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: STEELE 3 N, ND **COOP ID: 328366**

Climate Division: ND 5 **NWS Call Sign:** **Elevation: 1,885 Feet** **Lat: 46˚54N** **Lon: 99˚56W**

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	18.1	-2.8	7.7	52+	1981	24	22.8	1992	-42	1950	26	-7.7	1982	1779	0	.0	.0	.2	24.3	31.0	16.1
Feb	25.6	4.4	15.0	61	1958	25	28.2	1998	-36	1982	3	-2.2	1979	1401	0	.0	.0	1.0	17.3	28.0	10.4
Mar	37.5	16.7	27.1	79	1967	29	35.5	2000	-28	1962	1	19.1	1996	1176	0	.0	.0	6.0	9.4	28.7	3.6
Apr	54.7	30.2	42.5	93	1952	27	52.5	1977	-7	1954	2	32.4	1975	679	2	.0	.1	20.3	1.3	18.1	.2
May	68.6	42.9	55.8	95	1969	27	63.4	1977	12	1967	2	49.6	1979	308	22	.0	.7	29.8	.0	3.6	.0
Jun	76.6	52.4	64.5	102	1961	27	74.6	1988	29	1969	20	58.6	1985	114	99	.1	2.4	30.0	.0	.1	.0
Jul	82.8	57.0	69.9	109	1973	11	74.7	1989	37+	1972	4	64.0	1992	26	179	.6	6.3	31.0	.0	.0	.0
Aug	82.4	54.5	68.5	106	1958	9	74.6	1983	32	1982	27	61.2	1977	63	170	.4	7.1	31.0	.0	@	.0
Sep	71.3	43.9	57.6	105	1978	5	63.6	1998	14	1974	30	52.4	1984	250	29	.2	1.7	29.1	.0	2.6	.0
Oct	57.7	31.5	44.6	95	1963	4	48.9	1973	-3	1991	31	39.8	1976	632	0	.0	.1	23.6	.6	14.7	@
Nov	36.5	16.0	26.3	76+	1999	1	38.3	1999	-24	1985	29	14.8	1985	1163	0	.0	.0	6.1	11.4	28.4	2.6
Dec	22.7	3.0	12.9	60	1969	1	25.5	1999	-40	1983	23	-3.0	1983	1617	0	.0	.0	.5	22.0	31.0	12.0
Ann	52.9	29.1	41.0	109	Jul 1973	11	74.7	Jul 1989	-42	Jan 1950	26	-7.7	Jan 1982	9208	501	1.3	18.4	208.6	86.3	186.2	44.9

\+ 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

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Precipitation (inches)

Precipitation Totals

Means/Medians(1)

Month	Mean	Median
Jan	.48	.34
Feb	.44	.34
Mar	.98	.89
Apr	1.51	1.33
May	2.53	2.02
Jun	3.24	2.50
Jul	2.95	2.37
Aug	2.01	1.56
Sep	1.90	1.41
Oct	1.55	1.05
Nov	.74	.59
Dec	.44	.46
Ann	18.77	17.92

Extremes

Month	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year
Jan	.68	1996	18	1.89	1996	.00	1988
Feb	.98	1969	27	1.41	1998	.00+	1988
Mar	1.60	1988	10	2.73	1988	.08	1978
Apr	2.30	1976	23	4.64	1976	.00	1987
May	2.25	1985	12	8.62	1999	.23	1984
Jun	2.97	1953	15	8.73	1990	1.16	1974
Jul	3.38	1957	17	13.11	1993	.60	1985
Aug	2.80	1998	3	6.67	1998	.29	1971
Sep	5.05	1994	16	6.44	1994	.05	1974
Oct	2.55	1982	9	4.91	1982	.08	1987
Nov	.90	1956	2	2.30	1996	.00+	1999
Dec	.84	1950	25	1.05	1993	.00	1986
Ann	5.05	Sep 1994	16	13.11	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.6	1.7	.1	.0
Feb	4.5	1.8	@	.0
Mar	5.4	2.4	.6	.1
Apr	7.1	3.8	.7	.2
May	9.1	5.4	1.7	.4
Jun	10.4	6.4	2.3	.6
Jul	9.3	6.1	1.7	.6
Aug	8.0	4.6	1.3	.3
Sep	7.0	3.7	.9	.4
Oct	6.1	3.3	.9	.4
Nov	5.3	2.3	.3	.0
Dec	5.2	1.7	.0	.0
Ann	83.0	43.2	10.5	3.0

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	.04	.09	.16	.23	.31	.39	.48	.59	.74	.99	1.23
Feb	.00	.05	.12	.19	.26	.34	.43	.54	.69	.94	1.18
Mar	.14	.22	.36	.50	.64	.80	.98	1.20	1.50	1.98	2.45
Apr	.14	.32	.57	.79	1.01	1.25	1.53	1.86	2.31	3.03	3.72
May	.43	.65	1.02	1.36	1.72	2.11	2.55	3.09	3.81	4.97	6.08
Jun	.91	1.22	1.68	2.09	2.49	2.90	3.36	3.90	4.61	5.71	6.74
Jul	.57	.84	1.27	1.67	2.07	2.51	3.00	3.59	4.38	5.64	6.84
Aug	.46	.64	.94	1.20	1.47	1.75	2.06	2.44	2.94	3.72	4.47
Sep	.16	.30	.55	.81	1.10	1.43	1.82	2.32	3.00	4.13	5.25
Oct	.12	.23	.43	.64	.88	1.15	1.47	1.88	2.45	3.39	4.33
Nov	.00	.05	.17	.28	.41	.55	.71	.92	1.20	1.68	2.15
Dec	.05	.10	.17	.23	.30	.37	.45	.54	.66	.86	1.05
Ann	11.42	12.76	14.52	15.89	17.12	18.34	19.60	21.02	22.77	25.34	27.60

\+ 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	8.3	5.0	6	5
Feb	5.8	5.5	5	2
Mar	8.1	7.0	3	1
Apr	1.8	.0	1	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	1.1	.0	#	0
Nov	5.2	4.5	1	#
Dec	7.6	6.5	3	2
Ann	38.3	28.5	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	13.0	1996	18	21.5	1971	26	1982	30	15+	1996
Feb	7.0	1982	24	17.5	1972	29	1982	7	23	1982
Mar	10.0	1982	20	19.0	1982	20	1975	28	14	1975
Apr	11.0	1984	28	13.0	1984	16	1975	1	5	1975
May	8.0	1991	4	8.0+	1991	2	1991	6	#+	1991
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	1.0	1995	21	1.0	1995	0	0	0	0	0
Oct	7.0	1991	24	10.0	1972	4	1972	30	#+	1999
Nov	7.0	1994	18	18.0	1998	12	1985	30	5	2000
Dec	11.0	1973	14	18.0+	1973	15	1973	14	10	2000
Ann	13.0	Jan 1996	18	21.5	Jan 1971	29	Feb 1982	7	23	Feb 1982

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.6	3.2	.8	.2	.1
Feb	2.8	2.4	1.1	.2	.0
Mar	2.4	2.0	.8	.3	.1
Apr	.5	.4	.2	.1	.1
May	@	@	@	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	@	@	.0	.0	.0
Oct	.5	.5	.2	.1	.0
Nov	2.5	2.2	.9	.3	.0
Dec	3.5	2.9	.7	.2	.1
Ann	16.8	13.6	4.7	1.4	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	12.3	8.4	5.2	1.8
Apr	1.6	.7	.1	.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	.5	.1	.0	.0
Nov	7.8	3.5	1.7	.4
Dec	19.5	14.6	11.3	2.5
Ann	-9.9	-9.9	-9.9	-9.9

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	6/08	6/03	5/30	5/26	5/23	5/20	5/16	5/12	5/07
32	5/27	5/22	5/18	5/15	5/12	5/09	5/06	5/03	4/28
28	5/12	5/08	5/06	5/03	5/01	4/29	4/26	4/23	4/20
24	5/09	5/04	4/30	4/27	4/24	4/22	4/19	4/15	4/10
20	4/29	4/23	4/18	4/15	4/11	4/08	4/04	3/31	3/25
16	4/16	4/12	4/08	4/06	4/03	3/31	3/29	3/25	3/21

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	8/25	8/31	9/05	9/08	9/12	9/15	9/19	9/24	9/30
32	9/10	9/14	9/18	9/20	9/23	9/25	9/28	10/01	10/05
28	9/19	9/23	9/26	9/29	10/01	10/04	10/06	10/09	10/13
24	9/25	9/30	10/04	10/07	10/10	10/13	10/16	10/19	10/24
20	10/04	10/10	10/14	10/17	10/21	10/24	10/27	10/31	11/06
16	10/14	10/20	10/24	10/28	10/31	11/04	11/07	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	140	130	123	117	111	105	99	92	82
32	152	146	141	137	133	129	125	120	113
28	170	164	160	156	153	149	145	141	135
24	189	182	176	172	168	163	159	154	146
20	216	207	201	196	192	187	182	176	167
16	233	225	220	215	210	206	201	195	188

***** 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	1779	1401	1176	679	308	114	26	63	250	632	1163	1617	9208
60	1624	1261	1021	537	192	50	6	23	144	478	1013	1462	7811
57	1531	1177	928	456	137	27	1	11	93	386	923	1369	7039
55	1469	1121	866	404	105	17	0	6	67	327	863	1307	6552
50	1314	985	715	287	48	4	0	1	22	196	715	1152	5439
32	791	534	259	42	0	0	0	0	0	8	269	637	2540

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	35	58	106	355	737	975	1176	1130	769	399	96	43	5879
55	0	0	0	27	129	302	463	423	146	5	0	0	1495
57	0	0	0	19	98	251	402	366	112	2	0	0	1250
60	0	0	0	10	61	185	314	285	73	0	0	0	928
65	0	0	0	2	22	99	179	170	29	0	0	0	501
70	0	0	0	0	5	40	84	87	9	0	0	0	225

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	21	177	520	752	948	906	551	230	23	0	0	0	21	198	718	1470	2418	3324	3875	4105	4128	4128
45	0	0	5	99	371	602	793	751	406	134	7	0	0	0	5	104	475	1077	1870	2621	3027	3161	3168	3168
50	0	0	0	51	242	453	638	596	278	64	0	0	0	0	0	51	293	746	1384	1980	2258	2322	2322	2322
55	0	0	0	23	142	309	484	444	167	20	0	0	0	0	0	23	165	474	958	1402	1569	1589	1589	1589
60	0	0	0	6	65	181	330	298	90	6	0	0	0	0	0	6	71	252	582	880	970	976	976	976
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	19	133	328	466	612	580	350	167	24	0	0	1	20	153	481	947	1559	2139	2489	2656	2680	2680

(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