



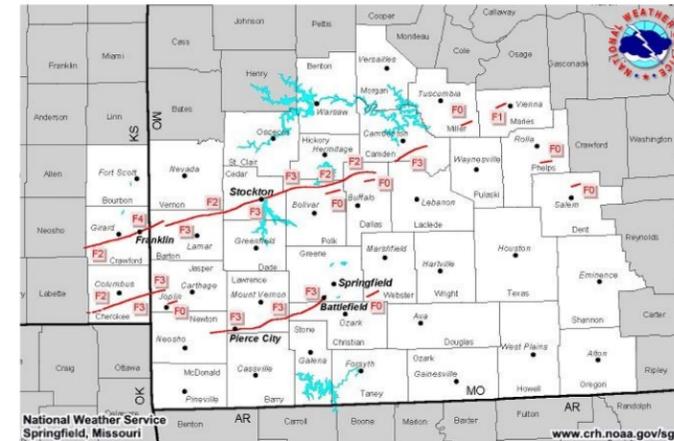
"To provide weather and flood warnings, public forecasts and advisories for all of the United States...and its territories...for the protection of life and property."

National Weather Service

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National Weather Service

Natural Hazard Risk Assessment Information For: **Jasper 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 Jasper County and the communities with in the county.

By Gene Hatch
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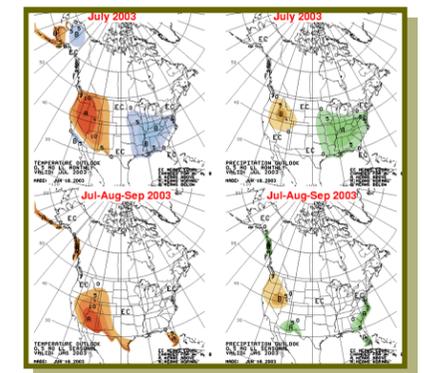
Local Climatology

Averages and records for Joplin, Missouri in Jasper County

	Normal High	Normal Low	Normal Precip.	Normal Snow	Record High	Record Low	Record Precip.	Record Snow
Jan	42	24	1.82	4.5	79	-12	6.95	17.9
Feb	49	29	2.26	3.4	87	-21	7.82	14.0
Mar	59	38	3.53	1.2	94	-5	9.04	25.0
Apr	69	47	4.6	0	96	19	10.38	4.0
May	77	56	5.12	0	96	30	25.54	0
Jun	85	65	5.43	0	104	44	14.12	0
Jul	90	70	3.45	0	115	50	14.99	0
Aug	89	68	3.88	0	106	46	9.04	0
Sept	81	59	5.19	0	105	30	19.08	0
Oct	71	48	3.86	0	94	18	16.67	0.8
Nov	57	37	4.04	0.6	87	7	12.34	10.5
Dec	46	27	2.99	2.8	76	-15	7.67	11.5

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. 9th-1994... A major winter storm moved across Arkansas and into the Ohio Valley dumping heavy snow over most of southern Missouri. Four to six inches of snow fell from Joplin to south of St. Louis, much heavier snow fell from the Branson area towards Cape Giardeau ranging from 8 to 19 inches. The cities of Branson and Poplar Bluff reported 18 inches, West Plains had 15 inches, and Cape Giardeau had 12. Many older roofs on barns and homes collapsed due to the weight of the snow. Numerous boat docks collapsed in the Branson area damaging several houseboats and broken tree limbs caused widespread power outages. A 42 year-old man died in Springfield (Zone 90) after his tractor-semitrailer slipped off a U.S. Highway 65 bridge and into Lake Springfield.

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.

June 3rd 2001... Showers and thunderstorms slowly moved across the Ozarks producing very heavy rainfall. Urban and Flash flooding occurred over much of the region as 2.29 inches of rain fell in Joplin, Missouri, setting a new record for the day. Springfield received 1.29 inches of rain during the event.

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.

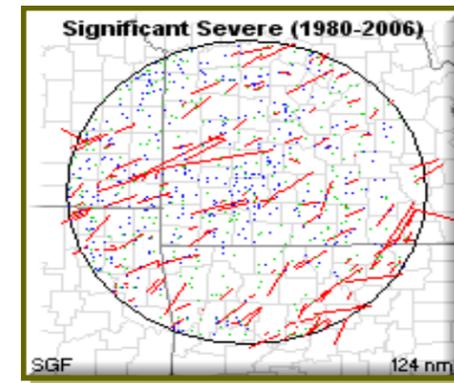


Overview of Weather Hazards in Southwest Missouri & Extreme Southeast Kansas

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

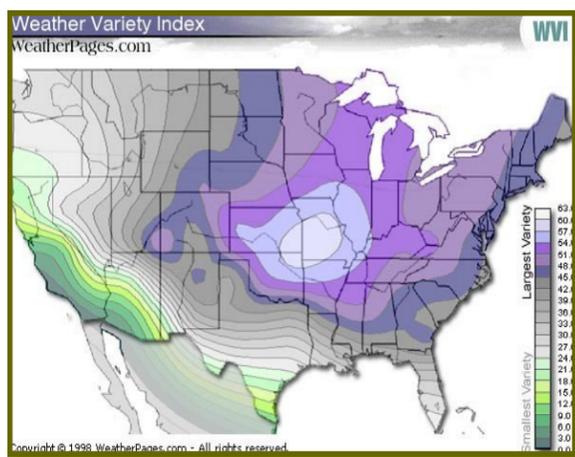
Tornadoes by county for the Springfield County Warning Area from 1950 to June 2003

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 Jasper County, Missouri

Severe Weather in Jasper 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.

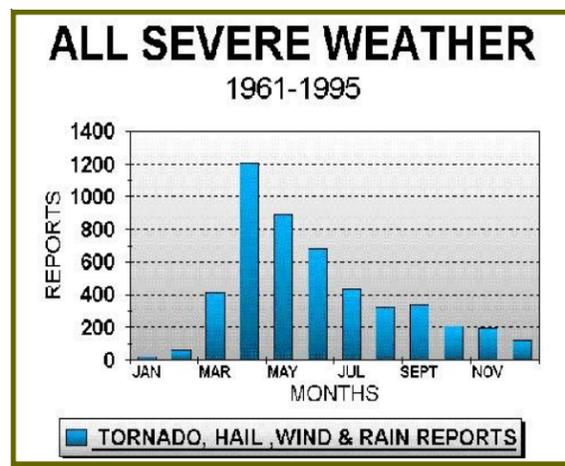


From www.weatherpages.com

Jasper County Missouri is located on the Ozark Plateau along the eastern edge of tornado ally. Because of its location Jasper 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 Jasper County have dropped hail up to 4 1/2” in diameter, created winds in excess of 100 miles an hour and rainfall rates greater than 2” in an hour. While southwest Missouri receives nearly 11 tornadoes a year, Jasper County averages an event every 1 1/2 years.

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

F0/F1	F2	F3	F4	F5
30	5	4	1	0
75%	13%	10%	2%	0%

During the winter season Jasper County averages 12.5 inches of snow. With the most snow in one season at 37.3 inches, falling during the 1958 to 1959 winter season. Ice storms also affect the county during the winter season causing significant damage to homes, trees and utilities.

Dam Failure

Dams in Jasper County

Jasper County contains 12 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. All of the dams in Jasper County are of earthen construction and there have been no recorded failures.

Where are they Located

- Kellogg Lake Dam: Spring River, Carthage
- Shelton Lake Dam: Duval Creek, Smithfield
- Scroggs Lake Dam: North Fork Spring River, Jasper
- Asbury Farms Dam: North Fork Spring River, Smithfield
- Blackberry Hay Farm Dam: Pond Creek, Asbury
- Elliot Lake Dam: Spring River, Baxter Springs
- Rainey Lake Dam: Short Creek, Riverton
- Maple Lanes Farm Lake Dam: Dry Fork, Carrytown
- Oscie Ora Acres Lake Dam: Center Creek, Carl junction
- Herr Lake Dam: Spring River, Baxter Springs
- Barker Lake Dam: Slater Branch, Galesburg
- Smith, Raymond Dam: North Fork Spring River, Near Galena, KS.



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



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 Jasper county on almost a yearly basis.

Jasper County averages 12 days a year with temperatures at or above 95 degrees. July and August are the two warmest months, which average 5 days at or above 95 degrees.

Year	Days 95* +	Days 100* +	Days in a row
1911	40	9	11
1947	47	27	18
1953	45	12	10
1954	71	39	15
1980	59	33	27
1983	40	16	12
Normal # of Days	12	3	▲ Above 95*

Years with above average summer heat

Drought and wildfires can, and often do accompany excessive heat. Jasper 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 Jasper County

- 45 days: 3 Sept 1979 ~ 17 Oct 79
- 43 days: 21 Dec 1960 ~ 1 Feb 61
- 42 days: 8 Oct 1950 ~ 18 Nov 50
- 39 days: 13 Jun 1954 ~ 21 Jul 54
- 35 days: 1 Jul 1947 ~ 4 Aug 47
- 33 days: 23 Jun 1980 ~ 25 Jul 80

While no major wildfires have affected Jasper 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 5600 fires occurred during that time in the Neosho fire district which includes Barton, Jasper, Newton, McDonald, Lawrence and Barry counties. This represented nearly 9% of the wildfires in the state with over 88,000 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 Springfield fire district were the result of lightning.

Tornado Information

Jasper County lies at the eastern edge of tornado ally and receives on average a tornado every two years. From 1950 to 2008 Jasper county recorded 40 tornadoes from F0 to F4 in strength. The strongest tornado, an F4, passed across the county on the evening of April 3rd, 1956. Along its 12 mile track it caused 250 thousand dollars in damage and injured 2.

Historical Tornadoes of Jasper County

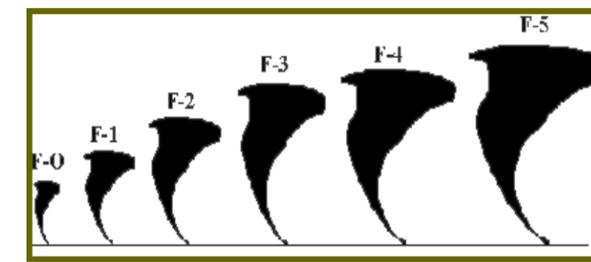
- Dec 4, 1880 (F2) 3 inj, 1 dead
- May 13, 1883 (F2) 40 inj, 2 dead
- Apr 12, 1911 (F3) 7 inj, 1 dead
- Nov 1, 1922 (F3) 15 inj, 1 dead
- Apr 3, 1956 (F4) 2 inj, 0 dead
- Jan 27, 1967 (F2) 3 inj, 0 dead
- May 5, 1971 (F3) 60 inj, 1 dead
- May 4, 2003 (F3) 2 dead

For the Record Jasper County

- Has experienced one F4 tornado.
- No F5 tornadoes
- Most recent Tornado May 10, 2008 (F1)
- 12 deaths and 222 injuries since 1880.

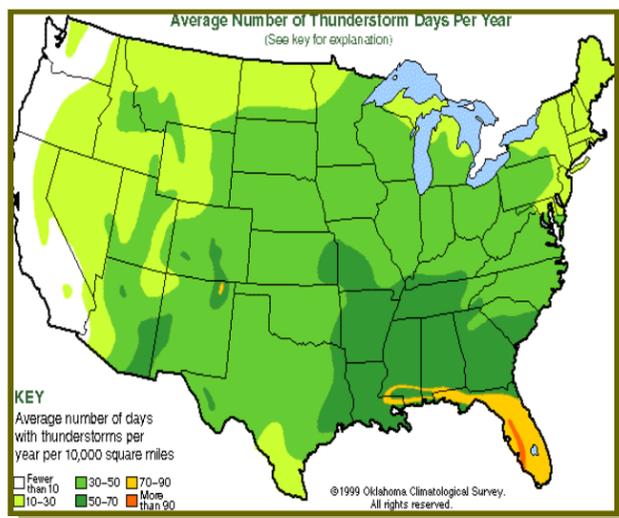


The tornado outbreak of May 4, 2003 was one of the worst that southwest Missouri has had since the late 1800's. Fourteen tornadoes touched down across the Ozarks during the evening of May 4th one of which was an F3 that struck the town of Carl Junction. This F3 is the latest killer tornado to strike Jasper county since an F3 that struck in March of 1976.



- **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 4.50 inches in diameter in Jasper county on May 6, 2003. 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 Jasper county reached 104 mph and occurred in 1973 on the 11th of May. Since 1957 high winds have caused around \$2,530,000.00 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 Jasper 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 Jasper County. Jasper 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

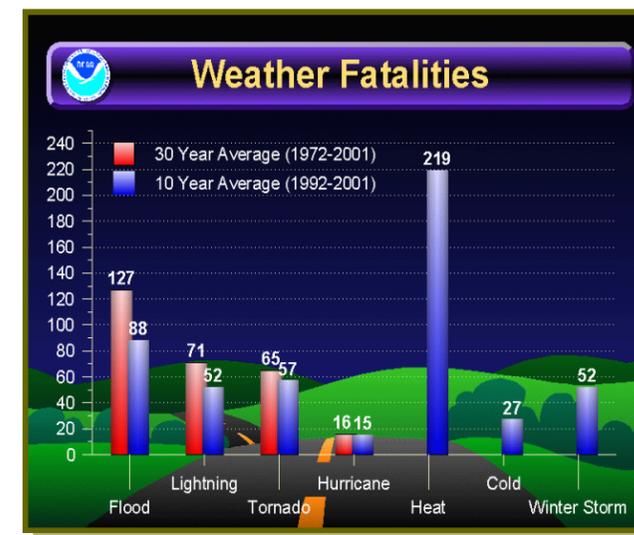
inches, major flooding can occur, and amounts over four inches creates significant flooding that affects most of the county.



Floods in Jasper County

25 Sept 1993: Sections of Shoal Creek flash flooded which closed Highway 71 and heavily damaged a bridge. Numerous homes were also damaged and many cattle killed after being swept away.

3 June 2001: Rainfall amounts of three to six inches fell during the morning across the southern portion of Jasper County. Rescue officials reported numerous roads around the Joplin area had 2 to 2 1/2 feet deep of standing water. Numerous people were stranded in their vehicles as they underestimated the depth of the water and drove in. The St.



National Weather Fatality Statistics

Johns Regional Medical Center parking lot in Joplin had water up to car windows during the height of the storm.

12 May 2002: Another in a series of thunderstorm complexes moved across the area producing excessive rainfall on the already saturated soils. Most of the heavy rainfall began across central Missouri Sunday morning May 12th, and then produced another round of torrential rainfall Sunday evening. By Monday morning May 13th, a large area of two inches fell north of Interstate 44, with the heaviest bands of three to six inches from Joplin northeast to Greenfield, Bolivar and Urbana. Another area of excessive rain fell over eastern Texas, northern Shannon, and southern Dent counties where locally three to six inches fell.

25 Apr 1999: Thunderstorms produced heavy rain and flooding over a portion of southwest Missouri. The hardest hit areas were in the Lamar and Joplin areas where numerous roads were flooded. Some homes and businesses in Lamar had minor flood damage.