



Environment & Society



White Horse Press

Full citation:

Lockwood, Michael, "Humans Valuing Nature: Synthesising Insights from Philosophy, Psychology and Economics."
Environmental Values 8, no. 3, (1999): 381-401.
<http://www.environmentandsociety.org/node/5781>

Rights:

All rights reserved. © The White Horse Press 1999. Except for the quotation of short passages for the purpose of criticism or review, no part of this article may be reprinted or reproduced or utilised in any form or by any electronic, mechanical or other means, including photocopying or recording, or in any information storage or retrieval system, without permission from the publisher. For further information please see <http://www.whpress.co.uk/>

Humans Valuing Nature: Synthesising Insights from Philosophy, Psychology and Economics

MICHAEL LOCKWOOD

*Johnstone Centre
Charles Sturt University
PO Box 789, Albury, NSW 2640, Australia*

ABSTRACT: A rational process for assessment of environmental policy options should be based on an appreciation of how humans value nature. Increased understanding of values will also contribute to the development of appropriate ways for us to relate to and manage natural areas. Over the past two decades, environmental philosophers have examined the notion that there is an intrinsic value in nature. Economists have attempted to define and measure the market and nonmarket economic values associated with decisions concerning natural areas. Psychologists have tried to assess the extent to which people believe in an intrinsic value in nature, and have also begun to work with economists to improve nonmarket valuation techniques. I briefly review the contributions made to our understanding of natural area value by environmental philosophy, psychology and economics, and develop a model that integrates insights from these disciplines. Components in the model include cognitions, held values, assigned values and various modes of value expression. I make recommendations for future validation, development and use of the model.

KEYWORDS: Intrinsic value, value expression, integrated evaluation

1. INTRODUCTION

In this paper I attempt to indicate how contributions from a number of disciplines can be integrated to assist understanding and evaluation of choices between alternative environmental futures. Such choices, if they are to have a rational basis, must involve identification and assessment of the values affected or created by each alternative.

The study of values is central to and involves the intersection of interests of philosophers, anthropologists, sociologists, and psychologists [and economists!]. Values are presumed to encapsulate the aspirations of individuals and societies: They pertain to what is desirable, to deeply engrained standards that determine future directions and justify past actions. (Braithwaite and Scott 1991, p. 661)

This is as true of environment-human interactions as it is of any other area of human behaviour. As Rokeach (1973, p. 3) observed: 'The value concept, more than any other, should occupy a central position ... able to unify the apparently diverse interests of all the sciences concerned with human behaviour.' At present we only have limited understanding of individuals' values, the ways that they are expressed, and means of appropriately incorporating them into our decision making processes.

Drawing on the work of Brown (1984) and O'Neill (1992), I will refer to intrinsic, instrumental, functional, held and assigned values. I will take intrinsic value to indicate that the referent entity is an end in itself, such that the value is autonomous and independent of any other entity. Instrumental value indicates that the referent entity is a means to achieving a purpose of another entity. Instrumental values may be functional in that they contribute to another value without the intervention of consciousness, or they may be held or assigned by self-conscious entities. A natural area has functional value when there is a technical relationship between the existence of an entity and the natural area. Brown (1984) noted that, unlike the values that generally concern social scientists, functional values are not preference related. These functional values exist regardless of humans' awareness of them or attitudes to them. Though they are not of direct relevance to evaluation, the knowledge individuals acquire about functional values can motivate construction of other value types.

Held values are principles or ideas that are important to people, such as notions of liberty, justice or responsibility. Assigned values are values that people attach to things, whether they are goods such as timber, activities such as recreation, or services such as education. I will also distinguish between 'beliefs' which mean the set of held values adopted by a person, and 'cognitions', which are the understandings, factually correct or not, that a person has with respect to functional values, and the impacts of decisions on such values.

Psychologists tend to use the term 'value' to refer to what I will call held values. For example, Rokeach (1973, p. 5) defined value as 'an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence'. In social psychology, the term attitude refers to a psychological tendency that is identified through a person expressing some degree of favour or disfavour towards a particular attitude object. Attitudes closely correspond to what I refer to as assigned values. Psychologists, after Rokeach (1973), see held values as motivating and guiding principles varying in importance. They are determinants of assigned values, but are deeper and more stable. A value orientation is the position taken by a person where a particular set of related held values are more important to them compared to all others (Axelrod 1994). Peoples' value orientations are likely to be especially strong determinants of their pro-environmental actions because people often need to react to environmental conditions or problems on the basis of very limited experience (Stern and Dietz 1994).

HUMANS VALUING NATURE

Value orientations are a subset of beliefs, since a person may simultaneously hold more than one orientation.

Deliberation on the ethical content – intragenerational, intergenerational and interspecies – of environmental decisions is a necessary task for any integrated account of environmental value. It is not my purpose here to reiterate or debate the various positions that have been advocated concerning the rights and responsibilities of individual humans, and the implications these have for collective decisions. Suffice it to say that there are generally no grounds for privileging the values of one person over another. At the very least, the values of all people who declare a stake in a decision should, in principle, be taken into account in the making of that decision. Stakeholder participation in environmental decisions is widely accepted.

How can decision makers arrive at allocative decision-making procedures and outcomes that are seen to be 'just', or legitimate by all stakeholders? Presumably one approach is to ensure that society's values and ethical considerations are reflected both in the decision-making process and outcome (Seligman et al. 1994, p. 106).

The existence of an intrinsic value in nature is crucial to the existence of a coherent interspecies ethic. Economics has been built up from western philosophic traditions in which the natural world is only of instrumental value to current human needs and wants. This narrow anthropocentric view of value is now under challenge, even from within some sections of the economics profession.

How can the putative rights of future generations be established and accounted for? Can and should the 'rights' of non-human species be considered? Both of these issues can be sensibly discussed only in a wide social-natural framework, such as is offered by ecological economics (Faber et al. 1996, p. 12).

However, I question whether ecological economics does, in its current state of development, offer a clearly articulated 'wide social-natural framework'. The main purpose of this paper is to contribute to such a framework in a way that integrates insights from three disciplines where values are a central consideration – philosophy, psychology and economics – as well as drawing on work by anthropologists and sociologists.

Philosophers have begun to develop the basis for a distinct environmental value theory (e.g. Callicott 1987, Rolston 1989). Psychologists have examined individuals' value orientations toward the environment, and attempted to develop scales to measure the degree people believe in an intrinsic value in nature (e.g. Stern et al. 1995a). Economists have developed a number of techniques to assess the nonmarket economic values associated with natural areas (e.g. Mitchell and Carson 1989). Benefits of integrating developments in these disciplines into a comprehensive approach to environmental valuation include:

- i. integrating economic and non-economic values within a unified framework;
- ii. explicit recognition of the limits to economic valuation – as the ability of economists to measure values has increased, concern has been expressed by philosophers and social scientists about the appropriate boundaries of economic valuation (see, for example, Sagoff 1988a or Brennan 1992);
- iii. grounding of the valuation approach on a particular theory of value that is informed by both environmental philosophy and economic theory;
- iv. improving the correspondence between the underlying nature of individuals' values, and the way they are represented and processed in the evaluation procedure; and
- v. improving the quality of value advice provided to decision makers, in terms of both breadth of content and consistency with underlying theoretical constructs.

In the next three sections, I present the relevant body of philosophical, psychological and economic work, and in the final section of the paper I attempt to integrate these into a coherent model of individuals' environmental values. The model is constructed in the context of decisions about alternative environmental futures.

2. INTRINSIC VALUE

While the intrinsic value of nonhuman species is a 'widely shared intuition' (Callicott 1986, p. 140), a generally accepted theory supporting such value has yet to be developed.¹ Similarly, there is no consensus regarding the necessity of intrinsic value for an environmental ethic.²

Independent of the philosophical arguments concerning coherence and significance, it is likely that at least some stakeholders in environmental issues believe in some form of intrinsic value in nature. A selection of possible positions individuals might take with respect to intrinsic value is given in Table 1. The symbols used in the table are defined below. To simplify the presentation, eight classes of valued items are recognised, from inanimate nature through to human quality of life. Ecosystems refer to a group of biotic elements with close functional relationships together with the abiotic elements that support them. A landscape refers to a physical type that may or may not feature biotic elements – for example, mountains, glaciers, deserts and so on.

Each class can either be considered to have intrinsic value (*I*), instrumental value (*X*), or no value (*N*). *I* and *X* may also be considered negative (-) – that is, as a disvalue. Three types of relationships between the eight classes are recognised. Hierarchical relationships³ imply that where there is a conflict

HUMANS VALUING NATURE

between the two related classes, one is always given priority (an absolute hierarchy H_a), or is given priority under certain circumstances (a limited hierarchy H_l). In Table 1, the priority order is denoted by, for example, $H_a(1)$ for the top priority class or classes, $H_a(2)$ for the second priority class or classes, and so on. Tradeoff relationships (T) imply that, for example, human quality of life can be traded off against the health of ecosystems. It is also possible to consider each life form class at either the individual or species level. For convenience of presentation, this distinction is suppressed in the table. Note that there is no necessary relationship between the value type (I or X), and relationship (H_a , H_l or T). Intrinsic values, for example are not necessarily viewed hierarchically by all individuals. I come back to this point in Section 4 when discussing human value expressions.

Position	Inanimate nature	Plants	Lower animals	Non-human higher animals	Eco-systems	Land-scapes	Human survival	Human quality of life
1	$IH_a(1)$						$IH_a(2)$	$IH_a(3)$
2	$IH_l(2)$					N	IH_a	$IH_l(1)$
3	N	XT	XT	XT	XT	N	IH_a	XT
4	N	XT	XT	$IH_l(2)$	XT	N	IH_a	$XH_l(1)$
5	XT				N		IH_a	XH_l
6	$-IH_a(3)$						$IH_a(1)$	$IH_a(2)$

TABLE 1. Examples of possible human-nature value positions

At one extreme, a person taking Position 1 views the natural world as always more valuable than human survival or human quality of life. Position 6 is the other extreme, where human survival is of most value, followed by human quality of life, and where nature is intrinsically bad. Of course very few people, if any, would hold such positions. Between are for example, Position 3, where human survival is always top priority, but under some circumstances human quality of life can be traded off against environmental quality; or Position 4 where higher animals are considered to have intrinsic value, but other life forms do not. Most of the intermediate positions are not shown in the table. Given: (i) the eight classes of value items; (ii) the possibility that each class is considered to have either intrinsic or instrumental value; and (iii) that each class may be related as either an absolute hierarchy, a limited hierarchy, or through tradeoffs; there are 166,320 possible positions!

Given the lack of a clear direction from philosophers, it is reasonable to accept most if not all positions as being potentially relevant for development and evaluation of environmental policy. Identification of which, if any, positions are adopted by stakeholders is a first step to incorporating such values into decision processes. Such identification is important, because, as discussed below, intrinsic value beliefs are likely to influence the mode by which an individual makes environmental decisions.

3. PSYCHOLOGY AND ENVIRONMENTAL VALUES

In this section I discuss three aspects of psychological research – psychometric attempts to measure the values people hold for natural areas, the notion of value construction, and psychologically based models of human decision processes. With respect to the former, I concentrate on the work designed to explore the extent to which people believe in an intrinsic value in nature.

Value orientation and belief in intrinsic values

Terms such as ‘biocentric’, ‘ecocentric’, ‘biospheric’ values or orientations are used in the psychology literature to refer to an often misconceived notion of an intrinsic value in nature. A typical example is the apparent correspondence assumed between support for the position that humans must live in harmony with nature, and a belief in intrinsic value in nature. Though a high level of correlation might be expected between these two beliefs, one does not necessarily imply the other. I will use ‘biocentric’ to refer to beliefs regarding an intrinsic value associated with individual life forms and species, and ‘ecocentric’ to refer to a wider conception of intrinsic value that includes individual life forms, species and ecosystems (Table 1).

Misunderstanding or inappropriate definition of intrinsic value has led to confusing interpretation of scales such as the New Environmental Paradigm (NEP), and to the development of ‘ecocentric’ scales that do not have content validity. The 15-item NEP scale devised by Dunlap and Van Liere (1978) is the most popular and significant instrument for measurement of general environmental concern. Being sociologists, Dunlap and Van Liere (1978) developed the NEP as a means to test their hypothesis that, in the 1970s, a new social paradigm or ‘worldview’ about the natural environment was emerging. That is, a shift from a dominant anthropocentric view in society that nature exists solely to serve human use and that industrial progress is absolutely desirable, towards a view (new environmental paradigm) that recognises that nature needs to be in balance and natural resources are limited.

Some authors label high NEP scorers as ‘ecocentrists’, even though the NEP scale is not intended to differentiate an anthropocentric from an intrinsic value

HUMANS VALUING NATURE

orientation. Jurowski et al. (1995), for example, used the NEP scale to show that 'anthropocentric' park users would prefer utilisation management strategies while 'ecocentric' users would prefer protection and preservation. The NEP only includes two items relevant for consideration of an intrinsic value in nature, both of which have the potential to identify participants who do not believe in the concept: 'Humans have the right to modify the natural environment to suit their needs', and 'Plants and animals exist primarily to be used by humans'. As noted by Stern et al. (1995b), the NEP scale measures generalised environmental beliefs, and although generally a sound psychometric measure, does not enable identification of distinct ecocentric or biocentric motivations.

Gagnon Thompson and Barton (1994) attempted to develop scales to measure 'ecocentric' and anthropocentric value orientations. Ecocentric individuals were defined as those people who value nature for its own sake and therefore judge that it deserves protection because of its intrinsic value, whereas anthropocentric individuals consider that the environment should be protected because of its value in maintaining or enhancing quality of life for humans. Multiple item scales were used to measure these constructs. The 'ecocentric' scale items were:

- One of the worst things about overpopulation is that many natural areas are getting destroyed for development.
- I can enjoy spending time in natural settings just for the sake of being out in nature.
- Sometimes it makes me sad to see forests cleared for agriculture.
- I prefer wildlife reserves to zoos.
- I need time in nature to be happy.
- Sometimes when I am unhappy I find comfort in nature.
- It makes me sad to see natural environments destroyed.
- Nature is valuable for its own sake.
- Being out in nature is a great stress reducer for me.
- One of the most important reasons to conserve is to preserve wild areas.
- Sometimes animals seem almost human to me.
- Human are as much a part of the ecosystem as other animals.

Only one of these, 'nature is valuable for its own sake', actually requires participants to believe in an intrinsic value in nature. All the other items are also consistent with an anthropocentric value orientation.

Several authors have attempted to develop three-category models of value orientation. These models are often conceptually consistent with the three

grounds for an environmental ethic identified by Merchant (1992): egocentric, homocentric and ecocentric.

Drawing on Maslow's (1954) hierarchy of needs, Axelrod (1994) identified the following value orientations: economic (desire for material well-being); social (need for belonging and acceptance); and universal (self respect from contributing to societal improvement despite personal and social costs). He then examined the influence value orientation had on decisions related to three hypothetical dilemmas, each of which involved a conflict between economic motivations and environmental protection. He found that universal oriented participants were more likely to support environmentally protective actions.

Stern et al. (1993) used a regression model to relate behavioural intentions to the strengths of each value orientation and cognitions regarding the consequences of environmental conditions for valued objects. Cognitions were assessed in relation to personal, social and environmental impacts, and behavioural intentions included various political actions and an expression of willingness to pay for environmental improvements. Strengths of value orientations were inferred from the magnitudes of the regression coefficients. They found that strengths of cognitions about consequences for each type of valued object independently predicted willingness to take political action, but only cognitions about consequences for self reliably predicted willingness to pay. They then suggested that nonmarket economic valuation techniques such as contingent valuation direct participants to focus on the personal well being domain. In other words, questions about behaviours that involve financial commitments focus attention on an economic calculus that arises from an egoistic value orientation.

In follow-up work, Stern and Dietz (1994) used a psychometric approach to develop scales that measured value orientation directly. They identified three variants of biocentric positions: humans should not harm nature because we are part of nature; species have a right to continue; and nature has intrinsic rights broader than mere species survival. Value orientations were assessed using 34 Likert scale items developed from the work of Schwartz (1992, 1994), including several related to an environmental value orientation, such as 'preventing pollution' and 'respecting the earth'. The work showed that willingness to take pro-environmental action is a function of both held values and cognitions, with held values also predicting cognitions. Stern et al. (1995a) also showed that, on the one hand, environmentalists seem particularly willing to believe claims regarding adverse consequences of environmental change for themselves, others and the biosphere, and on the other hand, those opposed to the environmental movement are predisposed to believe contrary claims.

However, the work failed to identify a distinct biospheric value orientation. Stern and Dietz (1994) concluded that there is no clear distinction in public consciousness between valuing nature in itself and valuing nature because of the human benefits it provides. While there is strong support for environmental protection, they claim that the data confirm that in western cultures there is no widespread ecocentric orientation (Gardner and Stern 1996). However, the

HUMANS VALUING NATURE

survey items that were used to generate the data do not, in general, sensitively or even accurately measure biospheric value orientation, if this orientation is taken to imply belief in an intrinsic value in nature.

The work of Kempton et al. (1995) comes closest to using a philosophically supportable notion of intrinsic value in nature. Their survey included the following statements (with which participants had to agree or disagree).

All species have a right to evolve without human interference. If extinction is going to happen, it should happen naturally, not through human actions.

If there is no economic, aesthetic, or other human use for a species, for example, some lichen out in the desert, then there is no reason to worry much about it becoming extinct.

I would rather see a few humans suffer or even be killed than to see human environmental damage cause an entire species to go extinct.

Justice is not just for human beings. We need to be fair to plants and animals as we are towards people.

Our obligation to preserve nature isn't just a responsibility to other people but to the environment itself.

Other species have as much right to be on this earth as we do. Just because we are smarter than other animals doesn't make us better.

These statements concern obligations that humans may have towards nature. Such obligations may arise from belief in an intrinsic value in nature, though the connection between any such belief and responses to the above statements is indirect. Furthermore, their study was done from an anthropological rather than psychometric perspective. They used small and non-representative samples and did not attempt to validate their instrument. Nonetheless, they concluded that Americans' environmental values derive from three orientations: religious, anthropocentric, and biocentric, the latter being living thing centred values that grant nature itself intrinsic rights, particularly the rights of species to continue to exist. Most people agreed with intrinsic rights of nature. Support dropped slightly when there was a conflict posed between the rights of humans and the rights of nature, and declined to a minority view if the rights of nature were placed above human survival. Such positions can be described in terms of the values and relationships shown in Table 1.

There is currently no psychometrically sound instrument that uses a philosophically robust concept of intrinsic value. Developing such an instrument is an important area for future work. It would also be of interest to disaggregate intrinsic value into its various components – humans, higher animals, all animals, plants and collective entities such as species and ecosystems. For example some people might accord intrinsic value only to individual mammals, others might include non-sentient creatures, plants or whole species.

Value construction

In a survey context, assigned values for an unfamiliar natural area are unlikely to exist prior to their measurement, and are often constructed during the measurement process (Gregory et al. 1993). People may have no view on an issue, or have an unformed view that is difficult to express. If the latter, then they may not desire to clarify or more exactly define their values (Fischhoff et al. 1980). Clearly defined values may only be held for items and in contexts with which the person has had previous valuation experience, and has had an opportunity to clarify his or her beliefs through trial and error (Fischhoff 1991). Opportunities to learn about values is crucial in their formation and establishment.

When people do not have clearly defined assigned values and have difficulty in appraising a situation, then a value elicitation procedure is likely to influence the values which are expressed. A characteristic feature of value construction is the relatively large influence of a variety of task, context and personal factors (Schkade and Payne 1994). Surveyors can therefore have a significant effect on the expression of values by the way the problem is defined and the information that is presented. One approach to addressing these problems is simply to present the person with as little information as possible. However, this increases the likelihood that the responses are not answers to the same question the surveyor has in mind. The best approach is an explicit recognition of the researcher's role in the creation and expression of values. This point is taken up again in Section 5.

Psychological models of human decision processes

Of the various psychological models that are applicable to human values in relation to environmental decisions, that of Stern et al. (1995b) seems most useful. Stern and his colleagues (Stern et al. 1993, Stern and Dietz 1994, Stern et al. 1995a, Stern et al. 1995b) developed a socio-psychological model to underpin their extensive research into environmental values and attitudes. Their work explored how an analysis of value orientations (held values) and of beliefs about consequences (cognitions concerning functional values) can account for variation in environmental attitudes (assigned values). Note that I have modified the terminology of Stern et al. in keeping with the definitions given earlier in the paper. Their model draws on the theories of norm activation (Schwartz 1992, 1994) and reasoned action (Ajzen and Fishbein 1977).

The theory of reasoned action is a well researched model of the antecedents of behaviour. In the model, behaviour is determined by intention, which is itself a function of attitude and subjective norms. Antecedents of attitudes and subjective norms are beliefs concerning the behaviour (which influence attitudes) and normative beliefs (which influence subjective norms) (Ajzen and Peterson 1988). Given these relationships, behaviour is predictable from attitude

HUMANS VALUING NATURE

if there is a good correlation between intention and behaviour. Where the behaviour requires possession of resources such as money the degree of volitional control the agent has over the situation can intrude between intention and behaviour. High correspondence between attitude, intention and behaviour relies on consistency of four situational conditions: the action involved, the target of the action, the context in which it occurs and the time of its occurrence (Ajzen and Fishbein 1977, Ajzen and Peterson 1988).

Sheppard et al. (1988) reviewed 87 studies that examined the intention-behaviour relationship and the attitude-subjective norm-intention relationship, and found strong support for the theory, even though some studies actually looked at goals rather than behaviours. Ajzen and Fishbein (1977) reviewed 109 studies examining the intention-behaviour correspondence. Many of the designs for these studies only contained a low or partial correspondence between the contextual and situational elements, and found little correspondence between attitude and behaviour. The 26 studies that did have a good correspondence and used appropriate measures all identified a strong attitude-behaviour relationship. These results provide strong support for the Ajzen-Fishbein conditions – where these conditions were met, attitudes were good predictors of behaviour.

Schwartz's (1992) norm activation model of moral imperatives is used to explain a social-altruism value orientation as the basis of assigned values and behaviour arising from a moral obligation. Norms do not flow directly from general psychological predispositions or the products of socialisation, but must be activated by cognitions specific to environmental conditions. Stern et al. extended this model to postulate that people also are motivated by anticipated adverse consequences for self (egoistic value orientation) and other species or ecological systems (biospheric value orientation). The norm activation model suggests that a person is more likely to adopt pro-environmental behaviour when they are aware of harmful consequences to themselves, other people or elements of the natural world, and when they accept some responsibility for assisting the implementation of the required change. The Stern et al. model introduces worldviews (which I have re-interpreted as value orientations) to precede specific cognitions and assigned values, all of which mediate between held values and behavioural intentions. The model also constructs value orientations as filters for new information or ideas. The model presumes that worldviews are formed from more contemporary political and social experiences whereas values are formed from earlier life experiences.

Elements of the norm activation and reasoned action theories can be combined as shown in Figure 1. Factors at the top of the figure are considered to be the most stable, and applicable across a range of circumstances. Causality generally flows from top to bottom, and is strongest between adjacent elements. However, the model does not exclude the possibility of direct relationships between more distant elements (Stern et al. 1995b).

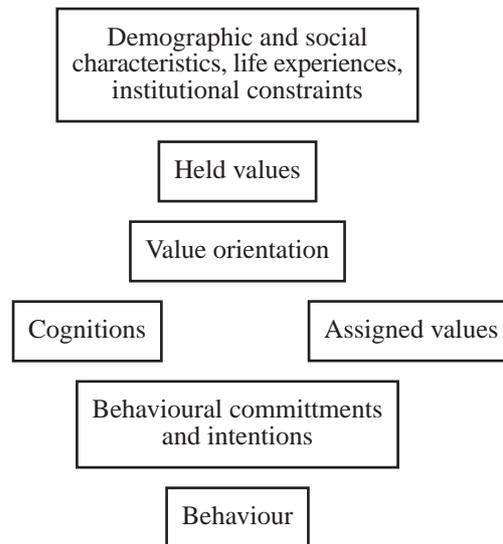


FIGURE 1. Psychological model of antecedents to behaviour (modified from Stern et al. 1995b)

4. ECONOMICS AND VALUE EXPRESSION

In this section I briefly outline points I have made elsewhere (Lockwood 1998a) concerning the relationship between economic methods and the ways in which people might express assigned values. Economists use two classes of techniques to assess individuals' value expressions. Conventional economic approaches have relied on measurements based on behavioural expressions of value. People reveal the value they place on a good or service through transactions they make in a market. For some goods, such as recreation undertaken in natural areas, markets may not exist, but visitors still reveal their value through their willingness to spend time and money in order to gain access to a site. Such revealed preferences for recreation can be measured using indirect market methods based on travel cost. Recently economists have also developed methods based on what people say about, for example, their willingness to pay for nature conservation, rather than what they reveal through their behaviour. Such stated preference (SP) methods are particularly important with respect to natural areas, because many of the potential benefits provided by such areas are not revealed in markets, and

HUMANS VALUING NATURE

cannot be recovered through indirect market techniques. At present, the most significant SP technique is contingent valuation (CV).

Since a valid and widely accepted SP method is required for a complete economic assessment of environmental policy options, there has been an enormous effort by economists, as well as psychologists and other social scientists, directed towards developing CV. Other techniques that have been explored include contingent rating, contingent ranking, paired comparisons and choice modelling (Mitchell and Carson 1989, Morrison et al. 1996). Given some economists' mistrust of stated preferences as meaningful expressions of economic value, research has particularly focused on assessing the validity of CV. Such concerns have led to calls for a widening of the CV research effort beyond economics:

effective use of the CV method [and by implication other SP approaches] in estimating the values individuals place on improvements in specific aspects of environmental resources ... requires a model of how individuals report choices for proposed objects of choice in response to alternative framing schemes. Clearly, such an effort extends beyond the confines of economics to psychology and other social sciences (Smith 1996, p. 18).

Other social scientists such as Sagoff (1988a) have raised more fundamental issues, arguing that values which are the subject of a typical CV survey are not necessarily economic in nature. To resolve this issue, an understanding of the various ways in which individuals express values is required.

Held or ascribed values can be rationally expressed in three ways (Lockwood 1997). Two alternatives may be weakly comparable, in that their values may be regarded as comparable but incommensurate (O'Neill 1993, Beckerman and Pasek 1997). A person adopting this mode of expression will choose between two alternatives without being able rank them according to their relative value. Strongly comparable alternatives, on the other hand, can be completely ranked on the basis of their value. Individuals can be said to have preferences over the alternatives if their value expressions are strongly comparable. Strong comparability either allows for trade-offs to be made between different quantities and qualities of each alternative (exchange preferences), or exclude the possibility of such trade-offs (noncompensatory preferences).

A person who makes decisions according to noncompensatory preferences can rank alternatives on the basis of their relative value, but is unwilling to make trade-offs between them. Noncompensatory structures associated with particular levels of an environmental good define preference discontinuities or thresholds below which environmental values should not, from an individual's perspective, be traded for other things of value such as improvements in economic welfare. Most work on noncompensatory modes of value expression has focussed on lexicographic preferences (Edwards 1986, Opaluch and Segerson 1989, Stevens et al. 1991, Mazzotta and Opaluch 1995, Spash and Hanley 1995,

Lockwood 1996, Stern 1997). Referring back to the terminology used in Table 1, lexicographic preferences indicate that a hierarchical preference relationship exists between two valued entities.

Economic methods such as CV rely on the willingness and ability of survey participants to express their values according to exchange preferences. Exchange preferences satisfy the axioms of completeness, reflexivity, transitivity, nonsatiation and continuity that provide the theoretical underpinning of economic welfare measures obtained from CV. The continuity condition means that any change in the quantity or quality of one alternative can be compensated for by a change in another alternative. With noncompensatory preferences, this continuity condition does not hold.

Two aspects of natural areas likely to attract noncompensatory preference expressions are cognitions concerning essential functional values, and held values concerning an intrinsic value in nature. A person may consider certain functional relationships as essential for supporting themselves, other people and/or other elements of the natural world. Such essential functional values have no substitutes, and cannot be traded for other goods or services. It is perfectly rational to respond to choices involving such cognitions through some hierarchical and noncompensatory expression such as lexicographic preferences. Similarly, a person may not be willing to make trade-offs between held values associated with an intrinsic value in nature and other valued entities or items.

It is therefore important to identify each individuals' preferred mode of value expression, so that an appropriate assessment method can be used. This is the only way to ensure that all participants in an SP survey either express their values according to exchange preferences, or are able to separate noncompensatory from compensatory preferences. In general, SP surveys concerning natural areas will often involve essential services or intrinsic values that may well be considered non-tradeable by some participants. However, current CV instruments do not give participants any opportunity to explore different ways of expressing their values. In the absence of any other option, participants may offer an economic value response simply in order to express a view about an issue. Willingness to pay is the only means CV survey participants have to communicate their values to the analyst, so those with noncompensatory values must either stay mute, or offer a response that is against their preferred mode of value expression. This may explain the apparently unreasonably high willingness to pay values and 'protest zeros' often encountered in SP survey responses.

That is not to suggest that there is no place for SP surveys in evaluating environmental policy options. As indicated above, some form of SP economic evaluation is required for a comprehensive evaluation of alternatives. CV, for example, could provide a legitimate partial assessment, as long as the data are not contaminated by attempts by survey participants to express noncompensatory values. Further refinement of SP survey approaches is required to ensure that this does not occur. For example, Lockwood (1998b) used the psychometric method of paired comparisons to construct preference maps that enabled identification

HUMANS VALUING NATURE

of exchange and lexicographic preferences. Such approaches could be used to ensure that only participants with exchange preferences are asked about their willingness to pay for environmental goods.

5. SYNTHESIS

A synthesis of the ideas presented in Sections 2, 3 and 4 is given in Figure 2. Values and value expressions are located in the context of individuals making choices related to an environmental policy issue. Held values are developed under the influence of social norms and individual socioeconomic attributes.

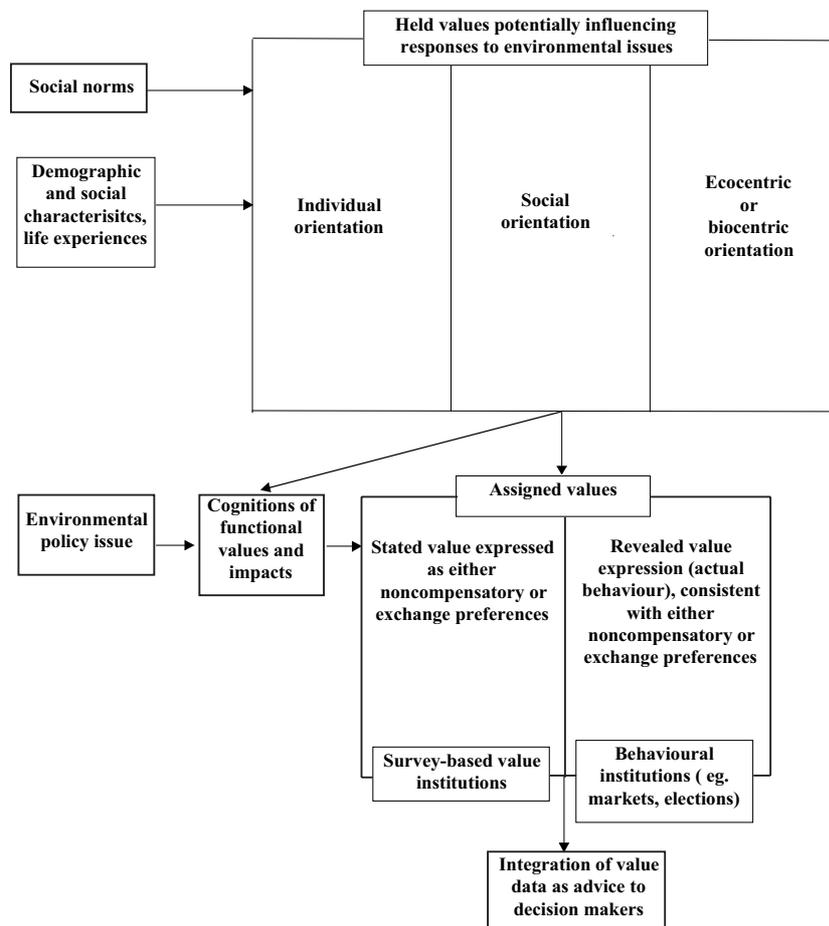


FIGURE 2. Relationships between values, assessment, and environmental policy

Three held value orientations are recognised: individual, social and eco- or biocentric. Cognitions related to functional values, and impacts of the proposed policy on these values, are influenced by held values, and influence construction and expression of assigned values.

For values to be considered in a decision they must be expressed in some way. Value expression takes place in a particular institutional context. Stated expressions of assigned value include hypothetical commitments and behavioural intentions. For example, assigned values might be expressed as a willingness to pay. Assigned value may also be revealed through actual behaviour via such institutions as the market place or a political election. Both stated and revealed value expression may be structured as either noncompensatory or exchange preferences.

The institutional context will influence the nature and content of the value expressions. Consider, for example, three institutions – voting in a democratic election, engaging with a market, and responding to a SP survey. Institutions such as the market provide evidence of value expressions as revealed through actual behaviour. SP surveys elicit stated value expressions in response to a hypothetical market. Both these institutions assume the value expressions to be consistent with neoclassical economic value theory. An institution such as a referendum makes fewer assumptions about the nature of the underlying values, but permits only ‘yes’ or ‘no’ responses. Such limitations imposed by the institution will encourage participants to construct their values within those limitations. For example, an *a priori* institutional assumption that values are economic in nature will tend to direct participants to construct their values in a way that is not necessarily in accordance with their preferred mode of expression (which may be noncompensatory). It is desirable that value institutions are employed to maximise the opportunity for participants to express assigned values in a manner which is consistent with their held values and cognitions concerning the issue. As noted above, cognitions regarding the essential nature of some functional values, or beliefs concerning an intrinsic value in nature, may influence the manner in which assigned values are constructed and expressed.

The validation and operationalisation of the model illustrated in Figure 2 will require coordinated application of a number of methodologies, and perhaps the development of new methods or modifications to existing approaches. Given: (i) the difficult and possibly unconsolidated nature of the values involved; (ii) the likelihood that the valuation process encompasses several held and assigned value types; (iii) the impossibility of external validation for many of the relevant value types; and (iv) the potential importance survey results might have for informing major environmental decisions, it is desirable that several measures of the relevant value constructs are obtained. According to psychometric theory, no single item is a pure measure of the construct of interest, since each reflects error, some attributable to other irrelevant constructs and some to random fluctuations. Therefore, constructs are best measured by a number of different

HUMANS VALUING NATURE

items that converge on the theoretical meaning of the construct, while diverging on the irrelevant aspects that are being unavoidably assessed (Braithwaite and Scott 1991).

A coordinated and multifaceted methodology could involve content analysis of verbal protocols, structured interviews, psychometric value scales, stated preference assessment and behavioural analysis. Structural equation modelling could be used to analyse relationships between the various components in the model.

The model provides a framework for testing the content validity of economic assessment methods, particularly stated preference approaches, as well as identifying the appropriate scope for economic evaluation. The model explicitly recognises that not all relevant values will be expressed in a manner that is appropriate for economic assessment. It therefore provides an opportunity for testing the hypotheses that people are likely to express (i) beliefs concerning an intrinsic value in nature, or (ii) cognitions regarding the essential nature of functional values, through noncompensatory preferences. In order to research the first hypothesis, a scale is required that can measure the degree to which individuals consider that there is an intrinsic value in nature. As note in Section 3, scales hitherto developed by psychologists do not have construct validity in relation to such intrinsic value. An instrument that was able to locate individuals on a scale according to their beliefs regarding intrinsic and instrumental values should also take into account the range of possible positions that can be adopted (Table 1).

Designing a procedure that incorporates all the elements indicated in Figure 2 is of course an enormous challenge – some may say an unrealistic one. However, without such an integrated approach to assessing environmental policy options, the limitations and inadequacies of current assessment practice will remain. These include failure to consider the entire range of relevant values; potentially inappropriate structural assumptions imposed by particular valuation institutions; widespread mistrust among non-economists (and some economists) of economic assessment methods; and lack of support among decision makers, at least in Australia, for formal valuation processes such as CV.

These issues demand that longer and more complex procedures must be used to assess individuals' value expressions. Unfortunately, extended assessment would probably make the costs of surveying large samples of stakeholders prohibitive. This compromises one of the major advantages SP surveys have over the unaided political process. The direct capture of representative samples of values can help mitigate the biases inherent in decisions solely formed on the basis of indirect representation of those values through the political process, in particular those arising from the privileged access to decision makers that certain stakeholder groups often enjoy.

Furthermore extended survey processes will require considerable commitment from participants, as well as placing additional cognitive burdens on them.

More demanding processes will probably require that small samples of stakeholders are paid to participate. An extended version of Sagoff's (1988b) jury panel, with the addition of formal psychometric and SP survey components, may offer a compromise between representativeness and practicality. Again, this is an area that warrants further research.

The approach recommended in this paper involves tackling the validation and value identification problems from a number of directions. The model summarised in Figure 2 provides a framework that can guide and integrate efforts to develop valuation methods that enable participants to construct and express their assigned values in a manner consistent with their underlying beliefs. The framework is intended to assist efforts to develop a theoretically robust, credible and widely accepted means of assessing individuals' values associated with environmental policy decisions.

NOTES

I appreciate the comments made by an anonymous referee, Kreg Lindberg and Greer Blanch on an earlier draft of this paper. Greer Blanch also assisted with compilation of the material on environmental psychology.

¹ Attempts to justify an intrinsic value in nature include Regan (1981), Rolston (1983), Pluhar (1983), Callicott (1985), Armstrong-Buck (1986), Haught (1986), Taylor (1986), Johnson (1992) and Plumwood (1993). Challenges to such attempts have been mounted by, for example, Weston (1985), Cheney (1989) and Grey (1993).

² Rolston (1975), Godfrey-Smith (1979) and Regan (1981) considered that an ethic that provides humans with sufficient moral guidance with respect to natural areas must be grounded in some notion of intrinsic value in nature. Alternative views are offered by, for example, Katz (1987) and Green (1996).

³ An environmental ethic does not necessarily override other moral considerations. Callicott (1987) regarded moral considerability as having an hierarchical aspect in which obligations more central to the valuing subject can be given priority over more distant obligations. Similarly, the annular model of Routley and Routley (1980) comprised nested zones based on distinctions derived from entities as objects of moral concern, welfare having objects, preference havens, rights holders, obligation holders, responsibility bearers and the contractually committed. As pointed out by Warren (1990), a value hierarchy does not necessarily support unqualified subordination of the 'lower' by the 'higher' – for subordination a condition of domination is also required. Thus human welfare should not necessarily be sacrificed for the health of ecosystems. This of course gives rise to further problems – at what point does the hierarchical relationship take precedence? Is the threshold at the point where human life is under threat, or merely where some level of human well-being is at issue? If the latter, at what level of human comfort and wealth do we judge that we relinquish the more proximate moral duty for the more distant environmental concern? The answers individuals give to such questions in relation to a particular environmental issue can be assessed using methods such as those suggested in Sections 4 and 5.

HUMANS VALUING NATURE

REFERENCES

- Ajzen, I., and Fishbein, M. 1977. 'Attitude-behaviour relations: a theoretical analysis and review of empirical research', *Psychological Bulletin* **84**: 888-918.
- Ajzen, I., and Peterson, G.L. 1988. 'Contingent value measurement: the price of everything and the value of nothing?', in *Amenity Resource Evaluation: Integrating Economics with other Disciplines*, edited by G.L. Peterson, B.L. Driver, R. Gregory, pp. 65-76. Venture, State College.
- Armstrong-Buck, S. 1986. 'Whitehead's metaphysical system as a foundation for environmental ethics', *Environmental Ethics* **8**: 241-259.
- Axelrod, L.J. 1994. 'Balancing personal needs with environmental preservation: identifying the values that guide decisions in ecological dilemmas', *Journal of Social Issues* **50**: 85-104.
- Beckerman, W., and Pasek, J. 1997. 'Plural values and environmental valuation', *Environmental Values* **6**: 65-86.
- Braithwaite, V.A., and Scott, W.A. 1991. 'Values', in *Measures of Personality and Social Psychological Attitudes*, edited by J.P. Robinson, P.R. Shaver, L.S. Wrightsman, pp. 661-749. New York: Academic Press.
- Brennan, A. 1992. 'Moral pluralism and the environment', *Environmental Values* **1**: 15-33.
- Brown, T.C. 1984. 'The concept of value in resource allocation', *Land Economics* **60**: 231-245.
- Callicott, J.B. 1985. 'Intrinsic value, quantum theory, and environmental ethics', *Environmental Ethics* **7**: 257-275.
- Callicott, J.B. 1986. 'On the intrinsic value of nonhuman species', in *The Preservation of Species: The Value of Biological Diversity*, edited by B.G. Norton, pp. 138-172. Princeton: Princeton University Press.
- Callicott, J.B. 1987. 'The conceptual foundations of the land ethic', in *Companion to A Sand Country Almanac: interpretive and critical essays*, edited by J.B. Callicott, pp. 186-217. Madison: University of Wisconsin Press.
- Cheney, J. 1989. 'Postmodern environmental ethics: ethics as bioregional narrative', *Environmental Ethics* **11**: 117-134.
- Dunlap, R.E., and Van Liere, K. 1978. 'The 'new environmental paradigm'', *Journal of Environmental Education* **9**: 10-19.
- Edwards, S.F. 1986. 'Ethical preferences and the assessment of existence values: does the neoclassical model fit?', *Northeastern Journal of Agricultural & Resource Economics* **15**: 145-150.
- Faber, M., Manstetten, R., and Proops, J. 1996. *Ecological Economics: Concepts and Methods*. Cheltenham: Edward Elgar.
- Fischhoff, B. 1991. 'Value elicitation: is there anything there?', *American Psychologist* **46**: 835-847.
- Fischhoff, B., Slovic, P., and Lichtenstein, S. 1980. 'Knowing what you want: measuring labile values', in *Cognitive Processes in Choice and Decision Behavior*, edited by T.S. Wallsten, pp. 117-141. Hillsdale: Lawrence Erlbaum Associates.
- Gagnon Thompson, S.C., and Barton, M.A. 1994. 'Ecocentric and anthropocentric attitudes toward the environment', *Journal of Environmental Psychology* **14**: 149-157.
- Gardner, G.T., and Stern, P.C. 1996. *Environmental Problems and Human Behavior*. Boston: Allyn and Bacon.

- Godfrey-Smith, W. 1979. 'The value of wilderness', *Environmental Ethics* **1**: 309-319.
- Green, K. 1996. 'Two distinctions in environmental goodness', *Environmental Values* **5**: 31-46.
- Gregory, R., Lichtenstein, S., and Slovic, P. 1993. 'Valuing environmental resources: a constructive approach', *Journal of Risk and Uncertainty* **7**: 177-197.
- Grey, W. 1993. 'Anthropocentrism and deep ecology', *Australasian Journal of Philosophy* **71**: 463-475.
- Haight, J.F. 1986. 'The emergent environment and the problem of cosmic purpose', *Environmental Ethics* **8**: 139-150.
- Johnson, L.E. 1992. 'Toward the moral considerability of species and ecosystems', *Environmental Ethics* **14**: 145-155.
- Jurowski, C., Uysal, M., Williams, D.R. and Noe, F.P. 1995. 'An examination of preferences and evaluations of visitors based on environmental attitudes: Biscayne Bay National Park', *Journal of Sustainable Tourism* **3**: 73-86.
- Katz, E. 1987. 'Searching for intrinsic value: pragmatism and despair in environmental ethics', *Environmental Ethics* **9**: 231-241.
- Kempton, W. Boster, J.S., and Hartley, J.A. 1995. *Environmental Values in American Culture*. Cambridge MA: MIT Press.
- Lockwood, M. 1996. 'Noncompensatory preference structures in nonmarket valuation of natural area policy', *Australian Journal of Agricultural Economics* **40**: 1-17.
- Lockwood, M. 1997. 'Integrated value theory for natural areas', *Ecological Economics* **20**: 83-93.
- Lockwood, M. 1998a. 'Contribution of contingent valuation and other stated preference methods to evaluation of environmental policy', *Australian Economic Papers* **37**: 292-310.
- Lockwood, M. 1998b. 'Integrated value assessment using paired comparisons', *Ecological Economics* **25**: 73-87.
- Maslow, A.H. 1954. *Motivation and Personality*. Harper & Row, New York.
- Mazzotta, M.J., and Opaluch, J.J. 1995. 'Decision making when choices are complex: a test of Heiner's hypothesis', *Land Economics* **71**: 500-515.
- Merchant, C. 1992. *Radical Ecology: The Search for a Livable World*. New York: Routledge.
- Mitchell, R.C., and Carson, R.T. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington: Resources for the Future.
- Morrison, M.D., Blamey, R.K., Bennett, J.W., Louviere, J.J. 1996. *A Comparison of Stated Preference Techniques for Estimating Environmental Values*. Choice Modelling Research Report No. 1, University of New South Wales, Canberra.
- O'Neill, J. 1992. 'The varieties of intrinsic value', *Monist* **75**: 119-133.
- O'Neill, J. 1993. *Ecology, Policy and Politics: Human Wellbeing and the Natural World*. London: Routledge.
- Opaluch, J.J., and Segerson, K. 1989. 'Rational roots of 'irrational' behaviour', *North-eastern Journal of Agricultural and Resource Economics* **18**: 81-95.
- Pluhar, E. 1983. 'The justification of an environmental ethic', *Environmental Ethics* **5**: 47-61.
- Plumwood, V. 1993. *Feminism and the Mastery of Nature*. London, Routledge.
- Regan, T. 1981 'On the nature and possibility of an environmental ethic', *Environmental Ethics* **3**: 19: 34.
- Rokeach, M. 1973. *The Nature of Human Values*. New York: Free Press.
- Rolston, H. 1975. 'Is there an ecological ethic?', *Ethics* **85**: 93-109.

HUMANS VALUING NATURE

- Rolston, H. 1983. 'Values gone wild', *Inquiry* **26**: 181-207.
- Rolston, H. 1989. *Philosophy Gone Wild*. New York: Prometheus.
- Routley, R., and Routley, V. 1980. 'Human chauvinism and environmental ethics', in *Environmental Philosophy*, edited by D.A. Mannison, M.A. McRobbie, R. Routley, pp. 96-189. Department of Philosophy Monograph Series 2, ANU, Canberra.
- Sagoff, M. 1988a. 'Some problems with environmental economics', *Environmental Ethics* **10**: 55-74.
- Sagoff, M. 1988b. *The Economy of the Earth: Philosophy, Law, and the Environment*. Cambridge: Cambridge University Press.
- Schkade, D.A., and Payne, J.W. 1994. 'How people respond to contingent valuation questions: a verbal protocol analysis of willingness to pay for an environmental regulation', *Journal of Environmental Economics and Management* **26**: 88-109.
- Schwartz, S.H. 1992. 'Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries', in *Advances in Experimental Social Psychology (Volume 25)* edited by M. Zanna, pp. 1-63. Orlando: Academic Press.
- Schwartz, S.H. 1994. 'Are there universal aspects in the structure and contents of human values?', *Journal of Social Issues* **50**: 19-45.
- Seligman, C., Syme, G.J., and Gilchrist, R. 1994. 'The role of values and ethical principles in judgements of environmental dilemmas', *Journal of Social Issues* **50**: 105-119.
- Sheppard, B.H., Hartwick, J., and Warshaw, P.R. 1988. 'The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research', *Journal of Consumer Research* **15**: 325-343.
- Smith, V.K. 1996. 'Resource evaluation at the crossroads', in *Estimating Economic Values for Nature: Methods for Non-market Valuation*, edited by V.K. Smith, pp. 3-41. Cheltenham: Edward Elgar.
- Spash, C.L., and Hanley, N. 1995. 'Preferences, information and biodiversity preservation', *Ecological Economics* **12**: 191-208.
- Stern, D.I. 1997. 'Limits to substitution and irreversibility in production and consumption: a neoclassical interpretation of ecological economics', *Ecological Economics* **21**: 197-215.
- Stern, P.C., Dietz, T., and Kalof, L. 1993. 'Value orientations, gender and environmental concern', *Environment and Behavior* **25**: 322-348.
- Stern, P.C., Dietz, T. 1994. 'The value basis of environmental concern', *Journal of Social Issues* **50**: 65-84.
- Stern, P.C., Dietz, T., Kalof, L., and Guagnano, G. A. 1995a. 'Values, beliefs and proenvironmental action: attitude formation toward emergent attitude objects', *Journal of Applied Social Psychology* **25**: 1611-1636.
- Stern, P.C., Dietz, T., and Guagnano, G. A. 1995b. 'The new ecological paradigm in social-psychological context', *Environment and Behavior* **27**: 723-743.
- Stevens, T.H., Echeverria, J., Glass, R.J., Hager, T., and More, T.A. 1991. 'Measuring the existence value of wildlife: what do CVM estimates really show?', *Land Economics* **67**: 390-400.
- Taylor, P.W. 1986. *Respect for Nature: A Theory of Environmental Ethics*. Princeton: Princeton University Press.
- Warren, K.J. 1990. 'The power and promise of ecological feminism', *Environmental Ethics* **12**: 125-145.
- Weston, A. 1985. 'Beyond intrinsic value: pragmatism in environmental ethics', *Environmental Ethics* **7**: 321-339.