

Using decision theory to select indicators for managing threats to biodiversity

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Things we know

- 1 We need clear objectives related to quantifiable monitoring and management outcomes.
- 2 Thinking about complementarity avoids redundancies and reduces uncertainty.
- 3 Considering monitoring costs and indicator cost-effectiveness is crucial.
- 4 Choosing indicators necessitates trade-offs in representativeness, certainty in outcomes and costs.
- 5 Strategic decision-theoretic approaches help make difficult choices by meeting explicit objectives under uncertainty.

Knowledge gaps

- 6 Current indicator selection methods do not evaluate indicators in terms of their ability to reduce uncertainty
- 7 Most of our systems for selecting indicators assume we have prior information on how they respond to threats and actions
- 8 Indicators can represent actions, threats or ultimate biodiversity outcomes – what are the consequences of not knowing all of these parts of the management cycle?
- 9 Indicators are rarely chosen with more than one threat and mitigating action in mind – how is it best to account for the complexities of interacting threats?
- 10 Indicators are about accepting risk – can we use risk analysis to assess what the consequences might be if the indicator is wrong?

Introduction

In an ideal world, with unlimited resources, we could monitor or track the progress of anything we might be interested in, from changes in the weather, to responses of declining populations of species of conservation concern, to threat mitigation actions. However, it is rarely possible to measure everything. Not only are budgets limited, but the ecology and