

LATITUDE 44° 03' N
 LONGITUDE 91° 39' W
 ELEV. (GROUND) 652 Feet

STATION WINONA, MINNESOTA

CLIMATOLOGICAL SUMMARY

MEANS AND EXTREMES FOR PERIOD 1928 - 1957

Month	Temperature (°F)								** Mean degree days	Precipitation Totals (Inches)						Mean number of days					Month		
	Means				Extremes					Mean	Greatest daily	Year	Snow, Sleet				Precip. .10 inch or more	Temperatures					
	Daily maximum	Daily minimum	Monthly	Record highest	Year	Record lowest	Year	Mean					Maximum monthly	Year	Greatest daily	Year		90° and above	Max.			Min.	
																			32° and below	32° and below		32° and below	0° and below
(a)	30	30	30	30		30		10	30	30		30	30		30	30	30	30	30	30			
Jan.	26.3	8.5	17.3	64	1944	-32	1951	1531	1.17	1.24	1936	10.0	33.2	1932	13.5	1932	3	0	21	30	10	Jan.	
Feb.	30.8	11.8	21.3	63	1930	-29	1929	1223	0.97	1.23	1938	8.3	36.0	1936	11.5	1939	2	0	15	27	6	Feb.	
Mar.	41.6	22.9	32.3	81	1945	-18	1948	1118	1.89	1.72	1956	10.1	36.5	1951	16.0	1933	5	0	6	25	1	Mar.	
Apr.	58.5	37.5	48.0	96	1952	10	1954+	538	2.40	1.41	1954	1.6	10.4	1945	10.0	1945	6	*	*	9	0	Apr.	
May	71.3	49.5	60.3	107	1934	21	1956	178	3.86	3.83	1936	T	T	1955+	T	1955+	7	1	0	0	0	May	
June	81.0	59.9	70.4	106	1931	35	1937	29	4.71	2.80	1956	0	0		0		7	5	0	0	0	June	
July	86.5	64.4	75.4	108	1936	46	1947	2	3.71	3.46	1951	0	0		0		6	10	0	0	0	July	
Aug.	83.5	62.0	72.7	103	1948	38	1931	11	3.84	2.94	1928	0	0		0		7	6	0	0	0	Aug.	
Sept.	74.7	52.2	63.6	100	1939+	25	1942	111	3.17	2.51	1938	0	0		0		6	2	0	*	0	Sept.	
Oct.	62.8	41.8	52.0	92	1953	18	1936	383	1.86	2.24	1942	0.1	2.5	1929	1.5	1929	4	*	0	5	0	Oct.	
Nov.	43.9	27.7	35.7	84	1950	-9	1947	873	2.11	3.71	1945	4.0	15.8	1947	10.0	1934	4	0	5	20	*	Nov.	
Dec.	30.5	15.1	22.8	61	1951	-24	1950	1327	0.98	0.97	1948	7.8	26.6	1950	10.5	1927	2	0	17	29	5	Dec.	
Year	57.6	37.8	47.7	108	July 1936	-32	Jan. 1951	7324	30.67	3.83	May 1936	41.9	36.5	Mar. 1951	16.0	Mar. 1933	59	24	64	145	21	Year	

(a) Average length of record, years. + Also on earlier dates, months, or years.
 † Trace, an amount too small to measure. * Less than one half.
 ** Base 65°F

CLIMATE OF WINONA, MINNESOTA

Winona, county seat of Winona County, is located in southeastern Minnesota in the valley of the Mississippi River. The valley is approximately 3 miles wide at this point and at an elevation of 660 feet above sea level. Precipitous bluffs line either side of the valley, rising to a height of 500 feet above the valley floor.

Most of the city is high enough above the river flood plain so that it is only at very high river stages that any damage occurs. Flood stage is 13 feet. The highest stage of record is 17.9 feet occurring in April 1952.

The climate of Winona is a continental type with rather cold winters and warm summers. Frequent passage of high and low pressure centers bring a variety of weather both winter and summer. Clear, calm, bitter cold days and raging blizzards have been experienced but are infrequent. Oppressively hot humid days last only for a short time before an outbreak of cool dry air tempers the heat and lowers the humidity.

Average annual precipitation of near 31 inches is ample for the agricultural economy of the region. Nearly 70% of this falls during the months of April through September insuring sufficient moisture for crop production. Heaviest rains occur with summer thunderstorms when the warm moisture laden winds from the south collide with cooler drier air from the north.

Annual snowfall averages 41.9 inches a year with the greatest on record in any one month, 36.5 inches in March of 1951, and the greatest in any one year, 82.8 inches in 1951.

Annual temperature range has been as great as 121 degrees in a year. Mean temperature of the winter months of December, January and February is 20.4 degrees. Winters have frequent outbreaks of cold Canadian air that bring readings to zero or below on an average of 21 days a year. The most notable winter storm of record occurred on November 11, 1940. A day that began quite mild suddenly changed. An outbreak of frigid air accompanied by gale winds and snowfall dropped the temperature from an afternoon high of 50 to 8 degrees by the following morning. Many duck hunters, in light clothing, out on the sloughs of the Mississippi were caught unprepared and a number perished.

One of the coldest months on record was January 1912 with an average temperature of minus 1.0 degrees, 19.0° below normal. In more recent years February 1936 will be remembered. The lowest temperature of record is 40° below zero in January of 1888.

The summers are warm and sometimes humid, well suited for the production of corn and other crops. On the average 24 days with a maximum of 90° or higher can be expected. The mean temperature for the summer months of June, July and August is 72.6°F. The maximum for the period of record is 108 degrees in July 1936. The warmest month on record was July 1936 with the average temperature of 81.0°.

The following table gives occurrences of some critical temperatures:

Temperature O F	Average Date of last in Spring	Average Date of First in Fall	Average number of Days be- tween temperature values.
32° or below	April 28	October 9	165
28° or below	April 17	October 22	187
24° or below	April 2	November 2	214
20° or below	March 26	November 11	230
16° or below	March 19	November 19	245

The earliest fall occurrence of a temperature of 32° is September 10. May 25 is the latest spring occurrence.

The probability of a killing frost after April 20th is 42 years out of 50; after April 30th, 25 years out of 50; after May 10, 11 years out of 50 and after May 20th, 3 years out of 50.

The probability of the first frost in Autumn occurring before September 1 is 1 year in 50; before October 1, 17 years in 50; and before October 20, 37 years in 50.

No information is available as to any tornadoes occurring within the city limits of Winona. However, during the period 1916-1957 only 4 tornadoes have been reported in the county of Winona as a whole thus indicating that the city is relatively free from this type of severe storms.

Navigation on the Mississippi River at Winona is terminated generally by the first week of December and resumes again in the spring on or about March 20. The following table enumerates flood occurrence at Winona:

Station	Flood Stage (Feet)	Historical Floods		Occurrence of High Water (in years)		
		Stage	Date	1' below FS	FS	4' above FS
Winona, Mississippi River	13.0	17.9	4-20-52	1.6	6	70+
		17.4	4-18-51			
		16.9	6-18-80			
		16.5	4-9-97			
		16.2	4-27-16			

Joseph H. Strub, Jr.
 State Climatologist
 Weather Bureau Office
 Minneapolis, Minnesota

Average Temperature (°F)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l
1928	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1929	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1930	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1931	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1932	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1933	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1934	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1935	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1936	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1937	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1938	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1939	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1940	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1941	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1942	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1943	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1944	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1945	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1946	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1947	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1948	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1949	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1950	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1951	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1952	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1953	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1954	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1955	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1956	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6
1957	22.4	25.4	36.0	45.5	54.8	65.6	73.2	72.2	59.4	52.2	38.4	27.9	48.6

STATION HISTORY

The earliest known weather records for Winona were taken in 1885 under supervision of the Signal Service, U. S. Army. All records are on file at the Weather Bureau Office, 504 U. S. Court House, Minneapolis, Minnesota. The earlier records included temperature, precipitation, prevailing wind direction and character of the day (cloudiness). Published records prior to 1910 are found in a number of different bulletins. Since 1910 the records are published in Minnesota Climatological Data. While the exact location of the station over the period of years is not known it has always been within the city limits of Winona.

Professor J. M. Holtzinger was the observer from August 1885 to 1922. The records for this period are not complete.

A. M. Pett and son were observers from January 1, 1893 until June 30, 1897.

W. F. Pett began observations on July 1, 1894 and continued until January 30, 1897.

P. C. Myers was the observer from January 1, 1903 until February 28, 1927. It is believed that during this period the station was located at 476 W. 5th Street until February 1914 when it was moved to 669 Main Street.

J. R. Johns, Chemist, began observations April 1, 1927 and continued until November 30, 1943. During this time the station was first located 7 stories above ground, on the roof of the J. R. Watkins factory then moved to 751 Mahaska. The date of the move is not known.

Wallace W. Morgan, newspaper editor, was appointed observer December 1, 1943 and the station was moved to the roof of the Republican Herald building. In 1945 the station was moved to Dr. Morgans' residence at 135 East King Street.

Total Precipitation (Inches)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l
1928	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1929	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1930	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1931	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1932	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1933	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1934	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1935	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1936	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1937	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1938	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1939	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1940	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1941	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1942	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1943	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1944	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1945	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1946	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1947	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1948	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1949	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1950	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1951	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1952	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1953	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1954	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1955	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1956	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53
1957	0.31	1.63	0.80	2.29	2.03	3.64	4.41	8.40	2.66	4.10	1.14	1.12	32.53

STATION HISTORY - Cont'd.

H. W. Smoock became observer June 1, 1947 and the station was moved to his residence at 216 High Forest Street.

William J. Cole took over the observations January 1, 1949 and the equipment was moved to the roof of the Republican Herald Building at 67 West 2nd Street. The station was moved to the new Daily News (formerly Republican Herald) Building on July 3, 1954 where it is now located and with Mr. Cole as observer. This last move resulted in a change to a ground location in a residential area from the former roof exposure in the downtown district.

A river gage is also maintained at Winona. River stage readings since 1919 for Winona are available in the Weather Bureau publication Daily River Stages.

A recording rain gage station was in operation in Gilmore Valley, three miles southwest of Winona from April 16, 1941 until July 10, 1957.

The U. S. Corps of Engineers maintain a river gage and take precipitation readings at their Look and Dam No. 5A about 3 miles northeast of Winona. Precipitation records from this station are also published in Minnesota Climatological Data.