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: BIG FALLS, MN **COOP ID: 210746**

Climate Division: MN 2 **NWS Call Sign:** **Elevation: 1,220 Feet** **Lat: 48˚12N** **Lon: 93˚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	17.6	-7.0	5.3	49+	1981	24	19.5	1990	-51	1996	20	-6.8	1994	1853	0	.0	.0	.0	27.7	31.0	20.1
Feb	26.7	.4	13.6	62	1958	26	27.4	1998	-48	1996	1	1.4	1989	1441	0	.0	.0	.6	19.2	27.9	14.1
Mar	38.8	13.3	26.1	72	1963	31	36.4	1973	-42	1962	1	17.3	1996	1208	0	.0	.0	5.8	9.4	28.9	6.3
Apr	55.3	27.3	41.3	92	1952	28	50.0	1987	-19	1954	3	34.4	1996	712	0	.0	@	19.9	.8	21.7	.5
May	70.3	40.1	55.2	94	1969	28	64.0	1977	12	1967	3	48.0	1979	333	28	.0	.5	29.7	.0	7.4	.0
Jun	76.8	48.8	62.8	99+	1995	18	69.4	1995	21	1964	1	57.1	1982	128	62	.0	1.2	29.9	.0	.6	.0
Jul	80.8	52.9	66.9	101	1975	29	71.7	1975	32+	1972	4	60.5	1992	56	114	.1	2.6	31.0	.0	.1	.0
Aug	78.6	51.0	64.8	99+	1976	20	71.1	1983	29+	1982	28	58.7	1977	103	97	.0	1.6	31.0	.0	.2	.0
Sep	67.8	41.9	54.9	97	1976	7	59.6	1998	15	1965	26	49.5	1993	311	7	.0	.3	29.1	.0	4.3	.0
Oct	55.3	32.1	43.7	89	1963	5	50.0	1973	3	1988	30	38.4	1976	660	0	.0	.0	20.9	.5	17.2	.0
Nov	34.7	16.8	25.8	75	1975	5	36.2	1981	-33	1985	29	15.8	1985	1176	0	.0	.0	2.9	13.9	28.1	3.0
Dec	21.6	.7	11.2	57	1962	3	22.3	1997	-46	1955	19	-.9	1983	1669	0	.0	.0	@	25.7	30.9	14.8
Ann	52.0	26.5	39.3	101	Jul 1975	29	71.7	Jul 1975	-51	Jan 1996	20	-6.8	Jan 1994	9650	308	.1	6.2	200.8	97.2	198.3	58.8

\+ 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: 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	.87	.77	1.10	1950	24	3.25	1975	.21	1973
Feb	.65	.62	.80	1987	2	1.26	1996	.07	1993
Mar	1.05	.98	1.48	1966	4	2.18	1988	.26	1984
Apr	1.61	1.58	1.83	1957	19	4.30	1986	.19	1988
May	2.92	2.18	2.22	1985	11	7.02	1977	.28	1976
Jun	4.25	4.05	2.75	1957	21	7.49	1976	.55	1987
Jul	3.69	3.22	4.02	1966	3	7.48	1987	1.20	1990
Aug	3.43	3.22	2.45	1950	24	7.59	2000	.59	1971
Sep	3.23	3.03	2.53	1999	2	7.54	1977	.90+	1976
Oct	2.34	2.08	2.72	1979	31	7.44	1971	.19	1992
Nov	1.46	1.31	1.77	1977	10	4.16	1977	.12	1999
Dec	.83	.80	.95	1960	5	1.96	1992	.19	1982
Ann	26.33	26.06	4.02	Jul 1966	3	7.59	Aug 2000	.07	Feb 1993

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.4	2.6	.1	.0
Feb	7.2	2.0	.1	.0
Mar	8.0	3.2	.4	@
Apr	8.2	3.8	.9	.2
May	11.3	6.4	1.7	.4
Jun	12.9	8.2	2.8	.9
Jul	11.6	7.2	2.3	.6
Aug	11.1	6.5	2.3	.8
Sep	11.9	6.6	2.1	.7
Oct	9.5	4.9	1.3	.4
Nov	8.4	3.3	.6	.1
Dec	10.1	2.6	@	.0
Ann	119.6	57.3	14.6	4.1

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	.24	.33	.45	.56	.67	.78	.90	1.05	1.24	1.54	1.82
Feb	.17	.23	.32	.41	.49	.57	.67	.78	.93	1.16	1.37
Mar	.30	.40	.56	.69	.81	.95	1.09	1.26	1.49	1.84	2.16
Apr	.31	.46	.70	.91	1.13	1.37	1.64	1.96	2.39	3.08	3.74
May	.71	.98	1.41	1.79	2.16	2.56	3.01	3.54	4.24	5.34	6.37
Jun	1.60	2.00	2.57	3.04	3.49	3.95	4.45	5.02	5.76	6.89	7.92
Jul	1.48	1.82	2.30	2.70	3.07	3.45	3.87	4.34	4.94	5.86	6.70
Aug	.93	1.25	1.75	2.18	2.61	3.05	3.54	4.13	4.89	6.08	7.20
Sep	.88	1.19	1.65	2.06	2.46	2.88	3.34	3.89	4.61	5.73	6.78
Oct	.42	.63	.97	1.29	1.61	1.96	2.36	2.85	3.49	4.53	5.52
Nov	.28	.41	.62	.82	1.02	1.24	1.48	1.78	2.17	2.81	3.41
Dec	.28	.36	.48	.58	.67	.77	.87	.99	1.15	1.39	1.62
Ann	20.40	21.59	23.09	24.21	25.20	26.15	27.12	28.19	29.47	31.31	32.89

\+ 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	12.6	12.9	14	13
Feb	9.0	8.7	15	16
Mar	10.3	9.8	11	11
Apr	4.0	2.9	2	#
May	.2	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	#	.0	0	0
Sep	#	.0	0	0
Oct	1.6	1.4	#	0
Nov	7.3	5.9	2	1
Dec	11.4	11.0	7	6
Ann	56.4	52.6	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	8.3	1989	7	29.6	1989	32	1975	27	23+	1989
Feb	9.1	1987	2	17.7	1979	30	1975	15	29	1975
Mar	9.0	1985	4	25.3	1988	36	1972	6	25	1975
Apr	8.1	1998	1	12.8	1990	23	1975	3	10	1975
May	1.2	1974	14	1.8	1991	0	0	0	0	0
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	#	1974	31	#	1974	0	0	0	0	0
Sep	#	1975	12	#+	1975	0	0	0	0	0
Oct	3.5	1990	17	5.6	1981	4	1988	28	#+	1996
Nov	10.0	1988	16	19.7	1988	16	1977	21	7	1991
Dec	10.5	1988	27	15.3	1978	17	1988	27	14	1977
Ann	10.5	Dec 1988	27	29.6	Jan 1989	36	Mar 1972	6	29	Feb 1975

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.4	4.2	1.2	.4	.0
Feb	6.6	2.5	.7	.2	.0
Mar	6.0	3.0	1.1	.4	.0
Apr	2.6	1.3	.4	.1	.0
May	.3	.1	.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	1.0	.6	.1	.0	.0
Nov	5.5	2.8	.9	.4	.1
Dec	10.2	4.2	.9	.2	@
Ann	41.6	18.7	5.3	1.7	.1

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	-9.9	-9.9	-9.9	-9.9
Apr	5.4	4.3	3.7	2.2
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	.4	.1	.0	.0
Nov	-9.9	-9.9	-9.9	-9.9
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	6/30	6/24	6/19	6/15	6/12	6/08	6/04	5/31	5/24
32	6/14	6/08	6/04	5/31	5/28	5/25	5/21	5/17	5/12
28	5/26	5/21	5/17	5/14	5/11	5/08	5/05	5/01	4/26
24	5/11	5/08	5/05	5/03	5/01	4/29	4/26	4/24	4/20
20	5/05	4/29	4/25	4/22	4/19	4/16	4/13	4/09	4/03
16	4/21	4/17	4/14	4/12	4/09	4/07	4/05	4/02	3/29

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	8/21	8/25	8/28	8/31	9/03	9/07	9/11	9/16
32	8/29	9/03	9/06	9/09	9/12	9/14	9/17	9/20	9/25
28	9/15	9/19	9/21	9/24	9/26	9/28	10/01	10/03	10/07
24	9/21	9/27	9/30	10/04	10/07	10/10	10/13	10/16	10/22
20	10/03	10/09	10/13	10/16	10/19	10/22	10/26	10/30	11/04
16	10/14	10/19	10/23	10/27	10/30	11/02	11/06	11/10	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	104	96	90	85	80	75	70	64	56
32	125	119	114	110	106	102	98	93	86
28	156	149	145	141	137	134	130	125	119
24	175	169	165	161	158	155	151	147	141
20	207	198	192	187	182	177	172	166	158
16	221	215	210	207	203	199	196	191	185

***** 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	1853	1441	1208	712	333	128	56	103	311	660	1176	1669	9650
60	1698	1301	1053	565	219	56	14	40	184	506	1026	1514	8176
57	1605	1217	960	480	163	29	5	19	122	416	936	1421	7373
55	1543	1161	898	425	130	18	1	12	88	359	876	1359	6870
50	1388	1021	744	299	67	4	0	1	31	230	727	1204	5716
32	846	547	274	35	0	0	0	0	0	14	267	672	2655

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	16	30	89	313	719	925	1081	1017	686	377	80	26	5359
55	0	0	0	13	136	252	369	316	84	8	0	0	1178
57	0	0	0	8	106	203	312	262	58	4	0	0	953
60	0	0	0	4	69	140	227	189	30	1	0	0	660
65	0	0	0	0	28	62	114	97	7	0	0	0	308
70	0	0	0	0	9	18	41	37	1	0	0	0	106

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	0	12	136	473	685	839	776	456	175	12	0	0	0	12	148	621	1306	2145	2921	3377	3552	3564	3564
45	0	0	1	70	329	535	684	621	316	92	3	0	0	0	1	71	400	935	1619	2240	2556	2648	2651	2651
50	0	0	0	35	209	390	529	466	191	39	0	0	0	0	0	35	244	634	1163	1629	1820	1859	1859	1859
55	0	0	0	12	117	249	375	319	105	15	0	0	0	0	0	12	129	378	753	1072	1177	1192	1192	1192
60	0	0	0	2	54	136	227	179	44	1	0	0	0	0	0	2	56	192	419	598	642	643	643	643
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	16	124	323	439	537	494	288	119	11	0	0	0	16	140	463	902	1439	1933	2221	2340	2351	2351

(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