

# Climatography of the United States No. 20

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

Station: WARRENSBURG 4 NW, MO

1971-2000

COOP ID: 238712

Climate Division: MO 3

NWS Call Sign:

Elevation: 796 Feet

Lat: 38°47N

Lon: 93°48W

## 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	38.2	17.1	27.7	75	1950	24	38.6	1990	-20+	1930	18	14.1	1979	1158	0	.0	.0	5.6	10.3	28.8	3.2
Feb	44.4	22.9	33.7	82	1972	29	43.2	1976	-15+	1979	9	20.3	1978	878	0	.0	.0	10.0	6.4	22.9	2.0
Mar	56.3	33.0	44.7	90	1929	24	49.4	1986	-9	1978	4	37.6	1978	631	0	.0	.0	19.9	1.2	16.3	.1
Apr	67.2	43.4	55.3	94	1987	21	60.8	1981	16	1936	3	47.9	1983	304	13	.0	.2	27.5	.0	4.2	.0
May	76.3	53.1	64.7	103	1934	30	71.5	1987	28	1976	3	59.2	1981	114	105	.0	.5	31.0	.0	.3	.0
Jun	85.2	62.4	73.8	108	1936	19	78.5	1971	39	1982	1	67.3	1982	12	275	.2	5.6	30.0	.0	.0	.0
Jul	90.6	66.7	78.7	116	1954	14	86.0	1980	49+	1997	6	75.5	1979	0	422	1.9	15.4	31.0	.0	.0	.0
Aug	89.2	64.3	76.8	111+	1936	9	83.4	1983	43	1979	12	70.1	1992	7	371	1.1	13.3	31.0	.0	.0	.0
Sep	81.1	55.7	68.4	106+	2000	3	73.3	1998	29	1942	27	61.6	1974	55	157	.2	4.6	30.0	.0	.1	.0
Oct	69.8	44.6	57.2	96+	1963	10	64.3	1971	19+	1981	24	52.4	1976	259	18	.0	.2	29.8	.0	4.2	.0
Nov	54.3	33.4	43.9	85	1937	1	51.8	1990	-3+	1991	9	35.8	1976	635	0	.0	.0	18.5	1.0	15.1	.1
Dec	42.1	22.7	32.4	73+	1998	2	38.3	1984	-17	1983	25	17.1	1983	1010	0	.0	.0	8.4	6.4	26.7	1.7
Ann	66.2	43.3	54.8	116	Jul 1954	14	86.0	Jul 1980	-20+	Jan 1930	18	14.1	Jan 1979	5063	1361	3.4	39.8	272.7	25.3	118.6	7.1

+ 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/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1918-2001

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

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**Lon: 93°48W**

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	1.29	1.11	2.43	1946	5	3.23+	1979	.03	1986	6.1	3.9	.7	.2	.08	.16	.32	.50	.70	.93	1.21	1.56	2.06	2.90	3.74
Feb	1.75	1.72	3.28	1997	21	4.48	1997	.04	1996	5.9	3.6	.9	.2	.23	.38	.63	.87	1.12	1.41	1.73	2.13	2.67	3.56	4.42
Mar	3.22	3.19	4.40	1927	19	8.73	1973	.67	1971	8.1	5.5	2.2	.7	.90	1.21	1.67	2.07	2.47	2.88	3.33	3.87	4.57	5.67	6.69
Apr	3.79	2.88	5.49	1960	16	12.85	1994	.49	2000	9.8	6.7	2.5	1.1	.82	1.17	1.73	2.23	2.74	3.28	3.88	4.61	5.56	7.09	8.53
May	4.81	4.47	6.50	1985	14	10.56	1995	.45	1998	10.9	7.4	2.7	1.2	1.06	1.51	2.21	2.85	3.49	4.16	4.93	5.84	7.04	8.96	10.76
Jun	4.53	3.97	4.10	1924	27	11.72	1981	.53	1972	9.4	6.5	2.9	1.3	1.18	1.61	2.27	2.85	3.42	4.01	4.68	5.47	6.49	8.11	9.63
Jul	4.12	3.38	5.92	1965	20	14.83	1993	.47	1999	8.2	5.6	2.6	1.2	.70	1.06	1.66	2.22	2.80	3.43	4.15	5.03	6.20	8.09	9.89
Aug	3.47	2.83	6.05	1980	5	10.55	1980	.13	1973	8.4	5.6	2.3	1.0	.32	.57	1.04	1.52	2.04	2.64	3.35	4.23	5.44	7.47	9.45
Sep	4.38	3.53	6.10	1998	14	13.72	1986	.26	1990	7.9	5.1	2.3	1.3	.67	1.04	1.68	2.28	2.91	3.60	4.39	5.35	6.64	8.74	10.76
Oct	3.18	3.03	3.82	1976	5	7.13	1976	.26	1999	7.9	5.1	2.1	.8	.76	1.06	1.52	1.94	2.35	2.78	3.27	3.85	4.61	5.81	6.94
Nov	3.46	3.05	6.52	1928	16	12.27	1983	.05	1989	7.7	5.4	2.4	.9	.52	.81	1.32	1.79	2.29	2.84	3.46	4.23	5.26	6.93	8.53
Dec	2.08	1.97	4.65	1982	2	8.38	1982	.15	1976	6.3	4.0	1.3	.5	.29	.46	.76	1.05	1.35	1.69	2.07	2.54	3.18	4.22	5.23
Ann	40.08	37.34	6.52	Nov 1928	16	14.83	Jul 1993	.03	Jan 1986	96.6	64.4	24.9	10.4	26.03	28.65	32.07	34.69	37.05	39.35	41.74	44.40	47.66	52.43	56.59

+ 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: 1918-2001

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**NWS Call Sign:**

**Elevation: 796 Feet**

**Lat: 38°47N**

**Lon: 93°48W**

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										Snow Fall >= Thresholds					Snow Depth >= Thresholds			
Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	4.4	3.7	1	#	7.5	1976	25	11.3	1977	15	1974	11	5	1974	1.7	1.4	.3	.2	.0	-9.9	-9.9	-9.9	-9.9
Feb	4.0	2.5	1	#	7.0	1975	23	12.5	1975	12	1978	21	6	1978	1.4	1.0	.3	.1	.0	1.9	.6	.2	.0
Mar	2.1	1.4	#	0	6.0	1974	24	12.0	1978	6	1978	25	2	1978	.6	.5	.3	.1	.0	.3	.1	.1	.0
Apr	.1	.0	0	0	2.5	1973	9	2.5	1973	0	0	0	0	0	@	@	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	#	.0	0	0	#	1976	19	#	1976	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.9	.0	#	0	6.0	1975	26	7.0	1975	7	1975	27	1	1975	.5	.2	.1	@	.0	.6	.2	.1	.0
Dec	1.8	.5	#	0	9.0	1973	31	12.0	1973	9	1973	31	1+	2000	.8	.4	.1	.1	.0	.6	.1	.1	.0
Ann	13.3	8.1	N/A	N/A	9.0	Dec 1973	31	12.5	Feb 1975	15	Jan 1974	11	6	Feb 1978	5.0	3.5	1.1	.5	.0	-9.9	-9.9	-9.9	-9.9

+ 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:

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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	5/13	5/08	5/04	5/01	4/28	4/24	4/21	4/17	4/12
32	5/04	4/28	4/24	4/20	4/17	4/14	4/10	4/06	3/31
28	4/19	4/14	4/11	4/08	4/06	4/03	4/01	3/28	3/24
24	4/11	4/05	4/01	3/28	3/25	3/22	3/18	3/14	3/08
20	3/30	3/24	3/19	3/16	3/12	3/08	3/04	2/28	2/22
16	3/24	3/16	3/11	3/06	3/01	2/24	2/19	2/14	2/06
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	9/15	9/22	9/27	10/01	10/04	10/08	10/12	10/17	10/23
32	9/27	10/03	10/08	10/12	10/15	10/19	10/23	10/27	11/02
28	10/13	10/18	10/21	10/24	10/27	10/30	11/02	11/05	11/10
24	10/22	10/28	11/02	11/06	11/10	11/13	11/17	11/22	11/28
20	10/31	11/07	11/12	11/16	11/20	11/24	11/28	12/03	12/09
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	187	177	170	164	159	153	148	141	131
32	210	200	193	186	181	175	168	161	151
28	223	216	211	207	204	200	196	191	184
24	252	244	238	233	229	224	220	214	206
20	281	271	264	258	252	246	240	233	223
16	309	298	289	282	275	268	261	253	241

\* 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:

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**Degree Days to Selected Base Temperatures (°F)**

<b>Base</b>	<b>Heating Degree Days (1)</b>												
<b>Below</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Ann</b>
<b>65</b>	1158	878	631	304	114	12	0	7	55	259	635	1010	5063
<b>60</b>	1003	742	483	184	51	2	0	1	17	145	490	855	3973
<b>57</b>	910	664	396	127	27	0	0	0	7	94	408	765	3398
<b>55</b>	850	612	342	95	17	0	0	0	3	67	355	706	3047
<b>50</b>	706	486	223	37	4	0	0	0	0	24	238	563	2281
<b>32</b>	263	155	19	0	0	0	0	0	0	0	23	170	630

<b>Base</b>	<b>Cooling Degree Days (1)</b>												
<b>Above</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Ann</b>
<b>32</b>	128	201	411	699	1013	1254	1445	1387	1093	782	378	183	8974
<b>55</b>	2	14	21	103	317	564	732	674	406	136	20	6	2995
<b>57</b>	0	10	13	76	265	504	670	612	349	101	13	2	2615
<b>60</b>	0	5	7	43	196	416	577	520	270	60	5	0	2099
<b>65</b>	0	0	0	13	105	275	422	371	157	18	0	0	1361
<b>70</b>	0	0	0	3	44	156	272	236	78	3	0	0	792

**Growing Degree Units (2)**

<b>Base</b>	<b>Growing Degree Units (Monthly)</b>												<b>Growing Degree Units (Accumulated Monthly)</b>											
	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>40</b>	15	77	216	448	752	996	1181	1123	844	530	190	41	15	92	308	756	1508	2504	3685	4808	5652	6182	6372	6413
<b>45</b>	2	39	128	317	597	846	1026	968	694	384	108	20	2	41	169	486	1083	1929	2955	3923	4617	5001	5109	5129
<b>50</b>	1	14	68	201	447	696	871	813	545	251	52	7	1	15	83	284	731	1427	2298	3111	3656	3907	3959	3966
<b>55</b>	0	4	31	115	302	546	716	658	405	150	23	0	0	4	35	150	452	998	1714	2372	2777	2927	2950	2950
<b>60</b>	0	1	9	58	177	396	561	504	276	71	6	0	0	1	10	68	245	641	1202	1706	1982	2053	2059	2059
<b>Base</b>	<b>Growing Degree Units for Corn (Monthly)</b>												<b>Growing Degree Units for Corn (Accumulated Monthly)</b>											
<b>50/86</b>	19	57	144	274	474	676	802	756	553	340	123	33	19	76	220	494	968	1644	2446	3202	3755	4095	4218	4251

(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](http://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.  
Complete documentation for the 1971-2000 Normals is available on the internet from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/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 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/normal.html](http://www.ncdc.noaa.gov/normal.html)  
U.S. Climate Normals 1971-2000-Products Clim20, [www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html)  
Snow Climatology Project Description, [www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html](http://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](http://www1.ncdc.noaa.gov/pub/data/special/serialcomplete_jam_0900.pdf)