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: NEW LONDON, MN **COOP ID: 215842**

Climate Division: MN 5 **NWS Call Sign:** **Elevation: 1,240 Feet** **Lat: 45˚18N** **Lon: 94˚57W**

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	19.5	-.2	9.7	60	1981	24	23.7	1990	-38	1970	19	-3.3	1982	1718	0	.0	.0	.1	24.7	31.0	15.8
Feb	26.8	7.3	17.1	56+	1981	18	30.8	1987	-39	1996	2	4.2	1979	1342	0	.0	.0	.9	16.6	27.6	9.2
Mar	39.0	19.4	29.2	76+	1986	31	39.4	2000	-34	1962	1	19.9	1975	1109	0	.0	.0	5.8	7.4	26.7	2.6
Apr	56.6	32.9	44.8	95	1980	21	54.2	1987	0	1979	6	36.5	1975	612	4	.0	.1	21.8	.4	13.7	@
May	70.9	46.1	58.5	97+	2001	15	66.2	1988	19	1967	3	52.3	1979	250	48	.0	.5	30.6	.0	1.7	.0
Jun	79.0	55.6	67.3	102	1988	24	74.8	1988	33+	1964	2	62.1	1982	58	126	.1	2.8	30.0	.0	.0	.0
Jul	82.9	60.7	71.8	104	1988	31	77.3	1988	41	1967	5	65.4	1992	17	228	.2	5.4	31.0	.0	.0	.0
Aug	80.6	58.7	69.7	102	1988	1	76.1	1983	38	1950	20	65.1	1985	30	173	.1	3.2	31.0	.0	.0	.0
Sep	71.3	49.0	60.2	99	1978	7	66.7	1998	25	1989	23	54.5	1989	185	38	.0	.8	29.7	.0	.9	.0
Oct	58.2	37.0	47.6	90	1953	2	53.1	1973	10	1976	27	42.9	1976	541	0	.0	.0	24.9	.2	9.5	.0
Nov	37.4	21.9	29.7	78	1999	8	40.6	1999	-23	1964	30	20.2	1985	1061	0	.0	.0	5.9	9.6	25.5	1.5
Dec	23.2	6.9	15.1	58+	1998	3	24.5	1997	-35	1983	19	-1.1	1983	1549	0	.0	.0	.4	22.4	30.8	10.1
Ann	53.8	32.9	43.4	104	Jul 1988	31	77.3	Jul 1988	-39	Feb 1996	2	-3.3	Jan 1982	8472	617	.4	12.8	212.1	81.3	167.4	39.2

\+ 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: 1948-2001

(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	1.14	.96	1.39	1949	4	3.16	1975	.00	1978
Feb	.78	.59	1.10	1951	28	2.06	1971	.02	1982
Mar	2.02	1.69	2.28	1981	29	4.73	1990	.48	1994
Apr	2.36	2.00	2.52	1994	25	6.40	1994	.28	1987
May	3.56	3.52	4.32	1987	21	8.52	1977	.84	1976
Jun	5.45	5.01	6.10	1957	17	14.97	1983	.52	1988
Jul	4.10	3.39	5.20	1993	31	9.11	1986	1.11	1988
Aug	3.94	3.95	3.79	1977	31	6.36	1990	1.28	1976
Sep	3.31	2.75	5.33	1991	8	11.30	1991	.43	2000
Oct	2.42	2.24	1.84	1968	17	6.08	1981	.12	1978
Nov	1.67	1.59	2.06	1977	9	4.72	1977	.10	1984
Dec	.92	.93	1.01	1982	25	2.29	1982	.00	1975
Ann	31.67	30.69	6.10	Jun 1957	17	14.97	Jun 1983	.00+	Jan 1978

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.0	3.9	.4	@
Feb	4.7	3.0	.3	.0
Mar	6.7	4.6	1.5	.2
Apr	8.3	5.6	1.6	.4
May	10.5	7.1	2.3	.7
Jun	11.2	7.9	3.1	1.4
Jul	10.1	7.0	2.5	1.3
Aug	9.3	6.3	2.5	1.3
Sep	8.6	5.7	2.1	.7
Oct	7.2	4.9	1.6	.6
Nov	6.3	4.0	.9	.3
Dec	5.3	2.9	.3	.1
Ann	94.2	62.9	19.1	7.0

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	.27	.46	.62	.79	.97	1.17	1.41	1.73	2.24	2.72
Feb	.12	.18	.29	.40	.51	.64	.78	.95	1.18	1.56	1.92
Mar	.70	.89	1.17	1.40	1.62	1.85	2.10	2.40	2.77	3.35	3.88
Apr	.49	.70	1.05	1.37	1.68	2.02	2.41	2.87	3.48	4.46	5.38
May	1.17	1.51	2.00	2.43	2.83	3.25	3.71	4.25	4.94	6.01	7.00
Jun	1.54	2.05	2.84	3.52	4.18	4.88	5.64	6.55	7.73	9.58	11.30
Jul	1.27	1.66	2.24	2.73	3.22	3.72	4.26	4.91	5.74	7.04	8.24
Aug	1.87	2.21	2.68	3.06	3.41	3.76	4.13	4.56	5.09	5.90	6.62
Sep	.60	.89	1.38	1.83	2.29	2.78	3.35	4.03	4.94	6.40	7.80
Oct	.27	.46	.79	1.13	1.49	1.90	2.37	2.95	3.75	5.07	6.35
Nov	.16	.28	.50	.73	.99	1.27	1.61	2.04	2.62	3.59	4.53
Dec	.09	.20	.36	.49	.62	.77	.93	1.13	1.39	1.82	2.22
Ann	19.47	21.70	24.62	26.89	28.93	30.94	33.03	35.38	38.26	42.50	46.22

+ 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: 1948-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	11.3	9.0	10	9
Feb	6.5	4.5	9	7
Mar	10.0	10.5	5	3
Apr	3.3	3.0	#	#
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.5	.0	#	0
Nov	9.8	9.0	2	1
Dec	9.4	9.5	5	4
Ann	50.8	45.5	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	8.0	1996	18	28.0	1982	38	1982	25	23	1997
Feb	7.0	1986	20	21.0	1991	38	1979	12	34	1979
Mar	10.0	1980	22	20.0+	1989	40	1979	4	24	1979
Apr	9.0	1998	1	10.0	1994	12	1998	1	3	1979
May	#	1997	13	#+	1997	#	1990	1	#	1990
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	#	1985	24	#+	1985	0	0	0	0	0
Oct	3.0	1991	31	4.0	1991	3	1991	31	#+	1997
Nov	14.0	1975	20	29.0	1983	18	1983	30	5	1991
Dec	11.0	1985	1	21.1	2000	28	1985	2	21	1985
Ann	14.0	Nov 1975	20	29.0	Nov 1983	40	Mar 1979	4	34	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.5	5.0	1.6	.6	.0
Feb	3.6	3.3	.6	.3	.0
Mar	3.4	3.1	1.5	.7	.1
Apr	1.2	1.1	.6	.2	.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	.4	.3	@	.0	.0
Nov	3.7	3.2	1.4	.6	.1
Dec	4.7	3.6	1.1	.4	.1
Ann	22.5	19.6	6.8	2.8	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	27.2	23.6	20.8	14.0
Feb	23.2	21.3	16.8	10.9
Mar	14.2	10.9	8.6	4.4
Apr	1.2	.8	.5	.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	8.8	5.4	2.9	.9
Dec	21.6	16.5	12.9	5.0
Ann	96.3	78.5	62.5	35.2

+ 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

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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	5/23	5/19	5/16	5/13	5/11	5/09	5/06	5/03	4/29
32	5/17	5/12	5/08	5/05	5/02	4/29	4/26	4/22	4/17
28	5/07	5/02	4/29	4/26	4/23	4/21	4/18	4/14	4/10
24	4/23	4/19	4/16	4/13	4/11	4/08	4/06	4/03	3/29
20	4/18	4/13	4/10	4/08	4/05	4/03	3/31	3/28	3/23
16	4/11	4/06	4/03	4/01	3/29	3/27	3/24	3/21	3/16

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	9/13	9/17	9/19	9/22	9/24	9/26	9/29	10/02	10/05
32	9/16	9/21	9/24	9/27	9/30	10/03	10/06	10/09	10/14
28	9/27	10/02	10/06	10/09	10/11	10/14	10/17	10/21	10/26
24	10/06	10/11	10/15	10/18	10/21	10/24	10/27	10/31	11/05
20	10/16	10/21	10/25	10/28	10/31	11/03	11/07	11/11	11/16
16	10/24	10/29	11/02	11/05	11/08	11/11	11/14	11/18	11/23

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	153	147	142	139	135	132	128	124	118
32	170	164	159	154	150	146	142	137	130
28	191	184	179	174	170	166	161	156	149
24	213	206	201	197	193	188	184	179	172
20	230	223	217	213	209	204	200	194	187
16	244	237	232	227	223	219	215	210	203

***** 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	1718	1342	1109	612	250	58	17	30	185	541	1061	1549	8472
60	1563	1202	954	471	153	17	2	6	93	389	911	1394	7155
57	1470	1118	861	392	107	7	0	2	54	304	821	1301	6437
55	1408	1062	800	342	82	3	0	0	35	251	761	1239	5983
50	1253	922	654	233	37	0	0	0	9	140	614	1084	4946
32	719	470	219	23	0	0	0	0	0	3	192	567	2193

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	24	52	133	405	822	1058	1234	1166	844	486	122	41	6387
55	0	0	1	34	190	372	521	454	189	20	0	0	1781
57	0	0	0	24	154	315	459	393	148	11	0	0	1504
60	0	0	0	13	106	236	368	304	96	4	0	0	1127
65	0	0	0	4	48	126	228	173	38	0	0	0	617
70	0	0	0	0	18	52	118	79	10	0	0	0	277

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	1	32	221	605	847	1008	938	618	289	35	1	0	1	33	254	859	1706	2714	3652	4270	4559	4594	4595
45	0	0	11	131	454	697	853	783	470	176	14	0	0	0	11	142	596	1293	2146	2929	3399	3575	3589	3589
50	0	0	2	66	315	547	698	628	333	95	4	0	0	0	2	68	383	930	1628	2256	2589	2684	2688	2688
55	0	0	0	34	190	398	543	473	207	40	0	0	0	0	0	34	224	622	1165	1638	1845	1885	1885	1885
60	0	0	0	13	104	255	389	320	110	11	0	0	0	0	0	13	117	372	761	1081	1191	1202	1202	1202
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	22	148	373	547	676	620	380	168	21	0	0	0	22	170	543	1090	1766	2386	2766	2934	2955	2955

(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:
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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