

SHORT NOTE

Dispersal of translocated endemic passerines to nearby islands in Chalky and Preservation Inlets, southern Fiordland, New Zealand

COLIN M. MISKELLY*

Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington 6140, New Zealand

COLIN R. BISHOP

Department of Conservation, PO Box 29, Te Anau 9600, New Zealand

TERRY C. GREENE

Biodiversity, Department of Conservation, Private Bag 4715, Christchurch 8140, New Zealand

ALAN J.D. TENNYSON

Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington 6140, New Zealand

Most of New Zealand's endemic passerines have poor dispersal ability, which is one of the reasons why they are the focus of much conservation translocation effort (Diamond 1984; Miskelly & Powlesland 2013). It is self-evident that species with poor dispersal ability will require translocation over large distances following their local extirpation, in order to achieve ecological restoration objectives. However, their subsequent dispersal from translocation release sites will be influenced by many factors including species-specific flying ability, inter-specific competition at the release site, habitat fragmentation, and physical barriers to dispersal (Diamond 1984; Empson & Fastier 2013; Miskelly *et al.* 2017).

A recent survey of the dispersal ability of three species of endemic passerines by Miskelly *et al.* (2017) found that South Island robins *Petroica australis* readily crossed water-gaps of at least 1.4 km, while South Island saddlebacks *Philesturnus carunculatus* and mohua *Mohoua ochrocephala* rarely crossed gaps of more than 100 metres (although mohua are apparently capable of crossing gaps up to 860 m). An additional robin example from

Fiordland was a bird seen on a northern peak of Resolution Island in early 2007, a few months before they were released on Pigeon Island off the south coast of Resolution Island (Pete Kirkman pers. comm. to CMM, 26 November 2017). This bird is likely to have come from either Breaksea Island or nearby Hawea Island, requiring a minimum water-crossing of 1.2 km.

The impetus for the 2017 paper was a survey of 56 islands in Dusky Sound, Fiordland, undertaken in November 2016. We here report observations from a November 2017 survey of 70 islands in Chalky Inlet and Preservation Inlet and adjacent waterways in southern Fiordland, and additional data from June 2018. These same three passerine species had each been released at two sites in Chalky and Preservation Inlets following predator eradication campaigns on the Passage Islands, Chalky and Coal Islands (Department of Conservation 2017).

Ecological restoration of islands in Chalky and Preservation Inlets began with eradication of stoats *Mustela erminea* from Chalky Island (514 ha) and the Passage Islands (177 ha) in 1999, followed by stoat eradication on Coal Island (1,163 ha) in 2005, and mouse *Mus musculus* eradication there in 2008 (further information and maps in Department of Conservation 2017). Limited information is

Received 17 June 2018; accepted 20 July 2018

*Correspondence: colin.miskelly@tepapa.govt.nz

available on predator distribution on adjacent islands in Chalky and Preservation Inlets; however, traps targeting stoats and rats (*Rattus* spp.) are maintained on most of the smaller islands referred to here, including 'North' Passage Island, Steep-to Island, and the Cording Islands (CRB unpublished data).

South Island saddlebacks were released on the larger ('South') Passage Island in 2001 and on Chalky Island in 2008 (Miskelly & Powlesland 2013). Mohua were released on Chalky Island in 2002 and Coal Island in 2015, and South Island robins were released on Chalky Island in 2010 and Coal Island in 2015 (Miskelly & Powlesland 2013; Department of Conservation 2017). All three species were thriving on Chalky Island on 23 November 2017, plus we observed many South Island saddlebacks on South Passage Island on 24 November (Coal Island was not included in our survey).

In addition to these sites, in November 2017 and June 2018 South Island robins were observed on three islands where they had not been released, and South Island saddlebacks on two islands (Table 1). The 160 m minimum water gap between the two Passage Islands equals the previous maximum water crossing recorded for South Island saddleback (Taylor & Jamieson 2007). Mohua were not recorded at any sites where they had not been released in Chalky and Preservation Inlets, supporting the suggestion that this species has a fear of flying over water (Diamond 1981, 1984; Miskelly *et al.* 2017).

Two of the islands where we recorded robins are large enough to hold substantial populations, and we suspect that we witnessed the very earliest stages of colonisation. A single robin was heard singing on Steep-to Island, and the only robins recorded on South Passage Island were a pair feeding three fledglings on the south-west

headland. If robins become established on Steep-to and South Passage Islands, and effective predator control is maintained on adjacent islands, these two islands are likely to provide source populations for colonisation of several further islands. Islands within 1.4 km of either Steep-to Island or South Passage Island include Round Island, Weka (Long) Island and the Cording Islands in Preservation Inlet, and North Passage Island and Great Island in Chalky Inlet.

South Island robins have apparently displaced congeneric tomtits (*Petroica macrocephala*) on numerous small islands in Dusky Sound (Miskelly *et al.* 2017). Robins were translocated to three islands in Dusky Sound between 2002 and 2013, and have subsequently spread to at least 33 further islands (Miskelly & Powlesland 2013; Miskelly *et al.* 2017). The smallest island where both species were recorded in 2016 was Parrot Island (40 ha), and tomtits were no longer present on 9 smaller (1–21 ha) islands where they were found during 1979–84 which now have robins. Robins (but not tomtits) were also recorded from 19 additional small islands (0.2–20 ha) in Dusky Sound in 2016 for which there was no 'pre-robin' data (Miskelly *et al.* 2017).

We recorded tomtits on 16 islands in southern Fiordland in November 2017, including South Passage Island, Weka Island (110 ha), Steep-to Island, 4 of the Cording Islands (1.6–24.5 ha) and North Passage Island (8.7 ha) (full species lists for all sites are entered in eBird). Based on the minimum island size where robins and tomtits were found to co-exist in Dusky Sound, we predict that tomtits will disappear from North Passage and the Cording Islands, concurrent with the establishment of robin populations there. However, tomtits may persist on the larger South Passage, Weka and Steep-to Islands regardless of the presence of robins.

Table 1. Endemic passerines recorded away from translocation release sites in southern Fiordland, South Island, New Zealand, in November 2017 and June 2018. *Pair with 3 fledglings.

Species	Island	Date	Island size (ha)	No. of birds	Nearest source population	Minimum distance flown (m)
South Island saddleback	Largest stack off south-west coast of South Passage Island	23 Nov 17	0.2	2	South Passage Island	50
South Island saddleback	North Passage Island	16 Jun 18	8.6	1	South Passage Island	160
South Island robin	Steep-to Island	22 Nov 17	57.6	1	Coal Island	550
South Island robin	Zero Nugget	23 Nov 17	0.1	2	Chalky Island	370
South Island robin	South Passage Island	24 Nov 17	167.9	5*	Chalky Island	870

ACKNOWLEDGEMENTS

The November 2017 survey was funded by the Department of Conservation (DOC), and was based on the DOC vessel *Southern Winds*. CMM & AJDT received additional financial support from Te Papa. We thank Graeme Taylor (DOC), Riki Parata (Kāi Tahu), and Lawrie Mead for their assistance with the surveys, and *Southern Winds* crew Chris Pascoe and Pete Kirkman for their skill in getting us safely on and off the islands.

LITERATURE CITED

- Department of Conservation 2017. *Conserving Fiordland's biodiversity 1987–2015; the challenges, the achievements, the knowledge. Ti Tiaki i te Taiao ki Tu Rua o te moko; ngā wero, ngā haumāiui, ngā mātauranga*. Te Anau, Department of Conservation. 128 pp. <https://www.doc.govt.nz/Documents/science-and-technical/sap263entire.pdf> (viewed 23 July 2018).
- Diamond, J.M. 1981. Flightlessness and fear of flying in island species. *Nature* 293: 507–508.
- Diamond, J.M. 1984. Distribution of New Zealand birds on real and virtual islands. *New Zealand Journal of Ecology* 7: 37–55.
- Empson, R.; Fastier, D. 2013. Translocations of North Island tomtits (*Petroica macrocephala toitoi*) and North Island robins (*P. longipes*) to Zealandia-Karori Sanctuary, an urban sanctuary. What have we learned? *Notornis* 60: 63–69.
- Miskelly, C.M.; Powlesland, R.G. 2013. Conservation translocations of New Zealand birds, 1863–2012. *Notornis* 60: 3–28.
- Miskelly, C.M.; Tennyson, A.J.D.; Edmonds, H.K.; McMurtrie, P.G. 2017. Dispersal of endemic passerines to islands in Dusky Sound, Fiordland, following translocations and predator control. *Notornis* 64: 192–205.
- Taylor, S.S.; Jamieson, I.G. 2007. Factors affecting the survival of founding individuals of translocated New Zealand saddlebacks *Philesturnus carunculatus*. *Ibis* 149: 783–791.

Keywords: saddleback, South Island robin, translocation