

= Tropical Storm Arlene (1993) =

Tropical Storm Arlene brought torrential rainfall to the western United States Gulf Coast , particularly to the U.S. state of Texas , in June 1993 . The first named storm of the annual hurricane season , Arlene developed from an area of low pressure in the Bay of Campeche on June 18 . The depression slowly strengthened as it tracked west @-@ northwestward and later north @-@ northwestward across the western Gulf of Mexico . Arlene was subsequently upgraded to a tropical storm on June 19 , but failed to intensify further due to its proximity to land . The cyclone then made landfall on Padre Island , Texas , with winds of 40 mph (65 km / h) and degenerated into a remnant disturbance on June 21 .

The precursor disturbance to Tropical Storm Arlene dropped heavy rainfall over Central America . As a result , 20 fatalities occurred , all of which were from a mudslide in El Salvador . Heavy rainfall also produced heavy rainfall on the Yucatán Peninsula . After Arlene became a tropical cyclone , rainfall in Mexico inundated areas of Campeche , where damage totaled US \$ 33 million . In total , five people were killed in Mexico . Flood damage in South Texas was extensive , with widespread urban flooding and road closures . Entire plots of farmland were inundated by torrential rains brought by Arlene . The landfalling Arlene interacted with a passing cold front which helped to produce showers further northeast , though damage in those locales was comparatively less severe . In total , Arlene caused 26 deaths and at least US \$ 60 @.@ 8 million in damage .

= = Meteorological history = =

The precursor to Arlene was first identified in satellite images as a cluster of disturbed weather east of the Mosquito Coast on June 9 . Over the following week , the system grew in expanse as it slowly tracked northwestward as strong wind shear in the area prohibited the development of a tropical cyclone . On June 16 , the formation of an upper @-@ level low over the Bay of Campeche and the progression of a tropical wave across the Caribbean Sea helped foster the development of a low @-@ pressure area over the Yucatán Peninsula . Although initially diffuse , new rainbands began to wrap around the new vortex 's center , and at 0000 UTC , the National Hurricane Center (NHC) classified the system as a tropical depression west of the Yucatán Peninsula . Although the storm was now considered a tropical cyclone , wind shear that had earlier inhibited development remained present , as well as the outflow of Tropical Storm Beatriz in the Eastern Pacific , disrupting the core of the infant tropical depression ; aircraft reconnaissance often could not identify a defined center of circulation .

While the initial system in the Bay of Campeche continued to struggle in its organization , a new cluster of thunderstorms concentrated in a band developed to the depression 's northwest late on June 18 . Over the next 24 hours , this new area of precipitation began to wrap cyclonically around a new and dominant circulation center ; the NHC assumed the tropical depression to have relocated to the northwest and classified the system as Tropical Storm Arlene at 1200 UTC on June 19 . As Arlene would not strengthen after classification , peak intensity was attained concurrent with its upgrade to tropical storm strength with maximum sustained winds of 40 mph (65 km / h) and a minimum barometric pressure of 1000 mbar (hPa ; 29 @.@ 71 inHg) . Meandering off the coast of South Texas due to the presence of a shortwave trough to its north , Arlene eventually made landfall at 0900 UTC on June 20 at a virtually unchanged intensity at point on Padre Island roughly 45 mi (70 km) south of Corpus Christi , Texas . The tropical storm quickly deteriorated to tropical depression intensity after landfall , and was no longer considered a tropical cyclone after 0600 UTC on June 21 . The remnants of Arlene continued to track across the Rio Grande Valley before they faded into the ambient environment .

= = Preparations and impact = =

= = Central America and the Gulf of Mexico = = =

The precursor to Arlene caused torrential and prolonged rainfall across Central America . In El Salvador , a single landslide attributed to the flooding killed 20 people . Flooding in Mexico associated with the tropical system killed four in the state of Yucatán and one in Campeche , where flood damage was estimated at US \$ 33 million . As many as 4 @, @ 000 homes were flooded , impacting roughly 10 @, @ 000 people and prompting Mexican armed forces to implement emergency rescue plans in the state . The highest rainfall total in Mexico was documented in Mérida , Yucatán , where a station measured 13 @. @ 26 in (336 mm) of rain . As a tropical cyclone , however , Arlene 's highest rainfall total occurred in the Camargo Municipality of Tamaulipas , where 7 @. @ 32 in (186 mm) of rain was reported . In Matamoros , roads were blocked by mud and rocks .

Arlene passed over several offshore oil platforms as it tracked northwestward across the Gulf of Mexico , producing gusty winds . The strongest surface wind gust reported in association with Arlene was clocked at 63 mph (101 km / h) on an oil platform south of Sabine Pass , Texas . Four other oil platforms experienced gusts or sustained winds of at least gale force .

= = = Texas = = =

Due to the unanticipated relocation of Arlene , only one tropical cyclone watch or warning ? a tropical storm warning for coastal areas from Brownsville to Matagorda on June 19 ? was ever issued by the NHC in association with the cyclone . Issued 21 hours before landfall , the warning was discontinued after the system moved inland . Prior to the warning , Arlene had satisfied the criterion for a tropical storm watch as a developing tropical depression . However , the NHC and various National Weather Service forecast offices opted to delay the watch as a result of the poorly organized appearance of the cyclone at the time . Given the weak nature of Arlene and the relatively unpopulated extent of coast which it impacted , evacuations were minimal ? only fifteen fled from summer homes along Magnolia Beach and Indianola , Texas due to the threat of flooding .

On the Texas coast , Arlene produced a small storm surge peaking at 4 ft (1 @. @ 2 m) in some areas , breaching sections of Padre Island and causing flooding . The storm tide also eroded up to a foot (0 @. @ 3 m) of sand from beaches in the lower Texas coast . Combined with the heavy rainfall associated with Arlene , the storm surge produced significant tidal flooding in some coastal stretches . Beach erosion occurred as far north as Galveston Bay , where tides were reported to be as high as 5 ft (1 @. @ 5 m) . A woman was swept into the sea off a jetty near Freeport and required rescue by United States Coast Guard . Over the waters of Lake Corpus Christi , a large funnel cloud was reported but never touched down or caused any damage . Nearby , the John F. Kennedy Memorial Causeway was completely inundated with the exception of one lane , prompting an extensive study of possible solutions to raising the causeway nearly two years later .

Precipitation from the tropical storm reached areas 170 mi (275 km) inland , and was enhanced in northeastern Texas , Louisiana , and Arkansas as a result of interaction between the cyclone and a passing frontal boundary . Arlene exacerbated preexisting flood conditions in some areas of South Texas . Rainfall peaked at 15 @. @ 26 in (388 mm) in Angleton , Texas , and other localized rainfall maxima of at least 10 in (250 mm) were observed in Texas . The torrential precipitation caused rivers to swell and overflow their banks , forcing farm @-@ to @-@ market roads to close and inundating plots of crops . Portions of Interstate 10 were forced to close after flood waters overran the highway . The entirety of the watermelon crop in Waller County was eliminated by the floods . In Kingswood , Texas , some homes were flooded . One storm @-@ related death occurred in Henderson , where rain was measured at 14 @. @ 82 in (326 mm) .

The deep moisture from Arlene caused extensive crop damage , with 20 % losses to the cantaloupe crop , 10 % for the watermelon crop , and 18 % of the tomato crop , resulting in US \$ 3 ? 5 million in damage in East Texas . In the Brownsville area , standing floodwaters ruined the near harvest @-@ ready sorghum crop and killed blossoming cotton plants . Street flooding was prevalent in urban areas . At one point during the storm downtown Raymondville was completely underwater . The U.S. Coast Guard deployed small boats to the city to encourage the evacuation of

about 250 homes . Urban flooding also occurred in the Corpus Christi area , in addition to an increase of weeds and insects . A station in the city set a daily record for rainfall with 2 @. @ 57 in (65 mm) of rain over a seven @-@ and @-@ a @-@ half @-@ hour period . Roughly 50 @, @ 000 ac (20 @, @ 000 ha) of sorghum , 11 @, @ 000 ac (4 @, @ 000 ha) of cotton , and 8 ac (3 ha) of pima cotton were inundated in Refugio County . Damage to crops in San Patricio County totaled US \$ 2 @. @ 8 million . The destruction wrought to homes , businesses , and infrastructure across Texas reached US \$ 22 million .

= = = Louisiana = = =

In Louisiana , rainfall peaked at 12 @. @ 96 in (329 mm) in Shreveport Regional Airport . Nearby , Cross Lake rose to its third highest level in recorded history , flooding 180 nearby homes and necessitating the rescue of 30 ? 40 people . Six parishes sustained flood damage to some extent , mainly resulting from bayou overflows .