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: MOOSE LAKE 1 SSE, MN **COOP ID: 215598**

Climate Division: MN 6 **NWS Call Sign:** **Elevation: 1,110 Feet** **Lat: 46˚26N** **Lon: 92˚45W**

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	19.7	-2.7	8.5	54	1973	25	20.1	1990	-53	1972	15	-3.3	1982	1753	0	.0	.0	.1	26.5	31.0	16.9
Feb	27.5	3.6	15.6	57+	1981	18	30.1	1998	-41+	1982	3	4.2	1989	1385	0	.0	.0	.5	18.0	27.9	12.0
Mar	38.6	16.2	27.4	73+	1987	7	36.3	2000	-39	1962	1	18.8	1975	1166	0	.0	.0	4.4	8.6	29.1	4.7
Apr	54.6	28.1	41.4	92	1980	21	47.5	1987	-8+	1975	4	33.7	1975	710	0	.0	@	19.3	.7	21.0	.1
May	69.0	39.0	54.0	92	1949	3	61.3	1977	16+	1971	3	48.5	1979	353	12	.0	.1	29.8	.0	7.4	.0
Jun	76.7	47.7	62.2	95+	1963	30	66.5	1995	26	1988	9	56.7	1985	125	41	.0	.9	30.0	.0	.5	.0
Jul	81.0	54.1	67.6	101+	1988	28	71.6	1988	34	1972	4	60.4	1992	46	125	.1	2.5	31.0	.0	.0	.0
Aug	78.2	53.3	65.8	98+	1988	16	70.0+	1998	30	1950	20	60.5	1977	83	105	.0	1.3	31.0	.0	.1	.0
Sep	68.5	44.5	56.5	97	1976	7	63.2	1998	18	1974	22	51.3	1974	268	13	.0	.1	29.4	.0	3.2	.0
Oct	55.8	33.6	44.7	87+	1992	2	49.8	1973	5+	1976	27	39.1	1976	628	0	.0	.0	22.4	.2	14.1	.0
Nov	36.8	20.3	28.6	72	1975	4	37.7	1999	-31	1976	28	20.8	1985	1094	0	.0	.0	4.1	11.0	26.5	1.9
Dec	23.4	4.4	13.9	57+	1982	2	25.0	1997	-46	1983	19	.1	1983	1585	0	.0	.0	.2	24.6	30.8	12.6
Ann	52.5	28.5	40.5	101+	Jul 1988	28	71.6	Jul 1988	-53	Jan 1972	15	-3.3	Jan 1982	9196	296	.1	4.9	202.2	89.6	191.6	48.2

\+ 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	.94	.86	1.51	1975	11	3.39	1975	.05	1981
Feb	.69	.54	1.41	1971	27	2.13	1971	.04	1982
Mar	1.48	1.42	1.68	1977	12	3.97	1977	.49	1993
Apr	1.92	1.83	2.52	2001	23	4.90	1994	.10	1980
May	2.99	3.11	2.50+	1979	10	4.65	1991	.53	1976
Jun	4.50	4.31	4.15	1953	20	7.70	1996	1.30	1987
Jul	4.35	4.39	4.50	1952	17	11.35	1972	1.18	1989
Aug	4.07	4.27	4.42	1989	31	7.39	1990	.64	1976
Sep	3.51	2.74	3.95	1985	3	7.54	1986	.57	1974
Oct	2.49	2.31	2.35	1971	28	8.22	1971	.40	1976
Nov	1.86	1.54	1.74	1996	17	4.65	1996	.29	1976
Dec	.83	.82	1.12	1977	18	2.08	1982	.09	1999
Ann	29.63	28.54	4.50	Jul 1952	17	11.35	Jul 1972	.04	Feb 1982

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.9	3.1	.2	.1
Feb	4.9	2.2	.2	@
Mar	6.3	4.2	.7	.1
Apr	6.9	4.9	1.2	.2
May	9.5	6.7	2.0	.6
Jun	10.9	7.8	3.3	1.2
Jul	10.1	7.4	3.1	1.2
Aug	9.2	6.7	2.7	1.0
Sep	9.8	6.8	1.9	.6
Oct	8.2	5.4	1.7	.6
Nov	7.3	4.6	1.2	.4
Dec	6.7	3.0	.2	.1
Ann	96.7	62.8	18.4	6.1

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	.14	.22	.35	.48	.62	.77	.94	1.15	1.43	1.90	2.34
Feb	.06	.11	.21	.30	.41	.52	.66	.84	1.08	1.48	1.88
Mar	.42	.56	.77	.96	1.14	1.32	1.53	1.77	2.09	2.59	3.05
Apr	.31	.47	.75	1.02	1.29	1.59	1.93	2.35	2.90	3.81	4.68
May	1.18	1.46	1.85	2.18	2.48	2.80	3.13	3.52	4.02	4.78	5.47
Jun	1.82	2.23	2.82	3.30	3.75	4.22	4.71	5.29	6.02	7.13	8.14
Jul	1.57	1.98	2.57	3.06	3.54	4.02	4.55	5.16	5.94	7.15	8.25
Aug	1.27	1.65	2.23	2.72	3.20	3.69	4.23	4.87	5.69	6.97	8.15
Sep	.78	1.10	1.62	2.08	2.55	3.04	3.60	4.26	5.14	6.53	7.85
Oct	.42	.63	1.00	1.34	1.69	2.07	2.51	3.04	3.75	4.89	5.99
Nov	.40	.57	.84	1.09	1.34	1.60	1.90	2.26	2.73	3.48	4.20
Dec	.17	.25	.37	.48	.59	.71	.85	1.01	1.23	1.57	1.90
Ann	21.64	23.20	25.20	26.70	28.04	29.32	30.65	32.11	33.88	36.44	38.64

\+ 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)

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	9.1	9.2	11	10	11.3	1996	18	26.3	1975	31	1975	31	23	1997	6.6	3.4	1.1	.1	.1	-9.9	-9.9	-9.9	-9.9
Feb	5.5	4.8	14	14	8.0	1971	27	15.2	1971	30	1975	2	28	1975	4.2	2.1	.3	.2	.0	-9.9	-9.9	-9.9	-9.9
Mar	6.8	5.6	11	10	7.6	1988	12	20.6	1975	33	1979	9	27	1975	3.4	2.4	.7	.3	.0	21.3	20.5	19.8	17.7
Apr	2.9	2.0	2	#	7.0	1995	19	10.1	1983	26	1975	6	16	1975	1.4	1.1	.4	.1	.0	4.9	4.1	3.5	2.5
May	.1	.0	#	0	.5	1989	6	1.0	1991	1+	1991	5	#+	1991	.1	.0	.0	.0	.0	.1	.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	.7	.0	#	0	4.0	1995	24	7.3	1995	2	1995	22	#+	1997	.5	.3	@	.0	.0	.3	.0	.0	.0
Nov	6.4	3.9	1	1	10.2	1991	2	31.2	1991	21	1991	6	13	1991	3.5	2.5	.9	.3	.1	5.9	2.0	1.3	.4
Dec	7.2	6.8	6	5	10.0	1982	28	21.0	1982	21	1982	31	17	1983	5.9	3.0	.3	.1	@	24.9	14.4	9.1	.8
Ann	38.7	32.3	N/A	N/A	11.3	Jan 1996	18	31.2	Nov 1991	33	Mar 1979	9	28	Feb 1975	25.6	14.8	3.7	1.1	.2	-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	6/25	6/19	6/15	6/11	6/08	6/05	6/01	5/28	5/22
32	6/12	6/06	6/01	5/29	5/25	5/22	5/18	5/14	5/08
28	5/30	5/24	5/20	5/16	5/12	5/09	5/05	5/01	4/24
24	5/14	5/08	5/04	5/01	4/28	4/24	4/21	4/17	4/11
20	5/02	4/27	4/23	4/19	4/16	4/13	4/10	4/06	4/01
16	4/22	4/17	4/14	4/11	4/08	4/05	4/02	3/30	3/25

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	122	111	103	96	90	84	77	69	58
32	143	133	126	120	115	109	103	96	87
28	162	154	148	143	139	134	129	123	115
24	193	183	176	170	164	158	152	145	136
20	219	209	202	196	191	185	179	172	162
16	232	224	218	213	208	203	198	192	184

***** 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	1753	1385	1166	710	353	125	46	83	268	628	1094	1585	9196
60	1598	1245	1011	562	226	49	10	28	152	475	944	1430	7730
57	1505	1161	918	474	164	23	4	12	98	387	854	1337	6937
55	1443	1105	856	417	128	12	0	6	69	331	794	1275	6436
50	1288	965	702	286	61	2	0	0	23	207	646	1120	5300
32	745	498	239	24	0	0	0	0	0	9	201	593	2309

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	37	95	304	682	907	1101	1046	735	404	97	32	5454
55	0	0	0	7	97	229	388	339	114	12	0	0	1186
57	0	0	0	4	71	179	330	283	82	7	0	0	956
60	0	0	0	1	40	115	244	206	47	2	0	0	655
65	0	0	0	0	12	41	125	105	13	0	0	0	296
70	0	0	0	0	2	9	47	40	2	0	0	0	100

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	1	12	127	439	667	861	803	504	206	16	0	0	1	13	140	579	1246	2107	2910	3414	3620	3636	3636
45	0	0	2	58	296	517	706	648	358	109	5	0	0	0	2	60	356	873	1579	2227	2585	2694	2699	2699
50	0	0	0	23	174	370	551	493	228	46	0	0	0	0	0	23	197	567	1118	1611	1839	1885	1885	1885
55	0	0	0	7	87	232	396	341	126	17	0	0	0	0	0	7	94	326	722	1063	1189	1206	1206	1206
60	0	0	0	1	40	116	245	203	60	1	0	0	0	0	0	1	41	157	402	605	665	666	666	666
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	13	113	303	427	551	514	312	125	11	0	0	0	13	126	429	856	1407	1921	2233	2358	2369	2369

(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

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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