

Climatology of the United States

No. 20

1971-2000

Station: KELLIHER, MN

COOP ID: 214233

Climate Division: MN 2

NWS Call Sign:

Elevation: 1,390 Feet Lat: 47° 57N

Lon: 94° 27W

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	13.8	-8.0	2.9	49	1973	25	16.4	1990	-46	1966	28	-10.5	1982	1926	0	.0	.0	.0	27.9	31.0	21.0
Feb	22.0	-.3	10.9	55	2000	23	26.6	1998	-46	1996	2	-2.0	1989	1517	0	.0	.0	.2	20.3	28.0	14.8
Mar	34.6	13.0	23.8	70	1967	30	34.3	1973	-29	1967	7	13.0	1996	1278	0	.0	.0	3.2	11.9	29.1	6.3
Apr	51.4	28.7	40.1	95	1980	21	50.0	1987	-9	1975	2	31.8	1996	749	1	.0	.1	17.1	1.6	20.8	.3
May	65.5	41.8	53.7	93+	1964	22	64.4	1977	13	1966	1	45.6	1979	377	24	.0	@	28.9	@	5.8	.0
Jun	73.4	51.0	62.2	93	1966	30	68.4	1988	20	2001	22	56.4	1982	141	58	.0	.7	29.9	.0	.4	.0
Jul	77.3	55.7	66.5	97	1975	30	70.6	1989	27	2001	26	59.2	1992	65	111	.0	1.1	31.0	.0	.0	.0
Aug	75.4	52.8	64.1	98+	1983	7	69.8	1983	27+	2001	31	57.9	1977	112	84	.0	.9	31.0	.0	@	.0
Sep	64.7	43.6	54.2	95	1976	8	59.7	1998	16	1965	26	49.4	1993	331	5	.0	.2	28.8	.0	3.2	.0
Oct	52.4	32.8	42.6	93	1963	6	49.5	1973	7+	1976	27	37.4	1976	695	0	.0	.0	19.1	.7	15.9	.0
Nov	32.7	17.4	25.1	74	1975	5	35.3	1981	-28	1985	29	15.4	1985	1198	0	.0	.0	2.9	14.8	28.2	2.8
Dec	18.1	.0	9.1	53	1982	2	20.8	1997	-38	1967	31	-4.7	2000	1737	0	.0	.0	.1	26.6	30.9	15.6
Ann	48.4	27.4	37.9	98+	Aug 1983	7	70.6	Jul 1989	-46+	Feb 1996	2	-10.5	Jan 1982	10126	283	.0	3.0	192.2	103.8	193.3	60.8

+ 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

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1963-2001

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

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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: KELLIHER, MN

COOP ID: 214233

Climate Division: MN 2

NWS Call Sign:

Elevation: 1,390 Feet Lat: 47°57N

Lon: 94°27W

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	.72	.64	.82	1975	11	2.00	1975	.00	1973	6.4	2.5	.3	.0	.16	.27	.39	.48	.57	.66	.77	.88	1.03	1.27	1.49
Feb	.54	.59	1.00	1965	10	1.19	1984	.05	1993	5.9	1.9	.0	.0	.10	.14	.22	.30	.37	.45	.54	.66	.80	1.04	1.27
Mar	1.07	1.02	1.20	1970	4	2.26	1999	.28	1986	6.5	3.1	.2	.1	.38	.48	.63	.75	.87	.99	1.12	1.27	1.46	1.76	2.04
Apr	1.59	1.48	2.20	1970	20	3.14	1986	.00	1988	6.7	3.6	.9	.3	.23	.44	.71	.93	1.15	1.38	1.64	1.95	2.36	3.00	3.60
May	2.84	2.35	2.26	1987	18	7.18	1999	.40	1976	10.3	6.2	1.5	.4	.78	1.05	1.46	1.81	2.16	2.53	2.94	3.42	4.04	5.02	5.93
Jun	4.09	4.18	2.55	1990	3	8.11	1990	.75	1987	12.1	7.7	2.6	.9	1.34	1.73	2.30	2.78	3.25	3.73	4.26	4.88	5.67	6.90	8.04
Jul	4.22	4.02	4.25	1969	15	9.02	1995	1.59	1990	10.6	6.7	3.0	1.0	1.62	2.01	2.57	3.03	3.48	3.93	4.42	4.98	5.70	6.81	7.82
Aug	3.71	3.13	3.82	1981	6	7.72	1983	.95	1971	9.5	6.1	2.4	.8	1.03	1.39	1.92	2.38	2.84	3.32	3.84	4.47	5.28	6.55	7.73
Sep	3.10	2.92	2.12	1973	1	9.87	1973	.59	1976	10.3	6.1	1.9	.7	.74	1.03	1.49	1.89	2.29	2.72	3.19	3.76	4.50	5.68	6.79
Oct	2.53	2.16	2.78	1995	2	8.15	1971	.33	1992	8.2	4.7	1.4	.7	.33	.53	.89	1.24	1.61	2.02	2.50	3.09	3.89	5.20	6.46
Nov	1.28	1.25	1.15	1997	3	3.15	1977	.00	1999	7.4	3.7	.6	.1	.21	.38	.60	.77	.95	1.13	1.33	1.57	1.89	2.38	2.84
Dec	.69	.66	.92	1972	31	1.90	1996	.11	1976	6.8	2.5	.1	.0	.16	.22	.32	.41	.50	.60	.71	.84	1.01	1.28	1.53
Ann	26.38	26.21	4.25	Jul 1969	15	9.87	Sep 1973	.00+	Nov 1999	100.7	54.8	14.9	5.0	18.79	20.26	22.14	23.57	24.84	26.06	27.33	28.73	30.43	32.89	35.01

+ 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: 1963-2001

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

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

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151 Patton Avenue
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Station: KELLIHER, MN

COOP ID: 214233

Climate Division: MN 2

NWS Call Sign:

Elevation: 1,390 Feet

Lat: 47° 57N

Lon: 94° 27W

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	10.4	9.1	13	12	9.0	1989	7	22.0	1989	33	1971	31	28	1971	6.2	3.8	1.0	.2	.0	-9.9	-9.9	-9.9	-9.9
Feb	5.7	6.0	16	15	6.1	1994	12	13.8	1996	37	1971	15	31	1971	3.6	2.1	.7	.1	.0	-9.9	-9.9	-9.9	-9.9
Mar	7.0	5.5	12	12	10.0	1985	5	16.8	1985	32	1972	14	27	1996	3.4	2.2	.7	.2	.1	-9.9	-9.9	-9.9	-9.9
Apr	1.5	.7	3	#	6.0	1982	3	7.2	1994	28	1996	2	17	1996	1.4	.8	.2	.1	.0	4.5	3.9	3.2	2.1
May	.1	.0	#	0	2.0	1991	1	2.0	1991	2	1991	1	#+	1991	.1	@	.0	.0	.0	.1	.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	1.2	.0	#	0	6.0	1984	17	7.1	1984	6	1984	17	#+	1996	.7	.4	.2	@	.0	.5	.2	.1	.0
Nov	7.8	6.2	2	2	9.0	1998	11	22.4	1998	16	1983	30	6	1992	4.2	2.7	.9	.4	.0	7.9	4.9	2.7	.6
Dec	8.9	9.1	7	6	10.0	1972	31	14.2	1988	19+	1988	28	14+	1996	5.9	3.5	.9	.2	.1	-9.9	-9.9	-9.9	-9.9
Ann	42.6	36.6	N/A	N/A	10.0+	Mar 1985	5	22.4	Nov 1998	37	Feb 1971	15	31	Feb 1971	25.5	15.5	4.6	1.2	.2	-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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NWS Call Sign:

Elevation: 1,390 Feet

Lat: 47° 57N

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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	6/20	6/14	6/10	6/07	6/03	5/31	5/28	5/23	5/18
32	6/10	6/04	5/30	5/27	5/23	5/20	5/16	5/12	5/06
28	5/23	5/18	5/14	5/11	5/07	5/04	5/01	4/27	4/21
24	5/09	5/04	5/01	4/28	4/25	4/22	4/19	4/15	4/10
20	4/25	4/21	4/19	4/16	4/14	4/12	4/09	4/07	4/03
16	4/19	4/15	4/12	4/09	4/07	4/04	4/02	3/30	3/25
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	8/22	8/27	8/31	9/03	9/06	9/09	9/13	9/16	9/22
32	9/11	9/14	9/16	9/19	9/21	9/23	9/25	9/27	10/01
28	9/16	9/20	9/24	9/26	9/29	10/01	10/04	10/07	10/12
24	9/28	10/03	10/07	10/10	10/13	10/16	10/20	10/24	10/29
20	10/06	10/13	10/17	10/21	10/25	10/28	11/01	11/06	11/12
16	10/23	10/27	10/30	11/01	11/04	11/06	11/09	11/12	11/16
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	117	109	104	99	94	90	85	79	71
32	140	133	128	124	120	116	111	106	99
28	165	158	152	148	144	139	135	130	123
24	193	185	180	175	171	166	162	156	149
20	214	207	202	197	193	189	184	179	172
16	229	223	218	214	210	206	203	198	191

* 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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NWS Call Sign:

Elevation: 1,390 Feet Lat: 47° 57N Lon: 94° 27W

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	1926	1517	1278	749	377	141	65	112	331	695	1198	1737	10126
60	1771	1377	1123	603	257	66	17	44	200	540	1048	1582	8628
57	1678	1293	1030	518	197	36	7	21	135	449	958	1489	7811
55	1616	1237	968	464	162	23	2	13	99	391	898	1427	7300
50	1461	1097	814	337	91	6	0	2	37	257	748	1272	6122
32	912	619	328	53	2	0	0	0	0	18	279	736	2947

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	9	26	73	294	673	907	1069	995	665	346	71	23	5151
55	0	0	0	15	120	239	358	295	74	6	0	0	1107
57	0	0	0	10	93	192	301	241	50	3	0	0	890
60	0	0	0	5	59	132	218	171	25	0	0	0	610
65	0	0	0	1	24	58	111	84	5	0	0	0	283
70	0	0	0	0	8	17	39	29	0	0	0	0	93

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	0	8	130	451	674	825	762	444	163	13	0	0	0	8	138	589	1263	2088	2850	3294	3457	3470	3470
45	0	0	1	67	317	525	670	607	304	86	5	0	0	0	1	68	385	910	1580	2187	2491	2577	2582	2582
50	0	0	0	31	201	378	515	452	183	32	0	0	0	0	0	31	232	610	1125	1577	1760	1792	1792	1792
55	0	0	0	13	112	236	362	303	95	9	0	0	0	0	0	13	125	361	723	1026	1121	1130	1130	1130
60	0	0	0	1	55	129	214	172	33	0	0	0	0	0	0	1	56	185	399	571	604	604	604	604
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	6	97	286	413	520	473	260	100	9	0	0	0	6	103	389	802	1322	1795	2055	2155	2164	2164

(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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
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
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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