

= 1933 Chesapeake ? Potomac hurricane =

The 1933 Chesapeake ? Potomac hurricane was among the most damaging hurricanes in the Mid @-@ Atlantic states in the eastern United States . The sixth storm and third hurricane of the very active 1933 Atlantic hurricane season , it formed in the eastern Atlantic , where it moved west @-@ northwestward and eventually became a Category 4 on the Saffir @-@ Simpson hurricane wind scale . A strong ridge over New England allowed a continued northwest course , bringing the storm south of Bermuda and later toward the middle coast of the eastern United States . Advance warning allowed hundreds of people to evacuate ahead of the hurricane making landfall . It did so in northeastern North Carolina on August 23 with winds of about 90 mph (150 km / h) . Soon after , the eye crossed over Norfolk , Virginia , the first time that happened since 1821 . The hurricane weakened into a tropical storm over northern Virginia shortly before passing near Washington , D.C. , becoming the worst tropical cyclone there since 1896 . Curving northward , the storm moved through Pennsylvania and New York before losing tropical characteristics on August 25 . Now extratropical , the former hurricane moved across Atlantic Canada , dissipating on August 28 .

Across the eastern United States , the hurricane left widespread damage amounting to over \$ 40 million and causing 47 deaths . Although the storm struck North Carolina , damage in the state totaled only about \$ 250 @,@ 000 , largely to crops and transport . Along the Chesapeake Bay , the storm produced 100 @-@ year flooding from its storm surge , setting records that remained for over 80 years . In Virginia , flooding covered downtown portions of Norfolk in the southeast and Alexandria in the north . Damage in the state was estimated at \$ 17 @.@ 5 million . Similarly heavy damage occurred in Maryland , including over \$ 7 million to crops . High waves along the coast eroded beaches and created a new inlet at Ocean City . The highest rainfall associated with the hurricane was 13 @.@ 28 in (337 mm) at York , Pennsylvania . In the state , the rains flooded several rivers which forced thousands to evacuate . In neighboring New Jersey , high waves wrecked boats and destroyed a fishing pier , while in New York , flooding caused traffic jams . In Atlantic Canada , heavy rainfall assisted firefighters in combating wildfires , and the associated winds caused isolated power outages .

= = Meteorological history = =

On August 13 , a tropical depression developed near the west coast of Africa , southeast of Cape Verde , with an associated closed circulation . Based on observations from a nearby ship , it is estimated the depression quickly intensified into a tropical storm while moving generally to the west @-@ northwest . For several days the storm continued this general trajectory , eventually shifting more to the northwest . Based on interpolation of reports , it is estimated the storm intensified into a hurricane on August 16 while halfway between Africa and the Lesser Antilles . The Weather Bureau began tracking the system on August 18 . Later that day , a ship reported a pressure of 948 mbar (28 @.@ 0 inHg) , suggesting winds of 135 mph (215 km / h) . This made the hurricane a Category 4 on the Saffir @-@ Simpson hurricane wind scale . Another ship report on August 20 indicated a pressure of 940 mbar (28 inHg) while reporting hurricane winds , suggesting peak winds of 140 mph (230 km / h) .

After remaining near peak intensity for three days , the hurricane began steadily weakening while curving more to the west @-@ northwest , a rare track for the region due to steering from a ridge over New England . On August 21 , the storm passed about 150 mi (240 km) southwest of Bermuda . At 1000 UTC on August 23 , the hurricane made landfall along the northern Outer Banks of North Carolina , near Nags Head , with a pressure of 963 mbar (28 @.@ 4 inHg) . Based on the steady weakening , coastal observations , and a larger than normal size , landfall winds were estimated at 90 mph (150 km / h) . A few hours later , the hurricane made another landfall on the North Carolina mainland after crossing the Albemarle Sound . While the hurricane continued to the northwest , the eye briefly moved over Norfolk , Virginia , for the first time since the 1821 Norfolk and Long Island hurricane . Early on August 24 , the hurricane weakened into a tropical storm while passing near Washington , D.C. Curving to the north , the storm crossed Pennsylvania and into New

York , where it weakened further into a tropical depression . On August 25 , the former hurricane turned to the east near the Canadian border , and after interacting with a cold front , became extratropical . It emerged from Maine and briefly re-intensified , moving across southern Nova Scotia with gale force winds . On August 28 , the circulation dissipated to the south of Newfoundland .

= = Preparations and impact = =

The hurricane first affected Bermuda when it passed to the south . Winds at St. George 's reached 64 mph (103 km / h) . High waves along the coast prevented boats from docking .

Early on August 21 , the Weather Bureau issued storm warnings from Cape Hatteras to Boston , Massachusetts . As the hurricane approached land , the warnings were extended southward to Southport , North Carolina . In Norfolk , Virginia , most ships either remained at port or sought shelter due to advance warning . Residents were advised to evacuate in Ocean View , Virginia Beach , and Willoughby Spit , and about 350 people left their houses in Virginia Beach . Along the coast , the United States Coast Guard rescued more than 200 people , many of whom due to capsized boats . A 1993 article published in the Monthly Weather Review considered the storm to have been " one of the most severe storms that has ever visited the Middle Atlantic coast . " Flooding affected a larger portion of the northeastern United States than any other hurricane in the 1900s after Hurricane Agnes in 1972 . The Federal Emergency Management Agency later used high water levels from the storm as a 100 -year event for the Chesapeake Bay region . The next storm to approach the storm surge levels was Isabel in 2003 , which was lower in most locations in Virginia , although higher in Washington , D.C. and Baltimore due to sea level rise . This hurricane caused damage from North Carolina through New Jersey , due to the combination of high winds and storm tides , and left 47 people dead overall .

= = = North Carolina and Virginia = = =

When the hurricane made landfall in the Outer Banks , it produced winds of 76 mph (122 km / h) at Cape Hatteras . The winds caused crop damage as far inland as Granville County . Across the region , the storm downed power lines , highways , boats , and houses , and overall damage in the state was around \$ 250 million .

As the hurricane moved into Virginia , winds were as strong as 82 mph (131 km / h) at Cape Henry , while Norfolk reported winds of 70 mph (113 km / h) . The latter city reported a record high tide of 9 ft (3 m) above normal at Sewell 's Point , which flooded the downtown section with 5 ft (1.5 m) of water . Water levels were 5 to 8 ft (1.5 to 2.4 m) higher than any previous high water mark in Newport News and most of Fort Eustis was flooded . In Hampton the storm surge flooded Langley Air Force Base , swamped homes and businesses , wrecked boats , and destroyed fishing piers . Rainfall in Chesapeake reached about 10 in (250 mm) , and reached about 7 in (180 mm) in Norfolk . Flooding near Norfolk damaged crops , and after its downtown section was flooded , residents were forced to travel by boat . When the flood levels dropped , many fish were left behind in the streets . High water levels of around 4 ft (1.2 m) along the York River destroyed buildings at Gloucester Point . In Virginia Beach , the storm knocked down about 600 trees , many of them about 100 years old , and over 79 million people lost telephone service .

Due to advance warning , there was minimal damage to shipping in the region . However , high waves damaged the steamer Madison with 90 people on board and caused it to drift off Cape Charles , which necessitated rescue from the Coast Guard . Inland flooding occurred along the James River as far west as Richmond , where damage was limited to downed trees and broken windows . The pier of the Jamestown Ferry was washed out in Surry and a marina at Jordan Point near Hopewell was wrecked after the river reached the highest level on record . A powerful storm surge moved up the Chesapeake Bay and flooded waterfront locations . At Colonial Beach along the Potomac River , the surge flooded the town with 4 ft (1.2 m) of water and wrecked a local

amusement park . The Potomac in Alexandria was at its highest level since 1899 , causing floods 8 ft (2 @. @ 4 m) deep along U.S. Route 1 , and flooding the Old Town section . High winds in the city caused power outages , and flooding along the Cameron Run washed out a bridge . The combination of rain and winds damaged crops in Fairfax and Loudoun counties , mainly to corn and peaches . Statewide , the storm caused \$ 5 @. @ 25 million in crop damage , largely to corn and tobacco . Damage in the state was estimated at \$ 17 @. @ 5 million , and there were 15 deaths . After the storm , about 350 people helped clear debris from the streets of Norfolk .

= = = Maryland north = = =

Farther north , it is estimated the storm produced hurricane @-@ force winds in portions of Maryland . Along the coast , high waves eroded about 2 sq mi (5 @. @ 2 km²) of beaches in Maryland and another 1 sq mi (2 @. @ 6 km²) in Delaware . High waves created an inlet that turned Assateague into an island . The storm damaged or destroyed several hotels in the region . Power , telephone , and telegraph outages occurred from Cape Charles through Delaware . In Baltimore , 7 @. @ 62 in (194 mm) of precipitation fell in 24 hours , setting a record and causing flooding . The storm surge wrecked a steamboat pier and promenade at Chesapeake Beach , and damaged or destroyed 70 houses in neighboring North Beach . In Cheverly , flooding caused nine cars of a train to derail , killing four people . Statewide , the storm caused about \$ 7 million in crop damage , mostly to tobacco , tomato , and corn . The high tides caused \$ 3 million in damage to the fishing industry , having damage or destroyed many boats and docks . There was about \$ 90 @, @ 000 worth of damage to the United States Naval Academy in Annapolis , after docks were damaged . Throughout the state , the hurricane caused about \$ 10 million in property damage , with another \$ 1 @. @ 1 million to federal properties , about \$ 960 @, @ 000 in transportation damage , and \$ 364 @, @ 000 in utility damage .

In neighboring Delaware , road damage was about \$ 150 @, @ 000 , after three bridges were wrecked along DuPont Highway . Rainfall in the state reached 13 @. @ 24 in (336 mm) in Bridgeville . In Washington , D.C. , the storm dropped 6 @. @ 39 in (162 mm) of rainfall , at the time the highest on record for a single day total . High winds knocked down trees and destroyed the roofs of several houses . Along the Anacostia River , flooding surpassed a seawall , and traffic was disrupted when the Benning Bridge was flooded with 2 ft (0 @. @ 61 m) of water . The Washington @-@ Hoover Airport was also flooded . Damage in the nation 's capital was the worst since a tropical storm in 1896 . The highest rainfall associated with the hurricane was 13 @. @ 28 in (337 mm) near York , Pennsylvania . On August 24 , the minimum pressure in Philadelphia dropped to 996 mbar (29 @. @ 40 inHg) , which was the lowest on record in the month of August at the time . Wind gusts in the city reached 42 mph (68 km / h) . In the surrounding area , winds and rainfall caused \$ 1 million in damage , mostly to crops and houses , and there were four deaths . Rainfall caused the worst flooding in the Lehigh Valley since 1902 . In York County , floods destroyed 47 bridges , while in York proper , about 3 @, @ 000 people evacuated along the swollen Codorus Creek .

Hurricane @-@ force winds potentially affected portions of Delaware and southern New Jersey . In Atlantic City , New Jersey , winds reached 76 mph (122 km / h) at a height of 171 ft (52 m) , which is 67 mph (107 km / h) at sea @-@ level . At the time , this was the highest wind report for the station in the month of August . Rainfall in Atlantic City totaled 8 @. @ 12 in (206 mm) , including 2 @. @ 25 in (57 mm) that fell in an hour on August 20 , which was the monthly average . Two people drowned along the Jersey Shore due to high waves , and the storm capsized nine boats . The waves destroyed a 300 ft (91 m) long fishing pier in Cape May . High winds damaged the boardwalk while streets were flooded in Atlantic City , and there was about \$ 3 million in damage . The storm spawned a tornado in Wildwood . At Picatinny Arsenal , residents and members of the military helped prevent a dam from breaking . Sustained winds of around 35 mph (55 km / h) were observed across northern New York , while the top of the Empire State Building reported a gust of 90 mph (140 km / h) . Heavy rainfall in the state increased water levels along streams , causing one person to drown at Mount Tremper . After a dam broke , 190 people at Godeffroy were stranded

until they were rescued by a fire crew . A power outage during the storm caused the Statue of Liberty torch to extinguish for the first time since 1929 . Streets and basements of New York City were flooded after the heavy rainfall . The combination of flooding and fallen trees caused heavy traffic jams .

The former hurricane passed near southern Quebec as a tropical depression , and later crossed southern Nova Scotia as an extratropical cyclone . Along Lake Ontario , winds reached 51 mph (81 km / h) , and in Montreal , winds reached 21 mph (33 km / h) . After a dry summer , the storm 's accompanying rainfall was beneficial , reaching 4 @. @ 4 in (112 mm) in Fredericton , New Brunswick and 2 in (50 mm) in Halifax , Nova Scotia . The rains helped farmers in Ontario and assisted firefighters in New Brunswick and Nova Scotia . In Montreal , 2 @. @ 4 in (60 mm) of rainfall flooded a tunnel . Gusty winds knocked down power lines in portions of Quebec , Nova Scotia , and Nova Scotia . Overall effects were minor , limited to some utility damage and delays for shipping .