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Variation in public perceptions and attitudes towards terrestrial ecosystems

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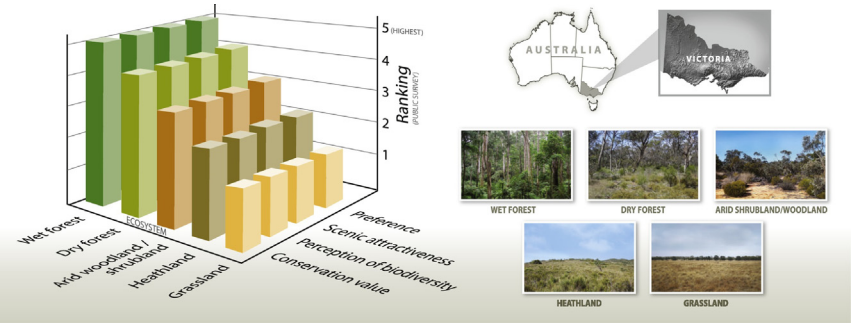
HIGHLIGHTS

- Underappreciation of ecosystems is a fundamental driver of the biodiversity extinction crisis of the anthropocene.
- We aim to better understand human perceptions (anthroposphere) of elements of their environment (biosphere).
- We surveyed 503 members of the public (Victoria, Australia) and documented preferences and attitudes to five ecosystems.
- People favoured wet forest, followed by dry forest, mallee, heathland then grassland.
- Ecological worldview, familiarity and scenic attractiveness influenced perceived conservation value.
- Bias by public towards particular ecosystems, which likely mediates conservation attention, documented for the first time.

GRAPHICAL ABSTRACT



Rank order of five particular ecosystems in Victoria (Australia) for preference, scenic attractiveness, perception of biodiversity and conservation value, from a survey of 503 members of the Victorian public.

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ABSTRACT

Biodiversity is a global asset of inestimable value which is threatened by human activities. Biodiversity exists within ecosystems, which enjoy differing levels of conservation. The ways in which humans regard ecosystems can play an important role in identifying strategies to change human behaviour, thereby achieving conservation goals. We investigated how preference, scenic attractiveness, perceptions of biodiversity and conservation value varied between five terrestrial ecosystems in Victoria, Australia (503 respondents). We document, for the first time, distinct ecosystem preferences, with people favouring wet forest, followed by dry forest, arid woodland/shrubland, heathland and then grassland. The ecological worldview of the respondent (i.e., the set of beliefs that guide the way a person interacts with the natural world), their familiarity with the habitat and perceived scenic attractiveness influenced the conservation value assigned by the members of the public to each ecosystem. The conservation and biodiversity value assigned to each ecosystem was higher where people were familiar with the ecosystem, considered it attractive, and held an ecocentric worldview. These aspects may correlate with public attitudes and represent key elements

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which could be used to engender higher levels of support for less appreciated ecosystems. Enhanced support may then underpin better conservation outcomes.

1. Introduction

Despite recent global conservation efforts (Butchart et al., 2010), there has been a sharp increase in the number of species extinctions over the past 150 years (Baillie et al., 2004). Biodiversity (the variety of life) is considered of immense environmental, economic and social value yet is increasingly threatened by human activity (IUCN, 2014). One of the major causes of biodiversity decline is escalating habitat loss driven by human consumption on an enormous scale (Balling and Falk, 1982; Butchart et al., 2010; NRMMC, 2010).

Since the arrival of European settlers in 1788, Australia has experienced significant decline of terrestrial ecosystems and greater biodiversity loss than any other continent (NRMMC, 2010). One key strategy to mitigate ecosystem and biodiversity loss is the creation and management of reserve systems (Cabeza and Moilanen, 2001). Although the extent of protected areas worldwide is growing (Butchart et al., 2010), reserve systems often expand by the addition of areas of low economic value rather than conservation value per se (Ando et al., 1998; Fitzsimons and Wescott, 2001). In Australia, reserve selection has historically been based on scenic, recreational or perceived wilderness values rather than biodiversity conservation values (Fitzsimons and Wescott, 2001). Some major implications of this historical pattern of reserve selection are: (1) existing protected areas may not be effective in sustaining biodiversity; (2) some ecosystems are under-represented in reserve systems; and (3) conserving biodiversity may depend on the preservation of habitat on privately-held land (Aycrigg et al., 2016). For example, grassland ecosystems in southeastern Australia that have been coveted for their value as easily exploitable pastureland; >90% of the original extent of native grassland is now on private land, and <5% is within conservation reserves (Gullan, 2015).

Preventing further depletion of biodiversity depends upon sustained and collective efforts of a range of stakeholders and institutions. One important way of generating and maintaining community engagement in conservation decision-making is to improve the effectiveness of communication strategies to influence attitudes and encourage pro-environmental behaviour (Groffman et al., 2010). However, providing information and technical knowledge alone rarely results in changes to attitudes and behaviour (Heberlein, 2012; McKenzie-Mohr et al., 2012). Existing values and attitudes, past experiences and sociocultural context can affect the way humans filter and assimilate information (Ballantyne and Packer, 2005) and, along with other factors, can create barriers to behavioural change (Heberlein, 2012). Messages that consider these psychological and contextual filters engage audiences more effectively (Groffman et al., 2010). Therefore, improving understanding of current public attitudes and values regarding different natural landscape types has the potential to enhance the effectiveness of communication strategies designed to foster engagement in the protection of a variety of natural environments (Sheridan, 2014).

1.1. Landscape preference

The most fundamental way that humans respond to their environment is through their perceptions about the characteristics of their surroundings (Clayton and Myers, 2009), and this forms the basis of 'landscape preference' research, a multidisciplinary field which has grown over the past four decades (Appleton, 1996; Herzog et al., 2000; Irvine et al., 2013; Nassauer, 1997a; Ulrich, 1993). Humans are predisposed to engaging more readily with landscapes that elicit positive responses, and to avoid or alter those considered ugly or dispensable (Gobster et al., 2007). Thus, humans often value landscapes more highly for their own purposes (e.g. recreation, scenic qualities) rather than for their ecological value (value for supporting natural processes or the survival of non-human species) (Gobster et al., 2007). This presents a challenge for the conservation of natural landscapes and biodiversity because of a potential disparity between conservation goals and human preferences (Gobster et al., 2007; Groffman et al., 2010). That is, landscapes which are preferred by humans may not always be ecologically diverse and resilient, and ecologically important or significant ecosystems may sometimes be seen as unattractive or unimportant. Consequently, landscapes people admire more are likely to remain healthy through conservation attention than those admired less (Carlson, 1979; Dobbie and Green, 2013; Duarte et al., 2008; Nassauer, 1997b). Numerous factors relating to landscape preference have been identified, and their effects on human perceptions of landscapes are often contextual and non-independent (Clayton and Myers, 2009).

1.1.1. 'Preference' as a relic of human evolution

Landscape 'preference' describes people's attitudes towards particular landscape patterns, but also describes what is considered to be a basic emotion to natural environments that evolved from human habitat selection (Appleton, 1996; Kaplan and Kaplan, 1989). Three major theories have emerged based on how particular landscape patterns may have supported human evolution by offering both 'prospect' (the opportunity to see without being seen) and 'refuge' (protection from the elements and predators) (Appleton, 1996). The most widely supported theory is the 'savanna hypothesis' that identifies the emergence of savanna grassland in Africa as a factor in hominid evolution (Balling and Falk, 1982). Second is the 'forest hypothesis', which proposes that closed forests were the setting for early human evolution (Clarke and Tobias, 1995), and third is the 'grassland-woodland theory' that suggests humans evolved in a mixture of these landscape types (Blumenschine, 1987). It is proposed that human habitat selection is an ancestral trait, and that modern humans may retain psychological and behavioural artifacts that continue to influence their predilection for certain landscape patterns (Balling and Falk, 1982).

1.1.2. Landscape preference and aesthetics

Another major theoretical area deals with attitudes towards the 'aesthetics' of landscapes, described as "a feeling of pleasure attributable to directly perceivable characteristics of spatially and/or temporally arrayed landscape patterns" (Gobster et al., 2007, p964). The aesthetic experience has been classified in various ways, such as the 'scenic aesthetic' (visual pleasure of 'natural-looking' landscapes) and the 'aesthetic of care' (appreciation of manicured or cultivated landscapes) (Gobster et al., 2007). Much of this research has sought to identify which kinds of landscapes elicit the most positive outcomes for human wellbeing – which types of environmental features make people happier (De Groot and Van Den Born, 2003; Han, 2007; Kaplan and Kaplan, 1989), inspire or amuse them (Burgess et al., 1988; Özgüner and Kendle, 2006), or aid their recovery from illness or stress (Kaplan, 1992; Ulrich, 1984).

1.1.3. Landscape preference, familiarity and environmental worldview

Another well-documented influence on judgments of landscape scenes is the sociocultural effect of familiarity, where environmental preference may be shaped by previous experience, learning and/or cultural identity. Familiarity is thought to affect cognitive empathy and

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