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Environmental decision making and an ecosystems approach: Some challenges from the perspective of social science

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Abstract
This paper explores issues of theoretical design and application arising from ecosystem service based approaches to natural resource management. Conserving ecosystem services is now a key normative goal of environmental decision making, but the implications of embracing this concept are still little understood. In this paper I highlight two recurring and cross-cutting aspects of an ecosystems approach around which credible treatments of ecosystem services can be realized, not only in theory, but also in practice: first, the need to think 'holistically' about how any given project, proposal or plan would impact on service provision and human well-being; and, second, the need to manage ecosystem services in relation to wider stakeholder values, needs and priorities. While thinking about decision making from the perspective of ecosystem services is no panacea for sustainability, the paper points to a number of social science issues that interdisciplinary researchers could usefully address in these two contexts if they are to harness this concept in creative and critically engaged ways.

Keywords
ecosystem services, ecosystems approach, social science, theory and application

I Introduction

Although there are some grounds to claim that the conceptual basis of a transdisciplinary approach to natural resource management is beginning to take shape in the idea of 'ecosystem services', natural and social scientists are still a long way from appreciating fully the practical needs and consequences of thinking about the natural world in this way. It is easy to forget in the recent, and rather frenetic, efforts to position the conservation of ecosystem services as a key normative goal of environmental decision making just how embryonic and tentative practical understanding of this concept really is, and in particular what propagating an ecosystem services 'world view' of non-human nature implies for the way we think about governance arrangements for sustainability. Norgaard (2010: 1219) has written alarmingly of the way in which 'ecosystem services' has evolved, in a very short space of time indeed, from being an 'eye catching metaphor' – one serving the important political goal of building support for the conservation of biological diversity – to a

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concept now apparently 'integral to how we are addressing the future of humanity and the course of biological evolution'.

Although ecosystem services is a concept whose time has clearly come, the gradual harmonization of policy and academic discourses around this imperative arguably raises as many questions as it answers for those working at the interface of environmental research and decision making. Who is it that social and natural scientists should now be working with and what should they be creating evidence of, and for? How should data about ecosystem services be translated into information that can then be usefully communicated, accounted for and valued in decision making? How, on the basis of the many and manifold relationships (both synergies and trade-offs) that potentially exist between services and human well-being in a given decision context, can a course of action be determined with confidence? What are the appropriate 'delivery mechanisms' for resource management frameworks given the cross-sectoral and multi-scalar nature of service provision? These are some of the questions that are preoccupying an emerging 'epistemic community'[1] (Haas, 1992) of scientists and policy practitioners concerned with the conservation of ecosystem services for human well-being.

Efforts to deal with these questions find their main expression in the development of a so-called 'ecosystems approach' (EsA). An EsA is essentially a strategic and tactical framework for taking account of ecosystem services within decision making. Its origins are in the efforts of natural scientists to cultivate more integrated, cross-sectoral, approaches to resource management within agendas for sustainable development. While it would be inaccurate to write of a single and monolithic ecosystems approach, the formative influence on thinking in this area has been the 1993 Convention on Biological Diversity (CBD) (Haines-Young and Potschin, 2010). Conceptions of an EsA are typically modifications and refinements, indeed sometimes simplifications, of the 12 principles of approach developed under the CBD (see, for instance, in the UK, Defra, 2007a). In this paper I highlight two recurring and cross-cutting aspects of this approach to address some of the key challenges arising for social and natural scientists wishing to inform the conservation of valued ecosystem services in ways that are credible not only in theory, but also in practice: first, the need to think 'holistically' about how any given project, proposal or plan would impact on service provision and human well-being; and, second, the need to manage ecosystem services in relation to wider stakeholder values, needs and priorities.

II Thinking holistically about ecosystem services

The need to think holistically is a key motif of an EsA. It is concerned with taking a strategic view of the way different ecosystem services may be impacted on in any given decision context and designing management responses that reflect different needs, values and perspectives – in a word 'claims' – over them. Appeals to holistic thinking are far from novel in debates about sustainable resource management. We might say that taking a holistic approach is what sustainability has always been about. What is arguably distinctive about an EsA are the *qualities* of its organizing framework and its attendant *range* of concerns. In the former case, an EsA is significant in the way it utilizes the concept of ecosystem services to standardize how decision makers can read across the potential impacts of a decision. Because the units of management are simply differences of a kind, an EsA provides a systematic basis for comparing potential changes across ostensibly diverse aspects of resource management. In the latter case, an EsA's conception of what counts as a legitimate resource management concern is also significantly broadened. The basis of the framework is the natural environment's contribution to human well-being and this provides an

ambitious, arguably more daunting, utilitarian and non-utilitarian frame of reference for determining what falls within the ambit of environmental decision making. Not surprisingly, operational considerations for holistic thinking are presaged on a highly complex framework for exploring society-nature relations, but in certain important respects its conceptual logic remains underdeveloped and incomplete. Two challenges from the perspective of social sciences stand out.

Challenge 1: Elaborate further on the relationship between ecosystem services and well-being

The theoretical formula embedded in the ecosystem services framework suggests that ecosystems are generative of services from which benefits to human well-being are then derived. By design, the framework moves 'outwards' to well-being rather than 'inwards' to ecosystems. The conceptual basis of the influential Millennium Ecosystem Assessment (MA, 2005) is indicative of this general rubric.[2] Its visual construction of the ecosystem services framework is presented as a series of crisscrossing arrows, of varying strength, projecting outwards *from* different categories of ecosystem services *towards* constituents of well-being, such as human security, good social relations and so forth. To the extent that human processes move 'inwards' towards ecosystems and their respective services, they tend only to do so as 'drivers of change' (economic, demographic, etc.) impacting variably on service delivery. This reasoning has been replicated in the recent UK National Ecosystem Assessment (UK NEA, 2011).

Thus, the general theoretical premise is that ecosystems provide nature's 'services' and humans provide ecosystems with 'impacts'. This allows natural scientists to make better the case for conservation, but by starting from the perspective of services 'provided' the framework of ecosystem services has, paradoxically, developed a quite constrained understanding of the relationship between well-being and the natural environment. If we look after the services, the framework implies, well-being will take care of itself. Now, there are clearly some instrumental claims that advocates of the ecosystem services framework can reasonably make with regards to the relationship between ecosystem services and human well-being. No one would doubt the life-giving properties of clean water and nutritious food. But it is quite another thing to claim that ecosystem services have a constitutive role in such 'big' sociological and political ideas as 'social cohesion', 'mutual respect' or 'freedom of choice of action' (see MA, 2005). As it is currently conceptualized, this wider and more interpretative sense of well-being tends to be constructed as an 'emergent' property of the system and therein something that seems to elude direct observation. There is a sense, in effect, that well-being is a bit of a 'black box'.

My first challenge is this. Advocates of the ecosystem services framework need to develop a more elaborate understanding of how a rich and variegated term such as 'well-being' maps back onto the services that nature provides. The framework constructs services as providing benefits *to* well-being but the links are functionally quite narrow. A focus on the 'services provided' is rather like starting a business without conducting proper market research. There is a need to develop a better grasp of what 'well-being' means operationally and develop new and creative metrics for capturing systematically its otherwise elusive relationship with environmental systems. I am reminded here of the recent work of the New Economics Foundation (NEF, 2011). In what ways do its five steps towards well-being – 'connect', 'be active', 'take notice', 'keep learning' and 'give' – find expression in the way the natural environment is encountered and embodied? Or, more specifically, in what ways are these steps presaged on hitherto unexplored functional relationships between ecosystem services that can then be planned and accounted for within decision making? There is much in

the idea of ecosystem services that the methods and concepts of an established community of well-being researchers and practitioners can speak to (e.g. Chu et al., 2004; Huppert, 2008; McGillivray, 2007; Williams, 2007). We need to cultivate a better understanding of what this community is saying about the concept of well-being and how it is implicated in the services that nature provides.

Challenge 2: Develop a more subtle conception of 'culture'

One of the fascinating and most vexed areas of conceptualizing ecosystem services is in its allusion to 'cultural ecosystem services'. Running alongside the framework's more utilitarian considerations – such as the provision of clean water, nutritious food or air quality – the idea of cultural ecosystem services has been described as the 'non-material benefits people obtain from ecosystems' and includes inter alia 'spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience' (MA, 2005: 25). While there has been some conceptual and applied discussion of these services (e.g. Gee and Burkhard, 2010), it is arguably one of the least understood, and most controversial, areas of the framework.

Rather like the idea of well-being, this area of the framework creates an operational problem for resource management scientists faced with translating a rich concept like 'culture' into a programmatic and observable set of accounting units. The danger is that an EsA ends up addressing a rather underwhelming and predictable set of activities, such as types and patterns of recreation and (undertheorized) appeals to aesthetic value. There is a paucity of viable metrics for systematically gauging what it these cultural services are and how they may be changing.

There is another difficultly here that is not simply epistemological. The idea of cultural ecosystem services appears, in principle, to be an invitation to wider communities of researchers, across the humanities and social sciences, to engage with a more pluralistic and generative conception of natural resources, one that opens itself to more 'interpretive' concerns. Yet, if we set this idea against the many years of scholarship, geographical or otherwise, on scrutinizing and collapsing the dialectical relationship between 'culture' and 'nature' (e.g. Castree et al., 2001; Soper, 1995; Whatmore, 2002), we realize that cultural ecosystem services is a concept that is simplified at best, and dangerously close to overreaching itself at worst. It is not only problematic from the perspective of social scientific and humanities scholarship to imply a linear and deterministic relationship between ecosystems and culture – *it would be treacherous talk indeed to imply that ecosystems creates 'culture' in a non-reciprocal way* – but also highly reductionist to think of 'culture' as a 'service' provided. This seems out of step with how 'culture' is generally considered in the social sciences and humanities literature: namely, a set of practices and discourses riven with questions of social power and conduct, not least in relation to environment and landscape itself (Cosgrove and Daniels, 1988; Harvey, 1996; Wylie, 2007).

Advocates of the ecosystem services framework face a steep climb in winning the hearts and minds of cultural theorists over to their world view, many of whom would be more likely to regard cultural ecosystem services as an object of critique, rather than a concept to be embraced. Even if the idea of 'cultural ecosystem services' was accepted on its own terms – namely a helpful addition to an open and pragmatic decision making calculus ('better cultural ecosystem services than no culture at all') – it might be said that the framework is not yet subtle enough to recognize where cultural services end, and other aspects of the framework begin. It is probably more accurate to think of 'culture' less as a separate 'box' within the services typology and more as a systemic feature of many – ostensibly 'non-cultural' – examples of benefit provision. In what sense, for instance, is the provision

of 'food' not also a cultural ecosystem service? The production of food is central to the reproduction of culture often in highly specific and material ways: the relationship between food and local 'place making', for instance, is well documented in the human geography literature (e.g. Fonte and Papadopoulos, 2010; Maye et al., 2007). In other words, given the presumed importance of 'ecosystems' to all services, it might logically be more consistent to put 'culture' on an equally foundational footing as that of 'ecosystems'. It would not be implausible to think of the framework as really one of 'ecosystem-cultural services' or, perhaps more elegantly, 'culture-nature' services.

III Complexities of engagement under an ecosystems approach

In this section, I move away from issues of theoretical design to issues of theoretical application. I use the EsA's premise of broad and deep stakeholder participation as my jumping-off point (for an elaboration in policy, see Fish et al., 2011a, 2011b). Ensuring that environmental decision-making processes harness the values and insights of stakeholders is a well-established concern of applied environmental research. Many of the general problems and issues that must be faced when designing 'fit for purpose' stakeholder engagement processes have been well established in both theory and practice (e.g. Clark et al., 2001; Hage et al., 2010; Petts et al., 2003; Reed, 2008; Stagl, 2007). It seems important therefore to take stock and ask: what specific challenges does an EsA raise for the way in which decision making and corresponding interdisciplinary research are carried out in conjunction with stakeholder engagement?

Challenge 3: Move beyond 'ready-made' communities of interest

The general assumption behind a participatory approach is that there is a need to 'cast the net' widely in terms of who is being involved in decision making. Inclusive, legitimate and informed responses to issues of natural resource management – three common rationales for an inclusive process (Chilvers, 2009) – are likely to emerge where mechanisms are put in place to accommodate a diversity of perspectives and experiences. In questions of natural resource management stakeholders may seem readily identifiable, and the formal process of stakeholder identification self-evident. For instance, stakeholders may be identifiable to a participatory process because of their previous (or ongoing) experiences of engagement with a situation. Commonly, this includes those with designated power to act on behalf of others (such as statutory bodies charged with environmental mandates), and/or individuals, groups or organizations who have formal credentials or expertise (such as members of the scientific community). While these types of stakeholder remain integral to informed decision making, there is a need to encompass a much greater diversity of ideas, expertise and creative inspiration under an EsA.

It has been noted amply above that consideration of ecosystem services within decision making introduces a new level of complexity to assessing what matters and why in a decision. The framework encompasses ecosystem services that span quite different sectoral areas and places the natural environment directly in the service of human 'well-being'. Just as there is a need to engage with a broad constituency of scholars and policy practitioners in the theoretical design aspects of the framework, so too is it necessary to move beyond 'ready-made' communities of interest within the more vernacular domain of management. If we follow the broad conceptual logic of an EsA, the implication must be that parameters of evidence and practical 'know-how' should be significantly extended and redrawn. The challenge here is not a blithe and well-rehearsed appeal to arguments about salient local/lay expertise (Irwin, 1996). The value of such knowledge is hardly 'new news'

to those versed in the language and needs of stakeholder engagement. Rather, my point is to suggest that, as the meaning of 'environmental' resources is recast under an EsA, there is a need to think more creatively about 'who's in and why' (Reed et al., 2009). Who, for instance, are the people who can tell those with power and responsibility in environmental decision making about the value of ecosystem services to mental health, or to young people's sense of self-esteem in their communities, or to spiritual renewal, aesthetic value and cognitive development? We might say mental health workers, youth officers, faith-based groups, landscape architects, artists and environmental psychologists. There is a new cadre of expertise, with different professional norms and standards, that must find a voice within an EsA.

Challenge 4: Accept that the language of ecosystem services is generative of ideas

The fourth challenge concerns issues of language. There is a peculiar development in the recent history of the ecosystem services agenda that, while asserted as central to the future of natural resource management, involves an anxiety that people 'won't get it'. This is not only impressionistic. Reporting at the heart of UK central government has highlighted the potential for confusion, and that the language of ecosystem services may have to be recast in terms that people will understand (Defra, 2007b). The suggestion is that the idea of 'ecosystem services' is obfuscatory and, by implication, should remain a private expert language with a rather different public face. Moreover, I have already suggested above that the term 'ecosystem services' carries with it technocratic connotations which naturally expose it to a level of critique and scepticism. Yet, accepting that this terminology is by no means perfect, and that concepts have to be communicated cogently, an EsA loses much of its analytical power if it does not work with its own, very particular, vocabulary. It is precisely because the language of ecosystem services is non-conventional that it allows new thoughts and connections to be made. It is generative of reactions, debate, curiosity and demands explanation. The challenge is to work heuristically with this framework, and harness its generative power for reasoned discussion, not to deny it.

Challenge 5: Cultivate conversations about underpinning freedoms, not merely 'choices'

The CBD argues famously that the management of ecosystems and their services is a matter of 'societal choice' – one reflecting legitimate rights to influence and shape decisions that impact on human livelihoods and well-being. Pathways to the sustainable management of ecosystem services are rarely self-evident and uncontested, it is suggested. Underlying purposes of decisions may be open to competing claims and perspectives. Decisions will often be made in circumstances where evidence is often highly uncertain or incomplete, and where concern for the management of ecosystem services must be compared alongside a range of other factors, political or otherwise, that are driving and informing decisions.

An emphasis on choice within the EsA is a useful way of linking consideration of ecosystem services directly to the process of decision making, but there is a danger of misstating what is at stake in discussions of resource management. The danger with the word 'choice' is that it is sometimes confused with the idea of 'freedom'. Choices are always made in the context of wider systemic constraints on freedom; the most obvious in this context is environmental limits. There are also wider social limits that prescribe limits to freedom, which can be positive and negative – but always restrictive, even if any given decision making starts in some sense from the premise of 'choice'. Recognizing these wider parameters seems to be an important part of placing choices in context and identifying deep-seated tensions in ostensibly open – choice

driven – decision making processes. In short, if we are to use the word 'choice', then we need to accompany it with some open recognition and exploration of limits, environmental or otherwise. The concept of 'sustainability choice space' (Potschin and Haines-Young, 2008) is one version of what rising to this challenge may look like from a geographical perspective.

Challenge 6: Combine analytical rigour with interpretive complexity

In an EsA, natural and social scientists must develop well-reasoned analytical constructions of a decision issue: natural scientists, for instance, must be able to demonstrate how services interact and impact on service provision; social scientists must determine the criteria and mechanisms through which interventions are weighed up, assessed and valued. The whole role of the interdisciplinary researcher is to help cultivate trust and instil confidence that a course of action can be made in an informed fashion.

Yet, as I have alluded to above, an EsA, by definition, amplifies the complexities and uncertainties – what some might term indeterminacies (Wynne, 1992) – of a decision issue. This has both natural and social scientific dimensions. Decision making in a particular area may involve consideration of a range of ecosystem services but the precise impact of change on these services, and therefore how they might be managed, is often unclear. Consideration of one service impact, let alone multiple interacting phenomena, may be presaged on varying degrees of certainty and rely on analytical leaps of faith – such as probabilistic, expert-informed, assessments of risk (Fish et al., 2009). There is often no short cut to assured evidence and an EsA tends to reinforce this. To this we may add that management options under an EsA may combine and arrange benefits in a variety of plausible ways, or indeed involve different trade-offs that are considered equally optimal on different grounds of significance. Priorities for management are also complex and uncertain because the significance of a given change reflects how values are being applied and these will often vary depending on whether and, in what ways, individuals and groups derive benefits from services. For example, a change in the cultural service of recreation in a particular locality may be marginal from the perspective of those who use the service for recreational benefit, but non-marginal for individuals producing that service for their livelihood. Interventions may also be understood differently depending on how needs are related to particular timescales, for example, the difference between priorities in the 'here and now' over medium- and long-term (often intergenerational) concerns.

I make all these points to highlight that one of the emerging challenges of decision making under an EsA is for interdisciplinary researchers to develop further platforms for decision making that marry together the interpretative (social) complexity of sustainable resource management and the analytical (scientific) needs of informed – evidence based – decision making. Too often the tendency is to deal with uncertainty by artificially partitioning the world into one of 'facts' and 'values'. Natural scientists deal with the (uncertainty of) facts 'over here'; social researchers – the *handmaidens* of science – deal with the (uncertainty of) values 'over there'. This is not a credible basis for informed decision making. In one respect it tends to bury the scientific uncertainties and assumptions at work within expert discourse. Stakeholders become effectively blind to (or suspicious of) science's analytical claims, while science itself becomes insulated from the moral complexities that it could inform in a more dynamic and iterative way. We might also say the wider practical 'know-how' of stakeholders, which may well be of lasting significance to a decision process, also tends to be positioned outside the world of 'evidence' and into that of opinions and conjecture. The very basis for a reasoned discussion of what matters and why to a decision is, in short, heavily debilitated under this 'facts-values' model.

As the moral and scientific stakes rise under an EsA, this model will not do. The alternative trajectory of science-society engagement I envisage develops an 'analytic-deliberative' imperative to decision making. This is an approach originating in theories of environmental risk management (see Chilvers, 2007; Renn, 1999). Rather than setting facts and values apart, the approach actively meshes them together, dealing with the uncertainties pervading all 'evidence-based' decision making in an open and responsive way. Examples include a recent research project on UK flood risk management. The research team inaugurated what they termed 'competency groups' (Whatmore, 2009; Whatmore et al., 2008), a novel participatory 'apparatus' designed to 'equip a mapping of scientific uncertainty into public knowledge' (Whatmore, 2009: 595). The idea of a competency group is designed to convey the way in which distinctions between expert and lay knowledge start breaking down as explanations for an issue, and corresponding responses are developed collaboratively. There are other examples. Bayesian belief networks would be one (Chan et al., 2010; Smith et al., 2011; see also Haines-Young, 2011). Variants of deliberative multicriteria analysis, in which analytical tools are deployed to assess the performance of options against a range of (quantitative and qualitative) criteria – designed by stakeholders – would be another (Garmendia et al., 2010; Kenyon, 2007; Proctor and Drechsler, 2006). The overall focus of analytic-deliberative techniques is on integrating deliberative practice with more scientific/technical forms of analysis, and, in so doing, bringing facts and values into more open play.

IV Conclusion

The purpose of this paper has to been to consider some of the challenges facing the conceptual and applied aspects of incorporating ecosystem services into decision making. The tone of the challenges described in this paper are designed to impart neither untainted optimism nor dismissive cynicism about the adequacy of this framework for addressing, in all their variety, the ecological, economic and political dimensions of sustainable resource management. The reality is that, while thinking about decision making from the perspective of ecosystem services is no panacea for sustainability, it is a concept that is here, persistent, and carrying a momentum which interdisciplinary researchers need to find ways of both harnessing creatively and thinking about in critically engaged ways. As physical geography and related disciplinary areas continue to innovate in this area, the six challenges presented here are designed to offer some social science 'clues' as to how this creative and critical treatment of ecosystem services may reasonably begin to take shape and assert its influence.

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Notes

1. Haas (1992: 3) refers to an epistemic community as 'a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy relevant knowledge within that domain or issue-area'.
2. In this paper I am deploying the analytical frameworks of the Millennium Ecosystem Assessment (MA, 2005) and UK National Ecosystem Assessment (UK NEA, 2011) to illustrate some of the challenges underpinning the use of the 'ecosystem services' concept within EsA-style decision making. However, it is important to keep in mind that these assessments and their corresponding methodologies (such as scenario building) should not be conflated with the *Ecosystems Approach* which is focused on the practical decision making process.

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