Government of South Australia

BIODIVERSITY

There is currently little knowledge of the link between carbon storage and biodiversity in different types of planted woody vegetation. This project provides information to guide land management decisions about the type of vegetation to plant and how to manage it.

The Biodiversity Benefits of 'Biodiverse Carbon'

BACKGROUND

The emerging carbon market is prompting land managers to consider alternative and cost-effective ways to capture and store carbon. As the market develops, planted perennial vegetation will form part of the changing face of Australian agricultural landscapes. This change represents an opportunity to achieve multiple positive NRM outcomes, including biodiversity gains at local and landscape scales. There is currently little knowledge of the link between carbon storage and biodiversity in different types of planted woody vegetation. Information is urgently needed to guide land management decisions about the type of vegetation to plant and how to manage it. We sought to establish relationships between carbon sequestration and indicators of biodiversity across a range of planted and remnant vegetation types.

Common Bronzewing

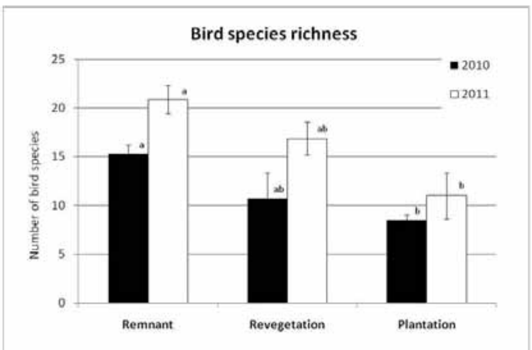

Figure 1. Mean bird species richness in each treatment in both seasons (error bars are standard error). Means sharing the same letter are not significantly different (comparison between treatments within each season, ANOVA, p>0.05)

WHAT WE MEASURED

We recorded the number of plant species and vegetation structure, bird communities and carbon sequestration in 2 ha plots within 30 study sites across eucalypt plantations, revegetation (<20 yr) and remnant systems over two consecutive years in the southern and northern Mount Lofty Ranges.

KEY RESULTS

There were clear differences in plant species richness, structural complexity and community composition between the sampled treatments. Carbon sequestration was highest in plantations in the northern sites (2010), but showed high variability in southern sites (2011).

Despite significant differences in bird community composition between the two landscapes, relationships between birds, plants and carbon remained consistent. Mean bird species richness was highest on remnant sites and lowest in structurally simple plantation sites for both years (Figure 1). Carbon sequestration showed high variability within and between treatments with the highest mean values in plantation sites (Figure 2).

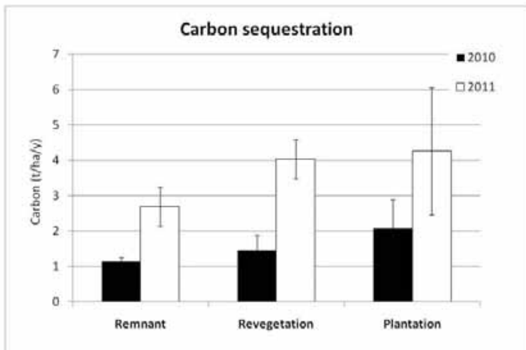

Figure 2. Mean carbon sequestration across treatments and seasons (error bars are standard error). There was no statistically significant difference between treatments within each season.

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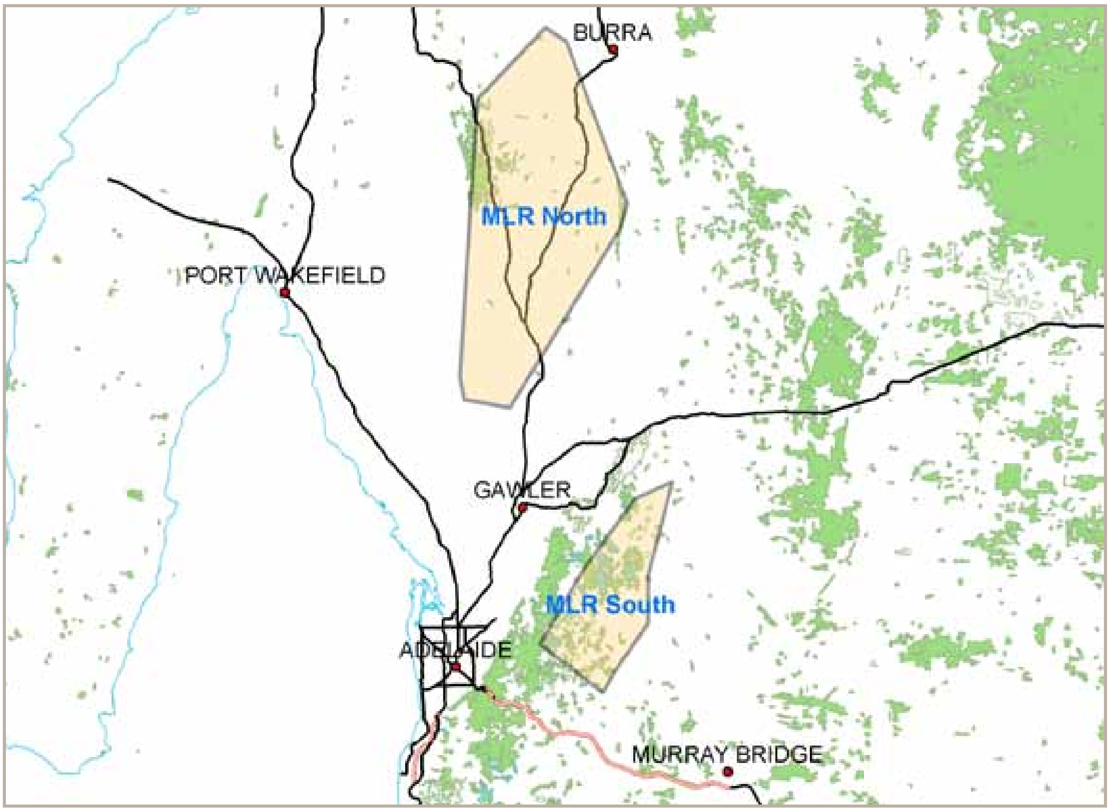

Survey areas in 2010 (MLR North) and 2011 (MLR South)

IMPLICATIONS FOR CARBON PLANTINGS

Our findings indicate that monoculture plantings that are managed for wood production have the potential to store the highest amount of carbon. However this relationship is uncertain due to high variability in plantation sites. These plantings lack the structure required and offer limited habitat opportunities for native biota compared with mixed-species revegetation or remnant vegetation.

Careful consideration should be given to the types of plantings established under future carbon market scenarios. The added benefit of higher biodiversity could be achieved by small changes to the plant species mix and management of these systems. To achieve gains in biodiversity, plant species diversity and structural complexity should be enhanced. Incentives could be offered to landholders to compensate for potential shortfalls in carbon sequestration.

Mixed-species revegetation (age 18 years) near Woodside

ACKNOWLEDGEMENTS

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