

Winter Review

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Quarterly Climate Impacts and Outlook

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Eastern Region March 2015

National - Significant Events for December 2014–February 2015

U.S. Selected Significant Climate Anomalies and Events February and Winter 2015



The contiguous United States had its 19th warmest winter on record at 2.1°F above the 20th century average. It was the 20th warmest December at 4.5°F above average, January was 2.9°F above average, while February was 0.7°F below average. Winter precipitation was 0.57 inches below average. December precipitation was 0.16 inches above average. It was the 18th driest January on record at 0.56 inches below average, while it was the 20th driest February at 0.43 inches below average. Winter snow cover extent was below the 1961–2010 average. It was the 14th smallest December snow cover extent on record (based on the 49-year satellite record) and the 18th smallest January snow cover extent. However, it was the 20th largest February snow cover extent.

Highlights for the East

Repeated blasts of Arctic air made it one of the coldest Februaries on record across the region. Erie, PA, tied its all-time record low of -18°F on the 16th, while Lynchburg, VA, set an all-time record low of -11°F on the 20th. Below-zero wind chills were reported as far south as the Carolinas. For more details, see Climate Overview below and Impacts on next page.

Multiple storms in February brought excessive snowfall to New England. Several sites set records such as all-time snowiest month, snowiest February, and snowiest winter. Boston, MA, had its all-time snowiest season (Oct–May) on record. See Impacts on next page for details.

From January 26 to 28, a nor'easter dropped up to 3 feet of snow on New York and New England. Worcester, MA, set its greatest one-day snowfall, 31.9 inches, on January 27. Hurricane-force winds caused coastal flooding and blizzard conditions.

A slow-moving storm from December 9 to 11 caused the largest storm surge along the New Jersey coast since Sandy in 2012.

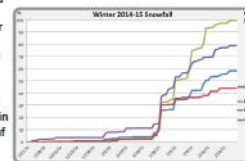
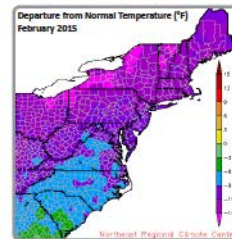
Two tornadoes touched down on December 24: an EF-1 in North Carolina and an EF-0 in Ohio. The storms damaged trees, cars, and buildings.

Regional - Impacts for December 2014–Winter 2015

Cold and Snow
A persistent trough over eastern North America allowed Arctic air and numerous storms to move through the region in late January and February. Exceptionally cold temperatures (see top right map) caused water main breaks and frozen pipes, while snowstorms contributed to frequent school and business closures, power outages, thousands of flight delays and cancellations, and a multitude of vehicle crashes. AAA Mid-Atlantic set a record for **greatest one-day call volume** when it received more than 12,000 roadside-assistance calls on February 17.

Ice buildup in waterways made navigation difficult, **slowed commerce**, and forced ferry services to be suspended. **Boat traffic was restricted** in parts of the upper Chesapeake Bay for about a week due to icy conditions. Railroad freight deliveries were delayed due to snow-covered side tracks and the need to use shorter trains. In New England, New York, and Ohio, the start of maple season was delayed by up to three weeks because cold and snow kept sap from flowing.

The cold and snow has been beneficial for one group: **several ski resorts reported an increase in revenue and total skier visits this year.** Sugarloaf Ski Resort, in Carrabassett Valley, ME, was closing in on its best season ever.



Warmer than normal sea surface temperatures off the New England Coast may have **helped intensify snowstorms** in that region, with central and eastern Massachusetts hit particularly hard. With back-to-back storms and cold air temperatures, snow accumulated quickly and snow removal efforts were hampered. During three weeks in February, more than 150 roofs collapsed or were on the verge of collapsing in Massachusetts. It was estimated that the snowstorms cost the state's economy at least \$1 billion. The Massachusetts Bay Transportation Authority rail service shut down for several days and experienced delays throughout February. Boston, MA, set numerous snowfall records when it received 64.8 inches of snow in February, which is more than the city normally gets in an entire snow season.

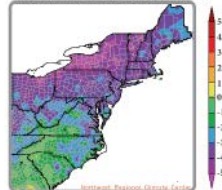
Boston, MA (records to 1891)

- Snowiest February
- February: all-time snowiest month
- Snowiest winter (Dec–Feb)
- Snowiest snow season (Oct–May)
- 2015: snowiest year
- Greatest 7-day, 14-day, 30-day, 2-month snowfalls
- Greatest number of 12+ inch snowfalls
- Greatest snow depth
- 6th snowiest January

Regional - Climate Overview for December 2014–February 2015

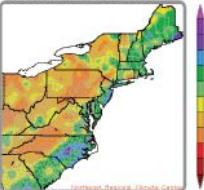
Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)
December 1, 2014–February 28, 2015



The Eastern Region's average temperature during winter was 28.0°F, 3.4°F below normal. New York and Ohio had their 17th and 20th coldest winter, respectively. This December was the region's 15th warmest on record at 3.6°F above normal. Fourteen states ranked the month among their top 20 warmest Decembers. January was 2.4°F colder than normal, while February was extremely cold at 11.3°F below normal. All states ranked the month among their top 13 coldest Februaries. Despite cold conditions in the Eastern Region, global temperatures are still warmer than normal. In fact, this February was the **second warmest on record globally**.

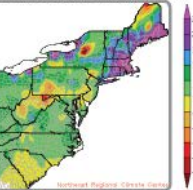
Percent of Normal Precipitation (%)
December 1, 2014–February 28, 2015



The Eastern Region ended winter with 95% of normal precipitation. In December, the region saw 107% of normal precipitation. Eleven states were wetter than normal, with three ranking this December among their top 20 wettest. Kennedy Airport, NY, had its wettest December on record. January was a drier month at 88% of normal precipitation. Eleven states saw below-normal precipitation; however, Delaware had its 18th wettest January on record. February was also a dry month at 78% of normal precipitation. Three states ranked the month among their top 20 driest.

Seasonal Snowfall

Departure from Normal Snowfall (in)
December 1, 2014–February 28, 2015

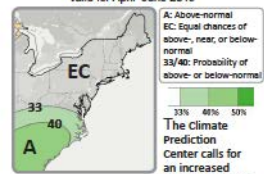


During winter, the Eastern Region generally saw near-normal to above-normal snowfall. Coastal New England was particularly snowy, seeing more than 30 inches above normal. In December, snowfall ranged from near normal to more than 12 inches below normal. Huntington, WV, had its least snowy December on record. January snowfall was within 6 inches of normal in most areas. However, coastal New England snowfall was 18 to 30 inches above normal. In February, snowfall ranged from near normal to more than 30 inches above normal. Coastal New England and much of upstate New York saw the greatest amounts.

Regional - Outlook for Spring 2015

Precipitation and Temperature

Valid for April–June 2015



Spring Flood Potential

Issued: March 19, 2015



Ohio, western West Virginia, southeastern Virginia, and eastern parts of the Carolinas may experience minor flooding due to spring rainstorms. In Ohio and West Virginia, river ice breakup and snow melt could also contribute to flooding. Heavy rainfall can cause river flooding at any time, even in areas where the flood potential is considered low. Local river forecasts can be found via NOAA's river forecast centers.

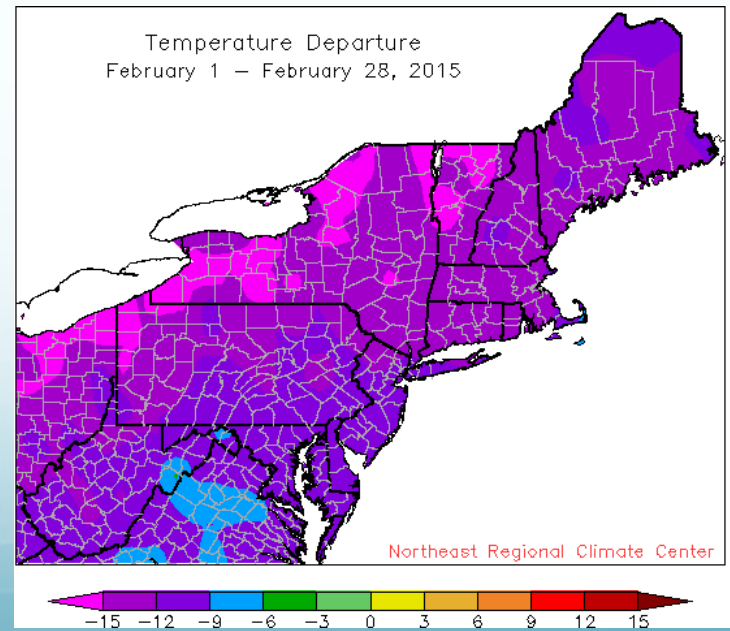
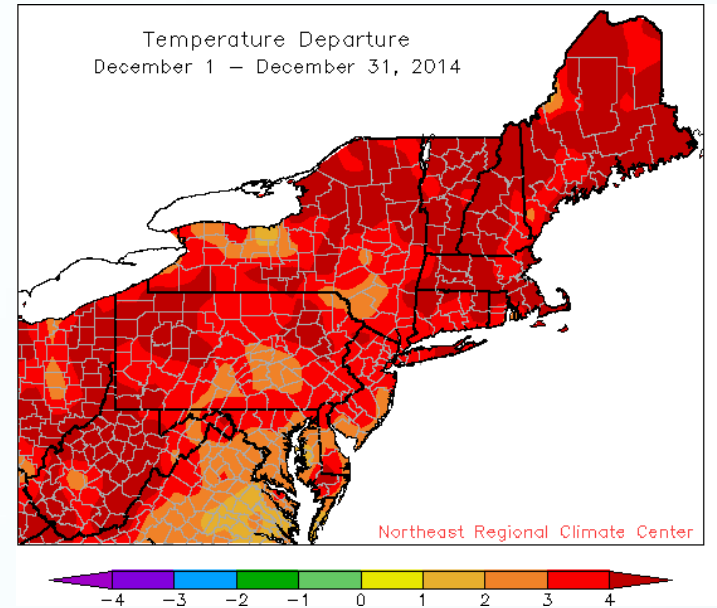
Eastern Region Partners

- National Oceanic and Atmospheric Administration
www.noaa.gov
National Climatic Data Center
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National Weather Service, Eastern Region
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NOAA Fisheries Science Centers and Regional Offices, Atlantic
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Climate Prediction Center
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National Operational Hydrologic Remote Sensing Center
www.noahrs.noaa.gov
Northeast Regional Climate Center
www.nrcc.cornell.edu
Southeast Regional Climate Center
www.sercr.com
National Integrated Drought Information System
www.drought.gov
Carolina Integrated Sciences and Assessments
www.cisa.sc.edu
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



Temperature

- December
 - 4.0° above normal
 - Ranked among top 20 warmest Decembers for all 12 states
- January
 - 3.2° below normal
- February
 - 12.7° below normal
 - Ranked among top 7 coldest Februaries for all 12 states
- Winter (averaged Dec-Feb)
 - 4.0° below normal



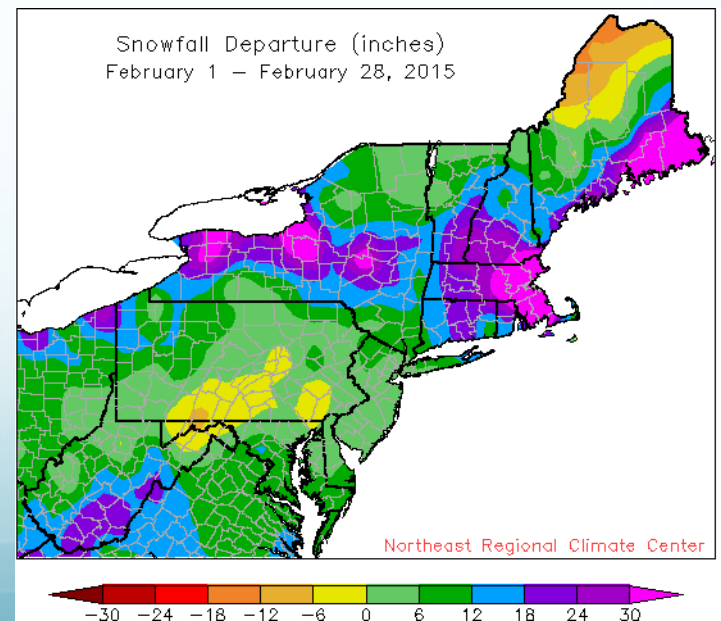
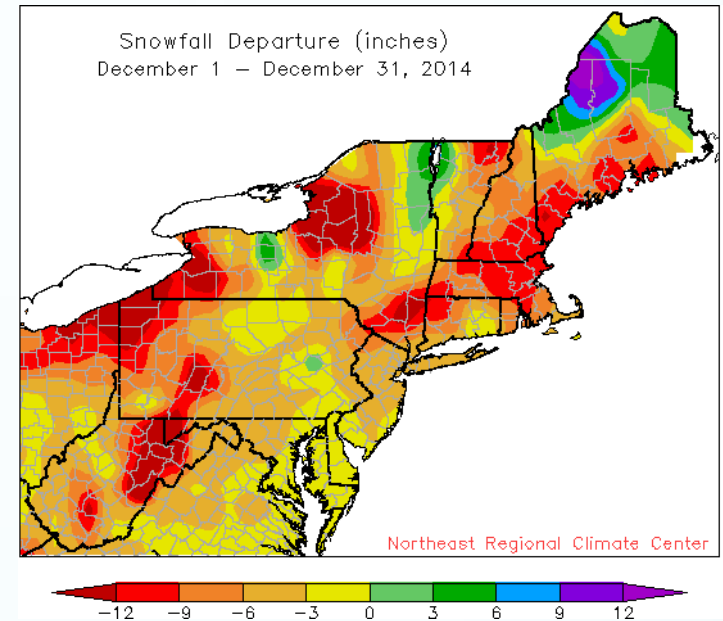
February Temperature

- Of the 35 major Northeast airport climate sites...
 - Departures ranged from 8.7° colder than normal in Washington, DC, to 16.9° colder than normal in Syracuse, NY
 - 15 sites had a record-cold February
 - Another 20 sites had top 15 coldest Februaries
 - 7 sites had all-time coldest month
 - Another 26 sites had top 10 all-time coldest months
 - Erie, PA, tied all-time lowest temp of -18°
 - 107 low temperature records were set/tied
 - 63 cold maximum temperatures records were set/tied

Area	Feb. 2015	Normal	Departure	Feb. Rank (coldest)	All-Time Rank (coldest)
Syracuse, NY	9.0	25.9	-16.9	1	1
Buffalo, NY	10.9	26.3	-15.4	1	1
Erie, PA	13.1	28.3	-15.2	1	2
Rochester, NY	12.2	26.4	-14.2	1	1
Hartford, CT	16.1	29.7	-13.6	1	1
Worcester, MA	14.2	27.0	-12.8	1	1
Binghamton, NY	12.2	24.7	-12.5	1	2
Bridgeport, CT	19.9	32.4	-12.5	1	1
Concord, NH	12.1	24.3	-12.2	1	8
Harrisburg, PA	20.9	32.9	-12.0	1	4
Portland, ME	13.8	25.5	-11.7	1	2
Williamsport, PA	18.1	29.7	-11.6	1	3
Caribou, ME	2.8	14.1	-11.3	1	4
Islip, NY	21.6	32.8	-11.2	1	1
Kennedy Ap, NY	24.5	34.9	-10.4	1	2
Providence, RI	18.4	32.0	-13.6	2	2
Albany, NY	12.7	25.9	-13.2	2	4
Pittsburgh, PA	18.3	31.1	-12.8	2	4
Boston, MA	19.0	31.7	-12.7	2	2
Elkins, WV	20.1	32.2	-12.1	2	7
Charleston, WV	25.7	37.7	-12.0	2	5
Huntington, WV	25.2	37.2	-12.0	2	8
Newark, NJ	22.6	34.6	-12.0	2	3
Allentown, PA	18.9	30.7	-11.8	2	3
LaGuardia Ap, NY	24.2	35.3	-11.1	2	3
Dulles Ap, VA	25.4	36.2	-10.8	2	5
Baltimore, MD	25.3	35.8	-10.5	2	4
Burlington, VT	7.6	21.5	-13.9	3	7
Central Park, NY	23.9	35.3	-11.4	3	5
Scranton, PA	17.5	28.8	-11.3	3	5
Beckley, WV	23.2	34.4	-11.2	4	9
Atlantic City, NJ	24.4	35.3	-10.9	4	7
Wilmington, DE	24.8	35.1	-10.3	4	9
Philadelphia, PA	25.8	35.7	-9.9	7	20
Washington, DC	30.3	39.0	-8.7	14	

Snowfall

- December
 - Near normal to 2 feet below normal
 - Huntington, WV had no measurable snow: least snowy December
- January
 - 1.5 feet below normal to 2+ feet above normal
 - Ranked among top 20 snowiest Januaries at 16 sites
- February
 - Near normal to 4.5 feet above normal
 - Ranked among top 20 snowiest Februaries at 23 sites
 - Ranked among top 20 all-time snowiest months at 14 sites
- Winter (snowfall accumulated Dec-Feb)
 - Near normal to 5.5 feet above normal
 - Ranked among top 20 snowiest winters at 15 sites



Significant Snow Events

- December 9-11 storm
 - Up to 2 feet of snow inland, 4-6 of rain coastal areas, coating of ice
 - Largest storm surge along the New Jersey coast since Sandy in 2012
- January 26-28 nor'easter
 - Up to 3 feet of snow
 - Hurricane-force winds: blizzard conditions, large waves, and coastal flooding
- February
 - Feb 1-2: up to 2 feet of snow
 - Feb 7-10: up to 3 feet of snow
 - Feb 14-15: up to 2 feet of snow



Credit: FEMA/Dominick Biocchi

Cold & Snow Impacts

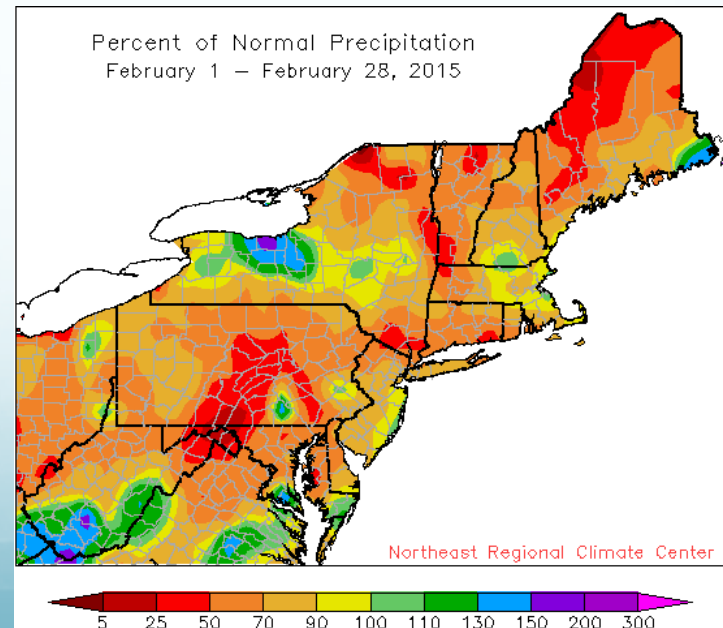
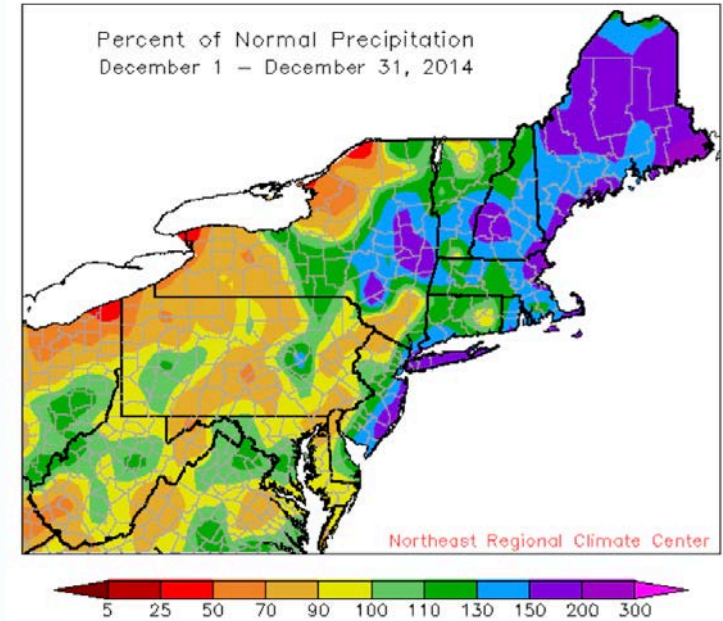
- Economy & Education
 - School and business closures
 - Snow removal difficult
- Transportation & Commerce
 - Ice buildup on waterways
 - Vehicle accidents
 - Thousands of flight delays/cancellations
 - Delays in railroad freight deliveries
 - Maple season delayed
- Infrastructure
 - Water main breaks and frozen pipes
 - Power outages
 - Roof collapses
- Ski resorts benefitted

Credit: NASA Earth Observatory



Precipitation

- December
 - 114% of normal
 - 3 states ranked had top 20 wettest Decembers
- January
 - 87% of normal
- February
 - 70% of normal
 - 3 states had top 20 driest Februaries
 - Below-normal February precipitation, but what did fall, fell as snow
- Winter (accumulated Dec-Feb)
 - 96% of normal



Contact Information

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