

INVESTIGATION NO: S5020/129**CORPORATE OBJECTIVE:** 3.3

TITLE: Kiwi Call Scheme.

INVESTIGATION LEADER: Rogan Colbourne

STUDY VENUE: National

INVESTIGATION STATUS: Current

CLIENT: DOC

EXPECTED FINISH DATE: Ongoing

INVESTIGATION SUMMARY:

A data base of standardised survey results, documenting the relative measures of abundance (as determined by calling frequencies) of all kiwi populations (*Apteryx* spp.), is being collected throughout New Zealand. The project was started in 1986 by the Wildlife Service and transferred to DOC. Collection of data is ongoing. Call rates are density dependent. Most populations of kiwi occur at relatively low densities and the birds are now absent from some areas where they were recorded earlier this century. The densest populations are those in large unbroken tracts of forest.

OBJECTIVES:

1. To determine the present distribution of all species of kiwis.
2. To relate kiwi density to location and habitat.
3. To assign a kiwi call index to specific listening stations at particular periods of a year to enable trends in the size of kiwi populations to be determined over time.
4. To establish reliable methods of surveying kiwis.

INTRODUCTION

Recent logging and burning of forest and scrublands throughout New Zealand, particularly in Northern Hawkes Bay and Taranaki, has caused concern about the fate of resident kiwis and raised fears that the kiwis' future may not be as secure as was previously thought. A decline in North Island brown kiwi numbers has recently been documented when a feral dog was responsible for killing an estimated 500 birds in a Northland forest (Taborsky 1988). The Kiwi Call Scheme will attempt to make managers and the public aware of the plight kiwis are facing.

Kiwis are strongly territorial and regularly give very loud calls. This type of behaviour provides a good basis for surveying animals (Dawson 1981).

METHODS

Rip and waterproof cards, instruction sheets and a tape of the calls of all kiwi species have been distributed to each DOC region, relevant DOC districts and to interested organisations and individuals to use when spending nights in kiwi habitat. Each kiwi call heard is recorded

along with listening parameters (see lay-out of card shown in Appendix I). Results are entered into computer for later analyses.

To reduce variation error, observers are requested to listen only when weather conditions provide little background noise, over a wide coverage area, in a dark moon phase and in the first hours of darkness. In the North Island observers are asked not to survey in summer months. Repeated listening in an area and averaging the call rates further reduces any variation error.

Data are grouped into three indices of density (no kiwis heard; mean of three or less calls/hour; and mean greater than three calls/hour).

Observers listening regularly at three stations (two on Stewart Island and one in North-West Nelson) are providing information on nightly and seasonal variations in call rates.

INTERIM RESULTS

1. To date data from over 700 cards (1422 hours listening) have been entered onto computer.
2. There is a strong positive relationship between call rate and density of kiwi (Fig. 1). Large reductions in kiwi density may be detected by the Kiwi Call Scheme (Table 1).

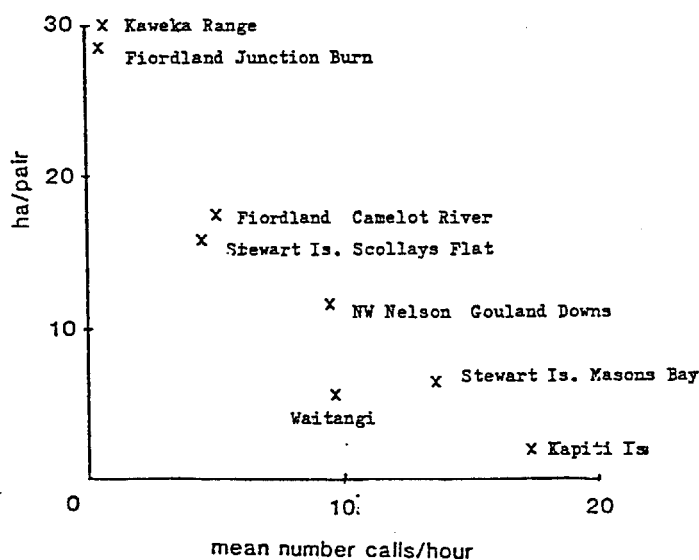


FIGURE 1. Call rate versus density. References for territory size of breeding pairs: Waitangi (Colbourne & Kleinpaste 1984); Fiordland (Colbourne 1987 & 1988); Kaweka (McLennan et al. 1987); NW Nelson (McLennan pers. comm.); Kapiti Island (Colbourne pers. comm.); Stewart Island (Colbourne & Powlesland 1988, Colbourne 1988).

TABLE 1. Comparison between October call rates of kiwis in 1985 and 1987 at 4 stations in Waitangi State Forest. During 1987 the population was decimated by dog predation (Taborsky 1988). The 1985 data were collected by Keyes & Rasch (1985).

Station	Call Rate 1985	Call Rate 1987
11	22 calls/ 55minutes	7 calls/ 90minutes
12	17 calls/ 55minutes	2 calls/ 60minutes
100	3 calls/ 55minutes	0 calls/ 150minutes
93	12 calls/ 55minutes	0 calls/ 60minutes

3. Variations in call rate occur from night to night and seasonally. North Island brown kiwi are very quiet on moonlit nights and in dry summers (Colbourne & Kleinpaste 1984). Where repeated listening occurred from a single listening station, or area, there was little seasonal variation in call rates of great spotted kiwi and Stewart Island brown kiwi (Table 2).

Table 2. Variation in call rates with repeated visits to listening stations throughout a year. (n=number of visits; x=mean number of calls/hour; o =standard deviation).

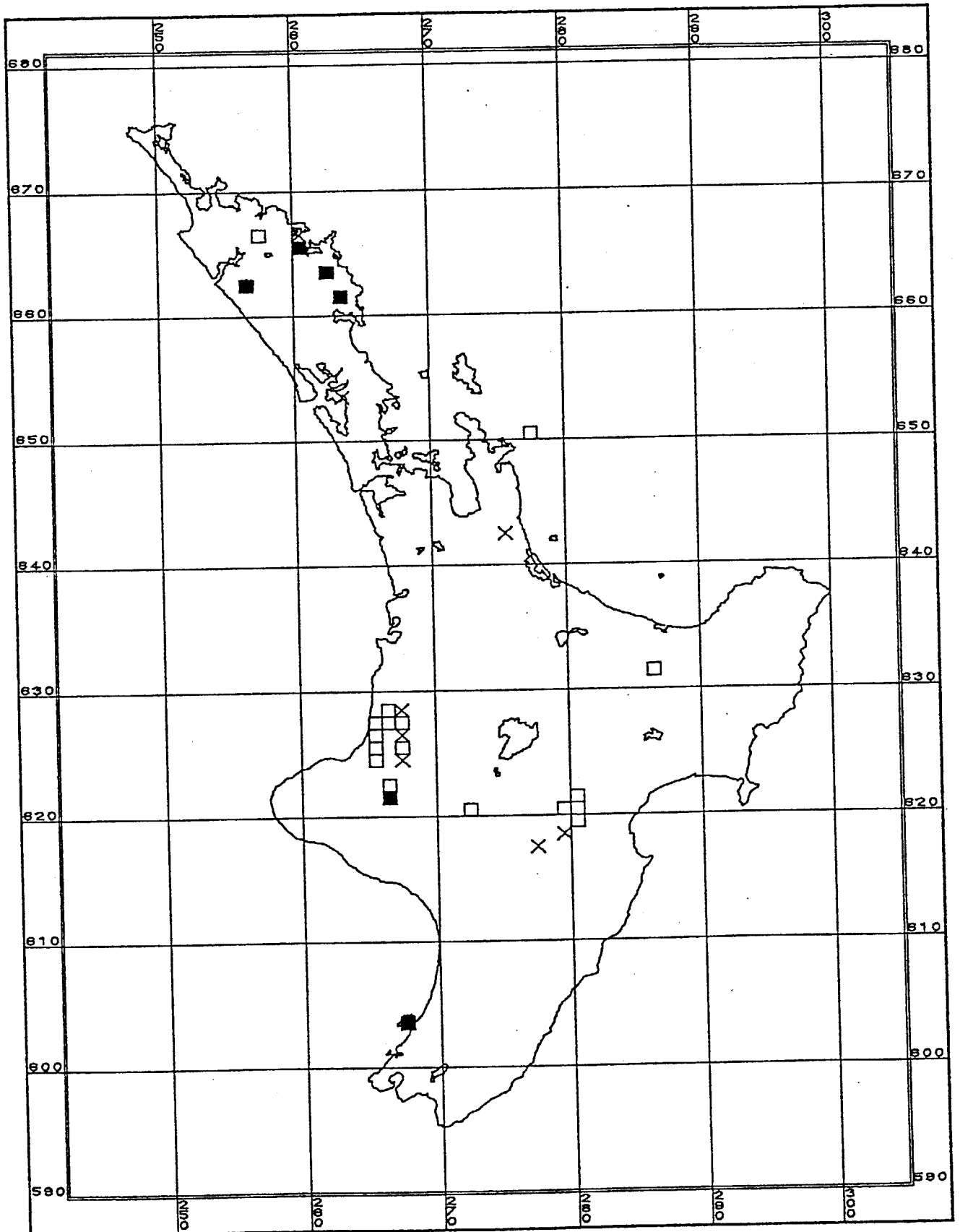
Listening station	n	x	a
Scollays Flat Stewart Island	6	4.8	2.14
Masons Bay Stewart Island	10	14.3	3.65
Goulard Downs NW Nelson	16	10.2	3.58

4. The highest density measures (average call rates) of kiwi occur in Central Fiordland, Stewart Island, subalpine NW Nelson, Kapiti Island and northern Northland (Fig. 2).
5. Kiwis occur at relatively lower densities in Taranaki-Waikato, Coromandel-Rotorua-Hawkes Bay, Arthurs Pass National Park, North, Central and South Westland and Southern Fiordland.
6. Reports received of the endangered little spotted kiwi have led to surveys being undertaken in Fiordland, South Westland and Marlborough. As a consequence, a male little spotted kiwi was caught on D'Urville Island and transferred to Long Island in 1987. A survey to investigate a suspected record of little spotted kiwi at Doubtful Sound revealed a brown kiwi with a little spotted kiwi-like call.
7. Except for great spotted kiwi, male kiwis call more frequently than females (Table 3), although studies have shown that the sex ratio for all species is 1:1.

FIGURE 2A: Kiwi call scheme information from North Island

■ = mean > 3.0 calls/hr per 10,000 grid square

□ = mean < 3.0 calls/hr



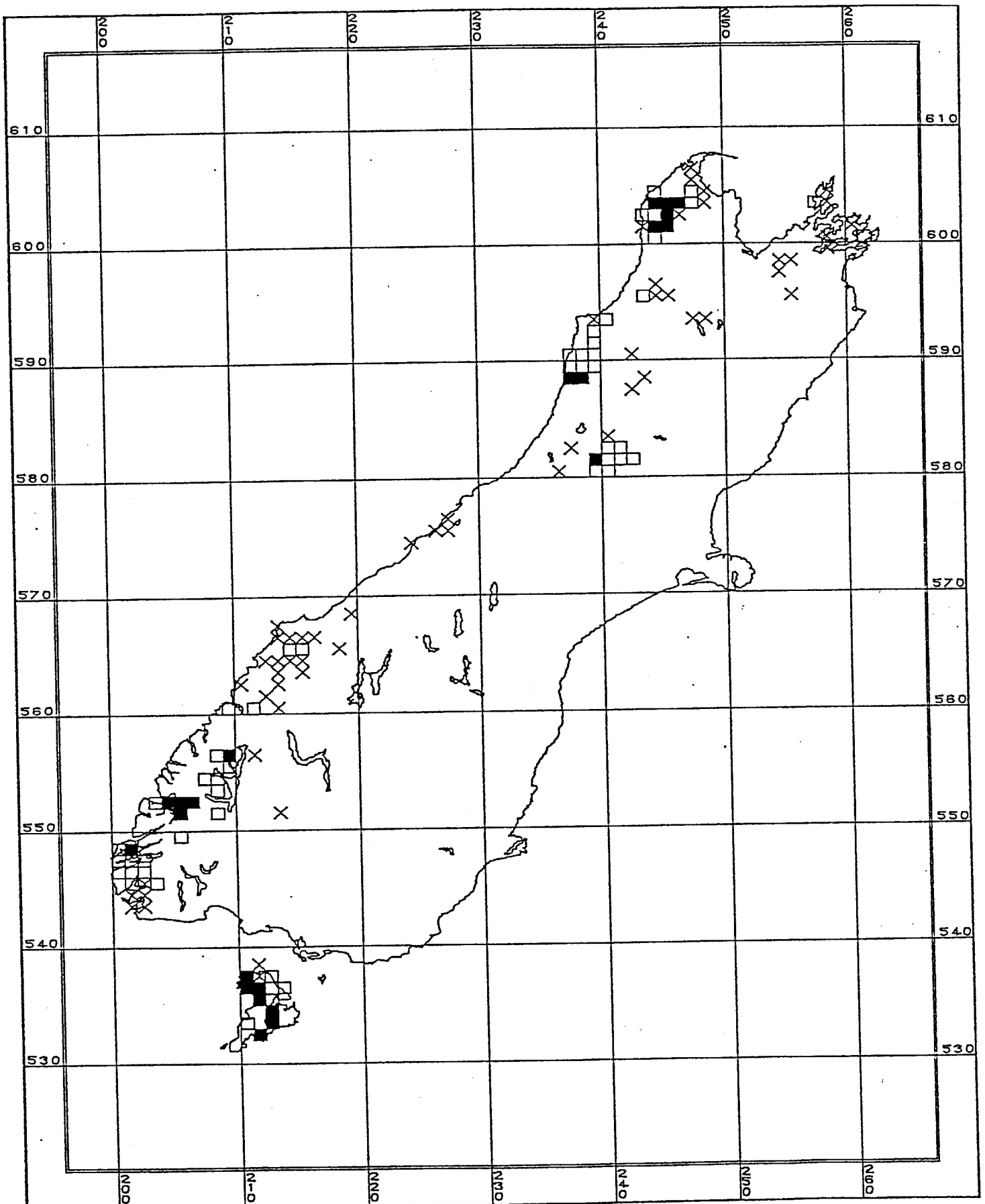
North Island brown kiwi (*Apteryx australis mantelli*): mainland North Island
 Little spotted kiwi (*Apteryx owenii*): Kapiti Island, Red Mercury Island

FIGURE 2B: Kiwi call scheme information from South Island

■ = mean > 3.0 calls/hr per 10,000 grid square

□ = mean < 3.0 calls/hr

X = listened but no kiwis heard



Little spotted kiwi (*Apteryx owenii*): Marlborough Sounds

Great spotted kiwi (*A. haastii*): NW Nelson; North Westland; Arthur's Pass

Brown kiwi (*A.a. australis* and *A.a. lawryi*): South of Franz Josef

TABLE 3. Analysis of sex call ratios from Kiwi Call Scheme records.

Species/subspecies	sex	number of calls	ratio M/F
North Island brown kiwi	M	146	2.12
	F	69	
South Island brown kiwi	M	497	3.01
	F	162	
Stewart Is brown kiwi	M	166	1.89
	F	88	
little spotted kiwi	M	92	2.49
	F	37	
great spotted kiwi	M	228	1.00
	F	228	

8. The calls of other animals were noted while listening for kiwi (Appendix II). Moreporks were widely distributed in lowland and upland forests but few were found above the bushline. Weka were only abundant on Kapiti Island, in the Marlborough Sounds and NW Nelson. The Kiwi Call Scheme also holds distribution data on kaka, a bird that is more vocal at dusk than during the day, and on bats.

INTERIM CONCLUSIONS

1. Kiwis, in particular North Island brown kiwi in the east of the North Island, South Island brown kiwi, great spotted kiwi and little spotted kiwi, are now absent from areas where they were recorded earlier this century.
2. Most populations of kiwis occur at relatively low densities. As the kiwi is a long lived bird, it is conceivable that many small populations in isolated forest remnants are composed of aged individuals. Productivity in such populations may be insufficient to keep pace with mortality. Such populations would have small gene pools, which makes them more vulnerable to the effects of environmental disturbance than larger populations. Brown kiwi from the eastern North Island, Okarito and South Westland have the lowest density indices and are heard from proportionally the least number of listening stations.
3. Kiwi species cannot be reliably distinguished by calls alone. Some male great spotted kiwi sound similar to male brown kiwis and vice versa. Both brown and great spotted kiwi have been mistaken for little spotted kiwi. Fortunately, apart from Kapiti Island, there is no known overlap of species range.
4. Female great spotted kiwi call more frequently than the females of other kiwi species. Thus call rates, if interpreted in the same manner for all kiwi species, would overestimate the size of great spotted kiwi populations.

DISCUSSION

Genetic differences among different kiwi populations are being investigated by D. Fountain (isoelectric focusing) and C. Daugherty (blood electrophoresis). Preliminary results have shown that Northland and Taranaki brown kiwi are closely related and distinct from Bay of

Plenty birds (Powlesland 1988). Furthermore, South Island brown kiwi from Fiordland are quite distinct from those at Okarito suggesting that present taxonomy is suspect. If species or subspecies are re-classified, kiwi call scheme records could show which of the new taxa are under threat.

RECOMMENDATIONS FOR FURTHER WORK.

1. Kiwis in Northland, particularly in the Waipoua Forest with its dense populations, are at risk from traps and poisons targeted at newly established possums, and from the effect of increasing urbanisation, viz fires and dogs. Emphasis should be given to monitoring these populations.
2. Surveys should be carried out in Coromandel, Ureweras and Tongariro N.P. as very little is known of kiwi distribution in these places.
3. Emphasis should be placed on searching gaps between the known populations of great spotted kiwi from N.W. Nelson-Paparoas-Arthurs Pass. Is their apparent distribution indeed discontinuous?
4. Two of the three brown kiwi populations in the South Island (Okarito and Arawata-Jackson's Bay) should be surveyed in detail.
5. Two unconfirmed reports of great spotted/little spotted kiwi in McArthur Creek, Arawata River should be checked. These records, if confirmed, have considerable importance because they would represent an extension of the southern limit of the great spotted kiwi range (currently Franz Josef) by 150km.
6. Generally, listening for kiwi calls should be strongly encouraged in all forested areas yet uncovered.

ACKNOWLEDGEMENTS

I would like to thank Ross Pickard and Kevin Moynihan for writing computer programmes for this scheme.

PUBLICATIONS AND REPORTS

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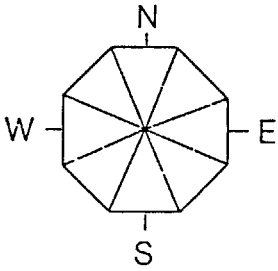
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FRONT OF CARD

CARD No.		KIWI CALL SCHEME														
OBSERVER: _____ <small>Initials Surname</small>		Date: _____	Locality Name: _____													
Address _____		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">Series</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 15%; text-align: center;">Sheet</td> <td style="width: 20%; text-align: center;">Grid Reference</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">S</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </table>			Series	N	Sheet	Grid Reference		S				X		
Series	N				Sheet	Grid Reference										
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Affiliation _____		NOTES:														
Number of Kiwi calls.	WIND DIRECTION 		WIND 1 Calm 2 Light 3 Mod 4 Strong RAIN 1 Nil 2 Light 3 Moderate TEMPERATURE 1 Cold 2 Mild 3 Warm CLOUD COVER 1 Clear 2 Partly cloudy 3 Overcast	GROUND CONDITION 1 Dry 2 Damp 3 Wet NOISE 1 None 2 Slight 3 Mod MOONLIGHT 1 Light 2 Dark 3 Black LISTENING COVERAGE 1 Narrow 2 Medium 3 Wide	Major Habitat Types 1 Beech forest 2 Podocarp forest 3 Broadleaf forest 4 Exotic forest 5 Scrub 6 logged 7 burnt 8 undeveloped farmland 9 developed farmland 10 grassland 11 tussock 12 swamp 13 coastal 14 beach 15 river terrace 16 alpine 17 other											
Minutes listened																

4000/7/86-55730E-Y14

BACK OF CARD

Start time:																									
	Finish:																								
		Sp	Sex	Time	Bearing	Distance																			

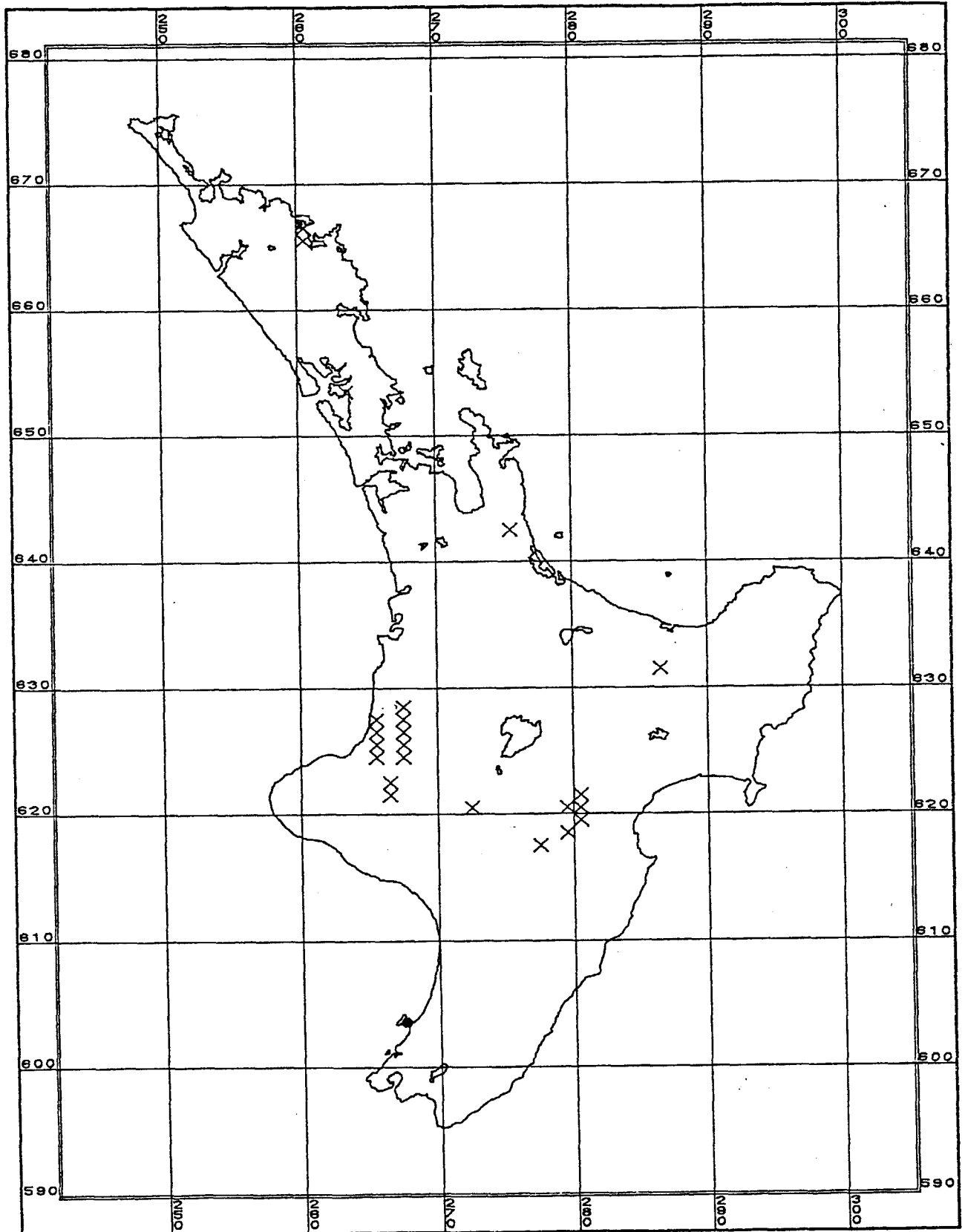
OTHER ANIMALS HEARD									
		1	2	3	4				
		none	few	mod	many				
	Morepork	none	few	mod	many				
	Weka	none	few	mod	many				
Opossum	none	few	mod	many					
		few	mod	many					

APPENDIX II. Samples of distribution of other animals heard

Distribution of weka in the North Island

• = present in 10,000m grid square

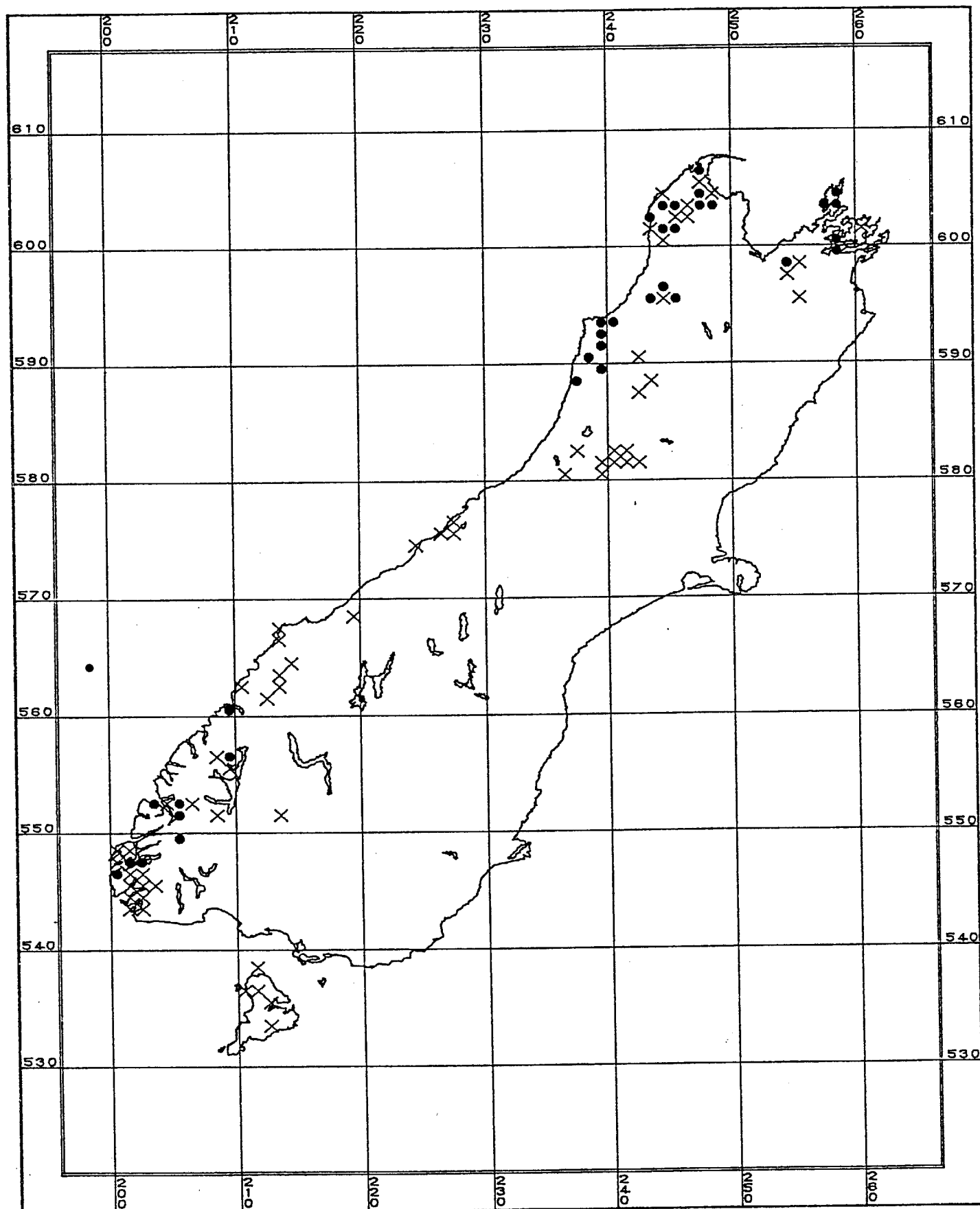
x = listened but none heard



Distribution of weka in the South Island

• = present in 10,000m grid square

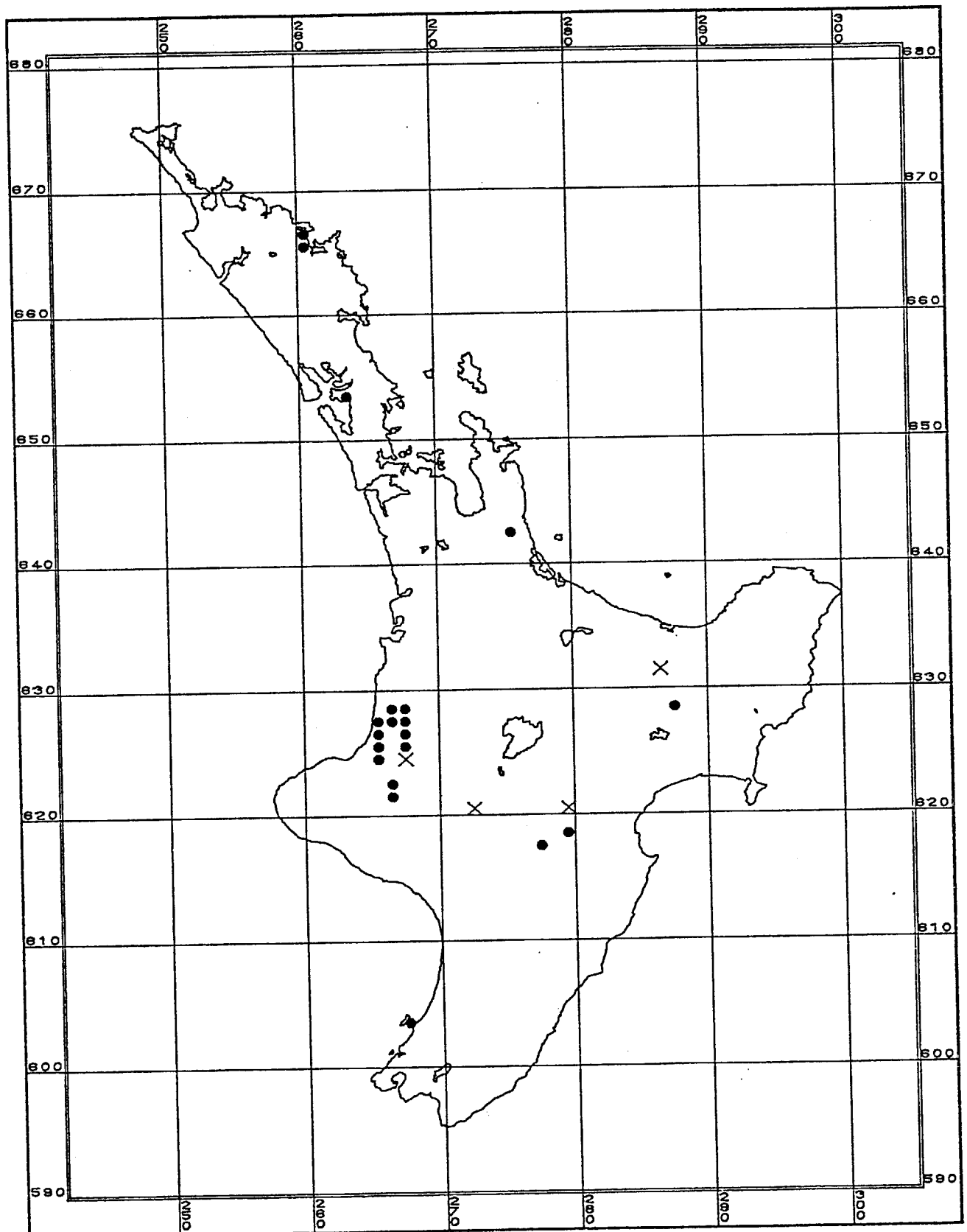
x = listened but none heard



Distribution of morepook in the North Island

• = present in 10,000m grid square

x = listened but none heard



Distribution of morepook in the South Island

• = present in 10,000m grid square

x = listened but none heard

