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: MYSTIC LAKE, MT **COOP ID: 245961**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 6,558 Feet** **Lat: 45˚15N** **Lon: 109˚44W**

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	33.2	17.8	25.5	59	1981	22	35.7	1986	-33	1963	11	14.8	1979	1225	0	.0	.0	1.8	12.3	27.1	5.0
Feb	36.3	19.7	28.0	62	1951	11	37.1	1991	-38+	1989	3	15.3	1989	1036	0	.0	.0	2.9	7.7	24.7	3.2
Mar	41.5	23.2	32.4	65	1978	30	40.4	1986	-22	1960	2	26.3	1975	1013	0	.0	.0	7.5	4.7	25.7	1.4
Apr	48.9	29.1	39.0	76	1987	28	48.9	1987	-7	1975	1	29.8	1975	779	0	.0	.0	14.8	1.7	20.2	.1
May	57.7	37.1	47.4	83	1960	11	52.5	1987	6	1954	1	42.4	1996	546	0	.0	.0	24.6	.1	10.0	.0
Jun	66.9	45.1	56.0	91	1990	30	65.5	1988	21	1951	2	49.9	1998	285	14	.0	@	29.1	.0	1.2	.0
Jul	73.8	50.9	62.4	90	1989	4	66.5	1988	29	1972	19	53.8	1993	142	60	.0	@	30.9	.0	.1	.0
Aug	73.4	51.0	62.2	92	1954	31	68.5	1971	29+	1992	24	56.7	1993	159	73	.0	.0	30.8	.0	.2	.0
Sep	63.9	42.5	53.2	88	1950	4	61.0	1998	6	1965	18	45.5	1985	371	17	.0	.0	27.2	.2	4.7	.0
Oct	53.4	34.8	44.1	79	1957	1	50.0	1988	-8	1971	29	38.5	1984	647	0	.0	.0	20.9	1.0	14.0	.1
Nov	39.2	25.1	32.2	68	1952	7	44.4	1999	-24	1959	13	18.7	1985	986	0	.0	.0	6.1	6.5	22.6	1.5
Dec	33.2	19.2	26.2	58+	1980	16	33.9	1980	-35	1990	21	13.3	1983	1203	0	.0	.0	1.4	12.3	26.8	3.6
Ann	51.8	33.0	42.4	92	Aug 1954	31	68.5	Aug 1971	-38+	Feb 1989	3	13.3	Dec 1983	8392	164	.0	.0	198.0	46.5	177.3	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: 1948-2001

(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	1.29	1.17	1.22	1975	26	3.01	1975	.20	1978
Feb	1.18	1.01	1.00	1989	1	3.55	1986	.09	1992
Mar	2.07	1.88	1.33	1962	28	4.75	1989	.85	1999
Apr	2.81	2.47	3.50	1958	23	7.78	1971	.22	1985
May	3.78	3.71	3.30	1988	7	7.74	1978	.99	1998
Jun	3.06	2.94	2.10	2001	13	8.00	1992	.93	1971
Jul	2.42	2.32	1.72	1994	6	4.65	1987	.47	1996
Aug	1.91	1.91	1.61	1997	16	3.93	1997	.26	1988
Sep	2.09	2.01	1.45	1978	12	4.57	1972	.34	1979
Oct	2.14	1.74	3.01	1974	31	5.64	1974	.28	1987
Nov	1.51	1.26	1.39	1996	19	3.35	1996	.50	2000
Dec	1.47	1.32	1.36	1955	23	3.70	1996	.10	1986
Ann	25.73	26.05	3.50	Apr 1958	23	8.00	Jun 1992	.09	Feb 1992

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.4	4.7	.3	.1
Feb	7.6	4.1	.3	@
Mar	11.3	6.8	.7	.1
Apr	11.5	7.2	1.5	.3
May	13.8	8.8	2.2	.5
Jun	14.1	8.6	1.6	.3
Jul	12.8	7.5	.9	.2
Aug	11.6	6.3	.7	.1
Sep	9.9	5.8	1.0	.2
Oct	7.7	5.1	1.2	.4
Nov	8.4	4.8	.8	.1
Dec	8.6	5.0	.5	.1
Ann	125.7	74.7	11.7	2.4

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	.28	.40	.59	.76	.93	1.11	1.32	1.56	1.89	2.40	2.89
Feb	.23	.34	.51	.67	.83	1.00	1.20	1.44	1.75	2.25	2.73
Mar	.89	1.08	1.34	1.55	1.75	1.95	2.17	2.42	2.73	3.21	3.64
Apr	.59	.85	1.26	1.64	2.02	2.42	2.87	3.42	4.14	5.29	6.37
May	1.28	1.64	2.16	2.60	3.03	3.47	3.94	4.50	5.22	6.33	7.35
Jun	1.11	1.39	1.81	2.16	2.49	2.83	3.20	3.62	4.17	5.02	5.79
Jul	.81	1.04	1.37	1.66	1.93	2.21	2.52	2.88	3.34	4.06	4.72
Aug	.48	.66	.93	1.18	1.43	1.68	1.97	2.31	2.76	3.47	4.13
Sep	.52	.72	1.02	1.29	1.56	1.84	2.16	2.53	3.02	3.79	4.51
Oct	.50	.70	1.01	1.29	1.57	1.86	2.19	2.59	3.11	3.93	4.71
Nov	.41	.55	.77	.96	1.15	1.35	1.56	1.82	2.16	2.69	3.19
Dec	.32	.46	.67	.87	1.06	1.27	1.50	1.78	2.15	2.73	3.28
Ann	18.72	20.09	21.83	23.15	24.32	25.45	26.61	27.89	29.44	31.68	33.62

\+ 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	19.0	16.8	5	4
Feb	17.2	15.5	5	4
Mar	29.8	26.5	5	4
Apr	32.8	25.0	5	3
May	14.2	12.3	1	1
Jun	1.6	.0	#	0
Jul	.1	.0	0	0
Aug	.0	.0	0	0
Sep	7.5	2.0	#	#
Oct	17.6	16.5	1	1
Nov	18.5	17.2	3	2
Dec	19.4	18.1	5	3
Ann	177.7	149.9	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	1975	26	43.5	1972	40	1979	17	31	1979
Feb	12.0	1987	23	48.5	1986	29	1986	20	16	1979
Mar	25.0	1989	2	79.0	1989	42	1989	3	15	1980
Apr	25.0	1993	12	96.0	1991	63	1991	14	23	1991
May	20.0	1975	7	58.0	1975	40	1978	8	6	1978
Jun	10.0	1976	14	11.0+	1998	6+	1998	4	#+	1998
Jul	2.5	1972	19	4.0	1972	0	0	0	0	0
Aug	1.0	1977	31	1.0	1977	0	0	0	0	0
Sep	18.0	1982	13	37.0	1982	23	1982	14	3	1982
Oct	20.0	1990	6	38.0+	1995	22	1996	26	6	1975
Nov	26.0	1986	6	49.0	1986	29	1986	8	12	1975
Dec	25.0	1994	4	54.0	1994	41	1994	5	23	1978
Ann	26.0	Nov 1986	6	96.0	Apr 1991	63	Apr 1991	14	31	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.3	5.9	2.4	1.0	.2
Feb	6.6	5.5	2.3	1.1	.1
Mar	9.2	8.1	4.1	2.0	.5
Apr	8.0	7.5	3.9	2.3	.8
May	3.8	3.4	1.9	1.2	.3
Jun	.5	.4	.2	.1	@
Jul	.1	.1	.0	.0	.0
Aug	@	@	.0	.0	.0
Sep	1.6	1.4	.7	.5	.3
Oct	4.4	3.8	2.2	1.3	.5
Nov	6.7	5.6	2.0	1.0	.4
Dec	7.4	6.3	2.6	1.2	.3
Ann	55.6	48.0	22.3	11.7	3.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	21.4	13.6	8.2	2.2
Feb	19.5	13.6	9.8	3.8
Mar	22.6	17.2	11.8	4.8
Apr	14.0	10.9	8.6	5.0
May	4.6	3.3	2.2	1.0
Jun	.3	.2	.1	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	1.6	.9	.6	.3
Oct	6.8	4.4	3.1	1.4
Nov	15.8	8.9	5.4	2.5
Dec	19.0	12.7	8.3	3.3
Ann	125.6	85.7	58.1	24.3

+ 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	7/15	7/07	7/02	6/28	6/23	6/19	6/15	6/09	6/02
32	6/22	6/16	6/12	6/08	6/05	6/02	5/29	5/25	5/19
28	5/30	5/26	5/22	5/19	5/16	5/14	5/11	5/07	5/02
24	5/16	5/11	5/08	5/05	5/02	4/29	4/26	4/23	4/18
20	5/07	5/02	4/28	4/24	4/21	4/18	4/15	4/11	4/05
16	4/30	4/24	4/20	4/16	4/13	4/09	4/05	4/01	3/26

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	8/24	8/28	9/01	9/04	9/06	9/09	9/12	9/15	9/20
32	9/03	9/07	9/10	9/13	9/15	9/17	9/20	9/23	9/27
28	9/10	9/15	9/18	9/21	9/24	9/27	9/30	10/04	10/09
24	9/16	9/22	9/26	9/30	10/03	10/06	10/10	10/14	10/20
20	9/24	9/30	10/05	10/09	10/13	10/16	10/20	10/25	11/01
16	10/04	10/11	10/16	10/20	10/25	10/29	11/02	11/07	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	101	92	85	79	74	69	63	56	47
32	119	113	109	105	101	98	94	90	83
28	151	144	139	134	130	126	122	117	110
24	175	168	162	158	153	149	144	139	131
20	200	191	185	179	174	168	163	156	147
16	222	212	206	200	194	189	183	176	166

***** 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	1225	1036	1013	779	546	285	142	159	371	647	986	1203	8392
60	1070	896	858	629	394	167	63	80	249	493	836	1048	6783
57	977	812	765	541	309	113	32	47	187	401	746	955	5885
55	915	756	703	485	255	83	19	31	151	342	686	893	5319
50	760	616	549	348	143	30	3	10	78	206	544	740	4027
32	278	192	114	42	2	0	0	0	0	4	144	271	1047

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	76	80	125	253	480	719	941	937	636	380	148	91	4866
55	0	0	0	5	19	112	247	255	97	4	0	0	739
57	0	0	0	2	11	82	198	209	73	2	0	0	577
60	0	0	0	0	3	47	136	149	45	1	0	0	381
65	0	0	0	0	0	14	60	73	17	0	0	0	164
70	0	0	0	0	0	3	18	25	5	0	0	0	51

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	9	13	36	105	266	493	709	707	429	216	46	7	9	22	58	163	429	922	1631	2338	2767	2983	3029	3036
45	0	0	5	51	156	350	554	553	298	121	18	0	0	0	5	56	212	562	1116	1669	1967	2088	2106	2106
50	0	0	0	16	75	220	402	398	186	59	4	0	0	0	0	16	91	311	713	1111	1297	1356	1360	1360
55	0	0	0	1	28	115	254	255	100	17	0	0	0	0	0	1	29	144	398	653	753	770	770	770
60	0	0	0	0	2	49	129	130	42	2	0	0	0	0	0	0	2	51	180	310	352	354	354	354
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	3	21	69	156	287	432	432	258	121	15	0	0	3	24	93	249	536	968	1400	1658	1779	1794	1794

(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