1982; estimated that c.20 pairs present in about 400 acres of dense rimu-predominant forest (J. Clark).

WHITE-BACKED MAGPIE *Gymnorhina tibicen hypoleuca*

Hokianga S, scattered but never more than 3 seen together (DB). Rotorua City, first birds in "at least 30 years" heard singing regularly in residential area 21/7 (GAT). Arahahi Lagoon, Whirinaki SF, 8 on 30/4 (JGI). Rotoiti, Kaikoura, 1 on 20/9 (BE). Alexandra Basin, mid-winter census on 30/7, 205; first arrived in district 20 years ago (PC). Southland, continuing to increase slowly over whole of district (RRS).

ROOK *Corvus frugilegus*

Helensville, 4 sighted during winter 1982 (CE). Miranda, 8 on 2/4 (BB), 55 on 23/5 (SD). Tokoroa/Lichfield, 2 on 18/12 (JCD). Tihiroa (N of Otorohanga), 1 on 11/7, sitting on fence with White-backed Magpies (RWD). Gisborne City, 8 on 21/7 cawing in flight (JCH, MAW). Tolaga Bay, 7 on 12/5 paddock feeding with 3 Spur-winged Plover (JCH). Wairoa, 3 on 28/12 among driftwood on beach; 2 over town on 19/6 (GAF). L Poukawa, c.30 on 6/7 (KVT). Mangatahi, 80+ on 21/12 and following 2 evenings at dusk, flew across Ngaruroro R to roosting place (PWT, MT). Makuri Valley, Pahiatua, c.50 with nests on top of pine shelter belt on 10/10 (LJD, RAC, SEC). Kaikoura, 13 and 3 nests in gumtrees on 16/9; 6 and c.5 nests on 30/10; 16+ on 5/11 (BE). Lumsden, 1 on 8/4 (S. A. Sutherland per RRS).

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SHORT NOTES

BELLBIRDS IN AUCKLAND AND NORTHLAND

History: Early reports (e.g. Buller 1873) suggest that Bellbirds *(Anthornis melanura)* were once abundant throughout New Zealand, including Northland and Auckland. In the early 1860s, numbers began to decline rapidly, starting in the north and progressing southwards. In North Auckland numbers diminished rapidly from 1862 (Buller 1888), whereas the low in Canterbury was not recorded until the early 1900s (Stead 1927). Subsequently, Bellbird numbers have increased in most regions with the notable exception of Auckland and Northland, where they are absent. Bellbirds have persisted, apparently without decline on the following northern offshore islands: Arid, Poor Knights, Hen & Chickens, Mokohinau, Little Barrier and Tiritiri Matangi. Until the 1950s Bellbirds were also known on Motuihe Island and the Cavalli Islands.

Present status: Sporadic reports of Bellbirds on the mainland in Auckland and North Auckland can be found in the literature (Turbott 1953; Classified Summarised Notes in *Notornis* Vol. 6, 7, 8, 9, 19, 20, 22, 23, 24, 26) but many of these are sightings of a few birds in places close to the above offshore islands (Fig. 1). The rare reports of Bellbirds within Auckland City or on the West Coast localities may have been misidentified song of Tui *(Prosthemadera novaeseelandiae)*.

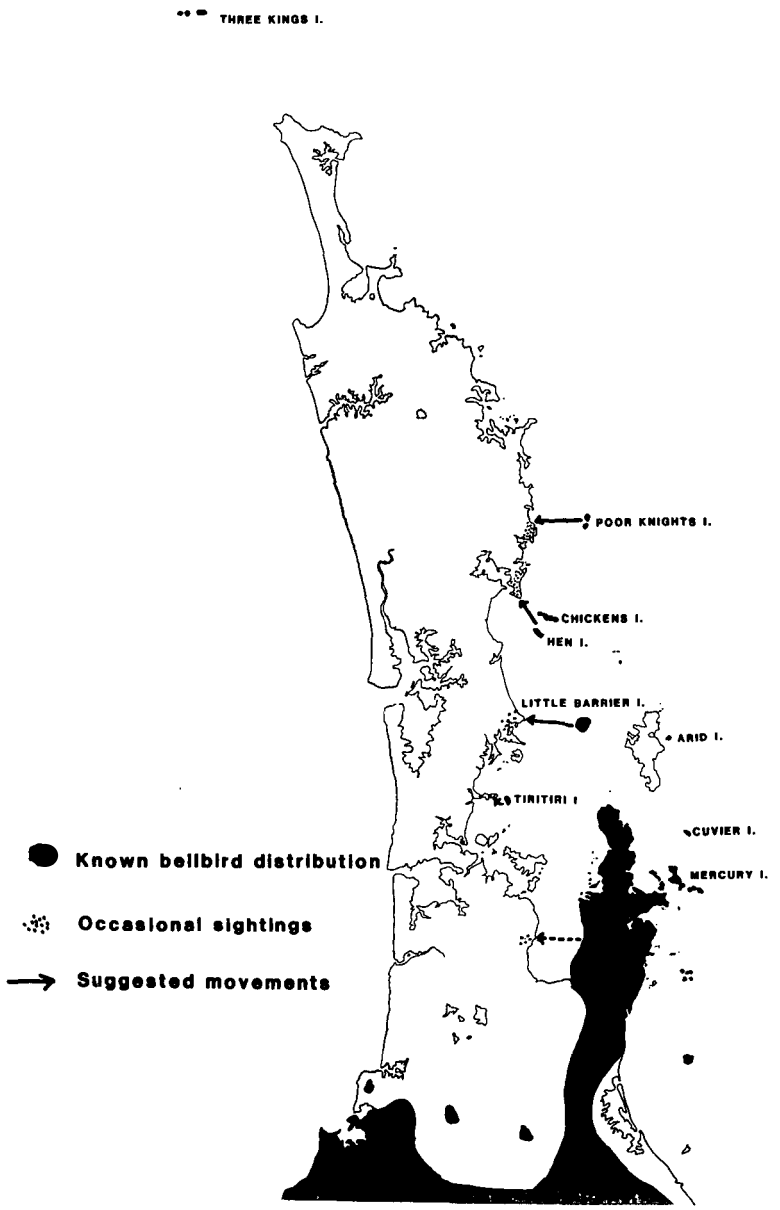
THREE KINGS I.
POOR KNIGHTS I.
CHICKENS I.
HEN I.
LITTLE BARRIER I.
ARID I.
TIRITIRI I
CUVIER I.
MERCURY I.
Known bellbird distribution
Occasional sightings
Suggested movements

FIGURE 1

One exception to these sporadic reports appears to have been the establishment of Bellbirds in the Hunua Ranges near Moumoukai (C.S. Notes, *Notornis)*. They were reported in 1942 and apparently increased until 1952, spreading to Clevedon by 1948. The population then declined rapidly and only occasional sightings of single birds now occur.

Reasons for failure to re-establish — differential movement: Given that Bellbirds died out in Northland, the only way they could re-establish naturally is by birds moving in from other areas. Bellbirds do move, as is shown by the above sightings, but it appears that there is differential movement by the sexes. There are many positive reports of males, but few females have been seen. Thus males appear to move much more often than females, and without an influx of good numbers of both, recolonisation is impossible.

Female Bellbirds are less conspicuous in some seasons and hence they may be missed by inexperienced observers. This may explain some but not all of the above records, but it does not explain the following results.

In the winter of 1982, we heard and saw many Bellbirds on the end of Whangaparaoa Peninsula opposite Tiritiri Island. As males and females sing sexually distinctive songs, all records could be assigned to one sex. Of 19 records only one was a female. Similarly, in late August 1982, Bellbirds moved into Waihi Beach, primarily to feed on *Pittosporum crassifolium* flowers. Bellbirds are not normally present in the town but do occur 10 km north of it. All the 14 " sight and sound " records were of males. Movements to mainland areas near Tutukaka (presumably from the Poor Knights Is) are also mainly by males (J. G. Buckleton, pers. comm.).

Since 1974 we have been studying a banded population of Bellbirds on Tiritiri Matangi Island. There, both males and females move to get food. At a single food source, access is determined by a linear social hierarchy with males dominating females and often excluding them from food. We have previously argued (Craig *et al.* 1981) that, as a result, males move more than females as the latter can recoup the costs of moving only if males are absent. Such a pattern seems to exist on Tiritiri with males making daily trips to concentrated food sources. Females do move but only infrequently, except when they do not have to compete with males. A recently established feeder on the island is used by many male but no female Bellbirds. This pattern also occurs at the Little Barrier honeyeater feeder.

Furthermore, playback of songs within one forest patch will attract both males and females, but only a male will visit other forest patches when his mate's song is played there.

Thus, there seems a clear pattern of greater movement by males, and it appears that most Bellbirds seen on the Auckland/North Auckland mainland are males moving from offshore islands or the Coromandel

TABLE 1 — Important nectar sources for Bellbirds on Tiritiri Matangi Island and the end of Whangaparaoa Peninsula

Species	Approximate Occurrence on Tiritiri	Whangaparaoa
Meterosideros excelsa	c	c
" sp.(rata)	-	o
Leptospermum spp.	a	a
Eucalyptus sp.	-	f
Sophora microphylla	-	c
Knightia excelsa	o	c
Phormium tenax	a	c
Cordyline australis	c	a
Dysoxylum spectabile	c	f
Vitex lucens	o (2)	c
Pseudopanax spp.	o	f
Elaeocarpus dentatus	o (1)	o
Pittosporum crassifolium	o	c
tennifolium	-	c
eugeniodes	-	c
Beilschmiedia taraire	f	f
Myoporum laetum	f	c
Parsonsia heterophylla	f	f

Decreasing scale of abundance: a = abundant, c = common, f = frequent, o = occasional (n) = actual number of trees

Peninsula. As females rarely move such distances, Bellbirds are unlikely to re-establish naturally.

Re-establishment: Planned release of Bellbirds seems to be the only way that breeding populations of this species can be established in Auckland and North Auckland. One attempt was made in 1931, when 15 birds were released in the Waitakeres. No regular monitoring or follow-up release was done and this attempt failed.

Releases should involve a minimum of 20 birds (10 of each sex) and should be into small areas of forest, where short-range dispersal will not reduce the density of birds and make pairing difficult. This may have occurred in the Waitakere release and at Moumoukai.

Trial release area: The end of Whangaparaoa Peninsula makes an ideal area for a trial release as it is already visited by Bellbirds. In Shakespear Regional Park and the adjacent Armed Services land, there is 30-40 ha of mature forest plus at least three times this in scrub. This forest has a far greater diversity of nectar sources than Tiritiri and the recent plantings by the Auckland Regional Authority has extended this diversity (Table 1). A release of 10 males and 12 females was made into this area in March 1983. All birds were colour banded and joined at least two unbanded males that had moved to the area the year before. Subsequent checks have shown that many birds are still alive and that some pairs seem localised in particular areas. Regular monitoring is planned to determine the success of this re-establishment and supplementary releases are planned.

Effect of removal: Will removal of birds from other areas deplete these populations? Close monitoring of one forest patch on Tiritiri Island has shown very little turnover of adult birds. Of the resident pairs, many of the birds present in 1977 were still present in 1980. Four of the more dominant males were still dominant in 1981 with the two most dominant males having been present since 1975. Thus there appears to be a slow turnover of adults and most of the 2-4 chicks raised per pair annually disappear. Removal of birds in February-March, when the number of juveniles is high, is therefore not likely to reduce spring densities.

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JOHN L. CRAIG and MURRAY E. DOUGLAS, *Department of Zoology, University of Auckland, Private Bag, Auckland*

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CHICK FEEDING AND ATTENDANCE IN THE WHITE TERN

Holyoak & Thibault (1976) suggested that the frequency of chick feeding in the White Tern *(Gygis alba)* required study because, whereas they observed feeding at all times of the day in French Polynesia, Dorward (1963) observed it only at dusk on Ascension. On 17 December 1979 at Norfolk Island I saw chicks 5-15 days old fed throughout the day.