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: BUFFUMVILLE LAKE, MA **COOP ID: 190998**

Climate Division: MA 2 **NWS Call Sign:** **Elevation: 500 Feet** **Lat: 42˚07N** **Lon: 71˚54W**

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	33.9	11.5	22.7	64	1966	1	31.8	1990	-28	1984	22	12.4	1977	1312	0	.0	.0	2.3	13.8	30.5	5.1
Feb	36.4	14.0	25.2	68	1985	25	32.0	1998	-22	1996	5	17.4	1978	1115	0	.0	.0	3.1	10.7	26.9	4.0
Mar	45.6	23.8	34.7	83+	1977	31	41.7	2000	-16	1967	19	28.1	1984	938	0	.0	.0	9.9	3.3	26.7	.4
Apr	56.7	33.9	45.3	92	1976	20	48.7	1976	2	1982	8	40.7	1972	591	0	.0	.1	21.9	.2	13.4	.0
May	68.5	44.1	56.3	95	1962	20	61.7	1991	25	1985	9	52.7	1997	278	7	.0	.3	30.0	.0	1.8	.0
Jun	76.6	53.4	65.0	94+	1983	14	68.7	1976	34+	1964	6	60.4	1985	66	66	.0	1.4	30.0	.0	.0	.0
Jul	81.5	58.8	70.2	98	1991	21	74.7	1994	40	1988	1	67.1	1992	9	168	.0	2.9	31.0	.0	.0	.0
Aug	79.5	57.1	68.3	98	1975	3	72.4	1988	33+	1965	30	64.6	1982	23	126	.0	1.1	31.0	.0	.0	.0
Sep	72.0	48.2	60.1	95	1983	12	65.1	1999	23	1981	30	57.0	1975	164	17	.0	.3	30.0	.0	.8	.0
Oct	61.4	36.3	48.9	87	1963	8	55.1	1971	15+	1976	28	44.0	1974	500	0	.0	.0	28.3	.0	11.3	.0
Nov	50.0	29.4	39.7	79	1982	3	44.8	1979	-2	1989	24	35.3	1976	760	0	.0	.0	14.7	.9	20.7	@
Dec	38.4	18.6	28.5	72	1998	8	34.9	1998	-17	1963	31	15.1	1989	1130	0	.0	.0	4.3	8.0	29.0	2.0
Ann	58.4	35.8	47.1	98+	Jul 1991	21	74.7	Jul 1994	-28	Jan 1984	22	12.4	Jan 1977	6886	384	.0	6.1	236.5	36.9	161.1	11.5

\+ 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	4.41	3.97	3.42	1978	26	12.59	1979	.55	1985
Feb	3.20	3.09	2.15	1969	10	7.30	1981	.25	1987
Mar	4.35	3.83	3.21	1998	10	8.56	1980	.72	1981
Apr	4.21	3.94	3.50	1997	1	11.50	1987	.84	1999
May	3.70	3.42	2.45	1972	4	8.03	1984	.97	1993
Jun	3.85	3.20	3.30	1974	17	11.12	1982	.25	1999
Jul	4.16	3.83	3.25	1998	1	11.10	1988	1.11	1987
Aug	4.03	3.39	4.14	1991	20	9.96	1978	.53	1984
Sep	4.10	3.79	4.30	1999	17	10.24	1999	.86	1986
Oct	4.35	3.73	3.45	1990	14	10.15	1990	.99	1994
Nov	4.49	4.70	2.65	1988	21	8.76	1983	.58	1976
Dec	4.01	3.67	2.35	1986	19	8.50	1973	.78	1980
Ann	48.86	47.87	4.30	Sep 1999	17	12.59	Jan 1979	.25+	Jun 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.4	7.1	3.2	1.1
Feb	9.4	6.2	2.5	.8
Mar	10.8	7.4	3.0	1.2
Apr	10.6	7.0	2.8	1.2
May	12.2	8.0	2.3	.8
Jun	10.8	7.0	2.4	1.1
Jul	10.0	6.8	2.6	1.3
Aug	9.9	6.5	2.6	1.2
Sep	9.4	6.3	2.9	1.4
Oct	8.6	6.2	2.7	1.3
Nov	10.2	7.3	3.2	1.3
Dec	11.0	7.2	2.8	1.1
Ann	123.3	83.0	33.0	13.8

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	1.04	1.45	2.10	2.68	3.25	3.86	4.54	5.35	6.41	8.10	9.69
Feb	1.04	1.35	1.79	2.17	2.54	2.92	3.33	3.82	4.44	5.41	6.30
Mar	1.56	1.97	2.56	3.06	3.54	4.02	4.55	5.17	5.95	7.17	8.28
Apr	1.25	1.65	2.25	2.77	3.27	3.80	4.37	5.05	5.93	7.31	8.58
May	1.40	1.74	2.24	2.65	3.04	3.44	3.88	4.38	5.02	6.01	6.91
Jun	.62	.95	1.51	2.04	2.59	3.19	3.87	4.71	5.82	7.63	9.37
Jul	1.76	2.13	2.66	3.10	3.51	3.92	4.36	4.88	5.52	6.51	7.40
Aug	.91	1.28	1.87	2.40	2.93	3.50	4.14	4.90	5.90	7.49	8.99
Sep	1.03	1.42	2.01	2.54	3.07	3.62	4.23	4.96	5.91	7.42	8.84
Oct	1.52	1.93	2.53	3.03	3.51	4.01	4.55	5.17	5.98	7.22	8.36
Nov	1.39	1.82	2.45	3.00	3.52	4.07	4.67	5.38	6.29	7.71	9.03
Dec	1.07	1.45	2.03	2.54	3.04	3.57	4.15	4.84	5.75	7.16	8.48
Ann	38.77	40.82	43.39	45.31	46.99	48.61	50.25	52.06	54.23	57.33	59.98

\+ 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)

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	14.7	11.8	4	3	15.0	1987	2	47.5	1987	26	1987	28	14	1987	4.4	3.4	1.5	.9	.2	14.4	10.2	7.2	5.1
Feb	10.2	8.0	5	3	12.0	1972	20	33.5	1972	36	1978	8	27	1978	3.8	3.1	1.1	.5	.1	12.3	8.5	6.9	4.8
Mar	6.5	2.9	2	#	15.0	1993	14	25.0	1984	24	1978	4	20	1978	2.6	2.1	.8	.5	.1	6.6	4.4	2.8	1.2
Apr	2.4	.0	#	#	23.0	1997	1	24.0	1997	23	1997	1	2+	1997	.6	.5	.2	.2	.1	1.1	.8	.6	.3
May	#	.0	0	0	#	1976	20	#	1976	0	0	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	.1	.0	#	0	3.0	1979	11	3.0	1979	1	1972	19	#	1972	.1	@	@	.0	.0	@	.0	.0	.0
Nov	2.7	.5	#	#	12.0	1986	19	17.0	1986	12	1986	20	5	1971	1.0	.7	.4	.2	@	1.8	.9	.3	.1
Dec	7.2	4.5	2	1	10.0	1996	8	18.5+	1996	17	1996	8	6	1981	3.4	2.4	.6	.3	@	7.4	3.5	1.8	.0
Ann	43.8	27.7	N/A	N/A	23.0	Apr 1997	1	47.5	Jan 1987	36	Feb 1978	8	27	Feb 1978	15.9	12.2	4.6	2.6	.5	43.6	28.3	19.6	11.5

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

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	9/10	9/14	9/17	9/20	9/22	9/24	9/27	9/29	10/03
32	9/22	9/26	9/28	10/01	10/03	10/05	10/07	10/10	10/14
28	10/03	10/07	10/10	10/13	10/16	10/19	10/21	10/25	10/29
24	10/10	10/17	10/22	10/26	10/29	11/02	11/06	11/11	11/18
20	10/19	10/26	10/31	11/04	11/09	11/13	11/17	11/22	11/29
16	11/04	11/11	11/16	11/20	11/24	11/28	12/02	12/07	12/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	145	138	134	129	126	122	118	113	107
32	165	160	156	153	149	146	143	139	133
28	195	188	183	179	176	172	168	163	157
24	228	220	214	209	205	200	195	189	181
20	252	243	237	231	226	221	216	209	200
16	271	264	258	253	248	244	239	233	225

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1312	1115	938	591	278	66	9	23	164	500	760	1130	6886
60	1157	975	783	441	151	16	0	2	67	351	610	975	5528
57	1064	891	690	352	92	5	0	0	33	267	520	882	4796
55	1002	835	628	294	61	2	0	0	19	217	460	820	4338
50	847	695	474	163	16	0	0	0	3	113	315	665	3291
32	340	230	69	1	0	0	0	0	0	0	18	213	871

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	52	39	154	400	752	990	1182	1126	843	523	248	106	6415
55	0	0	0	3	101	302	469	413	172	26	0	0	1486
57	0	0	0	1	69	245	407	351	126	15	0	0	1214
60	0	0	0	0	35	166	314	260	70	6	0	0	851
65	0	0	0	0	7	66	168	126	17	0	0	0	384
70	0	0	0	0	0	15	62	40	1	0	0	0	118

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	3	7	51	189	509	754	941	888	607	291	101	14	3	10	61	250	759	1513	2454	3342	3949	4240	4341	4355
45	0	0	22	96	360	604	786	733	457	167	46	3	0	0	22	118	478	1082	1868	2601	3058	3225	3271	3274
50	0	0	6	46	224	454	631	578	316	85	18	0	0	0	6	52	276	730	1361	1939	2255	2340	2358	2358
55	0	0	2	17	118	311	476	423	186	31	4	0	0	0	2	19	137	448	924	1347	1533	1564	1568	1568
60	0	0	0	5	53	182	323	272	92	7	0	0	0	0	0	5	58	240	563	835	927	934	934	934
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	3	8	41	124	301	475	622	578	371	189	63	13	3	11	52	176	477	952	1574	2152	2523	2712	2775	2788

(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