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: LIBBY 1 NE RS, MT **COOP ID: 245015**

Climate Division: MT 1 **NWS Call Sign:** **Elevation: 2,096 Feet** **Lat: 48˚24N** **Lon: 115˚32W**

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	33.5	18.2	25.9	56+	1960	30	34.8	1994	-46	1924	2	7.4	1979	1214	0	.0	.0	.4	13.0	29.6	3.7
Feb	41.3	22.2	31.8	65	1995	25	37.5	1991	-37	1933	9	21.2	1989	932	0	.0	.0	2.3	4.6	26.3	1.7
Mar	52.0	26.7	39.4	75+	1939	23	44.8	1992	-20+	1960	3	33.4	1976	796	0	.0	.0	17.9	.5	25.2	.3
Apr	62.5	31.4	47.0	90+	1977	26	50.7	1980	-5	1936	1	41.3	1975	542	0	.0	.1	28.1	.0	18.1	.0
May	71.6	38.5	55.1	102	1936	30	61.0	1993	12	1954	1	50.6	1974	317	8	.0	.9	31.0	.0	6.8	.0
Jun	78.9	44.7	61.8	106	1895	29	67.9	1992	24	1951	1	56.9	1976	142	46	.1	4.0	30.0	.0	.9	.0
Jul	86.3	48.1	67.2	109	1896	5	74.0	1998	30+	1999	4	61.9	1993	58	127	1.5	12.7	31.0	.0	.2	.0
Aug	86.8	47.1	67.0	109+	1961	5	70.6	1986	26	1895	14	61.7	1980	61	121	1.5	13.0	31.0	.0	.2	.0
Sep	75.2	39.6	57.4	105+	1998	7	66.1	1998	13	1926	24	52.9	1971	252	24	.2	2.4	29.9	.0	4.6	.0
Oct	59.0	32.9	46.0	89+	1947	4	51.2	1988	-7	1935	31	43.3	1971	590	0	.0	.0	25.5	.1	14.8	.0
Nov	41.0	27.6	34.3	73	1895	16	40.0	1999	-27	1896	28	22.9	1985	921	0	.0	.0	3.6	3.9	22.5	.4
Dec	33.0	20.8	26.9	65	1924	12	33.3	1979	-39	1968	30	15.8	1983	1181	0	.0	.0	.4	13.5	29.6	1.7
Ann	60.1	33.2	46.7	109+	Aug 1961	5	74.0	Jul 1998	-46	Jan 1924	2	7.4	Jan 1979	7006	326	3.3	33.1	231.1	35.6	178.8	7.8

\+ 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: 1895-2001

(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	1.95	1.88	2.04	1953	9	4.94	1974	.21	1985
Feb	1.47	1.25	1.11	1986	15	3.17+	1996	.36	1978
Mar	1.31	1.15	1.00	1991	3	3.60	1997	.28	1981
Apr	1.05	.98	1.25	1922	28	2.60	1982	.28	1973
May	1.63	1.51	3.11	1998	27	6.07	1998	.42	1992
Jun	1.68	1.57	2.18	1984	21	3.79	1995	.18	1979
Jul	1.30	1.11	2.02	1990	24	4.67	1987	.00	1973
Aug	1.01	.93	1.55	1911	7	3.26	1989	.08	1998
Sep	1.02	.90	1.76	1959	15	3.66	1985	.00	1990
Oct	1.37	1.18	1.30	1927	3	3.56	1975	.00	1987
Nov	2.40	2.39	2.11	1946	18	5.31	1973	.30	1979
Dec	2.21	2.43	1.64	1933	18	5.44	1996	.45	1985
Ann	18.40	18.25	3.11	May 1998	27	6.07	May 1998	.00+	Sep 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	13.9	5.8	.7	@
Feb	10.9	4.3	.5	@
Mar	11.0	5.2	.2	@
Apr	9.4	3.9	.3	.0
May	11.5	5.1	.6	@
Jun	11.1	4.9	.7	.1
Jul	7.9	3.1	.6	.2
Aug	7.2	3.1	.5	.1
Sep	8.4	3.3	.5	.0
Oct	10.0	4.4	.4	@
Nov	14.9	7.7	1.0	.1
Dec	14.3	7.1	.7	.2
Ann	130.5	57.9	6.7	.7

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	.45	.63	.92	1.17	1.43	1.70	2.00	2.37	2.85	3.61	4.32
Feb	.29	.42	.64	.84	1.04	1.25	1.49	1.79	2.18	2.80	3.39
Mar	.36	.48	.67	.84	1.00	1.17	1.36	1.58	1.87	2.33	2.75
Apr	.31	.41	.56	.69	.81	.94	1.09	1.26	1.48	1.83	2.16
May	.32	.47	.71	.93	1.15	1.39	1.66	1.98	2.41	3.10	3.76
Jun	.33	.48	.73	.96	1.18	1.43	1.71	2.04	2.49	3.20	3.87
Jul	.04	.13	.31	.49	.70	.94	1.23	1.59	2.10	2.95	3.80
Aug	.18	.27	.42	.56	.70	.85	1.02	1.23	1.51	1.96	2.38
Sep	.09	.21	.37	.52	.68	.84	1.03	1.27	1.57	2.07	2.55
Oct	.09	.23	.44	.65	.86	1.09	1.36	1.70	2.14	2.88	3.59
Nov	.62	.85	1.19	1.50	1.81	2.12	2.48	2.90	3.45	4.32	5.13
Dec	.58	.79	1.11	1.39	1.67	1.96	2.28	2.66	3.16	3.95	4.68
Ann	12.62	13.73	15.15	16.24	17.21	18.15	19.12	20.20	21.51	23.43	25.09

\+ 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: 1895-2001
(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	13.1	13.2	8	7
Feb	6.0	3.7	8	8
Mar	4.1	2.5	3	2
Apr	.3	.0	#	0
May	.0	.0	0	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.6	.0	#	0
Nov	6.1	1.9	1	#
Dec	17.3	15.8	5	4
Ann	47.5	37.1	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	12.0	1971	15	29.4	1971	31	1971	15	19	1971
Feb	15.0	1986	15	24.3	1986	28+	1986	16	21	1975
Mar	6.5	1997	12	28.3	1997	29	1997	16	19	1997
Apr	1.5	1983	11	1.5+	1996	9	1997	4	2	1997
May	.0	0	0	.0	0	0	0	0	0	0
Jun	.0	0	0	.0	0	3	1995	6	#	1995
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	#	1972	27	#	1972	0	0	0	0	0
Oct	6.0	1984	28	9.5	1984	10	1984	28	1	1984
Nov	11.0	1996	20	37.5	1996	28	1996	23	10	1996
Dec	11.5	1996	29	53.0	1996	38	1996	30	22	1996
Ann	15.0	Feb 1986	15	53.0	Dec 1996	38	Dec 1996	30	22	Dec 1996

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.6	4.5	1.6	.5	@
Feb	4.2	3.0	.7	.2	@
Mar	2.0	1.5	.4	.2	.0
Apr	.4	.3	.0	.0	.0
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.1	.1	.1	.1	.0
Nov	3.3	2.4	.8	.3	@
Dec	8.5	5.6	1.4	.6	@
Ann	26.1	17.4	5.0	1.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.3	25.9	22.1	12.1
Feb	21.9	19.9	18.1	8.9
Mar	5.3	3.7	2.2	.6
Apr	.1	.0	.0	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.2	.2	.1	@
Nov	6.8	2.4	1.2	.6
Dec	21.0	15.4	11.2	5.1
Ann	83.6	67.5	54.9	27.3

+ 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	7/12	7/05	6/29	6/25	6/21	6/16	6/12	6/06	5/30
32	6/26	6/18	6/13	6/08	6/03	5/30	5/25	5/19	5/11
28	5/28	5/23	5/18	5/15	5/12	5/08	5/05	5/01	4/25
24	5/05	4/29	4/25	4/22	4/19	4/15	4/12	4/08	4/02
20	4/25	4/16	4/10	4/05	4/01	3/27	3/22	3/16	3/07
16	4/02	3/22	3/14	3/08	3/02	2/24	2/17	2/10	1/30

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	8/16	8/22	8/26	8/30	9/02	9/05	9/09	9/13	9/19
32	8/29	9/03	9/07	9/11	9/14	9/17	9/20	9/24	9/29
28	9/12	9/18	9/23	9/27	10/01	10/05	10/09	10/14	10/21
24	9/22	10/02	10/08	10/14	10/19	10/25	10/30	11/06	11/15
20	10/04	10/15	10/22	10/29	11/04	11/11	11/17	11/25	12/06
16	10/24	11/04	11/11	11/18	11/24	11/30	12/07	12/14	12/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	104	93	85	79	73	66	60	52	41
32	133	122	115	108	102	95	89	81	70
28	172	162	154	148	142	136	129	122	111
24	219	207	198	190	183	176	168	159	147
20	258	244	234	225	217	209	200	190	176
16	313	297	286	276	266	257	247	235	219

***** 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	1214	932	796	542	317	142	58	61	252	590	921	1181	7006
60	1059	792	641	393	187	62	16	18	144	435	771	1026	5544
57	966	708	548	307	125	31	7	7	93	343	681	933	4749
55	904	652	486	252	91	18	2	3	66	283	621	871	4249
50	756	512	336	134	31	3	0	0	21	149	477	716	3135
32	291	120	19	0	0	0	0	0	0	1	97	226	754

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	101	111	246	448	714	893	1092	1083	763	434	166	68	6119
55	0	0	0	10	92	221	381	373	138	3	0	0	1218
57	0	0	0	5	64	174	323	315	105	1	0	0	987
60	0	0	0	1	32	116	240	233	66	0	0	0	688
65	0	0	0	0	8	46	127	121	24	0	0	0	326
70	0	0	0	0	1	12	51	47	7	0	0	0	118

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	2	58	213	465	653	846	837	527	203	23	0	0	2	60	273	738	1391	2237	3074	3601	3804	3827	3827
45	0	0	10	104	311	503	691	682	379	91	3	0	0	0	10	114	425	928	1619	2301	2680	2771	2774	2774
50	0	0	0	40	178	355	536	527	240	33	0	0	0	0	0	40	218	573	1109	1636	1876	1909	1909	1909
55	0	0	0	12	83	217	382	375	123	6	0	0	0	0	0	12	95	312	694	1069	1192	1198	1198	1198
60	0	0	0	1	33	110	240	232	51	0	0	0	0	0	0	1	34	144	384	616	667	667	667	667
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	4	56	183	329	428	532	530	371	152	7	0	0	4	60	243	572	1000	1532	2062	2433	2585	2592	2592

(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