

Ecology and conservation of the swift parrot - an endangered austral migrant



Swift parrots by Geoffrey Dabb (2004)

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Declaration

The research described in this thesis is my own original work and no part has been previously submitted for a degree. Where others have contributed they are duly acknowledged in the Preface and Acknowledgement sections.

A handwritten signature in black ink, appearing to read 'Debra L. Saunders', with a stylized, cursive script.

Debra L. Saunders

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Preface

With the exception of Chapter 1 (Introduction) and Chapter 6 (Conclusion), this thesis consists of a series of interrelated manuscripts that have been prepared (Chapter 2), submitted (Chapter 5), or accepted for publication (Chapters 3 and 4). Each of the submitted and accepted manuscripts is presented as it appears, or is expected to appear, in the relevant journal with the exception of minor changes in style and formatting. Since the primary chapters of this thesis are manuscripts developed for independent publication in scientific journals, some repetition between chapters was unavoidable. Although several chapters include work with collaborators, I carried out the vast majority of work, including literature searches, research design, data collection, analysis and interpretation, and writing. Other contributors are acknowledged at the start of each chapter as co-authors and/or their specific contributions are detailed below. My supervisor, Robert Heinsohn provided guidance, support and editing for all chapters. Swift Parrot Recovery Team members Raymond Brereton, Chris Tzaros, Mark Holdsworth and Rob Price all provided information from their respective areas of expertise for inclusion in Chapter 3, which I compiled, edited and interpreted. Jeff Wood, Christine Donnelly and Ross Cunningham provided statistical advice and review regarding the appropriate data analyses and interpretation in Chapters 4 and 5.

Abstract

The swift parrot (*Lathamus discolor*, Psittacidae) is an endangered, austral migrant that inhabits forests and woodlands of south-eastern Australia. With a small population size (2500 birds), broad winter distribution (1 250 000 km²) and often cryptic nature, the swift parrot is a challenging species to study. In autumn they migrate north from their Tasmanian breeding grounds in search of suitable food resources throughout their winter range on mainland Australia. They are therefore dependent on a combination of suitable wintering, migration and breeding habitats. Although they spend a large proportion of their lives within winter habitats, the spatial and temporal dynamics of habitat use in this part of their range is poorly understood. This thesis aims to provide a greater understanding of large-scale winter habitat use by swift parrots, in both historic and current contexts, and provide a basis for future conservation management.

Swift parrots, or red-shouldered paroquets as they were previously known, were among the first Australian birds to be scientifically described and illustrated following European settlement in 1788. However, within 60 years of settlement, habitats throughout the range of the species were being impacted upon. An important aspect of this habitat loss is the speed and spatial extent with which it occurred throughout the parrots' broad distribution. Although the most extensive habitat loss in some areas occurred during colonial times, habitats continue to be lost as a result of various land management practices. Such impacts are also likely to be exacerbated by the ongoing cumulative impact with rapid climate change. As a result the swift parrot is an endangered species and is the subject of an ongoing national recovery program, to which this thesis contributes.

Conserving habitat for the swift parrot, and other wide-ranging fauna species, is challenging since impacts in one area tend to be dismissed based on the assumption that there is sufficient habitat in other areas. These conservation challenges are discussed in regard to the national swift parrot recovery program. Although recovery program implementation for this species has been successful in identifying and protecting some important habitats, there are still many gaps in our knowledge that need to be addressed through a continuing and adaptive recovery effort, including an understanding of variable habitat use throughout their winter range.

A study of swift parrot winter habitat use was therefore conducted at 53 sites across New South Wales over five years (2001-2005). Swift parrots used a diversity of winter foraging habitats in coastal and/or western slopes regions of New South Wales each year, including

several habitats that occur in endangered ecological communities. Landscapes containing winter foraging habitat included scattered trees, remnant vegetation and continuous forests, and swift parrots foraged extensively on lerp and nectar from a diversity of tree species within these. The occurrence of swift parrots at foraging sites was primarily associated with the abundance of lerp, nectar and non-aggressive competitors. Although swift parrot abundance fluctuated significantly between years and regions, over half of all foraging sites were used repeatedly, highlighting their likely importance for conservation.

Patterns of habitat use throughout the species' winter range were also studied across five states/territories using volunteer data from 4140 surveys. These surveys were conducted by up to 300 volunteers twice a year, for seven years (1998-2004) with swift parrots detected in 19% of surveys. As a result, this study provided the first demonstration of large-scale drought related movements by a migratory population throughout their winter range. It also demonstrated the dynamic spatial and temporal patterns of winter habitat use, including repeated use of sites, by an austral migrant. Four regions in central Victoria were used most consistently, although the birds also visited other regions each year.

During drought swift parrot abundance was significantly correlated with rainfall, whereby most of the population either concentrated in a few regions or migrated longer distances (up to 1000km) to drought refuges in wetter coastal areas. However, swift parrot abundance was not associated with specific climate variables during years of average to high rainfall throughout most of their range. Instead they appeared to prefer habitats within particular regions. Importantly this study emphasises that conservation measures need to be implemented throughout the distribution of migratory species, including drought refuge habitats and areas outside conservation reserves.

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