

How Much is that Ecosystem in the Window? The One with the Bio-diverse Trail

CLIVE L. SPASH

CSIRO, Sustainable Ecosystems Division
GPO Box 284, Canberra
ACT 2601, Australia
<http://www.clivespash.org>

ABSTRACT

Ecosystems are increasingly characterised as goods and services to allow their valuation in monetary terms. This follows an orthodox economic approach to environmental values, but is also being undertaken by ecologists and conservation biologists. There then appears a lack of clarity and debate as to the model of human behaviour, specific values and decision process being adopted. Arguments for ecosystems service valuation are critically appraised and the case for a model leading to value pluralism is presented. The outcome is to identify the need for value articulating processes which involve open deliberative judgment rather than instantaneously stated preferences, concealed expert opinion and global cost-benefit analysis.

KEYWORDS

Biodiversity, ecosystems services, economic valuation, judgement

INTRODUCTION

There has been an observable increase in the desire, especially of conservation biologists and ecologists, for concepts such as biodiversity and ecosystems functions to be expressed as part of a mainstream economic philosophy of value (McCauley, 2006). In recent years the need for monetary valuation of ecosystems has been voiced internationally.¹ In 2005 the National Research Council (NRC) in the USA published a report on the subject commissioned from six economists, four ecologists and one philosopher; aiming for 'better environmental decision-making' they adopted a narrow 'total economic value' approach (Heal et al., 2005). In 2007 the G8 and five other industrialising nations proposed a global cost-benefit assessment of biodiversity loss called the 'Potsdam Initiative – Biological Diversity 2010'.² Under a clause entitled 'The economic significance of the global loss of biological diversity', the parties stated:

In a global study we will initiate the process of analysing the global economic benefit of biological diversity, the costs of the loss of biodiversity and the failure to take protective measures versus the costs of effective conservation.

This study aims to emulate Stern's climate change report,³ but apparently has neglected critiques of that report and other such global environmental cost-benefit analyses (see Spash, 2002a; 2007a; 2007b). Some published studies – notably led by non-economists and appearing in natural science journals – claim to have already estimated the monetary value of the World's ecosystems (Costanza et al., 1997) and all remaining wild Nature (Balmford et al., 2002). The main approach consists of averaging and summing values from various contingent valuation method studies. Groups in the USA (e.g., Batker et al., 2005), and elsewhere, are trying to formalise such ecosystem services 'valuation' for inclusion in public policy decision processes.

One major thrust of all this work is linked to a general movement called 'benefit transfer' which aims for common use in policy of values taken from original monetary valuation studies but applied to represent the value of other sites, entities or environmental changes, as political necessity dictates (Abt Associates Inc, 2005). For example, the mean willingness to pay for wetland 'goods and services' of UK respondents to a stated preference survey may be averaged to a per hectare value and transferred to North America, or visa versa. More sophisticated approaches try to use a transfer function, although these are almost impossible to employ with any validity, due to the prevalence of non-economic and socio-psychological factors for which there is a lack of data across populations (Brouwer and Spanninks, 1999). Regardless of sophistication, these transfers suffer from serious practical and methodological problems (Spash and Vatn, 2006), but are defended as pragmatic. The numbers are attractive because they appear simple to derive and seem to place a 'market value' on a wide scope and scale of things. However, the stated preference methods (i.e., contingent

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

valuation and choice experiments) which mainly underlie these value transfers are themselves deceptively simple and the numbers they produce may not be all that is claimed, even before such transfers distort them out of context.

The problems can be taken on two levels. There are the concerns of economists over such things as the use of statistical techniques, cross validation, incentive compatible mechanisms, strategic behaviour, information provision, survey design and treatment of different bid categories (Spash, 2008a). Then there are the concerns of political scientists, applied philosophers and heterodox economists, amongst others, over the role and meaning of the mainstream economic approach. Thus, Holland (1997: 484) notes the difference between internal critiques, where refinements and scientific advance are assumed an adequate response, and principled arguments, which point toward the need for alternative approaches. He identifies six principled arguments in the literature which question the applicability of environmental cost-benefit analysis (CBA) and stated preferences in particular: (i) a variety of ethical commitments exist which cannot be made commensurable; (ii) methodological individualism inadequately addresses the collective values which constitute environmental goods and bads; (iii) the market approach to value elicitation is incapable of recognising certain values and precludes their expression; (iv) social context is inadequately addressed because the method is too abstract; (v) the process of economic valuation suppresses articulation and active thinking by assuming values are pre-formed; (vi) environmental values falling within the domain of political action are inappropriately addressed as preferences.

These principled arguments appear to fall into two broad categories. First are those concerning what constitutes environmental values, raising such issues as incommensurability, pluralism vs. monism, community vs. individualism, utilitarianism vs. deontology, objective truth vs. subjective judgement. Second are those relating to the appropriate process whereby values should be expressed, namely markets vs. politics, group vs. individual, hypothetical vs. actual, reflective deliberation vs. instant reaction, and who such processes should represent (experts, vested interests, public) and how (statistically, politically). The first set of arguments inevitably feed into the second, while, especially for an empirically based science, application of the second should influence and inform the first. That is, belief in say monism leads to design of processes using a single numeraire, but when incommensurable and plural values arise and are recognised in the value-articulating process these should bring into question the belief in and relevance of monism.

A contention of this paper is that there is a stark disconnect between environmental values as constituted in mainstream economics and as recognised by wider society and other disciplines. Yet some of those other disciplines, such as ecology, are actually employing a broadly defined economic approach in the apparent belief that this is a pragmatic solution to the neglect of their principled concerns over the loss of wild Nature and biodiversity. The ecologists' prag-

matic argument in support of ecosystem valuation is critically appraised in the next section, along with those arising in politics and from orthodox economics. One result, pursued in the ensuing section, is to question the model of human motivation and behaviour underlying orthodox economics and to point to alternative, more empirically accurate, models. This leads, in the final section, to recognition of the need for variety in value-articulating institutions: so enabling a more comprehensive and complex picture of how humans value the environment. In particular, respecting plural values brings out the contrast between a process of judgment through deliberation and an appeal to instantaneously stated preferences. The potential role for monetary calculations is not excluded from the former, but put in a very different light from use in the latter and by those currently valuing ecosystems as goods and services.

THE RAISON D'ÊTRE OF ECOSYSTEM VALUATION

A variety of arguments are put forward as to the importance of placing monetary values on aspects of the environment and human induced changes in it. Three are considered here:

1. Pragmatism or political realism, i.e. holding the view that this is what is necessary to communicate in the 'real' world, often combined with an expressed belief that there are no better alternatives – used by natural scientist such as ecologists.
2. Political and economic idealism: arising from a free-market, neo-liberal political philosophy; this sees the expression of all values via the market as the way the world should be run – used by industrialists and political leaders.
3. Scientific empiricism: arguing that such values reflect truth and in particular the true preferences of individuals – used by orthodox economists.

The groups identified with each are merely examples of some common supporters, rather than constitutive of the position or indeed a definitive position of the group. The positions may readily be combined and treated as complementary. Alternatively, for some, they may be regarded as highly distinct, for example, reluctant supporters of the ecosystems services valuation project may adopt it due to argument 1 while strongly rejecting 2 and 3.

Pragmatism or political realism

Calculating the value in money terms of the world's ecosystems, or less grandly, small parts thereof, is meant to show how important these things are for humanity. As the NRC report states: 'Failure to include some measure of the value

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

of ecosystem services in benefit-cost calculations will implicitly assign them a value of zero.' (Heal et al., 2005: 5). The pragmatic 'solution' is to fill-in the apparently missing value in the accounts of firms and consumers. This places money in the role of key means to communication. Money's dominant role in coordinating human exchange, trade and market activities is seen as a fundamental reality, the success of which makes application in all other spheres of human activity almost inevitable. Money may then be described as some neutral form of measure, by which all things can be made comparable, enabling trade-offs e.g. between preservation and development.

Money has a fundamental influence on human perception of 'value' and as a focus can be used to exclude policy options and non-market considerations. Recognising this point is important because of the assumption that using monetary valuation can only help protect the environment. Politicians concerned with traditional economic growth have a different agenda and see exposing ecosystems values as important because they indicate from where more commodities can be extracted and how ecosystems can be exploited. As the German Environment Minister stated, the week before release of the Potsdam Initiative: 'The 'biodiversity treasure trove' provides the global economy with an invaluable and extensive potential for innovative products and processes that is still widely untapped'.⁴ That monetary valuation may have nothing to do with biodiversity or ecosystem protection seems clear for economists who are concerned with trade-offs and calculating optimal extinction rates (Spash, 1995), but may be a surprise for some ecologists.

There is, of course, something contradictory in calculating a price for something you do not wish to trade. Perhaps realising this, one ecological advocate of ecosystems valuation has tried to claim that: 'Valuing ecosystem services is not identical to commodifying them for trade in private markets.' (Costanza, 2006: 749). That there is no commoditisation, or market-like exchange, implicit in ecosystem services valuation is plainly wrong.⁵ As the NRC report states: 'The use of a dollar metric for quantifying values is based on the assumption that individuals are willing to trade the ecological service being valued for more of other goods and services represented by the metric (more dollars).' (Heal et al., 2005: 5). This requires converting ecosystems functions into goods and services, and is clearly identical in approach to a model for trading commodities in a market. Other ecosystem service advocates are more open about the proactive market orientation of their position: 'Markets do not develop spontaneously or predictably, so market design is important to effectiveness and equity. Commodifying ecosystem services can be difficult.' (Brauman et al., 2007: 86).

Human ingenuity can create markets in all sorts of things and establish rules by which they are traded. Slavery provides a good example as here there is a market price, a willingness to pay and acceptance of payment, and a given monetary value. Yet who would say this payment reflects the worth of the human life involved? Clearly willingness to pay (or accept), whether actual or

intended, fails to constitute a universal encapsulation of all value, contrary to the oft cited totality of economic values.⁶ For example, say you earn an annual income which is the trade price for your labour, few would presumably claim the value of their life is merely annual income times life expectancy! Yet this is what is being suggested for life support systems.

The 'total value' in economic terms of, say, oxygen is the value human's place on their own survival. That fresh air lacks a price does not mean it has no value, merely that it is not a traded commodity and we govern its use via non-market institutions. Differentiation is actually made in economics between value in totality and market price or marginal value. This is referenced as the 'diamond water paradox': the total value of water exceeds by far that of diamonds but the latter has a high price and the former a low one. The explanation is that economic trade prices concern relative values in exchange set by the marginal units sold. The point here is that some ecosystems services literature, such as Costanza et al. (1997), confuses matters by taking marginal values, doing some calculations and claiming to have found the total worth of entire ecosystems. While economic welfare theory only tries to justify analysis of marginal changes, the spread of CBA means in practice (even writing-off those who claim to calculate values for the world) whole ecosystems and species are being 'valued' and theoretical validity blown to the wind.

The more begrudging supporters of ecosystem services valuation may admit to problems, with spreading the market model, and limitations, in using economics to address the range of values at stake as systems and biological diversity are lost. They may then justify calculated monetary values as just one input to a decision process. More zealous advocates use this justification to ignore alternatives and defend their concentration on a narrow approach. Environmental economists advocating CBA, when confronted by its inadequacies, also use this defence. For example, Hanley (1995: 51–52) confesses: 'It is certainly my view that CBA is unsuitable as a stand-alone decision mechanism, but it does remain useful as one input to decisions over environmental management'; but then, somewhat contradicting himself, states: 'No other stand-alone decision mechanism exists which is better in every respect to CBA', and advocates its use over all alternatives. Authors of the NRC report also recognise economic valuation methods as 'providing useful information in support of improved environmental decision-making' (Heal et al., 2005: 4), not as the sole decision criterion. They also note 'that all kinds of value may ultimately contribute to decisions regarding ecosystem use, preservation, or restoration' (Heal et al., 2005: 33). However, their fundamental position is that:

Although economic valuation does not capture all sources or types of value...it is much broader than usually presumed. ... The broad array of values included under this approach is captured using the total economic value (TEV) framework to identify sources of this value. Use of the TEV framework helps to provide a

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

checklist of potential impacts and effects that need to be considered in valuing ecosystem services as comprehensively as possible. (Heal et al., 2005: 5)

In one paragraph they have moved from an incomplete picture to a comprehensive economic value, which then forms their exclusive focus of attention.⁷

The problem is found across the ecosystems and economic valuation literature, namely a lack of attention given to the 'other values', to which authors allude, and the overall decision process in which values are included as 'inputs'. If economic values are just one input then what are the others? There appears an admission that not all values can be monetised. However, perplexingly, this literature fails to address the principled reasons why some values are monetised and others are not, and instead prefers to discuss internal critiques. The admission that there are other inputs to a decision process appears to be an acceptance of both plural values and that 'real' decisions involve, whether implicitly or explicitly, some kind of multiple criteria decision process. However, this logical conclusion never seems to be reached. Neither is any attention paid to who in the overall process 'makes decisions' or how.

Political and economic idealism

Political and economic idealism is equated here with a belief in the free market system as the best method of valuation and resource allocation. Accordingly, the argument goes, ecosystems should be regarded as goods and services so that their resources can be efficiently allocated along with all other commodities. The push to privatise and create markets fits well with the view that there is a 'biodiversity treasure trove' awaiting to be exploited. Good use is not being made of these resources because they are untapped. Worse, they may be lost unless markets are established. Endangered species should be traded to preserve them. People should pay for all the uses they make of the environment as a waste sink. A competitive market system, or as close as can be achieved, should be spread to every action. The free-market idealist sighs exclaiming: 'If only everything in the world had a private property right over it and all property could be excluded from use by others then resources might be allocated efficiently, nay optimally!'. A price would exist for everything. Indeed the project is well underway as humanity starts to allocate rights over the very elemental substances from which matter is constituted i.e., carbon. Markets have come a long way in a few centuries of development (Polanyi, 1944).

The idealist position often appeals to externality theory in economics. The core idea of externality theory is that unsuspecting firms and consumers unintentionally create harms and benefits for others. The result is inefficient resource allocation because harms will proliferate while benefits will be suppressed. There will be too much air pollution because there is no charge for using the air as a waste sink. There will be too few rose gardens because passers-by get to enjoy the sight and smell for free. This is the logic taken from Pigou (1920) and

developed by environmental economists, as popularly expressed, for example, by Pearce, Markandya and Barbier (1989), or more recently used as justification for global CBA (see Spash, 2007a).

Thus, the idealist claims that the market value approach allows people to have 'dollar votes' making them able to express the strength of their commitment. The hypothetical market shows people can state preferences and are willing to pay money so there may be a short step to attempting to establish actual markets. Contingent valuation method surveys have been described and recommended as self-contained referenda in which respondents vote to tax themselves (Arrow et al., 1993: 20), although the preferred approach is not a tax but a tradable permit which aims to emulate qualities of market trading.

However, in such systems, 'use' by rich humans is what really counts. Several billion people live on less than a few dollars a day, many with a tight subsistence relationship to the ecosystems around them. The environment is an immediate means of survival, and environmental damage has immediate consequences for their and their children's health. Yet these people have little disposable income to express the importance of these systems or their functions. One Bill Gates has far more power in the market place than a few billion people with no income to spare. Free market idealism delegates to growth in material throughput the job of addressing poverty. Actually the poor are too often confronted by 'development' with the loss of the ecosystems they strive to conserve (Martinez-Alier, 2002). Their conservation efforts are not motivated by a desire for environmental luxuries, but because ecosystems provide the necessities of life.

The lie in the idealist's position has long been exposed for those who care to pay attention. Kapp (1950) used extensive calculations to show the pervasive costs associated with modern economic systems. Systems in which narrow self-interest is encouraged as a virtue to the exclusion of all else will deliberately create harms and minimise benefits for others. The free-market credo often passes the buck to Adam Smith and his brief mention of the invisible hand while ignoring his own main life's work which framed the human condition in a non-utilitarian ethical setting (Smith, 1759). The modern market system may be more appropriately regarded as operating with an 'invisible foot' as people boot each other around through their uncoordinated but quite deliberate actions (Hunt and d'Arge, 1973). Kapp (1950) and other heterodox economists have noted the modern malaise as inherent in aspects of the political economy which positively encourage and reward those able to pass along harms/costs to others while reaping benefits at no cost to themselves.

Exploitation is the name of the game from cheap throwaway products and mass consumerism to resource extraction and pervasive pollution. Pigou's original story is intuitive but there is nothing external about 'externalities', rather they are an integral part of modern economic operations. They are not minor aberrations on an otherwise perfectly functioning system of efficient resource allocation. What the concept of externalities reveals is a system-wide lack of responsibil-

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

ity and accountability for acts of exploitation. Markets then can only operate if restrained by institutions and norms; something Adam Smith recognised. Strangely the idealists' redress for environmental problems is meant to come from unfettering and spreading the same system which created the problems but now emphasising its free-market democratic credentials.

Scientific empiricism

The philosophy of value underlying the modern economic approach to the environment is argued to be an empirical reality because neoclassical economics is meant to be an empirical science. Humans are observed to pay for things which gives those things value. However, this is linked to a meta-ethical claim that only the experiences of humans have value in their own right. This could be extended to the experiences of all sentient beings, as done by Bentham.⁸ Either way, entities possess only instrumental value by giving (directly or indirectly) painful and pleasurable experiences. An immediate problem with this account concerns the value attributed to sentient beings themselves, because it appears only to be experiences which are of value rather than the beings having those experiences (Holland and Roxbee-Cox, 1992).

This can be seen to have led economics into the uncomfortable position of valuing human life as a set of potential pleasures to be experienced, which for simplicity is represented by ability to achieve pleasure via income. The poor are then clearly less valuable than the rich. International controversy arose over this exact issue when such calculations were part of the economists' contribution to the Intergovernmental Panel on Climate Change second assessment report (see Spash, 2002a: 188–191). That a being has the capacity for valuable experiences can be taken to matter without the occurrence of the valuable experiences constituting the value of that being. A person may experience a life time of low income preventing avoidance of painful experiences or high income enabling pleasurable experiences, but their life's worth is a separate matter (for more on this see O'Neill, 2008).

Holland and Roxbee-Cox (1992) argue that the value we attach to ecological phenomena is of the same kind as that we attach to human beings and faces similar problems. As they state: 'If the theory which locates value in the experiences of sentient beings fails to do justice to the value we attach to human beings, it is unclear why we should accept it as providing an adequate theory of ecological value.' (Holland and Roxbee-Cox, 1992: 17). Some values may be absent from the interests of sentient beings while others should be discounted e.g. pleasure from violence, torture, rape, wanton destruction of Nature. Some alternative value theories are those which place value in all living things, not just sentient beings, by virtue of their ability to flourish; value may be argued to reside in the uninhibited natural state of features of Nature; inanimate Nature may be assigned value as part of a living organism; or features of Nature may be seen

as having value due to their supporting role in ecosystems. This last is differentiated from a purely instrumental value because of the intimate relationship in the framework of life of such features and is associated, by Rolston (1988), with a systemic value of ecosystems. The point here is to merely outline the potential for alternative ways of taking Nature into consideration, and to show that the approach being employed by advocates of ecosystem services valuation excludes all such alternatives without consideration.

That such variety in environmental values exists is also of more than merely academic philosophical interest. Intrinsic value concepts are found amongst groups as diverse as UK land managers (Butler and Acott, 2007) and UN officials (Craig, Glasser and Kempton, 1993). Empirical evidence shows that individuals give differential motives to valuing environmental change and associate responses to stated preference surveys with a variety of ethical approaches (Spash, 1997; 2000b; 2000a). This impacts the full range of bid responses. At one extreme, the refusal to trade aspects of the environment for money can be seen as indicative of a lexicographic preference supporting a rights based deontological philosophy (Spash, 1998; Spash and Hanley, 1995). At the other, positive willingness to pay for preventing environmental degradation can be associated with non-consequentialist reasoning which rejects an orthodox economic rationality but is nonetheless rational (Spash, 2006).

Along with environmental attitudes and social norms, ethical beliefs feed into the reasoning over whether to engage in a process of monetary trade-off. Respondents who take hypothetical surveys seriously seem to enter central processing mode and call upon ethical positions when considering environmental changes (Spash, 2002b; 2006). Interestingly then stated preference practitioners treat such non-economic motivation as bias, and recommend censoring and removing what they designate as 'ethical protesting' (Bateman et al., 2002: 276; Hanley, Mourato and Wright, 2001: 451). The fact is that some economists practise a whole range of unscientific data manipulation in the search for 'true preferences' which can be accepted as compatible with economic theory and their narrow model of human psychology and rationality (Spash, 2008a).

PSYCHOLOGY, PREFERENCES AND VALUES

In mainstream economics preferences are assumed to exist prior to a choice so that people know what they want. Values in the (actual or hypothetical) market are expressions of preferences which reflect an individual psychology. The job is then for changes in ecosystems services to be specified, preferences stated and values observed. Achieving this requires meaningfully locating attributes of the environment in respondents' cognition of the world.

Ecosystems valuation has two sets of evaluative categories which for simplicity I will term objects and values. Objects are the things listed as supposed

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

services (e.g. food provision, climate regulation, aesthetics) and their attributes (e.g. security, feeling well, social cohesion). As some ecosystem services advocates recognise: 'The conditions and processes underlying ecosystem service production are so tightly interlinked that any classification is inherently somewhat arbitrary.' (Brauman et al., 2007: 69). Despite this the idea of a comprehensive classification system has been adopted – now commonly being taken from the Millennium Ecosystem Assessment. This also goes well beyond the biophysical to include the service category 'culture' with its sub-categories of the spiritual, religious and aesthetic. The scientist then treats valuing all such objects as merely a matter of finding the right technical solution for addressing internal critiques. Hence Brauman et al. (2007: 70) state a key requirement as being: 'Formal methods for incorporating cultural values in a meaningful way'.

Ecosystems services literature describes values in orthodox environmental economics terms and includes indirect/passive use⁹ – option, bequest and existence – values. Any list of values is contentious, especially if it claims to be comprehensive e.g. total economic value. This approach adopts preference utilitarianism without questioning the philosophy. On a practical level only stated preferences methods are able to address the types of values being discussed. This creates an immediate problem because the number of ecosystem services that can be explicitly included in a survey is limited (e.g. choice experiments typically address just four plus cost, for example Barkmann et al., 2008) while the number of ecosystems functions is numerous (e.g. Batker et al., 2005 identify twenty three diverse functions).

On a more theoretical level, the inclusion of functions essential to life and such things as 'spiritual values' in the object listings implies considerable confusion as to what exactly is the meaning of then requesting that these be measured using a single metric and traded-off against each other and for other goods and services. There is identifiable self contradiction here. For example, Brauman et al. (2007) state that:

Although ideal metrics will likely vary with context, institutionalizing uniform measures facilitates comparison amongst services and between places.' (p.74)

In general, the effectiveness of ecosystem service policy is difficult to evaluate because these policies usually have multiple goals and there are many metrics for success. (p.87)

Monetary valuation, although not an end in itself, can be a powerful tool for assessment and policy making because it provides a common metric with which to make comparisons. (pp.83 and 89)

The temptation is clearly to conform to the requirements of the value model being put forward. Plural values and multiple criteria fail to fit within the philosophy of a single metric which assumes all things are commensurable.

There are then two broad areas of concern in terms of how the ecosystems services advocates frame the issue. First is how policy is misled by the search for preferences to inform values. Second is how the concept of preferences, and choices as trade-offs, offers a very limited perspective on human motivation for valuing the environment. These issues are addressed in turn.

Informing and forming preferences

Public cognition differs from ecologists' with respect to the world around us. Describing and understanding ecosystems functions requires alien concepts divorced from daily life. There is then a disconnect between the 'goods' demanded by the public and ecosystems services derived as outputs from functions conceptualised by ecological science. Accepting this divergence means confronting how to inform people as to what is to be valued. Economists persist in believing that people can be informed of 'facts' about environmental change in a neutral fashion. On the contrary, evidence shows that the same uniform information set, concerning concepts such as biodiversity, will inform some and form the preferences of others (Spash, 2002b).

Recognising the unfamiliarity of the public with the ecologists' world description seems to conflict with wishing to avoid formation of preferences when valuing ecosystem services. One suggestion is to conduct extensive qualitative pre-studies to select 'demand-relevant' ecosystem services from the existing understanding of the relevant population (Barkmann et al., 2008). This effectively relies upon the public to frame the issue without appeals to technical or scientific models. However, there is then likely to be divergence between public perception of important attributes, policy-makers' aims and ecologists' concerns.

One problem is that individuals tend to focus on the immediate and in the case of species those higher in the food chain. The focus of economic valuation studies has then, unsurprisingly, been upon key iconic species, and so far has rarely addressed species diversity, and hardly ever ecosystems and never genetic diversity. Stated preference work necessarily addresses the value people place on more pandas in the wild rather than the value of more bamboo in the wild; even though they are part of the same interconnected ecosystem. Elephants and tigers are the focus of public concern, not more species of grass in the savannas or insects in the grass. Appealing to preferences means species are preserved on the basis of factors such as their size or resemblance to humans (Samples, Dixon and Gowen, 1986). For example, the variety and number of snake species kept in zoos appear to ignore conservation concerns by over representing common 'attractive' species while maintaining really endangered species at levels far below the population limit for continued viability (Maresová and Frynta, 2008). Preference driven conservation effectively favours selective extinction of 'unattractive' species.

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

There is then a conflict between protecting ecosystems and appealing to goods as observed as relevant by the public. Raw preferences in the market place fail to recognise the goals of conservation and preservation, which is why there is a problem in the first place. Ecological concerns over nutrient cycles and soil microbe biodiversity have little cognitive relevance for the general public and therefore appeals to their preferences also seem to have little relevance. The importance of the integrity of whole systems is something ecology has raised and emphasised; why then employ methods aimed at preserving just the bits the public prefer e.g. large 'attractive' species outside the context of their habitats?

The emphasis on preferences (direct or indirect) also raises the importance of geographical proximity which then adds a weighting to a particular ecosystems' values. A barren piece of heavily maintained parkland in a city centre may have more economic importance than a rich bio-diverse trail set in some far distant and isolated wilderness. Similarly, among two sites with the same ecological functions the nearest to a larger human population is likely to have greater weight in CBA calculations. 'It is not that one site necessarily has more value; it is simply that the features that give it the value it has are more accessible.' (Holland and Roxbee-Cox, 1992: 21). The sole motivation for economic valuation is the quantity of quantifiable 'use' by humans.

This extends to indirect use values because in instrumental and preference utilitarian terms people recognise value in culturally familiar entities. The categories of bequest and existence value for entire ecosystems may be regarded as considerable (e.g. Amazonian rain forest), or if some obscure place perhaps miniscule (a Scottish bog in the highlands). Trivial short term development benefits, measured as economic welfare, can easily eradicate ecosystems in the latter category. The same species can also be highly valued in one location and elsewhere regarded as a pest to be eradicated (e.g. possums in New Zealand as opposed to Australia). There is nothing inherently protective about economic valuation and indeed the opposite is more likely because the modern economy extols short term consumptive use. If whale preservationists are not prepared to pay more than say Japanese 'researchers' and carnivores, then whales should be hunted and eaten to extinction. This is just efficiency at work with optimal resource allocation extended to optimal species extinction (Spash, 1995).

This raises the issue of whose preferences should count and why? There is no easy approach to identifying the relevant population of valuers. Two ecosystems may be similar, but one known widely, say having been given some international designation, while the other remains largely unknown. Should valuers only be selected from those with pre-existing knowledge? If not how can preferences be informed without being formed? We might believe that World Heritage Sites, for example, are valued by the entire human population, but who should we expect to pay for them and why? If species are lost, who should be potentially compensated to meet the Kaldor-Hicks criterion? What about the preferences of future generations? Even forgetting that the relevant population of preferences

is unknown, how preferences are taken into account, aggregated and weighed (e.g. for income inequity) are also highly contentious issues.

The focus purely upon instrumental values as they stimulate human preferences means many aspects of the environment may appear to have no need for protection or preservation. On these grounds, where parts of the natural world make no contribution to human 'welfare' at all there is no corresponding need to protect it. As Holland (1997: 485) notes, this has even been used as an argument for dismissing environmental concerns and in favour of traditional economic development, i.e. action which clearly is regarded as increasing human welfare defined in preference utilitarian terms. The problem seems to lie with the whole approach being taken to human motivation for environmental valuation.

Motivation and psychology

According to the orthodox economic model, the self-preoccupied and self-centred modern individual is only responsive if they are made to pay or are paid for their actions, and a price or money value is taken to send a clear behavioural signal. Thus we find a prominent advocate of ecosystem services valuation stating 'I do not agree that more progress will be made by appealing to people's hearts rather than their wallets' (Costanza, 2006: 749). So an implicit model of human motivation underlies the money argument for conservation. That is psychological egoism i.e., 'the claim that people are incapable of regarding as important anything other than their own interests' (Holland, 1995: 30).

The exclusive motive for an economically rational agent to value the environment, change in it or aspects of it, is because it has some personal use or utility for them. The search for preferences then involves long lists of diverse and incommensurable items which bring forth a variety of responses from respondents when asked to state their preferences. In particular respondents call upon non-economic motives (Spash, 2006) and reason about their actions in ways outside economic understanding of psychology e.g. involving norms, attitudes and personal perceptions of control (Spash et al., 2008). The idea that all ecosystem attributes and their associated diverse values can be considered as trade-offs for monetary loss, or gain, appears to misunderstand how humans interact with their environment and make reasoned choices.

Holland (2002) describes orthodox economic psychology as a belief/desire model. This can be understood as follows:

Beliefs without desires are inert; desires without beliefs are blind. Desires give the agent the motivational push to move, while beliefs are channels that guide the move to the right place. My desire for an apple moves me to search for one, while my beliefs guide the search to the fruit bowl. (Holland, 2002: 18).

Alternatively, my desire for peace and tranquillity moves me to search for isolation, my beliefs guide me to the woodland. While this seems reasonable upon

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

first reflection, further consideration of the implications raises several problems. Holland (2002) regards the model as ‘deeply flawed’ as a description of reasoned action on five grounds.

First, self-sacrifice, negating one’s own interests in preference for another’s, cannot be explained except to be dismissed as irrational. As I have noted elsewhere (Spash, 2006), economics has a problem in addressing the concept of selfless or social altruism. Instead there is only selfish altruism, the giving to others for self reward in one form or another.

Second, desires can take on an addictive character and become insatiable if not tempered by other sources of motivation. Desires should not be regarded as equally valid. The gratification of certain desires can undermine the capacity to conceive what is good and moderate action. Holland (1994: 1) cites Plato’s description of human psychology as a balance between three competing springs of motivation: appetite/desire, sense of honour/self-respect, and reason. Plato used love of money to exemplify the dethroning of self-respect and demeaning of a persons life-style. As Holland (2002: 22) explains:

In Plato’s view, although desires can constitute reasons for action, they do so only in the context of a well-ordered and hierarchically structured psyche, where considerations of self respect and some overall conception of the good moderate the extent to which, and the manner in which, they find expression.

Choice construed as trade-offs removes all constraints and structure and in Plato’s view is the mark of a disintegrating psyche (Holland, 1994). Modern consumerism then seems to push us towards psychic disintegration.¹⁰

Third, desires are given prior to choice and lack explanation; they may even appear outside of our control. Deliberation is then construed as a process of discovery, searching out wants, rather than a process of reflecting upon what there is most reason to want. Resolution of conflicting desires requires sensitivity to the reasons, their strengths and relevance, underlying motivation for those desires. Instead economics offers a process of exchange where all that counts is how strongly and widely held is a preference or desire.

Fourth, incommensurability refers to ‘an intelligible choice between feasible options, where there is no appropriate value in terms of which the options might be compared as ‘better’, ‘worse’ or approximately equal’ (Holland, 2002: 23). Choices involve dilemmas where values conflict (e.g., duty and love, vanity and greed) and lack a commensurating value for comparison. Tough decisions result in anguish because whatever we do may be wrong and there is no yardstick to aid us.

Happiness is not a homogeneous item but a mosaic of heterogeneous elements. There just is no common substance – no *utility* – by which to compare, for example, the suffering experienced by an experimental animal with the understanding gained from the experiment. (Holland, 2002: 27)

Fifth, a statement of preference fails to make an action intelligible. In the quest for an answer as to why someone does something the response 'because I want to' tells us nothing and indeed expresses unwillingness to provide a reason. As Holland (2002: 26) notes, '...to construe choices as trade-offs is to construe them in a way that is empty of explanatory significance'.

In summary, the ecosystems services literature makes much of the need for trade-offs in policy decision processes with concerns such as habitat loss and damage to ecosystems functions needing to be weighed against economic growth or 'development'. Preferences are taken to be the defining method by which humans make choices. However, this should not be taken to mean humans reach their best choices using appeals to preferences, or that the trade-off model of psychology, as found in economics, is relevant to making good decisions or even a good description of the choices we do make.

PRACTICAL JUDGEMENT AND DELIBERATIVE PROCEDURES

Choices over the protection of ecosystems and their functions are being placed into a market frame without much apparent reflection upon how different institutions encourage or suppress the expression of different values. The market concerns exchange values, where the parties to a freely entered agreement trade with mutual gain – each gives something (pays) and is compensated (accepts payment). The shopkeeper gives a product and accepts money, the consumer gives money and accepts goods. That this model of behaviour is then being recommended to address ecosystems losses where community and environmental values are involved appears both inappropriate and neglectful of behavioural impacts.

More than failing to reflect some important values, the economic approach can be transformative and destructive of value. Paying cash for sex changes the relationship and meaning of the act of intercourse. Neither friendship nor love can be bought. In the case of parent-child relations, paying large sums of money is precisely the wrong way for a parent to demonstrate how much their child matters to them (Holland, 1995: 22). Believing that 'only appeals to the wallet will make progress' shows ignorance of the crowding out literature where monetary mechanisms remove the behaviour they intended to encourage (Frey and Jegen, 2001).

In contrast to the market place, monetary compensation is not a universally acceptable corrective, with only the amount being at issue, and may be rejected where communal sharing or equality are the norm. As Holland (1995: 22) notes '...to be asked to trade one's principles, even hypothetically, is likely to seem inappropriate and even morally disreputable'. For example, monetary compensation for environmental degradation may be regarded as a bribe designed to undermine community values (Claro, 2007). This points towards the need for

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

research into the appropriate approaches by which plural values held within a given society may be recognised and protected as judged necessary.

Critiques of CBA have pointed the way towards deliberative decision processes where practical judgement is an input and an outcome. Holland (1997: 486) argues in favour of an environmental debate which recognises that environmentalism is more than merely a romantic attachment to Nature, but flows from, and is the focus of, some deeply felt values and commitments which require a suitable context and process for their articulation and defence. Holland and Roxbee-Cox (1992: 20) make the following modest proposal:

Quite simply the proposal is to *replace the view that values reflect preferences with the view that preferences reflect values*. That is to say, preferences are no longer to be constructed as what *constitute* the environmental values; rather, they are to be constructed as *surrogates* for, or *indicators* of, some independently existing value.

The independent value is then seen as a motivator for expressing concern in a decision process which allows room for reasoning, debate and reflection. To take an earlier example, we should not protect snakes on the basis of their attractiveness (preference utilitarianism) but because we understand there is value in life and diversity. The reasons for respecting different forms of life and how they should be protected are then matters for debate and deliberation.

Moving concerns over ecosystem and biodiversity preservation back to the realm of judgement is then required. Even if personal values should be respected, they should also be open to interpersonal dispute and challenge.

Unlike expressions of preference and feeling, and more so than expressions of opinion or belief, judgements are open to being contested – open that is to reasoned debate and reflection. A judgement is something for which we must be prepared to take responsibility, and which we must stand ready to defend... (Holland, 1997: 488)

The concentration of government and public life on a utilitarian philosophy of happiness, or welfare, can then be seen as having led to the assumption that such goals can be achieved by calculation rather than judgement. The question of ‘consumption for what?’ then seems lost as the political economy opts for the simple idea of more consumption as an unquestioned good in itself.¹¹

A decision that a public policy be formed on the basis of stated preferences, replacement cost or benefit transfers is itself one requiring judgment. Judgment is not optional, it is merely hidden. As Holland (1997: 491) notes: ‘One of the deepest illusions surrounding the practice of cost-benefit analysis is that it avoids value judgement.’ As is very clear in reading the Stern report, or other economic studies of human induced climate change, the practice is an art requiring numerous and repeated judgments from the appropriate treatment of the poor to the standing of future generations in current decisions to the

characterisation of uncertainty and catastrophic events (Spash, 2002a; 2007a). Clearly ecosystems and biodiversity valuation face the same problems, which become compounded at the global level.

Ecologists and conservation biologists adopting ecosystem services valuation now seem to be vacillating between which of two approaches provides the best cover for their implicit judgments: objectivism or subjectivism. That is, scientific facts are only questionable on grounds of factual disputation not judgement. This is despite ever wider recognition of the value judgements behind scientific opinion. Yet value judgements are themselves characterised as subjective opinions (effectively tastes) reflecting personal values which should be respected and not judged. Policy choices can then hide behind appeal either to the scientists with their report on facts or to the economists with their report on subjective preferences (Holland, 1997).

The two positions become exposed in ecosystems services valuation. From the modern economists' perspective values are based upon the preferences of individuals, but from the ecologists' perspective such things as ecosystems existence and the value of bequeathing ecosystems to future generations are defined by the physical characteristics of that ecosystem. Ecologists use their own judgment in constructing lists of ecosystems functions to be described as goods and services. Economists use their own judgment in the design and construct of stated preference approaches (Spash, 2008a) or more generally CBA (Spash, 2002a). Ecosystems valuation attempts to combine both sets of judgements.

There are then two incongruous classification systems: one arising from environmental economics (primarily appealing to stated preferences), and the other arising from ecology and ecosystems functions.

... the science of ecology (i.e., dealing with facts and the way the natural world is) has tended to go hand in hand with normative claims (i.e., dealing with values and how the world should be, and how we ought to treat and use nature), and has found it difficult to maintain a strict and lasting separation between 'facts' and 'value'. Eroding this strict distinction has placed ecology in a unique position as a 'science', as a form of knowledge which seems to bridge the natural and the social sciences. (Barry, 2006: 304–305)

The problem facing those ecologists promoting ecosystems services valuation is that most of what they deem valuable is unlikely to produce meaningful willingness to pay amongst the general population, e.g. using state preference methods. Undaunted, studies place monistic monetary values on changes in a large number of ecosystem functions involving everything from nutrient cycling to cultural heritage. In order to achieve these numbers, the evaluator freely borrows and transfers values from a variety of economic studies with little apparent consideration of the original context or theoretical basis of those values. Benefit transfer is then used to produce numbers without having to confront the inconvenience of addressing the general public (Spash and Vatn, 2006). Meanwhile

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

the overall approach is justified as pragmatic, ideologically sound, empirically based and even democratic.

That experts are making judgments and excluding the public is not necessarily problematic. Instead, we may ask on what grounds are appeals being made to the general public in any case? The functions of ecosystems are complex and numerous. Ecologists attempt to classify these things using their specialist knowledge. They effectively frame the issue for everyone else. They know people fail to understand the complexity and importance of the various ecosystems functions. Even university students show poor understanding of concepts such as biodiversity (Spash and Hanley, 1995). That information is hard to impart to others merely compounds the problem. As Holland and Roxbee-Cox (1992: 21) state:

... if what we are seeking to discover is the value of the site, regarded as a value that it has independently of human interests, we must find this out from people who are in a position to recognise such values. The number of such people is not significant. ... if we are seeking the expression of *informed* preferences, then there is a clear role for the ecologist and others who will provide the information that will render the preferences informed.

The need is for informed judgment with accountability and this may or may not involve the public. It does however require an open and accessible process. Instead the need for professional judgement in ecosystem valuation is lamented as 'unavoidable' and to be guarded against by employing closed peer review processes (Heal et al., 2005: 216).

Here the point is worth making that there is a distinction between procedure and outcome. A procedure may be justified as, say, 'democratic' but this fails to justify the outcome, which may be a poor one (Holland, 1997: 491). Thus, 'democratic principles imply a right to be considered; but they do not imply a right to count, or to determine the outcome' (Holland, 2002: 33). An important aspect of modern democracy is the protection of the minority against the tyranny of the majority. This becomes especially important where voices are silent e.g., non-humans, future generations. Thus, constitutional safeguards prevent over zealous manipulation of policy by citizens of the day due to concerns of the day. As Holland (1995: 37–38) states:

Regarding environmental issues too, we need perhaps to cultivate the same sense that these are matters of a particularly fundamental kind, whose significance reaches from the past and extends to the future, and concerning which, therefore, it is appropriate to 'consult' the citizens of the past and those of the future, as well as those of today.

This consultation requires taking note of how silent voices can be represented in decision processes (see O'Neill, 2001).

Holland (1997) recommends deliberative institutions for addressing conflicts of value because a process of accommodation is required in which a plurality of principles can be reconfigured while permitting respect for principles. He sees the distinctive character of deliberation about values as involving: (i) non-negotiable positions which, contrary to economic logic, can be perfectly rational, e.g. refusing compensation so as to hold to a right or promise; (ii) sacrificing interests so as to hold to principles; (iii) the potential for values to inform whether preferences or interests count e.g., some preferences may be judged disgraceful, mean or despicable, others honourable but unobtainable; (iv) recognition that principles relinquished may be impossible to compensate by gain in interests or honouring of other principles; (v) recognition that principles abandoned can result in feelings of guilt, compromise of integrity and threat to self identity, which is very different from disappointment at not fulfilling one's interests. This is a process in stark contrast to the economic weighing and balancing of interests on a single scale with all judgements kept hidden or shrouded in the technical detail of the internal criticism which constitutes a peer review process.

In practical terms the potential for alternative institutional arrangements for articulating values must be explored (Vatn, 2005). Plural values including monetary considerations might be addressed through some forms of small group deliberative monetary valuation (Spash, 2008b, 2007c). Space precludes covering these and other available alternatives which exists, their relative merits or otherwise (for some further coverage see Getzner, Spash and Stagl, 2005; Kallis et al., 2006; Spash and Vatn, 2006). Suffice to say, where environmental policy requires budgetary choices what must be avoided is the pretence that either a total value or some transferable price can be derived for various entities, upon which trade-offs may now be calculated. Little has also been said of representation. I would argue the need here is to be inclusive of plural values whether the decision group is constituted of experts, vested interests or members of the public. What is clear is that a variety of new institutional approaches are required.

The penalty for not developing institutions in which ethical and other deeply felt concerns can be properly voiced will be residues of grievance, mistrust, injustice and guilt which are as corrosive of the civic body as are pollutants in the natural environment. (Holland, 2002: 33).

CONCLUSIONS

Modern economics professes to be an empirically based science but seems to defend highly abstract theory over empirical fact. The ideological position held by mainstream economists concerning what constitutes value in society is used to reinforce a specific model of political economy. Ecologists and conservation biologists then appear to be rather naively attempting to employ the economic

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

value approach without showing much awareness of the political and ideological system within which it is embedded. The problem then is that values which fail to fall within the ideological constructs must be ignored, excluded or transformed into those which do. The articulation of those values requires the design and implementation of specific institutions which control and manipulate the type and range of values allowed into the decision-making process. That different institutional processes result in different values being articulated seems poorly understood by both economists and ecologists trying to value ecosystems as goods and services.

The idea of monetary valuation work is not just to show a value exists but that it is tangible in economic terms. The belief then is that this will affect human behaviour because 'if only people knew how much money biodiversity and ecosystems services were worth they would do something about preserving them'. One response from ecologists is to produce lists of what ecosystems 'goods and services' people should value, in their opinion. Any stated preference survey using these lists then needs to make a case explaining why the respondent should value things taken from the list. Realising people may not value and/or understand the listed items has led some to transfer values from wherever appears convenient and use their own judgment to calculate 'total values' for ecosystems and/or their services. Yet there seems inadequate comprehension, or at least discussion, of the arbitrary nature of any outcomes from this approach, its biases and limitations.

That judgment is required is not *per se* the problem. The problem is how judgment is concealed and used to frame public policy. The approach to ecosystem services valuation encapsulates an implicit model of both human behaviour and the relevant decision process for addressing environmental problems. The standard justifications for this are embedded in support for or acceptance of the dominance of market systems. This ignores the many ways in which humans operate outside such systems and without being psychological egoists whose only concern is their wallet. Taking human motivation into account is necessary to address why ecosystems are being destroyed and biodiversity lost. This implies something more is required than valuation studies allocating numbers to ecosystems in the pretence they are goods and services which can be mentally placed amongst items in a shop window.

ACKNOWLEDGEMENTS

As part of this special issue in honour of Alan Holland I pay particular attention, at various points, to his work. Four pieces are judged specifically relevant to the topic at hand (Holland, 1995; 1997; 2002; Holland and Roxbee-Cox, 1992). Thanks to Jeremy Roxbee-Cox, John O'Neill and Arild Vatn for their comments on an earlier draft.

NOTES

¹ For example, the 'European Biodiversity Research for a Sustainable Europe: Research Contributing to the Implementation of the EU Biodiversity Strategy', 12 to 30 March 2007. <http://www.nbu.ac.uk/biota/e-conference.htm> and 'Climate Change and Biodiversity Conservation: Knowledge Needed to Support Development of Integrated Adaptation Strategies', 29 August to 16 September 2005. Both organised in cooperation with the European Platform for Biodiversity Research Strategy (EPBRS) and the Centre for Ecology and Hydrology (CEH).

² The G8 comprises Britain, Canada, France, Germany, Italy, Japan, Russia and the United States; the five other countries at Potsdam were Brazil, China, India, Mexico and South Africa. The G8 Environment Ministers Meeting which produced this declaration was held in Potsdam, 15 to 17 March 2007.

³ The link to Stern is explicit in the discussions around this biodiversity valuation exercise. See <http://www.anped.org/index.php?part=424>. Accessed 13 February 2008.

⁴ Story from BBC NEWS: <http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/6432217.stm>. Published: 2007/03/09 11:55:18 GMT. Accessed 22 March 2007.

⁵ An attempt is sometimes made to distinguish market prices from 'shadow' or artificial prices (as calculated in environmental CBA). Shadow prices do not literally turn an item into a commodity that can be traded. Rather their calculation involves treating entities *as if* they were commodities that *could* be traded. A narrow definition restricts 'commodification' to actually establishing property rights and making objects tradable. The broader definition concerns spreading the norms and institutional framing of markets, so affecting the psychology of human relationships to entities. (See O'Neill, 2007: Chapter 1).

⁶ Such references occur in two contexts and are sometimes confused. The total value of a good in economic terms is the sum of the area under the demand curve, i.e., the sum of all individual willingness to pay amounts, across a population, with every unit supplied to the person prepared to pay the most for that unit. The term 'total economic value' is a separate concept used by environmental economists in reference to the sum of direct and indirect/passive use values which supposedly constitute an individual's willingness to pay.

⁷ A later brief return to the meaning of value, in Chapter 2, mentions 'intrinsic value' as something non-anthropocentric which might have 'potential validity'. However, economic valuation is noted to be anthropocentric, so such non-anthropocentric things are basically regarded by the authors as irrelevant.

⁸ Jeremy Bentham wrote in *The Principles of Morals and Legislation*, 1789: 'The day may come when the rest of the animal creation may acquire those rights which never could have been withholden from them but by the hand of tyranny... The question is not, Can they *reason*? nor Can they *talk*? but Can they *suffer*?'.

⁹ Indirect/passive use values are sometimes incorrectly termed non-use values (e.g., Brauman et al., 2007); there can be no such designation as 'non-use' values in economics because all economic value derives from the utility or usefulness it provides humans.

¹⁰ Holland (1995) gives the example of individual car ownership, which provides freedom. The unconstrained expression of this strong preference causes congestion, pollution, resource extraction, regular deaths and so on. A process (such as CBA) which protects

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

the unconstrained status of such a preference will not change the situation. There is no means to register that this preference should not count so much in the first place.

¹¹ I refer here to the observable modern obsession with growth in gross domestic product (GDP). In a Benthamite utilitarian philosophy of happiness more consumption can at some point lead to less pleasure. However, the more important point would be to address what constitutes a worthwhile life (see O'Neill, 2008).

REFERENCES

- Abt Associates Inc. 2005. Introduction and summary of major issues. *Benefit Transfer and Valuation Databases: Are We Heading in the Right Direction*. 21–22 March (Washington, D.C.), pp. 1:1–1:3.
- Arrow, K., R. Solow, P.R. Portney, E. Leamer, R. Radner and H. Schuman. 1993. Report of the NOAA Panel on Contingent Valuation. Washington, Resources for the Future. 38.
- Balmford, A., A. Bruner, P. Cooper, R. Costanza, S. Farber, R. E. Green, M. Jenkins, P. Jefferiss, V. Jessamy, J. Madden, K. Munro, N. Myers, S. Naeem, J. Paavola, M. Rayment, S. Rosendo, J. Roughgarden, K. Trumper and R.K. Turner. 2002. 'Economic reasons for conserving wild nature'. *Science* **297**: 950–953, doi: 10.1126/science.1073947.
- Barkmann, J., K. Glenk, A. Keil, C. Leemhuis, N. Dietrich, G. Gerold and R. Marggraf. 2008. 'Confronting unfamiliarity with ecosystem functions: The case for an ecosystem service approach to environmental valuation with stated preferences'. *Ecological Economics* **65**(1): 48–62, doi: 10.1016/j.ecolecon.2007.12.002.
- Barry, J. 2006. *Environment and Social Theory, 2nd edition*. London: Routledge.
- Bateman, I.J., R.T. Carson, B. Day, M. Hanemann, N. Hanley, T. Hett, M. Jones-Lee, G. Loomes, S. Mourato, E. Ozdemioglu, D.W. Pearce, R. Sugden and J. Swanson, eds. 2002. *Economic Valuation with Stated Preference Techniques: A Manual*. Cheltenham: Edward Elgar.
- Batker, D., E. Barclay, R. Boumans, T. Hathaway, E. Burgess, D. Shaw and S. Liu. 2005. *Ecosystem Services Enhanced by Salmon Habitat Conservation in the Green/Duwamish and Central Puget Sound Watershed*. Tacoma: Asia Pacific Environmental Exchange. 92 pages.
- Brauman, K.A., G.C. Daily, T. Ka'eo Duarte and H.A. Monney. 2007. 'The nature and value of ecosystems services: An overview highlighting hydrological services'. *Annual Review of Environment and Resources* **32**: 67–98, doi: 10.1146/annurev.enery.32.031306.102758.
- Brouwer, R. and F.A. Spanninks. 1999. 'The validity of environmental benefits transfer: Further empirical testing'. *Environmental and Resource Economics* **14**(1): 95–117, doi: 10.1023/A:1008377604893.
- Butler, W.F. and T.G. Acott. 2007. 'An inquiry concerning the acceptance of intrinsic value theories of Nature'. *Environmental Values* **16**(2): 149–168, doi: 10.3197/096327107780474528.

- Claro, E. 2007. 'Exchange relationships and the environment: The acceptability of compensation in the siting of wastes disposal facilities'. *Environmental Values* **16**(2): 187–208, doi: 10.3197/096327107780474519.
- Costanza, R. 2006. 'Nature: ecosystems without commodifying them'. *Nature* **443**(7113): 749, doi:10.1038/443749b.
- Costanza, R., R. d'Arge, R. deGroot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V. O'Neill, J. Paruelo, R.G. Raskin, P. Sutton and M. van den Belt. 1997. 'The value of the world's ecosystem services and natural capital'. *Nature* **387**(6630): 253–260, doi: 10.1038/387253a0.
- Craig, P.P., H. Glasser and W. Kempton. 1993. 'Ethics and values in environmental policy: The said and the UNCED'. *Environmental Values* **2**(2): 137–158, doi: 10.3197/096327193776679945.
- Frey, B.S. and R. Jegen. 2001. 'Motivation crowding theory'. *Journal of Economic Surveys* **15**(5): 589–611, doi: 10.1111/1467-6419.00150.
- Getzner, M., C.L. Spash and S. Stagl. 2005. *Alternatives for Environmental Valuation*. London: Routledge.
- Hanley, N.D. 1995. 'The role of environmental valuation in cost-benefit analysis', in K.G. Willis and J.T. Corkindale (eds.), *Environmental Valuation: New Perspectives* (Wallingford: CAB International), pp. 39–55.
- Hanley, N.D., S. Mourato and R.E. Wright. 2001. 'Choice modelling approaches: A superior alternative for environmental valuation?' *Journal of Economic Surveys* **15**(3): 435–462, doi: 10.1111/1467-6419.00145.
- Heal, G.M., E.E. Barbier, K.J. Boyle, A.P. Covich, S.P. Gloss, C.H. Hershner, J.P. Hoehn, C.M. Pringle, S. Polasky, K. Segerson and K. Shrader-Frechette. 2005. *Valuing Ecosystems Services: Toward Better Environmental Decision-Making*. Washington, D.C.: National Research Council.
- Holland, A. 1994. 'One wants and one wants not to want'. *Environmental Values* **3**(1): 1–2.
- Holland, A. 1995. 'The assumptions of cost-benefit analysis: A philosopher's view', in K.G. Willis and J.T. Corkindale (eds.), *Environmental Valuation: New Perspectives* (Wallingford: CAB International), pp. 21–38.
- Holland, A. 1997. 'The foundations of environmental decision-making'. *International Journal of Environment and Pollution* **7**(4): 483–496.
- Holland, A. 2002. 'Are choices tradeoffs?' in D.W. Bromley and J. Paavola (eds.), *Economics, Ethics and Environmental Policy: Contested Choices* (Oxford: Blackwell Publishing), pp. 17–34.
- Holland, A. and J. Roxbee-Cox. 1992. 'The valuing of environmental goods: A modest proposal', in A. Coker and C. Richards (eds.), *Valuing the Environment* (London: Belhaven Press), pp. 12–24.
- Hunt, E.K. and R.C. d'Arge. 1973. 'On lemmings and other acquisitive animals: Propositions on consumption'. *Journal of Economic Issues* **7**(June): 337–353.
- Kallis, G., N. Videira, P. Antunes, Â. Guimarães Pereira, C.L. Spash, H. Coccossis, S. Corral Quintana, L. del Moral, D. Hatzilacou, G. Lobo, A. Mexa, P. Paneque, B. Pedregal and R. Santos. 2006. 'Participatory methods for water resource plan-

HOW MUCH IS THAT ECOSYSTEM IN THE WINDOW?

- ning'. *Environment and Planning C: Government and Policy* **24**(2): 215–234, doi: 10.1068/c04102s.
- Kapp, K.W. 1950. *The Social Costs of Private Enterprise*. New York: Shocken.
- Maresová, J. and D. Frynta. 2008. 'Noah's Ark is full of common species attractive to humans: The case of boid snakes in zoos'. *Ecological Economics* **64**(3): 554–558, doi: 10.1016/j.ecolecon.2007.03.012.
- Martinez-Alier, J. 2002. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*. Cheltenham: Edward Elgar.
- McCauley, D.J. 2006. 'Selling out on nature'. *Nature* **443**(7): 27–28, doi: 10.1038/443027a.
- O'Neill, J.F. 2001. 'Representing people, representing nature, representing the world'. *Environment and Planning C: Government and Policy* **9**(4): 483–500, doi: 10.1068/c12s.
- O'Neill, J.F. 2007. *Markets, Deliberation and Environment: Economics as Social Theory*. London: Routledge.
- O'Neill, J.F. 2008. 'Happiness and the good life'. *Environmental Values* **17**(2): 125–144, doi: 10.3197/096327108X303819.
- Pearce, D., A. Markandya and E.B. Barbier. 1989. *Blueprint for a Green Economy*. London: Earthscan.
- Pigou, A. C. 1920. *The Economics of Welfare*. London: Macmillan.
- Polanyi, K. 1944. *The Great Transformation*. New York/Toronto: Rinehart & Company Inc.
- Rolston III, H. 1988. *Environmental Ethics: Duties and Values in The Natural World*. Philadelphia, Pennsylvania: Temple University Press.
- Samples, K.C., J.A. Dixon and M.M. Gowen. 1986. 'Information disclosure and endangered species valuation'. *Land Economics* **62**(3): 306–312, doi: 10.2307/3146394.
- Smith, A. 1759. *The Theory of Moral Sentiments*. Indianapolis: Liberty Fund.
- Spash, C.L. 1995. Review of Tim Swanson, *The International Regulation of Extinction*. *Economic Journal* **105**(432): 1318–1321.
- Spash, C.L. 1997. 'Ethics and environmental attitudes with implications for economic valuation'. *Journal of Environmental Management* **50**(4): 403–416, doi: 10.1006/jema.1997.0017.
- Spash, C.L. 1998. 'Investigating individual motives for environmental action: Lexicographic preferences, beliefs and attitudes', in J. Lemons, L. Westra and R. Goodland (eds.), *Ecological Sustainability and Integrity: Concepts and Approaches* **13** (Dordrecht: Kluwer Academic Publishers), pp. 46–62.
- Spash, C.L. 2000a. 'Multiple value expression in contingent valuation: Economics and ethics'. *Environmental Science & Technology* **34**(8): 1433–1438, doi: 10.1021/es990729b.
- Spash, C.L. 2000b. 'Ethical motives and charitable contributions in contingent valuation: Empirical evidence from social psychology and economics'. *Environmental Values* **9**(4): 453–479, doi: 10.3197/096327100129342155.
- Spash, C.L. 2002a. *Greenhouse Economics: Value and Ethics*. London: Routledge.

- Spash, C.L. 2002b. 'Informing and forming preferences in environmental valuation: Coral reef biodiversity'. *Journal of Economic Psychology* **23**(5): 665–687, doi: 10.1016/S0167-4870(02)00123-X.
- Spash, C.L. 2006. 'Non-economic motivation for contingent values: Rights and attitudinal beliefs in the willingness to pay for environmental improvements'. *Land Economics* **82**(4): 602–622.
- Spash, C.L. 2007a. 'The economics of climate change impacts à la Stern: Novel and nuanced or rhetorically restricted?' *Ecological Economics* **63**(4): 706–713, doi: 10.1016/j.ecolecon.2007.05.017.
- Spash, C.L. 2007b. Review of *The Economics of Climate Change: The Stern Review. Environmental Values* **16**(4): 532–535, doi: 10.3197/096327107X243277.
- Spash, C.L. 2007c. 'Deliberative monetary valuation (DMV): Issues in combining economic and political processes to value environmental change'. *Ecological Economics* **63**(4): 690–699, doi: 10.1016/j.ecolecon.2007.02.014.
- Spash, C.L. 2008a. 'Contingent valuation design and data treatment: If you can't shoot the messenger, change the message'. *Environment and Planning C: Government and Policy* **26**(1): 34–53, doi: 10.1068/cav4.
- Spash, C.L. 2008b. 'Deliberative monetary valuation (DMV) and evidence for a new theory of value'. *Land Economics* **84**(3): forthcoming.
- Spash, C.L. and N. Hanley. 1995. 'Preferences, information and biodiversity preservation'. *Ecological Economics* **12**(3): 191–208, doi: 10.1016/0921-8009(94)00056-2.
- Spash, C.L., K. Urama, R. Burton, W. Kenyon, P. Shannon and G. Hill. 2008. 'Motives behind willingness to pay for improving biodiversity in a water ecosystem: Economics, ethics and social psychology'. *Ecological Economics*: forthcoming, doi: 10.1016/j.ecolecon.2006.09.013.
- Spash, C.L. and A. Vatn. 2006. 'Transferring environmental value estimates: Issues and alternatives'. *Ecological Economics* **60**: 379–388, doi: 10.1016/j.ecolecon.2006.06.010.
- Vatn, A. 2005. *Institutions and the Environment*. Cheltenham: Edward Elgar.