

= Hurricane Flora =

Hurricane Flora is among the deadliest Atlantic hurricanes in recorded history , with a death total of over 7 @, @ 000 . The seventh tropical storm and sixth hurricane of the 1963 Atlantic hurricane season , Flora developed from a disturbance in the Intertropical Convergence Zone on September 26 while located 755 miles (1 @, @ 215 km) southwest of the Cape Verde islands . After remaining a weak depression for several days , it rapidly organized on September 29 to attain tropical storm status . Flora continued to quickly strengthen to reach Category 3 hurricane status before moving through the Windward Islands and passing over Tobago , and it reached maximum sustained winds of 145 miles per hour (233 km / h) in the Caribbean .

The storm struck southwestern Haiti near peak intensity , turned to the west , and drifted over Cuba for four days before turning to the northeast . Flora passed over the Bahamas and accelerated northeastward , becoming an extratropical cyclone on October 12 . Due to its slow movement across Cuba , Flora is the wettest known tropical cyclone for Cuba , Haiti , and the Dominican Republic . The significant casualties caused by Flora were the most for a tropical cyclone in the Atlantic Basin since the 1900 Galveston Hurricane .

= = Meteorological history = =

A disturbance in the Intertropical Convergence Zone organized into a tropical depression on September 26 while located about 755 miles (1 @, @ 215 km) southwest of the island of Fogo in the Cape Verde Islands . Upon forming , the depression had a poorly organized circulation with banding features to its north and east . The depression moved west @-@ northwestward , and the system failed to organize significantly by a day after developing . On September 27 , the banding features dissipated , though the area of convection around the center increased . Satellite imagery was unavailable until September 30 , during which there were not sufficient ship reports to indicate the presence of a low @-@ level circulation . The depression continued west @-@ northwestward , and it is estimated it intensified into Tropical Storm Flora on September 29 while located about 560 miles (900 km) east @-@ southeast of Trinidad , or about 350 miles (560 km) north of Cayenne , French Guiana . Operationally , advisories were not initiated until a day later .

Flora quickly intensified after it became a tropical storm , and early on September 30 it attained hurricane status . Later that day , Reconnaissance Aircraft confirmed the existence of the hurricane , with the flight reporting a well @-@ defined , circular 8 @-@ mile (13 km) wide eye . One observer noted Flora to be the best organized tropical cyclone over the previous two years . After attaining major hurricane status , Flora passed directly over the island of Tobago late on the 30th with winds of 120 mph (190 km / h) . The hurricane continued west @-@ northwestward as it entered the Caribbean , and early on October 2 its winds reached 140 miles per hour (230 km / h) . Thirty hours later , Flora intensified slightly further and attained peak winds of 145 mph (233 km / h) while located about 105 miles (169 km) south of the border of Haiti and the Dominican Republic .

After turning to the northwest , Hurricane Flora maintained its peak strength , and made landfall in the Sud Department of Haiti late on October 3 as a 145 mph (233 km / h) Category 4 hurricane on the Saffir @-@ Simpson Scale with gusts from 180 to 200 miles per hour (290 to 320 km / h) . The calm of the eye lasted for up to 70 minutes in one location . After quickly weakening to a 120 mph (190 km / h) hurricane , Flora turned more to the west in the Windward Passage , and restrengthened slightly to strike southeastern Cuba about 30 miles (48 km) east of Guantanamo Bay with winds of 125 mph (201 km / h) . A high pressure system to its north turned the motion of the hurricane to a westward drift , causing it to weaken quickly over land . Flora neared the north coast of Cuba on October 4 before turning to the south . It executed a cyclonic loop and entered the coastal waters off Granma Province . An anticyclone to the west of Flora turned the hurricane to the north , bringing it ashore near Santa Cruz del Sur on October 7 with winds of around 90 mph (140 km / h) . Flora initially turned southeastward over central Cuba , and late on October 8 a short @-@ wave trough turned the hurricane northeastward , bringing it into the coastal waters of the Holguín Province . Flora remained a hurricane while drifting over land due to abundant moisture and a

favorable upper level environment .

After passing over the southeastern Bahamas early on October 9 , Flora began to restrengthen , and on October 10 it again reached major hurricane status while located 290 miles (470 km) south of Bermuda . The hurricane gradually weakened as it continued northeastward , and weakened to a Category 1 hurricane on October 11 . Flora gradually lost its convection over the north Atlantic Ocean , and transitioned into an extratropical cyclone on October 12 while located 270 miles (430 km) east @-@ southeast of Cape Race , Newfoundland . The extratropical remnant dissipated the next day .

= = Preparations = =

The Weather Bureau in San Juan , Puerto Rico issued a hurricane warning for Trinidad , Tobago , and the Grenadines south of Saint Vincent in the cyclone 's first advisory on Hurricane Flora . Gale warnings were later issued for islands off northern Venezuela and from Saint Vincent northward to Martinique . Advisories on Flora emphasized the danger of the hurricane and advised preparations to be rushed to completion . The advisories also recommended small craft throughout the Windward Islands to remain at harbor and for shipping in the path of the hurricane to advise extreme caution . People in low @-@ lying areas and near beaches were advised to evacuate to higher grounds , as well . Lead time was short , especially in Tobago which received news of the approaching hurricane just two hours before it struck .

On October 2 , two days before it made landfall on southwestern Hispaniola , the San Juan Weather Bureau issued a gale warning from Barahona in the Dominican Republic to the Sud @-@ Est Department of Haiti . Advisories recommended small craft in the southern portions of the countries to remain at port . Later that day , the gale warning was upgraded to a hurricane warning in southwestern Haiti . On the day of when Flora made landfall , advisories recommended all citizens on beaches and in low @-@ lying areas west of Santo Domingo to evacuate . Carmelo Di Franco , the provisional Director of Civic Defense for the Dominican Republic , organized safety procedures and the dissemination of tropical cyclone bulletins from the San Juan Weather Bureau . Di Franco also organized for the transmission of hurricane emergency information to citizens , believed to reduce the loss of life . On the afternoon before the hurricane struck , the head of the Haitian Red Cross prohibited radio broadcasts of tropical cyclone advisories for fear of panic among citizens . As a result , many thought the hurricane would miss the country .

Officials at the Cuban National Observatory issued radio bulletins on the hurricane , which included the position of Flora , its intensity , direction of motion , and necessary warnings . By the time the hurricane left the island , more than 40 @,@ 000 had been evacuated to safer areas .

The Weather Bureau predicted Flora to turn to the northwest after entering the Windward Passage and affect the Bahamas . Forecasters advised those in The Bahamas to quickly complete preparations , though the eye of the hurricane did not pass over the archipelago until four days later . When Flora turned to the northeast out to sea , forecasters again advised Bahamian citizens to prepare for the hurricane , and on October 9 , weather advisories advised the southeastern Bahamas to prepare for gale @-@ force winds and strong tides . One advisory considered there to be less than a 50 % chance of the hurricane reaching southeastern Florida , though weather bulletins advised Florida citizens to monitor the hurricane . At its closest approach to Florida , the hurricane remained 330 miles (530 km) away , though gale warnings were issued from Stuart to Key West due to the hurricane 's large size .

= = Impact = =

Throughout its path , Hurricane Flora resulted in more than 7 @,@ 000 deaths and over \$ 525 million in damage (1963 USD , \$ 4 @.@ 06 billion 2016 USD) . It is estimated that , if a hurricane like Flora had struck in 1998 , it would have caused over 12 @,@ 000 casualties .

= = = East Caribbean = = =

Hurricane Flora passed Barbados a few days after Hurricane Edith moved through the area . The two hurricanes resulted in about \$ 65 @, @ 000 in damage (1963 USD) , primarily to fishing interests .

About four hours before the eye of Hurricane Flora moved over Tobago , the large hurricane began producing heavy rainfall throughout the island . Two hours later , strong winds began affecting the island , and while moving across the island Flora produced winds of up to 100 miles per hour (160 km / h) . While moving past Tobago , the hurricane produced rough surf and tides 5 to 7 feet (1 @. @ 5 to 2 @. @ 1 m) above normal . The hurricane sunk six ships between 4 and 9 tons in Scarborough harbour . One crew member drowned while attempting to save his vessel . Heavy rainfall caused a large mudslide from Mount Dillon onto a road leading to Castara . This was considered the most well @-@ known mudslide on the island . The strong winds caused severe damage to coconut , banana , and cocoa plantations , with 50 % of the coconut trees being destroyed and another 11 % being severely damaged . 75 % of forest trees fell , and most of the remaining were greatly damaged . The passage of Hurricane Flora destroyed 2 @, @ 750 of Tobago 's 7 @, @ 500 houses , and damaged 3 @, @ 500 others . The hurricane killed 18 on the island and resulted in \$ 30 million in crop and property damage (1963 USD) .

Winds on Trinidad reached 55 mph (89 km / h) with much higher gusts of over 70 mph (110 km / h) . Heavy rainfall and strong winds in the northern mountainous region lowered the visibility to zero . Due to the mountain range on its northern coast , damage on the island was minimal , totaling to \$ 100 @, @ 000 (1963 USD) . Two people on the island died due to drowning . When Flora passed the island and the winds turned to the southwest , many small boats in the westward facing harbor were sunk . Near Chaguaramas , nine boats were destroyed and eight were damaged . Additionally , several large vessels sustained damage and resulted in them being intentionally sunk . Damage in Grenada was minor , around \$ 25 @, @ 000 (1963 USD) , though six people died due to drowning . Rough seas and higher than normal tides were reported along the south coast of Puerto Rico , though no damage or deaths were reported there .

= = = Dominican Republic and Haiti = = =

Flora produced heavy rainfall and moderately strong winds in the Dominican Republic . The highest rainfall amount reported was 39 @. @ 43 inches (1 @, @ 002 mm) at Polo Barahona . Flooding from the hurricane , considered to be the most extensive on record , greatly damaged bridges and roads , with many roads left unpassable for several months after the hurricane struck . Over 3 @, @ 800 sq. miles (10 @, @ 000 km ²) in the western portion of the country were flooded . The hurricane caused about \$ 60 million in damage (1963 USD) and over 400 deaths .

While moving across southwestern Haiti , Hurricane Flora produced winds of up to 120 mph (190 km / h) near Derez , while the capital city of Port @-@ au @-@ Prince reported peak winds of 65 mph (105 km / h) . Intense rainbands dropped torrential precipitation estimated at over 75 inches (1 @, @ 900 mm) in Miragoâne , with one location recording over 57 inches (1 @, @ 400 mm) in three days . One location in the southwestern peninsula recorded 16 inches (410 mm) of precipitation in 12 hours . The storm surge on the southern coast is unknown , but estimated to exceed 12 feet (3 @. @ 7 m) . Flash floods from the hurricane washed out large sections of several towns , while mudslides buried some entire towns , resulting in many deaths . Heavy rainfall led to river flooding along the Grisse River , which crested at 14 feet (4 @. @ 3 m) above normal . The flood waters created new channels and washed away entire banana plantations .

In most areas , crops were entirely destroyed . The coffee crop was harvested prior to the arrival of the hurricane , though heavy rainfall and severe flooding ruined the crop for later years . Additionally , strong winds downed shading trees for the coffee crop on the southern peninsula . One official estimated it would require three years for the coffee crop to be replanted and regrown .

Strong winds in southwestern Haiti from the hurricane damaged or destroyed hundreds of trees . The path of Flora over the area was best determined by the trajectory of fallen trees across the peninsula . The strong winds left entire villages roofless , with many buildings entirely destroyed .

The combination of rough waves and strong winds destroyed three entire communities . Many of those who died in southwestern Haiti suffered from intense burns from strong winds .

About 3 @, @ 500 people were confirmed dead , with several thousands missing at one report five months after the hurricane . It is estimated the passage of Hurricane Flora killed around 5 @, @ 000 people and caused between \$ 125 million and \$ 180 million in damage in Haiti (1963 USD) .

= = = Cuba , Jamaica , the Bahamas , and Florida = = =

Strong northerly winds from Flora eroded the northern beaches in the Cuban province of Camagüey by up to 1 kilometre (3 @, @ 300 ft) . Santa Cruz del Sur reported strong southerly winds and rough seas . Winds in Cuba reached 125 miles per hour (201 km / h) . Nearly all crops in southeastern Cuba were affected by strong winds and flooding . Many citizens were left stranded at the tops of their houses . Several entire houses were swept away by the flooding , and many roads and bridges were destroyed , resulting in major disruptions to communications . Isolated locations in Cuba received over 80 inches (2 @, @ 000 mm) of rain , with Santiago de Cuba recording 100 @. @ 39 inches (2 @, @ 550 mm) , which is the highest rainfall total measured on Cuba from any rainfall event on record .

Heavy rainfall fell across the island of Jamaica due to southwest flow into the mountains on Flora 's southern periphery over several days . The maximum amount recorded was 60 inches (1 @, @ 500 mm) at Spring Hill persistent , which led to numerous landslides across the eastern portion of the island . Damage to the island totaled \$ 11 @. @ 9 million (1963 dollars) . Rough seas from Flora affected the Bahamas and the southeastern Florida coast on October 5 as the hurricane stalled over Cuba , keeping small craft in port , and hurricane @-@ force winds affected Ragged Island later that day . Rainfall amounts peaked at 17 @. @ 19 inches (437 mm) at Duncan Town , in the Bahamas . Damage to the island archipelago reached \$ 1 @. @ 5 million (1963 dollars) .

= = Aftermath = =

In Tobago , the great agricultural damage from Flora caused the crop plantations to be abandoned . As a result , the economy of the island changed towards tourism . The destruction of the Tobagonian rainforests resulted in a continual decline of agriculture on the island due to animals previously in the forest eating the crops for food . The passage of the hurricane reduced the height of the rainforest canopy above 800 feet (240 m) by half . Twenty @-@ five years passed before the canopy reached its previous height .

In the Dominican Republic , damage reports were largely unknown by a month after the hurricane passed the island , primarily in the western provinces . There , roads were still impassable , large areas remained without electricity , and helicopters could not land in remote areas due to mud , silt , and up to 3 feet (0 @. @ 91 m) of water in all landing fields . One official estimated several months would pass before survey teams could obtain information on loss of life and overall damages .

Due to its impact on the Caribbean nations , the name Flora was retired after this year and was replaced by Fern .