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 BRANCH 3 SE, MI **COOP ID: 208800**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 885 Feet** **Lat: 44˚15N** **Lon: 84˚12W**

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	28.0	8.0	18.0	57	1996	19	26.0	1990	-30	1951	30	8.9	1994	1458	0	.0	.0	.1	21.1	30.6	8.9
Feb	31.4	9.2	20.3	62	2000	27	30.2	1998	-30	1996	3	10.8	1994	1253	0	.0	.0	.6	16.4	27.7	7.9
Mar	41.3	18.9	30.1	78+	1990	16	39.0	2000	-19	1986	8	24.5	1972	1081	0	.0	.0	6.5	6.7	28.4	2.6
Apr	54.8	30.9	42.9	91	1990	26	47.7	1986	-5+	1954	3	37.8	1972	666	0	.0	@	19.2	.7	17.3	.0
May	68.5	41.8	55.2	94	1949	5	62.8	1998	18+	1950	8	47.7	1997	330	24	.0	.4	30.0	.0	5.1	.0
Jun	77.1	50.9	64.0	103	1995	20	68.4	1971	25	1949	8	58.7	1982	102	72	@	1.5	30.0	.0	.2	.0
Jul	81.5	55.7	68.6	100+	1987	21	72.8	1983	35+	1952	31	62.7	1992	27	137	.1	3.2	31.0	.0	.0	.0
Aug	78.9	53.8	66.4	103	1955	1	71.4	1995	31	1982	29	61.3	1992	65	106	.0	1.3	31.0	.0	.1	.0
Sep	70.5	45.7	58.1	96	1953	1	62.8	1971	23	1957	28	53.0	1993	217	10	.0	.2	29.8	.0	1.7	.0
Oct	58.4	34.8	46.6	86	1971	1	55.4	1971	14	1966	29	42.0	1980	572	0	.0	.0	24.5	.0	13.8	.0
Nov	44.2	26.4	35.3	77	1950	1	42.7	1975	-15	1950	24	28.5	1995	892	0	.0	.0	8.4	3.4	23.1	.1
Dec	32.8	15.9	24.4	68	2001	6	32.5	1982	-21	1985	25	13.1	1989	1261	0	.0	.0	1.5	14.7	29.8	3.5
Ann	55.6	32.7	44.2	103+	Jun 1995	20	72.8	Jul 1983	-30+	Feb 1996	3	8.9	Jan 1994	7924	349	.1	6.6	212.6	63.0	177.8	23.0

\+ 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: 1948-2001

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

Issue Date: February 2004

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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	1.66	1.59	1.43	1975	11	3.14	1975	.48	1977
Feb	1.22	1.11	1.21	1977	24	3.35	1971	.12	1982
Mar	1.98	1.81	1.95	1976	5	4.27	1976	.55	1999
Apr	2.42	1.98	2.02	1991	9	6.85	1991	1.07	1997
May	3.03	2.62	3.19	1959	20	8.47	1991	.35	1992
Jun	3.04	2.89	3.56	1996	18	7.41	1999	.83	1983
Jul	2.96	2.91	2.97	1951	4	7.59	1975	.77	1978
Aug	3.85	3.96	3.32	1991	3	6.75	1987	1.57	1976
Sep	3.51	3.13	3.78	1975	1	11.77	1986	.00	1979
Oct	2.49	2.43	4.36	1954	3	6.94	1991	.66	1975
Nov	2.39	2.12	1.98	1957	15	5.23	1988	.49	1999
Dec	1.86	1.75	1.95	1971	11	5.20	1971	.37	1997
Ann	30.41	29.74	4.36	Oct 1954	3	11.77	Sep 1986	.00	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.7	4.8	.6	.1
Feb	9.1	3.6	.5	.1
Mar	9.8	5.2	1.1	.2
Apr	9.7	5.6	1.4	.3
May	10.2	6.2	2.1	.5
Jun	10.2	6.2	1.8	.5
Jul	8.9	5.7	2.1	.7
Aug	10.6	6.8	2.5	1.0
Sep	10.8	6.4	2.1	.8
Oct	10.7	5.3	1.6	.3
Nov	11.2	5.9	1.4	.4
Dec	11.4	5.0	.9	.1
Ann	124.3	66.7	18.1	5.0

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	.65	.80	1.02	1.20	1.37	1.55	1.74	1.96	2.24	2.67	3.06
Feb	.24	.35	.52	.69	.86	1.04	1.24	1.49	1.82	2.34	2.84
Mar	.61	.79	1.07	1.32	1.55	1.79	2.06	2.37	2.78	3.41	3.99
Apr	.90	1.13	1.45	1.72	1.98	2.24	2.53	2.86	3.28	3.93	4.53
May	.79	1.08	1.52	1.90	2.28	2.68	3.13	3.66	4.34	5.43	6.44
Jun	.91	1.20	1.63	2.00	2.36	2.74	3.15	3.64	4.27	5.25	6.17
Jul	.98	1.26	1.67	2.02	2.36	2.70	3.08	3.52	4.09	4.97	5.79
Aug	1.78	2.12	2.58	2.96	3.31	3.66	4.04	4.47	5.01	5.83	6.56
Sep	.76	1.26	1.85	2.31	2.75	3.21	3.70	4.28	5.03	6.18	7.26
Oct	.79	1.02	1.37	1.67	1.96	2.26	2.59	2.98	3.48	4.26	4.97
Nov	.64	.86	1.21	1.51	1.81	2.12	2.47	2.88	3.42	4.26	5.05
Dec	.48	.65	.92	1.16	1.40	1.65	1.92	2.25	2.68	3.35	3.98
Ann	23.50	24.88	26.62	27.93	29.08	30.18	31.31	32.55	34.05	36.19	38.03

\+ 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	13.2	11.9	7	7	7.2	1991	12	26.5	1976	21+	1979	18	17	1979	9.3	4.7	1.2	.5	.0	28.0	23.0	17.9	6.5
Feb	9.4	9.2	8	6	9.0	1981	11	17.7	1985	24	1976	9	20	1979	7.3	3.5	.7	.2	.0	26.2	24.0	18.1	9.4
Mar	8.9	8.1	5	4	10.0	1985	4	26.5	1971	22+	1982	10	15	1971	5.0	3.0	1.0	.4	@	16.9	13.2	11.1	5.1
Apr	1.6	.5	#	#	6.5	1973	10	6.5	1973	12	1972	1	4	1972	1.1	.8	.2	@	.0	2.2	1.3	.8	.2
May	.1	.0	#	0	3.0	1994	1	3.0	1994	3	1994	1	#+	1997	.1	.1	@	.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	.3	.0	#	0	3.7	1997	27	3.7	1997	4	1997	27	#+	1997	.1	.1	.1	.0	.0	.1	.1	.0	.0
Nov	5.2	3.5	1	#	9.0	1981	20	18.5	1995	11	1995	28	3	1995	3.3	2.1	.5	.1	.0	5.0	1.9	.7	.1
Dec	11.0	11.0	3	3	8.1	1991	3	26.5	2000	14	1972	30	9	1995	8.1	3.9	1.1	.3	.0	18.9	12.1	7.0	2.1
Ann	49.7	44.2	N/A	N/A	10.0	Mar 1985	4	26.5+	Dec 2000	24	Feb 1976	9	20	Feb 1979	34.3	18.2	4.8	1.5	@	97.3	75.6	55.6	23.4

+ 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	6/16	6/11	6/08	6/05	6/02	5/30	5/27	5/24	5/19
32	6/04	5/30	5/26	5/23	5/20	5/17	5/14	5/10	5/04
28	5/21	5/16	5/12	5/09	5/06	5/03	4/30	4/26	4/21
24	4/30	4/26	4/24	4/21	4/19	4/17	4/15	4/12	4/08
20	4/26	4/21	4/18	4/15	4/12	4/10	4/07	4/04	3/30
16	4/13	4/09	4/05	4/03	4/01	3/29	3/27	3/23	3/19

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	123	116	111	106	102	98	94	88	81
32	147	140	135	130	126	122	118	113	106
28	175	169	164	160	156	152	148	143	136
24	206	200	195	191	187	183	179	174	167
20	228	220	215	210	205	201	196	191	183
16	252	245	240	236	232	227	223	218	211

***** 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	1458	1253	1081	666	330	102	27	65	217	572	892	1261	7924
60	1303	1113	926	517	214	40	5	17	105	424	742	1106	6512
57	1210	1029	833	430	156	19	0	6	59	340	652	1013	5747
55	1148	973	771	373	123	11	0	2	38	288	592	951	5270
50	993	833	617	244	60	2	0	0	9	177	443	796	4174
32	454	354	167	11	0	0	0	0	0	6	60	302	1354

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	18	25	109	335	717	959	1133	1065	783	457	159	65	5825
55	0	0	0	8	127	280	420	354	131	26	0	0	1346
57	0	0	0	4	98	229	358	296	92	16	0	0	1093
60	0	0	0	1	62	159	270	214	48	7	0	0	761
65	0	0	0	0	24	72	137	106	10	0	0	0	349
70	0	0	0	0	7	21	51	38	1	0	0	0	118

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	28	164	479	725	891	823	546	234	58	4	0	0	28	192	671	1396	2287	3110	3656	3890	3948	3952
45	0	0	14	91	333	575	736	668	399	131	23	1	0	0	14	105	438	1013	1749	2417	2816	2947	2970	2971
50	0	0	3	43	211	425	581	513	264	61	6	0	0	0	3	46	257	682	1263	1776	2040	2101	2107	2107
55	0	0	0	21	119	285	426	361	153	23	0	0	0	0	0	21	140	425	851	1212	1365	1388	1388	1388
60	0	0	0	6	58	165	275	215	73	5	0	0	0	0	0	6	64	229	504	719	792	797	797	797
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	27	120	305	456	576	528	340	150	31	1	0	0	27	147	452	908	1484	2012	2352	2502	2533	2534

(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