Elkins, WV, and Atlantic City, NJ, had their warmest Septembers on record. **October** was 0.4°F warmer than normal. Erie, PA, tied its all-time warmest October temperature on record. **November** was 3.9°F colder than normal, with all states being colder than normal.

Precipitation

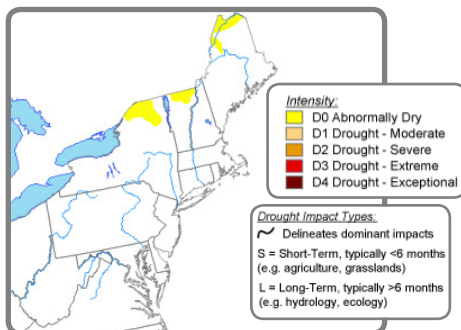
Percent of Normal (%)
September 1–November 30, 2018



The Northeast had a record wet **autumn** with 148% of normal precipitation. Maryland, New Jersey, Rhode Island, and West Virginia were **record wet**. It was the third wettest **September** with 169% of normal precipitation. West Virginia was **record wet**, and five major climate sites had their wettest September on record. **October** precipitation was 115% of normal. **November** precipitation was 161% of normal. Delaware, Maryland, and Massachusetts were record wet.

Regional Climate Overview – September–November 2018

Drought in the Northeast U.S. Drought Monitor December 18, 2018



The U.S. Drought Monitor released on **September 6** showed 8% of the Northeast in a severe or moderate drought and 13% of the region as abnormally dry. These areas included parts of New York and New England. Much-needed rain during the month improved conditions slightly, except in eastern Maine and northern New York. In early **October**, 5% of the Northeast was in a moderate or severe drought and 17% of the region was abnormally dry. While rainfall during the month allowed dry conditions to slowly ease, streamflow and groundwater levels remained below normal in parts of northern New York and northern New England. The U.S. Drought Monitor released on **November 1** showed 2% of the Northeast in a moderate or severe drought and 9% of the region as abnormally dry. Due to a wet November, drought was erased by mid-month and abnormal dryness continued to shrink. The U.S. Drought Monitor released on November 29 showed 4% of the Northeast as abnormally dry. In **December**, conditions generally remained unchanged, with lingering long-term abnormal dryness in northern New York and northern New England.

Regional Impacts and Updates – September–November 2018



Wet corn fields in central New York on September 20 (above) and December 3 (below).
Credit: Margaret Smith and Brian Richards.



Fall Conditions

A large portion of the Northeast experienced **extremely wet** conditions during **autumn**. One of the consequences of heavy rain in parts of Massachusetts was the discharge of [sewage into waterways](#). The wet autumn also **affected agriculture**. Growers reported saturated, muddy fields, which led to [harvest delays](#). Excess moisture led to mold growth and sprouting of [soybeans](#) and [some corn](#). In central New York, there were [prevented planting claims](#) because fall grains could not be planted. Reports from central Pennsylvania noted quality issues with apples and concerns that the apples would [rot in storage](#). Early season snow also affected agriculture.

However, areas such as northern New York and parts of northern New England [missed out](#) on the heavy precipitation. These areas experienced **drought** and abnormally dry conditions. Farmers in northern New York reported decreased hay and pasture production. In Aroostook County, ME, dry conditions contributed to a [hay shortage](#) and allowed bedstraw, an invasive plant species, to flourish, reducing the number of acres of hay for some farmers. Springs and private wells [continued to run dry](#) in parts of northern Vermont during September. One of Stowe's two primary wells was around ten feet lower this year (mid-September) compared to last year. Water levels at two dams on the Lamoille River were [too low to make electricity](#). Companies that drill, deepen, or replenish wells saw increased business. The wet November helped dry conditions improve in these areas.

State	Prelim. Oct. 2018 Tornado Count	Avg. Oct. Tornado Count*	Avg. Annual Tornado Count*
Pennsylvania	14	0	15
New York	5	0	10
Connecticut	3	0	2
Massachusetts	3	0	1
Rhode Island	1	0	0

*data from NOAA's Storm Prediction Center

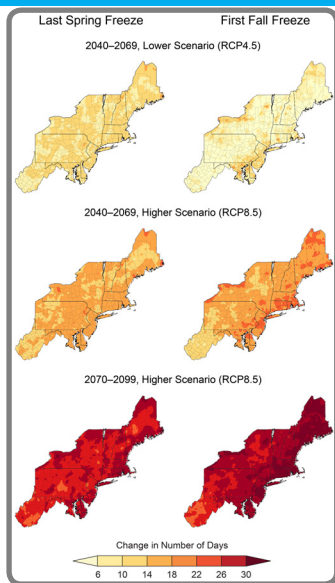
Rare October Tornadoes

On **October 2**, 14 tornadoes touched down in Pennsylvania, making it the state's largest single-day **tornado outbreak** since June 2, 1998. From 1950–2017, only 13 October tornadoes [had been reported](#) in the state. The last time the state had an EF-2 tornado in October was more than 25 years ago. The same storm system also produced three tornadoes in New York and two in Connecticut. The most recent October tornado in Connecticut was in 1979. The tornadoes downed hundreds of trees and caused structural damage. On **October 20**, another tornado touched down in New York. On **October 23**, storms spawned three tornadoes in Massachusetts and one in Rhode Island. Only 11 tornadoes had been reported since 1950 in Rhode Island, with only one of those being an October tornado. The tornado on the 23rd is the latest tornado in the calendar year for the state. For Massachusetts, there were only seven other October tornadoes, with the last one occurring in 1970. Tornadoes struck again on **October 29**, with one in Connecticut and one in New York.



Damage from an EF-2 tornado on Oct. 2 in Pennsylvania. Credit: NWS CLE

Regional Impacts and Updates – September–November 2018



Projected shifts in dates of last spring freeze and first fall freeze. Source: [NCA4](#).

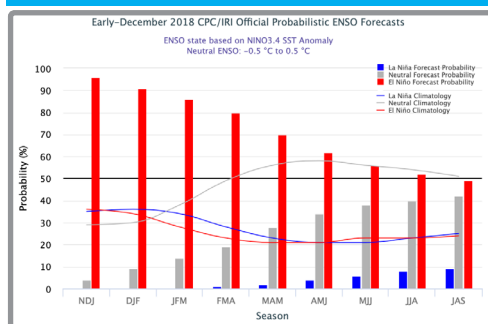
National Climate Assessment

The Fourth National Climate Assessment was released in late November. This report discusses climate change impacts, risks, and adaptations. There are [five key messages for the Northeast](#):

1. Mild winters and the early arrival of spring are adversely affecting the economies, ecosystems, and environments of rural areas. Further changes are expected.
2. The economy, ecosystem services, and livelihoods of coastal communities are threatened by warming ocean temperatures, sea level rise, and ocean acidification. Adaptation to increasing climate risks will determine environmental and societal outcomes.
3. Infrastructure, economies, and historic sites in the urban Northeast are being negatively impacted by the changing climate. These impacts are expected to become more common.
4. Warmer temperatures, extreme weather, sea level rise, and reduced air and water quality present threats to human health. These threats will vary across the region with individual and community demographics.
5. Northeast communities are already planning for and adapting to climate change.

For more information, see a recording of NOAA's Eastern Region Climate Services [December webinar](#).

Regional Outlook – Winter 2018–19



ENSO

ENSO-neutral conditions continued in November. NOAA's Climate Prediction Center indicates there is a 90% chance that El Niño [will form and continue during winter](#) and a 60% chance it will continue into spring. This El Niño is expected to be weak. For more information on El Niño's potential impact on winter conditions, see the [Northeast El Niño Impacts and Outlook](#) and NOAA's Eastern Region Climate Services [November webinar](#).

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](#)

[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](#)

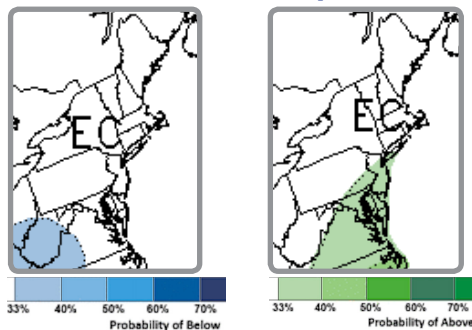
[National Integrated Drought Information System Consortium of Climate Risk in the Urban Northeast](#)

[Cooperative Institute for the North Atlantic Research](#)

[Northeast Region State Climatologists](#)

[Mid-Atlantic RISA](#)

Temperature and Precipitation



Normal January–March average temperatures range from the teens in northern New England and northern New York to the 40s in southern parts of Delaware and Maryland. NOAA's Climate Prediction Center (CPC) is calling for equal chances of below-, near-, or above-normal temperatures (left map) for January–March for most of the Northeast. However, there is an increased chance of below-normal temperatures for parts of West Virginia.

For precipitation (right map), CPC favors an increased chance of above-normal precipitation for much of Maryland, all of Delaware, southeastern Pennsylvania, most of New Jersey, and western Long Island. Equal chances were forecast for the rest of the region. Normal January–March precipitation ranges from less than 6 inches in portions of central and northeastern New York to more than 13 inches in southeastern Massachusetts and higher elevations of West Virginia.

The seasonal outlooks combine many factors including dynamical models, the effects of long-term trends, and soil moisture, in addition to past El Niño patterns. While the outlooks resemble weather patterns typically seen during El Niño winters, they may not match exactly.