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: DETROIT LAKES 1 NNE, MN **COOP ID: 212142**

Climate Division: MN 1 **NWS Call Sign:** **Elevation: 1,375 Feet** **Lat: 46˚50N** **Lon: 95˚51W**

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	16.4	-4.3	6.1	55	1942	24	18.8	1990	-45	1954	21	-6.3	1982	1829	0	.0	.0	@	27.3	31.0	19.7
Feb	24.1	3.2	13.7	59	1958	27	28.1	1998	-46+	1936	16	-.1	1989	1438	0	.0	.0	.2	20.2	27.9	12.8
Mar	36.7	17.1	26.9	74+	1967	30	37.5	2000	-40	1948	10	15.6	1996	1183	0	.0	.0	4.1	10.5	28.5	4.7
Apr	54.8	31.2	43.0	98	1980	21	51.6	1987	-11+	1979	6	34.6	1975	661	2	.0	.1	19.8	.7	18.8	.2
May	69.4	44.3	56.9	97	1934	31	66.3	1977	15	1968	5	49.7	1979	290	37	.0	.2	29.8	.0	5.3	.0
Jun	76.1	53.1	64.6	100+	2001	26	72.0	1988	28	1969	3	58.1	1982	106	95	.0	1.6	30.0	.0	.2	.0
Jul	80.5	58.0	69.3	107+	1936	11	74.2	1999	33	1969	1	61.6	1992	44	174	.1	3.0	31.0	.0	.0	.0
Aug	79.1	56.6	67.9	101+	1988	17	74.6	1983	32+	1986	28	62.3	1977	72	160	.1	2.7	31.0	.0	@	.0
Sep	69.1	46.8	58.0	98	1947	9	66.4	1998	17	1965	26	52.6	1993	234	21	.0	.6	29.2	.0	3.5	.0
Oct	55.9	35.5	45.7	90	1963	5	52.1	1973	1	1936	26	40.7	1988	599	0	.0	.0	22.2	.4	14.2	.0
Nov	35.1	20.0	27.6	72	1975	5	37.8	1999	-28	1964	30	18.2	1996	1124	0	.0	.0	4.1	12.9	27.0	2.4
Dec	21.0	3.7	12.4	60	1939	7	22.9	1999	-41	1955	19	-1.2	1983	1632	0	.0	.0	.2	25.5	30.8	13.6
Ann	51.5	30.4	41.0	107+	Jul 1936	11	74.6	Aug 1983	-46+	Feb 1936	16	-6.3	Jan 1982	9212	489	.2	8.2	201.6	97.5	187.2	53.4

+ 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: 1932-2001

(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	.76	.76	1.47	1949	5	2.58	1975	.13	1992
Feb	.57	.51	1.58	1946	6	2.03	1979	.08+	1988
Mar	1.15	1.13	1.30	1940	29	2.69	1995	.28	1996
Apr	1.54	1.38	2.25	1991	30	5.15	1986	.07	1980
May	2.97	2.71	3.37	1985	10	8.84	1985	.42	1976
Jun	4.41	4.37	3.73	1946	27	9.24	1983	1.23+	1982
Jul	4.03	3.94	3.36	1983	17	11.14	1983	.40	1989
Aug	3.67	3.83	4.50	1955	2	6.27	1988	.65	1976
Sep	3.02	2.85	2.07	1986	1	6.91	1986	.42	1974
Oct	2.50	2.15	3.49	1973	10	6.35	1984	.08	1991
Nov	1.10	1.04	1.41	1958	18	3.88	2000	.00	1999
Dec	.64	.58	1.00	1951	4	1.41	1977	.07	1994
Ann	26.36	25.63	4.50	Aug 1955	2	11.14	Jul 1983	.00	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.4	2.6	.2	.0
Feb	5.8	1.9	.1	@
Mar	5.4	3.0	.5	.1
Apr	7.0	4.1	1.0	.2
May	9.9	6.6	2.0	.4
Jun	11.0	7.8	2.7	1.0
Jul	9.8	6.6	2.6	1.3
Aug	9.5	6.2	2.4	.8
Sep	8.1	5.7	1.7	.8
Oct	7.4	4.8	1.8	.8
Nov	6.9	3.2	.6	.1
Dec	6.3	2.0	.2	.0
Ann	94.5	54.5	15.8	5.5

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	.13	.20	.31	.42	.52	.64	.77	.93	1.14	1.48	1.80
Feb	.09	.14	.22	.30	.38	.47	.57	.69	.85	1.12	1.38
Mar	.31	.41	.58	.73	.87	1.02	1.19	1.39	1.65	2.06	2.44
Apr	.18	.29	.51	.72	.95	1.21	1.51	1.88	2.38	3.21	4.02
May	.67	.94	1.38	1.77	2.16	2.57	3.04	3.60	4.33	5.50	6.60
Jun	1.26	1.68	2.31	2.86	3.39	3.95	4.57	5.30	6.25	7.73	9.11
Jul	1.16	1.54	2.12	2.62	3.11	3.61	4.18	4.84	5.70	7.04	8.29
Aug	1.33	1.68	2.17	2.59	2.99	3.40	3.84	4.35	5.01	6.02	6.95
Sep	.64	.92	1.36	1.76	2.17	2.60	3.08	3.67	4.43	5.66	6.82
Oct	.21	.38	.71	1.06	1.44	1.87	2.39	3.04	3.94	5.44	6.92
Nov	.08	.19	.37	.53	.70	.88	1.09	1.36	1.71	2.28	2.83
Dec	.10	.16	.25	.34	.43	.53	.65	.79	.97	1.28	1.57
Ann	17.53	19.19	21.34	22.99	24.47	25.91	27.40	29.06	31.08	34.04	36.61

\+ 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: 1932-2001
(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	11.5	10.6	10	9	14.0	1989	7	28.8	1975	32	1989	17	25	1989	6.4	3.9	1.2	.4	.1	-9.9	-9.9	-9.9	-9.9
Feb	6.8	6.0	9	9	6.0	1991	19	22.0	1979	32	1982	2	25	1989	4.4	2.7	.7	.2	.0	-9.9	-9.9	-9.9	-9.9
Mar	8.0	8.7	4	3	12.5	1990	16	16.5	1975	28	1989	4	22	1989	3.8	2.6	.7	.3	@	17.1	12.2	9.0	1.6
Apr	1.7	.7	#	0	5.0	1998	1	5.5	1998	12	1989	1	2	1989	1.3	.8	.2	@	.0	1.7	.7	.4	.1
May	.0	.0	0	0	1.0	1991	1	1.0+	1991	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	1.0	.1	#	0	4.0	1972	30	7.0	1972	7	1972	31	1	1981	.9	.4	.1	.0	.0	.5	.2	.1	.0
Nov	4.3	4.0	1	#	8.0	1985	25	19.6	1985	16	1985	30	4	1989	4.3	2.1	.7	.3	.0	9.0	4.5	1.4	.6
Dec	8.2	6.7	5	4	12.0	1988	27	17.7	1988	21	1983	29	18	1983	5.9	3.0	.7	.2	@	24.8	18.7	12.6	5.7
Ann	41.5	36.8	N/A	N/A	14.0	Jan 1989	7	28.8	Jan 1975	32+	Jan 1989	17	25+	Feb 1989	27.0	15.5	4.3	1.4	.1	-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	6/26	6/18	6/12	6/07	6/03	5/29	5/24	5/19	5/11
32	6/02	5/28	5/24	5/20	5/17	5/14	5/10	5/06	5/01
28	5/21	5/16	5/12	5/09	5/06	5/04	4/30	4/27	4/22
24	5/13	5/07	5/02	4/29	4/25	4/22	4/18	4/14	4/08
20	4/30	4/25	4/21	4/18	4/15	4/11	4/08	4/04	3/30
16	4/20	4/15	4/11	4/08	4/05	4/02	3/30	3/26	3/21

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	8/13	8/20	8/25	8/29	9/02	9/06	9/10	9/15	9/22
32	9/06	9/09	9/12	9/14	9/16	9/19	9/21	9/23	9/27
28	9/11	9/16	9/20	9/24	9/27	9/30	10/04	10/08	10/13
24	9/19	9/25	9/30	10/03	10/07	10/10	10/14	10/18	10/25
20	10/04	10/09	10/13	10/16	10/19	10/22	10/26	10/29	11/04
16	10/13	10/19	10/24	10/27	10/31	11/03	11/07	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	126	114	105	98	91	83	76	67	55
32	142	135	130	126	122	118	113	108	101
28	167	159	153	148	143	138	133	127	118
24	194	184	176	170	164	158	151	144	134
20	209	202	196	191	187	183	178	172	165
16	234	225	219	213	208	203	197	191	182

***** 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	1829	1438	1183	661	290	106	44	72	234	599	1124	1632	9212
60	1674	1298	1028	518	185	44	13	26	126	446	974	1477	7809
57	1581	1214	935	437	133	22	6	13	77	359	884	1384	7045
55	1519	1158	874	386	104	14	1	8	52	304	824	1322	6566
50	1364	1018	729	269	50	3	0	0	14	186	677	1167	5477
32	824	561	283	34	0	0	0	0	0	10	240	642	2594

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	18	47	124	365	769	979	1153	1111	777	434	106	33	5916
55	0	0	1	26	160	303	441	406	139	16	0	0	1492
57	0	0	0	18	127	251	384	349	104	8	0	0	1241
60	0	0	0	9	86	183	298	269	63	3	0	0	911
65	0	0	0	2	37	95	174	160	21	0	0	0	489
70	0	0	0	0	13	36	87	81	5	0	0	0	222

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	18	161	511	723	879	839	519	212	19	0	0	0	18	179	690	1413	2292	3131	3650	3862	3881	3881
45	0	0	4	90	365	573	724	684	375	115	7	0	0	0	4	94	459	1032	1756	2440	2815	2930	2937	2937
50	0	0	0	44	238	424	569	529	244	53	1	0	0	0	0	44	282	706	1275	1804	2048	2101	2102	2102
55	0	0	0	17	134	282	415	378	143	17	0	0	0	0	0	17	151	433	848	1226	1369	1386	1386	1386
60	0	0	0	4	66	159	269	240	70	4	0	0	0	0	0	4	70	229	498	738	808	812	812	812
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	11	125	334	457	571	542	324	136	13	0	0	0	11	136	470	927	1498	2040	2364	2500	2513	2513

(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