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: MIO HYDRO PLANT, MI **COOP ID: 205531**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 960 Feet** **Lat: 44˚40N** **Lon: 84˚08W**

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	27.2	7.3	17.3	60	1973	27	25.5	1990	-38	1951	30	7.5	1994	1479	0	.0	.0	.2	22.1	30.5	8.8
Feb	30.2	7.2	18.7	61+	1984	24	30.4	1998	-38	1979	17	7.3	1979	1297	0	.0	.0	1.1	16.7	27.4	8.5
Mar	40.3	16.8	28.6	78	2000	9	39.0	2000	-28	1962	2	22.1	1972	1130	0	.0	.0	6.5	6.5	27.5	3.3
Apr	53.6	29.7	41.7	88+	1976	16	47.2	1986	-12	1954	4	36.3	1972	701	0	.0	.0	19.3	.6	18.2	.0
May	67.3	40.5	53.9	93	1986	30	61.2	1998	17	1966	2	46.7	1997	364	21	.0	.6	29.7	.0	6.6	.0
Jun	76.6	50.1	63.4	103	1995	20	67.9	1987	26	1949	8	57.2	1982	117	67	@	1.7	30.0	.0	.4	.0
Jul	81.7	54.9	68.3	101	1988	9	73.3	1983	33	1965	6	62.4	1992	31	133	.1	3.7	31.0	.0	.0	.0
Aug	78.8	52.6	65.7	100	1955	1	70.3	1995	24	1982	28	61.2	1982	78	99	.0	1.6	31.0	.0	.1	.0
Sep	69.8	44.8	57.3	95	1953	2	62.4	1998	23	1965	27	53.1	1993	239	7	.0	.2	29.9	.0	2.4	.0
Oct	57.6	34.4	46.0	85+	1971	2	54.5	1971	13	1965	29	40.7	1980	589	0	.0	.0	24.3	.0	11.8	.0
Nov	43.6	26.0	34.8	75	1950	1	41.2	1999	-11+	1949	26	28.0	1976	907	0	.0	.0	7.8	3.6	22.4	.1
Dec	32.1	15.2	23.7	66	2001	6	32.6	1982	-26+	1951	19	12.2	1989	1282	0	.0	.0	1.4	15.5	29.6	3.9
Ann	54.9	31.6	43.3	103	Jun 1995	20	73.3	Jul 1983	-38+	Feb 1979	17	7.3	Feb 1979	8214	327	.1	7.8	212.2	65.0	176.9	24.6

+ 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: 1948-2001

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

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: MIO HYDRO PLANT, MI **COOP ID: 205531**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 960 Feet** **Lat: 44˚40N** **Lon: 84˚08W**

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	1.60	1.34	1.28	1978	26	2.91	1974	.45	1981
Feb	1.19	1.15	1.44	1971	20	3.34	1971	.00	1995
Mar	1.73	1.59	2.12	1998	31	4.98	1976	.15	1993
Apr	2.08	1.94	1.30	1981	9	4.23	1981	.61	1976
May	2.37	2.37	1.70	1973	28	5.68	1983	.44	1992
Jun	2.62	2.61	2.39	1999	14	5.52	1993	.59	1988
Jul	2.96	2.99	2.51	1960	26	7.25	1994	.62	1989
Aug	3.49	3.33	3.13	1990	19	7.74	1990	.76	1999
Sep	2.88	2.60	1.70	1999	28	8.25	1986	.38	1979
Oct	2.26	2.06	2.10	1988	20	7.04	1991	.59	2000
Nov	1.92	1.80	1.50	1988	6	4.42	1988	.32	1996
Dec	1.63	1.52	1.36	1971	15	3.84	1971	.20	1997
Ann	26.73	26.91	3.13	Aug 1990	19	8.25	Sep 1986	.00	Feb 1995

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.1	5.0	.6	.1
Feb	7.2	4.1	.4	@
Mar	8.5	5.2	.9	.1
Apr	8.9	5.8	1.2	.1
May	9.1	6.4	1.4	.2
Jun	9.0	6.0	1.9	.3
Jul	8.8	5.8	1.9	.7
Aug	9.8	7.3	2.3	.6
Sep	10.0	6.7	1.6	.6
Oct	10.0	5.9	1.3	.3
Nov	10.5	5.6	.8	.1
Dec	9.7	5.2	.7	.1
Ann	111.6	69.0	15.0	3.2

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	.57	.72	.94	1.12	1.29	1.47	1.67	1.89	2.18	2.63	3.04
Feb	.24	.41	.61	.77	.92	1.08	1.25	1.46	1.72	2.13	2.51
Mar	.34	.50	.76	.99	1.22	1.48	1.76	2.11	2.56	3.29	3.99
Apr	.75	.94	1.23	1.46	1.69	1.92	2.18	2.47	2.84	3.42	3.96
May	.85	1.07	1.39	1.66	1.92	2.18	2.47	2.81	3.24	3.90	4.51
Jun	.73	.98	1.36	1.68	2.01	2.34	2.71	3.15	3.72	4.62	5.46
Jul	1.01	1.29	1.70	2.04	2.37	2.71	3.08	3.52	4.07	4.93	5.72
Aug	.89	1.22	1.73	2.18	2.62	3.08	3.60	4.22	5.02	6.29	7.47
Sep	1.01	1.28	1.68	2.01	2.33	2.66	3.01	3.43	3.96	4.78	5.54
Oct	.67	.89	1.21	1.49	1.76	2.04	2.35	2.71	3.19	3.93	4.61
Nov	.57	.75	1.03	1.26	1.49	1.73	1.99	2.30	2.70	3.33	3.91
Dec	.38	.54	.77	.99	1.20	1.43	1.68	1.98	2.37	3.00	3.59
Ann	20.94	22.10	23.57	24.67	25.63	26.55	27.50	28.53	29.78	31.57	33.09

\+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: MIO HYDRO PLANT, MI **COOP ID: 205531**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 960 Feet** **Lat: 44°40N** **Lon: 84°08W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	17.5	14.4	9	7
Feb	10.1	9.0	11	8
Mar	10.8	10.0	7	5
Apr	3.1	2.0	1	#
May	.3	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.2	.0	#	0
Nov	5.1	4.5	1	#
Dec	13.5	14.0	4	3
Ann	60.6	53.9	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	17.0	1978	26	36.0	1978	34	1979	28	25	1979
Feb	10.0	1981	11	20.0	1985	38	1979	20	33	1979
Mar	11.5	1971	19	28.7	1971	33	1971	20	26	1971
Apr	8.0	1973	10	11.0	1979	23	1971	1	11	1972
May	3.0	1979	1	5.0	1979	4	1994	1	4	1994
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	#	1975	13	#	1975	0	0	0	0	0
Oct	3.0	1976	22	4.0	1976	3	1997	27	#+	1997
Nov	5.5	1977	25	13.9	1971	14	1995	29	4	1995
Dec	10.0	1971	30	32.1	1972	16	1972	30	13	1995
Ann	17.0	Jan 1978	26	36.0	Jan 1978	38	Feb 1979	20	33	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.3	5.7	1.6	.6	.1
Feb	6.3	3.8	.7	.2	@
Mar	5.3	3.3	1.0	.5	@
Apr	1.9	1.1	.3	.1	.0
May	.2	.2	@	.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	.3	@	@	.0	.0
Nov	3.1	1.6	.4	@	.0
Dec	7.5	4.6	1.1	.4	@
Ann	33.9	20.3	5.1	1.8	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	29.2	27.0	22.0	13.7
Feb	26.8	24.1	19.4	12.8
Mar	20.6	16.8	14.4	9.4
Apr	4.5	2.7	1.9	1.1
May	.1	.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	4.5	1.8	.6	.0
Dec	21.2	13.5	8.2	3.0
Ann	106.9	85.9	66.5	40.0

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: MIO HYDRO PLANT, MI **COOP ID: 205531**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 960 Feet** **Lat: 44˚40N** **Lon: 84˚08W**

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	6/19	6/15	6/12	6/09	6/07	6/05	6/02	5/30	5/26
32	6/11	6/06	6/02	5/30	5/27	5/24	5/21	5/17	5/12
28	5/21	5/18	5/15	5/13	5/10	5/08	5/06	5/03	4/29
24	5/06	5/02	4/29	4/27	4/25	4/23	4/20	4/18	4/14
20	4/24	4/21	4/18	4/16	4/15	4/13	4/11	4/08	4/05
16	4/18	4/13	4/10	4/07	4/04	4/02	3/30	3/27	3/22

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	8/28	9/02	9/05	9/08	9/11	9/14	9/17	9/21	9/26
32	9/11	9/15	9/18	9/20	9/22	9/25	9/27	9/30	10/04
28	9/21	9/26	9/30	10/03	10/06	10/09	10/13	10/16	10/22
24	9/29	10/07	10/12	10/16	10/20	10/24	10/29	11/03	11/10
20	10/17	10/24	10/28	11/01	11/05	11/09	11/12	11/17	11/23
16	11/01	11/07	11/12	11/16	11/19	11/23	11/26	12/01	12/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	115	108	104	99	96	92	88	83	76
32	134	128	124	121	117	114	111	107	101
28	166	160	155	152	148	145	141	137	130
24	202	194	188	183	178	173	168	162	154
20	228	220	214	209	204	199	193	187	179
16	253	245	238	233	228	223	218	211	203

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: MIO HYDRO PLANT, MI **COOP ID: 205531**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 960 Feet** **Lat: 44˚40N** **Lon: 84˚08W**

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	1479	1297	1130	701	364	117	31	78	239	589	907	1282	8214
60	1324	1157	975	552	243	50	6	24	120	439	757	1127	6774
57	1231	1073	882	464	182	26	0	10	69	354	667	1034	5992
55	1169	1017	820	407	146	16	0	5	45	300	607	972	5504
50	1014	877	666	275	76	4	0	0	11	185	459	817	4384
32	475	399	208	18	0	0	0	0	0	6	67	325	1498

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	19	26	101	308	679	940	1125	1044	758	440	149	66	5655
55	0	0	0	6	113	266	412	336	113	21	0	0	1267
57	0	0	0	3	86	216	350	279	77	13	0	0	1024
60	0	0	0	1	54	150	263	200	38	5	0	0	711
65	0	0	0	0	21	67	133	99	7	0	0	0	327
70	0	0	0	0	6	20	50	35	1	0	0	0	112

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	30	156	464	715	891	817	541	245	55	4	0	1	31	187	651	1366	2257	3074	3615	3860	3915	3919
45	0	0	15	87	322	565	736	662	394	133	22	1	0	0	15	102	424	989	1725	2387	2781	2914	2936	2937
50	0	0	3	43	203	415	581	508	258	66	5	0	0	0	3	46	249	664	1245	1753	2011	2077	2082	2082
55	0	0	0	19	113	277	426	357	147	27	0	0	0	0	0	19	132	409	835	1192	1339	1366	1366	1366
60	0	0	0	10	58	158	278	214	65	4	0	0	0	0	0	10	68	226	504	718	783	787	787	787
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	24	121	304	456	578	529	337	152	29	1	0	0	24	145	449	905	1483	2012	2349	2501	2530	2531

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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