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: COUGAR 6 E, WA **COOP ID: 451760**

Climate Division: WA 5 **NWS Call Sign:** **Elevation: 659 Feet** **Lat: 46˚04N** **Lon: 122˚12W**

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	42.6	33.2	37.9	60	1994	20	43.1	1994	8+	1969	1	27.8	1979	840	0	.0	.0	4.3	2.0	12.2	.0
Feb	46.5	34.6	40.6	69	1968	29	48.3	1992	5	1989	3	34.0	1989	685	0	.0	.0	9.5	.7	9.5	.0
Mar	52.1	36.6	44.4	78	1994	29	52.6	1992	15	1971	1	39.2	1977	641	0	.0	.0	17.8	.0	5.7	.0
Apr	57.8	39.6	48.7	91+	1998	30	53.6	2000	28+	1991	11	42.3	1975	489	0	.0	.1	22.9	.0	2.1	.0
May	65.2	44.9	55.1	100	1983	29	62.4	1992	29+	1985	12	49.4	1977	320	11	@	.6	30.0	.0	.1	.0
Jun	70.9	49.2	60.1	104	1961	16	65.8	1992	33	1991	4	55.9	1971	170	22	@	1.2	30.0	.0	.0	.0
Jul	78.0	53.3	65.7	105+	1994	22	70.9	1996	34	1972	13	60.8	1986	81	100	.5	4.4	31.0	.0	.0	.0
Aug	78.5	53.3	65.9	104+	1981	11	70.5	1986	38+	1973	22	59.7	1975	78	107	.6	4.4	31.0	.0	.0	.0
Sep	73.0	50.7	61.9	104	1987	1	66.0	1998	34+	1972	28	56.3	1977	152	56	.1	1.7	30.0	.0	.0	.0
Oct	62.0	44.7	53.4	92	1987	2	58.9	1987	28+	1985	9	49.0	1984	365	3	.0	.1	29.2	.0	.3	.0
Nov	48.9	38.5	43.7	70	1962	1	48.7	1997	12	1985	24	33.5	1985	639	0	.0	.0	13.6	.4	4.3	.0
Dec	42.8	33.7	38.3	59+	1989	4	42.0	1991	2	1990	21	31.8	1990	830	0	.0	.0	3.6	1.3	11.5	.0
Ann	59.9	42.7	51.3	105+	Jul 1994	22	70.9	Jul 1996	2	Dec 1990	21	27.8	Jan 1979	5290	299	1.2	12.5	252.9	4.4	45.7	.0

\+ 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: 1953-2001

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

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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	17.20	17.75	5.40	1964	25	29.90	1990	.49	1985
Feb	15.06	13.88	6.16	1996	8	30.95	1999	2.31	1993
Mar	12.14	11.54	5.10	1966	9	24.11	1997	1.82	1992
Apr	8.71	7.94	8.92	1954	12	19.32	1996	2.55	1977
May	5.43	4.86	2.53	1978	14	11.35	1984	.38	1992
Jun	3.93	3.65	4.61	1985	7	10.64	1981	.97	1979
Jul	1.54	1.22	2.02	1964	15	6.79	1983	.00+	1984
Aug	1.90	1.40	3.06	1985	8	6.45	1977	.02	1998
Sep	4.41	4.96	3.45	1972	21	11.45	1997	.03+	1993
Oct	8.42	8.15	4.59	1994	27	21.25	1997	.23	1987
Nov	18.33	18.16	6.44	1999	25	32.52	1983	4.85	1976
Dec	19.11	19.21	5.43	1998	28	35.25	1996	4.91	1985
Ann	116.18	122.30	8.92	Apr 1954	12	35.25	Dec 1996	.00+	Jul 1984

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	20.5	17.2	11.0	6.3
Feb	18.3	15.6	10.1	5.6
Mar	20.4	16.5	8.9	4.0
Apr	17.7	13.4	6.3	2.7
May	14.8	10.0	3.7	1.2
Jun	11.2	7.4	2.4	.8
Jul	6.0	3.2	.9	.3
Aug	6.1	3.8	1.2	.4
Sep	9.4	6.5	3.2	1.4
Oct	13.8	10.6	5.6	3.1
Nov	21.0	18.0	12.3	6.7
Dec	20.8	17.6	11.2	7.1
Ann	180.0	139.8	76.8	39.6

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	3.59	5.17	7.69	9.99	12.30	14.77	17.56	20.91	25.33	32.40	39.10
Feb	5.37	6.78	8.84	10.56	12.21	13.90	15.74	17.88	20.62	24.84	28.72
Mar	4.77	5.89	7.49	8.81	10.06	11.34	12.71	14.30	16.32	19.42	22.24
Apr	2.92	3.74	4.95	5.97	6.96	7.97	9.08	10.38	12.04	14.62	17.00
May	1.56	2.08	2.86	3.53	4.19	4.88	5.64	6.53	7.69	9.51	11.20
Jun	1.11	1.49	2.05	2.54	3.02	3.52	4.07	4.73	5.57	6.90	8.14
Jul	.00	.11	.35	.59	.85	1.14	1.48	1.90	2.49	3.47	4.43
Aug	.05	.13	.31	.55	.84	1.19	1.64	2.24	3.10	4.60	6.13
Sep	.18	.39	.87	1.44	2.12	2.94	3.95	5.27	7.14	10.39	13.65
Oct	1.19	1.88	3.09	4.26	5.48	6.83	8.38	10.28	12.85	17.04	21.07
Nov	6.10	7.84	10.38	12.55	14.63	16.77	19.12	21.86	25.38	30.85	35.88
Dec	6.68	8.48	11.10	13.31	15.42	17.59	19.96	22.72	26.25	31.70	36.72
Ann	80.89	87.66	96.37	103.00	108.91	114.63	120.55	127.10	135.06	146.64	156.67

\+ 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: 1953-2001
(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	5.1	2.0	1	1
Feb	6.0	3.3	1	#
Mar	1.5	.0	#	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	0
Nov	1.1	.0	#	0
Dec	3.4	1.3	#	0
Ann	17.3	6.6	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	12.0	1998	13	20.0	1982	45	1980	11	8	1980
Feb	16.5	1971	27	23.0	1979	30	1990	16	11	1990
Mar	5.0	1997	1	12.0	1997	10	1989	3	1	1989
Apr	2.0	1983	10	2.0	1983	1	1976	15	#	1976
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	.0	0	0	.0	0	0	0	0	0	0
Nov	8.0	1985	22	10.5	1977	21	1985	27	6	1985
Dec	12.0	1975	13	19.0	1984	22	1985	2	2	1985
Ann	16.5	Feb 1971	27	23.0	Feb 1979	45	Jan 1980	11	11	Feb 1990

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.9	1.7	.7	.4	.1
Feb	1.8	1.5	.7	.4	.1
Mar	.6	.5	.3	@	.0
Apr	.2	.1	.0	.0	.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	.0	.0
Nov	.8	.7	.3	.2	.0
Dec	1.4	1.1	.4	.2	.1
Ann	6.7	5.6	2.4	1.2	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	2.2	1.8	.9	.2
Feb	2.4	1.6	1.3	.4
Mar	.2	.1	.0	.0
Apr	.1	.0	.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	.0
Nov	.4	.1	.1	.0
Dec	.7	.3	.3	.1
Ann	6.0	3.9	2.6	.7

+ 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	6/07	5/28	5/21	5/15	5/09	5/04	4/27	4/20	4/10
32	5/08	4/27	4/20	4/13	4/07	4/01	3/25	3/17	3/07
28	3/28	3/14	3/05	2/25	2/17	2/09	2/01	1/22	1/06
24	2/25	2/15	2/08	2/01	1/26	1/20	1/12	12/31	0/00
20	2/15	2/03	1/24	1/14	1/03	12/15	0/00	0/00	0/00
16	2/02	1/18	1/05	12/15	0/00	0/00	0/00	0/00	0/00

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	10/03	10/12	10/18	10/23	10/28	11/02	11/07	11/13	11/21
32	10/24	11/01	11/07	11/12	11/17	11/22	11/27	12/03	12/11
28	11/10	11/20	11/28	12/05	12/11	12/17	12/24	1/01	1/14
24	11/28	12/10	12/19	12/27	1/04	1/13	1/23	2/12	0/00
20	12/15	12/28	1/08	1/19	2/02	0/00	0/00	0/00	0/00
16	12/20	1/05	1/21	2/14	0/00	0/00	0/00	0/00	0/00

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	216	200	189	180	171	162	152	141	126
32	264	250	240	232	224	216	207	197	183
28	>365	337	320	308	298	288	278	266	249
24	>365	>365	>365	363	342	330	320	309	295
20	>365	>365	>365	>365	>365	>365	>365	341	318
16	>365	>365	>365	>365	>365	>365	>365	>365	334

***** 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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	840	685	641	489	320	170	81	78	152	365	639	830	5290
60	685	545	486	345	193	76	25	24	72	226	491	675	3843
57	592	461	398	264	134	38	11	10	39	155	406	582	3090
55	530	406	341	214	101	22	6	6	24	116	351	520	2637
50	385	277	209	115	39	3	0	0	6	46	227	369	1676
32	40	16	6	0	0	0	0	0	0	0	11	23	96

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	222	255	387	501	714	841	1042	1052	894	661	362	216	7147
55	0	1	9	25	102	173	335	344	228	64	12	0	1293
57	0	0	5	15	73	130	278	287	183	41	7	0	1019
60	0	0	0	6	39	77	199	208	126	19	2	0	676
65	0	0	0	0	11	22	100	107	56	3	0	0	299
70	0	0	0	0	0	3	35	38	18	0	0	0	94

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	45	82	161	273	473	611	804	814	662	420	145	42	45	127	288	561	1034	1645	2449	3263	3925	4345	4490	4532
45	1	26	64	151	320	461	649	659	512	268	55	1	1	27	91	242	562	1023	1672	2331	2843	3111	3166	3167
50	0	4	15	70	191	313	494	504	364	143	12	0	0	4	19	89	280	593	1087	1591	1955	2098	2110	2110
55	0	0	0	29	101	179	340	349	225	61	0	0	0	0	0	29	130	309	649	998	1223	1284	1284	1284
60	0	0	0	2	43	90	202	207	119	17	0	0	0	0	0	2	45	135	337	544	663	680	680	680
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	1	27	71	141	248	342	485	493	381	200	37	1	1	28	99	240	488	830	1315	1808	2189	2389	2426	2427

(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