

= Hurricane Manuel =

Hurricane Manuel (pronounced / mænˈwʊl , m??n- , ?mænu??l , -ju- /) was a destructive tropical cyclone that brought widespread flooding across much of Mexico in September 2013 . The fifteenth named storm and seventh hurricane in the Eastern Pacific that year , Manuel originated from a strong area of low pressure south of Acapulco on September 13 . Within favorable conditions aloft , the storm intensified into a tropical storm as it tracked northward . The following day , Manuel curved westward and strengthened to a point just shy of hurricane intensity before making its first landfall at that intensity on September 15 . Due to interaction with land , the tropical storm quickly weakened , and its center dissipated over western Mexico on September 16 . However , the storm 's remnants continued to track northwestward into the Gulf of California , where they reorganized into a tropical cyclone the next day . Manuel regained tropical storm status on September 18 as it began to curve northeastward . Shortly thereafter , Manuel attained hurricane intensity , before making its final landfall just west of Culiacán at peak intensity . Over land , Manuel quickly weakened due to interaction with Mexico 's high terrain , and the storm dissipated early on September 20 .

Due to the impending threat of Manuel , several Mexican municipalities were put under disaster alerts . Upon making its first landfall , Manuel caused extreme flooding in southern Mexico . Property and agricultural damage as a result of the system was widespread , and roughly one million people were estimated to have been directly affected . In Guerrero , 97 people perished , including 18 in Acapulco . Seventy @-@ one others died due to a mudslide in La Pintada . In Guerrero alone , around 30 @,@ 000 homes were damaged and 46 rivers overflowed their banks . There , 20 @,@ 000 persons were evacuated to shelters . Statewide , repairs to damage from the storm totaled MXN \$ 3 billion (\$ 230 million USD) . Other impacts from Manuel spread as far east as the Isthmus of Tehuantepec , where 300 families were displaced . In the region , at least 11 @,@ 591 homes were destroyed by the floods . Meanwhile , the nation sustained additional impacts from Atlantic Hurricane Ingrid .

After its second landfall , additional floods occurred in several towns , and in Sinaloa over 100 @,@ 000 people were rendered homeless and four people died . As a result of Manuel 's impacts , 107 municipalities were declared disaster regions . Damage in Sinaloa totaled MXN \$ 500 million (US \$ 37 @.@ 9 million) . The Mexican Army was dispatched in several locations to aid in post @-@ tropical cyclone relief operations . Following the storm , looting in heavily impacted areas became commonplace , and as such government forces were also dispatched to prevent further looting . Overall , 123 people lost their lives in Mexico while damage exceeded MXN \$ 55 billion (US \$ 4 @.@ 2 billion) .

= = Meteorological history = =

The origins of Manuel can be traced back to a tropical wave that left the African continent in late August . The wave entered the Caribbean Sea on September 5 , although the northern portion of the wave axis later developed into Hurricane Ingrid . On September 10 , the National Hurricane Center (NHC) remarked the potential for a low @-@ pressure area to develop off the southwest coast of Mexico during the subsequent few days , provided the system remained offshore . The next day , a low formed while it was nearly stationary , accompanied by scattered convection . Strong wind shear and proximity to land were expected to limit development , although conditions became more favorable on September 12 . On that day , the convection became better organized . At 1200 UTC on September 13 , the NHC initiated advisories on Tropical Depression Thirteen @-@ E , noting that the system had enough of a well @-@ defined circulation and convection . By that time , wind shear had diminished and warm waters were expected to allow intensification , and the main inhibiting factors for development were proximity to Mexico and association with the intertropical convergence zone .

Within a few hours of developing , the depression quickly intensified into Tropical Storm Manuel . By early on September 14 , an eye feature developed as rainbands increased . However , Manuel was embedded within a broad weather system that extended from the eastern Pacific across Mexico

, which included Hurricane Ingrid in the Bay of Campeche on the Gulf of Mexico coast . The broad system , including Manuel , moved generally northward . By early on September 15 , Manuel had developed a central dense overcast , with a 17 mi (28 km) wide eye in the center . Based on the structure and satellite @-@ intensity estimates , the NHC estimated Manuel attained secondary peak winds of 70 mph (115 km / h) , just shy of hurricane status . The agency noted the potential for further strengthening into a hurricane , citing the warm waters , moist environment , and low shear . A break in the subtropical ridge to the north allowed the storm to initially continue generally to the north @-@ northeast , but after attaining its secondary peak , Manuel turned back to the northwest while accelerating . On September 15 , Manuel made landfall near Aquila in Michoacán as a high @-@ end tropical storm , though operationally , it was believed to have moved ashore near Manzanillo in Colima . Early on September 16 , the storm weakened into a tropical depression after the circulation became disrupted , although it continued dropping heavy rainfall . Later that day , the surface center dissipated over western Mexico .

The remnants of Manuel tracked northwest around a ridge situated over the southeastern United States , and late on September 16 , emerged over open waters . Despite only marginally favorable conditions , convection soon increased over the center . At 1800 UTC on September 17 Manuel regenerated into a tropical depression after redeveloping a well @-@ defined circulation . Furthermore , conditions favored additional strengthening as the system tracked slowly northwestward around a ridge , although the cyclone was expected to move onshore the Baja California Peninsula in a few days . Although the convection was initially ragged , Manuel re @-@ intensified into a tropical storm on September 18 . Later that day , an eye developed in the center of the increasingly organizing convection , and at 0000 UTC on September 19 , Manuel became a hurricane . It thus became the first eastern North Pacific tropical cyclone since records began in 1949 to make landfall in mainland Mexico , and later redevelop into a hurricane . The storm shifted more to the north , resulting in land interaction earlier than anticipated . Around 1200 UTC on September 19 , Manuel made landfall just west of Culiacán as a minimal hurricane . Moving over the high terrain of western Mexico , Manuel quickly weakened into a tropical storm . The circulation dissipated at 0000 UTC on September 20 , over the Sierra Madre Occidental mountain range .

= = Preparations = =

On the afternoon of September 13 , a tropical storm warning was issued from Acapulco to Lázaro Cárdenas , Michoacán . Thirty @-@ six hours later , a hurricane warning was issued from Lázaro Cárdenas to Manzanillo as the system was expected to become a hurricane prior to landfall . Later on September 15 , a tropical storm watch was declared north of the hurricane warning . By early the next day , all watches and warnings were no longer in effect . In addition to the aforementioned watches and warnings , an " orange " alert was issued in southern Michoacán , and " yellow " (moderate) alert was in place for the rest of Michoacán and Guerrero . Lower levels of alerts were issued in Nayarit , Colima , Jalisco , Oaxaca , and in the southern portion of Sinaloa . Twenty @-@ five families were evacuated in Lázaro Cárdenas , and Arteaga , Michoacán . On September 17 , all classes were suspended in Colima .

After regenerating into a tropical cyclone in the Gulf of California , a tropical storm watch was issued just north of Mazatlán as well as the southwestern portion of the Baja California Peninsula . The next day , a hurricane watch was issued for the area south of Topolobampo . At 2100 UTC on September 18 , the hurricane watch was upgraded into a hurricane warning . Meanwhile , a tropical storm warning was designated south of the hurricane warning area to Mazatlan . On the evening of September 19 , all watches and warnings were discontinued , as Manuel had moved inland .

On September 18 , when the cyclone first threatened the state , 13 municipalities were placed on alert in Sonora . Along the Baja California Peninsula , seven ports were closed . The ports of Mazatlán , Cabo San Lucas , and San José del Cabo were closed for small craft and night interests . A " yellow " alert was issued for southern Baja California Sur while a " green " alert was issued for the northern portion of the state . In Sinaloa , classes were suspended . Prior to landfall , statewide 700 humans were evacuated including 365 residents from two municipalities were evacuated . Over

60 families were evacuated in Navolato . An " orange " alert was also activated for the state .

= = Impact = =

Around the same time as Manuel 's first landfall , Hurricane Ingrid made landfall along the eastern coast of the nation ; this marked the first time two tropical cyclones struck the nation within 24 hours since 1958 . Overall , economic impact exceeded MXN \$ 55 billion (US \$ 4 @. @ 2 billion) . Damage to roads alone totaled to \$ 2 billion pesos (\$ 153 million 2013 USD) . A total of 123 people were killed due to Hurricane Manuel , at least of 104 of which were direct . Roughly 59 @, @ 000 people were evacuated , including 39 @, @ 000 that sought shelter . Approximately 1 million people were directly affected by Manuel .

Hurricane Manuel brought extremely heavy rains for eight days over much of Mexico , especially over mountainous terrain , although this precipitation was aided by Ingrid as well as large @- @ scale southwesterly monsoonal flow . Numerous locations recorded more than 10 in (250 mm) of rain . A peak storm total of 43 @. @ 6 in (1 @, @ 110 mm) was measured in San Isidro , Guerrero . In nearby Acapulco , a secondary maximum of 17 @. @ 8 in (450 mm) was recorded . Further north , in Michoacán , a statewide peak rainfall total of 22 @. @ 11 in (562 mm) occurred . After making its second landfall , 18 @. @ 52 in (470 mm) of precipitation fell in Culiacán and 15 @. @ 32 inches (389 mm) was observed in nearby Sanalona .

= = = Oaxaca = = =

In Jicayan , Manuel damaged 10 homes and flooded a school . Offshore , one boat was reportedly missing . Along the Isthmus of Tehuantepec , 300 families were displaced from their homes . Roughly 5 @, @ 000 animals were killed by the storm . A total of 200 ha (490 acres) of crop was destroyed in Oaxaca ; however , damage in the state was considerably less than in Guerrero . Within Oaxaca , 19 communities were isolated . Four people were killed in the state . Overall , 77 municipalities or 10 @, @ 000 people were directly affected by the floods .

= = = Guerrero = = =

At least 97 people were killed throughout Guerrero . Approximately 30 @, @ 000 dwellings were damaged , including 11 @, @ 591 houses sustained severe damage . Moreover , at least 11 @, @ 000 homes were destroyed 20 @, @ 000 people were evacuated to shelters . 12 @, @ 000 of which were evacuated to 47 shelters . Overall , 24 rivers flooded , at least 32 roads sustained damage , and four bridges collapsed .

In La Pintada , a remote fishing village of around 400 residents situated to the west of Acapulco , a mudslide occurred on September 14 , which within a few minutes , swept through the center of town . As such , many residents initially wandered throughout town in a state of panic and confusion ; it took two days for word of the mudslide to spread to the public . Throughout the village , 71 people were killed . Over half the town , including 20 homes , were demolished due to the mudslide . A total of 334 people were evacuated by police , though 30 elected to stay in the area until all the victims had been identified . Many surviving citizens of La Pintada were also hurt , including one seriously .

In the municipality of Atlamajalcingo , a woman died after a collapse of a dwelling . In Chilpancingo , the capital of Guerrero , four people perished . Numerous trees were downed and power outages were reported . Additionally , the nearby Cerrito Rico dam nearly overflowed its banks . In the Tecpan municipality , four rivers overflowed their banks and six people died because of landslides . Many mountainous communities were isolated , thus making in difficult to receive aid .

= = = Acapulco = = =

The city of Acapulco sustained the worst damage from the storm ; the damage in Acapulco was described by the National Broadcasting Company as the " worst storm damage to hit Mexico in

years " . There , 18 fatalities occurred , including one person that died when a wall collapsed . Nearby , six tourists perished in a car crash , including two minors . The crash also damaged two fences , a boat , and injured two people . Several homes were flooded in nearby neighborhoods of Acapulco when a nearby river overflowed its banks . Isolated incidents of vandalism were reported . Two mudslides were reported , resulting in the destruction of a home and the closure of a few roads . A family of six perished in Acapulco when a landslide demolished their home . At least 40 @, @ 000 tourists who spent the Mexican Independence Day in Acapulco were stranded since the terminal of the airport was underwater . Furthermore , the main roads out of the city were blocked by landslides . Even though by September 19 , the military had evacuated 10 @, @ 000 people via 100 flights to Mexico City , this process was difficult because the radar was not functioning . City @- @ wide , 13 @, @ 516 dwellings were damaged .

= = = Colima = = =

Although flooding was minor in Colima , a peak rainfall total of 144 mm (5 @. @ 7 in) was measured in Chanal . Many families were evacuated . Several dams statewide reached their maximum capacity while numerous roads that led to the Manzanillo airport were closed . In Ixtlahuacán , 50 families were evacuated when a river threatened to overflow its banks ; thirty others were taken to shelter in the rest of the state . A bridge collapsed in Villa de Alvarez . One man was killed in the state when he unsuccessfully attempted to cross a river . Four trees were brought down . Around 15 @, @ 000 ha (58 sq mi) of banana crop was wiped out . In all , the municipalities of Ixtlahuacán , Tecomán , Manzanillo , and Comala Coquimatlán sustained the worst effects from Manuel in the state . Manuel was considered the worst storm to hit the Mexican state since the 1959 Mexico hurricane . Damage in the state exceeded \$ 479 million pesos (\$ 36 @. @ 8 million 2013 USD) . Hurricane Patricia in 2015 caused \$ 483 @. @ 2 million USD , though

= = = Jalisco = = =

Further north , minor flooding was reported in Jalisco . Statewide , four people were killed . A 26 @- @ year @- @ old man died after being swept away by in the village of Juanacatlan while a 12 @- @ year @- @ old boy drowned after falling in a dam in the municipality of Teocuitatlan de Corona . Another man perished when he drove his car into a ravine in Cuautitlan de Garcia Barragan . A total of 1 @, @ 500 people were evacuated from their homes . Classes were briefly cancelled in 588 schools , leaving over 40 @, @ 000 pupils home . Bridges collapsed in the Jalisco towns of Zacoalco de Torres and Tamazula de Gordiano . The worst hit areas in the state were the southern and coastal areas of the state , as well as the Guadalajara area , where flooding and landslides occurred in some neighborhoods . Through Jalisco , 56 municipalities sustained damage .

= = = Sinaloa = = =

Just before its second landfall , one fisherman was killed in Tepechitlán . Another causality occurred when a person fell off a shrimp boat . A truck driver and a 5 year old also died , while the toddler 's mother was considered missing . The towns of Escuinapa , El Rosario , and Mazatlán sustained flooding . The municipalities of Angostura , Mocorito , Navolato , and Culiacán were flooded , resulting in modest damage . In Angostura , numerous people were trapped on the roofs of their houses . Coastal areas of Navolato were flooded while authorities reported 500 homeless ; hundreds of trees were toppled and power lines were disconnected . Parts of Mocorito were isolated due to overflow of the Humaya channel . About 2 m (6 @. @ 6 ft) of water and debris was reported in Mocorito . In Culiacán , minor flooding happened . Meanwhile , in Chinito , almost all roads were destroyed . Offshore , 24 boats were damaged . Throughout the state , 100 @, @ 000 people were rendered as homeless . A total of 3 @, @ 000 persons were evacuated to 62 shelters . In all , 70 communities were damaged by the tropical cyclone . Hurricane Manuel directly affected 146 @, @ 000 persons in 10 municipalities in the state . Damage in Sinaloa totaled \$ 500 million

pesos (\$ 37 @. @ 9 million 2013 USD) .

= = = Elsewhere = = =

Elsewhere , in Michoacán , flooding was reported ; many people had to be rescued via air and two casualties were reported . In Durango , 42 homes were damaged , stranding 50 residents . While brushing the Baja California Peninsula , 2 ft (0 @. @ 61 m) waves were measured in La Paz in addition to winds of 26 mph (42 km / h) . In Sinaloa , a peak rainfall total of 415 mm (15 in) was recorded at Culiacan . After dissipating , the remnants of Manuel brought copious amounts of rainfall to a wide swath of Texas . The precipitation was further enhanced by deepening moisture from the Gulf of Mexico and an approaching cold front . In the Austin area , the rains resulted in localized flooding , forcing the closure of several low water crossings . A weather station in Camp Mabry recorded 2 @. @ 92 in (74 mm) of rain on September 20 , making it a daily record for the station . Elsewhere , radar estimates indicated that as much as 8 in (200 mm) may have fallen in localized areas in West Texas . In Kimble County , one road was closed due to flooding . Across central Arkansas , 2 ? 4 @. @ 5 in (51 ? 114 mm) of rainfall was recorded .

= = Aftermath = =

During the aftermath of the storm , a state of emergency was declared for Acapulco ; about 12 @, @ 000 items were airlifted to the region. overall . In all , 662 donation centers were opened across Guerrero . Damages repairs to Guerrero totaled to \$ 3 billion MXN (\$ 123 million 2013 USD) . The Minister of Economy granted an additional \$ 100 million pesos to the devastated state . Furthermore , the Finance Ministry declared it had \$ 12 billion pesos (US \$ 925 @. @ 60 million) available in funds . In addition , the Mexican Red Cross collected and subsequently delivered cargo to the devastated area , especially Guerrero while also providing 400 @, @ 079 tons of aid . Local authorities also provided 29 @, @ 000 tons of personal and household items . The Médicos Sin Fronteras distributed 2 @, @ 800 L (620 imp gal) of water , food , and medicines in five shelters . A total of 87 million Euros (\$ 118 million USD) , from the National Fund for Natural Disasters , were allocated to provide essential items such as food , mattresses , drinking water , and medicine . The Water Missions International provided water to about 20 @, @ 000 persons . World Vision Mexico disturbed plastic tends to help cover roofs for 80 families . Furthermore , the organization donated mosquito nets for 76 families . Grocery items such as rice , oil , sardines , sugar , salt , cookies , and beans were also provided . ADRA Mexico was one of the first organizations to help victims , and by early October , had helped 8 @, @ 000 people .

In Oaxaca , 42 municipalities were declared disaster areas . Throughout the state of Guerrero , 56 municipalities were declared a disaster area while 9 municipalities in Michoacán were declared a disaster zone . In all , 428 municipalities were designated as disaster areas and 155 emergencies declarations were issued due to both Ingrid and Manuel . State of emergencies were declared in Michoacan and 21 municipalities in Jalisco , though by mid @- @ October , they were lifted .

Thirty @- @ two damage assessment committees were installed to help estimate and analyze the cost of damage to public infrastructure . Subcommittees were established to help assess damage to schools , houses , and water supplies . Ten shelters were opened in both Chilpancingo and Acapulco . All survivors form the La Pintada mudslide were transported to a basketball gym in Acapulco , who were all provided with a \$ 150 USD pension . Due to the closure of the commercial terminal of the Acapulco airport , special flights provided by Aeromexico and Interjet were used to deliver aid .

By September 18 , power services had been restored to the state of Guerrero . That day , gas and water services were revived in Acapulco . Emergency declarations were requested in Angostura and Navolato . Within 12 hours after its second landfall , power was retrieved to 26 @, @ 000 dwellings in Sinaloa . In La Pintada , the search process for victims was halted briefly due to the threat of another mudslide , but on September 20 , 100 rescuers resumed searching , who frequently had to dig through mud to recover bodies .

The Mexican government received criticism by the press for being under @-@ prepared for both Manuel and Ingrid . One newspaper said that the authorities underestimated both storms , due to a combination of a " lack of coordination " and " the distraction of the weekend ? s independence @-@ related festivities . " Guerrero governor Angel Aguirre was criticized by many for attending a night @-@ long party and drinking when the storm first threatened the state . However , Aguirre later acknowledged political corruption , as well as the construction of homes and hotels in unsafe areas in a televised speech . Consequently , the Mexican Senate requested an investigation in the amount of preparation that occurred .

To cope with relief efforts , Mexican Army troops and marines forces helped families whose homes were flooded . Additionally , the military provided 60 tonnes (132 @,@ 275 lb) of food supplies and 8 @,@ 000 litres (1 @,@ 760 imp gal) of water to the city . A military airbase was installed to transport aid via air . Authorities rushed to clean rocks and other debris from two highways in order to liberate Acapulco from isolation . The disaster also resulted in panic buying at supermarkets . Looters were spotted in Acapulco many angry victims robbed shops , homes , luxury hotels , and apartments . Marines were posted outside stores to prevent further theft . Mexico President Enrique Pena Nieto toured through most of the devastated areas , promising to rebuild La Pintada and Acapulco . On May 26 , 2014 , La Pintada was re @-@ opened , with 125 new homes .

Because of the severe damage caused by the storm in Mexico , the name Manuel was later retired by the World Meteorological Organization , and will never be used again for an Eastern Pacific hurricane . It will be replaced with Mario for the 2019 Pacific hurricane season .