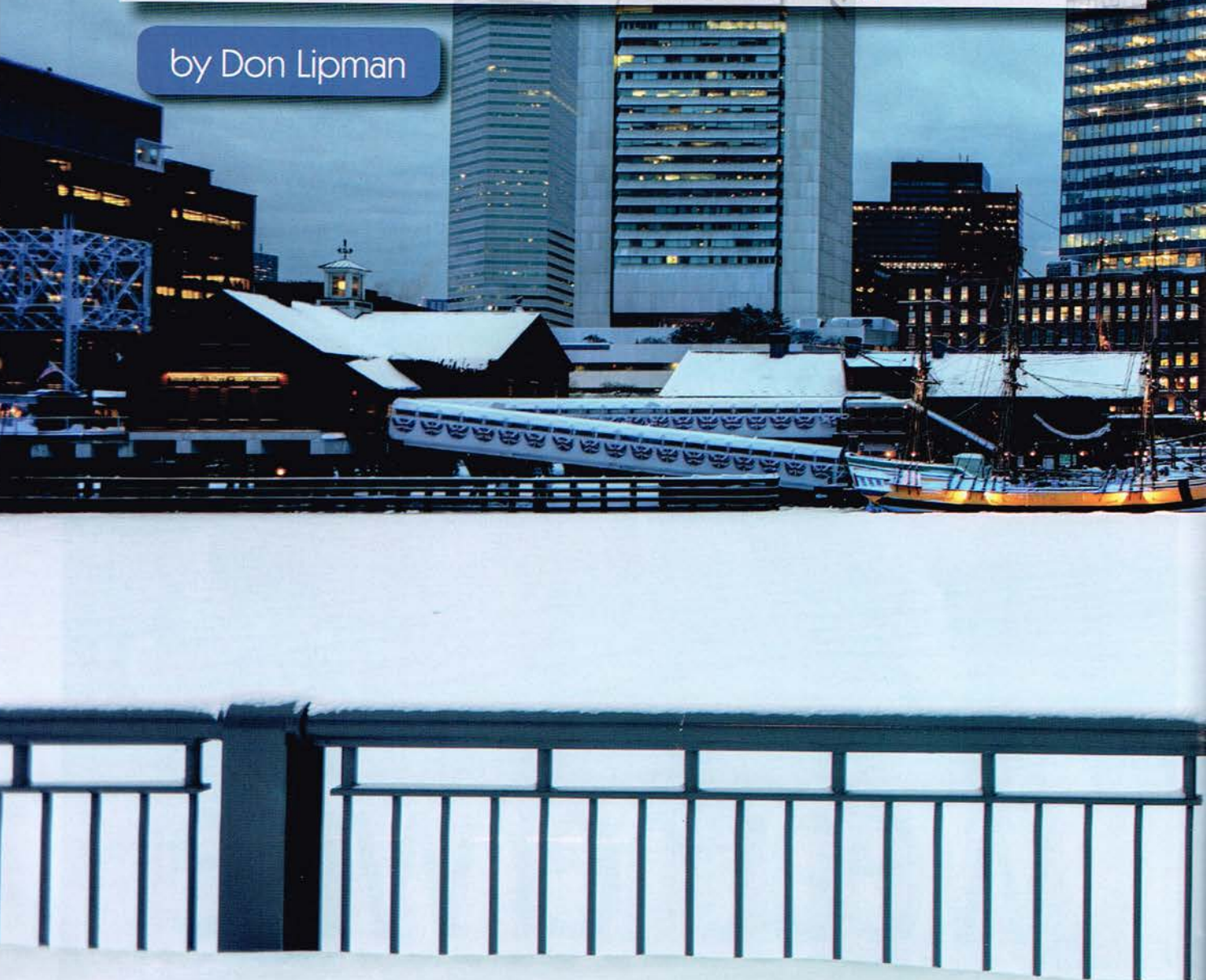


# BOSTON'S 2015 SNOW BLITZ: How Did it Compare?

by Don Lipman



The Boston waterfront after one of Boston's many big storms last winter.





**T**he winter of 2014–2015 in the mid-Atlantic and the Northeast, but particularly eastern New England, was long and severe. Few will deny that it was severe, as we were reminded of it constantly from the daily bombardment of news headlines streaming out of “Beantown,” or, as it was once known, “Hub City.”

But was last winter as long and hard in the affected region as it was billed by the media? Using Boston, Massachusetts’s Logan Airport (KBOS), the site of the city’s official weather station since January 1, 1936, as a guide, the answer is both “yes” and “no.”

Although the month of November in Boston was somewhat below normal temperature-wise, there were only two inches of snow in a month that averages less than 1 inch—but has seen as much as 18 inches, in 1898. This was nothing out of the ordinary, it would seem.

December 2014 was even more unremarkable, in that the average temperature was more than three degrees *above* normal (38.2°F), and less than one inch of snow fell in a month that averages 12 inches—but has seen nearly 28 inches, in 1970.



## Cold East, Warm West

It was not until January that the pattern began to change as a deep, cold trough with unusually strong staying power started to plague the eastern United States—the Polar Vortex, as it's sometimes called. Not surprisingly, an unusually strong ridge, along with its associated warm and arid conditions, held on in the West—the second winter in a row for both the eastern trough and the western ridge. In the East, the result is unabated cold and snow, particularly in New England; in the West, more warmth and below-normal rainfall, exacerbating the historic multi-year drought that was already affecting much of the region—what one weather blogger called the 'Triple-R,' or the 'ridiculously resilient ridge.'

## Real Winter Emerges

As for January's records, it would officially go down as a cold and very snowy month, with temperatures almost 3°F below the current average of 29°F and almost three feet of snowfall, close to three times the average of 12.9 inches. But at least the month featured periodic breaks, when temperatures nudged above freezing, even to the 40s and 50s (three days of the latter). And even though a cold, snowy pattern was expected to continue in February, Bostonians were probably unprepared for the arctic onslaught that would envelop Beantown, making most of January seem almost tame.

February's onslaught actually began in January, when the remnant of an "Alberta Clipper" formed a low pressure system near the Outer Banks of North Carolina. The low traveled north-northeast to a position near the "benchmark" of 40°N latitude/70°W longitude (southeast of Long Island, New York), where it literally "bombed out" over the Gulf Stream, creating a full-blown blizzard. This means that the barometric pressure of the low crashed about 24 millibars in 24 hours, causing the storm to greatly intensify.

The storm met expectations in eastern Long Island and southern New England, but the "Big Apple," and even more so New Jersey, were left severely "under-snowed," despite dire warnings by New York City Mayor Bill de Blasio and others. Officials could hardly be blamed, however, because it was the National Weather Service (NWS) that issued the warnings. The NWS expected the storm center to pass over or just west of the aforementioned "benchmark" position, which would have placed much of New Jersey and New York City in the zone of "historic" snowfall. Instead, the low passed east of that position, leaving New York City with about eight inches and New Jersey even less.

But where it did snow extremely hard (two to four inches per hour), more than two feet of wind-blown powder buried everything in sight from eastern Long Island northeastward. In addition, the unrelenting 35 mph or greater northeast winds (a peak gust on Nantucket Island was clocked at 78 mph) caused severe beach erosion all along the New England coastline.

## The Snowiest and (Almost) Coldest Month Ever

It was February 1915, however, that many Bostonians will long remember, as it broke so many long-standing records for cold and snow—even anecdotal records from the colonial era all the way up to 1870 (see inset box), the year of the official founding of the U.S. Weather Bureau.

FEMA/ELIS MAYNARD



Streets were deserted in Boston during a major winter storm that swept through the city with high winds and heavy snow.



## Anecdotal Snowfall Records from the Colonial Era to 1870

David M. Ludlum (d. 1997), America's premier weather historian and founder of *Weatherwise*, extensively chronicled early American winters in his two volumes, *Early American Winters I, 1604–1820* and *Early American Winters II, 1821–1870* (American Meteorology Society, 1966).

Although there are records in the Northeast of long and severe winters with very deep snows during the early 17th century, in Ludlum's opinion, none seemed to be as severe as those of 1641–1642, 1680–1681, and particularly 1697–1698—the three “Landmark Winters” of the entire century. The town recorder of Sudbury, Massachusetts, referred to the latter as “the terriblest winter for continuance of frost and snow, and extremity of cold, that ever was known.” Reportedly, at the end of February of that exceptional winter season, 42 inches of snow lay on the ground at Cambridge, Massachusetts, and, as Ludlum said, “would represent an historic depth for the Boston area,” if true.

Modern records support that comparison, as the official snow depth in Boston on February 9, 2015, was 37 inches, six inches greater than the January 11, 1996, record of 31 inches.

Still in the last throes of the “Little Ice Age,” the 18th century had its share of brutal winters. The three “Landmark Winters” of the century were that of 1740–1741; the Revolutionary War winter of 1779–1780, sometimes referred to as “The Hard Winter”; and 1783–1784. Those who had lived through all of them believed that the second was the most severe, while the last had many freeze and thaw cycles, even though the freezes were bitter.

But even though, in Ludlum's opinion, two of the above three winters may have taken the prize for all-around severity, he suggests that, in terms of snowfall, the winter of 1716–1717, “The Winter of the Great Snow,” has probably never been exceeded (and may never be exceeded). The title may be misleading, however, as the whole winter's snowfall seems to have been compressed into nine days, much like most of Boston's 2014–2015 snowfall of 90 inches was compressed into 21 days.

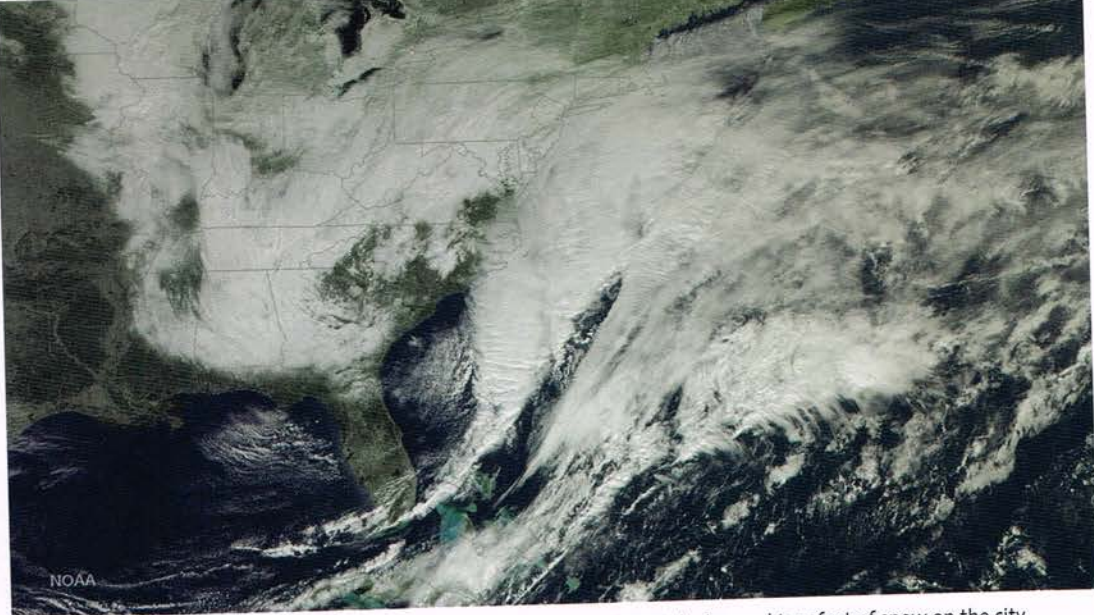
But Boston's snowburst occurred during the heart of winter, whereas the “Great Snow”—actually four separate storms—hit from February 27 to March 7. In both cases, eastern New England was hit hardest.

How deep was the snow? News reports of the day seemed to converge on anywhere from three to four feet, although there were many references to 20–30 feet—most likely drifts, which most, even then, believed was the case. All in all, it would seem that “The Winter of the Great Snow” may not have been any snowier than last winter in New England, especially considering the extremely condensed period of the worst effects and the many moderate intervals both before and after. But at least during last winter, rural Bostonians didn't have to burn their furniture (that we know of) because they were unable to get to the wood bin.

One thing is clear, however: the winter of 1716–1717 made such an indelible impression on the collective memories of New Englanders that for decades afterward, lay people and writers alike (including Henry David Thoreau) referred to historical events as either “before” or “after” the great snow.

During the 180 years from the beginning of the 19th century until the beginning of Boston's official weather records in 1870, Ludlum details the occurrence of many, many winter storms of unbelievable ferocity that caused untold misery for New Englanders. These included early snows, late snows, unusually cold storms, multiple storms in a row, and those that caused particularly high losses of life on land and at sea, etc. In terms of snowfall, however, probably no winter surpassed that of the historic “Winter of the Great Snow,” except possibly what Ludlum called “The Standout Winter of the First Half of the 19th Century, 1835–1836.”





A nor'easter had Boston in its sights on January 26, 2015. The storm ultimately dropped two feet of snow on the city.

True to tradition, on Groundhog Day (February 2) Punxsutawney Phil supposedly did see his shadow (although scattered snow showers abounded), foretelling six more weeks of winter. Though Phil's forecasting prowess has long been in question by NOAA's National Climatic Data Center (NCDC), this time he was definitely right. On that very day, after burying much of the Midwest (Chicago, Illinois, had almost 20 inches of snow—its fifth biggest storm on record), a reinvigorated system took aim at New England again. Dubbed "Linus" by The Weather Channel, this storm dumped another 16 inches of wind-blown snow on the Boston area.

Aside from a few minor systems, during the next 13 days Boston experienced two more major blizzards (February 7–10, almost two feet; and February 14–15, 16 inches), with each breaking records of its own. When all was said and done, the city had accumulated 64.8 inches of snow, shattering the old record of 43.3 inches set in January 2005, making it the snowiest month on record.

Also, among many other February snowfall records, Boston saw more days (16) with measurable snowfall than any previous month. The old record was 14, in multiple years. In addition, a record snow depth of 37 inches was recorded on February 9. The previous record was 31 inches on January 11, 1996, although the latter figure may have been surpassed in other (missing) years. Also of note, for the first time there were four calendar days each with 12 inches of snow. The previous record was two.

Aside from KBOS's remarkable snow totals, the thermal characteristics of February 2015 were

also stunning. Officially, Boston averaged 19.0°F for the month, which was mistakenly called the coldest month on record by some media (possibly due to preliminary unverified calculations). In a city with a 143-year weather record dating back to 1872, the frigid month of February 1934, with an average of 17.5°F, was actually Boston's coldest. But other New England locations (Worcester, Massachusetts; Hartford, Connecticut; Bangor, Maine) did record their coldest months ever, at least since pre-Weather Bureau records. In any case, most would agree that during February 2015, Boston was also frigid.

Taken as a whole, Boston's January and February snowfall records were almost too numerous to count. Six of these, as tabulated by my colleague, Angela Fritz, of the *Washington Post's* Capital Weather Gang, were as follows: the city's five-, seven-, 10-, 20-, 30-, and 40-day snowfall records were all broken within a couple of weeks. To put it another way, in the 21 days between January 26 and February 15, the city of Boston accumulated over 90 inches of snow, more than double an average winter's snowfall.

Figure 1 summarizes Boston's weather during the heart of 2015's winter season.

## City Faces the Challenge

We all knew that the self-declared badge—"Boston Strong"—that Bostonians bestowed upon themselves after the tragic bombings of April 15, 2013, was well deserved. Then, less than two years later, events of a totally different nature once again tested the mettle of weather-hardy Bostonians. People will say that they did indeed, show their ability to cope by confront



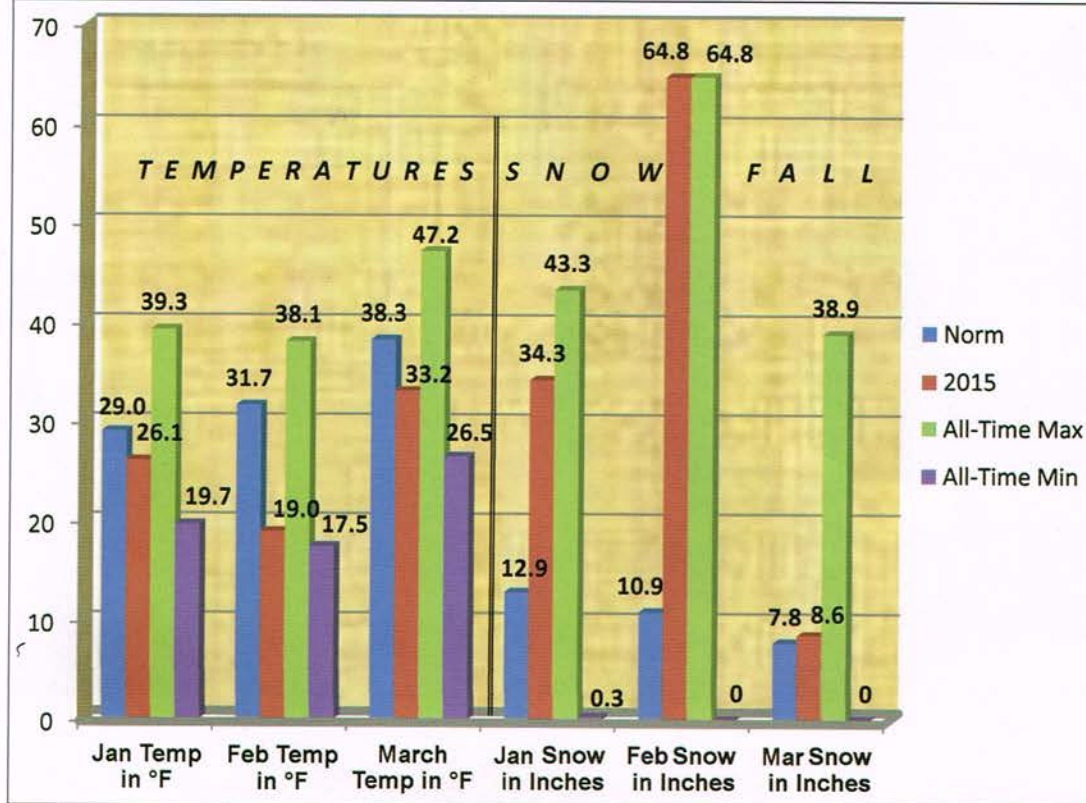


Figure 1. Boston's Extreme Weather Conditions: January, February, and March 2015.

ing the difficulties of dealing with more than 110 inches+ of snow compressed into such a short period of time.

As hard as it was, the city was ready, willing, and able to haul away much of the snow, and when officials realized they needed help, they weren't embarrassed to call on New York City. The Big Apple was happy to oblige, offering many pieces of equipment, including front-end loaders, plows, and two giant snow melters, together capable of melting 350 tons of snow per hour.

Needless to say, the imported equipment was greatly appreciated by Bostonians, many of whom couldn't even get out of their homes for days. Then, on a day near the end of the mid-February storm (February 9), those who could leave their homes lost their primary mode of transportation—the MBTA Subway System. The shutdown—even for a day—was deemed unacceptable, and was blamed on system deterioration and failure to budget for a major overhaul.

Not being able to get to work was bad enough, of course, but for homeowners it was often a disaster, with repairs and renovations "expected to go on well into the summer," said Marc Baron back in February. Baron is a partner at the New England Adjustment Company in Massachusetts. For homeowners, it was a serious situation when insurers failed to cover the whole cost of renovations—or worse yet, any of the cost, such as

when flooding caused by melting snows actually causes the damage. This type of hazard is usually not covered by typical homeowner's policies and requires special flood insurance, said Jeanne Salvatore, another spokesperson, who is with the Insurance Information Institute.

Boston's desperate effort to clear city streets and sidewalks was not totally motivated by the need to get traffic and commerce moving again. Mayor Marty Walsh was concerned for the safety of (and possible lawsuits from) city residents who were jumping out of second-story windows into the great snow piles below. "Let's stop this nonsense, this is not Loon Mountain [New Hampshire]," he said. Nevertheless, there was great amusement on the social media.

## Roof Damage, a Serious Issue

Heavy snow is capable of causing different types of roofing damage. One of the more common types is caused by ice dams, which are often associated with window dormers on sloping rooflines. Joe Salerno of Quincy, Massachusetts-based Arbella Insurance, for example, said that 25-40% of the company's new claims were tied to the dams, which can cause tens of thousands of dollars in damages to the roof and guttering as well as interior walls, etc.

Aside from ice dams, an even greater hazard is probably roof collapses themselves, of which





A typical Boston street, buried under snow.

there were many in New England last winter. But there probably weren't as many collapses there as in western New York during November 2014, when lake-effect snows inundated the region during the week of November 13–21, eventually causing hundreds of major roof collapses and structural failures, according to the National Weather Service's "Lake Effect Summary of November 17–19, 2014." During that week, the "favored" areas wound up with almost as much snow as Boston accumulated in three weeks.

Most of the newer roofs in both areas were probably up to the local snow load codes of 35–65 pounds per square foot (depending on local ordinances). But the disparity in the num-

ber of roof collapses between the two areas was largely due to the minimal February melting in New England (only five days exceeded the freezing point), whereas in western New York, rain and much higher temperatures arrived soon after the second wave of snow squalls, weighing roofs down greatly.

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Some Boston residents evaded snowplow crews as they skied along snowy roads.