ENCLOSURE B TO MAJOR DISASTER REQUEST

Estimated Stafford Act Requirements for Public Assistance

DAMAGE ASSESSMENT WORKSHEET

Massachusetts

State: $1.41

County: $3.56

Date: 3/19/2015	PUBLIC DAMAGE								GOAL			
Report #:	A	B	C	D	E	F	G	TOTAL	*POP. '10*	*$/CAP.*	*$3.56/CAP.*	*SHORT*
Barnstable County	$0	$1,787,192	$0	$0	$0	$0	$0	$1,787,192	215,888	$8.28	$768,561	$0
Bristol County	$0	$2,517,943	$0	$0	$0	$0	$0	$2,517,943	548,285	$4.59	$1,951,895	$0
Dukes County	$0	$104,022	$0	$0	$0	$0	$0	$104,022	16,535	$6.29	$58,865	$0
Essex County	$0	$4,149,796	$0	$0	$0	$60,310	$0	$4,210,106	743,159	$5.67	$2,645,646	$0
Middlesex County	$0	$6,916,469	$0	$0	$0	$0	$3,239	$6,919,708	1,503,085	$4.60	$5,350,983	$0
Nantucket County	$0	$0	$0	$0	$0	$144,166	$1,200,000	$1,344,166	10,172	$132.14	$36,212	$0
Norfolk County	$0	$3,370,742	$0	$0	$5,000	$0	$0	$3,375,742	670,850	$5.03	$2,388,226	$0
Plymouth County	$0	$2,905,082	$165,200	$0	$65,355	$0	$2,767,645	$5,903,282	494,919	$11.93	$1,761,912	$0
Suffolk County	$0	$5,347,398	$0	$0	$0	$0	$0	$5,347,398	722,023	$7.41	$2,570,402	$0
Worcester County	$0	$3,661,691	$0	$0	$0	$0	$0	$3,661,691	798,552	$4.59	$2,842,845	$0
Totals	$0	$30,760,335	$165,200	$0	$70,355	$204,476	$3,970,884	$35,171,250	6,547,629	$5.37	$9,232,157	$0
NOTES:	DEBRIS CLEARANCE	PROTECTIVE MEASURES	ROAD SYSTEM	WATER CONTROL	BUILDINGS & EQUIPMENT	PUBLIC UTILITY	PARKS & OTHER		6,547,629	State Population Check Sum		
Percentage	0.00%	87.46%	0.47%	0.00%	0.20%	0.58%	11.29%					

ENCLOSURE C TO MAJOR DISASTER REQUEST

Estimated Assistance from Other Federal Agency Programs

County/ Tribal Area	SBA Home Loans	SBA Business Loans (Economic Injury Disaster Loans)	FSA Loans	NRCS	FHWA	USACE	BIA	OTHER
Barnstable		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Bristol		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Dukes		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Essex		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Middlesex		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Nantucket		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Norfolk		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Plymouth		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Suffolk		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Worcester		**X**		**TBD**	**TBD**	**TBD**		**TBD**
Totals		***TBD***						

Note: *Provide numbers and amounts, as appropriate.*

ENCLOSURE D TO MAJOR DISASTER REQUEST

Historic and Current Snowfall Data

County / Tribal Area	NWS Snowfall (inches)	Period (# of days)	NCDC Record Snowfall Data		Evaluation				
			Amount	Period	Record Exceeded	Near Record	Contiguous County	Core County	Comments
Barnstable	30.5	2	28.0	Ending 10 Feb 1987	X			X	
Bristol	26.0	1	21.5	Ending 6 Feb 1978	X			X	
Dukes	27.0	2	23.0	Ending 6 Feb 2005	X			X	
Essex	31.5	2	43.7	Ending 8 Feb 1978			X		Contiguous w/ Suffolk
Middlesex	36.0	2	32.0	Ending 2 Apr 1997	X			X	
Norfolk	31.0	2	36.1	Ending 8 Feb 1978			X		Contiguous w/ both Suffolk & Plymouth
Plymouth	30.7	2	30.0	Ending 23 Jan 2005	X			X	
Suffolk	31.0	2	27.6	Ending 18 Feb 2003	X			X	
Worcester	36.0	2	32.1	Ending 12 Dec 1992	X			X	

Note: Provide National Weather Service statement.

ENCLOSURE D-1

National Weather Service Taunton – Event Summary for Jan. 26-28 Blizzard

Memo For: CT, MA, RI State Emergency Management Agencies 2/4/15

From: Robert Thompson, MIC, National Weather Service – Taunton, MA
Glenn Field, WCM, National Weather Service – Taunton, MA
Joseph DelliCarpini, SOO, National Weather Service – Taunton, MA

Subject: Summary of Blizzard of 2015 that impacted southern New England

The following is a summary of the Blizzard of 2015 (Jan. 26-28, 2015) that impacted all of southern New England.

EVENT OVERVIEW

An historic winter storm brought heavy snow to southern New England with blizzard conditions to much of Rhode Island and eastern Massachusetts, beginning during the day on Monday, January 26 and lasting into the afternoon hours of Tuesday, January 27 in western portions and into the pre-dawn hours of Wednesday, January 28th in easternmost areas. The highest snowfall totals, averaging two to three feet, extended from extreme northeast Connecticut and northwest Rhode Island into much of central and northeast Massachusetts, including greater Boston. Some of the highest totals reported include Hudson, MA (36 inches), Acton, MA (34 inches), Thompson, CT (33.5 inches), and Methuen, MA (31.5 inches). Much of southeast Massachusetts and the rest of Rhode Island received one to two feet of snow. Totals dropped off dramatically west of the Connecticut River Valley where totals of 4 to 11 inches were observed.

The storm was well-forecast, with Blizzard Watches and Winter Storm Watches issued 2 days before the snow began. Low pressure tracked northeast from the Carolinas and strengthened rapidly as it slowly passed southeast of Nantucket on Monday evening, January 26. All of the precipitation fell as snow with this storm. At its peak, snowfall rates of 2 to 3 inches per hour were common. In Massachusetts, blizzard conditions were officially reported in Marshfield (14 hours), Hyannis (13 hours), Nantucket (11 hours), Boston (9 hours), Chatham (9 hours), Worcester (7 hours), and Beverly (3 hours). In Rhode Island, blizzard conditions were officially reported in Westerly (5 hours), Newport (4 hours), and at T.F. Green State Airport in Warwick (3 hours). Several other locations in the Taunton area of responsibility fell just short of the required criteria (3 consecutive hours of blizzard conditions) including Fitchburg, New Bedford, Falmouth, and Martha's Vineyard in Massachusetts and Smithfield in Rhode Island. The NWS Forecast Office in Upton, NY is working on the determination of any blizzard conditions for southern Connecticut...please refer to a separate report from their office for that.

Daily snowfall records were set for January 27 in Boston (22.1 inches, previous record 8.8 inches in 2011), Worcester (31.9 inches, previous record 11.0 in 2011), and Providence (16.0 inches, previous record 6.7 inches in 2011). In Worcester, the snowfall total of 34.5 inches was the greatest on record (dating back to 1892), breaking the previous record of 33.0 inches on March 31 to April 1, 1997. In Providence, the total of 19.1 inches was the fourth highest on record (dating back to 1904), while in Boston the total of 24.6 inches was the sixth highest on record (dating back to 1872).

The Blizzard of 2015 produced very strong winds late Monday into Tuesday near the Massachusetts and Rhode Island coasts where gusts of 50 to 65 mph were common. Gusts reached hurricane force at a few locations in Massachusetts including Nantucket (78 mph), Chatham (75 mph), Humarock (74 mph), and Aquinnah (74 mph).

Significant coastal flooding occurred along the Massachusetts east coast, mainly south of Boston. Due to a north-northeast wind around the time of the early morning high tide, Boston's north shore was spared much in way of significant impacts while north facing coastlines of Cape Cod and Nantucket received a higher storm surge. More specifically, the reach of coastline from Hull to Plymouth experienced significant damage as did the north side of Cape Cod and Nantucket Harbor.

BLIZZARD OF 2015 SNOWFALL TOTALS – HIGHEST BY COUNTY

** Please note that the following reports were taken from our Final Public Information Statements. The values listed have been vetted by our forecast staff and are believed to be reasonable and accurate based on radar trends and other reports in the area. For those listed as "amateur radio," that is the means by which the report was received. Most actively reporting amateur radio operators are trained Skywarn spotters, too, and some are local emergency managers, but they choose to report via the air waves instead of by phone or internet.

Connecticut

Fairfield	Weston	14.0	Public
	New Canaan	12.3	CT DOT
Hartford	Marlborough	22.0	Trained Spotter
	Manchester	19.0	Trained Spotter
Litchfield	Watertown	11.5	Trained Spotter
Middlesex	Haddam	22.0	Trained Spotter
	Essex	20.5	Public
New Haven	Guilford	17.0	Trained Spotter
	Meriden	12.5	CT DOT
New London	Lisbon	26.0	Trained Spotter
	Colchester	25.0	CT DOT
	Norwich	24.0	CT DOT
	Groton	24.0	CT DOT
Tolland	Staffordville	23.0	Cooperative Observer
	Tolland	21.5	Trained Spotter
	Stafford Springs	19.0	Trained Spotter

Windham	Thompson	33.5	Media
	Putnam	33.0	CT DOT
	Moosup	25.0	Amateur Radio
	North Grosvenordale	25.0	Cooperative Observer

Massachusetts

Barnstable	West Harwich	30.5	Trained Spotter
	Hyannis	27.0	Amateur Radio
	East Falmouth	24.8	Trained Spotter
Berkshire	Lanesboro	8.0	TV weather spotter, but trained by NWS-Albany
Bristol	East Freetown	26.0	Amateur Radio
	Fall River	24.1	Amateur Radio
	Somerset	24.0	Amateur Radio
Dukes	Oak Bluffs	27.0	Amateur Radio
	Edgartown	20.0	Cooperative Observer
	West Tisbury	19.0	Amateur Radio
Essex	Methuen	31.5	Public
	Gloucester	31.0	Trained Spotter
	Swampscott	30.4	Public
	Newburyport	30.0	Cooperative Observer
	Peabody	28.5	Trained Spotter / Amateur Radio
	Ipswich	28.0	Trained Spotter
Franklin	Greenfield	10.8	Cooperative Observer
Hampden	Wales	16.0	Media
	Ludlow	14.0	Trained Spotter
	East Longmeadow	12.5	Amateur Radio
Hampshire	Amherst	6.8	Cooperative Observer
Middlesex	Hudson	36.0	Public
	North Billerica	34.0	Trained Spotter
	Littleton	34.0	Trained Spotter
	Acton	34.0	Public
	Chelmsford	33.8	Amateur Radio
	Framingham	33.5	Amateur Radio
	Dracut	33.1	Public
	Westford	33.0	Trained Spotter
	Maynard	33.0	Cooperative Observer
	Lowell	33.0	Trained Spotter
Nantucket	Nantucket	12.0	Trained Spotter / Amateur Radio

Norfolk	Sharon	31.0	Public
	Milton	30.8	Blue Hill Observatory/Cooperative Observer
	Braintree	26.0	Public
	Walpole	24.6	Trained Spotter / Amateur Radio
Plymouth	Plymouth	30.7	Public
	Norwell	28.0	Amateur Radio
	Kingston	28.0	Trained Spotter
	Marshfield	25.0	Trained Spotter
	Hanover	24.0	Public
Suffolk	South Boston	31.0	Trained Spotter
	Logan Int'l Airport	24.6	Trained Observer/Spotter
Worcester	Auburn	36.0	Trained Spotter
	Lunenburg	36.0	Trained Spotter
	Worcester Airport	34.5	Trained Observer
	Clinton	34.1	Public
	West Boylston	33.1	CoCoRaHS Observer
	Holden	32.0	Trained Spotter
	Upton	31.5	Trained Spotter
	Milford	31.0	Cooperative Observer

Rhode Island

Bristol	Barrington	18.0	TV Meteorologist
Kent	West Warwick	20.5	Trained Spotter
	Warwick (TF Green)	19.1	Trained Observer – Airport
	Greene	18.0	Trained Spotter
Newport	Tiverton	19.0	Amateur Radio
	Middletown	16.0	Trained Spotter
Providence	Burrillville	30.0	Emergency Manager
	Scituate	29.0	Emergency Manager
	West Glocester	25.6	Trained Spotter
	North Cumberland	24.0	Trained Spotter
	Glendale	23.5	Amateur Radio
Washington	Westerly	21.0	Trained Spotter
	Hope Valley	18.5	Trained Spotter
	North Kingstown	16.0	Trained Spotter

BLIZZARD OF 2015 SNOWFALL DURATION AT VARIOUS REPORTING SITES:

To determine the duration of "the storm" at any location, we felt that it was best to use visibilities of 2 miles or less as the basis, since that would generally equate to accumulating snow. (Snow that only reduces visibility to between 3 and 6 miles would be very light and not do much accumulating.) In general, although this event spanned parts of 2 and even 3 calendar days, it was primarily a one- to one-and-a-half-day event for most areas (duration-wise), as can be seen by the durations listed below. The event lasted from 13 to 20 hours in the westernmost portions of southern New England, 20 to 30 hours across eastern Connecticut, Rhode Island, and central Massachusetts...but lasted as much as 30 to 38 hours over east coastal Massachusetts.

Connecticut

Danbury (DXR)	20.1 hours
Windsor Locks (BDL)	20.0 hours
Bridgeport (BDR)	20.8 hours
Hartford (HFD)	23.5 hours
Meriden (MMK)	22.9 hours
New Haven (HVN)	22.8 hours
Groton (GON)	28.4 hours
Willimantic (IJD)	28.9 hours

Massachusetts

Pittsfield (PSF)	13.9 hours
Orange (ORE)	20.9 hours
Westfield (CEF)	13.0 hours
Worcester (ORH)	26.8 hours
Bedford (BED)	26.0 hours
Lawrence (LWM)	30.4 hours
Boston (BOS)	32.1 hours
Plymouth (PYM)	26.3 hours
Falmouth	36.0 hours (might be slightly overstated because of blowing snow)
Hyannis (HYA)	38.0 hours (might be slightly overstated because of blowing snow)
New Bedford (EWB)	20.7 hours
Martha's Vineyard (MVY)	32.3 hours
Nantucket (ACK)	36.1 hours (might be slightly overstated because of blowing snow)

Rhode Island

North Smithfield (SFZ)	27.0 hours
Warwick (PVD)	30.7 hours
Westerly (WST)	25.1 hours
Newport (UUU)	28.9 hours

HIGHEST WIND GUSTS (70+ mph)

Massachusetts

Nantucket	78 mph
Chatham	75 mph
Aquinnah	74 mph
Humarock	74 mph
Plymouth	72 mph
Centerville	72 mph
Sagamore	70 mph

COASTAL FLOODING

Fig. 1. Coastal Flooding following the January 27, 2015 AM High Tide in Scituate (Photo courtesy of Dave Laroche)

The January 26-27, 2015 blizzard produced significant coastal flooding along the Massachusetts east coast, mainly south of Boston. The Coastal Flood Watch/Warning issuances and Decision Support Services (DSS) information provided ample notice of the threat and overall communicated the right severity. Due to a shift in the wind from NE to more NNE by the time of the early morning high tide, Boston's north shore was spared much in way of significant impacts while north facing coastlines of Cape Cod and Nantucket received a higher storm surge and somewhat greater impact than anticipated. More specifically, the reach of coastline north of Boston received minor impacts, less than anticipated. The reach of coastline from Hull to Plymouth experienced widespread moderate with isolated major impacts, close to what was expected. Both the north side of Cape Cod and Nantucket Harbor received moderate to

major impacts and somewhat more than anticipated. The storm tide at Nantucket peaked about ¾ of a foot above what was forecast (7.2 feet MLLW observed versus 6.4 feet MLLW forecast). The Coastal Flood Warning was well-placed south of Boston. In retrospect, a Coastal Flood Advisory might have sufficed for the reach of coastline from Salisbury to Boston.

An interesting and challenging aspect of this coastal flood event was that the two storm tides of interest, early Tuesday morning and late Tuesday afternoon, occurred while the storm was rapidly ramping up and ramping down, respectively. Thus, coastal impacts were heavily dependent upon timing. Conditions were ramping up so quickly about the time of the Tuesday early morning high tide that the storm tide peaked a half hour or more after the scheduled astronomical high tide at many locations, and some locations such as along route 6A in Sandwich were still being impacted two to three hours after the time of the astronomical high tide. This temporal gradient in the storm's intensity and onshore wind flow/fetch inserted a level of uncertainty into the forecast process.

The storm surge at the time of the *early morning high tide* ranged generally between 3 and 4 feet from the Boston area south but peaked between 4.5 and a little over 5 feet in the vicinity of the *late morning low tide*. Similarly, seas just a few miles offshore had rapidly built to between 20 and 25 feet by the early morning high tide and were in the process of building rapidly before plateauing between 25 and 30 feet several hours after that high tide. Refer to Figures 2-4 for the observed tide trace at Boston, Scituate, and Nantucket Harbor, respectively. Refer to Figure 5 for a listing of wave heights at Boston Buoy (44013) during the height of the storm. The impact from this storm could have been substantially worse had it been about 4 to 6 hours faster. It is conjectured that this storm might have approached the level of impact of the December 1992 nor'easter or perhaps even the "Perfect Storm" of October 1991 in a number of locations south of Boston had the peak of storm surge and seas occurred just a few hours sooner. Had the peak surge occurred right at the 4:27 AM high tide of 10.5 feet MLLW in Boston, the Boston Harbor storm tide would have reached 15.3 feet MLLW or .2 feet above the record water level set during the February 1978 Blizzard (although with waves about 10 feet lower than those in 1978). And had this storm peaked out at the time of one of the spring high tides of the week before, we would have seen water levels in unchartered territory for Boston and areas south. Keeping an eye toward future preparedness, this storm should be remembered for not only what it was but what it could have been.

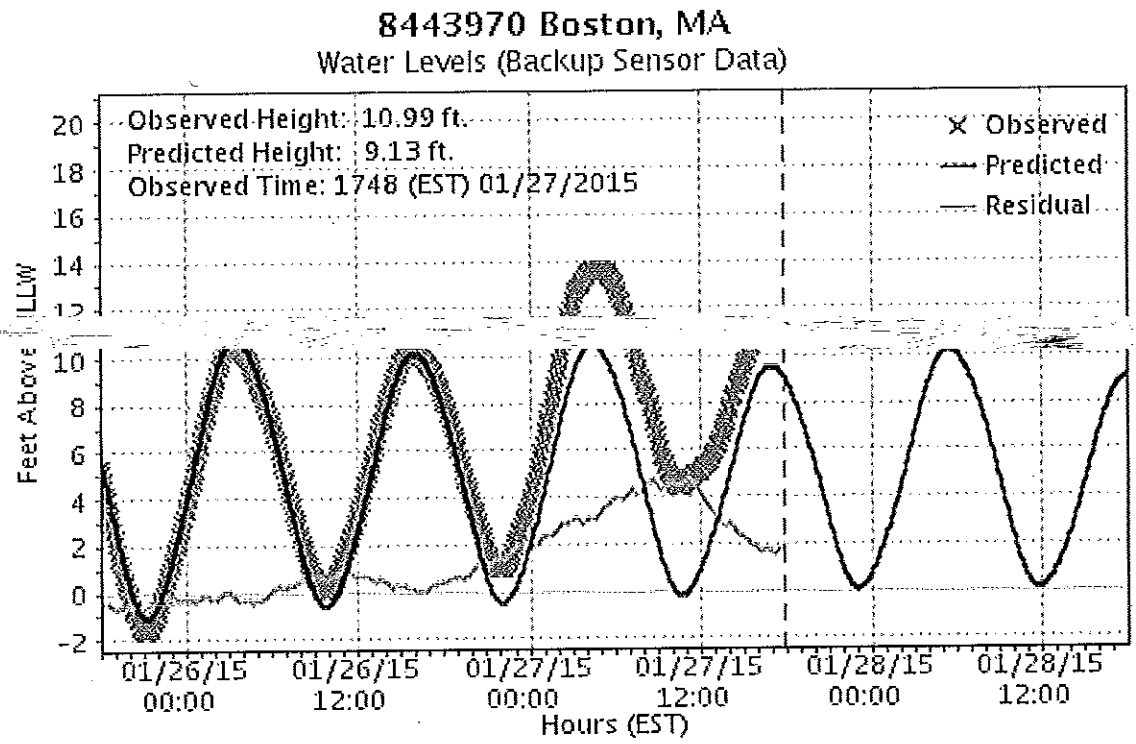


Figure 2. Observed Tide (MLLW datum) at Boston on January 27.

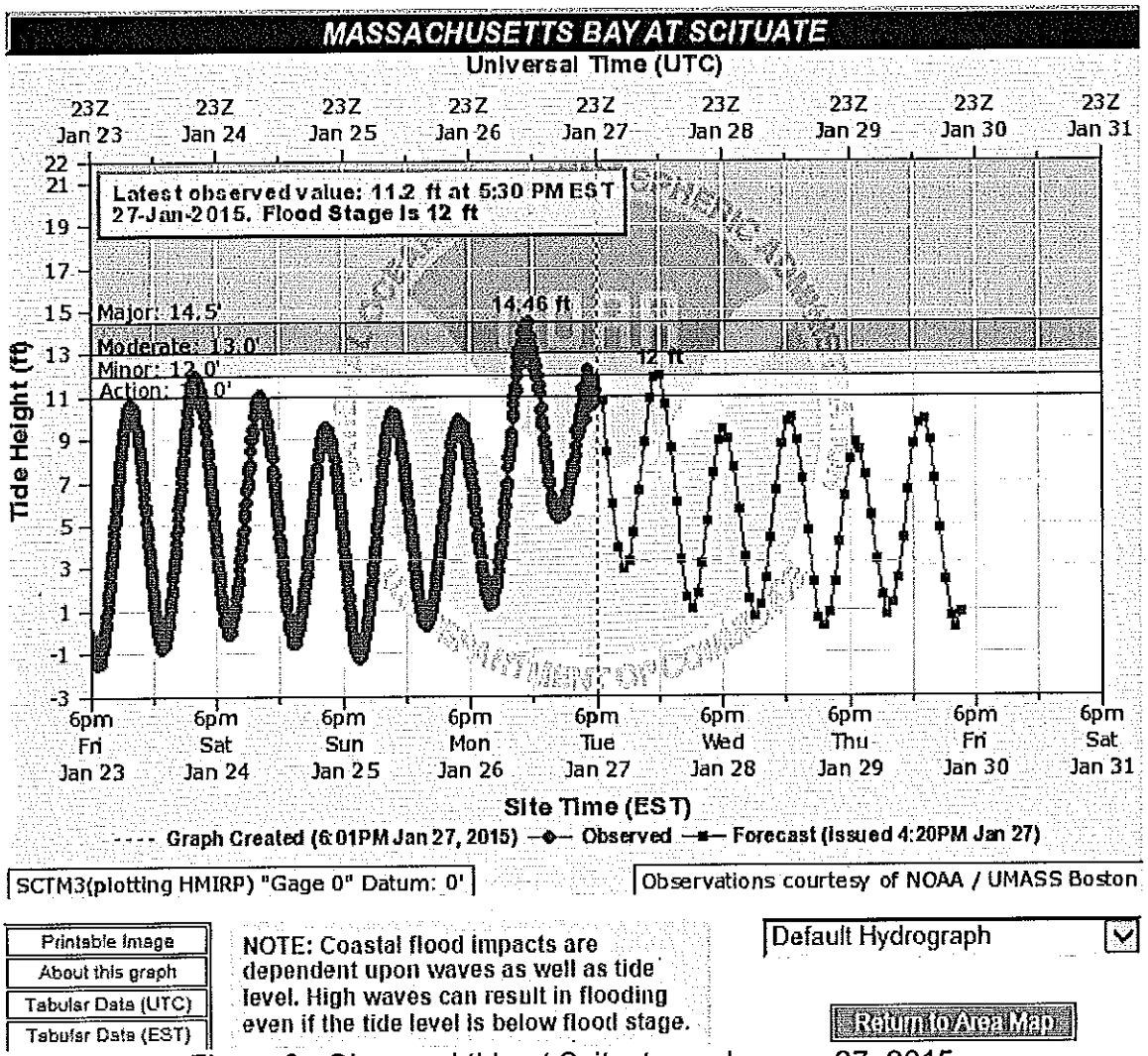


Figure 3. Observed tide at Scituate on January 27, 2015.

It is interesting to note that the storm tide at Scituate crested about 5 inches higher than the maximum water level for the February 2013 Blizzard (February 9 morning high tide). However, wave heights offshore were about 10 to 12 feet lower on January 27, 2015 compared with February 9, 2013. In Scituate the overall coastal impact from this storm appears to have been on par with the February 2013 event, but some portions of the shoreline fared better and others worse.

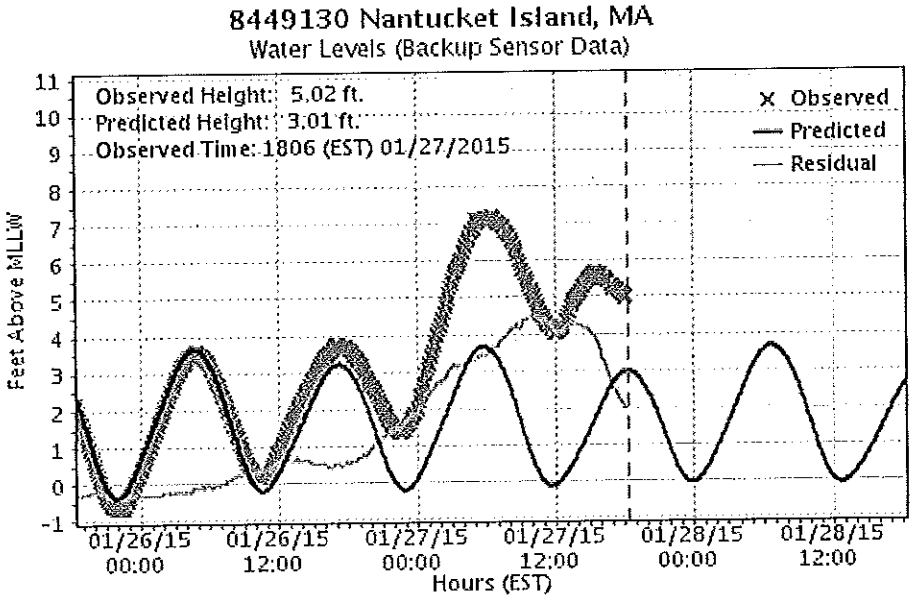


Figure 4. Observed tide at Nantucket Harbor on January 27, 2015.

The tide trace at Nantucket Harbor on January 27 illustrated a rapid increase in surge during the time of the morning high tide and a dramatic lowering of the surge in the 2 to 3 hours preceding the late afternoon high tide. Similar to Boston and Scituate, the storm surge peaked near or shortly before the late morning low tide.

Within a couple of hours of the late afternoon high tide, winds shifted to be from the northwest, and the storm surge rather quickly relaxed from above 4 feet to closer to 2 feet. Seas remained elevated between 24 and 28 feet, but the drop in surge combined with a lower amplitude astronomical high tide resulted in less impact compared with the early morning high tide in most locations. The impact is believed, however, to have only been slightly less along some of the Cape Cod Bay north facing shoreline as well as some locations along the Plymouth County coast where shoreline defenses had been compromised with the prior high tide.

Previous observations

MM	DD	TIME (EST)	WDIR	WSPD kts	GST kts	WVHT ft	DPD sec	APD sec	MWD	PRES in	PTDY in	ATMP °F	WTMP °F	DEWP °F	SAL psu	VIS nmi	TIDE ft
01	27	4:50 pm	N	36.9	44.7	23.9	14	9.6	ENE	29.41	+0.06	21.0	40.8	20.8	-	-	-
01	27	3:50 pm	N	35.0	40.8	25.9	14	9.8	NE	29.39	+0.04	21.4	40.8	21.4	-	-	-
01	27	2:50 pm	N	35.0	42.7	23.9	14	9.3	NE	29.38	+0.03	22.5	40.6	22.3	-	-	-
01	27	1:50 pm	N	40.8	48.6	26.6	14	9.5	ENE	29.35	-0.05	23.9	40.6	23.7	-	-	-
01	27	12:50 pm	NNE	40.8	50.5	25.9	14	9.6	ENE	29.35	-0.08	25.9	40.5	25.7	-	-	-
01	27	11:50 am	NNE	40.8	52.4	27.2	14	9.3	E	29.35	-0.09	25.9	40.5	25.7	-	-	-
01	27	10:50 am	NNE	38.9	46.6	25.6	12	9.4	NE	29.41	-0.06	25.7	40.5	25.7	-	-	-
01	27	9:50 am	N	40.8	52.4	23.9	11	9.2	NE	29.43	-0.04	24.8	40.5	24.8	-	-	-
01	27	8:50 am	N	38.9	48.6	22.3	12	8.7	ENE	29.44	-0.02	24.3	40.6	24.1	-	-	-
01	27	7:50 am	N	38.9	50.5	23.9	11	9.0	NE	29.46	+0.01	23.7	40.8	23.5	-	-	-
01	27	6:50 am	N	40.8	48.6	22.0	11	8.4	ENE	29.47	-0.04	22.6	40.8	22.6	-	-	-
01	27	5:50 am	N	40.8	52.4	22.3	11	8.6	ENE	29.46	-0.10	24.1	40.8	24.1	-	-	-
01	27	4:50 am	N	40.8	56.3	22.3	11	8.4	ENE	29.45	-0.15	25.3	41.0	25.3	-	-	-
01	27	3:50 am	NNE	40.8	50.5	19.0	11	7.9	NE	29.51	-0.15	26.6	41.0	26.6	-	-	-
01	27	2:50 am	NNE	40.8	48.6	19.7	10	8.0	NE	29.57	-0.17	28.0	41.0	28.0	-	-	-
01	27	1:50 am	NNE	38.9	52.4	19.7	8	7.5	ENE	29.61	-0.20	28.6	40.8	28.6	-	-	-
01	27	12:50 am	NNE	40.8	48.6	15.4	9	7.0	ENE	29.66	-0.20	28.9	40.6	28.8	-	-	-
01	26	11:50 pm	NE	35.0	44.7	14.1	8	6.7	NE	29.73	-0.21	30.4	40.6	30.4	-	-	-
01	26	10:50 pm	NE	35.0	40.8	12.8	8	6.5	NE	29.80	-0.17	30.4	40.6	30.4	-	-	-
01	26	9:50 pm	NE	33.0	38.9	10.8	7	6.0	ENE	29.86	-0.13	31.1	40.6	30.9	-	-	-
01	26	8:50 pm	NE	29.1	35.0	9.8	7	5.8	ENE	29.94	-0.07	30.9	40.6	30.7	-	-	-
01	26	7:50 pm	ENE	29.1	33.0	7.5	6	5.2	ENE	29.97	-0.04	31.1	40.6	28.8	-	-	-
01	26	6:50 pm	ENE	27.2	31.1	7.2	6	5.0	ENE	29.99	-0.03	31.3	41.0	28.6	-	-	-

Detailed Wave Summary
for 44013 as of (6:00 pm EST)
2300 GMT on 01/27/2015:

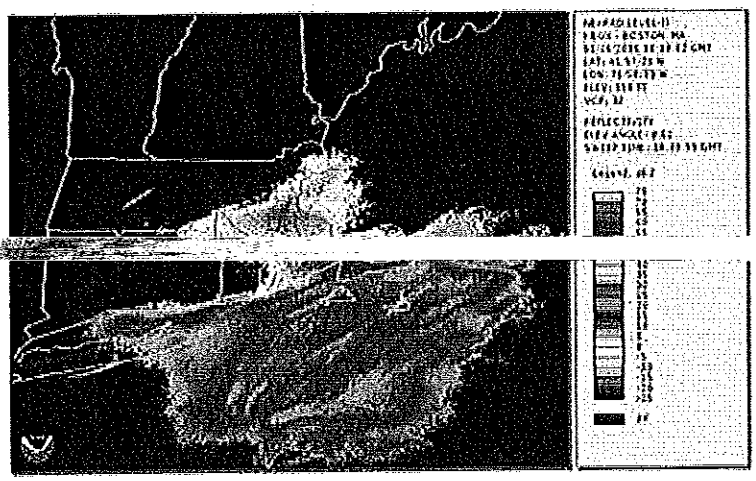
Figure 5. Observed wind and wave data at the Boston Buoy (44013).

The USGS with assistance from the WFO Taunton Senior Service Hydrologist, Nicole Belk, installed two new tide gages, Dennis (Sesuit Harbor) and Provincetown Harbor on Cape Cod, just a few weeks before the January 27 coastal storm. At the time of this writing, these two tide gages were being calibrated to report from a Mean Lower Low Water (MLLW) datum. Data were received during the storm and should help assess storm surge along the Cape Cod Bay side of Cape Cod. Once the data have been thoroughly checked out, data from these two tide gages will become available in the Advance Hydrologic Prediction System (AHPS). Dennis will become a new coastal impact forecast site.

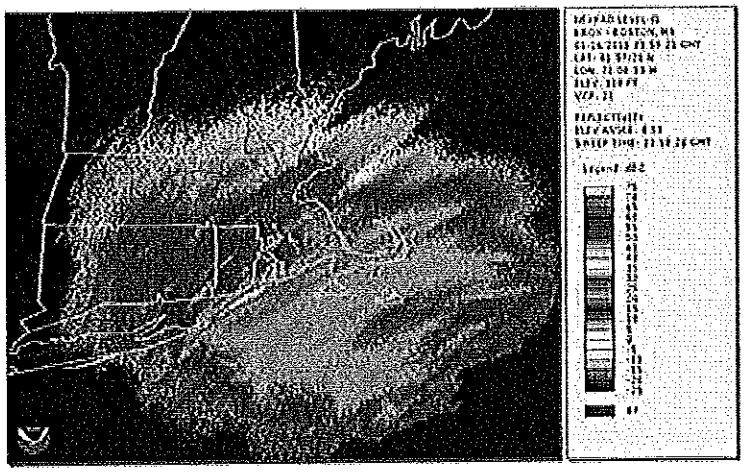
Both the ETSS and ESTOFS guidance underforecasted the surge from Boston south, being exceeded by nearly a couple of feet at some times and locations. A regional FVCOM model, referred to as NECOFS, also provides water level guidance but has been difficult to interpret on the fly due to the units and datum used. NWS staff has been working with the developers to enable storm surge as a model output parameter. WFO Taunton forecasters were able to significantly improve upon the operational storm surge guidance. This event once again illustrated that the forecaster can add value to the guidance.

RADAR IMAGERY

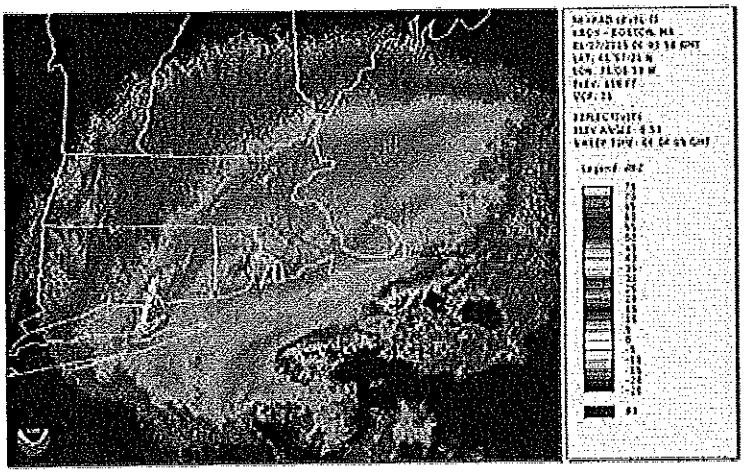
1 pm Mon 1/26



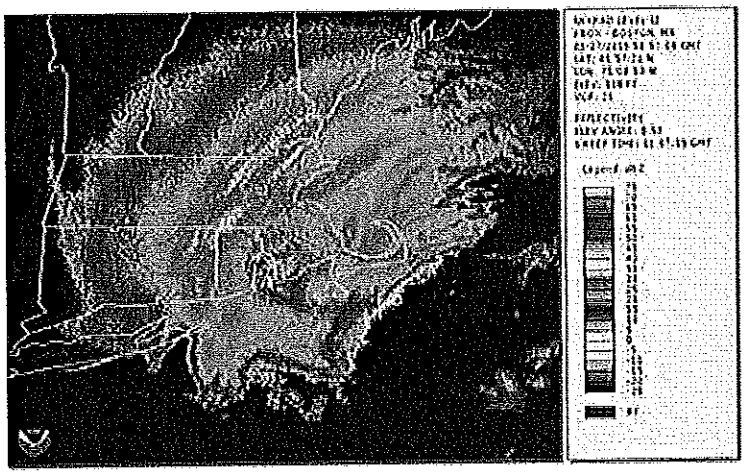
7 pm Mon 1/26



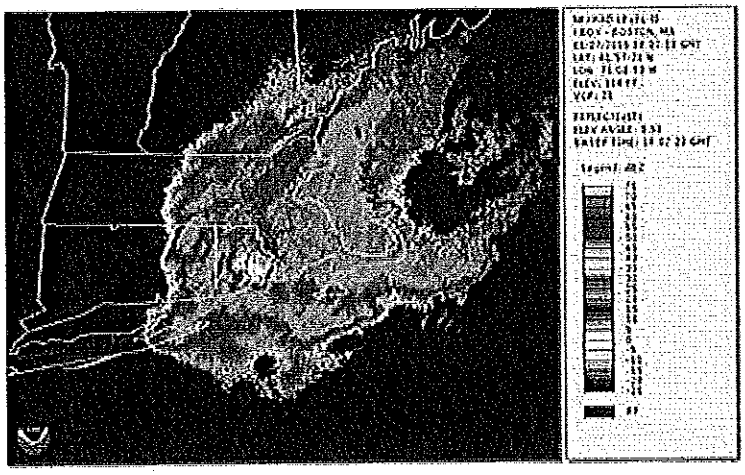
1 am Tue 1/27



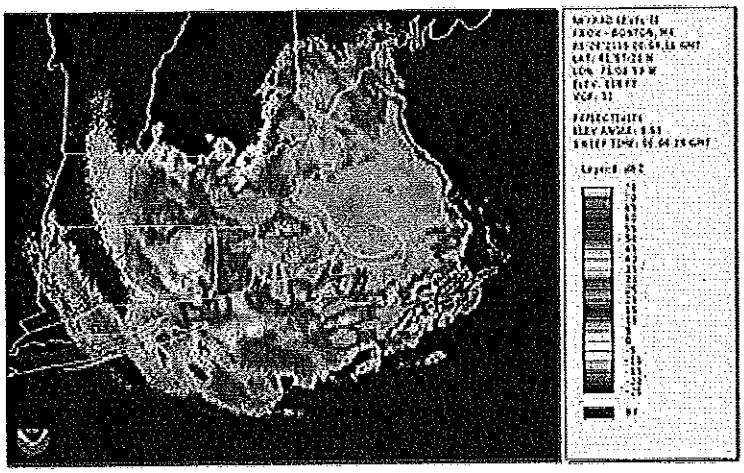
7 am Tue 1/27



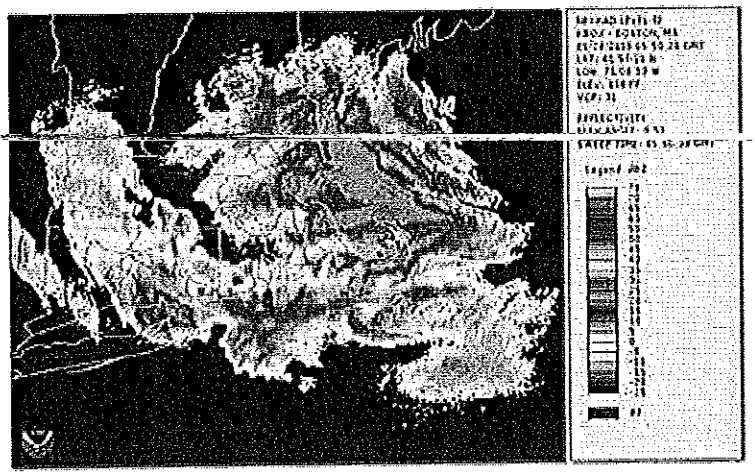
1 pm Tue 1/27



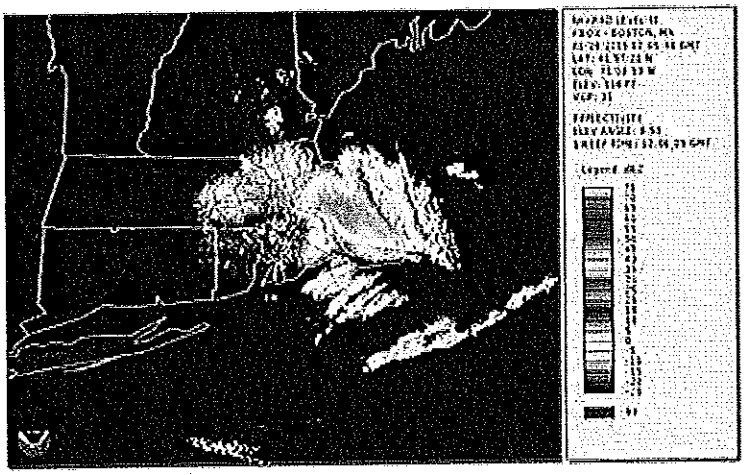
7 pm Tue 1/27



1 am Wed 1/28



7 am Wed



From: Glenn Field (NOAA Federal)
To: MacLeod, Scott (CDA); Heidelberg, Erica (CDA)
Cc: Thompson, Robert; Joseph Dellicarpini
Subject: Norwood Ouration
Date: Thursday, February 05, 2015 12:46:10 PM

Hi Scott & Erica,

Sorry for not including Norwood, MA (OWD) in the analysis. Their duration for 2 miles or less visibility for the Blizzard of 2015 was 26.5 hours.

-- Glenn

ENCLOSURE D-2

National Climatic Data Center (NCDC) - Historic Snowfall Data for 1-, 2- & 3-Day Events

18 February 2015

Below are the 1-day, 2-day, and 3-day current Massachusetts and Rhode Island County Snowfall Records through June 2014. These are based on analysis of the available GHCN-Daily data. Please note that the stations considered for analysis are only those with long-term, consistent snowfall records, as per FEMA request when the original snowfall climatology was constructed. For most of these counties, there are stations with short periods of record or less robust snow observation history that were not considered in this analysis. In some cases, these values differ from those listed in prior analyses. These differences are largely attributable to improvements in quality assurance algorithms since the prior analysis.

Note, this contains a correction for GARDNER, MA, relative to a document sent 30 January 2015.

Deke Arndt
Climate Monitoring Branch Chief
National Climatic Data Center

MASSACHUSETTS County	Station Name	Station ID (GHCN-Daily)	Event Duration	Total Snowfall	For the Period
BARNSTABLE County	CHATHAM	USC00191386	1-Day	19.5"	ending 19 Feb 1993
	CHATHAM	USC00191386	2-Day	28.0"	ending 10 Feb 1987
	CHATHAM	USC00191386	3-Day	28.0"	ending 10 Feb 1987
	HATCHVILLE	USC00193471	1-Day	15.0"	ending 27 Jan 1987
	HATCHVILLE	USC00193471	2-Day	20.0"	ending 5 Mar 1960
	HATCHVILLE	USC00193471	3-Day	20.0"	ending 5 Mar 1960
	HYANNIS	USC00193821	1-Day	24.0"	ending 23 Jan 2005
	HYANNIS	USC00193821	2-Day	24.0"	ending 23 Jan 2005
	HYANNIS	USC00193821	3-Day	24.0"	ending 23 Jan 2005
BERKSHIRE County	ADAMS	USC00190049	1-Day	24.0"	ending 9 Feb 1895
	ADAMS	USC00190049	2-Day	24.0"	ending 9 Feb 1895
	ADAMS	USC00190049	3-Day	24.0"	ending 9 Feb 1895
	GREAT BARRINGTON 2N	USC00193213	1-Day	18.0"	ending 14 Mar 1993
	GREAT BARRINGTON 2N	USC00193213	2-Day	32.0"	ending 9 Jan 1996
	GREAT BARRINGTON 2N	USC00193213	3-Day	34.0"	ending 10 Jan 1996
	HOOSAC TUNNEL	USC00193713	1-Day	20.0"	ending 3 Mar 1947
	HOOSAC TUNNEL	USC00193713	2-Day	27.5"	ending 17 Feb 1958
	HOOSAC TUNNEL	USC00193713	3-Day	30.5"	ending 5 Mar 1947
	LANESBORO	USC00194075	1-Day	13.0"	ending 14 Mar 1984
	LANESBORO	USC00194075	2-Day	16.0"	ending 13 Dec 1992
	LANESBORO	USC00194075	3-Day	18.0"	ending 13 Dec 1992
	PERU	USC00196311	1-Day	19.0"	ending 4 Mar 1947

	PERU	USC00196311	2-Day	26.8"	ending 4 Mar 1947
	PERU	USC00196311	3-Day	43.3"	ending 4 Mar 1947
	SOUTH EGREMONT	USC00197692	1-Day	18.0"	ending 10 Feb 1969
	SOUTH EGREMONT	USC00197692	2-Day	20.0"	ending 10 Feb 1969
	SOUTH EGREMONT	USC00197692	3-Day	20.0"	ending 10 Feb 1969
	STOCKBRIDGE	USC00198181	1-Day	15.0"	ending 21 Feb 1947
	STOCKBRIDGE	USC00198181	2-Day	24.0"	ending 10 Feb 1969
	STOCKBRIDGE	USC00198181	3-Day	24.0"	ending 10 Feb 1969
	WASHINGTON 2	USC00198843	1-Day	18.0"	ending 21 Jan 1961
	WASHINGTON 2	USC00198843	2-Day	20.0"	ending 28 Dec 1969
	WEST OTIS	USC00199371	1-Day	25.9"	ending 30 Oct 2011
	WEST OTIS	USC00199371	2-Day	27.0"	ending 13 Jan 2011
	WEST OTIS	USC00199371	3-Day	29.1"	ending 30 Oct 2011
BRISTOL County	FALL RIVER	USC00192642	1-Day	18.0"	ending 27 Jan 1894
	FALL RIVER	USC00192642	2-Day	18.0"	ending 27 Jan 1894
	FALL RIVER	USC00192642	3-Day	22.0"	ending 30 Nov 1898
	NEW BEDFORD	USC00195246	1-Day	21.0"	ending 6 Feb 1978
	NEW BEDFORD	USC00195246	2-Day	26.0"	ending 7 Feb 1978
	NEW BEDFORD	USC00195246	3-Day	26.0"	ending 7 Feb 1978
	TAUNTON	USC00198367	1-Day	21.5"	ending 6 Feb 1978
	TAUNTON	USC00198367	2-Day	38.5"	ending 7 Feb 1978
	TAUNTON	USC00198367	3-Day	38.5"	ending 7 Feb 1978
DUKES County	EDGARTOWN	USC00192501	1-Day	16.0"	ending 23 Jan 2005
	EDGARTOWN	USC00192501	2-Day	23.0"	ending 24 Jan 2005
	EDGARTOWN	USC00192501	3-Day	23.0"	ending 24 Jan 2005
ESSEX County	GROVELAND	USC00193276	1-Day	18.5"	ending 12 Dec 1992
	GROVELAND	USC00193276	2-Day	26.0"	ending 23 Jan 2005
	GROVELAND	USC00193276	3-Day	26.4"	ending 7 Mar 2001
	HAVERHILL	USC00193505	1-Day	25.3"	ending 7 Feb 1978
	HAVERHILL	USC00193505	2-Day	27.0"	ending 6 Mar 2001
	HAVERHILL	USC00193505	3-Day	29.0"	ending 26 Feb 1969
	IPSWICH	USC00193876	1-Day	30.0"	ending 25 Feb 1969
	IPSWICH	USC00193876	2-Day	43.7"	ending 8 Feb 1978
	IPSWICH	USC00193876	3-Day	43.9"	ending 8 Feb 1978
	LAWRENCE	USC00194105	1-Day	31.0"	ending 7 Feb 1978
	LAWRENCE	USC00194105	2-Day	37.0"	ending 8 Feb 1978
	LAWRENCE	USC00194105	3-Day	37.0"	ending 8 Feb 1978
	MARBLEHEAD	USC00194502	1-Day	21.0"	ending 1 Apr 1997
	MARBLEHEAD	USC00194502	2-Day	32.5"	ending 24 Jan 2005
	MARBLEHEAD	USC00194502	3-Day	32.5"	ending 24 Jan 2005
	MIDDLETON	USC00194744	1-Day	28.0"	ending 7 Feb 1978

	MIDDLETON	USC00194744	2-Day	29.4"	ending 7 Feb 1978
	MIDDLETON	USC00194744	3-Day	30.S"	ending 26 Feb 1969
	NEWBURYPORT 4 NNW	USC00195285	1-Day	24.0"	ending 26 Dec 1947
	NEWBURYPORT 4 NNW	USC0019S285	2-Day	32.0"	ending 26 Feb 1969
	NEWBURYPORT 4 NNW	USC0019S285	3-Day	3S.0"	ending 27 Feb 1969
	PEABODY	USC0019624S	1-Day	24.0"	ending 20 Jan 1978
	PEABODY	USC0019624S	2-Day	24.0"	ending 20 Jan 1978
	PEABODY	USC0019624S	3-Day	28.0"	ending 20 Jan 1978
	ROCKPORT 1 ESE	USC00196977	1-Day	29.0"	ending 7 Feb 1978
	ROCKPORT 1 ESE	USC00196977	2-Day	32.0"	ending 8 Feb 1978
	ROCKPORT 1 ESE	USC00196977	3-Day	36.0"	ending 26 Feb 1969
FRANKLIN County	ASHFIELD	USC00190213	1-Day	24.0"	ending 6 Feb 2001
	ASHFIELD	USC00190213	2-Day	29.0"	ending 8 Dec 1996
	ASHFIELD	USC00190213	3-Day	30.3"	ending 8 Dec 1996
	COLRAIN	USC00191611	1-Day	20.0"	ending 7 Apr 1982
	COLRAIN	USC00191611	2-Day	21.S"	ending 7 Apr 1982
	COLRAIN	USC00191611	3-Day	21.S"	ending 7 Apr 1982
	HEATH	USC00193S49	1-Day	26.0"	ending 19 Dec 1986
	HEATH	USC00193S49	2-Day	26.0"	ending 19 Dec 1986
	HEATH	USC00193S49	3-Day	27.S"	ending 19 Dec 1986
	NEW SALEM	USC0019S306	1-Day	20.0"	ending 10 Feb 1969
	NEW SALEM	USC0019S306	2-Day	23.0"	ending 10 Feb 1969
	NEW SALEM	USC0019S306	3-Day	25.0"	ending 11 Feb 1969
	SUNDERLAND	USC00198278	1-Day	22.3"	ending 9 Feb 2013
	SUNDERLAND	USC00198278	2-Day	22.3"	ending 9 Feb 2013
	SUNDERLAND	USC00198278	3-Day	22.8"	ending 11 Feb 2013
	TURNERS FALLS	USC00198S80	1-Day	18.0"	ending 28 Jan 1897
	TURNERS FALLS	USC00198S80	2-Day	18.0"	ending 28 Jan 1897
	TURNERS FALLS	USC00198S80	3-Day	19.0"	ending 1S Feb 1894
HAMPDEN County	CHESTER	USC0019142S	1-Day	20.0"	ending 20 Feb 1934
	CHESTER	USC0019142S	2-Day	20.0"	ending 20 Feb 1934
	CHESTER	USC0019142S	3-Day	21.5"	ending 22 Feb 1934
	CHESTER 2	USC00191430	1-Day	26.0"	ending 12 Feb 1988
	CHESTER 2	USC00191430	2-Day	26.0"	ending 12 Feb 1988
	CHESTER 2	USC00191430	3-Day	28.0"	ending 6 Apr 1982
	HOLYOKE	USC00193702	1-Day	18.0"	ending 12 Feb 1983
	HOLYOKE	USC00193702	2-Day	19.0"	ending 8 Feb 1978
	HOLYOKE	USC00193702	3-Day	19.0"	ending 8 Feb 1978
	SPRINGFIELD	USC00198046	1-Day	22.1"	ending 13 Dec 191S
	SPRINGFIELD	USC00198046	2-Day	22.2"	ending 13 Dec 191S

	SPRINGFIELD	USC00198046	3-Day	22.2"	ending 13 Dec 1915
	WESTFIELD	USC00199191	1-Day	21.0"	ending 12 Feb 1983
	WESTFIELD	USC00199191	2-Day	21.0"	ending 12 Feb 1983
	WESTFIELD	USC00199191	3-Day	21.0"	ending 12 Feb 1983
HAMPSHIRE County	AMHERST	USC00190120	1-Day	18.0"	ending 28 Jan 1897
	AMHERST	USC00190120	2-Day	20.0"	ending 1 Feb 1898
	AMHERST	USC00190120	3-Day	20.0"	ending 1 Feb 1898
	BELCHERTOWN	USC00190562	1-Day	20.0"	ending 6 Feb 2001
	BELCHERTOWN	USC00190562	2-Day	24.0"	ending 8 Dec 1996
	BELCHERTOWN	USC00190562	3-Day	24.0"	ending 8 Dec 1996
	CHESTERFIELD	USC00191436	1-Day	22.0"	ending 1 Apr 1997
	CHESTERFIELD	USC00191436	2-Day	23.5"	ending 8 Dec 1996
	CHESTERFIELD	USC00191436	3-Day	29.0"	ending 8 Dec 1996
	CUMMINGTON HILL	USC00191774	1-Day	24.0"	ending 19 Dec 1986
	CUMMINGTON HILL	USC00191774	2-Day	24.0"	ending 19 Dec 1986
	CUMMINGTON HILL	USC00191774	3-Day	25.0"	ending 13 Dec 1992
	KNIGHTVILLE DAM	USC00193985	1-Day	17.0"	ending 15 Feb 1962
	KNIGHTVILLE DAM	USC00193985	2-Day	19.0"	ending 17 Feb 1958
	KNIGHTVILLE DAM	USC00193985	3-Day	19.0"	ending 17 Feb 1958
	PELHAM	USC00196251	1-Day	20.0"	ending 10 Feb 1969
	PELHAM	USC00196251	2-Day	22.0"	ending 10 Feb 1969
	PELHAM	USC00196251	3-Day	25.0"	ending 28 Dec 1969
	PLAINFIELD	USC00196425	1-Day	24.0"	ending 7 Apr 1982
	PLAINFIELD	USC00196425	2-Day	26.5"	ending 26 Jan 1979
	PLAINFIELD	USC00196425	3-Day	26.5"	ending 26 Jan 1979
	WARE	USC00198793	1-Day	24.0"	ending 7 Feb 1978
	WARE	USC00198793	2-Day	27.0"	ending 8 Feb 1978
	WARE	USC00198793	3-Day	27.0"	ending 8 Feb 1978
MIDDLESEX County	ASHLAND	USC00190218	1-Day	21.0"	ending 10 Feb 1969
	ASHLAND	USC00190218	2-Day	26.0"	ending 26 Feb 1969
	ASHLAND	USC00190218	3-Day	28.0"	ending 26 Feb 1969
	BEDFORD	USC00190535	1-Day	21.0"	ending 4 Mar 1960
	BEDFORD	USC00190535	2-Day	29.0"	ending 7 Feb 1978
	BEDFORD	USC00190535	3-Day	32.0"	ending 26 Feb 1969
	FRAMINGHAM	USC00192975	1-Day	20.0"	ending 10 Feb 1969
	FRAMINGHAM	USC00192975	2-Day	23.5"	ending 26 Feb 1969
	FRAMINGHAM	USC00192975	3-Day	25.5"	ending 26 Feb 1969
	GROTON	USC00193270	1-Day	21.0"	ending 23 Jan 1935
	GROTON	USC00193270	2-Day	26.5"	ending 19 Feb 1952
	GROTON	USC00193270	3-Day	29.5"	ending 19 Feb 1952
	LOWELL	USC00194313	1-Day	22.1"	ending 9 Feb 2013
	LOWELL	USC00194313	2-Day	28.0"	ending 24 Jan 2005

	LOWELL	U5C00194313	3-Day	28.0"	ending 24 Jan 2005
	NATICK	USC00195175	1-Day	29.0"	ending 1 Apr 1997
	NATICK	U5C00195175	2-Day	32.0"	ending 2 Apr 1997
	NATICK	U5C00195175	3-Day	32.0"	ending 2 Apr 1997
	READING	U5C00196783	1-Day	20.4"	ending 7 Feb 1978
	READING	U5C00196783	2-Day	29.0"	ending 2S Feb 1969
	READING	U5C00196783	3-Day	34.5"	ending 26 Feb 1969
	SPOT POND	U5C00198030	1-Day	20.0"	ending 8 Feb 1945
	5POT POND	U5C00198030	2-Day	25.0"	ending 26 Feb 1969
	5POT POND	U5C00198030	3-Day	27.0"	ending 27 Feb 1969
	WESTON	USC00199360	1-Day	16.5"	ending 4 Mar 1960
	WESTON	USC00199360	2-Day	29.5"	ending 20 Feb 1934
	WESTON	USC00199360	3-Day	29.5"	ending 20 Feb 1934
	CONCORD	U5C00191622	1-Day	17.5"	ending 20 Feb 1921
	CONCORD	USC00191622	2-Day	24.5"	ending 1 Feb 1898
	CONCORD	U5C00191622	3-Day	24.5"	ending 1 Feb 1898
	LAKE COCHITUATE	USC00194012	1-Day	19.0"	ending 20 Feb 1934
	LAKE COCHITUATE	USC00194012	2-Day	21.0"	ending 5 Mar 1960
	LAKE COCHITUATE	U5C00194012	3-Day	21.0"	ending 5 Mar 1960
NANTUCKET County	NANTUCKET MEM AP	U5W00014756	1-Day	15.S"	ending 12 Dec 1960
	NANTUCKET MEM AP	U5W00014756	2-Day	24.2"	ending 4 Mar 1960
	NANTUCKET MEM AP	U5W00014756	3-Day	31.3"	ending 5 Mar 1960
NORFOLK County	8EECHWOOD	U5C00190551	1-Day	16.0"	ending 7 Feb 1978
	BEECHWOOD	USC00190551	2-Day	20.0"	ending 8 Feb 1978
	BEECHWOOD	U5C00190551	3-Day	20.0"	ending 8 Feb 1978
	BLUE HILL	U5C00190736	1-Day	27.4"	ending 24 Feb 1969
	BLUE HILL	U5C00190736	2-Day	34.6"	ending 2S Feb 1969
	BLUE HILL	U5C00190736	3-Day	37.8"	ending 26 Feb 1969
	FRANKLIN	U5C00192997	1-Day	28.0"	ending 13 Dec 1992
	FRANKLIN	U5C00192997	2-Day	28.0"	ending 13 Dec 1992
	FRANKLIN	U5C00192997	3-Day	28.0"	ending 13 Dec 1992
	WALPOLE	USC00198755	1-Day	19.4"	ending 12 Dec 1960
	WALPOLE	U5C00198755	2-Day	22.4"	ending 4 Mar 1960
	WALPOLE	U5C00198755	3-Day	24.4"	ending 5 Mar 1960
	WALPOLE 2	U5C00198757	1-Day	29.3"	ending 7 Feb 1978
	WALPOLE 2	U5C00198757	2-Day	36.1"	ending 8 Feb 1978
	WALPOLE 2	U5C00198757	3-Day	36.1"	ending 8 Feb 1978
	WEST MEDWAY	U5C00199316	1-Day	25.0"	ending 7 Feb 1978
	WEST MEDWAY	USC00199316	2-Day	29.0"	ending 8 Feb 1978
	WEST MEDWAY	USC00199316	3-Day	29.0"	ending 8 Feb 1978
PLYMOUTH County	BROCKTON	USC00190860	1-Day	15.8"	ending 8 Jan 1996
	BROCKTON	U5C00190860	2-Day	24.8"	ending 8 Jan 1996

	BROCKTON	USC00190860	3-Day	24.8"	ending 8 Jan 1996
	EAST WAREHAM	USC001924S1	1-Day	19.0"	ending 23 Jan 200S
	EAST WAREHAM	USC001924S1	2-Day	27.S"	ending 24 Jan 2005
	EAST WAREHAM	USC001924S1	3-Day	27.S"	ending 24 Jan 2005
	HINGHAM	USC00193624	1-Day	24.0"	ending 7 Feb 1978
	HINGHAM	USC00193624	2-Day	28.0"	ending 7 Feb 1978
	HINGHAM	USC00193624	3-Day	28.3"	ending 8 Feb 1978
	MIDDLEBORO	USC00194711	1-Day	29.0"	ending 28 Feb 1969
	MIDDLEBORO	USC00194711	2-Day	30.0"	ending 23 Jan 200S
	MIDDLEBORO	USC00194711	3-Day	33.S"	ending 19 Mar 19S6
	PEMBROKE	USC00196262	1-Day	18.0"	ending 23 Jan 193S
	PEMBROKE	USC00196262	2-Day	22.S"	ending S Mar 1960
	PEMBROKE	USC00196262	3-Day	22.S"	ending S Mar 1960
	PLYMOUTH-KINGSTON	USC00196486	1-Day	21.0"	ending 8 Feb 2013
	PLYMOUTH-KINGSTON	USC00196486	2-Day	24.3"	ending 8 Jan 1996
	PLYMOUTH-KINGSTON	USC00196486	3-Day	24.3"	ending 8 Jan 1996
	ROCHESTER	USC00196938	1-Day	24.0"	ending 23 Jan 200S
	ROCHESTER	USC00196938	2-Day	27.0"	ending S Mar 1960
	ROCHESTER	USC00196938	3-Day	27.S"	ending 6 Mar 1960
SUFFOLK County	CHESTNUT HILL	USC00191447	1-Day	20.0"	ending 10 Feb 1969
	CHESTNUT HILL	USC00191447	2-Day	24.0"	ending S Mar 1960
	CHESTNUT HILL	USC00191447	3-Day	24.8"	ending 23 Dec 197S
	BOSTON LOGAN INTL AP	USW00014739	1-Day	23.6"	ending 17 Feb 2003
	BOSTON LOGAN INTL AP	USW00014739	2-Day	27.6"	ending 18 Feb 2003
	BOSTON LOGAN INTL AP	USW00014739	3-Day	27.6"	ending 18 Feb 2003
	BOSTON CITY WSO	USW00094701	1-Day	16.S"	ending 20 Feb 1921
	BOSTON CITY WSO	USW00094701	2-Day	16.S"	ending 20 Feb 1921
	BOSTON CITY WSO	USW00094701	3-Day	16.S"	ending 20 Feb 1921
WORCESTER County	ASHBURNHAM	USC00190190	1-Day	22.0"	ending 2 Jan 1987
	ASHBURNHAM	USC00190190	2-Day	24.0"	ending 21 Jan 1961
	ASHBURNHAM	USC00190190	3-Day	26.0"	ending 8 Dec 1996
	BARRE FALLS DAM	USC00190408	1-Day	24.0"	ending 9 Feb 2013
	BARRE FALLS DAM	USC00190408	2-Day	26.0"	ending 10 Feb 2013
	BARRE FALLS DAM	USC00190408	3-Day	26.0"	ending 10 Feb 2013
	BIRCH HILL DAM	USC00190666	1-Day	24.0"	ending 6 Feb 2001
	BIRCH HILL DAM	USC00190666	2-Day	24.0"	ending 6 Feb 2001
	BIRCH HILL DAM	USC00190666	3-Day	24.0"	ending 6 Feb 2001
	BOYLSTON	USC00190801	1-Day	20.S"	ending 12 Feb 1899
	BOYLSTON	USC00190801	2-Day	20.S"	ending 12 Feb 1899
	BOYLSTON	USC00190801	3-Day	23.0"	ending 30 Nov 1898

	BUFFUMVILLE LAKE	USC00190998	1-Day	26.3"	ending 9 Feb 2013
	BUFFUMVILLE LAKE	USC00190998	2-Day	30.4"	ending 10 Feb 2013
	BUFFUMVILLE LAKE	USC00190998	3-Day	30.4"	ending 10 Feb 2013
	CLINTON	USC00191S61	1-Day	23.0"	ending 20 Feb 1934
	CLINTON	USC00191S61	2-Day	23.8"	ending 7 Feb 1978
	CLINTON	USC00191S61	3-Day	24.8"	ending 26 Feb 1969
	EAST BRIMFIELD LAKE	USC00192107	1-Day	28.0"	ending 1 Apr 1997
	EAST BRIMFIELD LAKE	USC00192107	2-Day	28.0"	ending 1 Apr 1997
	EAST BRIMFIELD LAKE	USC00192107	3-Day	28.0"	ending 1 Apr 1997
	FITCHBURG 4 SE	USC00192806	1-Day	19.5"	ending 8 Jan 1958
	FITCHBURG 4 SE	USC00192806	2-Day	26.0"	ending 21 Jan 1961
	FITCHBURG 4 SE	USC00192806	3-Day	26.0"	ending 21 Jan 1961
	GARDNER	USC001930S2	1-Day	30.0"	ending 5 Feb 2001
	GARDNER	USC001930S2	2-Day	31.0"	ending 1 Apr 1997
	GARDNER	USC001930S2	3-Day	31.0"	ending 1 Apr 1997
	HARDWICK	USC00193401	1-Day	22.0"	ending 6 Feb 2001
	HARDWICK	USC00193401	2-Day	22.0"	ending 6 Feb 2001
	HARDWICK	USC00193401	3-Day	23.0"	ending 8 Dec 1996
	HUBBARDSTON	USC00193772	1-Day	18.0"	ending 12 Apr 1933
	HUBBARDSTON	USC00193772	2-Day	18.0"	ending 12 Apr 1933
	HUBBARDSTON	USC00193772	3-Day	19.6"	ending 26 Feb 1969
	MILFORD	USC00194760	1-Day	22.5"	ending 18 Feb 2003
	MILFORD	USC00194760	2-Day	24.0"	ending 13 Dec 1992
	MILFORD	USC00194760	3-Day	24.5"	ending 26 Feb 1969
	NORTHBRIDGE 2	USC00195S24	1-Day	24.1"	ending 9 Feb 2013
	NORTHBRIDGE 2	USC00195S24	2-Day	26.0"	ending 2 Apr 1997
	NORTHBRIDGE 2	USC00195S24	3-Day	36.0"	ending 23 Dec 2008
	PETERSHAM 3 N	USC00196322	1-Day	22.8"	ending 13 Apr 1933
	PETERSHAM 3 N	USC00196322	2-Day	24.0"	ending 10 Mar 1916
	PETERSHAM 3 N	USC00196322	3-Day	24.0"	ending 10 Mar 1916
	QUABBIN INTAKE	USC00196699	1-Day	17.0"	ending 12 Feb 1983
	QUABBIN INTAKE	USC00196699	2-Day	17.0"	ending 12 Feb 1983
	QUABBIN INTAKE	USC00196699	3-Day	18.0"	ending 17 Mar 1956
	SOUTHBRIDGE 3 SW	USC00197627	1-Day	21.0"	ending 7 Feb 1978
	SOUTHBRIDGE 3 SW	USC00197627	2-Day	27.0"	ending 8 Feb 1978
	SOUTHBRIDGE 3 SW	USC00197627	3-Day	27.0"	ending 8 Feb 1978
	STERLING	USC001981S4	1-Day	20.0"	ending 31 Jan 1898
	STERLING	USC001981S4	2-Day	20.0"	ending 31 Jan 1898
	STERLING	USC001981S4	3-Day	20.0"	ending 31 Jan 1898
	TULLY LAKE	USC00198573	1-Day	21.0"	ending 6 Feb 2001
	TULLY LAKE	USC00198573	2-Day	23.0"	ending 8 Feb 1978
	TULLY LAKE	USC00198573	3-Day	23.0"	ending 8 Feb 1978

	WINCHENDON 2	USC00199780	1-Day	22.0"	ending 10 Feb 1969
	WINCHENDON 2	USC00199780	2-Day	26.0"	ending 8 Feb 1978
	WINCHENDON 2	USC00199780	3-Day	26.0"	ending 8 Feb 1978
	WORCESTER RGNL AP	USW00094746	1-Day	21.1"	ending 12 Jan 2011
	WORCESTER RGNL AP	USW00094746	2-Day	32.1"	ending 12 Dec 1992
	WORCESTER RGNL AP	USW00094746	3-Day	32.1"	ending 12 Dec 1992
	JEFFERSON	USC00193931	1-Day	21.0"	ending 14 Feb 1899
	JEFFERSON	USC00193931	2-Day	21.0"	ending 14 Feb 1899
	JEFFERSON	USC00193931	3-Day	21.0"	ending 14 Feb 1899
	MILLBURY	USC00194771	1-Day	18.0"	ending 4 Mar 1960
	MILLBURY	USC00194771	2-Day	22.0"	ending 5 Mar 1960
	MILLBURY	USC00194771	3-Day	22.0"	ending 5 Mar 1960
	NORTHBRIDGE	USC0019SS14	1-Day	22.5"	ending 4 Mar 1960
	NORTHBRIDGE	USC0019SS14	2-Day	29.5"	ending 5 Mar 1960
	NORTHBRIDGE	USC0019SS14	3-Day	29.5"	ending 5 Mar 1960
	PRINCETON	USC00196644	1-Day	21.0"	ending 13 Feb 1899
	PRINCETON	USC00196644	2-Day	21.0"	ending 13 Feb 1899
	PRINCETON	USC00196644	3-Day	21.0"	ending 13 Feb 1899
	WARE 2	USC00198798	1-Day	13.0"	ending 25 Feb 1933
	WARE 2	USC00198798	2-Day	16.0"	ending 26 Feb 1934
	WARE 2	USC00198798	3-Day	16.0"	ending 26 Feb 1934
	WINCHENDON	USC00199770	1-Day	22.0"	ending 12 Apr 1933
	WINCHENDON	USC00199770	2-Day	22.0"	ending 12 Apr 1933
	WINCHENDON	USC00199770	3-Day	22.0"	ending 12 Apr 1933
	WORCESTER	USC00199928	1-Day	20.0"	ending 4 Mar 1960
	WORCESTER	USC00199928	2-Day	24.6"	ending 4 Mar 1960
	WORCESTER	USC00199928	3-Day	25.6"	ending 5 Mar 1960

RHODE ISLAND County	Station Name	Station ID (GHCN-Daily)	Event Duration	Total Snowfall	For the Period
NEWPORT County	NEWPORT ROSE	USC0037S21S	1-Day	20.0"	ending 7 Feb 1978
	NEWPORT ROSE	USC0037S21S	2-Day	28.0"	ending 7 Feb 1978
	NEWPORT ROSE	USC0037S21S	3-Day	28.0"	ending 7 Feb 1978
PROVIDENCE County	NORTH FOSTER 1 E	USC0037S270	1-Day	22.0"	ending 12 Jan 2011
	NORTH FOSTER 1 E	USC0037S270	2-Day	36.0"	ending 7 Feb 1978
	NORTH FOSTER 1 E	USC0037S270	3-Day	36.0"	ending 7 Feb 1978
	WOONSOCKET	USC00379423	1-Day	30.0"	ending 7 Feb 1978
	WOONSOCKET	USC00379423	2-Day	38.0"	ending 8 Feb 1978
	WOONSOCKET	USC00379423	3-Day	38.0"	ending 8 Feb 1978
	PROVIDENCE T F	USW00014765	1-Day	18.3"	ending 4 Feb 1961

	GREEN AP				
	PROVIDENCE T F GREEN AP	USW00014765	2-Day	28.6"	ending 7 Feb 1978
	PROVIDENCE T F GREEN AP	USW00014765	3-Day	28.6"	ending 7 Feb 1978
WASHINGTON County	KINGSTON	USC00374266	1-Day	21.3"	ending 7 Feb 1978
	KINGSTON	USC00374266	2-Day	23.0"	ending 8 Feb 1978
	KINGSTON	USC00374266	3-Day	24.6"	ending 8 Feb 1978
	BLOCK ISLAND STATE AP	USW00094793	1-Day	21.2"	ending 20 Jan 1978
	BLOCK ISLAND STATE AP	USW00094793	2-Day	22.0"	ending 20 Jan 1978
	BLOCK ISLAND STATE AP	USW00094793	3-Day	22.0"	ending 20 Jan 1978

ENCLOSURE D-3

Cumulative Snowfall Total Matrix January 26, 2015 – February 22, 2015

Cumulative Snow Event Totals

Jan. 26, 2015 thru Feb. 22, 2015

County	NWS Public Information Statement Snowfall Totals									Conversion (inches to feet)
	1/26-1/28 2015 Snowfall Total [1]	2/2-2/3 2015 Snowfall Total [1]	2/5/2015 Snowfall Total [1]	2/9-2/10 2015 Snowfall Total [1]	2/14-2/15 2015 Snowfall Total [1]	2/17/2015 Snowfall Total [1]	2/18/2015 Snowfall Total [1]	2/21/2015 Snowfall Total [1]	*Snowfall Subtotal (Jan. 26th to Feb. 22nd)* [2]	
Barnstable	30.5	4.3	0.2	7.3	12.0	6.1	3.0	0.8	*64.2*	5.35
Bristol	26.0 [3]	11.2	2.0	16.3	22.8 [5]	4.5	2.5	2.8	*85.3*	7.11
Dukes	27.0	3.0	N/A	N/A	10.0	2.5	1.3	N/A	*43.8*	3.65
Essex	31.5	18.0	4.0	25.0	22.0	0.1	3.0	3.5	*107.1*	8.93
Middlesex	36.0	17.0	4.7	19.8	17.5	T	3.1	3.2	*101.3*	8.44
Norfolk	31.0	16.5	3.5	28.3	19.1	3.5	3.9	2.0	*107.8*	8.98
Plymouth	30.7	14.0	0.5	28.9 [4]	20.0	5.5	1.0	2.5	*103.1*	8.59
Suffolk	31.0	17.3	0.8	23.8	16.2	0.6	1.6	1.2	*92.5*	7.71
Worcester	36.0	20.7	8.0	18.0	13.3	0.2	3.2	6.3	*105.7*	8.81

Footnotes:

[1] *Source: NOAA NWS Public Informotion Stotements*

[2] *Subtotol bosed on individuol NWS Public Informotion Stotements*

[3] *Record for 1- doy event durotion, bosed on NWS event summory (duration of 20.7 hours)*

[4] *Neor Record for 1- or 2- doy event, no contiguous counties*

[5] *Record for 1-doy event durotion, no contiguous counties*

= Potential Record Snowfall

= Potential Near Record Snowfall (w/ in 10% of record snowfall)

= Potential Contiguous County

ENCLOSURE D-4

National Weather Service Taunton Memo Regarding Severe Weather Pattern

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
FORECAST OFFICE
445 Myles Standish Boulevard
Taunton, MA 02780

March 17, 2015

Mr. Kurt Schwartz
Director, Massachusetts Emergency Management Agency
400 Worcester Road
Framingham, MA 01702

Dear Director Schwartz:

Late January through February 2015 proved to be an extraordinary period weatherwise for the Commonwealth of Massachusetts. Although you, I, and our staffs are very cognizant of something unprecedented through the length and pace of our operations since late January, this letter attempts to place in perspective the historical nature of the snow and cold that have impacted our state, especially the more densely populated eastern and central sections of Massachusetts.

Official observation sites at Boston's Logan Airport, Blue Hill Observatory in Milton, National Weather Service Taunton, and Worcester have all recorded their snowiest February and snowiest month on record. As of mid-March, Boston had recorded its snowiest winter season ever, and Blue Hill was less than a half inch shy of its record snowiest season. This is especially significant when one considers that snowfall records for the Boston area go back to 1891, and Blue Hill's records began in 1885.

Drilling deeper into the snowfall experienced in Boston, the numbers are nothing less than astounding. In one 30 day period from late January to late February, the major city of Boston received an incredible 94.4 inches of snow, which has eclipsed the prior 30 day record of 58.8 inches during a 30 day period in 1978 (incorporating the famed 1978 Blizzard). During the January 27 to February 15 period (just shy of 20 days), four major snow storms struck Boston with 22.1 inches on January 26-27, 16.2 inches on February 2nd, 23.1 inches on February 7-9, and 16.2 inches on February 14-15. For the month of February 2015, Boston received 64.8 inches of snow, far above the prior monthly record of 43.3 inches set in January 2005. Similarly, Worcester measured 94.6 inches of snow during a 30 day period, a value that far surpassed the prior 30 day record of 66.2 inches. The cities of Boston and Worcester also smashed 20 and 14 day snowfall records. From the perspective of the number of days of snowfall exceeding thresholds in February 2015, a whole other set of records was broken. For example, measurable snow fell in Boston on a record number of 16 days in February (i.e., more than half of the days in February received measurable snowfall in Boston!). And three days had 12 or more inches of snow (prior record was one).

There have also been exacerbating factors. A couple of the storms (January 27 and February 15) contained high winds that caused blizzard conditions. The January storm featured extreme blowing and drifting snow with winds that gusted between 65 and 75 mph along much of coastal Massachusetts. The February 15 storm produced wind gusts between 55 and 65 mph across southeastern Massachusetts.

Notably, sustained cold temperatures accompanied the snowfall. The average temperature for February was 19.0 degrees, in second place behind the all-time record cold monthly average temperature of 17.5 degrees. The month featured an extraordinary record 22 days with *maximum* temperatures below 32 degrees and included a stretch of 15 *consecutive days* of maximum temperatures below freezing. The sustained cold allowed the snow to build up and caused a range of problems involving high snowbanks, narrow streets, roof loading/collapses, ice dams, etc.

New Englanders have a reputation for being resilient and experienced with winter storms. Nonetheless, as the above numbers validate, the period of late January through February 2015 brought unprecedented snowfall to the Commonwealth of Massachusetts accompanied by one of the coldest periods on record. It is a testimony to your agency and the extraordinary dedication of public employees throughout the Commonwealth that the people of Massachusetts have continued to maintain a relatively high level of functionality in the face of truly historical adversity.

Sincerely,

Robert M. Thompson
Meteorologist-in-Charge

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OMB No. 1660-0009 Expires March 31,2015

REQUEST FOR PRESIDENTIAL DISASTER DECLARATION MAJOR DISASTER OR EMERGENCY

1. Request Date Mar 28, 2015

Burden Disclosure Notice

Public reporting burden for this form is estimated to average 9 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting the form. This collection of information is required to obtain a benefit. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C Street SW, Washington, DC 20472, Paperwork Reduction Project (1660-0009). NOTE: Do not send your completed form to this address.

Completion of this form including applicable attachments satisfies legal requirements for emergency and major disaster declaration requests under 42 U.S.C. §§ 5170, 5191, 44 C.F.R. §§ 206.35 and 206.36. Failure to provide this form may result in a failure to meet these requirements and/or a delay in processing the request.

2a. Name of State (as defined in Stafford Act 102, 42 U.S.C. § 5122) or Indian tribal government requesting declaration.	2b. Population (as reported by 2010 Census) or estimated population of Indian tribal government's damaged area(s).
Commonwealth of Massachusetts	6,547,629

3. Governor's or Tribal Chief Executive's Name	4. Designation of State or Tribal Coordinating Officer upon declaration (if available) and phone number
Charles D. Baker	Kurt N. Schwartz, 508-820-2000

5. Designation of Governor's Authorized Representative or Tribal Chief Executive Representative upon declaration (if available) and phone number

Kurt N. Schwartz, 508-820-2000

6. Declaration Request For: [X] Major Disaster (Stafford Act Sec. 401) [ ] Emergency (Stafford Act Sec. 501(a))

7. Incident Period: Beginning Date Jan 26, 2015 End Date Feb 22, 2015 or [ ] Continuing

If requesting a "continuing" incident period, enclose an official statement from a qualified Federal Government agency acknowledged as a national authority in a specific incident field (e.g., United States Geological Survey for seismic incidents, the National Weather Service for flooding).

7b. Type of Incident (Check all that apply)

[ ] Drought [ ] Earthquake [ ] Explosion [ ] Fire [ ] Flood [ ] Hurricane [ ] Landslide [ ] Mudslide

[ ] Severe Storm (rain, high water, wind-driven rain, hail, lightning) [X] Snowstorm (Must include Enclosure O: Historic and Current Snowfall Data) [ ] Straight-Line Winds

[ ] Tidal Wave [ ] Tornado [ ] Tropical Depression [ ] Tropical Storm [ ] Tsunami [ ] Volcanic Eruption [X] Winter Storm

[ ] Other (please specify)

8. Description of damages (Short description of impacts of disaster on affected area and population). Include additional details in enclosed Governor's or Tribal Chief Executive's cover letter.

Twenty-five (25) storm related deaths.
Two hundred fifty (250) storm related roof collapses.
State and City of Boston offices and local schools closed for multiple days each for multiple storms.
Massachusetts Bay Transportation Authority (MBTA) forced to suspend services system-wide on 3 separate occasions. Service was restored incrementally, but continued to run far below normal service levels.
Local jurisdictions, on average, exceeded their budgeted snow removal appropriations by 2.5 times by the end of February.

Joint Preliminary Damage Assessments conducted for the Jan. 26-28th storm indicate damage in the 10 requested counties exceeds $35 million for this disaster.

9. Description of the nature and amount of State and local or Indian tribal government resources which have been or will be committed. Include additional details in enclosed Governor's or Tribal Chief Executive's cover letter.

The Governor issued a statewide emergency declaration, a statewide driving ban and activated the State emergency operations plan. The State Emergency Operations Center implemented a 24/7, Level III (Full Activation). Massachusetts National Guard troops were deployed and high water/high access rescue vehicles were staged in coastal communities to assist with evacuations from flood prone areas or communities experiencing flooding. High access rescue vehicles were also staged at State Police barracks throughout the Commonwealth to assist state and local law enforcement with rescuing stranded motorists and emergency response through heavy snow.
Mutual aid assistance was requested pursuant to the Emergency Management Assistance Compact (EMAC) resulting in the receipt of 151 pieces of heavy equipment with accompanying personnel from five states. Additionally, the Massachusetts Emergency Management Agency contracted with private vendors in two states for approximately 100 additional pieces of heavy equipment.

10. Joint Preliminary Damage Assessment*

☐ Individual Assistance Dates Performed Requested _____ Start _____ End _____

Individual Assistance Accessibility Problems (Areas that could not be accessed, and why)

☒ Public Assistance Dates Performed Requested Feb 2, 2015 Start Feb 17, 2015 End Mar 2, 2015

Public Assistance Accessibility Problems (Areas that could not be accessed, and why)

11. Programs and Areas Requested

Individual Assistance ☒ N/A ☐ Individuals and Households Program ☐ Crisis Counseling Program ☐ Disaster Unemployment Assistance

☐ All ☐ Disaster Case Management ☐ Disaster Legal Services

For the following jurisdictions, specify programs and areas (counties, parishes, independent cities; for Indian tribal government, list tribe(s) and/or tribal area(s)) If additional space is needed, please enclose additional documentation).

For States, identify Federally-recognized Tribes in the requested counties (if applicable).

Please see **Enclosure A: Supplemental Information for Individual Assistance** for additional information in support of this request*.

**Not Required for Emergency Declaration Request*

11. Programs and Areas Requested (Continued)

Public Assistance ☐ N/A ☒ Debris Removal (Category A) ☒ Emergency Protective Measures (Category B) ☒ Permanent Work (Categories C-G)* (not available for Emergency Declaration Requests)

For the following jurisdictions, specify programs and areas (counties, parishes, independent cities; for Indian tribal government, list tribe(s) and/or tribal area(s)). If additional space is needed or your request includes different categories of work for different jurisdictions; please enclose additional documentation.

Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk and Worcester counties.

For States, identify Federally-recognized Tribes included in the requested counties (if applicable).

Mashpee Wampanoag Tribe - Barnstable County
Wampanoag Aquinnah Tribe - Dukes County

Please see Enclosure B: **Supplemental Information for Public Assistance** for additional information in support of this request*.

Indemnification for Debris Removal Activity

☐ I do not anticipate the need for debris removal.

☒ I anticipate the need for debris removal, which poses an immediate threat to lives, public health and safety. Pursuant to Sections 403 and 407 of the Stafford Act, 42 U.S.C. §§ 5170b & 5173, the State or Indian tribal government agrees to indemnify and hold harmless the United States of America for any claims arising from the removal of debris or wreckage for this disaster. The State or Indian tribal government agrees that debris removal from public and private property will not occur until the landowner signs an unconditional authorization for the removal of debris.

Request for Direct Federal Assistance

☒ I do not request direct Federal assistance at this time.

☐ I request direct Federal assistance for work and services to save lives and protect property, and:

a. I request the following type(s) of assistance:

b. List of reasons why State and local or Indian tribal government cannot perform, or contract for, required work and services.

c. In accordance with 44 C.F.R. § 206.208, the State or Indian tribal government agrees that it will, with respect to direct Federal assistance: (1) Provide without cost to the United States all lands, easements, and rights-of-ways necessary to accomplish the approved work; (2) Hold and save the United States free from damages due to the requested work, and shall indemnify the Federal Government against any claims arising from such work; (3) Provide reimbursement to FEMA for the non-Federal share of the cost of such work in accordance with the provisions of the FEMA-State or FEMA-Tribe Agreement ; and (4) Assist the performing Federal agency in all support and local jurisdictional matters.

Request for Snow Assistance

☐ N/A ☒ I request snow assistance.

Snow assistance for the following jurisdictions (Specify counties, independent cities or tribes and/or tribal areas).
Barnstable, Bristol, Dukes, Essex, Middlesex, Norfolk, Plymouth, Suffolk and Worcester counties.

Please see Enclosure D: **Historic and Current Snowfall Data** for additional information in support of this request*.

*Not Required for Emergency Declaration Request

11. Programs and Areas Requested (Continued)

Hazard Mitigation* ☒ Statewide OR

For the following specific counties, parishes, independent cities or tribes and/or tribal areas.

12. Mitigation Plan Information*

a. Mitigation Plan Expiration Date Oct 10, 2018 b. Type of Plan ☐ Enhanced ☒ Standard

13. Other Federal Agency Programs

☐ I do not anticipate requirements from Other Federal Agencies ☒ I do anticipate requirements from Other Federal Agencies

Please see **Enclosure C**: Requirements for Other Federal Agency Programs for additional information in support of this request*.

14. Findings and Certifications

☒ I certify the following:

a. I have determined that this incident is of such severity and magnitude that effective response is beyond the capabilities of the State and the affected local government or Indian tribal government and that supplementary federal assistance is necessary.

b. In response to this incident, I have taken appropriate action under State or tribal law and have directed the execution of the State or Tribal Emergency Plan on Jan 26, 2015 In accordance with the Stafford Act.

c. The State and local governments, or Indian tribal government will assume all applicable non-Federal share of costs required by the Stafford Act.

15. List of Enclosures and Supporting Documentation

☒ Cover Letter ☐ Enclosure A (Individual Assistance)* ☒ Enclosure B (Public Assistance)*

☒ Enclosure C (Requirements for Other Federal Agency Programs) ☒ Enclosure D (Historic and Current Snowfall Data)

☒ Additional Supporting Documentation Attachment A: 2015 Severe Winter Weather Pattern Supplemental Information

Governor's or Tribal Chief Executive's Signature

3/27/15
Date

If anyone except the Governor or Tribal Chief Executive signs this document, please provide the documentation that establishes that this individual has the legal authority to act on behalf of the Governor or Tribal Chief Executive.

Not Required for Emergency Declaration Request