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: HOUGHTON LAKE ROSCOMMON, MI **COOP ID: 203936**

Climate Division: MI 4 **NWS Call Sign: HTL** **Elevation: 1,151 Feet** **Lat: 44˚22N** **Lon: 84˚41W**

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	25.9	9.7	17.8	54	1996	18	25.9	1990	-26	1981	4	9.0	1994	1468	0	.0	.0	.1	23.5	30.6	8.0
Feb	29.3	10.5	19.9	59+	1984	23	30.2	1998	-34	1979	17	11.0	1979	1278	0	.0	.0	.6	17.9	27.5	7.3
Mar	39.4	19.2	29.3	76	1990	15	38.5	1973	-23	1967	1	22.7	1972	1115	0	.0	.0	5.9	8.3	27.4	2.6
Apr	53.0	30.6	41.8	86	1980	22	46.6+	1987	3	1982	5	36.3	1972	685	3	.0	.0	17.9	1.1	16.9	.0
May	67.2	40.7	53.9	90+	1988	31	60.3	1998	21	1966	2	46.6	1997	348	20	.0	.1	29.4	.0	4.3	.0
Jun	75.5	48.9	62.2	103	1995	19	67.6	1995	29+	1972	11	56.1	1982	131	61	.1	.9	30.0	.0	.2	.0
Jul	80.0	53.4	66.7	98+	1987	20	70.2	1983	33	1965	6	61.7	1992	56	124	.0	2.0	31.0	.0	.0	.0
Aug	77.1	52.2	64.6	96+	2001	7	71.1	1995	29	1982	29	60.8	1982	82	85	.0	.5	31.0	.0	@	.0
Sep	68.3	45.3	56.8	92	1985	7	61.0	1994	21	1989	27	52.0	1993	254	24	.0	@	29.6	.0	1.6	.0
Oct	56.0	36.2	46.1	85	1971	2	54.6	1971	16+	1966	30	41.1	1980	577	1	.0	.0	22.3	@	9.2	.0
Nov	41.9	27.6	34.8	70+	1978	5	40.9	1975	-5	1995	29	28.4	1976	901	0	.0	.0	6.6	5.2	21.9	.1
Dec	30.5	16.8	23.7	64	2001	5	30.8	1982	-21	1976	30	12.6	1989	1271	0	.0	.0	.9	18.2	29.6	2.8
Ann	53.7	32.6	43.1	103	Jun 1995	19	71.1	Aug 1995	-34	Feb 1979	17	9.0	Jan 1994	8166	318	.1	3.5	205.3	74.2	169.2	20.8

\+ 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: 1964-2001

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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	1.61	1.63	.98	1974	26	3.13	1974	.60	1977
Feb	1.25	1.12	1.45	1997	21	3.36	1971	.29	1982
Mar	2.05	1.82	1.92	1976	4	5.67	1976	.40	1999
Apr	2.29	2.24	1.81	1991	8	4.73	1991	.86	1998
May	2.57	2.37	1.94	1973	25	5.99	1983	.49	1992
Jun	2.93	2.82	2.59	1996	17	6.31	1999	.85	1988
Jul	2.75	2.52	3.55	1984	10	5.33	1994	.55	1989
Aug	3.72	3.51	3.12	1981	7	7.18	1975	1.07	1976
Sep	3.11	2.87	2.30	1986	10	9.49	1986	.01	1979
Oct	2.26	1.90	3.47	1998	6	8.08	1991	.47	1971
Nov	2.14	2.03	1.80	1966	27	5.10	1988	.45	1986
Dec	1.75	1.70	1.70	1971	10	4.48	1971	.34	1997
Ann	28.43	27.72	3.55	Jul 1984	10	9.49	Sep 1986	.01	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.9	5.0	.5	.0
Feb	11.2	3.8	.3	.1
Mar	12.1	5.5	1.2	.1
Apr	11.7	6.0	1.2	.3
May	10.1	6.0	1.7	.3
Jun	10.4	5.8	1.8	.7
Jul	9.7	5.5	1.6	.6
Aug	10.4	7.0	2.5	.9
Sep	11.5	6.4	1.9	.8
Oct	11.2	5.4	1.2	.3
Nov	13.0	5.8	1.1	.1
Dec	14.3	4.5	.7	.2
Ann	140.5	66.7	15.7	4.4

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	.75	.89	1.09	1.24	1.39	1.53	1.69	1.87	2.09	2.43	2.73
Feb	.38	.50	.67	.83	.97	1.13	1.29	1.49	1.75	2.15	2.52
Mar	.58	.77	1.07	1.33	1.58	1.84	2.13	2.47	2.92	3.61	4.26
Apr	.97	1.17	1.47	1.71	1.93	2.16	2.40	2.69	3.04	3.59	4.08
May	.77	1.01	1.38	1.70	2.00	2.32	2.67	3.09	3.62	4.46	5.24
Jun	.89	1.17	1.58	1.94	2.29	2.65	3.05	3.52	4.12	5.06	5.94
Jul	.74	1.00	1.40	1.75	2.09	2.45	2.85	3.32	3.94	4.91	5.81
Aug	1.32	1.67	2.18	2.61	3.02	3.43	3.89	4.42	5.09	6.14	7.10
Sep	.43	.68	1.13	1.56	2.01	2.51	3.09	3.79	4.75	6.31	7.81
Oct	.65	.87	1.19	1.47	1.74	2.03	2.34	2.71	3.20	3.95	4.65
Nov	.61	.81	1.12	1.39	1.65	1.92	2.22	2.58	3.04	3.77	4.45
Dec	.49	.65	.90	1.12	1.34	1.56	1.81	2.10	2.48	3.08	3.63
Ann	22.64	23.82	25.29	26.39	27.36	28.28	29.22	30.25	31.49	33.27	34.78

\+ 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: 1964-2001
(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	17.7	15.0	7	6	15.4	1978	26	33.3	1978	24+	1979	26	20	1979	16.4	5.6	1.4	.5	@	29.6	25.2	20.9	7.8
Feb	12.8	12.7	8	5	6.7	1974	22	23.6	1971	21+	1979	22	19	1979	12.6	4.6	1.0	.3	.0	26.9	22.9	18.7	9.3
Mar	10.5	9.3	4	3	10.4	1971	19	28.7	1971	22+	1978	18	17	1978	9.4	3.3	1.0	.4	@	17.9	14.0	11.1	3.6
Apr	4.2	3.1	#	2	6.7	1996	4	12.6	1985	7	1973	11	1+	1996	4.2	1.5	.3	@	.0	3.0	.9	.2	.0
May	.3	.0	#	0	2.3	1979	5	2.3	1979	3	1994	1	#	1996	.4	.1	.0	.0	.0	.1	@	.0	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1994	.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	#	1995	22	#+	1995	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.6	.0	#	0	3.5	1980	14	4.4	1980	1+	1992	21	#	1992	1.1	.2	@	.0	.0	.1	.0	.0	.0
Nov	9.4	7.8	1	0	14.4	1981	20	41.9	1995	17	1995	28	4	1995	8.5	2.8	.6	.3	.1	7.4	3.0	1.3	.2
Dec	16.1	15.4	3	2	13.1	1980	2	40.0	1972	14+	1972	17	11	1995	14.6	5.0	1.1	.3	.1	22.6	14.2	8.5	1.8
Ann	71.6	63.3	N/A	N/A	15.4	Jan 1978	26	41.9	Nov 1995	24+	Jan 1979	26	20	Jan 1979	67.2	23.1	5.4	1.8	.2	107.6	80.2	60.7	22.7

+ 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	7/02	6/24	6/18	6/13	6/08	6/04	5/29	5/23	5/15
32	6/05	5/31	5/27	5/23	5/20	5/17	5/13	5/09	5/04
28	5/15	5/10	5/07	5/04	5/02	4/29	4/26	4/23	4/18
24	4/30	4/26	4/23	4/20	4/18	4/16	4/13	4/10	4/07
20	4/20	4/16	4/13	4/11	4/09	4/06	4/04	4/01	3/28
16	4/11	4/07	4/03	3/31	3/28	3/26	3/23	3/19	3/14

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	8/23	8/29	9/01	9/05	9/08	9/11	9/14	9/18	9/24
32	9/07	9/12	9/16	9/20	9/23	9/26	9/30	10/04	10/10
28	9/22	9/28	10/02	10/05	10/08	10/11	10/15	10/18	10/24
24	10/04	10/11	10/15	10/19	10/23	10/26	10/30	11/04	11/10
20	10/23	10/29	11/02	11/06	11/09	11/12	11/16	11/20	11/26
16	11/06	11/11	11/15	11/18	11/21	11/25	11/28	12/02	12/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	122	111	104	97	91	85	78	71	60
32	148	141	135	130	126	121	116	110	103
28	177	171	166	162	159	155	151	147	140
24	210	202	196	191	187	182	178	172	164
20	236	229	223	218	214	209	204	199	191
16	264	255	248	243	237	232	227	220	211

***** 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	1468	1278	1115	685	348	131	56	82	254	577	901	1271	8166
60	1309	1122	952	548	244	62	9	29	128	436	757	1126	6722
57	1216	1038	859	461	184	34	1	12	74	350	667	1033	5929
55	1154	982	797	404	148	21	0	6	48	296	607	971	5434
50	999	842	643	274	78	5	0	0	12	181	459	816	4309
32	460	363	187	18	0	0	0	0	0	6	65	313	1412

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	9	19	95	328	706	937	1106	1037	764	451	150	26	5628
55	0	0	1	18	110	260	394	328	139	22	1	0	1273
57	0	0	1	13	84	210	333	270	106	14	1	0	1032
60	0	0	0	8	54	144	247	190	66	6	0	0	715
65	0	0	0	3	20	61	124	85	24	1	0	0	318
70	0	0	0	1	4	20	47	29	6	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	26	153	470	706	868	800	535	236	50	4	0	0	26	179	649	1355	2223	3023	3558	3794	3844	3848
45	0	0	16	84	324	556	713	645	387	131	18	0	0	0	16	100	424	980	1693	2338	2725	2856	2874	2874
50	0	0	2	42	206	409	558	490	251	61	4	0	0	0	2	44	250	659	1217	1707	1958	2019	2023	2023
55	0	0	0	19	117	267	403	338	144	27	0	0	0	0	0	19	136	403	806	1144	1288	1315	1315	1315
60	0	0	0	7	55	151	255	198	69	4	0	0	0	0	0	7	62	213	468	666	735	739	739	739
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	21	108	296	443	567	513	315	126	23	0	0	0	21	129	425	868	1435	1948	2263	2389	2412	2412

(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