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: WILLISTON EXP FARM, ND **COOP ID: 329430**

Climate Division: ND 1 **NWS Call Sign:** **Elevation: 2,105 Feet** **Lat: 48˚08N** **Lon: 103˚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	20.9	1.6	11.3	52+	1981	23	25.2	1992	-37	1982	10	-6.2	1982	1666	0	.0	.0	.1	21.6	30.7	14.8
Feb	29.5	9.8	19.7	65	1992	27	32.4	1998	-40	1962	28	3.9	1979	1270	0	.0	.0	1.9	14.3	27.5	8.4
Mar	42.1	20.1	31.1	78	1978	30	41.2	1986	-28	1960	4	21.5	1996	1051	0	.0	.0	10.0	7.2	28.0	2.8
Apr	57.9	31.8	44.9	93	2001	28	53.3	1987	-14	1975	1	34.6	1975	608	3	.0	.1	22.4	1.0	17.1	.1
May	70.4	43.7	57.1	102	1980	22	64.2	1977	14	1967	2	50.5	1974	278	32	.1	.8	30.0	.0	3.6	.0
Jun	78.8	52.6	65.7	105+	1988	20	78.5	1988	30	1969	12	60.3	1993	99	121	.5	3.6	30.0	.0	@	.0
Jul	84.9	57.2	71.1	108	1988	27	77.0	1989	35	1967	3	63.5	1993	35	224	1.3	9.3	31.0	.0	.0	.0
Aug	84.8	55.6	70.2	106	1988	6	77.2	1983	35+	1982	27	62.9	1977	58	219	.9	10.3	31.0	.0	.0	.0
Sep	72.8	44.8	58.8	105	1976	6	66.5	1998	17	1961	30	52.3	1984	234	49	.3	2.4	29.0	.0	2.3	.0
Oct	59.6	33.7	46.7	92+	1992	2	49.9	1974	-3	1991	30	42.1	1972	570	0	.0	.1	24.5	.7	13.4	@
Nov	37.7	19.1	28.4	76	1999	7	41.4	1999	-22+	1985	29	15.2	1985	1098	0	.0	.0	5.9	9.9	27.2	2.8
Dec	25.4	6.7	16.1	59	1979	4	28.4	1999	-40	1983	23	-2.7	1983	1519	0	.0	.0	.6	19.0	30.7	10.9
Ann	55.4	31.4	43.4	108	Jul 1988	27	78.5	Jun 1988	-40+	Dec 1983	23	-6.2	Jan 1982	8486	648	3.1	26.6	216.4	73.7	180.5	39.8

\+ 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: 1956-2001

(3) Derived from 1971-2000 serially complete daily data

Issue Date: February 2004

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: WILLISTON EXP FARM, ND

COOP ID: 329430

Climate Division: ND 1 **NWS Call Sign:** **Elevation: 2,105 Feet** **Lat: 48°08N** **Lon: 103°44W**

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	Median	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	.48	.37	.73	1999	21	1.67	1999	.00	1973	5.9	1.2	.2	.0	.03	.07	.14	.22	.29	.37	.47	.59	.75	1.02	1.28
Feb	.34	.19	.90	1998	25	2.47	1998	.02	1984	4.4	1.1	.1	.0	.02	.03	.07	.12	.17	.23	.31	.40	.54	.77	1.01
Mar	.62	.55	.98	1983	6	1.62	1987	.02	1977	5.8	2.2	.1	.0	.07	.12	.20	.29	.38	.49	.61	.76	.96	1.30	1.63
Apr	1.13	1.02	1.52	1967	20	2.62	1976	.11	1987	6.8	3.2	.6	.1	.15	.24	.40	.55	.72	.90	1.11	1.38	1.73	2.31	2.88
May	2.09	1.68	2.50	1965	25	5.89	1978	.07	1980	9.5	5.4	1.0	.3	.31	.48	.78	1.07	1.38	1.71	2.09	2.56	3.19	4.21	5.20
Jun	2.72	2.47	2.81	1994	8	6.60	1991	.79	1997	10.2	6.0	1.7	.5	.77	1.03	1.42	1.76	2.09	2.43	2.82	3.27	3.85	4.77	5.63
Jul	2.45	1.95	3.80	1993	3	8.19	1993	.27	1976	8.3	4.8	1.5	.5	.33	.53	.88	1.22	1.58	1.97	2.43	2.99	3.75	5.00	6.20
Aug	1.63	1.25	3.77	1993	22	5.47	1993	.05	1971	7.5	4.0	.7	.3	.25	.38	.62	.84	1.08	1.33	1.63	1.99	2.48	3.26	4.02
Sep	1.56	1.57	1.90	1971	5	3.96	1986	.19	1997	7.2	3.4	.9	.3	.24	.37	.60	.81	1.03	1.28	1.56	1.90	2.36	3.11	3.82
Oct	.94	.51	2.14	1971	2	3.58	1971	.11	1978	4.5	2.2	.5	.2	.06	.12	.24	.36	.51	.68	.88	1.13	1.49	2.10	2.70
Nov	.58	.42	1.43	2000	1	2.87	2000	.00	1999	5.5	1.7	.1	@	.03	.08	.17	.25	.34	.44	.56	.71	.91	1.24	1.57
Dec	.45	.41	.90	1975	31	1.18	1975	.02	1997	6.3	1.4	.1	.0	.06	.09	.15	.22	.28	.36	.44	.55	.70	.94	1.17
Ann	14.99	14.01	3.80	Jul 1993	3	8.19	Jul 1993	.00+	Nov 1999	81.9	36.6	7.5	2.2	8.88	9.98	11.43	12.56	13.58	14.59	15.64	16.83	18.29	20.45	22.35

\+ 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: 1956-2001
(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: WILLISTON EXP FARM, ND **COOP ID: 329430**

Climate Division: ND 1 **NWS Call Sign:** **Elevation: 2,105 Feet** **Lat: 48°08N** **Lon: 103°44W**

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	4.7	3.5	6	4	9.0	1995	16	18.0	1982	19	1999	27	15	1997	3.7	2.5	.6	.3	.0	22.7	15.2	8.1	1.9
Feb	4.4	2.5	4	3	10.0	1998	25	23.0	1998	22	1998	28	14	1979	2.6	1.9	.4	.1	@	13.1	6.6	3.7	.2
Mar	5.4	4.0	2	1	9.0	1975	23	23.0	1975	23	1975	31	9	1998	2.5	2.1	.6	.2	.0	7.1	3.7	3.0	1.4
Apr	2.7	1.0	#	#	13.0	1986	13	13.0	1986	20	1975	1	6	1975	1.0	.9	.4	.1	.1	1.5	.8	.6	.3
May	.6	.0	#	0	15.0	1983	12	15.0	1983	13	1983	12	1	1983	.1	.1	@	@	@	.1	.1	.1	@
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	.2	.0	#	0	4.0	1984	24	4.0	1984	2	1972	25	#+	1984	.1	.1	@	.0	.0	.1	.0	.0	.0
Oct	1.6	.0	#	0	6.0	1975	14	12.0	1985	9	1985	8	1	1985	.7	.5	.2	.1	.0	.8	.3	.1	.0
Nov	5.1	3.0	1	1	9.0	2000	2	25.3	2000	14	2000	17	11	2000	2.9	2.0	.7	.2	.0	8.3	4.2	2.5	1.0
Dec	6.5	7.0	3	2	10.0	1975	31	14.0	1975	16	1996	30	12	1996	4.5	3.0	.5	.1	@	17.6	9.6	5.4	.5
Ann	31.2	21.0	N/A	N/A	15.0	May 1983	12	25.3	Nov 2000	23	Mar 1975	31	15	Jan 1997	18.1	13.1	3.4	1.1	.1	71.3	40.5	23.5	5.3

+ 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: WILLISTON EXP FARM, ND **COOP ID: 329430**

Climate Division: ND 1 **NWS Call Sign:** **Elevation: 2,105 Feet** **Lat: 48˚08N** **Lon: 103˚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	6/03	5/29	5/26	5/23	5/20	5/18	5/15	5/11	5/07
32	5/24	5/20	5/17	5/14	5/12	5/09	5/07	5/04	4/29
28	5/16	5/11	5/08	5/05	5/03	4/30	4/27	4/24	4/19
24	5/08	5/02	4/27	4/23	4/19	4/16	4/12	4/07	4/01
20	4/21	4/17	4/14	4/11	4/09	4/06	4/04	4/01	3/28
16	4/15	4/10	4/06	4/03	3/31	3/28	3/25	3/21	3/16

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	9/04	9/07	9/10	9/12	9/14	9/16	9/18	9/20	9/24
32	9/10	9/14	9/17	9/20	9/22	9/25	9/27	9/30	10/04
28	9/17	9/22	9/26	9/29	10/02	10/05	10/08	10/12	10/17
24	9/27	10/02	10/06	10/10	10/13	10/16	10/20	10/24	10/30
20	10/02	10/09	10/14	10/18	10/21	10/25	10/29	11/03	11/09
16	10/11	10/18	10/22	10/26	10/30	11/02	11/06	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	132	127	123	119	116	113	109	105	100
32	153	146	141	137	133	129	124	119	112
28	171	165	160	156	152	148	144	139	133
24	202	193	187	181	176	171	165	159	150
20	218	210	204	199	195	190	185	179	171
16	239	230	223	217	212	206	200	193	184

***** 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: WILLISTON EXP FARM, ND **COOP ID: 329430**

Climate Division: ND 1 **NWS Call Sign:** **Elevation: 2,105 Feet** **Lat: 48˚08N** **Lon: 103˚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	1666	1270	1051	608	278	99	35	58	234	570	1098	1519	8486
60	1511	1130	896	468	171	42	11	23	136	416	948	1364	7116
57	1418	1046	804	388	120	22	4	12	91	326	858	1271	6360
55	1356	996	745	338	92	14	1	7	66	268	798	1209	5890
50	1204	866	603	229	40	3	0	1	24	146	659	1057	4832
32	698	440	197	23	0	0	0	0	0	4	239	560	2161

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	55	94	169	407	777	1011	1211	1185	804	457	131	64	6365
55	0	7	4	33	156	335	499	478	180	8	0	0	1700
57	0	0	1	23	122	283	440	422	145	4	0	0	1440
60	0	0	0	12	80	213	354	339	101	1	0	0	1100
65	0	0	0	3	32	121	224	219	49	0	0	0	648
70	0	0	0	0	10	55	127	128	19	0	0	0	339

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	41	212	532	770	962	937	571	254	27	0	0	3	44	256	788	1558	2520	3457	4028	4282	4309	4309
45	0	1	11	117	386	620	807	782	428	148	10	0	0	1	12	129	515	1135	1942	2724	3152	3300	3310	3310
50	0	0	1	60	249	472	652	627	299	76	1	0	0	0	1	61	310	782	1434	2061	2360	2436	2437	2437
55	0	0	0	22	142	325	497	473	181	28	0	0	0	0	0	22	164	489	986	1459	1640	1668	1668	1668
60	0	0	0	6	69	192	344	328	97	7	0	0	0	0	0	6	75	267	611	939	1036	1043	1043	1043
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	3	40	160	334	477	616	594	359	181	23	0	0	3	43	203	537	1014	1630	2224	2583	2764	2787	2787

(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