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: ROSS DAM, WA **COOP ID: 457185**

Climate Division: WA 5 **NWS Call Sign:** **Elevation: 1,236 Feet** **Lat: 48˚44N** **Lon: 121˚04W**

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	37.5	28.2	32.9	57+	1981	21	39.6	1994	-2	1969	29	25.4	1993	997	0	.0	.0	.5	5.1	19.9	@
Feb	41.5	29.8	35.7	61	1973	23	40.5	1977	-2+	1989	3	27.4	1989	821	0	.0	.0	1.7	2.0	17.3	.0
Mar	48.1	33.0	40.6	71	1966	30	48.1	1992	10	1989	3	35.6	1971	758	0	.0	.0	11.9	.2	11.8	.0
Apr	55.8	37.3	46.6	80+	1992	3	50.3	1994	28+	1975	3	42.2	1982	554	0	.0	.0	22.0	.0	3.7	.0
May	63.6	43.5	53.6	97	1983	30	58.9	1993	27	1964	14	48.6	1984	359	4	.0	.1	29.5	.0	.1	.0
Jun	69.4	49.2	59.3	100	1986	1	65.4	1992	36	1976	2	54.4	1981	194	23	@	.8	30.0	.0	.0	.0
Jul	76.3	53.8	65.1	101+	1998	27	71.0	1985	37+	1962	18	60.0	1993	88	88	.1	3.6	31.0	.0	.0	.0
Aug	77.1	55.0	66.1	101	1967	31	71.5	1986	40	1975	24	60.5	1995	76	109	.1	3.2	31.0	.0	.0	.0
Sep	69.6	49.8	59.7	97	1998	1	65.1	1995	34+	1972	28	54.9	1972	201	41	.0	.3	29.8	.0	.0	.0
Oct	57.1	42.4	49.8	86	1991	12	54.2	1987	16	1984	31	45.3	1990	475	1	.0	.0	25.7	.0	.7	.0
Nov	43.7	34.9	39.3	64	1965	2	44.2	1987	2	1985	27	29.3	1985	771	0	.0	.0	5.2	1.0	8.0	.0
Dec	38.0	29.6	33.8	57+	1980	27	38.6	1976	-10	1968	30	26.8	1983	968	0	.0	.0	.5	3.6	18.6	.2
Ann	56.5	40.5	48.5	101+	Jul 1998	27	71.5	Aug 1986	-10	Dec 1968	30	25.4	Jan 1993	6262	266	.2	8.0	218.8	11.9	80.1	.2

\+ 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: 1960-2001

(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	8.84	8.88	3.65	1983	10	17.98	1974	.60	1985
Feb	6.47	5.62	3.48	1995	19	13.45	1972	.42	1993
Mar	5.14	4.74	3.16	1972	6	12.53	1997	.29	1992
Apr	3.01	2.51	2.82	1991	4	7.22	1981	.27	1999
May	2.15	1.94	2.48	1987	12	5.32	1984	.35	1992
Jun	1.65	1.28	2.19	1968	2	4.01	1997	.56+	1996
Jul	1.39	1.04	1.95	1997	9	4.54	1983	.05	1984
Aug	1.22	1.29	1.14	1961	31	3.50	1990	.01	1986
Sep	2.19	1.91	2.30	1972	21	6.43	1972	.21	1989
Oct	5.23	4.96	3.24	1963	22	12.55	1990	.23	1987
Nov	10.51	10.14	5.36	1995	8	28.41	1995	1.24	1979
Dec	9.64	8.82	4.54	1980	26	18.60	1975	1.26	1985
Ann	57.44	57.71	5.36	Nov 1995	8	28.41	Nov 1995	.01	Aug 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	17.4	12.9	6.2	2.8
Feb	15.0	11.0	4.5	1.8
Mar	16.6	11.1	3.0	1.1
Apr	13.6	8.0	1.5	.4
May	11.3	5.8	1.0	.2
Jun	9.9	4.6	.8	.1
Jul	7.5	3.3	.7	.2
Aug	7.0	3.5	.6	.1
Sep	9.0	4.8	1.4	.4
Oct	13.8	9.0	3.7	1.3
Nov	19.8	15.0	7.0	2.9
Dec	18.4	13.7	6.6	3.0
Ann	159.3	102.7	37.0	14.3

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	1.90	2.71	4.01	5.18	6.36	7.62	9.04	10.74	12.98	16.56	19.94
Feb	1.42	2.02	2.97	3.83	4.69	5.60	6.63	7.86	9.48	12.07	14.51
Mar	1.31	1.79	2.54	3.20	3.85	4.54	5.30	6.21	7.39	9.26	11.01
Apr	.64	.92	1.36	1.76	2.16	2.59	3.07	3.65	4.42	5.64	6.80
May	.58	.78	1.09	1.36	1.63	1.91	2.22	2.59	3.07	3.82	4.52
Jun	.51	.67	.90	1.10	1.29	1.50	1.72	1.98	2.32	2.84	3.33
Jul	.16	.27	.46	.66	.86	1.09	1.36	1.69	2.15	2.90	3.62
Aug	.08	.15	.31	.47	.66	.88	1.14	1.48	1.95	2.74	3.53
Sep	.28	.45	.76	1.07	1.39	1.74	2.16	2.67	3.36	4.50	5.60
Oct	.75	1.18	1.93	2.66	3.41	4.25	5.21	6.39	7.98	10.57	13.07
Nov	2.66	3.65	5.18	6.53	7.87	9.28	10.85	12.71	15.15	19.00	22.60
Dec	2.91	3.83	5.20	6.38	7.52	8.71	10.02	11.56	13.55	16.66	19.54
Ann	39.82	43.19	47.54	50.85	53.79	56.65	59.61	62.88	66.87	72.66	77.68

\+ 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: 1960-2001
(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	20.9	21.2	6	4
Feb	12.5	10.0	4	3
Mar	3.0	.5	1	#
Apr	.3	.0	#	0
May	.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	2.8	.0	#	#
Dec	11.2	6.0	3	2
Ann	50.8	37.7	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	15.0	1991	8	50.5	1972	34	1997	1	22	1972
Feb	20.0	1995	15	46.5	1990	27	1975	12	17	1972
Mar	12.0	1971	3	18.7	1971	17	1971	5	5	1972
Apr	7.0	1975	3	7.0	1975	7	1975	3	#+	1991
May	.0	0	0	.0	0	#	1999	4	#	1999
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	1.5	1984	31	2.6	1984	#	1996	18	#	1996
Nov	9.0	1973	24	14.7	1985	10	1996	23	2	1996
Dec	18.0	1996	27	51.5	1990	44	1996	30	17	1971
Ann	20.0	Feb 1995	15	51.5	Dec 1990	44	Dec 1996	30	22	Jan 1972

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.2	3.7	2.1	1.2	.5
Feb	2.7	2.5	1.4	.9	.4
Mar	1.6	1.2	.4	.2	@
Apr	@	@	@	@	.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	.1	.1	.0	.0	.0
Nov	1.3	1.2	.5	.2	.0
Dec	3.7	3.3	1.7	1.1	.3
Ann	13.6	12.0	6.1	3.6	1.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	12.6	10.2	8.1	4.1
Feb	6.6	4.9	3.5	1.3
Mar	2.9	1.8	1.0	.4
Apr	.1	@	@	.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	2.0	.4	.2	.2
Dec	10.8	7.7	5.1	1.3
Ann	35.0	25.0	17.9	7.3

+ 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	5/23	5/17	5/13	5/09	5/06	5/02	4/28	4/24	4/18
32	5/01	4/26	4/22	4/18	4/15	4/12	4/08	4/04	3/29
28	3/28	3/18	3/12	3/06	3/01	2/24	2/18	2/12	2/02
24	3/12	3/03	2/24	2/18	2/13	2/08	2/02	1/26	1/17
20	3/05	2/23	2/15	2/08	2/02	1/27	1/20	1/11	12/25
16	2/27	2/16	2/08	2/02	1/26	1/19	1/09	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	10/10	10/14	10/17	10/20	10/23	10/27	10/30	11/05
32	10/20	10/26	10/30	11/02	11/06	11/09	11/13	11/17	11/23
28	11/03	11/11	11/16	11/21	11/26	11/30	12/05	12/11	12/18
24	11/06	11/16	11/24	11/30	12/06	12/12	12/19	12/26	1/06
20	11/17	11/27	12/04	12/10	12/16	12/23	12/29	1/07	1/23
16	11/21	12/03	12/12	12/20	12/27	1/04	1/15	2/03	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	191	183	177	172	167	162	157	151	143
32	229	220	214	209	204	199	194	188	180
28	306	293	284	276	269	262	254	245	232
24	336	322	312	304	296	288	279	269	255
20	>365	355	335	324	315	307	299	290	278
16	>365	>365	>365	>365	346	332	319	307	291

***** 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	997	821	758	554	359	194	88	76	201	475	771	968	6262
60	842	681	603	404	220	96	28	24	108	324	621	813	4764
57	749	597	510	316	151	54	12	10	67	240	531	720	3957
55	687	541	448	260	113	34	6	5	45	190	471	658	3458
50	532	401	300	136	42	8	0	0	14	88	331	503	2355
32	101	42	10	0	0	0	0	0	0	0	27	83	263

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	127	145	275	436	668	818	1024	1056	830	549	246	139	6313
55	0	0	0	6	68	162	317	348	185	26	1	0	1113
57	0	0	0	2	44	123	260	291	147	14	0	0	881
60	0	0	0	0	20	74	183	211	98	5	0	0	591
65	0	0	0	0	4	23	88	109	41	1	0	0	266
70	0	0	0	0	0	4	28	40	13	0	0	0	85

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	1	15	74	214	430	585	784	813	590	309	58	2	1	16	90	304	734	1319	2103	2916	3506	3815	3873	3875
45	0	0	16	102	279	435	629	658	440	169	12	0	0	0	16	118	397	832	1461	2119	2559	2728	2740	2740
50	0	0	1	33	151	287	474	503	294	69	0	0	0	0	1	34	185	472	946	1449	1743	1812	1812	1812
55	0	0	0	5	69	163	324	348	169	21	0	0	0	0	0	5	74	237	561	909	1078	1099	1099	1099
60	0	0	0	0	25	79	189	209	80	2	0	0	0	0	0	0	25	104	293	502	582	584	584	584
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	36	110	219	314	463	494	324	128	7	0	0	1	37	147	366	680	1143	1637	1961	2089	2096	2096

(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