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: CROSS VILLAGE 1 S, MI **COOP ID: 201896**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 743 Feet** **Lat: 45˚38N** **Lon: 85˚02W**

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	25.3	9.8	17.6	55	1996	19	26.1	1990	-27	1981	4	7.3	1994	1473	0	.0	.0	.2	22.5	30.4	5.6
Feb	27.2	8.2	17.7	61	2000	27	29.4	1998	-29+	1976	2	7.4	1979	1325	0	.0	.0	.5	17.7	26.9	6.0
Mar	37.1	17.6	27.4	76	1990	15	35.4	1973	-19	1972	3	19.9	1972	1166	0	.0	.0	4.4	7.9	26.9	2.2
Apr	49.5	29.6	39.6	89+	1985	23	45.0	1987	2	1977	8	32.7	1996	763	0	.0	.0	16.4	.8	18.2	.0
May	62.5	40.5	51.5	90+	1978	28	58.0	1998	22	1987	3	44.8	1997	427	9	.0	.1	29.1	.0	5.8	.0
Jun	70.6	50.1	60.4	90	1994	15	65.0	1995	31+	1977	9	55.7	1982	166	26	.0	.2	30.0	.0	.3	.0
Jul	75.5	56.3	65.9	95	1988	8	71.4	1983	36	2000	19	59.6	1992	57	85	.0	.4	31.0	.0	.0	.0
Aug	74.2	55.7	65.0	93+	1976	27	70.2	1995	35	1976	30	61.6	1982	75	73	.0	.3	31.0	.0	.0	.0
Sep	66.6	48.6	57.6	90	1999	6	61.7	1971	25	2000	28	53.2	1974	229	8	.0	@	29.8	.0	.4	.0
Oct	55.4	38.0	46.7	82	1989	1	54.6	1971	18+	1975	30	41.8	1981	567	0	.0	.0	24.1	@	4.5	.0
Nov	41.4	28.0	34.7	73	1990	1	39.6	1999	6+	1974	29	29.6	1976	909	0	.0	.0	7.1	3.4	17.5	.0
Dec	30.6	18.1	24.4	65	1982	3	31.4	1994	-20	1976	29	14.1	1989	1260	0	.0	.0	.8	15.2	27.9	1.2
Ann	51.3	33.4	42.4	95	Jul 1988	8	71.4	Jul 1983	-29+	Feb 1976	2	7.3	Jan 1994	8417	201	.0	1.0	204.4	67.5	158.8	15.0

\+ 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: 1953-2001

(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	1.77	1.70	1.10	1990	17	4.05	1997	.22	1981
Feb	1.12	.95	1.24	1994	20	3.18	1985	.04	1993
Mar	1.92	1.70	1.69	1959	6	4.85	1977	.26	1993
Apr	2.39	2.23	2.80	1954	27	4.94	1985	.43	1997
May	2.47	2.51	2.05	1963	8	6.66	1983	.47	1992
Jun	2.47	2.57	2.26	1961	28	4.72	1974	.55	1983
Jul	2.10	2.17	1.87	1961	22	4.30	1991	.12	1989
Aug	3.33	3.30	3.57	1968	20	5.89	1978	.52	1991
Sep	3.29	3.20	2.08	2001	24	6.24	1972	.62	1979
Oct	2.85	2.65	2.01	2001	14	5.45	1983	.88	1976
Nov	2.42	2.41	1.68	1966	27	4.74	1992	.66	1976
Dec	2.01	1.91	1.50	1998	1	4.12	1971	.21	1994
Ann	28.14	28.34	3.57	Aug 1968	20	6.66	May 1983	.04	Feb 1993

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.4	5.6	.4	.1
Feb	10.0	3.7	.3	@
Mar	10.5	5.0	1.1	.2
Apr	10.3	5.8	1.4	.3
May	10.2	6.0	1.3	.3
Jun	10.5	5.8	1.5	.4
Jul	10.6	5.3	1.5	.3
Aug	11.0	6.7	2.1	.9
Sep	12.3	7.5	2.4	.5
Oct	13.1	7.1	1.6	.4
Nov	13.2	6.9	1.0	.3
Dec	14.8	6.2	.9	@
Ann	140.9	71.6	15.5	3.7

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	.59	.76	1.00	1.21	1.41	1.62	1.85	2.11	2.45	2.98	3.46
Feb	.18	.27	.43	.59	.75	.92	1.12	1.36	1.69	2.22	2.73
Mar	.39	.56	.85	1.10	1.36	1.64	1.96	2.34	2.84	3.64	4.40
Apr	.80	1.03	1.36	1.64	1.91	2.19	2.49	2.85	3.30	4.01	4.65
May	.86	1.10	1.43	1.72	1.99	2.27	2.58	2.93	3.39	4.09	4.74
Jun	.82	1.06	1.40	1.69	1.97	2.26	2.58	2.95	3.42	4.16	4.83
Jul	.51	.71	1.01	1.29	1.56	1.84	2.16	2.54	3.04	3.82	4.56
Aug	1.24	1.55	2.00	2.37	2.73	3.09	3.49	3.94	4.53	5.43	6.25
Sep	1.12	1.43	1.89	2.27	2.64	3.02	3.44	3.92	4.54	5.50	6.39
Oct	1.03	1.29	1.68	2.01	2.32	2.63	2.98	3.38	3.90	4.69	5.42
Nov	.89	1.12	1.45	1.72	1.98	2.25	2.53	2.87	3.30	3.96	4.56
Dec	.71	.90	1.18	1.41	1.63	1.86	2.10	2.39	2.76	3.33	3.85
Ann	21.91	23.16	24.74	25.92	26.96	27.96	28.98	30.10	31.44	33.37	35.02

\+ 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

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(2) Derived from station's available digital record: 1953-2001
(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	23.1	24.8	10	9	10.9	1978	26	34.7	1971	35	1999	12	20+	1984	16.8	6.9	2.0	.6	@	28.2	26.0	22.6	15.1
Feb	13.4	12.8	12	11	7.5	1985	12	35.4	1985	30	1985	20	25	1971	12.5	5.0	1.5	.4	.0	27.6	26.2	23.5	15.6
Mar	10.5	10.6	8	5	7.5	1997	14	27.6	1989	31	1972	5	22	1972	8.5	3.6	1.1	.4	.0	20.0	15.9	13.3	10.5
Apr	4.8	4.0	1	#	8.5	1985	6	15.2	1985	17	1972	5	8	1972	3.2	1.5	.4	.1	.0	4.9	3.2	2.2	.9
May	.3	.0	#	0	3.0	1994	1	3.0	1994	#	1979	5	#	1979	.2	.1	@	.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	#	1989	23	#	1989	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.4	.0	#	0	2.9	1992	19	4.8	1972	2	1992	19	#+	1992	.4	.2	.0	.0	.0	.1	.0	.0	.0
Nov	6.2	5.9	#	#	8.0	2000	19	17.5	1989	10	2000	20	2	1995	5.8	2.4	.3	.1	.0	5.7	1.9	.6	@
Dec	16.6	15.0	4	3	15.1	1989	17	48.5	1996	26	1989	18	17	1985	14.8	6.0	1.5	.7	.1	20.7	14.2	9.0	3.8
Ann	75.3	73.1	N/A	N/A	15.1	Dec 1989	17	48.5	Dec 1996	35	Jan 1999	12	25	Feb 1971	62.2	25.7	6.8	2.3	.1	107.2	87.4	71.2	45.9

+ 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	6/23	6/17	6/13	6/10	6/06	6/03	5/30	5/26	5/20
32	6/07	6/03	5/31	5/28	5/26	5/23	5/21	5/18	5/13
28	5/22	5/17	5/14	5/11	5/09	5/06	5/03	4/30	4/25
24	5/06	5/02	4/30	4/28	4/26	4/24	4/21	4/19	4/15
20	4/24	4/20	4/18	4/16	4/14	4/12	4/09	4/07	4/03
16	4/15	4/11	4/07	4/05	4/02	3/31	3/28	3/25	3/20

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	132	125	120	115	111	107	103	98	91
32	158	151	145	140	136	131	126	121	113
28	189	181	176	171	167	162	158	152	144
24	211	204	200	196	192	188	184	179	173
20	235	228	224	219	215	212	207	203	196
16	259	252	247	243	239	235	231	225	218

***** 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	1473	1325	1166	763	427	166	57	75	229	567	909	1260	8417
60	1318	1185	1011	613	293	76	11	19	114	418	759	1105	6922
57	1225	1101	918	525	224	41	3	7	65	332	669	1012	6122
55	1163	1045	856	467	183	25	0	2	42	280	609	950	5622
50	1008	905	701	329	101	6	0	0	10	166	460	795	4481
32	467	418	211	29	1	0	0	0	0	4	59	293	1482

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	17	18	68	257	607	850	1051	1021	769	460	140	56	5314
55	0	0	0	4	75	185	339	310	121	23	0	0	1057
57	0	0	0	2	54	141	279	252	84	13	0	0	825
60	0	0	0	0	30	86	194	172	43	6	0	0	531
65	0	0	0	0	9	26	85	73	8	0	0	0	201
70	0	0	0	0	1	5	22	18	0	0	0	0	46

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	1	28	123	410	653	830	820	586	287	62	3	0	1	29	152	562	1215	2045	2865	3451	3738	3800	3803
45	0	0	11	63	270	503	675	665	437	167	23	1	0	0	11	74	344	847	1522	2187	2624	2791	2814	2815
50	0	0	1	31	162	354	520	510	293	86	3	0	0	0	1	32	194	548	1068	1578	1871	1957	1960	1960
55	0	0	0	14	82	222	366	357	167	31	0	0	0	0	0	14	96	318	684	1041	1208	1239	1239	1239
60	0	0	0	5	34	115	220	209	80	4	0	0	0	0	0	5	39	154	374	583	663	667	667	667
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	16	81	250	395	528	520	335	135	24	0	0	0	16	97	347	742	1270	1790	2125	2260	2284	2284

(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