COMPARATIVE EFFECTS OF CYCLONE DAMAGE TO MANGROVE FORESTS: KATHY VERSUS WINIFRED.

T.J. Smith III
Australian Institute of Marine Science

This paper compares the effects of two cyclones on mangrove vegetation. Cyclone Kathy crossed the coastline of the Gulf of Carpentaria near the mouth of the MacArthur River on March 23, 1984, with winds of 185 km/hr, gusts to 230 km/hr, and a central pressure of 940 mb. Winifred crossed Mourilyan Harbour on February 1, 1986, having winds of 170 km/hr, gusts to 220 km/hr, and a 950 mb central pressure. Kathy's landfall coincided with slack water, whereas Winifred crossed the coast on a falling tide.

Detailed ground and aerial surveys were undertaken in August, 1984, and February, 1986, along the MacArthur River and North Queensland coasts respectively. Massive tree mortality was noted along the MacArthur River. Among the Rhizophoraceae, mortality upstream was significantly greater than at the river mouth (80±20 percent as opposed to 35±20 percent). Mangroves at the river mouth may have been protected from the winds by being flooded by the 3 to 4 m storm surge generated by the cyclone. Averaged over the entire river length, species such as Excoecaria agallocha, Lumnitzera racemosa and Avicennia marina, suffered much less mortality than the Rhizophora, Bruguiera and Ceriops (18.5±11.4 percent against 45±15.3 percent). Excoecaria, Avicennia and Lumnitzera are capable of stump sprouting whereas the other genera are not. This capability probably accounted for the lower mortality observed in the former species.

Mortality in North Queensland's coastal areas (Murray, Tully, Hull, Russell, Johnstone Rivers and Missionary Bay) was less than 0.05±0.04 percent. Those few trees which had been windthrown were invariably located on creek banks or the edge of a light gap where they were not supported by the surrounding canopy. Most trees had suffered small to moderate amounts of defoliation and substantial amounts of leaf litter and small branches were present in the forest floor.

Reasons for the large difference between Kathy and Winifred are most simply explained by the difference in windspeed of the two cyclones. Wind damage to vegetation usually increases dramatically at some threshold value. For mangroves this threshold may be between 170 and 185 km/hr.