Exploring potential futures for the Coorong using scenario analysis of ecosystem states

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Over the last ten years, there has been a major decline in the condition of the Coorong, the estuary for Australia's largest river system, the River Murray, due to prolonged drought and past management of the river basin. In order to successfully manage the estuary in the future, predictions are needed to evaluate the effect of possible management actions on the Coorong ecosystems under a variety of climatic scenarios. We have constructed an ecosystem response model for the Coorong using a technique we call 'ecosystem states', whereby combinations of biota that co-occur are identified and linked explicitly to the environmental conditions under which they are found. This multivariate approach objectively defines a set of parameters and the relevant thresholds for each that govern transitions between the identified ecosystem states. The data set used to anchor this modelling was collected by a range of agencies and scientists over a period of nine or so years, and is typical of the data types routinely collected about aquatic ecosystems for the purpose of environmental management in many jurisdictions. Ecosystem state modelling builds links between the biotic and abiotic datasets in a spatially- and temporally- explicit fashion. These links are useful to us as key indicators rather than representing strictly causal connections. A range of scenarios will be explored to provide managers with information as to the likely consequences of their decisions. We will identify the potential impacts of management within the Murray-Darling Basin as a whole, possible climate change, and a range of local management options on the ecology of the Coorong. The outcomes of these scenarios will allow for unbiased assessment of the ecological response to a range of possible management options, providing the basis for informed decision-making in the management of the Coorong.