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: WELLS, MN **COOP ID: 218808**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 1,197 Feet** **Lat: 43˚44N** **Lon: 93˚44W**

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	.0	.0	.0	49	1996	18	.0	0	-30+	1970	20	.0	0	0	0	.0	.0	.1	24.6	31.0	13.4
Feb	.0	.0	.0	61	2000	26	.0	0	-31+	1996	3	.0	0	0	0	.0	.0	1.3	16.4	27.6	7.6
Mar	.0	.0	.0	80	2000	8	.0	0	-10	1995	8	.0	0	0	0	.0	.0	6.5	6.9	26.6	1.9
Apr	.0	.0	.0	89	1994	19	.0	0	7	1995	4	.0	0	0	0	.0	.1	20.9	.6	12.6	.0
May	.0	.0	.0	95	2001	15	.0	0	25	1997	13	.0	0	0	0	.0	.6	30.5	.0	1.2	.0
Jun	.0	.0	.0	98+	2001	12	.0	0	39+	1998	4	.0	0	0	0	.1	3.2	30.0	.0	.0	.0
Jul	.0	.0	.0	100+	1995	14	.0	0	45+	2000	21	.0	0	0	0	.1	3.1	31.0	.0	.0	.0
Aug	.0	.0	.0	94	1995	19	.0	0	45+	1994	14	.0	0	0	0	.1	2.6	31.0	.0	.0	.0
Sep	.0	.0	.0	94	1998	20	.0	0	27+	1999	30	.0	0	0	0	.0	1.0	29.7	.0	1.0	.0
Oct	.0	.0	.0	93	1997	4	.0	0	13	1997	27	.0	0	0	0	.0	.1	25.6	.1	9.7	.0
Nov	.0	.0	.0	79	1999	9	.0	0	-16	1996	27	.0	0	0	0	.0	.0	7.8	7.8	25.0	1.1
Dec	.0	.0	.0	68	1998	2	.0	0	-20+	1993	29	.0	0	0	0	.0	.0	.5	20.7	30.6	7.7
Ann	.0	.0	.0	100+	Jul 1995	14	-99.9	0	-31+	Feb 1996	3	99.9	0	0	0	.3	10.7	214.9	77.1	165.3	31.7

\+ 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

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: WELLS, MN **COOP ID: 218808**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 1,197 Feet** **Lat: 43˚44N** **Lon: 93˚44W**

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	.59	.50	1.24	1949	4	2.09	1975	.08	1995
Feb	.44	.38	1.54	1951	28	1.99	1971	.00	1997
Mar	1.52	1.28	1.68	1952	23	3.19	1979	.14	1994
Apr	2.63	2.33	2.34	1999	6	8.11	1999	.97	1971
May	3.70	3.42	4.52	2000	18	7.95	2000	1.31	1989
Jun	4.67	3.96	4.30	2001	13	9.54	1975	1.37	1988
Jul	4.51	3.92	6.00	1968	23	8.64	1987	1.25	1988
Aug	4.29	4.29	6.70	1948	10	8.40	1993	.64	1971
Sep	2.58	2.01	3.80	1964	8	6.34	1973	.66	2000
Oct	2.19	2.13	2.20	1992	7	4.93	1998	.21	1975
Nov	1.64	1.43	1.80	1973	15	4.28	1991	.08	1976
Dec	.76	.56	1.50	1982	28	2.88	1982	.09	1989
Ann	29.52	29.08	6.70	Aug 1948	10	9.54	Jun 1975	.00	Feb 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.7	2.1	.1	@
Feb	4.8	1.5	.1	.0
Mar	7.9	4.2	.9	.1
Apr	10.2	6.0	1.9	.5
May	11.4	7.1	2.4	.9
Jun	11.1	7.3	3.2	1.3
Jul	10.0	6.6	3.2	1.5
Aug	9.8	6.5	2.8	1.6
Sep	8.8	5.2	1.8	.4
Oct	7.6	4.7	1.5	.5
Nov	7.1	3.8	1.0	.4
Dec	6.2	2.5	.2	.1
Ann	101.6	57.5	19.1	7.3

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	.11	.16	.24	.33	.41	.50	.60	.72	.88	1.14	1.39
Feb	.01	.03	.08	.13	.20	.29	.39	.53	.72	1.06	1.40
Mar	.29	.43	.65	.86	1.07	1.29	1.55	1.85	2.26	2.91	3.53
Apr	.81	1.06	1.44	1.75	2.06	2.38	2.74	3.15	3.68	4.51	5.28
May	1.31	1.66	2.16	2.59	2.99	3.41	3.87	4.39	5.07	6.12	7.08
Jun	1.41	1.85	2.52	3.09	3.64	4.22	4.86	5.60	6.57	8.08	9.47
Jul	1.34	1.77	2.42	2.97	3.51	4.07	4.69	5.42	6.36	7.83	9.20
Aug	1.44	1.85	2.44	2.95	3.43	3.93	4.47	5.11	5.93	7.19	8.36
Sep	.58	.82	1.20	1.54	1.88	2.24	2.64	3.13	3.76	4.78	5.73
Oct	.38	.57	.89	1.19	1.49	1.83	2.21	2.67	3.28	4.28	5.23
Nov	.19	.31	.54	.77	1.01	1.29	1.61	2.01	2.55	3.44	4.31
Dec	.13	.20	.31	.41	.52	.64	.77	.93	1.15	1.50	1.83
Ann	20.88	22.55	24.69	26.32	27.77	29.16	30.61	32.21	34.15	36.96	39.40

\+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: WELLS, MN **COOP ID: 218808**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 1,197 Feet** **Lat: 43°44N** **Lon: 93°44W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	9.3	6.9	6	5
Feb	4.1	3.4	7	3
Mar	6.7	6.4	2	#
Apr	2.5	1.0	#	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	.5	.0	#	0
Nov	4.7	2.5	1	#
Dec	7.8	8.0	3	2
Ann	35.6	28.2	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	1982	23	25.0	1975	33	1979	31	25	1979
Feb	6.0	1983	3	12.0	1983	33	1979	4	30	1979
Mar	14.0	1985	4	17.0	1989	28	1975	12	18	1975
Apr	7.0	1988	26	13.0	1983	10	1975	2	2	1983
May	#	1989	5	#	1989	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	3.0	1991	19	3.0	1991	3	1991	19	#	1991
Nov	8.0	1983	28	17.5	1983	12	1978	30	5	1978
Dec	11.0	1987	28	19.0	1985	19	1978	31	15	1978
Ann	14.0	Mar 1985	4	25.0	Jan 1975	33+	Feb 1979	4	30	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.5	3.8	1.0	.5	@
Feb	3.2	2.0	.6	.1	.0
Mar	3.6	2.3	.8	.3	@
Apr	1.4	1.0	.3	.1	.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	.2	.2	@	.0	.0
Nov	3.1	2.0	.5	.2	.0
Dec	4.7	3.3	1.2	.3	@
Ann	21.7	14.6	4.4	1.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	21.3	16.9	13.4	8.7
Feb	15.9	11.5	8.9	4.3
Mar	9.9	7.1	4.8	2.7
Apr	2.0	.8	.5	.1
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	@	@	.0	.0
Nov	5.3	1.8	1.0	.4
Dec	20.1	12.0	6.7	3.6
Ann	74.5	50.1	35.3	19.8

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: WELLS, MN **COOP ID: 218808**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 1,197 Feet** **Lat: 43˚44N** **Lon: 93˚44W**

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	5/22	5/18	5/15	5/13	5/11	5/09	5/06	5/04	4/30
32	5/15	5/10	5/06	5/04	5/01	4/28	4/25	4/22	4/17
28	5/04	4/29	4/25	4/22	4/19	4/16	4/13	4/09	4/04
24	4/17	4/13	4/11	4/09	4/06	4/04	4/02	3/30	3/27
20	4/16	4/11	4/08	4/05	4/02	3/30	3/27	3/24	3/19
16	4/10	4/05	4/01	3/29	3/26	3/23	3/20	3/17	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	9/12	9/16	9/19	9/21	9/23	9/26	9/28	10/01	10/04
32	9/20	9/24	9/28	9/30	10/03	10/05	10/08	10/11	10/15
28	9/28	10/03	10/06	10/09	10/12	10/15	10/18	10/21	10/26
24	10/09	10/15	10/19	10/23	10/26	10/30	11/02	11/06	11/12
20	10/15	10/21	10/24	10/28	10/31	11/03	11/06	11/10	11/15
16	10/26	11/01	11/05	11/08	11/11	11/15	11/18	11/22	11/27

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	151	145	141	138	135	131	128	124	118
32	172	166	161	158	154	151	147	143	137
28	195	188	183	179	175	171	167	162	155
24	222	215	210	206	202	198	194	189	182
20	231	224	219	215	211	207	203	198	191
16	254	245	239	234	229	225	219	213	205

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: WELLS, MN **COOP ID: 218808**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 1,197 Feet** **Lat: 43˚44N** **Lon: 93˚44W**

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	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	0	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0

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	3	38	235	582	858	989	923	629	288	41	2	0	3	41	276	858	1716	2705	3628	4257	4545	4586	4588
45	0	0	17	141	432	708	834	768	480	175	16	0	0	0	17	158	590	1298	2132	2900	3380	3555	3571	3571
50	0	0	5	70	293	558	679	613	340	97	3	0	0	0	5	75	368	926	1605	2218	2558	2655	2658	2658
55	0	0	0	35	179	410	524	458	218	43	0	0	0	0	0	35	214	624	1148	1606	1824	1867	1867	1867
60	0	0	0	13	92	270	371	304	118	11	0	0	0	0	0	13	105	375	746	1050	1168	1179	1179	1179
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	30	157	352	555	668	604	391	179	29	0	0	1	31	188	540	1095	1763	2367	2758	2937	2966	2966

(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/normals/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.
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