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: TULLY LAKE, MA **COOP ID: 198573**

Climate Division: MA 2 **NWS Call Sign:** **Elevation: 690 Feet** **Lat: 42˚38N** **Lon: 72˚13W**

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	31.7	9.2	20.5	62	1950	27	29.9	1990	-29+	1957	14	11.9	1977	1381	0	.0	.0	1.4	17.0	30.4	8.4
Feb	35.5	11.2	23.4	64+	1957	27	30.4	1984	-27	1958	18	14.9	1979	1166	0	.0	.0	1.9	12.1	27.5	6.0
Mar	44.8	21.3	33.1	83	1998	31	38.4	1973	-19	1967	19	28.5	1984	991	0	.0	.0	7.8	3.5	27.8	1.0
Apr	57.5	31.7	44.6	94	1990	29	48.1	1976	6	1965	1	39.9	1972	612	0	.0	.2	21.2	.2	16.7	.0
May	70.5	42.3	56.4	96	1962	20	61.1	1975	22	1956	25	52.6	1990	276	9	.0	.9	29.8	.0	2.6	.0
Jun	78.9	51.5	65.2	98+	1953	21	70.1	1999	30+	1958	7	60.3	1985	74	80	.0	2.4	29.9	.0	.0	.0
Jul	83.9	56.4	70.2	100	1966	4	73.8	1994	37+	1957	3	66.7	1992	7	167	.0	4.5	31.0	.0	.0	.0
Aug	81.6	54.9	68.3	99+	1955	6	72.1	1973	30	1965	31	64.4	1982	25	124	.0	3.1	31.0	.0	.0	.0
Sep	72.5	46.3	59.4	100	1953	3	63.9	1999	22	1950	25	56.3	1986	180	13	.0	.4	30.0	.0	1.3	.0
Oct	60.7	35.3	48.0	87	1963	8	53.6	1971	16	1952	26	42.8	1974	528	0	.0	.0	27.1	.0	13.1	.0
Nov	47.7	28.1	37.9	80	1950	2	43.0	1975	0+	1989	24	33.5	1976	812	0	.0	.0	11.0	1.5	22.0	.1
Dec	35.6	16.9	26.3	67	2001	7	32.4	1998	-22	1980	26	11.2	1989	1202	0	.0	.0	2.1	11.1	29.6	3.3
Ann	58.4	33.8	46.1	100+	Jul 1966	4	73.8	Jul 1994	-29+	Jan 1957	14	11.2	Dec 1989	7254	393	.0	11.5	224.2	45.4	171.0	18.8

\+ 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: 1949-2001

(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	3.91	3.73	2.44	1986	27	10.10	1979	.72	1981
Feb	2.88	2.70	2.64	1970	4	7.71	1981	.21	1987
Mar	3.79	3.74	2.45	1986	15	6.12	1980	.59	1981
Apr	3.79	3.76	2.77	1988	29	7.89	1987	.82	1999
May	3.91	3.20	3.30	1984	30	11.18	1984	.97	1987
Jun	3.94	3.69	3.57	1953	22	9.09	1998	.41	1979
Jul	4.30	3.75	2.92	1996	14	9.05	1984	1.80	1987
Aug	4.38	3.96	3.82	2000	12	9.57	1991	.27	1996
Sep	3.74	3.17	4.60	1999	17	10.09	1999	.95	1997
Oct	3.87	3.07	5.72	1959	25	10.15	1995	1.70	1982
Nov	4.02	3.87	3.57	1950	26	7.32	1983	.92	1976
Dec	3.61	3.16	2.14	1986	19	8.64	1973	.93	1980
Ann	46.14	44.66	5.72	Oct 1959	25	11.18	May 1984	.21	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.2	7.3	2.8	.9
Feb	9.5	6.3	2.1	.5
Mar	11.1	7.3	2.6	.8
Apr	11.1	7.4	2.6	.8
May	12.5	7.9	2.6	.7
Jun	11.9	7.1	2.5	.8
Jul	10.8	7.2	3.3	.9
Aug	10.2	6.9	2.7	1.3
Sep	9.8	6.3	2.3	1.0
Oct	9.5	6.7	2.5	1.2
Nov	10.8	7.6	3.0	.9
Dec	10.8	6.9	2.4	1.0
Ann	129.2	84.9	31.4	10.8

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	1.10	1.47	2.03	2.52	3.00	3.50	4.05	4.70	5.54	6.87	8.11
Feb	.88	1.15	1.56	1.91	2.25	2.60	2.99	3.45	4.04	4.97	5.82
Mar	1.67	2.01	2.48	2.87	3.23	3.59	3.98	4.42	4.99	5.84	6.61
Apr	1.19	1.55	2.08	2.54	2.98	3.44	3.94	4.53	5.29	6.48	7.57
May	1.17	1.55	2.10	2.58	3.05	3.53	4.07	4.69	5.51	6.77	7.95
Jun	1.01	1.38	1.95	2.46	2.96	3.48	4.07	4.76	5.66	7.09	8.43
Jul	1.75	2.14	2.70	3.16	3.59	4.03	4.51	5.05	5.75	6.81	7.77
Aug	.99	1.40	2.04	2.62	3.19	3.80	4.49	5.31	6.39	8.10	9.72
Sep	.99	1.34	1.88	2.36	2.83	3.32	3.87	4.52	5.36	6.69	7.94
Oct	1.38	1.74	2.27	2.71	3.14	3.57	4.04	4.59	5.29	6.38	7.37
Nov	1.74	2.10	2.61	3.02	3.41	3.80	4.22	4.70	5.31	6.23	7.07
Dec	1.01	1.35	1.87	2.32	2.77	3.23	3.74	4.34	5.12	6.35	7.50
Ann	34.83	37.07	39.91	42.04	43.93	45.74	47.61	49.65	52.12	55.68	58.73

\+ 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: 1949-2001
(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	16.4	16.0	7	6
Feb	11.2	10.0	7	7
Mar	9.7	7.0	4	3
Apr	3.2	.0	1	#
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	.0	.0	#	0
Nov	2.8	1.0	#	#
Dec	11.3	8.6	3	2
Ann	54.7	42.6	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	27	1996	13	17	1982
Feb	12.0	1978	7	25.0	1978	29	1978	8	17	1971
Mar	13.0	1984	14	33.0	1993	24	1993	15	18	1971
Apr	17.0	1997	1	17.5	1996	17	1997	1	6	1971
May	2.0	1986	4	2.0	1986	2	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	.8	2000	30	.8+	2000	1	2000	30	#	2000
Nov	7.5	1980	18	12.0+	1986	10	1971	26	2	1971
Dec	13.0	1996	8	30.0	1981	19	1996	8	8	1995
Ann	17.0	Apr 1997	1	37.0	Jan 1987	29	Feb 1978	8	18	Mar 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.8	5.0	2.3	1.2	.1
Feb	4.8	3.8	1.4	.6	.1
Mar	3.2	2.7	1.0	.6	.1
Apr	.7	.5	.3	.2	.1
May	@	@	.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	.0	.0
Nov	1.1	.9	.4	.2	.0
Dec	3.9	3.5	1.4	.8	@
Ann	19.5	16.4	6.8	3.6	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	22.0	18.8	15.3	6.9
Feb	22.8	20.6	17.9	9.6
Mar	16.1	12.7	9.6	4.4
Apr	1.9	1.6	.9	.5
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	.0	.0
Nov	2.7	1.3	.4	@
Dec	13.3	9.5	5.3	1.4
Ann	78.8	64.5	49.4	22.8

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

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	138	131	126	122	118	114	110	105	98
32	154	149	146	143	141	138	136	132	128
28	185	180	176	173	170	167	164	160	155
24	218	212	207	203	199	195	191	186	180
20	245	237	232	227	222	218	213	208	200
16	265	259	254	250	247	243	239	235	229

***** 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	1381	1166	991	612	276	74	7	25	180	528	812	1202	7254
60	1226	1026	836	462	152	22	0	3	77	376	662	1047	5889
57	1133	942	743	374	94	8	0	0	39	290	572	954	5149
55	1071	886	681	316	64	4	0	0	23	237	512	892	4686
50	916	746	526	186	18	0	0	0	4	127	364	737	3624
32	393	271	91	2	0	0	0	0	0	0	31	258	1046

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	35	29	123	380	756	996	1183	1123	823	496	209	79	6232
55	0	0	0	4	107	309	470	410	155	20	0	0	1475
57	0	0	0	2	75	254	408	348	112	11	0	0	1210
60	0	0	0	0	40	178	315	257	60	3	0	0	853
65	0	0	0	0	9	80	167	124	13	0	0	0	393
70	0	0	0	0	1	23	58	39	1	0	0	0	122

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	3	35	175	509	754	931	874	586	257	69	5	0	3	38	213	722	1476	2407	3281	3867	4124	4193	4198
45	0	0	11	88	358	604	776	719	436	148	29	0	0	0	11	99	457	1061	1837	2556	2992	3140	3169	3169
50	0	0	3	40	225	456	621	564	292	70	9	0	0	0	3	43	268	724	1345	1909	2201	2271	2280	2280
55	0	0	0	16	123	311	467	410	173	23	2	0	0	0	0	16	139	450	917	1327	1500	1523	1525	1525
60	0	0	0	5	54	182	315	263	87	5	0	0	0	0	0	5	59	241	556	819	906	911	911	911
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	33	128	318	477	611	566	366	171	44	3	0	1	34	162	480	957	1568	2134	2500	2671	2715	2718

(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