= Hurricane Irene (1999) =

Hurricane Irene was a hurricane that produced somewhat heavy damage across southern Florida during the 1999 Atlantic hurricane season . The ninth tropical storm and the sixth hurricane of the season , Irene developed in the western Caribbean Sea on October 13 from a tropical wave . It moved northward , hitting western Cuba before attaining hurricane status . Irene struck Florida as a Category 1 hurricane , moved across the state , and moved northward over the Gulf Stream . It approached the Carolinas but remained offshore . Irene turned eastward , and rapidly intensified to reach Category 2 hurricane status before becoming extratropical due to cooler waters . The hurricane first produced heavy rainfall across western Cuba , causing four deaths and damage . Irene was a wet Florida hurricane in October , similar to many hurricanes of the 1930s and 1940s . It later dropped 10 to 20 inches (255 to 510 mm) of rainfall in the Miami metropolitan area , causing urban flooding unseen since Hurricane Dennis in 1981 . Despite being only a Category 1 hurricane , Irene caused eight indirect deaths and $ 800 million (1999 USD) in damage across Florida .

The hurricane produced flooding and caused one death in the northwestern Bahamas . In North Carolina and Virginia , Irene produced heavy rainfall of over 10 inches (255 mm) , adding more flooding after previous Hurricanes Dennis and Floyd . The flooding closed many roads , and caused rivers to crest past their banks , though damage in the area was relatively minor .

= = Meteorological history = =

A broad area of low pressure formed over the western Caribbean Sea on October 8 , and it persisted until October 11 , when a tropical wave reached the area and caused the convection to organize , resulting in the development of a low @-@ level circulation . Convection increased and organized around the circulation 's center late on October 12 , and the system organized into Tropical Depression Thirteen on October 13 off the north coast of Honduras . The depression continued to organize over the favorable conditions present in the Caribbean Sea , and attained tropical storm status later on October 13 , when it was assigned the name Irene . Operationally , the system remained a tropical wave until it already reached tropical storm strength .

Tropical Storm Irene strengthened as it moved northward , and reached maximum sustained winds of 70 mph (115 km / h) early on October 14 . Operationally , Irene was upgraded to a hurricane on October 14 , although later analysis after the hurricane season indicated it remained a tropical storm until later . Irene continued to move towards the north @-@ northeast , crossed over the western portion of the Isla de la Juventud as a strong tropical storm , and hours later , it struck mainland Cuba near Batabano . The storm was able to strengthen further over the Florida Straits , and Irene attained hurricane status on October 15 . It passed over Key West , turned more to the north @-@ northeast , and struck mainland Florida at Cape Sable as an 80 mph (130 km / h) hurricane .

Irene entered the Atlantic Ocean near Jupiter , Florida early on October 16 , still as a Category 1 hurricane . It turned to the north , remained a hurricane despite little convection , then turned to the northeast in response to an approaching upper @-@ level trough . Just offshore , Irene moved parallel to the coastlines of South Carolina and North Carolina on October 17 . On October 18 , as it interacted with very warm ocean waters and the upper level trough , Irene rapidly intensified , reaching peak winds of 110 mph (175 km / h) with a pressure of 952 mbar , a Category 2 hurricane . Despite its strength , the circulation was very asymmetrical , and the convection was not particularly organized . The hurricane continued to accelerate to the northeast , steadily weakening until becoming extratropical on October 19 to the south of Newfoundland . The extratropical storm continued to the northeast until becoming absorbed by another , larger extratropical storm late that same day .

= = Preparations = =

In Cuba , slightly over 228 @,@ 000 residents were evacuated from low @-@ lying areas before the storm . Around 10 % stayed in temporary shelters , while the rest stayed with family or friends .

Included in the evacuation total were 6 @,@ 000 tourists and over 1 @,@ 000 residents in rickety houses . Workers protected tobacco leaves by moving them to sealed warehouses , and transported cattle and livestock to higher ground . The hurricane forced the closure of schools and the cancellation of some flights . The Cuban government issued a Hurricane Watch for Pinar del Río Province , Havana , Havana Province , and Isla de la Juventud 21 hours before Irene hit . These areas , along with Matanzas Province , were upgraded to a Hurricane Warning 15 hours before Irene hit the area .

 Initially , forecasters predicted Irene to parallel the west coast of Florida , weakening to a tropical storm before making landfall on the west @-@ central portion of the state . However , when a more eastward track became evident , officials in Monroe , Charlotte , Lee , and Manatee Counties issued evacuation orders for people in mobile homes and recreational vehicles . In addition , Key West issued a curfew during the storm 's onslaught . The National Hurricane Center issued a Hurricane Warning from Florida City around the Florida Peninsula to Boca Grande , including all of the Florida Keys and the Dry Tortugas . A Tropical Storm Warning was also issued from Florida City northward to Savannah , Georgia . In addition , the majority of flights during Irene 's passage were cancelled in Miami International Airport . Governor Jeb Bush declared a state of emergency on Florida the day before Irene made landfall , and ordered for the activation of the Florida National Guard to aid in disaster efforts .

 While moving northward off the coast of Florida , Irene was initially expected to make landfall along the South Carolina coastline , prompting the National Hurricane Center to issue a Hurricane Warning from Edisto Beach , South Carolina to Cape Hatteras , North Carolina . Because of this , voluntary evacuation orders were issued for portions of South Carolina . However , when the track shifted further to the east , mandatory evacuation orders were issued for coastal areas of North Carolina , with tens of thousands removed from their homes . The evacuation order included several beach towns ; those living in low @-@ lying areas and mobile homes were advised to seek shelter . In addition , many of those left homeless from Hurricane Floyd 's passage just weeks before were evacuated to shelters . Jim Hunt , the Governor of North Carolina , declared a state of emergency , with the state 's emergency management team switching from a recovery objective towards a preparations mission .

= = Impact = =

 Irene killed 18 people (15 indirectly) and caused $ 800 million ($ 937 million 2006 USD) in damage . Most of the damage and deaths occurred due to the torrential rain the storm caused .

= = = Cuba = = =

 While crossing Cuba , Irene produced heavy rainfall , totaling as high as 35 @.@ 6 inches (905 mm) in Manaca @-@ Iznaga . A rainfall total of 11 @.@ 9 inches (303 mm) was noted at Playa Girón in Matanzas Province . The city of Havana reported 4 @.@ 8 inches (122 mm) , while many other locations reported more than 7 inches (178 mm) . In addition , the city of Havana recorded a peak wind gust of 78 mph (126 km / h) .

 The flooding caused by Irene damaged more than 471 @,@ 000 acres (1 @,@ 900 km ²) of sugar cane and 39 @,@ 000 acres (158 km ²) of banana plantations . Irene 's rainfall also flooded tobacco fields . Throughout the country , Irene 's rainfall damaged 27 @,@ 336 houses and caused the total loss of 730 . 13 hospitals were also affected to some extent . 154 sectors of Havana lost power due to the storm . In all , four people were killed by the storm in Cuba , two of whom in Havana due to electrocution .

= = = Florida = = =

 While moving through the Florida Keys , Irene produced a storm surge of up to 2 @.@ 3 feet (0 @.@ 7 m) in Key Vaca , while Key West reported a surge of 1 @.@ 5 feet (0 @.@ 5 m) . The

hurricane produced sustained winds peaking at 79 mph (127 km / h) ; it also produced strong gusts , the strongest of which was clocked at 102 mph (164 km / h) at Big Pine Key . Irene produced heavy rainfall in the Keys , including 12 inches (305 mm) of rain in Key West . The rainfall flooded roads throughout the Keys , prompting officials to close 50 miles (80 km) of U.S. Highway 1 . Irene spawned a tornado in Islamorada , causing heavy damage to three houses . Moderate wind gusts caused power outages throughout the Keys , but damage was overall minor .

 Despite moving across the state as a minimal hurricane , there were no reports of hurricane @-@ force winds on mainland Florida . The highest official recorded wind report was 60 mph (97 km / h) in Miami Beach , while the highest accurate wind gust was 71 mph (114 km / h) in Vero Beach . In addition to the National Weather Service Reports , the South Florida Water Management District reported higher wind gusts near Lake Okeechobee of up to 93 mph (150 km / h) in Belle Glade , though these were likely caused by small @-@ scale meso @-@ cyclone @-@ induced downbursts . Irene produced heavy rainfall across southeastern Florida , peaking at 17 @.@ 45 inches (443 mm) at Boynton Beach , though many areas in the Miami Metropolitan Area received from 10 to 15 inches (255 to 380 mm) . One F1 and three F0 tornadoes touched down in Broward and Palm Beach Counties , injuring three people .

 Strong wind gusts left 700 @,@ 000 people without power from Miami to West Palm Beach , including the National Hurricane Center . The center briefly lost power , but during an hour and a half delay to reboot the computers , they obtained information from computers in the Mid @-@ West and Washington , D.C. Officials from the Florida Power & Light Company were unable to repair power lines due to strong wind gusts , while Irene 's flooding submerged underground lines , preventing repairs until the waters subsided . Five people , including three in one family , were killed when they walked through electrified waters due to downed power lines . The rains from Irene flooded roads and canals , stalling numerous cars . Three people drowned when they drove their vehicles into the canals . The floodwaters persisted for nearly a week in areas , displacing hundreds from their homes and isolating thousands . Property damage in southeastern Florida totalled to $ 262 million .

 Irene also caused severe agricultural damage in southeastern Florida totalling to $ 338 million Floodwaters killed 30 cattle at one farm , though the owners protected the rest of their 1700 cattle by raising the feeding areas above the flood plain . According to an initial estimate , the flooding destroyed between 5 % and 15 % of fruit groves along its path . The flooding delayed the winter planting of corn and bell peppers and damaged tomato plants , forcing Miami @-@ Dade County growers to replant damaged crops . The hurricane also damaged sugar cane , vegetables , and citrus crops , with citrus canker spreading after the storm passed through the area . Due to the crop damage , the U.S. Department of Agriculture declared Broward , Collier , Miami @-@ Dade , and Monroe Counties as disaster areas . This qualified eligible farmers for low @-@ interest emergency loans .

 After moderate beach erosion from previous hurricanes Dennis and Floyd , Irene caused significant beach erosion on the eastern Florida coastline . The erosion exposed the foundations of private homes , leaving some uninhabitable . Beach erosion damage totalled to $ 21 million . Many beach access points were closed until more sand could be pumped in , or until the stairways were rebuilt . Strong north winds and high seas severely destroyed or damaged docks in the Indian River Lagoon . Heavy rainfall , ranging from 5 to 9 inches (127 to 229 mm) in Martin and St. Lucie Counties flooded 260 homes . Strong wind gusts from 60 to 70 mph (97 to 113 km / h) severely damaged 34 houses and caused light damage to 1 @,@ 114 homes in Martin , St. Lucie , and Brevard Counties . In addition the winds damaged 465 mobile homes , 15 severely , and destroyed one . 555 commercial buildings also experienced light damage , and gusty winds downed about 1 @,@ 000 trees . Rough seas broke a large barge free from its mooring into a bridge on Florida Highway 528 . In Flagler County , the hurricane caused severe damage to four homes , and minor damage to 173 houses and 18 businesses . Damage in northeastern Florida totaled to $ 51 million .

 = = = Bahamas = = =

Hurricane Irene passed near the northwestern Bahamas , causing moderate flooding and spawning a few tornadoes . One tornado caused damage in Marsh Harbour and killed one on Abaco island . Four indirect deaths occurred when a truck drove off a wet pier during a downpour .

Carolinas and Mid @-@ Atlantic

Hurricane Irene dropped moderate rainfall ranging from 5 to 6 inches (125 to 150 mm) in eastern South Carolina . The flooding closed several roads , including some in western Georgetown County which were washed out . Moderate wind gusts of up to 48 mph (77 km / h) in Charleston downed trees and power lines , causing sporadic power outages . The winds also caused minor beach erosion along the coastline .
While paralleling the coast of North Carolina , Irene produced heavy rainfall across the state , peaking at 11 inches (280 mm) in Ernul with several other locations reporting over 6 inches (152 mm) . The rainfall caused severe river flooding in North Carolina , many of which had not receded from Hurricane Floyd 's passage less than a month earlier . Due to the runoff , the Tar , Cape Fear , and Neuse Rivers all crested above their banks . The flooding also caused a dam in south @-@ central Hoke County to overflow . Irene spawned two tornadoes ; an F0 in Onslow County and an F2 in Weeksville . The F2 destroyed 2 trailers , damaged several houses , and injured one person . The heavy flooding closed several roads throughout North Carolina , causing several traffic accidents . Hurricane Irene was indirectly responsible for one death when a man hydroplaned on a wet road and crashed . Despite the severe flooding , Hurricane Irene caused little damage in North Carolina .
Hurricane Irene also produced heavy rainfall in southeastern Virginia of up to 12 inches (305 mm) in Chesapeake . The rainfall resulted in widespread street flooding , with some locations reporting flooding of up to 4 feet (1 @.@ 2 m) deep .

Aftermath

Following the hurricane , the International Red Cross and Red Crescent Movement launched an emergency appeal for Cuba . The appeal raised $ 217 @,@ 498 (1999 CHF) to supply hygiene items , household goods , water purification tablets , and water containers to the 12 @,@ 000 living in temporary shelters . The appeal asked for repair supplies and to improve the response capacity of the national society for future disasters . The Cuban Red Cross mobilized over 4 @,@ 500 volunteers to the affected areas to provide first aid to injured , distribute meals and medical supplies , and collaborate with blood banks . The government @-@ controlled media broadcast system guaranteed repair items , though many people remained in damaged houses in the weeks after the storm .
Just days after Irene moved through Florida , President Bill Clinton declared 18 counties as disaster areas . The declaration allowed affected businesses and homeowners to apply for federal assistance , such as money for temporary housing , minor home repairs , or disaster @-@ related expenses . In addition , the president issued an emergency declaration for Florida , which released federal resources to aid in debris removal and emergency services . In addition , President Clinton declared the 66 counties in North Carolina eligible for assistance due to Hurricane Floyd were also eligible for more assistance due to damage from Irene .
In the Bahamas , township volunteers assisted in cleanup efforts . The Royal Bahamas Defence Force distributed hurricane relief supplies to those affected .