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: MORAN 5 WNW, WY **COOP ID: 486440**

Climate Division: WY 2 **NWS Call Sign:** **Elevation: 6,798 Feet** **Lat: 43˚51N** **Lon: 110˚35W**

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	26.7	2.3	14.5	51	1974	16	20.5	1981	-52	1930	22	3.9	1979	1566	0	.0	.0	@	24.4	30.9	14.8
Feb	32.8	4.3	18.6	60+	1915	20	24.4	1986	-63	1933	9	10.8	1985	1301	0	.0	.0	.3	14.2	28.1	11.3
Mar	40.6	12.5	26.6	62	1915	4	33.7	1986	-43	1922	1	17.5	1976	1192	0	.0	.0	3.1	4.8	30.6	5.4
Apr	48.8	21.4	35.1	73+	1992	29	40.8	1992	-28	1945	3	28.3	1975	897	0	.0	.0	12.1	.8	28.4	.9
May	58.5	30.5	44.5	82+	1936	30	50.6	1992	5	1929	1	39.3	1975	636	0	.0	.0	25.1	.0	20.1	.0
Jun	69.2	37.6	53.4	92	1926	26	60.7	1988	18+	1929	4	47.8	1998	351	4	.0	@	29.3	.0	6.0	.0
Jul	77.9	42.5	60.2	92	2000	30	64.1	1989	23	1988	7	51.7	1993	175	26	.0	.3	31.0	.0	1.1	.0
Aug	77.3	41.3	59.3	91	1928	9	63.0	1971	19	1928	30	55.2	1993	191	13	.0	.1	31.0	.0	2.2	.0
Sep	67.6	33.7	50.7	87	1924	4	56.3	1990	7	1926	25	46.4	1986	432	1	.0	.0	28.1	.0	15.7	.0
Oct	54.7	25.6	40.2	79	1934	11	47.1	1988	-11	1917	29	34.7	1984	771	0	.0	.0	20.8	.7	27.2	.1
Nov	36.5	15.5	26.0	64+	1999	6	31.7	1999	-28	1955	16	17.6	2000	1170	0	.0	.0	2.4	10.9	29.3	3.8
Dec	26.8	4.6	15.7	53+	1939	10	23.4	1980	-50	1924	20	6.5	1990	1528	0	.0	.0	@	24.2	30.7	13.9
Ann	51.5	22.7	37.1	92+	Jul 2000	30	64.1	Jul 1989	-63	Feb 1933	9	3.9	Jan 1979	10210	44	.0	.4	183.2	80.0	250.3	50.2

\+ 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: 1915-2001

(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	3.22	3.36	2.12	1920	27	6.15	1998	.45	1992
Feb	2.37	2.17	2.75	1927	26	7.49	1986	.55	1977
Mar	2.24	2.18	1.68	1920	5	5.52	1974	.40	1994
Apr	2.00	2.03	2.01	1990	28	3.34	1992	.62	1987
May	2.32	2.41	1.25	1963	9	4.80	1996	.62	1979
Jun	1.53	1.45	1.13	1989	3	3.30	1998	.38	1988
Jul	1.35	1.10	1.07	1951	29	3.51	1987	.08	1988
Aug	1.27	1.20	1.20	1949	9	2.75	1997	.11	1985
Sep	1.40	1.46	1.50	1927	9	3.05	1972	.00	1987
Oct	1.59	1.54	1.43	1924	11	3.51	1975	.04	1987
Nov	2.88	2.73	2.95	1921	25	6.80	1988	.21	1976
Dec	2.99	2.84	2.12	1921	25	8.95	1996	.35	1986
Ann	25.16	24.68	2.95	Nov 1921	25	8.95	Dec 1996	.00	Sep 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	14.8	9.9	1.5	.2
Feb	12.3	7.4	.9	.1
Mar	12.3	7.6	.9	.1
Apr	11.1	6.6	.7	.1
May	11.5	7.4	1.0	.1
Jun	8.5	4.9	.8	@
Jul	7.6	4.2	.6	.1
Aug	7.6	4.3	.4	.0
Sep	7.0	4.6	.7	.0
Oct	8.2	4.8	.8	.1
Nov	13.2	8.8	1.4	.3
Dec	14.0	8.9	1.3	.2
Ann	128.1	79.4	11.0	1.3

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	.85	1.16	1.62	2.03	2.44	2.86	3.33	3.89	4.62	5.76	6.83
Feb	.62	.85	1.19	1.49	1.79	2.10	2.45	2.86	3.40	4.25	5.04
Mar	.51	.72	1.05	1.35	1.64	1.95	2.30	2.72	3.27	4.14	4.97
Apr	.74	.93	1.20	1.42	1.64	1.86	2.09	2.37	2.72	3.26	3.76
May	.79	1.01	1.33	1.60	1.86	2.13	2.42	2.77	3.21	3.89	4.51
Jun	.55	.70	.90	1.08	1.24	1.41	1.60	1.81	2.08	2.51	2.89
Jul	.18	.28	.48	.66	.86	1.08	1.34	1.65	2.08	2.77	3.45
Aug	.29	.40	.59	.76	.92	1.10	1.30	1.54	1.86	2.36	2.83
Sep	.21	.39	.63	.82	1.02	1.23	1.45	1.73	2.08	2.65	3.18
Oct	.23	.37	.59	.81	1.04	1.29	1.58	1.94	2.41	3.19	3.94
Nov	.62	.88	1.30	1.69	2.07	2.48	2.95	3.50	4.24	5.41	6.52
Dec	.63	.91	1.35	1.74	2.15	2.57	3.06	3.64	4.40	5.63	6.78
Ann	17.17	18.70	20.66	22.17	23.51	24.81	26.16	27.66	29.48	32.14	34.45

\+ 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: 1915-2001
(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	44.3	47.0	32	32
Feb	31.4	22.5	39	38
Mar	22.3	21.5	38	38
Apr	10.2	8.3	21	22
May	2.1	.0	2	#
Jun	.2	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	3.7	.5	#	0
Nov	26.0	27.4	6	5
Dec	41.7	35.5	19	18
Ann	182.0	162.7	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	15.0	1999	23	72.0	1972	66	1978	31	53	1978
Feb	18.0	1975	13	69.0	1978	73	1978	9	58	1978
Mar	12.5	1974	6	69.5	1974	68	1976	25	61	1976
Apr	7.0	1972	12	30.8	1975	58+	1982	3	48	1975
May	6.0	1978	4	7.5	1975	39	1975	1	18	1975
Jun	2.0	1973	18	3.5	1973	#	1973	18	#	1973
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	2.0	1971	30	2.0	1971	1	1971	30	#	1971
Oct	12.0	1975	26	25.5	1975	11	1975	27	2	1975
Nov	21.0	1989	26	50.6	1988	30	1991	27	19	1986
Dec	18.0	1992	2	85.0	1992	45+	1996	27	31+	1978
Ann	21.0	Nov 1989	26	85.0	Dec 1992	73	Feb 1978	9	61	Mar 1976

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	14.3	12.9	6.1	2.9	.4
Feb	10.2	8.5	4.3	2.0	.2
Mar	9.2	7.7	3.0	1.2	.2
Apr	4.4	3.4	.9	.6	.0
May	1.1	1.0	.1	@	.0
Jun	.1	.1	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	@	.0	.0	.0
Oct	1.5	1.4	.4	.2	@
Nov	9.6	7.9	3.4	1.5	.3
Dec	13.6	10.8	5.5	3.0	.7
Ann	64.1	53.7	23.7	11.4	1.8

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	-9.9	-9.9	-9.9	-9.9
May	2.5	2.3	2.0	1.3
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	1.5	.5	.4	.1
Nov	18.1	13.8	11.1	5.5
Dec	30.6	30.0	29.4	24.3
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	7/29	7/24	7/20	7/17	7/14	7/11	7/08	7/04	6/29
32	7/18	7/13	7/09	7/06	7/03	6/30	6/27	6/23	6/18
28	6/27	6/20	6/16	6/12	6/08	6/05	6/01	5/27	5/21
24	6/03	5/27	5/23	5/19	5/15	5/11	5/07	5/03	4/26
20	5/15	5/11	5/08	5/05	5/03	4/30	4/28	4/25	4/20
16	5/10	5/05	5/01	4/28	4/26	4/23	4/20	4/16	4/11

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	7/31	8/05	8/08	8/10	8/13	8/15	8/18	8/21	8/25
32	8/11	8/16	8/20	8/24	8/27	8/30	9/02	9/06	9/12
28	8/24	8/29	9/02	9/05	9/08	9/11	9/15	9/18	9/24
24	9/07	9/12	9/16	9/19	9/22	9/25	9/29	10/02	10/08
20	9/21	9/26	9/30	10/03	10/06	10/09	10/12	10/15	10/20
16	10/03	10/09	10/13	10/16	10/19	10/23	10/26	10/30	11/05

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	49	42	37	33	29	25	21	16	9
32	77	69	63	59	54	49	45	39	31
28	117	109	102	97	91	86	81	74	65
24	154	145	139	134	130	125	120	114	106
20	175	168	163	159	155	151	147	142	135
16	200	192	186	181	176	171	166	160	152

***** 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	1566	1301	1192	897	636	351	175	191	432	771	1170	1528	10210
60	1411	1161	1037	747	481	217	81	84	289	616	1020	1373	8517
57	1318	1077	944	657	390	149	42	41	212	523	930	1280	7563
55	1256	1021	882	597	330	111	24	23	166	461	870	1218	6959
50	1101	881	727	449	194	42	5	3	76	311	720	1063	5572
32	543	382	216	61	2	0	0	0	0	11	220	515	1950

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	0	6	47	153	389	642	874	845	559	264	40	10	3829
55	0	0	0	0	4	64	185	155	34	0	0	0	442
57	0	0	0	0	1	42	141	112	20	0	0	0	316
60	0	0	0	0	0	19	87	61	8	0	0	0	175
65	0	0	0	0	0	4	26	13	1	0	0	0	44
70	0	0	0	0	0	0	5	1	0	0	0	0	6

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	30	172	409	626	591	314	82	0	0	0	0	0	30	202	611	1237	1828	2142	2224	2224	2224
45	0	0	0	4	73	264	471	436	187	26	0	0	0	0	0	4	77	341	812	1248	1435	1461	1461	1461
50	0	0	0	0	17	145	320	284	83	3	0	0	0	0	0	0	17	162	482	766	849	852	852	852
55	0	0	0	0	0	52	173	142	23	0	0	0	0	0	0	0	0	52	225	367	390	390	390	390
60	0	0	0	0	0	11	58	40	1	0	0	0	0	0	0	0	0	11	69	109	110	110	110	110
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	0	49	151	296	440	429	269	110	3	0	0	0	0	49	200	496	936	1365	1634	1744	1747	1747

(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