



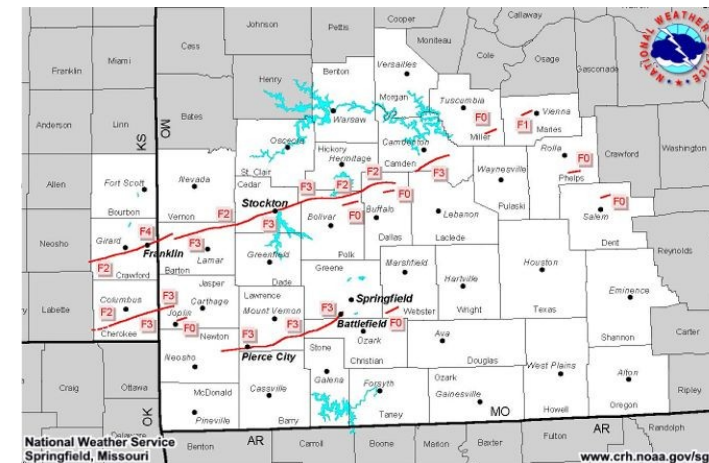
"To provide weather and flood warnings, public forecasts and advisories for all of the United States...and its territories...for the protection of life and property."

National Weather Service

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National Weather Service

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



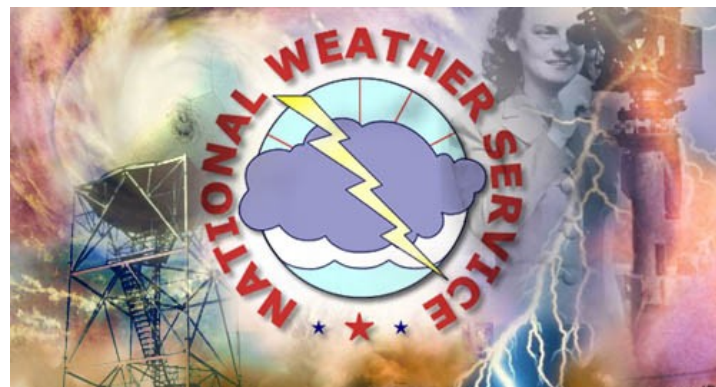
Information Provided By
WFO Springfield, Mo

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 Newton County and the communities with in the county.

By Gene Hatch
 Meteorologist Intern WFO Springfield. Mo.

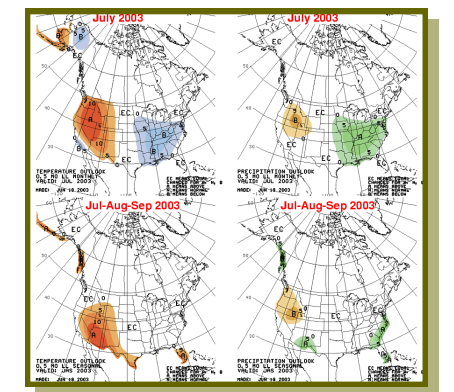
Local Climatology

Averages and records for Neosho, Missouri in Newton County

44	22	4.1	78	-29	25.0
51	27	2.6	87	-20	15.0
61	36	2.3	92	-11	34.7
70	44	0	95	6	3.2
78	54	0	97	28	0
85	62	0	101	38	0
91	67	0	112	44	0
90	64	0	109	40	0
82	57	0	105	27	0
72	46	0	95	15	0
58	35	0.7	85	4	16.8
48	26	2.1	79	-15	18.0

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. 26th-1976...Severe thunderstorms spawned an F3 tornado in Newton county MO. The tornado stayed on the ground for 29 miles and left a 120 wide path of damage. One person was killed and 3 others were injured by the tornado.

Apr. 15th-2001...thunderstorms raced across the Ozarks during the early morning hours producing high winds and three tornadoes. The first tornado tracked south and east of Redings Mill in northwest Newton County. The second tracked from the southwest side of Neosho to 3 miles southwest of Boulder City in south central Newton County. The same squall line moved rapidly southeast and produced another tornado around the Kimberling City area, west of Branson in south central Stone County. In addition to the tornadoes that occurred on April 15th, straight line winds, estimated as high as 90 mph, produced a swath of damage across the Ozarks. The most significant damage occurred



around Joplin, Neosho, and Kimberling City.

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.

Apr. 24th-1975...An F4 tornado killed 3 and injured 22 people as it tracked for 11 miles across Newton county KS. The 1500 yard wide tornado path left 50 million dollars of destruction before it dissipated.

Dec. 17th-2002...An F0 tornado touched down northwest of Fairview in Newton County Missouri. it damaged a house, a barn and downed several trees. It lifted and then touched down again briefly 6 miles west of Monett in Barry county.

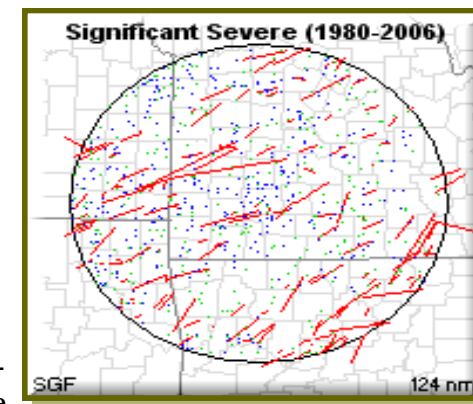


Overview of Weather Hazards in Southwest Missouri & Extreme Southeast Kansas

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

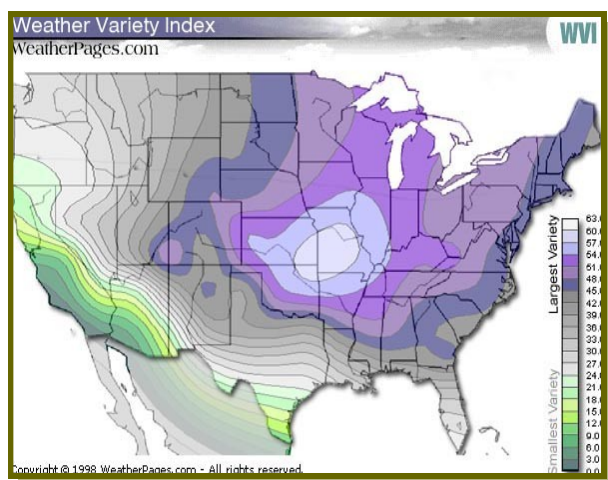
Tornadoes by county for the Springfield County Warning Area from 1950 to 2008

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 Newton County, Missouri

Severe Weather in Newton 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.

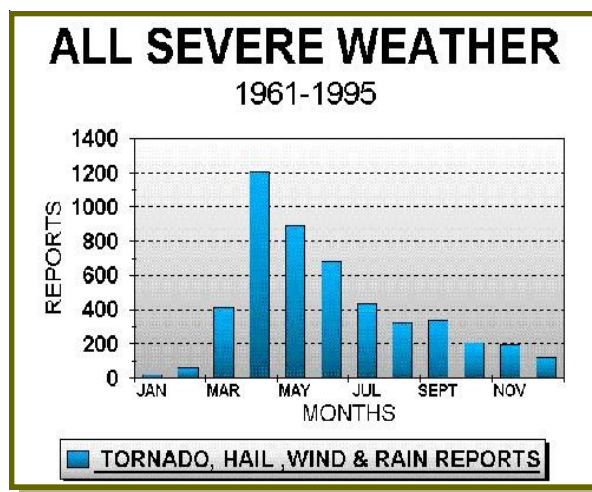


From www.weatherpages.com

Newton County Missouri is located on the Ozark Plateau along the eastern edge of tornado ally. Because of its location Newton 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 thunderstorms in Newton County have dropped hail up to 4 1/2” 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, Newton County averages an event every 1 1/2 years.

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

F0/F1	F2	F3	F4	F5
30	5	1	2	0
79%	13%	3%	5%	0%

During the winter season Newton County averages 11.8 inches of snow. With the most snow in one season at 38.2 inches, falling during the 1970 to 1971 winter season. Ice storms also affect the county during the winter season causing significant damage to homes, trees and utilities.

Dam Failure

Dams in Newton County

Newton County contains 13 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 Newton County are of earthen construction and there have been no recorded failures.

Where are they Located

- Hargis Lake Dam: Harrison Branch, Tiff City
- Grand Falls Dam: Shoal Creek, Near Lowell, KS.
- Austin Harrison Dam: Lost Creek, Wella Park
- Pepper Lake Dam: Center Creek, Sarcoxie
- Lake Mintahama Dam: Beef Branch, Redings Mill
- Lost Creek Watershed E-1 Dam: Lost Creek, Seneca
- Newton County Structural F-1 Dam: Lost Creek, Seneca
- Newton County Structural F-2 Dam: Lost Creek, Seneca
- Lost Creek Watershed F-3 Dam: Lost Creek, Seneca
- Lost Creek Watershed B-2 Dam: Lost Creek, Racine
- Lost Creek Watershed D-1 Dam: McDougale Creek, Seneca
- Lost Creek Watershed A-1 Dam: Little Lost Creek, Seneca
- Lost Creek Watershed C-2 Dam: Little Lost Creek, Seneca



Most of the dams in Newton 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 Newton county on almost a yearly basis.

Newton County averages 20 days a year with temperatures at or above 95 degrees. July and August are the two warmest months, which average 8 days at or above 95 degrees.

Year	Days 95* +	Days 100* +	Days in a row
1918	39	11	20
1930	35	12	10
1934	68	36	20
1936	75	43	22
1954	76	30	15
1980	68	32	32
Normal # of Days	20	4	▲ Above 95*

Years with above average summer heat

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

- 47 days: 2 Dec 1955 ~ 17 Jan 56
- 46 days: 19 Dec 1985 ~ 2 Feb 86
- 43 days: 12 Jul 1936 ~ 23 Aug 36
- 41 days: 10 Dec 1980 ~ 19 Jan 81
- 41 days: 3 Feb 1996 ~ 14 Mar 96
- 39 days: 7 Oct 1955 ~ 14 Nov 55

While no major wildfires have affected Newton 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, Lawrence, Newton, Barry and McDonald counties. This represented nearly 10% 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 Neosho fire district were the result of lightning.

Tornado Information

Newton County lies at the eastern edge of tornado ally and receives on average a tornado every 1 1/2 years. From 1950 to 2008 Newton county recorded 38 tornadoes from F0 to F4 in strength. The strongest tornado, an F4, passed across the county on the evening of May 10th, 2008 impacting the town of Hornet. Along its 31 mile track it caused 35 million dollars in damage, injured 200 and killed 14.

Historical Tornadoes of Newton County

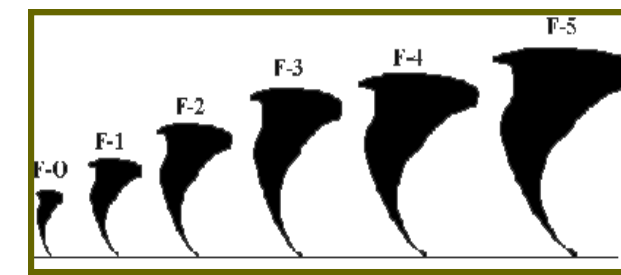
- Dec 4, 1880 (F3) 12 inj, 2 dead
- May 27, 1917 (F2) 5 inj, 0 dead
- Feb 24, 1935 (F2) 0 inj, 0 dead
- Oct 30, 1943 (F2) 0 inj, 0 dead
- Mar 12, 1962 (F3) 6 inj, 0 dead
- Jan 27, 1967 (F2) 3 inj, 0 dead
- Apr 24, 1975 (F4) 22 inj, 3 dead
- Mar 26, 1976 (F3) 0 inj, 0 dead

For the Record Newton County

- Has experienced one F4 tornado.
- No F5 tornadoes
- Most recent Tornado May 4, 2003 (F2)
- 17 deaths and 239 injuries since 1880.

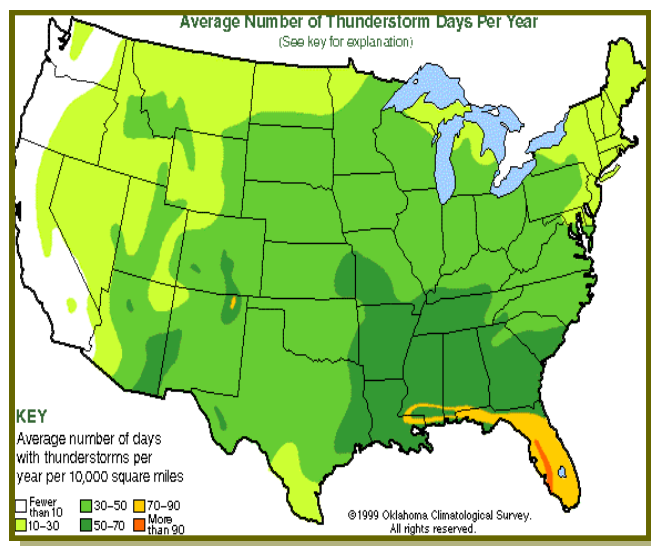


The tornado outbreak of May 4, 2003 was the one of the worst that southwest Missouri has had since the late 1800's. Fourteen tornadoes touched down across the Ozarks during the evening of May 4th one of which was an F2 that touched down just south of the town of Ritchey. This F2 is the latest tornado to strike Newton county since an F0 that struck Fairview in December of 2002.



- **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 Newton county on April 21, 1996. 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 Newton county reached 85 mph and occurred in 1998 on the 18th of June. Since 1957 high winds have caused around \$418,000.00 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.

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 Camden 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 Camden County. Camden 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



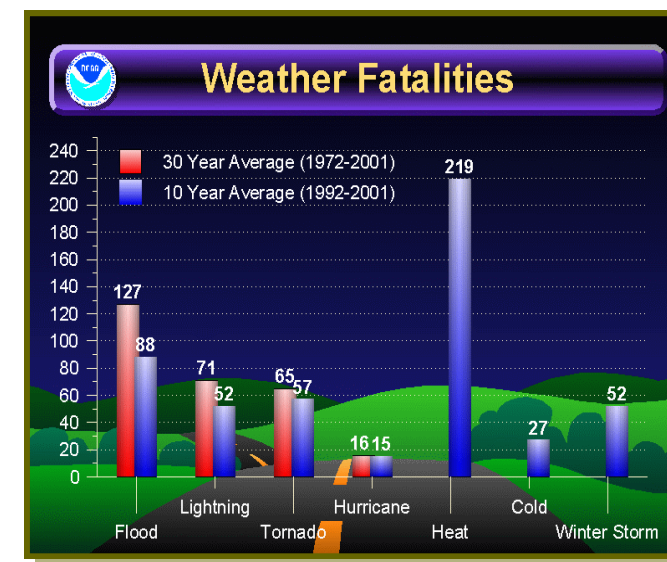
inches, major flooding can occur, and amounts over four inches creates significant flooding that affects most of the county.

Floods in Camden County

25 Sept 1996: A large storm system spread heavy rains into the county beginning late on September 25th and continued into the early morning of the 26th. The first batch of heavy rain caused minor flooding of streets in Neosho.

26 May 1997: Heavy rainfall of up to 3 inches in one hour caused widespread flash flooding throughout the city. Many city streets became impassable and some vehicles from a car lot floated into a ditch.

5 Oct 1998: Rain and embedded thunderstorms dumped a large area of 4 to 10 inches of rain producing widespread flooding. Most of the flooding



National Weather Fatality Statistics

was confined to low areas along creeks and highways. The hardest hit areas were in southeast Kansas and west central and central Missouri. Numerous highways were closed due to high water. Some storm highlights: Barton County - 10 persons were evacuated in southern Lamar 10/5 as Muddy creek rose rapidly. Miller County - Floods washed temporary repairs made to roads from severe flooding in July. West Central and Central Missouri - There were numerous school closings across the area to due to flooded roadways. There was flood damage, mainly to roadways, across the area.

12 June 2002: A complex of thunderstorms moved over southeast Kansas and portions of southern and central Missouri during the late evening and early morning hours of June 12th and 13th. Doppler radar estimated between two and three and a half inches of rain fell during a three hour period. Several low water crossings were flooded and impassable near Joplin, Neosho, and Versailles. Some areas in Joplin had over one foot of water flowing over the roadway. The worst flooding in Neosho was at the intersection of Highways 59 and J.