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: ROYAL OAK 2 SSW, MD **COOP ID: 187806**

Climate Division: MD 2 **NWS Call Sign:** **Elevation: 10 Feet** **Lat: 38˚43N** **Lon: 76˚11W**

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	43.7	28.4	36.1	77	1950	25	43.4	1990	-6	1982	18	25.4	1977	898	0	.0	.0	7.9	4.4	21.5	.2
Feb	46.8	30.1	38.5	75+	1976	17	45.8	1990	-3	1979	14	26.8	1979	743	0	.0	.0	10.2	2.7	18.3	@
Mar	55.8	37.5	46.7	87	1998	30	51.7	1977	13+	1960	11	41.9	1984	570	0	.0	.0	22.3	.3	9.9	.0
Apr	66.2	45.9	56.1	93	1990	27	61.1	1994	23	1982	7	51.6	1975	273	6	.0	.2	29.0	.0	1.2	.0
May	75.6	55.8	65.7	95+	1962	19	71.5	1991	35+	1957	4	62.0	1997	68	90	.0	.9	31.0	.0	.0	.0
Jun	83.8	64.6	74.2	101	1959	29	77.7	1994	43	1997	9	70.5	1972	2	279	.0	3.8	30.0	.0	.0	.0
Jul	88.0	69.2	78.6	101+	1954	31	81.9	1993	51	1977	28	74.2	2000	0	423	@	9.9	31.0	.0	.0	.0
Aug	86.4	67.4	76.9	101	1953	31	80.3	1988	45+	1986	29	74.0	1992	0	370	.0	6.9	31.0	.0	.0	.0
Sep	80.3	61.1	70.7	97+	1954	6	75.3	1998	37	1963	24	68.3	1984	13	185	.0	1.8	30.0	.0	.0	.0
Oct	69.5	50.1	59.8	95	1954	4	65.9	1971	25	1969	24	55.2	1988	198	38	.0	.0	30.8	.0	.6	.0
Nov	58.8	41.4	50.1	84	1950	1	56.2	1985	16	1955	29	43.9	1976	449	1	.0	.0	23.8	.0	5.6	.0
Dec	48.6	32.9	40.8	76	1998	6	46.9	1984	4	1983	25	28.3	1989	753	0	.0	.0	13.3	1.8	15.9	.0
Ann	67.0	48.7	57.9	101+	Jun 1959	29	81.9	Jul 1993	-6	Jan 1982	18	25.4	Jan 1977	3967	1392	@	23.5	290.3	9.2	73.0	.2

\+ 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

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: ROYAL OAK 2 SSW, MD

COOP ID: 187806

Climate Division: MD 2 **NWS Call Sign:** **Elevation: 10 Feet** **Lat: 38˚43N** **Lon: 76˚11W**

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	4.11	3.82	2.68	1998	28	7.68	1978	.58	1981
Feb	3.35	3.04	2.60	1973	2	7.30	1979	.96	1977
Mar	4.44	4.57	3.61	1978	26	9.80	1994	1.35	1981
Apr	3.50	3.50	2.36	1983	16	9.02	1983	.57	1985
May	4.13	3.52	4.11	1979	24	10.17	1990	.56	1999
Jun	3.47	3.27	3.31	1967	18	9.37	1989	.26	1988
Jul	4.22	4.16	4.65	1960	30	10.72	1975	.83	1983
Aug	4.10	3.88	7.12	1959	8	9.04	1971	.78	1995
Sep	3.99	3.38	7.90	1999	16	12.86	1999	.74	1986
Oct	3.46	3.15	3.93	1953	29	7.90	1971	.07	2000
Nov	3.43	3.11	2.55	1951	1	6.80	1997	.63	1981
Dec	3.67	3.05	2.68	1983	13	8.95	1983	.69	1980
Ann	45.87	43.75	7.90	Sep 1999	16	12.86	Sep 1999	.07	Oct 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.7	7.5	3.1	1.1
Feb	9.6	6.4	2.2	.8
Mar	10.6	7.4	3.1	1.3
Apr	9.9	7.0	2.6	.6
May	10.2	6.9	3.2	.8
Jun	9.0	6.6	2.5	.7
Jul	9.5	6.6	2.6	1.2
Aug	8.4	5.9	2.8	1.4
Sep	8.1	5.5	2.7	1.3
Oct	7.8	5.2	2.3	1.1
Nov	8.9	5.7	2.4	1.1
Dec	9.8	6.7	2.5	.9
Ann	112.5	77.4	32.0	12.3

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	1.41	1.80	2.36	2.84	3.30	3.77	4.29	4.89	5.66	6.85	7.95
Feb	1.02	1.34	1.82	2.22	2.62	3.03	3.48	4.01	4.70	5.77	6.76
Mar	1.41	1.83	2.45	2.99	3.50	4.04	4.63	5.32	6.20	7.58	8.86
Apr	1.20	1.53	2.01	2.42	2.81	3.21	3.65	4.16	4.82	5.84	6.77
May	1.19	1.58	2.17	2.68	3.18	3.70	4.28	4.96	5.84	7.21	8.50
Jun	.79	1.11	1.62	2.08	2.53	3.02	3.56	4.21	5.06	6.42	7.70
Jul	1.10	1.50	2.11	2.65	3.18	3.74	4.36	5.10	6.06	7.58	8.99
Aug	1.23	1.62	2.20	2.70	3.19	3.70	4.26	4.91	5.76	7.09	8.33
Sep	1.03	1.40	1.98	2.49	3.00	3.53	4.12	4.82	5.73	7.17	8.52
Oct	.67	.98	1.49	1.95	2.43	2.94	3.51	4.21	5.13	6.61	8.01
Nov	.89	1.21	1.71	2.15	2.58	3.03	3.54	4.14	4.92	6.15	7.31
Dec	.86	1.21	1.74	2.22	2.70	3.20	3.77	4.44	5.33	6.73	8.05
Ann	33.30	35.75	38.88	41.24	43.34	45.36	47.45	49.75	52.53	56.56	60.03

\+ 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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: ROYAL OAK 2 SSW, MD **COOP ID: 187806**

Climate Division: MD 2 **NWS Call Sign:** **Elevation: 10 Feet** **Lat: 38°43N** **Lon: 76°11W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	5.1	3.7	1	#
Feb	4.9	2.3	1	#
Mar	1.4	.3	#	0
Apr	.1	.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	.4	.0	#	0
Dec	1.4	.0	#	#
Ann	13.3	6.3	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	13.0	2000	25	21.5	1987	17	1987	26	4	1996
Feb	20.0	1979	19	31.6	1979	27	1979	19	7	1979
Mar	6.0	1978	3	9.0	1978	6	1980	2	1	1978
Apr	1.5	1997	1	1.5	1997	#+	2000	9	#+	2000
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	.3	1979	10	.3	1979	0	0	0	0	0
Nov	6.0	1989	23	6.0	1989	5	1989	23	#+	1996
Dec	5.5	1982	12	13.6	1989	8	1989	13	3	1989
Ann	20.0	Feb 1979	19	31.6	Feb 1979	27	Feb 1979	19	7	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.6	1.6	.7	.2	.1
Feb	2.2	1.5	.6	.3	.1
Mar	.8	.5	.1	.1	.0
Apr	.1	@	.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	@	.0	.0	.0	.0
Nov	.2	.2	.1	@	.0
Dec	1.0	.6	.1	@	.0
Ann	6.9	4.4	1.6	.6	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	4.6	2.8	1.4	.4
Feb	3.4	2.1	1.1	.2
Mar	.6	.3	.1	.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	.1	.1	@	.0
Dec	1.3	.7	.2	.0
Ann	10.0	6.0	2.8	.6

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: ROYAL OAK 2 SSW, MD **COOP ID: 187806**

Climate Division: MD 2 **NWS Call Sign:** **Elevation: 10 Feet** **Lat: 38˚43N** **Lon: 76˚11W**

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	4/27	4/23	4/20	4/18	4/16	4/13	4/11	4/08	4/04
32	4/15	4/11	4/08	4/05	4/03	4/01	3/29	3/26	3/22
28	4/03	3/29	3/26	3/23	3/20	3/17	3/14	3/11	3/06
24	3/24	3/18	3/14	3/10	3/07	3/03	2/28	2/23	2/18
20	3/11	3/06	3/01	2/26	2/22	2/19	2/15	2/11	2/04
16	2/28	2/22	2/17	2/13	2/09	2/06	2/01	1/27	1/17

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	10/06	10/12	10/15	10/18	10/22	10/25	10/28	10/31	11/06
32	10/19	10/25	10/29	11/02	11/05	11/09	11/12	11/16	11/22
28	11/02	11/08	11/12	11/15	11/19	11/22	11/25	11/29	12/05
24	11/19	11/25	11/30	12/04	12/07	12/11	12/15	12/19	12/26
20	12/03	12/09	12/13	12/17	12/20	12/24	12/27	1/01	1/08
16	12/13	12/20	12/26	12/31	1/04	1/09	1/14	1/21	2/02

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	207	201	196	192	188	184	180	176	169
32	237	230	224	220	215	211	206	201	194
28	265	257	252	247	243	238	234	228	221
24	298	290	284	279	275	270	265	259	251
20	324	313	308	303	299	295	291	286	280
16	>365	358	343	334	328	321	315	308	298

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: ROYAL OAK 2 SSW, MD **COOP ID: 187806**

Climate Division: MD 2 **NWS Call Sign:** **Elevation: 10 Feet** **Lat: 38˚43N** **Lon: 76˚11W**

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	898	743	570	273	68	2	0	0	13	198	449	753	3967
60	743	603	415	148	19	0	0	0	2	104	309	600	2943
57	650	522	328	91	7	0	0	0	0	64	232	514	2408
55	595	470	272	61	3	0	0	0	0	44	187	456	2088
50	451	342	153	16	0	0	0	0	0	13	97	322	1394
32	93	50	3	0	0	0	0	0	0	0	1	41	188

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	218	231	457	723	1045	1266	1446	1393	1162	863	543	311	9658
55	8	7	12	94	335	576	733	680	472	193	39	13	3162
57	1	3	7	63	276	516	671	618	412	151	24	9	2751
60	0	0	1	31	196	426	578	525	324	98	11	2	2192
65	0	0	0	6	90	279	423	370	185	38	1	0	1392
70	0	0	0	0	28	146	269	219	75	10	0	0	747

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	60	90	232	475	784	1015	1187	1137	911	600	304	115	60	150	382	857	1641	2656	3843	4980	5891	6491	6795	6910
45	28	45	129	333	629	865	1032	982	761	447	187	51	28	73	202	535	1164	2029	3061	4043	4804	5251	5438	5489
50	5	17	64	203	474	715	877	827	611	298	98	19	5	22	86	289	763	1478	2355	3182	3793	4091	4189	4208
55	1	2	28	105	321	565	722	672	461	178	46	5	1	3	31	136	457	1022	1744	2416	2877	3055	3101	3106
60	0	0	5	46	192	415	567	517	317	88	15	0	0	0	5	51	243	658	1225	1742	2059	2147	2162	2162
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	31	48	119	265	488	703	836	802	610	353	153	51	31	79	198	463	951	1654	2490	3292	3902	4255	4408	4459

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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