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: HARTFORD 2 W, WI **COOP ID: 473453**

Climate Division: WI 9 **NWS Call Sign:** **Elevation: 980 Feet** **Lat: 43˚20N** **Lon: 88˚25W**

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	24.5	6.5	15.5	55	1996	19	28.0	1990	-35+	1982	10	1.2	1977	1536	0	.0	.0	.3	21.0	30.5	10.4
Feb	29.5	11.3	20.4	63	2000	27	40.2	1998	-34	1959	2	8.5	1979	1249	0	.0	.0	1.6	15.3	26.7	6.8
Mar	40.9	23.1	32.0	81	1986	29	40.2	2000	-23	1962	1	24.7	1984	1022	0	.0	.0	7.6	5.7	25.7	1.3
Apr	54.3	33.7	44.0	88	1980	22	50.7	1985	1	1982	7	38.2	1975	630	1	.0	.0	20.2	.3	13.2	.0
May	67.5	44.5	56.0	94	1999	30	62.2	1977	20	1978	1	49.9	1983	310	31	.0	.2	30.3	.0	2.9	.0
Jun	77.1	53.4	65.3	100	1988	21	70.8	1999	31	1988	9	59.3	1982	84	91	@	2.1	30.0	.0	@	.0
Jul	81.1	58.3	69.7	105	1999	31	73.9	1999	39	1965	1	64.5	1992	18	164	.1	4.1	31.0	.0	.0	.0
Aug	78.6	56.4	67.5	101	1988	1	73.6	1995	36	1986	27	62.7	1992	53	131	.1	1.8	31.0	.0	.0	.0
Sep	70.4	47.8	59.1	97	1953	1	64.4	1998	23	1976	24	54.8	1974	197	21	.0	.6	29.8	.0	1.1	.0
Oct	58.9	37.3	48.1	89	1982	1	56.8	1971	15	1976	18	41.7	1988	525	1	.0	.0	26.0	@	9.1	.0
Nov	43.0	26.0	34.5	75	1999	10	43.5	1999	-11	1976	29	26.0	1995	915	0	.0	.0	9.5	4.2	21.4	.3
Dec	29.9	13.4	21.7	65	2001	6	29.8	1982	-29	1983	19	8.2	1985	1345	0	.0	.0	1.2	15.7	29.2	5.5
Ann	54.6	34.3	44.5	105	Jul 1999	31	73.9	Jul 1999	-35+	Jan 1982	10	1.2	Jan 1977	7884	440	.2	8.8	218.5	62.2	159.8	24.3

\+ 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	1.31	1.25	1.00	1996	27	3.26	1999	.16	1981
Feb	1.07	.67	1.80	1997	21	3.10	1997	.02	1995
Mar	1.93	1.79	2.10	1998	31	5.32	1976	.23	1978
Apr	3.02	2.88	2.25	1999	23	6.81	1993	.85	1994
May	3.07	3.00	2.73	2000	18	7.05	2000	.59	1992
Jun	3.82	3.99	3.80	1996	17	10.46	1996	.87	1992
Jul	4.13	3.88	3.95	1999	21	9.42	1999	1.16	1971
Aug	4.15	3.64	3.96	1983	17	8.52	1995	1.60	1976
Sep	3.61	3.71	5.20	1986	10	11.23	1986	.38	1979
Oct	2.62	2.59	3.20	1954	3	5.56	1991	.16	1975
Nov	2.22	2.12	1.96	1985	1	6.72	1985	.24	1976
Dec	1.57	1.64	1.54	1971	15	3.60	1971	.21	1976
Ann	32.52	33.21	5.20	Sep 1986	10	11.23	Sep 1986	.02	Feb 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.3	4.2	.5	@
Feb	6.3	3.1	.5	.1
Mar	8.2	5.0	1.3	.2
Apr	9.7	6.6	2.1	.5
May	9.6	6.4	2.1	.5
Jun	9.6	6.6	2.3	1.1
Jul	9.3	6.7	3.1	1.2
Aug	9.7	7.0	2.8	1.0
Sep	8.8	6.3	2.5	.9
Oct	8.8	5.6	1.9	.5
Nov	8.8	5.3	1.4	.4
Dec	8.0	4.5	.7	.2
Ann	105.1	67.3	21.2	6.6

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	.29	.42	.61	.78	.95	1.13	1.34	1.58	1.91	2.42	2.90
Feb	.10	.18	.32	.47	.63	.81	1.03	1.30	1.67	2.30	2.91
Mar	.33	.50	.78	1.04	1.31	1.61	1.94	2.35	2.90	3.78	4.63
Apr	1.14	1.42	1.82	2.16	2.48	2.80	3.16	3.57	4.09	4.89	5.62
May	1.02	1.32	1.74	2.10	2.45	2.81	3.20	3.66	4.25	5.17	6.01
Jun	1.15	1.51	2.05	2.52	2.98	3.45	3.97	4.58	5.37	6.61	7.76
Jul	1.47	1.86	2.42	2.89	3.35	3.81	4.32	4.90	5.65	6.81	7.88
Aug	1.66	2.04	2.59	3.03	3.45	3.88	4.35	4.88	5.56	6.60	7.54
Sep	.58	.89	1.41	1.91	2.42	2.98	3.62	4.41	5.45	7.15	8.77
Oct	.59	.83	1.21	1.56	1.91	2.27	2.69	3.18	3.83	4.87	5.85
Nov	.44	.64	.96	1.26	1.56	1.89	2.25	2.70	3.28	4.22	5.11
Dec	.30	.44	.67	.89	1.10	1.33	1.59	1.91	2.32	2.99	3.63
Ann	25.59	26.98	28.73	30.04	31.20	32.30	33.43	34.66	36.15	38.28	40.09

\+ 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	11.4	11.0	6	5
Feb	6.6	7.0	5	4
Mar	5.2	4.0	2	1
Apr	1.9	.0	#	#
May	.4	.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	2.8	1.0	#	#
Dec	8.4	7.3	3	2
Ann	36.8	30.3	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	11.0	1979	13	33.0	1979	34	1979	25	25	1979
Feb	10.0	1994	26	22.0	1994	28	1979	21	24	1979
Mar	12.0	1971	19	18.0+	1972	17	1979	2	8	1979
Apr	8.0	1973	9	14.5	1973	12	1973	10	2	1973
May	6.0	1994	1	6.0	1994	6	1994	1	#	1994
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	3.0	1992	20	3.0	1992	#+	1987	23	#+	1987
Nov	7.0	1985	9	15.0	1985	10	1985	10	2	1985
Dec	8.0	1990	3	20.7	2000	25	2000	31	11	2000
Ann	12.0	Mar 1971	19	33.0	Jan 1979	34	Jan 1979	25	25	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.9	4.2	1.5	.5	.1
Feb	3.5	3.1	.8	.2	@
Mar	2.6	2.1	.8	.3	@
Apr	.8	.7	.3	.1	.0
May	.1	.1	.1	@	.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	.1	@	@	.0	.0
Nov	1.4	1.2	.4	.1	.0
Dec	3.8	3.1	1.0	.3	.0
Ann	17.2	14.5	4.9	1.5	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	22.2	18.3	15.1	7.9
Feb	20.0	15.1	9.1	5.1
Mar	9.2	6.2	3.8	1.3
Apr	1.3	.6	.3	.1
May	@	@	@	.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	.0
Nov	1.9	.9	.2	@
Dec	15.7	9.6	6.0	1.1
Ann	70.3	50.7	34.5	15.5

+ 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	6/14	6/08	6/03	5/31	5/27	5/24	5/20	5/16	5/10
32	5/29	5/23	5/19	5/16	5/12	5/09	5/06	5/02	4/26
28	5/12	5/07	5/03	4/30	4/27	4/24	4/21	4/17	4/12
24	4/27	4/22	4/19	4/16	4/13	4/10	4/07	4/04	3/30
20	4/17	4/13	4/09	4/07	4/04	4/01	3/29	3/26	3/21
16	4/08	4/03	3/30	3/27	3/24	3/21	3/18	3/14	3/09

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	9/07	9/11	9/14	9/16	9/18	9/20	9/22	9/25	9/29
32	9/18	9/22	9/25	9/28	9/30	10/03	10/05	10/09	10/13
28	9/23	9/28	10/01	10/04	10/07	10/09	10/12	10/15	10/20
24	10/03	10/10	10/15	10/19	10/23	10/27	10/31	11/04	11/11
20	10/21	10/26	10/29	11/01	11/04	11/07	11/10	11/13	11/18
16	11/03	11/08	11/12	11/16	11/19	11/22	11/25	11/29	12/04

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	133	126	121	117	113	109	105	100	93
32	160	153	149	144	140	136	132	127	120
28	180	174	170	166	162	158	155	150	144
24	216	208	202	197	192	187	182	176	168
20	233	227	222	217	213	209	205	200	193
16	263	255	249	244	239	234	229	223	215

***** 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	1536	1249	1022	630	310	84	18	53	197	525	915	1345	7884
60	1381	1109	867	484	199	30	2	14	96	378	765	1190	6515
57	1288	1025	774	399	145	14	0	5	54	297	675	1097	5773
55	1226	969	712	346	114	8	0	2	35	247	615	1035	5309
50	1071	834	566	226	55	2	0	0	8	143	472	880	4257
32	554	394	151	12	0	0	0	0	0	4	97	394	1606

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	41	70	152	372	744	998	1168	1100	814	503	173	72	6207
55	0	0	0	16	145	316	455	389	158	33	1	0	1513
57	0	0	0	10	114	262	393	330	118	20	0	0	1247
60	0	0	0	4	75	188	302	246	69	9	0	0	893
65	0	0	0	1	31	91	164	131	21	1	0	0	440
70	0	0	0	0	10	30	67	53	3	0	0	0	163

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	6	52	204	526	784	946	877	611	296	64	5	0	6	58	262	788	1572	2518	3395	4006	4302	4366	4371
45	0	0	24	115	377	634	791	722	462	181	28	1	0	0	24	139	516	1150	1941	2663	3125	3306	3334	3335
50	0	0	10	60	245	484	636	567	320	94	9	0	0	0	10	70	315	799	1435	2002	2322	2416	2425	2425
55	0	0	3	29	143	337	481	412	197	44	2	0	0	0	3	32	175	512	993	1405	1602	1646	1648	1648
60	0	0	0	11	71	210	327	264	107	13	0	0	0	0	0	11	82	292	619	883	990	1003	1003	1003
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	34	135	324	500	624	571	378	183	39	2	0	1	35	170	494	994	1618	2189	2567	2750	2789	2791

(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