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: NEWCASTLE, WY **COOP ID: 486660**

Climate Division: WY 7 **NWS Call Sign:** **Elevation: 4,315 Feet** **Lat: 43˚51N** **Lon: 104˚13W**

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	32.7	10.7	21.7	66	1953	12	30.9	1992	-37	1930	17	7.0	1979	1341	0	.0	.0	2.5	12.0	30.7	6.8
Feb	38.1	15.0	26.6	69	1995	25	36.6	1992	-33	1936	8	15.4	1989	1077	0	.0	.0	5.5	7.1	27.3	3.8
Mar	47.2	23.5	35.4	82+	1918	30	42.0	1986	-17	1920	6	28.1	1971	919	0	.0	.0	15.0	3.4	26.0	.8
Apr	57.5	32.6	45.1	88	1962	20	51.4	1987	-13	1936	2	39.5	1975	598	0	.0	.0	22.5	.6	15.2	@
May	67.8	42.4	55.1	98	1934	28	61.2	1994	11	1954	2	50.5	1995	317	10	.0	.2	29.8	.0	3.5	.0
Jun	79.4	51.6	65.5	104	1974	26	73.9	1988	28	1951	2	57.8	1998	95	109	.2	4.6	29.8	.0	@	.0
Jul	87.1	58.1	72.6	108	1936	5	76.9	1989	37	1921	3	65.5	1993	15	250	1.2	13.0	31.0	.0	.0	.0
Aug	84.9	56.4	70.7	105	1937	14	76.2	2000	35	1966	22	66.3	1977	35	210	.2	10.4	31.0	.0	.0	.0
Sep	73.4	46.1	59.8	101	1940	1	68.0	1998	12	1926	25	54.2	1985	209	52	@	2.3	29.3	.0	2.1	.0
Oct	60.4	34.5	47.5	90+	1992	3	50.9	1988	-11	1925	28	42.7	1984	545	0	.0	.1	26.1	.4	11.9	.0
Nov	42.7	21.8	32.3	78+	1999	8	43.4	1999	-21	1985	23	17.0	1985	983	0	.0	.0	9.4	5.4	25.3	1.1
Dec	34.0	12.6	23.3	68	1939	5	30.8	1994	-35	1983	21	8.1	1983	1292	0	.0	.0	2.8	10.9	30.6	4.9
Ann	58.8	33.8	46.3	108	Jul 1936	5	76.9	Jul 1989	-37	Jan 1930	17	7.0	Jan 1979	7426	631	1.6	30.6	234.7	39.8	172.6	17.4

+ 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: 1918-2001

(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	.44	.42	.69	1953	14	1.22	1999	.05	1989
Feb	.58	.59	.53	1990	13	1.56	1987	.00	1983
Mar	.77	.71	.73	1998	30	1.91	1998	.07	1974
Apr	1.61	1.63	1.72+	2000	19	3.22	1986	.02	1987
May	2.55	2.38	2.34	1929	26	6.00	1991	.47	1973
Jun	2.42	1.75	2.70	1964	8	6.35	1999	.44	1981
Jul	2.09	1.83	2.25	1997	19	6.23	1997	.39	1994
Aug	1.82	1.71	2.25	1996	29	4.12	1996	.15	1975
Sep	1.16	.96	2.60	1923	29	4.22	1986	.05	1975
Oct	1.32	.87	2.19	1994	7	4.13	1998	.07	1979
Nov	.70	.64	.80	1924	6	1.65	1983	.23	1979
Dec	.58	.57	.95	1992	13	1.59	1996	.02+	1991
Ann	16.04	15.30	2.70	Jun 1964	8	6.35	Jun 1999	.00	Feb 1983

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.9	1.6	.0	.0
Feb	5.3	2.2	@	.0
Mar	6.5	2.8	.2	.0
Apr	8.3	4.6	.7	.1
May	11.5	6.5	1.3	.2
Jun	10.3	5.7	1.5	.4
Jul	9.2	4.8	1.1	.5
Aug	7.2	4.2	1.1	.3
Sep	5.6	3.2	.6	.1
Oct	5.9	3.4	.8	.1
Nov	5.7	2.7	.1	.0
Dec	5.5	2.1	.1	.0
Ann	85.9	43.8	7.5	1.7

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	.05	.09	.15	.21	.27	.35	.43	.53	.67	.91	1.13
Feb	.10	.17	.27	.35	.43	.51	.61	.71	.85	1.08	1.28
Mar	.12	.19	.30	.40	.51	.63	.77	.94	1.16	1.52	1.87
Apr	.29	.43	.67	.88	1.11	1.35	1.63	1.96	2.40	3.12	3.80
May	.69	.93	1.30	1.62	1.94	2.27	2.64	3.07	3.64	4.53	5.36
Jun	.46	.67	1.03	1.36	1.69	2.05	2.46	2.95	3.60	4.65	5.64
Jul	.42	.61	.91	1.19	1.48	1.78	2.13	2.55	3.10	3.98	4.82
Aug	.34	.51	.77	1.02	1.27	1.54	1.85	2.22	2.71	3.51	4.26
Sep	.13	.22	.38	.55	.72	.91	1.14	1.42	1.80	2.43	3.04
Oct	.12	.21	.38	.57	.77	.99	1.26	1.61	2.07	2.86	3.63
Nov	.22	.29	.39	.47	.56	.64	.73	.84	.98	1.19	1.39
Dec	.05	.08	.16	.24	.33	.43	.55	.70	.91	1.26	1.61
Ann	10.36	11.42	12.80	13.85	14.80	15.73	16.70	17.77	19.09	21.02	22.70

\+ 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: 1918-2001
(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	5.8	5.7	3	2	5.2	1991	28	14.0	1994	13+	1993	12	9	1993	4.1	3.2	.6	@	.0	17.8	11.9	8.1	2.0
Feb	6.6	5.0	2	1	7.0	1990	13	20.0	1994	12+	1993	28	10	1993	3.6	3.0	.9	.2	.0	11.1	7.9	5.0	1.7
Mar	6.1	5.0	1	#	9.0	1998	7	15.9	1989	12	1998	7	3	1998	3.2	2.9	1.0	.2	.0	4.4	2.4	1.1	.2
Apr	3.6	3.5	#	0	8.0	1975	8	14.0	1984	7	1997	11	2	1997	1.7	1.6	.5	.1	.0	1.4	.6	.2	.0
May	.3	.0	#	0	4.5	1991	3	4.5	1991	#+	2000	13	#+	2000	.1	.1	@	.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	.3	.0	#	0	3.0	2000	23	3.0	2000	3	2000	23	#+	2000	.2	.2	@	.0	.0	.2	@	.0	.0
Oct	1.1	.0	#	0	8.0	1987	9	8.5	1987	6	1995	31	#+	1999	.6	.4	.2	.1	.0	.4	.2	.1	.0
Nov	6.0	4.0	1	1	8.0	1977	19	21.0	1985	13	1985	30	6	1985	3.0	2.6	.8	.1	.0	7.1	4.0	2.2	.1
Dec	7.8	9.0	3	2	10.0	1980	1	24.0	1996	18	1996	26	11	1983	4.1	3.0	.9	.3	.1	15.9	10.9	7.2	1.8
Ann	37.6	32.2	N/A	N/A	10.0	Dec 1980	1	24.0	Dec 1996	18	Dec 1996	26	11	Dec 1983	20.6	17.0	4.9	1.0	.1	58.3	37.9	23.9	5.8

+ 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	6/20	6/13	6/09	6/05	6/01	5/28	5/24	5/19	5/13
32	5/27	5/23	5/19	5/17	5/14	5/12	5/09	5/06	5/02
28	5/12	5/08	5/05	5/03	5/01	4/29	4/26	4/24	4/20
24	5/04	4/29	4/25	4/21	4/18	4/15	4/12	4/08	4/02
20	4/24	4/19	4/15	4/11	4/08	4/04	4/01	3/28	3/22
16	4/16	4/10	4/05	3/31	3/28	3/24	3/19	3/15	3/08

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	9/07	9/11	9/13	9/15	9/17	9/19	9/21	9/23	9/27
32	9/11	9/15	9/18	9/21	9/23	9/25	9/28	10/01	10/05
28	9/16	9/22	9/26	9/30	10/03	10/07	10/10	10/15	10/21
24	9/25	10/01	10/06	10/09	10/13	10/16	10/20	10/24	10/30
20	10/06	10/12	10/16	10/20	10/23	10/27	10/30	11/03	11/09
16	10/16	10/22	10/25	10/29	11/01	11/04	11/07	11/11	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	128	121	116	112	108	103	99	94	87
32	151	144	139	135	131	127	123	118	111
28	177	169	164	159	155	150	146	140	132
24	199	191	186	181	177	172	168	162	155
20	224	215	208	203	198	193	187	181	172
16	241	233	227	222	217	213	208	202	194

***** 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	1341	1077	919	598	317	95	15	35	209	545	983	1292	7426
60	1186	937	764	450	190	39	2	10	117	392	833	1137	6057
57	1093	853	671	364	128	19	0	4	75	303	743	1044	5297
55	1031	797	609	310	94	11	0	2	53	248	685	982	4822
50	878	663	460	189	35	2	0	0	17	131	546	828	3749
32	386	246	76	5	0	0	0	0	0	3	159	339	1214

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	68	93	179	396	715	1004	1258	1198	832	480	166	70	6459
55	0	0	0	12	96	325	545	487	195	12	2	0	1674
57	0	0	0	6	68	273	483	427	157	6	0	0	1420
60	0	0	0	2	37	202	392	340	109	2	0	0	1084
65	0	0	0	0	10	109	250	210	52	0	0	0	631
70	0	0	0	0	2	47	135	110	19	0	0	0	313

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	0	11	72	227	501	783	1025	973	623	284	49	5	0	11	83	310	811	1594	2619	3592	4215	4499	4548	4553
45	0	1	26	130	355	633	870	818	481	167	16	0	0	1	27	157	512	1145	2015	2833	3314	3481	3497	3497
50	0	0	4	68	221	486	715	663	345	87	2	0	0	0	4	72	293	779	1494	2157	2502	2589	2591	2591
55	0	0	0	27	120	343	560	510	227	32	0	0	0	0	0	27	147	490	1050	1560	1787	1819	1819	1819
60	0	0	0	7	55	216	406	359	129	7	0	0	0	0	0	7	62	278	684	1043	1172	1179	1179	1179
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	14	66	165	318	497	660	628	399	198	39	5	1	15	81	246	564	1061	1721	2349	2748	2946	2985	2990

(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

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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