

**VEGETATION STUDY
COHASSET, MA**

**Prepared for
THE COHASSET BOARD OF SEWER COMMISSIONERS**

**BY
TUTELA ENGINEERING ASSOCIATES
AND
APPLIED SCIENCE ASSOCIATES, INC.**

FEBRUARY, 1995

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INTRODUCTION

In the fall of 1994 Tutela Engineering Associates (TEA) and its subconsultant Applied Science Associates, Inc. (ASA) undertook the first of several tasks to evaluate one of the potential receiving water systems for the Cohasset Wastewater Treatment Plant, namely Cohasset Harbor. The October 25, 1994 Special Town Meeting authorized the evaluation of this and other alternatives to better provide an environmentally sound and cost effective option for the Town. Since the assessment of existing eutrophic conditions or tendencies in a receiving water system is a primary element to defining the impacts of future nutrient loadings, an early indication of the conditions, can facilitate future evaluation efforts. Since climatic conditions during the Fall of 1994 were relatively mild (i.e., Average Air Temperatures: 64.2°F in September, 55.5°F in October and 55.1°F for the first 15 days of November with minimal extremes, it was deduced that conducting a vegetation study at that time would still be highly productive since aquatic vegetation seasonal "die-off" would still be minimal.

The water-based study could also provide a reference base to TEA and ASA for comparison purposes during subsequent dye study or water quality evaluation work. Significant masses of aquatic vegetation could also provide added insight to the detection and location of nutrient sources entering the embayment.

STUDY

The Vegetation Study was conducted on November 15, 1994 during low tide conditions. Doctor Henry M. Rines of ASA conducted the study with the aid of an environmental engineer from TEA. Due to the relatively small size of Cohasset Cove and Harbor and the numerous land-based references available along the shores, visual locating of delineated areas was deemed more than sufficient. Vegetation landward boundaries were supplemented by shoreline field verification. Deep water delineations of aquatic vegetation were shown in an approximate fashion as observed. Water turbidity restricted full delineation of eelgrass boundaries and have thus been labeled with "unknown limits".

STUDY RESULTS

The Cohasset Harbor area vegetation study took place from 13:30 to 16:10 on November 15, 1994. Low tide was predicted or occur at 15:16 with a height predicted for Boston at 0.13 m (MLLW) or close to mean low water. The survey took place from a small Zodiac capable of navigating most of the area of the cove and harbor at low tide. Where shoreline details were indistinct from the boat, landings were made to more closely examine shoreline flora. Notes were also made on subtidal flora that could be seen and identified from the boat. In addition to writing down descriptions of the observed vegetation, notes were also made on copies of maps of the area to more closely define where each observation was made.

The study started in Bailey Creek at the public boat landing. The shoreline here is pebble and cobble with a thin coat of encrusting green and brown algae on some of the pebbles and sparse stands of *Fucus*, a brown macroalga ("rockweed"), on some of the larger rocks. The area to the east of the landing is surrounded by saltmarsh with stands of *Spartina* (salt marsh cordgrass). The peat edge of the marsh is eroding into the creek and the exposed peat is covered to varying degrees with algae. Directly to the east of the landing is an area with a thin but nearly complete covering of filamentous green and brown algae (tentatively identified as *Dityosiphon* and *Rhizoclonium*), with the green alga *Enteromorpha* mixed in. Further on, this algal

cover varies 10% to 50% in patchy areas, and is mostly lacking on the north side of the creek. The *Spartina* is backed by *Phragmites* (reed) on the north side of the creek. *Fucus* occurs intermittently where rocks are exposed.

The areas of intermittent *Fucus* extend westward along the south shore all the way to the mouth of the Gulf. The only other major vegetation here is a small isolated *Spartina* patch in front of the Cohasset Sailing Club. The rocks in and around the mouth of the Gulf all have heavy cover of *Fucus* along with considerable cover of a red encrusting alga *Hildenbrandia*. This is coverage characteristic of an open shore and reflects the considerable water movement associated with the ebb and flow of the tide in this area.

Fucus cover is rare further to the west even on the rip-rap wall abutting the Chart House on Tower Wharf, though coverage increases to about 30% at the north end of the wall. In front of the Chart House, there is a light *Fucus* cover and solid *Hildenbrandia* cover on the rocks.

On the adjoining Bates Wharf, to the west, only *Hildenbrandia* was noted. On the stones of the docks and wall further to the west, there is a 20% to 60% cover of *Hildenbrandia* and/or a similarly-encrusting brown alga *Ralfsia*. The rocks at the west end of the Cove on the south shore have a coating of *Hildenbrandia* near the water's

edge and occasional patches of *Fucus* and *Ascophyllum* ("wrack", similar to *Fucus* in appearance). A patch of *Spartina* occupies the south west corner of the shore.

The rocks around the outlet of James Brook into the Cove have about a 20% cover of *Fucus* and *Hildenbrandia*. The wall to the north is almost bare. On the north shore of the Cove there are patches of *Spartina* and eroding peat at the west end. The walls here have a light staining suggestive of *Hildenbrandia*. There is little else along this north shore.

Further to the east, there are patches of *Spartina* around the point with sparse *Fucus* cover on exposed rocks. The east shore of the point is bare, but patches of *Spartina* and eroding peat are also evident on its north side. In the cove above this point, there is an extensive marshy area - *Spartina* on a thick peat layer - to the west of the Cohasset Yacht Club. A thin layer of filamentous green algae and some brown algae intermixed with sparse *Enteromorpha* and *Fucus* cover the eroding peat in patches. There is more *Spartina* along the shore to the east of the yacht club, but no algal covering on the peat.

Heading northward along the channel out of Cohasset Harbor, there is more *Spartina* cover with bare eroding peat banks along the western shore. Hominy Point and other exposed rocky areas have about a 20% cover of *Fucus*. The jetty walls to the east

are essentially bare. *Zostera* (eel grass) grows along the bottom here on the jetty side of the Channel. The extent of this grass bed could not be defined from the boat.

Further to the north, along the shore, low-lying areas of *Spartina* back the sand flats.

At the north end of this area, just south of White Head, there is another *Zostera* bed of unknown extent. All around White Head and Little White Head there is a 10 to 20% cover of *Fucus*, with 50 to 100% cover of *Hildenbrandia*, on the lower areas.

Northwest of this lies Windmill Point which has a heavy cover of *Hildenbrandia*, with about 50% coverage of *Fucus*, and, for about a foot above the water line, a dense cover of a red alga *Chondrus* (Irish moss). The *Fucus* cover is much lighter to the west of this, but these areas of *Fucus/Hildenbrandia/Chondrus* are repeated on some of the most seaward north-facing points. The sandy bottom in this area has about a 10% cover of *Laminaria*, a brown alga (kelp).

CONCLUSIONS

In conclusion, there are few, if any indications of eutrophication in the Cohasset Harbor/Cove area. Most of the vegetation present is characteristic of a healthy system. Occasional coverage of filamentous algae along eroding peat margins, though not abnormal, may reflect the presence of some local nutrient inputs, but certainly cannot be attributed to the wastewater treatment plant inputs as they are all remote. The presence of classical rocky shore algae at the mouth of the Gulf and eelgrass in the channel by the Harbor entrance are indications of a clean and healthy system. For those who might seek a bench mark for the health of the system over time, mapping the extent and density of this eelgrass bed (in the proper season) would probably be a useful effort. Such a study is anticipated to be conducted by the Town in the late Spring of 1995 as part of it's current USACOE coordinated dredging program.

APPENDIX A

LOCAL CLIMATOLOGICAL DATA



LOCAL CLIMATOLOGICAL DATA MONTHLY SUMMARY

INQUIRIES/COMMENTS CALL
 (704) 271-4800 VOICE
 271-4010 TDD/271-4876 FAX

GEN LOGAN INTERNATIONAL AP

LATITUDE 42° 22' N LONGITUDE 71° 02' W ELEVATION (GROUND) 15 FEET TIME ZONE EASTERN 14739

SEP 1994
 BOSTON, MA

DATE	TEMPERATURE °F				DEGREE DAYS BASE 55 F		WEATHER TYPES 1 FOG 2 HEAVY FOG 3 THUNDERSTORMS 4 ICE PELLETS 5 HAIL 6 GLAZE 7 DUSTSTORM 8 SMOKE, HAZE 9 BLOWING SNOW	SNOW/ICE ON GRD AT 0700 (IN.)	PRECIPITATION (INCHES)		AVERAGE STATION PRESSURE (INCHES OF Hg) ELEV. 29 (FT. MSL)	WIND (M.P.H.)					SUNSHINE		SKY COVER TENTHS																		
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT	HEATING			COOLING	WATER EQUIVALENT		SNOW ICE PELLETS	RESULTANT DIR	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST		FASTEST 1-MIN		MINUTES	PERCENT POSSIBLE	SUNRISE TO SUNSET	MIDNIGHT TO MIDNIGHT														
																SPEED	DIR	SPEED	DIR																		
01	72	58	65	-3	58	0	0	8	0	0.00	0.0	29.930	01	4.7	11.5	22	NW	17	32	346	44	9	8														
02	74	54	64	-4	46	1	0		0	0.00	0.0	30.195	30	6.8	11.6	24	NW	16	32	777	99	2	2														
03	66	50	58	-10	49	7	0		0	0.00	0.0	30.330	08	3.3	9.8	18	E	15	11	710	91	4	4														
04	65	52	59	-9	49	6	0		0	0.00	0.0	30.290	02	12.9	14.5	25	NE	21	05	101	13	10	8														
05	59	52	56*	-12	49	9	0	1	0	0.34	0.0	29.960	33	19.0	20.1	44	NW	29	32	0	0	10	10														
06	70	55	63	-5	49	2	0		0	T	0.0	29.800	30	13.3	15.0	30	NW	22	31	313	40	8	7														
07	80	54	67	0	50	0	2		0	0.00	0.0	29.860	27	13.2	13.8	29	W	20	29	590	76	3	3														
08	81	60	71	4	52	0	6		0	0.00	0.0	29.950	27	15.3	15.8	29	W	21	27	717	93	2	2														
09	81	60	71	4	57	0	6	3	0	0.25	0.0	29.960	24	7.5	10.8	28	SW	17	26	352	46	9	8														
10	71	57	64	-3	46	1	0		0	0.01	0.0	30.010	31	10.7	11.6	24	NW	20	30	695	91	1	3														
11	69	54	62	-4	48	3	0		0	0.00	0.0	30.040	30	13.9	14.5	25	NW	18	33	482	63	5	4														
12	75	56	66	0	49	0	1		0	T	0.0	30.015	30	13.9	14.9	25	NW	18	31	692	91	3	4														
13	83	63	73	7	61	0	8	8	0	0.06	0.0	29.910	28	10.6	11.7	24	NW	18	28	522	69	8	9														
14	73	61	67	1	60	0	2	1	8	0.01	0.0	29.920	14	0.8	9.4	21	NE	17	04	177	24	8	7														
15	68	56	62	-4	52	3	0		0	0.00	0.0	30.090	05	1.3	9.9	16	N	12	24	750	100	2	2														
16	72	56	64	-1	57	1	0	1	0	T	0.0	30.060	23	10.9	11.1	21	SW	15	22	270	36	9	9														
17	87*	69	78*	14	67	0	13	1	8	0.50	0.0	29.750	24	14.8	15.7	29	SW	21	24	212	28	8	9														
18	69	53	61	-3	50	4	0		0	0.33	0.0	29.800	01	8.4	10.7	31	NE	23	06	430	58	7	6														
19	71	52	62	-2	44	3	0		0	0.00	0.0	29.970	29	11.2	12.0	25	W	18	31	646	87	3	2														
20	76	53	65	1	49	0	0		0	0.00	0.0	30.135	24	9.1	10.4	18	SW	16	23	736	100	7	5														
21	78	58	68	5	56	0	3	1	0	0.00	0.0	30.180	09	3.2	8.8	16	E	14	07	733	100	6	7														
22	64	60	62	-1	56	3	0	1	0	0.24	0.0	30.290	07	15.4	15.5	26	E	21	07	215	29	10	9														
23	65	60	63	0	62	2	0	1	0	2.64	0.0	30.010	10	17.9	19.9	36	SE	30	07	0	0	10	10														
24	68	61	65	3	63	0	0	1	0	0.05	0.0	30.000	08	5.9	7.8	14	NE	12	06	15	2	10	10														
25	69	60	65	3	59	0	0	1	0	T	0.0	30.005	07	5.2	8.7	14	E	13	09	125	17	10	10														
26	63	60	62	0	58	3	0		0	T	0.0	30.010	08	7.5	7.8	12	E	9	09	0	0	10	10														
27	62	58	60	-1	58	5	0	2	0	0.13	0.0	29.920	09	10.0	10.8	23	E	20	11	3	0	10	10														
28	75	60	68	7	60	0	3	2	8	0.02	0.0	29.730	17	3.1	9.2	29	W	18	28	294	41	8	9														
29	69	56	63	3	49	2	0		0	T	0.0	29.590	26	14.3	15.1	29	W	20	27	413	58	5	4														
30	67	51	59	-1	38	6	0		0	0.00	0.0	29.750	30	17.0	17.6	41	W	28	29	613	87	3	3														
SUM		SUM		TOTAL		TOTAL		NUMBER OF DAYS		TOTAL		TOTAL		FOR THE MONTH :					TOTAL		SUM		SUM														
2142		1709		61		44				4.58		0.0		29.980		30		1.9		12.5		44		NW		30		07		1929		FOR		200		194	
AVG.		AVG.		AVG.		DEP.		DEP.		PRECIPITATION		DEP.		DATE: 5		DATE: 23		POSS		MONTH		AVG		AVG		AVG		AVG		AVG		AVG		AVG			
71.4		57.0		64.2		-2.6		53.3		-22		≥ .01 INCH		12		1.52						22444		53		6.7		6.5		6.5		6.5					
NUMBER OF DAYS				SEASON TO DATE				SNOW, ICE PELLETS				GREATEST IN 24 HOURS AND DATES				GREATEST DEPTH ON GROUND OF																					
				TOTAL				≥ 1.0 INCH								SNOW, ICE PELLETS OR ICE																					
MAXIMUM TEMP.				MINIMUM TEMP.				THUNDERSTORMS				PRECIPITATION				SNOW, ICE PELLETS																					
≥ 90°		≤ 32°		≤ 32°		≤ 0°		DEP.		DEP.		HEAVY FOG		2		2.88		22-23		0.6		0															
0		0		0		0		-13		258		CLEAR		8		PARTLY CLOUDY		6		CLOUDY		16															

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
 † TRACE AMOUNT.
 - ALSO ON EARLIER DATE(S).
 HEAVY FOG: VISIBILITY 1/4 MILE OR LESS.
 BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

DATA IN COLS 6 AND 12-15 ARE BASED ON 21 OR MORE OBSERVATIONS AT HOURLY INTERVALS. RESULTANT WIND IS THE VECTOR SUM OF WIND SPEEDS AND DIRECTIONS DIVIDED BY THE NUMBER OF OBSERVATIONS.
 COLS 16 & 17 : PEAK GUST - HIGHEST INSTANTANEOUS WIND SPEED.
 ONE OF TWO WINDS IS GIVEN UNDER COLS 18 & 19 : FASTEST MILE- HIGHEST RECORDED SPEED FOR WHICH A MILE OF WIND PASSES STATION (DIRECTION IN COMPASS POINTS). FASTEST OBSERVED ONE MINUTE WIND - HIGHEST ONE MINUTE SPEED (DIRECTION IN TENS OF DEGREES).
 ERRORS WILL BE CORRECTED IN SUBSEQUENT PUBLICATIONS.

I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER.

Kenneth D. Hoken
 DIRECTOR
 NATIONAL CLIMATIC DATA CENTER

OCT 1994
 BOSTON, MA
 NAT'L WEA SERVICE.
 SUITE 102N MASS.TECH.CTR.

ISSN # 0198-2427

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GEN LOGAN INTERNATIONAL AP

LATITUDE 42° 22'N LONGITUDE 71° 02'W ELEVATION (GROUND) 15 FEET TIME ZONE EASTERN 14739

OCT 1994
 BOSTON, MA

DATE	TEMPERATURE °F			DEGREE DAYS BASE 65 °F		WEATHER TYPES 1 FOG 2 HEAVY FOG 3 THUNDERSTORMS 4 ICE PELLETS 5 HAIL 6 CLARE 7 DUSTSTORM 8 SMOKE, HAZE 9 BLOWING SNOW	SNOW/ ICE ON GRD AT 0700 (IN.)	PRECIPITATION (INCHES)		AVERAGE STATION PRESSURE (INCHES OF Hg ELEV. (FT. MSL)	WIND (M.P.H.)				SUNSHINE		SKY COVER TENTHS							
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT			HEATING	COOLING		WATER EQUIVALENT	SNOW ICE PELLETS	RESULTANT DIR	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST	FASTEST 1-MIN	MIRUTES	PERCENT POSSIBLE	SUNRISE TO SUNSET	MIDNIGHT TO MIDNIGHT			
	1	2	3	4	5			6	7A		7B	8	9	10	11	12	13	14	15	16	17	18	19	20
01	59	48	54	-6	38	11	0	1	0	0.10	0.0	29.830	28	10.6	12.0	26	W	20	28	335	48	10	8	
02	63	47	55	-4	38	10	0	1	0	0.02	0.0	29.825	30	11.6	12.3	28	NW	22	28	464	66	3	5	
03	59	42	51	-8	34	14	0	0	0	0.00	0.0	29.900	32	15.3	16.2	33	NW	24	34	696	99	0	0	
04	61	45	53	-6	38	12	0	0	0	0.00	0.0	29.930	31	13.1	13.4	24	NW	17	33	432	62	5	4	
05	58	46	52	-7	36	13	0	0	0	0.00	0.0	29.910	31	12.4	13.2	24	NW	20	29	57	8	10	9	
06	61	44	53	-5	35	12	0	0	0	0.00	0.0	30.100	31	8.6	9.9	22	W	16	33	627	91	4	4	
07	68	46	57	-1	45	8	0	0	0	0.00	0.0	30.280	21	6.1	9.6	22	SW	17	22	688	100	0	0	
08	75	51	63	6	51	2	0	1	8	0	0.00	0.0	30.200	23	13.4	13.7	23	SW	18	23	651	95	3	3
09	77	55	66	9	57	0	1	1	0	T	0.0	29.970	22	14.5	15.6	35	W	23	30	411	60	7	6	
10	64	45	55	-1	38	10	0	0	0	T	0.0	30.000	31	12.6	13.5	26	NW	18	29	292	43	7	6	
11	57	41	49	-7	26	16	0	0	0	0.00	0.0	30.340	33	11.2	11.7	26	NW	18	34	677	100	0	0	
12	54	39	47	-9	30	18	0	0	0	0.00	0.0	30.505	07	1.9	9.7	15	E	13	08	674	100	0	0	
13	70	41	56	0	33	9	0	0	0	0.00	0.0	30.360	24	6.8	8.3	17	W	13	23	553	82	4	4	
14	63	48	56	1	43	9	0	0	0	0.00	0.0	30.260	05	5.7	10.7	24	NE	17	07	439	66	10	10	
15	53	41	47	-8	36	18	0	0	0	0.00	0.0	30.350	03	6.4	11.0	23	NE	17	06	664	100	0	2	
16	63	40	52	-3	29	13	0	0	0	0.00	0.0	30.225	35	6.6	10.7	21	NW	15	03	661	100	0	0	
17	58	45	52	-2	35	13	0	0	0	0.00	0.0	30.200	02	7.2	11.1	25	N	16	05	658	100	1	3	
18	57	44	51	-3	42	14	0	0	0	0.02	0.0	30.090	31	0.6	8.8	18	S	12	28	445	68	10	9	
19	62	51	57	3	52	8	0	0	0	0.03	0.0	29.995	14	5.8	8.6	20	E	15	11	125	19	9	10	
20	66	55	61	8	56	4	0	1	0	0.02	0.0	29.910	13	6.2	6.7	16	SE	14	15	0	0	10	10	
21	66	56	61	8	55	4	0	2	0	0.01	0.0	29.780	36	11.4	12.2	25	N	17	34	37	6	10	10	
22	68	56	62	9	50	3	0	0	0	0.00	0.0	29.810	32	11.8	12.5	26	N	17	33	36	6	10	9	
23	71	51	61	8	49	4	0	1	0	0.18	0.0	29.840	25	5.4	8.3	25	SW	17	23	350	54	7	7	
24	69	51	60	8	46	5	0	1	0	T	0.0	29.910	26	4.9	10.3	20	SE	15	31	638	99	0	2	
25	68	48	58	6	45	7	0	1	8	0	0.00	0.0	29.930	24	7.7	10.4	26	S	18	25	404	63	7	4
26	57	47	52	0	36	13	0	0	0	0.00	0.0	30.020	32	4.7	8.5	17	NW	10	30	120	19	10	9	
27	57	46	52	1	33	13	0	0	0	0.00	0.0	30.070	33	8.4	11.0	20	NW	16	32	363	57	6	6	
28	62	43	53	2	35	12	0	0	0	0.00	0.0	30.170	27	9.8	10.8	22	SW	14	26	631	100	0	0	
29	66	47	57	6	41	8	0	0	0	0.00	0.0	30.130	23	14.8	14.9	28	SW	21	23	228	36	10	8	
30	74	51	63	12	42	2	0	0	0	0.00	0.0	30.080	25	11.1	12.2	25	W	17	27	625	100	0	2	
31	72	51	62	12	48	3	0	1	0	0.03	0.0	30.020	17	4.6	7.8	25	S	17	20	380	61	9	8	
SUM	SUM				TOTAL	TOTAL		NUMBER OF DAYS	TOTAL	TOTAL		POP FOR THE MONTH :				TOTAL		SUM	SUM					
1978	1461				288				0.41	0.0	30.16	29	4.9	11.1	25	W	24	34	13361		162	158		
AVG.	AVG.	AVG.	DEP.	AVG.	DEP.	PRECIPITATION	DEP.					DATE: 9	DATE: 3	POSS	MONTH	AVG	AVG							
63.8	47.1	55.5	0.7	41.0	-33	-4	0.01 INCH	8	-2.89						20544	65	5.2	5.1						
NUMBER OF DAYS				SEASON TO DATE		SNOW, ICE PELLETS		GREATEST IN 24 HOURS AND DATES				GREATEST DEPTH ON GROUND OF												
				TOTAL		≥ 1.0 INCH						SNOW, ICE PELLETS OR ICE												
MAXIMUM TEMP.		MINIMUM TEMP.		353		932		THUNDERSTORMS		0		PRECIPITATION		SNOW, ICE PELLETS										
≥ 90°		≤ 32°		≤ 32°		≤ 0°		DEP.		DEP.		HEAVY FOG		1		0.18		23-24						
0		0		0		0		-46		254		CLEAR 12		PARTLY CLOUDY		8		CLOUDY 11						

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE. DATA IN COLS 6 AND 12-15 ARE BASED ON 21 OR MORE OBSERVATIONS AT HOURLY INTERVALS. RESULTANT WIND IS THE VECTOR SUM OF WIND SPEEDS AND DIRECTIONS DIVIDED BY THE NUMBER OF OBSERVATIONS.
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 BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.
 COLS 16 & 17 : PEAK GUST - HIGHEST INSTANTANEOUS WIND SPEED.
 ONE OF TWO WINDS IS GIVEN UNDER COLS 18 & 19 : FASTEST MILE- HIGHEST RECORDED SPEED FOR WHICH A MILE OF WIND PASSES STATION (DIRECTION IN COMPASS POINTS). FASTEST OBSERVED ONE MINUTE WIND - HIGHEST ONE MINUTE SPEED (DIRECTION IN TENS OF DEGREES).
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL ENVIRONMENTAL SATELLITE DATA AND INFORMATION SERVICE

NATIONAL CLIMATIC DATA CENTER ASHVILLE, NORTH CAROLINA

Kenneth D. Haden
 DIRECTOR NATIONAL CLIMATIC DATA CENTER

NOV 1994
 BOSTON, MA
 NAT'L WEA SERVICE.
 SUITE 102N MASS.TECH.CTR.

ISSN # 0198-2427

LOCAL CLIMATOLOGICAL DATA MONTHLY SUMMARY



INQUIRIES/COMMENTS CALL
 (704) 271-4800 VOICE
 271-4010 TDD/271-4876 FAX

GEN LOGAN INTERNATIONAL AP

LATITUDE 42° 22' N LONGITUDE 71° 02' W ELEVATION (GROUND) 15 FEET TIME ZONE EASTERN 14739

NOV 1994
 BOSTON, MA

DATE	TEMPERATURE °F			DEGREE DAYS BASE 65 °F		WEATHER TYPES 1 FOG 2 HEAVY FOG 3 THUNDERSTORMS 4 TFF PELLETS 5 HAIL 6 SLEET 7 DUST/STORM 8 SNOW, HAZE 9 BLOWING SNOW	SNOW/ICE ON GROUND AT 0700 (IN.)	PRECIPITATION (INCHES)		AVERAGE STATION PRESSURE (INCHES OF HG) ELEV. 29 (FT. MSL)	WIND (M.P.H.)				SUNSHINE		SKY COVER TENTHS						
	MAXIMUM	MINIMUM	AVERAGE	DEPARTURE FROM NORMAL	AVERAGE DEW POINT			HEATING	COOLING		WATER EQUIVALENT	SNOW ICE PELLETS	RESULTANT DIR	RESULTANT SPEED	AVERAGE SPEED	PEAK GUST	DIR	SPEED	DIR	HOURS	PERCENT POSSIBLE	SUNRISE TO SUNSET	MIDNIGHT TO MIDNIGHT
1	2	3	4	5	6	7A	7B	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	69	56	63	13	60.8	2	0	2	0	0.21	0.0	29.520	16	7.2	9.8	24	S	20	19	1	0	10	17
02	63	48	56	6	39.7	9	0	1	0	0.00	0.0	29.460	27	18.8	21.2	46	W	29	27	96	16	9	7
03	65	45	55	5	26.6	10	0	0	0	0.00	0.0	30.030	28	10.5	12.7	28	NW	18	32	585	95	4	7
04	77	54	66	17	46.5	0	1	0	0	0.00	0.0	30.060	21	10.0	10.8	21	SW	17	21	589	96	4	7
05	79	57	68	19	50.0	0	3	0	0	0.00	0.0	29.960	22	12.9	13.2	31	SW	18	22	545	89	8	7
06	66	53	60	11	33.9	5	0	1	0	0.04	0.0	29.810	22	2.9	13.4	63	W	41	25	3	0	10	7
07	58	47	53	5	25.7	12	0	0	0	0.00	0.0	29.965	30	21.9	22.6	51	NW	35	29	606	100	0	7
08	64	46	55	7	26.4	10	0	0	0	0.00	0.0	29.970	25	12.6	13.3	31	W	23	25	31	5	9	17
09	63	51	57	9	40.0	8	0	0	0	0.01	0.0	29.990	29	8.9	12.2	31	N	20	34	14	2	10	17
10	55	39	47	-1	25.9	18	0	0	0	0.04	0.0	29.970	32	14.4	15.1	35	NW	23	33	240	40	6	7
11	49	36	43	-4	21.7	22	0	0	0	0.00	0.0	30.180	31	16.0	16.3	36	NW	24	32	596	100	0	7
12	53	35	44	-3	27.3	21	0	0	0	0.00	0.0	30.265	25	7.7	9.8	23	SW	14	24	579	97	9	7
13	57	43	50	3	31.9	15	0	0	0	0.00	0.0	30.180	30	2.7	10.2	23	N	16	35	564	95	4	7
14	60	39	50	4	36.6	15	0	0	0	0.00	0.0	30.255	22	7.4	10.1	25	SW	17	23	441	75	9	7
15	68	50	59	13	43.5	6	0	0	0	0.00	0.0	30.090	27	12.1	14.7	30	W	18	29	64	11	10	7
16	51	44	48	3	30.7	17	0	0	0	0.00	0.0	30.350	36	6.2	7.8	16	N	13	34	0	0	10	17
17	53	37	45	0	38.2	20	0	0	0	0.00	0.0	30.440	06	8.0	11.0	20	E	15	09	553	95	0	7
18	56	40	48	3	46.2	17	0	1	0	1.33	0.0	30.200	36	7.6	9.0	17	NW	13	04	119	20	9	7
19	63	46	55	11	38.3	10	0	1	0	0.59	0.0	29.980	29	12.4	12.9	26	NW	18	31	548	95	0	7
20	51	38	45	1	24.5	20	0	0	0	0.00	0.0	30.360	33	9.2	10.8	29	NW	16	34	558	97	6	7
21	59	34	47	4	39.3	18	0	1	0	0.26	0.0	30.210	15	7.9	11.0	30	S	24	18	7	1	10	7
22	59	37	48	5	33.2	17	0	1	0	0.66	0.0	29.735	29	18.1	18.6	41	W	30	28	574	100	0	7
23	43	24	34	-9	14.5	31	0	0	0	T	0.1	29.820	27	15.5	18.7	41	NW	28	28	264	46	5	7
24	34	24	29	-13	3.3	36	0	0	0	0.00	0.0	30.015	28	15.0	16.2	32	NW	23	29	565	99	1	7
25	50	30	40	-2	22.8	25	0	0	0	0.00	0.0	29.940	24	12.6	13.4	30	SW	20	24	310	55	7	7
26	46	26	36	-5	18.8	29	0	0	0	0.00	0.0	30.160	30	12.7	14.4	31	NW	22	33	539	95	3	7
27	37	22	30	-11	16.7	35	0	0	0	0.00	0.0	30.550	03	3.0	10.2	20	NW	14	13	526	93	4	7
28	66	35	51	11	46.5	14	0	1	0	1.17	T	29.815	18	9.0	18.4	44	W	29	12	0	0	10	7
29	54	44	49	9	25.0	16	0	0	0	0.00	0.0	29.910	26	13.8	14.2	35	W	22	26	482	86	8	7
30	51	37	44	5	26.6	21	0	0	0	0.00	0.0	30.070	29	10.6	11.8	29	NW	18	31	431	77	5	7
SUM	SUM			TOTAL	TOTAL	NUMBER OF DAYS		TOTAL	TOTAL	FOR THE MONTH :				TOTAL	%	SUM	SUM						
1719	1217			479	4	4.3		0.1	30.025	28	7.6	13.5	63	W	41	25	10430	180	178				
AVG.	AVG.	AVG.	DEP.	AVG.	DEP.	PRECIPITATION		DEP.	DATE: 6				DATE: 6	POSS	MONTH	AVG	AVG						
57.3	40.6	49.0	3.7	32.8	-112	.01 INCH		9	17625				59	6.0									
NUMBER OF DAYS				SEASON TO DATE		SNOW, ICE PELLETS		GREATEST IN 24 HOURS AND DATES				GREATEST DEPTH ON GROUND OF											
				TOTAL		≥ 1.0 INCH						SNOW, ICE PELLETS OR ICE											
MAXIMUM TEMP.		MINIMUM TEMP.		832		936		THUNDERSTORMS		PRECIPITATION		SNOW, ICE PELLETS		AND DATE									
≥ 90°		≤ 32°		≤ 32°		≤ 0°		DEP.		DEP.		HEAVY FOG		1 1.92 18-19 0.1 23 0									
0		0		5		0		-158		258		CLEAR 7		PARTLY CLOUDY 9 CLOUDY 14									

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE. DATA IN COLS 6 AND 12-15 ARE BASED ON 21 OR MORE OBSERVATIONS AT HOURLY INTERVALS. RESULTANT WIND IS THE VECTOR SUM OF WIND SPEEDS AND DIRECTIONS DIVIDED BY THE NUMBER OF OBSERVATIONS. COLS 16 & 17 : PEAK GUST - HIGHEST INSTANTANEOUS WIND SPEED. ONE OF TWO WINDS IS GIVEN UNDER COLS 18 & 19 : FASTEST MILE- HIGHEST RECORDED SPEED FOR WHICH A MILE OF WIND PASSES STATION (DIRECTION IN COMPASS POINTS). FASTEST OBSERVED ONE MINUTE WIND - HIGHEST ONE MINUTE SPEED (DIRECTION IN TENS OF DEGREES). ERRORS WILL BE CORRECTED IN SUBSEQUENT PUBLICATIONS.

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