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: SAGINAW TRI STATE AP, MI **COOP ID: 207227**

Climate Division: MI 7 **NWS Call Sign: MBS** **Elevation: 660 Feet** **Lat: 43˚32N** **Lon: 84˚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	27.9	14.9	21.4	62+	1916	27	30.9	1990	-22	1994	19	12.1	1994	1352	0	.0	.0	.6	20.3	29.6	3.6
Feb	30.7	16.8	23.8	67	1930	22	33.4	1998	-23	1918	5	12.1	1979	1156	0	.0	.0	1.1	15.9	25.8	2.5
Mar	41.3	25.6	33.5	83	1910	24	41.5	2000	-12	1962	2	25.2	1978	979	0	.0	.0	6.8	6.6	23.9	.4
Apr	55.0	35.9	45.5	89	1899	29	52.7	1985	8	1923	1	41.3	1982	587	1	.0	.0	19.7	.5	10.3	.0
May	68.4	46.8	57.6	95	1919	31	64.6	1977	24+	1903	1	50.2	1997	272	42	.0	.5	30.1	.0	.9	.0
Jun	77.5	56.0	66.8	104	1934	1	72.3	1971	33+	1941	10	60.6	1982	68	120	.1	2.3	30.0	.0	.0	.0
Jul	81.9	60.4	71.2	111	1936	13	75.8	1988	40+	1898	10	66.2	1992	10	200	.1	3.9	31.0	.0	.0	.0
Aug	78.9	58.5	68.7	103	1918	6	73.6	1995	37	1982	29	64.6	1992	40	155	.0	1.7	31.0	.0	.0	.0
Sep	70.9	50.5	60.7	100+	1931	11	66.0	1998	27+	1942	29	56.7	1993	155	26	.0	.5	29.9	.0	.2	.0
Oct	58.8	40.1	49.5	88+	1900	4	58.1	1971	0	1905	5	43.7	1972	487	4	.0	.0	25.4	.0	5.2	.0
Nov	44.8	31.1	38.0	80	1950	1	45.9	1975	-3	1949	26	31.6	1995	812	0	.0	.0	9.6	2.8	17.8	@
Dec	33.0	20.9	27.0	66	1909	5	34.5	1982	-12	1914	26	16.3	1989	1181	0	.0	.0	1.6	14.0	28.4	1.1
Ann	55.8	38.1	47.0	111	Jul 1936	13	75.8	Jul 1988	-23	Feb 1918	5	12.1+	Jan 1994	7099	548	.2	8.9	216.8	60.1	142.1	7.6

\+ 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: 1898-2000

(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	1.56	1.92	1978	26	4.04	1998	.54	1981
Feb	1.57	1.39	3.51	1997	21	6.10	1997	.39	1984
Mar	2.42	2.23	2.11	1948	19	6.69	1998	.31	1981
Apr	2.82	2.78	2.87	1967	21	5.93	1991	1.13	1978
May	2.89	2.82	3.14	1996	20	6.29	1996	.80	1988
Jun	3.06	3.24	2.98	1935	17	6.92	1996	.61	1988
Jul	2.50	2.29	3.07	1928	27	5.31	1980	.45	1989
Aug	3.38	3.12	3.73	1914	18	9.01	1975	.93	1982
Sep	3.95	3.50	5.51	1986	10	16.16	1986	.00	1979
Oct	2.49	2.61	4.58	1954	3	5.57	1990	.46	1975
Nov	2.65	2.38	2.07	1990	5	6.31	1995	.51	1986
Dec	2.11	2.01	2.08	1962	6	5.33	1972	.55	1993
Ann	31.61	31.62	5.51	Sep 1986	10	16.16	Sep 1986	.00	Sep 1979

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.4	4.9	.7	.2
Feb	9.4	4.2	.5	.2
Mar	10.2	5.8	1.4	.3
Apr	10.7	6.6	1.8	.4
May	9.4	5.9	2.1	.7
Jun	9.0	6.0	1.9	.6
Jul	8.4	5.2	1.9	.6
Aug	9.2	6.0	2.4	.8
Sep	10.0	6.4	2.7	1.1
Oct	9.3	5.6	1.8	.3
Nov	11.1	5.9	1.6	.6
Dec	12.0	5.8	1.0	.3
Ann	120.1	68.3	19.8	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	.50	.67	.93	1.15	1.36	1.59	1.84	2.13	2.51	3.11	3.67
Feb	.28	.42	.65	.86	1.08	1.32	1.59	1.91	2.35	3.05	3.72
Mar	.63	.86	1.21	1.52	1.83	2.15	2.50	2.92	3.47	4.34	5.15
Apr	1.09	1.35	1.73	2.03	2.33	2.62	2.95	3.32	3.80	4.52	5.19
May	.80	1.08	1.49	1.85	2.21	2.58	2.99	3.48	4.11	5.10	6.03
Jun	1.16	1.44	1.85	2.19	2.52	2.85	3.20	3.62	4.15	4.96	5.70
Jul	.74	.97	1.33	1.64	1.94	2.25	2.59	3.00	3.52	4.34	5.11
Aug	.91	1.23	1.72	2.15	2.57	3.01	3.50	4.08	4.84	6.02	7.12
Sep	.58	1.10	1.77	2.32	2.87	3.45	4.09	4.85	5.86	7.45	8.94
Oct	.83	1.07	1.41	1.71	1.99	2.28	2.59	2.96	3.44	4.18	4.85
Nov	.75	1.00	1.38	1.71	2.03	2.37	2.75	3.19	3.76	4.66	5.50
Dec	.58	.78	1.08	1.35	1.61	1.88	2.18	2.54	3.00	3.73	4.41
Ann	24.01	25.52	27.43	28.86	30.13	31.34	32.59	33.96	35.62	37.99	40.03

\+ 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: 1898-2000
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Month	Means/Medians (1)				Extremes (2)										Mean Number of Days (1)								
															Snow Fall >= Thresholds					Snow Depth >= Thresholds			
	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	11.4	10.6	4	3	19.2	1978	26	30.3	1978	28+	1978	29	15	1979	8.2	3.9	.9	.3	.1	21.7	15.7	9.3	2.5
Feb	8.1	7.5	4	2	9.3	1976	21	19.8	1985	21+	1985	12	15	1978	5.9	3.0	.8	.2	.0	18.1	11.7	7.1	3.6
Mar	7.1	6.1	1	2	21.3	1973	17	21.7	1973	21	1973	18	4	1978	4.5	2.4	.7	.3	.1	8.8	4.5	2.6	.4
Apr	2.2	1.0	#	0	8.5	1975	2	14.4	1975	14+	1975	4	2	1975	1.3	.8	.2	.1	.0	.9	.4	.2	.1
May	.0	.0	#	0	.2	1994	1	.2	1994	0	0	0	#	1999	.0	.0	.0	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.2	.0	#	0	2.9	1997	27	2.9	1997	3	1997	27	#	1997	.1	.1	.0	.0	.0	@	@	.0	.0
Nov	3.9	2.1	#	0	9.5	1995	27	23.0	1995	11	1995	28	2	1995	2.8	1.4	.4	.1	.0	2.4	.9	.2	@
Dec	10.0	10.6	1	1	11.5	1971	30	21.9	1972	10+	1973	21	4	1972	6.8	3.7	1.0	.3	@	13.0	5.9	2.3	.1
Ann	42.9	37.9	N/A	N/A	21.3	Mar 1973	17	30.3	Jan 1978	28+	Jan 1978	29	15+	Jan 1979	29.6	15.3	4.0	1.3	.2	64.9	39.1	21.7	6.7

+ 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	5/27	5/22	5/18	5/15	5/12	5/08	5/05	5/01	4/26
32	5/13	5/09	5/05	5/02	4/30	4/27	4/24	4/21	4/16
28	4/27	4/23	4/20	4/18	4/16	4/13	4/11	4/08	4/04
24	4/17	4/13	4/10	4/07	4/04	4/02	3/30	3/27	3/22
20	4/10	4/05	4/02	3/31	3/28	3/26	3/23	3/20	3/16
16	4/01	3/28	3/24	3/22	3/19	3/16	3/13	3/10	3/06

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	9/15	9/19	9/22	9/25	9/28	10/01	10/03	10/07	10/11
32	9/27	10/02	10/06	10/09	10/12	10/15	10/19	10/22	10/28
28	10/09	10/14	10/18	10/21	10/24	10/27	10/30	11/03	11/08
24	10/22	10/27	10/31	11/03	11/06	11/09	11/12	11/16	11/22
20	11/08	11/13	11/17	11/20	11/24	11/27	11/30	12/04	12/09
16	11/16	11/22	11/26	11/29	12/02	12/05	12/08	12/12	12/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	159	152	147	143	139	135	130	125	119
32	185	178	173	169	165	161	157	152	145
28	212	205	200	195	191	187	182	177	170
24	233	227	222	219	215	211	208	203	197
20	261	254	248	244	240	235	231	226	218
16	278	271	266	261	257	253	249	244	237

***** 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	1352	1156	979	587	272	68	10	40	155	487	812	1181	7099
60	1197	1016	824	440	169	24	0	9	65	344	662	1026	5776
57	1104	932	731	356	119	11	0	3	33	267	572	933	5061
55	1042	876	669	303	91	6	0	0	19	221	513	871	4611
50	887	736	518	186	41	1	0	0	4	125	367	716	3581
32	368	284	113	5	0	0	0	0	0	2	36	245	1053

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	38	52	157	408	793	1042	1213	1138	861	542	215	86	6545
55	0	0	0	17	172	358	500	425	190	47	1	0	1710
57	0	0	0	10	137	303	438	365	144	31	0	0	1428
60	0	0	0	4	94	226	345	279	86	15	0	0	1049
65	0	0	0	1	42	120	200	155	26	4	0	0	548
70	0	0	0	0	15	48	89	69	4	0	0	0	225

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	1	4	56	212	553	811	975	901	630	313	82	10	1	5	61	273	826	1637	2612	3513	4143	4456	4538	4548
45	0	0	22	118	403	661	820	746	481	193	39	3	0	0	22	140	543	1204	2024	2770	3251	3444	3483	3486
50	0	0	12	65	271	512	665	591	341	99	16	1	0	0	12	77	348	860	1525	2116	2457	2556	2572	2573
55	0	0	3	32	158	366	510	436	212	45	2	0	0	0	3	35	193	559	1069	1505	1717	1762	1764	1764
60	0	0	0	13	82	229	356	286	112	16	0	0	0	0	0	13	95	324	680	966	1078	1094	1094	1094
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	34	126	326	511	651	586	375	166	39	3	0	1	35	161	487	998	1649	2235	2610	2776	2815	2818

(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