



Analysis

Understanding Spatial Variation in the Drivers of Nature-based Tourism and Their Influence on the Sustainability of Private Land Conservation



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ABSTRACT

Protected areas connect socio-economic and ecological systems through their provision of ecosystem goods and services. Analysis of ecosystem services allows the expression of ecological benefits in economic terms. However, cultural services, such as recreation opportunities, have proved difficult to quantify. An important challenge for the analysis of cultural services is to understand the geography of service provision in relation to both human and ecological system elements. We used data on visitation rates and measures of context, content, connectivity, and location for 64 private land conservation areas (PLCAs) to better understand geographic influences on cultural service provision. Visitation to PLCAs was influenced by a combination of ecological and socio-economic drivers. Variance partitioning analysis showed that ecology explained the largest proportion of overall variation in visitation rates (26%), followed by location (22%). In tests using generalized linear mixed models, individual factors that significantly explained visitation rates included the number of mammal species, the number of Big 5-species (ecological variables), the number of facilities provided (infrastructure) and average accommodation charges (affordability). Our analysis has important implications for the economic sustainability of PLCAs and more generally for understanding the relevance of spatial variation for analyses of cultural services.

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1. Introduction

Protected areas (PAs) are an important tool for the conservation of biodiversity (Chape et al., 2005; Mascia and Pailler, 2010). They are considered essential for maintaining ecological resilience and ecosystem functioning, both locally and for the broader landscapes in which they are embedded (Tilman and Downing, 1994). As recognized by global policy instruments like the Millennium Ecosystem Assessment (2005), the sustainable development goals (SDGs) and the Convention on Biological Diversity (CBD, particularly under Aichi target 11), ecosystems provide benefits which directly and indirectly support human well-being (CBD Secretariat, 2015; Daw et al., 2016; Millennium Ecosystem Assessment, 2005; United Nations, 2015). Thus, PAs are institutions that link social and ecological systems, through the provision of ecosystem services (Kettunen and ten Brink, 2013).

The services provided by protected areas are not just related to biodiversity conservation, but encompass many other tangible (e.g., the generation of economic revenue) and intangible (e.g., providing visitors with a sense of place) benefits (Cumming et al., 2015; Infield, 2001; Maciejewski et al., 2015; Sundaesan and Riginos, 2010). In recent

years, the ecosystem services framework has become the *de facto* conceptual tool with which to understand these benefits and services, the links between ecological structures and processes, and their utilisation and valuation (Carpenter et al., 2009; Costanza et al., 1997; Daily, 1997; Guerry et al., 2015). Indeed, ecosystem services have become a conceptual bridge between conservation and developmental objectives (Daniel et al., 2012). Three major categories of ecosystem services are generally recognized: i) provisioning services, ii) regulating and supporting services, and iii) cultural services (Haines-Young and Potschin, 2013; Millennium Ecosystem Assessment, 2005). Of these, cultural services, the non-material benefits that people derive from nature, are generally the most poorly understood and the hardest to quantify (Hernández-Morcillo et al., 2013; van Jaarsveld et al., 2005). Cultural values have played an important role in motivating the protection of ecosystems and their integration into management can reduce resistance towards protected areas and help strengthen conservation efforts (Daniel et al., 2012; Infield, 2001).

The asymmetries in knowledge between ecosystem service categories in assessments are problematic given the importance of cultural services for the sustainability of protected areas (Reyers et al., 2013). PAs exist because of decisions made by society to protect natural resources, based on the perceived benefits from PAs to society. Different approaches to categorizing the benefits provided to people by

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ecosystems exist (e.g., Chan et al., 2012). A widely applied framework (Millennium Ecosystem Assessment, 2005) defines cultural services as including the categories spiritual and religious, aesthetic, inspirational, sense of place, cultural heritage, recreation and ecotourism, and educational. More recently, the Common International Classification of Ecosystem Services (CICES) has grouped cultural services into ‘physical and experiential interactions’, ‘intellectual and representational interactions’, ‘spiritual and/or emblematic services’ and ‘other cultural outputs’ (Haines-Young and Potschin, 2013). Examples of these categories as experienced in PAs are (among many others) the pleasure of watching and interacting with wildlife, outdoor activities (e.g., hiking and canoeing), and scenic beauty (Di Minin et al., 2013; Paloniemi and Tikka, 2008). Established facilities and the natural context and location of PAs provide visitors access to these non-material benefits, influencing how visitors value PAs. The value that society places on PAs has important implications for their sustainability (Mascia and Pailler, 2010). Ecotourism, in particular, has been looked to as a cultural service that can facilitate win-win scenarios for conservation and development, with the revenue derived from PA visitors being a potentially important source of income to aid PA sustainability (Lindsey et al., 2007). Ecotourism provides incentives for nature conservation and has the potential to contribute to poverty alleviation through job creation and by increasing demand for local products (Binns and Nel, 2002; Chape et al., 2005; Lindsey et al., 2007; Spenceley et al., 2002). In a global meta-analysis, Oldekop et al. (2015) found that PAs which are associated with positive socio-economic outcomes are more likely to report positive conservation outcomes. Such positive conservation and socio-economic outcomes, in turn, are more likely to occur when PAs adopt co-management regimes, empower local people, reduce economic inequalities and maintain cultural and livelihood benefits.

In Southern Africa, ecotourism from different sectors in total generates roughly the same revenue as farming, forestry and fisheries combined, and its contribution to the economy has steadily increased over the past decades (Loon and Polakow, 2001; Scholes and Biggs, 2004). In South Africa, a country that is still impacted by its apartheid history and is seeking to develop socially just, economically viable and ecologically appropriate land-uses, ecotourism plays a vital role in conservation and development (Langholz and Kerley, 2006; Ramutsindela, 2004).

Practitioners are only just beginning to realise the important opportunities that Private Land Conservation (PLC), and particularly nature-based tourism in privately owned reserves, can offer governments to meet global conservation and sustainability targets. As examples from Australia (Figgis, 2004; Fitzsimons and Wescott, 2008), Brazil (de Vasconcellos Pegas and Castley, 2016) and the USA (Langholz, 2010) show, private lands significantly contribute to biodiversity conservation. It is, however, also becoming evident that PLC does not necessarily obey the same rules as traditional, statutory PAs (Stolton et al., 2014). Maintaining and expanding a network of PAs is expensive and includes costs like salaries and fencing. Statutory PAs that are managed by mandated authorities often derive portions of their income from public funds and do not completely depend on internal income. For example, although South African National Parks (SANParks, the authority responsible for managing South Africa’s national parks) derives large amounts of resources from ecotourism activities, the agency receives government funds for running priority programmes within national parks and procures substantial state subsidies in support of regional natural resource management programmes (SANParks, 2014). By contrast, Private Land Conservation Areas (PLCAs) depend almost entirely on income generated on the property or by the landowner. In the United States, for example, only a few external income sources exist for PLCAs, through incentives such as tax rebates, conservation easements (Rissman and Sayre, 2012), or non-governmental support such as funding from private donors (Paulich, 2010). This is also true in many other countries (see Stolton et al., 2014 for examples). The sustainability of private PAs is thus more directly dependent than that of most public lands on visitors paying for the provision of cultural services.

Regardless of PA type, ecotourism represents both an important economic influence to manage and understand cultural services, and one of the few avenues for readily quantifying them. Visitation rates, and income from visitors, are easily quantifiable metrics that can be used as “willingness to pay” measures (Alpizar, 2006; Chase et al., 1998; Ellingson and Seidl, 2007; Khan, 2004).

Both internal and external factors are likely to influence visitation rates in private reserves. At larger scales, the context in which PLCAs are embedded will determine visitor’s choices based on factors such as a country’s stability, a region’s safety and a destination’s security. Mahony and Van Zyl (2002), for example, stated that tourism potential in parts of the Eastern Cape Province is restricted by negative perceptions about safety. Similarly, Kepe (2001) found that tourists tend to not visit surrounding locations of protected areas because safety is a concern. Landowners and managers of PLCAs, when asked to state negative future influences on their ventures, perceived political factors to be the most relevant (e.g., safety, legislation, land claims, mining and fracking) (Baum, 2016).

For individual PLCAs, the ecological features of a reserve are important for attracting people, for example to enjoy game viewing or hiking in a natural environment. Visitors may have different attitudes, backgrounds and belief systems and people make decisions based on what they would like to see or experience (Martín-López et al., 2012; Neuvonen et al., 2010). However, features of convenience inside a reserve (e.g., accommodation), can further strongly influence visitor choices, as people do not only consider ecological features when deciding where to spend money and time (Puustinen et al., 2009; Seddighi and Theocharous, 2002). This means that, in addition to ecological “infrastructure”, elements of location, built infrastructure, discoverability, and affordability may be underlying drivers of the utilisation and valuation of cultural services in PLCAs. All of these potential drivers show heterogeneity in space. Furthermore, they do not occur in isolation from one another, meaning that a combination of factors may play an important role in determining spatial variation in nature-based tourism.

Despite the importance of nature-based tourism for the social-ecological sustainability of PAs, remarkably little is known about its influence on PLCAs. Little information is available about the effects of internal or external drivers on visitation rates on private lands, particularly when taking spatial variation into consideration. South Africa offers a potentially insightful case for understanding the relevance of reserve location for cultural service use in PLCAs. Not only does it boast a diverse and growing nature-based tourism industry (particularly in the private sector), it also represents a diversity of private PA models that are managed under relatively well-developed policies and rules (Cumming and Daniels, 2014).

In this study, we concentrated on the roles that elements of location, ecology, infrastructure and affordability play in the economic sustainability of PLCAs. We investigated two focal questions: (1) Can visitation rates be better explained by particular categories of drivers (i.e. “ecological features” vs. “infrastructure”); and (2) which specific factors (e.g., travel time, number of activities offered) best explain spatial variation in visitation rates in PLCAs?

We expected that either predominantly socio-economic factors (e.g., infrastructure or marketing); predominantly ecological factors (e.g., presence of large mammal species in the reserve); or a combination of both socio-economic and ecological factors would be most relevant in determining nature-based tourism in private reserves. Socio-economic factors may enhance the demand for, and utilisation of cultural services. Ecological factors form the basis for the provision of cultural services. A combination of these factors may most strongly determine visitation rates, since visitors make choices based on both what they want to experience and how these experiences are facilitated. The key interest and novelty of the study lies in our quantification of the relative magnitudes of the different influences on PLCA nature-based tourism; understanding these has potentially important implications for the

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