Prevailing Winds

Volume 5, Issue 1 May 7, 2015

Inside this Issue:

A Winter to Remember…

by Matt Doody, General Forecaster

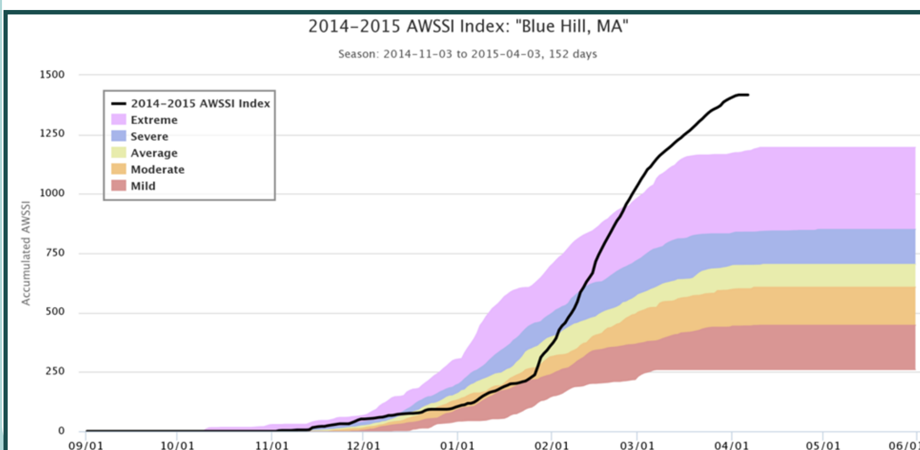
Charlestown, MA. Picture by Sarah Levy.

After Christmas, or even by mid-January for that matter, if you had told any random person you may meet that Southern New England would see one of its worst winters on record; they probably would have laughed at you. Growing up in Northern Maine, I assumed I had winter figured out. There would never be a winter here in Southern New England that would rival those of my youth. In fact, just before starting my career in the National Weather Service, Caribou, ME received its own seasonal snowfall record, at 198.5 inches. "There is nothing that winter could throw at us here that would surprise me," I thought to myself.

Wow, was I wrong.

All hyperbole and cliché aside this was a winter we will not soon, if ever, forget. Records were broken, some even smashed. However, the fact that these records were broken only during the span of about 5 weeks is what makes it truly amazing. With temperatures getting warmer by the day, let's take a look back at the winter that was. We will examine the numbers for all four of our area "climate" sites: Boston, MA (Logan International Airport), Providence, RI (TF Green International Airport), Worcester, MA (Worcester Airport) and Hartford, CT (Bradley International Airport).

While scientific proof that this was a severe winter is not really necessary, the folks at the Midwest Regional Climate Center have been calculating an index to describe the severity of any given winter. The index, known as the **A**ccumulated **W**inter **S**eason **S**everity **I**ndex (AWSSI), attempts to quantify winter severity by taking into account temperature, snowfall and snow depth among other factors. For more information on how it is calculated and scored, please see the index webpage: http://mrcc.sws.uiuc.edu/research/awssi/indexAwssi.htm. If you need the proof to show your friends and family, look at this graph for Blue Hill in eastern Massachusetts for this winter season, which is well above the "extreme" quartile for the AWSSI.



Cont'd on page 2

Cont'd from pg 1…A Winter to Remember

Andover, CT. Picture by Jennifer Lynn.

Meteorological winter is generally December, January and February only, but total snowfall will include November's snow amounts as well. However, it should be noted that winter really started in late January, as the large majority of the snowfall and coldest temperatures occurred during the latter half of January and February. In fact, by the beginning of 2015, Boston had only received 2.9 inches of total snowfall, and 2.5 inches in Providence, a far cry from the record breaking snowfall that was to follow.

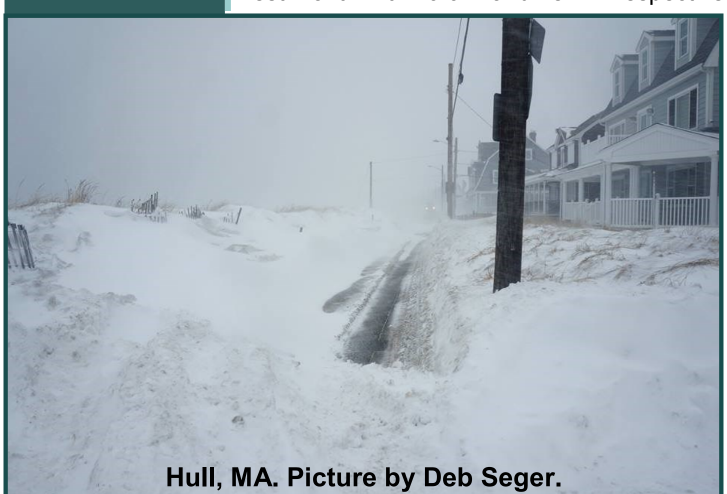
Ending on January 24th a moderate storm with total snowfall of 2.0 to 9.0 inches fell, but as soon as the warnings expired the Blizzard Watches went up for a significant and potentially crippling snowstorm. Ending on January 26th, the first Blizzard of 2015 brought 20.0 inches to nearly three feet of snowfall, combined with strong wind gusts 50+ mph. However, during the month of February, there were three storms in which more than a foot of snowfall fell. In some locations, such as eastern Massachusetts, as much as a foot and a half to two feet fell in each of these storms. These storms wrapped up on the 2nd, 7th and 14th. We do not always even experience one storm of this magnitude during a season, but to have four (with several smaller snowfalls in between) is almost unprecedented.

Although the strongest storm occurred during the month of January, it was during the month of February when many of the records fell. Three of the four climate sites actually broke their all-time February snowfall records: Boston at 64.8" (previously 41.6 inches in 2003), Providence at 31.8" (previously 30.9" in 1962), and Worcester at 53.4" (previously 45.2" in both 1996 and 1962). For Boston and Worcester, these totals also exceeded the all-time monthly snowfall which for Boston was 43.3" and for Worcester was 50.9 inches both in January 2005. Not to be forgotten, even though Hartford did not exceed its monthly or February snowfall, it did reach 3rd place at 31.9" for the month.

Ending the month of February also marks the end of the meteorological winter. Both Boston and Worcester reached their snowiest December through February season on record; Boston just shy of the century mark with 99.4" and Worcester just over with 101.4".

While snow totals such as these astonish, the amount of time in which the snow fell is awesome. Boston had the two highest 7 day total snowfall values on record: the second, between February 9 and February 15 at 33.2" and the first between January 27 and February 2 at 40.5." During that same week, Worcester reached 49.9", the highest 7 day total on record.

For we Southern New Englanders snow is nothing new, but even this was a lot to try and shovel. However, shoveling may have not seemed so bad had it not been so cold! Not only was this one of the snowiest winters on record, it was also one of the coldest. In fact, even though no snowfall records were broken, Hartford during the month of February gained the dubious privilege of experiencing its coldest month ever on record at an average of 16.1°F. This was also achieved at Worcester, with an average monthly temperature of 14.2°F. Even though Boston and Providence did not make number one, they were not far beyond at the second coldest month with 19.0°F and 18.4°F respectively. There were several multi-day stretches where each of the four cities failed to reach freezing.



Hull, MA. Picture by Deb Seger.

With the season coming to a close however, we save the "best" stat for last, total seasonal snowfall. By now we know the big winner, Boston which broke its all-time seasonal snow record of 107.6 set in 1995-1996, reaching 110.6 inches at the time of this writing. Although Providence's record status is still being officially verified, at 76.2" this winter, that is more than double the seasonal normal. Worcester is still just short of its record of 132.9 set in 1995-1996 at 119.7". Only Hartford didn't quite make it there this time around, but it did crack the top 20 snowiest winters on record.

There are several other ways to slice and dice the statistics, highest 10, 20 and 30 day snowfall totals were also topped out. No matter how you read it, this was one to remember. The immortal Ron Burgundy's closing statement was definitely meant for us having survived this winter, "stay classy Southern New England."

MIC Musings

by Robert Thompson, Meteorologist-in-Charge

We've talked about Decision Support Services (DSS) and have shown examples in action for support of special events like the Boston Marathon and July 4th Esplanade activities. This winter gave us the opportunity to showcase our DSS capabilities when the event *is* the weather.

Let's start with a little history. December 13, 2007 gave us the impetus to step up DSS to a new level. We had a great forecast for that day – about as perfect a forecast as one might imagine on the timing, amount, and intensity of a snow event. We even participated in a conference call or two with the emergency management community. Plans were put in place to dismiss public employees early and dismiss some schools early. The snow arrived as scheduled and quickly became heavy as promised. And then the scene became horrific. Commuters clogged main arteries as the snow came down fast and heavy. Even school buses got caught up in the gridlock. Although many did leave work before the snow began, they didn't perceive a sense of urgency and opted to stop along the way home and do some holiday shopping. Men, women, and children were stranded on the roads for hours – some up to 8 hours. Nearly everyone had a story to tell on that day. The forecast was excellent, the intentions of public officials were noble, but the impact of that 6 to 8 inch snow event on a pre-holiday afternoon was underappreciated until too late. We from the NWS and our public safety partners learned a lot from that day and have come a long way since. The response to the incredible January through February 2015 winter storm blitz demonstrates just how far we've come.

The late January through February record-breaking snow and cold set the stage for record breaking DSS from our office. As the snow piled high, the level of DSS from this forecast office rose still higher. Forecasters disseminated over 120 emails (most with customized briefing packages) and held more than 60 conference calls for emergency managers (at the federal, state, and local levels), the Governors of Massachusetts and Rhode Island and their Cabinet members, transportation officials, and other key decision-makers throughout southern New England. Importantly, the DSS information focused on life and property threatening impacts, not just how much snow and when. Hazardous Weather Outlooks, Area Forecast Discussions, a myriad of winter weather statements, experimental snowfall probability maps, and social media communication on an unprecedented scale kept people informed before and during each storm. In just the late January through February timeframe, the Taunton Weather Forecast Office (WFO) gained 8900+ followers on Twitter and 18,000+ likes on Facebook. Forecasters issued a virtual blizzard of 432 Facebook posts. WFO Taunton's tweets made 1,224,917 impressions on January 27th alone! Information disseminated through a variety of means led to more effective and coordinated safety messaging among the NWS and federal, state, and local officials. The lack of direct weather-related fatalities or other crippling dimensions from this winter storm onslaught compared with lesser winter events in the past suggests that the Taunton WFO took a major step forward in promoting the area's resiliency and validating the value of the NWS strategic Weather Ready Nation goal.

Let there be no mistake, however. The success of DSS in enabling more effective responses to hazardous weather rests upon forecast accuracy and timeliness. And the roots of valuable and useful forecasts reach into the fertile soil of good science, nurtured by forward-thinking research to operations concepts, technological advances, and aggressive staff training. Warning decision-making was as solid as the accumulated snow and ice. Winter Storm Watches achieved an average lead time of 52 hours, and Winter Storm Warnings provided people with an average lead time of 35 hours. Similarly impressive, forecasters accomplished average lead times of 45 and 32 hours for Coastal Flood Watches and Warnings, respectively.

We should not stop at the numbers. The success of this office's forecasts and DSS during the winter storm blitz can ultimately be traced to relationships. The collaborative relationships established between operational forecasters and academia blazed the trail from research to operations. The collaborative relationships nurtured for years between the WFO staff and emergency managers/other decision-makers built the trust that lends credibility to the products and services issued by this office.

Finally, consider not only the December 13, 2007 event we started with, but also other past events like the Blizzard of 1978 that crippled the region for over a week. A large part of the story for this winter lies in what didn't happen! There were hardly any stranded motorists during this entire epic winter storm blitz, and commerce rebounded relatively quickly after each big snow storm. The DSS provided to key decision-makers and top notch weather forecasting greatly mitigated the impact on public safety and commerce and served to protect lives and property, the central goal of the NWS mission.

"Let there be no mistake, however. The success of DSS in enabling more effective responses to hazardous weather rests upon forecast accuracy and timeliness. And the roots of valuable and useful forecasts reach into the fertile soil of good science, nurtured by forward-thinking research to operations concepts, technological advances, and aggressive staff training."

Learn more about the NWS's effort to become a Weather Ready Nation: http://www.nwsnoaa.gov/com/weatherreadynation/

Amateur Radio Operations: Blizzard Activation

by Rob Macedo, SKYWARN Coordinator

Above: North Chelmsford, MA after the January 26th-27th Blizzard. Photo By: KC1AJJ-Tim Miranda

The Winter of 2014-2015 was record breaking for the city of Boston and Blue Hill Observatory in Milton, MA. You could also say that it was very rough across much of southern New England particularly in central and eastern parts of the region. It is rare that a winter season brings two blizzards to the region but the 2014-2015 season did. The 2 blizzards brought significant snowfall rates, strong winds and coastal flooding to the region. It also prompted 2 very long duration activations at WX1BOX, the Amateur Radio station at the National Weather Service (NWS) in Taunton, Massachusetts.

For both blizzard activations, Rob Macedo-KD1CY and Noah Goldstein-KB1VWZ staffed the WX1BOX Amateur Radio Station. For Noah, he has operated at NWS Taunton several times over 2014 but it was his first long duration and overnight activations. He did a tremendous job and Noah made the operation flow that much easier during the very long and busy SKYWARN activations.

Starting with the January 26th-27th blizzard, snow moved in from southwest to northeast across Southern New England. Snow was light to moderate in intensity at the onset during the day on Monday. As we moved into the overnight hours, snow and wind intensity picked up. Wind gusts of hurricane strength occurred on the island of Nantucket. Even on Cape Cod, wind gusts ranged between 55 and 70 MPH. These strong winds caused isolated pockets of tree and wire damage with more extensive wind damage on Nantucket as we moved into the day on Tuesday. Snowfall rates of 2-3" were common throughout the day. Blizzard conditions were occurring throughout southern New England.

Coastal flooding commenced across much of East Coastal Massachusetts, Cape Cod and Nantucket Island during the Tuesday morning (January 27th) high tide. This was the worst of the high tide cycles affected from this storm. A widespread moderate to pockets of major coastal flood episode impacted much of the coastline especially in the South Shore of Massachusetts and Cape Cod. Some of the hardest hit communities included Hull, Scituate, Marshfield, Plymouth, Sandwich and Nantucket, MA. In Sandwich, MA, 10 homes were severely damaged from coastal flooding.

The heavy snow and blizzard conditions continued through much of the day Tuesday. The PART Team SKYWARN Net on the 146.955-Westford repeater provided hourly snowfall reports documenting the 2-3" per hour snowfall rates as they overspread their area. Amounts of 24-30" with isolated higher amounts were recorded. In fact, KA8SCP-Terry Stader reported 35.8" of snow in Westford, Massachusetts. We also received reports via the Waltham and Boston Repeaters. North Shore SKYWARN was active on the 145.47-Danvers Repeater with periodic SKYWARN nets providing snowfall, coastal flooding and damage reports during the blizzard.

Norfolk County SKYWARN provided reports every few hours with final snowfall totals in the 18-26" range across their area. Similar reports of heavy snow were recorded all across central and eastern Massachusetts, northeast Connecticut and Rhode Island. Lower snow amounts occurred in immediate western Massachusetts and western Connecticut.

Sandwich, MA after the 26-27th January Blizzard. Photo by: W1WAL-Bill Lapine

Cape Cod and Islands ARES-SKYWARN Net was run hourly and doing 'double duty'. Not only were SKYWARN reports of damage and snowfall being received but they also were reporting in shelter statistics for the Cape Cod Mutual Aid Coordination Center (MACC) and had several EOCs and shelters on frequency. Pockets of wind damage were across eastern Massachusetts and Rhode Island. The snow was not of a heavy and wet consistency with the highest winds along the immediate coast. This prevented the significant wet snow and damaging wind event that had occurred in the February 2013 blizzard. The exception was Nantucket where hurricane force wind gusts and heavy wet snow caused the entire island to be without power and have some phone service interruptions.

Cont'd on page 5

Cont'd from pg 4…Blizzard


Heavy snowfall in Harwichport, MA from the February 14th-15th, 2015 Blizzard - Photo by: KC1KM-Jim Leavitt

A federal disaster declaration was recently made for the January 26th-27th, 2015 Blizzard which lasted about 30 hours and resulted in several hundred reports of snowfall, wind damage, and coastal flooding being received. The activation was 28 hours long at the WX1BOX Amateur Radio station. Blizzard criteria were met for extended periods of time at Marshfield, MA, Hyannis, MA, Nantucket, MA, Boston, MA, Chatham, MA, Worcester, MA, Westerly, RI, Newport, RI and Beverly, MA.

On February 14th-15th, after several rounds of winter storms including a significant major winter storm on February 8th-9th, another blizzard was taking aim on eastern New England. This blizzard featured 2 rounds of very heavy snow. The first on Saturday evening of Valentine's Day over portions of eastern New England and the second round on Sunday with the peak during the morning hours. Once again, WX1BOX Amateur Radio station operations were active via Rob-KD1CY and Noah-KB1VWZ.

With the initial round of heavy snow, snowfall rates of 1.5-2.5" per hour were common over south coastal Massachusetts and Rhode. Snowfall amounts of 5-7" were reported with the first round of snow in this area and across northeast Massachusetts. After a lull in the snowfall, a heavy snow band took shape over the North Shore of Massachusetts. Within a couple of hours it expanded fairly rapidly and started diving farther south. Thunder-snow was reported in the Metro Boston area, South Shore and south coast of Massachusetts. Snowfall rates were very intense with 2.5-5" per hour range. Winds increased as well creating blizzard conditions in several locations. Wind gusts as high as 45-65 MPH range caused isolated pockets of wind damage and power outages.

Total storm snowfall across much of Eastern New England was in the 10-18" range with isolated higher amounts to 20"+ recorded. SKYWARN Nets were once again active on a periodic basis all across the region including the PART SKYWARN Team Net, North Shore SKYWARN, Norfolk County SKYWARN, Hartford-Tolland County CT SKYWARN, Windham County CT SKYWARN, and South Shore SKYWARN. The Cape and Islands ARES/SKYWARN Net was again active with both ARES and SKYWARN reporting active on their repeater through various net controls. Many of the various net control operators and Amateur Radio and non-Amateur Radio SKYWARN Spotters that were involved in the January 2015 blizzard were involved in the February 14th-15th, 2015 blizzards.

Blizzard conditions for the February 2015 blizzard were met in Hyannis, MA, Nantucket, MA, Chatham, MA, Marshfield, MA, and Falmouth, MA for between a 3-4.5 hour period.

The amount of snowfall that was already on the ground and the rate at which the snow came down in the February blizzard particularly on February 15th, 2015 led to impassable roads due to the heavy snow cover, the lack of a place to plow the snow, and drifts due to high winds. An inordinate number of these reports were received during this blizzard and included some major highways.

Minor to moderate coastal flooding was reported at the time of the Sunday Morning high tide across portions of East Coastal Massachusetts and Cape Cod. The coastal flood event from the February 2015 blizzard was not as significant as the January 2015 blizzard but had more impact than normal given the coastal flood damage done in the previous blizzard. Locations affected once again included similar towns as the January blizzard including Hull and Marshfield, Massachusetts.

There were many winter storms that affected the region in this record 2014-2015 Winter Season for Boston. Many of these storms were handled with the SKYWARN Self-Activation and the biggest of those winter storms was the February 8th-9th major winter storm which brought near blizzard conditions to East Coastal Massachusetts and a band of 20-28" of snow to that area embedded in a wide area of 10-20" of snow.

Thanks again to all SKYWARN Spotters for their support during this historic 2014-2015 Winter Weather Season. The Amateur Radio Staff at WX1BOX, the Amateur Radio station at NWS Taunton, looks forward to working with you as we head towards the severe weather season. We hope to hear from you when weather begins to meet or reach the reporting criteria. If interested in joining the SKYWARN Announcement email list sign-up (you don't have to be an amateur radio operator to join): contact Rob Macedo-KD1CY: rmacedo@rcn.com

"It is rare that a winter season brings two blizzards to the region but the 2014-2015 season did. The 2 blizzards brought significant snowfall rates, strong winds and coastal flooding to the region. It also prompted 2 very long duration activations at WX1BOX, the Amateur Radio station at the National Weather Service (NWS) in Taunton, Massachusetts."

Learn more about becoming an Amateur Radio Operator: http://www.wx1box.org

NWS Miami Forecaster Sees What Winter is All About!

by Dan Gregoria, NWS Miami Senior Forecaster

Above: Snowiest 7 Days in Boston brought to you by Dan Gregoria

From January 26 through February 6, 2015 I had the opportunity to work a temporary duty assignment at National Weather Service (NWS) Boston – what an exciting experience! Coming from the NWS Miami office, I knew this would be an exciting and dramatic change. Having grown up in Minnesota, I've seen my share of harsh winters, but little did I realize I would be in Boston for its two snowiest weeks on record!

I just made it into Boston Logan the day before the "Blizzard of 2015". Weeks leading up to my assignment at Boston, I stayed in tune with the weather in southern New England. There was talk of it being one of the least snowiest winters to date before my arrival. Wow did that change in a hurry! In fact, during my stay, a whopping 66.7 inches of snow fell at Boston Logan! This broke the all-time 30-Day snowfall record…over a period of just 17 days! Needless to say, some of the forecasters at NWS Boston thought I brought a curse to the area.

My first shift there was all about the incoming blizzard. I realized quickly that there was a lot of in-office and intra-office coordination/collaboration being done while forecasting for the blizzard, along with decision support services provided to local and state officials. There was a lot of moving parts during this time due to the high impact this storm would have on the area. I supported the social media desk, sending out storm information as well as interacting with concerned residents. It was fun to be a part of the team during this big winter event!

"I will never forget my time at NWS Boston. Being a part of that awesome and dedicated team...was such a privilege."

This experience really gave me insight into the challenges of winter weather forecasting. Not only does a forecaster need to determine the chance of precipitation, they also need to determine the precipitation type based on thermal profiles of the atmosphere as well as the intensity. During my time there, it was mostly cold enough to support all snow, though a mix and even some rain did manage to sneak across the Cape and the Islands during one of the storms I witnessed.

Other forecast challenges include the storm track and where the heavy snow will set up. One thing I learned while working at NWS Boston was the use of a local benchmark -- 40°N 70°W. Storm tracks near this benchmark tend to have a high impact to the area, whereas storms too far offshore (east of the benchmark) result in little or no snow to the area. Storms that track west of the benchmark (nicknamed "inside runners") tend to reduce snow prospects. These rules of thumb are useful, but first forecasters must determine the most probable forecast track and then comes the challenge of determining where the heaviest snowband(s) will occur. Once forecasters assess the situation, they then collaborate between the neighboring offices so forecasters can express their thoughts on the upcoming event. Collaboration like this is useful to help coordinate watches/warnings and worked extremely well during "The Blizzard of 2015" as well as subsequent winter weather events during my temporary assignment at NWS Boston.

I will never forget my time at NWS Boston. Being a part of that awesome and dedicated team during the record breaking snow was such a privilege. Southern New England should be proud of the team at NWS Boston! That being said, I would take my palm-tree lined commute over snow-packed roads any day!!

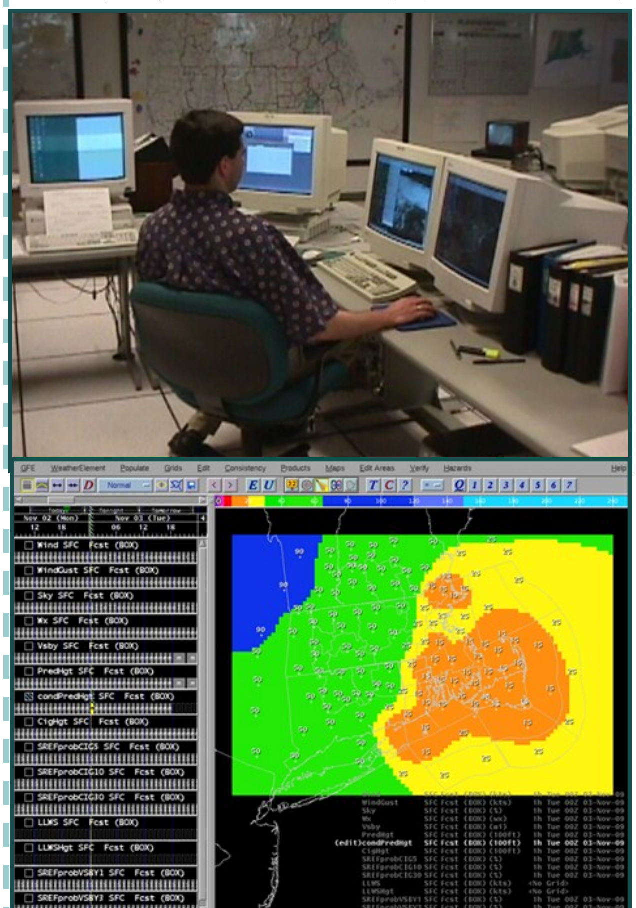
Picture: Boston area commute (top); Miami area commute (bottom)

How NWS Forecasts are Prepared

by Joseph Dellicarpini, Science and Operations Officer

Have you ever wondered how we produce our forecasts? Over the past winter, I'm sure you saw hundreds of snowfall forecasts, temperature, wind chill, and wind gust maps issued by our forecasters. Many people think we simply draw them on our computer workstations, but in reality, it's a much more involved process!

In the past, National Weather Service (NWS) forecasters manually typed forecasts, originally on teletype machines and eventually on computers. Then about 15 years ago, new software was implemented at NWS offices nationwide, known as the Graphical Forecast Editor (or GFE) that allowed forecasters to produce graphical forecasts. No longer were forecasters limited to issuing forecasts by using words - the explosion of the Internet and social media provided an easy way to share forecast graphics for a variety of users.



Then and Now: Before 2003, forecasters manually typed forecasts (top). Today, forecasts are prepared graphically on the Graphical Forecast Editor (bottom).

GFE allows forecasters to incorporate model guidance and observed data to produce high-resolution forecasts of temperature, sky cover, wind, and precipitation (to name a few). But we also produce forecasts of wave heights for boaters, ceiling and visibility for pilots, rip current risk for beach-goers, and water level for those along the coast who can be affected by coastal flooding.

So what about those snowfall maps? As I mentioned before, it's a pretty involved process. First, the forecaster populates hourly temperatures, which can affect precipitation type (rain, sleet, or snow) as well as how much accumulates. We typically use 36 degrees for rain versus snow, and 34 degrees to start accumulation, but these can be changed on the fly depending on the situation at hand. Next, the forecaster populates the amount of precipitation (in liquid) in 6-hour increments. Then, tools are used that convert the liquid to snowfall based upon the temperatures which were input into the system, again using 6-hour increments. Finally. a storm total is determined by adding up the 6-hour amounts during the time period of the storm. This gives us a "first guess" as to how much snow will fall across the region. Typically, some adjustments are made to better fit the forecaster's thinking, and based upon collaboration with neighboring offices and the Weather Prediction Center in Camp Springs, MD, in order to present a common picture. On many days, it takes over an one hour to end up with the "final" forecast you see on our web page and on social media!

Keep in mind what we produce from our office in Taunton is just one piece of a nationwide puzzle that includes more than 120 forecast offices which provide data for the National Digital Forecast Database (NDFD). The NDFD contains a seamless mosaic of digital forecasts which cover the U.S. and its territories. You can find out more about the NDFD by visiting http://www.nws.noaa.gov/

@NWSBoston

Be sure to find

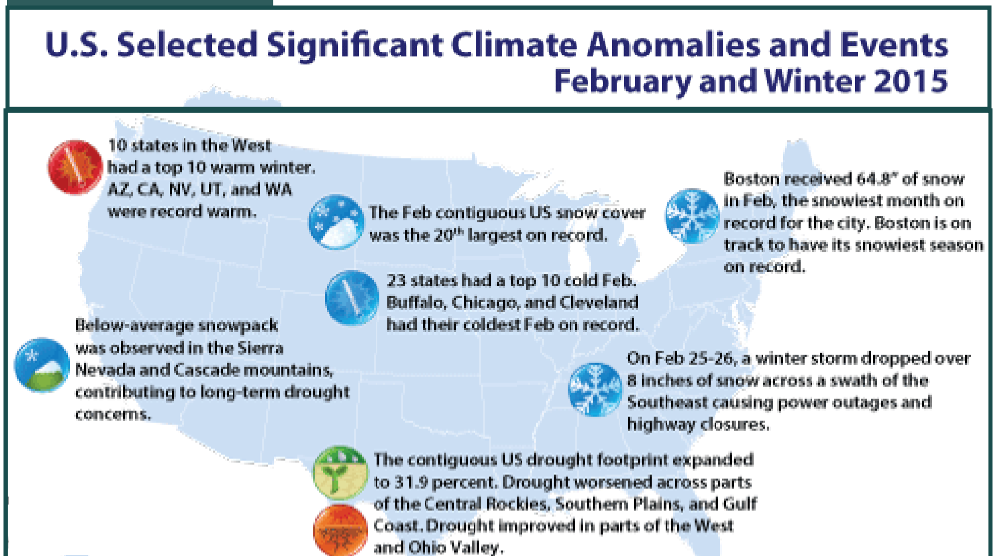
NWS Boston

on Twitter

http://www.twitter.gov/NWSBoston

Quarterly Climate Outlook & Impact

by Ellen Mecray, NOAA Eastern Region Climate Director



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 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 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 ski visits this year. Sugarloaf Ski Resort, in Carrabassett Valley, ME, was closing in on its best season ever.

Warmer than normal sea surface temperatures of 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 records when it received 64.8 inches of snow in February, which is more than the city normal gets in an entire snow season.

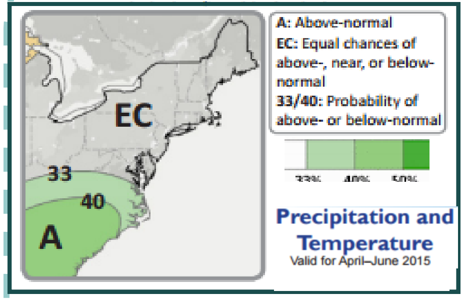
Cont'd on page 9

2015 Preparedness Week Information

- **March 16th - 20th:** Flood Preparedness Week
- **April 27th - May 1st:** Severe Weather Preparedness Week
- **May 18th - 22nd:** Safe Boating & Beach Safety Week
- **June 22nd - 26th:** Lightning Safety Preparedness Week
- **July 20th - 24th:** Hurricane Preparedness Week
- **November 2nd - 6th:** Winter Weather Preparedness Week

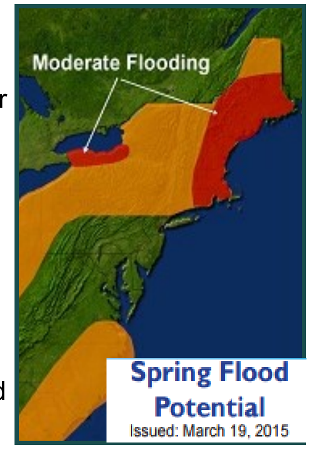
http://www.nws.noaa.gov/om/severeweather/severewxcal.shtml

Cont’d from pg 10…Climate Outlook & Impacts



Regional Outlook:

The Climate Prediction Center calls for an increased chance of above normal precipitation from April-June for the Carolinas, most of Virginia and southern West Virginia. Areas marked by a 40 have a 40% to 50% chance of being wetter than normal, a 33.3% chance of being near-normal, and less than a 33.3% chance of being drier than normal.



Areas marked by a 33 have a 33.3% to 40% chance of seeing above-normal precipitation, a 33.3% chance of near-normal precipitation and less than a 33.3% chance of below-normal precipitation. The forecast is based on computer models and typical El Nino weather patterns. The rest of the region falls under equal chances, marked EC. These areas have a 33.3% each of above-, near-, or below-normal precipitation.

The potential for river flooding during the spring is near to above normal for most of the region, according to National Oceanic and Atmospheric Administration. Across eastern New England, the potential for spring river flooding is above normal. Snow water equivalents are above normal for this time of the year in that area. If the Northeast gets a period of warm weather combined with heavy rainfall events, then the possibility of moderate flooding may occur. In northern New England and northern New York, extensive river ice increases the risk for ice jam flooding. Minor River flooding is possible across the rest of New England, New York and northern Pennsylvania.

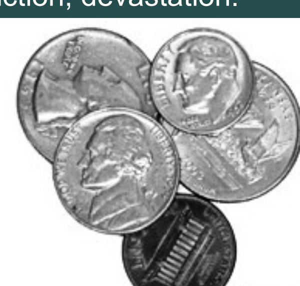
Skywarn Spotters, don’t forget to call the National Weather Service and report the following:

- **What you see (hail, wind, tornado etc.)**
- **Your location**
- **The time you witness the event**
- **Your spotter ID**

SKYWARN

What to report to the NWS

Hail		Wind	
Plain M&M	0.50 inches	25-31 mph	Large tree branches move, telephone wires begin to “whistle” .
Penny	0.75 inches	32-38 mph	Large trees sway, becoming difficult to walk.
Nickel	0.88 inches	39-46 mph	Twigs and small branches are broken from trees, walking is difficult.
Quarter (Severe)	1.00 inches	47-57 mph	Slight damage occurs to buildings, shingles are blown off of roofs.
Half Dollar	1.25 inches	58-63 mph (Severe)	Trees are broken or uprooted, buildings damage is considerable.
Ping Pong	1.50 inches	64-72 mph	Extensive widespread damage.
Golf Ball	1.75 inches	73+ mph	Extreme destruction, devastation.
Lime	2.00 inches		
Tennis Ball	2.50 inches		
Apple	3.00 inches		
Grapefruit	4.00 inches		
Softball	5.00 inches		



Cooperative Observer Program Corner

by Kim Buttrick, Cooperative Program Manager

Pictured: Kim Buttrick, Nichole Becker, Hendricus Lulofs, Doug Webster, his wife Linda, and Robert Thompson

John Campanius Holm Award

This award is to honor cooperative observers for outstanding accomplishments in the field of meteorological observations. It is named for a Lutheran minister, the first person known to have taken systematic weather observations in the American Colonies. Reverend Holm made observations of climate without the use of instruments in 1644 and 1645, near the present site of Wilmington, Delaware. No more than twenty-five Holm awards are given annually. The certificate is signed by the Administrator of the National Oceanic and Atmospheric Administration (NOAA).

On October 15, 2014, Mr. Douglas A. Webster, a Cooperative Weather Observer from Hudson, NH, received the prestigious John Campanius Holm Award for his outstanding accomplishment in the field of meteorological observations. Presenting Doug's award were personnel from 2 National Weather Service (NWS) offices – NWS Taunton's Meteorologist-in-Charge Robert Thompson and Cooperative Program Manager Kimberly Buttrick and NWS Gray's Meteorologist-in-Charge Hendricus Lulofs and Observation Program Leader, Nichole Becker. Also presenting was Doug's former colleague, Michael Abair, a Meteorologist with the Federal Aviation Administration's Air Routing Traffic Control Center in Nashua, NH. Doug's wife Linda was also present for this celebratory event. To honor Doug, all parties rendezvoused at his home for a more intimate gathering. It was an afternoon of good company and good conversation over sandwiches, chips and Dunkin Donuts' coffee and donuts. For Doug, weather is a passion that is not just his hobby but his full time job as well. Doug works for DTN/The Progressive Farmer out of Andover, MA where he is a Senior Agricultural Meteorologist. Doug provides agricultural forecasts for North and South America.

On July 7, 2014, Mr. Stacey G. Swift, a Cooperative Weather Observer from North Foster, RI received the prestigious John Campanius Holm Award for his outstanding accomplishment in the field of meteorological observations. Presenting Stacey's award were NWS Taunton's Meteorologist-in-Charge Robert Thompson, Hydrologist-in-Charge David Vallee and Cooperative Program Manager Kimberly Buttrick. Stacey's wife of 53 years, Marjory, was also present. To celebrate, Stacy and company dined for lunch at Cindy's Diner and Restaurant in North Scituate, RI – a favorite of Stacey's. Lunch was full of lovely, colorful and competing stories from husband and wife! At NWS Taunton, Stacey Swift is known for being anything but "swift" when he calls in his weather reports. As a weather enthusiast, Stacey always adds multiple layers of detail – the story behind the story. At age 84, Stacey's zest for life spills over in the community where he is a substitute school teacher and where he volunteers with the Swamp Meadow Community Theatre as an actor and singer.

Pictured: Kim Buttrick, Marjory Swift, Stacey Swift, Robert Thompson and David Vallee

Cont'd on page 11

Cont'd from pg 10…COOP Corner

Coop Observer Recruitment Blog:

We are looking to recruit Cooperative (COOP) Weather Observers who would be willing to take daily precipitation measurements, to include snowfall. This is a commitment that entails daily weather observing 365 days a year. It is a tall task to commit to daily observations 365 days a year, but if you have a passion for weather, desire to be a citizen soldier of climate, and would be willing to volunteer we could use your skill set. We are looking to recruit precipitation only Coop Observers in the following areas:

1) Outer Cape Cod in the areas of Eastham, Wellfleet, Truro or Provincetown.
2) On the island of Nantucket
3) Coventry, Rhode Island
4) Far northwest Massachusetts in the Charlemont area.

We would provide you with the necessary equipment and training. Please contact our Cooperative Program Manager, Kim Buttrick (Kimberly.buttrick@noaa.gov), if you are interested.

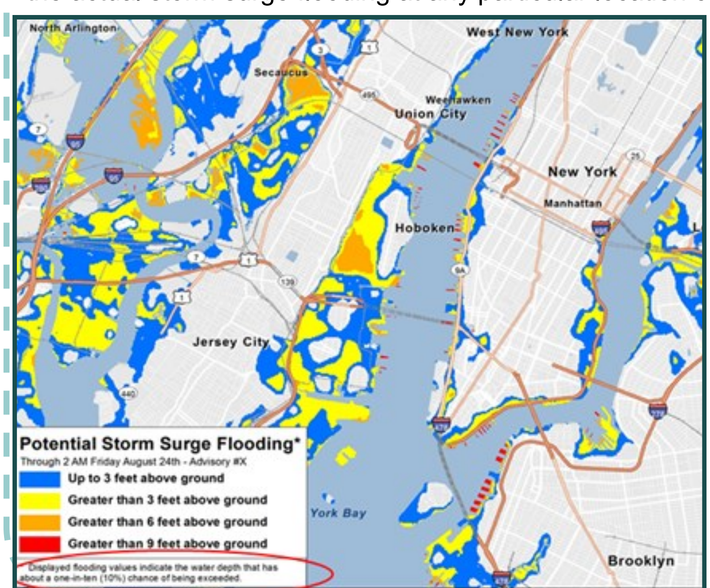
For the latest weather information, check out:

www.weather.gov/boston

New Experimental Storm Surge Product

by Glenn Field, Warning Coordination Meteorologist

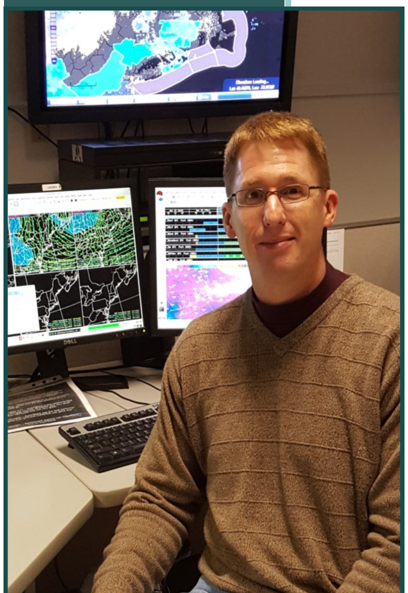
Last year, the National Hurricane Center (NHC) began showing an experimental potential storm surge flooding map, or what we refer to as an "inundation map," on their website when an actual hurricane warning was in effect. This map is computed based on several runs of the Sea, Lake, and Overland Surge from Hurricanes (SLOSH) model. An example of the output, for a hypothetical storm hitting New York City, is shown below. Very important: Note that the datum here is not Mean Lower Low Water – or Mean Sea Level – it is ABOVE GROUND LEVEL at that location. So, topography is already taken into account. If it says it'll be three feet, it means it will be taller than a toddler standing up at that location. The map is intended to show a reasonable worst-case scenario, with only a 1-in-10 chance that the actual storm surge flooding at any particular location could be higher than the values shown on the map. So, it's not what is expected, but what one should definitely plan for. Not planning for a reasonable worst case scenario could be devastating! (What would you do if someone told you there was a 1-in-10 chance of getting hit in the head by a baseball bat swung by a major leaguer?)



In 2015, those maps will again be available on the NHC website, usually within 48 hours of a landfalling hurricane. New this year, however, will be an experimental Storm Surge Watch/Warning graphic, which is intended to introduce the idea of a new product – the Storm Surge Watch/Warning – which could be implemented as early as 2016. Many factors influence the magnitude of storm surge, including storm intensity; storm size; storm forward speed; angle of approach to the coast; shape of the coastline; width and slope of the ocean bottom; local features such as barrier islands, bays, and rivers.

To learn more information about storm surge, visit: http://hurricanes.gov/surge

Getting to know your NWS Team: Matthew Belk, Senior Forecaster



Matthew Belk decided he wanted to be a Weatherman at 4 years old. But he had some additional inspiration on his way to college. One evening in the Worcester area when Matt was 11 years old, Matt was in a car with his Mom and siblings. Mom was taking all of them to meet up with his Dad for dinner. There was a little bit of rain, but nothing much. Then seemingly out of nowhere, their car was struck by lightning. After a flash, a bang, a circular melted hole in the windshield, there was a singed spot in the front seat between Matt and his Mom. There were minor injuries, but thankfully no one was seriously hurt.

Consistent with his childhood dream, Matt majored in Meteorology at The Pennsylvania State University. During semester breaks, Matt used to visit the staff at the National Weather Service Office (WSO) in Worcester, MA. The staff at WSO Worcester would give Matt the previous day's weather maps, which he'd take home to analyze.

In the summer of 1991, Matt had the privilege to intern for Bob Copeland at WCVB TV in Needham. The very next year, Matt was able to combine his interests in weather, water and computer programming as a Hydrologist Intern at the National Weather Service Ohio River Forecast Center, in Cincinnati, Ohio. Since graduating with a B.S. degree in Meteorology in 1993, he has worked at various NWS Offices across the eastern USA, before returning to his native Massachusetts in August, 2001, when he joined the Weather Forecast Office in Taunton.

In July 2007, he became one of the Senior Meteorologists on staff. As a Senior Meteorologist, Matt is responsible for leading the on-duty operations team, and ensuring an effective flow of weather information. Matt also is the Hurricane Program Leader for the office, working closely with federal, state and local partners to help prepare southern New Englanders to deal with tropical storms and hurricanes. He also maintains the digital weather forecasting software, including all our text product formatters and tools.

Besides forecasting, Matt is involved with several national program efforts including: digital aviation services, the new tropical storm surge watches and warnings being experimented with this year, and numerous technical teams associated with the digital forecast system used by the NWS. As a result of these efforts, Matt was the recipient of both the 2014 Greater Boston Federal Executive Board Specialty Employee of the Year award, and a 2014 National Isaac M. Cline award for Program Management.

Outside of work, Matt likes to travel, hike and bike with his wife, Nicole. He also spends time with their "fur family" of three dogs and two cats. Matt also enjoys hanging out with his nephews and nieces, including a most recent addition this past March!

facebook

Like

Be sure to find

NWS Boston

on Facebook

http://www.facebook.com/US.NationalWeatherService.Boston.gov

Visit to a Remote Sensor: The Islands' ASOS

by Michael Esip, Electronic System Analysis

Nantucket Airport*—Located on the south central portion of the Island.*

This is the third of several articles that will take you to various remote sensors assigned to the National Weather Service (NWS) Taunton County Warning Area. Each article will provide a little information with regard to a site and sensor. In this article you will visit the Automated Surface Observation System (ASOS) sites at Martha's Vineyard Airport (MVY) and Nantucket Memorial Airport (ACK).

The ASOS system at all airports is fairly standard from site to site. In many cases, what differentiates one site from another are the unique characteristics that apply to those sites. Those characteristics could include physical equipment and airport location, accessibility, site climate, local wildlife, or a host of other sundry characteristics. In the cases of MVY and ACK, both are classified as Federal Aviation Administration (FAA) ASOS sites meaning they belong to the FAA and are maintained by the NWS.

What make both ACK and MVY unique are the locations of the airports at which both ASOS sites reside. Both are on islands off the coast of Massachusetts which hosts a very affluent summer colony. MVY is only a few miles offshore and due south of Woods Hole, while ACK is 30 miles offshore and south of Dennisport. By policy, preventative maintenance must be performed four times per year at each site. Additionally, visits resulting from restorative maintenance can come at any time. Technicians visiting these sites must be prepared for any unforeseen issue or unexpected part replacement they find necessary during site visits. As a result, most maintenance visits require travel with an ASOS vehicle carrying a full complement of parts, requiring travel via Steamship Authority. These visits can be challenging to schedule and can be quite costly. Restorative maintenance does offer a little flexibility with regard to travel. If a restorative issue can be diagnosed to a specific part small enough to carry on an aircraft, a technician can then fly from either New Bedford or Hyannis to either airport to achieve the restoration. Typically, good weather is necessary during any maintenance visit in order to avoid travel delays using a commercial carrier and the possible reluctance of the local airport authority, to release the ASOS should it need to be shut down.

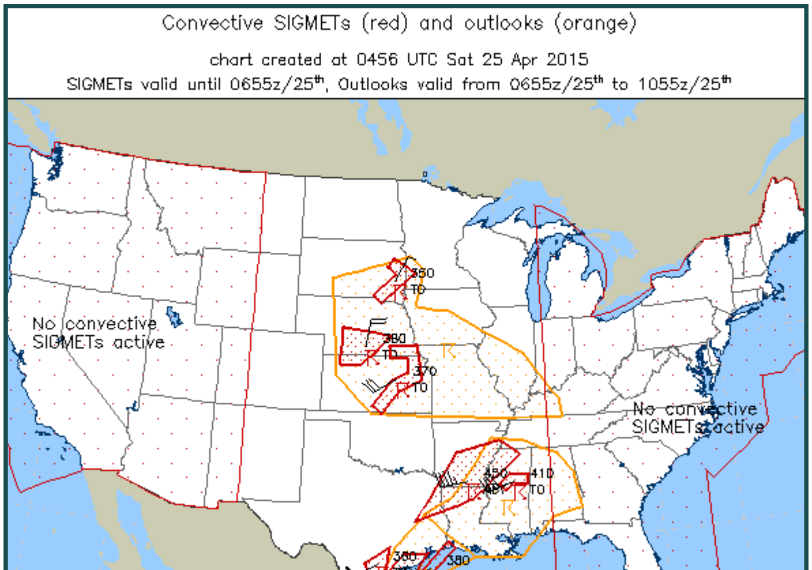
A major impact to both of the island ASOS systems is the salt water and salt air environment in which the equipment resides. Corrosion is a major issue to the entire system as can be seen in the comparison photos below. Nantucket's Data Collection Package (DCP) Power Distribution Transformer was refurbished in 2009. However, just five years later there is a significant amount of corrosion on the DCP. Additionally, blowing wind, snow, and rain also have their wearing effects on the equipment. After any winter, the spring preventative maintenance cycle can require a two technician visit, lasting two to four days. Fortunately, ASOS is a good and robust system. It can be somewhat forgiving if preventative maintenance visits need to be extended beyond their normal cycles due to the various challenges.

Then and Now: The picture on the left is the Nantucket DCP in 2009, after it was refurbished. The image on the right is the same DCP but taken in 2014.

So Why is My Flight Delayed?

by Scott Reynolds, Meteorologist-in-Charge CWSU - Nashua, NH

> "Think of the National Airspace System (NAS) like an interstate highway system in the skies. The higher traffic volume airports, or the "big" airports in the US, dictate much of the traffic flow throughout the NAS."



Areas that are or will experience convection ie. thunderstorms.

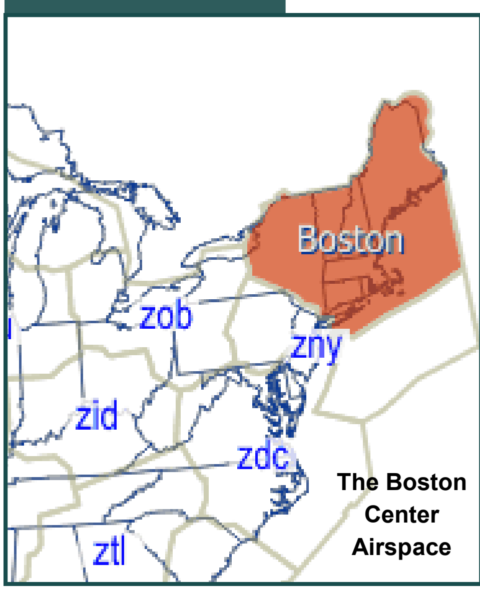
Have you ever been at your favorite airport, on a beautiful sunny day, only to hear that your flight is being delayed? Well, flight delays could be a result of a number of things. It could be mechanical (with the plane itself, or with equipment used in air traffic control) or it is because of the weather.

Flight delays due to weather don't just have to be at or near the airport you are flying into, or leaving from. Think of the National Airspace System (NAS) like an interstate (or international) highway system in the skies. The higher traffic volume airports, or the "big" airports in the US, (i.e. Boston, JFK, Newark, Detroit, Chicago O'Hare, Dallas-Fort Worth, Atlanta, Los Angeles, Denver) dictate much of the traffic flow throughout the NAS.

The NAS' traffic is "directed" by several levels of air traffic control.

The Air Traffic Control System Command Center (Command Center) in Warrenton, VA oversees the NAS from a big picture standpoint, while the 21 Air Route Traffic Control Centers (ARTCCs) oversee the traffic in particular regions of the country. The Command Center specialists work with the individual ARTCCs and their underlying facilities (including the "big" airport Air Traffic Control Towers) to manage the overall flow of traffic throughout the US.

If the Command Center and/or the ARTCCs see issues that will impact traffic adversely, meaning that there is too much traffic for the conditions en-route or at specific airports, they will put initiatives in place to slow, re-route, or even stop traffic. Things that could lead to these initiatives being implemented range from areas of severe turbulence, thunderstorms, hurricanes and even Nor'Easters.



The Boston Center Airspace

Low ceilings (cloud bases) and/or visibilities impact airports adversely. As the visibility and/or ceilings lower, more "space" is needed between arriving and departing aircraft. Thunderstorms in the "wrong" place can mean the Tower controllers must change the arrival (or departure) route for arriving or departing aircraft. The same goes for winds. Pilots much prefer headwinds for landings and departures, so the Tower will have to change arrival and departure paths to and from airports based on the winds.

NWS meteorologists at all 21 ARTCCs as well as at the Command Center all provide a variety of weather information directly to air traffic management in order to best assist the planners and traffic managers. The NWS meteorologists at "Boston Center" work with our neighboring Central Weather Service Unit (CWSU) meteorologists and the Command Center meteorologists, as well as with our NWS brothers and sisters at the local Weather Forecast Offices and the Aviation Weather Center in Kansas City MO, to do our part to help "keep the metal moving."

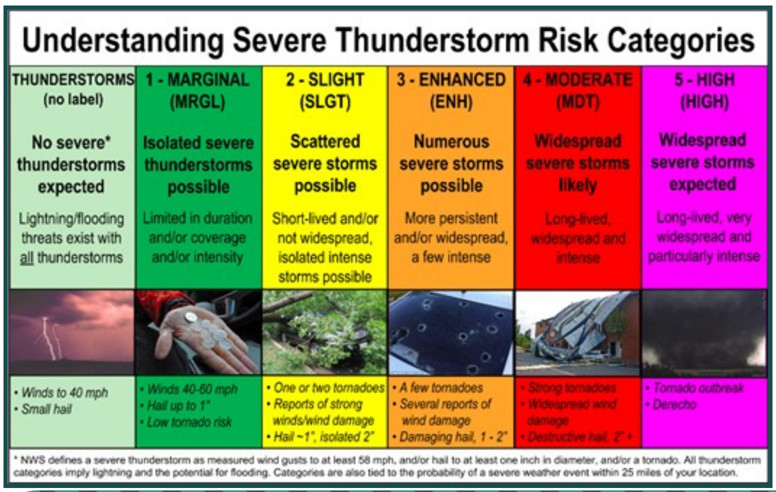
New Enhancements to SPC Outlooks

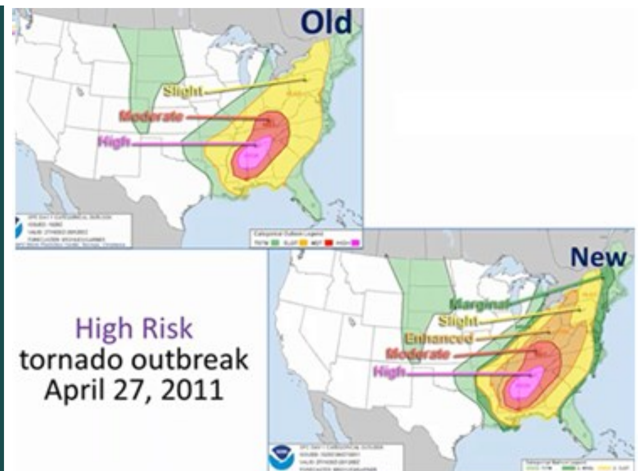
by Glenn Field, Warning Coordination Meteorologist

You may have noticed that there is more detail now in the Day 1, 2, and 3 Convective Outlooks from the Storm Prediction Center in Norman, OK. The old system had 3 thresholds (Slight, Moderate, and High) and the new system gives more definition, with 5 thresholds. A “Marginal” category has now replaced the “See Text” section in the old system and an “Enhanced” category has now been added to the higher-end ‘Slight’ and lower-end ‘Moderate’ situations. The following diagram shows the difference between the old system and the new one – for the tornado outbreak from April 27, 2011. Note how western PA and western NY are in an enhanced area, not just slight.

The categories above are defined based on the statistical probabilities of a severe storm occurring within 25 miles of a given point for a given meteorological situation. For more details about this, please see http://www.spc.noaa.gov/misc/about.html

Please note that National Weather Service (NWS) in Taunton tries to avoid the term ‘slight’ in our Hazardous Weather Outlooks because we don’t want to imply that it is not important -- and we will usually opt for the terminology given above – “scattered severe storms possible.”





Want to be an official spotter for the NWS? Check out the following dates for a class near you!

5/5/15 - Warren, RI at 7:00 PM
5/7/15 - Andover, CT at 7:00 PM
5/12/15 - Ashford, CT at 7:00 PM
5/13/15 - Provincetown, MA at 6:30 PM
5/14/15 - Ipswich, MA at 7:00 PM
5/14/15 - Mansfield, MA at 7:00 PM
5/21/15 - Glocester, RI at 7:00 PM
5/26/15 - Holden, MA at 7:00 PM
5/27/15 - Narragansett, RI at 6:00 PM
6/2/15 - Norwell, MA at 7:00 PM
6/3/15 - Maynard, MA at 7:00 PM
6/4/15 - Revere, MA at 7:00 PM
6/8/15 - Granby, CT at 7:00 PM
6/11/15 - Marion, MA at 7:00 PM

More Information: **http://www.weather.gov/skywarnprogram**

The Great Tornado Outbreak of August 15th, 1787

by Hayden Frank, Senior Forecaster

"The Tornado Outbreak on August, 15 1787 was the first known in the United States, but it could have been much worse. The tornadoes missed the majority of homes and towns in their paths."

On August 15th of 1787, the first known tornado outbreak occurred in the United States. At least five tornadoes resulted in major damage across four states: Connecticut, Rhode Island, Massachusetts and New Hampshire. Many injuries occurred in southern New England, as well as two fatalities.

The first tornado touched down near New Britain, CT between 1 and 2 pm, where a barn roof was torn off and blown 2 miles. The tornado then went through Newington, CT but fortunately missed most of the town's houses, which were located a half mile north and a half mile south of the tornado's path. The tornado then moved northeast across Wethersfield, CT and struck one home. Unfortunately, it killed two people in that house and completely leveled several outbuildings. The tornado continued onward into Glastonbury, CT where it destroyed every tree in its path. Two people were injured and several homes along with other buildings were damaged. Its final known path took it across Bolton and Coventry, CT but it is unknown if there were any other fatalities or significant damage.

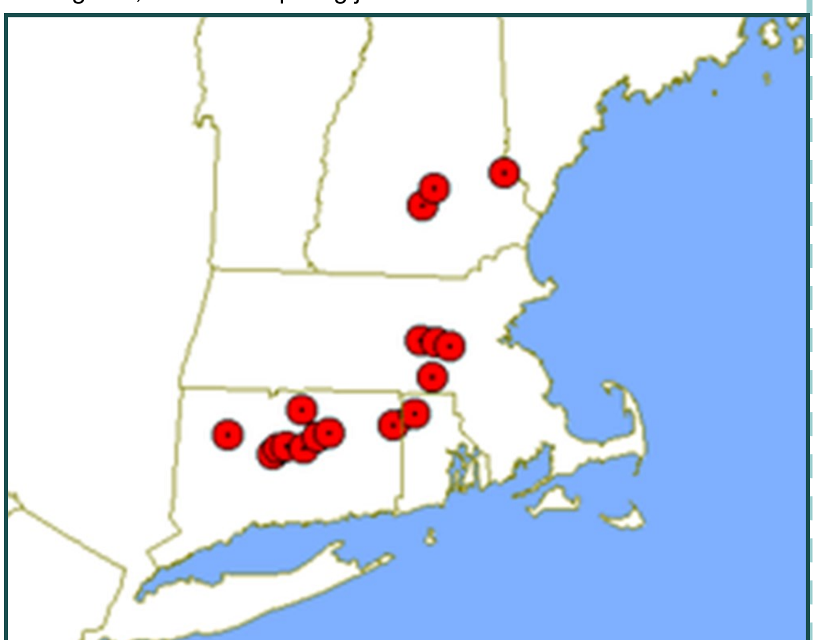
The second tornado of the outbreak is thought to have started in East Windsor, CT. While it caused damage to a home, it mainly traveled across rural areas of Connecticut at the time resulting in extensive tree damage.

The third tornado travelled at least 20 miles and crossed three states. It began in Killingly, CT and moved into Glocester, RI, with its final known location in Mendon, MA. Several homes suffered damage which included their roofs being completely ripped off.

The fourth tornado affected Central and East Central Massachusetts. The tornado was first reported in Northborough, MA and caused severe damage on the borders of Marlborough and Southborough. It then continued into Framingham, before dissipating just to the east. Numerous houses were damaged or destroyed along with many crops.

The fifth and final tornado occurred much farther north in Rochester, New Hampshire. Trees and crops were leveled from the tornado. There was also significant damage that occurred in Dumbarton and Concord, NH but it is unknown if this was caused by straight line wind damage or a tornado.

The Tornado Outbreak on August, 15 1787 was the first known in the United States, but it could have been much worse. The tornadoes missed the majority of homes and towns in their paths. Given the descriptions and extensive tree damage, there could have been many more fatalities and injuries.



Locations of reported damage during the Four-State Tornado Swarm of August 15, 1787. Not all of these necessarily represent tornadoes, and a few individual tornadoes stuck multiple locations. Locations from: Grazulis, Thomas P (July 1993). *Significant Tornadoes 1680–1991* Ludlum, David McWilliams (1970). *Early American Tornadoes 1586–1870*

The National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

National Weather Service Southern New England

445 Myles Standish Blvd
Taunton, MA 02780

Phone: 508-823-1900
Fax: 508-823-2321
E-mail: box.webmaster@noaa.gov

Visit our Website:
www.weather.gov/boston

Meteorologist-in-Charge: Robert Thompson

Warning Coordination Meteorologist: Glenn Field

Science and Operations Officer: Joe DelliCarpini

Editor: Stephanie Dunten

2015 Hurricane Names

K	I	S	P	O	A	T	I	E	S	O	R	D	N	A
D	A	D	I	D	F	C	L	A	U	D	E	T	T	E
M	O	T	T	R	N	A	L	R	G	E	N	A	Q	P
J	G	D	E	R	C	O	I	A	R	T	A	N	E	N
W	I	D	T	I	H	R	B	I	A	T	D	T	L	N
H	A	A	U	C	I	Y	K	R	C	E	E	O	U	N
K	A	N	I	U	Q	A	O	J	E	R	P	N	A	A
M	I	N	D	Y	N	T	E	A	Y	E	A	S	S	D
I	R	Y	R	A	C	T	T	E	E	S	T	N	E	R
E	T	R	T	I	E	N	A	N	C	A	C	Y	A	I
N	A	O	V	N	A	N	L	T	A	D	O	T	C	L
L	Q	F	J	N	U	T	E	L	A	G	T	L	O	I
E	Y	C	R	E	T	A	A	R	R	N	T	I	L	R
E	R	R	E	T	R	C	I	D	T	N	H	N	A	H
F	I	S	D	E	O	R	S	D	A	E	E	E	D	E

Find the following names:

ANA
BILL
CLAUDETTE
DANNY
ERIKA
FRED
GRACE
HENRI
IDA
JOAQUIN
KATE

LARRY
MINDY
NICHOLAS
ODETTE
PETER
ROSE
SAM
TERESA
VICTOR
WANDA