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: BARRE FALLS DAM, MA **COOP ID: 190408**

Climate Division: MA 2 **NWS Call Sign:** **Elevation: 910 Feet** **Lat: 42˚26N** **Lon: 72˚02W**

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	31.6	10.5	21.1	60	1974	28	31.0	1990	-25	1984	22	12.2	1977	1362	0	.0	.0	1.8	17.1	30.4	7.0
Feb	34.3	12.5	23.4	67	1997	23	32.0	1998	-22+	1971	3	14.2	1979	1164	0	.0	.0	2.2	13.3	27.2	4.6
Mar	43.3	21.9	32.6	81	1977	31	38.2	2000	-16	1967	19	27.0	1984	1005	0	.0	.0	7.4	4.9	27.7	.8
Apr	54.9	31.8	43.4	89+	1976	20	47.0	1976	6	1964	1	38.4	1975	650	0	.0	.0	19.8	.2	17.7	.0
May	67.2	41.3	54.3	92	1962	19	59.1	1991	21	1987	2	50.1	1997	337	4	.0	.1	29.5	.0	4.8	.0
Jun	75.4	50.2	62.8	94	1999	8	66.6	1976	29+	1964	6	59.0	1985	103	37	.0	.6	30.0	.0	.3	.0
Jul	80.0	55.0	67.5	95	1980	16	71.2	1994	34	1988	1	64.3	1992	23	100	.0	1.2	31.0	.0	.0	.0
Aug	78.1	53.2	65.7	98	1990	4	69.4	1988	28+	1965	31	62.5	1982	56	77	.0	.4	31.0	.0	.2	.0
Sep	70.2	44.1	57.2	90+	1973	1	61.7	1999	24+	1965	28	54.1	1978	239	5	.0	.1	30.0	.0	3.5	.0
Oct	59.4	33.9	46.7	84+	1963	8	52.0	1990	13	1974	19	42.0	1974	569	0	.0	.0	26.8	.0	15.6	.0
Nov	47.7	27.5	37.6	77	1982	3	42.9	1999	-7	1989	24	32.8	1976	822	0	.0	.0	11.7	1.4	22.4	.1
Dec	36.1	17.0	26.6	69	2001	7	33.0	1998	-16	1980	26	12.4	1989	1193	0	.0	.0	2.8	10.8	29.4	2.6
Ann	56.5	33.2	44.9	98	Aug 1990	4	71.2	Jul 1994	-25	Jan 1984	22	12.2	Jan 1977	7523	223	.0	2.4	224.0	47.7	179.2	15.1

\+ 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: 1959-2001

(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	3.75	3.57	2.47	1986	27	11.40	1979	.62	1981
Feb	2.65	2.57	2.10	1970	4	7.63	1981	.11	1987
Mar	3.56	3.75	2.35	1980	22	7.14	1980	.75	1981
Apr	3.87	3.65	3.00	2000	22	10.30	1987	1.08	1999
May	3.91	3.50	3.82	1984	30	11.37	1984	.98	1987
Jun	3.88	3.68	4.38	2001	18	10.55	1982	.39	1979
Jul	4.05	3.71	3.31	1979	17	7.77	1979	1.50	1987
Aug	4.52	3.78	4.20	1991	20	10.71	1990	.88	1996
Sep	3.82	3.05	3.35	1960	12	9.90	1974	.99	1984
Oct	4.16	3.75	3.36	1990	14	9.89	1995	1.07	1994
Nov	3.86	3.58	1.90	1988	2	7.50	1983	.85	1976
Dec	3.54	3.20	2.32	1986	19	8.90	1973	.85	1980
Ann	45.57	44.44	4.38	Jun 2001	18	11.40	Jan 1979	.11	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.2	7.5	2.4	.9
Feb	9.7	6.4	1.7	.5
Mar	11.3	7.8	2.6	.7
Apr	11.5	7.7	2.4	.9
May	12.1	7.9	2.7	.8
Jun	11.4	7.3	2.6	1.0
Jul	11.0	7.2	2.8	.9
Aug	10.0	6.9	2.9	1.4
Sep	9.7	6.5	2.4	1.1
Oct	9.3	6.5	2.7	1.6
Nov	11.1	7.7	2.7	.8
Dec	11.6	7.5	2.6	.7
Ann	129.9	86.9	30.5	11.3

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	.95	1.30	1.85	2.33	2.81	3.31	3.87	4.54	5.41	6.79	8.07
Feb	.59	.83	1.22	1.57	1.92	2.29	2.71	3.21	3.87	4.92	5.92
Mar	1.40	1.73	2.20	2.59	2.95	3.33	3.73	4.20	4.79	5.70	6.52
Apr	1.30	1.66	2.20	2.66	3.09	3.55	4.04	4.62	5.36	6.50	7.56
May	1.25	1.62	2.17	2.64	3.09	3.56	4.08	4.68	5.45	6.66	7.78
Jun	.97	1.34	1.90	2.40	2.90	3.42	4.00	4.69	5.60	7.03	8.37
Jul	1.62	1.99	2.52	2.96	3.37	3.79	4.24	4.76	5.43	6.44	7.36
Aug	1.08	1.50	2.16	2.75	3.34	3.95	4.65	5.47	6.55	8.27	9.88
Sep	.90	1.26	1.81	2.31	2.81	3.34	3.93	4.63	5.56	7.02	8.40
Oct	1.58	1.96	2.52	2.98	3.42	3.87	4.35	4.91	5.63	6.73	7.74
Nov	1.57	1.92	2.42	2.83	3.22	3.62	4.04	4.53	5.16	6.11	6.98
Dec	.93	1.26	1.77	2.23	2.67	3.14	3.66	4.28	5.08	6.35	7.53
Ann	35.67	37.66	40.17	42.05	43.70	45.28	46.90	48.68	50.81	53.87	56.48

\+ 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: 1959-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	15.5	13.6	6	4
Feb	10.6	9.2	7	6
Mar	9.5	6.9	4	1
Apr	4.4	1.0	#	#
May	.8	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.2	.0	#	0
Nov	3.2	2.5	#	#
Dec	10.3	9.3	2	2
Ann	54.5	42.5	N/A	N/A

Extremes (2)

Month	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year
Jan	11.0	1988	9	44.5	1987	30	1996	13	18+	1996
Feb	14.0	1983	12	25.0	1994	25+	1987	1	21	1971
Mar	12.0	1972	15	36.1	1993	23	1971	5	18	1971
Apr	22.0	1997	1	24.0	1997	22	1997	1	3	1982
May	15.0	1977	10	20.0	1977	1	1986	4	#	1986
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	.0	0	0	.0	0	0	0	0	0	0
Oct	6.0	1979	11	6.0	1979	6	1979	11	#+	2000
Nov	8.0	1971	26	15.5	1971	14	1971	28	3	1971
Dec	16.0	1992	12	25.6	1981	21	1996	8	8	1981
Ann	22.0	Apr 1997	1	44.5	Jan 1987	30	Jan 1996	13	21	Feb 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.0	4.5	2.0	1.1	.1
Feb	4.8	3.6	1.1	.6	.1
Mar	3.6	3.0	1.0	.6	.1
Apr	1.3	.8	.4	.2	.1
May	.1	.1	.1	.1	@
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	@	@	@	@	.0
Nov	1.3	.9	.5	.2	.0
Dec	4.2	3.4	1.3	.6	.1
Ann	21.3	16.3	6.4	3.4	.5

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.9	17.6	13.8	7.1
Feb	20.5	17.0	13.6	6.4
Mar	13.3	10.0	8.2	4.3
Apr	2.3	1.4	.8	.4
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	@	@	@	.0
Nov	2.7	1.2	.6	.1
Dec	13.1	8.5	4.5	1.1
Ann	72.8	55.7	41.5	19.4

+ 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	6/28	6/21	6/16	6/12	6/08	6/04	5/31	5/26	5/19
32	6/08	6/02	5/29	5/25	5/22	5/18	5/15	5/10	5/04
28	5/22	5/17	5/13	5/10	5/07	5/04	4/30	4/27	4/21
24	5/02	4/28	4/24	4/22	4/19	4/16	4/13	4/10	4/05
20	4/15	4/11	4/08	4/05	4/02	3/31	3/28	3/25	3/21
16	4/05	4/01	3/30	3/28	3/26	3/23	3/21	3/19	3/15

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	8/25	8/29	9/01	9/04	9/06	9/08	9/11	9/14	9/18
32	9/03	9/08	9/11	9/14	9/17	9/20	9/23	9/27	10/02
28	9/15	9/20	9/24	9/27	9/30	10/03	10/06	10/09	10/14
24	10/01	10/07	10/11	10/14	10/17	10/21	10/24	10/28	11/03
20	10/12	10/18	10/23	10/27	10/31	11/03	11/07	11/12	11/18
16	10/27	11/04	11/09	11/14	11/19	11/23	11/28	12/03	12/11

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	115	107	100	95	89	84	79	72	64
32	141	133	128	123	118	113	109	103	95
28	165	158	153	149	145	141	137	132	125
24	204	196	190	185	181	176	172	166	158
20	231	224	219	215	211	206	202	197	190
16	264	255	248	243	237	232	227	220	211

***** 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	1362	1164	1005	650	337	103	23	56	239	569	822	1193	7523
60	1207	1024	850	500	200	33	1	11	117	415	672	1038	6068
57	1114	940	757	411	134	12	0	3	65	326	582	945	5289
55	1052	884	695	353	97	6	0	1	40	270	522	883	4803
50	897	744	540	217	34	0	0	0	8	150	375	728	3693
32	377	274	96	3	0	0	0	0	0	1	36	249	1036

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	38	35	114	343	690	924	1100	1043	755	455	204	79	5780
55	0	0	0	2	73	239	387	331	106	11	0	0	1149
57	0	0	0	1	48	186	325	271	70	5	0	0	906
60	0	0	0	0	22	116	233	186	33	1	0	0	591
65	0	0	0	0	4	37	100	77	5	0	0	0	223
70	0	0	0	0	0	5	23	18	0	0	0	0	46

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	0	5	39	149	445	684	851	795	517	231	72	8	0	5	44	193	638	1322	2173	2968	3485	3716	3788	3796
45	0	0	13	74	297	534	696	640	371	130	32	2	0	0	13	87	384	918	1614	2254	2625	2755	2787	2789
50	0	0	4	32	176	387	541	486	237	58	10	0	0	0	4	36	212	599	1140	1626	1863	1921	1931	1931
55	0	0	2	13	88	249	388	332	130	20	4	0	0	0	2	15	103	352	740	1072	1202	1222	1226	1226
60	0	0	0	1	38	136	242	196	60	3	0	0	0	0	0	1	39	175	417	613	673	676	676	676
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	30	106	276	431	554	510	331	162	48	3	0	2	32	138	414	845	1399	1909	2240	2402	2450	2453

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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