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: MC HENRY 3 W, ND **COOP ID: 325730**

Climate Division: ND 5 **NWS Call Sign:** **Elevation: 1,555 Feet** **Lat: 47˚35N** **Lon: 98˚39W**

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	14.3	-4.8	4.8	53	1990	10	21.9	1990	-39	1951	29	-11.5	1982	1869	0	.0	.0	@	26.8	31.0	20.1
Feb	22.1	3.0	12.6	63	1958	25	26.0	1998	-41	1996	1	-3.8	1979	1470	0	.0	.0	.3	20.8	28.1	13.2
Mar	33.7	16.0	24.9	73	1963	31	34.7	2000	-32	1980	1	15.6	1996	1245	0	.0	.0	2.9	12.7	30.0	6.0
Apr	52.4	29.9	41.2	98	1980	22	49.4	1987	-13	1979	6	31.0	1979	718	2	.0	.1	17.3	2.4	19.4	.3
May	68.4	42.9	55.7	97	1980	23	64.5	1977	11	1967	3	47.5	1979	321	30	.0	.4	29.0	.0	4.8	.0
Jun	75.8	52.2	64.0	103	1961	27	73.6	1988	26	1964	1	57.8	1982	117	87	.0	1.7	29.9	.0	.0	.0
Jul	81.1	56.9	69.0	103+	1988	28	74.3	1989	38+	1983	5	63.2	1992	38	163	.2	3.7	31.0	.0	.0	.0
Aug	80.3	54.6	67.5	107	1983	8	74.0	1983	28	1982	27	60.9	1977	68	143	.2	3.6	31.0	.0	@	.0
Sep	68.7	44.2	56.5	104	1978	6	63.2	1998	17	1965	26	52.2	1972	276	20	.1	1.1	28.7	.0	3.3	.0
Oct	54.8	32.5	43.7	94	1963	4	47.6	1973	-5	1991	29	38.0	1976	662	0	.0	.1	20.4	1.0	17.8	.1
Nov	33.2	16.6	24.9	76	1999	8	36.8	1999	-29	1985	29	13.1	1996	1204	0	.0	.0	3.9	14.5	29.0	3.8
Dec	19.1	1.8	10.5	60	1969	1	23.5	1997	-39	1983	23	-3.9	1983	1693	0	.0	.0	@	25.3	31.0	15.0
Ann	50.3	28.8	39.6	107	Aug 1983	8	74.3	Jul 1989	-41	Feb 1996	1	-11.5	Jan 1982	9681	445	.5	10.7	194.4	103.5	194.4	58.5

\+ 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	.60	.50	.66	1983	6	1.52	1996	.05	1991
Feb	.48	.41	1.16	2000	26	1.50	2000	.09	1997
Mar	.87	.85	1.12	1966	4	2.08	1990	.04	1986
Apr	1.32	1.02	2.36	1997	6	4.62	1986	.00	1980
May	2.28	1.82	3.12	1985	12	5.77	1985	.41	1976
Jun	3.63	3.38	3.06	2000	14	8.13	1990	.89	1986
Jul	3.09	2.65	3.41	1995	14	9.23	1993	.74	1985
Aug	2.76	2.41	2.95	1989	18	6.52	1983	.77	1984
Sep	1.99	1.79	3.08	1957	2	5.46	1973	.27	1976
Oct	1.47	1.17	2.21	1949	10	4.44	1982	.00+	1999
Nov	1.03	.63	1.67	1986	8	2.64	2000	.00+	1999
Dec	.57	.41	.83	1960	5	1.53	1996	.04	1989
Ann	20.09	19.99	3.41	Jul 1995	14	9.23	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.8	1.9	.1	.0
Feb	6.6	1.6	@	@
Mar	7.3	2.8	.4	.0
Apr	7.1	3.6	.6	.1
May	9.6	5.2	1.3	.3
Jun	11.3	7.1	2.4	.8
Jul	10.0	5.8	2.1	.9
Aug	9.7	6.0	1.7	.4
Sep	8.1	4.3	1.2	.4
Oct	6.3	3.3	1.0	.3
Nov	6.6	3.1	.4	.1
Dec	7.4	1.5	.1	.0
Ann	97.8	46.2	11.3	3.3

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	.11	.16	.25	.33	.41	.50	.61	.73	.90	1.17	1.42
Feb	.07	.11	.18	.24	.31	.39	.48	.58	.73	.97	1.20
Mar	.13	.20	.33	.45	.57	.71	.87	1.06	1.32	1.75	2.16
Apr	.05	.16	.36	.55	.76	.99	1.27	1.62	2.10	2.90	3.69
May	.59	.80	1.13	1.42	1.71	2.02	2.35	2.75	3.28	4.10	4.87
Jun	1.09	1.44	1.95	2.40	2.83	3.28	3.77	4.35	5.10	6.28	7.37
Jul	.69	.98	1.43	1.84	2.25	2.68	3.17	3.75	4.51	5.73	6.88
Aug	.90	1.16	1.55	1.88	2.19	2.52	2.87	3.29	3.83	4.66	5.43
Sep	.37	.54	.84	1.11	1.38	1.68	2.01	2.42	2.96	3.83	4.66
Oct	.00	.06	.24	.45	.69	.98	1.33	1.78	2.42	3.52	4.62
Nov	.00	.10	.28	.44	.61	.80	1.02	1.29	1.65	2.25	2.84
Dec	.09	.14	.23	.30	.38	.47	.57	.69	.85	1.12	1.37
Ann	13.50	14.75	16.36	17.59	18.70	19.77	20.88	22.11	23.62	25.81	27.72

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	9.5	8.4	9	8
Feb	6.6	6.1	9	8
Mar	7.7	8.2	6	5
Apr	4.0	1.5	1	#
May	.3	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	2.2	.5	#	#
Nov	9.3	8.5	3	3
Dec	7.5	7.4	6	4
Ann	47.3	40.6	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	12.0	1996	18	24.3	1996	30	1997	24	25	1997
Feb	7.0	1999	23	17.0	1979	28	1994	12	25	1997
Mar	10.0	1975	28	20.6	1995	31	1979	3	21	1979
Apr	10.0	1997	6	12.5	1986	21	1979	13	16	1979
May	5.0	1991	4	6.0	1979	4	1991	4	#+	1991
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	2.5	1972	26	2.5	1972	1	1984	24	#+	1984
Oct	14.0	1985	8	14.0	1985	10	1985	8	1	1991
Nov	14.0	1986	8	22.5	1998	18+	1998	20	11	1986
Dec	8.0	1983	13	21.4	1996	23	1996	29	16	1996
Ann	14.0+	Nov 1986	8	24.3	Jan 1996	31	Mar 1979	3	25+	Feb 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.3	3.5	.8	.3	@
Feb	6.0	2.6	.5	.2	.0
Mar	5.0	2.8	.9	.4	@
Apr	1.8	1.0	.4	.3	@
May	.2	.1	.1	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.0	.0	.0
Oct	.9	.7	.2	.1	@
Nov	5.6	3.5	1.0	.6	@
Dec	6.8	3.0	.6	.2	.0
Ann	33.7	17.3	4.5	2.1	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.8	25.4	20.0	9.8
Feb	24.5	19.9	16.5	7.9
Mar	17.8	15.1	10.9	2.4
Apr	2.7	1.4	.9	.3
May	.1	@	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	1.1	.4	.2	@
Nov	14.3	9.3	5.2	1.5
Dec	24.9	19.1	11.7	5.3
Ann	114.2	90.6	65.4	27.2

+ 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	6/08	6/03	5/30	5/27	5/25	5/22	5/19	5/15	5/10
32	5/23	5/20	5/18	5/15	5/13	5/11	5/09	5/07	5/03
28	5/16	5/11	5/08	5/05	5/03	4/30	4/28	4/25	4/20
24	5/12	5/06	5/02	4/29	4/26	4/23	4/19	4/15	4/10
20	4/28	4/23	4/20	4/17	4/14	4/11	4/08	4/05	3/31
16	4/17	4/13	4/10	4/07	4/05	4/03	3/31	3/28	3/24

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	136	127	121	116	111	106	101	94	86
32	147	141	136	133	129	126	122	118	112
28	169	162	157	153	149	145	141	136	129
24	187	179	174	169	165	161	157	151	144
20	208	200	195	190	186	182	177	172	164
16	227	219	214	209	205	201	196	191	183

***** 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	1869	1470	1245	718	321	117	38	68	276	662	1204	1693	9681
60	1714	1330	1090	575	209	51	10	24	163	507	1054	1538	8265
57	1621	1246	997	492	155	27	2	11	108	415	964	1445	7483
55	1559	1190	935	440	123	17	0	6	78	355	904	1383	6990
50	1404	1050	784	320	63	4	0	1	27	218	756	1228	5855
32	871	589	319	54	1	0	0	0	0	11	301	699	2845

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	25	43	97	328	732	960	1147	1098	734	372	87	30	5653
55	0	0	0	24	142	287	435	391	122	3	0	0	1404
57	0	0	0	16	111	237	375	334	91	1	0	0	1165
60	0	0	0	9	73	171	289	254	56	0	0	0	852
65	0	0	0	2	30	87	163	143	20	0	0	0	445
70	0	0	0	0	10	32	76	66	5	0	0	0	189

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	7	143	477	709	882	834	482	173	13	0	0	0	7	150	627	1336	2218	3052	3534	3707	3720	3720
45	0	0	0	75	336	559	727	679	339	96	4	0	0	0	0	75	411	970	1697	2376	2715	2811	2815	2815
50	0	0	0	33	215	411	572	524	215	44	0	0	0	0	0	33	248	659	1231	1755	1970	2014	2014	2014
55	0	0	0	15	120	272	417	372	124	12	0	0	0	0	0	15	135	407	824	1196	1320	1332	1332	1332
60	0	0	0	3	55	150	267	230	56	4	0	0	0	0	0	3	58	208	475	705	761	765	765	765
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	7	105	299	436	565	528	297	127	14	0	0	0	7	112	411	847	1412	1940	2237	2364	2378	2378

(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