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Structured decision making for designing complex release strategies

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Summary

The release of individuals at a chosen location is the defining feature of reintroduction programs. However, the choice of an adequate release protocol for translocated individuals can be complicated, particularly for programs with multiple objectives, such as maximising release numbers while minimising impacts on the source population. Limited resources and the biology of species can also generate trade-offs, such as where older individuals have greater survival but are more expensive to translocate or breed. Uncertainty will surround many of these aspects: yet decisions must be made, often within strict time frames. This chapter illustrates how a structured decision-making framework can be used to guide the choice of release strategies in complex reintroduction programs. This approach focuses on clearly specifying objectives, comparing the available actions by their expected outcomes and explicitly considering uncertainties and trade-offs. An example is provided using the release program for the endangered southern corroboree frog *Pseudophryne corroboree*. For a 10-year release program for this species, mixed releases of eggs and sub-adults are expected to maximise the persistence of both wild and captive populations, while meeting budget constraints. Decision-analytic methods can help managers design transparent and effective release strategies, making rational decisions in the face of uncertainty.

Release strategies as complex decision problems

The movement of individuals between populations is a defining moment for most reintroduction programs, often representing the result of arduous efforts to recover small populations, or to restore previously degraded habitats, and attracting attention from media and public. Although most reintroduction programs do not end with the release of individuals, this is a key step in ensuring that the long-term objectives of the reintroduction are met, and the choice of the optimal strategy for release is therefore particularly important. For example, assuming releases aim to establish a viable population of the target species (IUCN 2013), the probability that they are successful may depend on several biological factors, such as the number of individuals released, their fitness, the suitability of the release site or the chosen method of release (Fischer and Lindenmayer 2000; Griffith *et al*. 1989; Griffiths and Pavajeau 2008; Letty *et al*. 2000; Wolf *et al*. 1996). Incomplete information about the direction and magnitude of these influences is likely