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: GLADWIN, MI **COOP ID: 203170**

Climate Division: MI 6 **NWS Call Sign:** **Elevation: 775 Feet** **Lat: 43˚59N** **Lon: 84˚29W**

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	27.3	9.3	18.3	57+	1950	25	26.9	1990	-23+	1981	4	9.5	1994	1448	0	.0	.0	.3	20.8	30.3	7.7
Feb	30.5	10.6	20.6	63+	1984	24	31.1	1998	-27	1996	3	9.7	1979	1245	0	.0	.0	.6	15.6	27.5	6.2
Mar	40.9	19.8	30.4	79	1990	16	40.0	2000	-14+	1962	2	23.2	1978	1075	0	.0	.0	7.5	5.5	27.3	1.9
Apr	54.6	31.0	42.8	90	1990	26	47.4+	1986	8+	1954	3	37.0	1972	666	0	.0	@	19.9	.4	16.6	.0
May	68.7	42.1	55.4	92+	1969	28	61.9	1991	22+	1961	2	47.6	1997	326	27	.0	.7	30.0	.0	4.2	.0
Jun	77.4	51.3	64.4	102	1971	28	69.2	1991	30+	1949	8	59.2	1972	95	77	.1	2.5	30.0	.0	.1	.0
Jul	82.1	55.9	69.0	101+	1988	7	73.0	1988	36+	1971	31	64.5	1992	25	149	.2	4.6	31.0	.0	.0	.0
Aug	79.5	54.1	66.8	100+	1955	21	71.6	1995	31	1982	28	62.7	1992	54	109	.0	2.2	31.0	.0	@	.0
Sep	71.0	45.8	58.4	98	1953	2	63.1	1998	24	1951	29	53.0	1974	213	15	.0	.4	30.0	.0	1.7	.0
Oct	58.9	34.7	46.8	87	1963	6	54.1	1971	11	1972	17	41.3	1972	565	0	.0	.0	25.2	.0	11.0	.0
Nov	44.2	26.6	35.4	77	1950	1	41.5	1999	-8	1950	24	29.4	1976	889	0	.0	.0	9.3	2.8	22.2	@
Dec	32.5	16.9	24.7	69	2001	6	32.2	1982	-19+	1951	19	14.4	1989	1250	0	.0	.0	1.7	14.5	29.2	2.6
Ann	55.6	33.2	44.4	102	Jun 1971	28	73.0	Jul 1988	-27	Feb 1996	3	9.5	Jan 1994	7851	377	.3	10.4	216.5	59.6	170.1	18.4

\+ 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

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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	1.92	1.70	1.76	1982	5	3.99	1995	.42	1977
Feb	1.31	1.15	1.50	1997	22	2.93	1971	.24	1987
Mar	2.24	2.21	2.30	1976	5	5.70	1976	.68	1978
Apr	2.54	2.38	1.96	1966	18	6.55	1991	1.05	1972
May	2.89	2.80	2.22	2000	9	6.23	2000	.14	1977
Jun	3.25	3.39	3.32	1954	19	6.49	1996	.90	1977
Jul	2.83	2.51	3.71	1975	19	6.52	1999	.50	1993
Aug	3.69	3.32	4.25	1998	8	10.26	1972	1.33	1971
Sep	3.48	3.48	4.30	1986	11	13.64	1986	.01	1979
Oct	2.59	2.53	3.03	1991	5	6.66	1991	.85+	1975
Nov	2.52	2.27	1.80	1965	26	5.97	1988	.47	1986
Dec	2.08	1.95	2.17	1971	10	5.93	1971	.57	1976
Ann	31.34	31.39	4.30	Sep 1986	11	13.64	Sep 1986	.01	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.6	5.0	.8	.3
Feb	7.8	3.7	.6	.1
Mar	9.2	5.4	1.4	.3
Apr	10.2	5.9	1.6	.4
May	9.7	6.3	2.1	.5
Jun	9.4	6.2	2.4	.8
Jul	8.7	5.5	1.9	.7
Aug	10.3	6.8	2.3	.9
Sep	11.0	7.1	2.4	.6
Oct	10.0	5.7	1.9	.5
Nov	10.5	5.9	1.5	.5
Dec	10.2	5.4	1.0	.2
Ann	117.6	68.9	19.9	5.8

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	.61	.79	1.06	1.29	1.51	1.74	2.00	2.29	2.67	3.27	3.81
Feb	.31	.44	.63	.80	.97	1.14	1.34	1.58	1.89	2.39	2.85
Mar	.62	.83	1.16	1.44	1.71	2.00	2.32	2.69	3.18	3.94	4.66
Apr	.94	1.18	1.52	1.81	2.08	2.35	2.65	3.00	3.45	4.13	4.76
May	.58	.84	1.27	1.66	2.05	2.47	2.95	3.52	4.28	5.50	6.65
Jun	1.10	1.40	1.85	2.23	2.60	2.98	3.39	3.87	4.48	5.44	6.31
Jul	.86	1.13	1.53	1.87	2.21	2.56	2.94	3.39	3.97	4.88	5.72
Aug	1.28	1.63	2.14	2.57	2.97	3.40	3.86	4.39	5.08	6.14	7.11
Sep	.44	.71	1.21	1.69	2.20	2.77	3.43	4.25	5.36	7.17	8.94
Oct	.75	.99	1.36	1.68	2.00	2.32	2.68	3.11	3.66	4.52	5.32
Nov	.65	.89	1.25	1.58	1.89	2.23	2.60	3.04	3.62	4.53	5.38
Dec	.59	.79	1.09	1.35	1.60	1.87	2.16	2.51	2.95	3.66	4.31
Ann	23.71	25.22	27.13	28.57	29.84	31.06	32.32	33.70	35.36	37.75	39.81

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	13.9	13.8	7	7
Feb	8.8	8.2	7	4
Mar	7.8	6.6	3	2
Apr	2.0	1.0	#	#
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	.3	.0	#	0
Nov	4.0	4.0	#	#
Dec	8.8	8.6	3	2
Ann	45.6	42.2	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	13.0	1978	27	27.6	1994	23+	1978	27	13	1976
Feb	12.0	1974	22	18.1	1985	24	1976	4	18	1985
Mar	12.0	1971	19	17.0	1985	30	1971	19	18	1971
Apr	6.0	1975	3	8.0	1996	7	1996	5	1	1996
May	.8	1994	1	.8	1994	1	1994	1	#	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	.0	0	0	.0	0	0	0	0	0	0
Oct	6.0	1997	27	6.0	1997	6	1997	27	#+	1997
Nov	8.0	1995	28	12.4	1985	10	1985	10	2	1995
Dec	12.0	1971	30	17.1	1996	16	1972	16	10	2000
Ann	13.0	Jan 1978	27	27.6	Jan 1994	30	Mar 1971	19	18+	Feb 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.8	4.8	1.5	.5	.1
Feb	5.2	3.2	1.0	.3	@
Mar	4.2	2.9	1.0	.4	.1
Apr	1.0	.8	.3	.1	.0
May	@	.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	@	@	@	.0
Nov	2.4	1.6	.5	.2	.0
Dec	6.5	4.1	1.2	.4	.1
Ann	27.3	17.4	5.5	1.9	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	27.7	23.4	17.7	8.1
Feb	23.6	20.6	14.5	9.2
Mar	14.2	9.6	5.6	2.2
Apr	1.6	.6	.3	.0
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	@	@	@	.0
Nov	2.9	1.2	.5	@
Dec	17.1	9.9	5.5	2.3
Ann	87.1	65.3	44.1	21.8

+ 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	6/28	6/20	6/14	6/09	6/04	5/30	5/25	5/19	5/11
32	5/30	5/25	5/22	5/19	5/16	5/14	5/11	5/07	5/03
28	5/17	5/13	5/09	5/07	5/04	5/01	4/29	4/25	4/21
24	4/29	4/26	4/23	4/21	4/19	4/17	4/15	4/12	4/09
20	4/23	4/19	4/16	4/13	4/11	4/08	4/05	4/02	3/29
16	4/14	4/09	4/06	4/03	4/01	3/29	3/27	3/23	3/19

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	8/30	9/04	9/08	9/12	9/15	9/18	9/21	9/25	10/01
32	9/11	9/16	9/19	9/22	9/24	9/27	9/30	10/03	10/08
28	9/29	10/04	10/07	10/10	10/12	10/15	10/18	10/21	10/25
24	10/12	10/17	10/21	10/24	10/27	10/30	11/02	11/06	11/11
20	10/23	10/28	10/31	11/03	11/06	11/08	11/11	11/14	11/19
16	11/02	11/08	11/12	11/16	11/19	11/23	11/27	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	131	121	114	108	102	96	90	83	73
32	149	143	138	134	130	127	123	118	112
28	179	172	168	164	161	157	153	149	143
24	211	204	199	194	190	186	182	177	170
20	229	222	217	212	208	204	200	195	188
16	258	249	243	237	232	227	221	215	206

***** 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	1448	1245	1075	666	326	95	25	54	213	565	889	1250	7851
60	1293	1105	920	518	211	36	4	13	105	416	739	1095	6455
57	1200	1021	827	431	155	17	0	4	61	331	649	1002	5698
55	1138	965	765	374	123	10	0	1	40	279	589	940	5224
50	983	825	612	246	60	2	0	0	10	167	440	785	4130
32	444	355	171	12	0	0	0	0	0	4	59	290	1335

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	20	34	119	336	724	972	1148	1078	792	463	160	63	5909
55	0	0	0	8	134	291	435	366	142	25	0	0	1401
57	0	0	0	5	104	239	373	306	103	15	0	0	1145
60	0	0	0	2	68	167	284	222	57	6	0	0	806
65	0	0	0	0	27	77	149	109	15	0	0	0	377
70	0	0	0	0	9	23	60	38	2	0	0	0	132

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	0	43	186	512	761	921	857	577	261	61	5	0	0	43	229	741	1502	2423	3280	3857	4118	4179	4184
45	0	0	19	103	363	611	766	702	428	149	24	1	0	0	19	122	485	1096	1862	2564	2992	3141	3165	3166
50	0	0	6	52	235	461	611	547	291	74	7	0	0	0	6	58	293	754	1365	1912	2203	2277	2284	2284
55	0	0	1	27	134	319	456	395	173	27	1	0	0	0	1	28	162	481	937	1332	1505	1532	1533	1533
60	0	0	0	8	70	192	303	245	86	8	0	0	0	0	0	8	78	270	573	818	904	912	912	912
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	34	133	333	485	601	555	360	167	33	2	0	0	34	167	500	985	1586	2141	2501	2668	2701	2703

(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