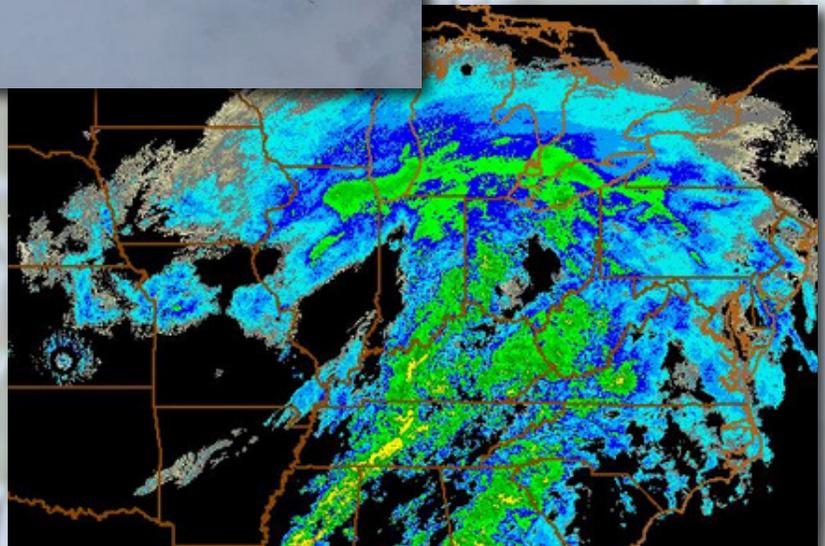
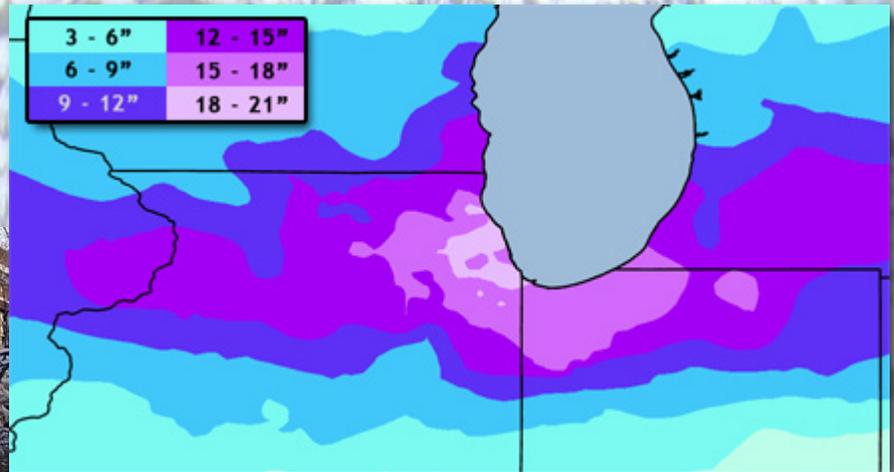


WeatherWorks



Your Weather Experts

2014 - 2015 Winter Summary Chicagoland Edition



WeatherWorks 2014 - 2015 Winter Summary

2014 -2015 Winter Overview

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WeatherWorks was founded in 1986 in an effort to bring quality meteorological expertise to both the public and private sectors. WeatherWorks' objective has remained the same ever since: to provide the highest quality of weather consultation based on years of training, experience, and the scientific principles of Meteorology. Now in its twenty-ninth year of publication, the WeatherWorks Winter Summary is a small part of that effort. Please direct any comments or suggestions about this winter summary to mikemihalik@weatherworksinc.com.

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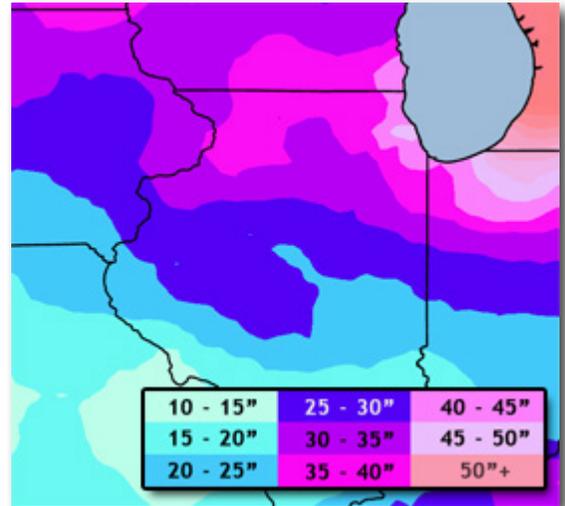
On the Cover:

Top: Chicago Blizzard Snowfall

Middle: Chicago Blizzard Aftermath 2/2/15 (WikiCommons)

Bottom: Blizzard Radar Image (NOAA)

Following last winter's record-breaking performance with over 80 inches of snow and arctic outbreaks, the 2014-2015 Winter was certainly not a dud in either category. Although the total seasonal snowfall was just a little over half of last year, this year's total was still close to or even over 10" above normal. Furthermore, the Chicago area once again suffered through severe cold outbreaks which set new records over the season.



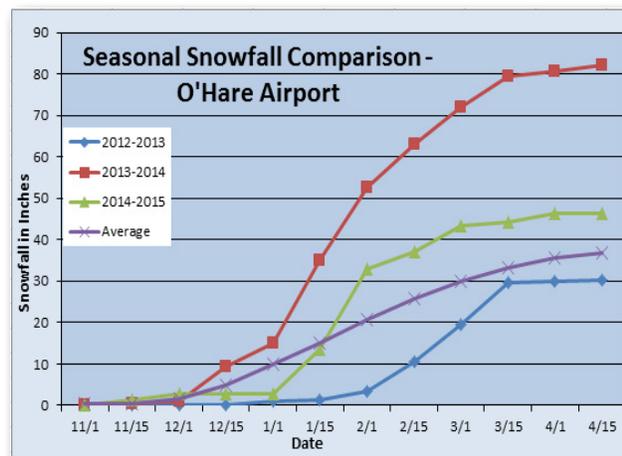
2014 - 2015 Regional Snowfall

November and December were two completely different months to end 2014. First, November featured below average temperatures and above average snowfall. 2.8" of snow fell at O'Hare during the month to be exact, thanks in large part to a minor snow event just before Thanksgiving. Meanwhile, the month's average temperature struggled to finish above freezing. December, on the other hand, was quite different as a snow deficit developed thanks to mild temperatures.

cold period from the 5th-14th, the rest of the month was near or above average temperature - wise. As January ended, a record-breaking February arrived with a major blizzard to start the month. This storm broke a daily snowfall record as nearly 20" of snow fell over the city. The blizzard aided in the city's climb to above-average seasonal snowfall, which was accompanied by record cold, especially during the latter half of the month.

The winter season then took a colder and snowier turn as 2015 arrived. January was filled with minor snowfalls, as Chicago was hit with over a dozen events of less than 3". Despite a bitterly

Finally, March featured its typical up and down temperatures. The month began cold, but moderated mid-month, then ended below average as April arrived. Although there were a few snow events throughout the month, March 2015 was notable for its dry conditions, with only 1.10" of liquid precipitation (1.40" below normal). The month did end up 5.0 - 8.0" of snowfall, while April for the most part was void of snow, with the exception of scattered coatings late in the month.

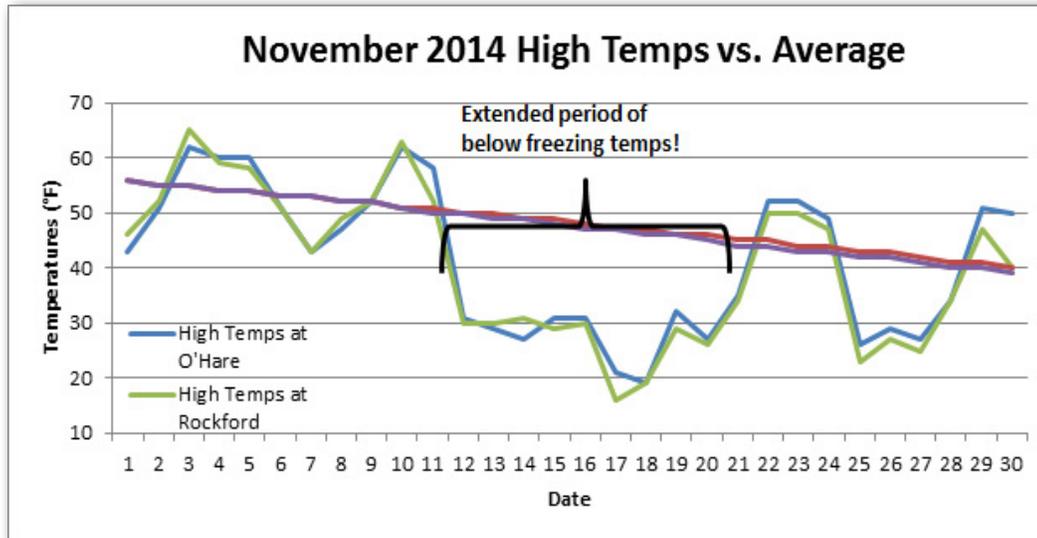


WeatherWorks 2014 - 2015 Winter Summary

November 2014

While October remained mostly free of accumulating snow (with the exception of Halloween's 0.1"), November turned out to be a colder and snowier month than average when all was said and done. The first third of the month (November

where temperatures did not rise above 32 degrees. In fact, low temperatures reached the single digits on November 18th, which was the 3rd earliest single digit low on record and the earliest since 1964! Much of the month's snowfall also occurred during this stretch of cold, mainly in the form of snow shower events.



After a brief period of warmth, very cold air made a return just before Thanksgiving. An accumulating snow event on the 24th-25th, along with snow showers on ensuing days, made up the remainder of the month's snowfall. November closed with 2.8" of snow at O'Hare, which was 1.3" snowier than normal, however, monthly totals ranged from 0.5

1-11) was quite pleasant with dry, mild conditions. A significant pattern change during the middle of the month led to an extended period from November 12th through the 20th

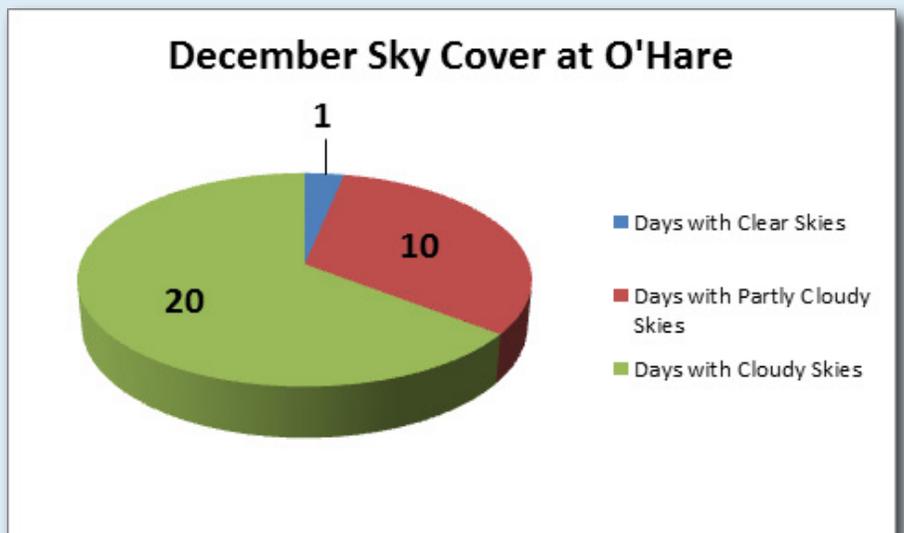
- 3.0"+ from the lake shore to Rockford. Additionally, Chicago's average November temperature of 33.6°F (6.7 degrees below normal) was the 8th coldest on record.

December 2014

It may be hard to believe now, but by the end of December, the hot topics were the mild weather and developing snow deficit. In fact, the Chicago area saw only a few scattered coatings of snow during the entire month, as occasional bouts of snow showers were all that contributed to the lackluster snow statistics. O'Hare officially recorded a trace of snow for the entire month - which is rather rare, as it was only the 4th time this occurred in Chicago's recorded history. The last time it occurred was in 1996! As a whole, the month turned out to be 4.3 degrees warmer than average with below average precipitation.

Despite the uninspiring snowfall, one thing that December was notable for was the amount of cloudiness. Incredibly, there was only one day where skies were clear during

the entire month of December. Every other day saw at least partly cloudy skies, though a significant number of days (20 in fact) were cloudy.

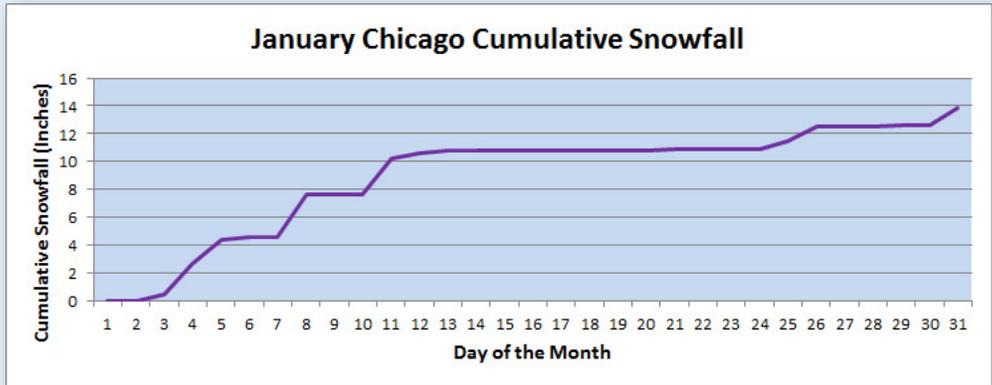


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January 2015

Following a rather mild and uneventful December, 2015 came in on a snowier and colder note, with temperatures and snowfall more typical of January in Chicago. Although there was not a major blockbuster system that pummeled the area (stay tuned for February), a series of weak clippers pushed through the region and brought minor snowfalls to the area. In fact, the region had 14 snow events of 3.0" or less with only the Joilet area surpassing the mark on January 5 - 6th. In total, the region received 9.0 - 13.0" of snow for the month, with the most snow occurring over the Metro and near the lake shore.

Switching gears to temperature, Janu-



ary was definitely a tale of two halves. Below average temperatures were entrenched for the first half of the month, while the latter half was near to above average. The biggest departure from normal occurred from the 5th-10th when average temperatures were 10-25 degrees below normal and lows failed to

break zero for every day of the stretch. However, from the 15th and on, only one day featured below average temperatures, with the rest above average. In the end, the cold won out, as the average temperature for Chicagoland was 22.3°, which was 1.5° colder than normal.

February 2015

February 2015 took the 2014-15 winter to the next level, with record-setting snowfall and temperatures throughout the month. Winter unleashed its fury with a major blizzard impacting the Chicago area from January 31st through February 2nd. This storm

set a daily snowfall record at O'Hare of 16.2" on the 1st (19.3" total), with storm totals ranging from 12.0 - 20.0"+ area-wide. Along with the snow, the beginning of the month was accompanied by frigid temperatures ranging 10 - 20 below average from the 2nd-5th.

After this brutal stretch, there was a bit of a break as temperatures climbed to near average with only a trace of snowfall through the 11th.

During the last two-thirds of February, truly bitter temperatures took a firm grasp on northern Illinois. Arctic blasts

were commonplace during this period, with zero days at or above normal after the 11th. Clippers continued to bring minor snowfall to the region, but the cold was unrelenting. Average temperatures fell into the teens and single digits, which ranged from 10 - 30°F below normal. The cold peaked on two record-setting days for the city: the 19th had the lowest high temperature ever for that date at 4° and the 28th set a daily record low at -10°F.

During this frigid span, Chicagoland was blanketed in 2.0 - 6.0 inches of snow from a system on the 24 - 26th. This storm brought the monthly total to 26.8" at O'Hare, only 2.2" short of the all-time monthly record. February 2015 was a record month up to the end, and the region actually tied for the coldest February of all-time, with an average temperature of 14.6°F.

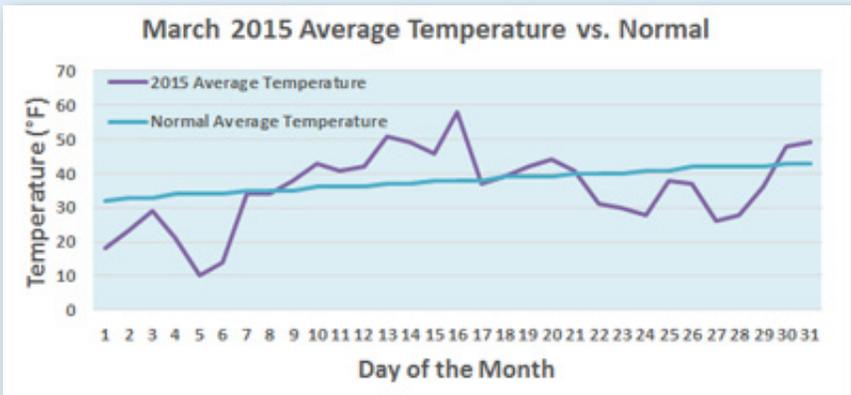


Groundhog's Day Blizzard of 2015 from NWS Chicago

WeatherWorks 2014 - 2015 Winter Summary

March/April 2014

Much like February, March in Chicago started off cold but without the major blizzard. Average temperatures ran well below normal for the first several days, with the coldest readings on the 5th and 6th, where it was 20-24 degrees below the normal of 34 degrees. This opening week was also accompanied by a wintry event that brought a coating up to 2.0" of snow and ice to northern Illinois. The middle of the month then warmed nicely with temperatures near average and a break in wintry weather. Highs even reached into the 60s and 70s from the 13th-16th which gave the region a quick taste of spring.



terestingly, liquid precipitation was rather lacking with only 1.10" which was well below the average of 2.50".

Ironically, winter made a return just in time for the start of spring. Although it was not to the extent of February, temperatures ran 5 - 15 degrees below normal from the 23rd-29th. This period was also accompanied by wintry weather with 3.0 - 6.0" of snow on the 22nd-23rd, with one last gasp of snow on the 27th when a coating - 1.0" of lake effect fell over the area. In total, 7.1" of snow fell at O'Hare during March, which was 1.5" above normal. In-

As April arrived so did spring, with temperatures generally near to above average across the region. With the exception of some scattered coatings of sleet and snow on the 22nd, winter weather was almost non-existent for the month. For the winter as a whole, Chicago's O'Hare Airport received 50.7" of the white stuff, which was 14.1" above the seasonal average of 36.7 inches.

Winter Statistics & Climate Data

2014 - 2015 Winter Snowfall Data*							
Location	November	December	January	February	March	April	Total
Chicago (Dwtn)	0.2	Trace	11.1	30.3	4.7	0	46.3
Elgin	4.2	Trace	12.7	18.0	6.8	Trace	41.7
Joliet	1.0	0	9.5	21.1	4.6	0	36.2
Libertyville	1.2	0	9.8	22.6	7.7	Trace	41.3
Naperville	1.6	Trace	10.4	20.0	5.0	0	37.0
O'Hare Airport	2.8	Trace	12.6	28.1	7.1	0	50.7**

*For comparison, we placed the total snowfall amount from the blizzard into the month of February.

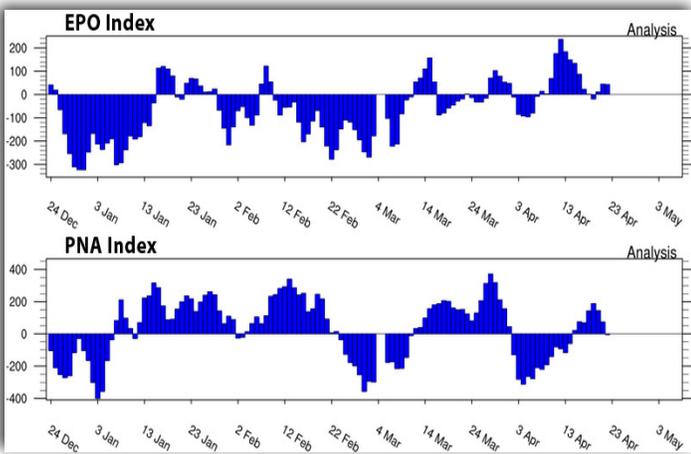
**Including 0.1" from October 31, 2014.

2014 - 2015 Winter Temperature Data		
	Average High (Departure)	Average Low (Departure)
November	41.4 (-6.8)	25.8 (-6.6)
December	36.9 (+2.1)	27.1 (+6.4)
January	29.0 (-2.0)	15.5 (-1.0)
February	23.4 (-11.9)	5.7 (-14.4)
March	44.4 (-2.2)	26.3 (-2.9)
April	60.3 (+1.3)	38.8 (+-0.0)

How Does the Winter of 2013-14 Compare to 2014-15?

After a historically cold and snowy season in 2013-14, the winter of 2014-15 did not quite match the harsh conditions of its predecessor. However, it was far from a quiet one, as 2014-15 was another season that featured colder than normal temperatures and above average snowfall for Chicago. Let's take a look at some of the key players that made the last two winters similar, but a bit different as well.

While the winter of 2013-14 was frigid and snowy from the onset, 2014-15 took a little bit of time to get going. A zonal (west to east) flow resulted in a relatively quiet and mild December during 2014. This was not the case for the year prior, as much of the Midwest, Northeast and Mid-Atlantic experienced above normal snowfall amounts in December of 2013. However, by the time we moved into middle of winter, the mild conditions became a distant memory, as February 2015 was one of coldest on record. So the question is, "what made the past two winters so cold?"

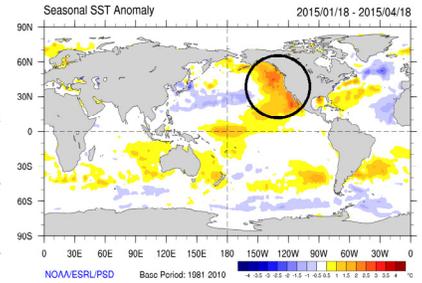


EPO & PNA Pattern from the End of December 2014 through April 2015 (NOAA/ESRL)

The answer to this question lies in the Pacific North American Pattern (PNA) and the Eastern Pacific Oscillation (EPO). During the last two winters, we have been predominantly entrenched in a positive PNA and a negative EPO pattern. This +PNA/-EPO regime is characterized by a large ridge of high pressure situated over the West Coast of North America. This in turn promotes a broad trough of low pressure over the eastern half of the country. As a result, frigid air is able to usher south from the arctic region into the Midwest and Northeast. So the next question is, "why have we been stuck in this +PNA/-EPO pattern the last two years?"

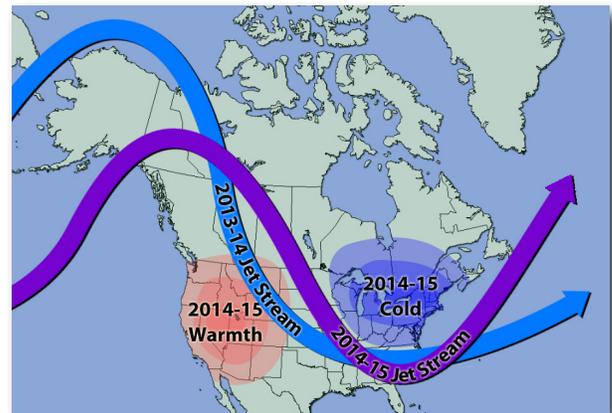
The most logical explanation to the last question is the sea surface temperatures (SSTs) in the Pacific Ocean. Despite

being thousands of miles away, the Pacific Ocean has an important influence on our pattern. Over the past two winters, SSTs in the Eastern Pacific were well above average. Research shows that warmer than usual SSTs off the West Coast favors ridging across Western North America. So even when the pattern would breakdown to a more zonal flow, the presence of above average SSTs in the Pacific would favor the redevelopment of the +PNA/-EPO regime.



SST Anomaly (NOAA/ESRL)

Although the overall pattern in 2014-15 was quite similar to its predecessor, they were not complete duplicates of one another. The main difference between the two winters was the exact location of the ridge/trough set up. In 2014-15, the "average" position of the ridge shifted eastward from the Gulf of Alaska to West Coast of North America. As a result, the center of trough in the Eastern US moved from the Upper Midwest to the Northeast. This led to expansive and record warmth out west, while the coldest temperature anomalies shifted towards the East Coast.



2014 - 15 Winter "Average" Pattern Compared to the 2013 - 14 Winter Pattern

In terms of snowfall, the greatest positive anomalies also drifted eastward. This was highlighted in New England, as Boston set a new all-time record for seasonal snowfall! Overall, much of the Midwest, Northeast and Mid-Atlantic finished with at least average snowfall totals. And let's not forget, if it was not for a lackluster December, things could have been a lot snowier.