

= Hurricane Charley (1986) =

Hurricane Charley (US : / ˈtʃərli /) was the costliest tropical cyclone of the 1986 Atlantic hurricane season . The third tropical storm and second hurricane of the season , Charley formed as a subtropical low on August 13 along the Florida panhandle . After moving off the coast of South Carolina , the system transitioned into a tropical cyclone and intensified into a tropical storm on August 15 . Charley later attained hurricane status before moving across eastern North Carolina . It gradually weakened over the north Atlantic Ocean before transitioning into an extratropical cyclone on August 20 . Charley 's remnants remained identifiable for over a week until after crossing the British Isles and dissipating on August 30 .

The storm brought light to moderate precipitation to much of the southeastern United States . In Georgia and South Carolina , the rainfall alleviated drought conditions . In North Carolina , where the hurricane made landfall , tidal flooding and downed trees were the primary impacts . The storm brought high winds to southeastern Virginia , where 110 @, @ 000 people were left without power . Minor damage extended along the Atlantic coastline northward through Massachusetts . One traffic fatality was reported each in North Carolina and Virginia . Three people in Maryland died due to a plane crash related to the storm . Throughout the United States , Hurricane Charley caused an estimated US \$ 15 million in damage (equivalent to US \$ 32 @, @ 400 @, @ 000 in 2015) . One person drowned in Newfoundland .

As an extratropical cyclone , Charley brought heavy rainfall and strong winds to Ireland and the United Kingdom , causing at least 11 deaths . In Ireland , the rainfall set records for 24 @-@ hour totals , including an accumulation of more than 7 @. @ 8 in (200 mm) which set the record for the greatest daily rainfall total in the country . In the country , the rainfall caused widespread flooding , causing two rivers to exceed their banks . In the Dublin area , 451 buildings were flooded , some up to a depth of 8 ft (2 @. @ 4 m) . In the United Kingdom , the storm flooded rivers and brought down trees and power lines .

= = Meteorological history = =

Hurricane Charley originated in an area of convection associated with a trough of low pressure first observed on August 11 across southern Florida and the southeastern Gulf of Mexico . The area of disturbed weather spread northward , spawning a broad low @-@ pressure area on August 12 . Moving northward over the Florida panhandle , the low became slightly better organized as it merged with a weakening weather front . On August 13 , the National Hurricane Center (NHC) identified the system as a developing subtropical low near Apalachee Bay along the northern coast of the Gulf of Mexico . The agency defines a subtropical cyclone as " a non @-@ frontal low pressure system that has characteristics of both tropical and extratropical cyclones . "

After becoming a subtropical low , the cyclone tracked northeastward through Georgia , before turning eastward and exiting South Carolina into the Atlantic Ocean . Its track was influenced by the western periphery of the subtropical ridge , which is a large belt of high pressure . While moving over land , the cyclone had become better organized , and on August 15 it transitioned into a tropical depression about 70 miles (110 kilometres) southeast of Charleston , South Carolina . The depression strengthened further , and based on reports from the Hurricane Hunters , it intensified into Tropical Storm Charley late on August 15 . With a weak ridge to its north , the storm initially tracked slowly eastward just off the coast of North Carolina , before turning to the north @-@ northeast as a trough approached from the west . A broad cyclone , Charley gradually intensified , and a single ring of convection around the center developed into an eyewall . At 1200 UTC on August 17 , it attained hurricane status about 13 mi (21 km) off the North Carolina coastline . About two hours later , Hurricane Charley made landfall near Cape Fear , and it subsequently moved across the eastern portion of the state .

Hurricane Charley did not weaken while moving over land ; instead , it intensified , attaining peak winds of 80 mph (130 km / h) after emerging into the Atlantic Ocean near the North Carolina ? Virginia border . Within 12 hours of reaching peak intensity , however , the hurricane weakened to

tropical storm status . The approaching trough , which had previously caused Charley to turn northward , forced the hurricane to accelerate northeastward and later eastward , bringing the storm about 80 mi (130 km) southeast of Nantucket , Massachusetts on August 19 . As the trough was not very strong , Charley slowly underwent the process of extratropical transition , unlike other tropical cyclones that complete the transition much quicker with a stronger trough . As a result , the storm maintained hybrid , or subtropical characteristics for several days . By August 21 , Charley completed the transition south of Atlantic Canada .

After becoming extratropical , Charley re-intensified under baroclinic instability . The resulting storm was a very large and fairly strong gale that gradually moved across the northern Atlantic Ocean . As an extratropical cyclone , Charley attained an atmospheric pressure of 980 mbar , which was lower than its pressure as a tropical cyclone . On August 24 , it spawned a separate extratropical cyclone , which initially moved northeastward before turning and dissipating near Spain . The remnants of Charley accelerated as it approached the British Isles , and after passing south of Ireland it moved across Great Britain on August 27 . While in the North Sea , the cyclone weakened as it executed a counter-clockwise loop , and on August 30 the remnants of Charley dissipated near Denmark as a new circulation developed to its southwest .

= = North American impact = =

= = = Southeastern United States = = =

As the hurricane paralleled the east coast of the United States and its exact track and strength were uncertain , there were several tropical cyclone warnings and watches issued in association with Charley ; in a post-storm analysis , the NHC described " the complication of the warning process for this type of situation . " Initially , the storm was not expected to affect land . In its first advisory on Charley , the NHC issued a 22 % probability of Charley passing within 65 mi (105 km) of land ; specifically , it was predicted to be closest to the South Carolina coastline . About 16 hours prior to the hurricane 's landfall , the NHC issued a gale warning between Bogue Inlet and Oregon Inlet along the North Carolina coastline , including the Pamlico Sound . When the storm 's intensification and track close to land became apparent , the gale warning was replaced by a hurricane warning , and additional gale warnings were issued westward to Topsail Beach and northward to Virginia Beach , Virginia . Up to 10 000 people evacuated the Outer Banks , which resulted in traffic jams on roadways heading out of the area . Ocracoke island was partially evacuated by six ferries , although many people were unable to leave and instead rode out the storm on the island .

Hurricane Charley affected at least ten U.S. states , resulting in five total deaths and \$ 15 million in damage (1986 USD) . The precursor disturbance to Charley brought rainfall to much of Florida , including a total of 8.61 inches (219 millimetres) in Steinhatchee ; that rainfall maxima was the greatest total associated with Charley within the United States . The system also produced light to moderate rainfall across Georgia and South Carolina , which proved beneficial as the region was in a major drought . However , its heaviest rainfall remained over open waters .

Moving across eastern North Carolina as a minimal hurricane , Charley produced locally strong wind gusts , peaking at 80 mph (130 km / h) in Frisco . However , no stations recorded sustained winds of hurricane force . The cyclone dropped rainfall along the coastline , amounting to over 7 in (175 mm) near Manteo . As it moved ashore , the storm generated high tides reaching 5.78 feet (1.76 metres) at the Duck Coe fishing pier . Near Cape Hatteras , a woman drowned while attempting to drive through a flooded roadway . The hurricane 's passage left roads and bridges flooded with up to 3 ft (0.91 m) of water , including a portion of North Carolina Highway 12 on Hatteras Island . Across the Outer Banks , the storm left about 8 000 people without power , but damage was minimal and limited to shingles and roofs . Impact in the state was primarily caused by tidal flooding and downed trees , and a preliminary damage estimate placed total monetary losses at \$ 400 000 (1986 USD) .

= = = Northeastern United States and Canada = = =

As Charley moved across eastern North Carolina , hurricane warnings were extended northward , first to Virginia Beach ; they were later extended to Cape Charles , then to the Maryland / Delaware border , and ultimately as far north as Sandy Hook , New Jersey . Prior to its arrival , the storm resulted in the closure of Norfolk International Airport , and more than 9 @, @ 000 people evacuated the coastline for emergency shelters . Tropical storm force winds spread across southeastern Virginia , with wind gusts reaching 82 mph (133 km / h) on Cape Charles . Offshore , a station on the Chesapeake Bay Bridge ? Tunnel recorded sustained winds of 97 mph (157 km / h) with gusts to 104 mph (168 km / h) . After the gust , the bridge @-@ tunnel was closed overnight . The winds downed many trees , and in Norfolk , a motorist died after crashing into a downed tree . In Virginia Beach , the winds blew off the roof of a hotel and destroyed two homes under construction . Across the area , the storm left about 110 @, @ 000 customers without power . Rainfall in Virginia was fairly light , including a 24 @-@ hour total of just over 1 in (25 mm) in Norfolk . Strong waves destroyed 250 ft (76 m) of Harrison 's Pier in Norfolk . A preliminary damage estimate for the area was \$ 1 million (1986 USD) .

Thunderstorms to the north of the circulation brought moderate rainfall to Maryland ; the same thunderstorms caused a light aircraft to crash near Baltimore , resulting in the death of its three occupants . Rainfall spread across much of Maryland , peaking at 4 @. @ 24 in (105 mm) in Hollywood . Tropical storm force winds extended into Delaware , and a peak wind gust of 75 mph (121 km / h) was reported in Rehoboth Beach . Only isolated and minor damage occurred in Maryland and Delaware . In New Jersey , a hurricane force wind gust was reported on Long Beach Island , and 1 @. @ 3 in (33 mm) of rainfall was reported in Atlantic City . In the southernmost counties in the state , the winds left about 15 @, @ 000 electrical customers without power . In New York , after Hurricane Gloria in the previous season left thousands of customers without power , the Long Island Lighting Co. arranged for additional workers for potential power restoration . Light rainfall and gusty winds extended into the New York metropolitan area .

Officials issued gale warnings through Chatham , Massachusetts , including Martha 's Vineyard and Nantucket . As Charley passed south of Massachusetts , it produced precipitation in the southeastern portion of the state . Nantucket reported 3 @. @ 20 in (81 mm) of rainfall , and Chatham recorded 2 @. @ 68 in (68 mm) in a 24 @-@ hour period . Nantucket also reported sustained winds of 60 mph (96 km / h) , and as the storm passed the island it produced a storm tide of 3 @. @ 5 ? 4 ft (1 ? 1 @. @ 2 m) . High tides and heavy rain caused significant street flooding on Nantucket . Several boats were damaged , others were beached , and one large boat sunk in Nantucket Harbor . Damage on the island \$ 75 @, @ 000 (1986 USD) .

Before becoming extratropical , the storm brushed the coast of Nova Scotia with wind gusts of 65 mph (105 km / h) and moderate precipitation totaling 4 @. @ 57 in (116 mm) . Strong waves damaged several boats along the coasts of Nova Scotia and New Brunswick , killing one person in St. John 's , Newfoundland .

= = European impact = =

After Charley became extratropical , the United Kingdom Met Office issued weather alerts prior to the arrival of the storm , noting the potential for " extremely heavy rainfall [which would] cause local flooding . " In the United Kingdom , the threat of the storm resulted in the cancellation of ferry service between Northern Ireland and Great Britain , as well between Great Britain and France . The extratropical remnants of Hurricane Charley moved across Ireland and United Kingdom with winds of 50 mph (85 km / h) . The storm 's rainfall significantly affected most of both countries , with the exception of Scotland in the United Kingdom . In the English Channel , waves up to 26 ft (8 m) in height breached and flooded a ship ; the 31 passengers on board were rescued by helicopters and other ships . Throughout the region , the storm resulted in at least 11 deaths .

First passing just south of Ireland on August 25 , the storm dropped heavy rainfall and brought

strong winds , significantly affecting the coastline where winds of 65 mph (105 km / h) were reported . Rainfall spread across the entire country , peaking at 11 @. @ 0 in (280 mm) in Kippure . There , a station reported more than 7 @. @ 8 in (200 mm) in 24 hours , which set the record for the greatest daily rainfall total in the country . Several 24 @- @ hour rainfall records were set during the storm , and new six @- @ hour and twelve @- @ hour record totals at Casement Aerodrome were set with 1 @. @ 63 in (41 @. @ 5 mm) and 2 @. @ 61 in (66 @. @ 2 mm) , respectively . The rainfall left some areas flooded , particularly in the Dublin area where 451 buildings were inundated , some up to a depth of 8 ft (2 @. @ 4 m) . Preliminarily , it was described as the worst flooding in the history of Dublin . Two small rivers , the Dodder and the Dargle , overflowed their banks due to the rainfall . The River Dargle overflowed in Bray , flooding some areas up to a depth of 5 ft (1 @. @ 5 m) and forcing about 1 @, @ 000 people to evacuate ; several special @- @ needs people were evacuated by boat . The flood , which originated about one mile north of the town , damaged over 500 houses and brought down several trees . Despite local politicians promising for flood protection after the flood , the town remained vulnerable to such flooding at least 20 years after the storm . The River Dodder , which also overflowed , nearly exceeded the reservoir dam in Bohernabreena in South Dublin . Additional spillways were later added in the event of another similar flood . In the Wicklow Mountains , the rainfall resulted in significant runoff , which caused erosion along the Cloghoge River . The passage of the storm left heavy crop damage , part of a larger period of poor agriculture in the country . Throughout the country , the storm caused at least five deaths , four of which were drownings in flooded rivers ; the fifth death was caused by a heart attack while being evacuated from flooding . Two months after the storm struck , the government of Ireland allocated IR £ 6 @, @ 449 @, @ 000 (1986 IEP , \$ 8 @, @ 650 @, @ 000 1986 USD) to repair roads and bridges damaged by the weather system .

The storm also affected the United Kingdom as it moved across the southern portion of the country . In Wales , Charley produced record @- @ breaking daily rainfall , which surpassed 4 inches (100 mm) in Dyfed . Some locations received hundred @- @ year rainfall . The storm struck the area during the Late Summer Bank Holiday , creating unfavorable conditions for driving and resulting in several accidents . Heavy rainfall flooded rivers , which swept away several people . This prompted officials to deploy boats and helicopters to assist in rescues , although at least three deaths were reported due to drowning in the rivers . Severe flooding was reported in Cumbria and Gloucestershire . The storm also left roads blocked by fallen trees and power lines . At the start of the storm , the inaugural Birmingham Super Prix motorsport race was just getting underway but poor visibility from precipitation contributed to an accident which temporarily called halt to proceedings . In Whitland , Wales , local soldiers assisted rescuing people , and later contributed to the cleanup of the town . Throughout the country , five people were missing after the storm , all of whom are presumed to have drowned ; an additional death was confirmed in Newry , Northern Ireland .