

RECOVERY OF RINGED HARRIERS.

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INTRODUCTION.

Ringling studies of birds will only provide reliable information on vital statistics and movements when a large number of returns are available for analysis. The species selected for such investigation should, therefore, be either those in which a large proportion of marked birds will be recovered or those that can be caught and marked in large numbers so that although the proportion of returns may be small yet the total recovered is large enough to be useful. The Australasian harrier (Kahu) (*Circus approximans* Peale) is a particularly suitable species for ringing because many birds are killed each year for the bounty paid by the acclimatization societies, so a good proportion of recoveries can be expected; moreover, the birds, being readily attracted by carrion, can easily be caught for marking.

A ringing study of these birds was undertaken as part of an investigation into the ecology of the rabbit in New Zealand, the harrier, about which little factual information is available, being a predator of this animal. This paper gives a preliminary account of this work and of the information on the birds' movements derived from the recoveries.

METHODS.

Apart from three nestlings, all the birds ringed were caught in traps of two types both baited with dead rabbit. One, a modified form of the "crow" trap described by Hollom (1950), is a wire-netting cage approximately 5 x 4 x 4 ft., with a hole along the top by which the birds can enter but which they have difficulty in finding to make their way out again. A perch above the trap is an improvement, for without it the birds alight on the ground and spend much time walking round trying to find a way in. A funnel entrance at ground level overcomes this difficulty, but also enables cats and ferrets to enter and remove the bait. This trap has the advantage that several birds can be caught at one time; as many as five harriers have been found simultaneously in one. The other trap, equally successful in catching birds, has a door that shuts when a hook holding the bait is removed. This trap can catch only one bird at a time and to be most effective must be placed where it can be easily seen and so can be emptied as soon as a bird is caught.

Some care is necessary when handling the birds to remove them from the traps. A harrier makes no attempt to defend itself with its beak but may strike vigorously with its feet, and having a very strong grip it is difficult to make it release its claws once it has taken hold; the birds should therefore be grasped firmly by the tarsi.

RINGING RESULTS.

Trapping began at the Animal Ecology Field Station, Hynish, in the Gwavas State Forest, near Tikokino, Hawke's Bay, in 1951, and an additional trapping locality was started the following year at Awatea Station about seven miles east of Hynish. Table 1 shows the number of birds marked, and the number recaptured from previous seasons at the two stations each year. Young birds, shown separately, are easily recognized by their uniformly coloured brown breast feathers and dark brown eye; they start moulting out of this plumage about the beginning of February when about 13 months old and by this time the eye is paler so that they are distinguishable from the young just out of the nest.

TABLE 1.
TRAPPING RESULTS.

Year.	HYNISH			AWATEA			Young	Adult	%
	Marked	Re-	Total.	Marked	Re-	Total.			
1951 ...	21	21	—	42	—	—	21	21	50
1952 ...	21	41	4	66	20	18	38	41	63
1953 ...	5	19	6	33*	16	21	4	21	50
Total ...	47	81	10	141*	36	39	4	83	134

* Includes three birds whose age was not determined.

Altogether 206 birds were ringed, of which 83 were young, 120 old, and three were of undetermined age. The different number caught each year reflects the intensity of trapping rather than changes in the harrier population; but the varying percentage of young birds in the total catch may well indicate the relative nesting successes in the different years. The steady fall could be due to the reduction of the rabbit population over this period, as the nestlings are fed very largely on young rabbits.

The harriers come most readily into the traps during the period March to June, but are difficult to catch throughout the breeding season from the start of their display flights in August until the young leave the nest in January. This could well be due to a greater abundance of alternative food such as the young rabbits and birds at this time. The same periodicity is apparent in the date when marked birds were recovered (Table 2).

TABLE 2.
MONTH OF DEATH OF MARKED BIRDS.

Month.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep	Oct	Nov.	Dec.	Total
No. killed	0	4	6	8	7	8	0	1	0	1	0	0	35

The proportion of marked harriers recovered is very high. Out of 142 birds marked in 1951 and 1952, 32 (22.5%) have so far been killed and reported. This is a higher recovery rate than any recorded in the British bird-ringing scheme; in the last report in which recovery figures were given (Thompson 1949) the black shag (English cormorant, *Phalacrocorax carbo*) had the highest rate with 22.1% recovered. In addition to the marked harriers killed, 14 birds were recaptured at the trapping stations in subsequent years so that the total recovery rate is 32.4%.

The harriers do not appear to become shy of the traps and a number were recaptured shortly after being marked. Table 3 shows the frequency with which different birds were recaptured within a month of being marked.

TABLE 3.
FREQUENCY OF RETRAPPINGS WITHIN A MONTH OF RINGING

	No. Marked	1	Times 2	Recaught. 3	4	5	Total.	Average No. recaptures.	Per cent. marked birds recaught.
Young ...	83	7	2	1	—	1	11	1.73	13.2
Old	120	15	9	1	—	—	25	1.44	20.8
Total	203	22	11	2	—	1	36	1.53	17.7

It can be seen that although individual young birds came back to the traps slightly more frequently than did adults, yet a larger proportion of the latter were retrapped. However, the differences between the two are no greater than one might expect to get by chance and do not indicate that the young birds are more liable to get caught than the old ones; this is interesting in view of the much higher mortality from trapping and shooting reported in the young of some other species (e.g. cormorant Stuart 1948).

Table 4 shows the distances travelled by recovered birds. Caution is needed when examining these figures as some of the birds recovered during the season in which they were ringed may well have been killed before being able to move as far as they might have done, thus giving a bias in favour of returns from near the trapping stations. There is a suggestion of this, for of the 16 birds killed in the same season as they were marked 8 (50%) had moved less than five miles, while of the 19 birds killed in subsequent years 7 (36%) were less than five miles away.

TABLE 4.
DISTANCES TRAVELLED BY MARKED BIRDS.

Distance Miles.	MARKED AS YOUNG.			MARKED AS OLD.		
	No. Recovered			No. Recovered		
	Same year.	after 1 year.	after 2 years.	Same year	after 1 year	after 2 years.
0 (re-trapped) ...	—	3	1	—	9	1
0-5 5	5	3	1	3	3	0
5-10 2	2	0	0	3	7	1
10-15 0	0	0	0	0	0	0
15-20 0	0	1	0	0	0	0
20-25 1	1	1	0	0	0	0
100-500 1	1	2	0	1	0	0

There appears to be some difference between the movements of old and young birds. Table 4 shows that the adults, with one exception, were killed within ten miles of their ringing place, whereas six out of the seven birds which moved more than ten miles were young when banded. There is a further record (Lopdell 1944) of a young harrier, ringed as a nestling and recovered 29 miles away four months later; thus there appears to be some dispersal of young birds probably in the winter after they leave the nest. The smaller proportion of young than old birds recovered where ringed in later years also supports this suggestion.

The large gatherings (Wodzicki 1949), communal roosts, and the numbers that assemble to feed on dead rabbits along the poison lines, show that the birds are rather mobile in winter. The ringing returns indicate the normal range from which individual birds might come as having a radius of about five miles, that is an area of about 80 square miles.

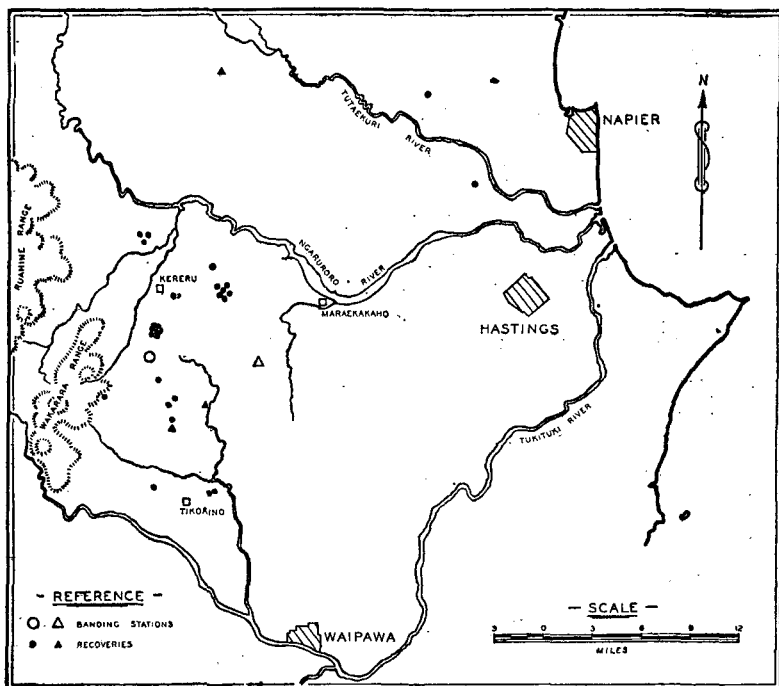


Figure 1—RECOVERIES OF MARKED BIRDS WITHIN
25 MILES OF TRAPPING STATIONS.

The maps (Figs. 1 and 2) show where the recovered birds were killed. Fig. 1 shows that the recoveries from the Hynish trapping station (marked

by a circle on the map) were in the opposite quadrants N.E.-N.W. and S.E.-S.W. and there were no recoveries in the other directions. The Whakarara and Ruahine ranges lying to the west are virtually uninhabited, which could explain why no birds were returned from that quarter. The absence of returns to the east is, however, harder to explain as this district is no more sparsely populated than that to the north and south. Moreover the Awatea trapping station (marked with a triangle) is only seven miles to the east with no obvious barrier intervening and although 131 birds have been ringed at Hynish and 75 at Awatea no bird marked at one station has ever been recaptured at the other which might suggest that east-west movements are not very frequent.

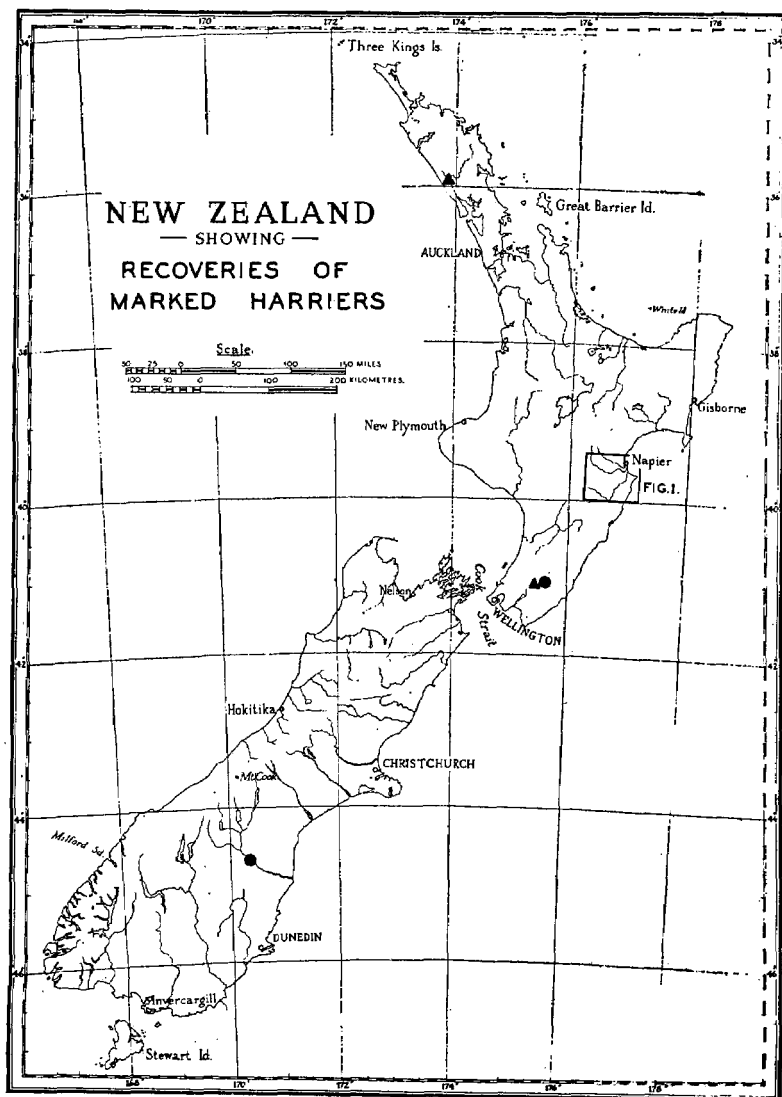


Figure 2—LONG DISTANCE RECOVERIES OF RINGED HARRIERS

- Fig. 2 shows the long distance recoveries of marked birds. These were:
- No. 13443, a young birds marked at Hynish on 3 March 1952, and killed near Carterton, 110 miles south-west, in June 1953.
 - No. 13458, an old bird marked at Hynish on 4 April 1952, retrapped twice in the following week, and killed a month later on 10 May 1952 near Lake Waitaki, Otago, 460 miles south-west.
 - No. 13461, a young bird marked at Awatea on 30 April 1952, and shot over a year later on 9 May 1953 at West Taratahi near Carterton.
 - No. 14639, a young bird marked on 12 March 1953 at Awatea, and killed three months later on 19 June 1953 at Te Wharau near Dargaville, 290 miles north-west.

Two of these birds, Nos. 13458 and 14639, killed shortly after being marked, show that these lengthy movements occur in the late autumn or early winter, about April and May. The birds disperse over a very wide area; only one of them (No. 14639) crossed the mountains running down the two islands—all the other recovered birds had remained on the east side. The mountains can hardly be a very serious barrier to this species as numerous gaps and passes give access to the other side, and the harrier, like other broad-winged hawks, uses convection currents to enable it to soar to considerable heights; nevertheless the mountains appear to influence to some extent the direction in which the birds move.

DISCUSSION.

This preliminary account of the ringing of harriers has been given to show the progress being made with this work. The number of returns is still too scant to enable very detailed conclusions to be drawn about the behaviour of these birds, but is sufficient to give some indication of the movements of this bird which hitherto has been a matter of speculation.

Some limitations of this ringing method are that the returns are almost all of birds which have been trapped or shot, so their distribution will be influenced to some extent by that of people interested in destroying harriers—which is probably not random throughout the country. The four long distance recoveries were all in rabbit infested districts which might indicate either the animosity of rabbiters against harriers or the predilection of harrier for rabbit-infested country. Moreover, marking and killing of the birds only occurs during half the year and therefore gives a rather limited picture of the harriers' behaviour.

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SUMMARY.

In the three years 1951-3 206 harriers have been caught and marked at two trapping stations in Hawke's Bay.

Thirty-five birds have so far been recovered and a further 14 were recaptured in subsequent years where ringed.

The returns indicate that the old birds tend to stay within a radius of about five miles but a proportion of the young ones disperse up to several hundred miles from where they were ringed.

REFERENCES.

- Hollom, P. A. D. (1950)—Trapping methods for bird ringers. British Trust for Ornithology, Field Guide No. 1, p. 7.
- Lopdell, J. C. (1944)—Harrier in Summarised Classified Notes, N.Z. Bird Notes 1 : 76.
- Stuart, D (1948)—Vital statistics of the Mochrum cormorant colony. Brit. Birds 41 : 194.
- Thompson, A. L. (1949)—Report of the bird-ringing committee. Brit. Birds 42 : 175.
- Wodzicki, K. (1949)—Display of the harrier, N.Z. Bird Notes 3 : 174.