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: BAY CITY WATERWORKS, TX **COOP ID: 410569**

Climate Division: TX 8 **NWS Call Sign:** **Elevation: 52 Feet** **Lat: 28˚59N** **Lon: 95˚59W**

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	65.7	45.7	55.7	84	1916	20	62.2	2000	11	1949	31	47.2	1978	320	33	.0	.0	26.6	.1	4.3	.0
Feb	69.3	48.7	59.0	90+	1962	10	67.4	2000	14	1951	2	48.9	1978	211	43	.0	.0	25.7	.2	2.4	.0
Mar	75.2	55.5	65.4	91	1974	30	71.9	2000	22	1980	2	59.2	1996	81	91	.0	.1	30.6	.0	.5	.0
Apr	80.1	60.2	70.2	93	1982	6	75.1	1972	34	1973	9	65.9	1973	16	171	.0	.5	30.0	.0	.0	.0
May	85.6	68.1	76.9	98	1953	1	81.3	1996	43	1954	4	73.7	1993	0	367	.0	2.6	31.0	.0	.0	.0
Jun	90.0	73.1	81.6	100+	1998	18	85.8	1998	57	1974	25	78.6	1973	0	496	.1	15.7	30.0	.0	.0	.0
Jul	92.4	75.2	83.8	107	1998	17	88.1	1998	61	1967	16	81.9	1989	0	584	1.1	27.0	31.0	.0	.0	.0
Aug	92.7	74.6	83.7	105	1962	14	86.7	2000	58+	1967	14	81.1	1992	0	577	.5	26.0	31.0	.0	.0	.0
Sep	89.7	70.4	80.1	109+	2000	6	84.0	1998	46+	1942	28	76.3	1974	0	452	.2	16.8	30.0	.0	.0	.0
Oct	83.5	61.7	72.6	97+	1956	8	75.2	1971	29	1993	31	64.4	1976	9	246	.0	2.5	31.0	.0	.0	.0
Nov	74.9	54.3	64.6	92	1963	7	70.2	1998	24	1959	18	54.7	1976	125	113	.0	.0	29.3	.0	.7	.0
Dec	67.7	47.0	57.4	88	1912	5	65.9	1984	7+	1989	24	47.6	1989	276	39	.0	.0	28.4	.2	2.9	.0
Ann	80.6	61.2	70.9	109+	Sep 2000	6	88.1	Jul 1998	7+	Dec 1989	24	47.2	Jan 1978	1038	3212	1.9	91.2	354.6	.5	10.8	.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: 1909-2001

(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	3.89	3.25	6.24	1989	29	12.96	1991	.37	1971
Feb	2.97	2.33	3.86	1992	3	8.13	1992	.37	1976
Mar	3.00	2.07	4.45	1979	21	9.57	1997	.35	1971
Apr	3.18	2.62	6.31	1991	4	11.00	1991	.02	1984
May	4.90	4.23	7.18	1982	7	11.49	1982	.00	1998
Jun	4.68	4.00	5.76	1981	5	13.88	1981	.14	1980
Jul	3.89	3.04	4.24	1983	16	15.79	1979	.12	1982
Aug	3.48	2.99	7.23	1953	30	9.56	1996	.32	1987
Sep	5.61	4.33	8.95	1961	12	17.22	1998	.33	1975
Oct	5.13	3.63	5.90	1949	3	23.73	1984	.10	1978
Nov	3.97	3.42	6.23	1965	4	12.43	2000	.36	1973
Dec	3.33	2.84	6.20	1995	17	9.07	1995	.00	1977
Ann	48.03	47.01	8.95	Sep 1961	12	23.73	Oct 1984	.00+	May 1998

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.4	6.2	2.4	1.0
Feb	8.3	4.7	1.8	.8
Mar	6.9	4.2	1.9	.9
Apr	5.8	3.5	1.6	1.1
May	7.8	4.8	2.6	1.6
Jun	8.2	6.0	2.9	1.5
Jul	7.6	4.5	2.2	1.3
Aug	8.3	5.6	1.9	.8
Sep	9.5	6.3	2.7	1.6
Oct	7.3	5.2	2.8	1.7
Nov	7.9	4.9	2.4	1.3
Dec	8.8	5.0	2.0	1.0
Ann	96.8	60.9	27.2	14.6

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	.73	1.08	1.65	2.18	2.71	3.29	3.95	4.74	5.79	7.49	9.10
Feb	.45	.70	1.14	1.55	1.97	2.44	2.98	3.63	4.51	5.95	7.32
Mar	.35	.58	1.00	1.42	1.86	2.36	2.94	3.66	4.64	6.26	7.83
Apr	.18	.36	.75	1.18	1.67	2.24	2.94	3.84	5.10	7.24	9.38
May	.24	.68	1.42	2.14	2.91	3.77	4.78	6.04	7.75	10.59	13.36
Jun	.56	.93	1.59	2.24	2.93	3.70	4.60	5.71	7.22	9.70	12.11
Jul	.32	.59	1.10	1.64	2.23	2.91	3.72	4.74	6.14	8.49	10.80
Aug	.47	.75	1.25	1.74	2.25	2.81	3.46	4.26	5.34	7.10	8.81
Sep	.54	.95	1.71	2.49	3.34	4.30	5.43	6.84	8.78	12.01	15.17
Oct	.46	.81	1.50	2.21	2.99	3.88	4.93	6.25	8.07	11.10	14.07
Nov	.53	.85	1.42	1.97	2.55	3.20	3.94	4.85	6.09	8.11	10.06
Dec	.43	.86	1.42	1.89	2.37	2.87	3.43	4.10	4.99	6.40	7.73
Ann	30.48	33.73	37.98	41.26	44.20	47.08	50.08	53.43	57.54	63.57	68.84

+ 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: 1909-2001
(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	3/25	3/16	3/10	3/04	2/27	2/22	2/17	2/11	2/02
32	3/17	3/05	2/25	2/18	2/11	2/04	1/27	1/17	12/29
28	2/25	2/13	2/04	1/27	1/19	1/09	12/28	0/00	0/00
24	2/10	1/30	1/22	1/13	1/02	0/00	0/00	0/00	0/00
20	1/19	1/07	12/25	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	11/02	11/10	11/15	11/20	11/24	11/29	12/04	12/09	12/17
32	11/17	11/26	12/02	12/08	12/13	12/18	12/24	1/01	1/15
28	11/29	12/09	12/17	12/24	12/31	1/08	1/21	0/00	0/00
24	12/16	12/29	1/09	1/20	2/02	0/00	0/00	0/00	0/00
20	12/27	1/08	1/21	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	304	292	284	276	269	262	255	246	234
32	>365	352	329	316	306	297	287	276	262
28	>365	>365	>365	>365	350	335	324	312	297
24	>365	>365	>365	>365	>365	>365	356	339	324
20	>365	>365	>365	>365	>365	>365	>365	>365	358
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	320	211	81	16	0	0	0	0	0	9	125	276	1038
60	209	127	27	2	0	0	0	0	0	1	61	174	601
57	158	86	12	0	0	0	0	0	0	0	36	125	417
55	126	64	6	0	0	0	0	0	0	0	25	96	317
50	61	25	1	0	0	0	0	0	0	0	8	41	136
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	736	756	1033	1145	1390	1486	1607	1600	1442	1260	978	786	14219
55	149	176	327	455	677	796	894	887	752	547	313	168	6141
57	118	143	270	395	615	736	832	825	692	485	265	135	5511
60	77	99	192	306	522	646	739	732	602	393	200	91	4599
65	33	43	91	171	367	496	584	577	452	246	113	39	3212
70	13	16	28	72	218	346	429	422	303	121	51	15	2034

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	429	497	728	881	1122	1246	1354	1340	1181	984	692	497	429	926	1654	2535	3657	4903	6257	7597	8778	9762	10454	10951
45	300	361	576	731	967	1096	1199	1185	1031	829	543	354	300	661	1237	1968	2935	4031	5230	6415	7446	8275	8818	9172
50	187	243	425	581	812	946	1044	1030	881	674	402	233	187	430	855	1436	2248	3194	4238	5268	6149	6823	7225	7458
55	101	142	287	432	657	796	889	875	731	521	273	138	101	243	530	962	1619	2415	3304	4179	4910	5431	5704	5842
60	46	65	160	290	502	646	734	720	581	372	169	70	46	111	271	561	1063	1709	2443	3163	3744	4116	4285	4355
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	252	297	453	586	798	883	946	927	823	667	436	297	252	549	1002	1588	2386	3269	4215	5142	5965	6632	7068	7365

(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