

STUDENT ABSTRACTS AND SUMMARIES



This section publishes abstracts and summaries from the theses of PhD and master's graduates and is designed to support new graduates and early-career researchers. These articles are generated from theses examined as part of accredited university programs, and the findings reported therein were not subject to additional peer review after submission to Australian Forestry.

Ecology and conservation of the regent honeyeater

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The critically endangered regent honeyeater *Anthochaera phrygia* has suffered a severe population decline since the mid-nineteenth century. The contemporary population is estimated to consist of 200–500 individuals, distributed across 600 000 km² of woodland in south-eastern Australia. The species is highly mobile, tracking nectar resources at large spatial scales. The small population size, vast range and irregular movement patterns of the regent honeyeater have severely hampered understanding of the drivers of an ongoing population decline. Lack of ecological data has inhibited efforts to implement targeted management actions to conserve the wild population. The aim of the thesis summarised here is to obtain robust contemporary ecological data to inform more effective efforts to prevent the extinction of the regent honeyeater. In chapter 2 of the thesis, we develop a novel monitoring strategy to locate breeding regent honeyeaters using a survey protocol that accounts for the species' rarity and high mobility. We show that regent honeyeaters may be rare but are not cryptic. In chapter 3, we review the literature on Allee effects to evaluate, based on life-history traits, the susceptibility of Australia's critically endangered bird species to inverse density-dependent population growth. We use the regent honeyeater as a case study to show how a lack of empirical evidence of Allee effects need not preclude efforts to account for their existence through precautionary conservation action. In chapter 4, we present the contemporary breeding biology of regent honeyeaters based on 119 nests distributed throughout the species' range. We provide evidence that nest success and productivity have declined over the past two decades, nest

success is highly spatially variable, predation is the main cause of nest failure and there is a slight male bias to the adult sex ratio. In chapter 5, we experimentally removed hyper-aggressive noisy miners, a major competitor and known cause of nesting failure, from a regent honeyeater breeding site. We monitored recolonisation of noisy miners following their removal, the co-occurrence of noisy miners and regent honeyeaters during nesting, and the response of the broader songbird community to miner removal. In contrast to recent studies, we significantly decreased the abundance of noisy miners at an ecologically relevant time and location to maximise benefits for regent honeyeaters. Abundance and species richness of the broader songbird community also increased significantly. In chapter 6, we combine genomic data from museum specimens with contemporary samples from 1989 to 2016 to uncover the impacts of severe population decline on regent honeyeater population genetics. We find very weak population structure in the population prior to its rapid decline, that the population comprises a single conservation unit, and that some genetic diversity loss has occurred over the past three decades. In combination, effort and effective sampling can generate crucial population data to inform better conservation of rare and highly mobile species that may otherwise be dismissed as too challenging to study in detail.

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