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: BATES CREEK NO 2, WY **COOP ID: 480552**

Climate Division: WY10 **NWS Call Sign:** **Elevation: 6,010 Feet** **Lat: 42˚38N** **Lon: 106˚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	31.3	9.4	20.4	60	1981	23	29.6	1986	-26	1975	12	8.4	1979	1384	0	.0	.0	1.5	11.7	30.3	5.6
Feb	34.9	12.8	23.9	62	1986	25	30.2	2000	-29	1989	4	13.3	1989	1151	0	.0	.0	3.1	7.1	27.7	3.3
Mar	42.9	21.2	32.1	72+	1986	29	38.0	1986	-11+	1998	7	26.8	1988	1022	0	.0	.0	11.5	2.9	27.2	.6
Apr	51.8	29.4	40.6	78+	1989	21	46.7	1987	-3	1975	2	32.9	1973	733	0	.0	.0	20.6	1.1	19.0	.1
May	62.2	38.2	50.2	87+	1973	31	54.7	1994	17	1990	1	44.3	1983	460	1	.0	.0	28.7	.0	6.3	.0
Jun	74.1	47.3	60.7	97	1974	25	68.3	1988	29+	1979	1	53.9	1998	182	52	.0	1.5	29.7	.0	.6	.0
Jul	81.2	53.5	67.4	98	1984	12	71.1	1989	32	1972	4	61.1	1993	47	119	.0	4.2	31.0	.0	@	.0
Aug	80.1	52.3	66.2	98	1979	5	71.0	2000	35+	1985	17	62.5	1974	66	103	.0	2.4	31.0	.0	.0	.0
Sep	69.7	42.1	55.9	92+	1978	7	63.2	1998	14	1985	30	49.9	1985	291	16	.0	.2	28.8	.1	3.3	.0
Oct	57.3	31.3	44.3	84	1976	1	48.1	1988	1+	1991	31	39.3	1995	642	0	.0	.0	25.5	.6	14.9	.0
Nov	40.9	19.2	30.1	71	1977	4	41.9	1999	-16+	1993	25	20.9	2000	1049	0	.0	.0	9.4	5.5	25.8	1.1
Dec	33.1	11.6	22.4	63	1999	1	31.5	1980	-38	1990	21	12.1	1983	1321	0	.0	.0	2.4	10.8	29.8	4.2
Ann	55.0	30.7	42.9	98+	Jul 1984	12	71.1	Jul 1989	-38	Dec 1990	21	8.4	Jan 1979	8348	291	.0	8.3	223.2	39.8	184.9	14.9

\+ 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: 1969-2001

(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	.60	.49	.66	2000	28	1.29	1997	.05	1989
Feb	.68	.64	.82	1997	3	1.70	1997	.14	1996
Mar	1.02	.89	1.52	1970	18	3.37	1983	.22	1974
Apr	1.66	1.28	2.45	1974	20	5.87	1973	.12	1987
May	2.39	2.02	3.01	1995	9	8.97	1995	.09	1974
Jun	1.34	1.16	2.61	1970	12	3.54	1998	.14	1990
Jul	1.08	1.02	1.42	1990	20	2.64	1990	.21	1994
Aug	.96	.94	1.11	1972	23	2.12	1987	.00	1988
Sep	.84	.82	1.31	1973	2	2.22	1982	.03	1978
Oct	1.33	1.22	2.35	1998	17	6.44	1998	.05	1973
Nov	.72	.72	.68	2000	1	1.62	2000	.02	1997
Dec	.60	.59	.90	1992	12	2.63	1982	.05	1979
Ann	13.22	13.26	3.01	May 1995	9	8.97	May 1995	.00	Aug 1988

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.3	2.2	.1	.0
Feb	5.4	2.3	.2	.0
Mar	6.8	2.9	.4	.1
Apr	8.0	4.6	.8	.2
May	9.3	5.6	1.4	.4
Jun	7.0	3.9	.8	.1
Jul	6.8	3.3	.4	@
Aug	5.2	3.0	.4	.1
Sep	5.2	2.6	.3	.1
Oct	5.6	3.3	.7	.2
Nov	5.5	2.5	.3	.0
Dec	5.2	2.0	.2	.0
Ann	76.3	38.2	6.0	1.2

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	.13	.19	.28	.35	.43	.52	.61	.73	.88	1.11	1.34
Feb	.18	.24	.34	.43	.51	.60	.70	.82	.97	1.21	1.44
Mar	.20	.29	.44	.58	.72	.87	1.04	1.24	1.51	1.94	2.35
Apr	.21	.34	.58	.81	1.06	1.33	1.64	2.03	2.56	3.43	4.27
May	.33	.53	.87	1.20	1.55	1.93	2.37	2.92	3.65	4.85	6.01
Jun	.18	.29	.48	.67	.86	1.08	1.33	1.63	2.05	2.72	3.38
Jul	.22	.31	.47	.62	.76	.92	1.10	1.31	1.59	2.05	2.48
Aug	.13	.25	.42	.55	.69	.83	.99	1.18	1.43	1.83	2.21
Sep	.10	.16	.28	.40	.52	.66	.82	1.03	1.30	1.75	2.19
Oct	.08	.16	.32	.50	.70	.94	1.23	1.60	2.12	3.01	3.89
Nov	.11	.17	.28	.38	.48	.59	.72	.88	1.09	1.44	1.77
Dec	.08	.13	.21	.30	.39	.48	.60	.73	.92	1.23	1.53
Ann	8.64	9.49	10.61	11.46	12.23	12.98	13.75	14.62	15.67	17.22	18.57

+ 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: 1969-2001
(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	11.6	11.0	5	4
Feb	12.5	10.1	5	4
Mar	14.9	9.2	2	1
Apr	14.6	9.8	1	#
May	2.8	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.5	.0	#	0
Oct	6.5	3.3	#	#
Nov	7.8	7.8	1	1
Dec	12.1	10.8	4	3
Ann	83.3	62.0	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	10.5	1994	31	23.8	1975	16+	1994	31	13	1994
Feb	10.0	1997	3	24.8	1978	24	1997	4	14+	1994
Mar	21.0	1983	26	53.0	1983	19+	1983	26	9	1973
Apr	26.0	1973	20	68.9	1973	41	1973	20	10	1973
May	20.0	1978	4	36.0	1978	17	1978	4	2	1978
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	4.5	2000	23	6.0	1984	5	2000	23	#+	2000
Oct	17.0	1998	17	28.4	1996	17	1998	17	2	1998
Nov	9.0	1992	3	16.0	1986	10	1996	7	6	2000
Dec	18.0	1982	2	58.0	1982	23	1982	25	12	1982
Ann	26.0	Apr 1973	20	68.9	Apr 1973	41	Apr 1973	20	14+	Feb 1994

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.3	4.2	1.6	.4	@
Feb	4.7	3.9	1.8	.7	.1
Mar	4.7	3.9	1.7	.8	.3
Apr	3.6	3.4	2.0	.9	.3
May	.5	.5	.2	.2	.1
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.3	.2	.1	.0	.0
Oct	1.8	1.4	.7	.5	.2
Nov	3.4	2.8	1.2	.5	.0
Dec	4.6	3.5	1.5	.6	.2
Ann	28.9	23.8	10.8	4.6	1.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	24.0	18.9	13.9	3.4
Feb	21.2	17.6	12.9	4.8
Mar	9.0	5.8	3.6	.6
Apr	2.8	1.7	.9	.2
May	.6	.4	.3	@
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.2	@	@	.0
Oct	1.8	.9	.6	.2
Nov	6.4	4.2	2.6	.1
Dec	17.5	12.0	6.8	1.3
Ann	83.5	61.5	41.6	10.6

+ 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	6/26	6/20	6/15	6/12	6/08	6/05	6/01	5/28	5/22
32	6/19	6/12	6/07	6/03	5/30	5/25	5/21	5/16	5/09
28	5/24	5/18	5/14	5/10	5/07	5/03	4/30	4/26	4/20
24	5/07	5/03	4/29	4/26	4/24	4/21	4/18	4/15	4/10
20	4/25	4/21	4/18	4/15	4/13	4/10	4/07	4/04	3/31
16	4/20	4/14	4/10	4/07	4/04	4/01	3/28	3/25	3/19

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	8/29	9/03	9/06	9/09	9/12	9/14	9/17	9/21	9/25
32	9/12	9/15	9/17	9/19	9/21	9/23	9/25	9/27	9/30
28	9/15	9/19	9/22	9/25	9/27	9/30	10/02	10/05	10/09
24	9/24	9/29	10/03	10/07	10/10	10/13	10/17	10/21	10/26
20	9/30	10/06	10/10	10/14	10/18	10/21	10/25	10/29	11/04
16	10/11	10/17	10/21	10/25	10/28	11/01	11/04	11/08	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	117	110	104	99	95	90	86	80	72
32	135	127	122	118	114	109	105	100	93
28	166	158	152	147	143	138	133	127	120
24	189	182	177	173	169	165	160	155	149
20	211	203	197	192	187	182	177	171	163
16	232	224	217	212	207	202	196	190	181

***** 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	1384	1151	1022	733	460	182	47	66	291	642	1049	1321	8348
60	1229	1011	867	583	311	96	11	20	175	487	899	1166	6855
57	1136	927	774	495	231	58	4	8	119	396	809	1073	6030
55	1074	871	712	439	182	39	1	4	88	336	749	1011	5506
50	919	731	558	304	86	12	0	0	34	202	602	856	4304
32	400	260	112	27	0	0	0	0	0	6	172	340	1317

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	39	33	114	284	565	861	1095	1060	716	387	113	42	5309
55	0	0	0	6	34	210	384	351	114	4	0	0	1103
57	0	0	0	3	20	169	324	293	84	2	0	0	895
60	0	0	0	0	8	117	238	212	51	0	0	0	626
65	0	0	0	0	1	52	119	103	16	0	0	0	291
70	0	0	0	0	0	17	42	34	4	0	0	0	97

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	6	46	153	384	668	891	859	541	240	44	5	0	6	52	205	589	1257	2148	3007	3548	3788	3832	3837
45	0	0	11	79	247	522	736	704	401	136	14	0	0	0	11	90	337	859	1595	2299	2700	2836	2850	2850
50	0	0	0	33	134	375	582	549	271	57	1	0	0	0	0	33	167	542	1124	1673	1944	2001	2002	2002
55	0	0	0	9	62	242	428	395	156	13	0	0	0	0	0	9	71	313	741	1136	1292	1305	1305	1305
60	0	0	0	0	15	133	280	248	71	1	0	0	0	0	0	0	15	148	428	676	747	748	748	748
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	4	44	116	249	425	579	559	351	180	38	5	0	4	48	164	413	838	1417	1976	2327	2507	2545	2550

(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