

Climatology of the United States

No. 20

1971-2000

Station: WARROAD, MN

COOP ID: 218679

Climate Division: MN 1

NWS Call Sign:

Elevation: 1,069 Feet Lat: 48°55N

Lon: 95°19W

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	12.1	-10.2	1.0	45	1981	24	13.6	1990	-47	1949	20	-12.1	1982	1988	0	.0	.0	.0	28.8	31.0	21.7
Feb	20.5	-3.8	8.4	56	1958	25	25.3	1998	-48	1966	19	-3.3	1989	1588	0	.0	.0	.1	21.8	28.0	15.7
Mar	32.6	9.9	21.3	73	1963	31	33.2	2000	-33	1962	1	12.5	1996	1358	0	.0	.0	1.9	13.3	29.7	7.5
Apr	49.4	25.3	37.4	93	1980	21	46.9	1987	-14	1954	2	29.4	1996	830	0	.0	.1	14.8	1.9	21.8	.4
May	64.8	40.9	52.9	94+	1964	22	62.7	1977	14+	1967	2	44.7	1979	397	21	.0	.3	28.3	.1	5.6	.0
Jun	74.1	51.6	62.9	98	1995	18	70.0	1988	20	1952	6	56.3	1982	130	65	.0	.9	30.0	.0	.1	.0
Jul	79.0	55.6	67.3	100	1988	6	73.6	1989	37	1983	5	60.3	1992	57	128	@	1.6	31.0	.0	.0	.0
Aug	77.6	53.3	65.5	101	1989	2	70.9	1983	30	1964	22	59.1	1977	89	103	@	1.2	31.0	.0	@	.0
Sep	66.3	42.1	54.2	94	1978	5	58.8	1998	18	1965	26	49.2	1993	328	5	.0	.2	28.5	.0	2.8	.0
Oct	52.9	31.2	42.1	86	1961	6	48.2	1973	2+	1988	30	37.8	1991	711	0	.0	.0	18.7	.7	15.9	.0
Nov	32.6	15.6	24.1	73	1975	5	34.2	1999	-30	1958	29	14.4	1985	1227	0	.0	.0	2.9	14.8	28.1	3.5
Dec	17.6	-1.6	8.0	50+	1982	3	22.0	1997	-40	1967	31	-3.0	2000	1769	0	.0	.0	@	26.5	30.9	16.2
Ann	48.3	25.8	37.1	101	Aug 1989	2	73.6	Jul 1989	-48	Feb 1966	19	-12.1	Jan 1982	10472	322	.0	4.3	187.2	107.9	193.9	65.0

+ 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: 1948-2001

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

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: WARROAD, MN

COOP ID: 218679

Climate Division: MN 1

NWS Call Sign:

Elevation: 1,069 Feet Lat: 48°55N

Lon: 95°19W

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	.63	.55	.66	1975	11	1.97	1989	.16	1985	6.7	2.3	.1	.0	.17	.23	.32	.40	.48	.56	.65	.76	.90	1.12	1.32
Feb	.55	.46	.94	1983	27	1.51	1987	.00+	1996	4.4	1.9	.2	.0	.00	.00	.15	.25	.34	.44	.55	.69	.87	1.17	1.46
Mar	.69	.52	1.03	1989	13	2.75	1983	.07	1984	5.0	2.2	.2	@	.07	.12	.21	.31	.41	.53	.67	.84	1.08	1.47	1.86
Apr	1.21	1.01	2.49	1974	21	3.79	1974	.00	1988	5.1	2.8	.7	.2	.11	.25	.45	.63	.81	1.00	1.22	1.49	1.85	2.42	2.98
May	2.40	1.95	2.05	1956	11	5.55	1999	.41	1980	9.4	5.6	1.4	.4	.68	.90	1.25	1.55	1.84	2.15	2.48	2.88	3.40	4.21	4.97
Jun	3.78	3.33	3.51	1991	13	8.25	1991	.76	1974	11.2	7.3	2.3	.7	1.16	1.52	2.05	2.51	2.96	3.42	3.93	4.52	5.29	6.50	7.61
Jul	3.64	3.64	2.60	1948	30	7.19	1982	.69	1972	10.8	6.7	2.1	1.0	1.28	1.62	2.12	2.54	2.94	3.35	3.80	4.33	5.00	6.03	6.98
Aug	2.95	2.86	2.45	1985	4	7.59	2000	.45	1990	9.6	5.3	1.7	.6	.63	.90	1.34	1.73	2.12	2.54	3.02	3.59	4.33	5.53	6.66
Sep	2.62	2.23	3.04	1955	18	8.23	1991	.23	1979	9.7	5.8	1.4	.4	.42	.65	1.03	1.39	1.76	2.16	2.63	3.19	3.95	5.17	6.35
Oct	1.80	1.44	1.92	1996	18	5.84	1998	.11	1992	7.9	4.2	1.1	.4	.21	.35	.60	.85	1.12	1.42	1.77	2.20	2.79	3.76	4.71
Nov	1.19	1.08	1.27	1986	8	3.96	2000	.03	1976	6.2	3.3	.7	.1	.12	.21	.38	.54	.72	.92	1.16	1.45	1.85	2.51	3.16
Dec	.63	.56	.65	1960	5	1.88	1996	.18	1980	5.6	2.5	@	.0	.17	.23	.33	.40	.48	.56	.65	.76	.90	1.12	1.32
Ann	22.09	22.16	3.51	Jun 1991	13	8.25	Jun 1991	.00+	Feb 1996	91.6	49.9	11.9	3.8	14.89	16.25	18.01	19.36	20.56	21.73	22.94	24.29	25.93	28.32	30.40

+ 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

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Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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Station: WARROAD, MN

COOP ID: 218679

Climate Division: MN 1

NWS Call Sign:

Elevation: 1,069 Feet

Lat: 48°55N

Lon: 95°19W

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	6.7	6.7	13	11	7.0	1989	7	16.1	1975	31	1996	19	24+	1997	3.9	2.5	.8	.3	.0	-9.9	-9.9	-9.9	-9.9
Feb	6.8	5.0	13	14	5.0	1977	24	16.3	1987	31	1979	22	25	1997	2.5	2.0	.6	.1	.0	-9.9	-9.9	-9.9	-9.9
Mar	5.6	4.0	9	8	10.0	1988	8	16.0	1988	31	1979	2	24	1997	1.9	1.5	.8	.3	.1	-9.9	-9.9	-9.9	-9.9
Apr	1.9	.2	2	#	6.0	1996	3	11.1	1975	25	1996	4	17	1989	.9	.6	.3	.1	.0	.2	.0	.0	.0
May	.0	.0	0	0	.2	1976	2	.2	1976	0	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	#	1974	30	#	1974	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.6	.0	#	0	6.0	1979	31	6.0	1979	3	1988	28	#+	1997	.2	.2	.1	@	.0	@	.0	.0	.0
Nov	2.4	-99.9	2	1	12.0	1977	20	12.0	1977	24	1977	21	6	1995	2.5	2.2	1.3	.4	.1	-9.9	-9.9	-9.9	-9.9
Dec	5.8	6.0	7	6	7.0	1972	31	9.0	1978	29	1995	18	22	1995	3.5	2.9	.9	.3	.0	-9.9	-9.9	-9.9	-9.9
Ann	29.8	-9.9	N/A	N/A	12.0	Nov 1977	20	16.3	Feb 1987	31+	Jan 1996	19	25	Feb 1997	15.4	11.9	4.8	1.5	.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

Complete documentation available from:

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Climate Division: MN 1

NWS Call Sign:

Elevation: 1,069 Feet

Lat: 48° 55N

Lon: 95° 19W

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	6/15	6/09	6/05	6/01	5/29	5/25	5/21	5/17	5/11
32	5/31	5/26	5/22	5/19	5/16	5/13	5/10	5/07	5/02
28	5/18	5/14	5/12	5/09	5/07	5/05	5/02	4/29	4/25
24	5/11	5/06	5/03	4/30	4/27	4/24	4/22	4/18	4/14
20	4/26	4/22	4/19	4/17	4/14	4/12	4/10	4/07	4/03
16	4/20	4/16	4/13	4/10	4/08	4/05	4/03	3/30	3/26
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	8/25	8/31	9/04	9/07	9/10	9/13	9/17	9/21	9/26
32	9/12	9/16	9/19	9/21	9/23	9/25	9/27	9/30	10/03
28	9/18	9/22	9/26	9/28	10/01	10/04	10/06	10/10	10/14
24	9/26	10/02	10/06	10/10	10/13	10/16	10/20	10/24	10/29
20	10/11	10/17	10/21	10/24	10/27	10/30	11/03	11/06	11/12
16	10/20	10/25	10/28	10/31	11/03	11/06	11/09	11/12	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	131	122	115	109	104	99	93	86	77
32	151	143	138	133	129	125	120	115	107
28	164	158	154	150	146	143	139	135	129
24	189	182	177	172	168	164	159	154	147
20	216	209	204	199	195	191	186	181	174
16	227	221	216	212	209	205	201	196	190

* 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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Climate Division: MN 1 NWS Call Sign: Elevation: 1,069 Feet Lat: 48°55N Lon: 95°19W

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	1988	1588	1358	830	397	130	57	89	328	711	1227	1769	10472
60	1833	1448	1203	681	274	58	15	32	197	556	1077	1614	8988
57	1740	1364	1110	594	211	31	6	14	132	464	987	1521	8174
55	1678	1308	1048	537	174	19	1	8	96	404	927	1459	7659
50	1523	1168	893	402	100	5	0	1	34	266	778	1304	6474
32	969	687	393	76	3	0	0	0	0	19	311	770	3228

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	5	23	58	237	650	925	1094	1038	667	331	74	24	5126
55	0	0	0	8	109	254	382	332	73	3	0	0	1161
57	0	0	0	5	83	206	325	277	49	1	0	0	946
60	0	0	0	2	53	143	241	201	25	0	0	0	665
65	0	0	0	0	21	65	128	103	5	0	0	0	322
70	0	0	0	0	7	20	52	40	1	0	0	0	120

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	4	102	436	689	855	796	454	160	11	0	0	0	4	106	542	1231	2086	2882	3336	3496	3507	3507
45	0	0	0	55	303	539	700	641	315	80	5	0	0	0	0	55	358	897	1597	2238	2553	2633	2638	2638
50	0	0	0	21	191	394	545	486	191	34	0	0	0	0	0	21	212	606	1151	1637	1828	1862	1862	1862
55	0	0	0	9	107	255	392	333	101	10	0	0	0	0	0	9	116	371	763	1096	1197	1207	1207	1207
60	0	0	0	1	48	143	241	196	43	1	0	0	0	0	0	1	49	192	433	629	672	673	673	673
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	1	85	268	423	546	498	265	92	9	0	0	0	1	86	354	777	1323	1821	2086	2178	2187	2187

(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