U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: HAVERHILL, MA **COOP ID: 193505**

Climate Division: MA 2 **NWS Call Sign:** **Elevation: 18 Feet** **Lat: 42˚46N** **Lon: 71˚04W**

Temperature (˚F)

	Mean (1)			Extremes										Degree Days (1) Base Temp 65		Mean Number of Days (3)					
Month	Daily Max	Daily Min	Mean	Highest Daily(2)	Year	Day	Highest Month(1) Mean	Year	Lowest Daily(2)	Year	Day	Lowest Month(1) Mean	Year	Heating	Cooling	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	34.9	15.6	25.3	71	1950	26	32.8	1990	-21	1984	22	17.1	1981	1233	0	.0	.0	3.0	12.6	28.7	2.7
Feb	37.8	17.7	27.8	73	1997	22	34.3	1998	-12	1983	13	19.9	1979	1044	0	.0	.0	3.3	8.4	25.6	1.8
Mar	46.7	26.2	36.5	90	1998	31	42.5	1977	-3+	1950	4	30.1	1984	885	0	.0	@	11.2	2.0	23.1	.1
Apr	57.5	35.3	46.4	94	1976	18	51.8	1976	15+	1982	7	43.3	1972	558	0	.0	.1	23.6	.1	11.3	.0
May	68.8	45.2	57.0	96+	1962	19	62.6	1975	24	2001	7	53.3	1990	261	13	.0	.8	30.5	.0	1.1	.0
Jun	77.8	54.5	66.2	101	1988	15	72.4	1976	36+	1984	1	60.1	1982	63	97	@	2.4	30.0	.0	.0	.0
Jul	83.5	60.8	72.2	105	1949	30	75.8	1975	41	1983	9	67.3	1992	8	229	.1	5.9	31.0	.0	.0	.0
Aug	81.2	59.3	70.3	104	1949	10	74.5	1973	36	1986	30	65.6	1987	15	178	@	3.5	31.0	.0	.0	.0
Sep	72.8	50.5	61.7	98+	1953	2	66.5	1971	29	1989	25	58.8	1988	132	32	.0	.7	30.0	.0	.4	.0
Oct	62.0	39.3	50.7	89	1963	7	57.4	1971	21+	1986	31	47.5	1981	445	1	.0	.0	29.2	.0	7.0	.0
Nov	50.5	31.5	41.0	84	1950	2	46.5	1975	-2	1989	24	36.6	1996	720	0	.0	.0	15.3	.4	17.3	@
Dec	39.7	21.3	30.5	76	1998	7	36.3	1990	-12	1980	26	17.4	1989	1071	0	.0	.0	4.7	6.4	27.2	.7
Ann	59.4	38.1	48.8	105	Jul 1949	30	75.8	Jul 1975	-21	Jan 1984	22	17.1	Jan 1981	6435	550	.1	13.4	242.8	29.9	141.7	5.3

\+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

Issue Date: February 2004

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Precipitation (inches)

Precipitation Totals

Month	Means/ Medians(1) Mean	Means/ Medians(1) Median	Extremes Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year
Jan	3.87	3.35	3.28	1979	25	11.74	1979	.37	1980
Feb	3.32	2.77	2.70	1981	25	8.05	1981	.08	1987
Mar	4.16	3.82	4.98	2001	22	11.11	1983	.43	1981
Apr	4.33	3.43	4.08	1987	5	11.06	1987	.52	1999
May	3.86	3.72	4.11	1954	9	9.39	1984	1.02	1993
Jun	3.61	2.93	3.83	1998	13	10.44	1982	.40	1976
Jul	3.44	3.25	4.39	1996	13	8.20	1988	.71	1998
Aug	3.50	2.84	5.98	1991	19	8.88	1991	.96	1996
Sep	3.97	3.13	7.06	1954	11	8.98	1996	.29	1978
Oct	4.31	3.66	6.45	1996	20	12.72	1996	.48	1994
Nov	4.46	3.83	3.00	1972	9	11.82	1983	.65	1976
Dec	4.05	3.67	3.17	1994	24	7.79	1986	1.16	1985
Ann	46.88	45.64	7.06	Sep 1954	11	12.72	Oct 1996	.08	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.6	7.2	2.6	.9
Feb	9.0	5.6	2.2	.9
Mar	11.1	7.0	3.0	1.2
Apr	11.9	7.3	3.0	1.1
May	12.9	7.9	2.7	.8
Jun	11.0	6.8	2.0	.9
Jul	10.0	6.2	2.5	.9
Aug	10.4	6.0	2.4	.8
Sep	9.7	5.8	2.4	1.0
Oct	10.0	6.4	2.7	1.1
Nov	10.8	6.8	3.0	1.3
Dec	10.8	7.3	2.8	1.1
Ann	128.2	80.3	31.3	12.0

Precipitation Probabilities (1)

Probability that the monthly/annual precipitation will be equal to or less than the indicated amount

Monthly/Annual Precipitation vs Probability Levels
These values were determined from the incomplete gamma distribution

Month	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.72	1.07	1.64	2.16	2.70	3.27	3.93	4.72	5.77	7.45	9.06
Feb	.70	1.01	1.49	1.94	2.38	2.86	3.39	4.04	4.89	6.24	7.52
Mar	1.29	1.69	2.27	2.78	3.26	3.77	4.33	4.98	5.82	7.13	8.35
Apr	1.33	1.74	2.36	2.88	3.39	3.92	4.50	5.18	6.06	7.44	8.71
May	1.25	1.62	2.16	2.62	3.06	3.52	4.02	4.61	5.37	6.54	7.63
Jun	.66	.98	1.51	2.00	2.50	3.04	3.65	4.40	5.38	6.97	8.49
Jul	.96	1.29	1.78	2.21	2.64	3.08	3.57	4.15	4.90	6.07	7.17
Aug	.95	1.29	1.79	2.23	2.67	3.12	3.62	4.22	4.99	6.21	7.35
Sep	.66	1.00	1.58	2.13	2.69	3.30	4.00	4.84	5.98	7.82	9.57
Oct	1.19	1.60	2.22	2.77	3.30	3.85	4.46	5.19	6.13	7.61	8.99
Nov	1.42	1.85	2.47	3.01	3.53	4.06	4.65	5.34	6.22	7.60	8.88
Dec	1.02	1.41	1.99	2.52	3.03	3.57	4.18	4.90	5.84	7.32	8.71
Ann	35.33	37.62	40.52	42.71	44.63	46.49	48.39	50.49	53.01	56.65	59.78

\+ Also occurred on an earlier date(s)
\# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
****** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1948-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	16.0	13.8	4	2	15.5	1996	8	35.6	1987	27	1996	12	20	1977	5.8	4.2	2.1	1.1	.2	16.8	13.8	10.8	5.7
Feb	10.9	8.3	4	2	25.3	1978	7	36.3	1993	32	1978	7	18	1978	4.5	2.8	1.3	.5	.2	13.1	9.9	7.8	4.9
Mar	9.8	4.9	2	#	15.0	1993	13	42.8	1993	25	1993	14	11	1993	3.3	2.3	1.0	.7	.1	5.3	4.0	3.2	1.0
Apr	2.7	.0	#	0	15.5	1982	6	16.1	1982	21	1997	1	1	1997	.9	.6	.3	.1	.1	.6	.3	.1	@
May	.0	.0	0	0	1.0	1977	10	1.0	1977	0	0	0	0	0	@	@	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.0	.0	#	0	1.0	1979	10	1.0	1979	1	1979	10	#	1979	@	@	.0	.0	.0	@	.0	.0	.0
Nov	2.8	2.5	#	0	7.0	1971	25	11.5	1971	6	1980	18	1+	1997	1.3	.9	.4	.2	.0	1.9	.8	.3	.0
Dec	8.8	6.9	1	1	12.0	1992	12	28.2	1975	17	1992	12	5	1977	3.9	2.5	1.2	.6	.1	6.6	4.4	3.4	.8
Ann	51.0	36.4	N/A	N/A	25.3	Feb 1978	7	42.8	Mar 1993	32	Feb 1978	7	20	Jan 1977	19.7	13.3	6.3	3.2	.7	44.3	33.2	25.6	12.4

+ Also occurred on an earlier date(s) #Denotes trace amounts

@ Denotes mean number of days greater than 0 but less than .05

-9/-9.9 represents missing values
Annual statistics for Mean/Median snow depths are not appropriate

(1) Derived from Snow Climatology and 1971-2000 daily data

(2) Derived from 1971-2000 daily data

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Freeze Data

Spring Freeze Dates (Month/Day)

Temp (F)	Probability of later date in spring (thru Jul 31) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	5/30	5/24	5/20	5/17	5/13	5/10	5/07	5/02	4/27
32	5/17	5/12	5/08	5/06	5/03	4/30	4/27	4/24	4/19
28	5/04	4/29	4/25	4/22	4/19	4/16	4/13	4/09	4/04
24	4/21	4/16	4/12	4/09	4/07	4/04	4/01	3/28	3/24
20	4/08	4/03	3/31	3/28	3/25	3/22	3/19	3/16	3/11
16	4/01	3/26	3/22	3/19	3/16	3/13	3/10	3/06	3/01

Fall Freeze Dates (Month/Day)

Temp (F)	Probability of earlier date in fall (beginning Aug 1) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	9/11	9/17	9/21	9/24	9/27	9/30	10/03	10/07	10/13
32	9/23	9/29	10/02	10/05	10/08	10/11	10/15	10/18	10/23
28	10/04	10/10	10/14	10/17	10/20	10/23	10/27	10/30	11/05
24	10/16	10/22	10/27	10/31	11/04	11/07	11/11	11/16	11/23
20	11/04	11/09	11/13	11/16	11/19	11/22	11/26	11/30	12/05
16	11/19	11/24	11/27	11/30	12/02	12/05	12/07	12/11	12/15

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	162	153	147	141	136	131	125	119	110
32	183	175	168	163	158	153	148	141	132
28	207	199	193	188	183	179	173	167	159
24	239	229	222	216	210	205	199	192	182
20	263	254	248	243	239	234	229	223	215
16	283	275	269	265	260	256	251	245	238

***** Probability of observing a temperature as cold, or colder, later in the spring or earlier in the fall than the indicated date.

0/00 Indicates that the probability of occurrence of threshold temperature is less than the indicated probability.

Derived from 1971-2000 serially complete daily data

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Degree Days to Selected Base Temperatures (˚F)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1233	1044	885	558	261	63	8	15	132	445	720	1071	6435
60	1078	904	730	409	142	18	0	1	50	298	570	916	5116
57	985	820	637	322	87	6	0	0	23	218	480	823	4401
55	923	764	575	266	59	3	0	0	12	171	421	761	3955
50	768	624	422	145	17	0	0	0	2	80	280	607	2945
32	268	174	49	1	0	0	0	0	0	0	13	163	668

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	58	55	187	432	775	1024	1244	1186	890	578	283	115	6827
55	0	0	0	8	121	337	531	473	212	37	1	0	1720
57	0	0	0	3	87	280	469	411	163	22	0	0	1435
60	0	0	0	1	49	202	376	319	100	8	0	0	1055
65	0	0	0	0	13	97	229	178	32	1	0	0	550
70	0	0	0	0	2	33	108	74	5	0	0	0	222

Growing Degree Units (2)

Base	Growing Degree Units (Monthly)												Growing Degree Units (Accumulated Monthly)											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
40	12	13	68	222	546	800	1011	952	665	351	124	27	12	25	93	315	861	1661	2672	3624	4289	4640	4764	4791
45	1	1	32	117	392	650	856	797	515	216	61	5	1	2	34	151	543	1193	2049	2846	3361	3577	3638	3643
50	0	0	10	57	247	501	701	642	368	114	27	0	0	0	10	67	314	815	1516	2158	2526	2640	2667	2667
55	0	0	4	24	135	352	546	487	232	48	9	0	0	0	4	28	163	515	1061	1548	1780	1828	1837	1837
60	0	0	2	11	64	215	391	336	124	16	2	0	0	0	2	13	77	292	683	1019	1143	1159	1161	1161
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	6	10	49	139	317	506	674	636	410	209	71	16	6	16	65	204	521	1027	1701	2337	2747	2956	3027	3043

(1) Derived from the 1971-2000 Monthly Normals
(2) Derived from 1971-2000 serially complete daily data
Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86

Complete documentation available from:
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Notes

a. The monthly means are simple arithmetic averages computed by summing the monthly values for the period 1971-2000 and dividing by thirty. Prior to averaging, the data are adjusted if necessary to compensate for data quality issues, station moves or changes in station reporting practices. Missing months are replaced by estimates based on neighboring stations.

b. The median is defined as the middle value in an ordered set of values. The median is being provided for the snow and precipitation elements because the mean can be a misleading value for precipitation normals.

c. Only observed validated values were used to select the extreme daily values.

d. Extreme monthly temperature/precipitation means were selected from the monthly normals data.
Monthly snow extremes were calculated from daily values quality controlled to be consistent with the Snow Climatology.

e. Degree Days were derived using the same techniques as the 1971-2000 normals.
Compete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

f. Mean "number of days statistics" for temperature and precipitation were calculated from a serially complete daily data set .
Documentation of the serially complete data set is available from the link below:

g. Snowfall and snow depth statistics were derived from the Snow Climatology.
Documentation for the Snow Climatology project is available from the link under references.

Data Sources for Tables

Several different data sources were used to create the Clim20 climate summaries. In some cases the daily extremes appear inconsistent with the monthly extremes and or the mean number of days statistics. For example, a high daily extreme value may not be reflected in the highest monthly value or the mean number of days threshold that is less than and equal to the extreme value. Some of these difference are caused by different periods of record. Daily extremes are derived from the station's entire period of record while the serial data and normals data were are for the 1971-2000 period. Therefore extremes observed before 1971 would not be included in the 1971-2000 normals or the 1971-2000 serial daily data set. Inconsistencies can also occur when monthly values are adjusted to reflect the current observing conditions or were replaced during the 1971-2000 Monthly Normals processing and are not reconciled with the Summary of the Day data.

a. Temperature/ Precipitation Tables
   1. 1971-2000 Monthly Normals
   2. Cooperative Summary of the Day
   3. National Weather Service station records
   4. 1971-2000 serially complete daily data

b. Degree Day Table
   1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals
   2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data

c. Snow Tables
   1. Snow Climatology
   2. Cooperative Summary of the Day

d. Freeze Data Table
   1971-2000 serially complete daily data

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normals.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normals/usnormalsprods.html
Snow Climatology Project Description, www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html
Eischeid, J. K., P. Pasteris, H. F. Diaz, M. Plantico, and N. Lott, 2000: Creating a serially complete, national daily time series of temperature and precipitation for the Western United States. J. Appl. Meteorol., 39, 1580-1591,
www1.ncdc.noaa.gov/pub/data/special/ serialcomplete_jam_0900.pdf