Severe Weather

in Arkansas

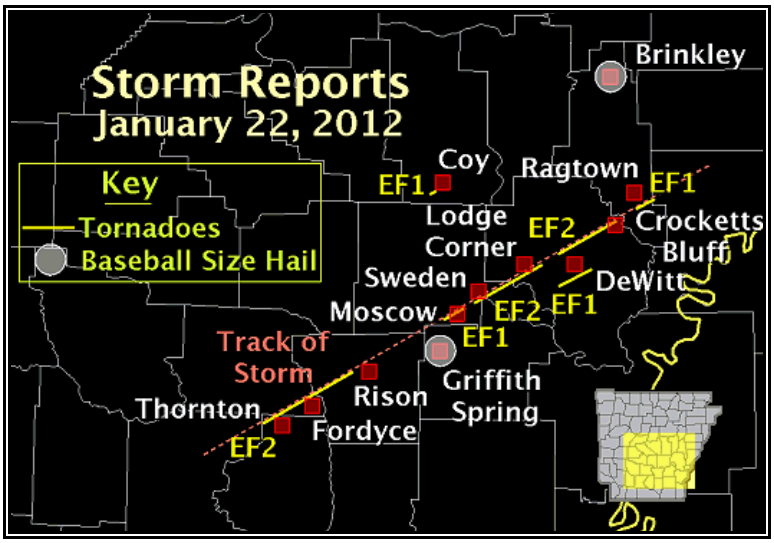
Produced by
National Weather Service
Little Rock, Arkansas
February, 2013

Severe Weather

2012 Highlights

in Arkansas

The year started off with a bang. There were seven tornadoes spawned in southern Arkansas on January 22nd. One of the strongest tornadoes (rated EF2) damaged houses and a country club on the north side of Fordyce (Dallas County), and slammed into a 150 year old church north of Kingsland (Cleveland County).



.

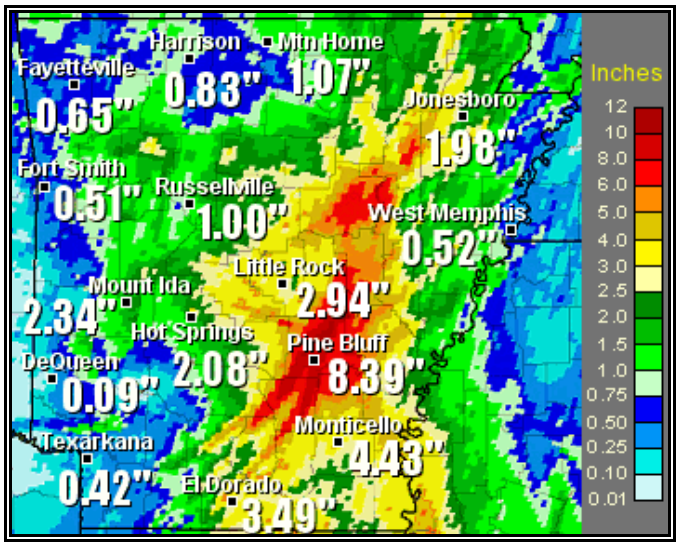
In the picture: One storm was responsible for five tornadoes (rated EF1/EF2) across a six county area in southern and eastern Arkansas on 01/22/2012. Nearby storms produced isolated tornadoes (two of them) and baseball size hail.

In March (the 19th through the 21st), some areas received more than five inches of rain in a narrow swath from Little Rock (Pulaski County) to Mountain Home (Baxter County). Two flash flood fatalities resulted. After this event, it got quiet.

It was the driest April through July on record in Arkansas. There was a statewide average of only 9.03 inches of rain (17 to 19 inches is normal). Drought conditions became widespread, and 85 percent of pastures were in poor or very poor condition. While row crops thrived (thanks to irrigation), ranchers struggled and were forced to sell cattle after the smallest hay yields since the mid 1950s.

The remnants of Hurricane Isaac brought some relief in late August. On the 30th/31st, three to more than six inches of rain fell from northeast into central and southeast Arkansas. Pine Bluff (Jefferson County) had a 48 hour total of 8.93 inches. Flash Flood Emergencies were declared from England (Lonoke County) to Pine Bluff (Jefferson County) and Fordyce (Dallas County). Extensive flooding was reported in these communities and surrounding areas, with roads barricaded and numerous homes threatened by high water.

In the picture: Forty eight hour rainfall through 700 am CDT on 09/01/2012.



Northern and western sections of the state were not as fortunate. Pine Bluff (Jefferson County) got more rain in this event than Fort Smith (Sebastian County) and Texarkana (Miller County) received in 122 days (August through November).

Much of the north and west also missed out on a Christmas snowstorm that resulted in the first accumulating snow at Little Rock (Pulaski County) in 86 years! A whopping 17.5 inches was measured at Perry (Perry County), which was a record snow depth for December in Arkansas. Harrison (Boone County) only got 0.01 inch of precipitation, and Fayetteville (Washington County) received a trace.

The year finished with a continuing drought in the north/west. It was the 10th driest year on record and the 2nd warmest. Because of the drought and a lack of storms, there was a grand total of only 18 tornadoes (33 is normal).

More Info ----> A Look Back at 2012

Severe Weather in Arkansas

Questions & Answers

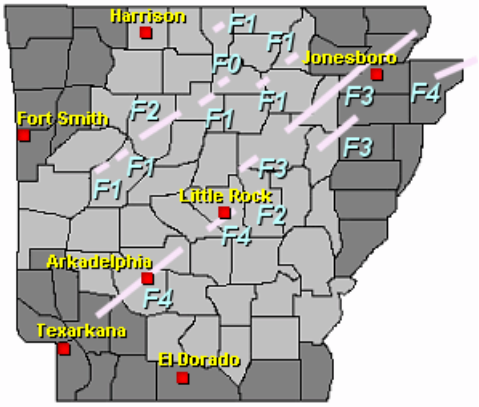
Tornadoes

Q. What was the deadliest day for tornadoes in Arkansas history?

A. On March 21, 1952, tornadoes killed 111 people and injured another 772 in Arkansas. Three tornadoes affected primarily the northeastern quarter of the state. The best-known was the infamous "Judsonia Tornado" in White County.

Q. What was the deadliest day for tornadoes in recent years?

A. On March 1, 1997, tornadoes were responsible for 25 fatalities. Most of these were the result of two tornadoes (both rated F4) spawned by the same parent storm (dubbed the "Interstate 30 Supercell").



In the picture: Sixteen tornadoes were spawned on March 1, 1997. The deadliest tornadoes tracked along Interstate 30 from Arkadelphia (Clark County) to Little Rock (Pulaski County).

This storm devastated Arkadelphia (Clark County), the Shannon Hills (Saline County) community, and also the south side of Little Rock (Pulaski County). Since this event, no weather related episode in Arkansas has been as deadly.

More Info ----> March 1, 1997 Tornado Outbreak

Q. Has there ever been an F5 (or EF5) tornado in Arkansas?

A. Only one such tornado has been documented. It occurred on April 10, 1929, in northern Jackson County, and is known as the "Sneed Tornado".

More Info ----> F5 Tornado on April 10, 1929

Q. Is it true that taking shelter under a highway overpass is the wrong thing to do when a tornado is near?

A. Yes. A strong pressure drop around tornadoes creates a suction effect, which may pull you out from under the bridge. Tornadoes also produce rotational winds, with potential injury causing debris swirling around the bridge.

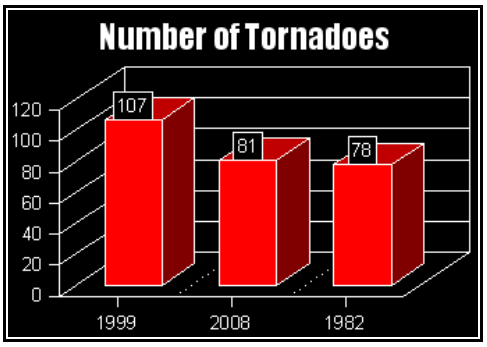
In the picture: Highway overpasses offer little protection from tornadoes.

Q. Who makes the decision to blow the tornado sirens?

A. City and county officials, not the National Weather Service, make these decisions. Some areas sound the sirens when a Tornado Warning is issued, while others wait for a sighting of severe weather in their area. Even the testing of tornado sirens varies from one town to another. The sirens may be tested once a week or once a month. In some areas, a test is postponed if the weather looks threatening that day.

Q. What was the most active year for tornadoes?

A. 1999. There were 107 tornadoes spawned. This was a La Niña year (i.e. cooler than normal water in the equatorial Pacific Ocean). In second place was 2008 with 81 tornadoes. This was also a La Niña year.



In the picture: There were 107 tornadoes in 1999...a record for Arkansas. Up until this time, the previous record was 78 tornadoes in 1982. This was surpassed in 2008 when 81 tornadoes were spawned.

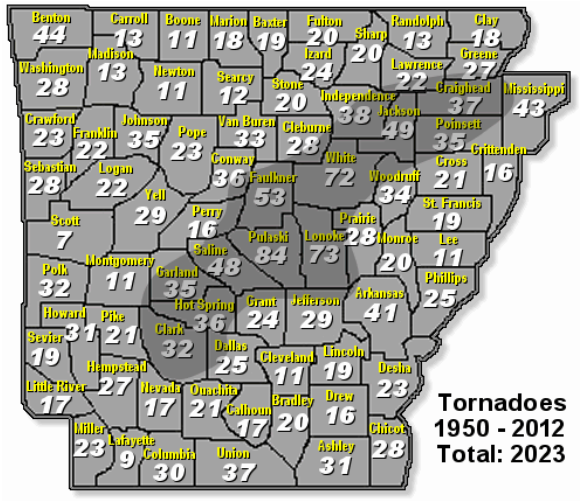
More Info -----> Making Tornado History in 1999

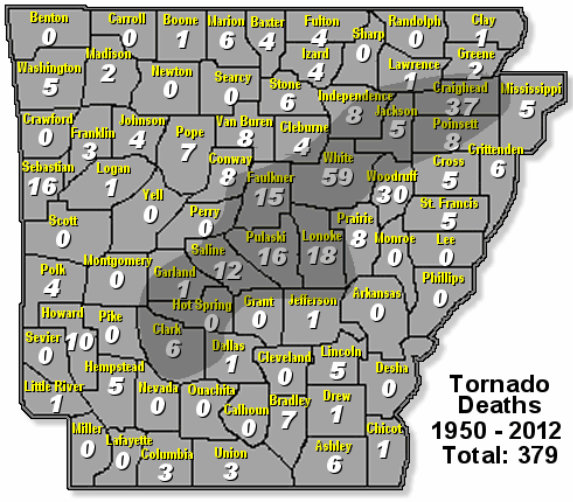
Q. What was the largest tornado outbreak?

A. There were 56 tornadoes on January 21-22, 1999.

Q. Is there a "Tornado Alley" in Arkansas?

A. Yes. Since 1950, counties with 35 or more tornadoes are mostly clustered along Interstate 30 and U.S. Highway 67/167. This includes areas from Arkadelphia (Clark County) to Little Rock (Pulaski County) and Jonesboro (Craighead County). Tornado deaths are highest in this part of the state as well.





In the pictures: The shaded regions are where the most tornadoes and tornado fatalities have occurred in Arkansas since 1950.

Q. Tornadoes used to be rated with an F-scale, and now it is an EF-scale. What is the difference?

A. In the past, the F-scale was decided mostly by visual evidence and the degree of

damage to an object such as a house. The F-scale method helps determine the EF-scale (first used in 2007), but the quality of construction is also considered. So, while a mangled home likely rated high on the F-scale, the EF-scale results might be lower given a poorly built structure.

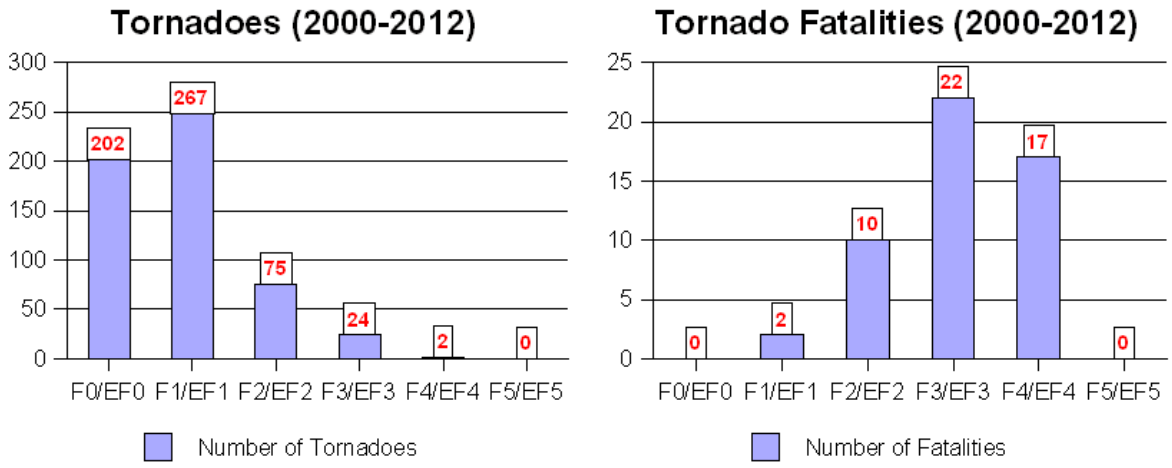
More Info ----> How Tornadoes are Rated

Q. How many tornadoes are spawned annually in Arkansas?

A. While this can vary widely, the yearly average is 33. This is based on a thirty year period from 1981 to 2010. From 2000 to 2012, roughly 44 tornadoes were counted each year. In this thirteen year span, 2008 and 2011 were the most active with 81 and 75 tornadoes respectively. The least active years were 2007 and 2012, with 16 and 18 tornadoes respectively.

Q. How common are destructive/deadly tornadoes?

A. They are rare. From 2000 through 2012, there were 570 tornadoes and 51 tornado related fatalities across the state. The vast majority, or 82% of tornadoes (469 of them), were weak (rated F1/EF1 or less) and responsible for 4% of the deaths (2 of them). Tornadoes rated F3/EF3 or higher (26 of them) occurred only 4% to 5% of the time, but accounted for 76% of the deaths (39 of them).



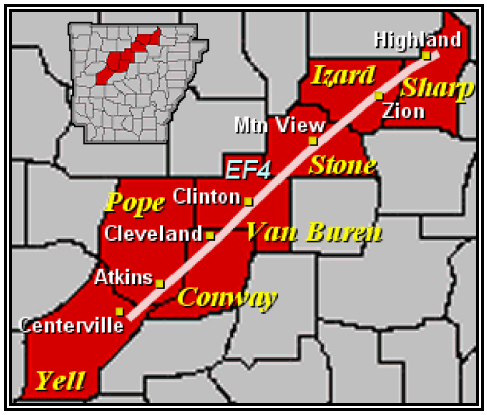
In the charts: Since 2000, the strongest tornadoes were few, but they were responsible for the most deaths.

Q. What is the longest tornado track in Arkansas?

A. On February 5, 2008, a tornado (rated EF4) tracked 122 miles through seven counties in northern and western sections of the state. The tornado killed 13 people. In

general, records show that tornadoes with the longest tracks tended to be strong/destructive. Weak tornadoes were usually brief with short tracks.

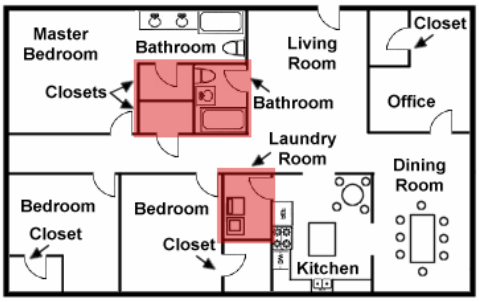
In the picture: A tornado rated EF4 tracked through portions of Yell, Pope, Conway, Van Buren, Stone, Izard and Sharp Counties on 02/05/2008.



More Info ----> Tornadoes on February 5, 2008

Q. When severe weather threatens, why am I told to go to an interior room on the ground floor of a building?

A. Post-storm damage surveys have revealed that destructive winds usually remove the roof of a building first, and then the outer walls. If a tornado is involved, the parent storm will have likely moved away by the time winds reach interior rooms.



In the picture: A floor plan with desired areas (highlighted interior rooms) to hide when severe weather approaches.

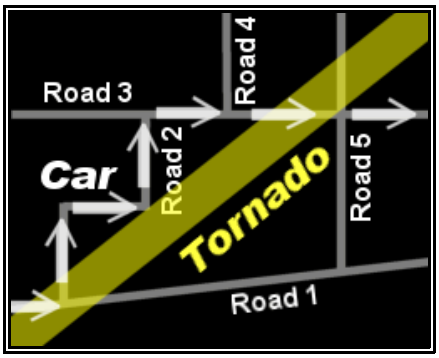
Q. Should I open windows if a tornado is approaching?

A. No. It was thought that rapidly falling pressure caused homes to expand and explode, and opening windows equalized the pressure and helped prevent bulging walls. Research showed that most damage is caused by powerful rotating winds, not pressure drops. In fact, opening windows allows winds (and flying debris) to flow freely into homes (i.e. a wind tunnel effect). From a safety standpoint, time would be better spent finding a place of safety rather than opening windows.

Q. Can I outrun a tornado in my car?

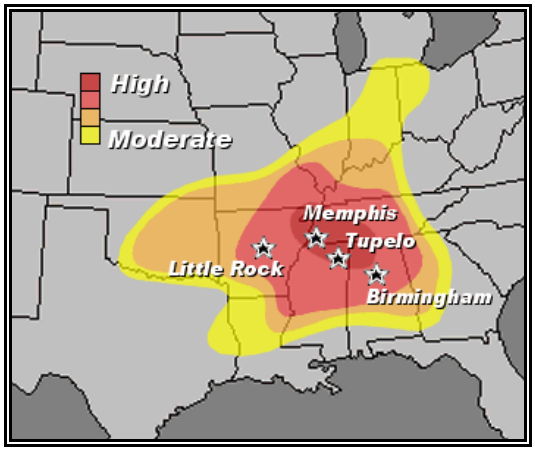
A. Sure you can, but there is a risk of losing ground to a tornado if there are turns involved, a traffic jam, or other unforeseen hazards on the road ahead. Consider leaving the vehicle and going to an appropriate place of safety (i.e. a building on a permanent foundation).

In the picture: Cars have to turn, tornadoes don't.



Q. We learned in school that "Tornado Alley" is in the Plains (Texas to Nebraska), so is it more safe to be in Arkansas?

A. Absolutely not. Due to more hills and trees, tornadoes are less visible here. Also, we are a part of "Tornado Fatality Alley", an area identified by Dr. Walter Ashley of Northern Illinois University.



In the picture: Relative frequency of killer tornado events from 1950 to 2004 (adapted from a graphic in Dr. Ashley's study).

A study (in 2007) by Dr. Ashley showed a higher likelihood of killer tornadoes in this part of the country due to a couple of factors: (1) the highest percentage of manufactured/mobile homes compared with any other region east of the Continental Divide, and (2) a close proximity to the Gulf of Mexico and a feed of warmth/moisture to sustain storms long after sunset.

Straight-Line Winds

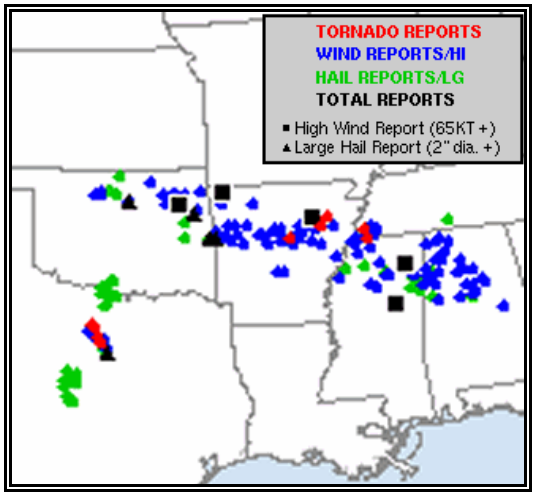
Q. What is a microburst?

A. Around here, these are most common in the summer on a hot afternoon. Isolated to scattered thunderstorms will rapidly develop as strong updrafts build cauliflower clouds. When rain and hail become too heavy for updrafts to support, precipitation falls and cool downdrafts surge toward the ground (and storms collapse). Sometimes, these downdrafts will cause damage as they hit the ground and spread out.

In the picture: Thunderstorm gusts up to 80 mph tore a car dealership apart at Hot Springs (Garland County) on 08/05/2012. A lot of windows were shattered. Local temperatures dropped from 105 degrees into the upper 70s and lower 80s.

Q. Can straight-line winds be as damaging as a tornado?

A. Yes, at least a weak tornado (rated EF0/EF1). The usual culprit in Arkansas is the bow echo. Powerful winds behind a line of storms causes the leading edge to bulge or bow out. The line now has a backward C-shape or boomerang appearance. The most destructive bows are fast movers, with a forward speed greater than 50 mph. Long-lived bows are called “derechos”.



In the picture: Severe weather reports on 06/12/2009. The graphic is courtesy of the Storm Prediction Center in Norman, OK. Mostly wind damage was reported from northeast Oklahoma through Arkansas and all the way to Alabama. The damage was caused by a derecho.

More Info ----> The Derecho of June 12, 2009

Q. If my mobile home has straps, am I protected from straight-line winds?

A. To a point, but if gusts exceed the load bearing of the straps, the mobile home is in danger of being rolled. The danger is increased if winds are perpendicular to the structure (i.e. the broad side of the mobile home acts as a sail to catch the winds).

Hail

Q. What is the largest hailstone ever reported in Arkansas?

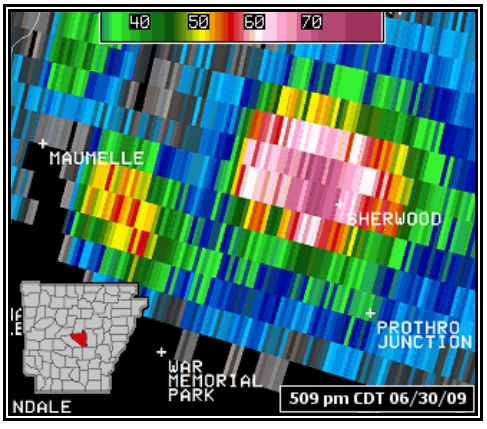
A. Hailstones 5 inches in diameter pelted areas near Albion and Searcy (both in White County) on April 2, 2006.

In the picture: Hail up to 5 inches in diameter fell about 2 miles north of Searcy (White County) during the afternoon of 04/02/2006. The picture is courtesy of Martha Benskin.

Q. How in the world does hail get so large?

A. Strong updrafts into a thunderstorm cloud suspend hailstones aloft where it is cold (subfreezing). If the hail falls and collects moisture (in the lower portion of the storm), and then gets driven overhead to refreeze, the stones can get huge.

Q. Have there been any multi-million dollar hail events recently?



A. Yes. One that comes to mind is June 30, 2009. Up to baseball size hail pelted cars, roofs, siding and crops in portions of Pulaski and Lonoke Counties (central Arkansas). Damage totaled more than $60 million.

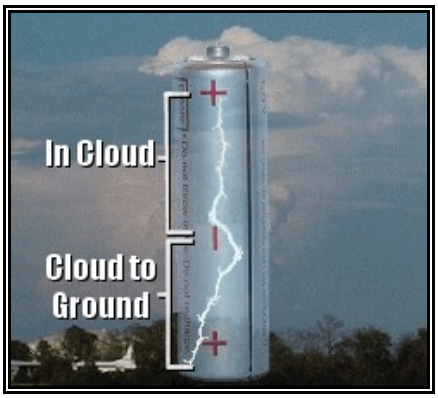
In the picture: The WSR-88D (Doppler Weather Radar) showed a severe storm with a large hail core near Sherwood (Pulaski County) at 509 pm CDT on 06/30/2009.

More Info ----> Severe Weather on June 30, 2009

Lightning

Q. When is lightning the most dangerous?

A. More than 80 percent of lightning deaths in Arkansas occur from May through August, or during the warm months when people tend to be outside. The real danger is when people become so engrossed in their activities that they lose track of the weather. The National Weather Service has a simple slogan to boost lightning awareness: "When thunder roars, go indoors!"



In the picture: Lightning is a part of an atmospheric battery surrounding a thunderstorm. It is produced due to the magnetic attraction between the base of a storm cloud (negative charge) and the ground (positive charge).

More Info ----> Lightning Safety

Q. Why does lightning tend to strike tall objects?

A. To go from cloud to ground, lightning must travel through air...a poor conductor of electricity. Because of this, lightning tends to go the shortest distance possible.

Q. As long as it is not raining, are you safe from lightning?

A. No. Lightning hits targets randomly, and sometimes strikes nowhere near the core of a storm. In fact, it has been known to hit objects more than 10 miles away from its parent thunderstorm! Given that lightning can strike at a distance, waiting until it rains before seeking shelter is not a good idea.

Q. Why is lightning not severe?

A. When warning criteria were established, the idea was to separate the big storms from the little ones. Not all storms have damaging winds, sizable hail and/or tornadoes. But every thunderstorm has lightning (i.e. if you hear thunder, there is lightning somewhere).

Flash Floods

Q. Is flash flooding really more deadly than tornadoes?

A. Yes. Nationwide, flash flooding was responsible for more than 90 fatalities annually in the past 30 years. Tornadoes accounted for around 75 fatalities yearly. More than half of all flash flood deaths occurred in automobiles, with people trying to drive through water. To help make people aware of the dangers of water, the National Weather Service has a simple slogan for motorists: "Turn Around Don't Drown".

More Info ----> Flood Safety

Q. What was the deadliest flash flood event in the state?

A. On June 11, 2010, more than a half foot of rain fell at the Albert Pike Recreation Area (Montgomery County) while several hundred campers slept during the early morning hours. Twenty foot rises resulted on the Little Missouri River (which flows through the area), and twenty people lost their lives after being swept downstream.

Little Missouri River at Langley (Pike County) on 06/11/2010	
Time	**Stage (ft)**
200 am CDT	3.81
230 am CDT	5.83
300 am CDT	9.87
330 am CDT	13.91
400 am CDT	17.70
430 am CDT	20.57
500 am CDT	22.30
530 am CDT	23.39
600 am CDT	22.40
630 am CDT	19.41

In the table: The Little Missouri River rose almost 20 feet in 3 hours at Langley (Pike County) during the predawn hours of 06/11/2010. This is just a few miles downstream from the Albert Pike Recreation Area.

More Info ----> The Albert Pike Flash Flood Event

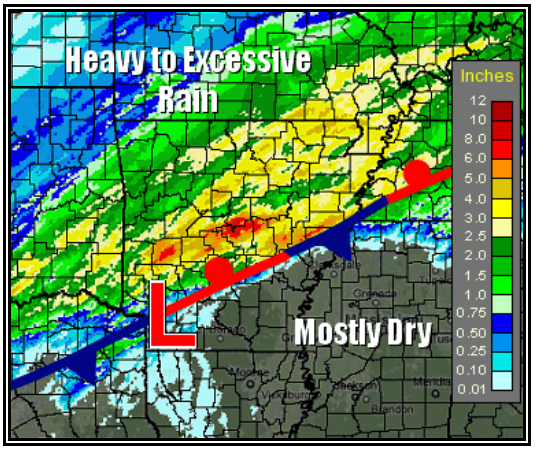
Q. Why was the Albert Pike event so deadly?

A. Other than happening in the middle of the night, the remoteness of the area made it difficult to get warning information and rescuers to the site. Also, campers may not have understood the area was flood prone. This is very important in any high water situation. People should be aware of their surroundings, and look for signs. For example, at the Albert Pike Recreation Area, several houses/cabins were built on stilts to avoid rising water. If there are indications that water is a problem, be vigilant and check the forecast and be ready to move to higher ground.

Q. What is the difference between a flood and flash flood?

A. A **flash flood** usually begins within 6 hours. The rate of rainfall exceeds the rate of runoff (rain falls faster than it can be carried away). Because water has nowhere to go, it covers roads and fills small streams and creeks. A **flood** usually takes longer than 6 hours to unfold and can last for several days. Water from a flash flood event or long-term heavy rain event eventually makes its way into rivers. Excess water (i.e. greater than flood stage) flows into nearby towns, fields, etc.

In the picture: Forty eight hour rainfall through 1100 pm CDT on 05/01/2011. Three to more than six inches of precipitation was common along and north of a nearly stationary front in central Arkansas. Widespread flash flooding eventually led to record high water levels along portions of the Black and lower White Rivers (eastern sections of the state).



More Info ----> Heavy Rain/Severe Weather on April 30-May 2, 2011

General Severe Weather

Q. What is severe weather?

A. Tornadoes, 58 mph winds or greater and quarter size hail or larger.

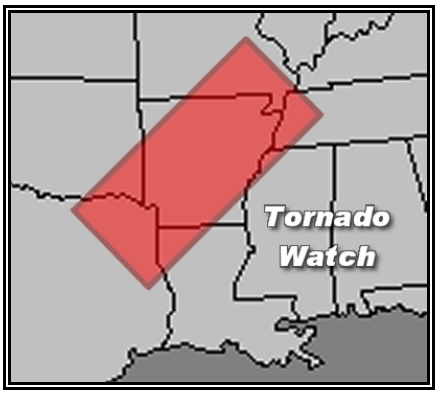
Q. When is severe weather most likely?

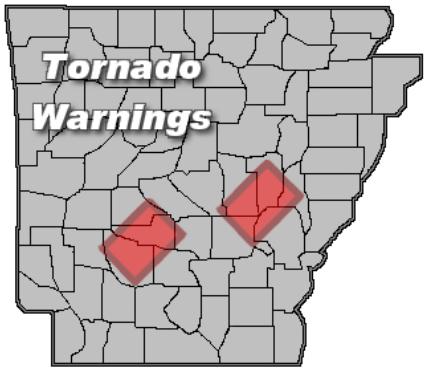
A. While severe storms can hit any time of day and any time of year, they are most likely between 200 pm and 1000 pm (afternoon and evening) from March through May and also in November/December. These are the months when air masses from Canada and the Gulf Coast clash the most.

Q. What is the difference between a watch and warning?

A. Severe Thunderstorm or Tornado Watches are issued by the Storm Prediction Center in Norman, OK. A watch encompasses a broad area (sometimes several states), and lasts for several hours. It is issued when conditions are favorable for the development of severe storms; that is, severe storms are **possible**. Severe Thunderstorm or Tornado Warnings are issued by local National Weather Service

Forecast Offices, such as the one in Little Rock, Arkansas. A warning is for a small area (one or more counties), and usually lasts for 30 minutes to an hour. It is issued when storms are active, and forecasters believe severe weather is **imminent** for the affected area.



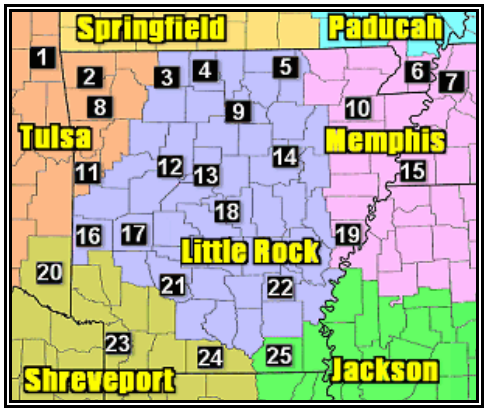


In the pictures: Examples of a Tornado Watch and Tornado Warnings.

Q. Where can I get warning information?

A. Warnings are available in a variety of places (i.e. television, radio, internet, etc.), but there are few options to alert you while you sleep. One option to consider is NOAA Weather Radio All Hazards, which is available 24 hours a day/7 days a week from the National Weather Service. If a warning is issued for your area, the radio will send an alert tone. SAME (Specific Area Message Encoder) technology allows you to program a code into the radio for your area of interest. For Arkansas, a prefix of "005" is followed by a county code (i.e. Pulaski County is "119").

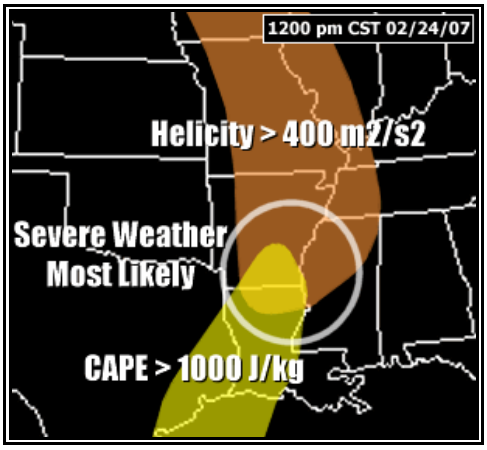
In the picture: There are 25 NOAA Weather Radio transmitters serving Arkansas.



More Info ----> NOAA Weather Radio

Q. How come storms do little on some days and are severe on others?

A. A lot depends on the amount of instability and available shear. Instability means destabilizing the atmosphere by adding warmth/moisture in the low levels and making it cooler aloft. Given these conditions, air parcels will have the tendency to rise quickly which creates strong/healthy updrafts to build storm clouds. More shear, or increasing wind with height, will tilt storms in the vertical. Precipitation (rain/hail) that forms will not be directly over the updrafts, and this promotes storm growth for a longer period. If the wind is turning with height, updrafts may rotate with time and tornadoes are now a concern.



In the picture: Helicity (representing the potential for rotating winds) in the lowest kilometer of the atmosphere was high (over 400 m2/s2), and CAPE (Convective Available Potential Energy...or a measure of instability) was increasing (to over 1000 J/kg) across southeast Arkansas at 1200 pm CST on 02/24/2007. Eventually, severe storms developed and several tornadoes were produced, including a tornado (rated EF3) at Dumas (Desha County).