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: GRAYS RIVER HATCHERY, WA **COOP ID: 453333**

Climate Division: WA 1 **NWS Call Sign:** **Elevation: 100 Feet** **Lat: 46˚23N** **Lon: 123˚34W**

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	47.5	33.7	40.6	63+	1986	12	45.7	1981	4	1979	5	33.4	1979	756	0	.0	.0	11.9	.2	15.2	.0
Feb	50.6	34.5	42.6	74	1968	27	48.2	1991	3+	1989	4	34.7	1989	628	0	.0	.0	15.4	.3	12.5	.0
Mar	54.2	35.7	45.0	81	1994	28	49.6	1992	19+	1975	29	40.9+	1976	621	0	.0	.0	23.2	.0	11.2	.0
Apr	58.2	37.9	48.1	88	1998	30	50.9	1989	22	1975	5	43.3	1975	509	0	.0	.0	26.8	.0	6.3	.0
May	63.3	42.5	52.9	97	1987	7	56.8	1993	29+	1996	9	49.0	1974	375	0	.0	.2	30.8	.0	1.2	.0
Jun	67.4	46.7	57.1	100	1982	19	60.7	1992	32+	1991	4	54.0	1976	239	1	@	.6	30.0	.0	.1	.0
Jul	72.6	49.9	61.3	99+	1996	14	64.2+	1996	34	1963	4	58.8	1986	130	13	.0	1.4	31.0	.0	.0	.0
Aug	73.8	49.7	61.8	105+	1981	11	64.9	1981	34	1973	18	58.0	1973	121	20	.2	1.4	31.0	.0	.0	.0
Sep	71.5	46.1	58.8	101	1988	2	62.4	1995	29+	1983	29	55.8	1972	197	10	@	.9	30.0	.0	.5	.0
Oct	62.6	40.8	51.7	87+	1991	15	55.2	1988	23	1971	27	48.1	1984	413	0	.0	.0	30.3	.0	3.9	.0
Nov	52.3	37.4	44.9	72+	1981	3	48.4	1995	9+	1985	24	36.6	1985	604	0	.0	.0	21.2	.2	9.9	.0
Dec	47.1	34.5	40.8	66	1980	27	45.9	1979	2	1972	8	34.2	1990	750	0	.0	.0	11.6	.8	14.2	.0
Ann	60.1	40.8	50.5	105+	Aug 1981	11	64.9	Aug 1981	2	Dec 1972	8	33.4	Jan 1979	5343	44	.2	4.5	293.2	1.5	75.0	.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: 1962-2001

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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	15.71	15.13	5.86	1982	23	26.72	1990	1.27	1985
Feb	13.21	12.62	6.00	1981	16	29.47	1999	1.24	1993
Mar	11.88	10.76	6.43	1997	19	25.77	1997	1.23	1992
Apr	7.96	7.06	4.30	1996	23	15.56	1996	2.68	1977
May	5.11	5.17	3.60	1968	31	9.98	1984	.78	1992
Jun	3.90	3.45	4.45	2000	11	7.90	1981	.92	1987
Jul	1.98	1.43	2.48	1974	17	6.79	1983	.00	1984
Aug	2.24	1.82	2.06	1963	19	5.61	1977	.23	1998
Sep	4.25	4.63	4.00	1997	17	11.18	1997	.06	1993
Oct	9.36	8.41	4.70	1982	29	25.42	1975	.61	1987
Nov	16.31	16.44	5.52	1986	23	29.26	1983	3.76	1976
Dec	17.49	17.63	6.10	1977	2	32.69	1975	5.33	1985
Ann	109.40	113.00	6.43	Mar 1997	19	32.69	Dec 1975	.00	Jul 1984

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	21.0	17.8	10.3	5.5
Feb	19.1	15.9	8.8	4.5
Mar	20.8	16.9	8.1	3.5
Apr	18.7	14.6	5.6	1.7
May	16.8	11.2	3.5	1.0
Jun	13.2	8.3	2.8	.5
Jul	8.6	4.1	1.2	.4
Aug	8.2	5.0	1.5	.5
Sep	10.2	6.8	3.2	1.2
Oct	15.2	12.2	6.1	3.1
Nov	21.4	18.3	11.0	5.9
Dec	21.1	17.7	10.8	5.9
Ann	194.3	148.8	72.9	33.7

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	4.53	6.02	8.27	10.22	12.12	14.11	16.30	18.88	22.23	27.47	32.34
Feb	3.69	4.95	6.85	8.50	10.12	11.81	13.69	15.90	18.77	23.28	27.48
Mar	4.30	5.42	7.03	8.38	9.67	10.98	12.42	14.08	16.21	19.49	22.50
Apr	3.09	3.83	4.88	5.75	6.58	7.42	8.33	9.38	10.72	12.78	14.65
May	1.70	2.18	2.90	3.50	4.08	4.68	5.33	6.10	7.08	8.60	10.01
Jun	1.21	1.59	2.14	2.61	3.06	3.54	4.06	4.67	5.46	6.69	7.82
Jul	.12	.31	.62	.91	1.22	1.56	1.96	2.44	3.10	4.19	5.24
Aug	.29	.47	.79	1.10	1.43	1.79	2.21	2.73	3.44	4.59	5.71
Sep	.24	.47	.98	1.56	2.21	2.98	3.92	5.13	6.82	9.71	12.60
Oct	1.48	2.28	3.64	4.93	6.26	7.72	9.39	11.44	14.17	18.61	22.86
Nov	5.48	7.03	9.29	11.21	13.05	14.94	17.01	19.43	22.54	27.36	31.80
Dec	6.70	8.33	10.65	12.58	14.41	16.28	18.30	20.65	23.63	28.20	32.38
Ann	79.83	85.61	92.98	98.56	103.50	108.26	113.17	118.58	125.13	134.60	142.76

\+ 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: 1962-2001
(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	2.6	.0	#	0	9.0	1971	12	27.0	1971	9	1982	6	2	1982	1.0	.7	.3	.1	.0	.7	.2	.0	.0
Feb	1.2	.2	#	0	6.0	1971	26	9.0	1971	6	1971	26	#+	1999	1.0	.5	.1	@	.0	.3	.1	.1	.0
Mar	.2	.0	#	0	1.5	1971	1	4.0	1971	1	1974	3	#+	1999	.2	.1	.0	.0	.0	.1	.0	.0	.0
Apr	#	.0	#	0	#	1999	9	#+	1999	#+	1999	9	#+	1999	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	#	.0	#	0	#	1999	8	#	1999	#	1999	8	#	1999	.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	#	1971	26	#	1971	#	1971	26	#	1971	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.3	.0	#	0	3.8	1975	29	3.8	1975	4	1975	29	#+	1978	.1	.1	@	.0	.0	@	@	.0	.0
Dec	1.3	.0	#	0	5.0	1971	29	8.5	1972	5	1972	12	1	1972	.6	.4	.2	@	.0	.5	.3	.1	.0
Ann	5.6	.2	N/A	N/A	9.0	Jan 1971	12	27.0	Jan 1971	9	Jan 1982	6	2	Jan 1982	2.9	1.8	.6	.1	.0	1.6	.6	.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	6/25	6/17	6/12	6/07	6/03	5/30	5/25	5/20	5/12
32	5/29	5/21	5/15	5/11	5/06	5/02	4/27	4/21	4/14
28	4/21	4/10	4/03	3/27	3/21	3/15	3/09	3/01	2/19
24	3/17	3/03	2/21	2/12	2/04	1/26	1/16	1/04	12/12
20	2/26	2/13	2/03	1/25	1/16	1/05	12/21	0/00	0/00
16	1/30	1/18	1/08	12/27	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	9/05	9/12	9/17	9/22	9/26	10/01	10/05	10/10	10/18
32	9/27	10/03	10/07	10/10	10/14	10/17	10/21	10/25	10/31
28	10/19	10/28	11/04	11/10	11/16	11/21	11/27	12/04	12/14
24	11/11	11/24	12/03	12/11	12/19	12/27	1/05	1/17	2/07
20	11/24	12/11	12/24	1/05	1/17	2/01	2/28	0/00	0/00
16	12/11	12/27	1/09	1/24	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	149	137	129	121	114	108	100	92	80
32	190	179	172	166	160	154	148	141	130
28	278	265	255	247	239	231	223	213	200
24	>365	>365	356	333	317	303	290	275	255
20	>365	>365	>365	>365	>365	349	327	310	290
16	>365	>365	>365	>365	>365	>365	>365	>365	335

***** 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	756	628	621	509	375	239	130	121	197	413	604	750	5343
60	601	488	466	359	227	107	37	36	87	260	454	595	3717
57	508	404	373	271	149	52	10	11	43	177	366	502	2866
55	446	351	316	215	107	27	4	5	23	128	310	440	2372
50	302	223	178	97	34	3	0	0	3	43	181	295	1359
32	13	6	1	0	0	0	0	0	0	0	2	11	33

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	280	302	402	481	648	751	906	922	803	610	388	284	6777
55	0	3	4	6	43	88	197	214	136	26	6	0	723
57	0	0	0	2	23	53	141	159	96	12	2	0	488
60	0	0	0	0	8	18	74	90	50	3	0	0	243
65	0	0	0	0	0	1	13	20	10	0	0	0	44
70	0	0	0	0	0	0	0	1	0	0	0	0	1

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	81	111	163	246	405	514	659	674	559	357	157	82	81	192	355	601	1006	1520	2179	2853	3412	3769	3926	4008
45	23	34	62	117	251	364	504	519	409	208	59	25	23	57	119	236	487	851	1355	1874	2283	2491	2550	2575
50	0	3	8	43	122	218	349	364	260	85	12	0	0	3	11	54	176	394	743	1107	1367	1452	1464	1464
55	0	0	0	9	49	94	198	212	131	22	0	0	0	0	0	9	58	152	350	562	693	715	715	715
60	0	0	0	0	12	32	83	87	46	2	0	0	0	0	0	0	12	44	127	214	260	262	262	262
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	24	45	88	138	214	278	383	399	339	208	60	22	24	69	157	295	509	787	1170	1569	1908	2116	2176	2198

(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