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: BILLINGS 2 N, MO **COOP ID: 230657**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,352 Feet** **Lat: 37˚05N** **Lon: 93˚33W**

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	40.0	18.5	29.3	73+	1967	23	40.2	1990	-17	1985	20	14.4	1977	1109	0	.0	.0	8.5	8.6	27.6	2.2
Feb	46.5	23.1	34.8	79+	1982	24	42.7	1999	-15	1979	9	21.4	1978	846	0	.0	.0	12.5	5.1	22.1	1.2
Mar	56.3	32.3	44.3	84+	1995	23	49.3	1986	0	1980	2	36.3	1975	642	0	.0	.0	21.4	1.2	14.9	@
Apr	66.2	41.2	53.7	91	1987	20	59.4	1981	19+	1987	3	49.0	1997	344	4	.0	.1	27.9	.0	4.5	.0
May	74.4	52.1	63.3	92	1987	20	70.0	1987	29	1976	3	58.3	1976	137	82	.0	.1	30.9	.0	.2	.0
Jun	82.5	61.2	71.9	100+	1988	27	75.7	1971	41	1972	1	66.9	1974	16	221	.1	3.9	30.0	.0	.0	.0
Jul	88.5	66.3	77.4	109	1986	31	85.1	1980	47+	1997	5	74.3	1971	0	383	1.1	13.7	31.0	.0	.0	.0
Aug	88.2	63.8	76.0	108	1984	30	83.2	1980	44	1986	29	68.5	1992	10	351	1.3	14.1	31.0	.0	.0	.0
Sep	80.0	56.3	68.2	102	2000	1	74.0	1998	34	1992	29	60.8	1974	62	158	.1	4.3	30.0	.0	.1	.0
Oct	68.9	43.9	56.4	94	1980	10	61.6	1971	17	1993	31	46.6	1976	290	23	.0	.2	29.8	@	3.3	.0
Nov	54.8	32.3	43.6	83	1978	4	52.7	1999	3	1976	29	35.3	1976	643	0	.0	.0	19.8	.9	14.8	.0
Dec	43.8	22.9	33.4	75	1991	9	41.5	1984	-15+	1989	23	19.2	1983	981	0	.0	.0	10.5	5.8	25.0	.9
Ann	65.8	42.8	54.4	109	Jul 1986	31	85.1	Jul 1980	-17	Jan 1985	20	14.4	Jan 1977	5080	1222	2.6	36.4	283.3	21.6	112.5	4.3

\+ 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: 1962-2001

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

Issue Date: February 2004

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: BILLINGS 2 N, MO **COOP ID: 230657**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,352 Feet** **Lat: 37˚05N** **Lon: 93˚33W**

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	1.98	1.46	2.28	1982	31	5.03	1982	.03	1986
Feb	2.07	2.05	2.66	1966	9	5.12	1990	.25	1982
Mar	3.67	3.41	3.31	1974	10	8.33	1990	1.27	1971
Apr	4.06	3.68	3.01	1996	22	9.44	1994	.10	1989
May	4.39	3.92	4.00	1979	20	12.80	1990	1.92	1972
Jun	4.69	3.84	3.70	1981	11	9.88	1981	1.73	1991
Jul	3.53	3.83	3.42	1979	28	7.33	1998	.32	1980
Aug	3.59	3.01	7.17	1982	13	13.12	1982	.39	1984
Sep	4.65	3.79	7.46	1993	25	18.15	1993	.46	1981
Oct	3.26	3.04	3.94	1973	27	8.84	1981	.84	1999
Nov	4.36	3.90	4.76	1987	25	10.05	1985	.14	1989
Dec	3.05	2.42	3.50	1982	3	7.96	1982	.58	1989
Ann	43.30	42.64	7.46	Sep 1993	25	18.15	Sep 1993	.03	Jan 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.2	4.5	1.2	.4
Feb	6.4	4.4	1.2	.4
Mar	9.2	6.3	2.7	.9
Apr	10.1	6.9	2.8	1.1
May	10.3	7.5	2.9	1.4
Jun	9.6	7.2	3.7	1.4
Jul	6.9	4.9	2.2	1.2
Aug	6.7	4.9	2.3	1.1
Sep	7.7	5.8	2.9	1.4
Oct	7.8	5.3	2.4	.9
Nov	8.2	5.9	3.0	1.4
Dec	7.4	4.7	2.1	.9
Ann	97.5	68.3	29.4	12.5

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	.23	.38	.66	.94	1.23	1.56	1.94	2.42	3.07	4.13	5.17
Feb	.44	.64	.94	1.22	1.49	1.79	2.12	2.52	3.04	3.88	4.68
Mar	1.04	1.39	1.92	2.37	2.82	3.29	3.81	4.42	5.21	6.46	7.62
Apr	.87	1.24	1.84	2.38	2.92	3.50	4.15	4.93	5.96	7.60	9.15
May	1.70	2.11	2.69	3.17	3.62	4.09	4.59	5.18	5.92	7.05	8.09
Jun	1.66	2.10	2.74	3.28	3.80	4.33	4.90	5.57	6.43	7.75	8.97
Jul	.61	.92	1.44	1.92	2.42	2.95	3.57	4.31	5.30	6.90	8.42
Aug	.54	.85	1.37	1.86	2.38	2.95	3.60	4.39	5.46	7.19	8.86
Sep	.78	1.18	1.86	2.50	3.15	3.87	4.69	5.68	7.01	9.16	11.22
Oct	.85	1.15	1.63	2.04	2.45	2.89	3.37	3.94	4.68	5.85	6.95
Nov	.63	.99	1.61	2.22	2.85	3.54	4.34	5.32	6.64	8.80	10.87
Dec	.58	.86	1.31	1.72	2.14	2.59	3.10	3.71	4.53	5.84	7.09
Ann	30.88	33.29	36.38	38.72	40.79	42.80	44.88	47.17	49.94	53.97	57.45

\+ 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: 1962-2001
(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: BILLINGS 2 N, MO **COOP ID: 230657**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,352 Feet** **Lat: 37°05N** **Lon: 93°33W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	6.2	4.0	1	1
Feb	4.2	2.0	1	#
Mar	1.9	.0	#	#
Apr	.5	.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	.1	.0	#	0
Nov	1.4	.0	#	0
Dec	3.1	1.5	1	#
Ann	17.4	7.5	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	10.0	1995	19	24.5	1979	12+	1979	31	5	1979
Feb	16.0	1980	8	18.0	1993	16	1980	9	6	1980
Mar	14.0	1999	14	14.0	1989	14+	1999	14	2	1999
Apr	6.5	1971	5	7.5	1971	4	1971	5	#+	1994
May	.0	0	0	.0	0	0	0	0	0	0
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	.0	0	0	.0	0	0	0	0	0	0
Oct	1.5	1993	30	1.5	1993	1	1993	30	#	1993
Nov	7.0	1980	18	11.5	1980	6	1980	18	1	1980
Dec	9.0	2000	13	15.0	2000	12	2000	15	5	2000
Ann	16.0	Feb 1980	8	24.5	Jan 1979	16	Feb 1980	9	6	Feb 1980

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.4	2.0	.9	.3	.1
Feb	1.6	1.2	.4	.3	.1
Mar	.8	.6	.3	.1	.1
Apr	.2	.1	.1	@	.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	@	@	.0	.0	.0
Nov	.5	.4	.2	.1	.0
Dec	1.6	1.2	.5	.1	.0
Ann	7.1	5.5	2.4	.9	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	8.2	4.7	2.4	.3
Feb	5.0	2.8	1.5	.7
Mar	1.0	.4	.2	.1
Apr	.1	.1	.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	@	.0	.0	.0
Nov	.6	.4	.2	.0
Dec	3.7	2.1	1.4	.1
Ann	18.6	10.5	5.7	1.2

+ 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

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: BILLINGS 2 N, MO **COOP ID: 230657**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,352 Feet** **Lat: 37˚05N** **Lon: 93˚33W**

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	5/12	5/07	5/04	5/01	4/28	4/25	4/23	4/19	4/15
32	4/29	4/24	4/21	4/18	4/15	4/13	4/10	4/06	4/02
28	4/15	4/11	4/09	4/06	4/04	4/01	3/30	3/27	3/23
24	4/10	4/05	4/01	3/29	3/25	3/22	3/19	3/15	3/09
20	4/02	3/26	3/21	3/17	3/13	3/09	3/05	2/28	2/21
16	3/20	3/13	3/08	3/04	2/28	2/24	2/19	2/14	2/07

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	177	171	167	163	160	156	152	148	142
32	209	201	195	190	185	181	176	170	162
28	231	224	219	214	210	206	201	196	189
24	251	244	238	233	229	225	220	214	207
20	276	268	262	257	252	247	242	236	227
16	303	294	287	282	276	271	265	259	250

***** 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: BILLINGS 2 N, MO **COOP ID: 230657**

Climate Division: MO 4 **NWS Call Sign:** **Elevation: 1,352 Feet** **Lat: 37˚05N** **Lon: 93˚33W**

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	1109	846	642	344	137	16	0	10	62	290	643	981	5080
60	954	706	489	212	64	3	0	1	22	175	498	826	3950
57	863	631	403	145	35	1	0	0	10	121	416	735	3360
55	806	578	347	108	22	0	0	0	5	91	362	678	2997
50	662	452	223	41	5	0	0	0	0	39	243	534	2199
32	243	129	16	0	0	0	0	0	0	0	22	149	559

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	157	207	397	651	968	1194	1406	1364	1085	756	369	191	8745
55	7	13	15	68	277	504	693	651	400	134	19	7	2788
57	2	9	9	45	228	445	631	589	345	102	13	1	2419
60	0	0	2	22	164	357	538	497	267	63	5	0	1915
65	0	0	0	4	82	221	383	351	158	23	0	0	1222
70	0	0	0	0	31	111	238	220	79	5	0	0	684

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	41	98	236	447	735	965	1172	1132	847	539	212	67	41	139	375	822	1557	2522	3694	4826	5673	6212	6424	6491
45	17	50	144	311	581	815	1017	977	697	394	123	32	17	67	211	522	1103	1918	2935	3912	4609	5003	5126	5158
50	3	18	78	199	428	665	862	822	549	261	65	10	3	21	99	298	726	1391	2253	3075	3624	3885	3950	3960
55	0	4	37	110	285	515	707	667	406	152	28	1	0	4	41	151	436	951	1658	2325	2731	2883	2911	2912
60	0	0	9	52	161	369	553	512	276	73	6	0	0	0	9	61	222	591	1144	1656	1932	2005	2011	2011
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	36	77	158	279	458	654	803	760	556	342	136	52	36	113	271	550	1008	1662	2465	3225	3781	4123	4259	4311

(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