

Climatography of the United States

No. 20

1971-2000

Station: LAWRENCE, MA

COOP ID: 194105

Climate Division: MA 2

NWS Call Sign:

Elevation: 60 Feet

Lat: 42° 42N

Lon: 71° 10W

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	34.5	14.5	24.5	69	1950	26	32.9	1990	-20+	1948	24	16.0	1982	1256	0	.0	.0	2.6	13.2	29.1	2.7
Feb	37.2	16.8	27.0	72	1997	23	34.3	1998	-25	1943	16	18.1	1979	1065	0	.0	.0	3.2	9.0	25.8	1.3
Mar	45.7	25.2	35.5	88	1998	29	42.9	2000	-6	1948	6	29.1	1984	916	0	.0	.0	9.7	2.5	22.1	.0
Apr	56.6	35.1	45.9	92+	1976	19	50.6	1994	15	1982	7	41.4	1975	574	0	.0	.1	22.5	.1	7.3	.0
May	68.4	45.9	57.2	96	1929	30	61.8	1991	28	1992	8	53.4	1974	251	8	.0	.6	30.3	.0	.1	.0
Jun	77.4	54.8	66.1	97+	1943	25	70.7	1999	35	1997	9	60.6	1982	61	94	.0	2.2	30.0	.0	.0	.0
Jul	82.9	60.6	71.8	102	1926	22	75.6	1994	46	1997	30	68.7	1986	3	213	@	4.2	31.0	.0	.0	.0
Aug	81.4	58.3	69.9	101	1975	3	73.8	1993	39	1965	31	66.5	1982	13	163	@	3.3	31.0	.0	.0	.0
Sep	72.8	49.8	61.3	100	1953	2	67.0	1999	31	1991	30	58.1	1986	143	32	.0	.4	30.0	.0	.1	.0
Oct	61.9	38.1	50.0	89+	1954	12	56.1	1971	19	1936	28	45.7	1974	467	0	.0	.0	29.0	.0	4.8	.0
Nov	51.1	31.2	41.2	81	1950	2	46.4	1999	4+	1938	26	36.3	1972	717	0	.0	.0	15.3	.5	16.1	.0
Dec	39.7	21.1	30.4	75	1998	8	38.3	1998	-20	1933	30	17.9	1989	1073	0	.0	.0	4.5	7.1	27.1	.7
Ann	59.1	37.6	48.4	102	Jul 1926	22	75.6	Jul 1994	-25	Feb 1943	16	16.0	Jan 1982	6539	510	.0	10.8	239.1	32.4	132.5	4.7

+ 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/normal/usnormals.html

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1926-2001

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

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No. 20

1971-2000

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

Station: LAWRENCE, MA

COOP ID: 194105

Climate Division: MA 2

NWS Call Sign:

Elevation: 60 Feet

Lat: 42°42N

Lon: 71°10W

Precipitation (inches)

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	3.92	3.62	3.22	1956	9	11.68	1979	.60	1989	10.4	7.7	2.9	1.2	.77	1.13	1.70	2.23	2.77	3.34	3.99	4.78	5.82	7.49	9.07
Feb	3.17	2.78	2.68	1978	7	8.57	1984	.37	1987	8.0	5.8	2.2	.8	.99	1.29	1.74	2.12	2.49	2.88	3.30	3.80	4.44	5.44	6.36
Mar	3.93	3.56	2.83	1968	18	10.60	1983	.49	1981	10.1	7.4	2.9	.8	1.37	1.74	2.28	2.73	3.17	3.61	4.10	4.67	5.39	6.52	7.55
Apr	4.06	3.11	3.29	1987	5	12.35	1987	.70	1999	10.2	7.0	2.8	1.0	1.21	1.60	2.17	2.67	3.16	3.66	4.21	4.87	5.71	7.03	8.26
May	3.67	3.44	3.24	1977	10	7.65	1984	1.07	1986	10.7	7.5	2.6	.7	1.22	1.57	2.08	2.51	2.92	3.35	3.82	4.37	5.08	6.17	7.18
Jun	3.46	2.73	3.30	1998	14	12.08	1998	.00	1997	9.3	6.4	2.2	.9	.30	.68	1.25	1.76	2.28	2.84	3.49	4.28	5.33	7.04	8.67
Jul	3.34	2.87	2.79	1938	21	7.07	2000	1.16	1974	8.1	5.9	2.8	.8	1.02	1.33	1.81	2.22	2.61	3.02	3.47	4.00	4.69	5.76	6.75
Aug	3.18	2.97	6.05	1991	20	8.60	1991	.68	1996	8.1	5.5	2.0	.9	.90	1.20	1.66	2.05	2.44	2.85	3.30	3.83	4.52	5.60	6.61
Sep	3.78	2.86	6.96	1954	11	9.40	1974	.67	1978	7.7	5.6	2.5	1.2	.82	1.17	1.73	2.23	2.73	3.27	3.87	4.59	5.55	7.07	8.50
Oct	3.96	3.63	6.72	1996	21	11.12	1996	.42	1994	8.1	5.9	2.7	1.2	1.26	1.64	2.19	2.67	3.12	3.60	4.12	4.73	5.52	6.74	7.87
Nov	4.06	3.91	3.69	1932	10	9.90	1983	.81	1976	9.7	6.9	2.9	1.1	1.24	1.63	2.20	2.70	3.18	3.68	4.23	4.87	5.70	7.00	8.21
Dec	3.56	3.63	2.96	1986	19	7.70	1986	.00	1989	9.0	6.4	3.0	1.1	.45	.90	1.50	2.01	2.52	3.06	3.66	4.39	5.34	6.86	8.31
Ann	44.09	43.41	6.96	Sep 1954	11	12.35	Apr 1987	.00+	Jun 1997	109.4	78.0	31.5	11.7	32.78	35.01	37.84	39.98	41.87	43.68	45.55	47.61	50.10	53.69	56.78

+ 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: 1926-2001

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

Complete documentation available from:

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Station: LAWRENCE, MA

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Climate Division: MA 2

NWS Call Sign:

Elevation: 60 Feet

Lat: 42°42N

Lon: 71°10W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	15.7	12.5	3	2	21.0	1978	21	41.0	1987	37	1996	13	16	1977	3.5	2.8	1.4	.7	.3	-9.9	-9.9	-9.9	-9.9
Feb	10.2	9.0	4	2	16.0	1972	19	35.5	1972	41	1978	8	19	1978	2.9	2.4	1.1	.4	@	10.7	6.8	4.7	1.7
Mar	5.1	2.3	1	#	10.0	1984	14	20.0	1972	18	1993	15	6	1993	1.6	1.4	.8	.4	.1	2.9	2.1	.9	.1
Apr	1.4	.0	#	0	12.0	1997	1	12.0	1997	11+	1997	2	1+	1997	.5	.4	.2	.1	.1	.2	.1	.1	.0
May	.1	.0	0	0	1.5	1977	10	1.5	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	#	1979	28	#+	1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	2.0	.0	#	0	8.0	1980	18	10.9	1971	8	1980	19	1+	1997	.6	.6	.3	.1	.0	.9	.5	.3	.0
Dec	9.1	6.0	1	#	10.0	1976	30	28.0	1981	16	1976	30	6	1985	2.3	1.9	1.0	.7	@	5.0	3.3	2.3	.6
Ann	43.6	29.8	N/A	N/A	21.0	Jan 1978	21	41.0	Jan 1987	41	Feb 1978	8	19	Feb 1978	11.4	9.5	4.8	2.4	.5	-9.9	-9.9	-9.9	-9.9

+ 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	5/18	5/12	5/09	5/05	5/02	4/29	4/26	4/22	4/17
32	5/03	4/29	4/27	4/24	4/22	4/20	4/18	4/15	4/11
28	4/24	4/18	4/15	4/12	4/09	4/06	4/03	3/30	3/25
24	4/12	4/07	4/04	4/01	3/30	3/27	3/24	3/21	3/16
20	4/04	3/30	3/27	3/24	3/21	3/18	3/15	3/12	3/07
16	4/01	3/26	3/21	3/18	3/14	3/11	3/07	3/03	2/25
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	9/26	9/29	10/01	10/03	10/05	10/07	10/09	10/11	10/14
32	10/03	10/08	10/11	10/14	10/17	10/19	10/22	10/25	10/30
28	10/16	10/21	10/25	10/29	11/01	11/04	11/07	11/11	11/17
24	10/30	11/05	11/09	11/12	11/15	11/19	11/22	11/26	12/01
20	11/12	11/17	11/21	11/24	11/27	11/30	12/04	12/07	12/13
16	11/24	11/29	12/03	12/06	12/09	12/13	12/16	12/20	12/25
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	173	167	162	159	155	152	148	144	138
32	195	188	184	180	177	173	169	165	158
28	227	219	214	210	205	201	196	191	184
24	253	245	239	235	230	226	221	215	207
20	274	266	260	255	251	246	241	235	227
16	293	285	279	274	270	265	260	254	246

* 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	1256	1065	916	574	251	61	3	13	143	467	717	1073	6539
60	1101	925	761	425	129	16	0	1	58	318	567	918	5219
57	1008	841	668	338	74	6	0	0	29	235	477	825	4501
55	946	785	606	282	48	2	0	0	16	186	417	763	4051
50	791	645	453	161	11	0	0	0	3	88	277	612	3041
32	289	195	63	2	0	0	0	0	0	0	13	175	737

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	56	54	170	418	780	1023	1233	1174	879	557	287	126	6757
55	0	0	0	8	115	335	520	461	205	30	1	0	1675
57	0	0	0	4	79	279	458	399	158	17	0	0	1394
60	0	0	0	1	41	199	365	307	97	6	0	0	1016
65	0	0	0	0	8	94	213	163	32	0	0	0	510
70	0	0	0	0	1	30	86	58	5	0	0	0	180

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	10	9	70	236	565	818	1018	962	679	357	130	29	10	19	89	325	890	1708	2726	3688	4367	4724	4854	4883
45	0	0	30	126	411	668	863	807	529	220	63	6	0	0	30	156	567	1235	2098	2905	3434	3654	3717	3723
50	0	0	9	61	264	519	708	652	382	114	24	1	0	0	9	70	334	853	1561	2213	2595	2709	2733	2734
55	0	0	4	24	148	372	553	497	241	45	7	0	0	0	4	28	176	548	1101	1598	1839	1884	1891	1891
60	0	0	2	8	69	233	399	345	130	12	1	0	0	0	2	10	79	312	711	1056	1186	1198	1199	1199
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	6	9	44	131	318	519	690	643	413	202	73	17	6	15	59	190	508	1027	1717	2360	2773	2975	3048	3065

(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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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 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.

- | | |
|---|---|
| <ol style="list-style-type: none">a. Temperature/ Precipitation Tables<ol style="list-style-type: none">1. 1971-2000 Monthly Normals2. Cooperative Summary of the Day3. National Weather Service station records4. 1971-2000 serially complete daily datab. Degree Day Table<ol style="list-style-type: none">1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data | <ol style="list-style-type: none">c. Snow Tables<ol style="list-style-type: none">1. Snow Climatology2. Cooperative Summary of the Dayd. Freeze Data Table
1971-2000 serially complete daily data |
|---|---|

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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