

= Tropical Storm Frances ( 1998 ) =

Tropical Storm Frances caused extensive flooding in Mexico and Texas in September 1998 . The sixth tropical cyclone and sixth named storm of the annual hurricane season , Frances developed from a low pressure area in the Gulf of Mexico on September 8 . The cyclone moved northward through the western Gulf of Mexico , making landfall across the central Texas coastline before recurving across the Midwest through southeast Canada and New England . A large tropical cyclone for the Atlantic Basin , yet an average sized system by western Pacific standards , the storm produced heavy rains across the Isthmus of Tehuantepec , Texas , western Louisiana and the Great Plains .

The interaction between developing Frances and Pacific Tropical Storm Javier produced torrential rainfall in southeastern Mexico , causing flooding that killed over 200 people and caused \$ 63 million in damage . Coastal flooding overran the coasts of Louisiana and Texas , which worsened river flooding across the region . Federal disaster declarations were made for the states of Louisiana and Texas on September 23 for damage relating to this tropical cyclone . Damage totaled US \$ 500 million ( 1998 dollars ) , mainly from flooding . There was one direct death and one indirect death associated with the tropical storm . Frances was the second tropical cyclone to hit Texas during the 1998 season , with Charley being the other .

= Meteorological history =

Before the storm formed , sea surface temperatures were above normal in the Bay of Campeche and tropical eastern Pacific Ocean . After Hurricane Earl developed and moved away from the region , a broad area of low pressure formed in the southwest Caribbean on September 4 . It moved to the northwest and slowly organized in the Gulf of Mexico , although a series of tropical waves prevented rapid development . By September 8 , there was a large area of convection located over the western Gulf of Mexico . That day , the system developed into Tropical Depression Six while 160 miles ( 260 km ) east @-@ southeast of Brownsville , Texas . Initially , the depression was large , without a well @-@ defined center of circulation . It more resembled a monsoon depression commonly seen in the Western Pacific Ocean and the Northern Indian Ocean . The depression drifted southward and strengthened into Tropical Storm Frances on September 9 .

Frances turned to the northwest and strengthened with warm water temperatures of 30 ° C ( 86 ° F ) , weak vertical shear , and a large anticyclone aloft . Just before making landfall on Corpus Christi , Texas , the storm reached a peak of 65 mph ( 105 km / h ) , and quickly weakened as it continued inland . Shortly after landfall , the storm executed a small loop before turning to the north and dissipating as a tropical cyclone on September 13 . The remnant low of Frances persisted another day , becoming a frontal wave over Iowa . This frontal wave moved across the Great Lakes and New England into the north Atlantic by the 16th .

= Preparations =

A tropical storm warning was issued for the Texas coast between High Island and Brownsville on the afternoon of the 8th . The next afternoon , the warning area was extended southward into northeast Mexico to Tampico . By the afternoon of the 10th , strong winds along the Louisiana coast led to an extension of the tropical storm warning eastward to the Pearl River . On the 11th , as Frances moved inland , tropical storm warnings were slowly lifted .

= Impact =

Federal disaster declarations were made for the states of Louisiana and Texas on September 23 for damage relating to this tropical cyclone . Although there was little wind damage , Frances caused \$ 500 million ( 1998 USD ) in damage , mostly from flooding . In addition , it killed one person . Several counties in Texas and Louisiana were declared disaster areas .

== Mexico ==

Simultaneous to Frances 's development , Tropical Storm Javier was located to the west of Mexico in the Pacific , although its moisture produced an area of thunderstorms that extended to the east toward southeastern Mexico . The interaction between the depression that became Frances and Javier produced three days of heavy rainfall along the Sierra Madre de Chiapas . On September 6 , a station named Guadalupe Victoria recorded 15 @. @ 79 in ( 401 mm ) of rainfall . The highest rainfall total in the country was 44 @. @ 06 in ( 1 @, @ 119 mm ) at Escuintla , Chiapas . In the period from 1981 to 2010 , this was the highest rainfall total in Chiapas related to a tropical cyclone .

About one @- @ third of the population of Chiapas , or about 800 @, @ 000 people , was directly affected by the flooding , most significantly in Motozintla and Pijijiapan . In Motozintla , near Mexico 's border with Chiapas , a two @- @ day rainfall total of 12 in ( 305 mm ) produced flash floods and mudslides . The rainfall total represented about 36 % of the town 's average annual precipitation . About 600 homes were destroyed in the town alone , and there were 30 fatalities . The rains caused 36 river basins to exceed their banks . Following the floods , officials in Motozintla created a channel to divert flooding . Throughout Chiapas , the floods damaged or destroyed 40 bridges , and there was damage to Mexican Federal Highway 200 along the Pacific coast ; this interrupted travel for several weeks . About 16 @, @ 000 houses were damaged , forcing about 25 @, @ 000 people in government shelters . The floods affected 51 @, @ 159 ha ( 126 @, @ 420 acres ) of croplands . Overall , damage was estimated at \$ 63 million ( 1998 USD ) , representing Mexico 's worst natural disaster since the 1985 Mexico City earthquake . Along Sierra Madre de Chiapas , the disaster was considered a 1 in 50 year event . There were at least 229 deaths , although a government report on the flooding indicated there were over 1000 people killed or missing . After the storm , the Mexican government established a study to determine the cause and the impact of the flooding .

== Louisiana ==

Though on the outskirts of the storm , Tropical Storm Frances dropped 10 to 15 inches ( 250 to 380 mm ) of rain across southwest Louisiana , and over 23 inches ( 580 mm ) of rainfall near New Orleans , Louisiana . This rainfall helped relieve drought conditions . Along the coast , the system caused a storm surge of 5 @. @ 1 feet ( 1 @. @ 6 m ) in Cameron , the worst experienced along the coast of southwest Louisiana since Hurricane Carla . The storm surge swept away five houses , destroyed a fishing pier , and submerged Grand Isle . A tornado in the outer bands of the storm killed one person in Lafourche Parish , while six others were injured . At least eight tornadoes were witnessed statewide , with seven touching down across Acadiana . In addition , the storm caused an indirect death in the New Orleans area in an automobile accident. m Also , two Pacific Coast League Playoff games involving the 1998 Triple A baseball champion New Orleans Zephyrs were cancelled due to the rain from Francis , and a third almost got called off , but thanks to the assistance from Zephyr Field ground crews and the Panther Helicopters , the Third game went on as planned , and the Zephyrs won 2 @- @ 1 , Sending them to the Pacific coast League Championship series

== Texas ==

Winds gusted as high as 66 miles per hour ( 106 km / h ) at Sea Rim State Park as Frances lashed the coast . The lowest pressure reported from a land station was 29 @. @ 33 inches of mercury ( 993 hPa ) at Rockport , Texas . Three tornadoes touched down across the Lone Star State , at Caney Creek , La Porte , and Galveston . A major disaster declaration was issued for Brazoria , Galveston , and Harris counties .

Tropical Storm Frances caused significant amounts of flooding across southeastern Texas , with a peak of 21 @. @ 46 inches ( 545 mm ) in Houston , Texas metropolitan area . Severe flooding was also reported in Harris County and Houston . More than 1 @, @ 400 homes and businesses in and

around Houston were either damaged or destroyed by the floods . In addition , three main highways in Houston were washed out , leaving many motorists stranded .

Sections of the Middle Texas coast , closer to the point of landfall , and the Golden Triangle of southeast Texas reported over 10 inches ( 250 mm ) of rainfall as well , resulting in significant flood damage . Roads and bridges were submerged near Corpus Christi . Flooding was also reported along the San Bernard River where several roads and a subdivision was flooded . The flooding also disrupted barge traffic at the Phillips Petroleum facility .

Coastal flooding occurred well in advance of the cyclone 's landfall . A storm surge of 5 @. @ 4 feet ( 1 @. @ 6 m ) was measured at Sabine Pass , Texas and 8 feet ( 2 @. @ 4 m ) was measured at the Matagorda Locks . Meacom 's pier and San Luis Pass pier were severely damaged . Coastal flooding worsened backwater flooding in area rivers since their waters were blocked from flowing southeast into the Gulf of Mexico . Sabine Pass was cut off from the mainland for a week , until Hermine 's passage to the east eased coastal flooding conditions .