

= 2008 Super Tuesday tornado outbreak =

The 2008 Super Tuesday tornado outbreak was a deadly tornado outbreak which affected the Southern United States and the lower Ohio Valley on February 5 and 6, 2008. The event began on Super Tuesday, while 24 U.S. states were holding primary elections and caucuses to select the presidential candidates for the upcoming presidential election. Missouri, Illinois, Arkansas, Alabama, and Tennessee were among the affected regions in which primaries were being held. Some voting locations were forced to close early due to the approaching severe weather.

Eighty @-@ seven tornadoes occurred over the course of the outbreak, which lasted over 15 hours from the afternoon of February 5 until the early morning of February 6. The storm system produced several destructive tornadoes in heavily populated areas, most notably in the Memphis metropolitan area, in Jackson, Tennessee, and the northeastern end of the Nashville metropolitan area.

A total of 57 people were killed across four states and 18 counties, with hundreds of others injured. The outbreak, at the time, was the deadliest in the era of modern NEXRAD doppler radar, which was fully implemented in 1997. The event was the second deadliest in February since 1950 behind the February 1971 Mississippi Valley tornado outbreak, which killed 123, the deadliest outbreak in both Tennessee and Kentucky since the 1974 Super Outbreak, and was at the time the deadliest tornado outbreak in the US overall since the 1985 United States ? Canada tornado outbreak which killed 90 people. This record would not be surpassed until the 2011 Super Outbreak which killed 324 people. Damage from tornadoes was estimated at over \$ 500 million (2008 USD).

The weather system which produced the tornadoes caused significant straight @-@ line wind damage, hail as large as softballs ? 4 @.@ 5 inches (11 cm) in diameter ? major flooding, significant freezing rain, and heavy snow across many areas of eastern North America. The total damage from the entire weather system exceeded \$ 1 billion.

= Meteorological synopsis =

A series of strong low pressure systems formed across the southern Great Plains on February 4, contributing to record warmth on February 4 and 5 in the southern Plains and lower Mississippi River Valley. High temperatures across many areas reached the 70s ° F (21 ? 26 ° C), and in Alabama temperatures reached the low 80s ° F (27 ° C) with dew points in the middle 60s ° (17 ? 20 ° C). Dewpoints in the mid 60s ° F were recorded as far north as Memphis. A strong cold front trailing the low pressure area approached the region from the west.

The high temperatures and dew points created moderate instability across the outbreak area. CAPE values, a measurement of the level of tropospheric instability, were over 1000 J / kg, and helicity levels, a measurement of the potential for rotating winds, reached over 200 m² / s². The upper level jet stream also contributed a large amount of wind shear. These factors were all indicative of a high potential for severe weather.

On February 5 at 6 : 39 am CST (1239 UTC), the Storm Prediction Center (SPC) issued a high risk of severe storms for most of Arkansas, the first in February since 1998. At 10 : 16 am CST (1616 UTC), the high risk area was extended farther northeast to include western Kentucky, northwestern Mississippi, the Missouri Bootheel, West Tennessee, and Southern Illinois. A moderate risk of severe weather was issued for northwestern Alabama, the rest of Arkansas, the rest of southern Illinois, southern Indiana, most of the rest of Kentucky, northern Louisiana, central Mississippi, parts of southeastern Missouri, southwestern Ohio, eastern Oklahoma, middle Tennessee and northeastern Texas. A total of fifteen watches were issued by the SPC during the outbreak, including thirteen tornado watches (two of which were PDS watches) and two severe thunderstorm watches.

Early on the morning of February 5, a squall line developed across eastern Texas northward into Missouri and moved east towards the high risk area. Ahead of the squall line, the cap took longer than expected to break, but when it finally did in the late afternoon hours, numerous supercell thunderstorms quickly formed across Arkansas and southern Missouri. The first tornadoes touched down around 3 : 30 pm CST (2130 UTC). A cap is a layer of relatively warm air aloft (usually

several thousand feet above the ground) which suppresses or delays the development of thunderstorms ; the cap often prevents or delays thunderstorm development even in the presence of extreme instability . However , if the cap is removed or weakened , then explosive thunderstorm development can occur . Some of the most powerful tornado @-@ producing supercells were situated across the Memphis and Jackson areas , as well as central Arkansas (one producing a tornado that tracked 122 miles (196 km) and lasted about two hours) between 5 : 00 and 7 : 30 pm CST (2300 to 0130 UTC) while numerous other tornadoes were reported across northern Mississippi northwest of Tupelo , Mississippi , early in the evening . As the evening progressed , one of these supercells traveled across Middle Tennessee including the Nashville metropolitan area and south @-@ central Kentucky , where several deadly tornadoes were reported during the evening hours between 7 : 30 pm and 11 : 00 pm CST (0130 to 0500 UTC) .

Meanwhile , the squall line that developed from near Dallas to Kansas City moved eastward throughout the late evening and overnight hours causing numerous reports of damaging wind along with many spin @-@ up tornadoes from Louisiana to Ohio and Indiana . It then moved through the southeast U.S. during the early morning hours . Additional strong thunderstorms developed ahead of the front across the southeast during the overnight and early morning hours . A record (at the time) of five tornado emergency declarations were issued on February 5 ; four for Tennessee , and one in Alabama .

On February 6 , a slight risk of severe weather was issued for much of the eastern United States from Pennsylvania to the Florida Panhandle as the squall line raced eastward ahead of the cold front . After several additional tornadoes touched down in Alabama during the early morning hours just before dawn , the primary severe weather threat became damaging wind across the Mid @-@ Atlantic States . No additional tornadoes were reported during the late morning and afternoon as the cold front exited into the Atlantic Ocean , although wind damage was reported across eastern Kentucky , eastern Pennsylvania and most of Georgia . Farther north , snow and freezing rain , at times heavy , continued from Iowa to Quebec until February 7 as the center of the system moved slowly out of the area .

= = Confirmed tornadoes = =

= = = North @-@ central Arkansas tornado = = =

The first long @-@ lived supercell , which spawned the tornado with the longest continuous track of any single tornado in this outbreak , developed around 4 : 50 pm CST (2250 UTC) southeast of Centerville in Yell County . The tornado tracked into Pope County , striking the community of Atkins . Four people died in Atkins and much of the town was destroyed . The tornado continued on and crossed into Conway County where it killed two more people , injured five others , and destroyed numerous homes . The next hard hit town was Clinton in Van Buren County , where three people died . One of these deaths occurred at a boat manufacturing facility which was destroyed . The tornado continued into Stone County , where one person was killed . In the town of Mountain View the local hospital lost its roof and a fire station was destroyed . The tornado affected mostly rural areas for the rest of its path , but two additional people were killed in Izard County before it finally lifted back into the clouds northeast of Highland in Sharp County , about two hours after it initially touched down .

An aerial survey later determined that the damage across the seven counties was caused by one tornado , with a track estimated at 122 miles (196 km) in length . This was the longest single tornado track recorded in Arkansas since detailed record keeping began in 1950 . The tornado was rated an EF4 on the Enhanced Fujita Scale . Thirteen people were killed by this tornado , and about 140 people were injured . Approximately 200 homes and businesses were destroyed along the tornado 's path . Damage from this tornado was estimated at nearly \$ 120 million across the seven counties .

== = Memphis area tornado == =

At 5 : 32 pm CST (2332 UTC) , a supercell thunderstorm produced a tornado in Southaven , Mississippi , inflicting heavy damage upon Southaven High School , now Southaven Middle School . The tornado quickly tracked across the Mississippi ? Tennessee state line and into southeastern portions of Memphis , where WREG tower cameras showed the tornado tracking across Memphis ' southeastern suburbs , particularly over Southaven , Mississippi . National Weather Service officials issued a Tornado Emergency (the first of five in the outbreak) for most of the Memphis metropolitan region .

This tornado produced a swath of extensive damage over residential and commercial areas . Hickory Ridge Mall suffered damage when portions of a wall and roof were destroyed . Major damage was also reported in the Pleasant Ridge area of Germantown in the southern end of Memphis . In addition , damage was reported at Memphis International Airport , where a hangar lost its roof , the FedEx freight terminal 's fire station suffered roof damage , airstair trucks were thrown 100 yards (91 m) , and aircraft were moved around , including a Boeing 737 that was moved one foot . FedEx service was disrupted due to flight delays and closed roads , all because of the tornado damage in surrounding areas . The airport weather station 's reporting equipment recorded a wind gust of 73 knots (84 mph , 135 km / h) . The Hardy Bottling Company facility was also damaged , which released 120 @,@ 000 pounds (54 @,@ 500 kg) of anhydrous ammonia into the atmosphere , although no public health impacts were reported . Electricity supply to about 65 @,@ 000 customers was briefly cut .

The National Weather Service office in Memphis rated the tornado as an EF2 . Four people in the metropolitan area were killed ; three of whom were in a warehouse when it collapsed in the Hickory Hill section of Memphis . A spokesperson for the state 's Emergency Management Agency also reported one fatality at the Hickory Ridge Mall , although the NWS office in Memphis did not confirm this . Thirty @-@ six other people were injured in Shelby County by the tornadoes . One additional death took place southeast of Hebron , Tennessee from a separate EF3 tornado . Shelby County Election Commission administrator James Johnson stated the weather did not interfere with Super Tuesday primary voting .

== = Jackson area tornadoes == =

Farther northeast near Jackson , Tennessee , a tornado touchdown caused the issuance of another tornado emergency (the second of the outbreak) at 7 : 00 pm CST (0100 UTC) . This tornado was spawned by the same supercell that had affected Memphis about an hour earlier . Several cars and at least 15 tractor trailers were overturned by the tornado along Interstate 40 between mile markers 68 and 79 . In addition , the areas southwest of Jackson saw severe damage , including destroyed homes and major damage to a church and a rest area along I @-@ 40 . Major damage was also reported in a commercial area near the U.S. Route 45 bypass and to the northeast of Jackson . Also , the Sharon Baptist Church (Savannah , TN) lost its \$ 7 million facilities to the tornado , including a 550 @-@ seat sanctuary which was completely destroyed . The most severe damage was at the devastated Union University , where a total of 31 buildings on the campus received damage of varying degrees . Hurt , Watters , and McAfee dormitories were the hardest hit with approximately 80 % of their accommodation rendered uninhabitable . Twelve students at the university were trapped in damaged buildings but all were eventually rescued . Due to the damage , the university was closed until February 18 .

The National Weather Service rated the tornado as an EF4 and later determined that there were two distinct tracks , with an EF3 satellite tornado to the southwest of the main one . It was originally believed a third (an EF3) touched down but it was later found to be linked to the main one that hit Union University . This was the third violent tornado to hit Jackson in 10 years . Two others , both rated F4 , had devastated the community on January 17 , 1999 and May 4 , 2003 .

Over 60 people in the Jackson area were treated for injuries as a result of the severe weather , 50 of whom were released immediately . No fatalities were caused by the main Jackson tornado ,

however two fatalities occurred in the Huntersville community , located west of Jackson , from the initial EF3 tornado . Estimates indicate that the tornadoes caused about \$ 47 million worth of damages in Madison County , with \$ 40 million of that total occurring at Union University alone .

= = = Northeast Nashville region tornado = = =

Just after 9 : 00 PM CST (0300 UTC) , a supercell that spawned tornadoes over northern Mississippi as well as causing fatalities in Hardin County , Tennessee , moved to the northeast over Nashville . Fortunately , no tornadoes were reported there (although there were reports of funnel clouds) and no significant damage was reported in Nashville or Davidson County . At the time the supercell moved over Nashville , a National Hockey League game between the Nashville Predators and the Carolina Hurricanes , which was nationally televised on Versus , was being played at the Sommet Center . With just over nine minutes left in the third period , Predators head coach Barry Trotz was told that the game may have to be stopped . Although the game continued to completion , at the game 's end fans were not allowed to leave the arena until the storm had passed .

After the supercell moved through Nashville the environment became more favorable again and a strong tornado did touch down , devastating a lengthy swath of Middle Tennessee in the late evening hours and killing 22 people . The tornado touched down near Castalian Springs and Westmoreland , a rural area in Sumner County , Tennessee , just after 10 : 00 pm CST (0400 UTC) . Eight fatalities were confirmed in Castalian Springs due to the tornado , the last occurring two weeks later . The 19th century Wynnewood Inn , a national historical landmark , suffered major damage to its second level and grounds during the storm .

The tornado then tracked into Trousdale County and left three people dead , two of whom were found at a home along U.S. Route 231 . From there the tornado continued northeast to Macon County , Tennessee , where 13 people died . As a result of the tornado , a major fire occurred at a natural gas plant near the small community of Green Grove in the extreme southwestern portion of the county . The area was evacuated and no one was injured at the plant . Widespread damage in the area was also reported to houses and trailers , particularly in the community of Lafayette . Debris from the Lafayette area was found as far north as Sano , Kentucky , in Adair County , approximately 70 miles (113 km) to the northeast . Sixteen thousand TVA electricity customers in Macon and Trousdale Counties lost power , some of whom did not have their service restored for a week . Macon County schools were closed until February 19 . In total , about 260 houses in the three counties were destroyed , and damage amounts were estimated at \$ 78 million in Macon County alone . In addition , on March 13 , 2008 , the tornado claimed the life of a 14th Macon County resident who had been critically injured .

The tornado continued across the state boundary into Kentucky where a metal warehouse , two homes and two mobile homes near Gamaliel were destroyed , and several other structures suffered extensive damage . Thirteen people from an adjacent trailer park hid inside a basement and were trapped by debris for up to 30 minutes .

Preliminary surveys by the National Weather Service office in Nashville confirmed that the 22 deaths (which was revised downward from 24 due to double @-@ counting) were caused by a single tornado , which was rated an EF3 . The tornado path was 51 miles (82 km) long and up to .75 miles (1 @.@ 21 km) wide . National Weather Service Meteorologist Bobby Boyd theorized that cold air downbursts impinging on the tornado forced it to lift up from the ground and remain a funnel cloud as it crossed over Davidson County and downtown Nashville before touching down again east of the city .

The devastation was described by Governor Phil Bredesen as " It looks like the Lord took a Brillo pad and scrubbed the ground " while surveying by helicopter . The tornado is the deadliest single tornado to strike Middle Tennessee in over 75 years , and the deadliest single US tornado since the Evansville Tornado of November 2005 (which killed 25) .

= = = North @-@ central Alabama tornado = = =

At approximately 1 : 00 am CST (0700 UTC) , the broken squall line that had affected Oklahoma and Missouri entered the state of Alabama . Individual supercell storms began to develop ahead of the squall line along the Alabama ? Mississippi border due to the strengthening of the upper level jet stream . A supercell that developed over Starkville , Mississippi , and tracked over Lamar , Marion and Fayette Counties in Alabama spawned a tornado in Lawrence County , Alabama , at 3 : 02 am CST (0902 UTC) . The tornado touched down at Pinhook near the William B. Bankhead National Forest . Many houses were damaged or destroyed , and a church was leveled . Three fatalities , all from a single family , were reported north of Aldrich Grove . An elderly woman was also killed by the storm , and 20 ? 25 others were injured . The tornado was initially classified as an EF3 , although it was upgraded to EF4 in later analysis . The hardest hit communities were the towns of Wren , Speake and Five Points . The tornado moved into Morgan County and threatened the Decatur area , leading the NWS in Huntsville to issue a tornado emergency (the fifth for the outbreak) for Morgan County and southern Limestone County . The tornado lifted off the ground before reaching Decatur . The same supercell moved over the Huntsville Metro area , though no tornadoes were reported .

= = Non @-@ tornadic events = =

Numerous reports of damaging winds were associated with the passage of the cold front . Wind gusts from Arkansas to Indiana exceeded 50 mph (80 km / h) , bringing down numerous trees and power lines , and causing widespread power outages . A 67 mph (108 km / h) wind gust was recorded during the passage of a squall line at Little Rock National Airport . The highest recorded wind gust associated with the passage of the squall line was 82 mph (131 km / h) in Terre Haute , Indiana . Hail as large as softballs (4 @.@ 5 inches (11 cm) in diameter) was reported in several communities . In Canada , unseasonably early thunderstorms brought bouts of heavy rainfall to parts of southern Ontario late on February 4 .

= = = Flooding = = =

Heavy rains in association with thunderstorms on February 4 to February 6 , combined with the melting of snow , caused flooding across parts of Illinois , New York , Kentucky , Indiana and Ohio . Among the areas hardest hit by the flooding rivers and streams were the Miami Valley , areas along the Blanchard River in Findlay and parts of northern Indiana between Indianapolis and north of Fort Wayne along the Tippecanoe , St. Marys and Wabash Rivers . Several streets in Fort Wayne were under water , and flooding also occurred between Lafayette and Terre Haute .

= = = Winter storm = = =

The same low pressure systems that caused the tornado outbreak also spawned a significant snowstorm from the Central Plains to the western Great Lakes where winter storm warnings were issued . Between 10 and 15 inches (25 ? 38 cm) of snow fell from eastern Iowa to southern Wisconsin and Northern Illinois , with local amounts ranging from 18 to 21 inches (45 ? 53 cm) in southeastern Wisconsin . In Michigan , up to 14 inches (35 cm) of snow fell north of Grand Rapids . Environment Canada also issued freezing rain and winter storm warnings for Southern Ontario , where some areas north of Lake Erie received close to 1 inch (25 mm) of freezing rain . In Toronto , two waves of moderate to heavy snow accompanied by thunder and lightning , along with ice pellets , brought up to 14 inches (35 cm) of accumulated winter precipitation on February 6 and 7 . Other areas from Windsor to Ottawa , as well as southwestern Nova Scotia , received from 4 to 20 inches (10 ? 50 cm) of snow .

Over 1 @,@ 000 flight cancellations were reported at Chicago 's O 'Hare International Airport , and numerous flight cancellations also occurred at Toronto 's Pearson International Airport . In Milwaukee , whiteout conditions and 13 inches (33 cm) of snow briefly shut down the General Mitchell International Airport . Near Madison , Wisconsin , about 1 @,@ 000 vehicles were stranded on Interstate 90 due to the snow . Wisconsin Governor Jim Doyle declared a state of emergency for

the area and activated the Wisconsin National Guard . On February 6 , numerous schools , colleges , government buildings , churches , businesses , and shopping malls were forced to close throughout southern Wisconsin and northern Illinois due to the inclement weather . The winter storm was responsible for at least four deaths : one each in Illinois , Wisconsin , Michigan and Quebec .

= = Aftermath = =

On February 7 a federal disaster declaration was made by President George W. Bush for 11 counties in Arkansas and five counties in Tennessee . Sixteen additional counties in Tennessee requested federal aid , and on February 12 , Tennessee Governor Bredesen announced that eight counties in Tennessee became eligible . President Bush also visited Tennessee to tour the devastated areas on February 8 .

The American Red Cross , the Salvation Army , the United Way and other charitable groups also quickly mobilized volunteers to assist survivors in the aftermath across the regions affected . In the three hardest hit Middle Tennessee counties alone , the Red Cross sent out over 100 volunteers to deliver meals and supplies . Emergency assistance was also offered by the Tennessee Department of Human Services for low income victims in the counties affected by the tornadoes . In addition , the Nashville Predators announced that for their game on February 7 against the Tampa Bay Lightning , half the ticket sales revenue would be donated to the American Red Cross to help with their efforts , and that fans could make additional donations to Red Cross volunteers at the arena 's main entrances . The National Football League 's Tennessee Titans along with the Mayor 's Office of Emergency Management of Nashville organized a donation drive during the weekend of February 9 at LP Field .