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: GRAND HAVEN FIRE DEPT, MI **COOP ID: 203290**

Climate Division: MI 8 **NWS Call Sign:** **Elevation: 620 Feet** **Lat: 43˚04N** **Lon: 86˚13W**

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	29.8	18.5	24.2	63	1950	26	32.5	1990	-11	1994	15	14.1	1977	1267	0	.0	.0	.6	17.0	28.9	1.3
Feb	32.8	20.3	26.6	65	2000	27	37.1	1998	-10	1979	17	16.8	1979	1077	0	.0	.0	1.4	12.4	24.6	.8
Mar	42.5	27.0	34.8	81	1981	31	41.5	2000	-2+	1962	1	27.9	1984	938	0	.0	.0	7.7	3.9	22.3	@
Apr	54.6	36.3	45.5	85	1970	29	50.1	1985	14	1982	7	40.5	1982	588	0	.0	.0	19.9	.2	8.0	.0
May	66.5	46.5	56.5	91	1982	14	62.9	1991	27+	1966	9	50.5	1997	294	31	.0	@	30.2	.0	.5	.0
Jun	75.3	55.7	65.5	94	1956	11	70.0	1987	36	1949	8	59.8	1982	82	96	.0	.4	30.0	.0	.0	.0
Jul	79.3	61.4	70.4	95	1999	31	74.6	1999	44	1968	10	67.1	1992	12	177	.0	.8	31.0	.0	.0	.0
Aug	77.9	60.5	69.2	95	1955	18	76.2	1995	39	1986	29	65.3	1992	34	163	.0	.5	31.0	.0	.0	.0
Sep	71.0	53.2	62.1	92	1953	29	66.8	1998	31	1991	28	57.9	1975	122	35	.0	.0	30.0	.0	.1	.0
Oct	59.3	43.1	51.2	84	1951	4	59.4	1971	24+	1965	29	46.2	1988	432	4	.0	.0	27.3	.0	1.9	.0
Nov	45.8	33.3	39.6	75+	1961	2	45.8	1999	-7	1950	25	33.6+	1995	762	0	.0	.0	10.6	1.5	13.2	.0
Dec	34.7	23.8	29.3	66	1982	3	36.0	1982	-9	1976	31	20.7	1983	1108	0	.0	.0	1.6	9.0	25.8	.2
Ann	55.8	40.0	47.9	95+	Jul 1999	31	76.2	Aug 1995	-11	Jan 1994	15	14.1	Jan 1977	6716	506	.0	1.7	221.3	44.0	125.3	2.3

\+ 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: 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	2.17	2.15	1.36	1960	12	3.88	1999	.64	2000
Feb	1.34	1.17	2.80	2001	9	3.50	1997	.00	2000
Mar	2.29	2.00	1.85	1985	4	5.66	1976	.63	1980
Apr	2.89	2.69	4.00	2000	21	4.95	2000	.64	1989
May	2.99	2.75	5.07	2000	18	6.48	2000	.50	1992
Jun	3.15	3.17	5.00	1994	24	6.16	1996	.47	1988
Jul	2.56	2.40	3.90	1949	29	4.48	1980	.72	1999
Aug	3.69	3.11	2.90	1989	4	9.55	1972	.83	1971
Sep	3.34	3.07	3.60	1971	27	10.76	1986	.05	1979
Oct	2.61	2.38	3.00	1991	5	8.19	1991	.15	1999
Nov	3.12	2.67	2.70+	1994	4	8.36	1994	.67	1986
Dec	2.57	2.39	2.25	1999	28	5.52	1982	.90	1994
Ann	32.72	32.18	5.07	May 2000	18	10.76	Sep 1986	.00	Feb 2000

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.4	6.4	.6	.2
Feb	10.0	4.4	.5	.1
Mar	10.0	5.7	1.6	.3
Apr	10.3	6.6	1.8	.5
May	9.5	6.1	1.7	.6
Jun	9.7	6.1	1.8	.5
Jul	8.2	5.4	1.7	.4
Aug	8.4	5.7	2.4	1.0
Sep	8.9	6.0	2.1	.9
Oct	9.8	6.3	2.0	.4
Nov	11.2	6.9	1.7	.5
Dec	13.2	6.9	1.3	.3
Ann	123.6	72.5	19.2	5.7

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	.67	.88	1.18	1.45	1.70	1.97	2.26	2.60	3.04	3.73	4.36
Feb	.12	.27	.49	.69	.89	1.10	1.35	1.65	2.05	2.70	3.32
Mar	.65	.87	1.20	1.48	1.76	2.05	2.38	2.76	3.25	4.03	4.76
Apr	1.09	1.36	1.75	2.07	2.37	2.68	3.02	3.41	3.91	4.67	5.37
May	.80	1.09	1.52	1.90	2.27	2.66	3.10	3.61	4.28	5.33	6.31
Jun	1.06	1.36	1.80	2.17	2.52	2.88	3.28	3.75	4.34	5.27	6.12
Jul	.97	1.21	1.55	1.83	2.10	2.38	2.68	3.02	3.46	4.14	4.76
Aug	.97	1.32	1.86	2.33	2.79	3.27	3.81	4.45	5.28	6.59	7.82
Sep	.48	.76	1.24	1.71	2.19	2.72	3.33	4.07	5.08	6.72	8.30
Oct	.49	.72	1.10	1.46	1.82	2.20	2.65	3.18	3.89	5.03	6.11
Nov	.75	1.04	1.49	1.90	2.30	2.73	3.21	3.78	4.52	5.70	6.82
Dec	.96	1.20	1.55	1.83	2.11	2.38	2.68	3.03	3.48	4.16	4.79
Ann	24.82	26.38	28.36	29.85	31.17	32.43	33.73	35.15	36.87	39.35	41.47

\+ 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	29.3	20.5	8	4	15.0	1977	28	55.0	1977	40	1985	29	27	1979	10.0	8.1	2.7	.8	.1	20.4	16.3	13.3	8.5
Feb	12.5	10.0	8	4	8.0	1981	10	39.5	1981	58	1985	16	36	1985	5.8	4.4	1.8	.6	.0	19.9	16.6	12.6	9.1
Mar	4.9	4.0	2	1	9.0	1971	19	16.5	1972	17	1978	5	9	1978	2.6	2.1	.6	.2	.0	7.9	4.2	2.7	1.0
Apr	1.6	.0	#	0	11.0	1982	6	17.0	1982	12	1982	6	2	1982	.6	.5	.3	.1	@	.9	.6	.4	.1
May	#	.0	0	0	#	1976	3	#	1976	0	0	0	0	0	.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	3.0	1972	18	3.0+	1989	2	1972	18	#+	1974	.1	.1	.1	.0	.0	.1	.0	.0	.0
Nov	4.1	4.0	#	#	6.0	1971	29	16.0	1976	7	1977	27	1	1991	2.1	1.7	.7	.2	.0	2.6	1.2	.3	.0
Dec	20.6	17.8	3	2	12.0	1977	11	43.5	1977	26	1983	31	12	1989	7.6	6.7	2.4	.6	.1	15.6	9.0	5.2	1.9
Ann	73.2	56.3	N/A	N/A	15.0	Jan 1977	28	55.0	Jan 1977	58	Feb 1985	16	36	Feb 1985	28.8	23.6	8.6	2.5	.2	67.4	47.9	34.5	20.6

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	5/21	5/16	5/12	5/09	5/06	5/03	4/30	4/26	4/21
32	5/11	5/07	5/03	4/30	4/28	4/25	4/22	4/18	4/14
28	4/27	4/21	4/18	4/15	4/12	4/09	4/06	4/02	3/28
24	4/14	4/10	4/07	4/05	4/03	3/31	3/29	3/26	3/22
20	4/09	4/04	3/31	3/28	3/25	3/22	3/19	3/16	3/11
16	3/30	3/25	3/21	3/17	3/14	3/11	3/08	3/04	2/27

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	9/27	10/01	10/05	10/07	10/10	10/13	10/15	10/19	10/23
32	10/06	10/12	10/15	10/19	10/22	10/25	10/28	11/01	11/06
28	10/18	10/24	10/28	10/31	11/04	11/07	11/10	11/14	11/20
24	11/07	11/13	11/16	11/20	11/23	11/26	11/29	12/03	12/08
20	11/16	11/22	11/26	11/29	12/03	12/06	12/09	12/13	12/19
16	11/23	11/30	12/04	12/08	12/12	12/15	12/19	12/24	12/30

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	176	169	164	160	156	152	148	143	136
32	198	191	186	181	177	172	168	162	155
28	231	222	216	210	205	200	194	188	179
24	252	246	241	237	233	230	226	221	215
20	275	267	261	256	252	247	242	236	228
16	293	286	280	276	271	267	263	257	250

***** 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	1267	1077	938	588	294	82	12	34	122	432	762	1108	6716
60	1112	937	783	441	184	30	0	8	44	291	612	953	5395
57	1019	853	690	357	132	14	0	2	20	218	523	860	4688
55	957	797	628	303	102	8	0	0	10	175	464	798	4242
50	802	657	477	185	46	2	0	0	1	91	323	644	3228
32	295	221	84	4	0	0	0	0	0	0	26	191	821

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	51	69	169	406	760	1005	1189	1152	903	596	253	106	6659
55	0	0	0	15	148	323	476	439	222	58	2	0	1683
57	0	0	0	9	116	268	414	379	172	39	1	0	1398
60	0	0	0	4	76	194	321	292	107	19	0	0	1013
65	0	0	0	0	31	96	177	163	35	4	0	0	506
70	0	0	0	0	10	33	72	74	6	0	0	0	195

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	2	9	69	232	545	799	975	938	698	393	110	15	2	11	80	312	857	1656	2631	3569	4267	4660	4770	4785
45	0	2	31	136	394	649	820	783	548	253	51	4	0	2	33	169	563	1212	2032	2815	3363	3616	3667	3671
50	0	0	14	69	256	499	665	628	401	142	21	0	0	0	14	83	339	838	1503	2131	2532	2674	2695	2695
55	0	0	3	30	148	352	510	473	261	69	4	0	0	0	3	33	181	533	1043	1516	1777	1846	1850	1850
60	0	0	0	12	73	219	356	321	148	27	0	0	0	0	0	12	85	304	660	981	1129	1156	1156	1156
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	3	36	125	309	506	663	630	423	192	44	3	0	3	39	164	473	979	1642	2272	2695	2887	2931	2934

(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