

= Hurricane Josephine (1984) =

Hurricane Josephine was a long @-@ lived Atlantic hurricane that threatened the East Coast of the United States for several days in October 1984 . The fifteenth tropical cyclone , tenth named storm , and third hurricane of the season , Josephine developed from an area of disturbed weather near the Bahamas on October 7 , forming with subtropical characteristics . It quickly organized , and gained tropical characteristics as it strengthened into a tropical storm on October 8 . Gradual intensification occurred thereafter , reaching hurricane status on October 10 . The storm headed northward , remaining well offshore of the eastern United States . Josephine strengthened further and peaked as a moderately strong Category 2 hurricane on the Saffir @-@ Simpson Hurricane Scale on October 12 . On the following day , Josephine weakened back to a Category 1 hurricane before becoming nearly stationary . It later headed northeastward and paralleled the coast well offshore of Nova Scotia . By October 17 , Josephine weakened back to a tropical storm , shortly before beginning to execute a cyclonic loop to the south of Newfoundland . While executing the cyclonic loop , Josephine became extratropical on October 18 .

Although Josephine remained well offshore of the eastern United States , the effects from the storm and an area of high pressure produced strong winds and high seas along the coast . In North Carolina , high tides caused severe beach erosion and minor damage to ocean @-@ front houses . Minor coastal flooding occurred in New York and New Jersey . In addition , one fatality occurred when a man drowned after falling off his boat while sailing a river in Massachusetts .

= = Meteorological history = =

A frontal trough moved eastward off the southeastern United States on September 30 , becoming stationary north of Haiti . The trough developed an area of disturbed weather that interacted with an upper @-@ level low pressure area , resulting in the development of a subtropical depression on October 7 . Upon formation , the system consisted of a very broad subtropical low , as well as a poorly defined surface circulation . As the subtropical depression drifted westward , it became further organized . By midday on October 8 , an Air Force reconnaissance aircraft flight indicated that the subtropical depression intensified and acquired enough tropical characteristics to be considered a tropical storm . The National Hurricane Center named the storm Josephine .

Further intensification was slow , as Josephine was very large and existed in a relatively cool environment . Shortly thereafter , Josephine curved northward to the northeast of the Bahamas . By October 10 , Josephine had strengthened into a hurricane . Josephine continued north @-@ northeastward , and became a Category 2 hurricane on October 11 . Winds increased slightly , and Josephine reached its maximum sustained winds of 105 mph (165 km / h) on October 12 . Josephine weakened back to a Category 1 hurricane on October 13 . That day , an area of high pressure moved off the northeastern United States , which caused Josephine to decelerate and abruptly curve northeastward , and eventually southeastward . By October 15 , Josephine began to accelerate east @-@ northeastward . Later that day , Josephine reached its minimum barometric pressure of 965 mbar (28 @. @ 5 inHg) .

As Josephine continued east @-@ northeastward , it had weakened back into a tropical storm . Under the influence of an area of high pressure to the north and a nearby area of low pressure , Josephine began executing a cyclonic loop to the north while approaching Atlantic Canada . During the cyclonic loop , it transitioned into an extratropical cyclone on October 18 . Shortly thereafter , the remnants of Josephine merged with a broad mid @-@ latitude trough . The remnants of Josephine tracked southward and completed the cyclonic loop on October 19 . The system eventually curved to the east @-@ northeastward and moved in that direction until it became unidentifiable on October 21 .

= = Preparations and impact = =

Shortly after the system was declared a tropical storm , gale warnings were issued for the central

Bahamas starting on October 8 . Slightly more than 24 hours later , a hurricane watch was issued on Eleuthera and the Abaco Islands . By early on October 11 , both of the alerts were discontinued . Later that day , gale warnings were issued from Cape Lookout , North Carolina to Virginia Beach , Virginia . The warning area was extended to as far north as Nantucket , Massachusetts on October 13 . The warning for the area from Cape Lookout , North Carolina to Virginia Beach , Virginia was discontinued late on October 14 . Simultaneously , gale warnings were issued from Nantucket to Cape Cod , Massachusetts . In addition , another gale warning was also issued from Cape Cod to Boston , Massachusetts . By October 15 , all gale warnings were discontinued . Early in the hurricane 's duration , NASA developed a contingency plan for delaying a landing of the space shuttle Challenger by a day in the event Josephine passed near Kennedy Space Center . The shuttle crew filmed the hurricane from orbit using an IMAX camera . This footage of the storm was featured in the 1985 IMAX documentary *The Dream is Alive* .

Although Josephine remained well offshore of the eastern United States , the storm produced strong winds and high seas in combination with an area of high pressure . On the Outer Banks of North Carolina , strong winds were reported from October 11 to October 14 . At Diamond Shoals , sustained winds were at 58 mph (93 km / h) , with gusts as high as 75 mph (120 km / h) . However , most of the damage caused by Josephine was due to high tides along the East Coast of the United States . On Hatteras Island , tides were 5 @. @ 8 ft (1 @. @ 8 m) above the mean sea level . In addition , wave heights of 8 to 12 ft (2 @. @ 4 to 3 @. @ 7 m) were reported on the island . Due to the tides , over @- @ wash occurred on highways along the Outer Banks , which in turn caused those roads to close . Coastal erosion was also occurred in that area ; most notably , the tides washed away nearly all protective sand dunes built by the Civilian Conservation Corps during the Great Depression , especially in the Rodanthe area . In the absence of protective sand dunes , the Outer Banks became vulnerable to future storms that would also produce high tides . Minor damage to houses were reported due to high tides near Nags Head and Kill Devil Hills ; damage was mostly from the detachment of steps and porches .

Effects were somewhat lighter in Virginia . Gale force winds were also observed in the state , with winds of 46 ? 52 mph (74 ? 84 km / h) being reporting at Cape Henry and Chesapeake Light , respectively . High tides also occurred in Virginia , with waves of 9 to 10 ft (2 @. @ 7 to 3 @. @ 0 m) reported at Chesapeake Light . Tidal flooding was reported in Delaware . In response to the hurricane , the United States Coast Guard activated extra workers in the event of any storm emergencies . High winds in Sea Bright , New Jersey washed an abandoned cabin cruiser into the jetty along the coast . In the same town , officials closed a portion of New Jersey Route 36 . Helicopters evacuated three coast guardsmen from Ambrose Light in New York Harbor and two guardsmen from West Bank Light . Tides between 2 and 4 ft (0 @. @ 61 and 1 @. @ 22 m) above normal resulted in minor coastal flooding on Long Island , New York and in parts of New Jersey . Officials closed 1 @. @ 5 mi (2 @. @ 4 km) of a road in Southampton due to 3 @. @ 5 ft (1 @. @ 1 m) deep flooding . In Massachusetts , a man fell off his boat and drowned while sailing the North River amidst large swells produced by Josephine . The outer fringes of the storm produced wind and rainfall in Cape Cod . In Newfoundland , Josephine dropped light rainfall , peaking at slightly less than 1 in (25 mm) .

Josephine also caused major effects to marine interests . High waves , estimated to have exceeded 15 ft (4 @. @ 6 m) , disabled a sailboat with a crew of six on it . They were quickly rescued after issuing a distress signal to a nearby tanker vessel . The storm caused the loss of 1 @, @ 799 bags of sorghum from water damage when a freighter encountered Josephine en route to Baltimore , Maryland . The major shipping lanes of North America were severely impacted , with more than 25 ships reporting winds of at least 58 mph (93 km / h) over a period of nine days . Furthermore , at least five of those ships reported hurricane force winds during a period of six days . The highest wind speed reported from a ship was 92 mph (148 km / h) , which was observed on October 16 .