= Hurricane Marie (2014) =

Hurricane Marie is tied as the seventh @-@ most intense Pacific hurricane on record , attaining a barometric pressure of 918 mbar (hPa ; 27 @.@ 11 inHg) in August 2014 . On August 10 , a tropical wave emerged off the west coast of Africa over the Atlantic Ocean . Some organization of shower and thunderstorm activity initially took place , but dry air soon impinged upon the system and imparted weakening . The wave trekked westward across the Atlantic and Caribbean for several days . On August 19 , an area of low pressure consolidated within the wave west of Central America . With favorable atmospheric conditions , convective activity and banding features increased around the system and by August 22 , the system acquired enough organization to be classified as Tropical Depression Thirteen @-@ E while situated about 370 mi (595 km) south @-@ southeast of Acapulco , Mexico . Development was initially fast @-@ paced , as the depression acquired tropical storm @-@ force winds within six hours of formation and hurricane @-@ force by August 23 . However , due to some vertical wind shear its intensification rate stalled , and for a time it remained a Category 1 hurricane on the Saffir ? Simpson hurricane wind scale .

On August 24 , Marie developed an eye and rapidly intensified to a Category 5 hurricane with winds of 160 mph (260 km / h) . At its peak , the hurricane 's gale @-@ force winds spanned an area 575 mi (925 km) across . Marie subsequently underwent an eyewall replacement cycle on August 25 which prompted steady weakening . Over the next several days , Marie progressively degraded to below hurricane strength as it moved into an increasingly hostile environment with cooler waters and a more stable atmosphere . On August 29 , after having lost all signs of organized deep convection , Marie degenerated into a remnant low . The large system gradually wound down over the following several days , with winds subsiding below gale @-@ force on August 30 . The remnant cyclone eventually lost a well defined center and dissipated on September 2 about 1 @,@ 200 mi (1 @,@ 950 km) northeast of Hawaii .

Although Hurricane Marie 's center remained well away from land throughout its entire existence , its large size brought increased surf to areas from Southwestern Mexico northward to southern California . Off the coast of Los Cabos , three people drowned after their boat capsized in rough seas . In Colima and Oaxaca , heavy rains from outer bands caused flooding , resulting in two fatalities . Similar effects were felt across Baja California Sur . Toward the end of August , Marie brought one of the largest hurricane @-@ related surf events to southern California in decades . Swells of 10 to 15 ft (3 @.@ 0 to 4 @.@ 6 m) battered coastal areas , with structural damage occurring on Santa Catalina Island and in the Greater Los Angeles Area . A breakwater near Long Beach sustained $ 10 million worth of damage , with portions gouged out . One person drowned in the surf near Malibu . Hundreds of ocean rescues , including over 100 in Malibu alone , were attributed to the storm , and overall losses reached $ 20 million .

= = Meteorological history = =

On August 10 , 2014 , the National Hurricane Center (NHC) began monitoring a westward moving tropical wave emerging off the west coast of Africa , centered along 16 ° W. Accompanied by disorganized convective activity , development , if any , was expected to be slow . A broad area of low pressure subsequently formed within the wave about halfway between Africa and the Cape Verde Islands . Embedded within an elongated trough , the weak system struggled to organize and convection soon diminished . Interaction with a monsoon trough reinvigorated shower and thunderstorm activity on August 11 across a large area southwest of the Cape Verde Islands , but the surface low had dissipated by this time . Development was no longer expected over the following days as dry air created a hostile area for storm organization . The wave continued westward across the Atlantic and entered the Caribbean Sea on August 16 . Subsequent interactions with South America and an upper @-@ level trough inhibited improvement of the system .

Beginning on August 17 , the NHC anticipated that a low pressure area would form within five days to the south of the Gulf of Tehuantepec in the East Pacific , with a 30 % chance of tropical cyclogenesis . By the next day , the wave was located over Panama , and the NHC upgraded the

potential for development to 60 % . The wave crossed into the eastern Pacific with accompanying convection , developing a low pressure area on August 19 . Conditions were favorable for further development , and the thunderstorms increased and became better organized on August 20 . After an increase in rainbands and outflow around the well @-@ defined center , the NHC classified the system as Tropical Depression Thirteen @-@ E early on August 22 about 370 mi (595 km) south @-@ southeast of Acapulco , Mexico . A strong ridge over the southern United States , later expanding into northern Mexico , steered the system on a west @-@ northwest course throughout its existence as a tropical cyclone .

Conditions were favorable for the nascent depression to strengthen . The Statistical Hurricane Intensity Prediction Scheme model predicted the system would become a Category 4 on the Saffir ? Simpson hurricane wind scale when the system was only a tropical depression . Only six hours after the NHC issued its first advisory the agency upgraded the depression to Tropical Storm Marie , the thirteenth named storm of the 2014 season . The storm very quickly organized , developing a central dense overcast consisting of intense convection ; this was aided by warm water temperatures and low wind shear . On August 23 , the NHC upgraded Marie to hurricane status , and an eye began forming later that day . On the next day , as the storm rapidly intensified , the eye became much more distinct and was surrounded by a powerful eyewall . During this phase the storm wobbled , shifting due west before resuming its previous motion . At 18 : 00 UTC on August 24 , Marie attained Category 5 status on the Saffir ? Simpson hurricane wind scale , the first such Pacific hurricane since Celia in 2010 . The NHC estimated peak sustained winds of 160 mph (260 km / h) , based on a Dvorak rating of 7 @.@ 0 provided by TAFB and SAB . They also estimated Marie 's minimum barometric pressure at 918 mbar (hPa ; 27 @.@ 11 inHg) , ranking as the seventh @-@ strongest in the Pacific east of the International Dateline since records began in 1949 . Coincidentally , Hurricane Odile attained the same pressure just three weeks later . At its peak , Marie was a large hurricane with tropical storm @-@ force winds covering an area 575 mi (925 km) across .

Shortly after Marie attained peak intensity , the convection weakened due to an eyewall replacement cycle , in which an outer eye formed . The storm also weakened due to gradually decreasing water temperatures . By early on August 26 , the eye became much less defined . The double eye feature persisted through that day , although the outer eyewall opened up as thunderstorms weakened further . Late on August 27 , Marie weakened to tropical storm status , by which time the circulation became exposed from the convection . A strengthening ridge near California caused the storm to accelerate more to the west @-@ northwest , into an area of cooler waters and dry air . Failing to produce any additional convection , Marie degenerated into a remnant low late on August 28 . The residual circulation gradually wound down as it continued northwest . Through August 29 , the system continued to produce gale @-@ force winds . Turning west and later west @-@ southwest within a weak easterly flow , Marie slowly moved across the open Pacific while remaining a broad , weak cyclone . The former cyclone eventually lost a well @-@ defined center and dissipated on September 2 , about 1 @,@ 200 mi (1 @,@ 950 km) northeast of Hawaii .

= = Preparations and impact = =

= = = Mexico = = =

Although the core of Hurricane Marie remained well offshore , a " green " alert was issued for Guerrero and Oaxaca and a " blue " (minimal) alert was issued for Jalisco , Colima , Michoacán , and Chiapas . Heavy rains in Oaxaca triggered flooding and landslides , with the districts of Juquila and Pochutla being most affected . Five people were swept away by a swollen river ; all were wounded but later rescued . A portion of Federal Highway 200 and a bridge were closed . Approximately 10 @,@ 000 people were in need of assistance and a disaster declaration was requested for the state of Oaxaca . Storm surge in Colima destroyed four buildings and damaged ten more . Flooding along the Marabasco and San Nicolás rivers resulted in two fatalities . Minor

flooding also occurred near Acapulco and in Colima where 16 ft (4 @.@ 9 m) waves pounded the coast . In Guadalajara , numerous trees were downed and 12 shops were closed .

Off the coast of Los Cabos in Baja California Sur , large swells capsized a fishing boat with seven people aboard on August 25 . Four were able to swim back to shore while the other three remained missing and were later presumed dead . Strong rain bands along the outer fringes of Hurricane Marie brought heavy rain to parts of the state . Landslides blocked several roads near Los Cabos while gusty winds downed trees and power lines . Owing to the dangerous conditions , all schools Los Cabos were closed on August 25 .

= = = United States = = =

Owing to the size of Marie , increased surf was anticipated well north of the hurricane . High surf advisories were issued in California for the Greater Los Angeles Area . Forecasters at the local National Weather Service office warned residents in Los Angeles and Ventura counties could " potentially see the largest surf in recent years generated by a hurricane . " Swells of 10 to 15 ft (3 @.@ 0 to 4 @.@ 6 m) were anticipated with the risk of coastal flooding and structural damage . Advisories were also issued for Orange and Santa Barbara counties . Surf in the region ultimately reached 20 ft (6 @.@ 1 m) along south @-@ facing shores while west @-@ facing beaches only saw waves up to 8 ft (2 @.@ 4 m) .

The combination of large swells , high tide , and powerful south @-@ to @-@ north longshore currents impeded by the bight formed by the Palos Verdes Peninsula resulted in significant coastal flooding in Seal Beach . A four @-@ block area of oceanfront property was affected ; several apartments were left with inches of water on the ground floor . Severe beach erosion resulted in the loss of 10 @,@ 000 ? 20 @,@ 000 yd3 (7 @,@ 600 ? 15 @,@ 200 m3) of sand ; a state of emergency was declared to assist with restoration efforts . Near Malibu Pier , several surfers were caught in the rough swells and knocked into each other ; one struck a rock , was knocked unconscious , and drowned . Malibu Pier itself sustained some damage and a lifeguard house built in the 1950s was destroyed . North of Malibu , one structure fell into the ocean . The Los Angeles County Fire Department assisted with over 115 ocean rescues on August 26 . More than 170 rescues were made the following day , including 73 at the famous surfing spot " The Wedge " in Newport Beach .

Significant flooding also occurred in and around the Port of Long Beach . The Army Corps of Engineers was sent out to inspect significant damage to the middle breakwater at Long Beach . Eleven sections of the breakwater sustained major damage , including three areas which were completely gouged out . Along the 18 @,@ 500 ft (5 @,@ 600 m) breakwater , 1 @,@ 550 ft (470 m) of it sustained major damage , 850 ft (260 m) saw significant damage , and a further 1 @,@ 725 ft (526 m) experienced moderate damage . Several hundred tons of rock were estimated to have been dislodged by the storm . The nearby San Pedro and Long Beach breakwaters saw substantial damage as well , though not as severe as the middle breakwater . Debris from the Navy Mole breakwater damaged a roadway near the Sea Launch Commander , within Long Beach . The breach resulted in roughly $ 3 million in damage to nearby terminals . Two barges and a pleasure craft were loosed from their anchors by the surging waves and had to be towed back . Two terminals had to close due to dangerous conditions for workers . Less than two weeks after Marie , Hurricane Norbert threatened to bring further increased surf to the area . With the breakwater yet to be repaired , a large sand berm was reinforced along beaches and residents were supplied with sandbags .

The Army Corps estimated that it would take more than $ 20 million to repair just the major breaches along the middle breakwater . On September 18 Connolly @-@ Pacific Co. was contracted for $ 5m to repair the twelve worst affected areas of the breakwaters and construction began on October 8 . An estimated 20 @,@ 000 ? 30 @,@ 000 tons of rock would be used in the project . A $ 200 @,@ 000 repair budget was initially allocated for areas around Navy Mole , including Pier F , J South , and Navy Mole Road ; this was later increased to $ 4 million by the Long Beach Board of Harbor Commissioners in January 2015 .

On Santa Catalina Island , boulders estimated to weigh 3 @,@ 000 lb (1 @,@ 400 kg) were tossed inland by the surf . Substantial damage took place at the Avalon Harbor where many dry @-@ docked boats were knocked off their stands . The harbor was littered with debris for several days , mainly pieces of lumber . A pier at White 's Landing was also partially destroyed . A 25 ft (7 @.@ 6 m) boat was tossed onshore at Pebbly Beach into Catalina Laundry , the only laundry business on the island . The building and a nearby boatyard were deemed total losses . Damage at the beach was deemed the worst since September 1997 when Hurricane Linda brought large swells to the region . The Catalina Express ferry halted service on August 27 due to the rough seas . Damage across Catalina Island was estimated to be $ 3 ? 5 million . Total losses in California amounted to nearly $ 20 million .