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: RATHBUN DAM, IA **COOP ID: 136910**

Climate Division: IA 8 **NWS Call Sign:** **Elevation: 965 Feet** **Lat: 40˚50N** **Lon: 92˚54W**

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	29.6	10.1	19.9	62	1981	25	32.2	1990	-28+	1974	12	5.6	1979	1401	0	.0	.0	2.2	16.9	30.3	7.4
Feb	36.1	15.9	26.0	72+	1976	28	36.7	2000	-26+	1996	3	10.5	1978	1092	0	.0	.0	5.0	11.8	26.2	4.6
Mar	48.5	28.0	38.3	87	1986	30	44.9	2000	-11	1978	4	29.4	1978	831	0	.0	.0	13.5	4.0	21.7	.5
Apr	61.0	39.5	50.3	89+	1980	22	56.8	1985	14	1982	6	44.3	1983	447	5	.0	.0	24.6	.4	6.3	.0
May	71.9	50.5	61.2	94	1985	27	67.4	1977	28	1989	7	55.9	1997	180	63	.0	.3	30.8	.0	.2	.0
Jun	81.3	60.2	70.8	103	1988	26	75.4	1971	41+	1974	17	66.1	1974	18	190	.1	2.8	30.0	.0	.0	.0
Jul	86.1	64.8	75.5	105	1983	23	79.5	1983	43	1971	31	71.3	1971	0	325	.5	9.1	31.0	.0	.0	.0
Aug	84.2	62.4	73.3	104	1984	30	80.5	1983	43	1971	1	67.5	1992	16	273	.6	6.6	31.0	.0	.0	.0
Sep	76.4	53.1	64.8	98+	1971	9	70.3	1998	30	1984	29	58.5	1974	97	90	.0	1.9	29.9	.0	.3	.0
Oct	64.8	40.8	52.8	92	1997	4	59.2	1971	16	1972	19	46.6	1976	384	6	.0	.1	28.1	.0	6.2	.0
Nov	48.1	28.4	38.3	79	1999	9	45.7	1999	-8	1991	8	30.3	1976	802	0	.0	.0	13.4	3.3	19.5	.2
Dec	34.5	16.3	25.4	70	1998	5	32.8	1982	-26	1989	23	10.8	1983	1227	0	.0	.0	3.6	12.6	28.6	3.9
Ann	60.2	39.2	49.7	105	Jul 1983	23	80.5	Aug 1983	-28+	Jan 1974	12	5.6	Jan 1979	6495	952	1.2	20.8	243.1	49.0	139.3	16.6

\+ 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: 1970-2001

(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	.90	.77	1.10	1973	4	2.87	1973	.00+	1986
Feb	1.08	.94	2.07	1997	21	3.50	1997	.10	1974
Mar	2.19	1.95	1.96	2001	15	5.45	1973	.21	1994
Apr	3.46	3.44	2.85	1986	30	6.80	1978	.56	1985
May	4.65	4.71	3.05	1970	14	10.45	1996	.84	1992
Jun	4.60	4.08	3.39	1978	23	10.58	1980	1.52	1992
Jul	5.13	4.05	4.90	1982	16	18.16	1982	.31	1975
Aug	3.95	3.12	5.03	1980	31	11.59	1977	.53	1984
Sep	4.08	3.69	3.84	1992	15	9.32	1986	.67	1979
Oct	2.93	2.72	3.24	1998	5	7.71	1984	.07	1975
Nov	2.35	2.16	2.50	1971	2	6.86	1983	.01	1989
Dec	1.33	1.05	2.47	1980	8	3.70	1980	.16	1976
Ann	36.65	34.53	5.03	Aug 1980	31	18.16	Jul 1982	.00+	Jan 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.1	2.6	.3	.1
Feb	6.5	3.2	.3	.1
Mar	8.3	4.9	1.2	.3
Apr	11.3	6.7	2.3	.6
May	12.3	7.9	3.1	1.3
Jun	10.9	7.4	3.0	1.2
Jul	10.1	6.5	3.3	1.6
Aug	9.8	6.5	2.4	1.1
Sep	9.3	6.4	2.7	1.2
Oct	8.6	5.2	1.9	.7
Nov	7.5	4.7	1.6	.5
Dec	6.9	3.3	.6	.2
Ann	107.6	65.3	22.7	8.9

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	.00	.15	.33	.48	.62	.77	.94	1.13	1.39	1.82	2.22
Feb	.19	.29	.45	.59	.74	.91	1.09	1.32	1.62	2.10	2.56
Mar	.39	.58	.90	1.20	1.51	1.84	2.21	2.67	3.27	4.25	5.18
Apr	1.01	1.34	1.83	2.26	2.67	3.11	3.59	4.15	4.88	6.03	7.09
May	1.34	1.78	2.45	3.02	3.59	4.17	4.82	5.59	6.58	8.13	9.58
Jun	1.45	1.89	2.54	3.09	3.63	4.18	4.79	5.50	6.42	7.86	9.18
Jul	.71	1.14	1.87	2.59	3.33	4.15	5.11	6.27	7.85	10.42	12.90
Aug	.86	1.23	1.81	2.33	2.86	3.41	4.04	4.79	5.79	7.37	8.86
Sep	1.25	1.64	2.22	2.71	3.20	3.70	4.25	4.89	5.73	7.03	8.24
Oct	.42	.66	1.08	1.49	1.91	2.38	2.92	3.57	4.46	5.91	7.30
Nov	.25	.43	.75	1.08	1.43	1.83	2.29	2.87	3.66	4.96	6.23
Dec	.29	.41	.61	.78	.96	1.15	1.36	1.61	1.95	2.48	2.99
Ann	23.79	26.19	29.31	31.72	33.88	35.98	38.17	40.61	43.59	47.96	51.77

\+ 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: 1970-2001
(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	4.3	4.5	2	1
Feb	3.4	3.5	2	1
Mar	2.3	.3	1	#
Apr	.4	.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	1.0	.0	#	#
Dec	3.8	2.0	1	#
Ann	15.3	10.3	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	9.0	1971	5	9.7	1974	16	1979	31	11	1979
Feb	6.0	1993	26	12.3	1978	16	1979	1	11	1979
Mar	6.5	1978	3	12.5	1978	18	1978	3	10	1978
Apr	8.0	1997	11	8.0	1997	12	1997	12	1	1997
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	2.0	1980	28	2.0	1980	3	1997	27	#+	1997
Nov	4.0	1974	30	4.1	1974	4+	1991	9	1	1991
Dec	7.0	1990	3	10.5	1977	12	2000	29	4	2000
Ann	9.0	Jan 1971	5	12.5	Mar 1978	18	Mar 1978	3	11+	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.5	1.9	.6	.1	.0
Feb	3.0	2.0	.6	.2	.0
Mar	1.4	.9	.3	.1	.0
Apr	.3	.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	.6	.4	.1	.0	.0
Dec	2.1	1.6	.6	.1	.0
Ann	10.9	7.0	2.3	.6	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	6.7	3.0	.3	.0
Feb	7.8	4.1	.7	.0
Mar	1.9	.6	@	.0
Apr	.2	@	.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	.5	.1	.0	.0
Dec	3.6	2.4	.9	.0
Ann	20.7	10.2	1.9	.0

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

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	9/20	9/25	9/29	10/02	10/05	10/08	10/12	10/15	10/21
32	9/26	10/01	10/05	10/08	10/11	10/14	10/17	10/21	10/26
28	10/04	10/10	10/14	10/17	10/20	10/23	10/27	10/31	11/06
24	10/17	10/22	10/27	10/30	11/02	11/06	11/09	11/13	11/19
20	10/28	11/03	11/07	11/10	11/13	11/17	11/20	11/24	11/30
16	11/05	11/11	11/16	11/19	11/23	11/26	11/30	12/04	12/10

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	176	170	165	161	158	154	150	146	139
32	200	193	187	182	177	173	168	162	155
28	214	207	202	197	193	189	184	179	172
24	235	228	223	219	215	211	207	202	195
20	262	253	246	240	235	229	223	216	207
16	286	276	269	263	257	252	245	238	229

***** 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	1401	1092	831	447	180	18	0	16	97	384	802	1227	6495
60	1246	952	676	311	96	3	0	3	37	250	653	1072	5299
57	1153	873	591	238	60	1	0	0	18	182	565	979	4660
55	1091	821	532	195	42	0	0	0	10	143	509	917	4260
50	939	691	394	107	14	0	0	0	1	69	374	771	3360
32	445	299	80	1	0	0	0	0	0	0	66	311	1202

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	68	131	272	549	906	1162	1348	1280	984	646	253	107	7706
55	0	9	12	52	235	472	635	567	303	75	6	0	2366
57	0	6	8	36	191	413	573	505	251	52	3	0	2038
60	0	0	0	19	134	325	480	415	181	27	0	0	1581
65	0	0	0	5	63	190	325	273	90	6	0	0	952
70	0	0	0	0	22	86	183	155	35	1	0	0	482

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	3	27	115	339	657	923	1100	1035	741	410	112	15	3	30	145	484	1141	2064	3164	4199	4940	5350	5462	5477
45	0	8	63	221	504	773	945	880	592	275	59	4	0	8	71	292	796	1569	2514	3394	3986	4261	4320	4324
50	0	1	33	128	355	623	790	725	448	164	26	1	0	1	34	162	517	1140	1930	2655	3103	3267	3293	3294
55	0	0	12	65	222	473	635	570	310	85	6	0	0	0	12	77	299	772	1407	1977	2287	2372	2378	2378
60	0	0	2	30	116	328	480	415	195	38	1	0	0	0	2	32	148	476	956	1371	1566	1604	1605	1605
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	24	81	199	392	612	748	694	471	252	66	9	0	24	105	304	696	1308	2056	2750	3221	3473	3539	3548

(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