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: MATHER 3 NW, WI **COOP ID: 475164**

Climate Division: WI 4 **NWS Call Sign:** **Elevation: 970 Feet** **Lat: 44˚11N** **Lon: 90˚22W**

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	22.9	2.8	12.9	58	1981	26	25.7	1990	-43	1951	30	.9	1977	1616	0	.0	.0	.2	24.1	30.9	14.1
Feb	29.5	8.4	19.0	60	2000	24	31.2	1998	-37+	1996	3	8.1	1979	1290	0	.0	.0	1.0	16.4	27.6	9.4
Mar	40.6	20.2	30.4	84	1986	30	39.5	1973	-37	1962	1	23.4	1996	1073	0	.0	.0	6.4	7.4	27.2	2.8
Apr	55.4	32.5	44.0	92	1952	30	51.3	1977	3	1954	3	38.2	1975	633	0	.0	@	19.7	.7	16.2	.0
May	68.9	43.4	56.2	93	1967	27	66.0	1977	22	1989	7	49.7	1983	306	31	.0	.3	30.0	.0	3.3	.0
Jun	77.3	52.5	64.9	100	1988	22	69.7	1971	31+	1972	10	58.0	1982	85	81	@	2.0	30.0	.0	.1	.0
Jul	81.3	57.1	69.2	103	1995	14	73.2	1983	39+	1983	6	63.7	1992	25	155	@	3.5	31.0	.0	.0	.0
Aug	78.9	54.9	66.9	107	1948	24	72.8	1995	30+	1979	15	62.8	1992	54	112	.1	1.9	31.0	.0	@	.0
Sep	70.2	45.8	58.0	96	1978	9	62.5	1998	18	1949	29	52.2	1993	224	14	.0	.4	29.7	.0	1.9	.0
Oct	58.2	35.1	46.7	91+	1976	2	54.6	1971	8	1988	30	41.2	1987	569	0	.0	@	24.1	.0	12.9	.0
Nov	41.5	23.4	32.5	78	1950	1	40.0	1999	-12	1977	27	25.0	1995	977	0	.0	.0	7.7	6.8	24.8	.9
Dec	27.8	9.6	18.7	62+	2001	6	26.5+	1998	-29	1983	19	7.1	1985	1435	0	.0	.0	.8	19.8	30.4	8.3
Ann	54.4	32.1	43.3	107	Aug 1948	24	73.2	Jul 1983	-43	Jan 1951	30	.9	Jan 1977	8287	393	.1	8.1	211.6	75.2	175.3	35.5

\+ 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	1.11	1.03	1.15	1988	20	2.84	1980	.00	1981
Feb	.84	.67	1.09	1959	23	2.54	1971	.02	1987
Mar	2.03	1.83	1.51	1966	23	4.20	1977	.21	1978
Apr	3.18	3.11	2.47	1994	25	5.92	1973	.58	1997
May	3.48	3.49	3.05	1989	30	7.74	1973	1.00	1986
Jun	4.25	3.83	4.70	1986	27	10.63	1998	.75	1983
Jul	4.65	3.95	4.22	1999	9	15.84	1999	1.60	1985
Aug	4.62	3.55	5.55	1975	23	13.79	1980	1.17	1976
Sep	3.83	2.67	3.35	1992	16	10.99	1986	.36	1979
Oct	2.33	2.35	2.52	1995	6	5.18	1995	.48	2000
Nov	2.38	2.13	2.05	1984	1	4.56+	1991	.10	1976
Dec	1.31	1.11	1.61	1975	14	3.13	1984	.27	1980
Ann	34.01	34.54	5.55	Aug 1975	23	15.84	Jul 1999	.00	Jan 1981

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.3	3.9	.4	.1
Feb	5.6	2.7	.4	.0
Mar	7.7	5.2	1.4	.2
Apr	10.8	6.9	1.9	.5
May	10.3	6.9	2.4	.8
Jun	10.6	7.8	2.7	1.2
Jul	10.2	7.4	3.0	1.3
Aug	11.1	7.8	3.0	1.1
Sep	9.8	6.9	2.3	1.0
Oct	8.5	5.3	1.5	.4
Nov	8.6	5.5	1.6	.4
Dec	7.4	3.8	.5	.1
Ann	107.9	70.1	21.1	7.1

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	.25	.41	.59	.74	.88	1.02	1.17	1.35	1.58	1.93	2.26
Feb	.11	.17	.29	.41	.53	.67	.83	1.03	1.29	1.73	2.16
Mar	.45	.64	.94	1.20	1.47	1.76	2.08	2.47	2.97	3.78	4.54
Apr	1.03	1.33	1.77	2.15	2.52	2.90	3.32	3.80	4.43	5.40	6.31
May	1.31	1.63	2.10	2.48	2.85	3.23	3.64	4.11	4.72	5.64	6.49
Jun	1.05	1.44	2.06	2.61	3.16	3.73	4.37	5.14	6.14	7.72	9.20
Jul	1.64	2.08	2.72	3.25	3.76	4.28	4.85	5.52	6.37	7.68	8.89
Aug	1.24	1.68	2.35	2.93	3.51	4.11	4.78	5.57	6.60	8.21	9.72
Sep	.63	.96	1.52	2.04	2.59	3.18	3.85	4.67	5.77	7.56	9.26
Oct	.69	.91	1.24	1.52	1.80	2.09	2.41	2.79	3.28	4.04	4.75
Nov	.43	.64	.99	1.31	1.64	2.00	2.41	2.91	3.56	4.62	5.64
Dec	.23	.35	.54	.72	.90	1.10	1.32	1.59	1.95	2.53	3.08
Ann	25.95	27.55	29.58	31.10	32.44	33.73	35.05	36.50	38.25	40.76	42.92

\+ 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	11.9	11.5	8	8	16.5	1971	4	27.5	1971	26	1971	4	22	1982	5.7	4.2	1.6	.6	.2	-9.9	-9.9	-9.9	-9.9
Feb	8.0	7.7	9	6	9.2	1971	5	22.0	1971	32	1971	5	28	1971	3.7	2.7	1.0	.3	.0	-9.9	-9.9	-9.9	-9.9
Mar	7.8	6.4	4	1	16.0	1997	14	22.5	1989	24	1971	4	17	1971	3.3	2.7	1.2	.6	.1	9.2	7.6	5.8	3.2
Apr	2.2	.7	#	0	6.0	1973	9	10.0	1973	9	1973	10	1	1993	1.1	.6	.3	@	.0	1.4	.6	.3	.0
May	.0	.0	0	0	1.0	1997	1	1.0	1997	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	.4	.0	#	0	3.0	1990	11	3.5	1990	1	1976	19	#	1976	.3	.2	.1	.0	.0	@	.0	.0	.0
Nov	4.4	3.6	1	#	18.0	1991	24	18.0	1991	20	1991	27	5	1991	2.4	2.0	.7	.2	@	2.7	1.8	.7	.0
Dec	8.6	6.8	4	2	9.0	1990	18	20.4	1972	24+	2000	29	17	1985	4.8	3.5	1.5	.3	.0	-9.9	-9.9	-9.9	-9.9
Ann	43.3	36.7	N/A	N/A	18.0	Nov 1991	24	27.5	Jan 1971	32	Feb 1971	5	28	Feb 1971	21.3	15.9	6.4	2.0	.3	-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	6/14	6/09	6/05	6/01	5/29	5/26	5/23	5/19	5/13
32	5/29	5/23	5/20	5/16	5/13	5/10	5/07	5/03	4/28
28	5/10	5/05	5/02	4/29	4/26	4/24	4/21	4/17	4/13
24	4/28	4/23	4/20	4/17	4/14	4/12	4/09	4/05	4/01
20	4/17	4/13	4/11	4/09	4/07	4/05	4/03	3/31	3/28
16	4/11	4/07	4/03	3/31	3/28	3/26	3/23	3/19	3/14

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	9/01	9/06	9/09	9/12	9/15	9/18	9/21	9/24	9/29
32	9/09	9/15	9/19	9/22	9/26	9/29	10/02	10/06	10/12
28	9/24	9/29	10/02	10/05	10/08	10/10	10/13	10/17	10/21
24	10/06	10/12	10/16	10/19	10/22	10/25	10/29	11/02	11/07
20	10/19	10/23	10/26	10/29	11/01	11/03	11/06	11/09	11/14
16	10/26	11/01	11/05	11/08	11/11	11/14	11/18	11/22	11/27

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	129	122	117	112	108	104	100	94	87
32	157	149	144	139	134	130	125	120	112
28	184	177	172	168	164	160	155	150	143
24	212	205	199	195	190	186	181	176	168
20	224	218	214	210	207	204	200	196	191
16	251	243	237	232	227	222	217	211	203

***** 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	1616	1290	1073	633	306	85	25	54	224	569	977	1435	8287
60	1461	1150	918	486	196	30	5	13	114	420	827	1280	6900
57	1368	1066	825	401	142	13	0	4	68	336	737	1187	6147
55	1306	1010	763	347	112	7	0	1	45	283	677	1125	5676
50	1151	870	612	226	54	1	0	0	12	171	532	970	4599
32	617	404	177	12	0	0	0	0	0	7	133	460	1810

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	24	38	127	370	748	986	1153	1081	780	460	146	48	5961
55	0	0	0	15	147	303	440	369	135	24	0	0	1433
57	0	0	0	9	115	249	378	310	98	14	0	0	1173
60	0	0	0	4	76	176	289	226	54	6	0	0	831
65	0	0	0	0	31	81	155	112	14	0	0	0	393
70	0	0	0	0	10	24	64	40	2	0	0	0	140

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	41	194	509	754	915	841	549	247	45	3	0	0	41	235	744	1498	2413	3254	3803	4050	4095	4098
45	0	0	16	110	365	604	760	686	404	146	20	0	0	0	16	126	491	1095	1855	2541	2945	3091	3111	3111
50	0	0	7	53	239	455	605	531	267	74	5	0	0	0	7	60	299	754	1359	1890	2157	2231	2236	2236
55	0	0	3	27	136	315	450	378	156	28	0	0	0	0	3	30	166	481	931	1309	1465	1493	1493	1493
60	0	0	0	9	69	186	298	234	81	7	0	0	0	0	0	9	78	264	562	796	877	884	884	884
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	27	134	321	479	595	543	341	157	29	0	0	0	27	161	482	961	1556	2099	2440	2597	2626	2626

(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