

= Hurricane Keith =

Hurricane Keith was a storm in October 2000 that caused extensive damage in Central America , especially in Mexico and Belize . It was the fifteenth tropical cyclone , eleventh named storm , and seventh hurricane of the that year 's Atlantic hurricane season . Keith developed as a tropical depression from a tropical wave in the western Caribbean Sea on September 28 . The depression gradually strengthened , and became Tropical Storm Keith on the following day . As the storm tracked westward , it continued to intensify and was upgraded to a hurricane on September 30 . Shortly thereafter , Keith began to rapidly deepen , and peaked as a Category 4 hurricane less than 24 hours later . Keith then began to meander erratically offshore of Belize , which significantly weakened the storm due to land interaction . By late on October 2 , Keith made landfall in Ambergris Caye , Belize as a minimal hurricane . It quickly weakened to a tropical storm , before another landfall occurred near Belize City early on the following day . While moving inland over the Yucatán Peninsula , Keith weakened further , and was downgraded to a tropical depression before emerging into the Gulf of Mexico on October 4 . Once in the Gulf of Mexico , Keith began to re @-@ strengthen and was upgraded to a tropical storm later that day , and a hurricane on the following day . By late on October 5 , Keith made its third and final landfall near Tampico , Tamaulipas , Mexico as a moderately strong Category4 hurricane . The storm quickly weakened inland and dissipated as a tropical cyclone by 24 hours after landfall .

Keith brought heavy rainfall to several countries in Central America , which resulted in extensive flooding , especially in Belize and Mexico . In Guatemala , the storm flooded 10 towns , and caused one fatality . Similarly , one fatality also occurred in El Salvador , and at least 300 people were affected by flooding in that country . Thirteen communities in Nicaragua were completely isolated after Keith made roads impassable . Twelve deaths were reported in Nicaragua , all of which were flood @-@ related . Five people were presumed dead in Honduras after an aircraft disappeared near Roatán ; one other fatality occurred due to flooding . The storm brought torrential rainfall to Belize , with many areas reporting at least 10 inches (250 mm) of rain , while highest reported amount of precipitation was greater than 30 inches (760 mm) . In Belize , a village reported that only 12 houses remained , while elsewhere in the country , at least 60 homes were destroyed or damaged ; several houses in Belize City suffered minor roof damage . At least 19 people were killed in Belize and damages totaled to \$ 280 million (2000 USD) . Heavy rainfall also occurred in Mexico , especially in the states of Nuevo León and Tamaulipas . Flooding from Keith caused several mudslides and a few rivers reached historic levels . Throughout Mexico , at least 460 houses were damage or destroyed and other losses in infrastructure occurred . In addition , one person drowned due to heavy rainfall . Damages incurred in associated with Keith in Mexico totaled to approximately \$ 365 @. @ 9 million (2000 MXN , \$ 38 @. @ 7 million 2000 USD) . Overall , Keith was responsible for 40 deaths and \$ 319 million (2000 USD) in damage .

= = Meteorological history = =

On September 16 , 2000 a tropical wave ? an elongated area of low air pressure moving from east to west ? exited the west coast of Africa . It moved westward across the Atlantic Ocean without development due to the presence of upper @-@ level wind shear . After moving across the Caribbean Sea , a disturbance along the wave started to become better organized on September 27 . The next day , a Hurricane Hunters flight indicated a closed circulation and winds of 37 mph (60 km / h) ; upon receiving the data , the National Hurricane Center (NHC) initiated advisories on Tropical Depression Fifteen at 2100 UTC . The NHC later estimated the depression had formed three hours earlier , about 70 mi (110 km) north @-@ northeast of Cabo Gracias a Dios . Upon forming , the depression had good outflow , although the convection was not as organized . With an anticyclone over the system , the depression was expected to gradually intensify while moving slowly to the west @-@ northwest , a motion caused by weak steering winds . Late on September 28 , the NHC upgraded the depression to tropical storm status and named it Keith , after another Hurricane Hunters mission reported flight @-@ level winds of 61 mph (98 km / h) .

By the time Keith became a tropical storm , it was beginning to undergo rapid deepening , fueled by warm waters , low wind shear , and an organizing cloud pattern . There initially was uncertainty in the storm 's future movement , due to a ridge in the Gulf of Mexico . Tropical cyclone prediction models differed on their assessments ; three models anticipated a turn to the northeast toward Florida due to a trough , while others predicted a continued slow motion to the west @-@ northwest , eventually reaching the Bay of Campeche . After continued strengthening , Keith became a hurricane on September 30 , just 18 hours after becoming a tropical storm , and making it the seventh such storm of that intensity of the season . That day , an eye began developing as the structure became much better organized . In a 13 ? hour period beginning at 1808 UTC on September 30 , Keith underwent explosive deepening , as its barometric pressure dropped at a rate of nearly 3 mbar (0 @.@ 089 inHg) per hour . The NHC noted that Keith experienced conditions " ideal for strengthening " , with the exception of the approaching land interaction with the Yucatán peninsula . The hurricane slowed until stalling offshore eastern Belize , caused by the ridge to the north and the precursor to Tropical Storm Leslie forming over Cuba . By early on October 1 , Keith had developed a well @-@ defined eye about 20 mi (32 km) in diameter , with what the NHC described as a " spectacular appearance . " Later that day , Hurricane Hunters estimated a minimum pressure of 939 mbar (27 @.@ 7 inHg) and deployed a dropsonde that observed peak winds of 176 mph (283 km / h) . Based on the data , the NHC estimated that Keith attained peak winds of 140 mph (230 km / h) at 0700 UTC on October 1 , while just offshore eastern Belize . This made it a Category 4 on the Saffir @-@ Simpson Hurricane Scale .

Shortly after Keith reached peak intensity , the eye had moved over portions of Belize , causing it to lose definition . Outflow became restricted , and the developing disturbance to the northeast increased wind shear . As a result , Keith began to weaken steadily , moving over Ambergris Cay and Caye Caulker as a Category 3 hurricane late on October 1 . While remaining nearly stationary , Keith made a second landfall on Ambergris Cay late on October 2 as a minimal hurricane . Shortly thereafter , Keith weakened into a tropical storm , and its convection became limited to the southeastern quadrant . At 0300 UTC , the storm made landfall about 30 mi (48 km) north of Belize City , and within nine hours weakened into a tropical depression . The building ridge to the north caused the system to accelerate more to the west @-@ northwest across the Yucatán peninsula . Early on October 4 , Keith emerged into the Bay of Campeche , where favorable conditions allowed convection to quickly redevelop . Later that day , it re @-@ intensified into a tropical storm , with improved outflow and convective organization . On October 5 , the Hurricane Hunters reported a circular eye had reformed along with winds supporting an upgrade to hurricane status . Keith intensified further that day , until it made its final landfall 23 mi (37 km) north of Tampico with winds of 90 mph (140 km / h) . It rapidly weakened over the high terrain of northeastern Mexico , dissipating late on October 6 .

= = Preparations = =

On September 29 , shortly after Keith formed , a hurricane watch was issued for the Yucatán peninsula from Chetumal to Cabo Catoche in Quintana Roo . The next day as Keith was nearing hurricane intensity , the watch was upgraded to a warning , and a tropical storm warning and hurricane watch was issued for the Belize coastline from Belize City to the Mexican border . At that time , the trajectory was expected to go more to the northwest , and when the storm turned to a slow westward drift , hurricane warnings were issued for the Belize coast with only about 24 hours of lead time for the offshore islands . The warnings for the Yucatán peninsula were dropped as Keith weakened .

On October 2 , the government of Belize declared a state of emergency and activated the entire Belize Defence Force due to the storm 's threat . The airport in Belize City was closed during Keith 's passage , limiting transportation from the country 's mainland to its offshore islands . In Corozal , Belize , authorities evacuated the entire city of 10 @, @ 000 people to numerous shelters in Orange Walk . Officials were also ordered evacuations for Belize City , setting up shelters in Belmopan . Overall , about 25 @, @ 000 people evacuate , or about 10 % of Belize 's population . Three

hospitals were evacuated in the country . In a post @-@ storm assessment , residents on the offshore islands acknowledged they were unprepared for the storm and did not anticipate such intensity .

In Quintana Roo , 5 @,@ 000 people from Chetumal and surrounding low @-@ lying areas were forced to evacuate to 30 shelters . Offshore along a coral reef , about 50 fishermen stayed on a coral reef during the storm . In the Bay of Campeche , Pemex evacuated about 6 @,@ 300 workers from its offshore oil platforms . Officials in Yucatán and Veracruz declared states of emergency . When Keith reached the Gulf of Mexico and began re @-@ intensifying , a hurricane warning was issued from Tuxpan to Matamoros in northeastern Mexico , with a tropical storm watch issued northward to Port Mansfield , Texas . About 3 @,@ 000 residents in Tamaulipas evacuated to 250 shelters , and in neighboring Veracruz , about 175 people left their houses before the storm struck . The threat of Hurricane Keith caused Mexican authorities to close most ports along the gulf coast , and many schools in the area were closed .

= = Impact = =

Keith 's slow and erratic movement caused it to produce strong winds and heavy rainfall in Central America . Belize bore the brunt of the storm , with about \$ 280 million in damage and 19 confirmed fatalities , primarily related to flooding . Several other countries reported significant but less severe flooding , including El Salvador , Guatemala , Honduras , Mexico , and Nicaragua . Overall , Keith was responsible for 40 deaths , as well as approximately \$ 319 million in damage .

= = = Belize = = =

While Keith was offshore from Belize , northerly winds blew water out of the Bay of Chetumal . There were reports of people walking onto the temporarily dry bay floor , despite the potential for the waters to return in the event of shifting winds . At Caye Caulker , the hurricane produced a 4 ft (1 @.@ 2 m) storm surge from the west . Winds were unofficially estimated to have reached 125 mph (201 km / h) in the offshore islands of Belize . Wind gusts on the mainland reached 61 mph (98 km / h) at Philip S. W. Goldson International Airport . Due to its slow motion , Keith dropped heavy rainfall , amounting to over 10 in (250 mm) in many parts of the country . The highest recorded precipitation total was 32 @.@ 67 inches (830 mm) at the international airport in Belize City .

The strong winds destroyed 130 houses in Belize . Two hotel roofs were wrecked , and the winds knocked down trees and power lines . Widespread areas of Belize lost power and telephone service , including Belize City . There , the heavy rainfall flooded streets , reaching 3 ft (0 @.@ 91 m) deep . Twenty homes were damaged to some degree in the capital , while many more suffered minor roof damage . The rains flooded the first floor of the primary hospital in the city , causing severe damage . Nationwide , 11 health facilities were damaged . Elsewhere in the country , the rains increased levels along rivers , including the Belize River , Rio Hondo , and New River . The Belize River rose for several days after the storm , reaching record levels of 21 ft (6 @.@ 6 m) in width , which isolated 15 villages . Flooding covered Northern Highway and Western Highway as well as the primary bridge from Belmopan to the rest of Cayo District . Residual floodwaters persisted due to the low @-@ lying land of the country and poor drainage . Floods contaminated water supply in the northern four districts , causing an E. coli outbreak and food poisoning . In Belize , Corozal , and Orange Walk districts , about 30 % of the houses were severely damaged by flooding .

Damage was heaviest in the northern offshore islands and in the northern portion of the mainland . On the offshore islands , downed trees and power lines blocked most roads . In Caye Caulker and San Pedro , Keith damaged the roofs of about 90 % of houses and damaged or destroyed 676 houses , leaving 3 @,@ 279 people homeless . About 50 % of the houses in Caye Caulker were destroyed , with reports of only five dwellings still standing after the storm . In San Pedro , about 30 % of houses , or at least 50 , were wrecked . On Ambergris Caye , four airplanes were destroyed . At Turneffe Atoll , about 35 % of the landmass was affected , with many trees in that section uprooted and numerous tree branches snapped .

Five individuals died in maritime accidents involving at least one catamaran . There was an accident involving a bus carrying evacuees , killing four people on board . Three people died on the offshore Ambergris Caye . Overall , 19 people perished in the country . Several injuries , mainly from flying debris , were reported in San Pedro , and there were 142 people who were injured in the storm . Throughout the country , approximately 3 @, @ 279 homes were either damaged or destroyed . The damage total from Keith was initially estimated at \$ 200 million , about half of which to tourism facilities ; the remainder was roughly split between crop and infrastructure damage . About 75 % of the crops in the country were damaged , including much of the corn harvest that was expected to begin in October . The damage total was later estimated at \$ 280 million , most of it on the offshore Ambergris Cay and Caye Caulker .

= = = Mexico = = =

Hurricane Keith caused damage in three Mexican states ? Quintana Roo along the Yucatán peninsula , Tamaulipas where the hurricane made landfall , and Sonora farther inland . In Quintana Roo , Keith left \$ 2 @. @ 7 million (2000 MXN , \$ 294 @, @ 000 2000 USD) in damage , and caused an additional \$ 39 @. @ 7 million (2000 MXN , \$ 4 @. @ 2 million 2000 USD) in indirect costs . While crossing the Yucatán peninsula , Keith dropped heavy rainfall , including over 10 in (250 mm) in Campeche state . Chetumal , Quintana Roo reported 9 @. @ 65 in (245 mm) of precipitation .

When Keith made its final landfall , Tampico reported tropical storm force winds , with gusts to 63 mph (101 km / h) . The winds damaged billboards and some trees in the city , and elsewhere along the coast , Keith knocked down trees and power lines . About 200 @, @ 000 people in northeastern Mexico lost power , and 100 @, @ 000 people were left without water . About 400 houses were damaged in Veracruz , and many roads and bridges were destroyed . Heavy rainfall occurred in the interior of northeastern Mexico , peaking at 24 @. @ 55 in (624 mm) in González , Tamaulipas . In a reporting station in the municipality of Gómez Farías , the pluviometer reported a 24 @- @ hour rain total of 13 @. @ 24 inches (336 mm) , and a storm total of 18 @. @ 44 inches (468 mm) , which broke the precipitation record for that location , which counted with 35 years of data . This rain also caused rivers to reach record levels , as the Sabinas River rose 10 @. @ 95 m (35 @. @ 9 ft) on October 6 , to a new historical peak , and the Guayalejo River rose 77 @. @ 46 ft (23 @. @ 61 m) , slightly under the 1976 record . This rainfall caused the Las Ánimas dam to catch 525 @, @ 000 acre feet (648 @, @ 000 @, @ 000 m³) of water between October 5 and October 17 ; however , some of this water had to be released , as the upstream face of the dam was damaged by debris , and had to be repaired . Overall , the storm produced \$ 117 @. @ 8 million in damage (2000 MXN , \$ 12 @. @ 4 million 2000 USD) in the state .

In Nuevo León , the remnants of Keith interacted with a cold front to produce heavy rainfall , reaching 14 @. @ 43 in (367 mm) in Sabinas . The average precipitation in the state was 5 inches (130 mm) , and the deluge caused causing mudslides in several cities , including San Pedro , Guadalupe and Escobedo . High rainfall also caused flash flood in mountainous areas near Monterrey , forming swift river currents that rose up to 9 @, @ 000 ft³ / s (250 m³ / s) , and dragged 130 people into local rivers ; however , all were rescued . The rivers also dragged 30 vehicles , all of which were moderate to total losses . The storm runoff caused the El Cuchillo dam to receive 105 @, @ 000 acre feet (130 @, @ 000 @, @ 000 m³) of water daily , and the La Boca dam to receive 810 acre feet (1 @, @ 000 @, @ 000 m³) per hour . About 13 @, @ 000 residents lost power . About 5 @, @ 000 people were forced evacuated from several municipalities in the state , including 2 @, @ 465 from Monterrey and 1 @, @ 900 from rural areas , at a cost of \$ 400 @, @ 000 (2000 MXN) . The total damages in the state rose to \$ 115 @. @ 6 million (2000 MXN , US \$ 12 @. @ 2 million in year 2000) , with the damage to urban infrastructure being the most expensive portion of the damage , with \$ 44 @. @ 2 million (2000 MXN , US \$ 4 @. @ 6 million in 2000) used to repair damage in eight municipalities ; in particular , San Pedro Garza García received approximately three quarters of the infrastructure damage , with \$ 30 @. @ 8 million (2000 MXN , \$ 3 @. @ 3 million 2000 USD) . Additionally , about 460 homes were damaged or destroyed , and 300

families had to be relocated to safer areas .

In other states , damage was lighter , but still significant . In Sonora , total damages rose to \$ 64 @. @ 4 million (2000 MXN , \$ 6 @. @ 8 million 2000 USD) ; in Chiapas , \$ 25 @. @ 6 million (2000 MXN , \$ 2 @. @ 7 million 2000 USD) of property damage were caused by the storm . This brings up the total damage in Mexico to \$ 365 @. @ 9 million (2000 MXN , \$ 38 @. @ 7 million 2000 USD) . In Tabasco , flooding damaged 7 @, @ 896 houses . Approximately 24 @, @ 000 residents in the state were impacted by flooding . At the capital city of Villahermosa , large rivers in the area overflowed , flooding some streets . However , dikes and sandbags along the banks of the rivers prevented further flooding . Overall , about 46 @, @ 000 people had to evacuate Mexico due to the storm and its flooding . There was one fatality when a man in Tampico was electrocuted by a downed power line . In Xicoténcatl , Tamaulipas , a swollen river killed a family of six when their house was flooded . Overall , Keith killed 23 people in Mexico ? 13 in Veracruz , 4 in Puebla , and 6 in Tamaulipas . There were six indirect deaths when a plane crashed while attempting to land in Reynosa , Tamaulipas .

= = = Elsewhere = = =

The outerbands of Keith brought intermittent rainfall to several areas of Cuba , though the amounts were very light . While Keith was organizing , the storm drew moisture from the eastern Pacific Ocean across Central America , producing heavy rainfall . In Guatemala , the rains caused flooding in ten towns and inundated approximately 500 farms in the Melchor de Mencos municipality with about 4 inches (100 mm) of water . Additionally , one fatality was reported . Governor of Petén Department Adán Regalado remarked that , " many communities are cut off by flooded rivers " . In El Salvador , a 20 @- @ year @- @ old man drowned in a river , and 200 families had to evacuate after several houses were damaged or destroyed . Rainfall in Honduras forced over 200 families to evacuate their houses . One person died when a wall collapsed , and there were five other fatalities an aircraft disappeared near Roatan Island . A bridge along the Pan @- @ American Highway between Honduras and Nicaragua was destroyed , which had been rebuilt following Hurricane Mitch . Additionally , a government agency reported that as many as 80 @, @ 000 people in southern Honduras were left isolated .

In Nicaragua , floods from the storm forced 3 @, @ 962 people to evacuate their houses to 57 shelters , many of which were schools . Floods affected 11 of the 17 Departments of Nicaragua , which began receding on October 5 as Keith exited the region . The floods caused several landslides and covered roads , which isolated communities . Keith damaged 436 houses in the country and destroyed another 160 . There were 12 fatalities due to the storm in Nicaragua , one of whom a boy who was swept away by a fast moving flooded river northeast of Managua , while another death occurred after a man drowned in Lake Managua . A man in the western portions of the country died after stepping on a power lines , which had fallen due to strong winds . Fifty communities were isolated , with at least thirteen of them due to impassable roads . Several neighborhoods in Corinto flooded , forcing the Civil Defense to evacuate 9 families . One house collapsed in Los Ángeles , though its ten occupant escape without injury . After rainfall lashed In Villanueva , Chinandega , for six days , the resultant flooding forced 300 families evacuated , while there was significant losses the corn , beans and plantains crops . An additional 20 families left their homes due to flooding in Poneloya . About 15 families in the port city of Puerto Sandino were evacuated after the El Contrabando river overflowed . Another 18 homes were flooded in the region of Salinas Grandes . About 52 fled Troilo after at least 11 homes flooded .

= = Aftermath = =

On October 3 , a Belize ambassador issued an appeal to the international community for food and money due to the damage from Keith . United Nations Development Programme received \$ 30 @, @ 000 from the Government of Norway to give immediate relief to the country of Belize . United Nations Children 's Fund also gave out \$ 150 @, @ 000 for relief in areas not focused on by other

relief groups . The Peace Corps , the Red Cross , and the United States Navy black hawk helicopters worked together to deliver rice , corn , sugar , salt , cooking oil , toilet paper , and medications to about 700 families in Bermuda Landings and adjacent isolated villages . The American Red Cross donated about \$ 28 @, @ 500 and 4 @, @ 080 family hygiene kits . Between October and November 2000 , the National Society distributed 5 @, @ 289 food and hygiene parcels to 26 @, @ 293 people in Belize City , Orange Walk , and Belmopan . Around that time , the Belize Red Cross Society (BRCS) distributed relief items to 4 @, @ 622 victims in Belize City . The BRCS also shipped two containers with kitchen sets and water buckets for 1 @, @ 600 families , donated by the German Red Cross . A donation account to help the relief effort , titled Hurricane Keith Relief Fund , was set up by the town of Placencia , in the local Atlantic Bank . The Belize Consulate in California also set up a donation fundraiser . Placencia also delivered a boat full of donated food , clothing , and building supplies to the San Pedro and Caye Caulker area .

In the immediate aftermath , officials enacted a curfew for Belize City , Caye Caulker and San Pedro to curtail looting , and the latter two areas were declared disaster areas . The entirety of the northern three districts (out of six total) were also declared disaster areas . There were initial difficulties in determining the needs in the affected residents , due to cut communications . The government sent planes with emergency supplies to the most affected offshore islands . Several emergency teams were sent to Caye Caulker and San Pedro as soon as weather conditions permitted it . Widespread road repairs also began almost immediately after Keith 's occurrence . The Belize International Airport was back online by the morning of October 4 , only a single day after the tropical cyclone passed through the area . By that time , boat service was re @-@ instated with the most affected areas to pick up stranded tourists . Workers quickly restored power and water in Belize City . In the days after the storm struck , residual flooding sparked fears for the spread of disease . In Orange Walk and Cayo District , residents were advised to stay indoors to avoid bites from poisonous snakes .

In Nicaragua , the United States ambassador declared a disaster , which prompted various United Nations departments to provide \$ 25 @, @ 000 to the country .

The name Keith was retired in the spring of 2001 and will never again be used for a North Atlantic hurricane . The name was replaced with Kirk for the 2006 Atlantic hurricane season . However , since the name Kirk was not used during the course of 2006 , it was then first used during the 2012 Atlantic hurricane season .