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: TWITCHELL DAM, CA **COOP ID: 049111**

Climate Division: CA 6 **NWS Call Sign:** **Elevation: 582 Feet** **Lat: 34˚59N** **Lon: 120˚19W**

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	65.8	40.5	53.2	90	1976	18	56.8	1976	20	1987	16	48.7	1987	368	0	.0	@	30.4	.0	3.9	.0
Feb	66.4	42.8	54.6	89	1971	12	57.6	1995	19	1990	15	50.8	1979	291	0	.0	.0	28.0	.0	1.4	.0
Mar	67.3	43.7	55.5	95	1988	26	60.5	1972	26	1976	7	50.8	1973	291	10	.0	.1	30.9	.0	.7	.0
Apr	71.4	44.9	58.2	102	1989	6	62.7	1992	18	1979	11	53.5	1975	216	11	.1	.6	30.0	.0	.3	.0
May	72.8	47.8	60.3	100	1970	15	66.3	1997	31	1964	3	56.2	1998	175	30	.0	1.0	31.0	.0	.0	.0
Jun	77.5	50.8	64.2	106	1993	24	70.7	1976	36	1976	3	60.3	1982	92	67	.6	2.2	30.0	.0	.0	.0
Jul	79.9	53.1	66.5	106	1985	3	71.1	1992	42+	1990	7	63.3	1987	37	83	.2	1.7	31.0	.0	.0	.0
Aug	81.2	53.6	67.4	109	1969	4	72.1	1977	40	1968	25	64.3	1987	27	101	.2	2.2	31.0	.0	.0	.0
Sep	80.9	53.1	67.0	109	1980	30	75.8	1984	37	1986	20	61.1	1986	59	119	.6	3.7	30.0	.0	.0	.0
Oct	78.2	49.5	63.9	106	1987	4	67.9	1993	26	1971	30	60.4	1973	86	51	.4	3.0	31.0	.0	.1	.0
Nov	71.5	44.9	58.2	97	1966	1	63.9	1977	26	1975	29	52.2	1994	217	13	.0	.2	30.0	.0	1.2	.0
Dec	66.6	40.3	53.5	86+	1980	30	59.7	1977	19	1987	26	48.3	1971	359	2	.0	.0	30.8	.0	4.8	.0
Ann	73.3	47.1	60.2	109+	Sep 1980	30	75.8	Sep 1984	18	Apr 1979	11	48.3	Dec 1971	2218	487	2.1	14.7	364.1	.0	12.4	.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: 1962-2001

(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	3.66	3.79	2.57	1983	27	9.40	1995	.01	1976
Feb	3.80	3.38	2.76	1978	10	10.82	1998	.06	1977
Mar	3.80	3.19	2.46	1974	2	10.95	1995	.00	1972
Apr	1.10	.91	1.81	1982	11	4.35	1982	.00+	1992
May	.28	.06	1.25	1971	28	1.84	1977	.00+	1992
Jun	.05	.01	.33	1993	5	.43	1993	.00+	1996
Jul	.04	.00	.12	1976	16	.95	1992	.00+	2000
Aug	.05	.00	.93	1976	19	1.09	1976	.00+	2000
Sep	.39	.03	1.93	1976	29	4.69	1976	.00+	1996
Oct	.77	.72	1.37	1992	30	1.93	1982	.00+	1995
Nov	1.52	1.04	2.25	1982	30	5.88	1982	.00	1980
Dec	2.38	2.01	2.85	1966	6	6.59	1988	.05	1989
Ann	17.84	17.33	2.85	Dec 1966	6	10.95	Mar 1995	.00+	Aug 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.9	5.9	2.4	1.1
Feb	7.8	5.5	2.7	1.2
Mar	8.4	5.8	2.6	1.1
Apr	4.0	2.5	.8	.3
May	1.9	.9	.1	@
Jun	.7	.2	@	.0
Jul	.6	.1	.0	.0
Aug	.4	.1	@	.0
Sep	1.6	.7	.2	.1
Oct	2.8	1.5	.5	.2
Nov	5.5	3.3	1.1	.3
Dec	5.9	3.8	1.6	.6
Ann	47.5	30.3	12.0	4.9

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	.16	.34	.75	1.23	1.79	2.46	3.30	4.38	5.91	8.56	11.22
Feb	.20	.40	.85	1.36	1.94	2.64	3.49	4.58	6.12	8.75	11.38
Mar	.21	.57	1.15	1.71	2.31	2.97	3.74	4.69	5.98	8.11	10.18
Apr	.00	.04	.17	.32	.50	.72	.99	1.33	1.81	2.65	3.49
May	.00	.00	.00	.00	.04	.10	.18	.30	.48	.82	1.18
Jun	.00	.00	.00	.00	.00	.01	.03	.06	.10	.17	.24
Jul	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.28
Aug	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.30
Sep	.00	.00	.00	.00	.00	.02	.09	.26	.58	1.16	1.89
Oct	.00	.00	.00	.23	.40	.58	.77	1.00	1.32	1.84	2.33
Nov	.02	.10	.28	.49	.73	1.02	1.37	1.83	2.49	3.61	4.73
Dec	.16	.31	.61	.94	1.30	1.73	2.23	2.88	3.78	5.31	6.81
Ann	7.98	9.56	11.77	13.56	15.23	16.92	18.72	20.79	23.39	27.34	30.91

\+ 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	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Ann	.0	.0	N/A	N/A	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.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	5/21	5/04	4/22	4/12	4/03	3/24	3/14	3/02	2/13
32	4/03	3/18	3/06	2/23	2/13	2/02	1/20	12/31	0/00
28	2/15	2/02	1/23	1/13	1/03	12/21	0/00	0/00	0/00
24	1/15	12/26	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	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	10/20	10/29	11/04	11/10	11/15	11/20	11/25	12/02	12/11
32	11/09	11/18	11/25	12/02	12/08	12/14	12/22	1/02	0/00
28	11/22	12/04	12/14	12/23	1/02	1/15	0/00	0/00	0/00
24	12/20	1/10	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	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	283	263	249	237	226	214	202	188	168
32	>365	>365	353	320	301	286	272	256	235
28	>365	>365	>365	>365	>365	348	327	310	292
24	>365	>365	>365	>365	>365	>365	>365	>365	>365
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)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	368	291	291	216	175	92	37	27	59	86	217	359	2218
60	222	159	177	106	83	30	5	3	16	21	109	219	1150
57	146	93	120	60	43	12	0	0	7	7	63	148	699
55	105	61	88	36	25	6	0	0	3	2	40	110	476
50	33	11	29	8	6	0	0	0	0	0	9	38	134
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	655	633	728	785	878	964	1070	1097	1050	988	786	666	10300
55	48	50	103	131	190	281	357	384	362	277	136	62	2381
57	26	26	73	95	146	227	295	323	306	220	99	38	1874
60	9	8	38	51	93	154	206	232	225	141	55	16	1228
65	0	0	10	11	30	67	83	101	119	51	13	2	487
70	0	0	0	0	7	17	16	25	46	10	1	0	122

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	367	427	486	545	632	721	803	828	792	727	511	405	367	794	1280	1825	2457	3178	3981	4809	5601	6328	6839	7244
45	218	282	331	395	477	571	648	673	642	572	361	254	218	500	831	1226	1703	2274	2922	3595	4237	4809	5170	5424
50	100	151	184	246	322	421	493	518	492	417	217	122	100	251	435	681	1003	1424	1917	2435	2927	3344	3561	3683
55	30	56	76	119	172	272	338	363	342	265	104	40	30	86	162	281	453	725	1063	1426	1768	2033	2137	2177
60	2	14	24	41	67	130	183	209	196	132	35	6	2	16	40	81	148	278	461	670	866	998	1033	1039
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	218	248	280	330	371	430	493	519	487	453	325	265	218	466	746	1076	1447	1877	2370	2889	3376	3829	4154	4419

(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