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TITLE: Decline and Restoration Ecology of Australian Seagrasses

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ABSTRACT:

Since the first version of this book almost 30 years ago, significant losses of seagrass meadows have continued to be reported from around Australia as a result of natural and human induced perturbations. Conservative estimates indicate losses over the past two decades have more than doubled that estimated in the late 1990s. Conservation and mitigation of disturbance regimesSeagrass restoration disturbance regimes have typically been the first line of defence, but ecological restorationSeagrass restoration ecological restoration or intervention is becoming increasingly necessary in a rapidly changing environment, and is potentially a more effective management strategy where seagrass habitat is already lost or heavily degraded. Accordingly, there has been an increase in the number of restoration studies and projects feeding our knowledge-base of restoration practiceSeagrass restoration restoration practice across Australia. Yet despite this increase, successful restoration has been rare, often uncoordinated, and almost always at a scale that is orders of magnitude lower than the scale of loss. Clearly, our understanding of the ecological mechanisms underlying successful and unsuccessful seagrass restoration is not keeping pace with the rates of loss and societal needs for restoration. Indeed, many orders of magnitude more restoration effort, in terms of science and practice and their interactions, will be required to prevent further seagrass loss. The science of seagrass restoration or restoration ecology is still a young science, but has strong foundations built from several decades of ecological research addressing many aspects of ecological interactionsSeagrass restoration ecological interactions in seagrasses. While restoration has strong scientific underpinnings from ecological theory, it is clear that restoration ecology can also contribute to ecological theory by providing new and novel opportunities to advance our understanding of the mechanisms that promote functional ecosystems. In this chapter, we provide examples of this understanding across the levels of biological hierarchy, from genes to landscapes, and where possible include future strategic research directions.

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