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Policy implications of ecosystem engineering for multiple ecosystem benefits

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Summary

The reintroduction of locally extinct species into their former range has become an increasingly popular conservation goal. Some of these species have the capacity to modify or maintain abiotic environments, via a range of activities, such as digging for food. These species, termed ecosystem engineers, can have a disproportionate influence on ecosystems by creating different habitat patches, with flow-on effects on other biota. In Australia, there has been increasing recognition over the past decade of the role of small soil-foraging mammals for maintaining and or reinstating important ecosystem functions and processes. Although the science underpinning the reintroduction of these ecosystem engineers is well established, policy aimed at facilitating ecosystem engineering is in its infancy. The move towards reintroducing these animals has largely been initiated by NGOs, with support from government. Here we discuss the policy implications of using small mammals to achieve land management co-benefits and highlight the opportunities that these ecosystem engineers represent for achieving cost-effective and appropriate conservation outcomes. We use the case study of the 'Saving our Species' program of the New South Wales Government to illustrate a potential future pathway for conservation policy that harnesses ecosystem engineers.

Introduction

Ecosystem engineers are organisms that, via their own physical structures (autogenic engineering) or changes in physical structure they cause in the environment (allogenic engineering), alter the abiotic environment, and hence alter biotic responses to these abiotic changes (Jones *et al*. 1994, 1997). Via engineering, such species create and maintain habitats for themselves and other species (Box 13.1 and Fig. 13.1). Since the introduction of the concept, ecosystem engineering has been widely used in ecology and conservation (e.g. >3000 citations to Jones *et al*. 1994: Google Scholar, 2 June 2014). Nevertheless, and despite the potential for using ecosystem engineers to enhance conservation outcomes (Byers *et al*. 2006), reported use of engineering species in management, and by extension prioritisation in policy, is relatively uncommon in the literature. This is somewhat