Avian use of Old Man Saltbush (*Atriplex nummularia nummularia*) plantings in the fragmented agricultural landscapes of the South Australian Murray Mallee

Timothy S. Richards
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School of Earth and Environmental Sciences

The University of Adelaide

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Cover photo: Storm clouds over rows of planted saltbush near Waikerie, South Australia. T. Richards.

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Jacky Winter, SIH = Singing Honeyeater, SQ = Stubble Quail, STP = Striated Pardalote, SWF = Southern Whiteface, VFW = Variegated Fairy-wren, WBB = White-browed Babbler, WFC = White-fronted Chat, WW = Willie Wagtail, WWC = White-winged Chough, YRT = Yellow-rumped Thornbill and YTM = Yellow-throated Miner.

Figure 3.4. Two-dimensional non-metric multi-dimensional scaling (NMDS) ordination of vegetation structure based on percentage cover of canopy (Rem Can), sub-canopy (Rem F2-4 m), understorey (Rem U/S), fallen timber/leaf litter (Rem FT/Lit) and groundcover (Rem GC) within remnant vegetation; understorey (SB U/S) and groundcover (SB GC) in saltbush plantings; and groundcover (Ag GC) in agricultural land across the four study site types: SB-Rem, Rem-Iso, SB-Iso, Ag-Iso. Distances between sample units approximate dissimilarity in site composition and the angles and lengths of the radiating lines (vectors) indicate the direction and strength of relationships of the variables with the ordination scores (McCune and Grace 2002). Data were collected during spring (S) 2010 and autumn (A) 2011.

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Abstract

Much of southern Australia has endured widespread vegetation clearance which has, through habitat loss and fragmentation, induced declines in regional avifauna and confined remaining populations to small, isolated patches of remnant vegetation where their numbers continue to fall. Conserving populations of fauna in highly fragmented agricultural landscapes is increasingly reliant on developing systems which can serve production as well as biodiversity. In recent times, perennial monoculture plantings of native tree and shrub species have been advocated as a means to increase the amount of woody vegetation in fragmented agricultural landscapes, enhance connectivity and provide supplementary habitat for wildlife. In the South Australian Murray Mallee, plantings of Old Man Saltbush (*Atriplex nummularia nummularia*) have been established as supplementary fodder for sheep. Preliminary research has recognised these plantings as a potential source of habitat and resources for native birds. The benefits these areas may provide to birds remain largely speculative and in depth investigations are required to fully understand the potential of saltbush plantings to contribute to the longevity of populations in highly fragmented agricultural zones.

This thesis represents a detailed ecological analysis of how birds use saltbush plantings. Initially the analysis identifies which species of birds use saltbush plantings before examining White-browed Babblers (*Pomatostomus superciliosus*), Variegated Fairy-wrens (*Malurus lamberti*) and Chestnut-crowned Babblers (*P. ruficeps*) in detail to determine the extent to which saltbush plantings are used, for what purposes, the resources provided by the plantings and the factors driving these patterns.

Repeated surveys of saltbush plantings and remnant vegetation showed the bird community found in plantings represented a significantly reduced suite of species compared to that found in remnant vegetation. Plantings did however represent areas of greater value to birds compared with cleared agricultural land. This value was substantially increased when adjacent to remnant vegetation which had the added benefit of encouraging greater numbers of bird species to make use of plantings. This study also identified White-browed Babblers,

Variegated Fairy-wrens and Chestnut-crowned Babblers as several of the species most common in these areas, confirming them as focal species for further study.

Direct observation of foraging by White-browed Babblers, Variegated Fairy-wrens and Chestnut-crowned Babblers revealed saltbush plantings represented substantial foraging habitat for these species. Babblers displayed highly plastic foraging ecologies, enabling them to exploit the foraging resources afforded by saltbush plantings. Despite this plasticity, babblers remained reliant on remnant vegetation for other elements, particularly those associated with breeding and nesting. Variegated Fairy-wrens remained solely within saltbush where they showed foraging ecology little changed from natural chenopod habitats. The highly plastic and adaptive foraging ecologies of these three species enable them to exploit saltbush plantings and hence they are among the most commonly encountered.

Detailed analysis of home range and internal patterns of spatial use exhibited by the focal bird species revealed key elements driving habitat selection. All showed clear selection toward areas with greater cover of dense shrub-level foliage, revealing an inherent dependence on cover presumably to minimise predation risk. The distribution of vegetative cover was found to be a key driver of foraging ecology, habitat use and patterns of spatial use in both saltbush plantings and remnant vegetation.

The distribution of foraging resources was examined by assessing the availability of invertebrate prey across the home ranges of the focal bird species. Invertebrate availability did not differ between intensely foraged areas and areas of no use, revealing prey distribution to be evenly distributed in both saltbush plantings and remnant vegetation. Cover dependence was therefore confirmed as the predominant driver of habitat selection patterns among these birds.

Saltbush plantings represent vegetation in which foraging resources can be found by a small number of bird species with highly plastic ecologies suited to exploiting a range of habitats. Despite their plasticity, several of these species, along with the majority of bird species in the region, remain reliant on remnant vegetation. In order to better manage saltbush plantings for biodiversity it is necessary to base practices on sound ecological research which demonstrates the importance of cover, heterogeneous vegetation and adjacency to remnant vegetation.

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