

Conceptualising cultural ecosystem services: A novel framework for research and critical engagement



Robert Fish^{a,*}, Andrew Church^b, Michael Winter^c

^a School of Anthropology and Conservation, University of Kent, Canterbury, Kent CT2 7NR, United Kingdom

^b School of Environment and Technology, University of Brighton, BN2 4GJ, United Kingdom

^c Land, Environment, Economics and Policy Institute, University of Exeter, EX4 4PJ, United Kingdom

ARTICLE INFO

Keywords:

Cultural ecosystem services
Ecosystem assessment
Theory
Methods
Interdisciplinarity

ABSTRACT

The construction of culture as a class of ecosystem service presents a significant test of the holistic ambitions of an ecosystems approach to decision making. In this paper we explore the theoretical challenges arising from efforts to understand ecosystems as objects of cultural concern and consider the operational complexities associated with understanding how, and with what consequences, knowledge about cultural ecosystem services are created, communicated and accounted for in real world decision making. We specifically forward and develop a conceptual framework for understanding cultural ecosystem services and related benefits in terms of the environmental spaces and cultural practices that arise from interactions between humans and ecosystems. The types of knowledge, and approaches to knowledge production, presumed by this relational, non-linear and place-based perspective on cultural ecosystem services are discussed and reviewed. The framework not only helps navigate more fully the challenge of operationalising ‘cultural ecosystem services’ but points to a more relational understanding of the ecosystem services framework as a whole. Extending and refining understanding through more ambitious engagements in interdisciplinarity remains important.

1. Introduction

Consideration of the cultural benefits and values associated with ecosystems is a distinguishing feature of ecosystem service based approaches to natural resource management. As a paradigmatic class of service, ‘cultural ecosystem services’ has emerged as a concept around which researchers and decision makers can understand ecosystems in terms of their life-enriching and life-affirming contributions to human well-being, and represents one salient example of the way culture is more generally embraced as an important “variable” in the work of environmental managers and planners (Satterfield et al., 2013). Encompassing a broad symbolic, experiential and virtuous realm of human interactions and understandings of the natural environment, cultural ecosystem services are considered by Chan et al. (2011: 206) to inspire “deep attachment” in communities, and as such, are thought by some to act as important entry points for public engagement and concern in environmental matters, thus helping build wider public support for ecosystem protection (Daniel et al., 2012).

An important body of grey literature has emerged seeking to develop the concept of cultural ecosystem services in different policy, practice and geographical contexts. For instance, the work of the UN

Sub Global Assessment Network, set in motion by the Millennium Ecosystem Assessment (MA) (MA, 2005), has a database containing details of over 80 assessments (www.ecosystemassessments.net/) and of these, two thirds have been identified as specifically addressing cultural ecosystem services and their associated benefits. This may well under-report the extent of work. There have, for example, been wider studies mapping cultural ecosystem services across the European Union (Maes et al., 2013) while cultural ecosystem services have featured significantly within ecosystem assessment processes carried out in UK, Spain and Germany. Elaborations of the concept at the global scale have been further advanced by the establishment in 2012 of The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) which is undertaking a global assessment of the status and trends of biodiversity and ecosystems services and four regional assessments in Africa, the Americas, Asia Pacific, and Europe and Central Asia. The conceptual framework used in these assessments identifies cultural services, along with provisioning and regulating services, as the three forms of ecosystem service, describing these collectively as ‘Nature’s Gifts’ to reflect cultural differences internationally in terms of how human and non-human interactions are conceptualised (Diaz et al. 2015).

* Corresponding author.

E-mail addresses: R.Fish@kent.ac.uk (R. Fish), A.Church@brighton.ac.uk (A. Church), D.M.Winter@exeter.ac.uk (M. Winter).

Despite over a decade of national and international policy and practice activity in assessing ecosystem services, approaches informing understanding of cultural ecosystem services remain the subject of ongoing debate. The initiative established by the European Environment Agency to create a ‘Common International Classification of Ecosystem services’ (CICES) has undertaken a number of consultation exercises in an attempt to develop a more standard approach to describing ecosystem services (<http://cices.eu>). The consultation in 2012 noted that cultural services “cover all the non-material, and normally non-consumptive, outputs of ecosystems that affect physical and mental states of people ... [and] ... that this area was particularly problematic in terms of the different terminologies used by the wider community, which often does not make a distinction between services and benefits” (Haines-Young and Potschin, 2013). The IPBES initiative was still consulting in 2016 on the definition of cultural services to be used in its global and regional assessments (www.ipbes.net/plenary/taskforce). This lack of agreement on the nature and descriptions of cultural and other ecosystem services has significant implications for natural resource management and decision making, since policy makers will be less able to compare assessments or confidently address complex cultural issues when considering the management of biodiversity (Haines-Young and Potschin, 2013; see also Potschin and Haines-Young, 2016).

Although treatments of the concept from the starting point of academic literature remain comparatively marginal within the broader development of ecosystem service discourse,¹ a number of significant theoretical and thematic interventions (e.g. Braat and De Groot, 2012; Chan et al., 2012a; Daniel et al., 2012; Pereira et al., 2005; Schaich et al., 2010) empirical studies (e.g. Bieling and Plieninger, 2013, Jobstovgt et al., 2014; in this issue: Bryce et al. 2016; Edwards et al. 2016; Fish et al. 2016;) and touchstone summaries (e.g. Milcu et al., 2013) have emerged in recent years.

In this paper we seek to make a theoretical contribution to the debate about how to make sense of culture through the lens of an ecosystem services framework. The idea of ‘cultural ecosystem services’ is practically challenging in the context of recent debates about ecological knowledge production and decision making (Russel and Jordan, 2014), since a common starting point of ecosystem services research is that culture is a nebulous, and generally non-compliant, category of integrated resource management. As Plieninger et al. (2013: 119) reflect, “cultural services differ in various aspects from other ecosystem services, presenting strong barriers toward their broader incorporation”. Whether energies should be directed towards constructing culture so that it remains consistent with existing methods, or towards elaborating its exceptional position by way of entirely different models of knowledge production, is the epistemological conundrum that has driven recent academic discourse in this area (Satterfield et al., 2013).

In the argument that follows we outline and exemplify a framework to help better align the ‘cultural’ to the framework of ecosystem services, whilst recognising that consideration of this category brings with it some distinctive challenges for researchers and decision makers. We build on recent work developed as part of the UK National Ecosystem Assessment Follow-On (NEAFO, 2014) to advance a novel approach to cultural ecosystem services that is relational and non-linear; starting from the perspective of peoples’ interactions with, and understandings of places, localities, landscapes and species. This approach situates ecosystem services in their cultural geography, allowing a highly interpretative category of human meaning and experience to be explored in the context of material processes and entities. This is important for while the idea of ecosystem services is

designed to capture how interacting components of nature give rise to human well-being researchers have, paradoxically, tended to equate the category of cultural ecosystem services with the idea of ‘intangibility’ (Braat and De Groot, 2012; Constanza et al., 2011).

The paper specifically follows Chan et al. (2011) in advancing an understanding of cultural ecosystem services that recognises them as a co-produced and co-created outcome of peoples’ interaction with ecosystems and suggests, as Schaich et al. (2010) have done in their analogous discussion of landscape, that geographical understandings of culture provide researchers and decision makers with a powerful framework by which the cultural value and significance of ecosystems can be understood in material terms. This logic is also consistent with the conceptual framework for IPBES, which argues for the need to incorporate into assessment not only a consideration of the instrumental values associated with the benefits people gain from nature to enhance their quality of life, but also an analysis of the relational terms on which values in and through nature are constructed (Diaz, 2015). More generally, by locating ecological phenomena in their geographical context we argue that the interpretive qualities of cultural ecosystem services can be recognised in ways that avoid slipping into the potentially disempowering claim that culture is simply nowhere and therefore beyond interrogation (See also Williams, 1983; Cosgrove and Jackson, 1987; Jackson, 1996).

In the section that follows we review briefly key tenets of the debate regarding culture’s placement within the ecosystem services framework and how researchers have sought to distinguish understanding of this concept in relation to prevailing scientific and economic approaches to ecological knowledge production. Our focus here draws principally on the theoretical academic literature to contextualise our case for this more relational understanding of cultural ecosystem services. The distinctiveness of our contribution is then set out in Sections 3 and 4, describing first the key parameters of a novel framework for conceptualising cultural ecosystem services and its relationship to existing definitions and approaches, and then second, outlining and justifying the specific attributes of the framework. In Section 5 we go on to consider the implications of this theoretical contribution for the practical elaboration of cultural ecosystems services. Here we address specifically the way the framework maps on to issues of evidence gathering and knowledge production to inform the practice of ecosystem assessment and decision making taking an ecosystems approach. Our analysis concludes by suggesting that refining understanding and applications of this relational approach to cultural ecosystem services depends on further extending the interdisciplinary reach and ambitions of the ecosystem services agenda.

2. Producing knowledge about culture? Key areas of debate and critique

Although the general concept of ecosystem services is often associated with a broadly instrumental view of ecosystem-human relations, the idea of cultural ecosystem services is designed to recognise that ecosystems are replete with cultural value and significance and invite therefore an expansive understanding of the contributions ecosystems make to human well-being. Definitions vary but, like other classes of ecosystem service, understanding of this cultural dimension of ecosystems has been influenced considerably by the logic of the MA. Cultural ecosystem services thus encompass the “non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences” (MA, 2005: 4). Indeed, definitions put forward in policy applications of the ecosystem services framework tend to correspond strongly with this MA formula. This not only includes exercises in sub-global ecosystem assessment, but also wider international initiatives seeking to harmonise understanding of key concepts within decision making. For instance, the work of ‘The Economics of Ecosystems and Biodiversity’ (Kumar, 2010: 79), argues that cultural ecosystem

¹ At the time of writing, a search for the term ‘ecosystems services’ in a ISI Web of Science topic search resulted in around 22,000 articles. A search for the topic ‘cultural ecosystem services’ revealed just 157 contributions.

services encompass the “aesthetic, spiritual, psychological, and other benefits that humans obtain from contact with ecosystems”. As a general introductory observation it is worth noting that what is going by the name of ‘culture’ here bears more than a passing resemblance to its wider normative framing. For example, according to the seminal work of Williams (1983: 90) culture is commonly taken to signify the intellectual, spiritual and aesthetic dimensions of human life and development; precisely the kinds of attributes borne out of the MA’s formulation and its various elaborations.

In principle, cultural ecosystem services provide a way in which the cultural dimension of ecosystem contributions to human well-being can be utilised in decision making through standardised comparison with all other ecosystem services. In particular, building an understanding of these cultural services should be consistent with the general tenets of the so-called ‘cascade’ logic and its concern to build bodies of knowledge that can populate and discern the links between underpinning natural capital and human welfare (De Groot et al., 2010; Haines-Young and Potschin, 2010; Potschin and Haines-Young, 2011, 2016). By exploring the elements that make up this cascade, and the mechanisms that link them together, the argument is that ecosystem service researchers can systematically connect environmental processes and entities occurring in nature with wider benefits – physical, cognitive, social – to people. Thus, as Daniel et al. (2012: 8813) has put it, for culture to qualify as an ecosystem service, a “significant relationship between ecosystem structures and functions specified in the biophysical domain and the satisfaction of human needs and wants specified in the medical/social/psychological domain” must be demonstrated. In practice, however, cultural ecosystem service researchers have generally struggled to adapt their inquiries to this framework where scientific and economic valuation epistemologies have tended to loom large in framing what ‘counts’ as a legitimate knowledge (Wegner and Pascual, 2011; Cooper et al. 2016). There are two prominent and well-rehearsed dimensions to this problem.

First, cultural ecosystem services are challenging with respect to scientific methodologies for an ecosystems approach because practices of knowledge production proceed on the misguided assumption that these services are born of processes and characteristics that can be observed in nature and measured against independently variable standards and thresholds as is the case with quantities of nutritious food, levels of water quality and so forth. However, the reasoning goes that dimensions of lived experience that go by the name of culture, such as spiritual enrichment or aesthetic pleasure, can’t be neatly linked with changes in natural environmental processes and lack the well-defined measurement boundaries and internal consistency of other ecosystem services (Cooper et al., 2016 in this issue). Cultural ecosystem services are not, it seems, external components of nature awaiting discovery and allocation by people, like wood is placed in the hearth, or food and water is ingested. Instead, they are typically constructed, intangible and interpretative in character and emerge out of the relations between the non-human and human. As Chan et al. (2011: 207) write: “[the] property of intangibility is central to cultural ecosystem services ... [...] and often renders them difficult to classify and measure.”

Second, cultural ecosystem services are challenging in terms of the economic basis of ecosystem service based decision making, where a prominent concern has been to value ecosystem services in monetary terms. This is partly expressed as a question of the difficulties associated with applying valuation techniques to processes that often exist outside of market processes. Innovations in non-market monetary valuation through stated and revealed preference techniques, for example, provide some grounds for thinking of cultural services in economic terms, although as Milcu et al. (2013: NP) have argued, they tend to privilege those cultural process amenable to quantification, such as recreational and touristic activity, thus “deepening the gap between counting that which matters to people and that which is easy to measure”. Perhaps more significantly, the issue at stake here is also

ontological. The argument is that by extending techniques of economic valuation into understanding of culture, the *very* idea of culture is being transformed. In other words, what makes a service ‘cultural’ is precisely its ‘non-economic’ character. We might say here that the valuation of cultural ecosystem services is doubly problematical with respect to the generally vexed issue of environmental valuation, since the issue is not only whether nature should be valued as an economic asset, (a common area of critique: O’Neil, 2007; Robertson, 2012), but culture as well (Thorsby, 2001). It is notable in this vein that the recent IPBES conceptual framework explicitly addresses these issues, arguing that ecosystem assessments require a remit much wider than economic valuation within which the interactions between cultural and other ecosystem services should be considered. In a discussion of the IPBES framework Diaz et al. (2015: 13) claim, for example, that “farmers who cherish an agricultural way of life as part of their cultural heritage may feel that these values cannot be captured monetarily. The provision of clean drinking water by vegetated watersheds is seen by some cultures as an entitlement and not a commodity, thus being beyond the market logic”. Similar points have been made elsewhere. A recent study of coastal locations explains how fishing fleets that harvest provisioning services have, despite declines in the numbers of boats and fishers, an influence on the ports in which they are based far beyond the economic value of their catch as they shape cultural heritage, identities and a sense of place (Acott and Urquhart, 2014).

Perhaps unsurprisingly, these problems of recognising and valuing cultural ecosystem services have meant that understanding of the concept has tended to be associated with the practices of social research. This has a number of dimensions of which two areas of innovation stand out that seek to move beyond a focus on instrumental economic value. First, research has tended towards an understanding of cultural ecosystem services in terms of the psychological realm of human experience and perception. In this particular vein Braat and De Groot (2012: 8) assert that “all cultural services (by definition) involve activity of human sensory organs and brains to absorb and process, respectively, the information provided by the components, structure and dynamics of ecosystems”. Or as Gee and Burkhard (2010: 349) put it “[t]he physical environment is a mere bedrock of perception; intangible value is assigned by adding cognitive and imaginative overlays.” The focus of these authors, then, is on cognitive ‘processing’ of the external environment, emphasising self-reported meanings, feelings, sensations about ecological phenomena (see also Willis, 2015).

Second, research into cultural ecosystem services has tended towards the participatory and ethnographic realm. Here, understanding has coincided strongly with a more general principle of an ecosystem approach (Orchard-Webb et al., 2016 in this issue), namely to manage ecosystems in ways that are sensitive to their cultural context, with context essentially taken to mean the presence of locally variable needs, values, priorities and ways of ‘doing things’. The valorisation of traditional knowledge and indigenous communities in particular has thus been an important part of the way cultural ecosystem services enters the fray of an ecosystem approach (Satterfield et al., 2012). At play here is the idea of culture as life expressed *in situ*; something counterpointed to the general scientific and technocratic rationalities of resource management, yet something with which these rationalities must engage and interact if an ecosystems approach is to be effective.

In other words, cultural ecosystem services are about understanding modalities of living that people participate in, that constitute and reflect the values and histories people share, the material and symbolic practices they engage in, and the places they inhabit. These practices may be creative, ceremonial, celebratory, but also everyday and routine. For instance, Chan et al. (2011) cite the whole panoply of rituals that surround so called ‘keystone’ species, such as food sharing and naming and gifting ceremonies linked to salmon in the Pacific Northwest. Likewise, Raymond and Kenter (2016, in this issue) discuss

how, in the Solomon Islands, collective tillage and harvest in shifting cultivation rainforest subsistence agriculture reproduce a range of shared cultural values, such as mutual care (*hemakuani*), communal discussion (*hekarigi*) and sharing (*hemoti*). A more prosaic example would be the tendency of much cultural ecosystem services research to document these services in terms of non-work - leisure time - activities, especially recreation (e.g. Ruiz-Fraua et al., 2013; Nahuelhual et al., 2013).

3. Cultural ecosystem services: a heuristic for ecological knowledge production

Taking this analysis at face value, the implication is that cultural ecosystem services have an exceptional status *vis a vis* conventional epistemologies for knowledge production under an ecosystems approach. That is to say, they require distinctive concepts and methods if they are to be accounted for and integrated into research and decision making.

In this section we outline a framework for studying cultural ecosystem services developed from the reasoning above, and also introducing some important caveats and differences. In this way we argue it is possible to incorporate the distinctive aspects of culture into an ecosystems approach in a way that supports the conceptual complexity required to analyse culture whilst enabling decision-makers to address cultural services in policy processes in varying geographical contexts. This framework is summarised graphically in Fig. 1 and focuses on ontological dimensions of culture alone, that is, on how culture might be conceptualised as a category within the ecosystem services framework. Our framework is distinguished by its emphasis on the co-production and reciprocity of culture-nature relationships that some suggest is required to understand the unpredictable relationality between non-humans and humans (Whatmore, 2002; Nightingale, 2003; Hinchcliffe, 2008).

Cultural ecosystem services are understood here not as part of subject-object ontology - as *a priori* products of nature that people utilise for a particular benefit to well-being - but rather as relational processes and entities that people actively create and express through interactions with ecosystems. In advancing this logic we are close to Chan et al.'s (2012b) understanding of cultural ecosystem services as the “ecosystems’ contribution to the non-material benefits (capabilities and experiences) that arise from human–ecosystem relationships” (our emphasis). Thus, the philosophy behind the framework is relational and rests on explicitly rejecting linear and unidirectional constructions of the contributions ecosystems may make to well-being. As such it is consciously designed to disavow the ecosystems approach of any tendency toward simplistic environmental determinisms when making the case for nature in decision making, or more specifically when imagining the role of culture in environmental concerns.

This relational view of cultural ecosystem services is more consistent with the ecosystems approach than might appear from a reading of the cascade model. Wider elaborations of the ecosystem services framework have rightly pointed to the contribution that humans necessarily make to ecosystem service production - so called ‘capital’ inputs. So for instance, Constanza et al. (2011: 2) describe cultural ecosystem services as services that “combine with built, human, and social capital to produce recreation, aesthetic, scientific, cultural identity, or other “cultural” benefits”. The sense of an effortless flow of services, cultural or otherwise, arising from nature, is therefore an acknowledged simplification within wider analyses of the concept (Braat and De Groot, 2012). Many reconstructions of the ecosystem services framework have sought to account for this point by surrounding linear representations of ecosystem services and well-being with various human ‘feedback’ loops (De Groot, et al., 2010). In this sense all - *not only* cultural - ecosystem services are co-determined and co-produced through human-non human relationships (see Jones et al., 2016).

Alongside this relational focus we also seek to distance ourselves from the conflation of cultural services with non-materiality as set out in the MA. Although intangibility tells us something important about the nature of cultural benefits that arise in conjunction with ecosystems (i.e. they are often intangible), this approach leads to three inter-related problems. First, creating knowledge about ecosystem services works on the basis of viewing benefits as the product of services, so by dissolving this distinction it is not clear analytically from where the benefits would then arise. Secondly, by conferring the property of a benefit (i.e. intangibility) onto what would otherwise be described as a material process or thing (i.e. the cultural service), assessment of cultural ecosystem services tends to be associated with the measurement of immaterial processes alone, and thus the relationship to the biophysical domain is unclear (Kirchhoff, 2012). Third and finally, any appeal to intangibility tends to obscure the way that human-ecosystem relationships can also have a material cultural dimension. Traditions of academic work in the social sciences and humanities from - archaeology to anthropology - have long used concepts such as ‘material culture’ and ‘cultural materialism’ to convey the way that culture resonates through, and adheres to material objects, and in the present context this point is extended to include ecosystems. Furthermore, writing on the cultural dimensions of landscape and place recognises there are immaterial and material dimensions to both (Massey, 2005). As Satterfield et al. (2013: 105) note, it is problematical to assume that “cultural phenomena are...immaterial or intangible, when many are not”. This point also seems to hold true of wider sectors of policy and practice concerned with understanding and managing the materiality of landscape in terms of cultural processes and encompassing diverse professions including landscape planners, designers, architects and historians. For instance, traditions of work centred on landscape character assessment focus on understanding the distinguishing qualities of ‘place’ and are often replete with discussions of the processes of cultural production that shape them: from practices of land management to literary association (Fish et al., 2016).

The definition we specifically advance here, and represented in Fig. 1 is that cultural ecosystem services are the contributions ecosystems make to human well-being in terms of the identities they help frame, the experiences they help enable and the capabilities they help equip. This approach leads to the idea that the many and varied cultural goods and benefits associated with ecosystems arise from a series of cultural practices and the related cognitive, non-cognitive and embodied interactions occurring between people and a range of (culturally constructed) environmental spaces: places, localities, landscape or seascapes. Let us first outline in the next section some of the general theoretical tenets of this framework before going on in Section 5 to discuss the types of methods and techniques of knowledge production that might illuminate it in an empirical sense.

4. Key tenets of the conceptual framework

A general theoretical point conveyed by Fig. 1 is that an understanding of cultural ecosystem services reflects and creates a wider set of cultural values about ecosystems. By cultural values we are referring to collective principles and life goals, and the associated norms and expectations that influence how ecosystems accrue meaning and significance for people. Researchers have argued that cultural ecosystem services are both a product of the way these values are applied and a context in which they can be understood (Pereira et al., 2005; Chan et al., 2012a; Kenter et al., 2015; Diaz et al. 2015). The characteristics of these cultural values interacting with cultural ecosystem services are wide-ranging from a philosophical perspective and are acknowledged as highly complex. The IPBES conceptual framework, for instance, refers generally to the need for ecosystem assessments to address intrinsic and anthropocentric values that include instrumental and relational values. In a related discussion of the social valuation of ecosystem services by Kenter et al. (2015), eight types of shared/social

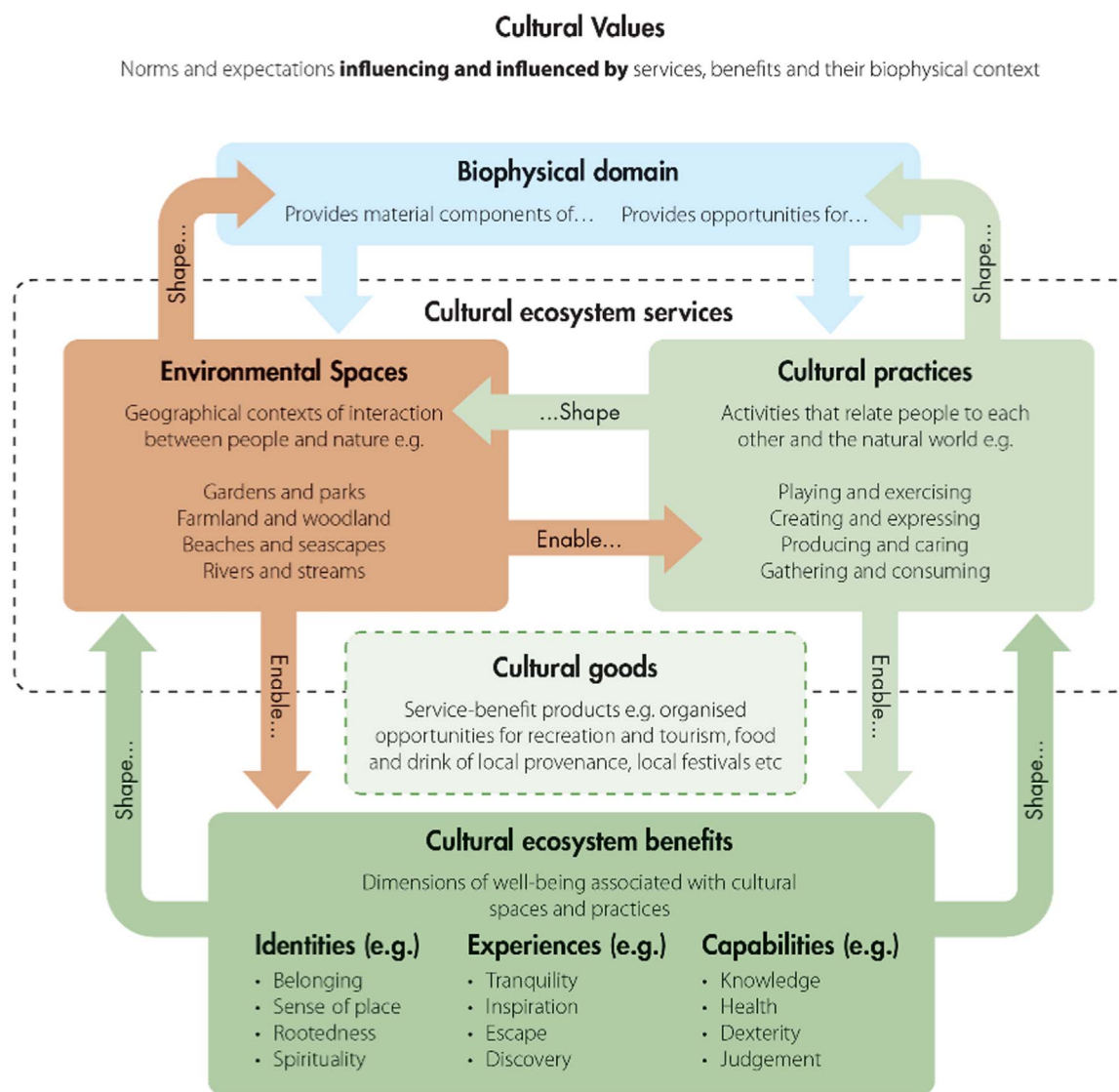


Fig. 1. A conceptual framework for cultural ecosystem services.

values interacting with cultural ecosystem services - ‘transcendental’, ‘cultural’, ‘societal’, ‘communal’, ‘group’, ‘deliberated’, ‘other regarding’ and ‘value to society’- are identified. We thus acknowledge, rather than directly amplify here, how cultural values intersect with the other component parts of our framework.

A number of important analytical and empirical distinctions can help guide understanding of these cultural services. In particular, the framework in Fig. 1 makes the distinction between:

- *Environmental spaces* - the places, localities, landscapes and seascapes in which people interact with each other and the natural environment;
- *Cultural practices* –expressive, symbolic and interpretive interactions between people and the natural environment;
- *Cultural benefits* - dimensions of human well-being that can be associated with these interactions between people and the natural environment; and,
- *Cultural goods* - the interactions between values, services and benefits will sometimes be amenable to market transactions, creating cultural goods that can be exchanged, sometimes but not always, in monetary terms.

Our overall argument is that environmental spaces and cultural practices should be considered mutually reinforcing cultural ecosystem services through which cultural benefits to well-being arise. In a biophysical sense, ecosystems are understood here to provide the physical and non-human components of these spaces, and the opportunities for cultural practices associated with them. By understanding these interacting elements of culture - spaces, practices and benefits – and the cultural values they shape and reflect, researchers and decision makers are provided with a framework by which to understand the cultural significance of ecosystems. This approach is consistent with wider developments in the cultural ecosystems services literature (e.g. Gee and Burkhard, 2010; Schaich et al., 2010; Bieling and Plieninger, 2013; Milcu et al., 2013; Palomo et al., 2016) and some of the detailed policy related activities to define and map cultural ecosystem services in Europe (e.g. European Union 2014).

In practical terms, the environmental spaces identified in Fig. 1 may be delineated in a variety of ways: a stretch of footpath, a street, a hill, an expanse of green space, a protected shipwreck, a marine conservation area, a national park or a nucleated settlement. All of these may plausibly provide ways of situating cultural benefits in their wider geographical milieu and be associated with a range of culturally

defined attributes (e.g. beauty, tranquillity, distinctiveness) that may be explored in the context of contributing natural capital. Approaches to classification and definition will vary according to underpinning purposes and resources, but a general philosophical point is that what counts as geographical context or attribute of significance to decision makers, communities and individuals will often rest on prevailing - deeply historical - ways of seeing (Cosgrove and Daniels, 1988).

While no single taxonomy of spaces and attributes exists to delineate these cultural contexts of human interaction and ecosystem benefit, accumulating convention and experience allow individuals, groups and institutions to make, re-make and discriminate over places according to established registers of cultural value (Selman and Swanwick, 2010). In this sense a landscape or seascape designated 'national park' or 'world heritage' status is not an absolute definition of cultural value, but neither is it purely arbitrary. Part of the task for researchers and decision makers, therefore, is to stay alert to counter-vailing tendencies; to explore places 'on the margin' (Shields, 1992). Places forgotten, obscured or indeed incongruent with prominent spatial frames: such as the unofficial countrysides and edgelands of the urban hinterland (see for example Crouch, 1998; Shoard, 2002; Mabey, 2010) Nevertheless, considerable attention in the attempt to measure cultural ecosystem services internationally and with Europe has focussed on measuring the provision and use of designated National Parks (Balmford et al., 2015; Schägner et al., 2016). The UK National Ecosystem Assessment (NEA, 2011) also measured trends in cultural services with a place based approach and referred to the types of places listed in Fig. 1 as 'environmental settings', a term also used as part of recent definitions of cultural services in the EU (Maes et al., 2013).

As Fig. 1 conveys, environmental spaces both enable, and are shaped by, cultural practices. By this we refer to that large symbolic, expressive and interpretive realm of human interactions with nature. Practices may be physical/embodied, textual/mediated and linguistic/discursive in form. Again cultural practices reflect and constitute cultural values and are a discernible way that culture can be said to manifest itself, both at particular moments in time (e.g. recreational activity) and as part of a broad cultural realm of lived experience (e.g. a whole 'way of life') (Williams, 1983). In the framework, these practices serve as the mechanism binding together cultural benefits to their biophysical/cultural contexts of production. Our framework distinguishes between four (often interrelated) types of cultural practice:

- *Playing and exercising* - activities of non-work leisure time involving informal and physical interactions between people and the natural environment. These may be sedentary, active, social and solitary such as walking, dog walking, climbing, running, cycling, sitting, looking, listening, picnicking or paddling.
- *Creating and expressing* - activities of non-work leisure time defined by the conscious construction of symbolic artefacts and processes. This may include solitary pursuits inspired by natural environment such as drawing, painting, photography, writing, poetry, as well as organised performances and participation in customs and rituals that draw on/reflect the natural environment in some way: music, drama and storytelling.
- *Producing and caring* - activities that span and blur both work/non-work engagements with the natural environment. The multitude of environmental and land based professions are included in this category as are more informal physical conservation and management of features of natural environment: cultivating land for food production, fishing, environmental volunteering, citizen science, gardening and, participation in agri-environmental stewardship.
- *Gathering and consuming* - activities spanning passive and active engagements with the natural world and which occur in both work and non-work contexts, such as: consuming food and drink of local provenance, collecting wild food, fibre and ornaments, consuming non conversational media and genre about a place e.g. local art/

artefacts/popular media/performances.

To reiterate, these cultural practices are understood by the framework as occupying a mutually constitutive role in the formation of cultural ecosystem services and benefits. Places, localities, landscapes and seascapes enable cultural practices to occur, but are also created through them. Equally, the identities, experiences and capabilities enabled through these practices also actively construct and reconstruct the character of cultural practices. And as Fig. 1 conveys, these services are subject to specific kinds of economic construction and transaction that place many of these elements within the realm of market based 'goods'. In the framework cultural ecosystem services are not reducible to the market sphere but neither are they wholly outside it. Another key dimension of the cultural practices listed in Fig. 1 is that they acknowledge the role of species and biota along with environmental places in the relational processes of creating cultural ecosystem services and also recognise the interactions between cultural and other services. In Europe, 97 species of mammals and birds have been identified as cultural ecosystem services arising from hunting (Schulp et al., 2014) which would in part be linked to the cultural practices of playing and exercise. Wild food, fruit and plant collecting that could be categorised as a gathering and consuming cultural practice have often in the past been conceptualised as provisioning services but recent studies have argued that they constitute both cultural and provisioning services (García-Nieto et al., 2013; Kenter et al., 2011).

As Fig. 1 indicates, environmental spaces and cultural practices enable and are shaped by cultural benefits. Despite the emphasis in most applications of the cultural ecosystem services concept on the issue of intangible benefits from nature, researchers and decision makers have generally struggled to disentangle what these many and diverse outcomes for people might be. To reiterate, the contributions these environmental spaces and cultural practices make to well-being are understood in three key ways: the *identities* they help frame, the *experiences* they help enable and the *capabilities* they help equip. By making these distinctions the framework is designed to avoid describing benefits in purely intangible terms. The cultural dimensions of human well-being are as visceral, embodied and 'felt' as they are constructed in thought, reason and cognitive processing of the environment (cf. Braat and De Groot, 2012). This broad classification represents a further development of the definition forwarded by Chan et al. (2011), thus:

- By *identities* we are highlighting the signifying qualities of ecological phenomena and how these are enmeshed in processes of identity formation. For instance, ecosystems are replete with cultural meanings through which people understand themselves and their relationship to the world around them. An example of a cultural benefit that coincides with these symbolic roles of ecosystem would be the idea of belonging: ecosystems play a role in the process of place identification through which ideas of affiliation and attachment develop.
- By *experiences* we are concerned with the way ecological phenomena are encountered and understood through events. Experiences are benefits felt mentally or physically through contact with ecosystems. Examples of an experiential cultural benefit might include feelings of calm or of spiritual enrichment arising from encountering some physical attribute of ecosystems, or an experience of nature deemed aesthetically pleasing. These contacts are not only embodied and proximate (such as the production of an experience through a walk in the forest or diving underwater), but also occur in disembodied and distant ways as well (such as the benefits associated with consuming nature through a television programme).
- By *capabilities* we are focusing on the role that ecological phenomena play in shaping individual and social capacities to understand and do things. For instance, ecological phenomena are utilised in processes of knowledge acquisition at the level of general intellectual

and scientific advancement (such as making sense of biodiversity), but also in patterns of individual development, such as the acquisition of personal skills and knowledge through which people flourish as individuals (such as wisdom, judgment, insight) and advance their situation in life (for example through acquiring gainful employment). The idea of capabilities is therefore about capturing how people and human cultures more generally, equip themselves, through nature, to prosper.

As befits the objectives of ecosystem assessment, exploring these types of benefits situates concerns firmly within a *normative* account of culture. Assessment is concerned with understanding culture in terms of its virtuous and life enriching qualities, as opposed to something contested, limiting or indeed threatening. The framework we advance here is designed to conform to wider historical and popular discourse on what these benefits might comprise (see Williams, 1983) but the idea of a cultural benefit is, of course, highly interpretive: one person's cultural benefit may well be another's cultural dis-benefit (see Plieninger et al., 2013). To reiterate a claim made more generally above, cultural benefits will often lack the apparent internal consistency of other arenas of ecosystem assessment. They also lack well defined measurement boundaries. For example, an experience of nature (e.g. aesthetic pleasure) can be read through the lens of identity (e.g. the construction of valued place identities) just as a capability (e.g. the ability to catch a fish) can be read through the lens of experience (e.g. a feeling of oneness with nature) and so forth. Practically, it may be logical to explore how these benefits mutually reinforce each other in particular geographical contexts rather than attempt to separate them artificially (see Fish et al. in this issue). As the next section suggests despite these challenges for measurement, the theoretical conceptual framework outlined in this paper can also contribute to the decision making process by providing clarity relating to cultural ecosystem services.

5. Epistemologies for exploring cultural ecosystem services in practice

Understanding and accounting for cultural ecosystem services is an essentially interpretive and plural issue: it follows from the framework outlined above that 'what matters, where and why to people' is always open to revision and debate, but as discussed earlier, in policy and practice there is a need for some consistency in how cultural and other ecosystem services are defined and conceptualised (Potschin and Haines-Young, 2016). The challenge facing the decision maker is how to approach culture in ecosystem management in ways that reveal, recognise and dignify this inherent diversity but are also amenable to systematic appraisal in ecosystem management. Our argument is that when disaggregated in the framework in Fig. 1 in terms of spaces, practices, goods and benefits, the concept of cultural ecosystem services lends itself more readily to use in ecosystem assessments and related decision making. In addition, the framework highlights the need for a range of assessment approaches that can provide a varied but consistent and robust evidence base to aid decision making. We suggest that the framework implies a consistency arising from the focus on environmental spaces, practices, goods and benefits but also given the differences between these conceptual entities it highlights the need for methodological plurality to address these entities in an ecosystem assessment. Methods will be needed to interplay and blend together sources and forms of evidence that straddle official and informal, tangible and intangible, as well as cognitive and embodied elements of human interactions with a range of environmental spaces (also see Kenter, 2016b).

By situating cultural ecosystem services in the context of 'environmental spaces and cultural practices', decision makers are well placed to provide analytical and quantitative treatments of these services, for instance measuring or producing indicators for the material stock and

supply of enabling environmental spaces for cultural practices, or assessing the volume and rate of the change of cultural practices that occur within these places. According to the framework, decision makers may, for example, produce indicators for cultural ecosystem services by measuring what proportion of an urban environment is comprised of public parks or woodland, or map these spaces onto different social cleavages such as how different social groups can be seen to access and use these spaces in particular ways (Tratalos et al., 2016). Moreover, these environmental spaces can also be explored in terms of the physical attributes that make them special, significant or important to people and thus inform the development of basic measures of ecosystem quality that reflect wider cultural judgements and uses (for examples see Kenter 2016b, and Fish et al., 2016 in this issue). In this way, the framework and measures associated with it are following the logic of the cascade model of assessing not just services but the processes contributing to those services (Potschin and Haines-Young, 2011; 2016). Furthermore, the framework encourages decision makers in assessing ecosystem services to regard environmental spaces, cultural practices, goods and benefits not as separate entities in linear relationships, but rather as relational phenomena continually enabling and shaping each other. In this way, the framework brings with it a recognition that the drivers of change underpinning ecosystem assessment (Ash et al., 2010) are also embedded in the services themselves. Environmental spaces and cultural practices, like culture itself (Williams, 1983), have an agency.

The elaboration of measures of cultural ecosystem services based on spaces, practices, benefits and goods requires the building of complex data infrastructures and ways of quantifying these services in a defensible, if not independently verifiable, ways. These issues are not exceptional to the concerns of cultural ecosystem services. Indeed, as noted above, the identification of these spaces and practices involves the implicit valorisation of particular ways of 'seeing' cultural significance, but this point holds true of all other ecosystem services, such as the identification of 'clean' water supply or the provision of 'nutritious' food. The issue is not so much whether one can measure an ecosystem service, but ensuring, as the conceptual framework in Fig. 1 does, that the conditions of cultural production that produce them are recognised in an ecosystem assessment.

Furthermore, the conceptual framework explicitly addresses an important countervailing requirement of the ecosystems agenda which is for decision makers to make citizens and communities active participants in, and witnesses to, any construction and assessment of a particular ecosystem service domain (see for instance the Convention on Biological Diversity [www.cbd.int/]). Such approaches may involve surveying people about their general values and attitudes towards cultural ecosystem services, through the use of extensive structured questionnaires, semi-structured interviews (including oral histories) and focus group discussions. They may also involve the use of deliberative and dialogue-based methods of research, such as extended in-depth discussion groups and creativity sessions using storytelling or arts-based deliberations (e.g. in this issue: Edwards et al., 2016; Fish et al., 2016; Kenter et al., 2016; Orchard-Webb et al., 2016). Current evidence suggests that the development of participatory approaches by way of the mapping of ecosystem services provide one context in which cultural services may be imagined, debated and find expression in practical arenas of resource management. Indeed, mapping in the form of multi-layered GIS resources is becoming a core inter-disciplinary tool for analysing and presenting information on ecosystem services in general, and cultural ecosystem services in particular. There is a range of publicly accessible academic research on the use of these techniques in decision-making contexts (e.g. Brown and Raymond, 2007; González, et al., 2010; Bieling and Plieninger, 2013; Plieninger et al., 2013; Klain et al., 2014; Kenter, 2016a,b,c; Fish et al., 2016). The conceptual framework, however, with its emphasis on spaces, practices, benefits and goods provides a series of clear entities that decision makers using participatory techniques can address when considering

cultural ecosystem services and in this way provides a ‘check list’ of what needs to be considered when devising and implementing such techniques.

The framework also provides a conceptual basis for attempts to hybridise culturally informed participatory research with environmental valuation techniques. For example, recent developments in ecological economics around the idea of deliberative monetary and non-monetary valuation provide a way in which preferences and values for ecosystem services change can be explored in group based discursive contexts (e.g. Raymond et al., 2014; Kenter, 2016c; Orchard-Webb et al., 2016). From this perspective, individuals function as much as citizens and members of communities as they do as consumers and thus the focus is on what binds people together as groups. Through these techniques, ecosystem services in all their variety are effectively being characterised as objects of collective, shared and social values, and therein, as services of cultural concern. These techniques have the potential to spin out in different ways, but all imply constructions of cultural ecosystem services from the ‘inside out’ as is stressed by the enabling and shaping relational components of the framework. Collectively, these methods allow researchers to further probe the reasoning that underlies attitudes about cultural ecosystem services, activate hitherto unarticulated or latent values, encourage the exchange of perspectives on matters of mutual interest and concern, as well as evaluate different types of evidence. More generally, these conversational and interactive research techniques may be complemented by the analysis of (non-deliberative and non-conversational) cultural texts in both historical and contemporary terms (Coates et al., 2014). For instance, many popular television, magazine, cinema, art and literature texts carry motifs and narratives about the cultural values and benefits associated with ecosystems, and there are a range of analytical techniques - such as content, semiotic and discourse analysis - that can be employed to develop sophisticated readings of these texts, not least in placing cultural ecosystem services in more historically contingent discourse.

Overall, the application of participatory and interpretive research techniques is important to investigate the complexity that underlies the personal and collective values associated with cultural ecosystem services and benefits that arise in conjunction with them, since they facilitate the study of the fine-grained, often time-profound texture of the relations of particular people with particular places at particular times, and indeed, are conducive to the process of negotiating the resolution of ‘clashes’ between values through social learning. Yet in advocating these approaches, this logic should not be seen as implicitly constructing the local and the participatory as a more authentic route to an understanding of cultural ecosystem services. In general, we need to avoid the simplistic and self-defeating claim that cultural ecosystem services can be rendered more clearly through one particular scale or method of knowledge production. The spaces, practices, goods and benefits at the core of the conceptual framework provide a readily adopted, but theoretically rooted, series of entities that can be used to play a variety of roles from guiding participatory techniques to designing quantitative measures and indicators for ecosystem assessments. As a result, the framework will facilitate comparisons between local situations and assessments whilst enabling a more consistent approach to cultural ecosystem services that has been identified as a priority for the ecosystem assessments in general.

6. Conclusion

Culture may well be intuitively important, if not critical, to the idea of holistic resource management, but extending this principle beyond the purview of a general theoretical framework is another thing altogether. The concept of cultural ecosystem services remains in important respects a residual category of ecological knowledge production. The litany of ‘nons’ that have often pervaded this category is in of note: non-market; non instrumental; non-use; non-material; non-

monetary; non-economic, non-secular. The danger is that in this guise culture remains a methodological and theoretical curiosity: “the surface variation left unaccounted for by more powerful economic analyses” to borrow Cosgrove and Jackson’s (1987: 95) memorable phrase. The placement of cultural ecosystem services at the bottom of most visualisations and lists of ecosystem services tends to reinforce this sense of residuality.

Yet, as our analysis shows, at least some of the apparent impediments to incorporating culture into the methods and mindsets of the ecosystem services framework are ‘phantom’ problems. We need in particular to stop conceiving cultural ecosystem services as a purely immaterial domain of inquiry, as conveyed and advanced influentially by the MA. The separation of cultural ecosystem services from benefits that we propose helps researchers and decision makers clarify what they are creating knowledge about. It also emphasises discernment between the environmental places and cultural practices that link together biophysical entities and processes with wider human well-being. In doing so we suggest that the framework outlined in this paper not only provides for a more theoretically nuanced approach to cultural services, but also clarity in their practical assessment across diverse contexts. And as our discussion here shows too, when advancing such an understanding of cultural ecosystems services we observe that many of the characteristics that are thought to make cultural ecosystem services exceptional with respect to the process of ecological knowledge production are shared across the study of all ecosystem services. The need for a relational and methodologically plural focus to research is not reducible to ideas of culture.

The framework is a significant but provisional advancement. In further elaborating the shape of our novel approach to cultural ecosystem services, we suggest commitments to a broad and deep interdisciplinarity will be important. The provenance of an ecosystem services and the ecosystems approach is in natural resource management debates and literatures and is designed to promote and embed such commitments in cross-sectoral decision making. Yet these commitments also significantly extend the boundaries of expertise (and we might say natural enthusiasms of much ecosystem services scholarship). If the theoretical frameworks and methods for ecological knowledge production are to evolve in the conjunction with a sophisticated reading of the ‘cultural’, ecosystem services researchers will need to explore much further and engage more fully with wider fields of study - from environmental anthropology and environmental history to cultural geography and cultural studies - replete with concepts and methods, indeed mature traditions, for interrogating environmental phenomena and processes in cultural terms. The argument, framework and models of knowledge production set out in this paper establish some of contexts in which the interdisciplinarity treatment of culture within ecosystem services thinking might occur. It remains the case that a conversation between critical and ecological constructions of the ‘culture of nature’ is at an early stage and overdue.

Acknowledgements

This research was funded through the UK National Ecosystem Assessment Follow-On (Work Package 5: Cultural ecosystem services and indicators) funded by the UK Department of the Environment, Food and Rural Affairs (Defra), the Welsh Government, the UK Natural Environment Research Council (NERC), Economic and Social Research Council (ESRC), and Arts and Humanities Research Council (AHRC).

References

- Acott, T., Urquhart, J., 2014. Sense of place and socio-cultural values in fishing communities along the English Channel. In: Urquhart, J., Acott, T., Symes, D., Zhao, M. (Eds.), *Social Issues in Sustainable Fisheries Management*. Springer, Dordrecht, NL, 257–278.

- Ash, N., Blanco, H., Brown, C., Garcia, K., Henrichs, T., Lucas, N., Raudsepp-Hearne, C., Simpson, R.D., Scholes, R., Tomich, T., Vira, B., Zurek, M., 2010. *Ecosystems and human well-being: A manual for assessment practitioners*. Island Press, Washington D.C., U.S.A.
- Balmford, A., Green, J.M.H., Anderson, M., et al., 2015. Walk on the Wild Side: Estimating the Global Magnitude of Visits to Protected Areas. *PLOS Biol.* <http://dx.doi.org/10.1371/journal.pbio.1002074>.
- Braat, L.C., De Groot, R.S., 2012. The ecosystem services agenda: bridging the worlds of natural science and economics, conservation and development, and public and private policy. *Ecosyst. Serv.* 1, 4–15. <http://dx.doi.org/10.1016/j.ecoser.2012.07.011>.
- Bieling, C., Plieninger, T., 2013. Recording manifestations of cultural ecosystem services in the landscape. *Landsc. Res.* 38, 649–667. <http://dx.doi.org/10.1080/01426397.2012.691469>.
- Brown, G., Raymond, C., 2007. The relationship between place attachment and landscape values: towards mapping place attachment. *Appl. Geogr.* 27, 89–111. <http://dx.doi.org/10.1016/j.apgeog.2006.11.002>.
- Bryce, R., Irvine, K., Church, A., Fish, R., Ranger, S., Kenter, J.O., 2016. Subjective well-being indicators for large-scale assessment of cultural ecosystem services. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.07.015>, This issue.
- Coates P., Brady E., Church A., et al., 2014. *Arts & Humanities Perspectives on Cultural Ecosystem Services*. UK NEA Follow-on: Final Report of the Arts and Humanities Working Group. (WCMC: Cambridge)
- Chan, K.M.A., Goldstein, J., Satterfield, T., Hannahs, N., Kikiloi, K., Naidoo, R., Vadeboncoeur, N., Woodside, U., 2011. Cultural services and non-use values. In: Kareiva, P., Tallis, H., Ricketts, T.H., Daily, G.C., Polasky, S. (Eds.), *Natural Capital: Theory and Practice of Mapping Ecosystem Services*. Oxford University Press, Oxford, 206–228.
- Chan, K., Guerry, A., Klain, S., Satterfield, T., Balvenera, P., Basurto, X., Bostrom, A., Chuenpagdee, R., Gould, R., Halpern, B.S., Hannahs, N., Levine, J., Norton, B., Ruckelshaus, M., Russell, R., Tam, J., Woodside, U., 2012a. Where are 'cultural' and 'social' in ecosystem services: a framework for constructive engagement. *Bioscience* 62, 744–756. <http://dx.doi.org/10.1525/bio.2012.62.8.7>.
- Chan, K.M.A., Satterfield, T., Goldstein, J., 2012b. Rethinking ecosystem services to better address and navigate cultural values. *Ecol. Econ.* 74, 8–18. <http://dx.doi.org/10.1016/j.ecolecon.2011.11.011>.
- Constanza, R., Kubiszewski, I., Ervin, D., Bluffstone, R., Boyd, J., Brown, D., Chang, H., Dujon, V., Granek, E., Polasky, S., Shandas, V., Yeakley, A., 2011. Valuing ecological systems and services. *F1000 Biol. Rep.* 3, 14. <http://dx.doi.org/10.3410/B3-14>.
- Cooper, N., Brady, E., Bryce, R., Steen, H., 2016. Aesthetic and spiritual values of ecosystems: recognising the ontological and axiological plurality of cultural ecosystem 'services'. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.07.014>, This issue.
- Cosgrove, D., Daniels, S., 1988. *The iconography of landscape*. University Press, Cambridge.
- Cosgrove, D., Jackson, P., 1987. New directions in cultural geography. *Area* 19, 95–101.
- Crouch, D., 1998. The Allotment, landscape and locality: ways of seeing landscape and culture. *Area* 21, 261–267.
- Daniel, T.C., Muhar, A., Aramberger, A., Aznar, O., Boyd, J., et al., 2012. Contributions of cultural services to the ecosystem services agenda. *Proc. Natl. Acad. Sci.* 109, 8812–8819. <http://dx.doi.org/10.1073/pnas.1114773109>.
- De Groot, R.S., Fisher, B., Christie, M., 2010. Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation. In: Kumar, P. (Ed.), *TEEB Ecology and Economic Foundations*. Earthscan, London, 9–40.
- Diaz, S., Demissew, S., Carabias, J., et al., 2015. The IPBES Conceptual Framework—connecting nature and people. *Curr. Opin. Environ. Sustain.* 14, 1–16. <http://dx.doi.org/10.1016/j.cosust.2014.11.002>.
- Edwards, D., Collins, T., Goto, R., 2016. An arts-led dialogue to elicit shared, plural and cultural values of ecosystems. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.09.018>, This issue.
- Fish, R., Church, A., Willis, C., Winter, D.M., Tratalos, J., Haines-Young, R., Potschin, M., 2016. Making space for cultural ecosystem services: insights from a study of the UK Nature Improvement Initiative. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.09.017>, This issue.
- García-Nieto, A.P., García-Llorente, M., Iniesta-Arandia, I., Martín-Lopez, B., 2013. Mapping forest ecosystem services: From providing units to beneficiaries. *Ecosyst. Serv.* 4, 126–138. <http://dx.doi.org/10.1016/j.ecoser.2013.03.003>.
- Gee, K., Burkhard, B., 2010. Cultural ecosystem services in the context of offshore wind farming: a case study from the west coast of Schleswig-Holstein. *Ecol. Complex.* 7, 349–358. <http://dx.doi.org/10.1016/j.ecocom.2010.02.008>.
- González, V., Balteiro, L.D., Martínez, E.L.P., 2010. Spatial valuation of recreation activities in forest systems: application to province of Segovia (Spain). *For. Syst.* 19, 36–50. <http://dx.doi.org/10.5424/fs/2010191-01165>.
- Haines-Young, R., Potschin, M., 2010. The links between biodiversity, ecosystem services and human well-being, in *Ecosystem Ecology: A New Synthesis* Eds D Raffaelli, C Frid (BES ecological reviews series, Cambridge University Press) pp. 110–139
- Haines-Young R., Potschin M., 2013. Common International Classification of Ecosystem Services (CICES): Consultation on Version 4, August–December 2012. EEA Framework Contract No EEA/IEA/09/003 (Accessible at www.cices.eu)
- Hinchcliff, S., 2008. Reconstituting nature conservation: towards a careful political ecology. *Geoforum* 39, 88–97. <http://dx.doi.org/10.1016/j.geoforum.2006.09.007>.
- Jackson, P., 1996. The Idea of Culture: A reply to Don Mitchell. *Trans. Inst. Br. Geogr.* 21, 572–582. <http://dx.doi.org/10.2307/622599>.
- Jobstovgt, N., Watson, V., Kenter, J.O., 2014. Looking below the surface: The cultural ecosystem service values of UK marine protected areas (MPAs). *Ecosyst. Serv.* 10, 97–110. <http://dx.doi.org/10.1016/j.ecoser.2014.09.006>.
- Jones, L., Norton, L., Austin, Z., Browne, A.L., Donovan, D., Emmett, B.A., Grabowski, Z.J., Howard, D.C., Jones, J.P.G., Kenter, J.O., Manley, W., Morris, C., Robinson, D.A., Short, C., Siriwardena, G.M., Stevens, C.J., Storkey, J., Waters, R.D., Willis, G.F., 2016. Stocks and flows of natural and human-derived capital in ecosystem services. *Land Use Policy* 52, 151–162. <http://dx.doi.org/10.1016/j.landusepol.2015.12.014>.
- Kirchhoff, T., 2012. Pivotal cultural values of nature cannot be integrated into the ecosystem services framework. *Proc. Natl. Acad. Sci.* 109, E3146. <http://dx.doi.org/10.1073/pnas.1212409109>.
- Kenter, J.O., Hyde, T., Christie, M., Fazey, I., 2011. The importance of deliberation in valuing ecosystem services in developing countries - Evidence from the Solomon Islands. *Glob. Environ. Change* 21, 505–521. <http://dx.doi.org/10.1016/j.gloenvcha.2011.01.001>.
- Kenter, J.O., O'Brien, L., Hockley, N., et al., 2015. What are shared and social values of ecosystems? *Ecol. Econ.* 111, 86–99. <http://dx.doi.org/10.1016/j.ecolecon.2015.01.006>.
- Kenter, J.O., 2016a. Integrating deliberative choice experiments, systems modelling and participatory mapping to assess shared values of ecosystem services. *Ecosystem Services*. This issue <http://dx.doi.org/10.1016/j.ecoser.2016.06.010>
- Kenter, J.O., 2016b. Shared, Plural and Cultural Values of Ecosystem Services. *Ecosystem Services*. This issue <http://dx.doi.org/10.1016/j.ecoser.2016.10.010>
- Kenter, J.O., 2016c. Deliberative and Non-Monetary Valuation, in Eds. M. Potschin, R. Haines-Young, R.Fish, R.K. Turner, *Routledge Handbook of Ecosystem Services*. Routledge, London
- Kenter, J.O., Jobstovgt N, Watson V, Irvine K, Christie M, Bryce R., 2016. The impact of information, value-deliberation and group-based decision-making on values for ecosystem services: integrating deliberative monetary valuation and storytelling Ecosystem Services. This issue <http://dx.doi.org/10.1016/j.ecoser.2016.06.006>
- Klain, S.C., Satterfield, T.A., Chan, K.M.A., 2014. What matters and why? Ecosystem services and their bundled qualities. *Ecol. Econ.* 107 (C), 310–320.
- Kumar, P. (Ed.), *The Economics of Ecosystems and Biodiversity*. 2010. EarthScan, London
- MA, 2005. *Millennium Ecosystem Assessment: Ecosystems and Human Well-being*. (Island Press, Washington DC)
- Mabey, R., 2010. *The Unofficial Countryside*. (Little Toller Books: Dorset)
- Maes, J., Teller, A., Erhard, M., et al., 2013. Mapping and Assessment of Ecosystems and their Services. An analytical framework for ecosystem assessments under action 5 of the EU biodiversity strategy to 2020. Publications office of the European Union, Luxembourg
- Massey, D., 2005. *For Space*. Sage, London.
- Milcu, A., Ioana, J., Hanspach, D., Abson, D., Fischer, J., 2013. Cultural ecosystem services: a literature review and prospects for future research. *Ecol. Soc.* 18, 44. <http://dx.doi.org/10.5751/ES-05790-180344>.
- Nahuelhual, L., Carmona, A., Lozada, P., Jaramillo, A., Aguayo, M., 2013. Mapping recreation and ecotourism as a cultural ecosystem service: an application at the local level in Southern Chile. *Appl. Geogr.* 40, 71–82. <http://dx.doi.org/10.1016/j.apgeog.2012.12.004>.
- NEA, 2011. *UK National Ecosystem Assessment*. (WCMC: Cambridge)
- NEAFO, 2014. *UK National Ecosystem Assessment follow-on*. (WCMC: Cambridge)
- Nightingale, A., 2003. Nature-society and development: social, cultural and ecological change in Nepal. *Geoforum* 34, 525–540. [http://dx.doi.org/10.1016/S0016-7185\(03\)00026-5](http://dx.doi.org/10.1016/S0016-7185(03)00026-5).
- O'Neill, J., 2007. *Markets, Deliberation and Environment*. (Routledge, London)
- Orchard-Webb, J., Kenter, J.O., Bryce, R., Church, A., 2016. Democratic Deliberative Monetary Valuation to implement the Ecosystems Approach. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.09.005>, This issue.
- Palomo, I., Felipe-Lucia, M.R., Bennet, E.M., Martín-López, B., Pascual, U., 2016. Disentangling the pathways and effects of ecosystem service co-production. *Adv. Ecol. Res.* 54, 245–283. <http://dx.doi.org/10.1016/bs.aecr.2015.09.003>.
- Pereira, E., Queiroz, C., Pereira, H.M., Vicente, L., 2005. Ecosystem services and human well-being: a participatory study in a mountain community in Portugal. *Ecol. Soc.* 10, 14–28.
- Plieninger, T., Dijks, S., Oteros-Rozas, E., Bieling, C., 2013. Assessing, mapping and quantifying cultural ecosystem services at community level. *Land Use Policy* 33, 118–129. <http://dx.doi.org/10.1016/j.landusepol.2012.12.013>.
- Potschin, M., Haines-Young, R., 2011. Ecosystem Services: Exploring a geographical perspective. *Progress in Physical Geography* 35 (5), 575–594.
- Potschin, M., Haines-Young, R., 2016. Defining and measuring ecosystem services. In: Potschin, M., Haines-Young, R., Fish, R., Turner, R.K. (Eds.), *Routledge Handbook of Ecosystem Services*. Routledge, London and New York, 25–44.
- Raymond, C., Kenter, J.O., 2016. Assessing and applying transcendental values to the management of ecosystem services. *Ecosyst. Serv.* <http://dx.doi.org/10.1016/j.ecoser.2016.07.018>, This issue.
- Raymond, C.M., Kenter, J.O., Plieninger, T., Turner, N.J., Alexander, K.A., 2014. Comparing instrumental and deliberative paradigms underpinning the assessment of social values for cultural ecosystem services. *Ecol. Econ.* 107, 145–156. <http://dx.doi.org/10.1016/j.ecolecon.2014.07.033>.
- Robertson, M., 2012. Measurement and alienation: making a world of ecosystem services. *Trans. Inst. Br. Geogr.* 37, 386–401. <http://dx.doi.org/10.1111/j.1475-5661.2011.00476.x>.
- Ruiz-Fraua, A., Hinz, H., Edwards-Jones, G., Kaiser, M.J., 2013. Spatially explicit economic assessment of cultural ecosystem services. *Mar. Policy* 38, 90–98. <http://dx.doi.org/10.1016/j.marpol.2012.05.023>.
- Russel, D., Jordan, A., 2014. Embedding the concept of ecosystem services? The utilisation of ecological knowledge in different policy venues. *Environ. Plan. C: Gov. Policy* 32, 192–207. <http://dx.doi.org/10.1068/c3202ed>.

- Satterfield, T., Gregory, R., Klain, S., Roberts, M., Chan, K.M.A., 2013. Culture, intangibles and metrics in environmental management. *J. Environ. Manag.* 117, 103–114. <http://dx.doi.org/10.1016/j.jenvman.2012.11.033>.
- Selman, P., Swanwick, C., 2010. On the meaning of Natural Beauty in landscape legislation. *Landsc. Res.* 35, 3–26. <http://dx.doi.org/10.1080/01426390903407160>.
- Shields R, 1992, *Places on the Margin: Alternative Geographies of Modernity*. (Routledge: London)
- Schägner, J., Brander, L., Maes, J., Paracchini, M.L., Hartjec, V., 2016. Mapping recreational visits and values of European National Parks by combining statistical modelling and unit value transfer. *J. Nat. Conserv.* 31, 71–84. <http://dx.doi.org/10.1016/j.jnc.2016.03.001>.
- Schaich, H., Bieling, C., Plieninger, T., 2010. Linking ecosystem services with cultural landscape research. *Gaia* 19, 269–277.
- Schulp, C., Burkhard, B., Maes, J., Van Vliet, J., Verburg, P.H., 2014. Uncertainties in Ecosystem Service Maps: A Comparison on the European Scale. *PLOS One*. <http://dx.doi.org/10.1371/journal.pone.0109643>.
- Shoard, M., 2002. *Edgelands*. In: Jenkins, J. (Ed.), *Remaking the Landscape*, (Profile Books, London).
- Tratalos, J.A., Haines-Young, R., Potschin, M., Fish, R., Church, A., 2016. Cultural ecosystem services in the UK: lessons on designing indicators to inform management and policy. *Ecol. Indic.* 61, 63–73. <http://dx.doi.org/10.1016/j.ecolind.2015.03.040>.
- Thorsby, D., 2001. *Economics and culture* (University Press: Cambridge)
- Wegner, G., Pascual, U., 2011. Cost–benefit analysis in the context of ecosystem services for human well-being: a multidisciplinary critique. *Glob. Environ. Change* 21, 492–504. <http://dx.doi.org/10.1016/j.gloenvcha.2010.12.008>.
- Whatmore, S., 2002. *Hybrid geographies: natures, cultures, spaces*. Sage, London.
- Williams, R., 1983. *Keywords*. (Fontana, London)
- Willis, C., 2015. A human needs approach to revealing nature's benefits for visitors to the coast. *Area* 47, 422–428. <http://dx.doi.org/10.1111/area.12206>.