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: HEBGEN DAM, MT **COOP ID: 244038**

Climate Division: MT 2 **NWS Call Sign:** **Elevation: 6,489 Feet** **Lat: 44˚52N** **Lon: 111˚20W**

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	21.4	2.7	12.1	43	1974	16	20.2	1998	-45+	1962	22	-.1	1979	1642	0	.0	.0	.0	27.3	31.0	13.0
Feb	27.1	5.1	16.1	49	1950	26	22.5	2000	-42+	1996	2	6.9	1985	1369	0	.0	.0	.0	19.3	28.2	9.9
Mar	36.3	13.1	24.7	60	1986	28	32.4	1992	-34	1965	18	15.9	1976	1250	0	.0	.0	1.5	7.5	30.8	4.7
Apr	45.9	22.9	34.4	75	1987	29	41.4	1992	-13	1975	1	25.0	1975	918	0	.0	.0	11.1	1.2	27.1	.3
May	57.8	31.9	44.9	88	1986	27	50.8	1992	8+	1967	4	38.9	1975	626	0	.0	.0	24.6	@	16.4	.0
Jun	68.2	38.7	53.5	92	1988	25	59.6	1988	20	1999	6	48.9	1998	349	3	.0	@	29.1	.0	3.7	.0
Jul	76.9	43.5	60.2	93	1960	21	64.0	1988	28	1955	2	53.3	1993	172	22	.0	.3	31.0	.0	.3	.0
Aug	76.6	42.9	59.8	90+	2001	8	62.8+	1994	27+	1962	30	55.5	1975	181	17	.0	.1	30.9	.0	.8	.0
Sep	66.4	35.5	51.0	87+	2001	4	57.1	1990	12+	1985	29	45.3	1985	424	3	.0	.0	28.0	@	8.5	.0
Oct	52.1	28.0	40.1	82	1996	1	47.3	1988	-9	1991	30	34.6	1984	775	0	.0	.0	19.2	.9	23.9	.1
Nov	32.7	17.2	25.0	59	1999	7	33.8	1999	-25	1955	16	15.7	2000	1201	0	.0	.0	1.6	14.1	28.9	2.0
Dec	21.5	4.6	13.1	45+	1981	8	21.2	1980	-38	1964	17	2.8	1990	1610	0	.0	.0	.0	27.2	31.0	11.2
Ann	48.6	23.8	36.2	93	Jul 1960	21	64.0	Jul 1988	-45+	Jan 1962	22	-.1	Jan 1979	10517	45	.0	.4	177.0	97.5	230.6	41.2

+ 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: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

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COOP ID: 244038

Climate Division: MT 2 **NWS Call Sign:** **Elevation: 6,489 Feet** **Lat: 44°52N** **Lon: 111°20W**

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	3.07	3.00	1.27	1976	5	5.91	1997	.90	1992
Feb	2.40	2.14	1.43	1969	25	4.96	1999	.71	1991
Mar	2.61	2.37	1.88	1974	2	7.46	1974	.50	1992
Apr	1.83	1.66	2.01	1982	2	4.67	1978	.11	1987
May	2.97	2.76	1.38	1995	6	6.20	1980	1.07	1983
Jun	3.13	3.19	1.65	1971	27	5.94	1998	.59	1974
Jul	2.00	1.83	1.54	1987	11	4.83	1987	.55	1974
Aug	1.88	2.13	1.79	1951	4	4.02	1971	.21	1988
Sep	1.87	1.98	2.15	1966	15	4.26	1985	.00	1993
Oct	1.72	1.79	1.52	1964	30	3.41	1991	.02+	1988
Nov	2.57	2.42	1.50	1970	30	5.01	1973	.28	1976
Dec	3.25	2.89	1.20	1964	23	8.35	1996	.36	1986
Ann	29.30	29.20	2.15	Sep 1966	15	8.35	Dec 1996	.00	Sep 1993

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	15.1	10.9	1.0	.1
Feb	11.9	8.3	.9	@
Mar	11.1	7.7	1.3	.2
Apr	9.1	5.8	.8	.1
May	11.9	8.4	1.5	.3
Jun	11.6	8.1	1.9	.5
Jul	9.4	5.9	.9	.1
Aug	8.6	5.0	1.0	.1
Sep	7.4	4.9	1.1	.2
Oct	7.6	4.8	.9	.1
Nov	12.1	8.1	1.1	.1
Dec	13.3	9.8	1.5	@
Ann	129.1	87.7	13.9	1.8

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	1.25	1.53	1.93	2.25	2.56	2.88	3.22	3.61	4.10	4.86	5.55
Feb	.86	1.08	1.41	1.68	1.94	2.21	2.51	2.85	3.28	3.95	4.57
Mar	.58	.82	1.21	1.55	1.90	2.26	2.68	3.17	3.82	4.85	5.82
Apr	.33	.50	.76	1.01	1.27	1.54	1.86	2.23	2.74	3.55	4.32
May	1.25	1.52	1.90	2.21	2.50	2.79	3.11	3.48	3.94	4.64	5.28
Jun	1.02	1.32	1.75	2.13	2.48	2.86	3.26	3.74	4.35	5.30	6.18
Jul	.66	.85	1.12	1.36	1.59	1.83	2.09	2.39	2.78	3.38	3.94
Aug	.39	.56	.83	1.09	1.34	1.61	1.92	2.29	2.78	3.56	4.30
Sep	.12	.30	.60	.87	1.16	1.48	1.85	2.31	2.93	3.94	4.92
Oct	.15	.27	.50	.74	1.00	1.30	1.65	2.09	2.70	3.72	4.72
Nov	.79	1.03	1.40	1.71	2.01	2.33	2.67	3.08	3.60	4.42	5.18
Dec	.90	1.21	1.68	2.09	2.49	2.90	3.37	3.91	4.62	5.74	6.77
Ann	21.05	22.65	24.70	26.26	27.64	28.97	30.34	31.86	33.70	36.37	38.67

\+ 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	47.1	49.0	27	25
Feb	35.9	32.0	33	33
Mar	28.4	26.0	34	35
Apr	8.2	7.0	17	17
May	2.3	2.0	1	#
Jun	.4	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	5.0	2.0	#	#
Nov	27.8	24.0	5	5
Dec	45.3	43.0	16	16
Ann	200.7	185.0	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	18.0	1976	5	73.8	1978	74	1971	17	59	1971
Feb	15.0	1994	24	83.0	1999	65	1971	28	62	1971
Mar	16.0	1979	1	74.0	1974	69	1971	14	64	1971
Apr	9.0	1972	13	23.0	1996	59	1971	3	48	1971
May	6.0	1982	9	8.0+	1995	38	1975	1	15	1975
Jun	3.0	1975	19	6.0	1975	3	1976	13	#+	1976
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	3.0	1978	18	3.0	1978	3	1978	18	#+	2000
Oct	7.0	1991	23	24.0	1975	10	1991	31	2	1991
Nov	15.0	1995	28	59.0	1988	25	1975	27	12	1991
Dec	20.0	1999	15	100.0	1971	40	1971	27	28	1971
Ann	20.0	Dec 1999	15	100.0	Dec 1971	74	Jan 1971	17	64	Mar 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	13.9	13.6	7.1	2.9	.5
Feb	11.0	10.6	5.3	2.2	.3
Mar	9.6	9.5	4.2	1.9	.3
Apr	3.9	3.9	1.4	.5	.0
May	.9	.9	.3	.2	.0
Jun	.2	.2	.1	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.2	.2	@	.0	.0
Oct	1.6	1.6	.7	.3	.0
Nov	9.6	9.5	4.2	1.9	.2
Dec	12.3	12.2	6.9	3.3	.6
Ann	63.2	62.2	30.2	13.2	1.9

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	30.2	30.2	30.2	30.1
Feb	28.2	28.2	28.2	28.2
Mar	30.4	30.4	30.3	30.2
Apr	22.9	22.5	21.8	20.6
May	3.1	2.4	1.9	1.2
Jun	.1	@	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.2	@	.0	.0
Oct	2.4	1.5	.7	.1
Nov	21.3	16.4	11.3	4.1
Dec	30.5	30.2	29.6	24.7
Ann	169.3	161.8	154.0	139.2

+ 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	7/19	7/14	7/11	7/08	7/05	7/03	6/30	6/26	6/21
32	7/06	7/01	6/28	6/25	6/22	6/20	6/17	6/13	6/09
28	6/15	6/09	6/04	6/01	5/28	5/25	5/21	5/16	5/10
24	5/29	5/23	5/19	5/15	5/12	5/08	5/05	4/30	4/25
20	5/17	5/11	5/07	5/04	5/01	4/28	4/24	4/20	4/14
16	5/04	4/30	4/27	4/24	4/22	4/19	4/17	4/14	4/10

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	8/09	8/15	8/18	8/22	8/25	8/28	8/31	9/04	9/09
32	8/15	8/21	8/25	8/29	9/02	9/06	9/10	9/14	9/20
28	9/07	9/10	9/13	9/15	9/17	9/19	9/21	9/24	9/28
24	9/14	9/19	9/23	9/26	9/29	10/02	10/06	10/10	10/15
20	9/22	9/29	10/04	10/08	10/12	10/15	10/19	10/24	10/31
16	10/10	10/16	10/20	10/23	10/26	10/30	11/02	11/06	11/12

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	72	64	59	54	50	45	40	35	27
32	92	85	80	75	71	67	62	57	49
28	134	126	120	116	111	107	102	97	89
24	166	157	151	145	140	135	129	123	114
20	190	181	174	168	163	158	152	145	136
16	211	202	196	191	187	182	177	171	163

***** 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	1642	1369	1250	918	626	349	172	181	424	775	1201	1610	10517
60	1487	1229	1095	768	471	214	76	79	286	620	1051	1455	8831
57	1394	1145	1002	678	381	146	37	40	213	527	961	1362	7886
55	1332	1089	940	618	323	108	21	23	170	465	901	1300	7290
50	1177	949	785	472	193	40	3	4	85	316	751	1145	5920
32	622	449	263	82	4	0	0	0	0	19	270	592	2301

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	3	3	36	154	402	644	873	859	569	267	59	5	3874
55	0	0	0	0	7	62	181	169	49	1	0	0	469
57	0	0	0	0	3	39	135	124	32	0	0	0	333
60	0	0	0	0	0	17	81	70	15	0	0	0	183
65	0	0	0	0	0	3	22	17	3	0	0	0	45
70	0	0	0	0	0	0	3	1	0	0	0	0	4

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	33	202	427	648	627	350	103	1	0	0	0	0	33	235	662	1310	1937	2287	2390	2391	2391
45	0	0	0	8	94	282	493	473	220	35	0	0	0	0	0	8	102	384	877	1350	1570	1605	1605	1605
50	0	0	0	0	32	158	339	320	109	9	0	0	0	0	0	0	32	190	529	849	958	967	967	967
55	0	0	0	0	3	64	190	181	36	0	0	0	0	0	0	0	3	67	257	438	474	474	474	474
60	0	0	0	0	0	13	73	64	6	0	0	0	0	0	0	0	0	13	86	150	156	156	156	156
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	0	42	162	296	441	431	267	91	0	0	0	0	0	42	204	500	941	1372	1639	1730	1730	1730

(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