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: RED LODGE 2 N, MT **COOP ID: 246918**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 5,500 Feet** **Lat: 45˚13N** **Lon: 109˚14W**

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	34.1	11.8	23.0	70	1953	12	32.9	1986	-38	1930	17	9.6	1979	1304	0	.0	.0	2.3	12.5	29.5	6.9
Feb	37.4	15.5	26.5	70	1935	2	33.8	1991	-42	1989	3	11.3	1989	1079	0	.0	.0	3.3	8.2	26.8	3.8
Mar	43.9	21.0	32.5	71+	1986	28	41.0	1986	-30	1945	5	24.0	1996	1009	0	.0	.0	9.4	4.6	27.9	1.5
Apr	52.7	28.6	40.7	80+	1987	28	49.1	1987	-10+	1945	3	31.0	1975	730	0	.0	.0	18.0	1.6	20.4	.1
May	61.9	37.0	49.5	88+	1936	15	54.5	1985	7	1943	12	44.3	1996	483	1	.0	.0	26.7	.0	9.1	.0
Jun	71.7	44.1	57.9	96	1900	22	68.1	1988	25+	1951	3	51.8	1998	240	27	.0	.5	29.6	.0	1.5	.0
Jul	79.2	49.3	64.3	101	1931	21	68.8	1988	30	1955	2	54.1	1993	118	95	.0	2.0	31.0	.0	@	.0
Aug	79.1	48.5	63.8	96+	2001	3	70.1	1971	28+	1992	24	57.0	1993	131	92	.0	.9	30.9	.0	.2	.0
Sep	68.6	40.0	54.3	92	1923	3	61.6	1998	8	1926	24	48.1	1985	340	18	.0	.2	27.8	.2	5.0	.0
Oct	56.7	31.7	44.2	86+	1922	3	49.1	1988	-13	1991	30	39.9	1984	645	0	.0	.0	21.8	1.0	15.7	.1
Nov	41.7	20.2	31.0	80	1899	10	43.1	1999	-25	1959	13	16.5	1985	1021	0	.0	.0	7.7	7.1	25.1	1.9
Dec	35.5	13.4	24.5	71	1899	2	32.2	1980	-42	1990	21	10.2	1983	1257	0	.0	.0	3.3	12.2	29.4	5.0
Ann	55.2	30.1	42.7	101	Jul 1931	21	70.1	Aug 1971	-42+	Dec 1990	21	9.6	Jan 1979	8357	233	.0	3.6	211.8	47.4	190.6	19.3

\+ 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: 1894-2001

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

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: RED LODGE 2 N, MT **COOP ID: 246918**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 5,500 Feet** **Lat: 45˚13N** **Lon: 109˚14W**

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	1.31	1.19	1.74	1972	2	4.76	1972	.05	1999
Feb	1.06	.92	1.20+	1903	27	2.67	1971	.00	1997
Mar	2.27	2.11	2.64	1973	23	6.08	1973	.44	1998
Apr	2.88	2.56	3.31	1958	22	7.32	1973	.00	1996
May	3.96	3.39	7.75	2000	17	9.47	1981	.63	1976
Jun	2.56	1.74	3.40	2001	13	6.35	1992	.56	1971
Jul	1.69	1.45	1.97	1951	10	4.24	1993	.00	2000
Aug	1.37	1.10	3.54	1923	21	4.58	1977	.00	2000
Sep	2.12	1.66	2.49	1982	13	5.57	1978	.11	1979
Oct	2.04	1.65	2.25	1974	31	5.51	1994	.00	1996
Nov	1.38	1.24	2.01	1986	6	3.71	1986	.00+	1999
Dec	1.13	1.00	1.07	1967	26	3.05	1978	.00+	2000
Ann	23.77	23.69	7.75	May 2000	17	9.47	May 1981	.00+	Dec 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.3	4.1	.6	.1
Feb	5.9	3.4	.4	.0
Mar	9.7	5.9	1.4	.3
Apr	10.4	6.7	1.7	.6
May	12.0	7.1	2.3	.9
Jun	11.4	6.4	1.7	.3
Jul	10.8	5.1	.6	.2
Aug	8.9	4.0	.5	.2
Sep	8.5	4.7	1.4	.3
Oct	7.0	4.6	1.3	.5
Nov	6.8	3.9	.7	.2
Dec	6.8	3.7	.4	.0
Ann	105.5	59.6	13.0	3.6

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	.13	.23	.40	.59	.78	1.01	1.27	1.60	2.05	2.79	3.52
Feb	.08	.19	.35	.51	.67	.85	1.06	1.31	1.65	2.21	2.75
Mar	.60	.81	1.14	1.43	1.71	2.01	2.34	2.73	3.25	4.05	4.80
Apr	.25	.57	1.05	1.47	1.90	2.37	2.91	3.56	4.43	5.85	7.20
May	1.01	1.38	1.96	2.47	2.97	3.50	4.09	4.79	5.71	7.15	8.50
Jun	.56	.79	1.17	1.51	1.85	2.21	2.62	3.11	3.75	4.78	5.75
Jul	.20	.41	.70	.94	1.18	1.44	1.73	2.08	2.54	3.28	3.98
Aug	.09	.23	.44	.65	.86	1.09	1.36	1.69	2.13	2.86	3.57
Sep	.26	.42	.72	1.02	1.33	1.68	2.09	2.59	3.27	4.39	5.47
Oct	.26	.52	.86	1.15	1.45	1.75	2.10	2.52	3.07	3.94	4.77
Nov	.00	.39	.68	.89	1.07	1.27	1.47	1.71	2.02	2.50	2.94
Dec	.00	.00	.51	.70	.87	1.04	1.22	1.43	1.70	2.11	2.50
Ann	13.15	15.01	17.50	19.46	21.24	23.01	24.88	26.98	29.59	33.47	36.91

+ 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: 1894-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: RED LODGE 2 N, MT **COOP ID: 246918**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 5,500 Feet** **Lat: 45°13N** **Lon: 109°14W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	26.3	22.8	13	9
Feb	18.0	16.0	12	8
Mar	30.6	29.0	7	6
Apr	22.3	16.0	4	1
May	10.5	5.1	1	#
Jun	.3	.0	#	0
Jul	.0	.0	#	0
Aug	.0	.0	#	0
Sep	6.6	.0	#	0
Oct	15.5	12.5	1	#
Nov	21.1	18.5	4	3
Dec	22.7	20.0	9	6
Ann	173.9	139.9	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	24.0	1972	2	62.5	1972	60	1979	31	53	1979
Feb	15.0	1971	20	40.5	1971	60	1979	2	39	1979
Mar	26.5	1973	23	74.5	1980	45	1980	31	18	1979
Apr	30.0	1984	25	77.5	1973	71	1991	19	28	1991
May	23.5	1975	7	57.0	1975	30	1984	1	5	1984
Jun	4.0	1995	8	6.0	1995	2	1995	8	#+	2000
Jul	1.0	1972	19	1.0	1972	#+	1999	1	#+	1999
Aug	.3	1992	24	.3	1992	#	1996	6	#	1996
Sep	22.0	1982	13	39.0	1982	28	1982	14	3	1982
Oct	19.0	1971	1	43.5	1971	36	1996	27	5	1996
Nov	22.0	1986	6	47.0	1986	35	1986	12	17	1978
Dec	16.0	1978	5	51.5	1982	50	1978	31	44	1978
Ann	30.0	Apr 1984	25	77.5	Apr 1973	71	Apr 1991	19	53	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.6	5.6	2.2	1.4	.5
Feb	4.9	4.1	2.4	1.3	.3
Mar	7.2	6.2	3.0	1.9	.5
Apr	5.2	4.8	2.7	1.9	.8
May	2.2	1.9	1.3	.9	.2
Jun	.2	.1	@	.0	.0
Jul	@	@	.0	.0	.0
Aug	@	.0	.0	.0	.0
Sep	1.1	1.0	.8	.4	.2
Oct	3.6	3.2	1.9	1.0	.4
Nov	5.1	4.4	2.1	1.2	.3
Dec	5.5	4.7	2.7	1.3	.4
Ann	41.6	36.0	19.1	11.3	3.6

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	27.7	25.4	22.8	15.8
Feb	23.4	20.8	18.2	13.1
Mar	19.8	15.9	13.2	8.1
Apr	8.9	7.1	5.8	4.0
May	2.0	1.6	1.0	.5
Jun	.1	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	1.1	.6	.4	.2
Oct	5.4	3.0	1.8	.8
Nov	15.3	11.2	8.3	4.1
Dec	23.8	20.8	17.0	11.5
Ann	127.5	106.4	88.5	58.1

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: RED LODGE 2 N, MT **COOP ID: 246918**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 5,500 Feet** **Lat: 45˚13N** **Lon: 109˚14W**

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	7/12	7/05	7/01	6/27	6/23	6/19	6/15	6/11	6/04
32	6/25	6/19	6/14	6/10	6/07	6/03	5/30	5/26	5/20
28	6/01	5/27	5/23	5/19	5/16	5/13	5/10	5/06	5/01
24	5/15	5/11	5/07	5/04	5/01	4/29	4/26	4/22	4/17
20	5/04	4/29	4/25	4/22	4/19	4/16	4/13	4/10	4/05
16	5/01	4/24	4/19	4/14	4/10	4/06	4/02	3/28	3/21

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	8/18	8/23	8/28	8/31	9/03	9/06	9/10	9/14	9/20
32	9/03	9/07	9/10	9/12	9/15	9/17	9/20	9/23	9/27
28	9/09	9/14	9/17	9/20	9/23	9/25	9/28	10/02	10/06
24	9/17	9/23	9/28	10/02	10/06	10/09	10/13	10/18	10/24
20	9/23	9/30	10/05	10/09	10/13	10/17	10/21	10/26	11/02
16	10/09	10/16	10/21	10/25	10/28	11/01	11/05	11/10	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	97	89	82	77	72	66	61	55	46
32	121	114	108	104	99	95	90	85	77
28	148	141	136	132	129	125	121	116	110
24	183	174	167	162	156	151	146	139	130
20	201	193	186	181	176	171	165	159	150
16	228	219	212	206	200	195	189	182	172

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: RED LODGE 2 N, MT **COOP ID: 246918**

Climate Division: MT 5 **NWS Call Sign:** **Elevation: 5,500 Feet** **Lat: 45˚13N** **Lon: 109˚14W**

Degree Days to Selected Base Temperatures (˚F)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1304	1079	1009	730	483	240	118	131	340	645	1021	1257	8357
60	1149	939	854	580	334	137	50	60	221	491	871	1102	6788
57	1056	855	761	494	252	89	25	33	161	399	781	1009	5915
55	994	799	699	438	203	63	16	21	127	339	721	947	5367
50	839	659	546	304	104	21	3	5	60	204	582	794	4121
32	346	230	120	30	1	0	0	0	0	6	176	315	1224

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	66	76	134	290	542	777	1000	985	669	384	145	81	5149
55	0	0	0	8	31	151	302	293	105	4	0	0	894
57	0	0	0	4	18	117	250	243	80	2	0	0	714
60	0	0	0	0	7	74	181	177	49	0	0	0	488
65	0	0	0	0	1	27	95	92	18	0	0	0	233
70	0	0	0	0	0	8	35	35	6	0	0	0	84

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	1	8	38	129	310	541	755	737	437	194	38	6	1	9	47	176	486	1027	1782	2519	2956	3150	3188	3194
45	0	0	11	64	191	394	600	582	302	106	12	0	0	0	11	75	266	660	1260	1842	2144	2250	2262	2262
50	0	0	0	26	92	255	447	429	188	49	1	0	0	0	0	26	118	373	820	1249	1437	1486	1487	1487
55	0	0	0	8	38	146	299	285	99	14	0	0	0	0	0	8	46	192	491	776	875	889	889	889
60	0	0	0	0	10	66	166	150	42	1	0	0	0	0	0	0	10	76	242	392	434	435	435	435
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	6	32	100	204	338	480	471	281	130	24	1	0	6	38	138	342	680	1160	1631	1912	2042	2066	2067

(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