Quarterly Climate Impacts and Outlook

Northeast Region

December 2019

National Significant Events – *September–November 2019*

Selected U.S. Significant Climate Anomalies and Events for November and Autumn 2019

A strong low-pressure system off the East Coast brought coastal flooding and beach erosion from the NC Outer Banks to New England, ice and snow to the Northeast Nov 17-19.

September

Southern parts of the region experienced a hot, extremely dry September, with drought developing.

October

A "bomb cyclone" in the Northeast Oct 16–17 brought wind gusts up to 90 mph. More than a half-million residents were without power and several new Oct low-pressure records were set.

Record heat blanketed the Northeast the first week of Oct, shattering some all-time Oct heat records.

The average autumn temperature for the contiguous U.S. was 53.9°F, 0.4°F above the 20th-century average. Average temperatures for September, October, and November were 3.7°F above average (second warmest), 1.8°F below average, and 0.5°F below average, respectively. Globally, it was the warmest September, the second warmest October, the second warmest November, and the second warmest autumn. The contiguous U.S. autumn precipitation total was 7.46 inches, 0.58 inches above average. September, October, and November precipitation were 0.07 inches below average, 0.98 inches above average (eighth wettest), and 0.37 inches below average, respectively.

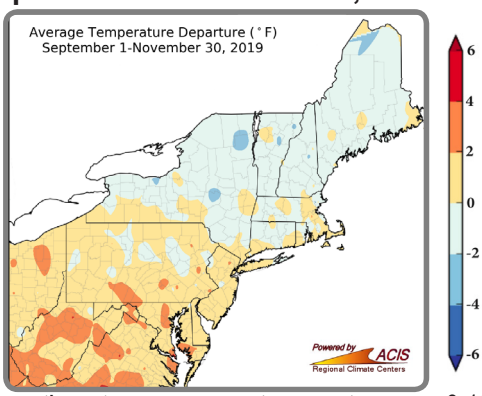
Highlights for the Northeast

- **September** was **hot and exceptionally dry** and **October** started with record-setting heat. **Drought** quickly developed in southern parts of the region. See Regional Impacts for details.
- Several **temperature and precipitation records** were set during autumn.
  - *Hottest September*: Beckley, Wheeling, Clarksburg, and Parkersburg (all in WV)
  - *All-time driest month*: Beckley and Alderson (WV)
  - *Driest September*: Huntington, Clarksburg, Lewisburg, Madison, Sutton Lake, and Princeton (all in WV), Aberdeen (MD), and Islip
  - *Hottest October day*: numerous climate sites including Wilmington, Baltimore, Newark, Kennedy Airport, Allentown, Beckley, and Syracuse
  - *Greatest number of October 90°F days*: Beckley, Elkins, Allentown, Atlantic City, and Kennedy Airport
  - *Hottest October min temperature*: Beckley and Erie
  - *Wettest October*: Burlington
  - *Hottest November day*: Caribou
  - *Coldest November day*: Watertown Airport (NY)
  - *Earliest subzero temperature*: Caribou and Watertown Airport
- Newport County, RI, had its **first tornado** since 1950 when an EF-0 touched down on October 2.
- A few **strong storms** affected the region in October. From **October 16–17**, a storm set **lowest October air pressure records** at Boston, Providence, Concord, and Portland. Another storm produced **record flooding** in New York from **October 31–November 2**. See Regional Impacts for details.

Regional Climate Overview – *September–November 2019*

Temperature

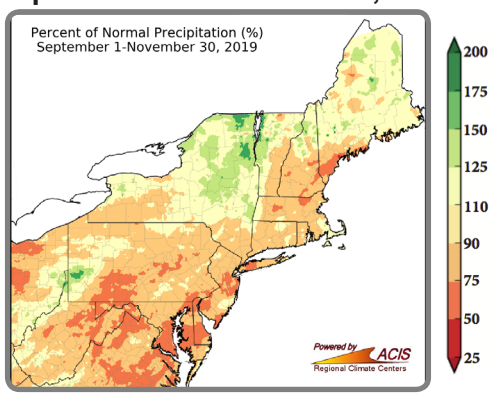
Departure from Normal (°F)
September 1–November 30, 2019



Climate normals based on 1981–2010 data; Rankings based on 1895–2019.

Precipitation

Percent of Normal (%)
September 1–November 30, 2019



The Northeast's **autumn** average temperature was 0.1°F **above normal**, ranking in the **middle third** of all years. This autumn was among the 20 warmest for three states. **September** was 2.1°F above normal, in the **warmest third** of all years. This September was among the 10 warmest for five states. It was the **13th warmest October** at 2.9°F above normal. Six states had a top 20 warm October. It was the **15th coldest November** at 4.4°F below normal. This November was among the 20 coldest for five states.

The Northeast saw 95% of normal precipitation during **autumn**, ranking in the **middle third** of all years. Vermont had its 19th wettest autumn. It was the **16th driest September** at 57% of normal. This September was record dry for West Virginia and among the 20 driest for six other states. It was the **ninth wettest October** at 151% of normal. Ten states had a top 20 wet October. **November** precipitation was 76% of normal, in the **middle third** of all years. This November was among the 20 driest for two states.

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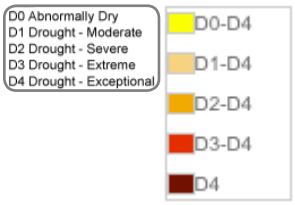
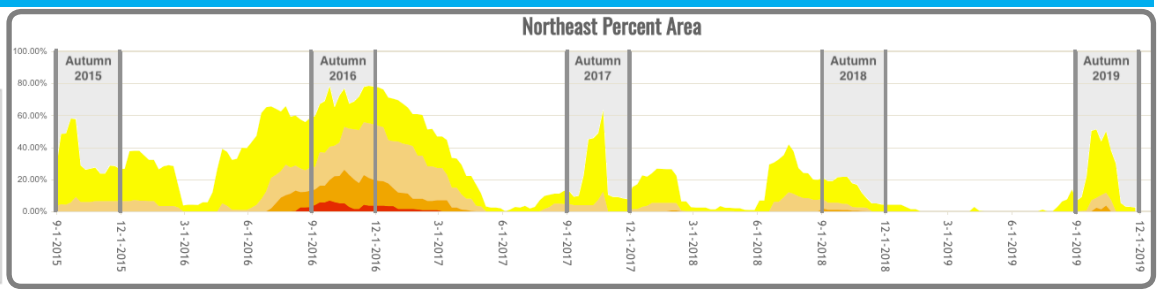
Regional Climate Overview – *September–November 2019*

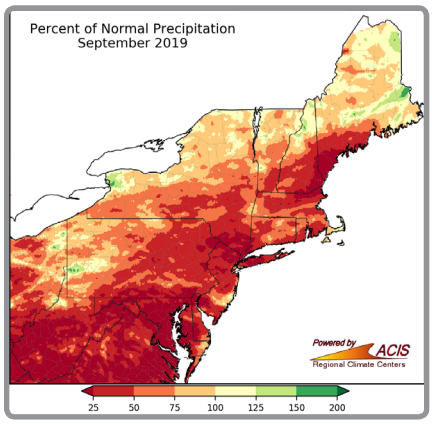
Drought in the Northeast





The **September 3** U.S. Drought Monitor showed a small portion (7%) of the Northeast was abnormally dry, but little rainfall and above-normal temperatures during the month caused **conditions to rapidly deteriorate**. By **October 1**, the U.S. Drought Monitor showed 8% of the Northeast was in a **moderate or severe drought** and 43% of the region was **abnormally dry**. Every state had areas of abnormal dryness, with moderate and/or severe drought in West Virginia, Maryland, Delaware, Pennsylvania, and New Jersey. **Sporadic rainfall and hot weather** during the first half of October generally led to **worsening conditions**, with drought peaking to include 12% of the region in the **October 15** U.S. Drought Monitor. However, **several rounds of rain** during the second half of October **quickly improved conditions**. The **October 29** U.S. Drought Monitor showed the Northeast was **free of drought** for the first time since early September but that 30% of the region was abnormally dry. **Conditions continued to improve** during **November** and **December**. By **December 17**, the U.S. Drought Monitor showed only small areas of abnormal dryness in southern Delaware and eastern Maryland, totaling less than 1% of the Northeast.

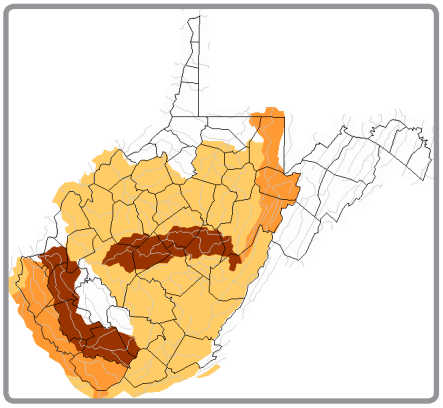
Regional Impacts and Updates – *September–November 2019*



Heat and Drought

Most of the Northeast had a dry, mild September, especially West Virginia, Maryland, and Delaware. Huntington recorded only one day with measurable precipitation (0.01 in.) from August 28–October 5 (38 days), its **longest such streak**, while Beckley and Elkins did not have a colder-than-normal day during September. Twenty-five of West Virginia's 55 counties had their **driest September** on record, with five of those counties seeing both their **driest and hottest September**. Anne Arundel County in Maryland also had its driest, hottest September. The Northeast experienced record-setting heat from October 1–3, with several locations having their **hottest October day** on record as highs soared into the 80s and 90s. Beckley and Elkins recorded their **first 90°F days in October**, also making it the latest 90°F day in the calendar year for both sites.

Drought quickly developed in West Virginia, Maryland, and Delaware in response to the prolonged dryness and heat. In early October, **topsoil moisture** was rated short or very short for all of Delaware and 97% of Maryland, while subsoil moisture was rated short or very short for all of Delaware and 94% of Maryland. In those states, it was **too dry to plant fall crops** unless irrigation was used. The dry conditions contributed to lower soybean yields but allowed for a **quick corn harvest**. For example, 72% of Maryland's corn had been harvested for grain in early October compared to the five-year average of 39%. Some West Virginia farmers **fed hay to livestock earlier than usual** because of poor pasture conditions. **Water levels** of rivers, creeks, ponds, and other bodies of water were unusually low in many of the drought-affected areas. In West Virginia, some farmers **hauled in water for livestock** because of dried-up water supplies. Those farmers can apply for assistance to purchase water tanks and fittings to provide water to livestock. In mid-October, the salt line on the Delaware River was 11 miles farther upstream than usual for October due to little rain and less runoff flowing downstream. The **dry conditions also affected fall foliage**, contributing to muted colors in some areas and, in a few cases, causing leaves to turn brown and drop before changing color. The **fall fire season started earlier** than usual, with several areas enacting burn bans. For instance, West Virginia had a **statewide burn ban** in effect from mid-September through early October. A State of Emergency was also in place in West Virginia from early October through early November. Although **above-normal rainfall in October alleviated drought conditions** in the Northeast, pockets of abnormal dryness lingered through November.



Average streamflow for September was below normal in West Virginia, with some areas experiencing moderate to severe hydrologic drought conditions. Image courtesy of USGS.

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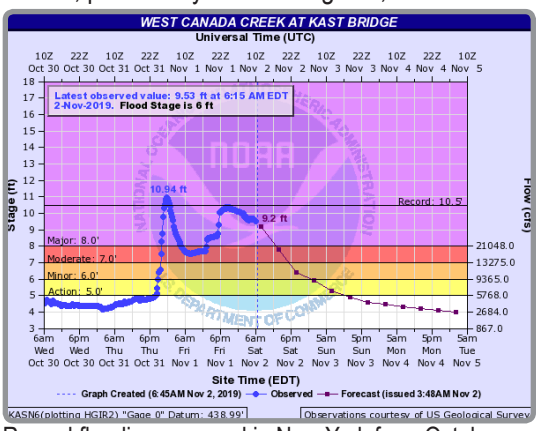
Regional Impacts and Updates – *September–November 2019*

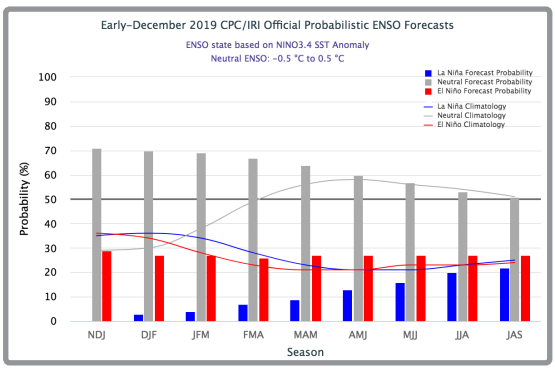
October Storms

A nor'easter, which became **Subtropical Storm Melissa**, stalled off the Northeast coast from **October 8–12**, creating **high water levels** and generally minor to moderate tidal flooding. However, a few sites along Maryland's Eastern Shore experienced **major flooding**, with the Chesapeake Bay at Cambridge, MD, reaching its fourth highest level since 1980. From **October 16–17**, a rapidly strengthening coastal storm brought **wind gusts of up to 90 mph** and up to 6 inches of rain, particularly to New England, eastern New York, and northern New Jersey. The powerful winds downed trees and power lines, damaging homes and cars, blocking roads, and closing schools. **More than 500,000 customers lost power** in the Northeast, with most in Massachusetts and Maine. From **October 20–21**, the **remnants of tropical storm Nestor** dropped up to 4 inches of rain on the southeast corner of the region. Another powerful storm brought up to 5 inches of rain from **October 31–November 1**. Flash flooding closed and washed out roads and led to water rescues. A **rare Flash Flood Emergency** was declared for Frankfort, NY. **Record-high water levels** were reached at four stream gauges in New York and one in Vermont. Severe thunderstorms produced an **EF-2 tornado** in Delaware County, PA, an **EF-1 tornado** in Morris County, NJ, and straight-line **winds of up to 110 mph** in Bucks County, PA. Across the Northeast, there were numerous downed trees and hundreds of thousands of power outages. The storm contributed to at least three deaths and several injuries.



Record flooding occurred in New York from October 31–November 1. Image courtesy of NOAA.

Regional Outlook – *Winter 2019–2020*



ENSO

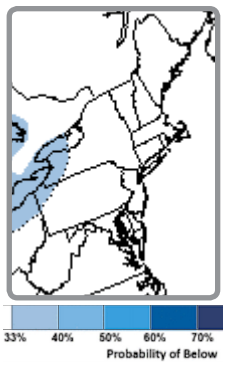
During November, El Niño-Southern Oscillation **(ENSO)-neutral conditions** were observed in the equatorial Pacific Ocean. NOAA's Climate Prediction Center indicates that ENSO-neutral conditions are expected to persist, with a 70% chance they will continue through winter 2019–20 and a 65% chance they will continue through spring 2020.

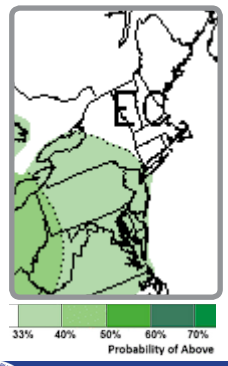
Temperature and Precipitation

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 favors **equal chances** of below-, near, or above-normal **temperatures** (top right map) for **January–March** for a majority of the Northeast. However, an **increased chance** of **below-normal temperatures** was forecast for northwestern Pennsylvania and western New York.

Increased chances of **above-normal precipitation** (bottom right map) were predicted for West Virginia, the Mid-Atlantic, Pennsylvania, and portions of New York for **January–March**. **Equal chances** of below-, near, or above-normal **precipitation** are favored for New England and the rest of New York. 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, soil moisture, and ENSO.





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

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