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: BIRCH HILL DAM, MA **COOP ID: 190666**

Climate Division: MA 2 **NWS Call Sign:** **Elevation: 864 Feet** **Lat: 42˚38N** **Lon: 72˚07W**

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	31.8	7.6	19.7	64	1995	17	29.5	1990	-34	1957	18	10.3	1977	1405	0	.0	.0	1.8	16.5	30.3	9.3
Feb	34.8	9.7	22.3	66	1985	25	29.7	1984	-28	1971	3	13.3	1979	1198	0	.0	.0	2.0	12.6	27.6	6.6
Mar	43.9	20.3	32.1	82+	1977	31	37.8	1973	-18	1967	19	26.5	1984	1021	0	.0	.0	8.0	4.3	28.0	1.2
Apr	55.5	30.4	43.0	91	1990	29	46.1	1976	6+	1964	1	38.0	1975	663	0	.0	.1	20.0	.2	18.6	.0
May	67.9	40.6	54.3	92+	1962	19	59.1	1991	20	1956	9	50.4	1997	336	3	.0	.2	29.6	.0	5.4	.0
Jun	76.2	49.6	62.9	97	1953	21	67.1	1976	28	1986	3	59.4	1982	106	44	.0	1.3	30.0	.0	.4	.0
Jul	81.1	54.7	67.9	97	1993	9	72.5	1994	34	1978	2	64.7	1992	23	113	.0	2.3	31.0	.0	.0	.0
Aug	79.1	52.7	65.9	99	1948	26	69.6	1973	29	1976	31	63.2	1987	48	75	.0	1.1	31.0	.0	.1	.0
Sep	70.9	43.8	57.4	98	1953	2	62.5	1999	20+	1951	30	54.5+	1978	235	5	.0	.2	30.0	.0	4.2	.0
Oct	59.6	32.3	46.0	85	1963	7	50.7	1971	12	1976	28	41.6	1974	591	0	.0	.0	26.6	.0	16.6	.0
Nov	47.5	26.2	36.9	79	1950	3	41.7	1999	-5	1989	25	32.2	1976	845	0	.0	.0	12.3	1.4	23.3	.1
Dec	35.9	15.0	25.5	69	1998	8	33.7	1998	-25	1951	28	10.3	1989	1225	0	.0	.0	3.0	11.0	29.4	3.9
Ann	57.0	31.9	44.5	99	Aug 1948	26	72.5	Jul 1994	-34	Jan 1957	18	10.3+	Dec 1989	7696	240	.0	5.2	225.3	46.0	183.9	21.1

\+ 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: 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	3.83	3.76	2.55	1986	27	9.59	1979	.66	1981
Feb	2.75	2.60	1.90	2001	6	7.62	1981	.15	1987
Mar	3.76	4.17	2.21	1974	17	6.51	1980	.72	1981
Apr	3.73	3.62	2.43	1996	17	7.78	1996	.81	1999
May	3.70	3.20	3.28	1984	30	10.03	1984	1.07	1993
Jun	3.83	3.81	3.95	1960	15	8.91	1998	.37	1979
Jul	4.24	3.84	2.63	1951	28	9.17	1988	1.54	1987
Aug	4.04	3.43	4.30	1991	20	10.33	1991	.52	1996
Sep	3.54	2.80	3.85	1999	17	9.35	1999	.98	1984
Oct	3.94	3.29	3.35	1989	21	12.58	1995	1.21	1994
Nov	4.16	4.02	3.05	1950	26	7.03	1997	1.04	1976
Dec	3.64	3.26	2.32	1996	2	8.50	1996	.79	1980
Ann	45.16	44.95	4.30	Aug 1991	20	12.58	Oct 1995	.15	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.5	7.3	2.8	.9
Feb	9.6	6.3	1.9	.4
Mar	11.0	7.7	2.7	.9
Apr	10.6	7.2	2.7	.9
May	10.5	7.9	2.3	.9
Jun	9.6	6.9	2.5	.7
Jul	9.5	7.0	3.2	1.1
Aug	9.3	6.4	2.9	1.2
Sep	8.0	5.9	2.3	1.2
Oct	8.1	6.3	2.6	1.3
Nov	10.2	7.6	3.1	1.0
Dec	10.7	7.1	2.8	.8
Ann	117.6	83.6	31.8	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	1.02	1.38	1.94	2.42	2.90	3.40	3.96	4.62	5.48	6.83	8.09
Feb	.78	1.04	1.43	1.77	2.11	2.46	2.85	3.30	3.90	4.83	5.69
Mar	1.56	1.90	2.38	2.78	3.15	3.53	3.94	4.41	5.00	5.91	6.74
Apr	1.27	1.63	2.14	2.58	2.99	3.42	3.89	4.44	5.14	6.23	7.24
May	1.07	1.42	1.95	2.41	2.86	3.32	3.84	4.44	5.23	6.46	7.61
Jun	.93	1.29	1.85	2.34	2.84	3.36	3.94	4.63	5.54	6.97	8.32
Jul	1.70	2.09	2.64	3.09	3.53	3.96	4.44	4.98	5.68	6.74	7.70
Aug	1.02	1.40	1.98	2.50	3.02	3.56	4.16	4.88	5.82	7.30	8.69
Sep	.81	1.14	1.66	2.13	2.59	3.08	3.63	4.29	5.16	6.53	7.82
Oct	1.23	1.60	2.16	2.63	3.09	3.57	4.10	4.71	5.51	6.74	7.89
Nov	1.84	2.21	2.72	3.14	3.54	3.93	4.36	4.85	5.46	6.39	7.24
Dec	.97	1.32	1.84	2.31	2.76	3.24	3.77	4.40	5.22	6.50	7.71
Ann	33.82	36.05	38.89	41.03	42.92	44.74	46.61	48.66	51.14	54.72	57.80

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	15.6	15.8	7	5
Feb	11.5	9.2	8	6
Mar	7.4	4.9	4	2
Apr	2.4	.0	#	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.1	.0	#	0
Nov	3.4	1.5	#	#
Dec	10.4	9.4	3	2
Ann	50.9	40.8	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	12.0	1977	8	37.0	1987	25	1987	31	18	1982
Feb	16.0	1972	20	38.0	1972	30	1971	8	21	1977
Mar	16.0	1993	14	24.4	1984	26	1993	15	15	1993
Apr	18.0	1982	7	18.0	1982	18	1982	8	4	1982
May	2.0	1977	10	2.0	1977	2	1977	10	#+	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	4.0	1979	11	4.0	1979	4	1979	11	#+	2000
Nov	9.0	1971	26	18.0	1971	15	1971	26	3	1971
Dec	10.0	1981	6	27.6	1981	17	1981	29	10	1981
Ann	18.0	Apr 1982	7	38.0	Feb 1972	30	Feb 1971	8	21	Feb 1977

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.1	4.3	2.0	1.1	.1
Feb	4.0	3.2	1.4	.6	.1
Mar	2.7	2.2	.9	.6	.1
Apr	.5	.5	.2	.2	.1
May	.1	@	.0	.0	.0
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	.0
Nov	1.2	.9	.5	.2	.0
Dec	3.8	3.1	1.1	.5	@
Ann	17.4	14.2	6.1	3.2	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.2	17.9	15.2	7.5
Feb	21.7	20.0	17.4	8.7
Mar	11.5	9.0	6.3	2.9
Apr	1.5	.8	.4	.2
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	.0
Nov	3.0	1.5	.6	.1
Dec	13.9	9.6	5.9	1.6
Ann	71.8	58.8	45.8	21.0

+ 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	6/25	6/19	6/15	6/11	6/07	6/04	5/31	5/27	5/21
32	6/13	6/07	6/03	5/30	5/26	5/23	5/19	5/15	5/09
28	5/19	5/14	5/11	5/08	5/05	5/03	4/30	4/27	4/22
24	5/03	4/29	4/26	4/24	4/21	4/19	4/17	4/14	4/10
20	4/20	4/15	4/12	4/09	4/06	4/03	3/31	3/28	3/23
16	4/07	4/03	3/31	3/29	3/27	3/24	3/22	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	8/22	8/27	8/30	9/02	9/05	9/08	9/11	9/14	9/19
32	8/31	9/05	9/09	9/12	9/15	9/18	9/21	9/25	9/30
28	9/19	9/23	9/26	9/28	9/30	10/02	10/04	10/07	10/10
24	9/29	10/04	10/07	10/10	10/12	10/15	10/18	10/21	10/26
20	10/10	10/17	10/22	10/26	10/29	11/02	11/06	11/11	11/17
16	10/26	11/01	11/05	11/09	11/12	11/16	11/19	11/24	11/29

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	112	104	99	94	89	84	79	74	66
32	137	128	122	116	111	106	100	94	85
28	160	156	152	149	147	144	141	138	133
24	192	185	181	177	173	170	166	161	155
20	231	222	216	211	206	201	195	189	180
16	251	244	239	234	230	226	221	216	209

***** 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	1405	1198	1021	663	336	106	23	48	235	591	845	1225	7696
60	1250	1058	866	513	198	36	2	8	114	436	695	1070	6246
57	1157	974	773	423	130	14	0	1	63	345	605	977	5462
55	1095	918	711	364	93	7	0	0	39	287	545	915	4974
50	940	778	556	225	31	0	0	0	8	158	396	760	3852
32	416	304	110	4	0	0	0	0	0	1	39	281	1155

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	34	29	112	331	690	927	1113	1050	760	433	185	78	5742
55	0	0	0	1	70	244	400	337	109	6	0	0	1167
57	0	0	0	0	46	191	338	276	73	2	0	0	926
60	0	0	0	0	20	123	247	189	34	0	0	0	613
65	0	0	0	0	3	44	113	75	5	0	0	0	240
70	0	0	0	0	0	8	31	16	0	0	0	0	55

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	1	3	34	146	456	698	873	810	533	228	67	8	1	4	38	184	640	1338	2211	3021	3554	3782	3849	3857
45	0	0	11	75	312	548	718	655	385	124	29	1	0	0	11	86	398	946	1664	2319	2704	2828	2857	2858
50	0	0	3	32	186	400	563	501	249	56	7	0	0	0	3	35	221	621	1184	1685	1934	1990	1997	1997
55	0	0	1	14	98	260	409	351	136	18	2	0	0	0	1	15	113	373	782	1133	1269	1287	1289	1289
60	0	0	0	1	40	149	263	212	67	2	0	0	0	0	0	1	41	190	453	665	732	734	734	734
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	28	112	294	445	571	526	342	167	48	5	0	2	30	142	436	881	1452	1978	2320	2487	2535	2540

(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