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: LAPEER WWTP, MI **COOP ID: 204655**

Climate Division: MI10 **NWS Call Sign:** **Elevation: 820 Feet** **Lat: 43˚04N** **Lon: 83˚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	28.5	13.0	20.8	66	1950	25	30.2	1990	-26	1984	11	9.9	1977	1371	0	.0	.0	1.0	19.2	29.6	4.8
Feb	31.4	13.8	22.6	68	1999	12	33.3	1998	-24	1994	10	11.2	1978	1188	0	.0	.0	2.0	14.2	26.5	3.9
Mar	42.3	22.3	32.3	81	2000	9	40.6	2000	-15	1978	2	24.9	1978	1013	0	.0	.0	9.1	5.1	25.1	.7
Apr	55.0	33.1	44.1	87	1960	23	48.6	1985	4	1965	3	37.6	1975	628	0	.0	.0	22.0	.3	14.0	.0
May	67.9	44.7	56.3	92+	1977	20	62.8	1998	23	1966	10	48.3	1997	300	29	.0	.2	30.3	.0	2.2	.0
Jun	77.1	53.8	65.5	100	1988	26	69.3	1988	31	1966	1	60.5	1977	78	92	@	1.9	30.0	.0	.1	.0
Jul	81.6	58.6	70.1	100+	1988	16	76.5	1988	36+	1960	15	66.1	1992	17	175	.1	4.0	31.0	.0	.0	.0
Aug	79.1	56.2	67.7	99	2001	9	73.7	1988	29	1976	30	63.4	1977	47	129	.0	1.9	31.0	.0	.1	.0
Sep	71.3	48.7	60.0	98	1953	3	65.0	1998	25	1959	17	55.2	1975	173	24	.0	.6	30.0	.0	.7	.0
Oct	59.2	38.0	48.6	89+	1953	3	57.0	1971	17+	1972	20	43.1	1977	512	3	.0	.0	26.8	@	7.5	.0
Nov	45.5	29.4	37.5	80	1950	1	43.6	1975	1	1950	24	29.6	1976	827	0	.0	.0	10.8	2.3	18.9	.0
Dec	33.9	19.8	26.9	69	2001	6	34.6	1982	-14	1963	31	15.0	1989	1182	0	.0	.0	2.5	12.4	28.3	1.8
Ann	56.1	36.0	46.0	100+	Jul 1988	16	76.5	Jul 1988	-26	Jan 1984	11	9.9	Jan 1977	7336	452	.1	8.6	226.5	53.5	153.0	11.2

\+ 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	1.53	1.16	1.33	1949	18	3.92	1998	.34	1971
Feb	1.12	.97	2.75	1954	16	3.26	1997	.05	1987
Mar	1.95	1.92	1.40	1949	31	4.21	1973	.53	1981
Apr	2.86	3.08	2.14	2000	21	5.06	1980	.68	1997
May	2.78	2.75	2.63	1996	21	5.53	1974	.41	1977
Jun	3.12	2.78	2.96	1996	18	6.61	1986	.58	1988
Jul	3.13	2.90	5.28	1948	21	7.77	2000	1.23	1974
Aug	3.46	3.45	2.71	1979	1	7.55	1975	1.03	1976
Sep	3.75	3.34	3.72	1981	4	9.78	1986	.24	1998
Oct	2.63	2.50	3.53	1981	1	6.68	1981	.53	1982
Nov	2.68	2.57	2.02	1952	17	4.94	1973	.62	1980
Dec	1.97	1.97	1.37	1979	25	4.37	1975	.32	1993
Ann	30.98	31.46	5.28	Jul 1948	21	9.78	Sep 1986	.05	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.5	4.8	.6	.2
Feb	7.4	3.6	.4	.1
Mar	8.4	5.6	1.1	.2
Apr	10.2	6.7	2.0	.6
May	9.3	6.2	1.7	.5
Jun	9.7	6.7	2.0	.5
Jul	8.9	6.0	2.0	.9
Aug	10.1	6.9	2.2	.7
Sep	9.7	6.8	2.7	.8
Oct	9.7	5.4	1.6	.4
Nov	10.0	6.1	1.9	.5
Dec	10.0	5.8	1.1	.2
Ann	112.9	70.6	19.3	5.6

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	.31	.45	.67	.88	1.09	1.31	1.56	1.87	2.27	2.91	3.53
Feb	.22	.32	.49	.64	.79	.96	1.14	1.36	1.66	2.13	2.58
Mar	.69	.87	1.14	1.37	1.58	1.80	2.04	2.32	2.68	3.23	3.74
Apr	.95	1.22	1.62	1.96	2.28	2.61	2.98	3.40	3.95	4.80	5.59
May	.78	1.05	1.45	1.80	2.14	2.49	2.88	3.35	3.95	4.90	5.78
Jun	1.03	1.33	1.76	2.13	2.49	2.86	3.26	3.73	4.33	5.27	6.13
Jul	1.12	1.42	1.84	2.20	2.54	2.89	3.27	3.71	4.28	5.15	5.95
Aug	1.32	1.64	2.10	2.49	2.85	3.22	3.63	4.09	4.69	5.60	6.43
Sep	.76	1.10	1.66	2.16	2.67	3.21	3.83	4.57	5.55	7.11	8.60
Oct	.80	1.05	1.42	1.74	2.05	2.38	2.73	3.15	3.69	4.54	5.32
Nov	.72	.97	1.36	1.70	2.03	2.38	2.77	3.23	3.83	4.77	5.65
Dec	.55	.74	1.02	1.27	1.51	1.76	2.04	2.37	2.80	3.47	4.10
Ann	22.81	24.41	26.46	28.00	29.37	30.68	32.04	33.53	35.34	37.95	40.19

\+ 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	7.1	6.3	4	3
Feb	7.5	7.4	3	2
Mar	6.0	4.8	1	#
Apr	.9	.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	.0	.0	#	0
Nov	1.9	1.0	#	#
Dec	9.9	7.8	2	1
Ann	33.3	27.3	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	6.5	1997	10	13.1	2000	19	1999	17	9+	1999
Feb	8.8	1982	1	21.8	1982	14+	1985	18	10	1982
Mar	7.0	1973	17	23.1	1971	12	1982	10	3	1996
Apr	4.0	1982	6	5.0	1982	4	1983	17	#+	2000
May	#	1976	3	#+	1976	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	1.0	1997	27	1.0	1997	1	1997	28	#	1997
Nov	4.5	1991	29	7.0	1971	8	1975	27	1	1975
Dec	14.0	2000	12	23.3	1975	17	2000	14	10	2000
Ann	14.0	Dec 2000	12	23.3	Dec 1975	19	Jan 1999	17	10+	Dec 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.9	3.9	.9	.1	.0
Feb	4.6	3.4	.7	.2	.0
Mar	2.9	2.0	.7	.3	.0
Apr	.6	.3	.1	.0	.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	@	@	.0	.0	.0
Nov	1.2	.8	.2	.0	.0
Dec	5.3	3.7	.8	.2	@
Ann	20.5	14.1	3.4	.8	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	17.2	12.1	5.3	.0
Feb	15.9	9.2	3.7	.3
Mar	5.4	3.0	1.7	.1
Apr	.5	.2	.0	.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	.1	.0	.0	.0
Nov	1.8	.6	.1	.0
Dec	13.2	7.1	3.9	.2
Ann	54.1	32.2	14.7	.6

+ 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	6/16	6/09	6/03	5/30	5/26	5/21	5/17	5/12	5/04
32	5/28	5/21	5/16	5/12	5/08	5/05	4/30	4/26	4/19
28	5/12	5/07	5/04	5/01	4/28	4/25	4/22	4/18	4/13
24	4/27	4/23	4/19	4/16	4/14	4/11	4/08	4/05	3/31
20	4/16	4/11	4/08	4/05	4/03	3/31	3/29	3/25	3/21
16	4/04	3/31	3/28	3/26	3/24	3/21	3/19	3/16	3/12

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	9/06	9/11	9/15	9/18	9/22	9/26	10/01	10/07
32	9/05	9/14	9/20	9/25	9/29	10/04	10/09	10/15	10/23
28	10/01	10/07	10/11	10/15	10/18	10/22	10/26	10/30	11/05
24	10/15	10/21	10/25	10/29	11/01	11/05	11/08	11/12	11/18
20	10/23	10/30	11/04	11/08	11/13	11/17	11/21	11/26	12/03
16	11/08	11/14	11/18	11/21	11/25	11/28	12/01	12/06	12/11

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	147	136	128	121	115	109	102	94	83
32	177	166	157	150	143	136	129	121	109
28	199	190	184	178	173	168	162	156	147
24	225	217	211	206	201	196	191	185	176
20	251	242	235	229	223	217	211	204	195
16	269	261	255	250	245	241	236	230	221

***** 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)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1371	1188	1013	628	300	78	17	47	173	512	827	1182	7336
60	1216	1048	858	480	189	27	1	11	79	367	677	1027	5980
57	1123	964	765	393	135	12	0	3	43	288	587	934	5247
55	1061	908	703	338	104	7	0	1	27	241	527	872	4789
50	906	768	552	212	47	1	0	0	6	141	383	721	3737
32	390	309	134	7	0	0	0	0	0	4	45	258	1147

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	42	45	144	368	752	1004	1181	1105	840	518	208	99	6306
55	0	0	0	9	143	320	468	393	178	42	1	0	1554
57	0	0	0	5	112	266	406	333	134	28	0	0	1284
60	0	0	0	2	73	191	314	248	80	14	0	0	922
65	0	0	0	0	29	92	175	129	24	3	0	0	452
70	0	0	0	0	9	30	76	51	3	0	0	0	169

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	2	7	66	228	550	797	953	888	640	326	94	15	2	9	75	303	853	1650	2603	3491	4131	4457	4551	4566
45	0	0	37	134	399	647	798	733	490	202	46	3	0	0	37	171	570	1217	2015	2748	3238	3440	3486	3489
50	0	0	17	73	269	497	643	578	346	110	19	1	0	0	17	90	359	856	1499	2077	2423	2533	2552	2553
55	0	0	5	37	160	350	489	424	220	50	4	0	0	0	5	42	202	552	1041	1465	1685	1735	1739	1739
60	0	0	1	15	83	218	335	273	121	17	0	0	0	0	1	16	99	317	652	925	1046	1063	1063	1063
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	48	146	344	512	635	581	397	191	52	7	0	1	49	195	539	1051	1686	2267	2664	2855	2907	2914

(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