

Climatology of the United States

No. 20

1971-2000

Station: ALPENA WASTEWATER PL, MI

COOP ID: 200169

Climate Division: MI 4

NWS Call Sign:

Elevation: 590 Feet

Lat: 45°04N

Lon: 83°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	26.7	12.0	19.4	53	1950	10	28.8	1990	-21	1994	16	9.9	1994	1415	0	.0	.0	.1	21.4	30.4	4.7
Feb	28.1	12.1	20.1	62	1984	23	29.1	1998	-24	1979	18	9.8	1979	1258	0	.0	.0	.4	17.8	27.3	4.1
Mar	36.1	21.1	28.6	75	1998	31	37.4	2000	-13	1962	2	21.9	1972	1129	0	.0	.0	3.1	9.2	26.8	1.0
Apr	48.3	32.8	40.6	93	1990	27	45.2	1986	7	1954	3	35.2	1972	734	0	.0	@	13.7	1.0	14.8	.0
May	60.8	44.0	52.4	94	1969	28	58.2	1998	21	2000	21	46.1	1997	399	9	.0	.1	28.3	.0	1.9	.0
Jun	70.7	53.4	62.1	100	1995	20	67.5	1991	32	1990	5	57.1	1972	137	49	@	.8	30.0	.0	@	.0
Jul	76.7	59.4	68.1	100+	1988	7	73.0	1983	39+	2000	4	60.9	1992	37	130	.1	1.5	31.0	.0	.0	.0
Aug	75.3	57.9	66.6	100+	1948	25	70.4	1983	36	1982	29	62.8	1992	53	103	.0	.8	31.0	.0	.0	.0
Sep	67.7	50.1	58.9	99	1953	1	63.4	1998	29	1993	30	54.3	1993	196	13	.0	.2	29.8	.0	.2	.0
Oct	55.4	39.5	47.5	86	1971	1	54.6	1971	20	1969	23	42.7	1988	543	0	.0	.0	23.3	@	5.3	.0
Nov	42.5	29.4	36.0	77	1950	1	41.8	1975	1	1950	24	29.6	1995	871	0	.0	.0	6.6	3.1	19.3	.0
Dec	32.0	19.4	25.7	65	1982	3	32.0+	1998	-8+	1980	17	15.4	1989	1218	0	.0	.0	1.2	14.0	28.5	1.3
Ann	51.7	35.9	43.8	100+	Jun 1995	20	73.0	Jul 1983	-24	Feb 1979	18	9.8	Feb 1979	7990	304	.1	3.4	198.5	66.5	154.5	11.1

+ 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/normal/usnormals.html

Issue Date: February 2004

(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								Mean Number of Days (3)				Precipitation Probabilities (1)											
														Probability that the monthly/annual precipitation will be equal to or less than the indicated amount											
Means/Medians(1)		Extremes								Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels											
														These values were determined from the incomplete gamma distribution											
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95	
Jan	1.70	1.42	1.18	1978	26	5.37	1997	.55	1981	14.2	5.1	.6	.1	.45	.61	.86	1.07	1.28	1.51	1.75	2.05	2.43	3.03	3.59	
Feb	1.34	1.02	1.58	1998	17	3.75	1997	.33	1982	10.6	4.1	.5	@	.32	.44	.64	.81	.98	1.17	1.37	1.62	1.94	2.45	2.93	
Mar	1.86	1.84	1.61	1998	31	5.90	1998	.34	1993	10.7	4.9	1.0	.1	.42	.60	.87	1.11	1.36	1.62	1.91	2.26	2.72	3.44	4.13	
Apr	2.13	2.06	1.86	2001	11	4.11	1995	.65	1997	11.2	5.5	1.3	.1	.78	.98	1.27	1.51	1.74	1.98	2.23	2.53	2.90	3.49	4.02	
May	2.83	2.53	2.04	1983	7	7.71	1983	.85	1988	11.4	6.5	1.6	.4	.96	1.22	1.61	1.95	2.26	2.59	2.95	3.37	3.90	4.73	5.50	
Jun	2.58	2.63	2.40	1969	26	4.86	1989	.42	1991	10.8	5.8	1.5	.5	.68	.92	1.30	1.63	1.95	2.29	2.67	3.12	3.70	4.62	5.48	
Jul	3.17	3.13	2.57	1960	26	5.83	1974	.36	1989	10.3	6.3	2.0	.8	.84	1.14	1.60	2.01	2.40	2.82	3.28	3.83	4.55	5.67	6.72	
Aug	3.43	3.28	2.48	1965	9	7.38	1994	1.18	1974	11.2	6.9	2.4	.8	1.24	1.56	2.03	2.42	2.79	3.17	3.59	4.07	4.68	5.63	6.50	
Sep	3.10	2.74	3.34	1968	10	8.61	1986	.34	1979	12.3	6.6	1.6	.7	.83	1.13	1.57	1.97	2.35	2.76	3.21	3.74	4.44	5.53	6.54	
Oct	2.43	2.15	2.31	1991	4	6.61	1991	.64	1971	12.6	6.0	1.4	.3	.86	1.09	1.42	1.70	1.96	2.24	2.54	2.88	3.33	4.01	4.64	
Nov	2.02	1.97	2.07	1966	27	4.13	1992	.44	1986	12.3	6.0	1.0	.1	.71	.90	1.18	1.41	1.63	1.86	2.11	2.40	2.77	3.35	3.87	
Dec	1.84	1.73	1.42	1950	7	4.43	1972	.22	1993	13.5	5.7	.8	.1	.40	.57	.84	1.08	1.33	1.59	1.88	2.23	2.69	3.43	4.13	
Ann	28.43	28.23	3.34	Sep 1968	10	8.61	Sep 1986	.22	Dec 1993	141.1	69.4	15.7	4.0	22.06	23.33	24.95	26.15	27.21	28.23	29.27	30.42	31.80	33.77	35.46	

+ 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															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	14.8	11.8	10	10	12.0	1978	26	36.3	1978	30	1979	26	24	1979	9.1	6.1	1.5	.6	.1	26.7	22.1	17.2	10.1
Feb	11.7	11.3	11	8	12.0	1974	22	21.1	1974	50	1997	28	35	1997	6.5	4.2	1.4	.4	.1	24.3	21.7	16.4	7.4
Mar	9.0	6.0	6	5	14.0	1985	4	30.4	1971	53	1997	2	34	1997	4.1	3.2	1.1	.3	.1	13.7	11.0	9.8	4.7
Apr	2.4	2.0	#	#	8.0	1973	10	9.0	1973	9	1990	2	1	1993	1.3	.9	.1	.1	.0	1.7	.6	.1	.0
May	.2	.0	#	0	4.0	1974	6	4.0	1974	#+	1979	5	#+	1979	.1	.1	@	.0	.0	.0	.0	.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	.2	.0	#	0	4.0	1997	27	4.0	1997	4	1997	27	#+	1997	.1	.1	@	.0	.0	.1	.1	.0	.0
Nov	4.1	3.7	1	#	6.0	1977	28	16.0	1977	15	1977	28	4	1995	2.0	1.4	.6	.2	.0	3.7	1.5	.6	.2
Dec	13.8	12.2	4	2	17.0	2000	18	37.8	1972	34	2000	31	19	2000	6.8	4.7	1.4	.5	@	14.6	8.9	5.9	2.1
Ann	56.2	47.0	N/A	N/A	17.0	Dec 2000	18	37.8	Dec 1972	53	Mar 1997	2	35	Feb 1997	30.0	20.7	6.1	2.1	.3	84.8	65.9	50.0	24.5

+ Also occurred on an earlier date(s) #Denotes trace amounts

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-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	6/03	5/29	5/25	5/22	5/19	5/16	5/13	5/09	5/04
32	5/23	5/17	5/13	5/09	5/06	5/03	4/29	4/25	4/20
28	5/03	4/28	4/25	4/22	4/20	4/17	4/14	4/11	4/07
24	4/25	4/20	4/16	4/13	4/10	4/07	4/03	3/31	3/26
20	4/14	4/09	4/06	4/04	4/01	3/30	3/27	3/24	3/20
16	4/09	4/05	4/02	3/30	3/27	3/25	3/22	3/19	3/15
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	9/25	9/28	10/01	10/04	10/07	10/12
32	9/26	10/02	10/06	10/09	10/12	10/15	10/19	10/23	10/28
28	10/09	10/14	10/19	10/22	10/26	10/29	11/02	11/06	11/12
24	10/27	11/01	11/05	11/08	11/11	11/15	11/18	11/22	11/27
20	11/07	11/12	11/15	11/18	11/21	11/24	11/27	12/01	12/05
16	11/13	11/19	11/22	11/26	11/29	12/02	12/05	12/08	12/14
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	154	146	140	136	131	127	122	116	108
32	185	176	169	163	158	153	147	141	132
28	209	202	197	192	188	184	180	175	168
24	238	230	224	220	215	211	206	200	192
20	254	247	242	238	233	229	225	219	212
16	268	260	255	250	245	241	236	231	223

* 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)

Base	Heating Degree Days (1)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Below													
65	1415	1258	1129	734	399	137	37	53	196	543	871	1218	7990
60	1260	1118	974	584	266	61	7	11	90	394	721	1063	6549
57	1167	1034	881	496	198	32	1	3	49	309	631	970	5771
55	1105	978	819	437	159	19	0	0	30	258	571	908	5284
50	950	838	664	299	81	4	0	0	6	148	423	753	4166
32	415	357	180	18	0	0	0	0	0	2	52	266	1290

Cooling Degree Days (1)

Base	Cooling Degree Days (1)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Above													
32	22	23	75	274	633	902	1117	1073	807	482	170	71	5649
55	0	0	0	3	78	231	404	360	147	25	0	0	1248
57	0	0	0	2	56	184	343	301	105	14	0	0	1005
60	0	0	0	0	31	123	256	216	57	6	0	0	689
65	0	0	0	0	9	49	130	103	13	0	0	0	304
70	0	0	0	0	1	13	49	33	1	0	0	0	97

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	17	120	405	674	878	834	570	261	53	4	0	0	17	137	542	1216	2094	2928	3498	3759	3812	3816
45	0	0	5	58	258	524	723	679	420	144	21	1	0	0	5	63	321	845	1568	2247	2667	2811	2832	2833
50	0	0	0	24	148	374	568	524	280	66	4	0	0	0	0	24	172	546	1114	1638	1918	1984	1988	1988
55	0	0	0	9	73	236	413	371	157	25	0	0	0	0	0	9	82	318	731	1102	1259	1284	1284	1284
60	0	0	0	1	29	127	260	223	72	4	0	0	0	0	0	1	30	157	417	640	712	716	716	716
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	10	67	209	392	561	526	320	118	19	1	0	0	10	77	286	678	1239	1765	2085	2203	2222	2223

(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/normal/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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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