

Climatography of the United States

No. 20

1971-2000

Station: WILLOW CITY, ND

COOP ID: 329445

Climate Division: ND 2

NWS Call Sign:

Elevation: 1,460 Feet Lat: 48° 36N

Lon: 100° 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	12.7	-8.6	2.1	50	1990	11	18.4	1990	-49	1996	20	-13.9	1982	1953	0	.0	.0	@	27.1	31.0	20.8
Feb	20.6	-1.1	9.8	63	1988	28	23.9	1998	-47+	1996	2	-7.2	1979	1549	0	.0	.0	.3	21.2	28.2	14.8
Mar	32.7	11.9	22.3	75	1963	23	34.2	1973	-41	1962	1	12.2	1996	1324	0	.0	.0	2.7	13.2	30.2	7.5
Apr	52.0	27.8	39.9	97	1980	22	49.0	1987	-22	1979	2	28.2	1979	753	0	.0	.1	16.7	2.2	20.8	.3
May	67.2	40.9	54.1	99+	1980	23	61.4	1977	12	1958	1	47.1	1979	355	16	.0	.8	28.9	.0	5.6	.0
Jun	75.1	50.3	62.7	100+	1988	21	73.3	1988	22	1964	1	55.9	1985	140	70	@	1.7	29.9	.0	.2	.0
Jul	79.8	54.1	67.0	107	1960	20	71.1	1983	35+	1967	3	60.7	1992	62	123	.1	3.2	31.0	.0	.0	.0
Aug	79.3	51.2	65.3	105	1988	7	71.3	1983	26	1958	31	57.9	1977	106	114	.2	4.5	31.0	.0	.1	.0
Sep	67.5	40.1	53.8	102	1976	7	59.3	1998	17+	1976	23	48.1	1984	347	10	.1	.9	28.5	.0	5.2	.0
Oct	54.3	28.1	41.2	93	1963	4	46.2	1973	-13	1991	31	35.3	1976	739	0	.0	.1	20.0	1.0	21.7	.1
Nov	33.2	13.2	23.2	74+	1975	6	33.6	1999	-33	1985	24	9.8	1985	1254	0	.0	.0	3.7	13.9	29.5	4.7
Dec	18.3	-2.0	8.2	58	1969	2	22.2	1997	-44	1983	23	-6.1	1983	1764	0	.0	.0	.1	25.4	31.0	17.3
Ann	49.4	25.5	37.5	107	Jul 1960	20	73.3	Jun 1988	-49	Jan 1996	20	-13.9	Jan 1982	10346	333	.4	11.3	192.8	104.0	203.5	65.5

+ 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/normal/usnormals.html

Issue Date: February 2004

(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

096-A

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: WILLOW CITY, ND

COOP ID: 329445

Climate Division: ND 2

NWS Call Sign:

Elevation: 1,460 Feet Lat: 48°36N

Lon: 100°18W

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.52	.49	.70	1989	7	1.83	1989	.00	1973	6.0	1.9	.1	.0	.06	.13	.21	.29	.36	.44	.53	.63	.77	1.00	1.21
Feb	.42	.22	1.07	1998	26	2.40	1998	.00+	1981	4.0	1.5	.1	@	.00	.01	.06	.12	.18	.27	.37	.50	.69	1.01	1.34
Mar	.78	.69	.87	1990	13	1.50	1987	.01	1977	5.0	2.2	.3	.0	.08	.13	.24	.35	.47	.60	.75	.95	1.22	1.67	2.10
Apr	1.18	.87	1.94	1953	24	4.36	1975	.06	1987	6.0	3.4	.7	.1	.15	.24	.41	.58	.75	.94	1.17	1.44	1.82	2.44	3.03
May	1.99	1.79	2.25	1960	25	7.63	1999	.29	1976	8.2	4.8	1.1	.3	.35	.53	.82	1.09	1.37	1.67	2.01	2.43	2.98	3.87	4.72
Jun	3.10	2.93	3.50	1996	19	5.40+	1996	.95	1992	10.8	6.5	1.8	.6	1.23	1.52	1.92	2.26	2.58	2.90	3.25	3.65	4.17	4.95	5.67
Jul	2.85	2.59	3.68	1974	16	6.45	1986	.26	1985	9.7	5.6	1.6	.6	.58	.84	1.26	1.64	2.03	2.44	2.91	3.47	4.21	5.40	6.53
Aug	2.34	1.94	3.50	1987	15	8.30	1980	.29	1997	8.0	4.5	1.1	.4	.36	.56	.90	1.23	1.56	1.93	2.35	2.86	3.55	4.67	5.74
Sep	1.72	1.65	3.21	1971	5	4.32	1971	.16	1976	6.9	3.6	1.0	.2	.28	.43	.68	.92	1.16	1.43	1.73	2.10	2.60	3.40	4.17
Oct	1.20	.78	2.64	1994	7	5.46	1994	.04	1987	4.9	3.0	.7	.2	.04	.09	.21	.37	.55	.77	1.05	1.42	1.95	2.87	3.80
Nov	.63	.49	1.10	2000	2	2.58	2000	.00	1976	4.4	1.9	.2	@	.02	.06	.14	.23	.33	.45	.59	.77	1.02	1.44	1.85
Dec	.44	.33	1.01	1982	2	1.83	1977	.03+	1987	4.8	1.5	.1	@	.03	.06	.12	.18	.25	.32	.42	.53	.69	.97	1.24
Ann	17.17	17.84	3.68	Jul 1974	16	8.30	Aug 1980	.00+	Feb 1981	78.7	40.4	8.8	2.4	10.58	11.79	13.37	14.59	15.70	16.78	17.92	19.18	20.74	23.03	25.04

+ 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

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: WILLOW CITY, ND

COOP ID: 329445

Climate Division: ND 2

NWS Call Sign:

Elevation: 1,460 Feet

Lat: 48°36N

Lon: 100°18W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	8.2	7.8	5	6	8.0	1982	2	27.0	1989	13+	1978	25	12	1978	5.7	3.9	.9	.3	.0	29.6	28.6	23.9	6.4
Feb	4.9	3.4	5	4	6.0	1979	23	19.4	1998	16	1980	29	13	1974	3.6	2.1	.6	.2	.0	21.8	20.8	18.1	8.6
Mar	6.3	5.0	4	#	7.0	1976	2	17.6	1976	19	1979	5	15	1980	3.5	2.3	.7	.3	.0	17.2	15.5	13.0	8.8
Apr	2.5	1.0	1	0	5.0	1997	6	13.8	1979	17	1979	4	12	1979	1.2	1.1	.3	.1	.0	3.4	2.2	1.6	.9
May	.1	.0	#	0	1.0	1979	5	2.0	1979	1	1979	11	#+	1979	.1	.1	.0	.0	.0	.1	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.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	.1	.0	#	0	4.0	1972	26	4.0	1972	4	1972	26	#+	1995	@	@	@	.0	.0	@	@	.0	.0
Oct	.7	.0	#	0	6.0	1985	8	6.0	1985	5	1971	31	#+	1997	.7	.4	.2	@	.0	.5	.1	@	.0
Nov	6.8	5.0	1	#	8.0	1986	9	25.5	1996	8	1996	6	4	1978	3.2	1.9	.8	.4	.0	5.6	2.9	2.2	.0
Dec	7.1	7.0	3	2	6.0	1977	18	19.2	1977	16	1977	19	9	1977	4.8	2.9	.8	.2	.0	25.1	19.6	11.7	2.0
Ann	36.7	29.2	N/A	N/A	8.0+	Nov 1986	9	27.0	Jan 1989	19	Mar 1979	5	15	Mar 1980	22.8	14.7	4.3	1.5	.0	103.3	89.7	70.5	26.7

+ 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

Complete documentation available from:

www.ncdc.noaa.gov/oa/climate/normal/usnormals.html

Climatography of the United States

No. 20 1971-2000

Station: WILLOW CITY, ND

COOP ID: 329445

Climate Division: ND 2

NWS Call Sign:

Elevation: 1,460 Feet

Lat: 48° 36N

Lon: 100° 18W

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	6/18	6/11	6/06	6/02	5/29	5/25	5/21	5/16	5/09
32	6/02	5/28	5/24	5/21	5/18	5/15	5/12	5/09	5/04
28	5/20	5/16	5/12	5/09	5/07	5/04	5/01	4/28	4/23
24	5/12	5/06	5/02	4/28	4/24	4/21	4/17	4/13	4/07
20	5/02	4/26	4/22	4/18	4/15	4/12	4/08	4/04	3/29
16	4/18	4/14	4/11	4/09	4/07	4/04	4/02	3/30	3/26
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	8/15	8/21	8/26	8/30	9/03	9/07	9/11	9/16	9/22
32	8/30	9/05	9/08	9/12	9/15	9/18	9/21	9/25	9/30
28	9/12	9/17	9/20	9/22	9/25	9/28	9/30	10/03	10/08
24	9/20	9/25	9/28	10/01	10/04	10/07	10/10	10/13	10/18
20	9/27	10/02	10/06	10/09	10/12	10/15	10/19	10/22	10/28
16	10/06	10/12	10/16	10/20	10/23	10/27	10/31	11/04	11/10
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	130	119	110	103	96	89	82	74	62
32	141	133	128	123	119	114	109	104	96
28	159	153	148	144	141	137	133	128	122
24	181	175	170	166	162	158	154	149	142
20	203	195	189	184	180	175	170	164	156
16	220	213	208	203	199	195	191	185	178

* 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/normal/usnormals.html

**Climatography
of the United States
No. 20
1971-2000**

Station: WILLOW CITY, ND

COOP ID: 329445

Climate Division: ND 2

NWS Call Sign:

Elevation: 1,460 Feet Lat: 48°36N Lon: 100°18W

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	1953	1549	1324	753	355	140	62	106	347	739	1254	1764	10346
60	1798	1409	1169	607	231	66	17	45	220	584	1104	1609	8859
57	1705	1325	1077	525	170	36	7	24	155	491	1014	1516	8045
55	1643	1269	1018	470	135	23	2	15	118	429	954	1454	7530
50	1488	1129	875	344	67	6	0	3	49	282	807	1299	6349
32	952	660	412	67	0	0	0	0	0	20	345	763	3219

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	22	35	111	304	685	920	1083	1031	653	305	82	22	5253
55	0	0	4	17	106	253	373	333	81	1	0	0	1168
57	0	0	1	12	79	206	316	280	59	0	0	0	953
60	0	0	0	5	47	146	233	208	33	0	0	0	672
65	0	0	0	0	16	70	123	114	10	0	0	0	333
70	0	0	0	0	4	24	48	49	2	0	0	0	127

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	4	128	453	693	850	799	434	145	10	0	0	0	4	132	585	1278	2128	2927	3361	3506	3516	3516
45	0	0	0	68	319	543	695	644	301	74	1	0	0	0	0	68	387	930	1625	2269	2570	2644	2645	2645
50	0	0	0	32	198	396	540	490	180	29	0	0	0	0	0	32	230	626	1166	1656	1836	1865	1865	1865
55	0	0	0	9	110	257	387	341	93	5	0	0	0	0	0	9	119	376	763	1104	1197	1202	1202	1202
60	0	0	0	1	49	142	240	205	36	0	0	0	0	0	0	1	50	192	432	637	673	673	673	673
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	6	103	289	421	541	502	282	125	11	0	0	0	6	109	398	819	1360	1862	2144	2269	2280	2280

(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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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 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.

- | | |
|---|---|
| <ol style="list-style-type: none">a. Temperature/ Precipitation Tables<ol style="list-style-type: none">1. 1971-2000 Monthly Normals2. Cooperative Summary of the Day3. National Weather Service station records4. 1971-2000 serially complete daily datab. Degree Day Table<ol style="list-style-type: none">1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data | <ol style="list-style-type: none">c. Snow Tables<ol style="list-style-type: none">1. Snow Climatology2. Cooperative Summary of the Dayd. Freeze Data Table
1971-2000 serially complete daily data |
|---|---|

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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