

**Habitat reconstruction guidelines for woodland birds:  
a detailed, focussed, bird-orientated approach**

**Joel Allan**  
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Department of Ecology and Environmental Science  
School of Biological Sciences  
The University of Adelaide

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# Abstract

Habitat reconstruction is needed to reverse severe declines in biodiversity, but opportunities will be limited and many species are facing imminent extinction. Hence, there is a need to ensure reconstructed habitat is successful in every possible opportunity, and this will ultimately depend on the ability of guidelines provided by research to reflect all the habitat requirements of the species concerned. Current assessments of habitat requirements for habitat reconstruction have been successful in identifying a range of important features, but they are based on human-defined sampling using randomly selected plots, transects or patches. While effective at capturing variation in habitat use over broad areas and timeframes, individual samples may not exactly match the scale at which species are operating, and therefore trade-off some of the finer details of habitat requirements.

In this thesis, an alternative, more detailed, focussed, organism-orientated approach was used to determine the important habitat requirements needed to reconstruct habitat for woodland birds in the Mount Lofty Ranges region of South Australia. Specifically, this approach was used to examine the habitat use of woodland birds in an existing system of reconstructed woodland and answer three key questions: 1) Where and how should reconstructed habitat be placed in the landscape, 2) How much habitat needs to be established in these areas, and 3) What microhabitat features should be included?

First, where and how reconstructed habitat should be placed in the landscape was investigated by searching the entire area of habitat for woodland birds in  $88 \times 1 \text{ km}^2$  cells spread over  $160 \text{ km}^2$ , to capture species patchily distributed across the landscape. These searches were pooled to examine the influence of 12 landscape features in  $22 \times 4 \text{ km}^2$  areas on the richness of all woodland bird species and the relative abundance of 19 declining species. The results suggested reconstructed habitat should be established in large blocks along drainage lines and near existing woodland for some hollow users.

Second, how much habitat should be established in these areas was estimated by the total amount of habitat in home ranges to reveal the entire area required by groups of

birds. Eight home ranges from three species anticipated to be large area users were determined using radio-telemetry and these estimates were combined with similar data collated from 13 other species studied previously in the same system. The area of habitat used within home ranges ranged from 166 ha to just under 10 ha, suggesting that 100s of hectares would be required to support at least one group of larger area users and that even lower area users may require around 10 ha of habitat to ensure their presence.

Finally, the microhabitat features that should be included were assessed using the fine scale distribution of woodland birds to determine the features that characterise the exact areas of highest use within patches. The distribution of woodland species richness and the richness of declining woodland species were determined by mapping the locations of birds in systematic area searches of five 40-60 ha patches of revegetation, and these were used to guide the sampling of microhabitat features. The findings implied that reconstructed habitat should include a mix of overstorey and understorey plants, comprised of a range of overstorey species, planted at low densities and incorporating a variety of ground substrates.

Overall these results represent a range of important habitat features for woodland birds that can be used to enhance the effectiveness of reconstructed habitat from the landscape down to the microhabitat scale. As these results were developed using a detailed, focussed, bird-orientated approach, they can be used to guide reconstructed habitat with the confidence that they represent some of the finer variation in habitat use. Therefore, together with other results incorporating broader trends, they can be used to increase the chance that any resulting reconstructed habitat will indeed be successful in supporting the species concerned, and ultimately able to ensure their persistence.

## Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution 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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This study was also carried out in accordance with the conditions of permits from the University of Adelaide Animal Ethics Committee, the Australian Bird and Bat Banding Scheme, and the South Australian Department for Environment and Heritage.

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