Perception of native grasslands in south-eastern Australia: some implications for landscape aesthetics and other landscape values

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Abstract

Grasslands are considered to be Australia's most threatened ecosystems, yet relatively little is known about human preferences and attitudes which contribute to continued degradation of these landscapes. In a study conducted in south-eastern Australia, landholders were asked to assess the agricultural, ecological and aesthetic value of native grassland and other rural landscapes. The results confirm suggestions of low regard for treeless landscapes. Landholders' preferences for native grass on their own property appear most closely related to the perceived aesthetic value of the landscape. This paper discusses the implication of these findings for programs seeking to protect native grasslands on private properties.

Introduction

It is thought that at the time of European colonisation there were some 2 million hectares of lowland native grasslands in south eastern Australia (Kirkpatrick, McDougall & Hyde, 1995). In 1992, it was estimated that around 10,000 hectares remained in a reasonably natural state. This means that 99.5% of open grassy ecosystems in south eastern Australia have been destroyed or significantly altered. Few of the remaining grasslands have been protected in public reserves. Public

opinion, including the views of both urban and rural communities, therefore plays a critical role in protecting these important biological resources. This paper explores factors influencing community perception of native grasslands, and describes research undertaken to examine current responses of residents of south eastern Australia.

Human response to native vegetation is shaped by numerous forces, some learnt, others innate. Orians and Heerwagen (1992) argue that evolutionary forces have resulted in inherited preferences for environments that appear safe and productive and provide for basic human needs for food, water and shelter. Research demonstrates landscape preferences that are consistent with this theory. Savanna-like landscapes with widely spaced trees and smooth, easily traversed ground cover are evaluated positively by most people (Kaplan & Kaplan, 1989; Kaplan, Kaplan & Brown, 1989), while landscapes which are very dense or, like grasslands, very open, are less preferred.

Our perceptions of native vegetation are also influenced by social norms and expectations. Nassauer (1995) has examined people's responses to gardens with mowed and un-mowed prairie grasses. She argues that both rural and urban communities expect well managed properties to be neat and tidy. Properties where native vegetation has been maintained in a relatively natural state (with scrubby understorey or long grass) may be considered uncared for and the owners judged to be poor stewards. For this reason, un-mowed native grassland is likely to be viewed unfavourably during much of the year. Work by Lamb and Purcell (1990) contains a similarly discouraging message for those promoting the importance of protecting our native grasslands. They found that tall and dense vegetation was considered more

natural than low, open vegetation. Cultural beliefs about naturalness shape our response to native grassland; landscapes with few trees are likely to be seen as somewhat unnatural, and consequently to hold little aesthetic appeal.

Predicted low preference for treeless environments has been supported by a number of studies undertaken in the United States and Europe. Cook and Cable (1995) studied the perceived scenic beauty of shelter belts on the Great Plains of Northern America. They found that treeless plains, historically and ecologically the most intact landscapes, were rated as less attractive than those with planted shelter belts. Ruddell and Hammitt (1987) examined preference for scenes showing meadow and forest edge in different arrangements. They found that scenes which showed open grassland, with only distant forest, were the least preferred. Kaplan, Kaplan and Brown (1989) investigated the impact of a number of land cover types, including agriculture, scrubland and forest, on landscape preferences. They found that fields in which grass was long and brown, with no sign or mowing or grazing, were a negative predictor of preference.

Perception of grassland environments is likely to vary with the intentions and experience of the viewer. Orland (1988) has demonstrated this with regard to grasslands. He found that rural people expressed higher preference for human manipulated grassland scenes than did urban people. Orland attributed this difference to relative familiarity with the landscape type. It is also plausible that rural and urban respondents used different criteria to assess the scenes. Rural respondents may consider the primary purpose of grassland to be agricultural production, and so evaluate these scenes according to utilitarian criteria. In contrast, urban people are

more likely to encounter grasslands during recreational activity (for example touring the country side). They may therefore assess the landscape according to it aesthetic appeal or potential for exploration.

This paper explores perceptual preferences for grasslands in south eastern Australia. It identifies the perceived values of native grasslands in comparison with more conventional rural landscapes and explores the importance of these landscape values in predicting landholders' preferences for their own properties.

Method

The use of photographic simulations have long been considered a valuable tool in environmental assessment research (Craik & Feimer, 1992) and the validity of this technique has been established through several studies (for example Shuttleworth, 1980; Stamps, 1990). The introduction of image-editing techniques has created even greater benefits by allowing researchers to explore human response to land use situations which do not currently exist (Schroeder & Orland, 1994; Swaffield & Fairweather, 1996; Thorn, Daniels, Orland & Brabyn, 1997). Photoquestionnaires are generally used in conjunction with very simple assessment procedures, most commonly preference judgements. In this study, landholders' perceptions of remnant vegetation were explored by examining responses to computer modified photographs of agricultural landscapes.

Participants: 130 landholders from three regions of south eastern Australia were interviewed. These landholders were selected from respondents to a related study regarding preference for woodland and forest vegetation on rural properties (Cary &

Williams, 2000). In the larger study, a defined population of landholders was drawn from council rolls in the Shires of Yarriambiak and Northern Grampians in Victoria , Tatiara in upper south east South Australia, and the Northern Midlands of Tasmania. These areas were selected on the basis of broad similarities in land use and vegetation characteristics. All survey recipients owned property of 5 hectares or greater.

During the larger study we established a pool of respondents who were willing to be personally interviewed. Responses to the initial survey indicated that those willing to be interviewed were more likely to be male and to be active in protecting native vegetation on their own property. To minimise the effect of self-selection to the interview, selection of interviewees was stratified to reflect characteristics of the original sample of landholders. Equal numbers of landholders were drawn from each of the three study areas (78 males, 53 females).

Materials: Eleven rural scenes, based on a single landscape (a paddock) were generated using computer imaging. These photographic images were full colour and approximately 21 x 21 cm. The scenes varied in three ways: presence and amount of native vegetation (none, small or large area), presence of fencing (vegetation fenced or unfenced) and ground cover (crop, introduced pasture, native grassland).

Procedure: Landholders were interviewed in their own homes. Participants rated the 11 visually edited photographs on four 5-point scales, responding to the following questions:

- How much you would like this paddock on your property? (Overall preference)

- How valuable is this paddock for protecting native plants and wildlife? (Perceived ecological value)
- How valuable is this paddock for farming? (Perceived agricultural value)
- How attractive is this paddock? (Perceived aesthetic value)

Two orders of question presentation were used, to avoid any distortions associated with order effects. Interviewees were also asked to describe liked and disliked aspects of the grassland scene. Responses were transcribed by the interviewer.

Results

Perceived values of native grassland

Perceived values of the native grassland (Figure 1) were compared with landholders' assessments of three other agricultural landscapes:

- pasture or crop with no remnant vegetation (Figure 2);
- pasture or crop with small areas of remnant bushland (Figure 3);
- pasture or crop with large areas of remnant bushland (Figure 4).

Table 1 shows mean overall preference, and perceived agricultural, ecological and aesthetic value of four rural landscapes:

Landholders expressed low preference for having native grassland, as shown in the photograph, on their own property. Native grassland however, was considered preferable to landscapes with no remnant vegetation. Native grassland was also perceived to have relatively low agricultural and aesthetic value. Landholders considered the aesthetic value of grassland to be significantly lower than landscapes

with large areas of trees, but significantly greater than landscapes with only crop or pasture land cover.

Predicting preference for grassland

The degree of association between perceived ecological, agricultural, aesthetic value and overall preference for grassland is shown in Table 2. All three values have a significant positive relationship with overall preference for grasslands. There are also significant inter-correlations between agricultural, ecological and aesthetic values. The strongest of these is the relationship between agricultural and aesthetic value. While moderately strong, it is doubtful whether this relationship is sufficient to confound the prediction of landscape preference from the three perceived values[1].

A step-wise multiple regression was conducted to examine the relative importance of perceived ecological, agricultural and aesthetic value for explaining variation in overall preference for grasslands. The resulting model (Table 3) indicates that perceived aesthetic value is the most important component.

The interaction between perceived agricultural and ecological values of grassland also had a significant association with landholder preference, and this relationship is illustrated in Figure 5. Overall, increasing perceived agricultural value in grassland is associated with increasing overall preference for this landscape, but this effect is enhanced if the ecological value of the landscape is considered to be low.

Discussion

Landholders' low overall and aesthetic preference for grassland confirms widespread belief that the Australian community has little appreciation of open grassland ecosystems, a finding which highlights some of the difficulties inherent in communicating the importance of grassy ecosystems. Landholders consider the aesthetic value of grassland to be significantly lower than landscapes with large areas of trees. This finding is consistent with theories predicting low preference for native grassland on the basis of habitat requirements (Orians & Heerwagen, 1992). Landholders also considered the aesthetic value of the grassland to be significantly greater than that of landscapes with only crop or pasture land cover. This finding is not entirely consistent with the work of Nassauer (1995) who predicted higher preference for neat and tended environments. The crop and pasture scenes provided strong signs of being tidy, managed environments yet landholders expressed higher preference for the relatively messy grassland environment.

A potentially important aspect of the study is the finding that native grassland was perceived to have only moderate ecological value. The ecological value of grassland was considered to be significantly less than that of landscapes with large areas of trees. In interpreting this finding, it should be noted that landscapes designated as having a "large" area of bushland actually retained quite small remnants (around one sixth of the visible land). In contrast, the native grassland scene presented a very large area of remnant vegetation, albeit tree-less vegetation. Current thinking in landscape ecology concerning management of remnant vegetation (Dramstad, Olson & Forman, 1996) would suggest that larger remnants (including treeless plains) are

less open to invasion from exotic weeds and from clearing, so that larger areas of remnant vegetation are highly valuable from an ecological perspective. Landholder response to the grassland scene suggests they have little appreciation of the ecological value of tree-less ecosystems, and little appreciation of the relationship between remnant size and viability. This finding supports the work of Lamb and Purcell (1990) who found that most people perceived low vegetation to be less natural.

This study suggests that perceived aesthetic value of the landscape is the most important predictor of landholders' preferences for their own properties. This was somewhat unexpected given repeated assertions that landholders' attitudes toward native vegetation more generally are most strongly associated with its more utilitarian benefits such as provision of shade and shelter (Cary, 1993; Cary *et al*, 1999; Wilson, 1992). The case of remnant grasslands appears somewhat different, but the reason for this is not yet clear. One possible explanation resides in the absence of strong community attitudes towards grasslands. While our response to trees and woodland vegetation is influenced by complex culturally reinforced beliefs and emotional expectations (Dwyer *et al*, 1991), Australian rural and urban communities have relatively little awareness of native grasslands. In the absence of clear social expectations, response to native grasslands may be formed primarily through simple and largely innate aesthetic responses.

The results of this study suggest that perceived agricultural value of the native grassland is not a significant predictor of overall preference when viewed in isolation. Rather, the association between these factors varies according to the perceived ecological value of the landscape…….IMPLICATIONS?

The study reported here is exploratory in nature. Potential to generalise the findings to other contexts is limited because the study utilised only a single grassland image, and because community response to grassland is likely to vary across regions. The study does however highlight two potential educational strategies for enhancing grassland protection in south eastern Australia.

First, there is a need for interventions that specifically target native grasslands. Study respondents clearly evaluate these landscapes differently from other forms of native vegetation. Educational approaches should raise awareness of these less familiar landscapes and challenge common misconceptions regarding these vegetation types.

Second, this research suggests the potential for using designed landscapes to promote community concern for grassy landscapes. Strategies might include: creating feelings of safety and coherence using built features, mowed paths and edges, and judicious planting of trees; planting (unnaturally) high ratio of flowering plants to promote the feeling that a landscape is productive and attractive; providing visual cues of "good management" including high quality fences and signs; providing interpretative material regarding unusual plants and ecosystems

Endnotes

1. To test for any possible distortion of the regression resulting from inter-correlations between independent variables, two additional regression analyses were conducted. In the first analysis, perceived agricultural value was omitted. Step-wise regression (adjusted R^2 =.400) identified aesthetic value as the major contributor to overall preference (standardised beta=.569). In addition, perceived ecological value was a significant predictor, but made relatively little contribution to accounting for overall

preference (standardised beta= .176). In the second analysis, aesthetic value was omitted from the regression. In this analysis (adjusted R^2 =.205) the only significant predictor of overall preference was the interaction between ecological and agricultural value (standardised beta=.459). These results suggest that the regression analysis reported in the main text is likely to be reliable.

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TABLE 1

Overall preference, perceived agricultural, ecological and aesthetic values of four landscape categories.

	No RNV	**Small area trees RNV**	**Large area trees RNV**	**Native grassland**	
Preference for own property	2.015 [a]	2.958 [b]	4.027 [c]	2.585 [d]	Wilk's Λ(3,127)=.202, p=.000
Agricultural value	3.242 [a]	3.688 [b]	4.167 [c]	2.792 [d]	Wilk's Λ(3,127)=.381, p=.000
Ecological value	1.336[a]	2.405[b]	3.815[c]	3.130[d]	Wilk's Λ(3,128)=.087, p=.000
Aesthetic value	2.142 [a]	3.006 [b]	4.233 [c]	2.938 [b]	Wilk's Λ(3,127)=.177, p=.000

[a,b,c,d] For each row, non-matching superscript annotation indicates means are significantly different

TABLE 2

Correlation between three four measures of perceived value of grassland (n=131)

	Preference for own property	Agricultural value	Ecological value
Agricultural value	.450**		
Ecological value	.323**	.231**	
Aesthetic value	.617**	.490**	.275**

** p<0.01 (2-tailed)

TABLE 3

Predicting preference for grassland on own property from perceived aesthetic, agricultural and ecological value

	Regression Weight	
	Raw Scores	Standardised Score
Predictor		
AEST	.562***	.512***
AGRIC	.054	
ECOL	.042	
Interactions		
AEST x AGRIC	.129	
ECOL x AGRIC	.005**	.231**
ECOL x AGRIC x AEST	.131	
Constant	.471	
Summary Statistics:	R=.650***	R^2=.423

** p<.01, *** p<.001

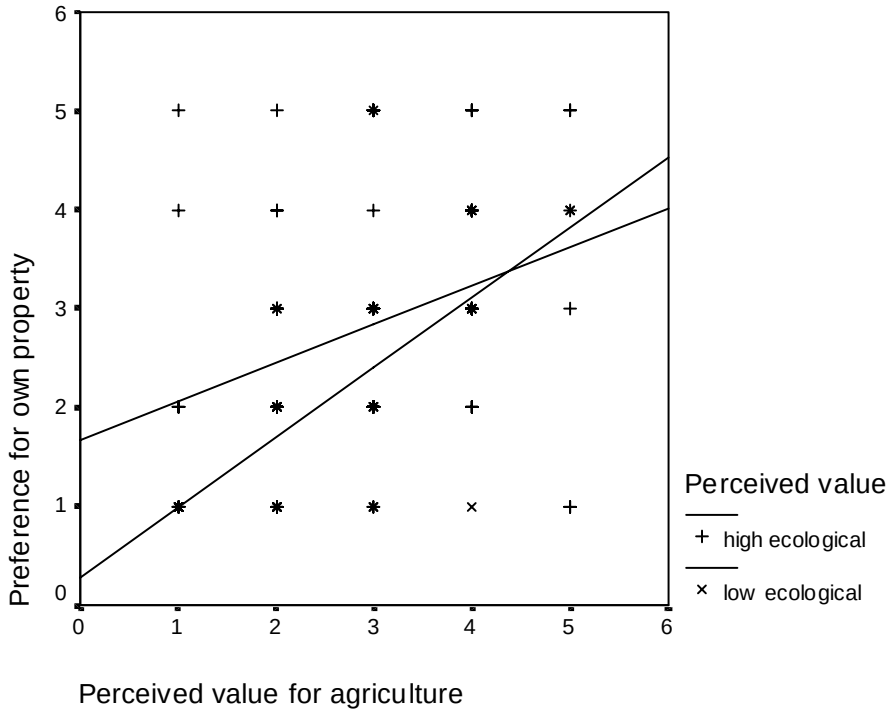

FIGURE 5

Relationship between perceived ecological and agricultural value of grassland and landholder preference for grassland on their own property.