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Review

The role of social values in the management of ecological systems

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ABSTRACT

The concept of value is central to the practice and science of ecological management and conservation. There is a well-developed body of theory and evidence that explores concepts of value in different ways across different disciplines including philosophy, economics, sociology and psychology. Insight from these disciplines provides a robust and sophisticated platform for considering the role of social values in ecological conservation, management and research. This paper reviews theories of value from these disciplines and discusses practical tools and instruments that can be utilised by researchers and practitioners. A distinction is highlighted between underlying values that shape people's perception of the world (e.g. altruistic or biospheric value orientations), and the values that people assign to things in the world (e.g. natural heritage, money). Evidence from numerous studies has shown that there are multiple pathways between these values and attitudes, beliefs and behaviours relevant to ecological management and conservation. In an age of increasing anthropogenic impacts on natural systems, recognising how and why people value different aspects of ecological systems can allow ecological managers to act to minimise conflict between stakeholders and promote the social acceptability of management activities. A series of practical guidelines are provided to enable social values to be better considered in ecosystem management and research.

1. Introduction

A dominant objective of ecological management has been to minimise negative human impacts on ecosystems. To achieve this, the dynamics and anthropogenic perturbations of ecological systems have been intensely studied. The resounding call from ecologists and environmental practitioners alike has been for better science and its effective application to practice (McNie, 2007; Sutherland et al., 2004). However, there is increasing recognition that environmental outcomes depend greatly on socio-political factors, in particular the way people think about the environment (Mascia et al., 2003; Robertson and Hull, 2001). The concept of 'values' is therefore becoming increasingly prominent in environmental decision-making. As stated by McIntyre et al. (2008, p. 658) "many natural resource conflicts are more about values than they are about facts".

Environmental managers are trained predominantly in the natural sciences, and social scientists are underrepresented (Endter-Wada et al., 1998). Managers are generally not well versed in methods and literature related to assessing social values and incorporating them into ecological decisions. Even the definition of the term 'value' can be problematic due to its widespread vernacular use and different interpretations and applications by academic disciplines. There can also be anxiety around the application of values to ecological management. Norton and Noonan (2007, p. 665) state that "[e]cologists, worried that they will not be viewed as sufficiently "objective" and "scientific", refuse to consider the important role of values in the development and use of ecological models". Nevertheless, values are a fundamental part of how people engage with conservation issues and provide a "natural connection between place and decision-making" (Brown and Reed, 2012, p. 320). Values must therefore be considered by managers as ignoring them can lead to conflict and poor ecological outcomes (Knight et al., 2011).

It is in this context that we outline the concept of social values. Social values have been explored comprehensively in numerous academic disciplines, including philosophy, economics, sociology and psychology. There have been comprehensive reviews of general environmental values (Dietz et al., 2005; Lockwood, 2005) and social values in forestry (Brown, 1984). However, much of this research is largely inaccessible to environmental practitioners due to the emphasis on theory, the contexts in which it has been applied (e.g. productive forests), and where it is published. In this article we

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present some of the key understandings of social values in a way that is comprehensible by conservation scientists and environmental managers. We also outline how this understanding might be applied in practical ways to enhance the management of ecosystems.

2. Theory

2.1. Key concepts

The many approaches to studying values can be differentiated according to (i) a focus on the *values of* people compared to how things in the world are *valued by* people, (ii) different measurement approaches, and (iii) whether values are considered commensurable (see Table 1). The first distinction is particularly relevant in distinguishing between disciplines. In philosophy, sociology and psychology the term 'value' is often used to describe the *values of* people, namely their preferences for particular means (e.g. integrity) or ends (e.g. social justice) (Brown, 1984). In this sense, values are an important characteristic of people that help shape the judgements they make about the world around them and why different people or social groups make the decisions they do. This class of values has been described as people's *underlying values* (the term we will use in this paper), *held values*, or collectively *value orientations*. A distinction is made between these underlying values and those things in the world that are *valued by* people. When used in the latter sense, the things being valued are often referred to as a *valued objects*, and the relative worth given to these objects is referred to as their *assigned value* (Bengston, 1994; Brown, 1984). Assigned values are the estimated worth of a thing or place (Bengston, 1994). They are the classic subject of economics, which typically applies instruments such as market pricing to indicate the worth of goods or services. Ecological managers and conservation practitioners are often more interested in assigned values than underlying values as their activities relate to protecting or managing particular valued objects (i.e. species, ecosystems or places). Indeed, conservation planning tools typically incorporate a system of 'weighting' (or valuing) species according to a set of criteria (e.g. level of threat, ecological function or genetic uniqueness) (Arponen et al., 2005). However, it is increasingly recognised that conservation actions rarely reflect biological priorities in practice (Knight et al., 2008) and that decisions by governing authorities often reflect a different set of social and political 'values' (Brechin et al., 2002). This reality highlights the need to understand the role of assigned and held values in environmental decision-making.

The study of social values can also be differentiated according to method of measurement (quantitative or qualitative) (Table 1). Examples of quantitative measurement of values include market pricing in economics, and the use of psychometric scales in psychology (Bengston, 1994). This allows (i) values to be measured for large and diverse groups of people, (ii) changes in values to be tracked across groups of people or across time, and (iii) models to be developed to predict values based on other factors (e.g. demographics, cultural background). In contrast, sociology and anthropology often use qualitative techniques that allow the values of a particular culture or population to be understood in much greater depth but make generalisation difficult.

The commensurability of values is their ability to be reduced to a single scale of measurement that allows them to be compared directly (Bengston, 1994). Commensurability of values is a fundamental principal underpinning cardinal utility theory, where many objects can be valued using a common standard: typically money (Farber et al., 2002). Where market pricing is not possible, methods such as contingent valuation (e.g. willingness to pay) are used to measure and convert a wide range of assigned values into money to allow direct comparison and make value tradeoffs. However, Chan et al. (2012) note that cultural services and non-use values of ecosystems are difficult to quantify because they are intangible and incommensurable. They are irreducible to a single common scale and do not conform to the neoclassical economic assumptions. In contrast to economics, values in psychology are measured on independent scales that allow intra-value comparison across people or time, but not inter-value comparisons to be made. This approach is consistent with the philosophy of value pluralism, treating values as incommensurable and unable to be converted to a single unit of measure (Bengston, 1994; Lockwood, 1999).

Values must be distinguished from related concepts such as attitudes, beliefs and norms (Dietz et al., 2005). Attitudes are statements of people's positive or negative evaluations of a specific object or situation, and are typically expressed as likes or dislikes, or preferences. Beliefs are statements of people's understanding of the world; "they are facts as an individual perceives them" (Dietz et al., 2005, p. 346). Norms are common understandings about how people ought to behave in a certain context (Dietz et al., 2005) and can operate at the individual or group level. A useful heuristic to understand the relationships between these psychological elements is the cognitive hierarchy model of human behaviour (Rokeach, 1973). It proposes that behaviours are influenced by attitudes, beliefs and values. The higher order cognitive factors (such as behavioural intentions) are more numerous and changeable, and are preceded by fewer and more stable concepts (such as values). This is depicted by Fig. 1 schematic adapted from Fulton et al. (1996).

2.2. The nature and structure of environmental values: theoretical basis

Environmental psychology is an interdisciplinary field that explores the interplay between people and their environment. It uses psychological methods to collect and analyse data but draws upon theory and knowledge from many disciplines such as social psychology, sociology and the environmental sciences (Steg et al., 2013). Research in environmental psychology has explored how

Table 1
Commonly used approaches to studying values.

Description	Disciplines	Held values	Assigned values	Commensurable	Qualitative	Quantitative	Examples
Explores the meanings and ethical implications of values	Philosophy	✓			✓		Plumwood (2002), Rolston (1994)
Measures a comprehensive set of underlying and assigned values for specific or abstract places/concepts	Psychology	✓	✓			✓	Stern and Dietz (1994), Ford et al. (2009)
Identifies the value relationships between particular people(s) and particular place(s)	Human Geography, Sociology, Anthropology	✓	✓		✓		Graham et al. (2013), Stephenson (2008)
Measures assigned values, typically using a common value scale (e.g. money, conservation value)	Economics, Conservation science		✓	✓		✓	Costanza et al., (1997), Bottrill et al. (2008)