



Sociogeomorphic river recovery: integrating human and physical processes

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River rehabilitation framed within a recovery-enhancement approach uses an understanding of river morphology, behavior and trajectory as a basis for improving river condition. In many parts of the world this is a preferable alternative to ‘command-and-control’ approaches that rely on hard engineering. Rehabilitation based on recovery-enhancement – or working with natural processes – recognises and supports ‘nature-based solutions’ that allow a river to ‘self-heal’ following disturbance. On-ground activities commonly use strategic passive interventions, such as vegetation plantings, targeted weed management and livestock exclusion, and only when and where necessary. However, in addition to the biophysical processes that are driving recovery, human processes can also allow or constrain possibilities for recovery. Although biophysical and human processes are interrelated, it is often the case that they are researched and managed in isolation, which is problematic from a coupled human-and-natural systems perspective. This paper examines relationships between human and physical (geomorphic) processes in river recovery through the lens of sociogeomorphology, which recognises that rivers are simultaneously produced by, and producing, physical and social processes with on-ground implications for river recovery. Using a case study from the Macdonald River in New South Wales, southeast Australia, we demonstrate how a sociogeomorphic perspective on geomorphic river recovery reveals linkages between biophysical (geomorphic, hydrological and ecological) processes and human (economic, demographic, land use and policy) processes, which all have contributed to recovery following disturbances associated with European settlement in the area some 200 years ago. Removal of vegetation and wood, along with active channel widening and the formation of a sediment slug after historical flooding produced a system that by the 1940s was in poor geomorphic condition. With change in land management practices and the demographics of the area, geomorphic river recovery has commenced since approximately the 1980s and continues today. Recognition of linkages between human and physical processes, through a sociogeomorphic perspective, leads to an integrative understanding of the river system, its history and potential future trajectories of river recovery. For river management planning, this presents an opportunity to recognise and act on opportunities and challenges in river rehabilitation in order to support the best possible outcomes for river health and the ecosystems they support.