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: MERRILL, WI **COOP ID: 475364**

Climate Division: WI 2 **NWS Call Sign:** **Elevation: 1,253 Feet** **Lat: 45˚10N** **Lon: 89˚40W**

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	21.0	-.3	10.4	57	1942	23	21.0	1990	-48	1909	12	-2.3	1977	1695	0	.0	.0	.1	25.7	30.9	15.7
Feb	27.3	4.0	15.7	60	1930	20	30.1	1998	-42	1907	5	5.6	1979	1382	0	.0	.0	.5	18.1	27.9	11.6
Mar	38.2	16.4	27.3	86	1910	27	36.7	2000	-35	1962	1	19.8	1996	1170	0	.0	.0	4.9	8.5	28.2	4.6
Apr	53.2	29.4	41.3	92	1952	28	47.0	1986	-5	1924	1	35.6	1995	710	0	.0	.0	18.2	.8	18.9	@
May	67.2	41.1	54.2	104	1934	30	61.0	1977	15	1950	6	47.6	1997	362	24	.0	.0	29.4	.0	6.3	.0
Jun	75.4	50.8	63.1	104	1934	23	68.6	1995	28+	1972	10	56.1	1982	125	67	.0	.8	29.9	.0	.5	.0
Jul	79.6	55.6	67.6	110+	1936	14	71.6	1983	33	1972	4	61.8	1992	44	124	@	2.0	31.0	.0	.0	.0
Aug	77.3	53.2	65.3	101	1936	15	70.6	1995	30	1915	30	60.3	1977	85	93	.0	1.0	31.0	.0	.2	.0
Sep	67.9	43.9	55.9	97+	1933	8	61.6	1998	18	1974	22	48.4	1974	284	10	.0	.1	29.4	.0	3.5	.0
Oct	55.8	33.6	44.7	89+	1963	6	53.7	1971	4	1925	30	38.8	1987	629	0	.0	.0	22.1	.1	15.6	.0
Nov	38.9	21.9	30.4	75	1909	1	37.8	1999	-15+	1976	29	21.9	1995	1038	0	.0	.0	5.4	8.3	26.3	1.3
Dec	25.5	7.4	16.5	62	1909	1	24.9	1997	-31	1983	19	5.1	1985	1506	0	.0	.0	.3	22.6	30.6	9.8
Ann	52.3	29.8	41.0	110+	Jul 1936	14	71.6	Jul 1983	-48	Jan 1909	12	-2.3	Jan 1977	9030	318	@	3.9	202.2	84.1	188.9	43.0

\+ 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/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1905-2001

(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	1.14	.92	1.66	1939	5	3.15	1996	.05	1981
Feb	.90	.93	2.05	1965	12	2.43	1971	.05	1987
Mar	1.81	1.76	1.63	1920	29	4.35	1976	.23	1978
Apr	2.64	2.56	2.21	1984	30	4.46	1991	.58	1997
May	3.27	3.17	2.45	1936	6	6.24	1973	1.10	1986
Jun	3.82	3.37	4.35	1946	24	8.17	1993	1.07	1976
Jul	3.85	3.54	5.90	1912	23	9.41	1978	.62	1998
Aug	4.35	3.77	3.74	1962	24	12.47	1995	1.34	1998
Sep	4.29	4.27	3.95	1993	14	8.69	1986	.56	1979
Oct	2.59	2.26	3.00	1911	6	5.11	1979	.31	1976
Nov	2.35	2.12	1.96	1949	13	6.41	1991	.17	1976
Dec	1.40	1.31	1.24	1972	30	3.45	1972	.37	1994
Ann	32.41	32.23	5.90	Jul 1912	23	12.47	Aug 1995	.05+	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.3	3.6	.3	.1
Feb	6.8	2.8	.4	.0
Mar	8.3	4.4	1.3	.3
Apr	10.6	6.2	1.8	.4
May	11.1	6.7	2.2	.6
Jun	11.8	7.4	2.3	.9
Jul	11.8	7.6	2.7	.8
Aug	11.6	7.8	3.0	1.0
Sep	12.7	7.7	2.8	1.0
Oct	11.1	6.0	1.4	.5
Nov	9.6	5.2	1.6	.4
Dec	10.2	4.1	.6	.1
Ann	124.9	69.5	20.4	6.1

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	.18	.28	.44	.60	.76	.94	1.14	1.39	1.72	2.26	2.78
Feb	.11	.19	.31	.44	.57	.72	.89	1.10	1.39	1.86	2.32
Mar	.31	.47	.74	.99	1.24	1.52	1.83	2.21	2.72	3.54	4.33
Apr	.94	1.19	1.55	1.85	2.14	2.43	2.76	3.13	3.61	4.35	5.03
May	1.24	1.54	1.98	2.35	2.69	3.04	3.43	3.87	4.43	5.30	6.09
Jun	1.06	1.42	1.97	2.45	2.92	3.41	3.95	4.60	5.44	6.75	7.98
Jul	1.19	1.56	2.10	2.57	3.02	3.49	4.00	4.61	5.39	6.60	7.73
Aug	1.67	2.07	2.65	3.13	3.58	4.05	4.55	5.14	5.88	7.02	8.06
Sep	1.22	1.63	2.24	2.78	3.30	3.85	4.45	5.17	6.09	7.54	8.89
Oct	.79	1.04	1.41	1.72	2.03	2.34	2.69	3.10	3.63	4.46	5.22
Nov	.47	.69	1.03	1.35	1.67	2.01	2.40	2.86	3.48	4.47	5.41
Dec	.38	.51	.71	.89	1.06	1.24	1.44	1.68	1.99	2.48	2.94
Ann	23.34	25.11	27.37	29.08	30.59	32.06	33.57	35.23	37.26	40.18	42.71

\+ 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: 1905-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	16.0	15.5	10	11
Feb	6.8	5.0	11	10
Mar	9.8	9.3	6	4
Apr	2.9	1.6	#	#
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.6	.0	#	0
Nov	5.4	5.0	1	1
Dec	9.9	9.7	5	5
Ann	51.4	46.1	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	10.0	1996	27	27.9	1999	25	1996	29	16+	1997
Feb	8.5	1983	3	15.9	1991	30	1971	17	25	1971
Mar	10.0	1989	4	25.4	1989	30	1982	17	17	1972
Apr	7.5	1996	30	14.7	1996	15	1972	2	4	1972
May	.1	1997	1	.1	1997	1	1984	1	#+	1996
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	#	1995	23	#+	1995	#	1995	23	#	1995
Oct	3.4	1979	23	4.5	1990	3	1995	21	#+	1999
Nov	8.5	1991	24	12.1	1995	14	1991	29	5	1991
Dec	8.0	1985	2	23.5	1985	22	1985	3	16	1985
Ann	10.0+	Jan 1996	27	27.9	Jan 1999	30+	Mar 1982	17	25	Feb 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.1	4.3	1.3	.4	@
Feb	5.3	2.5	.7	.1	.0
Mar	4.5	2.6	1.1	.3	@
Apr	1.3	.9	.4	.1	.0
May	@	.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	.3	.3	.1	.0	.0
Nov	4.2	2.2	.7	.2	.0
Dec	8.0	4.2	1.2	.2	.0
Ann	32.7	17.0	5.5	1.3	@

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	14.4	11.1	7.9	2.0
Apr	1.3	.7	.2	.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	.2	.1	.0	.0
Nov	5.3	2.2	.7	.0
Dec	25.5	21.1	13.3	2.7
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	6/26	6/19	6/14	6/10	6/05	6/01	5/28	5/23	5/15
32	6/12	6/06	6/02	5/29	5/26	5/22	5/19	5/14	5/08
28	5/24	5/19	5/15	5/12	5/09	5/06	5/03	4/30	4/24
24	5/09	5/03	4/29	4/26	4/23	4/20	4/16	4/13	4/07
20	4/24	4/20	4/17	4/15	4/13	4/11	4/08	4/06	4/02
16	4/19	4/14	4/11	4/09	4/06	4/04	4/01	3/29	3/25

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	8/18	8/24	8/29	9/02	9/06	9/09	9/13	9/18	9/24
32	9/02	9/08	9/12	9/15	9/19	9/22	9/26	9/30	10/06
28	9/17	9/21	9/25	9/27	9/30	10/02	10/05	10/08	10/13
24	9/27	10/02	10/06	10/10	10/13	10/16	10/19	10/23	10/29
20	10/07	10/13	10/18	10/22	10/26	10/30	11/03	11/08	11/14
16	10/23	10/28	11/01	11/04	11/07	11/10	11/13	11/16	11/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	121	111	104	97	91	85	79	72	61
32	140	132	126	120	115	110	105	99	91
28	161	154	150	146	143	139	135	131	125
24	195	187	182	177	172	167	163	157	149
20	221	212	206	200	195	190	185	178	170
16	235	227	222	218	213	209	205	199	192

***** 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	1695	1382	1170	710	362	125	44	85	284	629	1038	1506	9030
60	1540	1242	1015	562	242	55	10	28	164	478	888	1351	7575
57	1447	1158	922	475	183	29	2	12	108	392	798	1258	6784
55	1385	1102	860	418	148	18	0	6	79	338	738	1196	6288
50	1230	962	705	288	79	4	0	0	29	217	591	1041	5146
32	686	485	237	25	0	0	0	0	0	12	163	518	2126

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	27	90	305	686	933	1103	1031	717	407	114	36	5463
55	0	0	0	8	121	261	390	324	105	19	0	0	1228
57	0	0	0	5	94	212	330	268	75	11	0	0	995
60	0	0	0	2	60	148	244	191	41	5	0	0	691
65	0	0	0	0	24	67	124	93	10	0	0	0	318
70	0	0	0	0	8	21	46	31	1	0	0	0	107

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	21	151	462	706	860	788	486	202	26	1	0	0	21	172	634	1340	2200	2988	3474	3676	3702	3703
45	0	0	8	83	321	557	705	633	345	111	8	0	0	0	8	91	412	969	1674	2307	2652	2763	2771	2771
50	0	0	1	38	200	409	550	479	220	50	1	0	0	0	1	39	239	648	1198	1677	1897	1947	1948	1948
55	0	0	0	15	107	272	395	328	122	20	0	0	0	0	0	15	122	394	789	1117	1239	1259	1259	1259
60	0	0	0	6	50	151	249	192	58	4	0	0	0	0	0	6	56	207	456	648	706	710	710	710
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	18	115	299	446	559	505	303	131	16	0	0	0	18	133	432	878	1437	1942	2245	2376	2392	2392

(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