



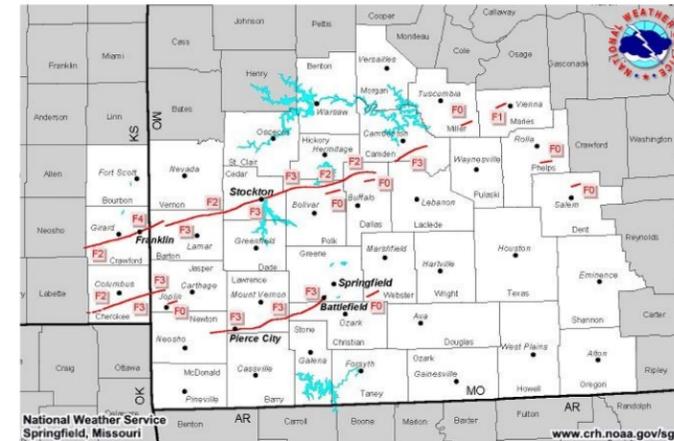
“To provide weather and flood warnings, public forecasts and advisories for all of the United States...and its territories...for the protection of life and property.”

National Weather Service

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National Weather Service

Natural Hazard Risk Assessment Information For: **Hickory County Missouri**



Information Provided By
WFO Springfield, Mo

2009 Update

Includes data and information
through December 2008

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This document is intended to provide general information on severe weather that has affected Hickory County and the communities with in the county.

By Gene Hatch
 Meteorologist Intern WFO Springfield. Mo.

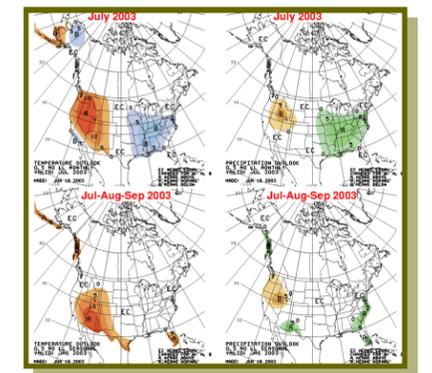
Local Climatology

Averages and records for Pomme De Terre, Missouri in Hickory County

40	20	1.0	74	-17	13.7
46	24	2.1	79	-21	8.0
57	33	1.0	86	-3	10.0
67	44	0.1	92	18	4.0
76	54	0	94	30	0
84	63	0	106	41	0
90	68	0	111	46	0
90	66	0	107	44	0
81	56	0	105	30	0
70	46	0	94	20	0
55	35	0.5	87	4	6.0
45	24	1.5	72	-22	15.7

Links for Climate information

- www.crh.noaa.gov/sgf/
- www.cpc.ncep.noaa.gov/
- www4.ncdc.noaa.gov
- web.missouri.edu/~moclimat/
- mrcc.sws.uiuc.edu/
- agebb.missouri.edu/weather/index.htm



Historic Weather in Southwest Missouri

Jan. 8th-1997...Six inches or more of snow fell over much southwest, south central and central Missouri from noon on the eighth to noon on the ninth. The heaviest snow fell in a band from Cassville to Springfield north to Hermitage where up to ten inches was recorded. Damage estimates at 670K dollars were due to the cost of snow removal.

Mar. 12th-1961...A tornado touched down at 745 am in southern Greene County and moved northeast from near Plainview road towards the KWTO towers. The tornado blew down 2 of KWTO's towers, damaged the roof on the Disney school and damage 3 other homes.

Apr. 23rd-1967...A severe thunderstorm formed over the northwest portion of the city of Springfield, MO spawning a tornado. The weather service office measured a wind gust of 63 mph as the tornado moved through the center of the city. Nearly 1000 homes and businesses were destroyed with one fatality and 9 injuries reported.

May 4th- 2003...Three tornadic supercell thunderstorms formed over southeast Kansas and moved across the Missouri Ozarks, spawning 13 tornadoes. This was a very rare event for this part of Missouri since many of the tornadoes experienced across this area are short lived small tornadoes.



This event surpassed the December 17-18, 2002 tornado event in both loss of lives and property damage, and exceeded tornado events that occurred over the past 100 Years for this part of Missouri. The hardest hit locations included Battlefield, Stockton and Pierce City. 14 tornadoes resulted in extensive damage and 24 deaths. Several of the tornadoes tracked long distances ranging from 15 to 80 miles.

Jun. 9th-1975...Thunderstorms that developed over the Springfield area dropped 3.62 inches of rainfall in one hour. This was the greatest hourly rainfall rate recorded for Springfield.

Nov. 11th-1911...A high of 80 and low of 13 were recorded on the same day in Springfield. A cold front, ahead of a very cold airmass, moved through the Ozarks making temperatures fall rapidly.

Nov. 29th-1991...An F4 tornado that developed 3 miles north of Nixa tracked southeast for 10 miles to Springfield and lifted over east Springfield. Extensive damage to homes and businesses was reported. 2 deaths and 64 injuries were directly related to the tornado.

Dec. 17-18th-2002...At approximately 1118 pm a tornado struck near Chesapeake Mo. The F2 tornado hit the Lucky Lady trailer park in addition to 1 home northeast and 3 homes southwest of the trailer park. The tornado resulted in 1 fatality and 15 injuries.

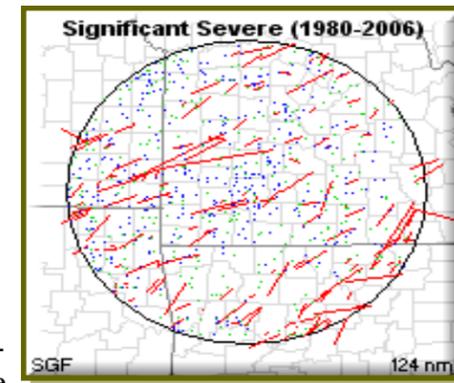


Overview of Weather Hazards in Southwest Missouri & Extreme Southeast Kansas

From 1961 to 2008, 522 tornadoes were reported in the 37 counties that WFO Springfield is responsible for, with an average of 11 occurring each year. There were 71 fatalities from these tornadoes, or near one and a half each year. Tornadoes occurred during every month of the year and at every hour of the day. The majority of these tornadoes are weak, but the occurrence of strong and violent storms is always a possibility and cannot be discounted.

The Ozarks experiences between 50 and 70 thunderstorm days a year. During any given storm, large hail, damaging winds and microbursts are possible. The Ozarks go through three severe thunderstorm seasons during the course of the year. The spring season is the period that supercell thunderstorms are most common, next comes summer as large clusters of storms move across the region, mainly during the overnight hours. Finally fall sees the return of supercells and tornadoes, squall lines and training storms (thunderstorms that form and move over the same area).

The region is affected during the course of any year by flooding, drought, heat and cold extremes and winter storms. Heat extremes and flooding have caused the greatest number of fatalities in the area. Winter storms affect the region in many forms. Ice storms, heavy snow and extreme cold have occurred across the area. Freezing rain is the typical form ice storms in the Ozarks take. Ice storms have deposited 2 to 3 inches of ice during their duration causing power outages, tree damage, and traffic problems.



Weather in the Ozarks

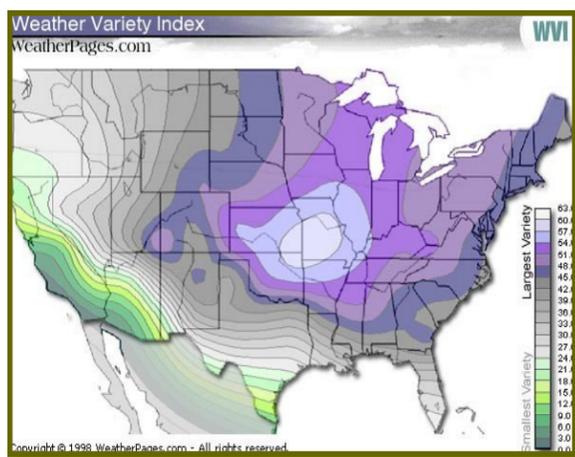
Tornadoes by county for the Springfield County Warning Area from 1950 to 2008

County	F0/1	F2	F3	F4	F5	County	F0/1	F2	F3	F4	F5	County	F0/1	F2	F3	F4	F5
BARRY	20	7	1	0	0	DOUGLAS	8	6	1	0	0	OREGON	9	4	2	1	0
BARTON	23	1	3	1	0	GREENE	19	10	3	1	0	OZARK	21	2	2	1	0
BENTON	18	2	4	0	0	HICKORY	8	1	1	0	0	PHELPS	15	4	2	0	0
BOURBON,KS	10	5	0	0	0	HOWELL	20	11	3	1	0	POLK	16	3	0	0	0
CAMDEN	15	6	1	0	0	JASPER	30	5	4	1	0	PULASKI	9	4	1	0	0
CEDAR	10	2	3	0	0	LACLEDE	9	6	1	0	0	SHANNON	11	1	1	0	0
CHEROKEE,KS	28	5	2	1	0	LAWRENCE	11	2	3	0	0	ST.CLAIR	13	2	2	0	0
CHRISTIAN	19	2	1	1	0	MARIES	4	3	0	0	0	STONE	10	3	0	0	0
CRAWFORD,KS	19	11	3	1	0	McDONALD	11	5	0	0	0	TANEY	6	1	0	0	0
DADE	11	2	2	0	0	MILLER	22	3	0	0	0	TEXAS	14	8	1	2	0
DALLAS	7	1	1	0	0	MORGAN	11	7	0	0	0	VERNON	20	1	6	0	0
DENT	8	1	1	0	0	NEWTON	30	5	1	2	0	WEBTSE	19	7	2	0	0
												WRIGHT	10	4	0	1	0

Historical information for Hickory County, Missouri

Severe Weather in Hickory County

In 2000, a private company looked at 277 cities across the United States. They rated each city on variations in temperature, precipitation and other factors. Of all the cities in their study Springfield, Missouri rated number one as the city with the most variable weather in the U.S.

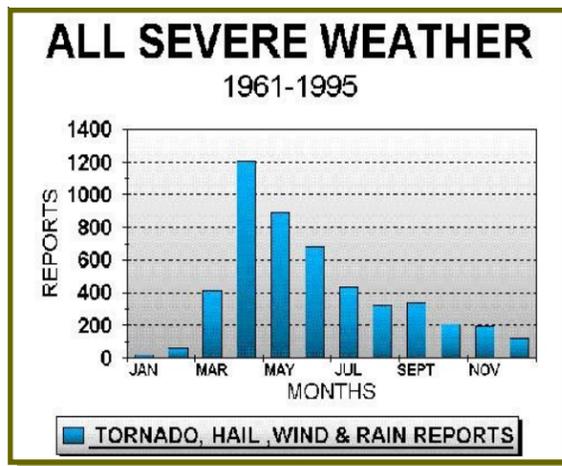


From www.weatherpages.com

Hickory County Missouri is located on the Ozark Plateau along the eastern edge of tornado ally. Because of its location Hickory County is subjected to severe thunderstorms, heavy rainfall, winter storms, flooding, ice storms, droughts, tornadoes and other wind storms.

When does severe weather occur ?

Severe weather in the Ozarks can occur in any month of the year. While the months of April through June are the peak severe weather season, there is a secondary peak from September to November.



Severe thunder storms in Hickory County have dropped hail up to 2 3/4" in diameter, created winds in excess of 80 miles an hour and rainfall rates greater than 2" in an hour. While southwest Missouri receives nearly 11 tornadoes a year, Hickory County averages an event every 6 years.

Number of Tornadoes in Hickory Co. (1950 to 2008)

<u>F0/F1</u>	<u>F2</u>	<u>F3</u>	<u>F4</u>	<u>F5</u>
8	1	1	0	0
80%	10%	10%	0%	0%

During the winter season Hickory County averages 6.2 inches of snow. With the most snow in one season at 19.3 inches, falling during the 1985 to 1986 winter season. Ice storms also affect the county during the winter season causing significant damage to homes, trees and utilities.

Dam Failure

Dams in Hickory County

Hickory County contains 6 dams. While the majority of these dams are small and used primarily for storm water management, irrigation and recreation, some are a part of local reservoirs. Most of the dams in Hickory County are of earthen construction and there have been no recorded failures. Pomme De Terre Dam is a concrete construction dam.

Where are they Located

- Alley Lake Dam: Weaubleau Creek, Weaubleau
- Vandaford Dam #1: Panther Creek, Weaubleau
- Vandaford Dam #3: Weaubleau Creek, Weaubleau
- Pomme De Terre Dam: Pomme De Terre River, Hermitage
- Talbot Dam: Starks Creek, Edwards
- Kulger Lake Dam: Turkey Creek, Lakeview Heights

Most of the dams in Hickory County are less than 100 feet high. Many are located on private land and fall under private ownership.

Pomme De Terre Dam is a concrete construction dam under the corps of engineers. This is one of the significant dams in the Ozarks and is a hydroelectric dam.



Heat, Drought and Wildfires



Excessive heat is the leading cause of weather fatalities in the nation. With the variability of the weather in southwest Missouri, it is not surprising that excessive heat impacts Hickory county on almost a yearly basis.

Hickory County averages 17 days a year with temperatures at or above 95 degrees. July and August are the two warmest months, which average 7 days at or above 95 degrees.

Year	Days 95* +	Days 100* +	Days in a row
1966	17	7	8
1970	30	7	6
1976	26	6	13
1980	60	34	17
1983	38	20	10
1991	34	15	8
Normal # of Days	17	4	▲ Above 95*

Years with above average summer heat

Drought and wildfires can, and often do accompany excessive heat. Hickory County has gone through dry periods and drought. The latest droughts occurred in 1999 and 2000 when well below normal rainfall and high temperatures combined to produce drought conditions.

Longest periods without rainfall in Hickory County

- 33 days: 7 Sept 1979 ~ 9 Oct 79
- 33 days: 25 Jan 1996 ~ 26 Feb 96
- 32 days: 22 Nov 1979 ~ 23 Dec 79
- 31 days: 19 Nov 1962 ~ 19 Dec 62
- 31 days: 21 Nov 1988 ~ 21 Dec 88
- 29 days: 3 Jan 1966 ~ 31 Jan 66

While no major wildfires have affected Hickory County, small grass fires do pose a hazard.

A twenty year study by the Missouri Department of Conservation, from 1970 to 1989 determined that over 2200 fires occurred during that time in the Clinton fire district which includes Cass, Bates, Vernon, Johnson, Henry, St. Clair, Pettis, Benton and Hickory counties. This represented nearly 4% of the wildfires in the state with over 49,000 acres burned.

There are numerous ways wildfires can be started, but when dealing with weather related phenomenon, namely lightning, only 0.8% of the wildfires in the Clinton fire district were the result of lightning.

Tornado Information

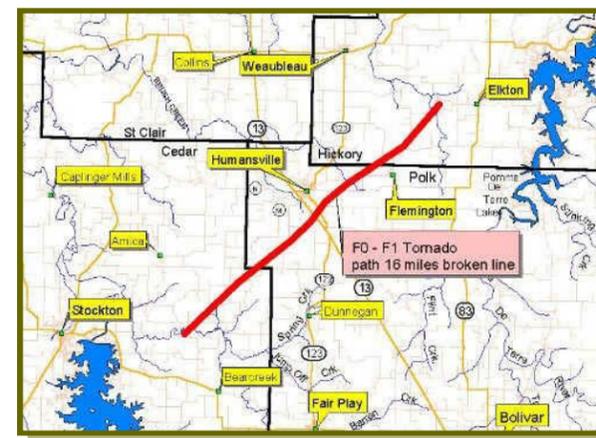
Hickory County lies at the eastern edge of tornado ally and receives on average a tornado every six years. From 1950 to 2008 Hickory county recorded 10 tornadoes of up to F3 strength. The strongest tornado, an F3, passed across the county on the evening of March 12th, 2006. Along its 17 mile track it caused 1.0 million dollars in damage.

Historical Tornadoes of Hickory County

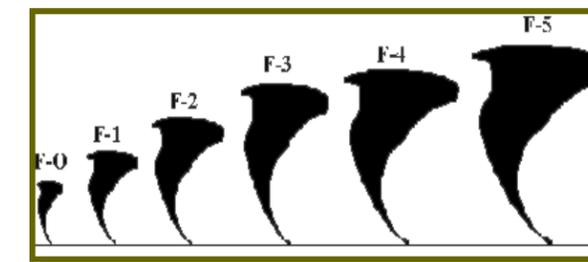
- Mar 26, 1882 (F2) 2 inj, 0 dead
- Apr 20, 1929 (F2) 12 inj, 0 dead
- Jan 21, 19 (F3) 2 inj, 0 dead
-

For the Record Hickory County

- Has experienced one F3 tornadoes.
- No F4 or F5 tornadoes
- Most recent Tornado March 31, 2008 (F0)
- 0 deaths and 21 injuries since 1880.

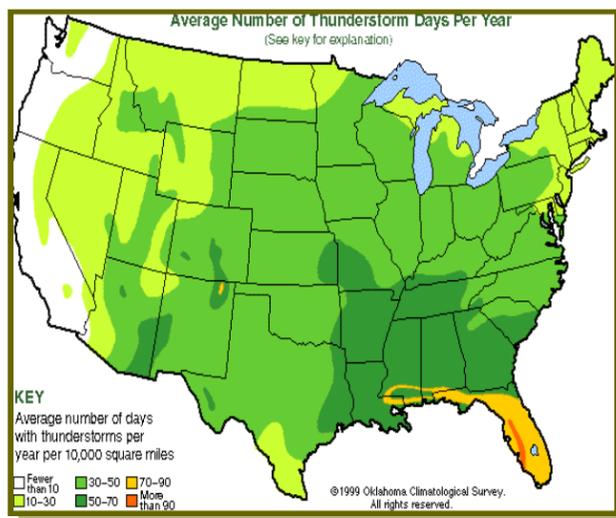


At approximately 235 am an F0 tornado touched down 6 miles east of Stockton Cedar county. The tornado tracked northeast to near Humansville, Mo. where it was rated F1. The tornado damaged 18 homes and uprooted numerous trees. The tornado resulted in 1 injury. The tornado continued northeast into southwest Hickory county about 5 miles southeast of Weaubleau before dissipating.



- **F-0:** 40-72 mph, chimney damage, tree branches broken
- **F-1:** 73-112 mph, mobile homes pushed off foundation or overturned
- **F-2:** 113-157 mph, considerable damage, mobile homes demolished, trees uprooted
- **F-3:** 158-205 mph, roofs and walls torn down, trains overturned, cars thrown
- **F-4:** 207-260 mph, well-constructed walls leveled
- **F-5:** 261-318 mph, homes lifted off foundation and carried considerable distances, autos thrown as far as 100 meters.

Severe Hail, Lightning, Wind and Winter Weather



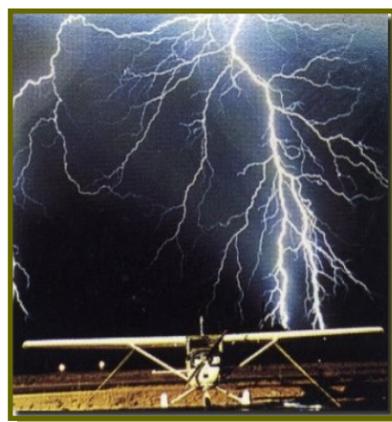
Average number of thunderstorm days per year.

Thunderstorms occur in the Ozarks on the average of 50 days per year.

April and May are the two most active hail months in the Ozarks. There is also evidence of a minor secondary peak in September. The greatest number of hail reports over 2 inches occur in the months of April, May and June with the largest report being 2.75 inches in diameter in Hickory county on May 17, 1991. Hail can cause considerable damage to homes, vehicles, and crops.

Severe thunderstorm winds are defined by the NWS as convective wind gusts that reach or exceed 50 knots (58 mph). June is the most active month with April a close second. In general, the most active period for damaging wind events occurs from April to August. This is due in part to the shift from supercell thunderstorms to large clusters of storms and squall lines. The highest wind gust recorded in Hickory county reached 81 mph and occurred in 2002 on the 7th of May. Since 1969 high winds have caused around \$224,000.00 in damages.

With any thunderstorm, lightning will be present and the safest place to be is indoors. In August of 2002, four people were killed near Willard in Greene County during a funeral. As a thunderstorm moved into the area, the victims sought shelter under a tree.



Nationally, Missouri ranks 27th in Lightning fatality rate, 44th in injuries and 38th in property damage related to lightning. During the period from 1960 to 1994, the total number of lightning casualties in Missouri was 165. This is nearly five casualties per year in the state.

Winter weather across the Ozarks comes in many forms. Freezing rain or drizzle, sleet and snow are common occurrences during the winter season. In the past the Ozarks have had up to 54 inches of snow, Sleet storms that produced inches of sleet and ice storms that laid a covering of one to two inches of ice on most surfaces. While the immediate impact of these storms is to travel, winter storms cause hundreds of thousands of dollars in damages across the region on a near yearly basis.

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21 Feb 2001: Sleet, freezing rain and embedded thunderstorms caused ice accumulations from one quarter, up to two inches in places across southwest, central and south central Missouri. The heaviest ice accumulations occurred along and north of Highway 60, and along the I-44 corridor. Howell-Oregon electric cooperative reported numerous power outages due to the ice around the communities of Willow Springs, Birch Tree, Mountain View, Winona, Eminence and Dora.

Flooding

From 1993 to 2002 Flooding has occurred in Hickory County in every year. While usually nuisance flooding such as water on city streets, significant flooding has caused numerous problems in the county. During the previous decade, only one injury and no deaths have been attributed to flooding in Hickory County. Hickory County contains numerous low water crossings.

Typically, flooding in the county is caused by heavy rainfall associated with high rain producing thunderstorms which move very slowly. In towns, rainfall of one to two inches will cause streets and ditches to flood and make some low water crossings impassable. When rainfall rates reach 3 to 4

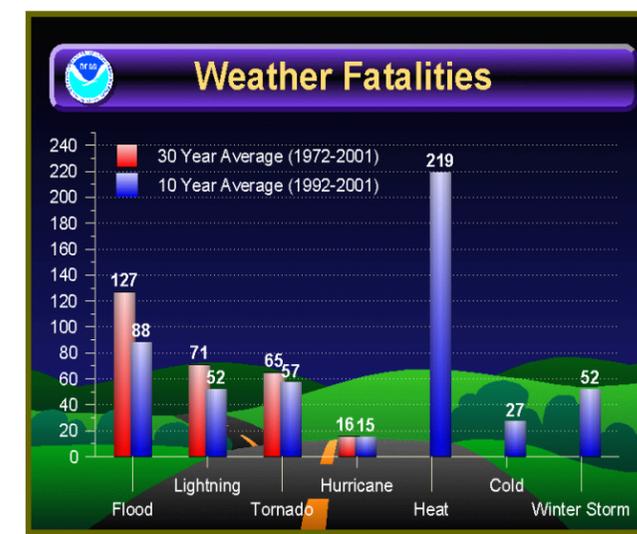
inches, major flooding can occur, and amounts over four inches creates significant flooding that affects most of the county.



Floods in Hickory County

23 Sept 1996: Heavy rains dumped more than 2 inches of rain in a short time over much of the county flooding highways and streets in the Pittsburg, Wheatland, and Weaubleau areas. Highway 64 just north of Pittsburg was reported impassable for a brief time.

12 July 2001: Numerous secondary roads and low water crossings were impassable across northern Hickory County. Small creeks and streams, or tributaries of the Pomme de Terre River between Wheatland and Cross Timbers were the main areas affected by the flood waters. Deer Creek, especially



National Weather Fatality Statistics

east of Edwards, was flooded along Highway 7 in extreme southeast Benton County.

10 July 2001: Numerous low water crossings were impassable across southern Benton and northeast Hickory Counties. Along Turkey Creek southeast of Frisroe, a bridge was covered by three feet of flowing water during the height of the storm.

19 Aug 1997: Brief flooding occurred along Crane Creek. A large complex of thunderstorms produced 3 to 5 inches of rain in a band from just north of Nevada to near Rolla. The previous three weeks had been very dry across the region, so flooding problems were minor.

19 Mar 1998: Heavy rain falling on saturated ground resulted in flooding of low water crossings in the county. Highway D between Preston and Nemo and Highway P east of Cross Timbers were among roads that were closed during this period.