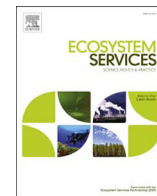




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Leisure activities and social factors influence the generation of cultural ecosystem service benefits

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ABSTRACT

The relationship between cultural ecosystem services (CES) and the many diverse aspects of biodiversity is complex and multi-faceted. A large public survey in Wiltshire, UK, was used to assess associations between public benefits from certain species groups in the local countryside, and (i) social antecedents, (ii) engagement in different outdoor leisure activities (iii) indirect nature experience via media-related activities and (iv) species group charisma and abundance.

Practitioners of leisure activities with a nature-related theme, whether outdoor activities or indoor media-related activities, reported significantly higher levels of benefit from named species groups, as did respondents whose personal background demonstrated an elevated degree of nature-relatedness. Benefits were also related to the charisma of the species group: enhanced benefit through nature-related activities and social factors was significant for less charismatic species, but inconclusive for more charismatic species. Respondents who participated in outdoor leisure activities without a nature focus were unlikely to report enhanced benefits from species groups in the local landscape.

To maximise people's CES benefits from broader aspects of biodiversity it may be necessary to encourage an active interest in biodiversity, leading people to participate or seek knowledge and understanding, and in turn develop a stronger sense of connectedness to nature.

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1. Introduction

Studying how biodiversity relates to cultural ecosystem service (CES) provision presents several challenges to researchers; it is difficult to quantify CES-derived benefits, which are commonly based on self-reporting methods (Bieling and Plieninger, 2013; Boerema et al., 2016), and further challenges relate to the diversity of types of benefits and well-being outcomes, such as psychological restoration (Kaplan, 1995; Hartig et al., 2003; White et al., 2013), improved physiological health (English et al., 2008; Jordan, 2009; Hanski et al., 2012), better social relations (Kuo and Sullivan, 2001; O'Brien and Murray, 2006; Morris and Urry, 2006; Weinstein et al., 2015), and spiritual development (Bhagwat, 2009; Lewicka, 2011). There is the added difficulty of defining

CES; a range of definitions and classifications exist and continue to evolve (Millennium Ecosystem Assessment, 2005; Chan et al., 2011; Church et al., 2011, 2014; CICES, 2017).

Whilst effects of interaction with 'green space', nature and wildlife, on human well-being are well accepted (BirdLife International, 2004; MacKerron and Mourato, 2013; Russell et al., 2013; Lovell et al., 2014; Alcock et al., 2015; Wheeler et al., 2015), the relationship is complex and multi-faceted and the mechanisms of benefit generation are poorly understood (Clark et al., 2014; Lovell et al., 2014; Belaire et al., 2015; Sandifer et al., 2015; Cox and Gaston, 2016; Graves et al., 2017). How service and benefit generation respond to variation in biodiversity at different levels (e.g. within-species, between-species, ecosystem-level), and the effects of particular species, or species groups is complex to characterise (Hooper et al., 2005; Costanza et al., 2007; Schneiders et al., 2012; Clark et al., 2014; Cumming and Maciejewski, 2017; Graves et al., 2017). So, while there is considerable global concern

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about declining biodiversity (Burns et al., 2016; Butchart et al., 2010; Barnosky et al., 2011 al), it is unclear how such changes might affect our well-being, or how conservation of CES might relate to biodiversity conservation (Czech et al., 1998; Clergeau et al., 2001; Luck et al., 2011; Cumming and Maciejewski, 2017; Krause and Robinson, 2017).

This paper considers whether there is evidence for associations between the benefits that the public consider that they get from the presence of common species groups in the local countryside and a range of factors relating to the benefit recipients and their activities and practices. As with Ecosystem Services (ES) generally, there is a range of definitions for the various associated concepts, such as well-being, benefit and service (Millennium Ecosystem Assessment, 2005; Chan et al., 2011; Church et al., 2011, 2014). For the purposes of this work, well-being is defined as a holistic positive mental and physical state of an individual or social group, and quality of life as a measure of the extent of well-being. The CES benefits may be considered to be any state or condition, or associated object (such as a work of art), which is positively valued by the receiving person, and which results from the interaction of the person and an environmental setting. The CES 'service' may be considered to be the role that the environmental setting (and associated biodiversity) plays in the co-production of such benefits.

The framework used here to conceptualise the benefit generation processes is given in Fig. 1. Under this framework, the various species groups of interest are located in the environmental setting (left-hand side) where the people may interact with them directly (in the field), or indirectly (through the media).

Indirect and direct interaction with biodiversity in the environmental setting are transformed by a number of benefit pathways into benefits that contribute to wellbeing (right hand side). Such benefit pathways can be considered to be any process through which aspects of the environmental setting (of which biodiversity is a feature) lead to the creation of benefits, and in the case of cultural ecosystem services may be considered as psychological processes of interpretation (Potter and Wetherell, 1987; King et al., 2017).

The public's perception of aspects of biodiversity is important in two key ways. First, there is the question of what people can perceive (can detect with the senses) including the levels of biodiversity that are salient to the public (Lindemann-Matthies et al., 2010; Graves et al., 2017; King et al., 2017). Second, of importance is how they perceive it (evaluation of what they detect) (Iftekhara and Takarna, 2008; Bayne et al., 2012; Qiu et al., 2013; Russell et al., 2013; Coll et al., 2014; Belaire et al., 2015; Botzat et al., 2016; Grilli et al., 2016; Kaltenborn et al., 2016; Silva-Andrade et al., 2016; Cumming and Maciejewski, 2017; Gundersen et al., 2017), including which species and habitats the public find attractive and charismatic (Lorimer, 2007; Fischer et al., 2011; Ducarme et al., 2013; MacDonald et al., 2015; McGinlay et al., 2017).

A wide range of human factors (social, cultural, educational, psychological, cognitive and emotional) are likely to influence how different people respond to different aspects of biodiversity in the landscape and how such encounters generate benefits and human well-being (Manfredo and Vaske, 1995; Vaske and Manfredo, 2012; Church, et al., 2014). Previous research has demonstrated that significant factors influencing environmental attitudes and behaviours, satisfaction with recreational experience in the countryside and people's desire to conserve nature, may include: level of education, age and social class, knowledge of the local environment and wildlife, and factors affecting a sense of place and of connection to nature such as childhood experience of the countryside (Nisbet et al., 2009; 2011; Farías-Torbidoni, 2011; Zelenski and Nisbet, 2014; Gifford, 2014).

A key element in shaping people's perceptions, experience and evaluation of nature are their practices (Bieling and Plieninger, 2013; Russell et al., 2013), whether nature-focused (such as bird-watching), or whether undertaken where the landscape and biodiversity form a backdrop to the activity. The importance of practices is reinforced by Church et al. (2014) in their model of cultural ecosystem services, whereby the interplay of cultural practices (activities and interactions) and environmental spaces are mutually reinforcing in leading to well-being (Willis, 2015), such that leisure-nature interactions contribute to psychological well-being. The importance of the biotic aspect of the landscape to an individual's evaluation of it and their quality of experience in it may therefore vary from crucial to entirely incidental or even irrelevant. For example, Farías-Torbidoni (2011) identified a typology of hikers: nature-minded hikers, sporting hikers and general-purpose hikers, with differing motivations and preferences and so reasons for their visits to particular landscapes. Furthermore, in reference to choice of landscape for recreational activities, De Valck et al. (2016) note that the type of recreational activity (e.g. hiking, cycling etc.) appears to modify substitutability patterns substantially among nature sites.

For the purposes of this work, interviewees who said that they engaged in an activity were described here as 'practitioners'. In this context their leisure activities were viewed as more than just 'things they happened to do' but also in some way formed a part of their identity. No connotation with professions or work was intended. Rather the connotation was with being part of a 'community of practice' for a particular activity.

In this context, by means of a survey of the public, we sought to determine the benefits that members of the public report that they receive from the presence of common species groups in the local countryside, by answering the following question:

To what extent are reported benefits associated with factors that characterise the interaction between people and biodiversity, specifically: (i) social antecedent and demographic factors; (ii) a range of common outdoor leisure activities; (iii) a number of indirect media-related activities; (iv) broad species group charisma and; (v) variation in provision (abundance) in the local landscape?

Such findings contribute to an understanding of the aspects of biodiversity, and biodiversity change that influence the provision of cultural ecosystem service benefits to the public. This in turn could inform policy and practical options for enhancing ecosystem service benefit supply. This paper builds on the previous work by McGinlay et al. (2017), which considered the broader patterns of variation in responses by the public to differences between species groups.

2. Methods

2.1. Overview

The research question was addressed through a questionnaire survey, administered in the County of Wiltshire, England, which was a focal lowland landscape for the Wessex-BESS project (<http://wessexbess.wixsite.com/wessexbess>), studying a range of ecosystem services. Wiltshire is in Central Southern England and is typical of multi-functional lowland landscapes, whilst also having distinctive natural and cultural features that contribute to its regionally distinctive landscapes. The area is readily accessible to a large population in the surrounding area (the population of Wiltshire is approximately 470 000, and that of immediately adjacent

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