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: HEBRON, ND **COOP ID: 324102**

Climate Division: ND 8 **NWS Call Sign:** **Elevation: 2,158 Feet** **Lat: 46˚54N** **Lon: 102˚03W**

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	.5	10.7	63	1981	24	25.2	1992	-47	1966	29	-4.1	1982	1683	0	.0	.0	.6	21.1	31.0	14.8
Feb	28.1	7.7	17.9	64	1992	28	30.0	1998	-36	1996	3	1.9	1979	1319	0	.0	.0	2.5	15.5	27.8	9.3
Mar	38.9	17.5	28.2	79	1993	25	37.7	1986	-29	1998	11	17.0	1996	1141	0	.0	.0	7.8	9.5	29.5	3.7
Apr	53.9	29.5	41.7	94	1980	22	48.5	1987	-14	1975	2	32.6	1975	699	0	.0	.2	19.1	1.7	19.6	.2
May	66.7	41.6	54.2	98	1980	23	62.6	1977	9	1967	3	48.9	1974	349	13	.0	.5	29.0	.0	4.8	.0
Jun	75.2	50.8	63.0	105	1979	14	75.5	1988	28	1969	2	58.1	1993	141	82	.2	2.2	30.0	.0	.2	.0
Jul	81.8	55.1	68.5	106+	1989	9	73.6	1989	34+	1967	13	61.0	1992	52	159	.8	5.9	31.0	.0	.0	.0
Aug	81.1	53.2	67.2	105	1973	28	73.8	1983	29	1964	12	60.7	1977	84	152	.5	6.8	31.0	.0	.1	.0
Sep	69.5	42.2	55.9	106	1978	6	62.4	1998	12	1974	30	51.0	1984	298	23	.2	1.7	28.7	.0	3.7	.0
Oct	56.1	30.4	43.3	96	1963	4	47.6	1973	-7	1991	30	38.7	1991	674	0	.0	.1	21.9	1.1	17.4	.1
Nov	36.9	17.2	27.1	80	1999	8	38.9	1999	-23	1964	29	14.3	1985	1140	0	.0	.0	6.4	10.5	28.3	3.1
Dec	25.5	5.7	15.6	66	1979	5	27.4	1997	-38	1967	31	-2.5	1983	1531	0	.0	.0	1.5	19.1	30.8	10.3
Ann	52.9	29.3	41.1	106+	Jul 1989	9	75.5	Jun 1988	-47	Jan 1966	29	-4.1	Jan 1982	9111	429	1.7	17.4	209.5	78.5	193.2	41.5

\+ 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/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1963-2001

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

Issue Date: February 2004

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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	.26	.20	.72	1999	16	.90	1997	.00+	1991
Feb	.31	.19	.67	2000	26	2.34	1998	.00+	1994
Mar	.56	.40	1.05	1966	3	2.85	1975	.00+	1999
Apr	1.66	1.39	2.47	1997	7	3.96	1975	.00	1988
May	2.53	2.42	3.69	1972	19	8.03	1972	.32	1980
Jun	3.23	2.97	3.06	1966	24	5.61	1993	1.01	1974
Jul	2.70	2.31	2.75	1993	22	10.01	1993	.51	1991
Aug	1.64	1.44	2.54	1995	24	4.51	1998	.21	1971
Sep	1.69	1.44	2.65	1976	16	6.47	1977	.12	1987
Oct	1.28	.88	2.25	1991	30	5.29	1994	.00	1987
Nov	.58	.52	1.06	2000	2	1.72	2000	.00+	1993
Dec	.29	.27	.55	1977	17	1.17	1977	.00+	1993
Ann	16.73	16.17	3.69	May 1972	19	10.01	Jul 1993	.00+	Mar 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	.9	.1	.0
Feb	4.3	.9	.1	.0
Mar	5.3	1.6	.1	@
Apr	7.7	4.4	1.0	.3
May	9.9	5.6	1.4	.4
Jun	11.1	7.0	2.1	.6
Jul	8.9	5.2	1.7	.5
Aug	7.9	4.0	.8	.3
Sep	7.3	3.6	1.0	.4
Oct	4.9	2.8	.7	.4
Nov	4.6	1.6	.1	@
Dec	4.7	1.0	@	.0
Ann	81.2	38.6	9.1	2.9

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	.00	.00	.06	.11	.15	.20	.26	.33	.43	.59	.74
Feb	.00	.01	.06	.10	.16	.22	.29	.38	.51	.73	.95
Mar	.00	.00	.13	.23	.32	.43	.55	.70	.90	1.24	1.56
Apr	.09	.25	.51	.76	1.01	1.30	1.64	2.05	2.61	3.54	4.44
May	.61	.84	1.21	1.54	1.87	2.22	2.60	3.07	3.67	4.63	5.53
Jun	1.28	1.58	2.00	2.35	2.68	3.02	3.39	3.81	4.34	5.16	5.90
Jul	.65	.91	1.30	1.65	2.00	2.37	2.78	3.27	3.92	4.94	5.90
Aug	.24	.37	.61	.84	1.07	1.34	1.64	2.01	2.51	3.32	4.10
Sep	.21	.34	.58	.81	1.06	1.34	1.66	2.06	2.60	3.49	4.36
Oct	.02	.10	.25	.43	.63	.87	1.17	1.54	2.08	2.98	3.89
Nov	.00	.06	.16	.25	.35	.45	.57	.72	.92	1.25	1.57
Dec	.00	.03	.07	.12	.17	.22	.28	.36	.46	.63	.80
Ann	10.64	11.77	13.25	14.38	15.41	16.41	17.45	18.61	20.03	22.12	23.95

\+ 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: 1963-2001
(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	4.3	2.5	6	5
Feb	3.4	4.0	5	2
Mar	4.8	3.0	3	1
Apr	1.2	.0	1	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	1.3	.0	#	0
Nov	4.0	3.0	1	1
Dec	4.8	3.0	3	2
Ann	24.0	15.5	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	5.0	1997	5	12.0	1971	21	1978	23	21	1978
Feb	5.0	2000	15	8.0	1979	26	1978	21	23	1978
Mar	11.0	1975	28	30.0	1975	30	1975	29	12	1978
Apr	11.0	1991	14	11.0	1991	30	1975	5	12	1975
May	3.0	1991	4	3.0+	1991	2	1991	4	#+	1996
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	2.0	1972	26	2.0	1972	2+	1995	20	#+	1995
Oct	5.0	1991	24	5.0+	1991	10	1991	30	1	1991
Nov	5.0	1977	20	15.0	1977	18	1993	25	5	1978
Dec	6.0	1972	30	15.0	1972	21	1977	31	17	1977
Ann	11.0+	Apr 1991	14	30.0	Mar 1975	30+	Apr 1975	5	23	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.5	2.4	.4	.1	.0
Feb	2.2	2.0	.2	.0	.0
Mar	1.9	1.8	.6	.1	.1
Apr	.7	.7	.2	@	@
May	@	@	@	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	@	@	.0	.0	.0
Oct	.7	.7	.1	@	.0
Nov	1.9	1.9	.5	.1	.0
Dec	3.0	2.9	.5	.2	.0
Ann	12.9	12.4	2.5	.5	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	24.2	18.9	14.9	8.1
Feb	17.6	10.8	8.5	7.8
Mar	10.3	7.5	5.8	2.9
Apr	3.0	1.9	1.4	.8
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	.9	.2	@	.0
Nov	7.1	3.6	2.0	.6
Dec	18.0	10.0	6.4	1.8
Ann	81.1	52.9	39.0	22.0

+ 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	6/18	6/12	6/08	6/04	6/01	5/28	5/24	5/20	5/14
32	6/01	5/27	5/24	5/21	5/18	5/16	5/13	5/10	5/05
28	5/24	5/19	5/15	5/12	5/09	5/06	5/03	4/30	4/25
24	5/14	5/09	5/05	5/02	4/30	4/27	4/24	4/20	4/15
20	5/04	4/29	4/25	4/22	4/19	4/16	4/13	4/10	4/05
16	4/20	4/16	4/13	4/10	4/07	4/05	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	8/22	8/27	8/31	9/04	9/08	9/12	9/17	9/24
32	9/04	9/09	9/12	9/15	9/18	9/21	9/24	9/28	10/03
28	9/14	9/18	9/22	9/24	9/27	9/29	10/02	10/05	10/09
24	9/22	9/27	9/30	10/03	10/06	10/08	10/11	10/15	10/19
20	9/26	10/03	10/08	10/11	10/15	10/19	10/23	10/27	11/03
16	10/08	10/14	10/19	10/22	10/26	10/30	11/03	11/07	11/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	120	111	105	100	95	90	84	78	70
32	141	135	130	126	122	118	114	109	103
28	160	153	148	144	140	136	132	127	120
24	176	170	166	162	158	155	151	147	141
20	201	193	188	183	178	173	169	163	155
16	223	216	210	205	201	196	192	186	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

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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	1683	1319	1141	699	349	141	52	84	298	674	1140	1531	9111
60	1528	1179	986	552	222	68	15	34	183	519	990	1376	7652
57	1435	1095	893	467	160	38	7	18	127	427	900	1283	6850
55	1373	1039	831	413	124	25	2	11	95	366	840	1221	6340
50	1221	912	685	287	57	7	0	2	38	226	697	1067	5199
32	713	473	241	33	0	0	0	0	0	9	256	567	2292

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	52	78	123	323	687	931	1130	1090	715	358	106	59	5652
55	0	0	0	13	98	266	419	388	120	2	0	0	1306
57	0	0	0	8	71	220	362	333	92	1	0	0	1087
60	0	0	0	3	41	159	277	256	58	0	0	0	794
65	0	0	0	0	13	82	159	152	23	0	0	0	429
70	0	0	0	0	2	31	76	76	7	0	0	0	192

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	1	31	160	456	699	897	864	500	201	23	0	0	1	32	192	648	1347	2244	3108	3608	3809	3832	3832
45	0	0	7	85	318	549	742	709	361	111	10	0	0	0	7	92	410	959	1701	2410	2771	2882	2892	2892
50	0	0	0	44	196	405	587	555	235	52	1	0	0	0	0	44	240	645	1232	1787	2022	2074	2075	2075
55	0	0	0	16	109	265	433	405	138	13	0	0	0	0	0	16	125	390	823	1228	1366	1379	1379	1379
60	0	0	0	5	49	151	284	261	69	4	0	0	0	0	0	5	54	205	489	750	819	823	823	823
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	3	34	122	286	430	568	551	322	156	25	1	0	3	37	159	445	875	1443	1994	2316	2472	2497	2498

(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