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A tale of two landscapes: Transferring landscape quality metrics from Wales to Iceland

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ABSTRACT

The assessment of visual landscape quality remains a tantalizing goal for geographers. Methods to evaluate landscape views proliferate, with increasing use made of both quantitative and qualitative techniques. Reproducibility of these methods is often claimed by researchers but is rarely tested. Landscape quality assessment is so often tailored to a location that little thought is given to its potential portability. In response to this challenge, we have taken a visual landscape quality method previously developed for Wales, UK (Swetnam et al., 2017) and tested its transferability to quite different landscapes in Iceland. We outline the methodological considerations required, demonstrate its successful application with a report on our pilot field investigations and provide a checklist for others wishing to transfer landscape quality metrics from one place to another.

1. Introduction

Current global environmental change is driven by socio-economic and bio-physical factors which are transforming the appearance and functioning of ecosystems worldwide (MEA, 2005). These drivers include: population growth, urbanisation, deforestation, nutrient enrichment and the spread of invasive species – all of which pose significant threats to the health of our planet and the natural capital on which we all depend (TEEB, 2010). Some of this natural capital is easy to valorise (such as the amount of timber harvested), but other elements are more challenging, especially within the arena of cultural ecosystem services (CES), which includes: spiritual nourishment, enjoyment of Nature, and access to green space (Costanza et al., 1997; Church et al., 2011). Visual landscape quality and the enjoyment that people derive from experiencing attractive landscapes is an example of such a CES (Daniel et al., 2012; Potschin and Haines-Young, 2016). It remains however, one of the most difficult services to quantify (Satz et al., 2013). What is it about a location, seen at a particular time that is valued? Are some of these aspects common across cultures? How will we know if our valued rural landscapes such as National Parks and Nature Reserves are suffering gradual erosion in their landscape beauty and coherence if we do not have the means to test it?

The value that people place on an attractive landscape view has a long history in geographical research. This is evident from the early sensory mapping work of Granö in the 1920s (Jones, 2007) to the landscape architectural work of Lynch (1960), contrasting with the component mapping undertaken in Wisconsin, USA by Lewis (1964, 1996); the preference matrix approaches of Kaplan and Kaplan (1989) and the holistic approaches proposed by Kellert and Wilson (1993). Later developments in the field of landscape ecology (Gobster et al., 2007) have led to many proposed theoretical frameworks (Tveit et al., 2006; Ode et al., 2008). There is also a distinction between landscape characterisation and landscape evaluation (Van Eetvelde and Antrop, 2009). The former uses holistic, fieldwork-based methods to define qualitative narratives without any specific attempt to value one landscape above another (Brabyn, 2009); examples include the influential UK Landscape Character Assessment method (Swanwick, 2003) which has been adapted and applied in several countries including Malaysia (Teh et al., 2017) and South Korea (Kim and Pautleitb, 2007). In contrast, landscape evaluation places a rating on or orders landscapes in terms of their landscape quality and frameworks exist for Denmark (Hansen et al., 2010) and Norway (Sala, 2014). Such quantitative, value-based approaches have received new momentum due to the rise of the ecosystem-services driven paradigm (Daily et al., 2009). Therefore, the development of effective means to assess aesthetic qualities of landscapes has received considerable attention (Clay and Daniel, 2000; Frank et al., 2013) as pressure on this cultural service provision intensifies.

1.1. Approaches to visual landscape quality assessment

Quantifying landscape quality is therefore important, as many people care passionately about their home landscapes and some have strong views on what they expect “their countryside” to look like. This

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need is heightened at present by the rapid pace of societal development and the urbanisation of the human species. Our landscapes are experiencing unprecedented rates of change due to direct human influence from land-use change, but more significantly, through indirect human impacts on climate, which in turn determines species and habitat composition over the longer term, as well as influencing land-forming processes. The appropriate approach to take to this challenge − whether this is quantitative and component-based with emphasis on measurement of biophysical features of a landscape or qualitative and perceptual-driven − has long been debated (Dakin, 2003; Price, 2012). There are many critiques of biophysical, component-based approaches to landscape evaluation (see Lothian, 1999), which partly explains the move towards more holistic responses in the form of character assessment (Selman and Swanwick, 2009). Such broad narratives are valuable, but time-consuming to construct and therefore alternatives are required for rapid assessments. Such needs are partially met by Geographic Information Systems (GIS) approaches to visual landscape quality assessment, whereby digital datasets offer opportunities for synoptic coverage and quantification (see Dramstad et al., 2006; Wu et al., 2006; s1Tratalos et al., 2016).

Our own research has previously developed such a GIS-enabled method to quantify the visual landscape quality of Wales in the UK (Swetnam et al., 2017) (Fig. 1). This work formed part of a monitoring programme, funded by the Welsh Government, to evaluate the landscape impact of the Glastir Agri-environmental scheme. The Visual Quality Index (VQI) was designed to quantify those components of the Welsh landscape that are quantifiable metrics of landscape quality. It has been successfully applied to a stratified sample of 300, 1 km^2 sites across Wales, and has undergone public validation through an online Photographic Preference Survey (PPS), which confirmed that the correct components of the landscape were captured and that the VQI ordering of landscape quality matched that of the public assessment (Swetnam et al., 2015).

Iceland is a developed northern European country where the interplay of ice and volcanic activity has generated diverse and distinctive landscapes and many locations are renowned for their scenic beauty (Fig. 1). The central highland plateau is the largest remaining terrestrial wilderness in western Europe and there are concerns about the pace of landscape change (Benediktsson, 2007; Landvernd, 2017). Many of the impacts of such change are due to i) the environmental effects of deglaciation and increased volcanic activity (e.g. Pagli and Sigmundsson, 2008; Tweed and Carrivick, 2015); ii) increased tourism (e.g. Sæþórsdóttir, 2010a); iii) energy resource development (Thórhallsdóttir, 2007) and iv) invasive plants, notably the Nootka lupin (e.g. Benediktsson, 2015). There is also undeniable tension between the forces of capitalism and the ideals of conservation and a very real sense of conflict and compromise in the context of landscape.

Consequently, there is an emerging body of work on landscape aesthetics and evaluation in Iceland (Jóhannesdóttir, 2015). Some of this work has investigated the culturally-embedded relationships between humans and nature and implications for conservation (e.g. Waage, 2013). Other research has concerned the evaluation of nature and wilderness (e.g. Ólafsdóttir and Runnström, 2011) often in the context of the highly-politicised nature of energy projects (e.g. Thórhallsdóttir, 2002,2007; Benediktsson, 2007; Sæþórsdóttir, 2010b; Ostman, 2015). The Icelandic Landscape Project (ILP) in particular, sought to characterise major landscape types and investigate their regional distribution against the backdrop of the Icelandic Framework

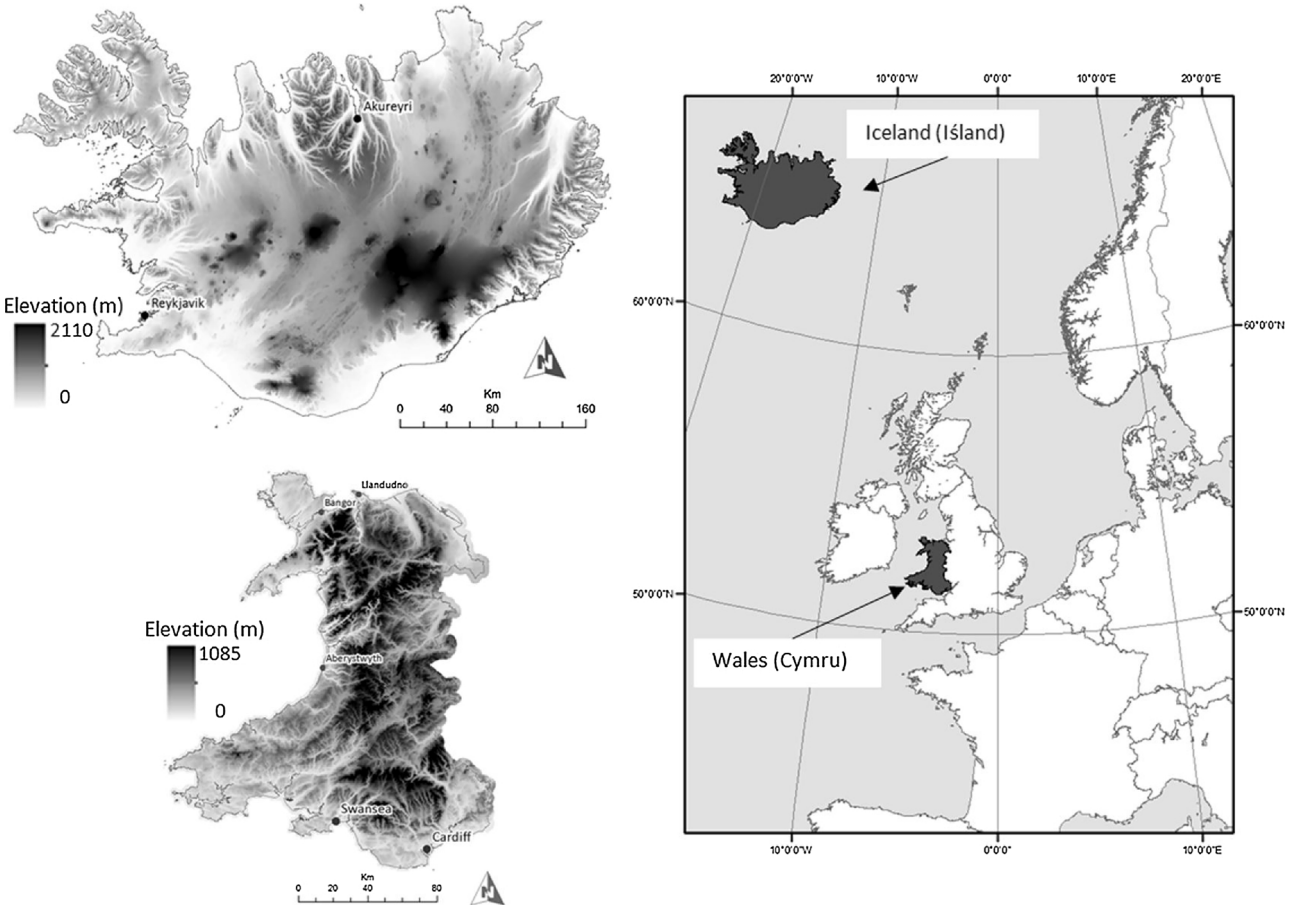

Fig. 1. The location of the two study sites within Europe. Inserts show the elevation of Iceland (top left) as extracted from the National Land Survey of Iceland 20 m × 20 m elevation dataset and Wales (bottom left) as extracted from the UK Ordnance Survey 5 m × 5 m NEXTMAP dataset. Note that different scales are used to ensure clarity of the countries, but Iceland is approximately 5× the size of Wales.