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: FULLERTON 1 ESE, ND **COOP ID: 323287**

Climate Division: ND 9 **NWS Call Sign:** **Elevation: 1,435 Feet** **Lat: 46˚09N** **Lon: 98˚24W**

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	19.8	-.7	9.6	60	1987	12	23.8	1990	-40	1977	9	-6.6	1982	1721	0	.0	.0	.2	23.6	30.9	16.2
Feb	27.3	6.6	17.0	69	1958	25	30.1	1987	-44	1994	9	.9	1979	1345	0	.0	.0	1.5	16.6	28.0	10.1
Mar	39.3	18.8	29.1	80+	1986	28	37.7	1973	-25	1980	1	19.3	1996	1115	0	.0	.0	6.2	8.4	28.6	3.3
Apr	57.4	31.4	44.4	98	1980	21	53.8	1977	-8	1975	3	35.6	1975	622	4	.0	.1	21.7	.8	17.2	.1
May	71.2	43.7	57.5	100	1969	27	64.9	1977	18+	1981	10	52.1	1979	261	27	.0	.7	30.4	.0	3.6	.0
Jun	79.1	52.9	66.0	105	1988	21	75.1	1988	31	1969	20	59.5	1982	82	113	.1	2.9	30.0	.0	.0	.0
Jul	84.8	57.5	71.2	111	1949	3	77.3	1974	39+	1981	9	63.5	1992	31	222	1.1	8.5	31.0	.0	.0	.0
Aug	83.5	55.3	69.4	107+	1976	26	77.4	1983	30+	1982	27	62.6	1977	54	191	1.1	6.8	31.0	.0	.1	.0
Sep	73.2	45.0	59.1	105	1983	2	64.0	1978	18+	1974	30	54.3	1993	203	26	.2	1.9	29.6	.0	2.5	.0
Oct	58.9	33.4	46.2	91+	1992	1	51.3	1973	5	1984	30	42.5	1976	584	0	.0	.1	24.0	.4	14.3	.0
Nov	37.1	18.7	27.9	76	1975	4	38.3	1999	-24	1964	30	15.9	1985	1114	0	.0	.0	5.7	11.5	27.6	2.1
Dec	24.2	4.8	14.5	65	1969	1	25.4	1979	-35	1983	23	-.8	1983	1565	0	.0	.0	.7	21.7	30.9	11.5
Ann	54.7	30.6	42.7	111	Jul 1949	3	77.4	Aug 1983	-44	Feb 1994	9	-6.6	Jan 1982	8697	583	2.5	21.0	212.0	83.0	183.7	43.3

\+ 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

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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	.75	.74	1.25	1997	4	2.05	1997	.01	1991
Feb	.66	.47	1.46	1979	15	2.28	1979	.08	1985
Mar	1.44	1.14	2.40	1975	24	3.96	1975	.11	1971
Apr	1.91	1.37	2.05	1986	14	8.61	1986	.00	1987
May	2.84	2.80	4.50	1991	15	9.24	1991	.33	1976
Jun	3.16	2.50	3.46	1969	25	8.88	1975	.45	1974
Jul	2.88	2.71	3.55	1994	7	6.99	1993	.29	1976
Aug	2.22	2.31	6.00	1966	1	5.63	1998	.29	1982
Sep	2.02	1.15	4.55	1973	24	7.97	1973	.34	1974
Oct	1.80	1.41	2.17	1982	9	5.50	1998	.00	1987
Nov	1.03	.99	1.75	1977	19	5.47	1977	.00+	1999
Dec	.41	.26	.85	1950	25	1.40	1972	.00	1986
Ann	21.12	20.30	6.00	Aug 1966	1	9.24	May 1991	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.0	2.5	.2	.1
Feb	4.6	2.2	.2	.1
Mar	5.6	3.6	.8	.3
Apr	7.2	4.8	1.1	.3
May	8.4	5.2	1.9	.7
Jun	9.5	6.4	2.0	.7
Jul	8.2	5.5	2.1	.7
Aug	7.2	4.5	1.5	.4
Sep	6.2	3.8	1.1	.6
Oct	5.4	3.4	1.1	.5
Nov	4.7	2.8	.6	.1
Dec	3.9	1.6	@	.0
Ann	75.9	46.3	12.6	4.5

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	.06	.11	.21	.31	.43	.56	.72	.92	1.19	1.65	2.11
Feb	.07	.12	.22	.31	.41	.52	.65	.81	1.03	1.40	1.75
Mar	.27	.40	.61	.81	1.01	1.22	1.46	1.76	2.14	2.77	3.36
Apr	.08	.23	.51	.79	1.09	1.43	1.84	2.35	3.05	4.22	5.36
May	.53	.78	1.20	1.59	1.98	2.40	2.88	3.46	4.23	5.48	6.66
Jun	.57	.85	1.32	1.75	2.19	2.66	3.20	3.86	4.73	6.13	7.46
Jul	.58	.84	1.26	1.65	2.04	2.46	2.93	3.50	4.25	5.46	6.61
Aug	.55	.76	1.09	1.37	1.66	1.96	2.29	2.69	3.20	4.02	4.79
Sep	.18	.32	.59	.88	1.18	1.53	1.95	2.47	3.18	4.37	5.54
Oct	.06	.19	.43	.69	.98	1.31	1.70	2.20	2.89	4.05	5.19
Nov	.00	.05	.18	.33	.50	.70	.95	1.26	1.70	2.45	3.19
Dec	.01	.03	.08	.14	.20	.28	.37	.49	.66	.95	1.23
Ann	12.75	14.27	16.27	17.83	19.24	20.62	22.07	23.69	25.69	28.64	31.23

\+ 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)

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	7.0	6.5	5	4	14.0	1982	22	17.7	1996	32	1978	30	28	1978	4.2	3.0	1.1	.3	.1	17.9	10.8	7.3	.8
Feb	6.0	5.5	6	4	11.0	1979	15	21.3	1979	34	1979	28	30	1978	3.9	2.6	.6	.2	@	-9.9	-9.9	-9.9	-9.9
Mar	8.9	7.3	3	2	17.0	1975	24	30.5	1975	35	1979	4	19	1978	3.1	2.7	1.1	.6	.1	8.1	5.8	3.5	1.3
Apr	2.6	.9	#	0	12.0	1976	3	12.0+	1986	29	1975	1	10	1975	.9	.6	.3	.1	@	.5	.3	.2	.1
May	.0	.0	#	0	1.0	1976	2	1.0	1976	1	1976	2	#+	1997	@	@	.0	.0	.0	@	.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	#	.0	#	0	#	1995	21	#+	1995	#	1995	21	#	1995	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.5	.0	#	0	2.4	1971	30	2.9	1971	2	1971	31	#+	1997	.4	.3	.0	.0	.0	.2	.0	.0	.0
Nov	5.7	4.5	1	#	13.0	1993	24	30.5	1977	23	1977	27	9	1977	3.0	2.4	.8	.5	.2	6.2	3.5	1.9	.8
Dec	3.9	1.1	5	2	5.0	2000	28	12.8	1972	27	1977	31	24	1996	3.4	2.1	.4	@	.0	-9.9	-9.9	-9.9	-9.9
Ann	34.6	25.8	N/A	N/A	17.0	Mar 1975	24	30.5+	Nov 1977	35	Mar 1979	4	30	Feb 1978	18.9	13.7	4.3	1.7	.4	-9.9	-9.9	-9.9	-9.9

+ 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	6/06	6/01	5/29	5/26	5/23	5/20	5/17	5/13	5/08
32	5/24	5/19	5/16	5/13	5/11	5/09	5/06	5/03	4/28
28	5/17	5/12	5/09	5/06	5/03	5/01	4/28	4/25	4/20
24	5/12	5/06	5/02	4/28	4/24	4/21	4/17	4/13	4/07
20	4/29	4/23	4/18	4/15	4/11	4/08	4/04	3/30	3/24
16	4/14	4/09	4/06	4/03	3/31	3/28	3/26	3/22	3/18

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	8/26	9/01	9/04	9/08	9/11	9/14	9/17	9/21	9/26
32	9/05	9/11	9/14	9/17	9/20	9/23	9/26	9/30	10/05
28	9/19	9/23	9/27	9/29	10/02	10/05	10/07	10/11	10/15
24	9/26	10/01	10/05	10/08	10/11	10/14	10/17	10/21	10/26
20	10/05	10/10	10/14	10/18	10/21	10/24	10/27	10/31	11/06
16	10/09	10/15	10/20	10/24	10/27	10/31	11/04	11/08	11/15

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	125	119	115	110	106	101	96	88
32	155	147	141	136	132	127	122	116	108
28	169	162	158	154	151	147	143	139	133
24	191	183	178	173	169	165	160	155	147
20	215	207	202	197	192	188	183	177	169
16	232	224	219	214	210	205	200	195	187

***** 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	1721	1345	1115	622	261	82	31	54	203	584	1114	1565	8697
60	1566	1205	960	481	154	29	9	18	99	429	964	1410	7324
57	1473	1121	867	402	105	14	2	9	54	338	874	1317	6576
55	1411	1065	805	352	78	8	0	4	33	280	814	1255	6105
50	1256	934	656	242	32	0	0	0	6	156	668	1100	5050
32	737	488	217	26	0	0	0	0	0	5	234	588	2295

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	39	67	125	398	789	1021	1214	1160	813	444	111	46	6227
55	0	0	0	34	153	338	501	451	156	6	0	0	1639
57	0	0	0	24	118	285	440	394	117	2	0	0	1380
60	0	0	0	13	75	210	355	310	72	0	0	0	1035
65	0	0	0	4	27	113	222	191	26	0	0	0	583
70	0	0	0	0	7	47	124	104	7	0	0	0	289

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	19	204	551	791	975	922	583	246	20	0	0	0	19	223	774	1565	2540	3462	4045	4291	4311	4311
45	0	0	5	115	403	641	820	767	436	140	10	0	0	0	5	120	523	1164	1984	2751	3187	3327	3337	3337
50	0	0	0	60	269	492	665	612	301	66	1	0	0	0	0	60	329	821	1486	2098	2399	2465	2466	2466
55	0	0	0	28	153	345	510	457	185	24	0	0	0	0	0	28	181	526	1036	1493	1678	1702	1702	1702
60	0	0	0	7	73	210	357	309	98	6	0	0	0	0	0	7	80	290	647	956	1054	1060	1060	1060
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	22	154	354	504	633	594	373	174	23	0	0	1	23	177	531	1035	1668	2262	2635	2809	2832	2832

(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

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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