Linda Winch noted that by her rush was "damp mud with protruding kauri peg roots". To date living kauri has only been found in community 4.

Note - layout and terminology follows Cameron & Jones (1996)

**References**

Cameron E.K. & Jones S. 1996: Vascular flora of North Cape (including Kerr Point, Murimotu Island, Surville Cliffs, Waikuku Flat). *Auckland Botanical Society Journal 51(2):* 78-96.

## Waterspout damage to Aorangi Island, Poor Knights

P.J. de Lange & E.K. Cameron

On 5-10 August 1996 both authors and P.B. Heenan visited Aorangi Island, Poor Knights group to investigate certain aspects of the island's botany. On our arrival on Aorangi Island on 5 August 1996 we noted that much of the vegetation peripheral to the bare rock and pool landscape of "Crater/Landing Bay" (NE margin of Aorangi) had been destroyed or toppled by what we interpreted as either a massive wave (tsunami or storm surge) or water spout. We noted that c. 500 m of the shore line from the Landing to eastern Crater Bay had been affected.

The damage was most clearly seen in the total elimination of the formerly dense belt of flax (*Phormium tenax*), and oioi (*Leptocarpus similis*) that once covered the upper reaches of the wide coastal platform. Further inland a narrow belt of petrel scrub (*sensu* Wright 1980:28) and the forested margin of the lower Puweto Valley had also been destroyed (Fig. 1). In some cases boulders (c. 2 m diameter) present near the rock pools had been displaced, up to a distance of 10 m, while the path of destruction continued in places in a swathe up to 20 m wide well into the Puweto Valley. Sea urchins (*Evechinus chloroticus*) and various species of seaweed (*Carpophyllum*, *Ecklonia*) were festooned in the tree tops and on the forest floor, as well as mixed within the debris. These were observed up to the 40 m contour, testifying to an immense tidal influx.

Much of the broken off foliage was still green and there were very young seedlings on the newly exposed soil and so we estimate that the damage occurred 4-6 weeks prior to our visit. As the line of damage was clearly delineated and many standing trees had had their tops broken off or were stripped of their foliage (Fig. 1) we suspect the damage was more likely to have been caused by a water spout. A large wave could not have snapped the tops out of trees close to the upper limit of the damage and wind damage would not have been so narrowly defined.

Discussions with W.P. de Lange at the University of Waikato (who maintain a climate station on Burgess Island, in the nearby Mokohinau Islands) confirm that while seismic activity was recorded from the Tonga Trench this was not of sufficient intensity to produce tsunami, while the weather pattern in the outer Hauraki Gulf during late June or early July (about the time we believe the storm occurred) was of a kind conducive to the production of water spouts. Furthermore, the nature of the damage we recorded, the fact that it was confined to a distinct narrow linear band and that in places c. 30 cm of oioi peat had been stripped from the rhyolite rock, leaving the underlying rock with a polished surface clean of organic staining, provided sufficient evidence that a storm of intense, localised pressure had been involved. The only known natural phenomenon able to inflict this kind of localised damage is a tornado or water spout (W.P. de Lange pers. comm., 1996).

The adjacent Tawhiti Rahi Island showed no sign of damage when viewed by us from Aorangi and Carol West (pers. comm., 1996) reported no obvious storm damage on that island during her visit there, 3-6 September 1996.


**Figure. 1.** Storm damage, Crater Bay, August 1996: A. Cabbage tree (*Cordyline kaspar*) photographed in October 1995, B. the same tree in August 1996, about 1 month after major damage inflicted by a water spout, C & D. Crater Bay foreshore (August 1996) about 1 month after passage of water spout.

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**References**

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