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SHORT NOTE

Counts of forest birds on Raoul Island, Kermadec Group

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Between 1967 and 1998 there have been 3 counts of forest birds on Raoul Island, the northernmost (29° 15'S 177° 55'W) and largest island of the Kermadec Group. Such a low number of observations may not usually merit analysis, however, there appears to have been a major change in bird numbers.

In January 1967, forest bird counts were made at 3 locations (Merton & Veitch 1986). Between 1972 and 1984, the feral goat (*Capra hircus*) population was eradicated (Parkes 1990) and this allowed remarkable regeneration of the forest understorey. In Jun/Jul 1994 and in July 1998, I was able to replicate the Boat Cove to Low Flat (Road Transect) counts. This was 10.3 km (a measured distance, count times 2h 24-2h 45) along a formed road varying from 70 to 240 m elevation in pohutukawa, nikau, and *Myrsine* coastal forest, with a grass road verge in places. In 1994 and 1998, I counted a "Forest Transect" along the Pukekohu to Hutchison Track (2 km point to point on a map, count times 1h 14-1h 25), as a forest area comparable to the Mt Prospect to Smith Bluff transect (3 km point to point on a map, count time 3h 10) of 1967. Transect 2 of the 1967 count was not replicated because in 1967 it had been open forest floor but by 1994 it was dense forest with no track.

In 1967 the counting method was for 2 people to walk the transect with a 1-min pause every 4 min to record all birds seen or heard within c. 100 metres. While walking between pauses we also counted the birds within c. 100 m of the transect line. In 1994 and 1998 I counted alone and endeavoured to replicate the 1967 method but found it necessary to increase the pause time in 1998 to 2 min to give myself time to search the 100 m radius.

These counts were carried out in different seasons: 1967, summer; 1994, 1998, winter; by different observers: 1967, 2; 1994, 1; 1998, 1; with different counting times: 1967, 1994, 1 min stops; 1998, 2 min stops; and, for the forest transect, in different locations. There will also have been differences in observer ability and the effects of weather. A statistical analysis of the data and direct comparisons of the numbers counted are therefore not appropriate. The counts do reflect general observations of forest bird abundance on Raoul Island and further discussion relates to their relative abundance.

Yellowhammers (*Emberiza citrinella*) comprised 4% of the 1967 count but were not recorded in later counts. Blackbirds (*Turdus merula*), song thrushes (*T. philomelos*), tuis (*Prosthemadera novaeseelandiae*), and starlings (*Sturnus vulgaris*) were present during all counts (Table 1). No other bird species were encountered on the transects.

Table 1 Counts of forest birds on Raoul Is, Kermadec Group, in 1967, 1994, and 1998. Counts, number of birds counted; relative abundance, overall relative abundance year⁻¹ (%).

| Species | Counts | | | | | | Relative abundance | | |
|-------------------------------------|-----------------|------|------|---------------|------|------|--------------------|------|------|
| | Forest transect | | | Road transect | | | Both transects | | |
| | 1967 | 1994 | 1998 | 1967 | 1994 | 1998 | 1967 | 1994 | 1998 |
| <i>Turdus merula</i> | 10 | 25 | 10 | 11 | 35 | 48 | 14 | 26 | 22 |
| <i>Turdus philomelos</i> | 23 | 0 | 0 | 8 | 3 | 7 | 20 | 1 | 3 |
| <i>Emberiza citrinella</i> | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 |
| <i>Sturnus vulgaris</i> | 25 | 7 | 4 | 28 | 21 | 15 | 45 | 12 | 7 |
| <i>Prothemadera novaeseelandiae</i> | 10 | 12 | 50 | 23 | 127 | 132 | 17 | 60 | 68 |

Blackbirds appear to have maintained their abundance in the forest habitat between 1967 and 1998 and increased along the Road Transect. The improved leaf litter and fruit-bearing understory plants may account for this. Song thrushes have gone from the forest but persist in low numbers along the road. Tuis have increased remarkably, probably as a result of the increase of flowering and fruit bearing understorey species and a probable associated increase in the arboreal invertebrate fauna. Starlings, which were abundant throughout in 1967, are still widespread but are now rarely seen on the forest floor and may be seen feeding on pohutukawa (*Metrosideros kermadecensis*) branches where they extend above the understorey. The open spaces provided by the road appear to have continued to provide a habitat for starlings, although they have still declined there. The ability of starlings to use the cliff environments has also been considerably reduced as these areas were heavily browsed by goats and are now rank vegetation. In 1967, the evening flight of starlings to roost on the nearby rodent-free Meyer Islands was a remarkable sight, with flocks of many hundreds of birds. The largest flock I recorded in June 1994 was 30 birds and I considered that the total number going to this roost may be fewer than 500. Starlings have not been recorded roosting on Raoul Island.

The removal of browsing mammals and subsequent growth of dense understory vegetation has been observed to change forest bird abundance at other locations (Diamond & Veitch 1981), so was expected on Raoul Island. The major difference on Raoul appears to be that blackbirds have maintained their abundance while in other locations where browsing animals have been removed they have declined.

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