

= Tropical Storm Allison =

Tropical Storm Allison was a tropical storm that devastated southeast Texas in June of the 2001 Atlantic hurricane season . The first storm of the season , Allison lasted unusually long for a June storm , remaining tropical or subtropical for 15 days . The storm developed from a tropical wave in the northern Gulf of Mexico on June 4 , 2001 , and struck the upper Texas coast shortly thereafter . It drifted northward through the state , turned back to the south , and re-entered the Gulf of Mexico . The storm continued to the east-northeast , made landfall on Louisiana , then moved across the southeast United States and Mid-Atlantic . Allison was the first storm since Tropical Storm Frances in 1998 to strike the northern Texas coastline .

The storm dropped heavy rainfall along its path , peaking at over 40 inches (1 ,000 mm) in Texas . The worst flooding occurred in Houston , where most of Allison 's damage occurred : 30 ,000 became homeless after the storm flooded over 70 ,000 houses and destroyed 2 ,744 homes . Downtown Houston was inundated with flooding , causing severe damage to hospitals and businesses . Twenty-three people died in Texas . Along its entire path , Allison caused \$ 9 billion (2001 USD) in damage and 41 deaths . Aside from Texas , the places worst hit were Louisiana and southeastern Pennsylvania .

Following the storm , President George W. Bush designated 75 counties along Allison 's path as disaster areas , which enabled the citizens affected to apply for aid . Allison was the first Atlantic tropical storm to have its name retired without ever having reached hurricane strength .

= = Meteorological history = =

A tropical wave moved off the coast of Africa on May 21 , 2001 . It moved westward across the Atlantic Ocean , retaining little convection on its way . After moving across South America and the southwestern Caribbean Sea , the wave entered the eastern North Pacific Ocean on June 1 . A low-level circulation developed on June 2 , while it was about 230 miles (370 km) south-southeast of Salina Cruz , Mexico . Southerly flow forced the system northward , and the wave moved inland on June 3 . The low-level circulation dissipated , though the mid-level circulation persisted . It emerged into the Gulf of Mexico on June 4 , and developed deep convection on its eastern side . Early on June 5 , satellite imagery suggested that a tropical depression was forming in the northwest Gulf of Mexico , which was furthered by reports of wind gusts as high as 60 mph (95 km / h) just a few hundred feet above the surface , towards the east side of the system .

At 1200 UTC on June 5 , the disturbance developed a broad , low-level circulation , and was classified as Tropical Storm Allison , the first storm of the 2001 Atlantic hurricane season . Some intensification was projected , though it was expected to be hindered by cool offshore sea surface temperatures . Due to the cold-core nature of the center , Allison initially contained subtropical characteristics . Despite this , the storm quickly strengthened to attain peak sustained winds of 60 mph (95 km / h) , with tropical storm force winds extending up to 230 miles (370 km) east of the center , and a minimum central pressure of 1000 mbar . The storm initially moved very little , and the presence of several small vortices from within the deep convection caused difficulty in determining the exact center location . Later in the day , several different track forecasts arose . One scenario had the cyclone tracking westward into Mexico . Another projected the storm moving east towards southern Louisiana . At the time , it was noted that little rain or wind persisted near the center , but rather to the north and east . Under the steering currents of a subtropical ridge that extended in an east-west orientation across the southeast United States , Allison weakened while nearing the Texas coastline , and struck near Freeport , Texas with 50 mph (80 km / h) winds . Inland , the storm rapidly weakened , and the National Hurricane Center discontinued advisories early on June 6 . Shortly after being downgraded to a tropical depression , surface observations showed an elongated circulation with a poorly defined center , which had reformed closer to the deep convection .

The depression drifted northward until reaching Lufkin , Texas , where it stalled due to a high pressure system to its north . While stalling over Texas , the storm dropped excessive rainfall ,

peaking at just over 40 inches (1 @, @ 033 mm) in northwestern Jefferson County . On June 7 , the subtropical ridge off Florida weakened , while the ridge west of Texas intensified . This steered Tropical Depression Allison to make a clockwise loop , and the storm began drifting to the southwest . As the center reached Huntsville , Texas , a heavy rain band began to back build from Louisiana westward into Liberty County , Texas , which had caused additional flooding . At the time , the system had a minimum central pressure of about 1004 mb and maximum sustained winds of about 10 mph (16 km / h) . Late on June 9 and early on June 10 , Allison 's remnants reentered reached the Gulf of Mexico and emerged over open waters . The low once again became nearly stationary about 60 mi (100 km) south of Galveston , Texas , and despite more favorable upper @-@ level winds , it showed no signs of redevelopment . Due to dry air and moderate westerly wind shear , the storm transformed into a subtropical cyclone . While the subtropical depression moved eastward , a new low level circulation redeveloped to the east , and Allison quickly made landfall on Morgan City , Louisiana on June 11 . At around the same time , the surface center reformed to the east @-@ northeast of its previous location , aligning with the mid @-@ level circulation . Strong thunderstorms redeveloped over the circulation , and Allison strengthened into a subtropical storm over southeastern Louisiana . The storm intensified further to attain sustained winds of 45 mph (70 km / h) and a minimum barometric pressure of about 1000 mb near McInnis , Mississippi , accompanied by a well @-@ defined eye @-@ like feature .

The storm was officially downgraded to a subtropical depression at 0000 UTC on June 12 . Somewhat accelerating , the depression tracked to the east @-@ northeast through Mississippi , Alabama , Georgia , and South Carolina before becoming nearly stationary near Wilmington , North Carolina . The depression drifted through North Carolina and sped to the northeast for a time in response to an approaching cold front . Though satellite and radar imagery show the system was well @-@ organized , the system slowed and moved erratically for a period of time , executing what appeared to be a small counterclockwise loop . The storm began tracking in a generally northeasterly direction , and crossed into the southern Delmarva Peninsula on June 16 . The subtropical remnants reached the Atlantic on June 17 , and while located east of Atlantic City , New Jersey , winds began to restrengthen , and heavy rains formed to the north of the circulation . The low was interacting with a frontal boundary , and started merging with it , as it accelerated to the northeast at 13 mph (21 km / h) . The remnants of Allison briefly reintensified to a subtropical storm through baroclinic processes , though it became extratropical while south of Long Island . By later on June 17 , the low was situated off the coast of Rhode Island , spreading a swath of precipitation over New England . The remnants of the tropical storm were then absorbed by the frontal boundary by June 18 , and eventually passed south of Cape Race , Newfoundland on June 20 , where the extratropical cyclone dissipated .

= = Preparations = =

Shortly after the storm formed , officials in Galveston County , Texas issued a voluntary evacuation for the western end of Galveston Island , as the area was not protected by the Galveston Seawall . The ferry from the island to the Bolivar Peninsula was closed , while voluntary evacuations were issued in Surfside in Brazoria County . When the National Hurricane Center issued the first advisory on Allison , officials issued Tropical Storm Warnings from Sargent , Texas to Morgan City , Louisiana . After the storm made landfall , flash flood watches and warnings were issued for numerous areas in eastern Texas . During the flood event , the National Weather Service in Houston issued 99 flash flood warnings with an average lead time of 40 minutes . With an average lead time of 24 minutes , the National Weather Service in Lake Charles , Louisiana issued 47 flash flood warnings . With an average lead time of 39 minutes , the National Weather Service in New Orleans / Baton Rouge issued 87 flash flood warnings , of which 30 were not followed by a flash flood .

In Tallahassee , Florida , a shelter opened the day before Allison 's movement northward through the area , seven staff members housing 12 people . Two other shelters were on standby . Teams informed citizens in the Florida Panhandle of flood dangers .

= = Impact = =

Tropical Storm Allison was a major flood disaster throughout its path from Texas to the Mid @-@ Atlantic . The worst of the flooding occurred in Houston , Texas , where over 35 inches (890 mm) of rain fell . Allison caused over \$ 9 billion in damage (2001 USD , \$ 12 billion 2014 USD) , making it the costliest tropical storm on record in the United States . The storm also killed 41 people directly , including 27 of whom which drowned . This ties Allison with a tropical storm in 1917 as the second @-@ deadliest tropical storm to impact the US ; only surpassed by the 1925 Florida tropical storm which killed 73 people .

= = = Texas = = =

Combined with waves on top , areas of Galveston Island experienced a wall of water 8 feet (2 @.@ 5 m) in height , creating overwash along the coastline . The storm caused winds of up to 43 mph (69 km / h) at the Galveston Pier . While Allison was stalling over Texas , it dropped very heavy rainfall across the state . Minimal beach erosion was reported . Flash flooding continued for days , with rainfall amounts across the state peaking at just over 40 inches (1 @.@ 033 mm) in northwestern Jefferson County . In the Port of Houston , a total of 36 @.@ 99 inches (940 mm) was reported . Houston experienced torrential rainfall in a short amount of time . The six @-@ day rainfall in Houston amounted to 38 @.@ 6 inches (980 mm) . The deluge of rainfall flooded 95 @.@ 000 automobiles and 73 @.@ 000 houses throughout Harris County . Tropical Storm Allison destroyed 2 @.@ 744 homes , leaving 30 @.@ 000 homeless with residential damages totaling to \$ 1 @.@ 76 billion (2001 USD , \$ 2 @.@ 29 billion 2012 USD) .

Several hospitals in the Texas Medical Center , the largest medical complex in the world , experienced severe damage from the storm , which hit quickly and with unexpected fury on a Friday evening . The Baylor College of Medicine experienced major damage , totaling \$ 495 million (2001 USD , \$ 643 million 2012 USD) . The medical school lost 90 @.@ 000 research animals , 60 @.@ 000 tumor samples , and 25 years of research data . The University of Texas Health Science Center at Houston , across the street , lost thousands of laboratory animals . Throughout the Medical Center , damage totaled to over \$ 2 billion (2001 USD , \$ 2 @.@ 6 billion 2012 USD) .

The underground tunnel system , which connects most large office buildings in downtown Houston , was submerged , as were many streets and parking garages adjacent to Buffalo Bayou . At the Houston Theater District , also in downtown , the Houston Symphony , Houston Grand Opera , and Alley Theater lost millions of dollars of costumes , musical instruments , sheet music , archives and other artifacts . By midnight on June 9 nearly every freeway and major road in the city was under several feet of water , forcing hundreds of motorists to abandon their vehicles for higher ground .

Despite massive flooding damage to entire neighborhoods there were no drowning deaths in flooded homes . In the area , there were twelve deaths from driving , six from walking , three from electrocution , and one in an elevator . Elsewhere in Texas , a man drowned when swimming in a ditch in Mauriceville . Damage totaled to \$ 5 @.@ 2 billion (2001 USD , \$ 6 @.@ 8 billion 2012 USD) throughout Texas .

= = = Louisiana = = =

While making its first landfall , Allison 's large circulation dropped severe rains on southwest Louisiana . Days later , Allison hit the state as a subtropical storm , dropping more heavy rains to the area . Rainfall totals peaked at 29 @.@ 86 inches (758 mm) in Thibodaux , the highest rainfall total in Louisiana from a tropical cyclone since another Tropical Storm Allison in 1989 . Most of the southeastern portion of the state experienced over 10 inches of rain (255 mm) . Winds were generally light , peaking at 38 mph (61 km / h) sustained in Lakefront with gusts to 53 mph (85 km / h) in Bay Gardene . The storm produced a storm surge of 2 @.@ 5 feet (0 @.@ 75 m) in Cameron as it was making landfall in Texas . While moving northward through Texas , the outer bands of the storm produced an F1 tornado near Zachary , damaging several trees and a power line

. A man was killed when a damaged power line hit his truck .

When Allison first made landfall , heavy rainfall flooded numerous houses and businesses . Minor wind gusts caused minor roof damage to 10 houses in Cameron Parish , while its storm surge flooded portions of Louisiana Highway 82 . When the system returned , more rainfall occurred , flooding over 1 @, @ 000 houses in St. Tammany Parish , 80 houses in Saint Bernard Parish , and hundreds of houses elsewhere in the state . The flooding also forced 1 @, @ 800 residents from their homes in East Baton Rouge Parish . The deluge left numerous roads impassable , while runoff resulted in severe river flooding . The Bogue Falaya River in Covington crested past its peak twice to near @-@ record levels . The Amite and Comite Rivers reached their highest levels since 1983 . In addition , the levee along the Bayou Manchac broke , flooding roadways and more houses . Damage in Louisiana totaled to \$ 65 million (2001 USD , \$ 84 million 2012 USD) .

= = = Southeast United States = = =

In Mississippi , Allison produced heavy rainfall of over 10 inches (255 mm) in one night , while some areas in the southwestern portion of the state received over 15 inches (380 mm) . The flooding damaged numerous houses and flooded many roadways . Thunderstorms from the storm produced four tornadoes , including one in Gulfport , Mississippi that damaged 10 houses . Severe thunderstorms in George County damaged 15 houses , destroyed 10 , and injured 5 people . Damage in Mississippi totaled to over \$ 1 million (2001 USD , \$ 1 @. @ 3 million 2012 USD) . Rainfall in Alabama was moderate , with areas near Mobile experiencing more than 10 inches (255 mm) . Heavy rainfall closed several roads in Crenshaw County . The storm , combined with a high pressure , produced coastal flooding in southern Alabama . Allison produced an F0 tornado in southwest Mobile County that caused minor roof damage and another F0 tornado in Covington County that caused minor damage to six homes and a church .

The storm , combined with a high pressure system , produced a strong pressure gradient , resulting in strong rip currents off the coast of Florida . The currents prompted sirens , which are normally used for storm warnings , to be activated in Pensacola Beach . The rip currents killed 5 off the coast of Florida . Outer rain bands from the storm dropped heavy rainfall across the Florida Panhandle of over 11 inches (280 mm) in one day . The Tallahassee Regional Airport recorded 10 @. @ 13 inches (257 mm) in 24 hours , breaking the old 24 ? hour record set in 1969 . Throughout the state , Allison destroyed 10 homes and damaged 599 , 196 severely , primarily in Leon County . Including the deaths from rip currents , Allison killed eight people in Florida and caused \$ 20 million (2001 USD , \$ 26 million 2012 USD) in damage .

Over Georgia , the storm dropped heavy rainfall of 10 inches (255 mm) in 24 hours in various locations . The deluge caused rivers to crest past their banks , including the Oconee River at Milledgeville which peaked at 33 @. @ 7 feet (10 @. @ 3 m) . The rainfall , which was heaviest across the southwestern portion of the state , washed out several bridges and roads , and flooded many other roads . Georgia governor Roy Barnes declared a state of emergency for seven counties in the state . The storm also spawned two tornadoes . In South Carolina , Allison 's outer bands produced 10 tornadoes and several funnel clouds , though most only caused minor damage limited to a damaged courthouse , snapped trees and downed power lines . Allison produced from 12 to 16 inches (305 to 406 mm) of rainfall in North Carolina , closing nearly all roads in Martin County and damaging 25 homes . The severe flooding washed out a bridge in eastern Halifax County and flooded numerous cars . Wet roads caused nine traffic accidents throughout the state .

= = = Mid @-@ Atlantic and Northeast United States = = =

In Virginia , Allison produced light rainfall , with the southeastern and south @-@ central portions of the state experiencing over 3 inches (76 mm) . A tree in a saturated ground fell over and killed one person . Allison also produced one tornado in the state . Washington , D.C. experienced moderate rainfall from the storm , totaling to 2 @. @ 59 inches (66 mm) in Georgetown . In Maryland , rainfall from Tropical Depression Allison totaled to 7 @. @ 5 inches (190 mm) in Denton , closing eleven

roads and causing washouts on 41 others . The Maryland Eastern Shore experienced only minor rainfall from one to two inches (25 to 50 mm) . Damage was light , and no deaths were reported . In Delaware , the storm produced moderate rainfall , peaking at 4 @. @ 2 inches (106 mm) in Greenwood . No damage was reported .

Allison , in combination with an approaching frontal boundary , dropped heavy rainfall across southeastern Pennsylvania , peaking at 10 @. @ 17 inches (258 mm) in Chalfont in Bucks County and over 3 inches (76 mm) in portions of Philadelphia . The rainfall caused rivers to rise , with the Neshaminy Creek in Langhorne peaking at 16 @. @ 87 feet (5 @. @ 1 m) . Several other rivers and creeks in southeastern Pennsylvania crested at over 10 feet (3 m) . The rainfall downed numerous weak trees and power lines , leaving 70 @, @ 000 without power during the storm . The flooding washed out several roads and bridges , including a few SEPTA rail lines . In addition , the rainfall destroyed 241 homes and damaged 1 @, @ 386 others . Flooding at a Dodge dealership totaled 150 vehicles . Hundreds of people were forced to be rescued from damaged buildings from flood waters . The flooding dislodged a clothes dryer in the basement of the " A " building of the Village Green Apartment Complex in Upper Moreland Township , breaking a natural gas line . The gas leak resulted in an explosion and an ensuing fire that killed six people . Firefighters were unable to render assistance as the building was completely surrounded by floodwaters . Additionally , one man drowned in his vehicle in a river . Damage in Pennsylvania totaled to \$ 215 million (2001 USD , \$ 279 million 2012 USD) .

In New Jersey , the storm produced heavy rainfall , peaking at 8 @. @ 1 inches (205 mm) in Tuckerton . The rains also caused river flooding , including the north branch of the Metedeconk River in Lakewood which crested at 8 feet (2 @. @ 5 m) . The flooding , severe at places , closed several roads , including numerous state highways . Gusty winds of up to 44 mph (71 km / h) in Atlantic City downed weak trees and power lines , leaving over 13 @, @ 000 without power . Several people had to be rescued from high waters , though no fatalities occurred in the state . Overall damage was minimal .

Tropical Storm Allison caused flash flooding in New York , dropping up to 3 inches (75 mm) of rain in one hour in several locations and peaking at 5 @. @ 73 inches (146 mm) in Granite Springs . The rains also caused river flooding , including the Mahwah River which crested at 3 @. @ 79 feet (1 @. @ 2 m) . Allison 's rainfall damaged 24 houses and several stores , while the flooding closed several major highways in the New York City area . Overall damage was light , and no fatalities occurred in New York due to Allison . Similarly , rainfall in Connecticut peaked at 7 @. @ 2 inches (183 mm) in Pomfret , closing several roads and causing minor damage to numerous houses . The Yantic River at Yantic crested at 11 @. @ 1 feet (3 @. @ 4 m) , while a state road was closed when a private dam in Hampton failed from the rainfall . In Rhode Island , Allison produced up to 7 @. @ 1 inches (180 mm) of rainfall in North Smithfield , washing out several roads and houses , and destroying a log house in Foster .

An isolated severe thunderstorm in the outer bands of Allison produced an F1 tornado in Worcester and Middlesex Counties in Massachusetts , impacting over 100 trees and damaging one house and one small camper . A microburst in Leominster and another in Shirley damaged several trees . Lightning from the storm hit two houses , causing significant damage there but little elsewhere . Allison also produced moderate rainfall in the state , mainly ranging from 3 to 5 inches (75 to 125 mm) . The rainfall caused drainage and traffic problems . Damage in Massachusetts totaled to \$ 400 @, @ 000 (2001 USD , \$ 520 @, @ 000 2012 USD) .

= = Aftermath = =

Within weeks of the disaster , President George W. Bush declared 75 counties in Texas , southern Louisiana , southern Mississippi , northwestern Florida , and southeastern Pennsylvania as disaster areas . The declarations allowed affected citizens to receive aid for temporary housing , emergency home repairs , and other serious disaster @-@ related expenses . The Federal Emergency Management Agency (FEMA) also provided 75 % for the cost of debris removal , emergency services related to the disaster , and repairing or replacing damaged public facilities , such as roads

, bridges and utilities .

A few weeks after Allison , FEMA opened six disaster recovery centers across southeast Texas , which provided recovery information to those who applied for disaster assistance . The American Red Cross and the Salvation Army opened 48 shelters at the peak of need for people driven from their homes , which served nearly 300 @, @ 000 meals . The National Disaster Medical System deployed a temporary hospital to Houston with 88 professionals , aiding nearly 500 people . Thirty @-@ five volunteer services provided aid for the flood victims in Texas , including food , clothing , and volunteers to help repair the houses . After nearly 50 @, @ 000 cars were flooded and ruined , many people attempted to sell the cars across the country without telling of the car 's history . Following the extreme flooding , a mosquito outbreak occurred , though FEMA provided aid to control the problem . By six months after the storm , around 120 @, @ 000 Texas citizens applied for federal disaster aid , totaling to \$ 1 @. @ 05 billion (2001 USD , \$ 1 @. @ 36 billion 2012 USD) .

Like in Texas , a mosquito outbreak occurred in Louisiana . Only pesticides acceptable to the US Environmental Protection Agency and the US Fish and Wildlife Service were allowed to be used . FEMA officials warned homeowners of the dangers of floodwaters , including mold , mildew , and bacteria . By three months after the storm , just under 100 @, @ 000 Louisiana citizens applied for federal aid , totaling to over \$ 110 million (2001 USD , \$ 143 million 2012 USD) . \$ 25 million (2001 USD , \$ 32 million 2012 USD) of the total was for business loans , while an additional \$ 8 million was for public assistance for communities and state agencies . More than 750 flood victims in Florida applied for governmental aid , totaling to \$ 1 @. @ 29 million (2001 USD , \$ 1 @. @ 5 million 2007 USD) . In Pennsylvania , 1 @, @ 670 flood victims applied for federal aid , totaling to \$ 11 @. @ 5 million (2001 USD , \$ 14 @. @ 3 million 2012 USD) . \$ 3 @. @ 4 million (2001 USD , \$ 4 @. @ 4 million 2012 USD) of the total was to replace a SEPTA rail bridge over Sandy Run in Fort Washington .

= = = Retirement = = =

Due to extreme destruction , the name Allison was retired in spring 2002 and will never again be used in the Atlantic basin ; the 2001 incarnation of Allison was the only Atlantic tropical system to have its name retired without reaching hurricane strength until the name Erika was retired following a storm in 2015 . The name was replaced with Andrea in the 2007 season .