

A closer inspection revealed the bird was an Adélie Penguin. It was either a subadult or a non-breeding adult/failed breeder. The plumage was well worn and large parts of the feather tips on the back had changed from bluish black to brown, although the bird did not seem to have come to the actual stage of moulting. It appeared to be in perfect physical condition, so after taking some photographs and noting down the characteristic features (long spiny tail, white eye ring, stubby chestnut beak), we decided to leave it alone rather than taking it into captivity. The next morning it had moved to an even more public place and was eventually shifted to a remote beach by Mike Morrissey, the local Department of Conservation Field Officer.

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### North Island Weka on Rakitu Island

Rakitu Island is a 350 ha privately owned island 2.5 km off the eastern side of Great Barrier Island. It comprises two bush-covered volcanic hills, 220 metres high, and a central farmed valley. At the time of our visit in October 1992, there were 40 cattle, 300 sheep and 100 goats. The goats were fenced in an area north of the Cove, and the sheep and cattle were in the central valley and had access to the bush.

On 22 October 1951, 13 North Island Weka from Gisborne were liberated on Rakitu Island by the Department of Internal Affairs (Bell & Brathwaite 1964).

The North Island Weka (*Gallirallus australis greyi*) was assigned "threatened" status in July 1991, after surveys during 1990-92 established that there had been a further decline in the East Cape/Bay of Plenty population (Chris Ward pers. comm., Beauchamp, unpubl. data), a substantial decline in Northland and on Kawau Island, and a decline on Mokoia Island, Lake Rotorua, since the 1980s (P. Jansen, pers. comm.). The status of the only other population, on Rakitu Island, was unknown.

We decided to assess the Rakitu Island population in October 1992. Previous assessments had been made in June 1957, January 1960 (Bell & Brathwaite 1964) and January 1981 (Bellingham *et al.* 1982). Bell & Brathwaite estimated the population at between 20 and 40 Weka, and attributed their very timid nature to disturbance by dogs during mustering. P. Stein reported that the island's caretaker thought there were up to 100 Weka in 1960. Members of the Auckland University Field Club counted Weka from seven locations during dusk and the following two hours of darkness on 5 January 1981. Cross tabulation of calls gave at least 60 Weka.

We traversed the lower bush areas at dawn on 19 and 20 October to assess the activity, feeding, distribution, age structure and breeding status of the population. On the evenings of 18 and 19 October we counted Weka from six locations (Figure 1) in the 1.5 hour period from before dusk to

darkness. Both evenings were clear and moonless. The evening of the 18th was calm, and there was a 10 knot northwesterly on the 19th. The count stations covered all the island except the eastern cliffs and a small area of the north-western coastal escarpment (Figure 1). We overlapped the coverage in the centre of the island on both evenings to assess the calling of known pairs.

The call rate on both evenings was high, and pairs called up to 7 times. Some pairs with dependent young did not call on both evenings, and no calls were heard in the grassland areas where non-territorial subadult Weka occurred. Population estimates are therefore conservative.

Counts and daylight surveys indicated a population of at least 39 pairs. The total number of adult and subadult Weka was at least 109 and maybe up to 135 (Figure 1). All the Weka seen were in good condition and estimated to be 800 - 950 g for males and 700 - 850 g for females.

The predominant Weka calling and activity periods were between two hours before and one hour after darkness, and the three hours after dawn. Weka were very timid and ran off when disturbed. Feeding observations

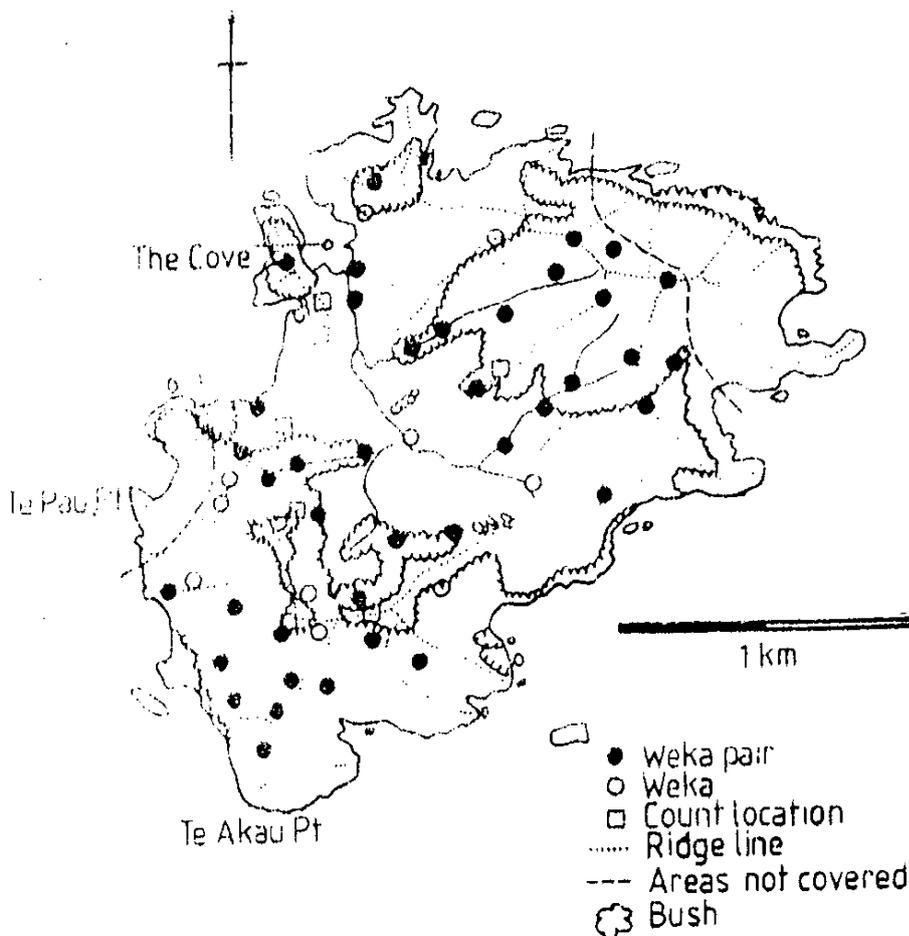


FIGURE 1 — The distribution of North Island Weka on Rakitu Island

and faecal analysis ( $n = 7$ ) showed that Weka were eating sheep carcasses, litter invertebrates and forest fruit. No shells of the large paraphantid *Rhytida greenwoodi* were found in faeces or seen in the litter in the western forests.

The farm managers, David and Ola Burling, reported that the breeding season was restricted to the spring and early summer, and that there was frequently a considerable size difference between siblings during their early development. The maximum number of clutches raised per season around The Cove was two, and the maximum number of chicks fledged per clutch was two. The families we saw were 1, 1, 2 and 2 young, and all young were 30 - 40 days old. No newly independent Weka were seen. All adult Weka were very timid and parents gave distress screeches for up to 7 minutes after disturbance.

David Burling reported that Weka numbers were lower during the past year than at any time during the preceding 5 years and that calling intensity during our visit was lower than during September.

### Discussion

The estimated number of Weka was higher than on previous surveys. The significance of this cannot be known because survey times and estimation techniques were different and the weather conditions and the coverage on previous surveys are not known. The Auckland University Field Club probably did not cover the entire island and the count teams contained members with little experience (R. Hitchmough, pers. comm.).

Previous work on the seasonal variability of Weka evening choruses in populations of known density (Beauchamp, unpubl. data) suggests that Weka numbers are more accurately estimated outside the breeding season. As territorial Weka were breeding during our visit, we probably counted fewer Weka than were present.

The distribution of territorial Weka was strongly associated with forest and shrubland cover (Figure 1). Weka densities were higher in the cliff and volcanic outcrop areas, where there was less understorey disturbance by stock, than in the central forest zone. On average each Weka occupied 1.2 ha of forest on Rakitu Island. This density was similar to that on other islands, including Kapiti Island (1.1 / ha, Beauchamp 1987), Allports Island (1.5 / ha) and Kawau Island (1.8 / ha), but between 10 and 12 times higher than that found at Parekura Bay, Bay of Islands (Beauchamp, unpubl. data).

Bell & Brathwaite (1964) reported that Weka on Rakitu Island were the most timid island Weka they had encountered, attributing this to dog disturbance during mustering 6 months before their visit. Bellingham *et al.* (1982) also reported the Weka as timid but frequently encountered in the bush. We too found them very timid. However, the Weka are seldom disturbed by the five dogs on the island, which are generally confined to the central grassed area. The Weka are probably just cautious of anything unfamiliar.

Brook *et al.* (1982) noted the occurrence of the paraphantid snail *Rhytida greenwoodi* in the leaf litter in the western forests. The population was restricted to under rocks in a gully unmodified by stock near Te Akau Point. Old undamaged shells, lacking periostracum, were found in groups

throughout the western forest. More recently damaged snail shells in the Te Akau point gully had the upper half of the outer whorl pealed back for half its length, in a manner similar to that seen on the Poor Knights Islands. The Poor Knights lack Weka and the ship rat, but had Banded Rail (*Gallirallus philippensis*), Spotless Crake (*Porzana tabuensis*) and Blackbird (*Turdus merula*).

Brook *et al.* (1982) attributed the lack of live snails in the litter and abundant empty undamaged shells on Rakitu Island to Weka. They claimed that the abundant shells in the litter in the western forest indicated a drastic recent population decline.

However, Weka predation on large native snails leaves many shells obviously damaged. The lack of reference to damaged shells in the forest litter by Brook *et al.* is surprising. *Powelliphanta* shells survive well in moist litter and for many years without apparent deterioration, but they deteriorate rapidly when exposed to dry conditions (Beauchamp, unpubl. data). Perhaps the *Rhytida* shells were exposed by foraging Weka or by the forest litter drying out after the destruction of the understorey by stock. In this way old snail shells would rapidly deteriorate. In addition, the snail population in the Te Akau gully could be restricted by feeding by Weka, other birds and rats or by other factors. During our visit we did not find *R. greenwoodi* shells in the western forests, but we did not enter the gully at Te Akau Point. Although Weka are likely to be greatly reducing the invertebrates of Rakitu Island, more work is required before the Weka can be cited as the main factor in the decline of the *R. greenwoodi* population.

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