



# **Defining Habitat Use by Declining Woodland Birds to Inform Restoration Programs**

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Do you just look, or do you see?

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## Abstract

Declines in woodland bird species across southern Australia is an ongoing concern, despite massive reductions in the rates of native habitat clearance. Species decline is particularly evident within the more isolated regions, such as the Mount Lofty Ranges (MLR) in South Australia. Within the MLR, a suite of woodland bird species are currently in decline, while a number of more common species are also now showing signs of being in trouble. It has been predicted that within the MLR, around 35 to 50 woodland bird species will eventually suffer local extinction under a status quo scenario. Proactive efforts aimed at addressing species decline and looming species loss need to be implemented. One such venture is the Para Woodland Reserve revegetation scheme. This 321 ha Reserve located within the north-central zone of the southern MLR, consists of cleared farming land that has been set aside for the re-establishment of woodland habitats through revegetation. The goal for these new woodlands, once established, is to attract and then support individuals of numerous woodland bird species that are currently in decline within the local region.

The first aim of this thesis was to determine if particular woodland types are better than other woodland types in supporting declining woodland bird species, or whether different species of woodland birds associated with different woodland types. If the latter, a mix of different woodland types would need to be reconstructed to maximise the range of bird species that the revegetated Para Woodland Reserve is likely to eventually support. Further, within a certain type of woodland, there is likely to be considerable spatial, structural and/or floristic heterogeneity that in turn may also influence which parts of that woodland will be used by individuals of different bird species. The second aim of this thesis was to document the extent of any heterogeneity within a woodland type and to determine if use by specific bird species was associated with specific habitat features within that woodland. Armed with such knowledge, a deliberate program that is aimed at incorporating specific habitat heterogeneity within the planting regime could be implemented to increase the likely use of new habitats by a suite of declining bird species.

Several novel approaches for surveying birds were employed during this project. In contrast to the popular twenty-minute / two-hectare survey method that is often used to infer broad habitat associations by birds, this project used survey areas that incorporated ten hectares. The strengths of this method are that the habitat associations of bird species

are reported at the scale of the surveyed area, and that the results do not need to be extrapolated beyond the habitat areas being surveyed (i.e. no assumptions are made regarding unsurveyed habitat for birds). Also, most bird surveys are concentrated on periods of peak bird activity (usually mornings) and are limited to times of fine weather conditions only. Instead, for the fine-scale habitat use surveys within individual home ranges, the birds were intensively surveyed for sustained periods between dawn and dusk over multiple days, regardless of the weather conditions. This approach avoided the typical survey biases mentioned above and helped to expose a more holistic view of habitat use by the birds. Much of the information that was gained from using this technique would have otherwise been missed had traditional bird survey methods been employed.

The key findings of this project include, 1) certain bird species responded to one (or two) particular woodland types, seemingly regardless of where within the landscape that woodland was located, 2) a relatively homogeneous woodland at ten hectares contained significant structural habitat heterogeneity, 3) numerous bird species were statistically associated with specific components of habitat structure within ten hectare sites, 4) the minimum home range requirements of birds belonging to several declining woodland species within the MLR were much larger than expected (i.e. 12 – 36 ha), 5) habitat use by birds within individual home ranges varied appreciably, in both time and space, 6) specific habitat attributes associated with either high use habitat areas (i.e. hot-spots) or low use habitat areas (i.e. cold-spots) helped to explain habitat associations by individuals of various bird species, and 7) these same habitat attributes helped to differentiate habitat use between birds of different species that co-existed within a common habitat area.

Recommendations for both the revegetation works on the Para Woodland Reserve and more broadly include, 1) revegetation should provide habitat areas that cover at least tens, if not hundreds, of hectares, 2) plant a variety of woodland types at large spatial scales (e.g. 10 ha each) to cater for a broader suite of locally declining bird species, 3) within each woodland type, incorporate structural (and floristic) heterogeneity at fine spatial scales (e.g. 30 m × 30 m), 4) identify and incorporate the habitat needs of individual bird species at fine spatial scales (e.g. multiple patches covering approximately 30 m × 30 m each), and 5) provide for multiple co-inhabiting bird species by planting a repeated mosaic of different habitat patches at these finer-scales, with each patch “type” catering to the individual habitat needs of one (or a few) pre-determined bird species.

## Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution in my name and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of The University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Phillip John Northeast

01/10/2013

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