

= Typhoon Pongsona =

Typhoon Pongsona was the last typhoon of the 2002 Pacific typhoon season , and was the second costliest United States disaster in 2002 , only behind Hurricane Lili . The name " Pongsona " was contributed by North Korea for the Pacific tropical cyclone list and is the Korean name for the garden balsam . Pongsona developed out of an area of disturbed weather on December 2 , and steadily intensified to reach typhoon status on December 5 . On December 8 it passed through Guam and the Northern Mariana Islands while near its peak winds of 175 km / h (110 mph 10 @-@ min) . It ultimately turned to the northeast , weakened , and became extratropical on December 11 .

Typhoon Pongsona produced strong wind gusts peaking at 278 km / h (173 mph 1 @-@ min) , which left the entire island of Guam without power and destroyed about 1 @, @ 300 houses . With strong building standards and experience from repeated typhoon strikes , there were no fatalities directly related to Pongsona , although there was one indirect death from flying glass . Damage on the island totaled over \$ 700 million (2002 USD , \$ 921 million 2016 USD) , making Pongsona among the five costliest typhoons on the island . The typhoon also caused heavy damage on Rota and elsewhere in the Northern Mariana Islands , and as a result of its impact the name was retired .

= = Meteorological history = =

During late November , an area of convection persisted about 625 kilometers (390 mi) east @-@ southeast of Pohnpei . Satellite imagery indicated broad cyclonic turning in the lower levels of the atmosphere , and a trough was located near the surface . The disturbance developed rainbands and gradually became better organized . By December 2 , the system had an elongated low @-@ level circulation , located to the south of the convection . At 0600 UTC that day , the Japan Meteorological Agency (JMA) classified the system as a tropical depression about 735 km (450 mi) east @-@ northeast of Pohnpei . Shortly thereafter , the Joint Typhoon Warning Center (JTWC) issued a Tropical Cyclone Formation Alert , and at 1800 UTC on December 2 the agency classified the system as Tropical Depression 31W . Initially the depression moved to the west @-@ northwest , and early on December 3 the JTWC classified the system as a tropical storm .

Initially , the circulation was exposed from the convection , although it was able to intensify into Tropical Storm Pongsona at 1200 UTC on December 3 while located 375 km (230 mi) northeast of Pohnpei . It turned to the west on December 4 , due to a ridge to the north . It slowly intensified , developing an eye feature on December 5 . That day , both the JTWC and the JMA upgraded Pongsona to a typhoon about 1150 km (715 mi) southeast of Guam .

While continuing generally to the west , the eye of Pongsona gradually became better organized . A baroclinic cyclone east of Japan weakened the ridge , which caused the typhoon to turn more to the northwest . By late on December 7 , Pongsona developed a well @-@ defined 55 km (35 mi) wide eye as it approached Guam . After the typhoon underwent rapid deepening , the JTWC estimated that Pongsona reached peak winds of 240 km / h (150 mph 1 @-@ min sustained) , making it a supertyphoon . At 0500 UTC on December 8 , the eyewall made landfall on Guam , and two hours later the northern portion of the eyewall crossed over nearby Rota . Around that time , the JMA estimated Pongsona attained a peak intensity of 175 km / h (110 mph 10 @-@ min winds) just to the north of Guam . The typhoon turned to the north @-@ northwest through a weakness in the subtropical ridge a short distance west of the Northern Mariana Islands . On December 9 , convection began to weaken as Pongsona began interacting with a mid @-@ latitude system to its north . Dry air became entrained in the southwestern portion of the circulation , and the circulation became exposed from the diminishing convection . As a result , both the JTWC and the JMA declared Pongsona as an extratropical cyclone on December 11 about 1400 km (865 mi) northwest of Wake Island .

= = Preparations = =

The Guam National Weather Service office issued a tropical storm watch for the Marshall Islands

shortly after Pongsona developed into a tropical storm , and a day later watches were issued for Chuuk . On December 5 , the service issued tropical storm warnings for parts of the Federated States of Micronesia . As Pongsona became a typhoon , the Guam National Weather Service office issued a typhoon watch for Guam , Rota , Saipan , and Tinian , which was upgraded to a typhoon warning about 23 hours prior to the onset of tropical storm @-@ force winds ; typhoon warnings were also issued for the unpopulated island of Agrihan . By one day before the typhoon moved through the Mariana Islands , JTCW predicted Pongsona to pass well east of the area . Despite a more westward track than anticipated , forecasts remained stagnant until the morning of December 8 , when forecasters reluctantly predicted much greater threat to the Mariana Islands . As a result , many citizens felt they were unprepared and insufficiently warned for the typhoon .

Nine shelters throughout the Northern Mariana Islands were opened to accommodate families needing assistance . Several schools opened classrooms as evacuation centers . On Guam , ten schools were used as shelters , and on the day of impact 2 @, @ 271 people were in shelters . On Rota , 159 people sought shelter , and in Saipan , 549 were in shelters by the day of impact . The Guam Memorial Hospital officials advised all pregnant women within 32 weeks of their delivery date to check in . The Guam Office of Civil Defense filed the paperwork for the Federal Emergency Management Agency to declare the island a disaster area . Governor Carl T.C. Gutierrez took similar measures to declare a state of emergency for the area . Following experience from previous typhoons , Guam newspaper Pacific Daily News underwent preparations to provide internet updates for the storm , including reinforcing the building , maintaining sufficient food supplies for the staff , and stationing two reporters elsewhere on the island ; the paper was the only immediate source of information about the typhoon outside of Guam .

= = Impact = =

= = = Federated States of Micronesia = = =

Early in its duration , Pongsona first affected Pohnpei as a tropical storm . There , it produced heavy rains and gusty winds , though little damage was reported . Later , it brought tropical storm force winds to Chuuk . High waves from the storm washed over and covered some atolls .

= = = Guam = = =

Typhoon Pongsona maintained a 65 km (40 mi) wide eye upon crossing the northern portion of the island of Guam ; the Andersen Air Force Base was in the eye for two hours . Sustained winds from the typhoon peaked at 232 km / h (144 mph) with gusts peaking at 278 km / h (173 mph) ; gusts of at least 160 km / h (100 mph) affected the entire island . The lowest pressure on the island was 935 millibars (27 @. @ 61 inHg) , making Pongsona the third most intense typhoon to strike Guam ; it is behind only a typhoon in 1900 (926 mbar , 27 @. @ 34 inHg) and Typhoon Karen of 1962 (932 mbar , 27 @. @ 52 inHg) .

Communications on the island failed due to the winds ; the entire island was left without power and phone service . The winds greatly damaged 715 power poles and 513 transformers , leaving about \$ 52 million in electrical damage reported (2002 USD , \$ 68 @. @ 4 million 2016 USD) . The local weather office 's communication link was cut off after flooding damaged a telecommunication facility , causing the National Weather Service in Honolulu , Hawaii , to provide backup support by temporarily issuing warnings and advisories . Many anemometers near the northern coastline failed from the winds . The winds collapsed several walls at the Guam Memorial Hospital , resulting in major damage throughout the northern two @-@ thirds of the facility and several units being shut down . Several hotels , churches , and schools received moderate damage , and the Antonio B. Won Pat International Airport received damage to navigation equipment . Typhoon Pongsona also left 65 % of the island 's water wells inoperable , with most of Guam left without water service following the storm . Officials estimate the typhoon destroyed 1 @, @ 300 homes , severely

damaged 1 @, @ 825 , and lightly damaged 4 @, @ 800 .

Tracking slowly across the center of the island , the intense inner rainbands dropped heavy rainfall which peaked at 650 mm (25 @. @ 61 in) at the University of Guam . The precipitation led to record river flow on the Pago and Asan Rivers ; overflowed rivers caused damage to some roads and bridges . The rainfall also caused extensive flooding in several villages . Pongsona produced a storm surge of up to 6 m (20 ft) at some locations , with 3 ? 4 m (9 ? 13 ft) recorded near the eyewall . Considerable storm surge flooding occurred from Tumon southward to Piti , leaving some buildings on the west coast of the island flooded with 1 m (4 ft) of water . The combination of strong storm surge and rough waves caused considerable beach erosion and severe coastal damage .

Across Guam , damage totaled over \$ 700 million (2002 USD , \$ 921 million 2016 USD) , placing it among the five costliest typhoons on the island . The typhoon injured 193 people , as reported by the Guam Department of Health ; most were lacerations and fractures caused by flying glass and other debris . There was one indirect death attributed to the storm , when a 71 @-@ year @-@ old woman was cut by flying glass and subsequently suffered a fatal heart attack ; medical help could not reach her due to the intensity of the storm . As six typhoons had passed directly over the island during the previous ten years , officials in Guam enacted strong building standards , keeping deaths and injuries to a minimum . The typhoon was considered by the public the worst typhoon to ever strike the island due to the large eye affecting most of the population .

= = Northern Mariana Islands = =

Pongsona produced sustained winds of 126 km / h (78 mph) with a gust to 137 km / h (85 mph) on Rota . The combination of winds and other effects from the typhoon destroyed 114 houses , severely damaged 154 , and caused minor damage to 306 ; on the island , about 200 families were left homeless . The typhoon produced a storm surge of 6 @. @ 7 m (22 ft) at the village of Songsong , which crossed about 80 % of the southwestern peninsula on Rota . The surge caused moderate beach erosion on the island , and destroyed a fuel pier and a loading pipeline . Additionally , the typhoon caused severe crop damage on the island . In all , the typhoon caused ten minor injuries on Rota , and resulted in over \$ 30 million in damage (2002 USD , \$ 39 @. @ 5 million 2016 USD) .

On Tinian , the passage of Pongsona destroyed two homes ; seven received major damage and another eight sustained minor damage . The winds damaged power lines , causing two island @-@ wide power outages . Major crop damage was reported .

On Saipan , two houses were destroyed and fifteen were damaged , seven severely . Sustained winds on the island peaked at 71 km / h (44 mph) , which caused scattered power outages . Six minor injuries were reported , and damage totaled about \$ 100 @, @ 000 (2002 USD , \$ 132 thousand 2016 USD) .

= = Aftermath = =

On the same day that Typhoon Pongsona struck Guam , President George W. Bush declared the island a major disaster area . Around the time of the cyclone passing over the island , 2 @, @ 271 residents were in shelters , and by the next day it increased to 3 @, @ 467 after people discovered their homes were uninhabitable . With thirteen Red Cross shelters across Guam , most remained in shelters for about three weeks before disaster tents were distributed . The American Red Cross worked with the United States Department of Agriculture to provide meals for shelter attendees for a two @-@ week period following the typhoon . Through the collaboration of federal and other agencies , disaster assistance on Guam totaled over \$ 300 million (2003 USD , \$ 335 million 2007 USD) by 100 days after the typhoon struck , including \$ 60 million (2002 USD , \$ 78 @. @ 9 million 2016 USD) in initial disaster response . Nearly 29 @, @ 000 individuals registered for disaster assistance , with the first assistance check arrived ten days after the disaster declaration . By three months after the storm , the United States Small Business Administration approved \$ 130 million (2003 USD , \$ 167 million 2016 USD) in low @-@ interest loans .

During the height of the typhoon at Cabras Island on Guam , a gasoline tank caught fire , believed to be from friction caused by extremely high winds running through its ventilation system . The tank exploded , sending its lid airborne and spreading the fire to other nearby tanks . The proximity of the tanks as well as low water pressure hampered firefighting efforts , and the fire was extinguished five days later ; it resulted in three destroyed gasoline tanks with two more caught on fire . While the fire was burning , transportation of gasoline from the port to the rest of Guam was suspended resulting in a halt in gasoline sales for the general public .

On December 11 , 2002 , President Bush extended the disaster declaration to include the Northern Mariana Islands , which allocated emergency disaster aid for the territory . The declaration provided funding for 75 % of the budget for debris removal and emergency protective measures . Immediately following the typhoon , FEMA assigned various federal agencies to respond to the island of Rota . Officials airlifted about 3 @, @ 600 kg (8 @, @ 000 lbs) of emergency supplies including tents , tarps , water containers , coolers , cooking kits and electrical equipment . Military personnel were transported to assist in recovery efforts . By four months after the typhoon , 749 individuals on the island registered through FEMA 's teleregistration number . The United States Small Business Administration approved 147 low ? interest loans for \$ 9 @. @ 1 million (2003 USD , \$ 11 @. @ 7 million 2016 USD) to individuals and businesses and for economic injury on Rota . In all , disaster aid to Rota totaled \$ 17 @. @ 4 million (2003 USD , \$ 22 @. @ 4 million . Additionally , President Bush authorized disaster assistance for the Federated States of Micronesia .

Due to the damage resulted from the storm , the name Pongsona was retired during the 38th session of the Economic and Social Commission for Asia and the Pacific and World Meteorological Organization typhoon committee in November 2005 ; it was replaced with the name Noul .