

# The decline of the North Island Weka (*Gallirallus australis greyi*) in the East Cape and Opotiki Regions, North Island New Zealand

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## ABSTRACT

Densities of the North Island Weka (*Gallirallus australis greyi*) have declined over much of the East Cape region since 1985. The area around Motu township had densities exceeding 0.72 ha<sup>-1</sup> in 1985-86, but they disappeared by 1990 and have increased only marginally since. The decline coincided with floods and the spread of ferrets (*Mustela furo*) into the valley.

The only region where Weka density increased is in the hills between Motu and Opotiki. Counts in the Tootoa and Whitikau Valleys in 1995 found a maximum density of 0.60 adult Weka ha<sup>-1</sup> in mixed farmland and fern, and between 0.08 - 0.18 ha<sup>-1</sup> in mature forest. There are less than 1,000 adults in the centre of this region, and in some areas the population is male-dominated.

KEYWORDS: North Island Weka, *Gallirallus australis greyi*, distribution, density.

## INTRODUCTION

The Weka (*Gallirallus australis*) is a large flightless New Zealand endemic rail. It occupies many habitats including beaches, shrublands, forest and sub-alpine shrublands. Weka comprise four sub-species found on the North Island, South Island and offshore islands of New Zealand (Heather & Robertson 1996). Weka are opportunist omnivores, that can raise four clutches a year when food is plentiful (Marchant & Higgins 1993).

In 1936-40, the North Island Weka (*G. a. greyi*) declined in southern Northland (Anon 1954, Gee 1956, McKenzie 1971), and after 1952 (Anon 1954), it was confined on the North Island to the East Cape region near Gisborne (Anon 1943). In 1953-54, Weka were found over approximately 25,000 hectares of the East Cape from Uawa River in the north, Muriwai in the south and Otoko in the west and were starting to expand (Stidolph 1955). Between 1956 and 1958, the southern boundary had expanded by 16.1 km and the western boundary by 19.3 km (Sibson 1958). A. Blackburn reported a good breeding season in 1958 and many dead Weka on the roads (Sibson 1958). Other reports suggested high densities and breeding since 1954 (Stidolph 1955, Monckton 1958). By 1962, the distribution area extended over 61,000 hectares from Bartletts to Tiniroto in the south, to Tokomaru Bay in the north and Whatatutu and Wharekopae in the west (Carroll 1963). Weka continued to expand and by 1982 most of East Cape south of the Raukumara Ranges (147,500 hectares) was populated: from Bartletts to 20 km north of Wairoa to Papunui and then north to Whitikau. In the north, Weka had reached the headwaters of the Raukokore, Hicks Bay and Rangitukia (Rasch 1989) (Figure 1). Some of the expansion was assisted by the

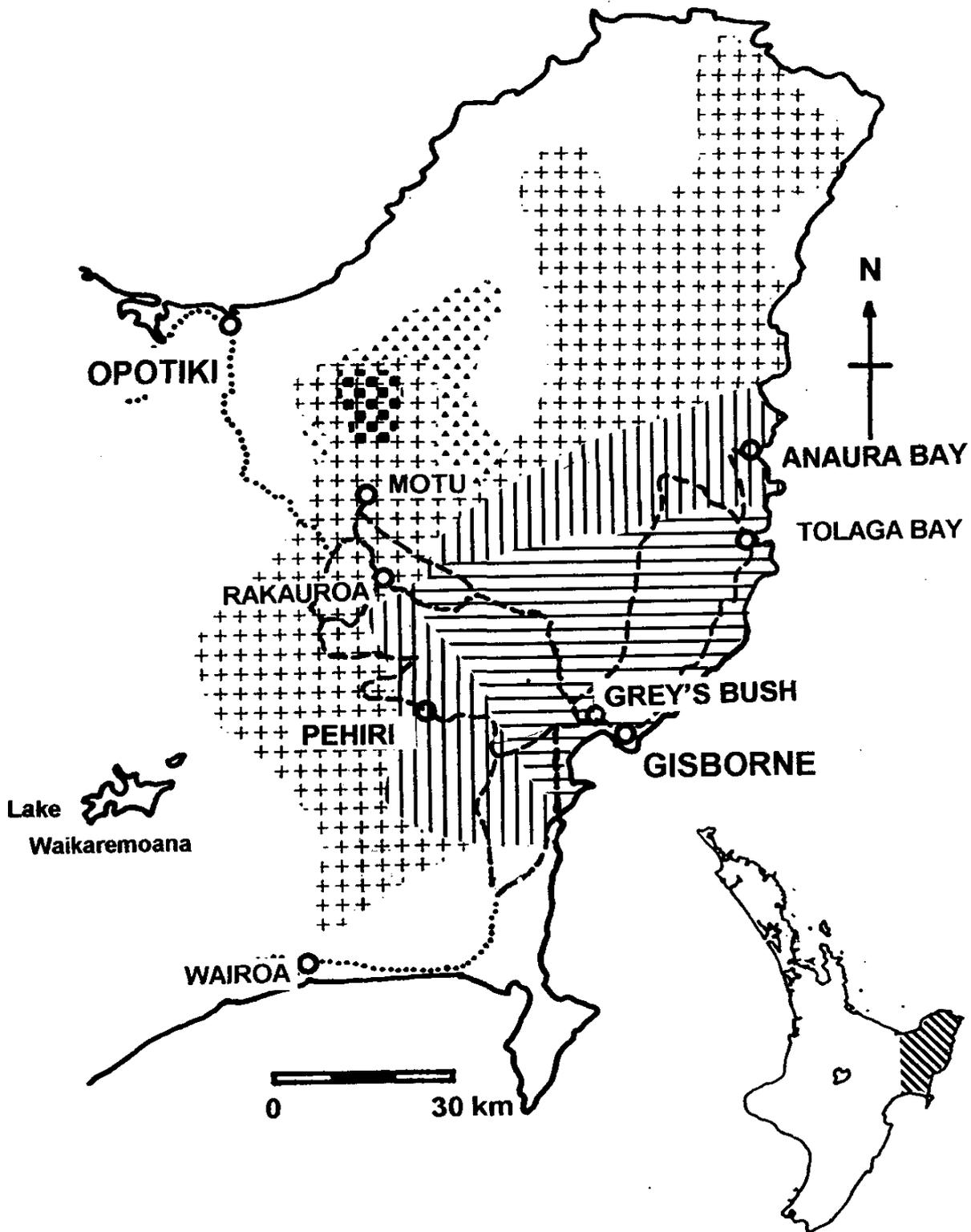


FIGURE 1 - The expansion and contraction of the range of Weka (*Gallirallus australis*) on the East Cape.   
 ≡ 1952 range, IIII 1962, the +++ is 1982; and the ▲▲▲ 1991. The patched area is the Tootoa and Whitikau region where most Weka remain in 1995. The dots are the route of State Highway 2. (data on 1991, Chris Ward & Mike McGlynn, pers. comm.). The dashed line shows the surveyed route in 1986.

Wildlife Service, who trapped Weka in areas where they were a problem and released them on the edge of their range. Weka were released at Bartlett's Farm Wharerata in 1961, at Tuai Power Station in 1964 and 1966, at Ngatapa in 1963 and 1964, near Motu in 1970, in the Morere Reserve in 1964 (C. Miskelly & S. Girardet, pers. comm.) and at Pakowhai in 1984 (Howell & Gaze 1987).

The population was considered to be safe in 1983-85, despite declines and local extinctions (Booth 1984, Howell 1987). It was only after the declines in the Matawai - Motu vilage region, Opuia, Rawhiti, and Kawau Island were recognised in 1990-91 (Beauchamp, unpubl. data), that the predicament of the North Island Weka was understood.

The North Island Weka was declared a threatened sub-species in 1991 and a draft plan was produced to define actions for its recovery, including a survey of the status of the remaining North Island populations. A postal survey of much of the East Cape region by the Department of Conservation in 1991 showed that Weka were still widely distributed over approximately 76,500 hectares (M. McGlinn & C. Ward, unpubl. data). During the 1980's the population in the Toatoa and Whitikau Valleys was expanding and Weka were seen in the Waioeka Gorge (Booth 1984), and Torere, 20 kilometres east of Opotiki.

I visited the Toatoa and Whitikau Valleys twice in 1995 to assess the status of the population there, and also re-surveyed Weka in the Motu and Rakauora regions.

## METHODS

I surveyed the southern East Cape region between 22-28 December 1985 by driving the route: Ormond - Waimata Valley - Tauwhareparae - Takapau - Anaura Bay - Tolaga Bay - Gisborne - Matawhero - Pehiri - Rere - Te Wera - Matawai - Motu - Waikohu Valley - Rakauora and Te Karaka (Figure 1). I spent the evenings counting at Grey's Bush (23 December 1985), Anaura Bay (24 December 1985), Pehiri (25 December 1985), Motu (26 December 1985) and Rakauora (27 December 1985) and was also looking for Weka in scenic reserves (Figure 1).

Weka were surveyed by counting "spacing calls" (see Marchant & Higgins 1993) by single Weka and pairs for half an hour before and after sunset (Beauchamp *et al.* 1993). Weka can be sexed on the basis of calls: higher pitched, faster calling individuals are females. Males have a slower, lower-pitched call (Beauchamp 1987). Weka that could be assigned to a specific location were plotted onto topographic maps with a scale of 1:20,000, and the area of coverage was defined so that the density could be calculated. Weka calling beyond this range were assigned a direction. Two areas were also surveyed for an hour after the start of the dawn chorus (Table 1). Sections of the roads in the Toatoa and Whitikau valleys were walked between mid-morning and early afternoon or at night to locate weka and age young.

Young were aged by their plumage. Small black chicks lacking brown grey and a white ear patch were less than 10 days old. Grey-brown chicks with a white ear patch and lacking brown wing covert patches and tails were 11 - 21 days of age. Young with a brown head cap, upper back and wing coverts, and a fluffy grey brown rear region and just visible tail tuft were 22 - 35 days. Young three quarters the size of adults, with a visible tail, grey-brown dorsal plumage and grey-brown ventral plumage were 36-50 days of age.

TABLE 1 - Location, counts and density estimates (individuals ha<sup>-1</sup>) in the Waiaua, Toatoa, Whitikau and Motu regions

Location (NZMS 260 reference)	Habitat and area of coverage	Density	
		January 1995	December 1995
<b>WAIUA VALLEY</b>			
Waiaua River (X15 998432)	Grass & shrubs (300 ha)	0	-
Waiaua River (X15 005410)	Kanuka (120 ha)	0.008	-
Wairoa Stream (X16 023384)	Bush (70 ha)	0.01	-
Wairoa Stream (X16 029362)	Bush (100 ha)	0.06	0.06
<b>TOATOA VALLEY</b>			
Petipeti Stream (X16 035359)	Grass fern & bush (150 ha)	0.08	0.11
Toatoa Bridge (X16 054337)	Grass & scrub (210 ha)	0.08	-
Waiopu & Petipeti Streams (X16 076339)	Grass & shrub (120 ha)	0.04	-
Ngaupokotangata Stream (X16 112329)	Bush (40 ha)	0.05	-
Ngaupokotangata & Whitikau Streams (X16 124326)	Fern & mature bush (160 ha)	0.03	0.03
<b>WHITIKAU VALLEY</b>			
Whitikau trig (X16 049301)	Bush (110 ha)	-	0.08#
Whitikau junction (X16 055270)	Grass, scrub & bush (200 ha)	0.11	0.08
Whitikau Valley (X16 077252)	Grass kahikatea & bush (220 ha)	0.12	0.13
Motu Road (X16 092220)	Fern & Bush (50 ha)	-	0.02#
Pakihi Hut (X16 015273)	Bush and cliff shrubs (50 ha)	-	0
<b>MOTU VALLEY</b>			
Marumoko Road (X16 120222)	Grass & scattered trees (290 ha)	0.003	-
Motu Reserve (X16 078177)	Farm & shrubs (230 ha)	0.05	0.01

# dawn count.

Fully developed young with a partly grown tail, a pail grey breast with no breast band, grey ear coverts and a dark brown eye were aged as 51-80 days old (Beauchamp 1987). Older young were likely to be independent.

On 27 December 1986 and 2 January 1987, I surveyed the Rakauroa, Motu and Pakihi Hut areas. I spent the evenings at the following places; Motu (27 December 1986), Pakihi Hut (28 December 1986), Waiaua River (29 December 1986) (NZMS 260 X15, 005410), Rakauroa (31 December 1986 to 2 January 1987). Between 31 December 1986 and 3 January 1987 I surveyed the distribution of the population in and near the Papatu Scenic Reserve at Rakauroa and cage trapped Weka to get an estimate of density.

During a week in May 1990 I counted the Weka in the Matokitoki Stream, Cook Hospital and Waimata Valley on Riverside and Cave Roads, Gisborne. I also made trips up to Ruatoria and to Matawai. On 29 December 1990 and 27 December 1991, I counted again at Motu, and on 28 December 1991 I counted at Rakauroa.

Between 19 - 23 January 1995, and 26 November - 5 December 1995, I surveyed and counted at specified points in the Motu, Whitikau and Toatoa regions (Table 1) in an attempt to define remaining stronghold of the population.

In 1989 and 1995 interviewed 9 farmers and residents in the Toatoa, Whitikau and Motu regions about the past and present status of Weka.

## RESULTS

In 1985 I found only one road killed weka, a ~70 day old male, in the 360 km travelled, at Tolaga Bay (Figure 1).

During evening counts I recorded 2 pairs at Grey's Bush on 23 December 1985, 1 male, 1 female and a pair plus three ~40 day old young at Anaura Bay on 24 December 1985, no Weka at Pehiri on 25 December 1985, hundreds at Motu on 26 December 1985 and 10 at Rakauroa on 27 December 1985.

In January 1987, six Weka were seen and two dead individuals were picked up at Tolaga Bay: one ~100 day old sub-adult female (530 g) and a 1-3 year old male (900 g).

In trips from Gisborne to Rakauroa and Matawai in May 1990 I saw no dead Weka. Four were heard on the margin of Tairāwhiti Hospital grounds and the grounds of the old Cook Hospital. Weka were at very low density ( $0.001 \text{ ha}^{-1}$ ) in the upper Waimatu Stream, on the northern outskirts of Gisborne. Weka were also present in the middle of Gisborne on the banks of the Taruheru River.

### Motu

I counted at a site near Motu Scenic Reserve on the 26 December 1985, 27 December 1986, 29 December 1990, 27 December 1991, 22 January 1995 and 4 December 1995. Weka were throughout the valley in December 1985 and 1986, and the "spacing call" (Beauchamp 1987) chorus of single and duet calls was continuous between 22:11 and 22:35 in 1986. Weka were throughout the district and especially on the lower foothills and in the valley. I estimated the number heard in 1985/86 within the Motu Valley (from the Motu Falls to Taumataokaretu to Phillips Road to Motu) to be 300 birds in the 600 ha (Figure 2). In the surrounding area there were hundreds more. Weka that did not call were seen moving about at dusk. In the immediate surrounding of the Motu Reserve and the southern end of the Marumoko Road the density of adults exceeded  $0.72 \text{ ha}^{-1}$ . One clutch of 3 eight-week old young was seen on the Marumoko Road.

In 1990, no Weka were heard during an evening count in fine, clear, windless conditions, and in 1991 only six Weka were heard near the road margin at Taumataokaretu under similar conditions.

In January 1995 four pairs and three single Weka called in the Motu reserve and Marumoko Road area, and another single bird was seen but did not call. In December 1995 only two males called repeatedly there, and a single Weka called once. The density in the area intensively surveyed in 1986 was  $0.08 - 0.24 \text{ individuals ha}^{-1}$ .

Only one Weka was heard in the northern Marumoko Road in ideal conditions on 21 January 1995 (Table 1), and the numbers seen and heard were low in the Motu Falls Reserve and on the Waitangirua Station. On the morning of 5 December 1995, no Weka were heard at dawn on the bush farmland margin on the Motu Road. These counts indicated that there were few Weka in the farmed areas beyond the forest margin south of the Whitikau Valley.

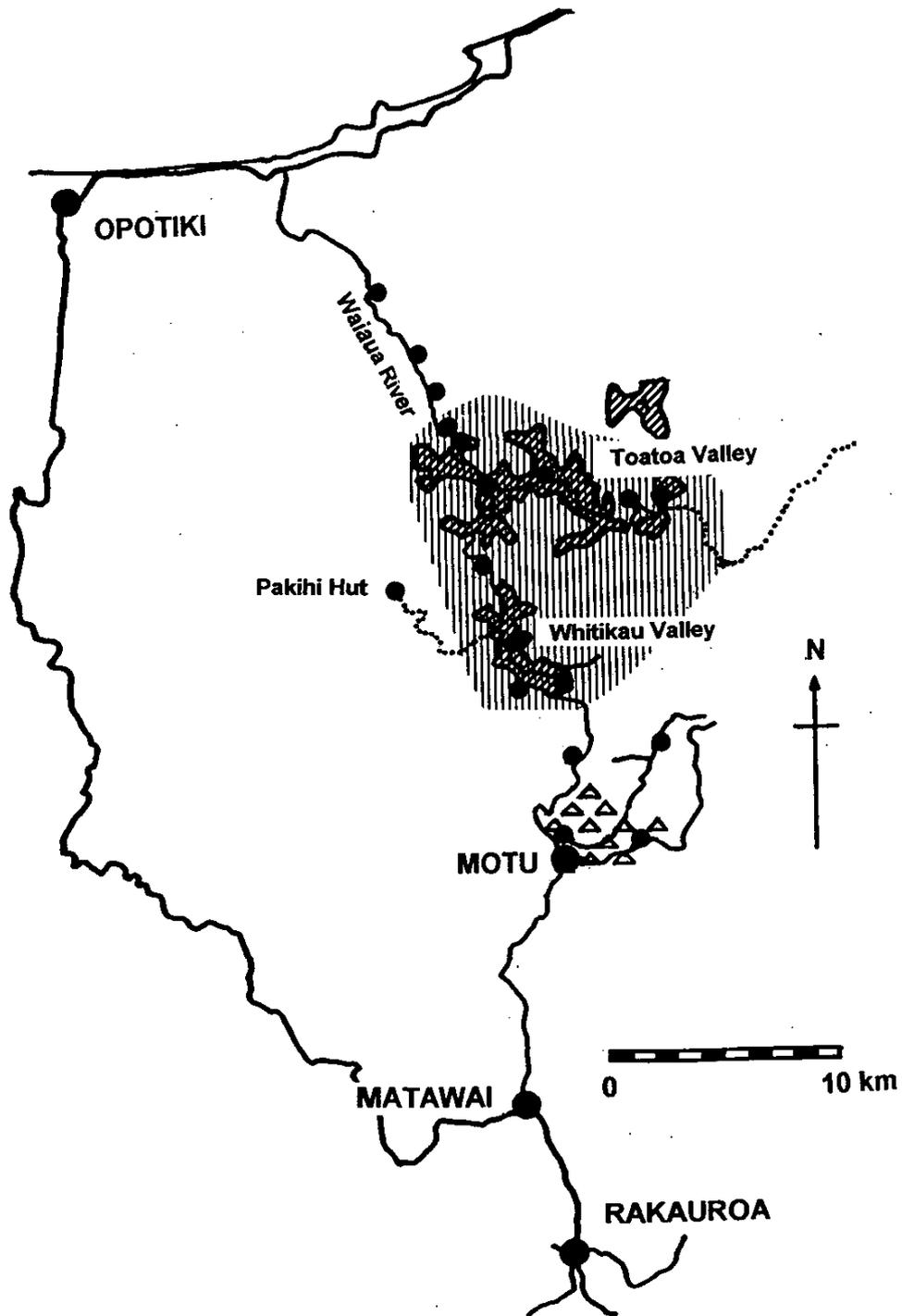


FIGURE 2 - The survey area in the Tootoa and Whitiakau Valleys. // vertical lines the core population area;  $\Delta\Delta\Delta$  distribution area of the Motu population with 300 individuals in 1985-86.

### Rakauroa

In December 1986, I found seven pairs and three individuals within and beside the Papatu Scenic Reserve, at least one pair and two males in the northern region of Station Road and the Rakauroa to Tahora Road, and two pairs and an individual on the Langer's property between the road and their airstrip. Three males were caught in good condition. The estimated density of adult Weka, based on calls at dusk, was 0.65 individuals ha<sup>-1</sup>, and the overall density over was 0.8 individuals ha<sup>-1</sup>. The population was lower in 1985, and was gradually increasing again (M. Gibson, pers. comm.).

At Langthorne station, 800 m west of Rakauroa, the owner reported 12 pairs around the house and many more up-stream. Three Weka were seen in an area of blackberry (*Rubus fruticosus*) and fallen logs near the old railway station and one pair further down the road had three ~7 day old chicks.

On 28 December 1991, I counted at Papatu Reserve car park in fine calm conditions and only located one pair and two males. This gave a density of 0.16 ha<sup>-1</sup>.

### Pakihi, Whitikau and Toatoa

On 28 December 1986, I walked the Pakihi pack track from Motu Road to the Pakihi hut. Two Weka were heard in the bush near the Whitikau Valley and 2 were heard in an evening count at the hut. Counts in the bush in December 1995 found Weka at low density but none were heard from the Pakihi Hut (Table 1).

Weka were not heard in the western Toatoa Valley in 1986. In 1995, the density of calling Weka differed from zero to 0.13 individuals ha<sup>-1</sup> (Table 1). Calls were predominantly from males and pairs. The densest population was in the regenerating forest surrounding the upper Whitikau Valley, and in an area in the mid to eastern Toatoa Valley. In the thickest vegetation, the margins of the valleys and regenerating kahikatea (*Podocarpus dacrydioides*) in the Whitikau Valley, Weka reached 0.60 ha<sup>-1</sup>. Throughout the bush the densities varied between 0.08 and 0.18 Weka ha<sup>-1</sup>. Most Weka appeared to be near permanent water.

Some areas appeared to lack females. At the junction of the Whitikau and Ngaupokotangata Streams on 19 January 1995 three male Weka gave calls which indicated that they were seeking females (Beauchamp, unpubl. data), and near Whitikau saddle on 28 November 1995 a male gave similar calls during the first hour of darkness. Pairs with young were seen or heard in the upper Waiua Stream near the saddle of the Motu Road, in two places in the Toatoa Valley, and throughout the upper Whitikau Valley (10 clutches). Weka were breeding in both January and December 1995, and have historically bred in the eastern Toatoa Valley throughout the year (M. Lynn, pers. comm.).

The number of Weka in the Toatoa and Whitikau Valleys and the Toatoa Scenic Reserve in the areas specified in Figure 2, were calculated to be 850 adults. This estimate was based on the densities calculated in Table 1, the distribution and stability of sites of calling pairs in January and December 1995, and the availability of suitable habitat. This estimate includes 200 Weka in the farm margin of the Toatoa Valley west of the junction of the Ngaupokotangata and Waitukuaruhe Streams, and 110 Weka in the

margins of the Whiti kau Valley west of where a straight line between Ngateretere and Onukuroa Trigs intercepts the Whiti kau Valley. Other, possibly young, Weka were seen moving in the area at night and did not call, and there could be up to 1,000 Weka within this area.

## DISCUSSION

Major Weka declines in East Cape in 1983-85 coincided with severe drought in 1982-83. I estimate from the distribution of Weka in 1982 and the data presented in this paper that the population density was a minimum of 0.6 Weka ha<sup>-1</sup>, or a total of 88,500 individuals. By 1991, this had declined to at most 1 - 3% of its former size (C. Ward, pers. comm.). The causes of this decline are unknown, but may have included food shortage during drought and habitat loss as farmers used all available vegetation to keep stock alive (C. Ward, pers. comm.). During another significant drought in 1986-87, I found Weka still relatively common at Tolaga Bay, Rakauroa and in the Motu Valley. However this time the stock densities in Gisborne were very low and there was ample tall grass cover.

This study has shown the subsequent decline at Motu and a lack of recovery there, despite the ability of Weka to raise up to 15 young year<sup>-1</sup> (Beauchamp, unpubl. data). The density of the strongest remaining population in the Toatoa - Whiti kau was still considerably smaller than other mainland and island Weka populations (Marchant & Higgins 1993), including the former population on the East Cape lowland.

The causes of the lower density in the Toatoa-Whiti kau, and overall lack of recovery on the East Cape are not known.

Recent population studies of North Island Weka have suggested a number of factors that could influence Weka recovery on the East Cape (Beauchamp, unpubl. data., Bramley 1994). These include drought, floods, disease, the loss of corridors, general habitat degradation, predation, loss of critical food supplies, road kills, poisoning and trapping. Land-use changes such as grazing under scrub (Bramley 1994), high density rotational stocking, herbicide spraying on farms and roadsides, roadside grazing, and the burning of stumps have reduced the amount of cover available to Weka in the areas around East Cape.

The information presented here suggests that there has been only one major decline since 1986, in the Matawai to Motu Village region. This may or may not be connected with changes caused by cyclone Bola in February 1988. Since 1987, there has been considerable loss of cover near Motu township. Riverside vegetation was cut, partly grassed fields and rushlands were converted to hay fields, stumps were burned, and roadside cover like blackberry and sweet brier (*Rosa rubiginosa*) was removed. In the surrounding districts, hillsides that were a mixture of grass and shrubs with fallen logs and rushes 20 years ago are now pure pasture, that offer few hiding and nesting sites for Weka.

Population studies in 1992-93 at Rakauroa found low productivity, but suggested that chick and juvenile Weka survival could be enhanced if cats and ferrets were controlled (Bramley 1996). Road traffic and predators were the most important causes of adult death; the exact causes of chick loss were not established (Bramley 1994). Ferrets first appeared in the Motu - Rakauroa region, and maybe the East Coast in 1988-89 (Beauchamp, unpubl., King 1990).

The Toatoa and Whiti kau Valleys appear to be better habitat for Weka than areas that previously held large populations, because they have a lower probability of drought allowing better access to soil invertebrates, and have diverse weed communities, shrub and fernlands. Heavy rainfalls cause numerous slips (R. Edwards, pers. comm.) which create habitat for fruit-producing plants. The density of Weka in the Toatoa and Whiti kau Valleys suggests that the population is limited. Ferrets have not been caught in the Whiti kau Valley but cats and stoats have been present for many years (R. Edwards, pers. comm.). Urgent work is required to define the role of predators in the Toatoa and Whiti kau areas, and to identify the factors that could be limiting population growth.

### ACKNOWLEDGEMENTS

I thank Wendy Baker and Linda Hayes for help with the 1985-86 and 1986-87 surveys respectively, and Melanie Closs who helped in January 1995. Rugby Edwards provided information on the Whiti kau and gave access to his land. Irene Baker and Murray Lynn gave information on the Weka in the Motu and Toatoa Valleys. Chris Ward, Graeme Elliott, Gábor Lövei and two anonymous referees are thanked for providing valuable comments which have improved this paper.

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Received 9 March 1996, revised 15 January 1997, accepted 16 February 1997