



# Making sense of landscape change: Long-term perceptions among local residents following river restoration



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## SUMMARY

Efforts to restore rivers are increasingly concerned with the social implications of landscape change. However, the fundamental issue of how people make sense of local riverine environments in the context of restoration remains poorly understood. Our research examined influences on perception among local residents 14 years after a restoration scheme on the River Dearne in the north of England. Human-landscape relationships emerging from semi-structured interviews with 16 local residents were analysed using an interpretive research framework. Nine recurring factors influenced perception among local residents: scenic beauty; the condition of riparian vegetation and of river channel morphology; opportunities to observe flora and fauna; cleanliness of the riverine environment; access available to the river; connections between the river and the surrounding landscape; disturbance and change in the familiarity of the landscape following restoration. These factors were not solely related to tangible outcomes of the restoration scheme, but were also influenced by history, memories, traditions and practices associated with the river. Critically, these factors also interacted rather than operating in isolation and two idealised perceptual frameworks were developed to map these interactions. Our research contributes to theoretical understanding of the relationships between humans and landscape change, whilst also considering how restoration practice may better reflect these relationships. The importance of a social dimension to the template of possibilities for restoring any given river emerges, underpinning place-based design and implementation of river restoration schemes.

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## 1. Introduction

River channels and the immediately surrounding riparian land are valuable features within many landscapes (e.g. [Millennium Ecosystem Assessment, 2005](#); [UK National Ecosystem Assessment, 2011](#)). However, human action frequently disturbs riverine environments, alongside the environmental, social and economic benefits derived from these ecosystems ([Montgomery, 2008](#); [Smith et al., 2014](#); [Tockner et al., 2010](#)). Disturbance is the subject of public and political concern, leading to efforts across the globe to restore riverine environments (e.g. [Postel and Richter, 2003](#); [Smith et al., 2014](#); [Wharton and Gilvear, 2006](#)) and significant investment in river restoration schemes within the USA (e.g. [Bernhardt et al., 2005](#); [Clarke and Dalrymple, 2003](#)),

Europe (e.g. [Buijse et al., 2002](#); [Gilvear et al., 2013](#)), China (e.g. [Stone, 2008](#)), Japan and Australia ([Smith et al., 2014](#)). In parallel, the conceptual and practical basis to river restoration has evolved, moving from a sole focus on ecological improvement towards schemes which also consider the economic and social implications of landscape change. Realising multifunctional riverine environments through restoration is increasingly important, being recognised within international legislation, such as the Water Framework Directive in Europe ([European Community, 2000](#)), and within national public policy arenas such as in the UK (e.g. [Defra, 2011](#); [Environment Agency, 2013](#)).

Whilst the ecological validity and success of river restoration remain contentious (e.g. [Kondolf, 2006](#); [Montgomery, 2008](#); [Palmer et al., 2010](#)), there is also particular concern that the social dimensions of the river restoration process are neglected ([Åberg and Tapsell, 2013](#); [Buijs, 2009](#); [Junker et al., 2007](#); [Selman et al., 2010](#); [Westling et al., 2009](#)). Purist definitions of restoration draw on a natural-cultural dichotomy in which human influence is perceived negatively and in which restoration should seek to

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return landscapes to natural, pre-disturbance states defined by the absence of significant human influence. However, defining and realising a pre-human disturbance state is problematic, due to long periods of human activity within landscapes and uncertainty regarding the exact timing of initial human disturbance (e.g. Walter and Merritts, 2008). This dichotomy is challenged, both by alternative theoretical frameworks arguing for the relevance of natural-cultural hybrid models for restoration (Eden et al., 2000), and by pragmatic perspectives that take restoration to be the balancing of ecological and human goals through rehabilitating or enhancing landscapes, rather than seeking return to a redundant, historical reference state (e.g. Davis, 2000; Dufour and Piegay, 2009; Nilsson et al., 2007).

Understanding the expectations and desires that members of the public hold regarding rivers and drawing on this knowledge to support public participation in the process of river restoration, are central to natural-cultural hybrid models and to notions of river rehabilitation and enhancement. Engaging members of the public in decisions regarding the restoration of rivers can increase the sense of public ownership and pride in local river environments (Eden and Tunstall, 2006), counteract feelings of alienation by promoting connection between people and restored riverine environments (Junker et al., 2007; Selman et al., 2010), and ultimately increase the likelihood that restoration schemes will be implemented and maintained (Nassauer et al., 2001; Nilsson et al., 2007). However, past technocratic approaches to river management have limited public participation in many restoration schemes (e.g. Eden and Tunstall, 2006; Smith et al., 2014; Spink et al., 2010) and constrained the extent to which local knowledge and experience is seen as valid and valuable (e.g. Higgs, 2003). Although more recent examples of enhanced public engagement in river restoration exist (e.g. Åberg and Tapsell, 2013; Petts, 2007), future restoration practice would benefit from better understanding of the nature of, and influences on, public perception of rivers and their restoration.

Perception regarding the outcomes of river restoration can differ substantially across academic, practitioner, local resident and visitor communities, but also with the wider context of riverine environments, for example whether rivers exist within urban or rural landscapes (e.g. Buijs, 2009; Spink et al., 2010). However, moving beyond a description of differences in perception to explore the underlying causes of these differences requires a focus on the factors and processes which shape public perception (Jacobs and Buijs, 2011). Perception following river restoration has been variously ascribed to changes in place attachment, aesthetic values, biodiversity, recreational and educational opportunities (e.g. Åberg and Tapsell, 2013; Findlay and Taylor, 2006; Gobster et al., 2007; Jacobs and Buijs, 2011; Jungwirth et al., 2002; Junker and Buchecker, 2008; Tapsell, 1995). However, the social impacts of river restoration have primarily been viewed as indicators for the success of a scheme, with research seeking to establish whether attitudes towards a river environment, including those associated with wildlife (e.g. Åberg and Tapsell, 2013), aesthetic values (Junker and Buchecker, 2008) and recreational opportunity (e.g. Seidl and Stauffacher, 2013), change as a consequence of restoration.

The fundamental issue of how people make sense of local riverine environments in the context of landscape change remains more poorly understood. Some previous research has explored public perception related to interconnected, tangible elements of river environments (e.g. Åberg and Tapsell, 2013; Junker and Buchecker, 2008). Despite such research, the complex networks of influence that govern perception of riverine landscapes have received little attention. These networks likely include intangible alongside tangible landscape elements, associated with the deeper meanings and emotions attached to places (Selman et al., 2010).

For example, historical relationships between local residents and a river have been argued to influence perception of contemporary restoration schemes (e.g. Eden and Tunstall, 2006; Spink et al., 2010). Such intangible elements are place-dependent rather than universal, meaning that their impacts on public perception may differ significantly between individual restoration schemes. Therefore, establishing in-depth understanding of public perception across the range of river types, landscapes and socio-political contexts within which restoration has been undertaken is a significant challenge (Buijs, 2009). Addressing this challenge requires new insights from social science approaches to support both the practice (Smith et al., 2014) and research (Eden and Tunstall, 2006) of river restoration.

In this paper, we draw on the wider landscape literature and specifically on the Cultural-Values-Model (CVM, Stephenson, 2008) to understand how local residents make sense of their riverine environment and changes in that environment following restoration. Below we describe the core elements of the CVM, before considering our empirical research.

## 2. The Cultural Values Model: a framework for understanding interconnectedness in perceptions of landscape change

Whilst the physical characteristics of landscapes strongly influence visual perception and preference, characteristics of the individual perceiver are equally important in the landscape experience. Such characteristics relate, for example, to previous knowledge, experience and familiarity with respect to a landscape (Kearney et al., 2008). Interpretation and perception of a landscape is therefore a constant interaction between humans and their environment (e.g. Nassauer et al., 2001; Stephenson, 2008; Terkenli, 2001). The CVM provides a theoretical framework through which human-landscape interactions can be analysed. In this paper, we draw on the CVM in the specific case of riverine landscapes, contributing more broadly to understanding of public perception of landscape change.

The CVM incorporates three elements: *forms*, *relationships* and *practices*, which interact in the construction of any given landscape. The forms element considers the physical, tangible aspects of a landscape, including natural features, such as riparian vegetation or river morphology, and human interventions such as footpaths or buildings. Therefore, the forms element captures both natural and cultural objects and the values associated with these objects. The relationships element of the CVM considers the notion that perception of a landscape is partly based on human relationships with and within that landscape. These relationships can be represented in various ways, including through sense of place, myths, stories and memories. The third element of the CVM considers human and natural practices, including past and present action and traditions. This component also encompasses ecological processes, but rather than separating nature and culture, practices 'capture the continuum of valued cultural practices and natural/human processes of the landscape' (Stephenson, 2008: 134).

Our application of the CVM extends past studies of perception among local residents following river restoration in three specific ways. Firstly, based on the hypothesis that public perception of river restoration is not solely influenced by forms, but also by relationships and practices, we draw on each individual element of the CVM to interpret the influences on perception of a river restoration scheme. Secondly, because perception is expected to be influenced by interacting rather than isolated elements of the CVM, the research focusses strongly on the nature of these interactions. Thirdly, the research examines public perception 14 years after completion of a river restoration scheme. Previous research has examined public perception of proposed restoration schemes (e.g. Buijs, 2009; Junker and Buchecker, 2008), or of schemes

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