For Symposium: 19. Landscape as heritage

Title:

Using land-use history to better understand biodiversity patterns in agricultural landscapes: case study of roadside vegetation.

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Abstract

Recent historical ecology studies have highlighted the over-riding influence of land-use history in creating past, present and future patterns of biodiversity in fragmented agricultural landscapes. Many landscape elements may still be experiencing major community changes as a consequence of recovery from intense historical land use. An historical ecology approach can enhance our understanding of why different species and ecosystem states occur where they do, and explain variations in ecological conditions within remnant ecosystems, too often casually attributed to the 'mess of history'. Understanding the history of the land, its biota, and its anthropogenic interrelations must be treated as an integral aspect of any landscape ecology study (Lunt & Spooner 2005).

The rural road network is an important social component of agricultural landscapes; it facilitates transport of people, is an infrastructure corridor and is important for movements of outputs and inputs of agricultural production (Spooner 2015) . Present day landscapes are dominated by road networks, which are a historical vestige of past land-use decisions - a collection of farm boundaries, stock routes, laneways, railway reserves and other land administration boundaries, all of which contribute to present day spatial patterns. In this paper, I will discuss the use of land-use history to better explain patterns of biodiversity in roadside environments.

Historical information on road development was collated from archived 19th and 20th century cadastral maps, such as road age, road width, as well as data relating to heritage including the locations of old fence lines, county or parish boundaries, previous reserves, stock routes and evidence of road re-alignments and upgrades (Spooner 2005). Significant differences in the density of mature trees in roadside vegetation was found for roads in different age classes. The oldest roads (<1870s) were characterized by having the greatest density of large hollow-bearing trees, which in turn are an important habitat component and predictor for threatened species. By contrast, the youngest roads (post-1900s) had few shrubs or large trees (Figure 1). Ordinal regression analyses showed that road age and road width were significant predictors of roadside conservation values (Spooner et al. 2004; Spooner & Smallbone 2009).

These findings highlight the influence and prevailing imprint of historical land-use on current roadside vegetation composition and structures. By understanding the history of roads, and developing the *story* of their development, can (i) provide a critical tool to enrich our understanding of present day biodiversity patterns, and (ii) aid in successful landscape conservation and restoration activities with land managers.

Figure 1. Different roadside vegetation structures according to three road age categories: (a) an old stock route, where large hollow-bearing Eucalyptus trees are often found, (b) an 1870s road, formed during European settlement, showing high Eucalypt stem density and a diverse understorey of shrubs, and (c) a post 1900s road, showing scattered native pine recruitment, but generally low tree densities and poor vegetation conditions.

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