

Using reintroduction to compensate for isolation in fragmented landscapes

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Summary

The rationale for most reintroductions is that: (1) habitat at the reintroduction site has been adequately restored through management or natural regeneration; and (2) natural colonisation is unlikely due to isolation from potential source populations. Therefore, reintroduction is usually preceded by restorative actions such as revegetation or control of exotic predators. However, where habitat has become fragmented, metapopulation theory suggests that absences of species from some sites could be due to isolation alone. That is, local extinctions may occur by chance in habitat fragments, and these are not recolonised if isolated. Therefore, in theory, reintroductions could be used to reverse declines of some species in fragmented landscapes without accompanying habitat restoration. We discuss the evidence necessary to assess whether this is a sensible strategy, noting that it will usually be impossible to obtain such evidence without doing the reintroductions. We then review three Australasian case studies where experimental reintroductions were done for this purpose. In all cases, isolation among fragments was found to be a significant barrier to dispersal, and reintroductions led to establishment and breeding in at least some fragments. However, these subpopulations ultimately declined to extinction. In the most extensive study, monitoring throughout the landscape revealed inter-fragment variation in adult survival that could account for fragments being unoccupied. This variation in habitat quality was subtle, because it was not associated with measures of vegetation structure or predator density. Metapopulation modelling suggested that improving connectivity (through reintroduction or corridors) would actually negatively impact the metapopulation by facilitating movement from source to sink fragments. Long-term research from the other case studies also suggested that absences from fragments followed declines due to habitat degradation, with isolation only being important in the final stages. Given the challenges involved in demonstrating that reintroduction to unrestored habitat fragments is a sensible strategy, we suggest that habitat restoration such as predator control should continue to be considered a necessary prerequisite for reintroduction in most circumstances.