

## Failed establishment of North Island weka (*Gallirallus australis greyi*) at Karangahake Gorge, North Island, New Zealand

ANTONY. J. BEAUCHAMP

71 Church Street, Onerahi, Whangarei, New Zealand

tonyb@nhl.co.nz

GARY. C. STAPLES

ELAINE. O. STAPLES

P O Box 92, Paeroa, New Zealand

ANN GRAEME

BASIL GRAEME

Forest and Bird Protection Society Inc., 53 Princess Road, Tauranga, New Zealand

ERIC FOX

Otorohanga Zoological Society, P O Box 222, Otorohanga, New Zealand

**Abstract** A captive-breeding programme was begun in August 1991 to breed North Island weka (*Gallirallus australis greyi*) for release at a North Island site. A total of 101 weka were released between October 1992 and January 1996 at Karangahake Gorge, southern Coromandel. The project was abandoned in March 1996 after dogs and ferrets (*Mustela furo*) killed many of the birds.

Beauchamp, A.J.; Staples, G.C.; Staples, E.O.; Graeme, A.; Graeme, B.; Fox, E. 2000. Failed establishment of North Island weka (*Gallirallus australis greyi*) at Karangahake Gorge, North Island, New Zealand. *Notornis* 47 (2): 90-96.

**Keywords** Rallidae; reintroduction; ferret; *Mustela furo*; predation

### INTRODUCTION

The New Zealand weka (*Gallirallus australis*) is a flightless, endemic rail. North Island weka (*G. a. greyi*) initially increased after European settlement (Buller 1876) and then declined. The major decline period was between 1895 and 1923. Information from the Wanganui/Waitotara area (Myers 1923), Tutira in Hawke's Bay (Guthrie-Smith 1914, 1927), and northern Auckland suggest that most local declines were sudden, after years of rising and stable populations (McKenzie 1971).

In 1936 - 1940, the North Island weka (*G. a. greyi*) declined in southern Northland (Anon 1954; Gee 1956; McKenzie 1971), and by 1953-54 became confined to about 25,000 ha of the East Cape (Anon 1954). The weka

population underwent a major expansion there between 1945 - 1982 (Gee 1956; Sibson 1958) in the presence stoats (*Mustela erminea*) and hedgehogs (*Erinaceus europaeus occidentalis*), and localised population of rabbits (*Oryctolagus cuniculus*) and ferrets (*M. furo*) (Marshall 1963; Turbott 1967). The population expanded to at least 88,000 individuals, and then declined during 1982-84 to c.10,000 individuals by early 1987 (Beauchamp 1997a).

In October 1990, the Royal Forest and Bird Protection Society (hereafter, the Society) had indicated to the Department of Conservation (DoC) that it wanted to be more involved with threatened species conservation and considered the North Island weka a good candidate. In May 1991, the Society surveyed weka in the Waikohu Valley and found that the species had declined

significantly there (Beauchamp 1997a). A postal survey of weka presence on rural stations was conducted thereafter. The survey showed that weka were uncommon over most of lowland East Cape, they had declined slowly over a number of years, and were common only in the Toatoa and Whitikau Valleys (C. Ward & M. McGlynn pers. comm.). The population was estimated at c.5000 birds. In 1991, two other small populations at Opuia and Parekura Bay were in decline (Beauchamp 1988; Beauchamp *et al.*; 1998, unpubl. data.), and so was the most numerous population on Kawau Island (Beauchamp 1997b, unpubl.). There were fewer than 50 birds on Mokoia Island (K. Owen pers. comm.), and the status of weka on other islands was unknown (Beauchamp *et al.* 1993).

A North Island weka recovery strategy meeting at DoC, Rotorua, officially recognised the taxon as threatened, and approved a Society captive rearing and release programme at some suitable place in the North Island, but remote from the East Cape population. Aviary stock for this programme was to include existing captive reared weka and some young weka from Kawau Island.

The aim of the release programme was to try to establish a viable weka population on the North Island within five years, using captive-reared weka.

## METHODS

### Breeding aviary establishment

Potential breeders of weka were recruited in February 1991 (Graeme 1991). DoC officers inspected aviaries and issued permits to the breeders. In late November 1991, 13 young weka were captured in the Mansion House Reserve on Kawau Island to make-up pairs with captive-reared weka from the Otorohanga Zoological Society. A pair of weka was also taken into captivity in Gisborne. The age of weka from Kawau Island was estimated to be 45 - 75 days for females, and 50 - 80 days for males (Beauchamp 1998), and the captive-reared weka were 325 - 2247 days ( $n = 4$ ) for females and 258 - 791 days ( $n = 6$ ) for males (E. Fox pers. comm.). Three pairs of Kawau birds, seven pairs of captive-reared birds and five pairs of mixed origin were established in aviaries throughout the North Island in December 1991.

The number of managed pairs was maintained at 18 between March 1993 and March 1996, using weka bred in the programme and sub-adult weka reared in the wild on Kawau Island.

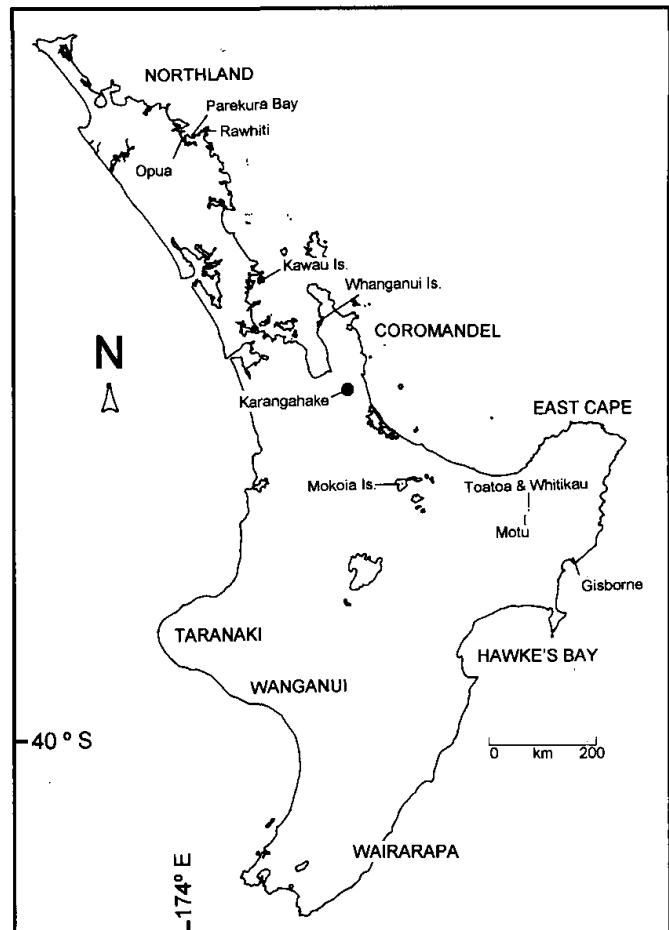


Fig. 1 Location of the Karangahake release site and other populations of North Island weka (*Gallirallus australis greyi*).

### Release site selection

Potential release sites were investigated in early 1992. The principal criterion for the release site was an area that allowed easy movement by weka to dry or moist locations. The most likely place for release was considered to have: mixed habitats including grasslands; seral and terminal forest types; adequate year-round food supplies; limited potential for extensive drought; a high proportion of public land; a supportive human community; low numbers of predators and competitors; and limited potential for weka foraging on other threatened and endangered species.

The Karangahake Gorge release site was investigated in April 1992 (Beauchamp, unpubl.). DoC considered that the only wildlife that was potentially threatened by a release of weka there were the Te Aroha stag beetle (*Dorcus auriculatus*), Archey's frog (*Leiopelma archeyi*), and Hochstetter's frog (*L. hochstetteri*). The stag beetle occupied ridges where weka were unlikely to settle because of insufficient food (Beauchamp, unpubl. data).

**Table 1** Release periods of North Island weka (*Gallirallus australis greyi*) at Karangahake Gorge, North Island.

Period	Location	Number released	Age of released weka (days.)	$\bar{x}$	$SE_{\bar{x}}$	Range
8 Oct 1992 - April 1993 (+Oct 93)	Aviary	17	184,	94,	92	393
9 Nov 1993 - 10 April 1994	Wairere	11	255,	101,	131	423
14 June 1994 - 19 June 1995	Aviary	58	372,	540,	78	2699
31 Aug 1995 - 7 Dec 1995	Aviary	10	138,	50,	95	247
1 Feb 1996 - 10 Feb 1996	Aviary	5	133,	99,	63	329

The frogs were beside upland streams or on mist-moistened ridgelines. An assessment found that there was little risk to frogs from weka foraging (Beauchamp 1996). DoC issued permits for the release of weka at Karangahake Gorge in June 1992. Community support was obtained in August, and an aviary was constructed by Society members at G. & E. Staples' property on 29-30 August (Fig. 1).

### Release management

Weka were released from October 1992 (Bramley & Veltman 1998). Adult weka that were on hand at the start of the release programme but were not required for breeding were held for a minimum of 28 days, to forestall potential homing behaviours (Sibson 1966; Wright 1981). From August 1994, retired adults from breeding aviaries were held for a minimum of 56 days before release, and young weka were held until they were at least 84 days old, and preferably 150 days old.

Most birds were released by opening flaps in the side of the aviary and allowing the weka to leave in their own time. In the second release phase (Table 1), we tried to reduce losses by pairing weka in the aviary and releasing them away from dogs, at Wairere (Fig. 2A).

DoC required telemetric assessment of at least 10% of the released weka to gauge movement, habitat use and causes of death. Back-mounted transmitters were placed on weka a few days before release to ensure there were no harness problems (Bramley 1994). Tracking was done by G. Bramley during monthly visits of 4-22 days between November 1992 and June 1993 (Bramley 1994), and at other times by G. and E. Staples.

## RESULTS

A total of 101 weka (61 males, 40 females) were released between October 1992 and January 1996 (Table 1). Most (84.3%) were sub-adults ( $\bar{x}$  = 138 days,  $SE_{\bar{x}}$  = 62 d.; Beauchamp 1998). Eighteen older weka were released

( $\bar{x}$  = 1073 days,  $SE_{\bar{x}}$  = 586 d). There was no significant difference in the age of release of each sex (Mann Whitney  $U$  = 108.91,  $P < 0.191$ ).

Most weka released in the first period were males between 177 and 393 days old (Table 1). In other periods, there were sex biases but the number of each sex released was similar.

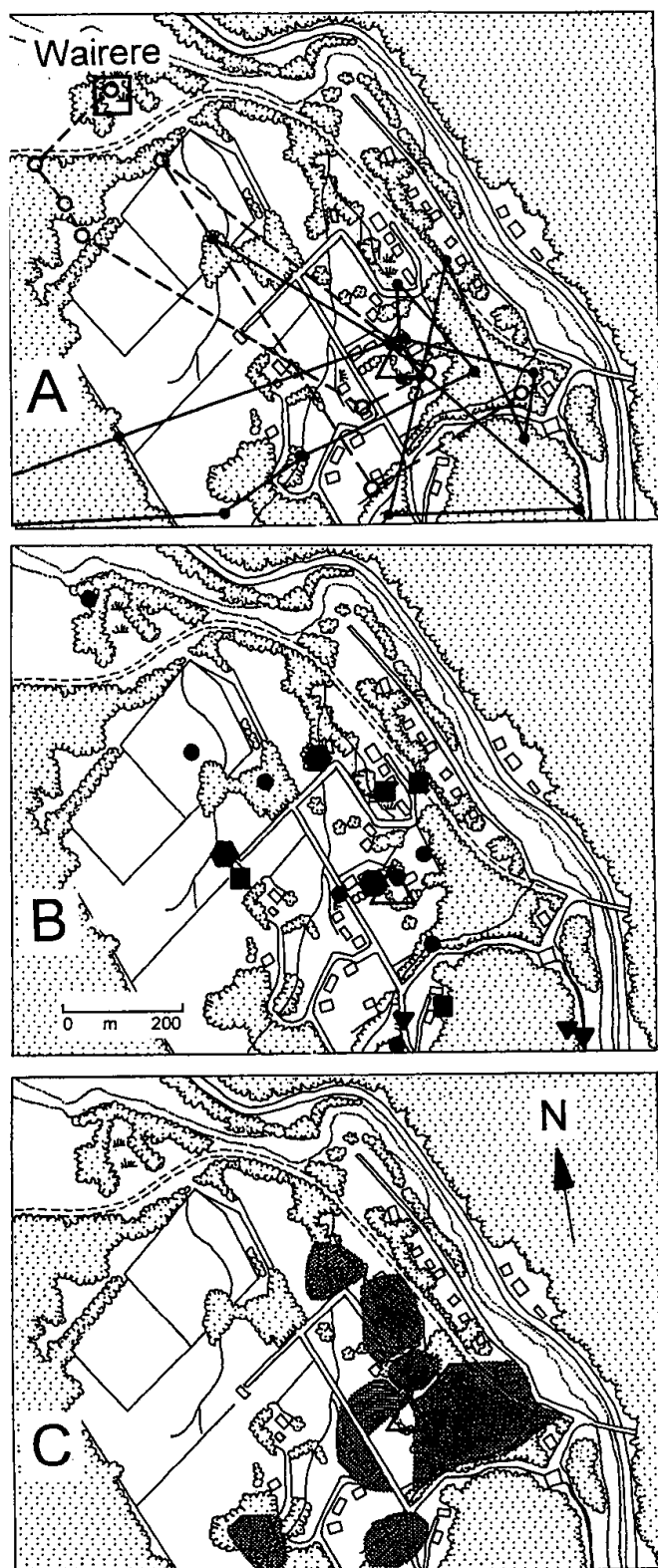
### Movements of released weka

Weka took hours to leave the aviary, and then stayed in the fern margin for up to 36 hours. Sub-adult weka explored up to 6 km from the release site (Fig. 2A). Adults paired more quickly with previously released birds and moved less (Fig. 2A), but the pair bonds of the adult weka released at Wairere did not survive the release process, and six of eight weka moved about the area, and four moved back towards the release aviary (Fig. 2A). All weka moved through cover, which made them more vulnerable to dogs in those properties with bush and swampy areas.

Most birds (94%) established or were killed within calling distance of the release aviary (Fig. 2B). However, one weka was seen 2 km away in the Rotokohu Valley, another bird spent up to three months 1 km away on the northern side of the Karangahake Valley near a chicken farm, and another moved 4 km north, between Mackaytown and Paeroa. In July 1995, there was an unconfirmed sighting of a weka at Waitawheta, 6 km south-east of the release site, and in December 1998 a bird was reported in the Waihi water reservoir 11 km further away. An adult male died beside a road at Te Aroha, 10 km south-west of the release site.

### Establishment and breeding outside the aviary

In March 1993, one male from the first release paired with a 5-month-old female and produced two fertile eggs, but their nest was deserted during heavy rain and the female was later found dead.



**Fig. 2 A-C** A, movement of released weka at Karangahake; B, locations where weka were killed by ferrets and dogs, and where ferrets were caught in December 1995; C, Regions of established pairs and individual weka in 1995. Open stippled, bush and scrub; open circle and line, track of sub-adult female in Sep 1994; closed circle and dashed-line, track of adult male released at Wairere in Nov 1994, open triangle, aviary and release site; open box, Wairere release site; closed box, weka killed by dog, closed circle, weka killed by ferret; closed hexagon, ferret killed; closed triangle, ferret seen; dense stipple, areas were weka established home ranges.

Two pairs and three single adult weka established home ranges near the aviary in 1994-95 (Fig. 2C). One pair deserted an area of *Eleagnus reflexa* when it was opened during forestry operations. The other pair raised clutches of two and three young in September and November 1994, respectively. By early March 1995 there were at least 10 weka within 500 m of the release aviary, and more distant calls (A. Beauchamp & M. Closs, unpubl.) suggested there were about 16 weka there. There were at least five pairs near the aviary in June 1995, and one pair raised three young to independence, and another pair raised at least one young to 21 days old. Three pairs raised at least five young in November 1995.

### Mortality

Radio tracking allowed the causes of death of 13 weka to be ascertained, seven others were recovered dead, and the cause of death of two others was reported to us. This information was less than expected because transmitters became detached in thick vegetation ( $n = 11$ ), or because transmitters stopped working before or when weka were killed ( $n = 3$ ).

Weka were lost to dogs ( $n = 9$ ), cars ( $n = 2$ ), slug bait ( $n = 1$ ), rat traps ( $n = 1$ ) and ferrets ( $n =$  at least 6 probably 16; March & May 1993, January, September, & December 1995) and perhaps drowning ( $n = 2$ ).

A dog that lived 150 m from the aviary killed half of the radio-tagged weka in the first release within 7 - 42 days ( $n = 5$ ), and other birds at 35 and 119 days after release. The change in release site to Wairere did not solve this problem, because weka moved back toward the aviary and were killed near it. This dog and at least two others were probably responsible for the deaths of 80% of the released birds before June 1994. Consequently, it was not possible to assess the importance of other factors on weka establishment until that dog was removed in June 1994, and a similar numbers of weka of each sex were released (Table 1).

From March to October 1995, there was a substantial rat population in the release area. A weka that had been killed by a ferret was found on the outer margin of the area occupied by established birds in early October 1995. Fenn traps were positioned to catch the ferret and others that were reported nearby (Fig. 2B). However, this was not successful and during 10 - 20 December 1995 ferrets killed at least five, and probably nine, of 13 weka (four breeding pairs; one wild-reared sub-adult, four newly-released sub-adults) at Karangahake Gorge.

On average, the weka killed by dogs survived 20 days ( $SE_{\bar{x}} = 18$  d, range 1 - 46 d,  $n = 9$ ). The birds assessed as, or known to have been, killed by ferrets survived 213 days ( $SE_{\bar{x}} = 259$  d, range 19 - 1142 d,  $n = 16$ ). Birds that died from other causes survived 42 days ( $SE_{\bar{x}} = 47$  d, range 13 - 146 d,  $n = 6$ ). There were significant differences in the duration of survival after release of weka killed by dogs, ferrets, and other causes (Kruskal-Wallis  $H = 17.506$ ,  $P < 0.0009$ ), but there was no significant difference between sexes in their length of survival (Mann Whitney  $U = 101.05$ ,  $P < 0.475$ ).

## DISCUSSION

### Release method

The release programme at Karangahake ceased in January 1996 as the gorge area was not suitable for mustelid control in perpetuity using existing techniques, and there had been significant changes in cover and land use that were likely to be detrimental to weka in the long term.

There were some positive aspects to the release programme. It established a viable method of release for adult and sub-adult weka that led to controlled movement and establishment of a wild population near the release site. This was important because all previous releases, except the successful release at Rawhiti (Robertson 1976) had not included any hold periods for weka and there was significant and almost immediate dispersal (Pracy 1966; Moon 1988; MacMillan 1990).

Fixed aviary releases were useful for controlling establishment, as wandering sub-adult and adult weka were drawn back to the release site by captive birds calling. The weka that moved least were adults released as pairs into areas where some weka had established home ranges. Consequently, it appears that the release of adults, held at the release site for 30 days, is the most controllable strategy for further releases of wild reared or aviary-reared weka. Such releases are likely to be even more controllable if there are favoured swampy areas with very dense, undisturbed vegetation nearby.

### Mortality factors

The major factors causing the failure of this release were predation by dogs and then ferrets. Before this release, there was limited evidence about the impact of dogs on weka populations. Liffiton (1889) attributed the lack of weka around Maori settlements to dog predation, and their protection from dogs by gorse (*Ulex europaeus*).

Brailsford (1996) attributed the lack of weka in 1863 in the Hokitika region, South Island, to feral dogs. Dogs killed weka at Opua, and were a problem at Parekura Bay (Beauchamp *et al.* 1998, unpubl. data). The release reported here showed that a strategically placed dog could be a significant threat to weka.

The historic impact of ferrets on weka populations was complicated by conflicting evidence and the use of the term "weasel" or "weasel tribe" to define the complex of mustelids in New Zealand in the pre-1950's literature (Guthrie-Smith 1914; Moncrieff 1928; Myres 1923; Wodzicki 1950). Stoats were postulated as being cosmopolitan in New Zealand by 1905 (King 1990), and ferrets were probably widely distributed in all region of the North Island, except Whanganui, Taranaki, and East Cape about this time.

Mustelids or rats were thought to have destroyed weka nests (Myres 1923), and in some districts to have reduced ground bird populations to extinction. However, weka populations latter appear to have increased or were reported to have migrated into regions with stoats (Buller 1898; Guthrie-Smith 1927), and coexisted with them (Fulton 1908; Myres 1923; Guthrie-Smith 1927). Myres (1923) stated that weka had been plentiful in the Whanganui district since at least 1905, and that their decline in 1919 was too rapid to be attributed to "weasels" (probably stoats). Weka increased in central Northland in the presence of stoats until the early 1940s and then declined rapidly over a few years at the same time as rabbits diminished or disappeared (Gee 1956). The decline took place when weka were in poor condition, and was attributed to disease (McKenzie 1971) and an epidemic and ticks (Carroll 1963), but, predation by mustelids cannot be discounted.

A large and well-dispersed population of North Island weka developed from a small number on East Cape area between c.1900 and 1982. The increase took place in the presence of populations of dogs, feral cats, stoats, and a localised population of ferrets (Carroll 1963; Wodzicki 1950; Marshall 1963; Beauchamp 1997b). The decline of this population in 1982-84 was not studied but coincided with a prolonged drought, loss of marginal habitats, and high use by farm stock of infrequently disturbed patches of scrub and roadsides (Beauchamp 1997a).

Ferrets were liberated early (1880s) in the Wairarapa (King 1990) and M. McLeod considered that they had eradicated weka in the bush-covered Aorangi Mountains (Stidolph 1971). The first indication that ferrets could

have a significant impact on weka populations in recent times was when weka declined near Motu some time between January 1987 and December 1990 (Beauchamp 1997a). Ferrets were then recent arrivals in the Matawhai and Motu region, but, the region also suffered considerable damage during cyclone Bola in March 1988, and some residents considered that the cyclone was the main cause of weka decline (Beauchamp 1997a). Ferrets were confirmed as a significant predator of weka near Matawai, and only road deaths killed more birds (Bramley 1994). However, the impact of ferrets alone on chicks, juvenile, and adult weka was not established before cats, hedgehogs, rats and ferrets were all trapped to assess the effect of their removal on weka productivity (Bramley 1994, 1996; Bramley & Veltman 1998).

The release at Karangahake confirmed that ferrets alone were a substantial threat to small populations of weka. It is possible that the historic declines and increases of weka in the North Island were more related to the distribution of ferrets than stoats, and that weka populations could increase only when they were not targeted by high populations of ferrets, and were not affected by other factors like food restrictions, parasites, and disease (Beauchamp 1987, 1997b, unpubl. data.; Carroll 1963). All post-1940 weka populations have been in areas that lacked or had localised ferret populations (Marshall 1963; King 1990; Beauchamp *et al.* 1998).

Future releases of weka in the North Island will require control of landscape features as well as of dogs and mustelids. The release onto Whanganui Island has already indicated that rabbits may need to be eliminated first to reduce the carrying capacity of mustelids and harriers (Beauchamp, unpubl. data). In Gisborne, a more controlled extension of this programme is beginning, using a protected breeding site and release area. Such precautions offer higher levels of landscape and predator control than was possible at Karangahake (A. Bassett pers. comm.).

#### ACKNOWLEDGEMENTS

We thank the weka breeders throughout the programme: Rowena & Murray Jenkinson; Anthea & Hugh McKergow; Graeme Keall; Judy & Roy Hanbury; Mary Wark; Elaine & Gary Staples; Helen & John Wilson; Katikati Bird Gardens; Roger Allen; Ann & Basil Graeme; Lynlea Tucker & Peter Arts; Andy Bassett; Jim McIvor; Dick & Val Neverman; Rainbow Springs; Eric Fox; June

& Hugh Lamont; Dick Hooper; and Judith & Andre Bakker. Gary Bramley is thanked for his work in monitoring the first release. Forest and Bird Waikato and Thames/Hauraki provided Fenn traps and tunnels. Kevin Lay & Dave Ward, Sirtrack Electronics, built the telemetry transmitters. Paul Jansen, David Holland, Hugh McKergow, Dick Hooper, Roger Allen, and Melanie Closs helped capture weka on Kawau Island. Phil Thompson, Paul Jansen, Shaarina Boyd, Keith Owen, Chris Ward, Dave King, Craig Summers, and other Department of Conservation staff assessed aviaries or provided advice and assistance. Wayne Boardman, Susan Cork, Backers Corner, Brookfields Vet Clinics, Ivan Petch, Brian Nicol, B. W. Schouten, Virginia Williams, Bert Westera, Bronwyn Smits, and other vets are thanked for assisting individual breeders. We thank Trilogy Business Systems and the New Zealand Lotteries Board for financial assistance. Ron Moorhouse and Paul Sagar are thanked for comments that have significantly improved this paper.

#### LITERATURE CITED

- Anon, 1954. Summarised classified notes. *Notornis* 5: 211-239.
- Beauchamp, A. J. 1987. A population study of the weka *Gallirallus australis* on Kapiti Island. Unpublished Ph.D. thesis. Victoria University of Wellington, Wellington.
- Beauchamp, A. J. 1988. Status of the weka *Gallirallus australis greyi* on Cape Brett, Bay of Islands. *Notornis* 35: 282-284.
- Beauchamp, A. J. 1996. Weka (*Gallirallus australis*) and *Leiopelma* frogs - a risk assessment. *Notornis* 43: 59-65.
- Beauchamp, A. J. 1997a. The decline of the North Island weka (*Gallirallus australis greyi*) in the East Cape and Opotiki regions, New Zealand 1986-1995. *Notornis* 44: 27-35.
- Beauchamp, A. J. 1997b. Sudden death of weka (*Gallirallus australis*) on Kawau Island, New Zealand. *Notornis* 44: 165-170.
- Beauchamp, A. J. 1998. The ageing of weka (*Gallirallus australis*) using soft parts, plumage and wing spurs. *Notornis* 45: 167-178.
- Beauchamp, A. J.; Chambers, R.; Kendrick, J. L. 1993. North Island weka on Rakitu Island. *Notornis* 40: 309-312.

- Beauchamp, A. J.; van Berkum, B.; Closs, M. J. 1998. The decline of North Island weka (*Gallirallus australis greyi*) at Parekura Bay, Bay of Islands. *Notornis* 45: 31-43.
- Bramley, G. N. 1994. The autecology and conservation of the North Island weka. M.Sc. thesis, Massey University, Palmerston North.
- Bramley, G. N. 1996. A small predator removal experiment to protect North Island weka (*Gallirallus australis greyi*) and the case for single-subject approaches in determining agents of decline. *New Zealand journal of ecology* 20: 37-43.
- Bramley, G. N.; Veltman, C. J. 1998. Failure of translocated, captive-bred North Island weka *Gallirallus australis greyi* to establish a new population. *Bird conservation international* 8:195-202.
- Brailsford, B. 1996. *Greenstone trails, the Maori and pounanu*. Hamilton, Stoneprint Press.
- Buller, W. L. 1876. On the ornithology of New Zealand. *Transactions and proceedings of the New Zealand Institute* 9: 327-337.
- Buller, W. L. 1898. On the ornithology of New Zealand. *Transactions and proceedings of the New Zealand Institute* 31: 1-37.
- Carroll, A. K. L. 1963. Food Habits of the North Island weka. *Notornis* 10: 289-300.
- Fulton, Dr. 1908. The disappearance of New Zealand Birds. *Transactions and proceedings of the New Zealand Institute* 40: 485-500.
- Gee, F. E. 1956. A note on the disappearance of weka (*Gallirallus australis*) In Northland. *Notornis* 6: 227-228.
- Graeme, A. 1991. The mystery of the vanishing weka. *Forest and bird* 22: 14-15.
- Guthrie-Smith, H. 1914. *Mutton birds and other birds*. Christchurch, Whitcombe & Tombs.
- Guthrie-Smith, H. 1927. *Birds of water wood and waste*. Wellington, Whitcombe & Tombs.
- King, C. M. 1990. (ed). *The handbook of New Zealand mammals*. Auckland, Oxford University Press.
- Liffiton, E. N. 1889. Notes on the disappearance of pheasants on the west coast of the North Island. *Transactions and proceedings of the New Zealand Institute* 21: 225-226.
- Marshall, W. H. 1963. The ecology of mustelids in New Zealand. *New Zealand Department of Scientific and Industrial Research information series no. 38*. 32 p.
- McKenzie, H. R. 1971. The brown teal of the Auckland province. *Notornis* 18: 280-286.
- MacMillan, B. W. H. 1990. Attempts to re-establish wekas, brown kiwis and red-crowned parakeets in the Waitakare Ranges. *Notornis* 38: 45-51.
- Moon, G. 1988. *New Zealand birds in focus*. Auckland, Weldon New Zealand.
- Moncrieff, P. 1928. Bird migration in New Zealand. *Emu* 28:138-149 & 301-313.
- Myers, J. C. 1923. The position of endemic birds in New Zealand. *New Zealand journal of science and technology*. 6: 76-99.
- Oliver, W. R. B. 1955. *New Zealand Birds, 2nd edition*. Wellington, A. H. & A. W. Reed.
- Pracy, L. 1969. Weka liberations in the Palliser Bay region. *Notornis* 16:212-213.
- Robertson, D. B. 1976. Weka liberation in Northland. *Notornis* 24: 213-219.
- Sibson, R. B. 1958. Classified summarised notes. *Notornis* 7: 73-88.
- Sibson, R. B. 1966. Items of special interest from the 13th annual report of the New Zealand bird banding scheme. *Notornis* 13: 64.
- Stidolph, R. H. D. 1971. *The birds around us*. Masterton, Hedley's Bookshop.
- Turbott, E. G. 1967. *Buller's birds of New Zealand*. Christchurch, Whitcoulls.
- Wodzicki, K. A. 1950. Introduced mammals of New Zealand. *New Zealand Department of Scientific and Industrial Research bulletin no. 98*.
- Wright, A. 1981. Weka swimming. *Notornis* 28: 28.