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: STILLWATER 1 SE, MN **COOP ID: 218037**

Climate Division: MN 6 **NWS Call Sign:** **Elevation: 710 Feet** **Lat: 45˚03N** **Lon: 92˚48W**

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	23.3	4.9	14.1	54	1981	25	27.1	1990	-40	1977	9	.3	1977	1578	0	.0	.0	.1	22.4	30.8	12.7
Feb	30.3	11.4	20.9	62	2000	29	33.9	1987	-36	1996	2	9.9	1979	1237	0	.0	.0	1.2	14.4	27.0	8.4
Mar	42.3	23.3	32.8	83+	1986	30	42.6	2000	-37	1962	1	23.6	1975	999	0	.0	.0	7.7	5.8	25.1	2.2
Apr	58.6	36.1	47.4	94	1980	21	55.3	1987	4	1975	2	39.2	1975	535	5	.0	.1	22.7	.3	11.2	.0
May	71.9	48.6	60.3	96	1964	22	68.4	1977	20	1967	3	54.1	1974	213	65	.0	.7	30.8	.0	.8	.0
Jun	80.5	57.9	69.2	103	1963	30	74.0	1988	34+	1990	4	64.4	1982	35	161	.1	3.5	30.0	.0	.0	.0
Jul	84.8	62.7	73.8	106+	1990	4	79.2	1988	45	1971	29	68.5	1992	8	278	.5	6.4	31.0	.0	.0	.0
Aug	82.1	60.6	71.4	104+	1988	16	76.4	1988	37	1964	26	67.5	1977	17	214	.1	4.1	31.0	.0	.0	.0
Sep	72.7	51.5	62.1	98	1960	6	68.6	1998	26	1974	22	56.5	1993	135	49	.0	.8	29.8	.0	.5	.0
Oct	60.2	40.2	50.2	90	1997	4	56.6	2000	15+	1976	27	44.5	1987	461	3	.0	@	26.2	@	7.3	.0
Nov	41.5	26.4	34.0	78+	1999	9	44.0	1999	-16	1964	30	26.7	1985	931	0	.0	.0	7.3	6.0	23.6	.7
Dec	27.5	12.0	19.8	67+	1998	2	28.5	1997	-39	1983	19	5.9	1983	1403	0	.0	.0	.5	19.2	30.3	7.7
Ann	56.3	36.3	46.3	106+	Jul 1990	4	79.2	Jul 1988	-40	Jan 1977	9	.3	Jan 1977	7552	775	.7	15.6	218.3	68.1	156.6	31.7

\+ 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/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

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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	1.02	.92	1.77	1996	18	3.05	1982	.16	1974
Feb	.72	.56	1.06	1965	10	2.87	1981	.05	1987
Mar	1.78	1.48	1.33	1979	30	4.18	1977	.31	1994
Apr	2.86	2.67	2.35	1986	28	6.56	1975	.19	1987
May	3.58	3.51	2.77	1978	28	8.37	1991	.44	1976
Jun	4.77	4.19	7.98	1967	1	10.20	1975	1.28	1988
Jul	4.70	4.50	5.14	1987	24	14.04	1987	.88	1974
Aug	4.92	4.56	4.50	1993	9	10.92	1993	1.08	1976
Sep	3.57	3.15	3.56	1992	16	8.52	1986	1.09	1998
Oct	2.61	2.42	2.53	1966	15	6.02	1971	.16	1978
Nov	2.15	1.59	1.92	1975	10	6.53	1991	.05	1976
Dec	.93	.91	1.81	1982	25	3.65	1982	.19	1997
Ann	33.61	33.17	7.98	Jun 1967	1	14.04	Jul 1987	.05+	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.0	3.4	.3	.1
Feb	5.7	2.4	.2	.0
Mar	7.8	4.4	1.0	.2
Apr	9.0	5.9	1.9	.5
May	10.5	7.0	2.5	.8
Jun	10.9	8.0	2.9	1.3
Jul	10.4	7.2	2.9	1.2
Aug	9.3	6.3	3.1	1.8
Sep	9.4	6.1	2.4	1.0
Oct	8.1	5.1	1.7	.6
Nov	7.7	4.7	1.4	.4
Dec	7.2	2.9	.3	.1
Ann	104.0	63.4	20.6	8.0

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	.17	.26	.41	.55	.70	.85	1.03	1.25	1.53	2.00	2.45
Feb	.09	.14	.24	.34	.45	.57	.71	.88	1.11	1.49	1.86
Mar	.38	.54	.80	1.04	1.28	1.53	1.82	2.16	2.61	3.34	4.02
Apr	.49	.74	1.16	1.55	1.95	2.38	2.88	3.49	4.29	5.59	6.84
May	1.07	1.41	1.92	2.36	2.78	3.23	3.72	4.29	5.04	6.20	7.28
Jun	1.78	2.23	2.87	3.40	3.91	4.43	4.99	5.64	6.48	7.76	8.93
Jul	1.40	1.84	2.51	3.09	3.65	4.24	4.89	5.65	6.63	8.17	9.59
Aug	1.63	2.09	2.78	3.36	3.92	4.50	5.13	5.87	6.82	8.29	9.65
Sep	1.03	1.37	1.88	2.32	2.75	3.20	3.70	4.29	5.05	6.24	7.34
Oct	.40	.62	1.00	1.36	1.73	2.14	2.61	3.19	3.96	5.21	6.42
Nov	.25	.42	.72	1.02	1.34	1.69	2.11	2.62	3.32	4.47	5.59
Dec	.16	.24	.38	.51	.64	.78	.94	1.14	1.40	1.82	2.22
Ann	22.57	24.66	27.36	29.43	31.28	33.08	34.94	37.01	39.54	43.23	46.44

\+ 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	9.1	10.5	9	8
Feb	5.5	4.2	7	6
Mar	7.5	6.5	3	2
Apr	1.2	.0	#	#
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	2.6	-99.9	2	1
Dec	8.1	9.0	4	3
Ann	34.0	-9.9	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	17.0	1982	23	21.0	1975	39	1982	30	39	1982
Feb	6.0	1990	16	13.1	1979	24	1979	1	18	1979
Mar	11.0	1977	3	16.0	1977	17	1989	5	10	1975
Apr	5.0	1974	4	5.0	1974	6	1980	10	1	1980
May	.0	0	0	.0	0	#	1989	6	#	1989
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	#	1997	14	#+	1997	#+	1997	14	#+	1997
Nov	12.8	1983	24	12.8	1983	14	1991	7	8	1991
Dec	7.5	1996	15	13.0	1972	18	1996	23	15	1983
Ann	17.0	Jan 1982	23	21.0	Jan 1975	39	Jan 1982	30	39	Jan 1982

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.3	3.8	1.3	.5	.0
Feb	3.6	2.2	.7	.2	.0
Mar	3.0	2.3	1.1	.4	.1
Apr	.5	.5	.1	.1	.0
May	.0	.0	.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	.0
Nov	2.4	1.6	.9	.5	.2
Dec	4.1	2.9	.7	.3	.0
Ann	18.9	13.3	4.8	2.0	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	5.8	2.5	1.4	.5
Apr	.6	.1	.1	.0
May	.0	.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	5.3	2.9	2.2	.7
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-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	5/27	5/22	5/17	5/14	5/10	5/07	5/04	4/29	4/24
32	5/11	5/07	5/03	4/30	4/27	4/25	4/22	4/18	4/13
28	4/30	4/25	4/22	4/19	4/16	4/13	4/10	4/07	4/02
24	4/21	4/17	4/13	4/11	4/08	4/06	4/03	3/31	3/26
20	4/13	4/09	4/06	4/04	4/01	3/30	3/28	3/25	3/21
16	4/11	4/05	4/01	3/29	3/26	3/23	3/20	3/16	3/11

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	9/16	9/20	9/22	9/24	9/26	9/28	10/01	10/03	10/07
32	9/22	9/27	9/30	10/04	10/07	10/10	10/13	10/16	10/21
28	9/27	10/03	10/07	10/11	10/15	10/18	10/22	10/27	11/02
24	10/15	10/20	10/24	10/27	10/30	11/02	11/05	11/08	11/13
20	10/24	10/28	11/01	11/03	11/06	11/09	11/12	11/15	11/19
16	10/27	11/03	11/07	11/11	11/14	11/18	11/22	11/26	12/02

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	160	153	147	143	138	134	129	124	116
32	182	175	170	166	162	157	153	148	141
28	206	197	191	186	181	176	171	165	156
24	224	217	212	208	204	200	196	191	184
20	236	230	225	222	218	214	211	206	200
16	258	249	243	238	233	227	222	216	207

***** 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	1578	1237	999	535	213	35	8	17	135	461	931	1403	7552
60	1423	1097	844	397	125	9	0	2	58	318	781	1248	6302
57	1330	1013	752	321	85	3	0	0	30	243	691	1155	5623
55	1268	957	693	274	63	1	0	0	17	197	633	1093	5196
50	1113	822	550	174	26	0	0	0	3	107	491	938	4224
32	591	382	158	10	0	0	0	0	0	2	117	438	1698

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	36	70	182	470	875	1115	1294	1220	904	567	176	57	6966
55	0	0	3	44	225	427	581	507	231	49	2	0	2069
57	0	0	1	31	185	368	519	445	184	32	0	0	1765
60	0	0	0	17	132	284	426	354	122	15	0	0	1350
65	0	0	0	5	65	161	278	214	49	3	0	0	775
70	0	0	0	1	25	72	151	105	13	0	0	0	367

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	42	255	624	875	1042	970	663	327	49	2	0	3	45	300	924	1799	2841	3811	4474	4801	4850	4852
45	0	1	19	153	470	725	887	815	514	205	21	1	0	1	20	173	643	1368	2255	3070	3584	3789	3810	3811
50	0	1	6	82	326	575	732	660	370	111	8	0	0	1	7	89	415	990	1722	2382	2752	2863	2871	2871
55	0	0	0	39	201	426	577	505	235	50	1	0	0	0	0	39	240	666	1243	1748	1983	2033	2034	2034
60	0	0	0	13	106	283	422	352	134	17	0	0	0	0	0	13	119	402	824	1176	1310	1327	1327	1327
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	33	165	386	568	703	644	405	191	29	1	0	1	34	199	585	1153	1856	2500	2905	3096	3125	3126

(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