

= Hurricane Pauline =

Hurricane Pauline was one of the deadliest Pacific hurricanes to make landfall in Mexico . The sixteenth tropical storm , eighth hurricane , and seventh major hurricane of the 1997 Pacific hurricane season , Pauline developed out of a tropical wave from Africa on September 16 , 1997 , moving across South America and into the Pacific Ocean . On October 5 , the depression intensified into a tropical storm early the next day and by October 7 , Pauline had reached hurricane intensity . It initially moved eastward , then turned northwestward and quickly strengthened to reach peak winds of 135 mph (215 km / h) . It paralleled the Mexican coastline a short distance offshore before weakening and making landfall near Puerto Angel , on October 9 , and dissipated the next day .

Hurricane Pauline produced torrential rainfall along the Mexican coastline , peaking at 32 @. @ 62 inches (930 mm) in Puente Jula . Intense flooding and mudslides in some of the poorest areas of Mexico killed between 230 and 500 people , making it one of the deadliest Eastern Pacific storms in recorded history . The passage of the hurricane destroyed or damaged tens of thousands of houses , leaving around 300 @, @ 000 people homeless and causing \$ 447 @. @ 8 million in damage (1997 USD) .

= Meteorological history =

A tropical wave exited the coast of Africa on September 16 . It traversed steadily westward , with the southern portion of the wave axis moving across northern South America . On September 26 the wave entered the eastern Pacific Ocean near Panama , and slowly organized . A weak low @- @ level trough extended from the Caribbean Sea to south of Mexico , disrupting the normal flow of westward steering currents . On October 3 , the tropical wave developed a distinct area of deep convection , and began to drift eastward to the south of Mexico . Two days later a low @- @ level circulation formed , and midday on October 5 the system developed into Tropical Depression Eighteen @- @ E while located about 250 miles (410 km) south @- @ southwest of Huatulco in the state of Oaxaca .

With an absence of vertical wind shear , the depression drifted just south of due east and steadily organized . The system developed banding features and a central dense overcast , and early on October 6 the depression intensified into a tropical storm and was named Pauline while located about 295 miles (475 km) south @- @ southeast of Salina Cruz , Oaxaca . A strong high pressure system eroded the trough over southeastern Mexico , which turned Pauline to the northeast . An eye feature developed late on October 6 , and early the next day Pauline intensified into a hurricane about 265 miles (425 km) southeast of Salina Cruz after turning to the north and northwest .

Pauline rapidly intensified after becoming a hurricane with favorable conditions for continued development , and 18 hours after becoming a hurricane it attained a peak intensity of 135 mph (215 km / h) . The winds of the hurricane weakened slightly to 115 mph (185 km / h) , but on October 8 Pauline re @- @ strengthened to reach winds of 135 mph (215 km / h) a short distance off the coast of Mexico . The hurricane turned more to the west @- @ northwest while paralleling the southern coast of Oaxaca , and Pauline quickly weakened due to interaction with the mountainous terrain before landfall near Puerto Ángel as a 110 mph (175 km / h) hurricane early on October 9 . The tropical cyclone continued to weaken as it paralleled the coast a short distance inland . On October 10 , Pauline dissipated over the state of Jalisco .

= Preparations =

Early forecasts underestimated the peak intensity of Pauline by 65 mph (105 km / h) . On October 7 , about 41 hours before landfall , the government of Mexico issued a hurricane warning from Tapachula in Chiapas to Punta Maldonado in Guerrero . Shortly after Pauline made landfall , the warning was extended northwestward to Manzanillo , Colima , and later to Puerto Vallarta , Jalisco . Pauline 's turn to the west @- @ northwest near landfall was unexpected , resulting in hurricane conditions with only a few hours notice in some areas .

Authorities in El Salvador declared a national state of alert in response to the potential threat from the hurricane . Residents in flood @-@ prone areas were warned of potential flash flooding . As the hurricane turned sharply to the northwest , there are no reports of damage or deaths from Pauline in the country . Officials in Puerto Madero closed port facilities to all ships , excluding ships in open seas seeking shelter . The government ultimately closed six major ports between Acapulco and Puerto Madero . State authorities in Oaxaca opened 75 emergency shelters and prepared 50 schools to house 10 @,@ 000 people .

= = Impact = =

Few surface observations were taken during the passage of the hurricane , though officials reported that southern Mexico experienced the brunt of the storm . Puerto Escondido , Oaxaca , near where Pauline made landfall , reported a peak wind gust of 70 mph (115 km / h) several hours before the hurricane moved through the area ; no reports were available after that time . An anemometer in Acapulco reported a wind gust of 59 mph (95 km / h) with sustained winds of 46 mph (75 km / h) . However , officials estimate Pauline might have been a hurricane while passing through the area . The hurricane produced very heavy rainfall along its path , with many areas receiving more than 15 inches (381 mm) . According to the Comision Nacional del Agua , precipitation was recorded at 2 @,@ 132 sites . The two highest reported rainfall totals are 27 @.@ 1 inches (688 mm) at San Luis Actlan , and 32 @.@ 62 inches (930 mm) at Puente Julia , near Paso Overjas . This made Pauline the wettest tropical cyclone in the history of Guerrero . In Acapulco , the hurricane dropped 16 @.@ 9 in (430 mm) of rainfall in 24 hours . This broke the city precipitation record set originally in 1974 ; the 1997 total represented about 25 % of the city 's annual rainfall . Seas of about 30 ft (9 m) were reported along the Oaxaca coastline while the hurricane made landfall .

Hurricane Pauline lightly affected the state of Chiapas , but severely affected Oaxaca and Guerrero , two of the poorest regions of Mexico . The area most impacted was the region in and around Acapulco . Throughout the country , Hurricane Pauline resulted in \$ 447 @.@ 8 million in damage (1997 USD) . A report issued by the United Nations Department of Humanitarian Affairs reported 137 deaths three days after Hurricane Pauline . Four days after the passage of the hurricane , a Reuters news report stated there were 173 dead with about 200 missing , while the government of Mexico issued a statement reporting 149 deaths . Ultimately , media reports indicated a death toll of at least 230 people , and the Mexican Red Cross estimated 400 dead and at least 1 @,@ 900 missing . The Church World Service estimated at least 500 people were killed . Relief Web suggests that 217 fatalities were reported and 600 @,@ 000 people were impacted . Approximately 300 @,@ 000 people were left homeless due to the storm .

= = = Environment = = =

The hurricane caused severe damage to the environment ; 200 square miles (700 km ²) of low @-@ lying rainforest and pine and evergreen oak woodlands were greatly damaged in southern Mexico . Strong waves produced severe beach erosion in some locations . The erosion affected two nesting cycles for the Olive Ridley turtle , destroying about 40 million eggs . Nearly 806 @,@ 000 nests were affected , and about 50 % of these were wiped out . The deadliest and most intense hurricane to hit southern Mexico since 1959 , the hurricane was the first documented hurricane strike on Pacific coral reefs . Crop damage was extreme , and 400 @,@ 000 bags of coffee were lost . In the days after the hurricane , soybean and wheat prices increased . In all , Hurricane Pauline had a large effect on fauna in Southern Mexico .

= = = Oaxaca = = =

A state of emergency was declared for the state of Oaxaca shortly after Pauline made landfall . Abundant rainfall caused the River Los Perros to overflow its capacity , flooding 50 municipalities in Oaxaca . The flooding damaged 12 bridges , of which two were destroyed , and cut off some areas

of electricity , drinking water , and telecommunications for several days . The passage of the hurricane affected thousands of houses , leaving roughly 250 @,@ 000 homeless in the state . At least 110 people died in the state , with hundreds of thousands of residents and 1 @,@ 278 communities being affected .

Strong winds from the hurricane downed trees and power lines throughout southern Oaxaca . The storm temporarily isolated Puerto Ángel , Oaxaca and a navy base thereby cutting off communications from the rest of Mexico . In Huatulco , the winds blew down antennas at the local television station and destroyed at least 30 cardboard houses . A community near the airport of the city was hit hard , with several people left homeless . Heavy rainfall from the storm caused severe flooding in portions of Oaxaca and neighboring Chiapas . A total of about 500 entire communities were destroyed in Oaxaca ; the areas worst affected were Zapotecos , Chatino , and Mixtecos .

= = = Guerrero = = =

Heavy rainfall led to severe mudslides and flooding throughout southern Guerrero . Entire communities were nearly destroyed , with some remaining flooded for a week after the hurricane . The flooding washed out or destroyed thousands of acres of crops , and killed thousands of cattle . The flooding and mudslides isolated more than 45 @,@ 000 people from the outside world . The passage of the hurricane resulted in damage to houses , bridges , and electrical and water supply . About 400 mm (16 in) fell in the city in a three @-@ hour span , resulting in rivers overflowing its banks . About 1 @,@ 100 vessels were stranded at port , and 35 ships sunk . Damage to the coffee industry was \$ 80 million (1997 USD) . One environmental agency remarked that it will take 15 years for coffee crops to recover . According to one preliminary estimate , 123 people died in Guerrero , primarily in Acapulco . Over 200 were missing by four days after the hurricane due to being washed out to sea or buried in mudslides . A total of 50 @,@ 000 people were left homeless across the state . Striking the week after Tropical Storm Olaf , previously wet grounds combined with heavy rainfall from Pauline resulted in severe mudslides and flash flooding in shanty towns around Acapulco Bay . There , around 5 @,@ 000 homes were destroyed with another 25 @,@ 000 damaged , with 10 @,@ 000 people left homeless in and around the city . The luxury resort hotels near the beach were largely unaffected by the hurricane , though residents in the shanty towns lost what little they had . Much of the city was covered in mud , and 70 percent of Acapulco was without water as a result of the hurricane . Most of the city 's one million residents were left without power or telephone service . Overall , total damage was nearly \$ 300 million pesos .

= = Aftermath = =

Volunteers from the Mexican Red Cross quickly went to disaster areas with search and rescue teams , including using specially trained dogs to search for hurricane victims trapped under muddy areas of Acapulco . By four days after the storm each team was finding one or two corpses per day , with officials stating the search could take weeks . In Guerrero , the teams rescued a total of 35 people from hazard . Hours after the hurricane passed through the area , relief works traveled by boat through flooded areas to assist the worst @-@ hit areas . The Red Cross provided food , water , clothing , blankets , water purification supplies , milk powder and other non @-@ perishable foods , and medical supplies to those staying in government shelters in Oaxaca , Guerrero , and Chiapas . The Mexican Red Cross also set up shelters to house and feed hundreds of displaced people , and by four days after the storm , the Red Cross distributed 100 tonnes of relief supplies to hurricane victims . Medical workers were also deployed to the area to aid the injured .

Officials set up emergency water purification plants in Acapulco , though water remained largely unavailable . Water trucks were sent to the city , with thousands standing in line for fresh water . Tourists in luxury hotels of Acapulco , for the most part generally unaffected by the hurricane , and rapidly recovered while other parts of the city remained devastated . Hotels were forced to use bottled water and ration their available water to as little as possible to provide water for the rest of the city . Extreme price gouging occurred in the city following the hurricane , with one consumer

protection official reporting shopkeepers charging 200 percent more for milk , 500 percent more for tortillas , and 1000 percent more than usual for water . Even though the government was blamed for lack of warnings and water shortages , Ernesto Zedillo , the president of Mexico at that time , cut his vacation in Europe short to respond to the catastrophe . Government officials set up 39 aid centers for Acapulco citizens , though some residents were unable to get food and water . Some residents suspected that the President and his Institutional Revolutionary Party of taking aid supplies for their own purposes . The president promised to seek charges and decided to close aid centers in favor of opening soup kitchens . Despite having the food , the Mexican army did not set up the kitchens , nor was aid distributed at the aid centers .

Most of Acapulco remained closed for at least a week after the hurricane . Initially , authorities around Acapulco gave preference to clean up tourist areas , which resulted in the scenic highway from the hotels to the airport being quickly fixed . Tourism greatly decreased following the hurricane , causing some hotels to charge 40 percent less than normal in an attempt to bring people back . One airline offered two plane tickets for the price of one from Mexico City to Acapulco . Most hotels were almost completely back to normal around a month after the hurricane .

= = = Donations = = =

The governments of Oaxaca and Guerrero asked UNICEF for assistance , specifically water tanks , water pumps , and construction material . International aid initially focused almost solely on the damage in Acapulco . By a week after the hurricane , 500 communities in Oaxaca remained isolated and without assistance , with several large communities in Guerrero not receiving any material aid by a week after the hurricane . The Adventist Development and Relief Agency organized about 7 tons of food and clothing , and sent a bus of 40 people to help isolated villages in southern Mexico . Around ten days after the hurricane struck , 20 @, @ 000 people were still isolated from emergency crews and relief works , causing the president to suspect people could begin starving to death . Helicopters were initially sent to the remote areas , though severe fog and heavy rainfall after the hurricane grounded the operations . The government worked to bring food to remote mountain communities , though officials noted the serious risk in doing so .

Three days after the hurricane , the American Red Cross sent an initial donation of \$ 25 @, @ 000 (1997 USD) , and also sent plastic sheets for temporary roofing and cleaning supplies such as mops , brooms , buckets , sponges , bleach , and cleaning chemicals . Local chapters also offered assistance . The chapter in San Antonio , Texas sent cleaning kits , and the chapter in Los Angeles delivered 2 @, @ 000 comfort kits containing hygiene supplies and crossword puzzles for children . The German Red Cross also offered assistance .

= = = Diseases = = =

The floodwaters from the hurricane combined with raw sewage in many poor areas of southwestern Mexico , leading to a widespread threat for a spread of tropical diseases . As a result , government health workers opened vaccination centers in several cities along the Guerrero and Oaxaca coasts . Thousands were inoculated for typhoid fever and tetanus . Officials noted a potential threat for dengue and cholera as a result of the spoiled water . Health workers also stated mosquitos possessing malaria and dengue fever were likely to breed in large areas of leftover water . In Acapulco , about two days after the hurricane passed , the first day of sun in a week evaporated the areas of leftover water , spreading dust across the region with the deadly diseases . Residents were warned to boil their food and water for 30 minutes due to the threat for contamination by the dust . At least twenty cases of cholera and at least six cases of dengue fever were reported . Most significantly , there were 14 @, @ 630 cases of malaria in 616 villages in Oaxaca due to Pauline ; this represented about 80 % of the malaria cases in Mexico during 1998 . Army soldiers distributed chlorine tablets to disinfect water pools and wheelbarrows to remove rotting mud and sewage from their damaged homes . Two C @-@ 130 Hercules planes and twenty helicopters airlifted food and water to smaller villages south of Acapulco that were stranded for nearly a week after the hurricane .

= = = Retirement = = =

Less than a month after Pauline , Hurricane Rick struck the same general region , which brought additional rainfall and hampered relief efforts . Compared to Pauline , however , damage was minimal . Because of the high death tolls and the extent of damage in Mexico , The name Pauline was retired in the spring of 1998 by the World Meteorological Organization and will never again be used for a Pacific hurricane . It was replaced by Patricia in the 2003 season .