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: HILLSBORO 3 N, ND **COOP ID: 324203**

Climate Division: ND 6 **NWS Call Sign:** **Elevation: 910 Feet** **Lat: 47˚26N** **Lon: 97˚04W**

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	15.8	-4.4	5.7	49	1958	9	21.4	1990	-35+	1994	20	-8.9	1982	1839	0	.0	.0	.0	26.8	31.0	19.1
Feb	23.0	2.5	12.8	65	1958	25	27.5	1987	-37+	1996	2	-4.3	1979	1463	0	.0	.0	.3	20.1	27.9	12.6
Mar	35.0	16.0	25.5	81	1963	31	36.0	2000	-30	1962	1	16.8	1996	1226	0	.0	.0	3.5	11.4	28.3	4.4
Apr	54.0	30.6	42.3	99	1980	21	51.0	1987	-5	1975	1	33.5	1979	684	2	.0	.2	19.2	1.2	16.4	.1
May	69.9	43.8	56.9	99	1964	21	65.3	1977	15	1967	3	49.5	1979	290	36	.0	1.0	29.7	.0	3.0	.0
Jun	77.6	53.2	65.4	100	1950	6	72.4	1988	31	1953	6	59.1	1982	92	104	.0	2.6	30.0	.0	.0	.0
Jul	82.5	57.7	70.1	106	1988	5	74.5	1983	40+	1967	3	62.6	1992	34	191	.3	5.3	31.0	.0	.0	.0
Aug	81.5	55.5	68.5	106	1983	8	73.9	1984	35+	1982	26	62.6	1977	50	158	.3	5.1	31.0	.0	.0	.0
Sep	70.1	44.6	57.4	102+	1983	3	63.6	1998	21	1995	23	52.5	1993	250	20	.1	1.3	29.4	.0	1.8	.0
Oct	56.2	33.0	44.6	94	1976	1	49.7	1973	6	1951	31	40.2	1976	633	0	.0	.1	22.4	.5	13.7	.0
Nov	35.2	17.3	26.3	78	1999	1	37.2	1999	-27	1964	30	15.3	1985	1162	0	.0	.0	4.1	13.3	27.9	2.7
Dec	21.3	3.1	12.2	57	1969	1	25.4	1997	-30+	1967	31	-.6	1983	1638	0	.0	.0	.2	24.6	31.0	13.4
Ann	51.8	29.4	40.6	106+	Jul 1988	5	74.5	Jul 1983	-37+	Feb 1996	2	-8.9	Jan 1982	9361	511	.7	15.6	200.8	97.9	181.0	52.3

\+ 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

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	.50	.41	.83	1967	6	1.21	1999	.00	1973
Feb	.55	.32	1.45	2000	26	1.89	1998	.08	1975
Mar	.93	.88	1.16	1973	14	2.34	1995	.00+	1991
Apr	1.56	1.23	1.89	1964	21	6.39	1986	.00	1980
May	2.35	2.43	2.22	2001	7	5.09	1985	.44	1980
Jun	3.46	3.35	4.12	1968	7	6.52	1998	.94	1972
Jul	3.23	2.89	6.38	1987	21	10.08	1987	.49	1984
Aug	2.78	2.59	2.50	1980	29	6.15	1980	.61	1984
Sep	2.05	1.79	5.18	1957	2	7.56	1973	.22	1974
Oct	1.92	1.52	2.62	1961	11	7.32	1998	.00	1992
Nov	.89	.64	1.92	1998	19	4.32	2000	.00+	1999
Dec	.48	.34	.80	1988	27	1.29	1988	.05	1989
Ann	20.70	20.73	6.38	Jul 1987	21	10.08	Jul 1987	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.0	1.7	.1	.0
Feb	4.2	1.8	.2	@
Mar	5.0	2.8	.4	@
Apr	6.2	3.6	.8	.3
May	9.4	5.9	1.4	.3
Jun	10.5	6.8	2.4	.7
Jul	8.9	5.9	1.9	.7
Aug	8.2	5.6	1.9	.6
Sep	7.4	4.5	1.3	.5
Oct	6.3	3.6	1.3	.5
Nov	5.1	2.5	.4	.1
Dec	4.8	1.6	.1	.0
Ann	81.0	46.3	12.2	3.7

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	.02	.06	.13	.20	.28	.37	.47	.61	.79	1.10	1.40
Feb	.05	.09	.17	.24	.33	.42	.53	.67	.87	1.19	1.50
Mar	.00	.15	.34	.49	.63	.79	.96	1.16	1.43	1.87	2.28
Apr	.06	.18	.41	.63	.88	1.16	1.49	1.91	2.49	3.45	4.39
May	.76	.98	1.31	1.59	1.86	2.14	2.45	2.80	3.27	3.98	4.65
Jun	1.25	1.57	2.04	2.44	2.82	3.20	3.62	4.11	4.73	5.69	6.58
Jul	.60	.89	1.36	1.80	2.25	2.73	3.28	3.94	4.82	6.24	7.59
Aug	.89	1.15	1.54	1.88	2.20	2.53	2.90	3.32	3.87	4.73	5.52
Sep	.32	.50	.79	1.08	1.37	1.69	2.06	2.50	3.11	4.08	5.02
Oct	.02	.10	.29	.54	.84	1.21	1.68	2.29	3.17	4.70	6.25
Nov	.00	.00	.16	.31	.46	.64	.85	1.11	1.47	2.07	2.67
Dec	.06	.10	.17	.23	.30	.38	.47	.59	.74	1.00	1.24
Ann	13.28	14.66	16.46	17.85	19.09	20.31	21.58	22.99	24.72	27.26	29.48

+ 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:
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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	5.7	6.0	5	4
Feb	4.5	3.7	5	5
Mar	3.4	1.3	2	#
Apr	.5	.0	#	0
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	.4	.0	#	0
Nov	2.5	2.5	1	#
Dec	6.7	4.5	3	2
Ann	23.7	18.0	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	10.0	1988	11	17.0	1989	24	1986	31	22	1986
Feb	7.5	1995	15	10.2	1995	23	1979	28	20	1997
Mar	5.2	1995	6	11.3	1982	21	1979	4	11	1979
Apr	5.0	1986	14	5.0	1986	8	1975	1	3	1975
May	.0	0	0	.0	0	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Oct	4.5	1972	30	5.0	1972	3	1981	21	#+	1983
Nov	8.0	1998	19	8.0	1998	15	1985	30	5	1985
Dec	9.0	1995	12	20.7	1995	19	1985	31	17	1985
Ann	10.0	Jan 1988	11	20.7	Dec 1995	24	Jan 1986	31	22	Jan 1986

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.8	1.9	.6	.2	.1
Feb	2.4	1.7	.5	.2	.0
Mar	1.4	1.0	.4	.2	.0
Apr	.1	.1	.1	.1	.0
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.2	.1	.1	.0	.0
Nov	1.5	1.2	.2	.1	.0
Dec	2.8	1.7	.7	.3	.0
Ann	11.2	7.7	2.6	1.1	.1

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	3.0	1.4	.7	.0
Apr	.2	.1	.1	.0
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	.1	@	.0	.0
Nov	3.2	1.8	.5	.0
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-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

Complete documentation available from:
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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	5/28	5/23	5/20	5/18	5/16	5/13	5/11	5/08	5/04
32	5/19	5/15	5/12	5/09	5/07	5/04	5/01	4/28	4/24
28	5/13	5/07	5/03	4/29	4/25	4/22	4/18	4/14	4/08
24	4/27	4/23	4/20	4/17	4/15	4/12	4/10	4/07	4/02
20	4/18	4/14	4/11	4/08	4/06	4/03	4/01	3/28	3/24
16	4/13	4/08	4/05	4/01	3/30	3/27	3/24	3/20	3/15

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	145	138	133	129	125	120	116	111	104
32	161	155	151	147	144	140	136	132	126
28	188	180	173	168	163	158	152	146	137
24	204	197	192	187	183	179	174	169	162
20	225	218	213	208	204	200	196	191	184
16	242	235	229	225	221	216	212	207	199

***** 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	1839	1463	1226	684	290	92	34	50	250	633	1162	1638	9361
60	1684	1323	1071	541	184	35	9	15	139	479	1012	1483	7975
57	1591	1239	978	458	133	17	2	5	88	389	922	1390	7212
55	1529	1183	916	406	104	10	0	2	62	331	862	1328	6733
50	1374	1043	765	288	50	2	0	0	19	203	714	1173	5631
32	840	585	304	40	0	0	0	0	0	10	262	645	2686

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	24	45	101	348	770	1002	1180	1131	760	400	90	30	5881
55	0	0	0	24	161	322	467	420	132	7	0	0	1533
57	0	0	0	16	127	269	407	361	98	3	0	0	1281
60	0	0	0	8	86	197	321	278	59	1	0	0	950
65	0	0	0	2	36	104	191	158	20	0	0	0	511
70	0	0	0	0	13	41	99	74	5	0	0	0	232

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	11	173	540	771	947	900	545	215	19	0	0	1	12	185	725	1496	2443	3343	3888	4103	4122	4122
45	0	0	1	93	395	621	792	745	399	117	7	0	0	0	1	94	489	1110	1902	2647	3046	3163	3170	3170
50	0	0	0	48	260	471	637	590	266	56	1	0	0	0	0	48	308	779	1416	2006	2272	2328	2329	2329
55	0	0	0	19	156	329	482	436	156	21	0	0	0	0	0	19	175	504	986	1422	1578	1599	1599	1599
60	0	0	0	7	78	197	331	284	77	5	0	0	0	0	0	7	85	282	613	897	974	979	979	979
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	7	120	335	483	621	577	331	137	13	0	0	0	7	127	462	945	1566	2143	2474	2611	2624	2624

(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