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: HART, MI **COOP ID: 203632**

Climate Division: MI 5 **NWS Call Sign:** **Elevation: 700 Feet** **Lat: 43˚41N** **Lon: 86˚22W**

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	14.5	21.2	59+	1950	25	28.7	1990	-18	1959	26	12.6	1977	1359	0	.0	.0	.4	19.4	30.0	2.6
Feb	30.4	14.9	22.7	65	1999	12	33.5	1998	-22	1979	17	11.5	1979	1185	0	.0	.0	.9	15.0	26.2	3.0
Mar	40.1	23.0	31.6	77	1986	31	40.9	2000	-15	1962	2	24.7	1978	1038	0	.0	.0	7.0	6.1	25.1	1.0
Apr	52.6	33.7	43.2	84+	1970	29	48.5	1985	1	1982	7	38.4	1982	656	0	.0	.0	19.1	.6	13.5	.0
May	65.7	44.1	54.9	90	1977	29	62.0	1977	20	1966	10	48.1	1997	342	29	.0	@	29.9	.0	3.0	.0
Jun	74.7	53.7	64.2	97	1995	21	69.9	1995	29	1949	8	58.1	1982	103	79	.0	.5	30.0	.0	@	.0
Jul	79.3	58.5	68.9	98	1953	16	72.9	1983	39	2001	2	63.6	1992	24	144	.0	1.7	31.0	.0	.0	.0
Aug	76.9	57.4	67.2	99	1955	19	73.7	1995	37+	1977	25	62.9	1992	58	124	.0	.6	31.0	.0	.0	.0
Sep	69.2	49.9	59.6	97	1953	1	63.9	1971	26	1989	27	54.9	1993	180	17	.0	@	29.8	.0	.7	.0
Oct	57.2	39.2	48.2	87+	1951	5	57.2	1971	20	1952	21	43.1	1988	522	2	.0	.0	25.2	.0	6.4	.0
Nov	43.9	29.9	36.9	74+	1950	1	42.6	1999	-18	1950	25	30.6	1976	843	0	.0	.0	9.3	2.8	19.0	.0
Dec	32.7	20.8	26.8	68	1982	3	34.7	1982	-16	1976	31	17.0	1989	1186	0	.0	.0	1.4	12.8	27.7	.7
Ann	54.2	36.6	45.5	99	Aug 1955	19	73.7	Aug 1995	-22	Feb 1979	17	11.5	Feb 1979	7496	395	.0	2.8	215.0	56.7	151.6	7.3

+ 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: 1921-2001

(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	2.56	2.52	1.50	1974	27	4.92	1982	.47	1989
Feb	1.73	1.69	1.97	1950	14	3.94	1994	.15	1987
Mar	2.34	2.24	2.12	1979	4	6.25	1976	.10	1999
Apr	2.87	2.65	2.36	1967	17	5.84	1993	.55	1998
May	3.03	2.46	4.65	2001	15	9.36	2000	.39	1992
Jun	3.29	2.86	3.75	1986	26	8.07	1974	.85	1988
Jul	2.84	2.99	4.60	1983	28	6.59	1983	.58	1981
Aug	4.09	3.36	4.83	1980	20	12.78	1975	1.36	1991
Sep	3.85	3.63	5.43	1986	11	11.44	1986	.03	1979
Oct	3.53	3.45	2.90	1954	3	8.84	1991	1.03	1971
Nov	3.33	3.23	3.45	1981	20	8.55	1988	.75	1986
Dec	2.65	2.37	1.90	1982	3	5.32	1982	.63	1994
Ann	36.11	34.81	5.43	Sep 1986	11	12.78	Aug 1975	.03	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.7	8.6	.9	.2
Feb	10.7	5.4	.7	.1
Mar	9.1	5.6	1.5	.3
Apr	9.9	6.6	1.9	.4
May	9.2	6.4	2.0	.7
Jun	8.8	6.6	2.3	.7
Jul	7.6	5.4	1.6	.8
Aug	9.1	6.7	2.8	.9
Sep	9.7	7.3	2.6	.9
Oct	10.5	7.4	2.6	.7
Nov	12.2	8.0	2.2	.5
Dec	14.4	8.1	1.0	.2
Ann	126.9	82.1	22.1	6.4

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	1.03	1.26	1.60	1.87	2.13	2.40	2.69	3.02	3.43	4.08	4.66
Feb	.46	.63	.88	1.10	1.31	1.54	1.79	2.09	2.48	3.08	3.65
Mar	.43	.64	.98	1.30	1.62	1.97	2.37	2.85	3.48	4.51	5.48
Apr	.97	1.24	1.64	1.97	2.30	2.63	2.99	3.42	3.96	4.80	5.58
May	.56	.83	1.28	1.69	2.11	2.56	3.07	3.69	4.52	5.85	7.12
Jun	.89	1.21	1.68	2.09	2.50	2.93	3.40	3.96	4.69	5.84	6.91
Jul	.73	1.00	1.41	1.78	2.14	2.51	2.93	3.43	4.08	5.11	6.07
Aug	1.28	1.67	2.25	2.74	3.22	3.71	4.25	4.89	5.71	6.99	8.17
Sep	.59	.91	1.47	2.00	2.56	3.16	3.86	4.71	5.85	7.70	9.49
Oct	1.18	1.52	2.01	2.42	2.82	3.23	3.68	4.21	4.88	5.93	6.89
Nov	1.07	1.39	1.86	2.26	2.64	3.04	3.47	3.98	4.64	5.66	6.61
Dec	.99	1.24	1.60	1.89	2.17	2.46	2.77	3.13	3.59	4.30	4.95
Ann	27.33	29.07	31.28	32.94	34.41	35.81	37.26	38.85	40.76	43.52	45.89

\+ 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: 1921-2001
(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	33.1	27.8	10	7
Feb	18.2	17.7	10	7
Mar	9.6	7.0	2	2
Apr	2.1	.5	#	#
May	#	.0	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	5.5	3.5	#	#
Dec	23.5	20.3	3	3
Ann	92.2	76.8	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	1990	25	64.0	1979	43	1979	17	30	1979
Feb	15.0	1974	22	36.0	1981	35+	1982	1	24	1982
Mar	11.0	1971	19	26.5	1971	16	1978	1	8	1989
Apr	5.0	1973	10	9.0	1990	8	1982	7	1	1982
May	#	1994	1	#+	1994	0	0	0	0	0
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	1976	17	3.0	1976	1	1988	12	#+	1993
Nov	9.5	1981	20	17.5	1976	9	1995	29	4	1995
Dec	14.0	1981	19	47.5	1977	31	1983	30	13	1983
Ann	15.0	Feb 1974	22	64.0	Jan 1979	43	Jan 1979	17	30	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	12.6	11.1	3.9	1.3	.1
Feb	8.5	7.6	2.5	.6	.1
Mar	4.2	3.6	1.0	.4	@
Apr	1.1	.9	.4	.1	.0
May	.0	.0	.0	.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	2.7	2.0	.4	.2	.0
Dec	9.8	8.4	2.9	1.0	.2
Ann	39.1	33.7	11.1	3.6	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	27.2	22.4	17.5	11.5
Feb	25.1	22.3	18.1	10.9
Mar	10.9	6.9	4.0	1.1
Apr	1.3	.3	.1	.0
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	3.0	.9	.2	.0
Dec	18.2	11.9	7.6	1.8
Ann	85.7	64.7	47.5	25.3

+ 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	6/13	6/07	6/03	5/30	5/27	5/23	5/19	5/15	5/09
32	5/28	5/22	5/18	5/15	5/12	5/09	5/06	5/02	4/27
28	5/11	5/07	5/04	5/02	4/29	4/27	4/24	4/21	4/17
24	4/29	4/25	4/22	4/19	4/17	4/14	4/11	4/08	4/04
20	4/17	4/13	4/10	4/07	4/05	4/02	3/31	3/27	3/23
16	4/09	4/04	3/31	3/28	3/25	3/22	3/19	3/16	3/11

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	9/20	9/23	9/25	9/27	9/30	10/03	10/07
32	9/24	9/28	10/02	10/05	10/08	10/11	10/14	10/17	10/22
28	10/06	10/12	10/16	10/20	10/24	10/27	10/31	11/04	11/10
24	10/22	10/27	10/31	11/03	11/06	11/09	11/13	11/17	11/22
20	11/08	11/13	11/17	11/21	11/24	11/28	12/01	12/05	12/11
16	11/16	11/22	11/26	11/30	12/03	12/07	12/11	12/15	12/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	139	133	128	124	121	117	113	108	102
32	171	163	157	152	148	143	139	133	125
28	198	191	185	181	177	172	168	162	155
24	224	217	212	207	203	199	194	189	182
20	258	249	243	238	233	228	223	217	208
16	276	268	262	257	252	248	243	237	229

***** 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.

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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	1359	1185	1038	656	342	103	24	58	180	522	843	1186	7496
60	1204	1045	883	507	227	42	4	15	79	376	693	1031	6106
57	1111	961	790	421	170	21	0	6	42	296	603	938	5359
55	1049	905	728	364	136	13	0	2	25	247	543	876	4888
50	894	765	575	237	70	3	0	0	5	145	396	721	3811
32	362	313	148	9	0	0	0	0	0	4	41	241	1118

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	26	52	133	344	710	966	1143	1089	826	507	188	78	6062
55	0	0	0	9	133	289	430	378	162	37	0	0	1438
57	0	0	0	5	104	238	368	320	118	24	0	0	1177
60	0	0	0	2	68	168	279	236	66	11	0	0	830
65	0	0	0	0	29	79	144	124	17	2	0	0	395
70	0	0	0	0	10	25	55	49	2	0	0	0	141

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	50	188	494	749	911	870	613	303	76	8	0	4	54	242	736	1485	2396	3266	3879	4182	4258	4266
45	0	0	22	106	346	599	756	715	465	182	34	1	0	0	22	128	474	1073	1829	2544	3009	3191	3225	3226
50	0	0	9	55	223	450	601	560	324	96	10	1	0	0	9	64	287	737	1338	1898	2222	2318	2328	2329
55	0	0	0	28	129	307	446	406	199	43	3	0	0	0	0	28	157	464	910	1316	1515	1558	1561	1561
60	0	0	0	11	64	186	298	254	104	13	0	0	0	0	0	11	75	261	559	813	917	930	930	930
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	27	113	299	472	603	563	365	164	35	1	0	0	27	140	439	911	1514	2077	2442	2606	2641	2642

(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