

= Hurricane Igor =

Hurricane Igor was the most destructive tropical cyclone to strike the Canadian island of Newfoundland on record . Igor originated from a broad area of low pressure that moved off the west coast of Africa on September 6 , 2010 . Tracking slowly westward , it developed into a tropical depression on September 8 and strengthened into tropical storm shortly thereafter . Higher wind shear temporarily halted intensification over the following days . On September 12 , explosive intensification took place , and Igor reached Category 4 status on the Saffir ? Simpson Hurricane Wind Scale . By this time , Igor had already begun a prolonged turn around the western periphery of the subtropical ridge . Peaking with winds of 155 mph ( 250 km / h ) , the cyclone began to enter an area unfavorable for continued strengthening , and Igor gradually weakened before brushing Bermuda as a minimal hurricane on September 20 . After turning northeastward , the system began an extratropical transition , which it completed shortly after striking southern Newfoundland . The remnants of Igor were later absorbed by another extratropical cyclone over the Labrador Sea on September 23 .

While over the open ocean , large swells produced by the hurricane caused the deaths of three people ? two in the Caribbean and one in the United States . Passing west of Bermuda as a minimal hurricane , damage was limited primarily to trees and power lines , with roughly 27 @, @ 500 residences having lost electricity . Total losses in the territory were less than \$ 500 @, @ 000 ( 2010 USD ) . In Newfoundland , damage wrought by Igor was extreme , claimed to be the worst ever seen in some areas . Large stretches of roadways were completely washed out by severe flooding , including a portion of the Trans @- @ Canada Highway , isolating approximately 150 communities . Throughout the region , one person was killed and damage costs amounted to a record \$ 200 million ( 2010 CAD ) . In the storm 's wake , military personnel were deployed to assist in recovery efforts and aid distribution .

= = Meteorological history = =

Hurricane Igor was first identified as a broad area of low pressure accompanying a tropical wave over western Africa in early September 2010 . Tracking nearly due west , the system emerged into the eastern Atlantic Ocean on September 6 . Gradual development took place as convection ? thunderstorm activity ? consolidated around its center . At 0600 UTC on September 8 , the low was deemed sufficiently organized to be classified as a tropical depression while situated roughly 90 mi ( 140 km ) southeast of the Cape Verde Islands . Attaining gale @- @ force winds six hours later , the depression intensified into a tropical storm and was subsequently named Igor by the National Hurricane Center ( NHC ) .

Development of Igor quickly ceased once it was named as a nearby disturbance produced moderate wind shear over the storm , displacing convection from its center . Embedded within a monsoon trough over the eastern Atlantic , the system maintained a slow westward track as it weakened to a tropical depression on September 9 . Intensification resumed the following day once shear lessened and the dominant steering factor shifted to a mid @- @ tropospheric ridge north of Igor ; it would remain so throughout the remainder of the cyclone 's existence . Contrary to its earlier movement , the storm 's forward motion markedly increased . Following the development of an intermittent eye feature and steady convection around its center , Igor strengthened into a hurricane around 0000 UTC on September 12 .

Once classified a hurricane , Igor underwent explosive intensification over the following 24 hours . During this time , satellite observations indicated that the storm 's winds increased from 75 mph ( 120 km / h ) to 150 mph ( 240 km / h ) and its barometric pressure decreased by 52 mbar ( hPa ; 1 @. @ 53 inHg ) . Near the end of this phase , forecasters at the NHC predicted that Igor would attain Category 5 status , the highest classification on the Saffir ? Simpson Hurricane Wind Scale . With a symmetrical 17 mi ( 27 km ) wide eye , deep convection and spiral banding , Igor maintained Category 4 intensity for nearly five days . Minor fluctuations took place during this period as multiple eyewall replacement cycles occurred . After the first of these cycles , the hurricane is estimated to

have reached its peak strength around 0000 UTC on September 15 with winds of 155 mph ( 250 km / h ) and an estimated pressure of 924 mbar ( hPa ; 27 @. @ 29 inHg ) . By this time , Igor began a northwestward track as it executed a prolonged " C @-@ shaped " curve over the Atlantic Ocean .

Passing roughly 345 mi ( 555 km ) northeast of the Leeward Islands on September 17 , Igor gradually weakened as it experienced increased wind shear and dry air intrusion . Over the following several days , the storm became exceedingly large , with tropical storm @-@ force winds covering an area about 920 mi ( 1 @, @ 480 km ) wide . Due to an overestimated bias in Igor 's intensity , forecasts from the NHC showed that the storm would strike Bermuda as a major hurricane . However , weakening was more marked than anticipated and by the time its center neared the territory on September 20 , winds decreased to 75 mph ( 120 km / h ) . Igor made its closest approach to Bermuda around 0230 UTC , passing roughly 40 mi ( 65 km ) to the west @-@ northwest .

Once north of Bermuda , Igor began to undergo an extratropical transition as it turned northeastward . Though deep convection was no longer consistently over its center , data from Hurricane Hunters continued to support hurricane intensity . Accelerating along the leading edge of a trough over the Canadian Maritimes , the storm intensified within a baroclinic zone as it neared Newfoundland . The interaction between these two systems allowed the hurricane to strengthen despite moving over decreasing sea surface temperatures . Around 1500 UTC on September 21 , Igor made landfall near Cape Race , with winds of 85 mph ( 140 km / h ) , slightly higher than several hours earlier . Shortly thereafter , the storm completed its transition into an extratropical cyclone as it became fully embedded within the baroclinic zone . After turning northwestward between Labrador and Greenland , the remnants of Igor were absorbed by another extratropical cyclone on September 23 .

= = Preparations and impact = =

= = = Cape Verde and Leeward Islands = = =

Forming near the Cape Verde Islands , Igor prompted the issuance of tropical storm watches for the southern islands on September 8 . Though the storm passed relatively close to the region , only minimal effects were recorded . Once the cyclone tracked away from Cape Verde , the watches were discontinued on September 9 .

Although several hundred miles from the Leeward Islands , Igor produced large swells averaging 9 to 13 ft ( 2 @. @ 7 to 4 @. @ 0 m ) in height , between September 16 and 21 . There were also large breaking waves of 15 to 20 ft ( 4 @. @ 6 to 6 @. @ 1 m ) or higher . The prolonged period of this event resulted in minor coastal flooding in St. Croix . One person drowned near Carambola Beach Resort after being overcome by large swells . Similar conditions affected Puerto Rico where another person drowned . On several occasions , Luquillo was flooded by the surf , though no damage took place . In nearby Haiti , still reeling from a devastating earthquake in January , officials warned residents of possible relocation from " tent cities " to safer areas . An orange alert was declared across the country , indicating that heavy rains could result in flooding . Portions of the Greater Antilles were affected by large swells and rip currents for several days as Igor approached Bermuda .

= = = United States = = =

Though Igor 's closest approach to the United States only brought it within 600 mi ( 970 km ) of land , its large circulation produced significant swells along the entire East Coast . High surf advisories were issued in Long Island , New York as waves of 6 to 10 ft ( 1 @. @ 8 to 3 @. @ 0 m ) affected the area . Rip currents in Florida pulled two people out to sea who were later rescued . One person drowned in Surf City , North Carolina after being overwhelmed by rough surf . Along the New Jersey coastline , waves averaging between 6 and 9 ft ( 1 @. @ 8 and 2 @. @ 7 m ) and dangerous rip

currents were reported .

= = = Bermuda = = =

Long seen to be within Igor 's track , Bermuda was finally placed under a hurricane watch on September 17 as the threat became imminent . Later that day , the watch was upgraded to a warning as hurricane @-@ force winds were anticipated to impact the islands within the following 24 hours . This remained in place for nearly three days while Igor battered Bermuda . Following the passage of hurricane winds , the advisory was changed to a tropical storm warning early on September 20 before being discontinued later that day .

The Bermudian government closed its schools and the Bermuda International Airport on September 20 and 21 in anticipation of Igor . No evacuation plans were put in place , although a local high school was converted into a shelter for residents who felt unsafe in their homes . Residents boarded up structures with plywood in order to protect windows . Tourists on the island wanting to escape the storm left more than a week before Igor 's arrival . Additionally , a British Royal Navy vessel and helicopter were stationed offshore to assist with recovery efforts once the storm passed . Prior to Igor 's arrival , there were fears that the enormous hurricane would be worse than Hurricane Fabian in 2003 and could " flatten " the territory . These fears resulted from forecasts from the National Hurricane Center which indicated the storm would strike Bermuda as a Category 3 hurricane . However , following post @-@ storm analysis , it was found that the forecast model consensus overestimated the storm 's future intensity .

Although effects from Igor were observed in Bermuda for several days , relatively little rain fell , with the highest amount being 3 @.@ 19 in ( 81 mm ) . Winds proved to be the most significant factor ; sustained winds reached 91 mph ( 146 km / h ) and gusts peaked at 117 mph ( 188 km / h ) at an unofficial AWOS station on St. David 's Lighthouse . Additionally , a storm surge of 1 @.@ 75 ft ( 0 @.@ 53 m ) took place in St. George 's , this combined with tides to produce a storm tide of over 4 ft ( 1 @.@ 22 m ) . As the storm arrived , the island 's airport was shut down earlier than originally planned due to the threat of tornadoes . Against initial fears , Igor left relatively little damage across Bermuda . The most significant impact was from downed trees and powerlines which cut power to 27 @,@ 500 residents . A few emergency rescues had to be made during the storm but no injuries took place . The causeway @-@ bridge connecting St. George 's Islands to the main island of Bermuda sustained minor damage , leaving one lane closed for several days . Waves over 15 ft ( 4 @.@ 6 m ) battered the coast , breaking several ships from their moorings and tossing them into rocks . Officials in Bermuda stated that the biggest loss from Igor would be lessened tourism revenue following a mass exodus prior to the hurricane 's arrival . Throughout the islands , damage from the storm was less than \$ 500 @,@ 000 .

= = = Canada = = =

On September 20 , roughly one day prior to Igor 's arrival in Atlantic Canada , the Canadian Hurricane Center ( CHC ) issued tropical storm watches and warnings for southern Newfoundland and the French territory of Saint Pierre and Miquelon . The following day the CHC issued a hurricane watch for the eastern and northern coasts . Although sustained hurricane @-@ force winds were recorded across parts of the island , warnings were not issued due to stronger @-@ than @-@ expected re @-@ intensification of the storm as it transitioned into an extratropical cyclone . Early on September 22 , all advisories were discontinued as Igor moved away from the region . In response to the storm 's arrival , schools were closed and several flights were delayed or canceled at St. John 's International Airport . Offshore , an oil rig with 110 personnel was mostly evacuated near the coast of Newfoundland on September 19 . In comparison to Hurricane Earl two weeks earlier , there was substantially less media attention given to Igor , attributed to the possibility of it going out to sea .

The combination of a stationary front and significant moisture from Hurricane Igor resulted in unprecedented rainfall across parts of eastern Newfoundland , leading to widespread flooding . In

Bonavista , more than 10 in ( 250 mm ) was estimated to have fallen between September 20 and 21 . In St. Lawrence , a confirmed 9 @. @ 37 in ( 238 mm ) of rain fell , ranking Igor as the third @-@ wettest tropical cyclone in Canadian history . The widespread nature of heavy rains ranked the storm as a 1 @-@ in @-@ 100 year event . Similar to the rainfall , winds across eastern Newfoundland were exacerbated by the interaction of the front and Igor . In Cape Pine , near where the center of Igor tracked , sustained winds of 80 mph ( 130 km / h ) and gusts to 107 mph ( 172 km / h ) battered the area . No records for sustained winds or gusts were broken ; however , it was noted as a 1 @-@ in @-@ 50 year event even with powerful winter storms taken into account . Along the coast , Igor produced a storm tide of 3 @. @ 5 ft ( 1 @. @ 1 m ) . Additionally , offshore waves reached immense heights , measured up to 83 @. @ 6 ft ( 25 @. @ 5 m ) ; one buoy reported a wave of 92 ft ( 28 m ) but data is subject to further analysis to verify it .

The most significant impacts from Igor were attributed to torrential rains , which led to excessive runoff and flash flooding . Several rivers rose to record levels across the Bonavista and Burin Peninsulas where many roads were washed out . Entire bridges , homes and portions of roads were destroyed . In some instances , flood waters were higher than entire homes . In response to the widespread floods , Newfoundland Power Inc. warned residents who still had power by the afternoon of September 21 to turn off their main electrical panel if water enters their basement . Much of St. Bernard 's ? Jacques Fontaine had to be evacuated by boat during the storm as rising water obstructed all roads in and out of the small town . Portions of Clarendville had to be evacuated under similar circumstances after a state of emergency was declared for the town . Water and sewage lines in Sunnyside broke due to flooding . In Glovertown , downed power lines sparked two fires during the storm , both of which were put out by firefighters without injuries .

Roughly 150 communities were temporarily isolated as all roads leading to them were severely damaged or washed out . Overall damage to roadways was regarded as " colossal " by Tom Hedderson , the minister for emergency preparedness . A 100 ft ( 30 m ) section of the Trans @-@ Canada Highway in Terra Nova National Park was severely eroded , leaving a large ravine behind and disconnecting the main population of Newfoundland from the rest of the island , while a bridge washout on the Burin Peninsula left 20 @, @ 000 people cut off from the rest of the island . Public infrastructure losses were estimated in excess of \$ 100 million , mainly attributed to roadways . On Random Island , a man was killed when his driveway collapsed from flooding and he was swept out to sea .

In addition to flood damage , hurricane @-@ force winds downed trees and power lines over large areas and many homes were damaged to varying degrees . An estimated 50 @, @ 000 residences were left without electricity in the region . The small coastal community of South East Bight sustained some of the most significant wind damage where entire fishing sheds were hurled into the air . Along the East Coast hiking trail , an estimated 5 @, @ 000 trees were downed . In all , losses from the hurricane were placed at \$ 200 million , ranking it as the costliest cyclone in Newfoundland history .

= = Aftermath = =

In Igor 's wake , a state of emergency was declared for 30 communities in Newfoundland . The mayor of one of the towns affected by Igor , Sam Synard , remarked that " We 've never seen such a violent storm before . " More than 50 families involved in the storm @-@ induced destruction were relocated to evacuation shelters . Electricity was gradually restored to residents ; by six days after the hurricane 's passage , a few hundred had yet to regain power .

In light of the widespread damage , 1 @, @ 000 personnel from the Canadian military were brought in for recovery efforts . The military operation , known as Operation Lama , was to last for the duration of the emergency phase in the immediate aftermath . An initial deployment of 120 soldiers and 40 vehicles arrived on September 25 from the Canadian Forces Base Gagetown in Oromocto , New Brunswick arrived in Newfoundland . Three ships and a fleet of helicopters were called in for the distribution of emergency aid and the military set up temporary bridges while long @-@ term plans for reconstruction were made . Operation Lama also enabled partial repairs of several

buildings , and simultaneously , emergency personnel surveyed roughly 500 mi ( 900 km ) of roads in Newfoundland . On September 27 , government officials stated that it would take months for cleanup efforts to finish . Ten days after the storm , six towns were still isolated as progress on temporary road reconstruction was being made only slowly . Allocation of military aid continued through October 6 , though the number of on -@ scene personnel began to decrease two days earlier .

Roughly a month after the storm , a benefit concert was held in St. John 's . The concert raised about \$ 400 @, @ 000 ( 2010 CAD ) toward storm relief in one night . In late October , the Government of Newfoundland and Labrador allocated \$ 275 @, @ 000 in funds for 200 workers who lost their jobs after two fish processing plants were damaged in Marystown and Port Union . However , union leaders claimed that the assistance was insufficient and accounted for just 420 of 600 work hours . Following more than a year of discussions , the plant 's parent company , Ocean Choice International , decided to permanently shut down operations on December 2 , 2011 . Numerous insurance claims , reaching \$ 65 million by early November , were made following Hurricane Igor 's landfall Over the course of the recovery phase , several complaints , including concerns lodged by church ministers , that relief funds for victims of the storm were not being distributed fast enough and the overall process was taking too long . Roughly ten months after the hurricane , work on permanent reconstruction of roadways began in several areas across the Burin Peninsula . By January 24 , 2011 , The Salvation Army received about \$ 1 @. @ 6 million worth of donations for residents affected by Hurricane Igor , roughly half of which had been distributed at that point . An additional \$ 200 @, @ 000 had been pledged by donors .

In June 2011 , a federal document detailing the actions made by province officials was released to be public and incited further outcry from residents affected by the storm . The main complaint raised was related to the delay in accepting federal aid despite the severity of the damage . In an email sent on September 21 , 2010 , Denys Doiron , the nation 's Emergency Preparedness and Response Officer , relayed that local emergency services reported Igor to be the worst disaster they have had to deal with . Doiron also stated that no requests for federal aid were made .

Nearly a year after the passage of Igor , a weather buoy from St. John 's was spotted near the Shetland Islands north of Scotland on September 12 , 2011 . In early October , Newfoundland was again struck by a tropical cyclone ? Hurricane Ophelia . Though a weaker storm , Ophelia caused more damage than expected as it destroyed infrastructure repaired in the wake of Igor . The mayor of Marystown criticized government officials for not increasing the size of repairs , especially to culverts , to account for flooding .

= = Retirement = =

Due to the extensive damage in Newfoundland , the name Igor was retired in the spring of 2011 by request of the Meteorological Service of Canada , and will never again be used for an Atlantic hurricane . In Canada 's report to the World Meteorological Organization , it was stated to be a storm without parallel in the island 's history . This was only the second time that the Meteorological Service of Canada had requested that a hurricane name be retired ( the first was Hurricane Juan in 2003 ) . The hurricane is also considered a probable benchmark for future cyclones in the region , having illustrated to residents that they are not immune from hurricanes and their impacts . The name was replaced by Ian for 2016 .