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: BAD AXE, MI **COOP ID: 200417**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 715 Feet** **Lat: 43˚48N** **Lon: 83˚00W**

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	13.6	20.4	64	1950	26	29.5	1990	-23	1951	30	10.8	1977	1384	0	.0	.0	.6	20.7	30.0	4.0
Feb	29.2	14.2	21.7	66	1999	12	31.3	1998	-21+	1959	2	11.5	1979	1212	0	.0	.0	.8	16.9	27.1	3.4
Mar	39.0	22.4	30.7	80	2000	9	39.5	2000	-13	1962	2	23.5	1978	1063	0	.0	.0	5.9	8.0	26.4	.6
Apr	52.0	32.6	42.3	88	1985	24	48.0	1985	8+	1954	3	36.4	1975	681	0	.0	.0	17.4	.5	15.6	.0
May	65.8	43.6	54.7	92	1977	22	61.2	1991	22	1966	8	47.1	1997	340	20	.0	.2	29.1	.0	1.8	.0
Jun	75.4	53.0	64.2	98	1971	28	69.0	1984	28	1949	8	59.1	1982	102	78	.0	1.9	30.0	.0	@	.0
Jul	80.1	58.1	69.1	101	1995	15	73.6	1987	37	1960	15	64.2	1992	21	148	.1	3.4	31.0	.0	.0	.0
Aug	77.6	56.3	67.0	100	1948	27	71.5	1995	34	1982	29	62.6	1992	52	112	.0	1.1	31.0	.0	.0	.0
Sep	69.8	49.5	59.7	97	1953	3	63.9	1998	26	1957	27	55.4	1993	177	16	.0	.4	29.9	.0	.3	.0
Oct	57.8	39.6	48.7	88	1951	4	56.7	1971	19+	1952	18	43.9	1980	508	2	.0	.0	24.6	@	5.8	.0
Nov	44.1	30.6	37.4	80	1950	1	44.1	1975	-7	1958	30	30.3	1995	830	0	.0	.0	9.0	2.5	19.3	.0
Dec	32.3	20.6	26.5	68	2001	6	34.7	1982	-8	1951	19	14.9	1989	1195	0	.0	.0	1.7	13.9	28.5	1.3
Ann	54.2	36.2	45.2	101	Jul 1995	15	73.6	Jul 1987	-23	Jan 1951	30	10.8	Jan 1977	7565	376	.1	7.0	211.0	62.5	154.8	9.3

\+ 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	1.89	1.58	1.68	1985	1	4.04	1985	.84	1981
Feb	1.61	1.46	2.02	1985	13	4.72	1997	.33	1995
Mar	2.34	2.07	1.99	1984	16	5.85	1976	.59	1978
Apr	2.76	2.72	1.62	1991	28	6.00	1991	.73	1997
May	2.89	2.56	2.87	2000	13	7.12	2000	.79	1988
Jun	2.91	2.66	2.09	1949	17	5.53	1994	.89	1995
Jul	3.04	2.94	2.85	1996	30	5.69	1994	.66	1983
Aug	3.68	3.56	2.86	1977	17	7.34	1977	.55	1976
Sep	3.75	3.28	6.46	1986	11	13.39	1986	.85	1979
Oct	2.54	2.47	1.92	1951	24	6.26	1988	.46	1982
Nov	2.80	3.06	2.25	1985	9	6.74	1985	.41	1986
Dec	2.22	2.05	2.26	1979	25	6.04	1972	.72	1993
Ann	32.43	30.90	6.46	Sep 1986	11	13.39	Sep 1986	.33	Feb 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.7	5.2	.7	.2
Feb	11.3	4.5	.7	.2
Mar	10.8	5.8	1.4	.3
Apr	11.7	6.9	1.5	.6
May	10.6	6.5	1.8	.5
Jun	10.2	6.4	1.5	.5
Jul	9.1	5.9	2.0	.6
Aug	10.0	6.5	2.2	1.0
Sep	11.4	7.2	2.6	.7
Oct	11.4	6.0	1.6	.3
Nov	12.8	6.7	1.7	.4
Dec	13.9	6.3	.8	.1
Ann	137.9	73.9	18.5	5.4

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	.73	.91	1.16	1.37	1.56	1.76	1.98	2.23	2.55	3.03	3.48
Feb	.41	.57	.80	1.01	1.21	1.42	1.66	1.94	2.31	2.89	3.43
Mar	.59	.81	1.15	1.45	1.75	2.06	2.41	2.83	3.37	4.23	5.04
Apr	1.04	1.30	1.67	1.97	2.26	2.56	2.89	3.26	3.74	4.47	5.15
May	.95	1.22	1.62	1.97	2.30	2.64	3.01	3.45	4.01	4.88	5.68
Jun	1.11	1.38	1.77	2.09	2.39	2.70	3.04	3.43	3.93	4.69	5.39
Jul	1.21	1.49	1.89	2.22	2.53	2.85	3.19	3.58	4.08	4.85	5.55
Aug	1.13	1.48	2.00	2.45	2.88	3.33	3.83	4.41	5.16	6.33	7.41
Sep	.91	1.26	1.81	2.29	2.78	3.29	3.86	4.54	5.42	6.83	8.15
Oct	.82	1.06	1.41	1.72	2.01	2.31	2.64	3.03	3.53	4.30	5.02
Nov	.81	1.07	1.48	1.82	2.16	2.52	2.91	3.37	3.97	4.91	5.78
Dec	.67	.88	1.20	1.47	1.73	2.01	2.31	2.66	3.12	3.83	4.50
Ann	25.24	26.68	28.50	29.86	31.05	32.20	33.37	34.66	36.21	38.43	40.33

\+ 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	13.5	12.0	4	4
Feb	9.9	9.9	4	3
Mar	10.8	10.3	2	1
Apr	3.0	2.7	#	#
May	.1	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.7	.0	#	0
Nov	5.7	4.1	#	#
Dec	12.0	11.6	2	1
Ann	55.7	50.6	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	11.1	1979	14	34.5	1985	24	1985	25	14	1985
Feb	11.5	1982	1	22.7	1985	31	1985	17	20	1985
Mar	12.0	1971	7	29.5	1971	14	1973	18	5	1978
Apr	12.7	1975	3	14.2	1975	10	1975	3	1	1996
May	1.0	1994	1	1.0	1994	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	#	1974	22	#	1974	0	0	0	0	0
Oct	7.0	1976	28	7.2	1976	3	1976	28	#+	1997
Nov	7.3	1981	21	16.9	1971	6	1995	28	2	1995
Dec	9.3	2000	12	33.1	2000	21	2000	31	10	2000
Ann	12.7	Apr 1975	3	34.5	Jan 1985	31	Feb 1985	17	20	Feb 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	12.0	4.3	1.0	.3	@
Feb	9.3	3.3	.8	.3	.1
Mar	6.8	2.9	.9	.4	.1
Apr	2.7	.9	.2	@	@
May	.1	@	.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	.4	.2	.1	@	.0
Nov	4.4	1.6	.6	.2	.0
Dec	10.3	4.2	.9	.2	.0
Ann	46.0	17.4	4.5	1.4	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	22.9	16.5	11.2	1.9
Feb	22.1	14.1	8.6	2.0
Mar	12.2	5.3	2.7	.5
Apr	1.3	.3	.2	@
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	.1	@	.0	.0
Nov	3.5	1.1	.2	.0
Dec	16.1	6.7	2.7	.8
Ann	78.2	44.0	25.6	5.2

+ 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	6/06	6/01	5/28	5/25	5/22	5/19	5/16	5/13	5/08
32	5/20	5/15	5/12	5/09	5/06	5/04	5/01	4/28	4/23
28	5/06	5/02	4/29	4/26	4/24	4/22	4/19	4/16	4/12
24	4/23	4/20	4/17	4/15	4/13	4/11	4/09	4/06	4/03
20	4/15	4/11	4/07	4/04	4/01	3/30	3/27	3/23	3/18
16	4/05	3/31	3/28	3/25	3/22	3/19	3/16	3/12	3/07

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	140	135	132	129	127	124	122	118	114
32	178	171	166	162	158	154	149	144	137
28	206	199	194	189	185	181	177	171	164
24	236	227	221	216	211	205	200	194	185
20	256	248	243	238	233	229	224	218	210
16	278	271	266	261	257	253	248	243	235

***** 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	1384	1212	1063	681	340	102	21	52	177	508	830	1195	7565
60	1229	1072	908	532	220	41	2	12	77	361	680	1040	6174
57	1136	988	815	444	161	20	0	3	40	281	590	947	5425
55	1074	932	753	387	126	12	0	1	24	233	531	885	4958
50	919	792	599	255	61	2	0	0	4	132	385	730	3879
32	390	320	157	12	0	0	0	0	0	2	41	254	1176

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	29	32	116	321	703	967	1150	1083	829	519	201	82	6032
55	0	0	0	6	116	288	437	370	163	37	0	0	1417
57	0	0	0	3	88	237	375	311	119	23	0	0	1156
60	0	0	0	1	55	167	284	227	66	10	0	0	810
65	0	0	0	0	20	78	148	112	16	2	0	0	376
70	0	0	0	0	6	25	56	39	2	0	0	0	128

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	2	42	169	481	750	920	855	608	301	79	8	0	2	44	213	694	1444	2364	3219	3827	4128	4207	4215
45	0	0	20	94	341	600	765	700	461	183	37	3	0	0	20	114	455	1055	1820	2520	2981	3164	3201	3204
50	0	0	9	49	215	451	610	545	322	98	14	0	0	0	9	58	273	724	1334	1879	2201	2299	2313	2313
55	0	0	2	25	126	309	455	392	197	45	2	0	0	0	2	27	153	462	917	1309	1506	1551	1553	1553
60	0	0	0	12	63	188	306	247	101	13	0	0	0	0	0	12	75	263	569	816	917	930	930	930
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	31	104	290	466	604	552	362	165	38	1	0	0	31	135	425	891	1495	2047	2409	2574	2612	2613

(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