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: MONROE, WA **COOP ID: 455525**

Climate Division: WA 3 **NWS Call Sign:** **Elevation: 120 Feet** **Lat: 47˚51N** **Lon: 121˚59W**

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	45.1	32.9	39.0	67	1986	12	44.2	1986	-3	1950	18	31.9	1979	807	0	.0	.0	8.8	.8	12.9	.0
Feb	49.6	34.4	42.0	75	1986	27	47.6	1991	-2	1950	1	32.3	1989	643	0	.0	.0	15.1	.3	10.3	.0
Mar	53.7	36.8	45.3	75+	1994	29	49.5	1986	12	1989	3	40.6	1976	612	0	.0	.0	24.2	.0	7.6	.0
Apr	59.2	40.1	49.7	84+	1987	27	52.9	1992	26+	1982	11	45.3	1972	460	0	.0	.0	28.7	.0	2.6	.0
May	65.2	45.3	55.3	94+	1963	22	59.6	1993	29+	1954	1	51.8	1974	304	1	.0	.1	30.9	.0	.1	.0
Jun	70.0	49.6	59.8	96	1958	22	63.2	1978	34	1949	11	56.5	1976	165	9	.0	.2	30.0	.0	.0	.0
Jul	75.4	52.6	64.0	100	1998	28	70.7	1998	40+	1971	7	59.6	1983	89	58	@	1.1	31.0	.0	.0	.0
Aug	76.3	52.9	64.6	100	1960	9	67.8	1998	39+	1973	23	60.5	1973	71	58	.0	1.2	31.0	.0	.0	.0
Sep	71.0	48.7	59.9	97	1979	14	63.9	1998	30	1970	13	55.9	1972	173	17	.0	.3	30.0	.0	@	.0
Oct	60.4	42.6	51.5	88+	1987	1	55.0	1988	0+	1998	7	48.4	1984	420	0	.0	.0	29.7	.0	1.8	.0
Nov	50.2	37.2	43.7	77	1980	4	47.7	1995	1	1985	23	33.7	1985	640	0	.0	.0	17.0	.4	6.9	.0
Dec	44.3	33.4	38.9	63	1952	13	43.5	1980	1+	1990	21	32.8	1985	811	0	.0	.0	7.8	1.3	13.0	.0
Ann	60.0	42.2	51.1	100+	Jul 1998	28	70.7	Jul 1998	-3	Jan 1950	18	31.9	Jan 1979	5195	143	@	2.9	284.2	2.8	55.2	.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

(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	6.05	5.81	3.92	1986	18	10.31	1971	.68	1985
Feb	4.50	4.33	2.55	1996	8	7.76	1999	.54	1993
Mar	5.09	5.09	2.06	1988	26	8.83	1997	2.17	1996
Apr	3.76	3.51	1.89	1996	23	7.60	1993	1.39	1989
May	3.25	3.22	1.40	1951	11	6.02	1977	1.14	1982
Jun	2.46	2.52	2.55	1985	7	4.48	1997	.21	1987
Jul	1.46	1.58	1.62	1954	1	3.60	1983	.06	1984
Aug	1.79	1.61	1.94	1980	27	5.19	1977	.18	1998
Sep	2.71	2.84	2.03	1982	10	5.95	1978	.28	1990
Oct	4.35	3.74	2.16	1981	6	9.78	1975	.40	1987
Nov	6.82	6.73	2.50	1962	25	13.33	1983	2.33	1979
Dec	6.54	6.65	2.69	1967	25	12.47	1996	1.41	1985
Ann	48.78	48.85	3.92	Jan 1986	18	13.33	Nov 1983	.06	Jul 1984

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	21.3	14.3	3.9	.9
Feb	18.4	12.6	2.5	.3
Mar	19.6	13.1	3.1	.5
Apr	16.1	9.8	2.0	.4
May	14.8	9.0	1.9	.2
Jun	11.7	6.4	1.4	.2
Jul	7.5	3.8	1.0	.1
Aug	7.7	4.3	1.2	.3
Sep	11.8	6.2	2.0	.3
Oct	17.1	9.6	2.9	.7
Nov	22.1	14.5	4.6	1.4
Dec	21.9	14.0	4.4	1.0
Ann	190.0	117.6	30.9	6.3

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	2.15	2.72	3.55	4.24	4.90	5.58	6.32	7.18	8.28	9.98	11.54
Feb	1.76	2.18	2.77	3.26	3.73	4.20	4.71	5.31	6.06	7.21	8.27
Mar	2.38	2.82	3.43	3.93	4.39	4.85	5.34	5.90	6.60	7.66	8.62
Apr	1.63	1.97	2.44	2.83	3.19	3.55	3.94	4.39	4.96	5.81	6.59
May	1.52	1.80	2.19	2.51	2.80	3.09	3.40	3.76	4.21	4.88	5.49
Jun	.68	.91	1.26	1.57	1.87	2.19	2.54	2.96	3.50	4.35	5.14
Jul	.18	.30	.51	.71	.93	1.16	1.44	1.79	2.25	3.02	3.76
Aug	.30	.45	.71	.96	1.21	1.49	1.80	2.19	2.70	3.53	4.32
Sep	.40	.62	1.01	1.39	1.78	2.21	2.70	3.31	4.12	5.45	6.73
Oct	1.00	1.41	2.04	2.61	3.18	3.79	4.46	5.27	6.33	8.01	9.60
Nov	2.78	3.40	4.28	5.01	5.70	6.39	7.14	8.01	9.11	10.78	12.31
Dec	2.94	3.52	4.32	4.98	5.59	6.20	6.86	7.62	8.57	10.00	11.30
Ann	37.77	39.97	42.75	44.83	46.67	48.42	50.23	52.20	54.58	58.00	60.92

+ 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

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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	1.8	.0	#	0
Feb	1.1	.0	#	0
Mar	.2	.0	#	0
Apr	#	.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	1.0	.0	#	0
Dec	1.6	.0	#	0
Ann	5.7	.0	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	1972	25	17.5	1972	15	1972	25	2	1972
Feb	5.0	1989	1	9.6	1971	6+	1972	2	1+	1989
Mar	3.0	1989	1	4.0	1989	4+	1989	2	#+	1989
Apr	#	1986	29	#+	1986	0	0	0	0	0
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	5.0	1996	19	10.4	1985	8	1985	27	2	1985
Dec	8.0	1974	27	11.0	1971	12	1996	28	1	1996
Ann	12.0	Jan 1972	25	17.5	Jan 1972	15	Jan 1972	25	2+	Nov 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.9	.7	.1	@	@
Feb	.7	.4	.1	@	.0
Mar	.1	.1	@	.0	.0
Apr	.0	.0	.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	.6	.3	.1	@	.0
Dec	1.0	.8	.3	.1	.0
Ann	3.3	2.3	.6	.1	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	1.2	.5	.3	.1
Feb	1.0	.4	.2	.0
Mar	.2	.1	.0	.0
Apr	.0	.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	.8	.5	.3	.0
Dec	1.3	.6	.3	.1
Ann	4.5	2.1	1.1	.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	5/24	5/18	5/14	5/11	5/07	5/04	5/01	4/26	4/21
32	4/30	4/25	4/21	4/17	4/14	4/11	4/07	4/03	3/29
28	4/06	3/29	3/23	3/18	3/13	3/09	3/04	2/26	2/18
24	3/08	2/26	2/19	2/13	2/07	2/02	1/26	1/19	1/07
20	2/21	2/12	2/05	1/29	1/23	1/16	1/06	0/00	0/00
16	2/13	1/28	1/14	12/31	12/12	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	9/19	9/25	9/29	10/03	10/07	10/10	10/14	10/18	10/24
32	10/07	10/13	10/18	10/22	10/26	10/30	11/03	11/08	11/15
28	10/20	10/30	11/07	11/13	11/19	11/24	12/01	12/08	12/18
24	11/05	11/17	11/26	12/03	12/10	12/18	12/26	1/04	1/19
20	11/22	12/05	12/15	12/23	1/01	1/11	1/27	0/00	0/00
16	12/06	12/19	12/31	1/12	2/02	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	178	169	162	157	151	146	140	134	124
32	220	211	205	200	195	189	184	178	169
28	293	278	267	258	249	241	232	221	206
24	>365	341	325	314	305	295	285	274	259
20	>365	>365	>365	>365	345	331	320	308	293
16	>365	>365	>365	>365	>365	>365	>365	362	326

***** 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	807	643	612	460	304	165	89	71	173	420	640	811	5195
60	652	503	457	311	162	59	24	15	73	266	490	656	3668
57	559	419	364	226	96	22	8	4	35	179	403	563	2878
55	497	364	304	173	62	9	3	1	18	129	347	501	2408
50	351	237	167	71	13	0	0	0	2	41	217	354	1453
32	26	8	0	0	0	0	0	0	0	0	8	23	65

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	242	289	411	530	720	834	992	1010	834	603	358	235	7058
55	0	1	2	13	69	154	283	297	162	19	7	0	1007
57	0	0	0	5	41	106	226	239	119	8	3	0	747
60	0	0	0	1	14	53	148	156	67	1	0	0	440
65	0	0	0	0	1	9	58	58	17	0	0	0	143
70	0	0	0	0	0	0	12	10	2	0	0	0	24

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	79	117	190	312	492	615	761	784	612	374	158	72	79	196	386	698	1190	1805	2566	3350	3962	4336	4494	4566
45	25	37	71	169	337	465	606	629	462	224	62	21	25	62	133	302	639	1104	1710	2339	2801	3025	3087	3108
50	0	2	13	62	186	315	451	474	312	99	12	0	0	2	15	77	263	578	1029	1503	1815	1914	1926	1926
55	0	0	0	15	75	169	297	319	171	25	1	0	0	0	0	15	90	259	556	875	1046	1071	1072	1072
60	0	0	0	0	19	60	153	169	59	2	0	0	0	0	0	0	19	79	232	401	460	462	462	462
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	20	47	86	160	259	338	458	478	349	180	46	7	20	67	153	313	572	910	1368	1846	2195	2375	2421	2428

(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