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: MANISTEE 3 SE, MI **COOP ID: 205065**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 44˚13N** **Lon: 86˚18W**

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	30.0	17.1	23.6	58	1950	24	30.7	1989	-16+	1959	26	14.8	1994	1285	0	.0	.0	.4	19.1	29.9	1.7
Feb	33.3	18.0	25.7	64+	2000	26	35.4	1998	-22+	1963	26	17.2	1978	1102	0	.0	.0	.8	14.3	26.3	2.1
Mar	42.3	24.6	33.5	78	1986	30	41.3	2000	-21	1962	2	27.6	1996	977	0	.0	.0	7.2	5.6	24.9	.6
Apr	55.0	34.3	44.7	86	1970	29	52.2	1986	10	1982	7	37.8	1992	612	1	.0	.0	18.5	.2	13.0	.0
May	67.4	43.9	55.7	91	1962	29	63.4	1977	21+	1950	2	49.0	1997	323	34	.0	.1	29.2	.0	2.9	.0
Jun	76.4	52.7	64.6	97	1952	16	69.4	1971	27	1992	22	59.7	1972	98	85	.0	.6	29.9	.0	@	.0
Jul	80.7	58.3	69.5	99	1955	26	73.7	1987	33	1992	21	61.2	1992	30	170	.0	1.5	31.0	.0	.0	.0
Aug	78.5	57.7	68.1	98+	1955	21	74.8	1988	31	1992	29	60.1	1992	56	152	.0	.8	31.0	.0	@	.0
Sep	71.4	51.2	61.3	97	1953	2	65.9	1971	23	1992	23	55.7	1993	143	32	.0	.1	29.9	.0	.5	.0
Oct	59.9	41.9	50.9	85+	1968	16	59.7	1971	17	1976	27	46.6	1988	441	4	.0	.0	25.6	.1	4.5	.0
Nov	46.0	32.6	39.3	73	1950	1	44.9	1975	-8	1950	25	31.5	1995	771	0	.0	.0	9.4	2.8	17.0	.0
Dec	34.3	22.7	28.5	64	2001	6	36.2	1982	-14	1976	31	19.4	1989	1132	0	.0	.0	1.1	12.2	27.3	.4
Ann	56.3	37.9	47.1	99	Jul 1955	26	74.8	Aug 1988	-22+	Feb 1963	26	14.8	Jan 1994	6970	478	.0	3.1	214.0	54.3	146.3	4.8

\+ 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	2.13	1.85	2.60	1982	5	5.83	1982	.60	1984
Feb	1.41	1.26	1.25	1997	21	3.83	1985	.23	1987
Mar	2.12	1.91	2.26	1998	31	5.83	1976	.11	1994
Apr	2.78	2.77	1.82	1993	20	5.95	1993	.88	1997
May	2.62	2.38	2.40	1989	31	5.82	1983	.49	1988
Jun	3.28	3.33	3.90	1969	26	8.81	1990	.63	1971
Jul	3.05	2.84	3.67	1982	17	7.57	1982	.33	1981
Aug	3.94	3.94	3.30	1959	21	8.29	1987	1.31	1992
Sep	3.57	3.09	2.85	1986	10	10.28	1986	.25	1979
Oct	3.26	3.42	2.43	2001	14	6.76	1991	1.35+	2000
Nov	2.89	2.61	2.45	1984	1	7.91	1988	.22	1986
Dec	2.28	2.29	1.40	1982	5	4.50	1982	.31	1994
Ann	33.33	33.35	3.90	Jun 1969	26	10.28	Sep 1986	.11	Mar 1994

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.9	5.8	.8	@
Feb	11.2	4.3	.5	.1
Mar	10.9	5.7	1.2	.2
Apr	11.6	6.5	1.6	.4
May	9.9	6.2	1.5	.4
Jun	9.4	6.1	2.2	.9
Jul	8.8	5.1	1.9	.9
Aug	10.2	6.4	2.4	.9
Sep	11.7	7.2	2.2	.7
Oct	12.0	7.1	1.9	.6
Nov	13.0	7.4	1.6	.4
Dec	15.2	6.1	1.0	.2
Ann	139.8	73.9	18.8	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	.72	.92	1.22	1.47	1.71	1.95	2.22	2.54	2.94	3.57	4.15
Feb	.34	.47	.67	.86	1.04	1.23	1.45	1.70	2.04	2.57	3.07
Mar	.28	.45	.76	1.05	1.36	1.71	2.10	2.59	3.26	4.34	5.39
Apr	1.31	1.55	1.89	2.15	2.40	2.65	2.92	3.22	3.61	4.18	4.70
May	.72	.97	1.34	1.67	2.00	2.33	2.71	3.15	3.73	4.63	5.48
Jun	.87	1.18	1.65	2.07	2.48	2.91	3.39	3.96	4.69	5.86	6.95
Jul	.59	.86	1.31	1.72	2.14	2.59	3.10	3.71	4.53	5.84	7.09
Aug	1.49	1.85	2.38	2.82	3.23	3.66	4.12	4.65	5.33	6.38	7.33
Sep	.85	1.18	1.70	2.17	2.63	3.12	3.67	4.32	5.18	6.54	7.81
Oct	1.17	1.48	1.92	2.30	2.65	3.01	3.41	3.87	4.46	5.36	6.19
Nov	.75	1.03	1.44	1.81	2.18	2.56	2.98	3.48	4.14	5.17	6.14
Dec	.81	1.03	1.34	1.60	1.85	2.10	2.38	2.70	3.12	3.76	4.34
Ann	26.82	28.14	29.79	31.03	32.11	33.14	34.20	35.35	36.74	38.71	40.40

\+ 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	36.3	31.6	14	8
Feb	16.8	15.6	12	5
Mar	10.3	9.0	3	1
Apr	1.2	.0	#	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	.1	.0	#	0
Nov	4.6	2.0	#	#
Dec	16.6	15.5	3	2
Ann	85.9	73.7	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	16.0	1982	5	57.0	1979	69	1979	26	45	1979
Feb	9.0	1975	28	31.1	1972	75	1982	13	60	1982
Mar	9.0	1971	19	30.0	1972	42	1982	4	18	1982
Apr	5.0	1973	9	9.0	1973	9	1973	10	1	1973
May	#	1983	16	#+	1983	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	1974	19	2.0	1974	1	1989	19	#	1989
Nov	4.0	1977	25	12.0	1971	8	1977	28	3	1988
Dec	9.0	1977	10	31.0	1977	24	1977	11	10	1989
Ann	16.0	Jan 1982	5	57.0	Jan 1979	75	Feb 1982	13	60	Feb 1982

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	11.4	9.4	3.2	1.7	.4
Feb	6.8	5.9	1.8	.6	.0
Mar	4.1	3.1	1.0	.1	.0
Apr	.4	.4	.2	.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	.1	.1	.0	.0	.0
Nov	1.9	1.6	.3	.0	.0
Dec	6.5	5.4	1.6	.3	.0
Ann	31.2	25.9	8.1	2.8	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	7.9	5.8	4.2	1.9
Apr	.6	.4	.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	1.8	.4	.3	.0
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

+ 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	6/20	6/13	6/07	6/03	5/29	5/25	5/20	5/15	5/07
32	5/29	5/24	5/20	5/17	5/14	5/11	5/08	5/04	4/29
28	5/22	5/15	5/11	5/07	5/03	4/29	4/25	4/20	4/13
24	5/05	4/29	4/25	4/21	4/18	4/14	4/10	4/06	3/31
20	4/21	4/15	4/11	4/08	4/04	4/01	3/29	3/25	3/19
16	4/07	4/02	3/29	3/25	3/22	3/19	3/16	3/12	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	9/01	9/09	9/14	9/18	9/23	9/27	10/01	10/07	10/14
32	9/17	9/24	9/29	10/04	10/08	10/13	10/17	10/22	10/30
28	10/06	10/12	10/17	10/21	10/24	10/28	11/01	11/05	11/11
24	10/20	10/27	11/01	11/06	11/10	11/14	11/19	11/24	12/01
20	11/06	11/12	11/17	11/21	11/25	11/29	12/03	12/08	12/15
16	11/19	11/25	11/29	12/03	12/07	12/10	12/14	12/19	12/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	152	140	131	123	116	109	101	92	80
32	178	167	160	153	147	140	134	126	115
28	203	193	186	180	174	168	162	154	144
24	238	227	219	212	206	199	192	185	173
20	260	251	245	239	234	229	223	217	207
16	284	275	269	264	259	254	249	243	234

***** 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	1285	1102	977	612	323	98	30	56	143	441	771	1132	6970
60	1130	962	822	466	213	39	7	16	58	300	621	977	5611
57	1037	878	729	382	159	19	0	7	28	225	532	884	4880
55	975	822	667	329	128	11	0	3	16	182	473	822	4428
50	820	682	517	211	65	2	0	0	2	95	333	667	3394
32	296	236	110	9	0	0	0	0	0	1	31	201	884

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	34	58	156	388	734	977	1163	1119	879	586	250	92	6436
55	0	0	0	18	149	298	450	409	205	54	2	0	1585
57	0	0	0	11	118	246	388	351	157	36	1	0	1308
60	0	0	0	5	79	175	302	267	97	17	0	0	942
65	0	0	0	1	34	85	170	152	32	4	0	0	478
70	0	0	0	0	13	28	79	72	6	0	0	0	198

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	5	52	183	483	730	916	869	626	326	87	6	0	5	57	240	723	1453	2369	3238	3864	4190	4277	4283
45	0	0	23	102	340	580	761	714	476	198	35	2	0	0	23	125	465	1045	1806	2520	2996	3194	3229	3231
50	0	0	12	51	214	431	606	559	330	105	14	0	0	0	12	63	277	708	1314	1873	2203	2308	2322	2322
55	0	0	2	25	123	291	452	407	204	46	3	0	0	0	2	27	150	441	893	1300	1504	1550	1553	1553
60	0	0	0	8	58	170	301	258	107	17	0	0	0	0	0	8	66	236	537	795	902	919	919	919
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	33	112	293	457	607	564	369	169	37	1	0	1	34	146	439	896	1503	2067	2436	2605	2642	2643

(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