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: TOWER FALLS, WY **COOP ID: 489025**

Climate Division: WY 1 **NWS Call Sign:** **Elevation: 6,266 Feet** **Lat: 44˚55N** **Lon: 110˚25W**

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	27.0	-.6	13.2	55	1954	30	20.5	1994	-48	1951	29	.5	1979	1608	0	.0	.0	.1	21.1	30.9	15.8
Feb	33.8	2.6	18.2	58	1986	26	25.3	1991	-42+	1996	3	8.5	1989	1310	0	.0	.0	.6	11.0	28.2	11.8
Mar	41.8	11.2	26.5	63	1972	22	33.3	1992	-34	1965	18	20.0	1976	1194	0	.0	.0	5.9	3.8	30.8	4.4
Apr	50.1	19.6	34.9	77	1987	28	40.1	1992	-11	1997	6	26.5	1975	904	0	.0	.0	15.7	.5	29.4	.6
May	60.5	27.9	44.2	84	1986	28	48.5	1992	2+	1984	1	40.8	1975	645	0	.0	.0	26.2	.0	24.1	.0
Jun	70.1	34.0	52.1	95	1990	30	58.0	1988	16+	2000	1	47.1	1998	390	1	.0	.2	29.3	.0	12.8	.0
Jul	78.7	37.3	58.0	97	1988	24	62.0	1998	20	1952	7	51.3	1993	232	15	.0	1.3	30.9	.0	5.8	.0
Aug	79.0	35.7	57.4	95+	2000	1	61.7	1971	13	1992	26	53.2	1977	244	7	.0	1.1	31.0	.0	8.0	.0
Sep	68.7	27.7	48.2	93	1955	4	54.4	1990	3	1983	20	42.7	1999	505	0	.0	.2	27.8	.1	22.8	.0
Oct	55.6	20.0	37.8	82	1992	1	44.6	1988	-15	1991	30	33.2	1984	843	0	.0	.0	21.1	.9	29.8	.4
Nov	37.0	9.5	23.3	66	1999	13	30.1	1999	-31	1959	13	15.8	2000	1253	0	.0	.0	3.6	10.0	29.8	6.7
Dec	27.1	-.1	13.5	53	1999	1	23.2	1980	-49	1964	17	2.3	1990	1598	0	.0	.0	.1	21.8	31.0	16.4
Ann	52.5	18.7	35.6	97	Jul 1988	24	62.0	Jul 1998	-49	Dec 1964	17	.5	Jan 1979	10726	23	.0	2.8	192.3	69.2	283.4	56.1

\+ 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: 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	1.21	1.06	1.10	1976	5	2.50+	1997	.14	1992
Feb	.83	.74	.74	1962	11	1.80	1978	.19	1977
Mar	1.10	1.01	.90	1994	11	3.07	1974	.37	1973
Apr	1.01	1.04	.92	1969	7	2.27	1993	.25	1977
May	1.87	1.79	1.24	1967	10	3.83	1991	.62+	1986
Jun	1.98	1.92	2.23	1965	26	5.78	1992	.61	1991
Jul	1.90	1.86	1.15	1952	11	4.30	1987	.20	2000
Aug	1.53	1.37	1.13	1977	30	3.46	1999	.22	1988
Sep	1.44	1.61	1.60	2000	2	3.29	1972	.19	1987
Oct	1.10	.96	1.08	1964	16	2.64	1975	.00	1987
Nov	1.17	1.11	.75	1986	6	2.36	1998	.22	2000
Dec	1.19	1.08	.96	1972	3	3.05	1996	.06	1973
Ann	16.33	16.45	2.23	Jun 1965	26	5.78	Jun 1992	.00	Oct 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	12.2	4.4	.3	@
Feb	9.2	3.2	@	.0
Mar	10.1	3.6	.2	.0
Apr	8.9	3.4	.2	.0
May	12.4	5.6	.6	.1
Jun	12.3	5.9	.6	.1
Jul	10.9	5.6	.8	@
Aug	10.9	5.0	.5	.1
Sep	8.0	4.1	.6	.1
Oct	7.7	3.1	.4	.0
Nov	9.8	3.9	.5	.0
Dec	11.6	4.1	.3	.0
Ann	124.0	51.9	5.0	.4

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	.30	.41	.59	.74	.90	1.06	1.24	1.46	1.74	2.19	2.60
Feb	.22	.30	.42	.52	.63	.73	.85	.99	1.18	1.47	1.74
Mar	.37	.47	.62	.75	.88	1.01	1.15	1.31	1.52	1.85	2.15
Apr	.22	.32	.47	.60	.73	.88	1.04	1.23	1.48	1.88	2.26
May	.59	.77	1.03	1.26	1.47	1.70	1.95	2.24	2.61	3.19	3.73
Jun	.69	.88	1.15	1.38	1.60	1.83	2.07	2.36	2.73	3.29	3.82
Jul	.50	.68	.96	1.20	1.44	1.69	1.96	2.29	2.72	3.39	4.02
Aug	.44	.59	.81	1.00	1.18	1.37	1.59	1.84	2.16	2.67	3.14
Sep	.21	.33	.54	.74	.95	1.18	1.44	1.76	2.19	2.90	3.57
Oct	.18	.32	.51	.66	.81	.97	1.15	1.36	1.63	2.06	2.46
Nov	.33	.44	.61	.76	.90	1.04	1.21	1.40	1.65	2.04	2.41
Dec	.24	.34	.52	.68	.84	1.02	1.22	1.45	1.77	2.28	2.76
Ann	12.70	13.43	14.35	15.03	15.64	16.22	16.81	17.46	18.24	19.36	20.32

+ 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	17.7	13.0	17	18
Feb	11.9	11.0	20	21
Mar	9.3	6.9	19	20
Apr	6.3	5.5	6	5
May	2.2	1.0	#	#
Jun	.1	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.5	.0	#	0
Oct	2.3	1.6	#	#
Nov	10.3	9.0	4	3
Dec	21.9	20.0	10	10
Ann	82.5	68.0	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	14.0	1978	26	41.1	1978	38	1978	26	25	1978
Feb	7.1	1980	15	26.1	1971	37	1978	25	34	1978
Mar	14.3	1979	1	25.2	1979	39	1979	1	31+	1978
Apr	8.0	1995	30	21.5	1991	31	1975	7	25	1975
May	7.5	1984	5	12.5	1984	13	1975	1	2	1975
Jun	2.5	1979	19	2.5	1979	3	1979	19	#+	1998
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	5.0	2000	22	6.0	1984	5	2000	22	#+	2000
Oct	10.0	1991	24	10.0	1991	15	1991	24	3	1991
Nov	12.0	1986	6	17.7	1991	22	1975	28	11	1991
Dec	12.0	1989	15	37.0	1996	28	1994	5	19+	1994
Ann	14.3	Mar 1979	1	41.1	Jan 1978	39	Mar 1979	1	34	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	11.8	7.0	1.6	.5	.2
Feb	8.8	5.0	1.0	.3	.0
Mar	6.9	3.4	1.2	.5	.1
Apr	3.6	2.2	.8	.3	.0
May	1.5	.9	.1	@	.0
Jun	.1	@	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.1	@	.0
Oct	1.6	1.0	.2	.1	@
Nov	6.8	4.0	1.1	.4	.1
Dec	10.7	6.5	2.0	.5	.1
Ann	51.9	30.1	8.1	2.6	.5

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	-9.9	-9.9	-9.9	-9.9
Apr	8.8	6.1	3.9	1.8
May	1.1	.3	.1	.0
Jun	@	@	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.1	.0
Oct	2.0	.9	.5	.1
Nov	15.8	9.8	6.5	1.2
Dec	28.9	24.7	19.2	12.6
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

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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	8/03	7/31	7/30	7/28	7/27	7/26	7/25	7/23	7/21
32	8/02	7/28	7/24	7/21	7/18	7/15	7/12	7/09	7/03
28	7/23	7/15	7/10	7/05	7/01	6/26	6/21	6/16	6/08
24	6/26	6/19	6/14	6/10	6/06	6/02	5/28	5/23	5/16
20	6/06	5/31	5/26	5/21	5/17	5/13	5/09	5/04	4/27
16	5/14	5/10	5/06	5/03	4/30	4/28	4/25	4/21	4/16

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	7/30	7/31	8/01	8/02	8/03	8/04	8/06	8/07	8/09
32	7/31	8/04	8/08	8/11	8/14	8/17	8/20	8/24	8/29
28	8/06	8/12	8/17	8/20	8/24	8/27	8/31	9/04	9/11
24	8/15	8/21	8/25	8/29	9/02	9/05	9/09	9/13	9/19
20	9/01	9/07	9/11	9/15	9/18	9/22	9/25	9/30	10/06
16	9/09	9/15	9/20	9/24	9/28	10/01	10/05	10/10	10/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	16	13	11	8	6	5	2	0	0
32	49	41	36	31	26	22	17	11	3
28	87	76	67	60	54	47	40	32	20
24	116	106	99	93	87	81	75	68	58
20	150	141	134	129	123	118	112	105	96
16	174	165	159	154	149	145	140	134	125

***** 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	1608	1310	1194	904	645	390	232	244	505	843	1253	1598	10726
60	1453	1170	1039	754	490	249	120	121	359	688	1103	1443	8989
57	1360	1086	946	664	398	174	72	69	277	595	1013	1350	8004
55	1298	1030	884	604	337	131	46	43	227	533	953	1288	7374
50	1143	890	729	455	198	52	12	10	122	379	803	1133	5926
32	587	396	215	62	2	0	0	0	0	27	305	585	2179

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	2	10	45	147	380	601	806	786	485	208	42	10	3522
55	0	0	0	0	2	42	139	116	22	0	0	0	321
57	0	0	0	0	1	25	103	80	13	0	0	0	222
60	0	0	0	0	0	10	58	39	5	0	0	0	112
65	0	0	0	0	0	1	15	7	0	0	0	0	23
70	0	0	0	0	0	0	2	0	0	0	0	0	2

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	0	0	42	178	365	565	536	270	76	2	0	0	0	0	42	220	585	1150	1686	1956	2032	2034	2034
45	0	0	0	11	79	233	412	382	152	21	0	0	0	0	0	11	90	323	735	1117	1269	1290	1290	1290
50	0	0	0	0	21	118	260	241	62	3	0	0	0	0	0	0	21	139	399	640	702	705	705	705
55	0	0	0	0	0	43	128	105	17	0	0	0	0	0	0	0	0	43	171	276	293	293	293	293
60	0	0	0	0	0	6	40	29	1	0	0	0	0	0	0	0	0	6	46	75	76	76	76	76
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	11	69	184	309	439	442	284	131	10	0	0	0	11	80	264	573	1012	1454	1738	1869	1879	1879

(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