

= Hurricane Ernesto ( 2006 ) =

Hurricane Ernesto was the costliest tropical cyclone of the 2006 Atlantic hurricane season . The sixth tropical storm and first hurricane of the season , Ernesto developed from a tropical wave on August 24 in the eastern Caribbean Sea . Ernesto first affected the northern Caribbean , reaching minimal hurricane status near Haiti before weakening and moving across eastern Cuba as a tropical storm . Despite initial predictions for it to track through the eastern Gulf of Mexico as a major hurricane , Ernesto moved across eastern Florida as a weak tropical storm . After turning to the northeast , it re @-@ intensified and made landfall on August 31 on the North Carolina coast just below hurricane status . Late the next day , Ernesto became extratropical after entering southern Virginia . The remnants spread moisture across the northeastern United States before dissipating over eastern Canada on September 4 .

The deaths of at least eleven people were attributed to Ernesto , which dumped heavy rains throughout its path , especially in the Mid @-@ Atlantic region of the United States . While moving across the Caribbean , it affected several countries , and initially Ernesto posed a threat to the Gulf Coast of the United States around the one @-@ year anniversary of Hurricane Katrina . Damage in Virginia was estimated at over \$ 118 million ( 2006 USD ) , prompting the declaration of a federal disaster area . Total damage in the United States was estimated at \$ 500 million ( 2006 USD ) .

= = Meteorological history = =

On August 18 , a tropical wave moved off the coast of Africa . It tracked westward , and its convection began organizing and concentrating on August 22 . The next day , convection increased along the wave axis , and Dvorak classifications from the Tropical Analysis and Forecast Branch of the National Hurricane Center began at 1200 UTC on August 23 . As it approached the Lesser Antilles , a surface low developed , and with the confirmation of a closed low @-@ level circulation from the Hurricane Hunters , it is estimated the system developed into Tropical Depression Five on August 24 about 50 mi ( 80 km ) north @-@ northwest of Grenada .

Located to the south of a ridge across the southwestern Atlantic Ocean , the depression tracked west @-@ northwestward through an area of dry air and westerly wind shear . Despite the shear , convection intensified near the center as banding features improved , and on August 24 , the depression intensified into Tropical Storm Ernesto . Convection deepened and expanded , though wind shear displaced the low @-@ level center to the west of the convection . By August 26 , the structure had become much better @-@ defined , and within five days Ernesto was forecast to be located about 275 mi ( 445 km ) south of the Gulf Coast of the United States as a powerful hurricane . The center reformed under the deepest convection after wind shear decreased , and at the same time outflow increased in all quadrants . Turning northwestward , a small eye formed , and early on August 27 Ernesto attained hurricane status about 95 mi ( 200 km ) south @-@ southwest of the border between Haiti and the Dominican Republic .

Upon becoming a hurricane , Ernesto was believed to be undergoing rapid intensification . However , the small inner core deteriorated as the circulation interacted with the mountainous terrain of southwest Haiti , and it quickly weakened back to tropical storm status . The center became broad and ill @-@ defined , though it was forecast to re @-@ intensify to hurricane status before striking Cuba . It continued to weaken due to land interaction , and early on August 28 Ernesto passed just offshore of the southwestern tip of Haiti with winds of 45 mph ( 70 km / h ) . Hindered by increased wind shear from an upper @-@ level low over the Bahamas , the storm weakened further before striking just west of Guantánamo Bay in Cuba as a minimal tropical storm . With very warm water temperatures and a favorable upper @-@ level environment , one forecast remarked the possibility of Ernesto strengthening greatly over the Straits of Florida and eastern Gulf of Mexico to hit western Florida as a major hurricane . Ernesto remained over land as a minimal tropical storm for about 18 hours before reaching the Straits of Florida . Convection gradually increased over the warm waters , though Ernesto failed to strengthen significantly due to its disrupted inner core . An eastward @-@ moving high pressure system over the southeastern United States allowed a continued northwest

movement , and at 0300 UTC on August 30 the storm struck Plantation Key in the upper Florida Keys with winds of 45 mph ( 70 km / h ) . Two hours later , Ernesto made landfall on the Florida mainland in southwestern Miami @-@ Dade County .

Moving through a weakness in the subtropical ridge , the storm turned to the north through the state . Operationally , the National Hurricane Center downgraded Ernesto to tropical depression status while over the state , though post @-@ analysis indicated the system maintained tropical storm status . Ernesto retained a well @-@ organized cloud pattern over land , and after emerging over the Atlantic Ocean near Cape Canaveral , convection again increased and began wrapping into the circulation . Upon reaching the Atlantic Ocean , Ernesto accelerated north @-@ northeastward ahead of an approaching deep layer trough . The convection increased as the storm strengthened over warm waters , and late on August 31 Ernesto attained an intensity of 70 mph ( 110 km / h ) while located about 170 mi ( 270 km ) south @-@ southwest of Wilmington , North Carolina . Shortly prior to moving ashore , an eye began to develop , and early on September 1 the storm made landfall on Oak Island , North Carolina very near the threshold between tropical storm and hurricane status . The National Hurricane Center remarked the possibility that Ernesto could have been a hurricane at landfall , due to the possibility that the strongest maximum wind was not sampled .

After landfall the storm rapidly weakened , and about eight hours after moving ashore , Ernesto deteriorated to tropical depression status . Interacting with a pre @-@ existing frontal zone that extended eastward through Virginia , Ernesto quickly lost its tropical characteristics , and late on September 1 it transitioned into an extratropical cyclone . It re @-@ intensified to a gale over the Mid @-@ Atlantic states , only to weaken to an extratropical depression near Pennsylvania . With a large high pressure area to its east , the remnants turned to the north @-@ northwest , reaching southern Ontario on September 3 . After turning northeastward , the extratropical remnants of Ernesto were absorbed into a larger storm over Quebec on September 4 .

= = Preparations = =

= = = Caribbean = = =

About nine hours after Ernesto became a tropical storm , the government of Haiti issued a tropical storm watch from its border with the Dominican Republic to the southwestern tip of the country . As the storm strengthened , the watch was replaced with a tropical storm warning , and about 15 hours prior to its closest approach the warning was replaced with a hurricane warning . Several low @-@ lying citizens in Gonaïves were evacuated after local meteorologists anticipated up to 20 inches ( 500 mm ) of rain in some mountainous areas . Additionally , authorities advised residents in shantytowns near the ocean to evacuate to emergency shelters .

Jamaican officials issued radio and television advisories for residents in low @-@ lying areas , urging them to be ready and evacuate if necessary . The Jamaican government opened all shelters on the island and placed its armed forces on standby . Long lines for storm supplies were reported at local businesses ahead of the storm as residents rushed to obtain supplies in preparation for Ernesto 's onslaught . When a tropical storm warning was put in effect for Jamaica and the central Bahamas , cruise ship companies indicated they were diverting several liners to avoid the storm .

Hurricane warnings were put in effect for six provinces in southeastern Cuba , where significant precipitation ranging up to 20 inches ( 500 mm ) across the mountainous south was expected as the center of Ernesto tracked slowly across Cuba . Cuban officials evacuated 300 @, @ 000 people and brought its fishing fleet into harbors . The Cuban state television broadcast extensive warnings about the storm , urging precautions . Cattle were moved to higher ground , tourists were evacuated from hotels in the southeastern province of Granma , and baseball games scheduled for the evening of August 27 in Havana were played earlier in the day . The threat of the storm caused domestic flights to be canceled .

= = = United States = = =

On August 26 , about four days prior to Ernesto striking the state , the government of Florida activated its Emergency Operations Center , while the National Guard was placed on standby , following a " warning order " to its commanders . On August 27 , the Governor of Florida , Jeb Bush , issued a state of emergency because of the high risk of impact from Ernesto on the state . Officials issued a mandatory evacuation order for all visitors and non @-@ residents in the Florida Keys about three days before the storm passed through the area . Mandatory evacuations were later issued for mobile homes and low @-@ lying areas of Monroe , Broward , St. Lucie , and Martin counties ; voluntary evacuations were also issued for barrier islands in Miami @-@ Dade and Palm Beach counties . On August 28 , forecasters issued a hurricane watch for southern Florida through the Florida Keys . When Ernesto was downgraded to tropical storm status , Governor Jeb Bush urged Florida residents to continue preparations and not wait until it regained hurricane status , as it was forecast to do by the National Hurricane Center . At least 30 shelters were opened , and tolls on four turnpike were lifted . Several schools were closed across southern Florida . The threat of the storm caused NASA to postpone the launch of Space Shuttle Atlantis at Kennedy Space Center to avoid risking damage from the storm .

The storm was initially expected to move into the Gulf of Mexico and affect people recovering from hurricanes Katrina , Rita , and Wilma in the previous year , which caused hundreds of billion in damage and left thousands of houses damaged or destroyed . There were initial fears that Ernesto would make landfall days after Hurricane Katrina 's one @-@ year anniversary , and that the levees in New Orleans might not be able to withstand a strong storm surge . Officials in New Orleans prepared buses and trains in the event that people needed to evacuate but could not . A possible path over the Gulf of Mexico oil fields , as well as tension with Iran , caused the price of oil to increase , although the prices receded when the threat of the storm receded .

On August 29 , a hurricane watch was issued from the mouth of the Altamaha River in Georgia to Cape Fear , North Carolina . The next day , the watch was replaced with a tropical storm warning , which was later extended to Currituck Beach Light in Corolla , North Carolina before the storm moved ashore . In South Carolina , voluntary evacuations occurred in Charleston and Colleton counties .

On August 31 before the storm 's arrival , Virginia Governor Tim Kaine declared a state of emergency , putting the Virginia National Guard and state agencies on alert and opening the state 's new Emergency Operations Center in suburban Richmond . North Carolina Governor Mike Easley activated 200 National Guard troops and had other emergency teams on standby . Washington D.C. and parts of Maryland and Delaware were put on a Coastal Flood Watch and Flash Flood Watch by the National Weather Service in preparation for Ernesto .

= = Impact = =

= = = Caribbean = = =

Shortly before Ernesto developed into a tropical cyclone , the precursor tropical wave produced sustained winds of 37 mph ( 60 km / h ) in Barbados in association with a convective downburst . On the island , the winds downed some trees , and some flooding was reported . Strong winds and rough seas damaged six fishing boats in the southern portion of the island . Squalls in Trinidad left about 12 people injured after winds destroyed several tents . Also on Trinidad , the system produced widespread flooding , which resulted in some crop damage .

Puerto Rico experienced peripheral rainfall from the cyclone as it tracked through the eastern Caribbean Sea . A two @-@ day storm total of 4 @.@ 69 inches ( 119 mm ) occurred in Sabana Grande .

In the Dominican Republic , heavy rainfall caused river flooding and mudslides , resulting in damage to several houses . The highest rainfall report noted was 7 @.@ 01 inches ( 178 mm ) at Barahona . The rainfall also downed trees , and caused flooding to enter over 400 houses near

Santo Domingo , which forced the evacuation of over 1 @, @ 600 people . In Haiti , the storm caused heavy rainfall of over 11 inches ( 300 mm ) and strong winds , causing flooding and destroying 13 homes on the island of La Gonave . In Port @- @ au @- @ Prince , rainfall severely damaged a bridge , isolating the southern portion of the region . Across the country , 59 homes were damaged , of which six destroyed , and a total of five deaths were reported .

Ernesto produced heavy rainfall in eastern Cuba , with Guantanamo reporting 3 inches ( 75 mm ) in four hours . Gusty winds left some towns in the Camagüey Province without power , though overall damage was minor . There were no reports from Cuba of deaths , injuries , or major damage attributed to the storm .

= = = Southeastern United States = = =

In the Florida Keys , Ernesto produced tropical storm force wind gusts and light rainfall , causing minor flooding . Upon making landfall in southern Florida , the storm produced a storm tide of about 1 foot ( 0 @. @ 3 m ) above astronomical tide levels , though no beach erosion was reported . Winds were fairly minor across the state , reaching 40 mph ( 64 km / h ) at a station on Lake Okeechobee . Ernesto dropped heavy rainfall across southwest Florida , with a state maximum of 8 @. @ 72 inches ( 221 mm ) recorded at South Golden Gate . The rainfall caused the Fisheating Creek to overflow , and some flooding also occurred in portions of Collier County . Floodwaters entered at least 13 homes in Palmdale . The storm resulted in more than 150 canceled flights at Orlando International Airport , stranding several travelers . While moving through the state , Ernesto spawned two F0 tornadoes in Osceola County . One person died in each in Broward and Miami @- @ Dade counties from traffic accidents ; the deaths are considered indirectly related to Ernesto . Overall damage in the state was minor .

Passing to the east of Georgia , the storm produced light winds and rainfall near the coast . In South Carolina , the storm brought over 7 inches ( 175 mm ) of precipitation to North Myrtle Beach , which caused ponding on roadways . Winds were generally light , peaking at around 35 mph ( 55 km / h ) , which caused isolated power outages ; about 2 @, @ 700 people across the state lost power . Near Charleston , the passage of the storm caused moderate flooding that left some roads closed . No significant damage was reported in the state .

Tropical Storm Ernesto made landfall in Brunswick County in the southern portion of North Carolina , producing a moderate storm surge along the Pamlico River which forced several evacuations . The storm surge reached 4 ? 6 feet ( 1 @. @ 2 ? 1 @. @ 8 m ) in Beaufort County , flooding many homes and businesses . Just east of where it moved ashore , the storm dropped 14 @. @ 6 inches ( 371 mm ) of rainfall in Wrightsville Beach ; this was the highest rainfall total associated with Ernesto in the United States . Much of the eastern portion of the state received over 3 inches ( 75 mm ) of precipitation , and in the northeastern portion of the state , the precipitation caused flash flooding . The rainfall caused freshwater flooding in low @- @ lying areas , as well as along major and minor roadways ; the floodwaters left a 12 mi ( 19 km ) portion of Interstate 40 closed in Duplin County . Subsequent to the storm 's passage , the rainfall caused severe river flooding , with many streams and rivers overflowing their banks for several days . The Northeast Cape Fear River at Chinquapin remained in major flood stage for a week , flooding about 300 homes .

The storm moved ashore just below hurricane strength , though wind gusts near the coast were generally around 40 ? 60 mph ( 65 ? 95 km / h ) . Gusts peaked at 62 mph ( 100 km / h ) in Wilmington , and the strong winds downed trees and power lines across the coastal region ; about 69 @, @ 000 people were left without power . Minor property damage was caused by three tornadoes spawned by the storm in eastern North Carolina . The passage of the storm caused a traffic fatality in the state . Overall damage was estimated at \$ 80 million ( 2006 USD ) , all but \$ 4 million of which from crop damage .

= = = Mid @- @ Atlantic States and Canada = = =

Ernesto transitioned into an extratropical cyclone as it entered southern Virginia , bringing heavy

rainfall which peaked at 10 @. @ 6 inches ( 270 mm ) in Wakefield . The precipitation caused flash flooding , which closed several roads but did not cause serious damage . The interaction between Ernesto and a strong ridge over the western Atlantic produced a tight pressure gradient , resulting in strong winds across the state ; wind gusts peaked at 87 mph ( 141 km / h ) at a station near the mouth of the York River . Strong winds downed numerous trees , including in Gloucester where two people died after a tree hit their home . The winds caused widespread power outages ; Dominion Virginia Power reported about 600 @, @ 000 customers as losing power some time during the storm . The storm produced a storm tide of 6 @. @ 12 feet ( 1 @. @ 86 m ) near Virginia Beach ; along the Chesapeake Bay , tidal flooding in combination with strong waves damaged boats and piers , and left a few homes flooded . Storm surge flooding also occurred along the Potomac River , with heavy beach erosion , light property damage , and flooded roadways reported in Alexandria . Across the state , the storm damaged or destroyed 609 houses , with damage totaling at least \$ 118 million ( 2006 USD ) . Seven people were killed in the state , of which two directly to the storm ; three of the deaths were from traffic accidents , and one person died from carbon monoxide poisoning , due to operating a power generator inside after a power outage .

In Washington , D.C. , the storm produced wind gusts of up to 45 mph ( 75 km / h ) which , in combination with heavy rainfall , resulted in a few downed tree branches and power lines . High tides left moderate damage in St. Mary 's County , Maryland of about \$ 4 @. @ 4 million ( 2006 USD ) , with the damage to trees and power lines considered worse than the impact in Hurricane Isabel in 2003 . In neighboring Charles County , storm surge flooding forced the evacuations of houses along the waterfront . The interaction between Ernesto and a high pressure area over eastern Canada produced high winds , heavy rainfall , tidal flooding , and high waves across the Mid @- @ Atlantic and New England . In Delaware , the winds left 151 @, @ 000 people without power , and the adverse conditions canceled several Labor Day Weekend events . A buoy in the Delaware Bay recorded a record @- @ high wave height of 22 @. @ 3 ft ( 6 @. @ 8 m ) . In southern New Jersey , 80 mph ( 130 km / h ) winds left over 200 @, @ 000 buildings without power , while high waves flooded or closed several roads and bridges . Further north , between 2 @- @ 4 inches ( 50 ? 100 mm ) of rain fell across Pennsylvania and New York . In Pennsylvania , there were two deaths . A seven @- @ year @- @ old boy died at a hospital , after a tree limb fell on him . A man was trying to rescue his golden retriever from a drainage steam , while he was sucked into an outflow pipe , and was found dead after being pulled out of a manhole . The rain in New York caused delays in the play at the 2006 U.S. Open , and washed out a whole day 's play .

The extratropical remnants of Ernesto moved across southern Ontario , dropping moderate rainfall of up to 2 @. @ 1 inches ( 54 mm ) . Wind gusts reached 37 mph ( 60 km / h ) near Toronto , and the winds in combination with the rainfall caused power outages when lines snapped . Hundreds were left without power , though the outages were quickly restored .

= = Aftermath = =

On September 22 , following a request from Virginia governor Tim Kaine , President George W. Bush declared 19 counties in Virginia as disaster areas , along with the cities of Richmond and Poquoson . The declaration allocated federal funding to assist in paying for debris removal and the rebuilding of public infrastructure damaged by Ernesto 's flooding , including roads , parks , and government buildings . The city of Newport News and four additional counties were added later in the areas eligible for federal funding . In all , FEMA provided about \$ 7 @. @ 3 million ( 2006 USD ) in assistance . Although the state of Virginia applied for individual assistance , the federal government denied the request .

Due to debris and waste being carried into waterways by flooding from Ernesto , Virginia officials closed the Chesapeake Bay to shellfishing for four days from the Chesapeake Bay Bridge @- @ Tunnel to the mouth of the Potomac River . In Richmond , officials condemned 70 homes , prompting city workers to establish temporary homes . By five days after the storm 's passage through the state , most of the 600 @, @ 000 people who experienced power outages had their electricity restored . Dominion Resources 's Tidewater Virginia area was among the most affected ,

requiring 2 ? 3 days to restore all areas . By two days after the storm moved through the area , all major roadways were opened , though secondary roadways took longer to be cleared from debris . Outside of Virginia , the Emergency Operation Centers in Pennsylvania , Delaware , and the District of Columbia were closed . Power crews worked to restore electricity to the affected areas across the region .