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# Wetland degradation in the Murray Basin, Australia: mitigating socio-economic costs of water buy-backs

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## Abstract

The waterways of the Murray River, Australia, have been greatly impacted by vegetation clearance, widespread grazing and cropping, and the regulation of flow and abstraction of water volume to sustain irrigation agriculture. This has been to the great benefit of Australia's agricultural gross domestic product and the development of strong regional communities in what is a largely urbanised society. Much focus has been on the loss of flow in channels and water to wetlands as principal causes of the degradation of aquatic habitat. In order to rehabilitate these ecosystems The Murray Darling Basin Plan has been implemented. This focuses on the recovery of water for environmental purposes through the purchase of private water rights or the investment in infrastructure to recover volume by mitigating leakage and evaporative losses. The Plan commits to recover 3200 GL, or ~ 25% of the mean annual flow. The cost of the plan has been estimated to be between \$5.5B and \$27.5B. The plan has already caused much hardship in irrigation communities and political pressure has driven a Senate Select Committee report that, in part, has called for a moratorium on further water recovery.

Meanwhile, a synthesis of over 50 paleolimnological records of wetland change across the southern Basin has identified flow related changes, but also the impact of increased fluxes of nutrients, salts, and in particular sediments as causes of condition decline. Many wetlands are shallow and are rapidly infilling with sediment suggesting that their persistence into the future is unlikely. Further, it appears likely that the main river channels are principal sources of sediments, and nutrients, to these systems. This synthesis has permitted the identification of drivers, such as erosion and nutrient release, to be agents of change at a regional scale sufficient to dampen any benefit that may accrue from environmental flows and watering. Further, it reveals the long term nature of ecosystem decline which raises questions as to who should carry the burden for rehabilitation.

The focus on water volume as the principal means of rehabilitation is likely to have emerged as a result of understanding from a short term view of system change. The longer term view, collated across a broad region, reveals sediment and nutrient mitigation to be complementary means by which environmental goals can be achieved. A more integrated socio-ecological approach to Basin management would spread the rehabilitation investment between landscape management and water volume recovery, and share it across generations rather than enacting a Plan that impacts on this generation heaviest.

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