



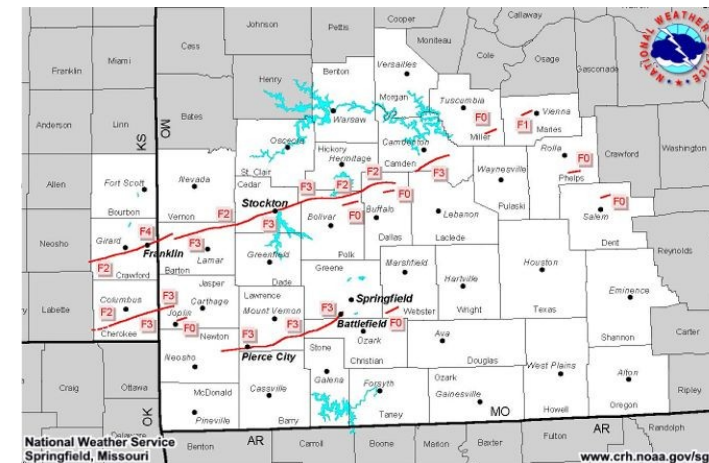
"To provide weather and flood warnings, public forecasts and advisories for all of the United States...and its territories...for the protection of life and property."

National Weather Service

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National Weather Service

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



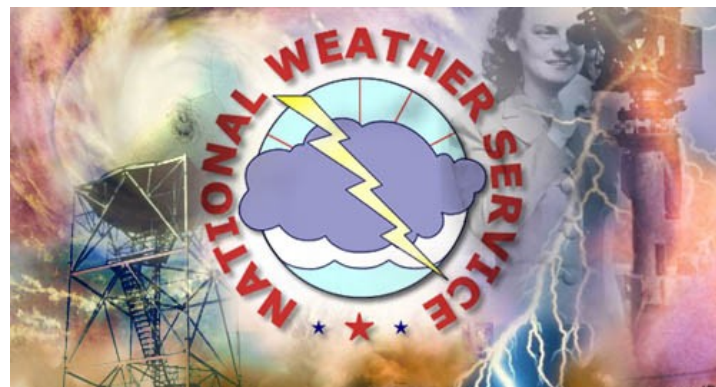
Information Provided By
WFO Springfield, Mo

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 Dallas County and the communities with in the county.

By Gene Hatch
 Meteorologist Intern WFO Springfield. Mo.

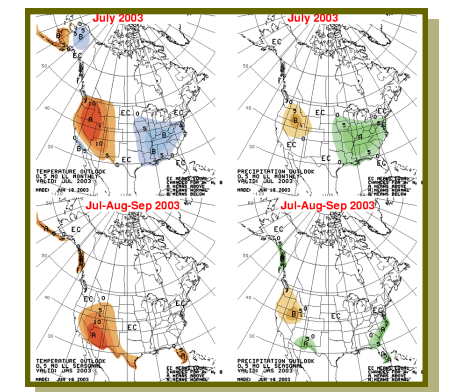
Local Climatology

Averages and records for Buffalo, Missouri in Dallas County

41	21	5.2	74	-19	16.5
48	27	3.9	82	-16	18.0
58	35	2.1	84	-4	15.9
69	44	0.2	91	16	4.0
75	53	0	92	28	0
84	61	0	101	37	0
89	66	0	109	44	0
88	64	0	106	39	0
80	57	0	99	24	0
69	46	0	95	17	0.5
56	35	1.5	81	3	7.6
45	25	2.9	77	-28	15.4

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. 10th-2000High winds gusting to around 40 mph on March 8th combined with low humidity and dry brush to create extremely hazardous fire conditions in central and south central Missouri. The ongoing drought over the region contributed to the overall dry surface conditions. More than 17 residences and 31 structures were destroyed by more than 70 separate fires. The largest number of fires and structural damage occurred in the Camden and northern Laclede county areas. Local officials reported that 44 fires destroyed 15 homes and 16 outbuildings south of the Lake of the Ozarks. Over 250 firefighters and 75 pieces of equipment were dispatched from surrounding areas in Missouri. A firefighter was injured in northern Dallas County.

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 tor-



nado 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 14 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, Tunas 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.

May 5th-1996...An F1 tornado that touchdown in southeast Dallas county MO traveled another 4 miles through the town of Conway. Numerous buildings were damaged in Conway, mainly due to falling trees. A car wash business was completely destroyed. 1 minor injury was reported.

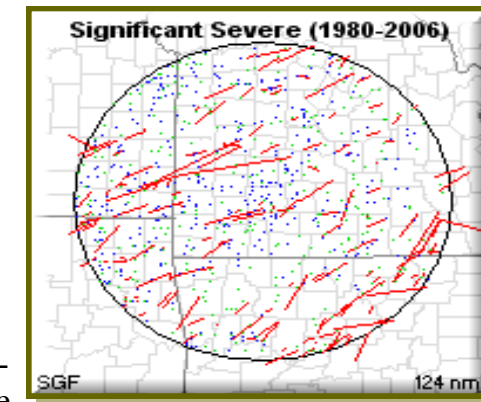


Overview of Weather Hazards in Southwest Missouri & Extreme Southeast Kansas

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

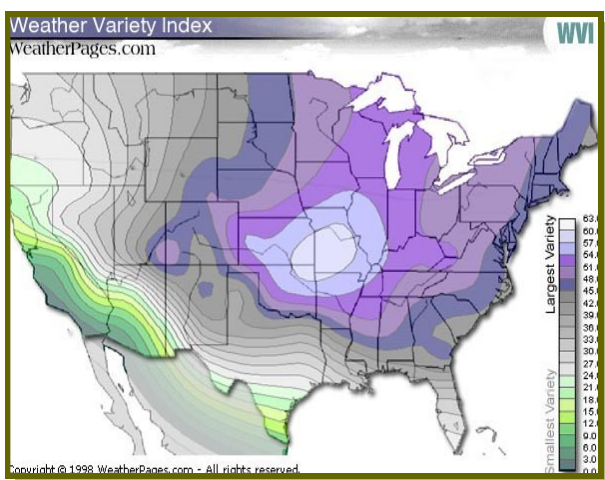
Tornadoes by county for the Springfield County Warning Area from 1950 to 2008

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 Dallas County, Missouri

Severe Weather in Dallas 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.

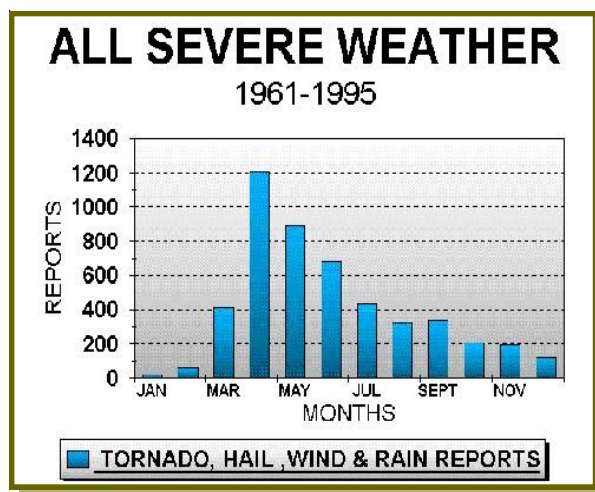


From www.weatherpages.com

Dallas County Missouri is located on the Ozark Plateau along the eastern edge of tornado ally. Because of its location Dallas 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 Dallas County have dropped hail up to 2.75" 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, Dallas County averages an event every 5 years.

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

<u>F0/F1</u>	<u>F2</u>	<u>F3</u>	<u>F4</u>	<u>F5</u>
7	1	1	0	0
78%	11%	11%	0%	0%

During the winter season Dallas County averages 15.8 inches of snow. With the most snow in one season at 34.4 inches, falling during the 1974 to 1975 winter season. Ice storms also affect the county during the winter season causing significant damage to homes, trees and utilities.

Dam Failure

Dams in Dallas County

Dallas County contains 3 dams. While 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 Dallas County are of earthen construction and there have been no recorded failures.

Where are they Located

- Maddux Lake Dam: Little Niangua, Plad
- Thurman Lake Dam: Goose Creek, March
- Hutton Lake Dam: Indian Creek, Bennett Springs

All of the dams in Dallas County are less than 100 feet high. Many are located on private land and fall under private ownership. Other dams may be present in the county but may be too small to be considered significant.



Spillway open to relieve lake after heavy rainfall



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 Dallas county on almost a yearly basis.

Dallas County averages 5 days a year with temperatures at or above 95 degrees. July and August are the two warmest months, which average 2 days at or above 95 degrees.

Year	Days 95* +	Days 100* +	Days in a row
1970	21	7	8
1972	20	4	6
1978	29	3	13
1980	60	34	18
1983	29	6	7
1986	21	6	9
Normal # of Days	5	1	▲ Above 95*

Years with above average summer heat

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

- 40 days: 11 Dec 1980 ~ 19 Jan 81
- 38 days: 10 Dec 1955 ~ 16 Jan 56
- 37 days: 17 Jun 1966 ~ 23 Jul 66
- 37 days: 3 Sept 1979 ~ 9 Oct 79
- 37 days: 21 Dec 1985 ~ 26 Jan 86
- 35 days: 22 Dec 1960 ~ 25 Jan 61

While no major wildfires have affected Dallas 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 11,000 fires occurred during that time in the Lake Ozark fire district which includes Morgan, Miller, Camden, Dallas and Laclede counties. This represented nearly 20% of the wildfires in the state with over 131,000 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 Lake Ozark fire district were the result of lightning.

Tornado Information

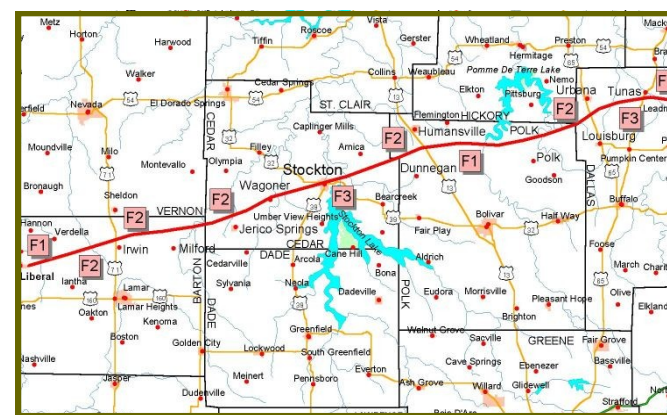
Dallas County lies at the eastern edge of tornado ally and has only received 3 tornadoes over the period from 1950 to 2002. The three tornadoes Dallas county recorded were from F0 to F1 in strength. The strongest tornado, an F1, passed across the county on the evening of May 5th, 1996. Along its 3 mile track it caused 50 thousand dollars in damage.

Historical Tornadoes of Dallas County

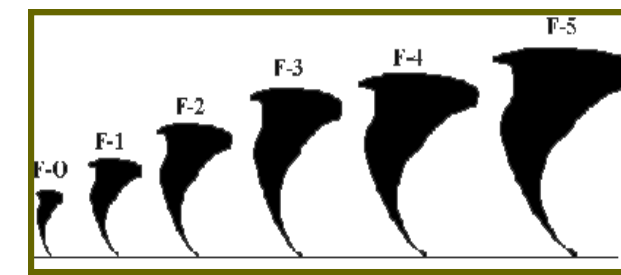
- Feb 26, 1936 (F2) 0 inj, 0 dead
- Nov 17, 1958 (F2) 0 inj, 0 dead
- May 4, 2003 (F3) 2 dead

For the Record Dallas County

- Has experienced one F3 tornado.
- No F4 or F5 tornadoes
- Most recent Tornado March 31, 2008 (F2)
- 2 deaths and 0 injuries since 1880.

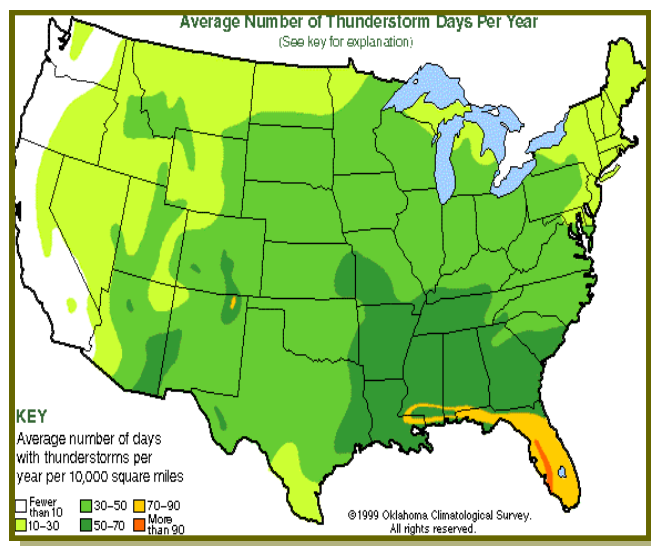


The tornado outbreak of May 4, 2003 was the one of the worst that southwest Missouri has had since the late 1800's. Fourteen tornadoes touched down across the Ozarks during the evening of May 4th one of which was an F3 that struck near the town of Tunas. This F3 is the latest killer tornado to strike Dallas county since an F1 that struck near Conway in May of 1996.



- **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



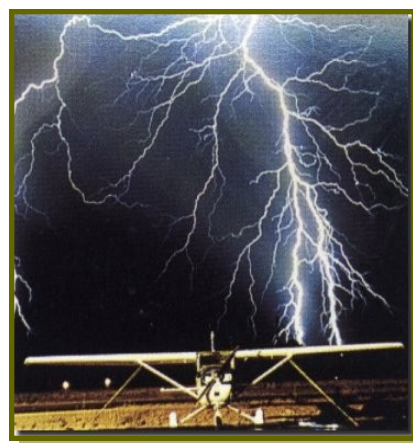
Average number of thunderstorm days per year.

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 Dallas county on April 30, 2002. 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 Dallas county reached 101 mph and occurred in 1998 on the 23rd of May. Since 1967 high winds have caused around \$343,000.00 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 Dallas 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 Dallas County. Dallas 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

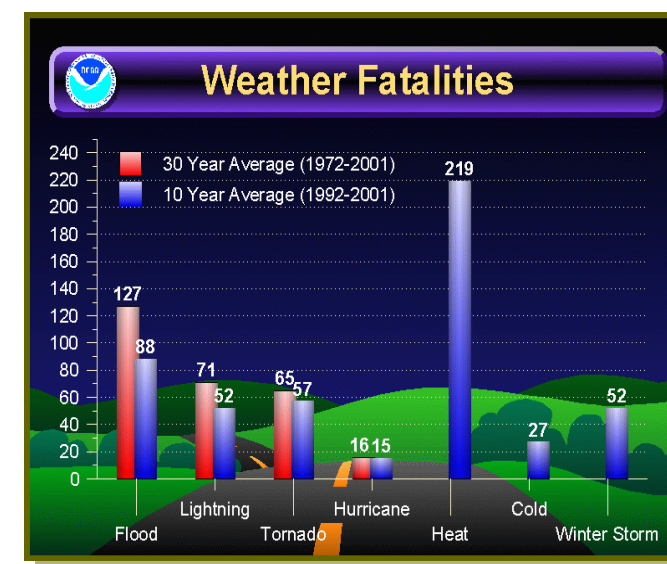


inches, major flooding can occur, and amounts over four inches creates significant flooding that affects most of the county.

Floods in Dallas County

25 Sept 1993: Heavy rain falling on saturated ground caused flooding of numerous low water crossings in the county. Highway P, 5 miles north of Long Lane, was closed during the afternoon and evening.

12 July 2002: A north to south band of extremely heavy rain fell in a 6 hour period during the early morning hours of July 12th. Widespread 3 to 6 inch rainfall occurred from just west of Hermitage to Springfield. Isolated rainfall amounts as high as 8 inches were reported in central and southeastern



National Weather Fatality Statistics Dallas

County including the city of Springfield. Most of the serious flood damage occurred in Dallas County. Areas along Jordan Creek in Springfield and the James River and its tributaries in southeast Greene County were the hardest hit. In Springfield, a trailer park was evacuated, 17 apartments, several hotel/motels, and about 35 businesses received damage. Well over 100 homes received damage with 17 sustaining major damage or being destroyed. A chemical plant was flooded resulting in a hazardous material spill which was quickly contained. The plant suffered an estimated \$4 million in damage.