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Has river rehabilitation begun? Social perspectives from the Upper Hunter catchment, New South Wales, Australia

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ABSTRACT

Recognition of the degraded state of rivers across the world has prompted the development of management programmes which promote river repair through rehabilitation practices. Efforts to date have emphasised concerns for biophysical attributes of rivers to the relative exclusion of socio-cultural values. Ultimately, the process of river repair must move beyond this technical focus and incorporate collective societal engagement, participation and ownership. However, the inherent complexities of informing and managing this process limit the prospects that engagement will be translated into an effective and sustained practice. This qualitative case study research analyses the community's knowledge, views and opinions regarding geomorphic river change and river works projects undertaken in the Upper Hunter catchment, New South Wales, Australia. The responses and views expressed by the participants highlight how ineffective communication and limited understanding of past river work practices has inhibited the connection and ownership between the people and their river. Essentially, historical river management was viewed as a technical process that failed to incorporate social values and aspirations, and which gave inadequate consideration to local knowledge and experience. Participants identified the need to address both diversity and commonality in vision-building and the need for greater confidence and transparency in river science and management. In light of these responses, this paper argues for the adoption of a geo-social, transdisciplinary approach to river rehabilitation.

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1. Introduction

There is a global trend towards increasing investment in river rehabilitation with associated pressure to demonstrate successful outcomes in both environmental and economic terms (Hibbard and Lurie, 2006; Postel and Richter, 2003; Sear et al., 1998). However, rehabilitation projects are as much a social undertaking as an environmental one (Anderson et al., 2003; Kates et al., 2001). Community and stakeholder involvement is a key component of effective practice (Byron and Curtis, 2002; Eden et al., 2000; Hildén, 2000; McDonald et al., 2004; Rhoads et al., 1999; Tunstall et al., 1999; Wondolleck and Yaffee, 2000). Integration of knowledge and understanding of the interactions between the biophysical and social dimensions of river rehabilitation are integral considerations in this process (Hedelin, 2007; Hillman, 2009).

Science and management have traditionally operated without a significant level of mutual understanding and collaboration, and in relative isolation from the place-specific characteristics of the surrounding landscape and community (Rogers, 2003). In many instances, the goals of river rehabilitation are contested within scientific and institutional settings. These are characterised by multiple disciplinary perspectives and socio-economic, cultural and political values which are constantly jostling for supremacy (Urban, 2005). This is not surprising given the multiple services that river systems provide (Cortese, 2003; Dunn, 2004). As river rehabilitation is increasingly seen as inherently complex and multidimensional, an integrative transdisciplinary framework is required that bridges the disciplines and time–space scales (Connick and Innes, 2003; Holling et al., 2002).

Responding to these challenges, a shift is occurring from piecemeal, site-specific 'ways of seeing' rivers to whole-system, collaborative, catchment-scale approaches (Brierley and Fryirs, 2008, 2009; Buijs, 2009; Frothingham et al., 2002; Hermans et al., 2007; Kondolf et al., 2007). Increasingly, catchment-scale visions are developed using a variety of consultation techniques, which range from surveys of individuals to focus groups, workshops and online discussion (Carter and Howe, 2006; Gregory and Brierley, 2008; Hermans et al., 2007; Hillman and Brierley, 2005). Goals can frame both desirable future states for a catchment and

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processes of community engagement to ensure that the vision remains relevant and reflects both physical realities and social aspirations (Hooper, 2008; Lake, 2007; Ryder et al., 2008).

However, avoiding the creation of new hierarchies of power and exclusion remains a key challenge in vision-building and in such stakeholder-based management (Piper, 2005). Effective engagement involves identifying and maintaining local values and cultural associations that enhance relationships between people and ecosystems (Higgs, 2003). This entails a shift from a purely scientific and biophysical focus on rehabilitation to one that acknowledges humans as core components of ecosystems (Mollinga, 2008; Palmer et al., 2005; Van Koppen, 2008). Effective rehabilitation therefore includes both biophysical and cultural components, such that a 'good' definition of rehabilitation includes social, cultural, aesthetic, and political values. This social perspective contrasts with the view that "restoration is about the perfection of a technique" or *technical restoration* (Higgs, 2003, p. 186), where efficiency, control and predictability are paramount. Spink et al. (2009) document a typical example of this technological focus in their analysis of the history of river works techniques applied in the Upper Hunter catchment since the 1950s.

The distinction between a technical and a *geo-social* approach to river rehabilitation is based upon the latter's emphasis on a place-specific range of geoecological variability and social connections, which build upon an understanding of river evolution and environmental history (Fryirs and Brierley, 2009). In geo-social approaches to river management, rehabilitation is predicated upon the adoption of principles of social participation and engagement (Burger, 2002; Calder et al., 2008; Carter and Howe, 2006; Hibbard and Lurie, 2006; Rhoads et al., 1999), offering a collaborative partnership between the science of river management and community values and involvement in rehabilitation processes. Effective cooperation and communication are integral components in this process (Crance and Draper, 1996; McDonald et al., 2004; Selin and Chavez, 1995; Selin et al., 2000). This also requires incorporation of local knowledge; otherwise landholders can become disempowered and disconnected (Baker, 1997; Carr, 2002).

Central to a geo-social perspective on rehabilitation is the pursuit of *ecosystem integrity* in both structural and functional terms (Brierley and Fryirs, 2008). Embedded within this notion are principles of ecosystem sensitivity and resilience, thresholds, elasticity and complex response. Tackling these concepts requires a solid place-based understanding of how a system has evolved and adjusted over space and time (Brierley et al., 2006; Buijs, 2009; Fryirs and Brierley, 2009). Understanding the past informs practitioners about the present and allows forecasting of the future. For example, understanding why a system is in its present condition (whether good or bad) allows practitioners to determine the level of intervention required, whether that is 'do nothing' or 'enhance recovery'.

Historical knowledge also provides a basis to forecast likely trajectories of change, promoting the adoption of proactive rather than reactive practices (Brierley and Fryirs, 2005). Learning from past successes and mistakes is required to inform this process, ensuring that meaningful commitment to adaptive management practice is maintained (O'Donnell and Galat, 2008). A range of biophysical, social, cultural, political, moral, and aesthetic qualities shapes this broad concept of historical range of variability. Inevitably, these relationships vary from place to place. Understanding this historical legacy provides critical insights with which to guide management practice.

In contrast to this requisite understanding of history and place, river management has most often been framed as a technical process that has failed to incorporate social values and aspirations, and which has given inadequate consideration to local knowledge and experience (see Higgs, 2003). However, there is growing realisation that the successful application of scientific knowledge and technical capacity is either promoted or constrained by this social context and the level of engagement by local communities (e.g. Allan and Curtis, 2005; Byron and Curtis, 2002; Carr, 2002; Piper, 2005). Hence, management success cannot be achieved through top-down processes in their own right. Rather, it is contingent upon understanding the existing perceptions and views of people who have a connection to rivers in one form or another – be it through residence, work or recreation. This case study illustrates these issues by exploring community perceptions of river management, by assessing community engagement with, and participation in, the process of river repair in the Upper Hunter catchment in south-eastern Australia.

1.1. Regional setting

The Upper Hunter catchment has an area of 4480 km^2 (Fig. 1). Fryirs et al. (2009) identify three major phases of river adjustment in the period since European settlement of the catchment, with variable responses along ten different types of river. Significant channel degradation characterised by channel incision and expansion occurred between 1881 and 1938. The most active phase of geomorphic adjustment between 1938 and 1955 included cut-off formation and floodplain stripping. The largest flood on record, from 23rd to 27th February 1955, was an important driver of river change and continues to shape the mindset of locals and state government agencies charged with the responsibility for river management and rehabilitation. Since 1955, a phase of river recovery has been underway, characterised by floodplain accretion and channel contraction in many reaches (Fryirs et al., 2009; Hoyle et al., 2008). However, these adjustments have been fairly localised and restricted to less than 50% of the total river length in the catchment (Fryirs et al., 2009).

In 1950 the Hunter Valley Conservation Trust (HVCT) was established under the provision of the Hunter Valley Conservation Trust Act 1950 to undertake works for the purpose of soil conservation, vegetation establishment and the conservation of surface water for agriculture. The organisation's income consisted of a levy collected by the local councils (Hunter Catchment Management Trust [HCMT], 1998). However, the floods of the early 1950s, in particular the record 1955 flood, added a new dimension to the organisation's responsibilities, as flood mitigation works became an important component of the HVCT activities (HCMT, 1998). This led to the creation of the Hunter Valley Flood Mitigation Scheme, which received its powers from the Hunter Valley Flood Mitigation Act 1956. Under the supervision of the Constructing Authority and with the provision of a substantive resource base tied to the ratepayer levy, 'river gangs' were established and charged with implementing river engineering projects. Through various administrative realignments, these activities have continued over the past 50 years.

As reported by the Hunter Catchment Management Trust (1998), Erskine (2001), Reddoch (1957), Rankin (1980, 1982) and Shattock (1966), the aims of the 'River Training and Improvement Program' which activated river work implementation included:

(1) The maintenance of a stable channel with a suitable conveyance capacity for irrigation waters and the removal of appropriate discharges.
(2) The reduction of the erosive nature of flood waters on river banks to protect arable lands.
(3) The maintenance of flood protection through the construction and maintenance of levee systems.
(4) The removal of obstructions that partially block the channel and concentrate flow against the banks.

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