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: MCNARY DAM, WA **COOP ID: 455231**

Climate Division: WA 8 **NWS Call Sign:** **Elevation: 361 Feet** **Lat: 45˚56N** **Lon: 119˚18W**

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	39.5	28.6	34.1	67+	1990	10	40.8	1990	-22	1957	27	18.4	1979	960	0	.0	.0	5.8	6.7	19.6	.2
Feb	45.9	30.8	38.4	70+	1982	16	43.2	1999	-7+	1996	3	26.3	1989	747	0	.0	.0	11.9	2.7	15.3	.4
Mar	55.6	35.4	45.5	79	1960	25	49.4	1983	12+	1993	2	40.6	1993	604	0	.0	.0	26.9	.2	7.2	.0
Apr	63.4	40.8	52.1	90	1977	24	56.1	1987	29+	1997	13	46.6	1975	388	1	.0	@	29.8	.0	1.0	.0
May	71.1	47.8	59.5	104	1983	30	63.1	1993	34	1986	23	55.6	1977	191	17	.1	1.1	31.0	.0	.0	.0
Jun	78.0	54.1	66.1	106	1961	17	71.8	1992	35	1974	8	61.9	1981	66	98	.2	4.6	30.0	.0	.0	.0
Jul	85.9	60.1	73.0	110	1960	17	79.4	1998	43	1963	31	67.4	1993	10	258	2.1	14.0	31.0	.0	.0	.0
Aug	85.8	60.1	73.0	111	1961	4	77.6	1986	43+	1964	11	68.3	1975	11	257	1.5	12.5	31.0	.0	.0	.0
Sep	76.4	52.2	64.3	103	1955	7	70.2	1990	34	1983	30	59.6	1985	105	83	.0	1.7	30.0	.0	.0	.0
Oct	63.7	42.8	53.3	87+	1991	2	59.2	1988	20	1971	29	50.6	1984	366	1	.0	.0	30.5	.0	1.4	.0
Nov	49.0	35.8	42.4	75+	1999	13	47.6	1998	-2	1955	16	30.3	1985	678	0	.0	.0	17.2	1.0	8.3	.0
Dec	40.5	30.0	35.3	67	1982	4	40.9	1973	-9	1983	24	22.9	1985	924	0	.0	.0	6.6	5.4	18.7	.5
Ann	62.9	43.2	53.1	111	Aug 1961	4	79.4	Jul 1998	-22	Jan 1957	27	18.4	Jan 1979	5050	715	3.9	33.9	281.7	16.0	71.5	1.1

\+ 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/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1954-2001

(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	1.01	.86	.92	1975	26	2.28	1975	.03	1977
Feb	.77	.61	.70	1997	1	1.77	1983	.00	1988
Mar	.75	.69	.58	1957	2	2.06	1983	.04	1994
Apr	.62	.44	1.13	1988	21	1.89	1988	.02	1977
May	.65	.59	1.01	1994	16	1.61	1994	.09	1992
Jun	.43	.37	.57	1996	28	1.22	1984	.00	1986
Jul	.25	.20	.62	1989	1	1.00	1992	.00+	2000
Aug	.37	.25	.88	1979	14	1.62	1978	.00+	2000
Sep	.39	.32	.83	1982	26	1.79	1982	.00+	1991
Oct	.59	.54	2.12	1957	1	1.93	1982	.00+	1988
Nov	1.18	1.14	1.68	1996	19	3.23	1973	.06	1993
Dec	1.12	.93	1.02	1964	22	3.61	1973	.20	1997
Ann	8.13	8.16	2.12	Oct 1957	1	3.61	Dec 1973	.00+	Aug 2000

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.7	3.6	.1	.0
Feb	9.5	2.6	.1	.0
Mar	9.1	2.5	@	.0
Apr	6.2	1.9	.2	@
May	6.1	2.3	.1	@
Jun	4.4	1.4	.1	.0
Jul	2.3	.8	.1	.0
Aug	2.9	1.0	.2	.0
Sep	4.0	1.4	.1	.0
Oct	5.7	1.9	.1	@
Nov	11.0	4.0	.2	@
Dec	11.1	3.9	.2	.0
Ann	83.0	27.3	1.5	.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	.21	.31	.45	.59	.72	.87	1.03	1.23	1.49	1.90	2.29
Feb	.16	.26	.39	.50	.60	.70	.81	.95	1.12	1.38	1.63
Mar	.14	.21	.32	.42	.52	.63	.76	.91	1.11	1.43	1.74
Apr	.03	.06	.13	.21	.31	.42	.56	.74	1.00	1.45	1.90
May	.14	.21	.30	.39	.47	.56	.67	.79	.95	1.21	1.46
Jun	.01	.03	.09	.15	.22	.30	.40	.52	.70	1.00	1.31
Jul	.00	.02	.06	.10	.14	.18	.24	.30	.40	.55	.71
Aug	.00	.00	.00	.05	.12	.20	.30	.44	.63	.98	1.32
Sep	.00	.00	.01	.07	.14	.23	.33	.47	.67	1.01	1.36
Oct	.00	.06	.16	.26	.36	.46	.59	.73	.94	1.27	1.60
Nov	.18	.28	.45	.61	.78	.97	1.18	1.43	1.78	2.34	2.88
Dec	.21	.30	.47	.62	.77	.94	1.13	1.36	1.66	2.15	2.62
Ann	4.76	5.36	6.16	6.78	7.35	7.90	8.48	9.14	9.95	11.14	12.19

\+ 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: 1954-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Extremes (2)

Mean Number of Days (1)

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	.8	.0	#	0	3.0	1978	3	3.0	1974	12	1993	19	6	1993	1.1	.6	.1	.0	.0	.2	.1	.1	.0
Feb	.5	.0	#	0	3.8	1973	11	4.3	1973	4	1993	28	1	1993	.4	.2	.1	.0	.0	.0	.0	.0	.0
Mar	.1	.0	#	0	.4	1993	2	.8	1993	5	1993	3	1	1993	.1	.0	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	0	0	.0	0	0	.0	0	0	0	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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.5	.0	0	0	4.0	1977	22	6.0	1977	6	1977	24	1	1977	.2	.2	.1	.0	.0	.2	.2	.1	.0
Dec	.6	.0	#	0	5.0	1972	12	5.0	1972	1	1987	31	#	1987	.4	.2	.1	.1	.0	.2	.0	.0	.0
Ann	2.5	.0	N/A	N/A	5.0	Dec 1972	12	6.0	Nov 1977	12	Jan 1993	19	6	Jan 1993	2.2	1.2	.4	.1	.0	.6	.3	.2	.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	5/11	5/04	4/29	4/24	4/20	4/16	4/12	4/07	3/30
32	4/15	4/09	4/04	4/01	3/28	3/25	3/21	3/17	3/11
28	3/28	3/19	3/13	3/08	3/02	2/25	2/20	2/13	2/05
24	3/13	2/28	2/18	2/10	2/03	1/26	1/18	1/07	12/23
20	2/23	2/14	2/08	2/02	1/28	1/22	1/16	1/07	0/00
16	2/17	2/08	2/01	1/26	1/21	1/15	1/07	12/24	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	10/05	10/09	10/12	10/15	10/18	10/20	10/23	10/26	10/31
32	10/16	10/23	10/27	10/31	11/04	11/07	11/11	11/16	11/22
28	10/27	11/05	11/11	11/17	11/22	11/27	12/02	12/09	12/17
24	11/06	11/15	11/21	11/27	12/02	12/07	12/13	12/20	12/31
20	11/17	11/28	12/07	12/14	12/21	12/29	1/06	1/18	0/00
16	11/29	12/11	12/20	12/28	1/05	1/14	1/26	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	206	197	190	185	180	175	169	162	153
32	247	238	231	225	220	214	209	202	192
28	303	290	280	271	264	256	247	237	224
24	>365	332	318	308	299	291	282	272	258
20	>365	>365	357	340	329	319	310	299	286
16	>365	>365	>365	>365	352	337	326	315	301

***** 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	960	747	604	388	191	66	10	11	105	366	678	924	5050
60	805	607	449	247	86	18	1	1	40	218	531	769	3772
57	717	523	357	172	44	6	0	0	18	142	447	676	3102
55	660	470	296	129	26	3	0	0	10	99	392	616	2701
50	516	340	160	51	4	0	0	0	0	33	267	473	1844
32	142	45	1	0	0	0	0	0	0	0	27	99	314

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	206	223	420	603	850	1022	1271	1269	968	658	339	198	8027
55	10	3	2	43	162	335	558	556	288	44	14	2	2017
57	6	0	0	25	119	278	496	494	236	25	9	0	1688
60	0	0	0	10	68	200	404	403	168	8	3	0	1264
65	0	0	0	1	17	98	258	257	83	1	0	0	715
70	0	0	0	0	2	35	137	135	31	0	0	0	340

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	41	74	206	390	636	820	1068	1067	768	449	148	52	41	115	321	711	1347	2167	3235	4302	5070	5519	5667	5719
45	4	21	82	245	481	670	913	912	618	298	57	10	4	25	107	352	833	1503	2416	3328	3946	4244	4301	4311
50	0	0	17	119	327	520	758	757	468	165	15	0	0	0	17	136	463	983	1741	2498	2966	3131	3146	3146
55	0	0	0	45	189	371	603	602	320	70	1	0	0	0	0	45	234	605	1208	1810	2130	2200	2201	2201
60	0	0	0	8	83	230	448	447	185	20	0	0	0	0	0	8	91	321	769	1216	1401	1421	1421	1421
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	14	33	112	226	369	509	689	694	477	251	54	18	14	47	159	385	754	1263	1952	2646	3123	3374	3428	3446

(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