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: VANDERBILT 11 ENE, MI **COOP ID: 208417**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 925 Feet** **Lat: 45˚10N** **Lon: 84˚26W**

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	25.1	4.7	14.9	55	1996	19	25.0	1990	-40	1951	30	4.3	1994	1554	0	.0	.0	.1	23.9	30.8	11.5
Feb	28.0	3.2	15.6	60+	1984	24	28.5	1998	-43+	1979	17	3.8	1979	1384	0	.0	.0	.7	19.2	27.7	12.4
Mar	37.9	13.3	25.6	79	2000	9	35.6	2000	-35	1962	1	18.4	1972	1222	0	.0	.0	4.6	9.5	29.1	6.1
Apr	52.1	26.5	39.3	90	1986	28	45.5	1986	-13	1954	4	32.4	1972	771	0	.0	@	17.2	1.4	22.5	.3
May	67.3	36.8	52.1	95	1998	16	59.6	1977	10	1966	7	45.5+	1997	419	18	.0	.5	28.7	.0	12.1	.0
Jun	76.1	45.9	61.0	100	1991	28	66.9	1995	20	1949	8	55.4	1982	161	41	@	2.1	29.9	.0	2.5	.0
Jul	80.3	50.4	65.4	100	1977	20	71.0	1983	27	1965	6	60.2	1992	79	89	@	3.2	31.0	.0	.1	.0
Aug	77.2	48.8	63.0	99+	1948	25	68.4	1995	24	1976	30	59.1+	1976	127	65	.0	1.0	31.0	.0	.9	.0
Sep	67.5	41.4	54.5	98+	1953	2	58.2	1985	18	1989	27	49.3	1975	321	4	.0	.2	29.4	.0	7.0	.0
Oct	55.2	32.3	43.8	87	1953	3	50.6	1971	10	1975	30	39.0+	1976	659	0	.0	.0	21.3	.1	17.5	.0
Nov	41.0	24.6	32.8	75	1990	2	38.7	1999	-17	1951	27	26.7	1976	966	0	.0	.0	6.3	6.2	24.4	.4
Dec	29.7	13.2	21.5	63	2001	6	30.1	1982	-31+	1976	29	9.9	1989	1349	0	.0	.0	.8	18.7	30.3	5.7
Ann	53.1	28.4	40.8	100+	Jun 1991	28	71.0	Jul 1983	-43+	Feb 1979	17	3.8	Feb 1979	9012	217	.0	7.0	201.0	79.0	204.9	36.4

\+ 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

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: VANDERBILT 11 ENE, MI **COOP ID: 208417**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 925 Feet** **Lat: 45˚10N** **Lon: 84˚26W**

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	2.22	2.00	1.61	1990	26	4.77	1990	.60	1981
Feb	1.43	1.24	1.12	1971	20	3.50	1971	.48	1982
Mar	2.07	2.11	1.40	1975	22	4.92	1976	.36	1993
Apr	2.35	2.17	1.68	1965	12	5.99	1980	.55	1997
May	2.86	2.79	2.52	1963	8	8.66	1983	.68	1992
Jun	2.44	2.46	2.20	1949	25	5.45	1999	.11	1991
Jul	3.32	3.10	2.72	1974	4	6.96	1975	.40	1989
Aug	3.61	3.15	2.50	1995	18	6.49	1995	1.32	1986
Sep	3.41	3.16	3.40	1961	14	7.14	1986	.19	1979
Oct	2.88	2.40	2.48	1991	25	6.43	1983	.95	1971
Nov	2.40	2.10	1.62	1956	15	4.95	1992	.90	1986
Dec	2.23	2.20	1.53	1971	15	4.66	1971	.52	1994
Ann	31.22	31.14	3.40	Sep 1961	14	8.66	May 1983	.11	Jun 1991

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.7	7.2	.7	.1
Feb	10.5	4.3	.4	.1
Mar	10.5	6.0	1.0	.1
Apr	9.5	6.0	1.4	.2
May	9.7	6.1	1.4	.6
Jun	10.1	5.8	1.6	.4
Jul	9.1	6.2	2.3	.7
Aug	10.6	6.9	2.5	.9
Sep	12.0	7.4	2.2	.5
Oct	12.5	7.4	1.4	.3
Nov	12.6	6.9	1.0	.2
Dec	15.3	6.8	.7	.1
Ann	138.1	77.0	16.6	4.2

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	.85	1.06	1.35	1.60	1.83	2.07	2.33	2.63	3.01	3.59	4.13
Feb	.46	.59	.79	.97	1.13	1.30	1.49	1.71	2.00	2.44	2.85
Mar	.62	.82	1.11	1.36	1.61	1.87	2.15	2.48	2.90	3.57	4.19
Apr	.78	1.00	1.33	1.60	1.87	2.15	2.45	2.80	3.26	3.96	4.61
May	.78	1.05	1.47	1.83	2.18	2.55	2.96	3.45	4.08	5.08	6.01
Jun	.58	.81	1.16	1.48	1.80	2.13	2.51	2.96	3.55	4.48	5.36
Jul	.97	1.29	1.76	2.17	2.57	2.99	3.45	3.99	4.69	5.78	6.80
Aug	1.47	1.80	2.27	2.65	3.02	3.38	3.78	4.24	4.82	5.70	6.51
Sep	1.06	1.38	1.86	2.28	2.68	3.09	3.55	4.09	4.78	5.86	6.86
Oct	1.08	1.35	1.74	2.06	2.37	2.68	3.02	3.41	3.91	4.68	5.38
Nov	.85	1.08	1.41	1.68	1.95	2.21	2.51	2.85	3.29	3.96	4.58
Dec	.73	.94	1.25	1.51	1.77	2.03	2.32	2.66	3.09	3.77	4.39
Ann	24.35	25.73	27.47	28.77	29.92	31.02	32.14	33.37	34.86	36.98	38.80

\+ 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: VANDERBILT 11 ENE, MI **COOP ID: 208417**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 925 Feet** **Lat: 45°10N** **Lon: 84°26W**

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	23.7	22.9	14	14	19.0	1990	26	39.7	1997	40	1978	27	26	1979	13.5	8.6	2.5	1.0	.2	27.4	26.8	25.8	21.3
Feb	14.7	12.7	18	17	11.5	1974	22	38.0	1971	37	1971	27	33	1971	9.6	5.5	1.6	.6	.1	27.7	27.7	26.2	21.0
Mar	9.4	7.6	15	14	10.0	1989	4	25.4	1998	37	1971	20	31	1971	6.6	3.3	1.3	.5	@	-9.9	-9.9	-9.9	-9.9
Apr	4.4	3.7	3	1	11.0	1973	10	11.0	1973	30	1971	2	14	1975	2.4	1.4	.5	.2	@	6.6	5.1	4.2	2.0
May	.5	.0	#	0	4.3	1994	1	4.3	1994	4	1994	1	4	1994	.2	.1	.1	.0	.0	.1	@	.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	1.0	.0	#	0	4.0	1992	18	7.5	1972	3	1992	19	2	1988	.7	.4	.1	.0	.0	.4	.0	.0	.0
Nov	10.0	10.0	1	1	13.0	1990	6	22.8	1989	13	1990	6	5	1995	5.6	3.4	1.1	.6	.1	7.6	3.4	2.5	.4
Dec	23.4	24.0	6	5	15.0	1971	30	41.9	1983	20+	1985	29	15+	1995	12.4	7.9	2.4	.8	.1	24.2	19.8	15.0	6.6
Ann	87.1	80.9	N/A	N/A	19.0	Jan 1990	26	41.9	Dec 1983	40	Jan 1978	27	33	Feb 1971	51.0	30.6	9.6	3.7	.5	-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

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: VANDERBILT 11 ENE, MI **COOP ID: 208417**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 925 Feet** **Lat: 45˚10N** **Lon: 84˚26W**

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	7/30	7/22	7/16	7/11	7/07	7/02	6/27	6/22	6/14
32	7/05	6/28	6/23	6/19	6/15	6/11	6/07	6/03	5/27
28	6/15	6/10	6/06	6/03	5/31	5/28	5/25	5/21	5/16
24	5/22	5/18	5/15	5/13	5/11	5/08	5/06	5/03	4/29
20	5/13	5/08	5/05	5/02	4/29	4/27	4/24	4/21	4/16
16	4/27	4/23	4/20	4/18	4/16	4/14	4/11	4/09	4/05

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	8/03	8/08	8/12	8/16	8/19	8/22	8/26	8/30	9/04
32	8/13	8/19	8/24	8/28	9/01	9/04	9/08	9/13	9/20
28	9/04	9/10	9/14	9/18	9/21	9/25	9/28	10/03	10/09
24	9/18	9/25	9/29	10/03	10/07	10/10	10/14	10/19	10/25
20	10/13	10/18	10/22	10/25	10/28	10/31	11/03	11/07	11/12
16	10/21	10/28	11/01	11/05	11/09	11/13	11/17	11/22	11/28

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	76	64	56	49	43	36	29	21	9
32	106	96	88	82	77	71	65	57	47
28	136	128	122	117	112	108	103	97	89
24	172	164	158	153	148	144	139	133	125
20	204	196	190	185	181	176	171	166	158
16	232	223	217	212	207	202	196	190	181

***** 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: VANDERBILT 11 ENE, MI **COOP ID: 208417**

Climate Division: MI 4 **NWS Call Sign:** **Elevation: 925 Feet** **Lat: 45˚10N** **Lon: 84˚26W**

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	1554	1384	1222	771	419	161	79	127	321	659	966	1349	9012
60	1399	1244	1067	622	292	78	22	53	190	506	816	1194	7483
57	1306	1160	974	535	227	44	9	25	126	416	726	1101	6649
55	1244	1104	912	477	189	28	5	15	91	359	666	1039	6129
50	1089	964	757	341	110	8	0	2	33	229	516	884	4933
32	545	481	266	39	3	0	0	0	0	8	87	375	1804

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	22	67	258	625	870	1032	961	673	372	111	49	5054
55	0	0	0	6	98	208	324	262	74	10	0	0	982
57	0	0	0	4	74	164	266	211	49	5	0	0	773
60	0	0	0	1	45	108	187	145	23	2	0	0	511
65	0	0	0	0	18	41	89	65	4	0	0	0	217
70	0	0	0	0	5	10	27	20	0	0	0	0	62

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	18	118	394	641	796	721	444	174	36	2	0	0	18	136	530	1171	1967	2688	3132	3306	3342	3344
45	0	0	5	65	267	493	641	567	304	95	11	0	0	0	5	70	337	830	1471	2038	2342	2437	2448	2448
50	0	0	0	34	165	351	486	414	187	46	3	0	0	0	0	34	199	550	1036	1450	1637	1683	1686	1686
55	0	0	0	18	91	219	333	272	102	18	0	0	0	0	0	18	109	328	661	933	1035	1053	1053	1053
60	0	0	0	6	46	123	197	148	48	3	0	0	0	0	0	6	52	175	372	520	568	571	571	571
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	18	102	291	421	521	475	288	121	24	0	0	0	18	120	411	832	1353	1828	2116	2237	2261	2261

(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