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: WILLOWS 6 W, CA **COOP ID: 049699**

Climate Division: CA 2 **NWS Call Sign:** **Elevation: 233 Feet** **Lat: 39˚31N** **Lon: 122˚18W**

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	55.1	35.5	45.3	79+	1976	31	49.5	1978	20+	1973	7	41.6	1973	610	0	.0	.0	25.5	.0	10.2	.0
Feb	60.6	38.6	49.6	80+	1996	12	53.4	1991	21+	1989	4	45.4	1989	431	0	.0	.0	26.8	.1	4.6	.0
Mar	65.1	41.2	53.2	88	1972	17	58.3	1972	22	1971	5	46.6	1991	372	5	.0	.0	30.6	.0	2.1	.0
Apr	72.1	44.2	58.2	94	1951	10	64.0	1977	23	1995	16	53.0	1975	228	21	.0	.5	30.0	.0	.4	.0
May	80.2	51.1	65.7	106	1950	31	71.9	1992	31	1950	3	57.6	1998	106	126	.5	6.3	31.0	.0	@	.0
Jun	87.6	57.3	72.5	113	1961	16	77.6	1977	39	1988	8	65.5	1980	16	240	3.2	14.0	30.0	.0	.0	.0
Jul	92.7	60.4	76.6	117	1972	15	80.3	1984	45	1990	23	72.1	1987	0	357	5.2	22.5	31.0	.0	.0	.0
Aug	91.5	58.6	75.1	115	1990	9	78.5	1996	45	1991	27	71.9	1980	0	312	3.8	20.7	31.0	.0	.0	.0
Sep	88.0	55.8	71.9	115	1950	2	76.2	1991	37	1971	30	65.9	1986	12	218	2.5	15.4	30.0	.0	.0	.0
Oct	79.1	49.3	64.2	105	2001	2	69.7	1991	33+	1970	29	60.4	1984	102	77	.5	4.8	31.0	.0	.0	.0
Nov	63.9	40.2	52.1	92	1967	2	57.9	1995	22	1985	21	45.9	1994	391	2	.0	.0	29.4	.0	2.8	.0
Dec	55.6	35.2	45.4	81	1980	15	49.6	1995	11	1990	22	39.3	1972	606	0	.0	.0	25.3	@	10.3	.0
Ann	74.3	47.3	60.8	117	Jul 1972	15	80.3	Jul 1984	11	Dec 1990	22	39.3	Dec 1972	2874	1358	15.7	84.2	351.6	.1	30.4	.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

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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	3.89	3.05	2.26	1957	13	15.46	1995	.22	1975
Feb	3.59	2.63	3.37	1998	3	15.72	1998	.02	1971
Mar	2.94	2.84	3.58	1995	9	8.63	1995	.06	1994
Apr	.98	.91	1.63	1953	27	3.51	1983	.01	1973
May	.79	.44	1.55	1996	16	4.35	1998	.00+	1992
Jun	.29	.05	1.23	1982	29	1.81	1982	.00+	1996
Jul	.06	.00	.92	1974	8	1.00	1974	.00+	2000
Aug	.09	.00	.90	1965	12	.80	1990	.00+	2000
Sep	.34	.11	1.74	1989	16	2.97	1989	.00+	1999
Oct	.98	.84	2.33	1962	12	3.89	1982	.00+	1995
Nov	2.43	2.10	3.20	1964	9	7.31	1983	.00	1995
Dec	2.65	2.58	2.64	1955	19	9.07	1983	.00	1989
Ann	19.03	17.65	3.58	Mar 1995	9	15.72	Feb 1998	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.9	6.0	2.4	1.1
Feb	8.4	5.4	2.6	.8
Mar	8.9	5.8	2.0	.5
Apr	4.9	2.4	.5	.1
May	3.8	1.9	.3	.1
Jun	1.6	.8	.2	.1
Jul	.3	.1	@	.0
Aug	.7	.2	@	.0
Sep	1.8	.9	.1	@
Oct	4.0	2.1	.6	.2
Nov	7.4	4.6	1.6	.5
Dec	8.0	4.6	1.6	.6
Ann	59.7	34.8	11.9	4.0

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	.20	.41	.87	1.39	1.99	2.70	3.57	4.68	6.25	8.94	11.62
Feb	.10	.24	.60	1.05	1.59	2.26	3.11	4.24	5.87	8.71	11.61
Mar	.22	.41	.79	1.19	1.64	2.16	2.78	3.57	4.66	6.50	8.32
Apr	.03	.07	.17	.30	.45	.63	.86	1.17	1.60	2.36	3.13
May	.00	.00	.02	.11	.24	.41	.62	.92	1.35	2.11	2.90
Jun	.00	.00	.00	.00	.02	.07	.16	.29	.50	.89	1.29
Jul	.00	.00	.00	.00	.00	.00	.00	.00	.00	.16	.38
Aug	.00	.00	.00	.00	.00	.00	.00	.02	.13	.32	.52
Sep	.00	.00	.00	.00	.03	.11	.22	.37	.60	1.01	1.42
Oct	.00	.05	.18	.33	.49	.68	.91	1.20	1.61	2.30	2.99
Nov	.04	.18	.47	.80	1.19	1.65	2.21	2.94	3.97	5.72	7.48
Dec	.14	.38	.79	1.18	1.59	2.05	2.60	3.27	4.18	5.69	7.16
Ann	7.28	9.05	11.58	13.69	15.68	17.72	19.93	22.48	25.74	30.73	35.30

\+ 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)

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	.3	.0	#	0	4.0	1973	8	6.0	1973	#	1982	20	#	1982	.1	.1	@	.0	.0	.0	.0	.0	.0
Feb	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Mar	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.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	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	#	.0	0	0	#	1977	21	#	1977	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	.3	.0	#	0	3.3	1988	27	4.8	1988	3	1972	13	#+	1983	.1	.1	@	.0	.0	.1	@	.0	.0
Ann	.6	.0	N/A	N/A	4.0	Jan 1973	8	6.0	Jan 1973	3	Dec 1972	13	#+	Dec 1983	.2	.2	@	.0	.0	.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	5/12	5/05	4/29	4/25	4/21	4/16	4/12	4/06	3/30
32	4/24	4/09	3/29	3/20	3/12	3/04	2/23	2/12	1/29
28	3/19	3/04	2/21	2/12	2/03	1/25	1/15	1/02	12/08
24	2/18	1/31	1/17	1/03	12/13	0/00	0/00	0/00	0/00
20	12/27	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	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	10/26	10/31	11/04	11/07	11/10	11/12	11/15	11/19	11/24
32	11/07	11/13	11/17	11/21	11/24	11/28	12/01	12/05	12/11
28	11/17	11/25	11/30	12/05	12/10	12/14	12/19	12/26	1/07
24	12/05	12/18	12/29	1/10	1/29	0/00	0/00	0/00	0/00
20	12/23	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	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	228	219	213	207	202	197	192	186	177
32	299	284	274	265	256	248	239	228	214
28	>365	353	335	323	313	304	294	283	269
24	>365	>365	>365	>365	>365	>365	>365	>365	330
20	>365	>365	>365	>365	>365	>365	>365	>365	>365
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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	610	431	372	228	106	16	0	0	12	102	391	606	2874
60	455	293	234	123	46	3	0	0	1	38	253	451	1897
57	362	214	165	77	24	1	0	0	0	18	181	361	1403
55	301	166	127	51	16	0	0	0	0	9	139	303	1112
50	164	72	53	15	4	0	0	0	0	1	61	171	541
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	413	493	656	783	1043	1214	1380	1335	1196	999	601	417	10530
55	1	15	70	145	345	524	667	622	506	295	50	7	3247
57	0	7	46	110	292	464	605	560	446	241	32	2	2805
60	0	2	22	66	221	377	512	467	357	169	14	0	2207
65	0	0	5	21	126	240	357	312	218	77	2	0	1358
70	0	0	0	5	58	128	212	167	107	25	0	0	702

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	200	305	433	572	821	1001	1155	1107	981	774	386	203	200	505	938	1510	2331	3332	4487	5594	6575	7349	7735	7938
45	85	170	282	422	666	851	1000	952	831	619	241	86	85	255	537	959	1625	2476	3476	4428	5259	5878	6119	6205
50	27	66	150	277	512	701	845	797	681	464	123	22	27	93	243	520	1032	1733	2578	3375	4056	4520	4643	4665
55	1	16	56	156	359	551	690	642	531	314	44	0	1	17	73	229	588	1139	1829	2471	3002	3316	3360	3360
60	0	0	12	63	224	403	535	487	383	178	11	0	0	0	12	75	299	702	1237	1724	2107	2285	2296	2296
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	110	173	261	363	511	630	721	690	614	478	227	116	110	283	544	907	1418	2048	2769	3459	4073	4551	4778	4894

(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