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: WEST BEND, WI **COOP ID: 479050**

Climate Division: WI 9 **NWS Call Sign:** **Elevation: 940 Feet** **Lat: 43˚22N** **Lon: 88˚05W**

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	26.1	10.7	18.4	60	1944	26	28.7	1990	-30+	1982	17	5.8	1977	1444	0	.0	.0	.2	21.1	30.2	8.3
Feb	31.0	15.7	23.4	65	2000	26	33.2	1998	-28	1933	9	13.0	1979	1165	0	.0	.0	1.1	14.9	26.7	4.4
Mar	41.5	25.1	33.3	91	1946	21	40.2	1973	-18	1962	1	27.6	1975	982	0	.0	.0	6.7	6.0	25.6	.6
Apr	54.6	35.4	45.0	88+	1980	22	51.3	1985	2	1982	7	39.3	1975	601	0	.0	.0	19.5	.5	12.3	.0
May	67.8	45.2	56.5	100	1934	31	64.4	1977	20	1935	4	50.7	1997	293	30	.0	.2	30.1	.0	2.3	.0
Jun	77.2	54.4	65.8	103	1934	1	69.8	1971	30	1945	4	60.7	1982	69	93	@	1.8	30.0	.0	.0	.0
Jul	81.3	59.9	70.6	107	1936	14	75.7	1983	37+	2001	2	66.6	2000	14	188	.1	3.7	31.0	.0	.0	.0
Aug	78.8	58.4	68.6	105	1988	16	75.9	1995	37+	1965	28	64.0	1992	45	157	.1	1.9	31.0	.0	.0	.0
Sep	71.3	50.5	60.9	98+	1939	15	65.6	1998	25	1984	30	55.4	1993	155	31	.0	.5	29.9	.0	.8	.0
Oct	59.3	40.1	49.7	88	1963	6	58.4	1971	2	1925	30	43.8	1988	478	3	.0	.0	26.0	.0	6.9	.0
Nov	43.9	28.9	36.4	77	1933	1	43.0	1975	-10	1958	30	29.3	1995	858	0	.0	.0	9.0	4.0	20.6	.2
Dec	31.2	17.1	24.2	64+	1998	4	32.6	1982	-24	1983	24	13.0	2000	1267	0	.0	.0	1.2	15.1	29.0	3.9
Ann	55.3	36.8	46.1	107	Jul 1936	14	75.9	Aug 1995	-30+	Jan 1982	17	5.8	Jan 1977	7371	502	.2	8.1	215.7	61.6	154.4	17.4

\+ 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: 1924-2001

(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	1.49	1.39	2.35	1938	24	3.80	1979	.09	1981
Feb	1.12	1.07	1.52	1937	21	3.06	1971	.00	1987
Mar	1.99	1.77	2.55	1998	31	5.52	1976	.30	1978
Apr	3.11	3.19	2.42	1955	24	5.46	1993	.94	1989
May	2.99	2.78	3.10	1974	16	6.55	1973	.39	1988
Jun	3.82	3.59	3.78	1940	22	11.15	1996	1.19	1995
Jul	3.99	3.81	6.57	1964	18	9.37	1999	1.07	1971
Aug	4.09	3.33	7.58	1924	4	7.93	1995	1.29	1976
Sep	3.47	3.26	2.89	1961	13	10.19	1986	.24	1979
Oct	2.55	2.16	3.10	1954	3	5.76	1985	.36	1975
Nov	2.52	2.51	2.17	1928	17	6.77	1985	.20	1976
Dec	1.71	1.82	2.20	1942	27	3.86	1971	.06	1995
Ann	32.85	34.39	7.58	Aug 1924	4	11.15	Jun 1996	.00	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.1	4.6	.6	.1
Feb	6.5	3.3	.4	.1
Mar	8.6	5.6	1.1	.1
Apr	10.6	6.8	2.2	.6
May	9.8	6.2	1.9	.5
Jun	10.3	7.0	2.5	.9
Jul	10.3	6.8	2.8	.9
Aug	10.2	7.5	2.6	1.2
Sep	9.7	6.1	2.3	1.0
Oct	9.2	6.2	1.6	.4
Nov	9.8	5.9	1.7	.3
Dec	8.3	4.7	1.0	.2
Ann	112.4	70.7	20.7	6.3

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	.29	.42	.64	.84	1.04	1.26	1.51	1.81	2.21	2.85	3.46
Feb	.11	.23	.42	.58	.75	.93	1.14	1.39	1.72	2.25	2.77
Mar	.40	.59	.88	1.14	1.41	1.70	2.03	2.42	2.94	3.77	4.55
Apr	1.56	1.82	2.18	2.46	2.73	2.99	3.27	3.58	3.98	4.57	5.10
May	.81	1.09	1.52	1.90	2.27	2.66	3.09	3.60	4.27	5.31	6.29
Jun	1.19	1.56	2.10	2.56	3.01	3.47	3.98	4.58	5.35	6.55	7.66
Jul	1.35	1.73	2.28	2.74	3.19	3.66	4.16	4.75	5.51	6.68	7.76
Aug	1.77	2.14	2.65	3.07	3.46	3.86	4.29	4.78	5.39	6.33	7.18
Sep	.64	.95	1.46	1.93	2.41	2.93	3.52	4.23	5.17	6.69	8.14
Oct	.62	.86	1.23	1.56	1.89	2.24	2.62	3.09	3.69	4.65	5.56
Nov	.49	.71	1.08	1.42	1.77	2.14	2.56	3.07	3.74	4.82	5.85
Dec	.28	.43	.68	.92	1.16	1.42	1.72	2.08	2.57	3.35	4.11
Ann	25.30	26.80	28.71	30.14	31.39	32.60	33.84	35.20	36.83	39.18	41.20

\+ 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: 1924-2001
(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	13.3	11.3	6	5
Feb	9.6	10.0	6	4
Mar	7.9	9.0	2	1
Apr	3.5	3.0	#	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.2	.0	#	0
Nov	4.0	3.0	#	#
Dec	11.0	9.4	3	2
Ann	49.6	45.7	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	15.0	1979	13	39.5	1979	33	1979	26	24	1979
Feb	14.0	1976	21	18.5	1976	29	1979	12	26	1979
Mar	9.5	1971	19	25.0	1972	18	1979	1	7	1979
Apr	13.0	1973	9	14.0	1973	12	1973	9	2	1973
May	3.5	1990	10	3.5	1990	#	1973	14	#	1973
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	.0	0	0	.0	0	0	0	0	0	0
Oct	2.0	1992	20	2.0	1992	#+	1997	27	#+	1997
Nov	7.5	1995	27	14.2	1995	7	1995	30	3	1995
Dec	11.0	1971	30	26.6	1978	19	2000	31	11	2000
Ann	15.0	Jan 1979	13	39.5	Jan 1979	33	Jan 1979	26	26	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.8	5.6	1.9	.6	.1
Feb	3.8	3.8	1.1	.5	.1
Mar	2.6	2.6	.9	.5	.0
Apr	1.0	1.0	.4	.2	@
May	@	@	@	.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	.2	.1	.0	.0	.0
Nov	2.0	1.8	.5	.1	.0
Dec	5.0	4.5	1.4	.5	.1
Ann	20.4	19.4	6.2	2.4	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	23.6	16.4	13.2	5.3
Feb	21.4	15.9	11.7	3.8
Mar	10.7	7.2	4.7	1.0
Apr	1.4	.9	.4	.1
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	.0	.0	.0	.0
Nov	3.3	1.7	.7	.0
Dec	16.6	10.0	5.3	.8
Ann	77.0	52.1	36.0	11.0

+ 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	6/11	6/05	6/01	5/28	5/25	5/22	5/18	5/14	5/08
32	5/24	5/19	5/15	5/12	5/09	5/06	5/03	4/29	4/24
28	5/12	5/06	5/02	4/29	4/26	4/22	4/19	4/15	4/09
24	4/27	4/22	4/18	4/15	4/12	4/08	4/05	4/01	3/27
20	4/12	4/08	4/05	4/03	3/31	3/29	3/26	3/23	3/19
16	4/05	3/31	3/28	3/25	3/22	3/20	3/17	3/13	3/09

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	9/11	9/15	9/19	9/22	9/24	9/27	9/30	10/03	10/08
32	9/19	9/24	9/28	10/01	10/04	10/07	10/10	10/14	10/19
28	9/27	10/03	10/08	10/12	10/16	10/19	10/23	10/28	11/04
24	10/17	10/22	10/25	10/28	10/31	11/03	11/06	11/09	11/14
20	10/22	10/28	10/31	11/03	11/06	11/09	11/13	11/16	11/21
16	11/06	11/10	11/13	11/16	11/19	11/21	11/24	11/27	12/01

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	145	137	131	126	122	117	112	106	98
32	166	160	155	151	147	143	139	135	128
28	198	189	183	177	172	167	161	155	146
24	222	215	210	206	202	198	194	189	182
20	238	232	227	223	219	216	212	207	200
16	260	253	249	244	241	237	233	228	221

***** 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	1444	1165	982	601	293	69	14	45	155	478	858	1267	7371
60	1289	1025	827	455	183	22	0	12	66	335	708	1112	6034
57	1196	941	734	370	131	9	0	4	34	258	618	1019	5314
55	1134	885	672	316	101	5	0	1	20	212	559	957	4862
50	979	745	520	197	46	1	0	0	4	118	415	802	3827
32	463	297	107	5	0	0	0	0	0	2	64	323	1261

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	42	56	148	395	759	1014	1197	1135	867	550	196	79	6438
55	0	0	0	15	147	329	484	423	197	47	1	0	1643
57	0	0	0	9	115	273	422	365	151	31	0	0	1366
60	0	0	0	4	74	196	329	279	93	15	0	0	990
65	0	0	0	0	30	93	188	157	31	3	0	0	502
70	0	0	0	0	9	29	83	73	6	0	0	0	200

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	4	48	194	510	771	949	886	626	312	67	5	0	4	52	246	756	1527	2476	3362	3988	4300	4367	4372
45	0	0	21	109	363	621	794	731	476	192	30	1	0	0	21	130	493	1114	1908	2639	3115	3307	3337	3338
50	0	0	10	53	230	471	639	576	334	101	9	0	0	0	10	63	293	764	1403	1979	2313	2414	2423	2423
55	0	0	3	24	134	329	484	421	208	47	1	0	0	0	3	27	161	490	974	1395	1603	1650	1651	1651
60	0	0	0	11	66	201	330	272	114	17	0	0	0	0	0	11	77	278	608	880	994	1011	1011	1011
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	33	120	310	488	629	576	380	175	32	2	0	1	34	154	464	952	1581	2157	2537	2712	2744	2746

(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