



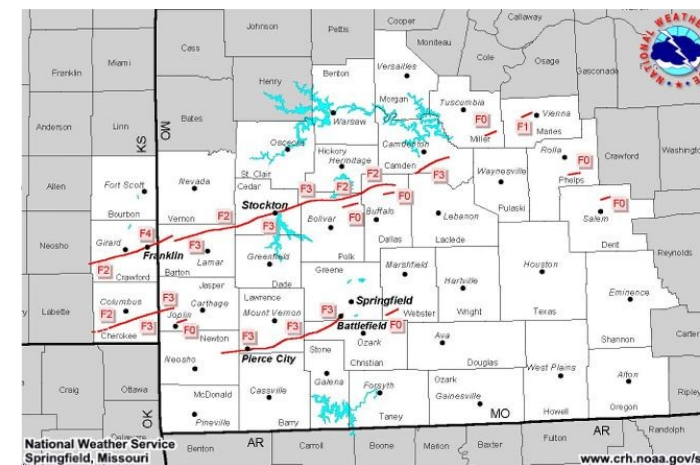
*“To provide weather and flood warnings, public forecasts and advisories for all of the United States...and its territories...for the protection of life and property.”*

## National Weather Service

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## National Weather Service

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

By Gene Hatch  
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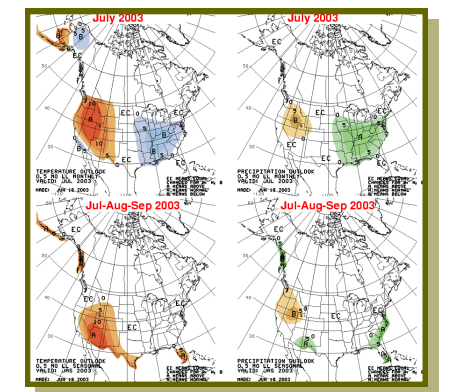
# Local Climatology

Averages and records for Anderson, Missouri in McDonald County

45	22	4.4	78	-21	23.0
51	27	3.0	86	-21	16.6
61	36	2.1	90	-4	24.0
70	44	0	93	6	4.0
76	53	0	93	27	0
84	62	0	100	39	0
89	66	0	112	44	0
88	64	0	108	42	0
80	57	0	104	27	0
71	45	0	96	13	0.5
58	35	1.1	86	0	8.0
48	26	2.7	80	-18	14.3

### Links for Climate information

- [www.crh.noaa.gov/sgf/](http://www.crh.noaa.gov/sgf/)
- [www.cpc.ncep.noaa.gov/](http://www.cpc.ncep.noaa.gov/)
- [www4.ncdc.noaa.gov](http://www4.ncdc.noaa.gov)
- [web.missouri.edu/~moclimat/](http://web.missouri.edu/~moclimat/)
- [mrcc.sws.uiuc.edu/](http://mrcc.sws.uiuc.edu/)
- [agebb.missouri.edu/weather/index.htm](http://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. 13th-1999**...A winter storm produced an area of 3 to as much as 16 inches of snow over a portion of southwest and south central Missouri. The hardest hit areas, where 14 to 16 inches of snow was reported, were in an area from Pineville and Neosho to Springfield then east to the Houston and Cabool areas. Unofficial snowfall reports of 23 inches were reported by law enforcement near Cassville and

18 to 22 inches in the Nixa/Ozark area in Christian County. Snow drifts were 3 to 4 feet high in some of the hardest hit areas. Although there were numerous accidents reported by law enforcement, no serious damage or injuries were reported. Scattered power outages were also reported by local electric cooperatives. Some homes in the hardest hit areas around Cassville and Pineville were without power for over 24 hours.

**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.

**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.

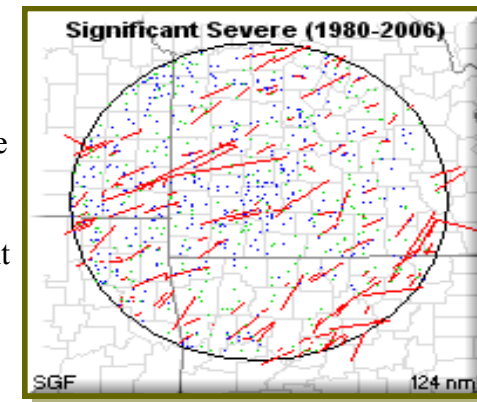


## Overview of Weather Hazards in Southwest Missouri & Extreme Southeast Kansas

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. There were 22 fatalities from these tornadoes, or less than one 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**

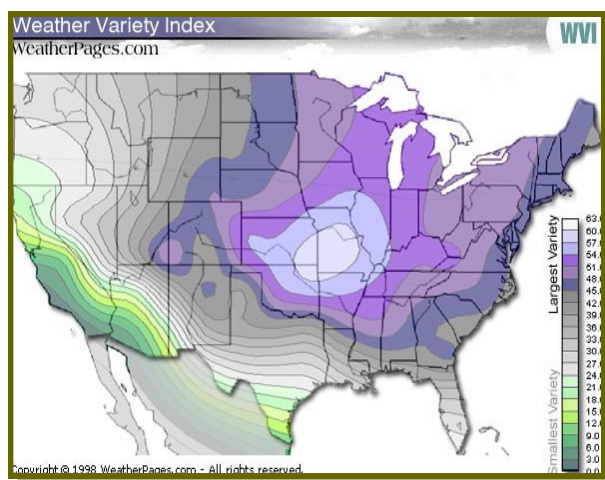
### Tornadoes by county for the Springfield County Warning Area from 1950 to 2008

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 McDonald County, Missouri

### Severe Weather in McDonald 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.

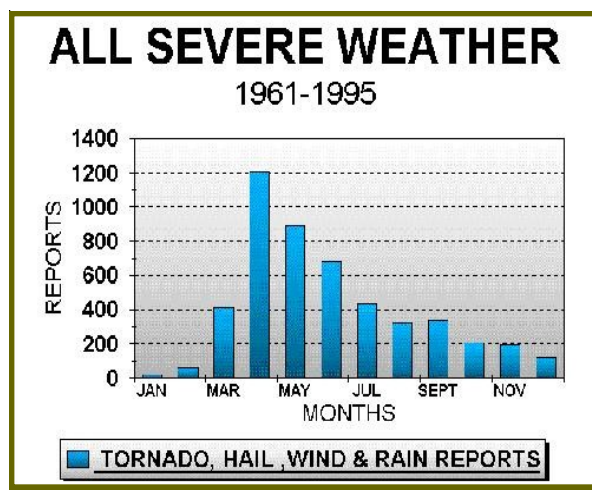


### From www.weatherpages.com

McDonald County Missouri is located on the Ozark Plateau along the eastern edge of tornado ally. Because of its location McDonald 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 McDonald County have dropped hail up to 2" in diameter, created winds in excess of 70 miles an hour and rainfall rates greater than 2" in an hour. While southwest Missouri receives nearly 11 tornadoes a year, McDonald County averages an event every 3 1/2 years.

### Number of Tornadoes in McDonald Co. (1950 to 2008)

<u>F0/F1</u>	<u>F2</u>	<u>F3</u>	<u>F4</u>	<u>F5</u>
11	5	0	0	0
69%	31%	0%	0%	0%

During the winter season McDonald County averages 13.3 inches of snow. With the most snow in one season at 36.3 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 McDonald County

McDonald County contains 3 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 McDonald County are of earthen construction and there have been no recorded failures.

### Where are they Located

- Fisher Lake Dam: Elk Prairie River, Noel
- Keaton Lake Dam: Little Sugar Creek, Pineville
- Southwest City Structure E-1 Dam: Honey Creek, Southwest City

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

Additional dams may be located in McDonald County, however they do not represent a significant hazard.



**Spillway gates open to relieve lake level after heavy rain.**



# 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 McDonald county on almost a yearly basis.

McDonald County averages 13 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
1953	43	5	14
1954	72	43	23
1963	24	3	6
1980	49	25	21
1983	31	5	14
1991	26	1	9
Normal # of Days	13	3	▲ Above 95*

Years with above average summer heat

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

- 47 days: 2 Dec 1955 ~ 17 Jan 56
- 44 days: 21 Dec 1985 ~ 2 Feb 86
- 42 days: 27 Jul 1995 ~ 6 Sept 95
- 41 days: 10 Dec 1980 ~ 19 Jan 81
- 40 days: 27 Aug 1952 ~ 5 Oct 52
- 36 days: 30 Jul 2000 ~ 3 Sept 00

While no major wildfires have affected McDonald 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

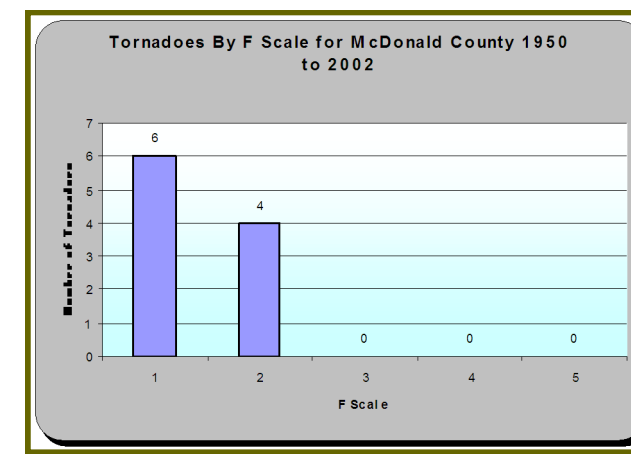
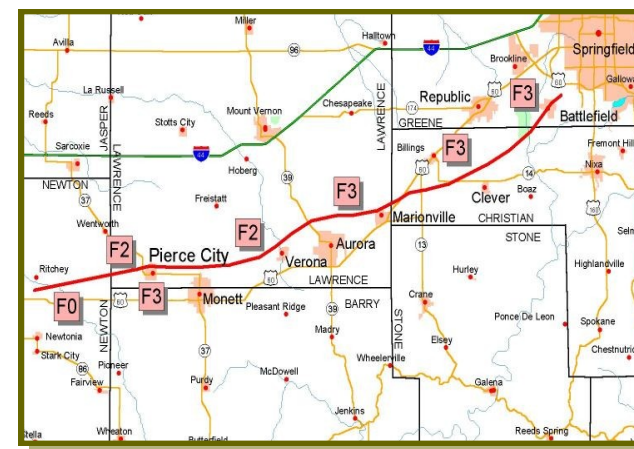
McDonald County lies at the eastern edge of tornado ally and receives on average a tornado every five years. From 1950 to 2008 McDonald county recorded 16 tornadoes from F0 to F2 in strength. The strongest tornado, an F0, passed across the county on the evening of May 26th, 1997. Along its 5 mile track it caused 5 thousand dollars.

## Historical Tornadoes of McDonald County

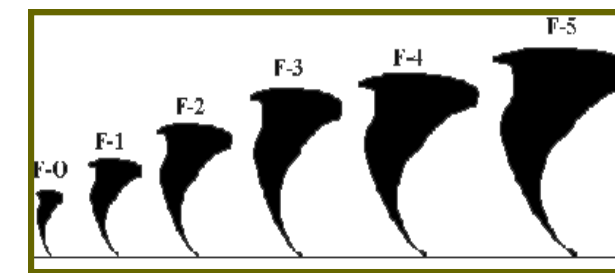
- Apr 18, 1880 (F2) 0 inj, 1 dead
- Apr 18, 1880 (F4) 10 inj, 0 dead
- Oct 30, 1943 (F2) 0 inj, 0 dead
- Apr 12, 1945 (F3) 15 inj, 1 dead
- Apr 3, 1956 (F2) 1 inj, 0 dead
- May 9, 1959 (F2) 0 inj, 0 dead
- Jun 10, 1967 (F2) 0 inj, 0 dead
- Nov 15, 1998 (F2) 0 inj, 0 dead

## For the Record McDonald County

- Has experienced one F4 tornado.
- No F5 tornadoes
- Most recent Tornado December 27, 2008 (F0)
- 2 deaths and 32 injuries since 1880.

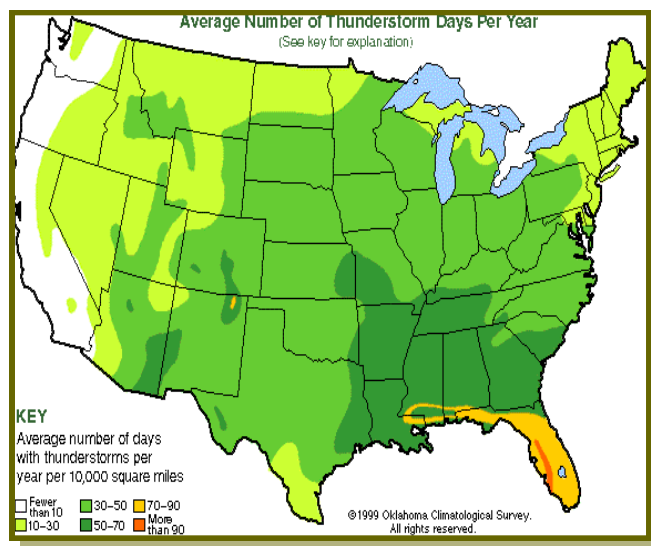


The tornado outbreak of May 4, 2003 was the one of the worst that southwest Missouri has had since the late 1800's. Fourteen tornadoes touched down across the Ozarks during the evening of May 4th one of which was an F0 that touched down in Newton County. This F0 is the latest tornado to strike near McDonald county since an F0 that struck Powell in May of 1997.



- **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 2.00 inches in diameter in McDonald county on May 109, 1959. 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 McDonald county reached 74 mph and occurred in 1985 on the 29th of May. Since 1955 high winds have caused around \$496,000.00 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 McDonald 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 McDonald County. McDonald 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

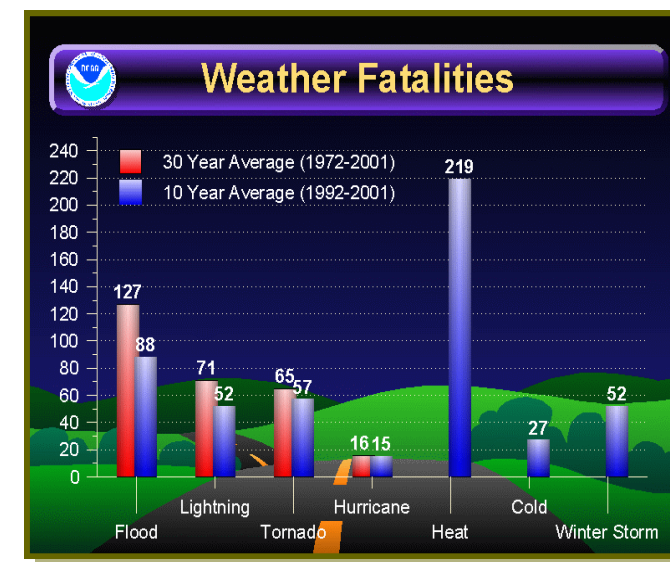


inches, major flooding can occur, and amounts over four inches creates significant flooding that affects most of the county.

### Floods in McDonald County

**4 Jan 1998:** Widespread heavy rainfall occurred over much of extreme southern Missouri from the late morning hours of Sunday January 4th into the early morning hours of Monday January 5th. Widespread rain totals of one to three inches occurred with locally higher amounts in the Branson area. This rain falling on saturated ground caused widespread flooding of low water crossings. Many highways that cross low water crossings or creeks were temporarily closed in the region. No serious damage or accidents were reported.

**19 Mar 1998:** Heavy rain falling on saturated



### National Weather Fatality Statistics

ground resulted in flooding of numerous low water crossings in the county. Flooding closed the bridge along the Elk River in the town of Ginger Blue, just south of Lanagan.

**28 Jul 2001:** Rainfall totals of three to six inches fell over portions of McDonald County during the late afternoon. One observer reported three inches of rainfall in less than one hour in Tiff City. Noel reported the worse damage when a mudslide occurred along Highway 59, which caused several large boulders to block the highway for several hours. Several campgrounds reported flowing water up four feet in depth during the height of the storm.

**27 Jul 2001:** A cooperative observer in Powell reported three inches of rainfall in less than one hour. Also, numerous roads were impassable over eastern McDonald County, especially Highway U where Mikes Creek and Brush Creek converge in Powell. Highway 76 southwest of Rocky Comfort had three to four inches of water flowing over the roadway.