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Research Brief

Authors

Luke P Shoo
Angela M Guerrero
Valerie Hagger
Kerrie A Wilson
School of Biological Sciences, The University of Queensland

Points of difference

- We have developed a decision support tool to help managers design best-practice restoration
- It takes into account the different values and priorities of various stakeholders
- It is a way to prompt decision-makers to define objectives, explore management options and examine trade-offs

Better decision making in ecological restoration

Many countries have committed to restore vast areas of degraded land to address global environmental concerns, although there is still much risk and uncertainty in achieving ecosystem recovery. We are finding and testing new ways to improve decision making in ecological restoration.

Why do we undertake restoration?

Ecological restoration assists the recovery of degraded ecosystems but the underlying motivations stem from diverse environmental and social reasons which influence the desired outcomes. Regional and stakeholder motivations vary which can determine, or alter, approaches to plan, implement and monitor restoration. We surveyed 307 people involved in the restoration of native vegetation across Australia to identify their underlying motivations. We also elicited information on planning and monitoring of restoration projects.

Motivations for restoration

We found that biodiversity enhancement is the main motivation for undertaking restoration, with biodiversity offsetting, water quality improvements, and social reasons as important secondary motivations. However, motivations varied significantly by stakeholder type and region. Restoration projects primarily motivated by ecosystem service provision, like water quality improvements, sought less pristine ecological outcomes than projects motivated by biodiversity enhancement or offsetting. Rigorous monitoring designs were rarely used in restoration projects, except for projects motivated by scientific research.

Better alignment of different restoration motivations, with the planning and monitoring of restoration projects, should deliver greater benefits. These improvements will increase the capacity of the restoration practice to meet international commitments (Hagger et al. 2017).

Accounting for values and preferences

The task of setting clear restoration objectives is hindered by the motivations and values of different stakeholders, which is not often accounted for. Values encompass judgments about what is important and reflect what people care about. In the context of restoration, different values might be reflected, ranging from the re-creation of habitat for flora and fauna or meeting basic human needs (e.g., by providing timber resources or clean air), to reconnecting humans with nature. Values can be translated into clearly defined measurable objectives that can be used to plan and evaluate the outcomes of management interventions. However, delivery of multiple benefits depends on how well restoration objectives are conceived. Therefore, restoration projects can benefit from the formal objective setting step in a structured decision making (SDM) framework to achieve project goals when

there are multiple stakeholder groups with varying values. An SDM framework can also incorporate stakeholders' expectations and preferences for outcome delivery. This is important because the choice of timeframe can affect how resources should be allocated to maximise outcomes.

Application to a case study

We applied this approach to a case study of restoration decision making by a local government in south-east Queensland, Australia that has responsibilities to maximise outcomes of public expenditure in a region with multiple stakeholders and budget considerations. We used a survey prior to a facilitated SDM workshop with decision-makers to incorporate the views of a diverse suite of stakeholders in the process of setting restoration objectives for the study area. This approach allowed for explicit consideration of the values held by stakeholders, to ensure that the suite of objectives identified at the workshop was complete. We used the 'why is that important? test' (WITI test) to help separate fundamental objectives that reflect values, from a much larger list of means, process and strategic organisational objectives. This ensured that specified restoration objectives captured the fundamental aspects, and at the same time helped identify multiple pathways for how these objectives might be achieved at a later phase in the SDM process. Our modified SDM process allowed us to ascertain more broadly held underlying values and timeframe considerations, alerted us to process issues and timeframes that mattered to stakeholders, and helped us facilitate transparent and inclusive establishment of restoration objectives.

Smart allocation of funds

Ecosystem restoration requires choosing between potential interventions that differ in cost and the time required to achieve outcomes of varying quality. Managers have different preferences for timeframes, certainty, and quality of outcomes, which can influence the choice of investment strategy. We have developed an approach to quantify expected restoration outcomes from alternative investment strategies, given operational constraints or alternative preferences. We applied this approach to a tropical forest restoration case study in which managers seek to allocate future resources between active planting and self-organized regrowth. We found that the best strategy depends on the desired forest attributes and the time required for outcomes to be achieved. We quantified the trade-off for three key forest attributes between restoring large areas of vegetation to a lower quality and restoring smaller areas to a higher quality. A useful outcome of this analytical approach is that it prompts decision-makers to define and reappraise their preferences for important attributes of the outcomes, to explore management options and their consequences, and to examine trade-offs.

Collaborating to develop a tool

Natural area managers are faced with the challenge of how to make public expenditure on restoration cost-effective, efficient and transparent. We are now working with a south-east Queensland council to develop and apply technical optimisation approaches that find solutions to resource allocation problems through mathematical formulation of restoration prioritisation problems, drawing on principles from systematic conservation planning. The new decision support tool will help allocate restoration funds for vegetation recovery across approximately 800 conservation parks, covering 12,000 hectares. The work will guide future management decisions about where to undertake restoration work in an environment where there are competing priorities and it is not possible to do everything at once. ●

Key references

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Further resources

Restoration prioritisation at The University of Queensland

> https://wilsonconservationecology.com/our-research/research-themes/restoration-prioritisation/

Contact

Professor Kerrie Wilson
Director of the ARC Centre of Excellence for Environmental Decisions
ARC Future Fellow
P: +61 7 3365 2829
E: k.wilson2@uq.edu.au

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