

= Cyclone Bola =

Cyclone Bola was one of the costliest cyclones in the history of New Zealand , causing severe damage as an extratropical cyclone when it passed near the country in March 1988 . It formed on February 24 to the north of Fiji , and tracking generally southwestward it reached hurricane @-@ force winds near Vanuatu on February 28 . The next day it generated peak wind velocities of 195 km / h (120 mph) , though it quickly weakened as it accelerated southward . On March 4 Bola transitioned into an extratropical storm , passing to the north of the North Island of New Zealand on March 8 . It weakened further and was absorbed by a stationary trough near the South Island on March 12 .

The cyclone first affected Fiji , where it produced gale force winds and strong waves . In Vanuatu , Bola dropped heavy rainfall , which destroyed two bridges and caused severe damage to islands in the group . Bola caused severe damage to the North Island of New Zealand , where heavy rainfall peaked at 917 mm (36 @. @ 1 in) in Gisborne Region . Damage totaled over \$ 82 million (1988 USD) . Three people were killed due to flooding , and hundreds were evacuated when a swollen river threatened Wairoa . In Whangaruru Harbor Northland a samaritan act accounted for another Bola fatality when an elderly male long time resident of Rapata road Oakura Bay attempted to tie down a neighbours empty water tank . He suffered a massive heart attack and died during the peak of the storm . The name Bola was later retired , meaning it will not be used again within the same basin .

= = Meteorological history = =

The system that was to become Severe Tropical Cyclone Bola was first noted during February 24 , as a depression that had developed within the South Pacific Convergence Zone about 850 km (530 mi) to the north @-@ east of Nadi , Fiji . During that day the system moved south @-@ westwards and passed about 260 km (160 mi) to the north of Nadi , Fiji , before it started to move north @-@ westwards during February 25 . The system was subsequently named Bola by the Fiji Meteorological Service during the next day , after it had become a Category 1 tropical cyclone on the Australian tropical cyclone intensity scale . The system subsequently moved south @-@ westwards which meant that the islands of Maewo and Pentecost were threatened . However , as Bola moved further southwards it entered a region of light and variable wind during February 27 , which along with an area of high pressure in the Tasman Sea blocked Bola 's movement southwards . By this time Bola had become a category 2 tropical cyclone on the Australian scale , with wind speeds of between 95 ? 110 km / h (60 ? 70 mph) occurring near the centre . During February 28 , the system became a Category 3 severe tropical cyclone on the Australian scale , as it performed a small clockwise loop , between the Shepherd Islands and Efate . After completing its first cyclonic loop during February 29 , Bola started to move south @-@ eastwards , before it performed a second cyclonic loop during the next day .

As it completed its second cyclonic loop during March 2 , the FMS reported that the system had peaked with 10 @-@ minute sustained wind speeds of 165 km / h (105 mph) , which made it a Category 4 severe tropical cyclone on the Australian scale . The United States Joint Typhoon Warning Center also reported that the system had peaked with 1 @-@ minute sustained wind speeds of 195 km / h (120 mph) , which made it equivalent to a category 4 hurricane on the Saffir @-@ Simpson hurricane wind scale .

After reaching peak intensity , Cyclone Bola quickly weakened as it accelerated southeastward toward a frontal trough . On March 3 , its winds dropped below hurricane @-@ force , and it gradually lost its tropical characteristics . The structure became asymmetric , with a large band of clouds extending well south of the circulation . By March 4 , Bola had completed the transition into an extratropical cyclone . Which turned south and began to affect the North Island of New Zealand on March 6 . A building ridge of high pressure to its south caused the extratropical remnants of Bola to slow and turn to the west on March 7 . The next day , the storm passed about 110 km (70 mi) north of the North Island . Around the same time , the storm began slowly filling , meaning the low

pressure area associated with Bola was losing its identity . It turned southward on March 9 , and on March 12 was absorbed by a stationary trough in the Westerlies near the western coast of the South Island .

= = Impact = =

= = = Vanuatu = = =

Cyclone Bola remained near Vanuatu for about a week , during which it reached its peak intensity while executing a cyclonic loop . The most affected locations were Epi island , the Shepherd Islands , and the islands in Malampa Province , and throughout the country the cyclone affected more than 15 @, @ 000 people and 3 @, @ 000 houses . In a five @-@ day period the cyclone dropped about 450 mm (17 @.@ 7 in) of rainfall . Two bridges on Malakula were destroyed , and several other bridges were flooded or damaged . The passage of the cyclone also left several buildings , roads , and crop fields damaged .

= = = Fiji = = =

Fiji was first affected by Bola on February 25 , while the system was within its developing stages . The system subsequently affected the island nation for a second time between March 3 and 4 . As it impacted the island nation for a second time , gale force winds of up to 81 km / h (50 mph) and waves of up to 5 m (16 ft) were observed . Only very minor damage to sugarcane , pawpaws and other crops was reported , while the Fijian Government decided not to assess the damage caused by Bola . During March 3 , an open punt went missing between Kadavu and Vateule with six fishermen on board . All six fishermen were subsequently presumed dead after repeated air searches had failed to find them .

= = = New Zealand = = =

Cyclone Bola created some of the heaviest rainfall totals for a single storm in the history of New Zealand , with some locations receiving more than half of their annual rainfall totals from the storm . While the cyclone passed north of the island , a strong easterly flow over the North Island contained the interaction between moist air from Bola and drier air from the ridge to its southeast . In the Gisborne region , the flow resulted in the heaviest rainfall totals , when the moisture ascended over the region 's western mountainous areas and condensed into precipitation . One station recorded 419 mm (16 @.@ 5 in) in a 24 ? hour period . The maximum rainfall total attributed to the storm was 917 mm (36 @.@ 1 in) , reported at a station near Tolaga Bay . Heavy rainfall totals of up to and over 300 mm (12 in) were observed in the regions of Auckland and Northland . The cyclone is the largest to be recorded in 93 years of rainfall records . As such , it had a large and lasting effect on the rivers of the area when it deposited a large amount of sediment , as recorded in the sedimentary record of Lake Tutira . Shortly prior to losing its identity , the remnants of Bola also dropped 100 ? 200 mm (4 ? 8 in) of precipitation on the South Island of New Zealand .

Storm damage was heaviest in Gisborne , where rain destroyed or damaged several roads and bridges . Three days of continuous rainfall led to mudslides , flooding , and erosion . Flooding killed three people when a car was swept away . In Te Karaka in Gisborne , a flooded river forced 500 residents to evacuate . A total of 1 @, @ 765 farmers were affected by the flooding , accounting for about 3 @, @ 600 hectares (8 @, @ 900 acres) of damaged crop fields and about \$ 90 million in crop damage (1988 NZD , \$ 82 million 1988 USD) . Water supplies were disrupted in two cities due to flooding . Rainfall in Northland Region caused flooding and outages to telephone and power . Additionally , beginning on about 6 March , the cyclone began affecting the North Island with strong easterly winds of over hurricane force , caused by the interaction between the extratropical remnants of Bola and a ridge of high pressure to its south . The winds damaged a few homes ,

including some in which the roofs were damaged or destroyed . In addition , the strong winds downed several trees , and at the same time , erosion and landslides left hillsides bare without grass or trees .

= = Aftermath = =

In Vanuatu , cyclone victims received food and emergency aid following the storm . Australian patrol boat HMAS Cessnock provided manpower assistance to 11 islands in the country . Reconstruction costs in Vanuatu totalled about \$ 5 million (1988 USD) , which was about 10 percent of the country 's national budget .

After the passage of the storm , four towns in New Zealand declared states of emergency . The New Zealand government provided about \$ 80 million (1988 NZD) to the east coast region of the North Island for assisting in cyclone damage . \$ 8 million was used to create an East Coast Forestry Conservation Scheme , which was set to protect forests and prevent erosion . A study was taken five years after the storm , consisting of a group of 112 people who were evacuated or received monetary assistance in response to the cyclone ; the study showed 12 % of the respondents as experiencing Posttraumatic stress disorder , of which they reported a general lack of assistance and public support .