Response of forest birds to rat eradication on Kapiti Island

Colin Miskelly
Wellington Conservancy
Department of Conservation
PO Box 5086, Wellington
cmiskelly@doc.govt.nz

Hugh Robertson
Science & Research Unit
Department of Conservation
PO Box 10420, Wellington
hrobertson@doc.govt.nz

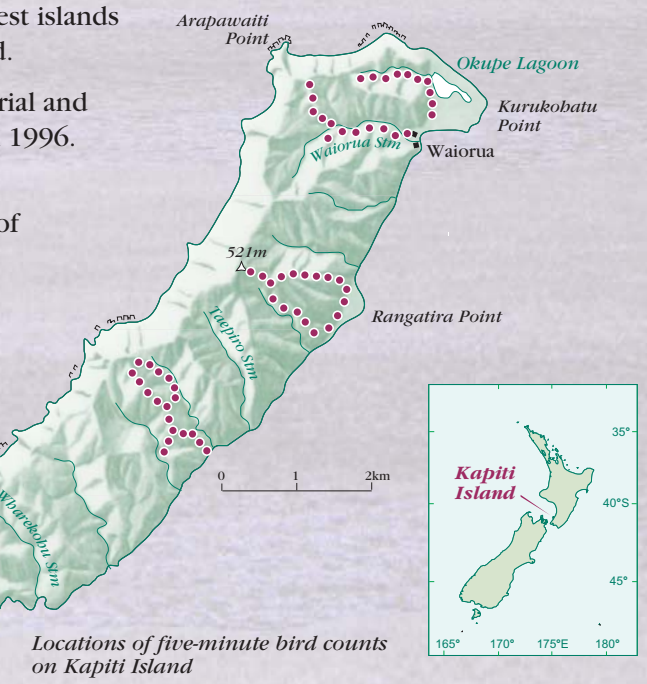
Kapiti Island forest

Kapiti Island (1965 ha) has long been renowned for its diversity and abundance of forest birds. It is one of the largest islands in the world from which rats have been eradicated.

Both kiore and Norway rats were eradicated by aerial and hand-spreading of baits containing brodifacoum in 1996. The island is now free of all introduced mammals.

The aim of this project is to identify the response of the diurnal Kapiti Island forest bird community to rat eradication.

Red-crowned parakeet



Locations of five-minute bird counts on Kapiti Island

Methods

Quarterly bird counts were undertaken by members of the Ornithological Society of New Zealand in 1991–94 and again in 1999–2002.

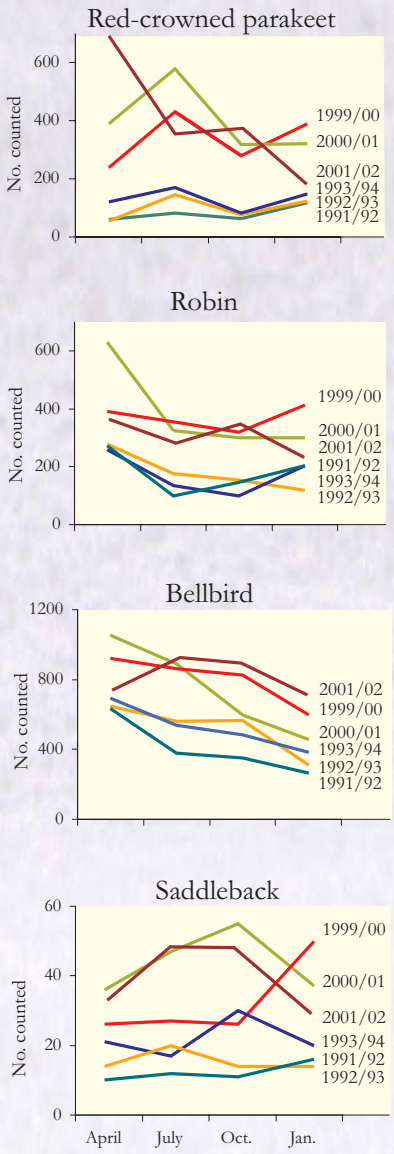
Counts were made at 64 permanent stations along six tracks. The numbers of all bird species seen or heard during five minutes were recorded separately at each station, and each station was counted four times by different observers over each count weekend.

Data presented here are for the 15 most abundant species, which included only one introduced bird species (blackbird).

Robin

Results

Four species showed evidence of an increase in abundance (or at least conspicuousness) since rats were eradicated. The most spectacular increase was for red-crowned parakeet, followed by robin, bellbird and saddleback. Saddleback numbers appear to be still increasing on Kapiti Island as the first three counts in 1999 were not significantly different from 1991–93 counts.



Number of birds in each weekend of five-minute bird counts

	Apr99	Jul99	Oct99	Jan00	Apr00	Jul00	Oct00	Jan01	Apr01	Jul01	Oct01	Jan02
Parakeet	98.3	152.0	241.5	161.7	222.3	238.0	289.0	115.4	145.5	107.0	393.9	22.1
Robin	40.1	102.9	107.1	99.0	126.2	85.7	94.8	44.7	34.1	44.6	127.9	
Bellbird	32.7	53.4	45.5	56.5	51.4	58.7		19.1	52.4	140.0	53.3	
Saddleback				150.0	71.4	135.0	83.3	85.0	10.5	67.6	45.5	
Blackbird				80.0	141.7		48.0		83.3			70.0
Kingfisher			145.5				163.6		66.7		118.2	
Cuckoo, L-t			250.0				450.0				450.0	-83.3
Whitehead	-7.5			-6.2	8.2		15.0		9.8	15.7	19.0	
Kaka	59.1		18.0					-58.8	53.4		136.0	
Kereru	-47.8			25.7	-23.5		32.3		-30.0		57.0	
Weka						25.5		-32.4				
Fantail									16.5		-56.8	-46.3
Tui	-54.7	-13.7			-59.9				-52.1			-34.8
Silvereye	-45.6	-34.9				-79.1			-36.8			-52.0
Tomtit	-37.3	-23.7	-33.3			-38.2			-28.8	-64.5		-35.3

Significant increase in conspicuousness
(figure given is percentage increase compared with previous high)
Not significantly different from 1991–94 counts
Significant decrease in conspicuousness
(figure given is percentage decrease compared with previous low)

Summary of 1999–2002 Kapiti Island five-minute bird counts

No species showed a consistent decrease in conspicuousness in 1999–2002 compared with 1991–94. Three species whose numbers may have declined on Kapiti Island since rat eradication are tui, silvereye and tomtit. Weka was the only bird species severely affected by the rat poisoning programme (Empson & Miskelly 1999), but they rapidly recovered to their 1991–94 levels.

Discussion

The four species that appear to have benefited most from rat eradication all nest in sites that are vulnerable to rat predation. Three (red-crowned parakeet, robin, and saddleback) are hole or cavity nesters, where incubating females would also be vulnerable to attack.

Parakeets are now commonly seen feeding on the ground on Kapiti Island, suggesting that they may have also benefited from decreased competition for fallen seeds and fruit.

Bellbird

Saddlebacks have probably not yet reached a new equilibrium since rat eradication, as fewer than ten females are thought to have survived the presence of rats on Kapiti Island.

Saddleback

It is of interest that two of the bird species that may have declined in numbers since rats were eradicated on Kapiti Island (tui and tomtit) are both potential competitors of species whose numbers have increased since 1994 (bellbird and robin respectively). Perhaps rat eradication can lead to second-order changes in abundance, if increased population densities result in increased interspecific competition for limited resources.

Wharekohu, Kapiti Island

Department of Conservation
Te Papa Atawhai

Reference
Empson, R.A; Miskelly, C.M. 1999. The risks, costs and benefits of using brodifacoum to eradicate rats from Kapiti Island, New Zealand. *New Zealand Journal of Ecology* 23: 241-254.

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