

= Hurricane Debbie ( 1961 ) =

Hurricane Debbie is the most powerful cyclone on record to strike Ireland in September , and possibly the only tropical cyclone on record to ever strike the British Isles while still tropical . The fourth named storm of the 1961 Atlantic hurricane season , Debbie originated from a well @-@ defined tropical disturbance that was first identified in late August over Central Africa . Tracking generally westward , the system moved off the coast of Senegal on September 5 into the Atlantic Ocean . By this time , it was estimated to have become a tropical storm , but forecasters did not issue advisories on the system until two days later . Late on September 6 , Debbie passed through the southern Cape Verde Islands as a strong tropical storm or minimal hurricane , resulting in a plane crash that killed 60 people in the islands . Once clear of the islands , data on the storm became sparse , and the status of Debbie was uncertain over the following several days as it tracked west @-@ northwestward and later northward . It was not until a commercial airliner intercepted the storm on September 10 that its location became certain . The following day , Debbie intensified and reached its peak intensity as a Category 3 hurricane on the Saffir ? Simpson hurricane scale , with maximum winds of 120 mph ( 195 km / h ) .

Maintaining its peak intensity for over a day , the hurricane gradually slowed its forward motion and weakened . By September 13 , Debbie 's motion became influenced by the Westerlies , causing the system to accelerate east @-@ northeastward . The system passed over the western Azores as a minimal hurricane on September 15 . At this point , there is uncertainty as to the structure of Debbie , whether it transitioned into an extratropical cyclone or maintained its identity as a tropical system . Regardless of which took place , the system deepened as it neared the British Isles , skirting the coast of Western Ireland on September 16 . Shortly thereafter , the system was confirmed to have become extratropical as it continued towards the northeast . The remnants of the storm later turned eastward , striking Norway and Russia , before dissipating on September 19 .

Striking Ireland as a powerful storm , Debbie brought record winds to much of the island , with a peak gust of 114 mph ( 183 km / h ) measured just offshore . These winds caused widespread damage and disruption , downing tens of thousands of trees and power lines . Countless structures sustained varying degrees of damage , with many smaller buildings destroyed . Agriculture experienced extensive losses to barley , corn and wheat crops . Throughout Ireland , Debbie killed 18 people ( 12 in the Republic of Ireland and six in Northern Ireland ) . It caused US \$ 40 ? 50 million in damage in the Republic and at least £ 1 @.@ 5 million ( US \$ 4 million ) in Northern Ireland . The storm also battered parts of Great Britain with winds in excess of 100 mph ( 160 km / h ) .

= = Meteorological history = =

During late August and into early September 1961 , an unusual series of low @-@ level disturbances developed over Central and West Africa and into the eastern Atlantic Ocean . One of these systems , that probably formed over Central Africa at the end of August , became increasingly organized as it moved over Nigeria on September 1 . As the disturbance travelled steadily westward , its mid @-@ level circulation became well defined , and the accompanying low @-@ level centre gradually followed suit . An upper @-@ level anticyclone accompanied the storm during this entire period , providing a favorable upper @-@ air regime for strengthening . According to a post @-@ storm study in 1962 , all the necessary environmental ingredients were available to the disturbance while it was over land ; the only factor inhibiting earlier development was a lack of access to the warm waters . Around 1200 UTC on September 5 , the low emerged off the coast of Senegal as a strong tropical depression or tropical storm . By this time , the system had a central pressure below 1006 mbar ( hPa ; 29 @.@ 71 inHg ) , and sustained winds of 35 mph ( 55 km / h ) were reported in Bissau , Guinea @-@ Bissau . As the system neared Cape Verde , it continued to intensify and by the evening of September 6 , reports from the nearby Danish tanker Charlotte Maersk indicated that the system was already at or near hurricane intensity .

Late on September 6 , Debbie passed over the southern Cape Verde Islands as a strong tropical

storm or low @-@ end hurricane . Continuing on a west @-@ northwest path , mainly in response to a large area of high pressure over the eastern Atlantic , the system continued to intensify . Sea surface temperatures in the region averaged 80 ° F ( 27 ° C ) , supportive of tropical development . At 1913 UTC on September 7 , a picture from TIROS @-@ 3 showed that an eye had already developed and banding features covered an area more than 300 mi ( 480 km ) from the centre . Debbie was not classified operationally as a tropical storm until 2200 UTC on September 7 , at which time the centre was estimated to be about 550 mi ( 890 km ) west @-@ southwest of Sal Island . Over the following three days , virtually no data was available on the hurricane and no reliable estimates on its intensity could be made . During this time , the storm was estimated to have taken a more north @-@ westerly course over the open ocean . It was not until a KLM flight encountered the storm on September 10 that an accurate positioning of the hurricane could be made .

After maintaining a nearly steady course for three days , Hurricane Debbie turned northward and slowed as it neared a break in the ridge previously steering it west @-@ northwestward . During the evening of September 11 , a United States Navy Aircraft reconnaissance mission into the storm found sustained winds of 110 ? 120 mph ( 175 ? 195 km / h ) and a central pressure of 976 mbar ( hPa ; 28 @. @ 82 inHg ) , reaching its peak intensity as a modern @-@ day Category 3 hurricane on the Saffir ? Simpson hurricane scale with winds of 120 mph ( 195 km / h ) . After maintaining its windspeeds for over 24 hours , the system weakened and turned sharply towards the east @-@ northeast in response to the upper @-@ level westerlies . By the afternoon of September 13 , Debbie was again a Category 1 storm as it quickly accelerated towards the Azores . Early on September 15 , the storm passed over the easternmost Azores with winds estimated at 80 mph ( 130 km / h ) before turning more northeasterly . Once past the Azores , there is an uncertainty over the structural changes that took place with Debbie . According to the United States Weather Bureau 's preliminary report , the system acquired characteristics of an extratropical cyclone on September 15 , though remained a strong system . This conflicts with the best track supplied by the Bureau and the National Hurricane Center 's hurricane database maintains the system as a tropical cyclone until the afternoon of September 16 .

The system moved towards the British Isles and began to deepen . Debbie eventually brushed the coast of Western Ireland near Achill Island during the morning of September 16 with sustained winds of 80 mph ( 130 km / h ) . Around this time , a pressure of 961 @. @ 4 hPa ( 28 @. @ 39 inHg ) was measured as it passed near Belmullet . If the system maintained tropical characteristics at this time , it would have been the first such storm on record to strike Ireland . Shortly after striking Ireland , the system was confirmed to have transitioned into an extratropical cyclone as it re @-@ emerged into the northeast Atlantic Ocean . While passing between Ireland and Scotland , the system continued to deepen , achieving an estimated central pressure of 950 hPa ( 28 @. @ 05 inHg ) . According to a study by Hickey and Connolly @-@ Johnston , this ranked Debbie as the most intense post @-@ hurricane from 1960 to 2012 to move through the British Isles . After clearing the United Kingdom , the hurricane 's remnants turned more easterly , later impacting Norway and Russia before dissipating on September 19 .

= = Impact = =

= = = Republic of Ireland = = =

As early as September 13 , residents were made aware that a storm might strike parts of Ireland with hurricane @-@ force winds . Two days later , forecasters believed the storm would take a more southerly course towards France . This forecast was later withdrawn as the storm failed to turn eastward . Consequently , gale warnings were issued for much of western Ireland on the morning of September 16 , hours before the brunt of the storm arrived . Fearing building collapses , officials in County Galway closed markets for the duration of the storm .

A powerful tropical or extratropical cyclone , on September 16 Hurricane Debbie became one of the

most intense storms on record to strike Ireland . The storm brought hurricane @-@ force winds to a large part of the country , with wind gusts peaking at 114 mph ( 183 km / h ) off the coast of Arranmore . At several locations , all @-@ time wind gusts and ten @-@ minute sustained wind records were broken . Sustained winds at Malin Head stayed at or above 62 mph ( 100 km / h ) for approximately six hours . Debbie was the strongest storm , in terms of atmospheric pressure , to strike Ireland during the month of September , with a pressure of 961 @. @ 4 mbar ( hPa ; 28 @. @ 39 inHg ) measured in Belmullet . Rainfall from the storm was relatively minor , with rainfall rates peaking at 0 @. @ 35 in ( 9 mm ) per hour at the Valentia Observatory . Though limited , the rain did cause some lakes in the west to flood .

The greatest damage occurred in a swath stretching from Kerry to Limerick as well as the counties of Sligo and Donegal . In these areas , the hurricane 's powerful winds damaged or destroyed many buildings and downed trees and power lines . In the hardest hit areas , communication was not restored for over four days . Many roads were blocked by debris for up to two days . Crops and trees were badly damaged . Approximately two percent of the trees in the forestry industry were snapped or uprooted , with some areas losing up to twenty @-@ four percent . In general , corn and wheat crops fared better than expected , with only 25 ? 30 percent being lost ; however , some farmers reported barley losses greater than 50 percent . Downed trees from the storm wreaked havoc , leaving considerable damage and loss of life behind . All told , Hurricane Debbie was responsible for 12 deaths in the Republic of Ireland . Four people were killed in County Cavan ? a widow , her two daughters and granddaughter ? after a tree fell on their car . Five deaths resulted from fallen trees and three others were from building collapses . At least 50 people were injured , few of which were serious . A study in 2012 estimated that damage from the storm was at least US \$ 40 ? 50 million across Ireland .

Newspapers reported that the city of Galway " resembled a bombed area , " referring to the scale of damage caused by the winds . In nearby Ballygar , two barns were destroyed , one of which had debris strewn over a wide area . Hurricane @-@ force winds battered Tuam for several hours , leaving most buildings damaged . Nearly every structure in Connemara was damaged and many homes lost their roofs . At Cork Airport , windows at the control tower were blown out and a construction crane was knocked over . Residents in Loughrea dubbed Saturday , September 16 , 1961 as " The Day Of The Big Wind " in light of the extensive damage . Damage in Roscommon was " impossible to calculate , " as all power and communication around the town was lost . In Limerick , 15 people were injured . Across County Cavan , thousands of trees were snapped or uprooted , leaving many towns temporarily cut off as roads were blocked and communications lost . Many structures sustained damage , which ranged from broken slate roofing to flattened barns . Most towns across the county were left without power and telephone service . Residents described the storm as " the worst in living memory . "

Along the coast , rough seas spurred by the winds damaged docks and flooded some coastal regions . Offshore , waves reached heights of 45 ft ( 14 m ) near Arranmore . Dozens of ships were torn from their moorings and run aground at various ports , some of which were found 200 yd ( 180 m ) inland . In Salthill , three marinas were damaged with forty vessels damaged or sunk . Between 11 : 00 a.m. and 1 : 00 p.m. local time , onshore winds from the storm caused the River Shannon to flow backwards and rise 4 ft ( 1 @. @ 2 m ) . Hundreds of acres of land , including potato and cabbage plots , were left several feet underwater . Many roads were submerged , making travel impossible in the area . The combination of strong winds and sea spray from the storm caused extensive defoliation of vegetation up to 10 mi ( 16 km ) inland . Spray from the River Foyle reportedly travelled 100 yd ( 91 m ) .

In the wake of the storm , more than 1 @, @ 000 Electricity Supply Board ( ESB ) personnel were deployed to restore power . In some areas , locals worked together to provide others with fresh food after electricity was lost . Fire brigades were sent on patrol to quell any looting . In Galway , ESB repair crews worked through labor and supply shortages to restore power and telephone service despite recent strikes in the company . By September 23 , officials in the city appealed to the Government for funding to deal with the aftermath of the hurricane . Uncertainty over whether some of the cost could be footed by landowners themselves resulted in disagreement over how much aid

to request . Due to the severity of damage to the electrical grid , there were numerous requests made to the ESB to build underground power cables , especially in Galway .

= = = United Kingdom = = =

Exceptionally strong winds from the storm buffeted parts of Northern Ireland , with gusts of 106 mph ( 171 km / h ) and 104 mph ( 167 km / h ) measured in Ballykelly and Tiree respectively . The winds downed tens of thousands of trees and more than 1 @, @ 000 telephone lines across the region . In the Baronscourt Forest in County Tyrone , 30 @, @ 000 trees were blown down . Countless roads across Northern Ireland were blocked by debris and major rail lines had to suspend service . There was severe damage in the city of Derry where a newly built school was destroyed . Losses in the city alone amounted to £ 500 @, @ 000 ( US \$ 1 @. @ 4 million ) . In Lagan Valley , a brick community hall was destroyed . An estimated 200 homes and two churches in Strabane were damaged . The town 's labour exchange building was severely damaged as well . In a local cemetery , many tombstones were uprooted from concrete foundations and destroyed . A newly built fire station in Clogher collapsed after its roof was blown off . Several people were injured in Belfast after a glass ceiling collapsed in a bus station and a piece of corrugated roofing blew in from a nearby building .

Six people were killed in Northern Ireland , mostly due to fallen trees : two in County Fermanagh and one each in Cookstown , Dungannon , Omagh , and elsewhere in Tyrone . The cereal crop in Northern Ireland suffered greatly due to Debbie , with half of the yield being lost . Losses from the crop were estimated at £ 1 million ( US \$ 2 @. @ 8 million ) . In the wake of the storm , military ambulances from the Royal Army Medical Corps were dispatched to parts of West Tyrone . Power repair crews were dispatched for nearly a week repairing downed wires across Northern Ireland . Many public authorities paid tribute to the workers for their tireless work . After passing through Ireland , the storm brought strong winds and heavy rain to parts of Scotland and Wales , resulting in some damage and flooding in the region . On the coast of Lancashire and the Isle of Man , sand storms were reported , with significant sand deposits found inland .

= = = Elsewhere = = =

Unsettled weather in the Cape Verde Islands brought about by Tropical Storm Debbie was blamed for a plane crash on September 6 that killed 60 people . Although the storm passed over the Azores as a hurricane , no reports of damage were received . Strong winds were also reported from the Bay of Biscay to locations in northern Norway .