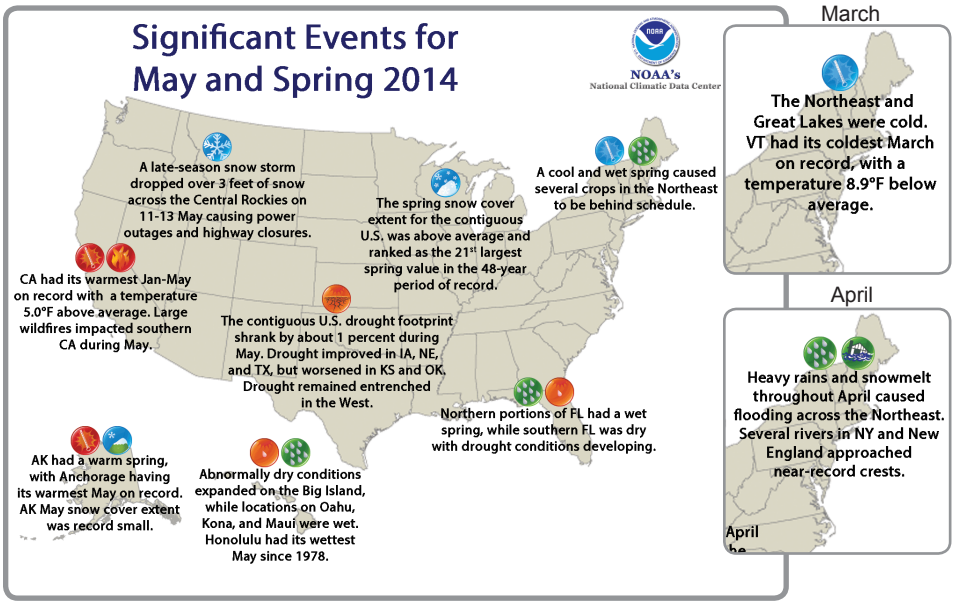
Quarterly Climate Impacts and Outlook

Eastern Region

June 2014

National - *Significant Events for March–May 2014*



The contiguous U.S. temperature for spring was 51.1°F, 0.2°F above the 20th century average. Spring precipitation for the contiguous U.S. totaled 8.01 inches, 0.07 inches below average. The U.S. Climate Extremes Index (an index that tracks extremes in temperature, precipitation, and drought across the U.S.) was near average for spring. On a regional scale, however, one-day precipitation extremes were record or near-record high in the East. Contiguous U.S. temperature-related energy demand during spring was 6% above average.

Highlights for the East

When Buffalo, NY, experienced blizzard conditions during a mid-March storm, it marked the first time the city has had blizzard conditions twice in a winter since recordkeeping began. March 25–26, a powerful nor'easter brought snow, wind gusts to 83 mph, and blizzard conditions for up to 7 hours to coastal Massachusetts and Maine.

More than a dozen tornadoes touched down in North Carolina and Virginia in April. The tornadoes caused extensive damage to hundreds of homes and structures. An EF-3 tornado on April 25 was the first EF-3 of 2014 and the latest occurring (into the calendar year) EF-3 or stronger tornado since 1950.

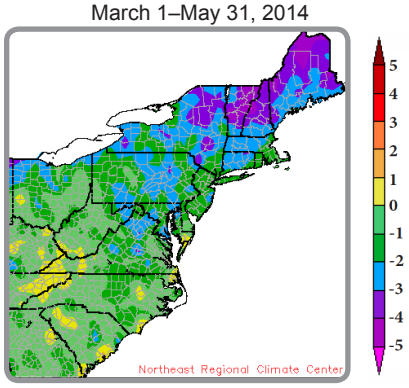
Rain and melting snow caused considerable flooding in upstate New York and New England in mid-April. In late April, heavy rain caused flash flooding that closed hundreds of roads from Washington, DC, to New York City.

From mid to late May, multiple rounds of severe weather hit the region. Extreme rainfall caused flash flooding that significantly damaged buildings and roads. Thirteen tornadoes, straight-line winds, and pea to baseball sized hail also caused damage. An insurance agency in South Carolina received 7,450 claims due to Memorial Day weekend storms.

Regional - *Climate Overview for March–May 2014*

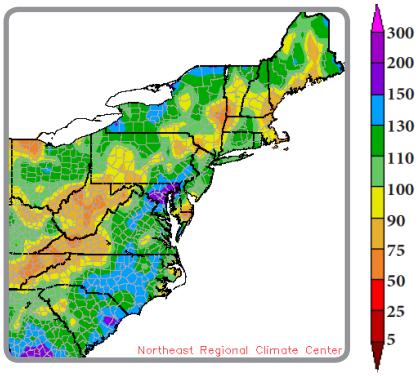
Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)
March 1–May 31, 2014



The average spring temperature in the Eastern Region was 48.6°F, 1.5°F below normal. March ranked eighth coldest on record for the region, with a departure of -6.3°F. Fifteen of 16 states ranked the month among their 20 coldest, with Vermont having its coldest March on record. Caribou, ME, and Washington Dulles, DC, were also record cold in March. The region ended April at 0.1°F above normal, with most states within 1.0°F of normal. May brought warmer weather, with the region 1.5°F above normal for the month. While temperatures were below normal regionally, globally March was the fourth warmest on record, and April tied for record warmest.

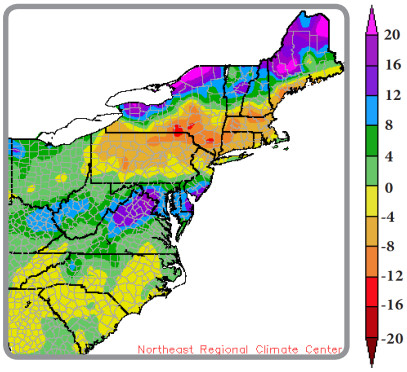
Percent of Normal Precipitation (%)
March 1–May 31, 2014



The Eastern Region wrapped up spring with 106% of normal precipitation. While the majority of states were within 10% of normal, Maryland had its 15th wettest spring since 1895. During March, the region saw 92% of normal precipitation. Ohio had its 18th driest March on record, while Rhode Island had its 17th wettest. April ended at 116% of normal for the region, with three states ranking this April among their top 20 wettest. Washington Dulles, DC, saw its wettest April on record. As for May, the region received 106% of normal precipitation. Maryland had its 18th wettest May on record.

March Snowfall

Departure from Normal Snowfall (in.)
March 1-31, 2014

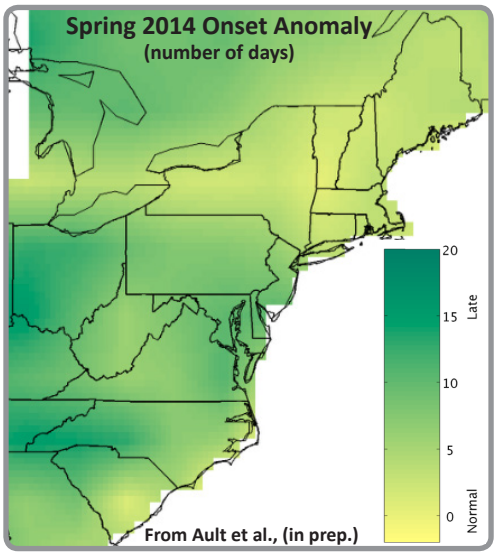


Snow totals ranged from well-above normal to well-below normal in March. Northern New England, northern New York, and parts of the Mid-Atlantic were snowier than normal, receiving an extra 12-24 inches. In fact, Washington Dulles, DC, had its snowiest March on record. The site saw 19.8 inches of snow during the month, surpassing the old record of 15.5 inches set in 1993. On the other hand, southern New England, southern New York, and Pennsylvania saw below-normal snowfall, receiving 8–16 inches less than normal. Most of Ohio and the Carolinas were within 4 inches of normal snowfall.

Normals based on 1981–2010

Contacts: Ellen Mecray (Ellen.L.Mecray@noaa.gov)
Samantha Borisoff (sgh58@cornell.edu)

Regional - *Impacts for March–May 2014*



The map shows the number of days later than normal of the onset of Spring 2014 based on average leaf-out dates of two honeysuckle species and one lilac species. (Reference: Schwartz, M. D., T. R. Ault, and J. L. Betancourt, 2013: Spring onset variations and trends in the continental United States: past and regional assess- ment using temperature-based indices. International Journal of Climatology, doi: 10.1002/joc.3625.)

Agriculture

Spring arrived later than normal for most of the region (see graphic to left) and the slow start took a toll on agriculture. A freeze in late March killed around 30% of South Carolina's peach crop, causing more than $27 million in revenue losses. According to a USDA Crop Report, as of April 30 only 17% of potatoes had been planted in Delaware compared to the five-year average of 71%, and in Pennsylvania, only 6% of cherry trees were in full bloom versus the five-year average of 76%. By mid-May, strawberry crops had been delayed one to three weeks regionwide, causing a shortened berry-picking season. While conditions improved by late May, some crops remained behind schedule.

Ocean Conditions

While recent sea surface temperatures have been cooler, 2013 temperatures were the second warmest since 1982. In fact, from 2004 to 2013, temperatures in the Gulf of Maine increased faster than 99.9% of the global ocean. The ecosystem responded to these unusual conditions in unexpected ways. The spring 2013 phytoplankton bloom was among the smallest in the satellite record (since 1998), and this may have impacted the zooplankton community. The phytoplankton community recovered and was back to historical conditions in the fall. One of the notable trends in the oceanographic conditions in the Gulf of Maine is a later appearance of fall-like temperatures.

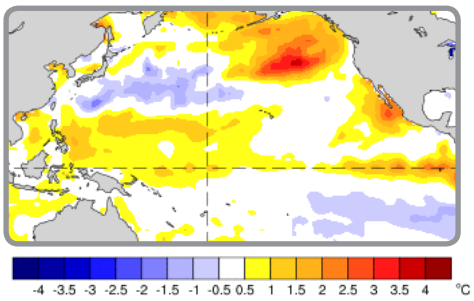
Climate Change

The third National Climate Assessment, released in early May, outlined the impacts of climate change in the U.S. According to the report, "The Northeast has experienced a greater recent increase in extreme precipitation than any other region in the U.S.; between 1958 and 2010, the Northeast saw more than a 70% increase in the amount of precipitation falling in very heavy events." Extreme precipitation, heat waves, sea level rise, and coastal and river flooding have already stressed and will increasingly compromise the Northeast's aging infrastructure. Ten of the 12 Northeast states have released, or are working on, statewide climate adaptation plans. Along with sea-level rise and extreme heat, Virginia and the Carolinas are also prone to floods and drought. These climate hazards, along with population growth and land use changes, may create challenges for maintaining an adequate water supply and water quality.

Regional - *Outlook for Summer 2014*

El Niño Outlook

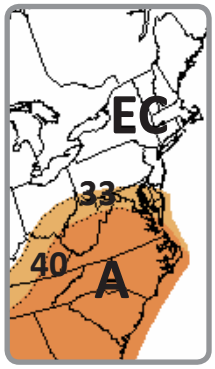
Sea Surface Temperature Anomaly (°C)
June 8-14, 2014



El Niño is characterized by unusually warm sea surface temperatures in the equatorial Pacific Ocean. While El Niño conditions remain neutral, these waters have been warming. In early June, NOAA indicated chances for El Niño development were 70% during summer and 80% during fall and winter. El Niño can influence weather patterns and the hurricane season. For example, El Niño causes increased vertical wind shear, can strengthen easterly trade winds, and can increase atmospheric stability—all of which hinder hurricane development and strength.

Three-Month Climate Outlooks

Valid for July–September 2014



EC: Equal chances of above-, near-, or below-normal
A: Above-normal
33/40: Probability of above- or below-normal temperatures

33% 40% 50% 60%
Probability of above-normal

Southern parts of the region have an increased chance of seeing above-normal temperatures from July through September, according to the Climate Predication Center's outlook. Elsewhere, equal chances of above-, near-, or below-normal temperatures were forecast.

The precipitation outlook for July through September indicates equal chances of above-, near-, or below-normal precipitation for the entire region.

2014 Atlantic Hurricane Season Outlook

NOAA is predicting a below- or near-normal 2014 Atlantic hurricane season with a 70% chance of each of the following: 8–13 named storms, 3–6 hurricanes, and 1–2 major hurricanes. While El Niño was the main driver of the outlook, it also took into account the predicted near- to below-normal sea surface temperatures and current conditions in the Atlantic hurricane main development region.

Eastern Region Partners

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Consortium on Climate Risk in the Urban Northeast
www.ccrun.org

Cooperative Institute for North Atlantic Research
www.cinar.org

Eastern Region State Climatologists
www.stateclimate.org

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