

= Effects of Hurricane Isabel in North Carolina =

The effects of Hurricane Isabel on North Carolina were the worst from a hurricane since Hurricane Floyd made landfall in 1999 . Hurricane Isabel formed from a tropical wave on September 6 , 2003 in the tropical Atlantic Ocean . It moved northwestward , and within an environment of light wind shear and warm waters it steadily strengthened to reach peak winds of 165 mph (265 km / h) on September 11 . After fluctuating in intensity for four days , Isabel gradually weakened and made landfall on the Outer Banks of North Carolina with winds of 105 mph (165 km / h) on September 18 . It quickly weakened over land and became extratropical over western Pennsylvania the next day .

Isabel produced moderate to heavy damage across eastern North Carolina , totaling \$ 450 million (2003 USD , \$ 579 million 2016 USD) . Damage was heaviest in Dare County , where storm surge flooding and strong winds damaged thousands of houses . The storm surge produced a 2 @ , @ 000 foot (600 m) wide inlet on Hatteras Island , isolating Hatteras by road for two months . Strong winds downed hundreds of trees of across the state , leaving up to 700 @ , @ 000 residents without power . Most areas with power outages had power restored within a few days . The hurricane directly killed one person and indirectly killed two in the state .

= Preparations =

By 4 days before Isabel made landfall , most computer models predicted Isabel to make landfall between North Carolina and New Jersey , and the National Hurricane Center consistently forecast a landfall on North Carolina . Initially , forecasters predicted a landfall in the northeastern portion of the state , though as the hurricane neared land the predicted landfall position was much closer to where it ultimately was . From three days in advance , the average track forecast error for its landfall was only 36 miles (58 km) , and for 48 hours in advance the average track error was 18 miles (29 km) . Strong confidence in Isabel 's final landfall prompted the National Hurricane Center to issue a hurricane watch for the entire North Carolina coastline about 50 hours before Isabel struck land . 38 hours before the hurricane made landfall , the National Hurricane Center upgraded the watch to a hurricane warning for the landfall area . The Newport Weather Forecast Office issued a flood potential statement two days before landfall , which indicated a threat for flash flooding . The office began preparing for the hurricane one week before landfall , and brought additional staff members to assist with hurricane related duties .

Evacuation orders began on September 16 , when officials issued a voluntary evacuation for portions of four counties and one entire county . By around 24 hours before landfall , mandatory evacuations were ordered for eight counties , all of which but one were for the entire counties . All coastal counties from Cape Fear northward were under a mandatory evacuation . A survey of 603 residents in northeastern North Carolina indicated 57 % of residents along the Outer Banks and 77 % of residents in storm surge @ - @ prone areas of the Pamlico Sound did not evacuate despite being under a mandatory evacuation . The two primary reasons stated for the residents ' evacuation decisions were the hurricane 's strength and track . The media and statements from officials were two other reasons . 70 % of people along the Outer Banks heard the official evacuation notices , though only 30 % of residents near the Pamlico Sound heard the notices . A majority of the respondents to the survey who heard the evacuation notices left the area . None of the surveyed evacuees from the Outer Banks went to a public shelter ; 60 % went to a friend or a relative 's house and 24 % went to a motel . Evacuees on the Outer Banks generally went elsewhere in North Carolina or to Virginia . For evacuees around the Pamlico Sound , only 9 % left for a public shelter , while 75 % left for a friend or relative 's house . Most near the Pamlico Sound remained in their own neighborhood or own county . Of the 19 North Carolina counties issuing evacuation orders , the duration of the evacuation process varied between 3 hours to 12 hours in Dare County . Five counties reported heavy amounts of traffic , while traffic problems included stalled cars along roads , inadequate route signing , and flooded or damaged roads .

By the morning of the hurricane 's landfall , 65 shelters were prepared with a capacity of 95 @ , @ 000 people . The American Red Cross prepared 100 feeding vehicles in staging areas , and

deployed two mobile kitchens each with the capacity to provide 10 @, @ 000 meals per day . Additionally , five Southern Baptist Convention kitchens were on standby , in total being able to provide 20 @, @ 000 meals per day .

= = Impact = =

Hurricane Isabel produced hurricane @-@ force wind gusts throughout eastern North Carolina . The winds downed hundreds of trees , leaving up to 700 @, @ 000 without power across the state . Damage from the hurricane totaled about \$ 450 million (2003 USD , (\$ 579 million 2016 USD)) . Three people were killed in the state , a utility worker attempting to restore electricity and two by falling trees .

= = = Outer Banks = = =

Hurricane Isabel first began affecting North Carolina about 15 hours before it struck land . Upon making landfall along the Outer Banks , the hurricane produced strong waves of 15 to 25 feet (4 @. @ 5 to 6 m) in height and a storm surge of about 6 to 8 feet (1 @. @ 8 to 2 @. @ 4 m) . Waters reached a height of 7 @. @ 15 feet (2 @. @ 18 m) in Hatteras . Storm tides along the coast peaked at 7 @. @ 7 feet (2 @. @ 3 m) in Cape Hatteras , though the total could be higher there due to the tide gage being destroyed by the hurricane . The surge and waves created a new inlet by washing out a portion of Hatteras Island between Hatteras and Frisco . Unofficially named Isabel Inlet , the break was 2 @, @ 000 feet (600 m) wide and 15 feet (5 m) deep , and consisted of three distinct channels . The formation of the inlet destroyed a portion of North Carolina Highway 12 , and also washed out three homes , dunes , power lines , and utility pipes . The new inlet destroyed all utility connections to Hatteras Village , isolating the residents there . The storm surge and waves from Isabel also resulted in a breach between Hatteras and Hatteras Inlet . The breach , which nearly became an inlet , formed from the flow of ocean water across the island , though it was not deep enough for a constant water flow . The breach occurred in an area without roads or houses , and had little impact on Hatteras residents . Rough surf and storm surge caused overwash and severe beach erosion throughout the Outer Banks , with flooding in Ocracoke reportedly being up to waist @-@ high . The hurricane produced an estimated 4 inches (100 mm) of rain throughout most of the Outer Banks , with Duck reporting a peak of 4 @. @ 72 inches (120 mm) . Wind gusts in association with the hurricane peaked at 105 mph (170 km / h) in Ocracoke , with several other locations reporting hurricane @-@ force gusts .

Wind and water damage across the Outer Banks was extensive . Strong waves and the storm surge from Hurricane Isabel knocked about 30 to 40 houses and several motels off of their pilings . Two families who did not evacuate were nearly swept out to sea when their home was destroyed . Local rescue was unable to reach them ; however , they were ultimately able to reach safety . The rough waves greatly affected piers in Nags Head , Rodanthe , and Frisco , with three being completely destroyed . Several locations along North Carolina Highway 12 were partially washed out or covered with debris , and 15 foot (4 @. @ 5 m) sections of pavement on both sides of a bridge near Ocracoke were washed away . Strong waves destroyed a beach access ramp , as well . Several thousand homes and businesses were damaged by the passage of the hurricane , and damage in Dare County totalled nearly \$ 350 million (2003 USD , (\$ 450 million 2016 USD)) . In the Outer Banks , no deaths or injuries were reported .

= = = Southeast North Carolina = = =

The effects of Hurricane Isabel were generally light in the southeastern portion of the state . Sustained winds reached 72 mph (116 km / h) offshore in the Frying Pan Shoals , where a gust of 82 mph (132 km / h) was also reported . Sustained winds were lighter along the coast , peaking at 45 mph (72 km / h) at the Wilmington International Airport , while gusts reached 66 mph (106 km / h) at a North Carolina State Ports Authority facility in Wilmington . Tropical storm force wind gusts

were reported as far inland as Lumberton , where gusts reached 52 mph (54 km / h) . The large circulation of Isabel dropped moderate rainfall across the area , peaking at 4 @. @ 51 inches (115 mm) in Whiteville . Additionally , weather radars estimated over 5 inches (125 mm) of precipitation fell in portions of New Hanover County . The rainfall resulted in ponding on roadways , though no severe flooding was reported . Storm tides were generally around 1 foot (0 @. @ 3 m) above normal , though Wilmington reported a storm tide of 3 @. @ 22 feet (1 m) . Rough waves resulted in moderate beach erosion near Cape Fear and minor erosion along eastward @-@ facing beaches north of Cape Fear .

Damage was minor in southeast North Carolina . Moderate winds inflicted isolated shingle and siding damage along barrier islands . The winds downed several trees , some onto cars and houses . Brief power outages were also reported . Beach erosion damaged a bridge in Bald Head Island , as well . In Chowan County , a business parking lot was under several feet of water due to flash flooding . One person was indirectly killed in Carteret County when trying to restore electricity .

= = Inland = =

Isabel produced strong winds throughout inland areas of eastern North Carolina . Plymouth , located 75 miles (120 km) from where the hurricane made landfall , reported gusts to 95 mph (155 km / h) . Sustained winds were lighter , with only a few locations receiving tropical storm strength winds . The passage of the hurricane resulted in moderate rainfall of up to 6 @. @ 02 inches (153 mm) in Havelock . Upon making landfall , Isabel produced moderate to severe storm surges along the Pamlico and Neuse Rivers , with a location in Craven County reporting a storm tide of 10 @. @ 5 feet (3 @. @ 2 m) above normal .

The strong storm surge produced significant flooding in Harlowe and Oriental . Several other locations also reported flooding of streets and low @-@ lying areas . The rise of water flooded many homes in Craven County and the eastern portions of Carteret and Pamlico counties . Emergency personnel performed many rescues to people who had not evacuated and had become trapped by storm surge flooding . Several eyewitnesses reported high velocity , waist deep water moving homes , trailers , and other objects many yards inland . As the water retreated , these objects were then dragged back towards the sound . A 5 to 8 foot (1 @. @ 5 to 2 @. @ 4 m) storm surge struck the western portion of the Albemarle Sound , with significant surge flooding occurring to the west of Edenton . There , the surge destroyed four homes , two of which were moved up to 20 feet (6 @. @ 1 m) off their concrete block foundations . Nearly 60 percent of all homes and business in Chowan County suffered some structural damage due to wind , many of which were the result of large falling trees . One female died when a tree fell on her vehicle in Chowan County .

= = Aftermath = =

Hundreds of residents were stranded in Hatteras following the formation of the new inlet created by rising waters . Many parts of North Carolina Highway 12 were partially washed or damaged , which slowed recovery efforts and the return of homeowners in the Outer Banks . Sections of the highway were closed to one lane . The ferry between Hatteras Island and Ocracoke Island was temporarily closed due to damage after the hurricane , though a small passenger ferry remained available for Hatteras Village residents and emergency workers . People who were not residents were not allowed to be on the Outer Banks for two weeks after the hurricane due to damaged road conditions . When visitors were allowed to return , many ventured to see the new inlet , despite a 1 mile (1 @. @ 6 km) walk from the nearest road .

Initially , long @-@ term solutions to the Isabel Inlet such as building a bridge or a ferry system were considered , though they were ultimately cancelled in favor of pumping sand and filling the inlet . Coastal geologists were opposed to the solution , stating the evolution of the Outer Banks is dependent on inlets from hurricanes . Dredging operations began on October 17 , about a month after the hurricane struck . The United States Geological Survey used sand from the ferry channel to the southwest of Hatteras Island , a choice made to minimize impact to submerged aquatic

vegetation and due to the channel being filled somewhat during the hurricane . On November 22 , about two months after the hurricane struck , Highway 12 and Hatteras Island were reopened to public access . On the same day , the ferry between Hatteras and Ocracoke was reopened . The breach on the southern end of Hatteras Island was filled in with sand , as well .

Hardware stores experienced great demand for portable generators , chain saws , dehumidifiers , and air movers following the passage of the hurricane . Utility crews from across the country came to the state to assist in returning power , though power outages persisted for several days . Over 2 @, @ 500 utility members worked , in some cases around the clock , to restore the power . One power company restored power to 68 % of its affected customers by the day after Isabel passed through the area . By four days after landfall , 83 @, @ 000 customers were without power , down from its peak of several hundred thousand .

Hours after Isabel made landfall , President George W. Bush issued a major disaster declaration for 26 North Carolina counties , which allowed the use of federal personnel , equipment and lifesaving systems and the delivery of heavy @- @ duty generators , plastic sheeting , tents , cots , food , water , medical aid and other essential supplies and materials for sustaining human life . The declaration also allocated federal funds for the long @- @ term recovery of hurricane @- @ stricken residents and business owners , as well as providing federal funds for the state and local governments to pay 75 percent of the eligible cost for debris removal and emergency services related to the hurricane , including requested emergency work undertaken by the federal government . By four days after the emergency declaration , assistance checks were mailed and used by residents to pay for what was not covered by their insurance .

By four days after landfall , FEMA served around 68 @, @ 000 meals to displaced families . More than a dozen disaster recovery centers were initiated throughout the state . FEMA provided 125 @, @ 000 pounds of ice in the first few days , and prepared 200 @, @ 000 pounds of ice and 180 @, @ 000 liters of water for the following week for the remaining communities without water . By six days after Isabel struck the state , all hospitals were opened and all roads excluding North Carolina Highway 12 were passable due to emergency crews clearing roads with debris . By about one month after the hurricane struck , 32 @, @ 560 North Carolina residents applied for federal assistance , with disaster aid totaling about \$ 50 million (2003 USD , (\$ 64 @. @ 3 million 2016 USD)) . Subsequent disaster declarations ultimately declared 47 North Carolina counties as disaster areas . By 12 weeks after the hurricane passed through the state , 54 @, @ 425 residents applied for federal assistance , with disaster aid totaling \$ 155 @. @ 2 million (2003 USD , (\$ 200 million 2016 USD)) .