

= Tropical Storm Carrie (1972) =

Tropical Storm Carrie was a strong tropical storm that affected the East Coast of the United States in early September 1972 . The third tropical cyclone of the 1972 Atlantic hurricane season , Carrie formed on August 29 from a complex sequence of meteorological events starting with the emergence of a tropical wave into the Atlantic in the middle of August . Tracking generally northward throughout its life , Carrie reached an initial peak intensity as a moderate tropical storm before nearly weakening back into tropical depression status . The storm began to reintensify in a baroclinic environment after turning toward the northwest ; its winds of 70 miles per hour (110 km / h) as it was transitioning into an extratropical system eclipsed the cyclone 's previous maximum strength . The extratropical remnants of Carrie skirted eastern New England before making landfall in Maine on September 4 and dissipating over the Gulf of Saint Lawrence during the next two days .

Carrie had a minimal impact on the East Coast south of New England , limited to increased swells , gusty winds , and light rainfall . The worst conditions occurred over southeastern New England , where wind gusts reached 84 mph (135 km / h) and rainfall exceeded 1 ft (0 @. @ 30 m) . Damage was most severe along and slightly inland from the coast . Thousands of people became stranded on offshore islands of Massachusetts after dangerous conditions created by the storm prompted the suspension of steamship service . Overall damage was generally light , with total monetary losses valued at \$ 1 @, @ 780 @, @ 000 , and four deaths are blamed on the storm .

= = Meteorological history = =

The origins of Tropical Storm Carrie are traced back to a tropical wave ? an elongated area of low atmospheric air pressure ? that emerged from the western coast of Africa on August 15 , 1972 . A relatively strong weather system , the wave progressed westward , but by the time it had reached the Leeward Islands ten days later , it had degenerated substantially . The influence of a nearby upper @-@ level low pressure system caused the disturbance to further deteriorate , and the resultant remnant circulation drifted toward the northwest ; by August 28 , it was situated at a position just offshore southeastern Florida . The low pressure system maintained a cold core and had not yet established itself at the surface . On August 29 , the low began moving northward in response to an approaching trough . For the first time , a low @-@ level circulation center had been identified in association with the system , and the storm became a tropical depression at 1200 UTC while located east of the central Florida peninsula . The depression tracked steadily northeastward as it gradually intensified .

On August 31 , reconnaissance aircraft flying into the cyclone reported maximum sustained winds of up to around 55 mph (89 km / h) . Post @-@ storm reanalysis estimated the depression had strengthened into a tropical storm at around 0000 UTC on August 31 . Operationally , however , it was not recognized as such until 2200 UTC that day , when it was assigned the name Carrie . At the time , the system was located approximately 350 miles (560 km) east of Cape Hatteras , North Carolina . A small storm , Carrie slowed drastically in forward movement as it curved northward . By the time it was identified as a tropical storm in real @-@ time , Carrie had already reached its initial peak intensity with maximum sustained winds of 60 mph (97 km / h) and a minimum central pressure of 1 @, @ 002 millibars (29 @. @ 6 inHg) , and strong wind shear inhibited immediate strengthening as it continue to slow to a drift . On September 1 , Carrie began to weaken , and by early on September 2 , it had dwindled to a minimal tropical storm with winds of only 40 mph (64 km / h) . Satellite imagery indicated that the storm 's center of circulation had become distorted with little or no associated convection . At its weakest , the storm 's highest winds were found far from the center , likely generated more by the increasing pressure gradient in relation to an anticyclone to the north than by the low pressure center itself .

A low pressure system moving through the Mid @-@ Atlantic states pulled Carrie northwest , back toward the United States East Coast , at an accelerated forward speed . Later on September 2 , the storm had begun to show signs of reorganization , including an improved appearance on satellite imagery and the development of some thunderstorm activity , although significant reintensification

was considered unlikely . However , with the advance of a trough embedded in the westerlies , Carrie quickly deepened under the influence of baroclinic processes . While the storm 's maximum sustained winds increased , it also began to shed its tropical characteristics and resemble an extratropical cyclone . Moving once again toward the north @-@ northeast , Carrie was declared extratropical by the National Hurricane Center during the late afternoon on September 2 . In the official Atlantic Hurricane Database , however , Carrie is listed as a tropical cyclone until 1800 UTC on September 3 , at which point it possessed winds of 70 mph (110 km / h) and a central barometric pressure of 993 mb (29 @.@ 3 inHg) . As a result , these data are considered representative of the storm 's peak intensity . Regardless of its status , the storm was a large and intense system as it progressed north and neared New England , generating strong winds and rough surf along the coast . Having fully transitioned into an extratropical system , the storm made landfall near Eastport , Maine on September 4 and slowly weakened as it continued north up the Gulf of Saint Lawrence . The cyclone fully dissipated on September 6 in the Gulf .

= = Preparations and impact = =

The pressure gradient between Carrie and the high pressure area to its north produced gusty northeasterly winds , and by extension high seas . In response , the National Weather Service issued small craft warnings starting on September 1 and extending from Massachusetts to the Carolinas . Gale warnings were posted the next day from southern New Jersey to the coast of central New England , and the small craft warnings were brought north to Maine . Ongoing , as well as the threat of continued heavy rainfall necessitated the issuance of flash flood watches throughout eastern Massachusetts , southeastern New Hampshire , and southern and central Maine on September 3 . Due to rough surf , the beach at Virginia Beach , Virginia was closed to swimmers on August 31 .

= = = Mid @-@ Atlantic = = =

Carrie had minimal effects on the East Coast south of the Mid @-@ Atlantic states , limited to moderate winds and generally light rainfall . Precipitation at Norfolk , Virginia reached 1 @.@ 12 inches (28 mm) between September 1 and 3 , and pressure fell to a modest 1 @.@ 012 mb (29 @.@ 9 inHg) . Sustained winds were recorded at 28 mph (45 km / h) , with only slightly higher gusts , although the Chesapeake Light unofficially reported gusts to near 50 mph (80 km / h) . Damage in the area was minimal with the exception of beach erosion , and tides 2 @.@ 5 feet (0 @.@ 76 m) above normal triggered minor flooding . Moderate rainfall , approaching or reaching 5 in (130 mm) , fell across the southern Delmarva Peninsula . Equally minor effects were felt in the Atlantic City , New Jersey , area , with comparable or even less significant reports of winds and rainfall and damages limited to coastal flooding and beach erosion . Since the adverse weather conditions fell on a portion of the Labor Day weekend , the local resort industry suffered economical losses .

= = = New England and Canada = = =

The brunt of the storm occurred in southeastern New England , particularly coastal Massachusetts , where strong gusts battered the shore . The distribution of winds resulting from the storm more closely resembled that of a nor'easter than a cyclone of tropical origin , in which the wind field would typically be concentrated closer to its center . Instead , the strongest winds remained well removed from the center of circulation , but were nonetheless severe ; gusts reached 84 mph (135 km / h) at Point Judith , Rhode Island , and 69 mph (111 km / h) on Cape Cod , Massachusetts . Sustained winds throughout the region were generally below 50 mph (80 km / h) . In Boston , Massachusetts , winds gusted to 46 mph (74 km / h) . The storm brought down trees and powerlines , blocking roads and damaging property . Structural damage was also evident , especially to buildings under construction , and an entire cottage in Rockland , Maine was blown off its foundation .

Rainfall in southeastern New England was heavy , locally exceeding 10 in (250 mm) . On the island of Martha 's Vineyard , a storm total of 12 @. @ 5 in (320 mm) was reported , the highest known precipitation sum resulting from Carrie . The most torrential rains were usually confined to within 70 mi (110 km) of the coast . The deluge swelled streams , inundated cellars , and washed out a railroad near Eagle Lake , Maine , derailing a train . Along the coast , rough surf caused beach erosion and swamped hundreds of small craft . On September 3 , choppy conditions forced the suspension of steamship services to and from the mainland and the islands of Martha 's Vineyard and Nantucket . Thousands of tourists and seasonal residents became stranded on the islands , creating what officials described as a " logistical problem " . During the height of the storm , around 20 @, @ 000 Narragansett Electric Company customers lost power , with scattered power outages reported elsewhere throughout New England .

In general , damage from Tropical Storm Carrie and its extratropical remnants was light . Total monetary damage was estimated at \$ 1 @, @ 780 @, @ 000 in 1972 terms , of which \$ 1 @, @ 200 @, @ 000 in losses was inflicted on Massachusetts . Losses totaled \$ 350 @, @ 000 in Rhode Island , \$ 200 @, @ 000 in Maine , and \$ 30 @, @ 000 in New Hampshire . Four fatalities were attributed to the storm : two in the aftermath of boating accidents in Massachusetts , and two due to rough surf along the coast of Maine . In the aftermath , a local disaster area was declared for the town of Plymouth . The weakening remnants of Carrie produced strong winds throughout New Brunswick on September 5 and 6 , peaking at 69 mph (111 km / h) . In Saint John , where wind gusts reached 49 mph (79 km / h) , there were reports of downed telephone wires and trees . Widespread power outages occurred throughout communities in the province . Only light rain fell in Saint John , and no flooding was evident . The storm damaged or destroyed numerous boats in Charlo , New Brunswick .

Oceanic currents produced by the storm washed cells of the harmful alga *Alexandrium fundyense* south and west into the coastal waters of New England . The alga releases toxins that cause shellfish poisoning and is native to the Bay of Fundy . Several weeks after the storm , a massive bloom of the alga occurred offshore the northeastern United States for the first time , and the species bloomed every year post @- @ Carrie .