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: ELWHA R S, WA **COOP ID: 452548**

Climate Division: WA 4 **NWS Call Sign:** **Elevation: 360 Feet** **Lat: 48˚02N** **Lon: 123˚35W**

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	40.5	30.6	35.6	60	1987	11	40.1	1994	2	1950	14	29.7	1993	914	0	.0	.0	1.8	2.4	16.6	.0
Feb	43.9	32.1	38.0	67	1966	22	42.6	1991	8	1989	4	28.7	1989	756	0	.0	.0	3.9	.8	13.8	.0
Mar	49.8	34.1	42.0	69	1969	26	47.4	1992	15	1955	4	38.0	1976	715	0	.0	.0	17.0	@	10.5	.0
Apr	55.8	37.2	46.5	78	1998	30	49.8	1989	26	1972	10	40.4	1972	555	0	.0	.0	26.5	.0	3.6	.0
May	62.2	41.5	51.9	87+	1972	28	56.7	1995	29	1965	7	48.9	1974	407	0	.0	.0	30.7	.0	.4	.0
Jun	66.6	46.0	56.3	93+	1969	17	61.1	1992	32	1973	2	52.4	1976	266	5	.0	.1	30.0	.0	@	.0
Jul	72.2	49.3	60.8	96+	1965	31	66.4	1985	36	1962	3	55.0	1986	164	31	.0	.9	31.0	.0	.0	.0
Aug	73.5	50.2	61.9	97+	1977	18	67.6	1986	36+	1982	20	57.5	1975	133	35	.0	.8	31.0	.0	.0	.0
Sep	67.4	46.5	57.0	91	1987	2	61.4	1998	32+	1972	27	53.2	1972	250	8	.0	@	29.9	.0	.1	.0
Oct	56.2	39.9	48.1	76+	1957	1	51.7	1987	21	1971	28	45.3	1984	526	0	.0	.0	27.5	.0	1.0	.0
Nov	45.6	34.6	40.1	70	1975	5	43.7	1981	10+	1985	24	31.8	1985	747	0	.0	.0	8.0	.7	8.0	.0
Dec	41.0	31.1	36.1	65	1980	27	40.4	1979	8+	1983	24	29.6	1983	899	0	.0	.0	2.2	1.9	15.9	.0
Ann	56.2	39.4	47.9	97+	Aug 1977	18	67.6	Aug 1986	2	Jan 1950	14	28.7	Feb 1989	6332	79	.0	1.8	239.5	5.8	69.9	.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	8.62	8.38	4.03	1954	2	17.30	1992	.70	1985
Feb	7.15	6.19	3.82	1949	16	20.53	1999	.45	1993
Mar	6.05	5.39	2.87	1997	19	14.45	1971	1.15	1992
Apr	3.25	3.18	4.10	1991	4	7.39	1982	.55	1998
May	1.92	1.71	1.46	1986	13	3.89	1984	.31	1995
Jun	1.25	1.06	1.09	1962	2	3.02	1997	.34	1987
Jul	.83	.66	1.45	1999	17	2.11	1997	.09	1984
Aug	1.22	.68	2.11	1951	28	5.81	1975	.00	1986
Sep	1.64	1.47	1.73	1988	25	5.19	1997	.02	1975
Oct	4.85	4.67	2.80	1985	27	12.12	1985	.15	1987
Nov	9.41	9.52	4.81	1955	3	19.00	1983	.80	1976
Dec	9.41	10.05	3.22	1979	14	20.01	1979	1.96	1985
Ann	55.60	55.64	4.81	Nov 1955	3	20.53	Feb 1999	.00	Aug 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	16.8	12.6	6.0	2.3
Feb	15.9	11.8	5.0	2.3
Mar	17.2	11.4	3.7	1.4
Apr	13.5	7.6	1.7	.5
May	11.4	5.6	.9	.1
Jun	9.3	4.0	.3	.0
Jul	5.6	2.2	.4	.1
Aug	5.9	2.8	.6	.3
Sep	7.5	3.9	.8	.2
Oct	13.4	8.5	3.8	1.2
Nov	18.8	14.7	6.8	2.8
Dec	18.1	13.6	6.0	2.6
Ann	153.4	98.7	36.0	13.8

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	2.13	2.94	4.20	5.32	6.42	7.58	8.88	10.43	12.45	15.65	18.65
Feb	1.84	2.52	3.56	4.47	5.38	6.33	7.38	8.64	10.27	12.86	15.27
Mar	1.84	2.41	3.27	4.01	4.72	5.47	6.29	7.25	8.49	10.44	12.23
Apr	.73	1.04	1.51	1.94	2.37	2.82	3.33	3.94	4.74	6.02	7.22
May	.47	.65	.93	1.18	1.43	1.69	1.98	2.32	2.77	3.49	4.16
Jun	.40	.51	.69	.84	.98	1.13	1.30	1.49	1.74	2.13	2.49
Jul	.10	.17	.29	.40	.53	.66	.82	1.02	1.28	1.72	2.14
Aug	.01	.07	.20	.36	.55	.79	1.08	1.46	2.01	2.96	3.92
Sep	.04	.11	.26	.47	.71	1.02	1.41	1.93	2.68	4.00	5.35
Oct	.64	1.03	1.72	2.39	3.11	3.89	4.81	5.93	7.45	9.95	12.36
Nov	2.46	3.35	4.71	5.92	7.10	8.34	9.72	11.36	13.49	16.86	20.01
Dec	3.32	4.21	5.49	6.58	7.61	8.68	9.83	11.18	12.91	15.57	18.02
Ann	36.93	40.45	45.01	48.51	51.64	54.69	57.85	61.37	65.66	71.94	77.40

\+ 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

Complete documentation available from:
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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	5.3	.0	1	#
Feb	2.6	.2	1	0
Mar	1.3	.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	2.0	.5	#	0
Ann	12.2	.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	8.0	1973	5	22.5	1982	15	1985	2	6	1985
Feb	6.0	1989	3	21.5	1989	16	1972	2	7	1989
Mar	8.0	1989	2	12.0	1989	12	1989	3	2	1989
Apr	1.0	1972	11	1.0	1972	#	1972	11	#	1972
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	.5	1971	27	.5	1971	0	0	0	0	0
Nov	14.0	1985	27	14.0	1985	19	1985	29	3	1985
Dec	8.0	1972	12	18.5	1972	22	1996	30	4	1996
Ann	14.0	Nov 1985	27	22.5	Jan 1982	22	Dec 1996	30	7	Feb 1989

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.3	1.0	.6	.2	.0
Feb	1.2	1.0	.4	.1	.0
Mar	.6	.4	.1	.1	.0
Apr	@	@	.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
Nov	.7	.6	.3	.1	.1
Dec	1.2	.6	.3	.2	.0
Ann	5.0	3.6	1.7	.7	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	1.5	1.0	.8	.1
Feb	.7	.1	.0	.0
Mar	.9	.3	.2	.1
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	.1	.0	.0
Dec	1.1	.4	.3	.0
Ann	5.0	1.9	1.3	.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	5/28	5/22	5/18	5/14	5/11	5/07	5/03	4/29	4/23
32	5/12	5/03	4/27	4/22	4/17	4/12	4/07	4/01	3/24
28	3/29	3/18	3/10	3/03	2/25	2/18	2/11	2/03	1/23
24	3/05	2/22	2/14	2/08	2/01	1/25	1/17	1/04	0/00
20	2/18	2/01	1/19	1/06	12/23	11/27	0/00	0/00	0/00
16	1/24	1/07	12/22	11/27	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	9/25	10/01	10/06	10/10	10/14	10/18	10/22	10/27	11/02
32	10/13	10/20	10/25	10/30	11/03	11/07	11/11	11/16	11/23
28	10/30	11/10	11/18	11/25	12/01	12/07	12/14	12/22	1/02
24	11/18	12/01	12/11	12/19	12/27	1/05	1/15	1/31	0/00
20	12/03	12/16	12/27	1/06	1/17	2/07	0/00	0/00	0/00
16	12/08	12/26	1/11	2/05	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	185	175	168	161	156	150	143	136	126
32	235	223	214	206	199	192	184	175	163
28	329	312	299	288	278	268	258	245	228
24	>365	>365	>365	354	336	322	309	296	278
20	>365	>365	>365	>365	>365	>365	>365	345	310
16	>365	>365	>365	>365	>365	>365	>365	>365	>365

***** 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	914	756	715	555	407	266	164	133	250	526	747	899	6332
60	759	616	560	405	256	140	73	51	130	371	597	744	4702
57	666	532	467	315	174	84	36	21	76	280	507	651	3809
55	604	476	405	257	127	54	20	11	49	221	447	589	3260
50	449	338	256	127	43	12	3	0	11	99	306	434	2078
32	44	19	3	0	0	0	0	0	0	0	15	32	113

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	153	187	311	435	616	729	890	926	748	497	258	157	5907
55	0	0	0	2	30	93	197	224	107	5	0	0	658
57	0	0	0	0	15	62	151	172	75	2	0	0	477
60	0	0	0	0	4	28	95	108	38	0	0	0	273
65	0	0	0	0	0	5	31	35	8	0	0	0	79
70	0	0	0	0	0	0	6	7	1	0	0	0	14

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	24	40	100	221	394	510	672	709	539	284	84	31	24	64	164	385	779	1289	1961	2670	3209	3493	3577	3608
45	0	1	21	95	244	360	517	554	389	141	18	0	0	1	22	117	361	721	1238	1792	2181	2322	2340	2340
50	0	0	0	29	112	212	362	399	243	42	0	0	0	0	0	29	141	353	715	1114	1357	1399	1399	1399
55	0	0	0	3	36	96	213	247	112	6	0	0	0	0	0	3	39	135	348	595	707	713	713	713
60	0	0	0	0	5	29	92	111	31	0	0	0	0	0	0	0	5	34	126	237	268	268	268	268
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	4	41	110	207	269	382	409	287	119	12	0	0	4	45	155	362	631	1013	1422	1709	1828	1840	1840

(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