

**Supplement to
 “Climatology of Tropical Cyclones In New England and Their Impact
 at the Blue Hill Observatory”, by Michael J. Iacono**

Date	Name	Intensity (At closest to BHO)	Location	Track with respect to BHO	BHO Precip (inches) (date)	BHO Gust (mph), (dir)
8/26/1851		TS	OS	E		
10/19/1851		TS	LFNE	W		
10/11/1852		TS	OS	E		
9/8/1853		H3	OS	E		
9/10/1854		TS	OS	E		
8/30/1855		H1	OS	E		
8/21/1856		TS	OS	E		
9/2/1856		TS	OS	E		
9/14/1857		H1	OS	E		
9/16/1858		H1	LFNE	W		
8/16/1859		H2	OS	E		
10/5/1859		H3	OS	E		
8/26/1860		H1	OS	E		
9/21/1860		TS	OS	E		
10/23/1860		H1	OS	E		
9/28/1861		TS	LF	W		
11/3/1861		TS	LFNE	O		
9/18/1862		H2	OS	E		
10/16/1862		H1	OS	E		
8/22/1863		H2	OS	E		
8/28/1863		H1	OS	E		
9/19/1863		TS	LF	W		
7/16/1864		H1	OS	E		
10/23/1864		H1	OS	E		
8/24/1865		TS	OS	E		
10/30/1866		TS	LF	W		
8/2/1867		H1	OS	E		
9/2/1867		TS	OS	E		
10/1/1867		H1	OS	E		
10/6/1868		TS	OS	E		
10/17/1868		H2	OS	E		
9/8/1869		H3	LFNE	O		
10/4/1869		H2	LFNE	E		
9/3/1870		H1	OS	E		
9/18/1870		H1	OS	E		
8/30/1871		TS	OS	E		
9/2/1871		H2	OS	E		
10/12/1871		H1	OS	E		
10/27/1872		TS	LF	E		

10/8/1873	H1	OS	E		
9/10/1874	TS	OS	E		
9/29/1874	TS	LF	W		
8/18/1875	H1	OS	E		
10/15/1875	TS	OS	E		
9/19/1876	TD	LF	O		
8/4/1877	TS	OS	E		
10/5/1877	ET	LF	E		
11/29/1877	TS	OS	E		
10/12/1878	H1	OS	E		
10/24/1878	TS	LF	W		
8/10/1879	TS	OS	E		
8/19/1879	H1	LFNE	E		
10/28/1879	TS	OS	E		
11/20/1879	H2	OS	E		
9/8/1880	H1	OS	E		
9/10/1880	H1	OS	E		
10/23/1880	ET	LFNE	E		
9/11/1881	TS	OS	E		
9/18/1881	TS	OS	E		
9/12/1882	TS	OS	E		
9/24/1882	TS	LFNE	O		
10/14/1882	H1	OS	E		
8/29/1883	H3	OS	E		
10/24/1883	TS	OS	E		
8/26/1885	H1	OS	E	0.99 (25)	33, NW
9/23/1885	H1	OS	E	0.40 (22-23)	52, NW
10/2/1885	H1	OS	E	1.56 (3)	27, S
10/14/1885	ET	LF	W	1.41 (13-14)	42, E
6/23/1886	TS	OS	E	0.24 (23-25)	21, NE
8/25/1886	H2	OS	E	0.02 (25)	34, NE
8/22/1887	TS	OS	E	2.35 (22-24)	24, SW
11/1/1887	TS	OS	E	0.00	41, NE
8/22/1888	TS	LF	O	2.97 (21-22)	43, E
9/12/1888	TS	LFNE	O	0.35 (12)	25, SW
9/26/1888	TS	LFNE	E	3.84 (26)	69, N
10/12/1888	TS	OS	E	0.18 (12-13)	28, E
11/27/1888	H2	OS	E	3.41 (26-27)	61, NE
5/21/1889	TS	OS	E	3.14 (20-21)	29, S
9/11/1889	H1	OS	E	1.15 (11-12)	38, NE
9/25/1889	TS	LFNE	E	0.22 (25-27)	31, NW
10/7/1889	TS	OS	E	0.87 (6-7)	32, SE
9/7/1891	H2	OS	E	3.37 (5-7)	
10/5/1891	H2	OS	E	0.26 (5)	
10/14/1891	H2	OS	E	1.75 (13-14)	
6/18/1893	H1	OS	E	0.31 (17-8)	

8/21/1893	H3	OS	E	2.07 (20-21)
8/24/1893	H1	LFNE	W	0.31 (24)
8/29/1893	H1	LF	W	0.29 (29)
10/14/1893	H1	LF	W	1.15 (14)
10/23/1893	TS	LF	W	2.09 (23-24)
9/30/1894	TD	OS	E	0.05 (30)
10/10/1894	TS	LFNE	W	1.37 (10)
9/10/1896	H2	LFNE	E	4.37 (9-10)
10/12/1896	H2	OS	E	2.17 (12-13)
9/24/1897	TS	LFNE	W	0.89 (23-24)
10/21/1897	TS	OS	E	0.28 (21)
10/5/1898	TD	LF	W	1.41 (5)
10/6/1899	ET	OS	E	1.00 (6-7)
11/1/1899	ET	LF	W	1.28 (31-1)
10/14/1900	ET	LFNE	W	0.66 (14-15)
9/19/1901	ET	OS	E	0.56 (18-19)
9/29/1901	ET	LF	W	1.62 (29-30)
10/12/1902	ET	OS	E	1.05 (11-12)
9/16/1903	H1	LF	W	0.20 (16-17)
9/15/1904	ET	LFNE	E	4.11 (14-15)
10/20/1910	ET	OS	E	0.16 (20)
8/5/1915	TD	LF	O	1.59 (4)
8/23/1915	ET	LF	W	1.10 (22-23)
7/21/1916	H1	LFNE	E	0.66 (20-21)
8/10/1917	TS	OS	E	3.12 (10)
8/26/1918	TD	OS	E	0.02 (26)
10/19/1923	TS	LFNE	O	0.70 (18-19)
10/24/1923	ET	LF	W	2.83 (23-25)
8/26/1924	H2	OS	E	5.85 (25-26)
9/17/1924	ET	OS	E	0.40 (17-18)
9/30/1924	ET	LF	E	0.65 (30-1)
12/3/1925	TS	OS	E	3.52 (3-4)
9/16/1926	H3	OS	E	0.30 (16-17)
8/24/1927	ET	OS	E	1.60 (23-24)
10/3/1929	ET	LF	W	1.92 (2-3)
9/16/1932	ET	LFNE	E	3.68 (16)
9/17/1933	H1	OS	E	5.30 (16-17)
10/28/1933	TS	OS	E	0.01 (28)
6/20/1934	ET	LF	E	1.33 (19-20)
9/9/1934	ET	LFNE	W	1.03 (8-9)
9/6/1935	H1	OS	E	0.11 (6)
9/12/1936	H1	OS	E	0.62 (12)
9/24/1936	H1	OS	E	0.22 (24)
8/1/1937	TS	OS	E	0.02 (1)
9/28/1937	ET	OS	E	0.74 (28)
9/21/1938	H3/ET	LFNE	W	0.13 (21)

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10/25/1938		ET	LFNE	E	1.91 (24-25)	
8/20/1939		TD	LF	W	0.73 (20)	
5/25/1940		TS	OS	E	0.09 (25)	41, NE
9/2/1940		H1	OS	E	0.12 (2)	49, NE
9/16/1940		H1	OS	E	0.45 (16)	37, N
10/18/1942		TS	OS	E	1.26 (17-18)	60, ENE
9/15/1943		TS	OS	E	0.36 (15)	39, N
10/1/1943		TS	LF	W	1.95 (30-2)	41, ESE
10/17/1943		ET	OS	E	1.58 (15-17)	48, SE
8/3/1944		TS	OS	E	0.04 (3)	21, ESE
9/15/1944		H1	LFNE	O	3.67 (14-15)	96, E
10/21/1944		ET	LFNE	E	2.41 (21-22)	51, NE
6/27/1945		TS	OS	E	1.56 (26-27)	55, N
9/19/1945		ET	LF	W	0.52 (18-19)	40, ENE
8/31/1948		ET	OS	E	0.14 (30-31)	26, NNE
8/29/1949		TS	LF	W	0.57 (29)	80, S
8/20/1950	Able	H2	OS	E	3.33 (19-20)	29, NNW
9/11/1950	Dog	H1	OS	E	0.78 (11-12)	65, NNE
10/5/1951	How	H1	OS	E	0.46 (4-5)	28, NE
2/4/1952	Unnamed	ET	LFNE	E	0.71 (4-5)	35, NE
9/1/1952	Able	ET	LF	W	0.56 (1-2)	50, SSE
8/15/1953	Barbara	H1	OS	E	1.34 (14-15)	41, WNW
9/7/1953	Carol	H1	OS	E	0.16 (6-7)	28, ENE
10/6/1953	Unnamed	ET	OS	E	0.65 (6-7)	46, NW
8/31/1954	Carol	H2	LFNE	W	2.46 (30-31)	125, SE
9/11/1954	Edna	H1	LFNE	E	5.23 (11)	101, NW
10/15/1954	Hazel	ET	LF	W	0.95 (15-16)	68, SSE
8/14/1955	Connie	TS	LF	W	2.01 (12-13)	39, SE
8/19/1955	Diane	TS	LF	E	12.77 (18-19)	58, E
9/20/1955	Ione	H2	OS	E	0.63 (20)	38, SSW
9/28/1956	Flossy	ET	OS	E	1.67 (27-28)	32, NE
8/17/1958	Becky	ET	OS	E	0.32 (17-18)	34, WNW
8/29/1958	Daisy	H3	OS	E	0.39 (29)	35, NNE
9/28/1958	Helene	H3	OS	E	2.51 (27-28)	39, ENE
6/19/1959	Unnamed	TS	OS	E	0.56 (18-19)	34, NE
7/11/1959	Cindy	TS	LFNE	E	1.96 (10-11)	39, N
10/1/1959	Gracie	ET	LF	W	0.30 (1)	37, S
7/30/1960	Brenda	TS	LF	W	1.01 (30)	63, ESE
8/19/1960	Cleo	H1	OS	E	0.32 (19)	34, NE
9/12/1960	Donna	H2	LFNE	W	2.79 (12)	140, SSE
9/15/1961	Unnamed	TS	LF	W	1.23 (14-15)	62, SW
9/21/1961	Esther	H3	OS	E	6.03 (20-22)	62, NE
9/26/1961	Esther	TS	LFNE	E	2.74 (24-26)	46, SW
10/8/1961	Francis	H1	OS	E	0.06 (8-9)	30, W
10/20/1961	Gerda	TS	OS	E	0.08 (20)	46, NNE
8/29/1962	Alma	H2	OS	E	3.64 (28-30)	55, N

10/29/1963	Ginny	H2	OS	E	1.66 (28-29)	65, NNW
9/14/1964	Dora	ET	OS	E	0.59 (14)	41, NE
9/23/1964	Gladys	H1	OS	E	1.64 (22-23)	35, NE
6/14/1966	Alma	ET	LFNE	E	0.11 (13-14)	36, S
9/15/1967	Doria	H1	OS	E	0.03 (15)	35, NE
8/21/1969	Camille	TS	OS	E	0.00	36, NW
9/9/1969	Gerda	H3	OS	E	2.58 (8-9)	52, WNW
8/28/1971	Doria	TS	LF	W	0.69 (27-28)	87, SSE
6/22/1972	Agnes	TS	LFNE	W	0.92 (22-24)	63, SE
9/3/1972	Carrie	TS	OS	E	3.82 (3)	58, NNE
8/1/1973	Alfa	TS	OS	E	0.58 (1)	27, NE
9/4/1974	Dolly	TS	OS	E	0.37 (3-4)	24, N
10/2/1975	Gladys	H4	OS	E	0.02 (2)	33, NNW
8/10/1976	Belle	H1	LFNE	W	2.72 (9-10)	88, S
7/15/1979	Bob	TD	LF	E	0.36 (15)	18, NE
9/6/1979	David	ET	LF	W	1.43 (6)	78, SSE
9/14/1979	Frederic	ET	LF	W	0.23 (14)	70, S
11/16/1981	Unnamed	TS	OS	E	3.48 (15-17)	45, NNE
9/15/1984	Diana	TS	OS	E	0.74 (15)	35, NE
9/24/1985	Henri	TD	LFNE	E	0.33 (24)	31, SE
9/27/1985	Gloria	H2	LFNE	W	0.40 (27)	100, SSE
6/8/1986	Andrew	TS	OS	E	0.42 (7-8)	38, WNW
8/18/1986	Charley	TS	OS	E	0.70 (17-18)	31, NE
8/7/1988	Alberto	TS	OS	E	0.02 (7)	20, W
8/30/1988	Chris	TD	LF	W	0.61 (29-30)	51, S
9/23/1989	Hugo	ET	LF	W	0.43 (22-23)	62, SSW
10/14/1990	Lili	TS	OS	E	3.02 (13-14)	33, SE
7/3/1991	Ana	TS	OS	E	0.01 (3)	22, NE
8/19/1991	Bob	H2	LFNE	E	2.58 (19)	78, ENE
10/31/1991	Unnamed	ET	OS	E	5.76 (30-1)	60, NE
9/26/1992	Danielle	TD	LF	W	1.16 (26)	24, ESE
9/1/1993	Emily	H2	OS	E	0.00	36, NE
8/18/1994	Beryl	TD	LF	O	2.09 (17-19)	29, E
6/7/1995	Allison	ET	OS	E	0.64 (7)	26, NNW
7/8/1995	Barry	TS	OS	E	0.28 (8)	24, S
10/6/1995	Opal	ET	LF	W	2.79 (5-6)	41, E
6/20/1996	Arthur	TD	OS	E	0.24 (19-20)	15, SE
7/13/1996	Bertha	TS	LF	O	3.54 (13)	55, SE
9/2/1996	Edouard	H1	OS	E	0.68 (1-3)	46, N
9/9/1996	Fran	TD	LF	W	0.01 (9)	12, WSW
9/14/1996	Hortense	H2	OS	E	0.37 (12-14)	30, NE
10/9/1996	Josephine	ET	LFNE	E	2.54 (8-9)	61, NE
7/25/1997	Danny	TS	OS	E	0.34 (24-25)	39, NE
8/29/1998	Bonnie	TS	OS	E	0.66 (28-29)	24, N
9/8/1999	Dennis	ET	LF	W	0.25 (8)	29, S
9/16/1999	Floyd	TS	LFNE	W	4.62 (15-17)	60, NW

10/18/1999	Irene	H2	OS	E	1.34 (17-18)	43, N
9/20/2000	Gordon	ET	LF	E	1.02 (20)	31, E
10/28/2000	Unnamed	TS	OS	E	0.00	50, NW
9/11/2002	Gustav	H1	OS	E	0.00	58, NW
9/28/2002	Isidore	ET	LF	W	0.72	50, S
9/19/2003	Isabel	TS	LF	W	0.38 (19)	38, ENE
8/13/2004	Bonnie	ET	LFNE	E	0.21 (13)	30, SSW
8/15/2004	Charley	TS	LFNE	O	1.57 (15-16)	28, ENE
8/31/2004	Hermine	TS	LFNE	E	0.63 (30-31)	24, NNW
9/9/2004	Francis	TD	LF	W	1.19 (8-9)	45, S
9/18/2004	Ivan	TD	LF	W	3.22 (18)	46, NE
9/29/2004	Jeanne	ET	OS	E	3.69 (28-29)	45, NNE
7/8/2005	Cindy	ET	OS	E	1.09 (8-9)	39, NNE
8/31/2005	Katrina	ET	LF	W	0.01 (31)	51, S
9/26/2005	Rita	ET	LF	W	0.38 (26)	39, S
10/25/2005	Wilma	H2	OS	E	2.72 (24-25)	67, NNE
6/15/2006	Alberto	ET	LF	E	0.13 (15)	33, NW
9/2/2006	Ernesto	ET	LF	W	T (2)	45, ENE
6/4/2007	Barry	ET	LFNE	O	1.66 (3-4)	35, ENE
11/3/2007	Noel	ET	OS	E	0.95 (3)	51, N
9/7/2008	Hanna	TS	LFNE	O	1.71 (6-7)	44, SE
9/15/2008	Ike	TD	LF	W	0.00	45, WSW
9/28/2008	Kyle	H1	OS	E	0.66 (28)	14, WNW
8/23/2009	Bill	H1	OS	E	0.53 (22-23)	23, N
8/29/2009	Danny	ET	OS	E	1.79e (28-29)	35, WNW
9/3/2010	Earl	TS	OS	E	0.47 (3)	37, WSW
8/28/2011	Irene	TS	LF	W	1.98 (27-28)	77, SE
10/29/2012	Sandy	H2	LF	W	3.29 (28-31)	76, E

Notes on the preparation of the list of tropical cyclones that have affected New England as described in the original 2001 BHO Bulletin article and the updated 2009 report: (Iacono, M.J., A Climatology of Tropical Cyclones in New England and Their Impact at the Blue Hill Observatory, 1851-2001, Blue Hill Observatory Bulletin, Vol. 19, No. 4, 2001)

- 1) This list includes all storms that are identifiable as distinct tropical cyclones that pass inside of the latitude/longitude box bounded by 37N-47N, 67W-77W. The list is derived from the NHC/CSU archive of tropical storm tracks and intensities maintained at 'weather.unisys.com' and 'www.nhc.noaa.gov' and developed from a NOAA database of tropical systems.
- 2) Of the storms that passed through the defined region, only those storms that had a noticeable impact at the Blue Hill Observatory are included on the list, that is, they produced either measurable precipitation (0.01 inch or more), or a peak wind gust of 35 mph or greater.
- 3) Tropical cyclones are identified by intensity as hurricanes (Hn, where 'n' is the Saffir-Simpson category), tropical storms (TS), and tropical depressions/extra-tropical storms (TD/ET). Storm intensity is listed for the time of closest approach to the Blue Hill Observatory, not the maximum intensity of the storm. The date listed is also the day of closest approach to Blue Hill. Of course, BHO data are only available for storms that occurred from 1885 to present. Naming of storms began in the Atlantic in 1950.
- 4) Three location categories are defined. Type I storms made primary or secondary landfall in New England or Long Island (LFNE), Type II storms made landfall elsewhere in the United States and later moved into or affected New England (LF) while remaining over land, and Type III storms remained entirely offshore or passed New England while offshore (OS).
- 5) Track of storm center relative to Blue Hill is listed either as west (W), east (E), or overhead within about 20 miles (O). Storms that passed to the west in most cases also passed north of the Observatory, while most storms that passed east usually approached from the south.
- 6) Storms that entered, exited, and then returned to the defined geographic area are listed more than once as necessary, and their impact during each closest approach to Blue Hill is listed. Through 2001, only Esther in 1961 is listed twice in this way.
- 7) It is possible that a few storms impacted New England during this time period that did not pass into the defined geographic area, though it is expected that they would be few and that the impact was small.
- 8) Precipitation amount is taken as a continuous period of rainfall during storm passage. No attempt was made in this list to definitively establish whether all listed rainfall was due exclusively to the passing tropical cyclone, or if any mid-latitude weather systems contributed precipitation. For storms that occurred during several days of continuous rain the nearest 24 or 36 hours to storm passage was used as an estimate of the tropical rainfall until a more detailed study of simultaneous weather events is completed. For example, the storms of 9/17/1933 and 11/16/1981 include all rainfall on the day of passage, and the last 12 hours of the previous day. An "e" following a rainfall amount identifies estimated storm totals where tropical cyclone precipitation in recent years is known to have combined with rainfall from mid-latitude synoptic systems.
- 9) Except for the calculated or timed gusts from the major hurricanes (i.e. 1938, 1944, 1954, and 1960), all gusts prior to 1955 are estimated from the available cinematograph maximum wind

speed, which is close to a two-minute average wind. An adjustment factor of 1.25 (based on 10-years of gust vs. fastest mile comparisons) is applied to these measurements to estimate a 1-2 second maximum gust. Gusts for a few later storms were estimated in a similar manner when gust chart recordings were unavailable. Gusts listed for years prior to 1938 were recorded with older instrumentation, and where not used in this study. The reliability of these records or their comparability to current wind records has not yet been determined, so these data should be used cautiously.

- 10) Cyclones for the 1851 through 2001 seasons are included in the article 'A Climatology of tropical cyclones in New England and their impact at the Blue Hill Observatory, 1851-2001' published in the Blue Hill Observatory Bulletin, Fall/Winter 2001, Vol. 19, No. 4. The storm on 8/26/1924, which is now included on the list, was inadvertently excluded from the statistics and tables prepared for the article.

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