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: IRON MTN-KINGSFORD WWTP, MI **COOP ID: 204090**

Climate Division: MI 1 **NWS Call Sign:** **Elevation: 1,060 Feet** **Lat: 45˚47N** **Lon: 88˚05W**

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	23.6	.6	12.1	51	1973	26	21.5	1990	-33	1996	31	3.0	1994	1639	0	.0	.0	.1	25.4	31.0	14.8
Feb	28.8	4.5	16.7	61	1976	24	29.4	1998	-39	1996	4	6.8	1979	1354	0	.0	.0	.7	18.0	27.7	10.5
Mar	38.9	16.1	27.5	77	2000	9	35.8	2000	-27+	1939	18	20.8	1989	1163	0	.0	.0	4.6	8.2	28.9	3.9
Apr	53.3	28.9	41.1	94	1980	22	47.1	1987	-6	1972	5	35.4	1972	718	0	.0	.1	18.0	1.0	20.1	@
May	67.8	40.9	54.4	100	1934	31	62.7	1977	16	1990	11	46.8	1997	357	27	.0	.4	29.4	.0	6.4	.0
Jun	76.3	50.4	63.4	100+	1931	29	69.0	1995	24	1949	8	56.9	1982	116	67	@	1.5	29.9	.0	.4	.0
Jul	80.4	55.4	67.9	103	1936	13	72.8	1983	35+	1939	16	62.2	1992	37	127	@	2.3	31.0	.0	.0	.0
Aug	78.0	53.8	65.9	101	1947	5	70.2	1983	30	1945	26	62.0	1986	69	96	.0	1.1	31.0	.0	.0	.0
Sep	68.7	44.9	56.8	98	1998	12	62.0	1998	19	1942	28	51.4	1974	255	8	.0	.3	29.6	.0	2.3	.0
Oct	56.3	34.0	45.2	88+	1947	15	52.3	1971	11+	1936	28	40.5	1988	616	0	.0	.0	22.4	.1	13.9	.0
Nov	40.0	22.4	31.2	75+	1975	5	38.6	1999	-10+	1976	29	23.8	1995	1014	0	.0	.0	5.6	7.0	25.8	.5
Dec	27.7	9.0	18.4	64	1998	4	27.3	1997	-26	1976	30	7.7	1989	1446	0	.0	.0	.4	20.9	30.5	8.1
Ann	53.3	30.1	41.7	103	Jul 1936	13	72.8	Jul 1983	-39	Feb 1996	4	3.0	Jan 1994	8784	325	.0	5.7	202.7	80.6	187.0	37.8

\+ 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: 1931-2001

(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	1.39	1.10	1.55	1996	19	4.01	1996	.26	1981
Feb	.89	.73	1.17	1999	12	2.35	1971	.05	1993
Mar	1.73	1.77	2.38	1998	30	3.88	1998	.27	1999
Apr	2.19	2.17	2.25	1951	1	5.11	1977	.23	1989
May	3.10	2.87	2.83	1976	16	6.68	1999	.39	1986
Jun	3.48	3.32	3.78	1951	17	6.49	1981	1.15	1972
Jul	3.62	3.13	4.05	1999	15	11.35	1999	1.14	1976
Aug	3.78	3.80	4.06	1941	29	6.85	1995	.74	1991
Sep	3.65	3.44	2.62	1931	20	6.27	1980	.81	1976
Oct	2.65	2.44	2.70	1983	12	5.22	1983	.52	1976
Nov	2.03	1.83	1.84	1985	2	5.42	1985	.38	1997
Dec	1.49	1.43	1.47	1959	28	3.51	1996	.18	1994
Ann	30.00	29.93	4.06	Aug 1941	29	11.35	Jul 1999	.05	Feb 1993

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.5	4.7	.4	@
Feb	7.1	2.8	.2	@
Mar	8.4	4.4	1.0	.2
Apr	9.2	5.5	1.5	.3
May	10.6	6.3	2.0	.9
Jun	12.0	7.9	2.0	.7
Jul	12.2	7.0	2.7	.5
Aug	12.1	7.9	2.7	.8
Sep	12.0	7.1	2.4	.9
Oct	11.0	5.8	1.6	.4
Nov	10.0	5.1	1.2	.2
Dec	9.6	4.2	.6	.0
Ann	124.7	68.7	18.3	4.9

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	.32	.45	.65	.83	1.01	1.20	1.42	1.68	2.02	2.56	3.07
Feb	.10	.16	.29	.41	.54	.69	.87	1.09	1.38	1.88	2.36
Mar	.29	.44	.70	.93	1.18	1.44	1.74	2.11	2.60	3.39	4.15
Apr	.53	.73	1.05	1.34	1.62	1.92	2.26	2.66	3.18	4.01	4.79
May	.82	1.11	1.56	1.96	2.35	2.75	3.21	3.75	4.45	5.55	6.59
Jun	1.43	1.75	2.19	2.56	2.91	3.26	3.64	4.08	4.64	5.48	6.25
Jul	1.21	1.56	2.06	2.49	2.90	3.32	3.78	4.32	5.01	6.09	7.08
Aug	1.60	1.94	2.42	2.81	3.18	3.56	3.96	4.42	5.00	5.89	6.70
Sep	1.15	1.50	2.01	2.45	2.87	3.31	3.79	4.36	5.09	6.22	7.27
Oct	.83	1.08	1.46	1.78	2.08	2.40	2.76	3.17	3.70	4.53	5.29
Nov	.49	.68	.97	1.23	1.50	1.77	2.08	2.45	2.94	3.70	4.42
Dec	.37	.51	.72	.91	1.11	1.31	1.53	1.80	2.15	2.70	3.22
Ann	22.51	23.99	25.86	27.28	28.52	29.72	30.95	32.31	33.94	36.30	38.33

\+ 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: 1931-2001
(3) Derived from 1971-2000 serially complete daily data

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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	16.3	15.5	12	11	17.0	1971	4	34.5	1976	38	1971	26	30	1971	10.2	5.5	1.6	.7	.1	30.7	29.7	28.0	19.8
Feb	8.6	6.6	13	11	8.5	1972	27	24.0	1971	39	1971	23	33	1971	6.0	3.4	.9	.4	.0	27.8	27.4	25.0	19.3
Mar	11.2	11.1	8	4	11.0	1997	14	23.6	1989	45	1972	7	27	1972	5.3	3.6	1.4	.6	.1	21.6	19.0	15.2	11.2
Apr	4.6	3.5	1	2	12.0	1977	4	19.0	1977	16	1972	1	6+	1996	2.0	1.5	.7	.2	@	4.6	3.3	2.4	1.1
May	.9	.0	#	0	8.0	1990	11	11.0	1990	8	1990	11	#	2000	.3	.3	.1	.1	.0	.2	.1	.1	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1997	.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	#	1984	29	#+	1984	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.2	.0	#	0	2.0	1989	20	2.5	1989	2+	1992	20	#	1995	.2	.1	.0	.0	.0	.2	.0	.0	.0
Nov	6.6	5.9	1	0	9.0	1992	26	20.8	1992	10+	1991	28	3	1991	4.6	2.8	.7	.1	.0	7.4	3.5	1.4	.1
Dec	15.0	14.7	5	5	12.0	1985	2	32.1	1996	27	1996	31	13	1995	8.8	4.8	1.8	.6	@	26.9	21.1	15.4	5.2
Ann	63.4	57.3	N/A	N/A	17.0	Jan 1971	4	34.5	Jan 1976	45	Mar 1972	7	33	Feb 1971	37.4	22.0	7.2	2.7	.2	119.4	104.1	87.5	56.7

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

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	9/03	9/06	9/09	9/11	9/14	9/16	9/19	9/24
32	9/10	9/14	9/17	9/19	9/21	9/23	9/26	9/28	10/02
28	9/19	9/24	9/27	9/30	10/03	10/06	10/09	10/13	10/17
24	9/30	10/05	10/09	10/13	10/16	10/19	10/22	10/26	10/31
20	10/15	10/21	10/24	10/27	10/30	11/02	11/06	11/09	11/14
16	10/27	11/01	11/04	11/07	11/10	11/13	11/16	11/19	11/24

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	118	110	104	100	95	91	86	80	73
32	134	128	124	120	117	113	110	105	99
28	166	160	155	151	148	144	141	136	130
24	192	185	179	175	170	166	161	156	148
20	219	211	206	201	197	193	188	183	175
16	240	232	226	221	217	212	208	202	194

***** 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	1639	1354	1163	718	357	116	37	69	255	616	1014	1446	8784
60	1484	1214	1008	570	240	49	7	19	137	464	864	1291	7347
57	1391	1130	915	484	182	25	1	7	83	376	774	1198	6566
55	1329	1074	853	428	148	15	0	3	57	321	714	1136	6078
50	1174	934	698	299	79	4	0	0	16	200	564	981	4949
32	626	452	217	29	1	0	0	0	0	8	133	460	1926

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	10	22	77	301	694	941	1113	1050	743	415	109	36	5511
55	0	0	0	11	127	266	400	340	110	15	0	0	1269
57	0	0	0	7	99	216	339	282	76	9	0	0	1028
60	0	0	0	3	65	150	252	201	40	3	0	0	714
65	0	0	0	0	27	67	127	96	8	0	0	0	325
70	0	0	0	0	9	20	46	31	1	0	0	0	107

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	138	458	707	870	809	510	211	29	1	0	0	18	156	614	1321	2191	3000	3510	3721	3750	3751
45	0	0	4	73	315	557	715	654	365	116	10	0	0	0	4	77	392	949	1664	2318	2683	2799	2809	2809
50	0	0	0	35	201	409	560	500	233	50	0	0	0	0	0	35	236	645	1205	1705	1938	1988	1988	1988
55	0	0	0	17	111	270	406	348	130	20	0	0	0	0	0	17	128	398	804	1152	1282	1302	1302	1302
60	0	0	0	2	54	154	257	204	60	3	0	0	0	0	0	2	56	210	467	671	731	734	734	734
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	18	109	298	447	562	514	308	128	16	0	0	0	18	127	425	872	1434	1948	2256	2384	2400	2400

(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