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: MC MILLIN RESERVOIR, WA **COOP ID: 455224**

Climate Division: WA 3 **NWS Call Sign:** **Elevation: 579 Feet** **Lat: 47˚08N** **Lon: 122˚16W**

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	44.5	31.7	38.1	64	1984	5	42.6	1994	0	1950	18	31.0	1979	834	0	.0	.0	8.0	1.2	15.5	.0
Feb	48.0	33.2	40.6	67+	1986	28	45.4	1991	3	1950	1	32.7	1989	684	0	.0	.0	11.9	.3	12.3	.0
Mar	52.3	35.4	43.9	75	1947	17	47.8	1986	9	1955	5	39.6	1976	656	0	.0	.0	21.6	.1	9.8	.0
Apr	57.4	38.3	47.9	83	1984	15	51.3	1992	25+	1985	21	43.1	1975	514	0	.0	.0	26.9	.0	4.2	.0
May	63.6	43.5	53.6	92	1983	29	58.0	1993	26	1954	1	50.6	1977	356	0	.0	@	30.8	.0	.4	.0
Jun	68.7	47.9	58.3	97	1955	10	63.0	1992	32	1976	3	54.4	1971	207	6	.0	.3	30.0	.0	@	.0
Jul	74.5	51.2	62.9	98+	1994	21	66.8	1998	36+	1952	6	59.7	1993	102	36	.0	1.0	31.0	.0	.0	.0
Aug	75.3	51.4	63.4	100	1981	10	66.9	1977	37	1980	29	59.3	1973	92	42	@	1.2	31.0	.0	.0	.0
Sep	69.5	46.9	58.2	95	1988	3	61.6	1974	29	1972	27	54.7	1972	212	9	.0	.2	30.0	.0	.2	.0
Oct	59.3	40.7	50.0	86	1987	2	53.0	1988	21	1971	28	47.4	1984	465	0	.0	.0	29.5	.0	3.1	.0
Nov	49.4	36.0	42.7	73	1949	1	47.7	1995	0	1955	15	33.5	1985	669	0	.0	.0	15.7	.4	9.7	.0
Dec	44.1	32.0	38.1	64+	1995	13	42.3	1979	-1	1983	23	31.9	1983	835	0	.0	.0	7.7	1.4	16.0	.1
Ann	58.9	40.7	49.8	100	Aug 1981	10	66.9	Aug 1977	-1	Dec 1983	23	31.0	Jan 1979	5626	93	@	2.7	274.1	3.4	71.2	.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: 1941-2001

(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	5.54	5.67	2.40	1990	9	10.65	1990	.47	1985
Feb	4.68	4.62	2.72	1996	8	8.77	1982	.33	1993
Mar	4.38	4.56	1.87	1993	23	7.06	1997	2.10	1992
Apr	3.45	3.26	2.60	1991	5	7.23	1996	1.28	1999
May	2.64	2.68	1.19	1996	13	4.77	1984	.22	1992
Jun	2.19	2.04	1.94	1968	2	4.77	1984	.54	1987
Jul	1.16	1.07	1.78	1946	9	3.86	1983	.01	1984
Aug	1.23	.90	2.48	1960	27	4.65	1975	.05	1998
Sep	2.00	2.03	1.81	1978	23	5.56	1978	.00	1993
Oct	3.40	3.13	1.82	1949	28	7.01	1975	.35	1987
Nov	6.53	6.56	3.52	1986	24	11.33	1999	1.50	1976
Dec	5.92	5.71	2.67	1974	27	12.23	1996	1.60	1985
Ann	43.12	43.98	3.52	Nov 1986	24	12.23	Dec 1996	.00	Sep 1993

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	18.7	12.7	3.9	.9
Feb	16.9	11.0	2.8	.7
Mar	19.0	12.8	1.9	.2
Apr	16.2	10.2	1.3	.3
May	14.1	8.4	1.0	.2
Jun	10.0	6.2	1.1	.2
Jul	6.3	2.7	.7	.1
Aug	5.8	3.3	.5	.2
Sep	9.0	5.5	.9	.2
Oct	13.5	8.5	2.0	.4
Nov	20.1	14.3	4.2	1.0
Dec	19.6	13.3	4.3	.7
Ann	169.2	108.9	24.6	5.1

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	1.67	2.20	2.99	3.67	4.33	5.01	5.76	6.65	7.79	9.58	11.24
Feb	1.37	1.81	2.48	3.06	3.63	4.21	4.86	5.63	6.62	8.16	9.60
Mar	2.24	2.60	3.10	3.49	3.85	4.21	4.59	5.02	5.56	6.37	7.09
Apr	1.30	1.62	2.09	2.47	2.83	3.21	3.61	4.08	4.67	5.59	6.42
May	.82	1.07	1.44	1.76	2.07	2.39	2.75	3.16	3.69	4.53	5.30
Jun	.73	.94	1.25	1.50	1.75	2.00	2.28	2.61	3.03	3.67	4.27
Jul	.08	.15	.29	.45	.63	.83	1.08	1.40	1.85	2.60	3.35
Aug	.08	.16	.32	.48	.67	.89	1.15	1.49	1.96	2.75	3.53
Sep	.04	.17	.42	.70	1.02	1.39	1.84	2.42	3.24	4.62	6.00
Oct	.70	1.01	1.51	1.97	2.43	2.92	3.47	4.14	5.02	6.43	7.77
Nov	2.25	2.87	3.77	4.53	5.26	6.00	6.82	7.77	8.99	10.88	12.62
Dec	2.23	2.78	3.57	4.23	4.86	5.49	6.19	6.99	8.02	9.60	11.04
Ann	31.78	34.00	36.84	38.98	40.87	42.70	44.58	46.65	49.15	52.76	55.88

\+ 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: 1941-2001
(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	1.5	.0	#	#	13.5	1972	25	17.0	1972	14	1980	10	3	1972	.9	.5	.2	.1	@	1.2	.3	.2	.2
Feb	.4	.0	#	#	7.0	1986	14	7.0	1986	10	1972	2	2	1972	.5	.3	.2	@	.0	.7	.3	.2	@
Mar	.7	.0	#	0	11.0	1989	2	11.0	1989	11	1989	2	1	1989	.3	.2	@	@	@	.4	.1	.1	@
Apr	.1	.0	#	0	1.2	1982	1	1.2	1982	#+	1991	10	#+	1991	@	@	.0	.0	.0	.0	.0	.0	.0
May	#	.0	0	0	#	1974	13	#	1974	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	.1	.0	#	0	2.3	1971	27	2.3	1971	2	1971	27	#	1971	@	@	.0	.0	.0	@	.0	.0	.0
Nov	.7	.0	#	0	5.0	1985	22	9.0	1996	12	1978	20	2	1985	.4	.3	.2	@	.0	.4	.2	@	.0
Dec	2.0	.0	#	#	16.0	1974	27	16.0	1974	16	1974	27	1	1990	.9	.6	.2	.1	@	1.3	.4	.2	@
Ann	5.5	.0	N/A	N/A	16.0	Dec 1974	27	17.0	Jan 1972	16	Dec 1974	27	3	Jan 1972	3.0	1.9	.8	.2	@	4.0	1.3	.7	.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	6/01	5/26	5/22	5/19	5/15	5/12	5/08	5/04	4/28
32	5/13	5/05	4/30	4/25	4/21	4/17	4/12	4/07	3/30
28	4/18	4/09	4/02	3/28	3/22	3/17	3/11	3/05	2/24
24	3/09	2/28	2/21	2/15	2/10	2/05	1/30	1/23	1/14
20	2/24	2/15	2/08	2/02	1/27	1/21	1/13	1/02	0/00
16	2/18	2/03	1/22	1/11	12/31	12/16	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	9/22	9/27	9/30	10/03	10/06	10/08	10/11	10/14	10/19
32	10/02	10/07	10/12	10/15	10/19	10/22	10/26	10/30	11/05
28	10/19	10/27	11/02	11/07	11/12	11/17	11/22	11/28	12/07
24	11/03	11/13	11/21	11/28	12/04	12/10	12/17	12/24	1/04
20	11/22	12/03	12/12	12/19	12/26	1/03	1/13	1/31	0/00
16	12/01	12/13	12/23	1/01	1/11	1/26	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	162	156	151	147	143	139	135	130	123
32	212	201	193	186	180	174	167	159	148
28	276	261	251	242	234	226	217	207	193
24	337	321	310	302	294	286	278	269	255
20	>365	>365	360	341	330	321	313	304	292
16	>365	>365	>365	>365	>365	>365	337	319	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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	834	684	656	514	356	207	102	92	212	465	669	835	5626
60	679	544	501	364	210	90	28	23	97	310	519	680	4045
57	586	460	408	276	135	45	9	7	49	219	430	587	3211
55	524	404	346	219	94	24	3	2	27	163	374	525	2705
50	375	270	202	100	26	3	0	0	3	55	240	374	1648
32	30	8	1	0	0	0	0	0	0	0	10	25	74

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	219	248	368	476	667	790	957	973	787	558	331	213	6587
55	0	0	0	5	48	123	248	262	124	8	5	0	823
57	0	0	0	2	27	84	191	205	86	2	0	0	597
60	0	0	0	0	9	40	117	128	44	0	0	0	338
65	0	0	0	0	0	6	36	42	9	0	0	0	93
70	0	0	0	0	0	0	5	6	1	0	0	0	12

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	66	92	149	249	433	559	717	737	566	329	130	64	66	158	307	556	989	1548	2265	3002	3568	3897	4027	4091
45	17	27	47	121	280	409	562	582	416	184	52	16	17	44	91	212	492	901	1463	2045	2461	2645	2697	2713
50	0	0	4	47	145	260	407	427	267	72	12	0	0	0	4	51	196	456	863	1290	1557	1629	1641	1641
55	0	0	0	9	59	128	256	273	132	18	0	0	0	0	0	9	68	196	452	725	857	875	875	875
60	0	0	0	0	19	49	120	133	46	1	0	0	0	0	0	0	19	68	188	321	367	368	368	368
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	18	32	67	127	225	304	419	441	322	164	41	10	18	50	117	244	469	773	1192	1633	1955	2119	2160	2170

(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

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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