



Does ecosystem quality matter for cultural ecosystem services?

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ABSTRACT

This short communication examines the relationship between nature conservation interventions aimed at enhancing ecological quality and cultural ecosystem services (CES) for human health and well-being. Using forest ecosystems as an exemplar – a system of international importance for both biodiversity and people – our UK and Ireland-focused review found little empirical evidence that incorporated a socio-ecological comparative analysis of management interventions and CES. We thus synthesised the identified literature into four themes from which to draw insight: public preferences for woodland characteristics; effects of urban/peri-urban woodlands; spiritual aspects of woodlands; and changing management paradigms. Across these bodies of literature, we found that ecological health was not the main factor underpinning CES from urban woodlands; instead social meaning, stemming from woodland experiences, was a primary factor. Despite woodlands being increasingly managed for multiple benefits, the literature provides little detail as to how native biodiverse woodlands are more beneficial than those that contain non-native species. We conclude highlighting the need for embedding a transactional socio-ecological frame that considers the interactions between people and woodlands, into both research and practice on CES and human well-being.

1. Introduction

Twenty-five years on from the 1992 United Nations Conference on Environment and Development, the world faces unprecedented loss of biodiversity (Rockström et al., 2009) and high rates of chronic health issues (World Health Organization, 2017). Against this backdrop is a flourishing dialogue amongst researchers, practitioners and policy-makers about the direct and indirect linkages between the natural environment – including biodiversity – and human health which embraces the potential for positive effect as well as negative (e.g. Romanelli et al., 2015). There are conceptual frameworks detailing pathways through which nature can influence health (e.g. Hartig, Mitchell, de Vries, & Frumkin, 2014), investigations into ‘doses’ of nature that might be beneficial (e.g. Shanahan et al., 2016) and examinations of the positive health effects of biodiverse environments (Lovell, Wheeler, Higgins, Irvine, & Depledge, 2014 for a review) as well as how the experience of biodiversity might contribute to mental well-being (e.g. Marselle, Irvine, Lorenzo-Arribas, & Warber, 2016). Practical initiatives exist that seek to more fully utilise the natural environment for human health benefit, for example: ‘nature’ or ‘park’ prescriptions to encourage use of the outdoors for physical and mental health (e.g. Bragg & Leck, 2016); integration of nature contact into national health guidelines (e.g. National Institute for Health and Care Excellence, 2017); and health

benefits as an important consideration for the management of ecosystems (e.g. ecosystems approach; Secretariat of the Convention on Biological Diversity, 2004, 2017).

Implicit in this dialogue is an assumption that healthier nature (considered in terms of an ecosystem’s condition, function and resilience; Scottish Government, 2018) means healthier people, thus adding strength to the utilitarian call for ecosystem restoration to address biodiversity loss. Yet is this really true? Harrison et al.’s (2014) review of the linkages between biodiversity attributes across multiple biomes and ecosystem services (ES) identified greater species abundance to be positively related with species-based recreation (e.g. wildlife watching), and more complex community/habitat structures as important for aesthetics which was considered in terms of beauty and visual quality.

Here we explore the question by examining evidence in relation to management of woodland ecosystems. Forests are considered one of the most well-being-enhancing terrestrial environments (Nilsson, Sangster, & Konijnendijk, 2011; UK National Ecosystem Assessment, 2014). Policy actions across multiple sectors (e.g. Forestry Grant Schemes, Climate Change Adaptation Programme, Land Use Strategy) acknowledge the importance of woodlands and forests in delivering ES and their contributions to human health and well-being through cultural ecosystem services (CES) (e.g. sense of place; Binner et al., 2017).

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Additionally, native woodland restoration and other management interventions that seek to enhance the condition, function and resilience of existing – and create new – woodlands are priorities for addressing biodiversity loss (e.g. European Biodiversity Strategy).

2. Method

We sought to identify woodland intervention-focused empirical research through a rapid evidence assessment process (Collins, Coughlin, Miller, & Kirk, 2015), an approach developed to synthesise a mixture of evidence sources, which has been applied recently to various socio-ecological issues such as recreational water quality and health (King et al., 2014). The search strategy was developed iteratively through discussion with research colleagues with a decision to restrict it to the UK and Ireland because of shared cultural values and similar woodland habitat characteristics. An expert elicitation process for grey literature and unpublished evidence confirmed interest and direction among key government, industry and environmental organisation contacts whose work relates to forestry and woodland management in Scotland. In addition to geographical, language (English) and publication year (1945–2016) restrictions, we aimed to screen for literature that examined effects of ecologically-focused interventions for aboveground conservation of biodiversity (e.g. enhancement, restoration) on four CES – recreation, aesthetics, sense of place, spiritual (Millennium Ecosystem Assessment [MEA], 2005; Haines-Young & Potschin, 2018) – ideally with a comparison site (woodland without intervention). Literature was identified using online databases (Web of Science, Mendeley) and an internet search engine (Google Scholar – first 100 articles considered). Search terms combined words to describe woodland management practices (conservation, forestry, woodland) and the CES (recreation, ‘landscape aesthetics’, ‘amenity’, cultur*, ‘sense of place’, belong*, ‘experiences of nature’, religion, ritual, spirit*, soul, communion, transcend*).

Unique articles (8101) were screened (by SH) for relevance based on title (per inclusion/exclusion criteria); 417 were retained. A random sample of 100 of these articles were reviewed (by KNI) to check for consistency in application and interpretation of the selection criteria; the authors had 96% agreement. A second filtering stage – based on the abstract – identified 88 articles for full review. Both authors read all available full text material (n = 86). Additional search strategies included reviewing reference lists and citations to identify material during the review process. A total of 66 articles were considered relevant.

We had initially anticipated a set of comparative, intervention studies for which a quantitative assessment and critique of empirical evidence could be conducted; the heterogeneity of the literature, however, precluded such an approach. Instead we adopted a qualitative analytical frame to identify themes within the literature and undertook a narrative analysis to consider what each theme does and does not contribute to an understanding of our research question.

3. Results

Only one article incorporated both ecological quality and CES outcomes, analysing the relationship using paired sites (i.e. with and without management intervention). Using a desk-based expert assessment, Eastwood et al. (2016) examined delivery of all classes of ES (as defined in MEA, 2005) from sites with and without biodiversity-focused conservation measures (i.e. designated status, incentive mechanism) within a geographically similar location in the UK. Intervention sites were assessed as providing significantly more education/research and artistic CES; no between-site differences were found for recreation/tourism and cultural heritage. Within the remaining literature, four themes were identified which we use to help unpack their findings and gain insight into understanding the relationship between ecological quality and CES.

3.1. Preferred forest characteristics and qualities

One theme focused on preferred forest qualities for recreation and aesthetic value. Central to these studies is an effort to understand the public’s acceptance of different management approaches (e.g. selective thinning, leaving deadwood standing) that inevitably influence the look, experience and other characteristics of a forest. Findings across multiple decades and similar biomes highlight a preference for forests with larger, mature trees comprising broadleaved or mixed species of varied heights rather than geometrically planted monocultures (e.g. Edwards et al., 2012b; Hummel, 1992; Lee, 2001). This desire for structural heterogeneity (i.e. uneven-height mixture of species) – prevalent for the past half century amongst the UK public – has been described as a ‘naturalness’ aesthetic (Yarrow, 1966). Emery, Martin, and Dyke’s (2006) Scotland-based qualitative study of foraging for non-timber forest products (NTFP) identified a unanimous preference for mixed species woodlands and support for future programmes that create deciduous species forests as these can be supportive of NTFP. This study also highlighted the personal meaning and sense of identity experienced through the practice of foraging in woodlands.

Several authors specifically examine the ecological dimension of these ecosystems. For example, Scarpa, Chilton, Hutchinson, and Buongiorno (2000) found a greater willingness-to-pay for forests managed for biodiversity. This is also present in subsequent studies where ‘wildlife habitat’ was considered the most important feature of woodlands (Henwood & Pidgeon, 2001) and there was a greater preference for management approaches that support wildlife (Lee, 2001; Willis et al., 2003) and biodiversity (Edwards et al., 2012a). Despite a partiality for structural heterogeneity, there is little evidence of preference for specific species (Edwards et al., 2012a; Willis et al., 2003) although Henwood and Pidgeon’s (2001) investigation of the meaning of trees suggests that some species do have emblematic meaning, e.g. English Oak (*Quercus robur*) and Scots pine (*Pinus sylvestris*) particularly in terms of sense of place and cultural identity.

3.2. The narrative of urban and peri-urban woodlands

A second theme focused on CES from urban and peri-urban woodlands. No investigation of the relationship between objective ecological qualities and CES was present within this set of literature. Agbenyega, Burgess, Cook, and Morris’s (2009) study in Eastern England did explore the importance of different community woodland ecosystem services; they found that local residents placed high importance on woodlands that provided ‘habitat services’ (habitats for wild animals and plants) while also ranking ‘information services’ (recreation and aesthetics) as highly important. The empirical focus within this theme was on understanding motivations for and barriers to use, activities undertaken, perceived quality, and ways in which these places contribute to the lives of different social groups.

Key factors seen to foster recreational use of urban woodlands are childhood visits (e.g. Jorgensen & Anthopoulou, 2007; E. O’Brien, 2005; O’Brien & Morris, 2014 for review; Ward Thompson et al., 2005). Such links to the past can contribute to a sense of attachment to and identity with a certain woodland place (e.g. E.A. O’Brien, 2005; Tartaglia-Kershaw, 1982). Motivations for woodland use also often include experiences of ‘escape’. For example, participants in Coles and Bussey’s (2000) study of use patterns and perceptions amongst an English community described their most important local woodlands as those that provided a ‘refuge from urban life’ (p. 185).

These local woodlands were also valued for their ‘naturalness’. However, the community member participants’ representation of ‘natural’ was not in relation to specific species or ecological characteristics – as was the frame among the forest ranger participants – but centred on these places being free from what was perceived as negative human influence, for example, litter and vandalism (Coles & Bussey, 2000). The importance of addressing such issues for CES was highlighted in

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