Turning over a new leaf: long-term monitoring for improved ecological restoration

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• Australia: a ‘megadiverse’ country

• Approx. 7 360 vertebrate species
Australia: a ‘megadiverse’ country

Approx. 24 700 plant species
High diversity of ecosystems and landscapes
A ‘biodiversity crisis’

- Over 50 animal species extinct
- 30 mammal species extinct since European settlement (compared with a single mammal extinction in USA)
- 48 plant species extinct
The M&E imperative

Urgent need for ecological monitoring and evaluation to:

• Understand ecological changes and drivers of these
• Understand effectiveness of interventions
• Prioritise limited resources for conservation and restoration
• Promote public and political support for conservation and restoration
Current state of ecological M&E in Australia

Knowledge bank of effectiveness of interventions compiled by CSIRO / DoEE for Australia found:

• Long-term monitoring very limited

• Much knowledge effectively lost / hidden in academic filing cabinets

• Very few empirical studies evaluating outcomes of on-ground interventions

• Of these, most suggest ecological interventions are “at least partially effective at delivering environmental outcomes”
Regional Lands Partnerships

• Australian government currently developing Regional Lands Partnerships (continuation of Landcare program)

• 5 year, $450 million program

• Ecological interventions to be carried out across 56 regional natural resource management areas Australia-wide
Regional Lands Partnerships (RLP)

To maintain and restore condition and values associated with 4 key environmental outcomes:

- Ramsar wetlands
- Threatened species
- World Heritage Areas
- Threatened ecological communities
RLP Long-Term Monitoring Framework

Griffith University engaged to develop a long-term ecological monitoring and evaluation framework for RLP:

Objectives:

• Evaluate and report on ecological outcomes of RLP interventions
• Inform adaptive management (prioritise investment)
RLP Long-Term Monitoring Framework

Framework objectives:

- Cost-effective
- Capitalise on existing M&E
- Scientifically robust, transparent & defensible
- Promote perpetuation of M&E beyond program
RLP Long-Term Monitoring Framework

Our approach:

• Knowledge review:
  • Interviews & surveys
  • Expert workshops
  • Systematic literature reviews
  • Novel approaches (ecoacoustics, eDNA etc.)

• Co-develop framework principles / design
Findings – knowledge review

• Monitoring tends to be inconsistent – temporally and spatially:
  • Local spatial scales
  • Short time periods (limited by funding, politics)

• Lack of consistency in data collection, leading to inability to describe meaningful patterns in space and trends over time
Findings – knowledge review

• Restoration objectives often not clearly defined (i.e. not S.M.A.R.T. goals)

• Indicators not clearly aligned with restoration objectives

• Monitoring often occurs opportunistically rather than having a solid, experimental design
Findings – knowledge review

• Lack of effective communication and integration across hierarchical levels of NRM organisation (i.e. on-ground practitioners, States, National Dep’t)

• Lack of trust and understanding regarding M&E and adaptive management decisions across levels, e.g. roles and responsibilities

“Some of the biggest challenges are people rather than science”
Findings – knowledge review

• Success often dependent solely on efforts of ‘champions’

Core goal of RLP LTMF is to cultivate a national culture of ecological M&E!
RLP projects and priority actions

Monitoring & Evaluation – data collection, management & analysis

Adaptive management - communication, engagement, decision-making

Evaluation of RLP Outcomes (2.5 years, 5 years, long-term)

RLP LTMF

RLP LTM Framework design
Explicit recognition of multiple levels of organisation and how these interact with each other over different spatial and temporal scales.
RLP LTM Framework design principles

- Indicators need to be tightly linked to specific restoration objectives
Example: Macquarie Marshes

- Hydrological variability
- Periods of flood and drought (boom and bust)
- Ecological variability not taken into account when establishing restoration objectives
- Monitoring inconsistent, opportunistic
RLP LTM Framework design principles

- Needs clear roles & responsibilities, especially data management pathways
  - Clear metadata
  - Effective, centralised data storage
  - Accessible, visualisable, real-time data
• Needs robust, defensible experimental design
  • Based on conceptual models
  • Capitalises on scientific knowledge
  • Replication, power of distributive experiments!

Example: Murray-Darling Basin
Long-Term Intervention Monitoring
Summary

- Previous M & E limited by:
  - Inconsistent monitoring, temporally and spatially
  - Indicators not aligned with restoration objectives
  - Lack of communication across multiple levels of organisation
Summary

• Indicators need to be tightly linked to restoration objectives

• Effective communication, clear roles and responsibilities

• Input welcome!

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