

= October 2008 Central America floods =

The October 2008 Central America floods were caused by a series of low pressure areas including Tropical Depression Sixteen , a short @-@ lived tropical cyclone in the 2008 Atlantic hurricane season that made landfall in Honduras . Heavy rainfall began in early October 2008 while a tropical wave passed through the region . On October 14 , Tropical Depression Sixteen formed just off the northeast coast of Honduras , and at the same time a low pressure system was on the Pacific coast . Both systems increased rainfall across the region , although the depression dropped heavy rainfall close to its center when it moved ashore on October 15 . Although Tropical Depression Sixteen quickly dissipated over land , its remnants persisted for several days . Another low pressure area interacted with a cold front on October 21 , adding to the rainfall in the region .

Heavy rainfall extended from Costa Rica to southeastern Mexico , causing what was considered the worst natural disaster in the region since Hurricane Mitch in 1998 . In the former country , rainfall totaled 2 @, @ 100 mm (83 in) over several weeks , making the week ending October 17 the wettest in San José since 1944 . Floods in Costa Rica damaged 32 bridges and roads in 174 locations , while 1 @, @ 396 homes were damaged , killing seven people . In Nicaragua to the north , weeks of heavy rainfall killed 16 people and damaged or destroyed 1 @, @ 333 houses . In Honduras where the tropical depression made landfall , rainfall reached 1 @. @ 2 m (4 ft) in some areas , although the highest official total there related to the depression was 360 mm (14 @. @ 19 in) on the offshore Roatán over six days . About 40 % of municipalities in the country experienced flooding , forcing over 50 @, @ 000 people to leave their homes . The floods damaged about 50 % of roads in Honduras , and over 10 @, @ 000 houses were damaged or destroyed . Damage totaled about 3 billion lempiras (HNL , \$ 225 million USD) , and there were 60 deaths .

In northern Guatemala , the floods damaged about 67 @, @ 000 ha (170 @, @ 000 acres) of crop fields , accounting for Q128.9 million (2008 GTQ , \$ 16 @. @ 8 million USD) in crop damage . There were 17 deaths and about 4 @, @ 000 damaged houses in Guatemala . In neighboring El Salvador , the rains contributed to October 2008 being the third wettest month across the country , after Hurricane Stan in 2005 and Hurricane Mitch in 1998 . One person died , and hundreds were forced to evacuate their houses . In Belize , the rains flooded about 1 @, @ 000 homes , forcing the evacuation of one entire town due to health reasons . The rains caused additional flooding following Tropical Storm Arthur striking the country in May , damaging a bridge that was rebuilt after Arthur . Nationwide , the floods caused BZ \$ 54 @. @ 1 million (BZD , \$ 27 @. @ 1 million USD) in damage and two deaths .

= = Meteorological history = =

Widespread rainfall occurred throughout Central America in early October 2008 due to the passage of a tropical wave through the region . Later , another tropical wave approached the region , which was believed to have left the west coast of Africa on September 17 . The wave developed a low pressure area on October 10 in the southwestern Caribbean , with sporadic convection . On October 13 , the system consisted of a large area of convection drifting northward offshore eastern Central America , and Dvorak classifications began , indicating gradual organization . At that time , there was another low pressure area on the Pacific coast , and both systems were producing rainfall across Central America .

At 1200 UTC on October 14 , the National Hurricane Center (NHC) indicated that Tropical Depression Sixteen developed about 85 km (50 mi) northeast of Cabo Gracias a Dios , a point where the border of Nicaragua and Honduras meet the Caribbean . In the hours after the depression 's formation , the convection decreased , and Hurricane Hunters indicated that the small low @-@ level circulation was rotating around a broader circulation . Shortly after 1200 UTC on October 15 , the weak tropical depression made landfall just west of Punta Patuca in northern Honduras , with a broad and ill @-@ defined circulation . Continuing west @-@ southwestward over land , the circulation dissipated on October 16 over the mountains of central Honduras , although the depression 's remnants continued to produce rainfall across the region for several days . On

October 21 , a cold front was moving through the Yucatán peninsula , interacting with a newly formed low in the Gulf of Honduras to produce additional rainfall .

= = Preparations = =

Around the time when the NHC began issuing advisories on the depression , officials issued a tropical storm warning for northern Honduras that eventually covered the country 's entire coastline . A tropical storm warning was also issued for the coast of Belize . When the NHC began issuing advisories on the depression , the agency anticipated the depression would intensify into a strong tropical storm , based on low wind shear and warm sea surface temperatures ; however , the agency noted uncertainty in the track . A ridge to the north was expected to steer the nascent depression westward , and two tropical cyclone forecast models predicted the storm would continue west @-@ northwestward to strike Belize . Other models forecast a more immediate landfall , which would limit intensification . While the storm was active , officials in Honduras issued a yellow alert for seven departments where heavy rainfall had occurred . A nationwide yellow alert was also issued for El Salvador , meaning there was potential for flooding and landslides , although alerts were dropped on October 21 when the threat of rainfall diminished .

= = Impact = =

Although a weak tropical cyclone , the depression and its remnants dropped heavy rainfall across Central America for several days , spreading into Nicaragua , Honduras , Guatemala , and Belize . In Honduras where it made landfall , rainfall peaked at 360 mm (14 @.@ 19 in) on the offshore Roatán over six days . A member from Mercy Corps estimated the rainfall in October to have totaled around 1 @.@ 2 m (4 ft) in some areas . On the mainland , rainfall reached 266 mm (10 @.@ 47 in) at El Empalme . In El Salvador , the depression dropped heavy rainfall , mainly in the southern coastal portion , with a 24 ? hour peak of 239 mm (9 @.@ 40 in) in Puerto Parada en La Unión . Over a period of eight days , rainfall in Belize reached 547 mm (21 @.@ 52 in) at Baldy Beacon . Rainfall extended as far north as southeastern Mexico . Throughout the region , the flooding destroyed about 10 @,@ 000 homes and left about 250 @,@ 000 people homeless . News agencies considered the flooding the worst in the region since Hurricane Mitch in 1998 .

According to Costa Rica 's National Meteorology Institute , the week ending on October 17 was the wettest in San José since 1944 . Over a period of several weeks , rainfall reached about 2 @,@ 100 mm (83 in) . The influence between the precursor to the depression and a low pressure area in the eastern Pacific caused flooding in Costa Rica that killed seven people . In Guanacaste Province , a landslide covered three cars , and in Monteverde , another landslide knocked over a power line that killed two people . In Parrita , an ambulance carrying four people was struck by a fallen tree , while in Puntarenas , another vehicle was struck by a tree , killing one of its occupants . Transport was disrupted in widespread areas in the north and south of the country due to landslides blocking roads . Across the country , the floods compromised roads in 174 locations and damaged 32 bridges . Flooding isolated about 6 @,@ 900 people in 75 communities , and about 77 @,@ 000 people were forced to leave their homes . Power outages affected 89 communities , and 424 water wells along the Pacific coast were polluted . Nationwide , the floods damaged 1 @,@ 396 houses and 39 schools .

In early October , heavy rainfall began affecting Nicaragua , causing mudslides and flooding . The tropical depression added to weeks of heavy rainfall that killed 16 people , many caused by people attempting to cross swollen rivers . Toward the end of October 2008 , Lake Managua overflowed , causing flooding in the capital city of Managua . Across the country , 2 @,@ 273 people evacuated to storm shelters after the floods damaged or destroyed 1 @,@ 333 houses . Transportation was disrupted when the floods wrecked four bridges and 154 mi (248 km) of highways . Classes were canceled in León and Chinandega departments . The crops in the latter department were almost entirely destroyed .

Following months of drought conditions , the heavy rainfall in Honduras caused flooding , initially in

the southern and central portions , although the entire country experienced rainfall , with 40 % of municipalities experiencing flooding . The rains caused widespread landslides , particularly in the western and central portions . In the capital city Tegucigalpa , the rainfall in October was estimated to have been twice the average annual total . In two locations , the Pan @-@ American Highway was disrupted by either landslide or flooding , and widespread areas were isolated nationwide by flooded roads . According to Reuters , about 50 % of the roads in Honduras were damaged during the floods , with 227 roads and 106 bridges damaged . A landslide near Corquín blocked a river and created a natural dam , forcing hundreds of nearby residents to leave . In Colón Department , the Tocoa River overflowed , while flooding in Atlántida damaged crop lands . A total of 101 @, @ 107 ha (249 @, @ 840 acres) of crops were damaged , mostly in Comayagua Department . 14 water systems were damaged , and 150 @, @ 000 people lost power in Olancho Department . Landslides in Tegucigalpa killed six and displaced about 500 people . In El Progreso , 375 inmates from a jail had to be evacuated to another facility . A total of 50 @, @ 676 people were forced to evacuate in the country , most of whom stayed in shelters . 2 @, @ 474 homes were destroyed in Honduras , with another 8 @, @ 688 damaged or flooded . In addition , at least nine schools were damaged or destroyed . Nationwide , the floods killed 60 people , and damage was estimated at about 3 billion lempiras (HNL , \$ 225 million USD) . The low death toll compared to Hurricane Mitch was largely due to the widespread evacuations .

Floods in Guatemala overflowed rivers and caused landslides in Izabal and Petén departments , blocking many roads . The rising rivers damaged about 175 houses , forcing hundreds of people to leave their homes . About 67 @, @ 000 ha (170 @, @ 000 acres) of crop fields were damaged or destroyed , including corn , rice , and beans , and crop damage nationwide was estimated at Q128.9 million (2008 GTQ , \$ 16 @. @ 8 million USD) . About 2 @. @ 5 % of the national corn crop and 3 @. @ 7 % of the rice crop were wrecked during the floods . Nationwide , about 4 @, @ 000 houses and 82 roads were damaged or destroyed , and 17 people died in the country from the floods . In neighboring El Salvador , floods affected the houses of about 600 families . High levels forced officials to release water from several dams , causing urban flooding . Along the coastline , the floods damaged maize and bean crops . The average rainfall across El Salvador for the month of October was 475 mm (14 @. @ 76 in) . This was the third highest for October since such record keeping began in 1971 , after 2005 when Hurricane Stan struck and 1998 when Hurricane Mitch crossed the area . The tropical depression killed one person in the country .

In Belize , the rainfall in one week represented the average monthly values at some stations . Heavy rainfall from the depression caused levels to rise along rivers and creeks . A bridge that had been rebuilt following earlier Tropical Storm Arthur was flooded , prompting the Belize Defence Force to assist in crossings . This isolated much of Cayo District from the rest of the country until the bridge was repaired . On the western portion of the district , flooding along the Macal River damaged a bridge crossing into northern Guatemala , which restricted traffic only to people returning home . Levels along the Macal and the Belize River were higher than the floods of Hurricane Mitch in 1998 , but less than that of Hurricane Keith in 2000 . The floods caused residents to evacuate after over 1 @, @ 000 homes were flooded ; 311 people stayed in shelters , while the remainder stayed with families and relatives . Of the affected houses , 12 were destroyed and 802 were severely damaged . Most of the affected population was in rural areas of western Belize . One village in Orange Walk District had to be quarantined due to the health threat from the floods for 25 days . Many roads were closed , and there were widespread school closures . Overall , the floods killed two people in the country and caused BZ \$ 54 @. @ 1 million (BZD , \$ 27 @. @ 1 million USD) in damage . Most of the damage was agricultural , accounting for BZ \$ 28 @. @ 2 million (BZD , \$ 14 @. @ 1 million USD) , or 25 % of the country 's agricultural gross domestic product . Other damage included BZ \$ 11 @. @ 7 million (BZD , \$ 6 @. @ 3 million USD) to roads and bridges . The ongoing floods caused BZ \$ 2 @. @ 7 million (BZD , \$ 1 @. @ 5 million USD) in tourism losses , due to closed facilities and water damage .

= = Aftermath = =

Following the floods in Costa Rica , the country 's Red Cross opened shelters to house storm victims . The government advised residents not to drink water out of fear it could be polluted from the flooding . A state of emergency was declared on October 18 due to the effects in Costa Rica . In Nicaragua , officials deployed about 3 @, @ 000 soldiers to assist in flood operations . The World Food Programme provided about 8 tons of food to families in El Salvador affected by the flooding . Then @-@ president of Honduras Manuel Zelaya declared a national state of emergency on October 19 . In Honduras , pre @-@ positioned supplies from UNICEF quickly diminished due to the widespread distribution of blankets and medical kits , raising fears for the spread of disease . The World Food Programme provided about 58 tons of food to 5 @, @ 500 families in Honduras . Residents returned home as floodwaters gradually receded . The Mercy Corps later provided corn and bean seeds to 1 @, @ 300 Honduran farmers to regrow the damaged crops . In May 2009 , the World Bank provided \$ 25 million (USD) to Honduras to rebuild damaged roads and bridges . Workers in Guatemala airlifted food to storm victims due to residual flooding . The Guatemalan government provided \$ 6 @. @ 6 million to residents in the northern portion of the country , including medical supplies and seeds to regrow crops . A state of emergency was declared for Cayo District in Belize . Search and rescue teams were deployed to the district , and medical crews visited several towns , providing help to 3 @, @ 000 people . The Belize National Emergency Management Organization provided meals to about 9 @, @ 000 people following the floods .

Across the affected areas , the Red Cross spent about \$ 247 @, @ 000 to provide food and blankets . In the weeks and months following the flooding , various international groups provided aid totaling nearly \$ 11 million . The United States donated \$ 622 @, @ 732 worth of assistance , mainly to help with logistical work and relief efforts . The United States military also worked to purify drinking water in Honduras . Canada donated \$ 412 @, @ 201 worth of assistance , including providing shelter in Honduras and rebuilding schools . The country of Brazil donated about \$ 1 @. @ 68 million worth of food . The Humanitarian Aid and Civil Protection department of the European Commission provided nearly \$ 2 @. @ 2 million for relief efforts . Other European country donations included nearly \$ 500 @, @ 000 from Ireland for hygiene and food supplies , \$ 675 @, @ 675 from the Netherlands for general relief efforts , \$ 154 @, @ 570 from Spain through the World Food Programme , \$ 159 @, @ 559 from Germany for shelters , and \$ 892 @, @ 468 from Sweden . Several Asian countries donated to the relief efforts , including \$ 123 @, @ 810 from Japan to Honduras to purchase emergency goods , \$ 22 @, @ 000 from South Korea , and \$ 10 @, @ 000 from Singapore to Honduras . Non @-@ governmental organizations and other groups providing aid included \$ 1 @. @ 5 million from the Central Emergency Response Fund , \$ 300 @, @ 000 from the Bill & Melinda Gates Foundation , \$ 120 @, @ 000 from Catholic Relief Services , and \$ 289 @, @ 000 from ACT Alliance .

In November , weeks after the tropical depression struck Honduras , Tropical Storm Paloma formed in the western Caribbean and caused additional rainfall in the region .