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: HAY SPRINGS, NE **COOP ID: 253710**

Climate Division: NE 1 **NWS Call Sign:** **Elevation: 3,855 Feet** **Lat: 42˚41N** **Lon: 102˚42W**

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	35.2	9.0	22.1	72	1981	23	30.9	1990	-31	1963	19	7.4	1979	1330	0	.0	.0	5.3	11.5	30.6	7.9
Feb	41.0	13.8	27.4	73+	1995	26	36.0	1999	-29	1996	3	14.8	1978	1053	0	.0	.0	9.1	7.1	27.2	4.4
Mar	49.1	20.8	35.0	81+	1986	30	41.5	1986	-22	1960	3	28.3	1996	931	0	.0	.0	16.3	3.7	27.8	1.2
Apr	58.5	29.8	44.2	90	1980	21	51.6	1981	-17	1975	2	37.9	1997	625	0	.0	.1	22.8	.7	17.6	.1
May	69.1	41.4	55.3	97	1969	26	60.5	1985	7	1954	3	49.1	1995	312	10	.0	.2	29.7	.0	3.6	.0
Jun	79.4	51.0	65.2	103	1953	29	72.4	1988	27	1951	3	59.0	1998	94	100	.3	5.0	29.8	.0	.1	.0
Jul	86.3	57.1	71.7	110	1973	6	76.5	1974	35	1968	2	64.9	1992	19	226	1.1	12.5	31.0	.0	.0	.0
Aug	85.5	54.9	70.2	104	1959	11	75.8	1983	33	1962	28	64.5	1992	25	186	.2	10.9	31.0	.0	.0	.0
Sep	76.3	43.8	60.1	99+	1998	5	66.4	1998	15	1984	29	54.4	1993	191	42	.0	3.8	29.2	.0	2.4	.0
Oct	63.8	31.2	47.5	94	1963	6	50.3	1973	-5	1991	31	44.9	1993	543	0	.0	.1	26.7	.4	14.8	.1
Nov	46.2	19.2	32.7	82	1999	9	43.2	1999	-17	1985	22	18.2	1985	969	0	.0	.0	12.8	5.3	27.3	1.2
Dec	38.0	10.8	24.4	70	1998	2	32.9	1999	-34	1990	23	8.4	1983	1259	0	.0	.0	6.7	9.7	30.4	5.4
Ann	60.7	31.9	46.3	110	Jul 1973	6	76.5	Jul 1974	-34	Dec 1990	23	7.4	Jan 1979	7351	564	1.6	32.6	250.4	38.4	181.8	20.3

\+ 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	.52	.44	1.40	1949	4	1.78	1983	.07	1989
Feb	.57	.46	.80	1958	27	1.64	1987	.00	1996
Mar	1.34	.91	1.32	1998	29	5.41	1977	.10	1981
Apr	2.48	2.37	1.75	1978	18	4.97	1978	.51	1998
May	3.13	3.23	3.70	1978	28	6.51	1978	1.09	1998
Jun	2.72	2.52	4.15	1952	20	7.33	1993	.40	2000
Jul	2.97	2.64	2.80	1986	20	6.31	1983	.56	1974
Aug	1.99	1.65	3.37	1996	4	6.39	1996	.10	1983
Sep	1.46	1.12	2.02	1951	3	4.74	1973	.00	1976
Oct	1.30	1.09	2.15	1982	9	4.74	1982	.10	1999
Nov	.80	.69	1.04	1993	13	2.30	1985	.17	1989
Dec	.52	.39	.84	1987	27	1.62	1987	.00	1991
Ann	19.80	18.76	4.15	Jun 1952	20	7.33	Jun 1993	.00+	Feb 1996

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	2.0	.1	.0
Feb	4.8	2.0	.2	.0
Mar	6.9	3.7	.6	.2
Apr	9.5	6.0	1.3	.4
May	10.8	6.8	1.9	.5
Jun	10.0	6.6	1.5	.4
Jul	9.5	5.6	1.8	.5
Aug	7.2	4.4	1.0	.3
Sep	6.1	3.8	1.0	.2
Oct	4.8	3.2	.7	.1
Nov	4.9	2.5	.3	@
Dec	5.1	1.7	.2	.0
Ann	84.2	48.3	10.6	2.6

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	.11	.16	.23	.30	.37	.44	.53	.63	.76	.97	1.17
Feb	.10	.18	.27	.35	.42	.50	.59	.69	.83	1.04	1.23
Mar	.14	.24	.42	.61	.81	1.04	1.30	1.64	2.09	2.85	3.58
Apr	.63	.86	1.22	1.54	1.86	2.19	2.56	3.00	3.57	4.48	5.33
May	.99	1.29	1.73	2.10	2.47	2.85	3.26	3.75	4.37	5.35	6.25
Jun	.69	.95	1.34	1.69	2.04	2.40	2.81	3.29	3.92	4.91	5.85
Jul	1.09	1.37	1.77	2.11	2.42	2.75	3.10	3.51	4.04	4.84	5.58
Aug	.25	.41	.69	.96	1.26	1.58	1.96	2.43	3.07	4.11	5.12
Sep	.10	.24	.47	.69	.91	1.16	1.44	1.80	2.27	3.05	3.81
Oct	.18	.29	.48	.66	.85	1.05	1.29	1.58	1.98	2.62	3.24
Nov	.22	.30	.42	.52	.61	.72	.83	.97	1.14	1.41	1.67
Dec	.03	.08	.16	.23	.31	.41	.51	.65	.83	1.12	1.42
Ann	13.59	14.77	16.30	17.47	18.51	19.51	20.56	21.72	23.13	25.18	26.96

\+ 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	6.5	5.6	2	1
Feb	7.1	6.6	2	1
Mar	8.4	6.5	1	#
Apr	4.4	3.0	#	#
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	2.3	1.1	#	#
Nov	8.7	7.6	1	1
Dec	6.4	5.5	3	1
Ann	44.1	35.9	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	1974	21	15.0	1976	13	1974	9	10	1974
Feb	14.5	1987	27	27.0	1978	12	1978	14	12	1978
Mar	15.0	1975	27	26.0	1977	12	1987	21	10	1986
Apr	10.0	1971	26	14.0	1972	12	1984	3	1	1995
May	1.0	1983	12	1.0	1983	1	1983	12	#+	1995
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	4.0	1985	27	4.0+	1995	4	1995	21	#+	1995
Oct	8.0	1975	24	14.0	1975	13	1982	19	1	1997
Nov	10.0	1977	8	39.0	1985	14	1985	30	14	1985
Dec	10.0	1973	18	19.4	1973	26	1985	20	19	1985
Ann	15.0	Mar 1975	27	39.0	Nov 1985	26	Dec 1985	20	19	Dec 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.8	3.0	1.2	.3	@
Feb	3.2	3.0	1.1	.3	@
Mar	3.6	2.9	1.1	.4	.2
Apr	1.6	1.4	.8	.3	@
May	@	@	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.1	.0	.0
Oct	.8	.7	.4	.2	.0
Nov	3.0	2.6	1.1	.5	.1
Dec	3.3	2.7	1.1	.4	.1
Ann	19.4	16.4	6.9	2.4	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	9.8	4.6	1.8	.0
Feb	4.8	3.1	1.8	.1
Mar	3.9	1.6	1.0	.1
Apr	1.2	.7	.2	@
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.0	.0
Oct	.7	.4	.3	.1
Nov	4.6	2.2	1.0	.1
Dec	10.1	4.1	1.8	.4
Ann	35.2	16.8	7.9	.8

+ 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	6/11	6/05	6/01	5/29	5/26	5/23	5/20	5/16	5/11
32	5/29	5/24	5/21	5/18	5/15	5/12	5/09	5/05	5/01
28	5/13	5/08	5/05	5/03	4/30	4/28	4/25	4/22	4/18
24	5/08	5/03	4/29	4/26	4/24	4/21	4/18	4/14	4/09
20	4/23	4/18	4/15	4/12	4/10	4/07	4/04	4/01	3/27
16	4/16	4/11	4/07	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	9/06	9/10	9/12	9/15	9/17	9/19	9/21	9/24	9/28
32	9/12	9/16	9/19	9/21	9/23	9/26	9/28	10/01	10/05
28	9/16	9/21	9/25	9/28	10/01	10/04	10/07	10/11	10/16
24	9/25	10/01	10/05	10/08	10/12	10/15	10/19	10/23	10/28
20	10/07	10/12	10/16	10/19	10/22	10/25	10/28	11/01	11/06
16	10/14	10/20	10/24	10/27	10/30	11/02	11/05	11/09	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	131	125	121	117	113	110	106	101	95
32	149	143	138	134	131	127	123	119	113
28	172	165	161	157	153	149	145	141	134
24	193	185	180	175	170	166	161	156	148
20	217	209	204	199	194	190	185	180	172
16	232	225	220	216	212	208	203	198	192

***** 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	1330	1053	931	625	312	94	19	25	191	543	969	1259	7351
60	1175	913	776	477	186	36	4	5	98	389	819	1104	5982
57	1082	829	683	391	125	17	0	2	57	298	729	1011	5224
55	1020	773	621	336	92	10	0	1	37	239	669	949	4747
50	868	643	467	212	36	1	0	0	9	114	531	799	3680
32	383	240	71	7	0	0	0	0	0	1	146	328	1176

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	76	112	163	372	721	995	1230	1184	841	481	166	92	6433
55	0	0	0	11	100	315	517	471	188	6	0	0	1608
57	0	0	0	6	71	262	456	410	148	2	0	0	1355
60	0	0	0	2	39	191	366	321	99	1	0	0	1019
65	0	0	0	0	10	100	226	186	42	0	0	0	564
70	0	0	0	0	1	40	118	85	13	0	0	0	257

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	3	27	84	218	499	780	1002	962	631	296	61	10	3	30	114	332	831	1611	2613	3575	4206	4502	4563	4573
45	0	5	34	125	353	631	847	807	484	180	21	1	0	5	39	164	517	1148	1995	2802	3286	3466	3487	3488
50	0	1	7	61	223	483	692	652	348	87	3	0	0	1	8	69	292	775	1467	2119	2467	2554	2557	2557
55	0	0	0	24	120	337	537	497	226	31	0	0	0	0	0	24	144	481	1018	1515	1741	1772	1772	1772
60	0	0	0	8	47	206	384	346	124	5	0	0	0	0	0	8	55	261	645	991	1115	1120	1120	1120
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	13	35	89	174	320	488	637	612	411	237	69	24	13	48	137	311	631	1119	1756	2368	2779	3016	3085	3109

(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:
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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