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: TEN SLEEP 4 NE, WY **COOP ID: 488852**

Climate Division: WY 4 **NWS Call Sign:** **Elevation: 4,820 Feet** **Lat: 44˚04N** **Lon: 107˚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	35.6	13.7	24.7	64	1981	23	35.7	1981	-25+	1997	11	7.9	1979	1251	0	.0	.0	3.9	10.3	29.8	5.8
Feb	40.4	18.4	29.4	66+	1982	22	38.3	1992	-31	1989	3	15.8	1989	996	0	.0	.0	6.8	5.6	26.4	2.9
Mar	49.7	26.5	38.1	79	1986	27	45.7	1986	-12	1989	4	31.0	1996	835	0	.0	.0	17.4	2.1	24.4	.4
Apr	59.2	34.2	46.7	87+	2000	29	55.0	1987	10+	1997	11	38.5	1975	551	2	.0	.0	24.5	.4	13.4	.0
May	69.2	43.0	56.1	91	1987	15	61.6	2000	20	1967	1	51.4	1975	291	15	.0	@	30.1	.0	3.3	.0
Jun	79.0	51.9	65.5	100	1970	27	75.0	1988	31	1970	13	58.6	1998	90	105	.0	3.1	29.9	.0	.0	.0
Jul	86.7	58.4	72.6	102	1976	13	77.1	1988	38	1983	16	66.0	1993	12	244	.1	12.2	31.0	.0	.0	.0
Aug	85.6	57.8	71.7	100+	2001	7	77.7	1971	36	1965	31	67.7	1977	20	227	.0	9.5	31.0	.0	.0	.0
Sep	75.1	48.0	61.6	95+	1983	2	68.1	1979	15	1984	25	55.5	1984	163	60	.0	1.3	29.1	@	2.2	.0
Oct	62.3	37.6	50.0	87+	1992	3	54.5	1988	4+	1991	31	45.2	1984	468	1	.0	.0	27.1	.4	11.7	.0
Nov	45.2	25.5	35.4	74+	2001	6	46.6	1999	-16	1985	23	21.9	1985	889	0	.0	.0	11.8	4.1	25.0	1.2
Dec	37.4	16.4	26.9	66	1980	27	36.4	1980	-34	1990	22	14.4	1983	1182	0	.0	.0	4.8	8.4	29.2	3.8
Ann	60.5	36.0	48.2	102	Jul 1976	13	77.7	Aug 1971	-34	Dec 1990	22	7.9	Jan 1979	6748	654	.1	26.1	247.4	31.3	165.4	14.1

\+ 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	.57	.50	.95	1967	14	1.62+	1978	.00	1983
Feb	.39	.30	.46	1991	17	1.24	1971	.00	1985
Mar	.94	.84	1.10	1981	17	2.43	1996	.25	1979
Apr	1.39	1.31	1.49	1978	28	3.52	1978	.08	1985
May	2.32	1.97	2.26	1988	7	4.32	1975	.16	1994
Jun	1.83	1.88	2.62	1969	25	4.56	1993	.06	1971
Jul	.96	.68	2.02	1977	4	3.03	1997	.02	1999
Aug	.67	.58	1.50	1976	2	2.21	1976	.00	1981
Sep	1.44	1.40	1.76	1990	19	3.56	1986	.00+	1981
Oct	1.25	1.01	1.95	1971	1	5.61	1971	.00	1984
Nov	.79	.76	1.30	1984	9	1.90	1984	.08	1985
Dec	.60	.45	.81	1984	24	1.85	1982	.00+	1985
Ann	13.15	13.02	2.62	Jun 1969	25	5.61	Oct 1971	.00+	Dec 1985

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.8	2.0	.1	.0
Feb	4.5	1.6	.0	.0
Mar	6.7	3.2	.2	.1
Apr	8.0	4.6	.5	.1
May	8.6	5.6	1.3	.2
Jun	7.8	4.7	1.2	.2
Jul	5.3	2.5	.5	.2
Aug	4.4	2.0	.2	.1
Sep	6.3	3.8	.8	.1
Oct	6.0	3.7	.6	.1
Nov	5.4	2.6	.2	.1
Dec	5.5	1.9	.2	.0
Ann	74.3	38.2	5.8	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	.03	.08	.17	.25	.34	.44	.56	.70	.90	1.23	1.55
Feb	.02	.06	.12	.17	.24	.30	.38	.48	.62	.84	1.06
Mar	.26	.35	.48	.60	.72	.84	.97	1.13	1.34	1.67	1.97
Apr	.35	.48	.68	.86	1.04	1.23	1.43	1.68	2.01	2.52	3.00
May	.67	.89	1.23	1.51	1.79	2.09	2.41	2.79	3.28	4.05	4.77
Jun	.32	.49	.75	1.00	1.26	1.54	1.85	2.23	2.74	3.56	4.35
Jul	.07	.13	.25	.39	.53	.70	.91	1.17	1.53	2.14	2.74
Aug	.02	.06	.15	.24	.35	.48	.63	.82	1.09	1.55	2.00
Sep	.00	.23	.51	.74	.97	1.21	1.49	1.80	2.24	2.93	3.60
Oct	.06	.17	.35	.54	.73	.96	1.22	1.54	1.99	2.73	3.45
Nov	.18	.26	.37	.48	.58	.69	.81	.96	1.16	1.46	1.75
Dec	.00	.09	.21	.31	.40	.50	.61	.75	.92	1.21	1.49
Ann	9.07	9.85	10.86	11.63	12.32	12.98	13.67	14.43	15.36	16.71	17.88

\+ 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	10.5	9.9	4	4	20.0	1978	25	40.5	1978	36	1978	27	14	1979	4.6	3.0	1.1	.3	.1	23.5	16.1	7.8	1.5
Feb	6.3	5.0	3	2	6.0	1976	4	17.0	1978	22	1978	1	11	1979	3.5	2.5	.6	.2	.0	16.0	9.5	4.5	1.1
Mar	8.5	7.0	1	1	9.0	1982	24	24.0	1977	11	1998	8	4	1998	4.5	3.5	1.0	.2	.0	6.3	3.0	1.4	.2
Apr	5.7	5.5	#	#	7.0	1999	1	16.0	1975	8	1977	2	1	1991	2.7	2.1	.6	.2	.0	1.4	.6	.2	.0
May	2.1	.0	#	0	8.0	1983	12	14.0	1975	6	1983	12	#+	1999	.6	.6	.3	.1	.0	.3	.1	@	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.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	.6	.0	#	0	6.0	1985	28	6.0	1985	4+	2000	23	#+	2000	.4	.2	.1	.1	.0	.1	.1	.0	.0
Oct	3.3	1.5	#	#	6.0	1971	2	21.0	1971	10	1971	29	1	1993	1.5	1.1	.4	.2	.0	1.2	.6	.4	@
Nov	7.8	7.2	1	1	8.0	1978	10	16.5	1986	10	1973	3	3	1986	3.6	3.0	1.0	.3	.0	9.1	4.1	1.5	@
Dec	8.8	5.7	2	2	10.0	1998	18	32.0	1989	15	1989	22	10	1978	4.6	3.3	1.2	.5	@	15.4	7.3	3.6	.5
Ann	53.6	41.8	N/A	N/A	20.0	Jan 1978	25	40.5	Jan 1978	36	Jan 1978	27	14	Jan 1979	26.0	19.3	6.3	2.1	.1	73.3	41.4	19.4	3.3

+ 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	6/14	6/08	6/04	5/31	5/28	5/24	5/21	5/17	5/11
32	5/28	5/22	5/18	5/15	5/12	5/08	5/05	5/01	4/26
28	5/16	5/10	5/06	5/02	4/29	4/25	4/22	4/17	4/11
24	4/28	4/22	4/17	4/14	4/10	4/07	4/03	3/30	3/24
20	4/22	4/14	4/09	4/04	3/31	3/27	3/22	3/17	3/09
16	4/11	4/03	3/28	3/24	3/19	3/14	3/10	3/04	2/24

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	9/09	9/12	9/15	9/17	9/19	9/21	9/24	9/28
32	9/11	9/16	9/20	9/23	9/26	9/29	10/02	10/05	10/10
28	9/20	9/26	9/30	10/03	10/07	10/10	10/13	10/17	10/23
24	10/02	10/08	10/12	10/16	10/19	10/22	10/26	10/30	11/05
20	10/10	10/17	10/22	10/26	10/30	11/04	11/08	11/13	11/20
16	10/15	10/22	10/27	11/01	11/05	11/09	11/13	11/18	11/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	130	124	119	115	111	107	103	99	92
32	162	153	147	141	136	131	126	120	111
28	186	177	171	165	160	155	150	143	134
24	217	208	202	196	191	186	180	174	164
20	250	237	228	220	213	205	198	188	176
16	265	253	244	237	230	223	216	207	195

***** 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	1251	996	835	551	291	90	12	20	163	468	889	1182	6748
60	1096	856	680	409	172	35	1	4	81	320	739	1027	5420
57	1003	772	587	330	116	17	0	1	47	240	652	934	4699
55	941	716	526	280	86	10	0	0	31	193	596	872	4251
50	787	582	382	175	33	1	0	0	8	98	458	723	3247
32	310	182	46	7	0	0	0	0	0	2	111	264	922

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	82	111	235	448	747	1005	1256	1231	887	558	212	106	6878
55	0	0	2	30	119	324	543	518	227	36	7	0	1806
57	0	0	1	20	88	271	481	457	184	22	3	0	1527
60	0	0	0	10	50	199	389	367	128	8	0	0	1151
65	0	0	0	2	15	105	244	227	60	1	0	0	654
70	0	0	0	0	2	43	125	117	21	0	0	0	308

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	5	17	91	246	497	762	989	954	617	308	67	14	5	22	113	359	856	1618	2607	3561	4178	4486	4553	4567
45	0	2	38	141	354	612	834	799	473	189	24	2	0	2	40	181	535	1147	1981	2780	3253	3442	3466	3468
50	0	0	10	72	226	465	679	644	336	96	5	0	0	0	10	82	308	773	1452	2096	2432	2528	2533	2533
55	0	0	2	28	119	322	525	490	217	37	0	0	0	0	2	30	149	471	996	1486	1703	1740	1740	1740
60	0	0	0	9	52	192	373	336	113	11	0	0	0	0	0	9	61	253	626	962	1075	1086	1086	1086
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	15	75	176	319	486	638	623	411	219	53	9	1	16	91	267	586	1072	1710	2333	2744	2963	3016	3025

(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

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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