



The Four Seasons

National Weather Service Burlington, VT



VOLUME II, ISSUE I

SPRING 2015

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Letter from the Editors

Welcome to the Spring 2015 edition of *The Four Seasons*, a quarterly newsletter issued by the National Weather Service in Burlington, VT. In this edition we'll take a look back at this very cold past winter and record setting February, and then look ahead to our upcoming Spring Awareness weeks and what you can do now to be prepared for hazardous weather. Also featured is a more in-depth look at our Fire Weather season in the North Country. Finally, we'll recap our first interactive webinar, provide you with some information on a new feature for our river gauge maps, and show you how to access some of our observed daily weather on our website. Thanks for reading and we hope you enjoy the newsletter.

WINTER '14 - '15: COLD.

-Michael Muccilli & Scott Whittier

Although several variations of the word have been used, the implication is clear, the winter of 2014-2015 was cold. Looking back at the meteorological winter, defined as the days from December 1st through February 28th, the season started on the mild and snowy side, but came across the finish line as dry and very cold, capped off by a historic February.

For the three month period, the temperatures at Burlington, VT were a solid 4.2 degrees below the 30-year normal, with the majority of the area finishing in a similar range from 4 to 5 degrees Fahrenheit below normal. Precipitation was below normal across most of Northern New York, especially the Saint Lawrence Valley, with some locations running a several inch deficit. Vermont was closer to normal, being closer to the mean winter storm track south and east of the region. Burlington, VT finished the winter 0.97 inches below normal, however Ogdensburg, NY was just over 3.5 inches below normal. Figures 1 and 2 on the following page show the 2014-2015 departures from the 1981 – 2010 climate normals across the North Country for both temperature and precipitation.

The Winter of 2014-2015 started off snowy but relatively mild, leading to an above normal December on all accounts; temperatures, precipitation, *(Continued on Page 2)*



...Continued from Page 1

and snowfall. This gave way to an increasing volume and intensity of cold air masses diving into the northeastern United States, bringing us a below normal January in terms of temperature. The mean storm track also set up shop well off to our south and east leading to Boston's and Southern New England's historic run of snow events from late January through February, while northern New York and central and northern Vermont were caught on the northwestern fringe. February then came along and unleashed one of the coldest months on record to a lot of the region.

December Recap

December was a relatively mild month, but was also very cloudy and ran a surplus in the snow department. The month started off with a 50 degree high at Burlington, however that was soon followed by a turn to a more cloudy and snowy period with at least a trace or greater of snow recorded on each of the first fourteen days of the month. This stretch also featured the season's largest snowstorm for the majority of the region, from December 9th – 11th, which brought a widespread 8 to 16 inches of snow for most, with some locally lower and higher amounts. The total snowfall can be seen in Figure 3 on Page 3. The script then suddenly flipped for the last two weeks when warming temperatures and a rainstorm threatened the prospects of a White Christmas. The official station at Burlington held on just long enough to declare a White Christmas, however the 54 degree Christmas Day in a midst of several other 40 to 50 degree days did the snowpack in and Burlington finished the month of December with no snow on the ground.

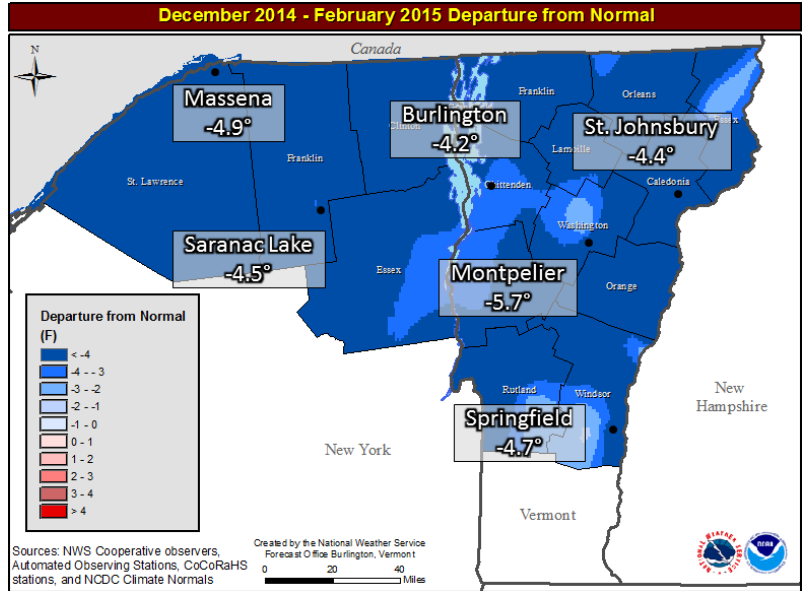
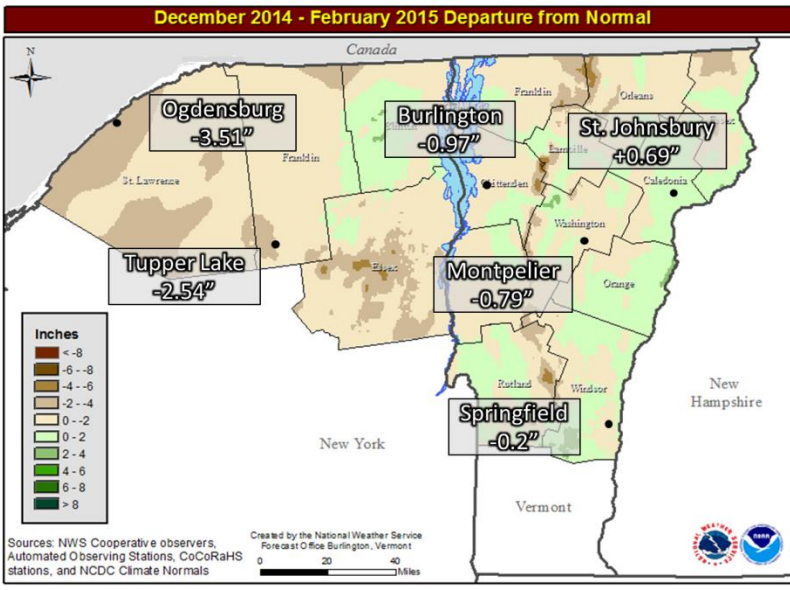


Figure 1. Average December 2014 – February 2015 Temperature Departures from 1981-2010 Normals

Figure 2. Total December 2014 – February 2015 Precipitation Departures from 1981-2010 Normals

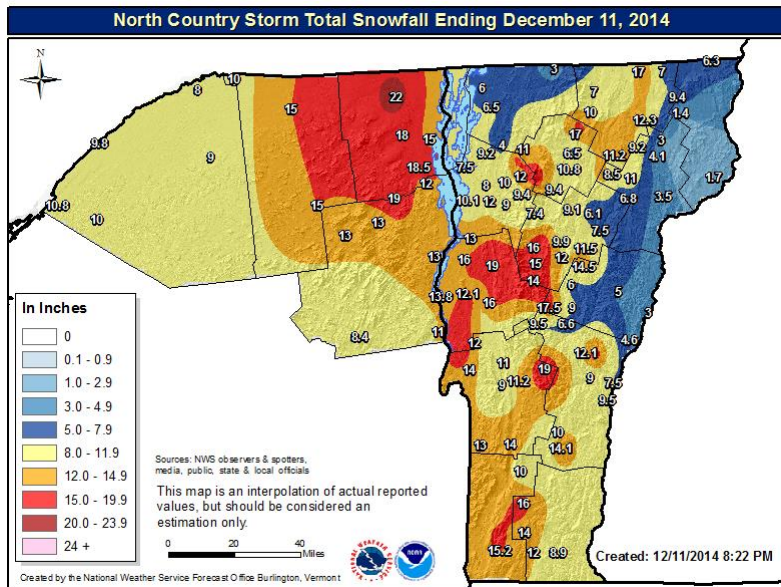


Warmest: 63° - Rutland, VT Dec 25th
 Coldest: -11° - Sutton, VT Dec 8th
 Warmest at Burlington: 54° - Dec 25th
 Coldest at Burlington: 8° - Dec 7th

January Recap

January was largely uneventful for the North Country with a relatively mild start and a pair of 40+ degree highs, followed by a descent downward into the depths of winter. The coldest morning of the month was on January 8th where temperatures bottomed out in the teens and twenties below zero. The high of 33 degrees on January 25th would be the last temperature above freezing for the next 27 days. The end of the month then featured the southern and eastern New England Blizzard on January 26th & 27th, (Continued on Page 3)

...Continued from Page 2



delivering a widespread 1 to 3 feet of snow in some areas, while only grazing much of our region with 3 to 7 inches of snow.

Warmest: 52°- Peru, NY Jan 4th
Coldest: -32°- Sutton, VT Jan 8th
Warmest at Burlington: 46°- Jan 4th
Coldest at Burlington: -11°- Jan 8th

February Recap

February brought brutal and near-record to record cold to the North Country. The month featured numerous nights of widespread below zero temperatures, even bottoming out at -10 to -30 quite a few times, as well as several bouts of extreme wind chills. It

Figure 3. Reported Total Snowfall from December 9th – 11th, 2014

only once went above freezing at Burlington, and that was only for a few hours on the 22nd. 26 out of the 28 days of the month were below normal as well. As seen in Table 1 below, departures for the month were between 13 and 15 degrees below the 1981 – 2010 Climate Normals, and finished as a Top 3 Coldest February at all of our climate sites. At our relatively newer sites of Massena, NY and Montpelier, VT, it was the coldest February on record (dating back to 1948). The month also finished in the Top 7 for any month for all sites, and actually tied with the coldest month on record at Massena (January 1994). February was also quite dry with the storm track largely to our south and east. At most of our climate sites, the month finished with about 1 to 2 inches of liquid equivalent precipitation, about 1 inch below the climate normals. The driest locations were in the northern Champlain Valley and northern Saint Lawrence Valleys where only a half inch to 1 inch fell.

The largest snowstorm of the month came on Groundhog Day (February 2nd) where a widespread 5 to 10 inches of snow fell across the region. There were three main large arctic outbreaks (Feb 1st – 6th, Feb 13th – 18th, and Feb 23rd – 24th) that sent low temperatures plummeting well below zero and gave us days that hovered in the single digits. The morning of the 24th was the coldest of the entire season with Island Pond, VT taking home the honors of being the coldest at -36 degrees. This month also saw the second consecutive year that Lake Champlain “closed”, meaning the lake had full ice coverage. This occurred on February 16th.

Warmest: 42°- Mount Tabor, VT Feb 22nd
Warmest at Burlington: 34°- Feb 22nd

Coldest: -36°- Island Pond, VT Feb 24th
Coldest at Burlington: -19°- Feb 24th

Table 1. February 2015 Average Temperatures, Departures from Normals, and Ranking among February's as well as all months.

	Average Temp	Departure from Normal	February Rank	All Monthly Rank
Burlington (1884)	7.6°	-13.9°	3 rd	7 th
St. Johnsbury (1894)	6.4°	-13.0°	2 nd	3 rd
Massena (1948)	2.4°	-15.3°	1 st	T-1 st

New Feature Added to River Gauge Maps

Greg Hanson

Users of the Advanced Hydrologic Prediction Service (AHPS) website at <http://water.weather.gov/ahps2/index.php?wfo=btv> may have noticed a new feature on the maps of individual river gauges. FEMA’s National Flood Hazard Layers can now be overlaid on the maps to show the 1 percent and .2 percent annual chance flood hazard areas near a river gauging station. These are also known as the 100 year and 500 year flood hazard areas. The addition of the FEMA flood hazard layers provides a view of the regulatory flood plain near a river gauge location, and will help people better understand their flood risk.

The map of the Winooski at Waterbury (Figure 1) shows the river gauge as a red circle. The Regulatory Floodway (red bars) is the area that the river typically occupies throughout the year. You can think of that area as what usually floods each year after a heavy rain or the spring *freshet*. The blue area is the 1 percent Annual Chance Flood Hazard area; in other words there is a one percent chance in any year that the blue area will flood. The orange area depicts the 0.2 percent Annual Chance Flood Hazard area, or the areas where there is a 0.2 percent chance for flooding in any year.

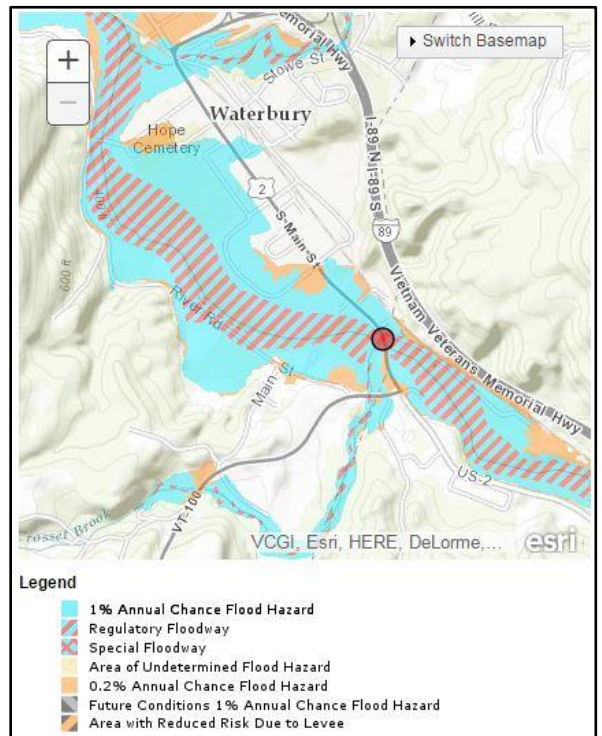


Figure 1. Overlay of FEMA’s National Flood Hazard Layers on AHPS

To get a look at the flood hazard maps for a river gauge



Figure 2. How to turn on FEMA’s National Flood Hazard Layers

near you, go to the AHPS web page, click on one of the dots on the map to display a river gauge, and then scroll down the page to view the map. In the lower left, if flood hazard maps area available for the gage, you will see a FEMA logo (Figure 2). Check the box to show FEMA’s National Flood Hazard Layers, and the map will update. You can zoom in and out and move the map around to find the area in which you are interested. Stay tuned, we have plans to correlate river gage levels with the 1% and 0.2% flood hazard areas to put a number to how high the rivers must rise to inundate the flood hazard areas.

Hydrology Terminology

Freshet- A sudden rise in the level of a stream, or a flood, caused by heavy rains or the rapid melting of snow and ice.

Spotlight On:

Fire Weather

-Eric Evenson

Spring is just around the corner and that means people will be cleaning up their yards and possibly burning brush and debris piles. Open burning is not allowed in New York State through May 15th, but is possible in Vermont. The National Weather Service in Burlington would like to bring attention to the fact that the months of April and May are the peak fire season in Vermont and New York. In Vermont, 74 percent of all fires reported occur during these two months, while New York experiences 54 percent of all its fires in April and May. The size of fires is typically small; 95 percent of all fires in Vermont are less than 10 acres with 89 percent of all fires in New York less than 10 acres. Despite the relatively small size of fires, it is important to note that the number one cause of fires in Vermont and New York is burning debris.

If you are trying to burn in April and May, which again is the area's peak fire season, be aware that it is also the pre-greenup time of year. Pre-greenup is the time of year where leaves have not come out on the trees, but fine dead fuels such as grass, twigs, and leaves from last Fall abound. This material reacts very quickly to weather conditions such as temperature, wind, precipitation, humidity and sunlight. On sunny days with low relative humidity and wind for example, these fine, dead fuels can dry very quickly and increase the risk of fire ignition and spread.

During peak fire season, the National Weather Service in Burlington, Vermont pays particularly close attention to situations where significantly dry fuels exist in combination with a critical weather pattern that brings low humidity, strong winds, and an extended period of little or no precipitation. We call these **RED FLAG** events and any fires that develop under these conditions could be very difficult to contain.
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NWS Burlington Fire Weather Information

www.weather.gov/btv and click on fire weather symbol in the lower left hand corner



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2012 Fire In Vermont – Photo Courtesy of Brooke Taber (NWS Burlington)

FIRE WEATHER FACTS

- April and May is the peak fire season in Vermont and New York.
- 74% of all fires in Vermont during a given year occur in April and May.
- 54% of all fires in New York during a given year occur in April and May.
- 95% of all fires in Vermont are less than 10 acres while 89% of all fires in New York are less than 10 acres.
- Burning debris is the number one cause of fires in Vermont and New York.

If there is a high potential for the development of a red flag event, we will issue a *Fire Weather Watch* to let forestry personnel and the general public know of this potential situation. If we feel a red flag event is likely to occur, we will issue a *Red Flag Warning*. To monitor our fire weather products such as fire weather watches, red flag warnings, and the fire weather planning forecast go to weather.gov/btv and click on the fire weather symbol in the lower left hand corner. Also, watch for our Open Burning Weather Awareness Campaign coming in April.

To find the Fire Weather Page, visit our site and click on the Fire Weather Icon on the bottom left hand side of the page (See Right).

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NWS Forecast Office Burlington, VT

Weather.gov > Burlington, VT

Burlington, VT
Weather Forecast Office

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs

Click on the map below to zoom in.

There are no watches, warnings, or advisories at this time.

Last Map Update: Tue, Mar. 10, 2015 at 9:32:10 pm EDT

Radar

Current Weather

Rivers & Lakes

Satellite

Weather Information Display

Forecast Maps

Detailed Forecast

Recreational Forecast

Forecaster's Discussion

Text Bulletins

Submit Storm Report

Fire Weather

Air Quality

Weather Hazard Briefing

Climate Plots

Skywarn

NOAA Weather Radio



It's important to remember as the seasons change, so do the potential weather hazards that can occur across the North Country. To help raise awareness of these dangers and how to prepare for them, the National Weather Service runs several awareness campaigns year round. For spring, we will be concentrating on different types of Flooding, Cold Water, and later in the season, Severe Weather and Lightning.

Flooding

Flooding is especially dangerous in the North Country as complex terrain can lead to fast river rises as the water does not have time to sit over an area and be absorbed into the ground. Flooding can also occur year round, with hazards ranging from ice jams on rivers, to flash flooding from thunderstorms, to inland flooding from tropical systems or their remnants.

In late winter and early spring, temperatures warm, and snow and ice begin to melt. As the snowmelt and rainfall run into rivers and streams, water levels rise and can lead to *ice jams*. An Ice Jam occurs when ice on the river breaks up due to river rises and weakening of the ice due to melting. The ice then floats downstream until it is stopped by an obstruction such as a bend in the river, a bridge or intact ice cover. Water then backs upstream and flooding begins. Also, large chunks of the ice can encroach upon the shore and damage trees and structures.

A combination of snowmelt and heavy rain is a common cause of *spring flooding*. During periods of warm days and warm nights, the snowpack will melt quickly in late winter into spring. This water can saturate the ground, or if the ground is still frozen, can become mostly runoff. The addition of heavy rainfall can quickly exacerbate the situation, leading to flooding.

Later in the season and into summer, when temperatures warm and thunderstorms develop, heavy rainfall from any storm has the potential to cause flooding. This is especially true of storms that move over the same area repeatedly, also known as training. Thunderstorms can commonly produce rainfall rates of 1 inch per hour or more. This heavy amount of rainfall during a short period of time can quickly flood low lying and poor drainage areas, leading to *flash flooding*.

For all seasons, you should have an emergency kit packed and ready in case you need to quickly vacate your residence. You should also know your evacuation route should you need to use it. Knowing several ways to get to safety is best, as some roads may be closed, especially if flooding is occurring. Remember, if you come upon a flooded road, **Turn around, don't drown**. There is no way of knowing how deep the water is, or even if the road underneath is still intact.

The best way to be prepared for hazardous weather is to keep abreast of the forecast, especially NWS watches and warnings. (Continued on Page 8)



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Did You Know?

We have a variety of different mediums to obtain NWS weather information:

NWS Burlington Webpage: www.weather.gov/btv

On Facebook: US National Weather Service Burlington VT

On Twitter: @NWSBurlington

On NOAA Weather Radio: <http://www.nws.noaa.gov/nwr/>



Our Spring 2015 awareness campaigns:



Flood Safety Awareness Week
(March 15-21):

http://www.weather.gov/btv/flood_awareness



Severe Weather Awareness Week
(April 26-May 2):

http://www.weather.gov/btv/severe_awareness



Open Burning Weather Awareness
(April):
http://www.weather.gov/btv/open_burning



The Hazard of Cold Water Boating
Particular caution is necessary early in the boating season across the North Country

Cold Water Awareness
(April - May):

http://www.weather.gov/btv/coldwater_awareness



Safe Boating Week
(May 16-22):

<http://www.nws.noaa.gov/os/marine/safeboating/>



Lightning Awareness Week
(June 22-27):

<http://www.lightningsafety.noaa.gov/>

More information on our local and national awareness campaigns can be found here:
http://www.weather.gov/btv/hazard_awareness

Reaching Out to Our Community... NWS Burlington's First Webinar

-Kimberly McMahon



We held our first live webinar on the topic of River Ice Processes, on the evening of Wednesday, February 11, 2015 to great success! There were 42 attendees, hailing from Vermont, New Hampshire, New York, New Jersey, Connecticut, Massachusetts and even Alaska!

Lead Forecaster, John Goff lead the webinar which covered how ice forms and breaks up on rivers, which can lead to ice jams. Quite the appropriate topic, since this winter has been very cold with one to two foot thick ice on rivers and streams! This presentation was educational, starting with the basics of ice formation on rivers in the winter. (You may have even learned a

new word, such as "frazil"!) John then explained how two different kinds of ice jams can form: freeze up jams in the beginning of winter, and break-up jams in late winter into spring. Both types can lead flooding and do occur in the North Country.

John rounded out the webinar with ice jam mitigation methods and more information on NWS hydrology operations, such as predicting the potential for ice jams and coordinating with officials. At the end of the webinar, John was able to answer a handful of questions from our attendees. We also received some great feedback! We hope to continue these about once a month or once every other month. When we schedule future webinars, we will post them on Facebook, Twitter and our webpage.

"Looking forward to the next one! It was super easy to join, watched right from my phone actually. I hope you guys continue to do these in the future."

– Jennifer Hannux via Facebook

"I missed the Webinar, where can I..."

You can watch it any time on our YouTube Channel:

<https://www.youtube.com/user/NWSBurlington>



"Very informative and interesting talk! Thanks!"

–Arlene Bird Guest via Facebook

Inside Our Website:

Michael Muccilli

The Daily Climate Maps

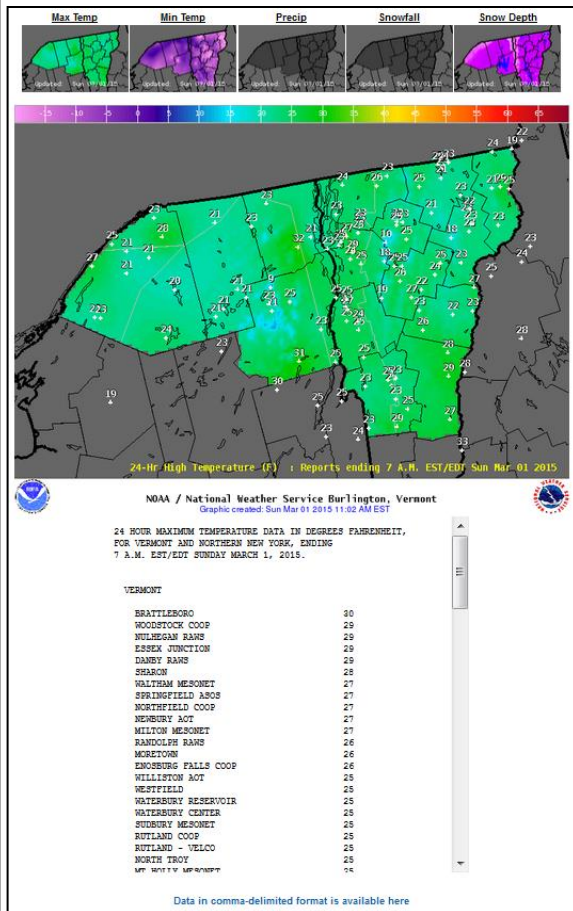
A light snow falls overnight; a rain falls in the afternoon; or you wake up to find a very cold morning; in all of these situations you may be wondering, just what were the reported weather conditions or how much fell in my neighborhood? There's an easy way to find that out.

The National Weather Service in Burlington creates maps each day between 10 and 11 AM showing conditions reported to us in the past 24 hours (7 AM – 7 AM) of reported high temperatures, low temperatures, precipitation amounts, snowfall amounts, and snow depth. We call these the Daily Climate Maps.

To find the Daily Climate Maps, visit our site and click on the link at the bottom left hand side of the page (Above).

These can be found on our website at <http://www.weather.gov/btv/climatemaps> or by going to our main page (<http://www.weather.gov/btv>), scrolling down to the bottom of the page, and clicking on “Daily Climate Maps” (See Above). From there you can find maps and listings of the past 24 hours of reported temperatures, precipitation, snowfall, and snow depth, as well as an archive of every day since May 11, 2007 (See Left). These reports are quality controlled by a member of the National Weather Service and come from automated stations, National Weather Service Cooperative Observer sites, and CoCoRaHS stations.

A screen capture of the Daily Climate Maps page. 24 hour reports of temperatures, precipitation, snow, and snow depth can be found, as well as an archive dating back to May 11, 2007 (Left).





The Four Seasons

Volume II, Issue I



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Michael Muccilli, Meteorologist



We Need Your Storm Reports!



Please report snowfall, flooding, damaging winds, hail, and tornadoes. When doing so, please try, to the best of your ability, to measure snowfall, estimate hail size, and be specific as to what damage occurred and when. We also love pictures!

For reports, please call:

(802) 863-4279

Or visit:

<http://www.weather.gov/btv/stormreport>



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