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: KENNEWICK, WA **COOP ID: 454154**

Climate Division: WA 8 **NWS Call Sign:** **Elevation: 390 Feet** **Lat: 46˚13N** **Lon: 119˚06W**

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	40.4	28.0	34.2	68+	1990	10	42.8	1990	-19	1950	29	18.5	1979	954	0	.0	.0	7.8	7.3	21.3	.4
Feb	47.9	31.3	39.6	74+	1995	21	44.1	1991	-23	1950	3	26.9	1989	712	0	.0	.0	14.5	2.4	15.9	.4
Mar	58.0	36.4	47.2	82	1960	25	51.0	1983	10	1955	5	42.2	1993	552	0	.0	.0	28.3	.1	9.3	.0
Apr	66.2	42.3	54.3	91	1987	29	58.9	1987	22	1952	8	49.5	1982	326	3	.0	.1	29.8	.0	2.3	.0
May	74.1	49.2	61.7	104	1983	30	66.1	1993	30+	1986	7	56.5	1977	142	39	.2	2.4	31.0	.0	.2	.0
Jun	81.6	55.8	68.7	107	1992	24	73.8	1992	38	1975	28	64.5	1991	32	142	.6	6.8	30.0	.0	.0	.0
Jul	89.3	61.0	75.2	108+	1998	29	82.1	1998	42	1971	7	69.1	1993	5	318	4.1	17.2	31.0	.0	.0	.0
Aug	88.9	60.5	74.7	110+	1998	5	79.5	1977	41	1965	30	70.5	1995	4	305	3.3	15.8	31.0	.0	.0	.0
Sep	79.5	51.8	65.7	100+	1987	2	70.9	1990	30	1983	29	60.5	1985	81	101	@	3.6	30.0	.0	.2	.0
Oct	66.3	41.9	54.1	89+	1991	2	60.0	1988	17	1971	29	50.2	1984	340	1	.0	.0	30.4	.0	3.7	.0
Nov	50.4	35.7	43.1	79	1999	14	48.5	1990	-8	1985	23	29.7	1985	659	0	.0	.0	17.6	1.3	11.0	.1
Dec	41.1	29.3	35.2	68+	1993	11	41.5	1999	-7	1983	23	23.1	1985	924	0	.0	.0	7.5	6.5	21.0	.6
Ann	65.3	43.6	54.5	110+	Aug 1998	5	82.1	Jul 1998	-23	Feb 1950	3	18.5	Jan 1979	4731	909	8.2	45.9	288.9	17.6	84.9	1.5

\+ 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	1.05	.99	.86	1953	9	2.26	1980	.23	1984
Feb	.79	.73	.70	1956	21	1.60	2000	.02	1988
Mar	.77	.70	.62	1986	24	1.73	1984	.03	1994
Apr	.52	.36	.95	1969	6	1.58	1993	.00	1973
May	.65	.54	1.18	1994	16	1.76	1980	.03	1992
Jun	.38	.29	.77	1948	11	1.21	1971	.00	1986
Jul	.25	.19	.88	1948	5	1.50	1992	.00+	1989
Aug	.39	.20	1.11	1977	30	1.67	1977	.00+	2000
Sep	.37	.29	.81	1980	13	1.63	1980	.00+	1999
Oct	.60	.51	1.21	1982	29	1.90	1982	.00+	1987
Nov	1.08	.94	1.33	1996	19	2.91	1973	.09	1976
Dec	1.16	1.04	.85	1995	12	3.47	1973	.17	1999
Ann	8.01	7.82	1.33	Nov 1996	19	3.47	Dec 1973	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.6	4.0	.1	.0
Feb	7.8	2.9	.1	.0
Mar	7.9	2.7	.2	.0
Apr	5.5	1.8	.1	.0
May	5.3	2.0	.2	@
Jun	4.4	1.2	@	.0
Jul	2.5	.8	@	.0
Aug	2.7	1.2	.2	@
Sep	3.5	1.2	.1	.0
Oct	4.9	2.0	.2	@
Nov	8.9	3.8	.2	@
Dec	9.3	4.1	.1	.0
Ann	72.3	27.7	1.5	.0

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	.28	.38	.54	.67	.80	.93	1.09	1.26	1.50	1.86	2.21
Feb	.17	.25	.36	.47	.57	.68	.81	.96	1.16	1.48	1.77
Mar	.14	.20	.32	.42	.53	.64	.78	.94	1.15	1.49	1.82
Apr	.02	.05	.12	.20	.28	.38	.49	.63	.83	1.17	1.50
May	.10	.15	.25	.34	.43	.53	.65	.80	.99	1.31	1.61
Jun	.03	.08	.14	.19	.25	.32	.39	.47	.59	.78	.96
Jul	.00	.00	.04	.08	.12	.17	.23	.31	.42	.60	.78
Aug	.00	.00	.00	.03	.10	.19	.30	.45	.67	1.06	1.44
Sep	.00	.00	.00	.06	.15	.24	.34	.47	.65	.95	1.24
Oct	.00	.05	.15	.25	.35	.45	.58	.74	.95	1.31	1.66
Nov	.19	.28	.44	.59	.74	.90	1.09	1.31	1.61	2.10	2.56
Dec	.23	.34	.51	.66	.82	.99	1.18	1.41	1.71	2.19	2.65
Ann	4.52	5.14	5.96	6.60	7.18	7.76	8.37	9.06	9.90	11.16	12.28

\+ 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	4.4	3.0	#	0
Feb	1.0	.0	0	0
Mar	#	.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	.5	.0	#	0
Dec	2.2	.5	#	0
Ann	8.1	3.5	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	1980	9	16.2	1980	2	1977	3	#	1977
Feb	2.5	1973	10	5.0	1975	0	0	0	0	0
Mar	#	1977	16	#+	1977	1	1980	5	#	1980
Apr	#	1975	4	#	1975	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	.5	1973	31	.5	1973	0	0	0	0	0
Nov	2.5	1979	26	4.2	1979	#	1993	28	#	1993
Dec	4.0	1977	30	9.0	1971	4	1977	30	#	1977
Ann	12.0	Jan 1980	9	16.2	Jan 1980	4	Dec 1977	30	#+	Nov 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.8	1.2	.4	.1	.1
Feb	.5	.4	.0	.0	.0
Mar	.0	.0	.0	.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	.1	.0	.0	.0	.0
Nov	.3	.2	.0	.0	.0
Dec	.9	.7	.3	.0	.0
Ann	3.6	2.5	.7	.1	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.2	.0	.0	.0
Feb	.0	.0	.0	.0
Mar	.0	.0	.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	.0	.0	.0	.0
Dec	.1	.1	.0	.0
Ann	.3	.1	.0	.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	5/15	5/07	5/02	4/27	4/23	4/19	4/14	4/09	4/01
32	4/29	4/22	4/17	4/12	4/08	4/04	3/31	3/25	3/18
28	4/09	4/02	3/28	3/23	3/19	3/15	3/10	3/05	2/25
24	3/23	3/13	3/06	2/27	2/22	2/16	2/09	2/02	1/23
20	3/06	2/23	2/16	2/09	2/03	1/28	1/21	1/13	12/31
16	2/24	2/15	2/08	2/02	1/27	1/21	1/15	1/05	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	9/28	10/03	10/07	10/10	10/13	10/15	10/18	10/22	10/27
32	10/05	10/11	10/15	10/18	10/21	10/24	10/28	11/01	11/06
28	10/14	10/23	10/30	11/04	11/10	11/15	11/20	11/27	12/06
24	10/25	11/04	11/11	11/17	11/22	11/28	12/04	12/11	12/20
20	11/15	11/24	12/01	12/07	12/13	12/18	12/24	1/01	1/12
16	11/23	12/05	12/13	12/20	12/27	1/04	1/13	1/27	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	204	193	185	178	172	165	158	150	139
32	226	215	208	201	195	189	183	175	165
28	275	261	252	243	235	227	219	209	195
24	312	296	286	278	270	263	255	245	232
20	>365	343	330	319	311	302	293	283	269
16	>365	>365	359	342	331	322	313	303	289

***** 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	954	712	552	326	142	32	5	4	81	340	659	924	4731
60	799	572	397	192	58	6	0	0	27	196	516	769	3532
57	714	492	305	126	28	1	0	0	11	124	432	676	2909
55	656	440	249	90	15	0	0	0	5	86	379	617	2537
50	514	313	125	28	2	0	0	0	0	29	259	474	1744
32	146	41	1	0	0	0	0	0	0	0	28	101	317

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	216	253	472	667	920	1101	1337	1324	1010	684	359	201	8544
55	12	8	7	67	222	411	624	611	325	57	19	3	2366
57	8	4	2	43	173	352	562	549	271	33	13	1	2011
60	0	0	0	19	110	266	469	456	197	12	6	0	1535
65	0	0	0	3	39	142	318	305	101	1	0	0	909
70	0	0	0	0	8	58	183	170	41	0	0	0	460

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	51	93	238	430	674	861	1090	1071	766	430	149	57	51	144	382	812	1486	2347	3437	4508	5274	5704	5853	5910
45	15	35	113	284	519	711	935	916	616	279	65	21	15	50	163	447	966	1677	2612	3528	4144	4423	4488	4509
50	1	4	34	151	365	561	780	761	467	152	22	1	1	5	39	190	555	1116	1896	2657	3124	3276	3298	3299
55	0	0	2	63	220	412	625	606	320	64	2	0	0	0	2	65	285	697	1322	1928	2248	2312	2314	2314
60	0	0	0	18	111	264	470	451	186	17	0	0	0	0	0	18	129	393	863	1314	1500	1517	1517	1517
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	23	49	146	265	410	541	691	686	483	267	64	21	23	72	218	483	893	1434	2125	2811	3294	3561	3625	3646

(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