

Supplementary Material

Appendix S1. Overview of breeding habitats, non-breeding habitats, and timing of migrations of New Zealand's endemic inland migrant species.

Species	Breeding habitats	Non-breeding habitats	Timing
Pohowera Banded dotterel	Dry, open, stable areas of shingle, sand or stones on riverbeds, lake shores, coasts or in herbfields (Dowding & Moore 2006)	Coastal mudflats (Pierce 1980)	Breeding: July–September (Dowding & Moore 2006); non-breeding: January–June
Tarāpunga Black-billed gull	Inland, mainly braided rivers with the majority of birds found in Southland and Canterbury (Mischler 2018)	Coastal estuaries and inland over farmland, lakes and rivers (Taylor 2000)	Breeding: August–January; non-breeding: February–July (Mischler 2018)
Tarapirohe Black-fronted tern	Braided rivers or herbfields, mainly east of main divide (Pierce 1983; Schlesselmann et al. 2017)	River mouths and estuaries (Heather & Sagar 1982)	Breeding: August–December; non-breeding: December–March (Lalas 1979)
Tōrea South Island pied oystercatcher	Inland on farmland, in tussock and on braided rivers, mainly east of the main divide in the South Island and Hawke's Bay (Baker 1973; Sagar & Veitch 2014)	Coastal estuaries, with 64% of population in Kaipara Harbour, Manukau Harbour and Firth of Thames (Riegen & Sagar 2020)	Breeding: June – early August; non-breeding: December–April (Sagar & Veitch 2014)
Ngutu parore Wrybill	Shingle of braided rivers or river deltas mainly east of the main divide (Pierce 1983). Move to local estuaries when rivers are flooded (Crossland & Crutchley 2020)	85% of population in Firth of Thames and Manukau Harbour (Dowding & Moore 2006)	Breeding: late August–September; non-breeding: late December–early February (Pierce 1983; Hay 1984)

Appendix S2 Description of methods and materials for the literature review of knowledge on vital rates of New Zealand's endemic inland migrant species.

We searched for relevant published or unpublished literature (reports and BSc Honours, PGDip, MWilm, MSc, and PhD theses) by using the species names and the more generic terms 'wader' and 'shorebird' and putting them into Google Scholar, and into the search bars of the following journals: *New Zealand Journal of Ecology*, *Notornis*, *Emu*, and *The Stilt*. We also searched publication pages and online archives on the Department of Conservation, Environment Canterbury, and BRaid (Braided River Aid) websites. Last, we contacted managers and/or species experts directly and asked them about relevant published or unpublished work. In addition, we searched through the references sections of each publication we sourced. As the number of new publications found through reference sections dropped off, we were confident that we had found the majority of the most relevant publications (published or unpublished).

We collated any reported population size or trend estimate, the data source (e.g. braided river bird counts), and year(s) of estimate, and the latest available estimates. We extracted any information on distribution and movements, including dispersal and migration flyways, and methods used (e.g. banding data).

For the three demographic rates relating to nest survival, chick survival, and adult survival, we extracted rates reported for a single year, if available, rather than average rates over multiple years if research was carried out at a site for multiple years. We recorded the longitude and latitude of each study site, the year of estimation, the source of the information, and the sample sizes of nests or individuals (chicks or adults).

For nest and chick survival we recorded whether the site had any predator control in place, which could range from landscape-scale trapping to targeted, small-scale trapping of various intensities. We did not find any reports of residual predator abundance to assess whether predator control resulted in low relative predator abundance. For nest survival, we recorded the proportion of nests that hatched at least one chick ('apparent nest success') and, where available, modelled nest survival rates and estimation method (e.g. Program MARK). For chick survival, we recorded fledging success (i.e. at least one chick fledged), productivity (number of chicks per female), and proportion of chicks that survived, and modelled survival rates and estimation method. For adult survival, we record the proportion of marked birds resighted or survival rates and estimation method.

References

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