Hurricane Carol

Hurricane Carol was among the worst tropical cyclones on record to affect the states of Connecticut and Rhode Island in the United States . It developed from a tropical wave near the Bahamas on August 25 , 1954 , and slowly strengthened as it moved northwestward . On August 27 , Carol intensified to reach winds of 105 mph (165 km / h) , but weakened as its motion turned to a northwest drift . A strong trough of low pressure turned the hurricane northeastward , and Carol later intensified into a major hurricane . While paralleling the Mid @-@ Atlantic and Southeastern United States , the storm produced strong winds and rough seas that caused minor coastal flooding and slight damage to houses in North Carolina , Virginia , Washington , D.C. , Delaware , and New Jersey . The well @-@ organized hurricane accelerated north @-@ northeastward and made landfall on Long Island , New York , and Connecticut on August 31 near peak intensity . Early on the following day , Carol transitioned into an extratropical cyclone over New Hampshire .

In New York , strong winds on Long Island damaged about 1 @,@ 000 houses , left 275 @,@ 000 people without electricity , downed many trees , and resulted in heavy crop losses . Storm surge flooded LaGuardia Airport and inundated the Montauk Highway , which left the eastern portion of Long Island isolated . Carol also brought strong winds and rough seas to New England . Throughout the region , about 150 @,@ 000 people were left without electricity and telephone service . 1 @,@ 545 houses were destroyed and another 9 @,@ 720 were damaged . Approximately 3 @,@ 500 cars and 3 @,@ 000 boats were destroyed . There were 65 deaths and 1 @,@ 000 injuries in New England . The storm caused an additional $ 1 million in damage in Canada as well as two deaths . Overall , Carol caused 72 fatalities and damage totaled $ 462 million (1954 USD) , making it the costliest hurricane in the history of the United States , at the time . Following the storm , Carol was retired , becoming the first name to be removed from the naming lists in the Atlantic basin .

Meteorological history

A tropical wave spawned a tropical depression over the northeastern Bahamas on August 25 . It moved to the north @-@ northwest and intensified into a tropical storm early on August 26 . Receiving the name Carol , the storm gradually turned to the north , and strengthened under generally favorable conditions . On August 26 , the Hurricane Hunters reported an eye , 23 miles (37 km) in diameter despite Carol being a tropical storm . The next day , Carol strengthened to attain hurricane status while located about 345 miles (545 km) east of Cape Canaveral , Florida . With a large anticyclone persisting across the southeastern United States , the motion of Carol turned to a northwest drift . The hurricane continued to strengthen , and Carol reached an initial peak intensity of 105 mph (165 km / h) on August 28 . By that time , it was a small hurricane , and the radius of maximum winds was smaller than normal for its latitude and central pressure . After maintaining peak intensity for 30 hours and moving a distance of about 75 miles (120 km) , Carol weakened slightly off the coast of Georgia .

An eastward moving deep @-@ wave trough intensified as it moved through the eastern United States . This caused Carol to accelerate as it turned to the north and north @-@ northeast . On August 30 , the hurricane again strengthened to reach Category 2 status while located 180 miles (290 km) east of Savannah , Georgia . Early on August 31 , Carol passed very near Cape Hatteras , North Carolina with reconnaissance aircraft intensity estimates from 75 ? 125 mph (120 ? 200 km / h) . The hurricane continued north @-@ northeastward with a forward motion of up to 39 mph (63 km / h) , and Carol intensified further to make landfall on eastern Long Island a Category 3 hurricane with peak winds of 115 mph (185 km / h) . After quickly crossing Long Island Sound , the hurricane made its final landfall on Old Saybrook , Connecticut , still at peak intensity . By that time , Carol had maintained its small structure and well @-@ defined eye , despite the fast forward motion and the latitude . The landfall intensity was based on a pressure of 957 mbar (28 @.@ 3 inHg) in Groton , Connecticut , where the eye resulted in calm conditions and clear skies , followed by hurricane @-@ force winds and storm tide that destroyed ninety percent of area homes . Carol quickly lost tropical characteristics while crossing Connecticut and western Massachusetts , and

became extratropical over southwestern New Hampshire late on August 31 . The powerful extratropical storm continued northward , and after entering Canada lost its identity over southern Quebec .

= = Impact = =

= = = Mid @-@ Atlantic = = =

Before affecting North Carolina , the threat of Carol prompted a hurricane warning from Wilmington to Manteo . Storm warnings were issued southward to Charleston . Residents evacuated north of Wilmington along the ocean . While passing by the state , the strongest winds remained to the east of Hurricane Carol , though winds of 90 to 100 mph (145 to 160 km / h) were reported at Cape Hatteras . Further inland , the hurricane produced a wind gust of 55 mph (90 km / h) in Wilmington and 65 mph (105 km / h) in Cherry Point . The winds resulted in agricultural damage to the corn and soy bean crop . High winds caused minor damage to roofs and houses , and also downed some trees and power lines . Near the coast , waves from the storm damaged fishing piers , and flooding was reported in New Bern . High waves also damaged coastal roadways . Damage in the state totaled to around $ 228 @,@ 000 . Carol passed 100 miles (160 km) to the east of Virginia , and produced 40 mph (65 km / h) winds in Virginia Beach . The hurricane produced 4 inches (100 mm) of rain in Norfolk . Further to the northwest , rainfall from the system alleviated drought conditions in the Washington , D.C. area . Damage was minor from Virginia to Delaware , where light rains fell . Precipitation also extended into Pennsylvania .

In New Jersey , high winds downed power lines , which killed two people . Along the coast , high waves damaged boardwalks and caused flooding . In neighboring Pennsylvania , Carol caused a tractor to crash into a train , resulting in two deaths . Damage in the state was estimated at $ 250 @,@ 000 .

On eastern Long Island near where Carol made landfall , a pressure of 960 mbar (28 inHg) was recorded . Winds on the island gusted to 125 mph (200 km / h) , leaving thousands of homes without power . The winds downed many trees , and left heavy crop damage to various fruits . High winds damaged widespread homes , boats , and cars . About 1 @,@ 000 houses were damaged on the island , and 275 @,@ 000 people lost power . The hurricane 's storm surge covered the Montauk Highway in Montauk , effectively isolating eastern Long Island for a period of time . Flooding also affected LaGuardia Airport . Due to the compact nature of the storm , areas west of Fire Island were largely unaffected by the hurricane . There were power outages in New York City , but little damage . Damage was estimated at $ 5 million in the state , and one death was reported , after thousands of people evacuated .

= = = New England and Canada = = =

Hurricane Carol produced hurricane and gale force winds across New England . Strong winds from Hurricane Carol destroyed nearly 40 % of the apple , corn , peach , and tomato crops from eastern Connecticut to Cape Cod . Overall crop damage was estimated at $ 22 @.@ 25 million . The hurricane destroyed several thousand homes in New England , many of which were destroyed from the waters or the powerful winds . Overall , 11 @,@ 785 families were directly impacted by the hurricane , including 9 @,@ 720 houses that were damaged and 1 @,@ 545 that were destroyed . High winds left over 150 @,@ 000 people without power in New England , potentially as many as one @-@ third of all of New England , and many residents also lost phone service . The hurricane also destroyed 3 @,@ 500 cars and 3 @,@ 000 boats in the region . Heavy rainfall from the storm caused traffic accidents , but only minor flooding .

Throughout the United States , Hurricane Carol caused $ 461 million in damage , mostly in New England , making it the costliest Atlantic hurricane at the time . There were 65 deaths in New England , and about 1 @,@ 000 injured people . Despite the high damage , advance warning

allowed for many fewer deaths than the total of 488 fatalities during the 1938 New England hurricane , which affected the same area with similar strength . However , some areas did not receive advance warning , due to power outages preventing people from receiving Weather Bureau warnings ahead of the storm .

Hurricane Carol struck Connecticut shortly after high tide , and its combination with 10 to 15 feet (3 to 4 @.@ 5 m) storm surges from New London eastward produced widespread tidal flooding . About 2 @,@ 000 people were stranded when a rail line between New Haven and Rhode Island was flooded . The heaviest rainfall associated with the passage of the storm occurred in New London , where up to 6 inches (150 mm) fell and wind blew off a portion of the city hall roof . These strong winds left much of the eastern portion of the state without power . Near the coast , the combination of strong winds and the storm surge damaged or destroyed thousands of buildings , including 100 destroyed houses . Many other homes in Eastern Connecticut were damaged by falling trees . Thousands had evacuated before the storm reached the area , and one person died in the state . Due to the compact nature of the storm , western Connecticut experienced little effects from Carol . Overall damage in the state was estimated at $ 50 million .

The hurricane produced a record @-@ high wind gust of 135 mph (215 km / h) at Block Island , while on mainland Rhode Island , sustained winds peaked at 90 mph (145 km / h) in Warwick with gusts to 105 mph (165 km / h) . Upon making landfall around high tide , Carol produced a storm surge of up to 14 @.@ 4 feet (4 @.@ 4 m) in Narragansett Bay , surpassing that of the New England Hurricane of 1938 . The resulting storm surge flooded downtown Providence with 12 feet (3 @.@ 7 m) of water . News reports indicated that the floods covered the area with 4 feet (1 @.@ 2 m) in about an hour . The winds downed two broadcasting towers in the city . Westerly was also flooded , where 200 homes were washed away . There was also heavy damage in Newport , where the Newport Casino was damaged . Some entire coastal communities were nearly destroyed , and 620 houses and 83 other buildings were destroyed in the state . The winds destroyed the roofs of hundreds of buildings , forcing many to evacuate to shelters during the passage of the storm . The powerful winds also downed thousands of trees and power lines , blacking out the entire state and interrupting 95 percent of phone service . Damage in the state totaled about $ 200 million , and there were at least 17 deaths in Rhode Island .

Before Carol affected the area , 20 @,@ 000 people evacuated from Cape Cod . In Massachusetts , the hurricane produced winds between 80 and 110 mph (130 to 180 km / h) across much of the eastern part of the state . Gusts reached 80 mph (130 km / h) at Blue Hill Meteorological Observatory , and the highest gusts in the state was around 125 mph (201 km / h) . The winds downed about 50 million board feet of trees in the state , many of which fell onto power lines ; much of eastern Massachusetts lost power during the storm . Carol left about $ 15 million in crop damage in the state . The winds destroyed much of the corn crop , about half of the peach crop , and about 1 @.@ 5 million bushels of apples . High winds destroyed the spire of the Old North Church in Boston , which was the location of where the lanterns were hung during Paul Revere 's ride . It was a replacement spire , after a hurricane in 1804 destroyed the original . Heavy damage was reported throughout Boston , and in Wareham , about 1 @,@ 500 people were left homeless . Statewide , 3 @,@ 350 homes were damaged to some degree , and another 800 were destroyed . The hurricane destroyed another 213 buildings and severely damaged 530 . Near the coast , strong storm surges were reported , and a 20 feet (6 @.@ 1 m) storm tide was reported at New Bedford , setting a record . At least 15 deaths were reported in the state , and damage was estimated at $ 175 million .

Carol maintained its intensity as it moved inland , and its winds were strong enough to knock down trees and power lines in New Hampshire . One tree fell onto a car , killing a person , and there were three deaths overall in the state , along with $ 3 million in damage . There was also a death in neighboring Vermont . Carol produced winds of up to 80 mph (130 km / h) in Augusta , Maine . Throughout the state , the winds downed hundreds of trees , some of which damaged houses , wrecked cars , destroyed one building , or fell onto power lines . Fallen trees blocked highways , and one person was injured by a falling tree limb . Downed power lines left several counties without power or telephone services . The winds flattened hundreds of acres of corn in North Livermore , and throughout the state , there was heavy damage to the apple crop . Damage to the apple crop

amounted to $ 1 @.@ 7 million . While moving west of Maine , the hurricane dropped heavy rainfall , including a report of 2 @.@ 15 inches (63 mm) in 12 hours . Along the coast , high waves damaged boats . In Maine , the hurricane killed three people , injured at least eight , and caused $ 10 million in damage , the costliest natural disaster in the state 's history . Carol lost this distinction 10 days later when Hurricane Edna caused $ 15 million in damage in the state .

Rainfall in Canada peaked at 4 @.@ 27 inches (108 mm) in Quebec . In Yarmouth , Nova Scotia , wind gusts peaked at 47 mph (75 km / h) . In Quebec , the extratropical remnants of Carol downed trees and power lines in Montreal from wind gusts as high as 55 mph (89 km / h) . Widespread power outages were reported in New Brunswick and Quebec , and downed trees struck three cars in Saint John , New Brunswick . The storm caused flights to be canceled , and subways were flooded in Montreal . Damage there totaled about $ 1 million (1954 CAD , $ 980 @,@ 000 USD) . Two people were killed , one of whom due to drowning on a sunken barge in Quebec City .

= = Aftermath = =

Governor of Rhode Island Dennis J. Roberts declared martial law for the state after Carol caused heavy damage . In Massachusetts , the National Guard were deployed to six towns to prevent looting . National Guardsmen flew a plane of dry ice from Newark , New Jersey to Boston to assist the widespread areas without power and refrigeration . Widespread areas were without power for days , and in some areas for up to a week , until crews could repair downed lines . Spoiled food due to lack of refrigeration resulted in about $ 1 million in losses . Power crews from elsewhere in the United States arrived to assist in the restoration . Workers quickly removed trees from highways . Damaged factories in Rhode Island prevented employees for working for three weeks after the storm . The steeple of the Old North Church in Boston was rebuilt in 1955 , after residents throughout the country provided $ 150 @,@ 000 in donations . Governor of Maine Burton M. Cross declared a state of emergency for the state . The Small Business Administration declared six counties in Maine as disaster areas . In the days after the storm , President of the United States Dwight Eisenhower declared Massachusetts and Rhode Island as federal disaster areas . The federal government provided financial aid , amounting to $ 1 @.@ 5 million in Massachusetts . The president ordered for troops to assist in the aftermath . The American Red Cross quickly deployed teams to the most affected areas , feeding hundreds of families . About 12 days after Carol struck New England , Hurricane Edna struck eastern Massachusetts , causing an additional $ 40 million in damage and 20 deaths . More disaster aid was provided after the second hurricane .

The high damage caused by Hurricane Carol and other hurricanes in 1954 prompted the United States government to devote research to set up the National Hurricane Research Project . Hurricane Hunters and the Weather Bureau collected data on subsequent hurricanes to determine their structure , as well as attempted to weaken storms with silver iodide via Project Stormfury .

Due to the high damage , the name Carol was removed from the naming list for 10 years . The name was reused in the 1965 season , but was retroactively retired , and it will never again be used for an Atlantic hurricane . Carol was the first Atlantic hurricane name in history to be retired .