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: SYBILLE RESEARCH UNIT, WY **COOP ID: 488808**

Climate Division: WY 8 **NWS Call Sign:** **Elevation: 6,100 Feet** **Lat: 41˚46N** **Lon: 105˚23W**

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	34.2	12.1	23.2	62	1997	2	31.4	1981	-22	1997	12	10.7	1979	1298	0	.0	.0	2.8	10.2	29.4	3.6
Feb	37.8	15.0	26.4	64+	1981	25	33.2	1991	-28+	1989	5	14.7	1989	1082	0	.0	.0	5.4	6.8	25.5	2.0
Mar	46.2	21.2	33.7	73	1989	10	40.6	1986	-15	1965	18	28.8	1980	970	0	.0	.0	14.4	2.6	26.0	.6
Apr	54.7	29.6	42.2	81	1981	25	49.2	1981	-2	1975	2	34.3	1983	686	0	.0	.0	21.5	.7	18.2	@
May	65.1	38.0	51.6	90	1969	27	57.1	1994	10	1967	4	46.3	1983	419	1	.0	.0	28.8	.0	5.8	.0
Jun	76.9	47.0	62.0	98	1994	26	67.7	1988	28+	1984	10	56.8	1982	145	53	.0	2.0	29.9	.0	.6	.0
Jul	83.6	53.0	68.3	99+	1995	29	71.8	1980	34	1968	1	64.3	1992	20	122	.0	6.8	31.0	.0	.0	.0
Aug	82.3	51.6	67.0	98	1979	5	71.8	1995	32	1966	22	64.0	1974	42	102	.0	3.4	31.0	.0	.0	.0
Sep	73.0	41.4	57.2	93+	1998	5	62.3	1979	9	1985	30	52.2	1985	255	20	.0	.4	29.0	.1	3.2	.0
Oct	61.1	31.5	46.3	85	1997	4	50.5	1992	-2	1991	31	40.0	1984	580	0	.0	.0	26.7	.4	13.4	.1
Nov	43.2	19.9	31.6	75	1999	8	43.6	1999	-17	1993	25	22.6	2000	1004	0	.0	.0	11.3	5.1	23.9	.6
Dec	35.5	13.7	24.6	68	1999	1	34.5	1980	-30	1983	23	12.7	1983	1253	0	.0	.0	4.1	9.1	28.5	2.9
Ann	57.8	31.2	44.5	99+	Jul 1995	29	71.8+	Aug 1995	-30	Dec 1983	23	10.7	Jan 1979	7754	298	.0	12.6	235.9	35.0	174.5	9.8

\+ 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: 1964-2001

(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	.64	.58	.92	1992	8	1.81	1980	.00	1989
Feb	.59	.46	.80	1993	10	1.43	1989	.05	1992
Mar	.96	.83	1.80	1990	6	3.55	1983	.21	1977
Apr	1.94	1.83	2.10	1968	3	4.73	1971	.59	1988
May	2.68	2.56	3.21	2000	18	5.84	1995	.37	1974
Jun	1.95	1.80	2.40	1970	12	5.87	1993	.07	1980
Jul	1.64	1.27	1.50	1999	17	4.13	1984	.15	2000
Aug	1.48	1.30	1.70	1990	5	4.64	1972	.05	1995
Sep	1.24	1.10	1.95	1973	11	3.46	1973	.00	1977
Oct	1.16	1.05	1.77	1978	22	2.78	1998	.15	1987
Nov	.96	.90	1.30	2000	1	3.19	1983	.09	1975
Dec	.62	.62	.69	1995	6	1.46	1987	.00	1991
Ann	15.86	16.11	3.21	May 2000	18	5.87	Jun 1993	.00+	Dec 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.3	2.5	.1	.0
Feb	5.0	2.1	.1	.0
Mar	6.8	3.1	.3	.1
Apr	8.7	4.7	1.0	.2
May	10.8	6.0	1.5	.3
Jun	8.8	4.7	1.0	.2
Jul	8.3	4.5	.9	.3
Aug	7.3	3.4	.9	.2
Sep	6.2	3.2	.7	.2
Oct	5.4	3.2	.8	.1
Nov	5.2	2.8	.4	.1
Dec	5.0	2.2	.3	.0
Ann	82.8	42.4	8.0	1.7

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	.07	.15	.26	.35	.44	.54	.65	.79	.97	1.26	1.53
Feb	.07	.11	.20	.28	.37	.46	.58	.72	.91	1.23	1.54
Mar	.16	.24	.38	.51	.65	.80	.97	1.18	1.45	1.90	2.33
Apr	.54	.73	1.01	1.25	1.49	1.74	2.01	2.34	2.76	3.42	4.03
May	.76	1.01	1.40	1.73	2.06	2.40	2.78	3.23	3.81	4.72	5.57
Jun	.27	.42	.70	.98	1.26	1.58	1.94	2.39	2.99	3.98	4.93
Jul	.25	.39	.63	.85	1.09	1.35	1.64	2.01	2.49	3.28	4.04
Aug	.15	.26	.46	.66	.89	1.14	1.44	1.81	2.31	3.16	3.98
Sep	.10	.23	.43	.62	.80	1.01	1.25	1.53	1.92	2.55	3.15
Oct	.23	.34	.51	.66	.82	.99	1.18	1.41	1.71	2.20	2.66
Nov	.09	.16	.29	.42	.57	.73	.93	1.17	1.51	2.07	2.62
Dec	.03	.09	.19	.28	.38	.49	.61	.77	.98	1.33	1.67
Ann	11.03	11.96	13.16	14.07	14.88	15.67	16.48	17.38	18.47	20.06	21.44

\+ 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: 1964-2001
(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	11.2	11.7	3	2	10.5	1992	8	22.5	1992	21	1988	8	16	1988	4.9	3.6	1.5	.6	.1	13.9	9.0	6.3	1.4
Feb	8.7	8.7	2	1	8.0	1993	10	18.5	1978	16	1980	1	6	1980	4.4	3.0	1.2	.3	.0	10.0	5.6	2.5	.2
Mar	12.0	10.0	1	1	18.0	1990	6	31.5	1990	18	1990	6	4	1990	4.8	3.8	1.4	.5	.1	8.0	3.9	2.0	.4
Apr	9.4	8.5	1	#	16.0	1984	20	33.4	1973	16+	1984	21	3	1984	3.3	2.8	1.5	.8	.1	3.1	1.7	1.1	.3
May	3.1	.5	#	0	12.0	1983	17	18.0	1978	10	1978	6	1	1978	.8	.7	.6	.2	.1	.5	.3	.1	@
Jun	.1	.0	#	0	1.5	1979	8	2.5	1979	#+	1979	8	#+	1979	.1	.1	.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	1.8	.0	#	0	10.0	2000	23	12.0	2000	10	2000	23	1	2000	.4	.4	.3	.1	@	.4	.3	.1	@
Oct	5.9	4.8	#	#	14.0	1972	30	18.0	1972	17	1972	30	1	1997	1.7	1.4	.7	.4	.1	1.5	.9	.4	.1
Nov	12.1	10.0	2	1	15.0	1979	20	42.5	1983	18+	1979	27	11	1993	4.3	3.7	1.6	.5	.1	7.2	3.7	2.0	.8
Dec	11.2	11.5	2	1	17.8	1992	13	25.6	1992	20	1992	16	9	1983	4.5	3.4	1.1	.6	.1	11.3	7.7	5.3	1.4
Ann	75.5	65.7	N/A	N/A	18.0	Mar 1990	6	42.5	Nov 1983	21	Jan 1988	8	16	Jan 1988	29.2	22.9	9.9	4.0	.7	55.9	33.1	19.8	4.6

+ 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	6/21	6/17	6/14	6/12	6/09	6/07	6/05	6/02	5/29
32	6/17	6/11	6/07	6/03	5/31	5/27	5/24	5/19	5/13
28	5/27	5/21	5/17	5/13	5/10	5/06	5/03	4/28	4/22
24	5/10	5/05	5/02	4/29	4/26	4/23	4/20	4/17	4/12
20	5/01	4/25	4/21	4/17	4/14	4/10	4/07	4/02	3/27
16	4/18	4/12	4/08	4/04	4/01	3/29	3/25	3/21	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	8/30	9/04	9/07	9/10	9/13	9/15	9/18	9/21	9/26
32	9/10	9/14	9/16	9/19	9/21	9/23	9/25	9/27	10/01
28	9/14	9/19	9/21	9/24	9/26	9/29	10/01	10/04	10/08
24	9/25	9/30	10/05	10/08	10/12	10/15	10/19	10/23	10/29
20	10/10	10/15	10/19	10/22	10/25	10/28	10/31	11/04	11/09
16	10/16	10/22	10/26	10/29	11/01	11/04	11/08	11/12	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	113	107	102	98	94	91	87	82	76
32	133	126	121	116	112	108	104	98	91
28	161	154	148	143	139	134	129	124	116
24	193	184	178	173	168	163	158	151	143
20	219	210	204	198	194	189	183	177	168
16	238	230	224	218	213	209	203	197	189

***** 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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1298	1082	970	686	419	145	20	42	255	580	1004	1253	7754
60	1143	942	815	538	274	67	2	10	144	425	854	1098	6312
57	1050	858	722	452	197	36	0	3	93	334	764	1005	5514
55	988	802	660	397	152	22	0	2	66	276	704	943	5012
50	833	662	507	269	68	5	0	0	21	150	562	788	3865
32	326	214	88	22	0	0	0	0	0	3	159	288	1100

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	51	56	141	326	606	898	1125	1084	755	446	145	58	5691
55	0	0	0	11	45	230	412	372	132	6	0	0	1208
57	0	0	0	7	27	184	350	312	99	3	0	0	982
60	0	0	0	2	12	125	259	225	60	1	0	0	684
65	0	0	0	0	1	53	122	102	20	0	0	0	298
70	0	0	0	0	0	15	33	27	5	0	0	0	80

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	15	64	180	402	683	908	873	584	296	71	12	3	18	82	262	664	1347	2255	3128	3712	4008	4079	4091
45	1	1	23	94	261	533	753	718	441	175	28	2	1	2	25	119	380	913	1666	2384	2825	3000	3028	3030
50	0	0	2	42	147	388	598	563	307	87	3	0	0	0	2	44	191	579	1177	1740	2047	2134	2137	2137
55	0	0	0	15	62	252	444	409	182	33	0	0	0	0	0	15	77	329	773	1182	1364	1397	1397	1397
60	0	0	0	0	18	137	294	257	89	7	0	0	0	0	0	0	18	155	449	706	795	802	802	802
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	12	61	140	269	445	582	570	395	217	54	7	0	12	73	213	482	927	1509	2079	2474	2691	2745	2752

(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