

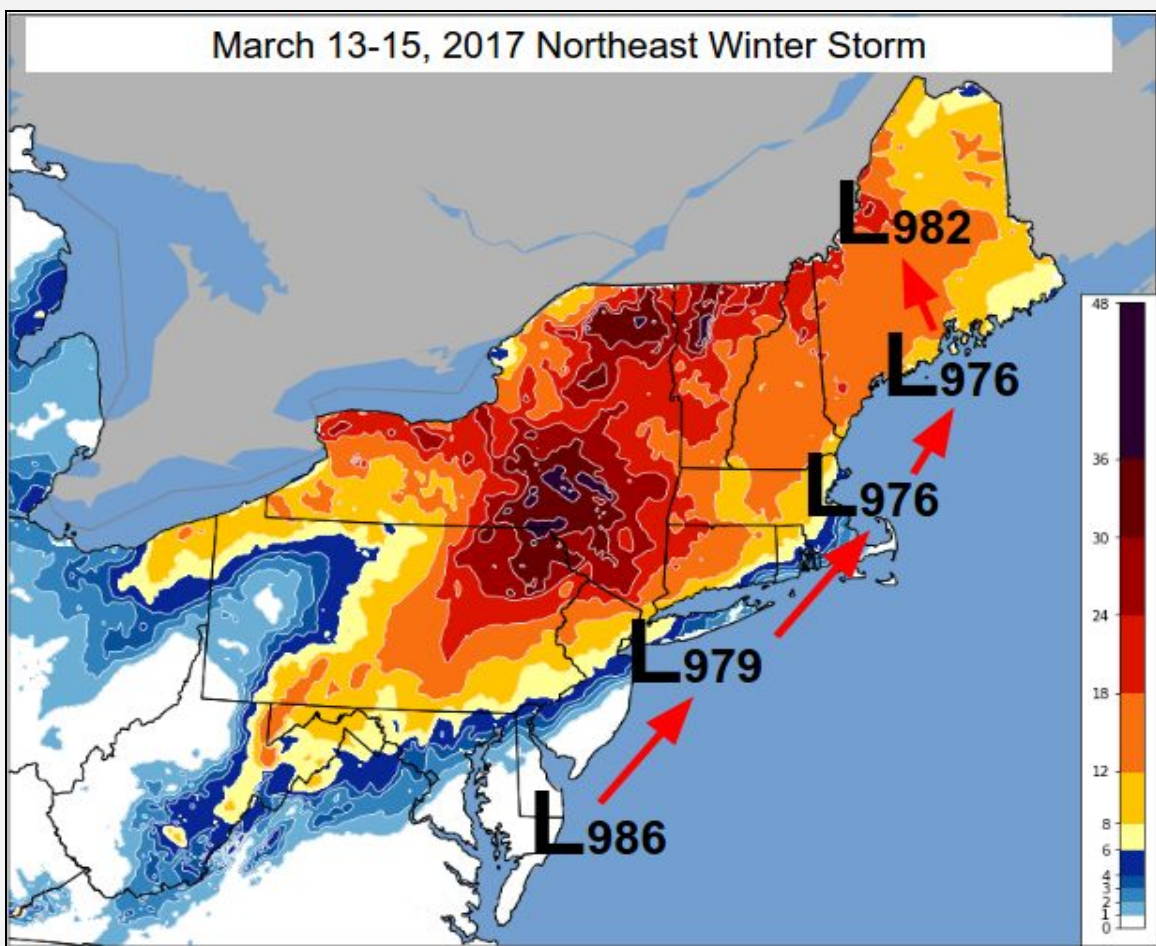
## Northeast Winter Storm

13-15 March, 2017

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### a) Meteorological Overview

A severe winter storm impacted portions of the interior Mid-Atlantic and the Northeast between 13-15 March 2017, producing widespread snowfall accumulations of one to over three feet from central Pennsylvania to northern New England (Fig. 1). Although prepared for the worst, areas along the I-95 corridor from Philadelphia to Boston were spared the brunt of the storm.



**Figure 1.** Summary 72h NOHRSC snowfall map 12 UTC 12 March through 12 UTC 16 March with surface low positions and central pressure every 6-hours commencing 12 UTC 14 March and ending 12 UTC 15 March 2017.

The storm began over the eastern U.S. as a mid-upper level shortwave trough, emanating from the eastern Pacific two days prior, and then approaching the southeastern U.S. around 2100 UTC 13 March. There, the trough began to interact with a subtropical mid-level shortwave

trough lifting northeast from the northern Gulf of Mexico. Precipitation began to spread north across the Carolinas as surface low pressure became better defined along the Southeast coast.

From 0000 UTC to 1200 UTC 14 March, the resultant phased trough deepened over the Southeast, eventually acquiring a negative tilt as it approached the East Coast. The trough orientation and evolving synoptic scale coupled-jet structure supported intensification of the surface low as it tracked north from coastal South Carolina to east of Delmarva. As the coupled jet entrance and exit regions became better defined, the low deepened rapidly over the Atlantic near-shore coastal waters. By early 14 March, mesoscale snowbands, supported by strong low to mid-level frontogenesis, were in place from central and northeastern Pennsylvania to Upstate New York. As bands of moderate to heavy snow spread north through the interior northern Mid-Atlantic and Northeast, snow changed to mixed precipitation along the I-95 corridor from Washington D.C. to New York City. Accumulating freezing rain was reported in a narrow zone of the Mid-Atlantic from central Maryland to southeastern Pennsylvania and central New Jersey.

From 1200 UTC 14 March to 0000 UTC 15 March, the mid-upper level shortwave trough continued to move north from the Mid-Atlantic to the Northeast, lifting ahead of a northern stream low spreading east-southeast from the upper Great Lakes. Surface low pressure continued to intensify and tracked north, deepening to 976 hPa low over southeast New England during the evening hours of 14 March. Moderate to heavy snow continued to fall to the north and west of the surface low center, impacting areas from northeastern Pennsylvania to New England. Strong gusty winds and very heavy snow contributed to local blizzard conditions from southeast New York to southern New England.

From 0000 UTC to 1200 UTC 15 March, the surface low tracked further to the north along the New England coast and then into interior Maine. Moderate to heavy snows persisted across portions of northern New England, continuing into the morning hours of 15 March before becoming more scattered in nature as the low moved toward the Canadian Maritimes.

### ***b) Meteorological Statistics***

This significant winter storm produced a wide swath of snow extending from the southern Appalachians to Maine. Widespread snowfall accumulations of two feet or more were recorded across northeastern Pennsylvania into the Catskills and the south central region of Upstate New York. Similar amounts were also reported in the Adirondack Mountains of New York, as well as the northern Green Mountains of Vermont. The highest reported snowfall total was 42 inches, recorded at West Winfield, New York.

At the Greater Binghamton Airport, an all-time 24 hour snowfall record was set. A total of 31.3 inches fell between 3:00 am ET on 14 March to 1:00 am on 15 March. This broke the previous 24 hour snowfall record of 23 inches set in February 1961.

At the Wilkes-Barre/Scranton International Airport in Avoca, Pennsylvania, an all-time daily snowfall record was set. On 14 March, 22.1 inches of snow fell - the most for any calendar day. This broke the previous record of 18.7 inches, which occurred on 13 March 1993.

Several locations across the Northeast and the northern Mid-Atlantic, including Binghamton and Scranton/Wilkes-Barre, established new daily maximum snowfall amounts for 14 March (Table 1). Ice accumulations of 0.10 inch or more were reported across portions of central Maryland, northern Delaware, southeastern Pennsylvania and southern New Jersey. Winds gusting to over 60 knots occurred along portions of the Northeast coast, with Plum Island, Massachusetts observing a peak wind gust of 77 mph.

The storm ranked as a Category 3, or “major” on the NESIS scale, with a NESIS value of 5.03. This storm ranks 23rd among all storms ranked by the NESIS scale, across the northeastern U.S., dating back to 1956. The storm also ranked as Category 4 on the RSI scale, with a value of 10.658, making it the 12th most impactful storm ever ranked on that scale for the northeastern U.S (dating back to 1900). The storm affected a total population of over 60 million people.

| City                      | New record | Previous Record | Year |
|---------------------------|------------|-----------------|------|
| Binghamton, NY            | 26.4       | 5.9             | 1991 |
| Wilkes-Barre/Scranton, PA | 22.1       | 3.4             | 1956 |
| Williamsport, PA          | 18.3       | 6.5             | 1991 |
| Burlington, VT            | 17.8       | 10              | 1980 |
| Albany, NY                | 17         | 12.9            | 1958 |
| Portland, ME              | 16.3       | 10.6            | 1961 |
| Hartford, CT              | 15.8       | 6.1             | 1958 |
| Concord, NH               | 15.6       | 6.6             | 1984 |
| Harrisburg, PA            | 14.7       | 8.3             | 1999 |
| Worcester, MA             | 14.4       | 11.5            | 1958 |
| Buffalo, NY               | 13.2       | 6.5             | 1998 |
| Allentown, PA             | 12.4       | 8.4             | 1958 |
| Central Park, NY          | 7.6        | 4.1             | 1958 |
| Bridgeport, CT            | 7.1        | 3               | 1958 |
| Philadelphia, PA          | 7.1        | 4.7             | 1999 |
| Newark, NJ                | 6.9        | 4.6             | 1958 |

|             |     |     |      |
|-------------|-----|-----|------|
| Boston, MA  | 6.6 | 3.8 | 1942 |
| Kennedy, NY | 5.1 | 2.1 | 1999 |
| Dulles, VA  | 4.1 | 4   | 1999 |

**Table 1.** New record daily maximum snowfall amounts set for March 14.

**c) Impacts**

Over 8000 flight cancellations occurred due to this storm from Sunday to Tuesday per AWC/NAS.

There were three fatalities from shoveling snow in Pennsylvania and a number of traffic-related incidents, including a 16-year-old girl, killed when she lost control of her car on a snowy road and crashed into a tree in Gilford, New Hampshire. In East Hartford, Connecticut, an elderly man died after being struck by a snowplow truck. And, in Longmeadow, Massachusetts, a public works employee was killed after the snowplow he was driving was hit by an Amtrak plow train clearing tracks.