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: LOWELL, IN **COOP ID: 125174**

Climate Division: IN 1 **NWS Call Sign:** **Elevation: 665 Feet** **Lat: 41˚16N** **Lon: 87˚25W**

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	30.1	12.1	21.1	65+	1967	24	33.1	1990	-28	1977	16	5.2	1977	1362	0	.0	.0	1.3	17.5	29.2	6.9
Feb	35.6	16.1	25.9	73	2000	26	36.8	1998	-21+	1979	5	11.2	1979	1097	0	.0	.0	3.2	11.8	25.3	4.3
Mar	47.3	26.7	37.0	84	1986	31	44.2	1973	-8	1978	5	29.2	1978	869	0	.0	.0	12.1	3.3	22.3	.2
Apr	59.5	36.8	48.2	91	1986	26	53.6	1985	7	1982	7	43.3	1975	507	1	.0	@	23.5	.1	9.8	.0
May	71.5	47.4	59.5	95+	1964	18	67.1	1991	26+	1966	10	53.9	1997	234	62	.0	1.4	30.5	.0	1.0	.0
Jun	80.4	57.7	69.1	104+	1988	25	73.8	1991	33	1972	11	63.0	1982	39	161	.2	4.6	30.0	.0	.0	.0
Jul	83.6	61.8	72.7	101+	1980	21	76.9	1999	41+	1972	5	69.4	1979	6	245	.3	7.0	31.0	.0	.0	.0
Aug	81.4	59.6	70.5	104+	1988	1	77.4	1995	38	1986	29	66.0	1992	28	198	.3	3.0	31.0	.0	.0	.0
Sep	75.4	51.4	63.4	98	1983	10	69.0	1998	28	1995	23	58.2	1975	106	60	.0	1.5	30.0	.0	.2	.0
Oct	63.5	39.0	51.3	92	1963	6	59.3	1971	18+	1976	28	44.3	1976	434	7	.0	@	28.5	.0	7.0	.0
Nov	48.4	29.8	39.1	77	1964	3	45.0	1999	2	1976	30	30.7	1976	778	0	.0	.0	13.5	1.6	18.0	.0
Dec	35.1	18.7	26.9	69	1982	2	36.8	1982	-21	1976	31	13.7	2000	1182	0	.0	.0	3.4	11.1	27.3	2.9
Ann	59.3	38.1	48.7	104+	Aug 1988	1	77.4	Aug 1995	-28	Jan 1977	16	5.2	Jan 1977	6642	734	.8	17.5	238.0	45.4	140.1	14.3

\+ 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: 1963-2001

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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	1.84	1.46	1.65	1975	10	4.60	1975	.12	1986
Feb	1.68	1.19	2.53	1968	1	4.78	1976	.52	1991
Mar	2.96	2.72	1.73	1976	5	5.69	1977	1.07	1996
Apr	4.11	4.03	3.88	1981	14	11.62	1981	.72	1971
May	4.33	4.57	2.91	1989	29	8.22	1987	.64	1992
Jun	4.79	4.07	5.85	1972	13	10.27	1993	.50	1991
Jul	3.87	3.90	2.86	1972	18	7.11	1996	.62	1991
Aug	3.87	3.61	5.28	1968	17	8.19	1980	.92	1996
Sep	3.33	2.44	3.20	1992	9	7.87	1972	.00	1979
Oct	2.98	2.66	2.92	1986	3	8.11	1991	.71	1992
Nov	3.57	3.26	5.14	1990	27	9.55	1985	.57	1999
Dec	2.71	2.48	3.50	1965	24	6.29	1971	.48	1995
Ann	40.04	38.65	5.85	Jun 1972	13	11.62	Apr 1981	.00	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.8	4.8	1.1	.1
Feb	9.5	4.4	.7	.3
Mar	11.6	6.6	2.1	.4
Apr	13.3	7.6	2.7	1.2
May	12.0	7.6	2.8	1.2
Jun	10.6	7.6	2.8	1.2
Jul	10.2	6.5	2.8	1.1
Aug	9.7	6.0	2.4	1.1
Sep	9.6	5.6	2.1	1.1
Oct	10.3	6.0	1.9	.7
Nov	11.7	6.9	2.3	.8
Dec	12.2	6.0	1.5	.6
Ann	131.5	75.6	25.2	9.8

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	.29	.45	.72	.97	1.24	1.52	1.85	2.25	2.79	3.66	4.49
Feb	.41	.56	.81	1.03	1.24	1.47	1.73	2.04	2.44	3.07	3.66
Mar	1.02	1.30	1.71	2.05	2.38	2.72	3.09	3.52	4.07	4.93	5.72
Apr	1.15	1.54	2.13	2.65	3.15	3.68	4.26	4.95	5.85	7.26	8.57
May	1.27	1.69	2.30	2.84	3.36	3.90	4.49	5.20	6.11	7.53	8.85
Jun	1.11	1.55	2.25	2.88	3.51	4.17	4.92	5.80	6.97	8.82	10.57
Jul	1.29	1.65	2.19	2.65	3.09	3.54	4.04	4.62	5.37	6.52	7.59
Aug	1.21	1.58	2.12	2.59	3.04	3.51	4.03	4.64	5.42	6.64	7.77
Sep	.48	.91	1.48	1.95	2.41	2.90	3.44	4.09	4.94	6.29	7.56
Oct	.98	1.26	1.68	2.03	2.37	2.73	3.11	3.56	4.14	5.04	5.87
Nov	.99	1.33	1.84	2.29	2.73	3.19	3.70	4.30	5.08	6.31	7.46
Dec	.73	.99	1.38	1.72	2.06	2.41	2.80	3.27	3.87	4.81	5.70
Ann	29.90	31.90	34.45	36.37	38.06	39.69	41.37	43.22	45.44	48.66	51.42

\+ 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: 1963-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	6.3	4.4	2	1
Feb	5.5	5.0	1	#
Mar	2.8	2.0	#	#
Apr	.5	.0	#	0
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.2	.0	#	0
Nov	2.1	1.0	#	0
Dec	8.2	4.7	1	#
Ann	25.6	17.1	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	14.0	1979	14	20.5	1978	21	1999	14	13	1999
Feb	6.0	1979	12	13.0	1993	12	1976	7	6	1989
Mar	4.0	1983	20	8.0+	1991	8	1994	1	1+	1999
Apr	4.1	1975	3	4.1	1975	4	1975	3	#+	2000
May	#	1989	6	#	1989	#+	1997	5	#+	1997
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	2.0	1989	19	3.0	1993	1+	2000	8	#+	2000
Nov	6.0	1974	14	8.0	1972	6	1974	14	1	1975
Dec	12.0	1988	26	32.8	2000	21	2000	20	10	2000
Ann	14.0	Jan 1979	14	32.8	Dec 2000	21+	Dec 2000	20	13	Jan 1999

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.4	3.2	1.2	.4	@
Feb	3.9	2.8	.8	.3	.0
Mar	2.0	1.2	.3	.0	.0
Apr	.5	.2	@	.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	.2	.1	.0	.0	.0
Nov	1.2	.7	.2	.1	.0
Dec	4.5	2.5	.9	.3	@
Ann	17.7	10.7	3.4	1.1	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	11.9	5.6	2.5	.0
Feb	5.8	2.0	.8	.0
Mar	1.9	.5	.1	.0
Apr	.4	.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	.1	.0	.0	.0
Nov	1.1	.4	.2	.0
Dec	9.2	3.1	2.4	2.1
Ann	30.4	11.7	6.0	2.1

+ 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	5/31	5/25	5/21	5/17	5/14	5/10	5/07	5/03	4/27
32	5/18	5/13	5/09	5/05	5/02	4/29	4/25	4/21	4/16
28	5/01	4/26	4/23	4/20	4/17	4/15	4/12	4/08	4/04
24	4/20	4/16	4/14	4/12	4/10	4/07	4/05	4/03	3/30
20	4/07	4/03	3/31	3/28	3/26	3/23	3/21	3/18	3/14
16	4/03	3/27	3/22	3/18	3/14	3/10	3/06	3/01	2/22

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	9/17	9/21	9/24	9/26	9/28	9/30	10/03	10/06	10/09
32	9/27	10/01	10/04	10/06	10/08	10/11	10/13	10/16	10/20
28	10/04	10/10	10/14	10/17	10/20	10/24	10/27	10/31	11/05
24	10/15	10/21	10/26	10/29	11/02	11/05	11/09	11/13	11/19
20	10/30	11/05	11/09	11/13	11/16	11/20	11/24	11/28	12/04
16	11/09	11/15	11/20	11/25	11/29	12/03	12/07	12/12	12/19

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	155	149	144	140	137	133	129	124	118
32	177	171	166	162	159	155	151	146	140
28	207	200	194	190	185	181	176	171	163
24	225	218	213	209	205	202	198	193	186
20	256	249	243	239	235	231	226	221	213
16	287	277	270	264	259	253	247	240	231

***** 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	1362	1097	869	507	234	39	6	28	106	434	778	1182	6642
60	1207	957	714	363	141	11	0	6	40	298	628	1027	5392
57	1114	873	621	283	98	5	0	1	19	227	539	934	4714
55	1052	817	562	233	73	3	0	0	10	185	481	875	4291
50	899	687	419	129	31	0	0	0	2	102	346	731	3346
32	412	277	78	1	0	0	0	0	0	2	46	290	1106

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	74	104	233	485	851	1112	1262	1193	943	598	259	131	7245
55	0	0	4	27	212	425	549	480	263	69	4	3	2036
57	0	0	0	17	174	367	487	419	212	49	1	0	1726
60	0	0	0	7	125	284	394	332	143	27	0	0	1312
65	0	0	0	1	62	161	245	198	60	7	0	0	734
70	0	0	0	0	25	72	118	100	16	1	0	0	332

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	4	18	99	285	625	890	1031	963	723	385	117	22	4	22	121	406	1031	1921	2952	3915	4638	5023	5140	5162
45	0	3	53	179	472	740	876	808	573	256	62	8	0	3	56	235	707	1447	2323	3131	3704	3960	4022	4030
50	0	1	27	100	331	590	721	653	424	149	25	2	0	1	28	128	459	1049	1770	2423	2847	2996	3021	3023
55	0	0	9	53	209	442	566	498	287	76	9	0	0	0	9	62	271	713	1279	1777	2064	2140	2149	2149
60	0	0	1	21	117	300	411	345	173	30	1	0	0	0	1	22	139	439	850	1195	1368	1398	1399	1399
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	14	66	182	382	577	694	643	460	243	71	12	1	15	81	263	645	1222	1916	2559	3019	3262	3333	3345

(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