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

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Australian Government

Department of the Environment and Energy

- 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

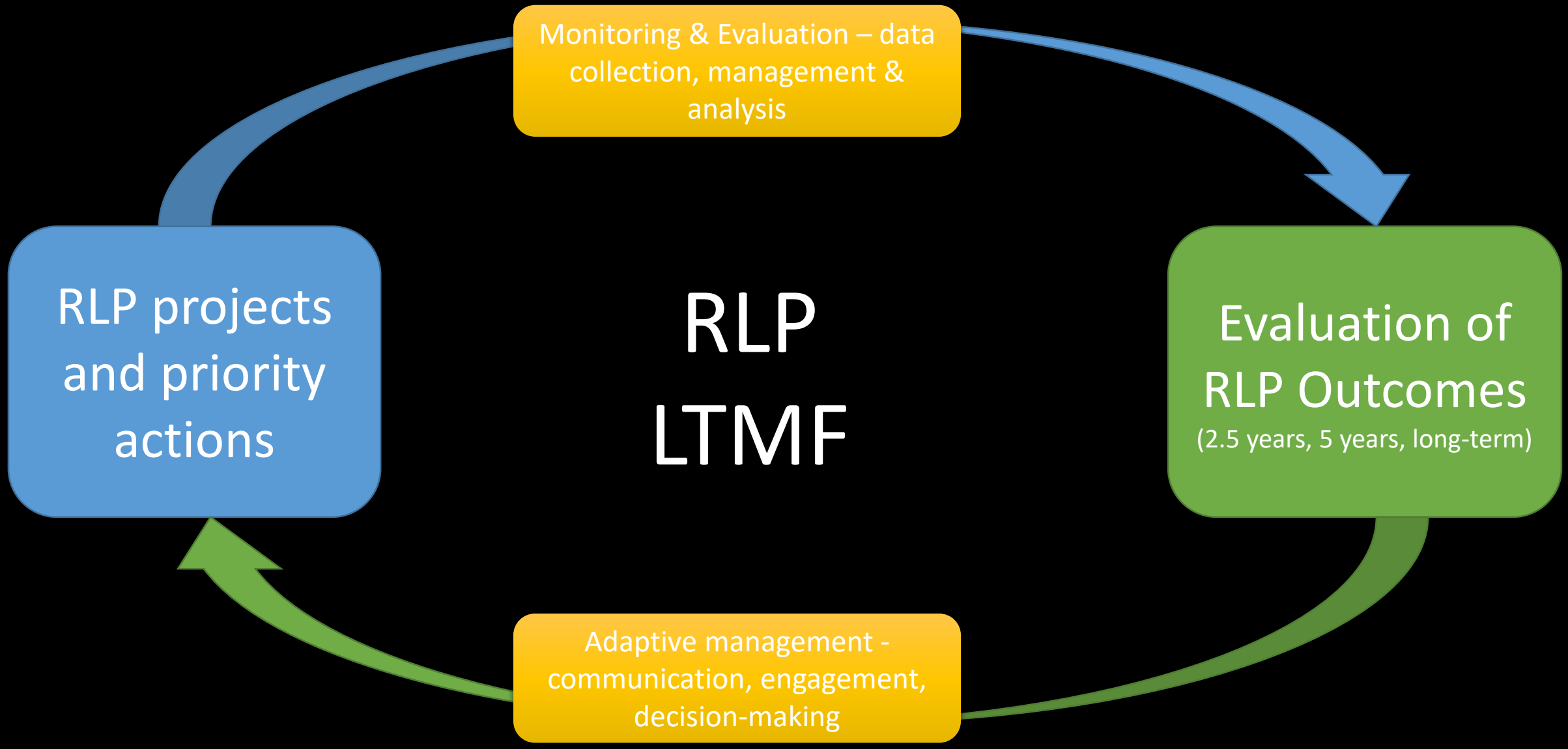
“Some of the biggest challenges are people rather than science”

Findings – knowledge review

- Success often dependent solely on efforts of ‘champions’

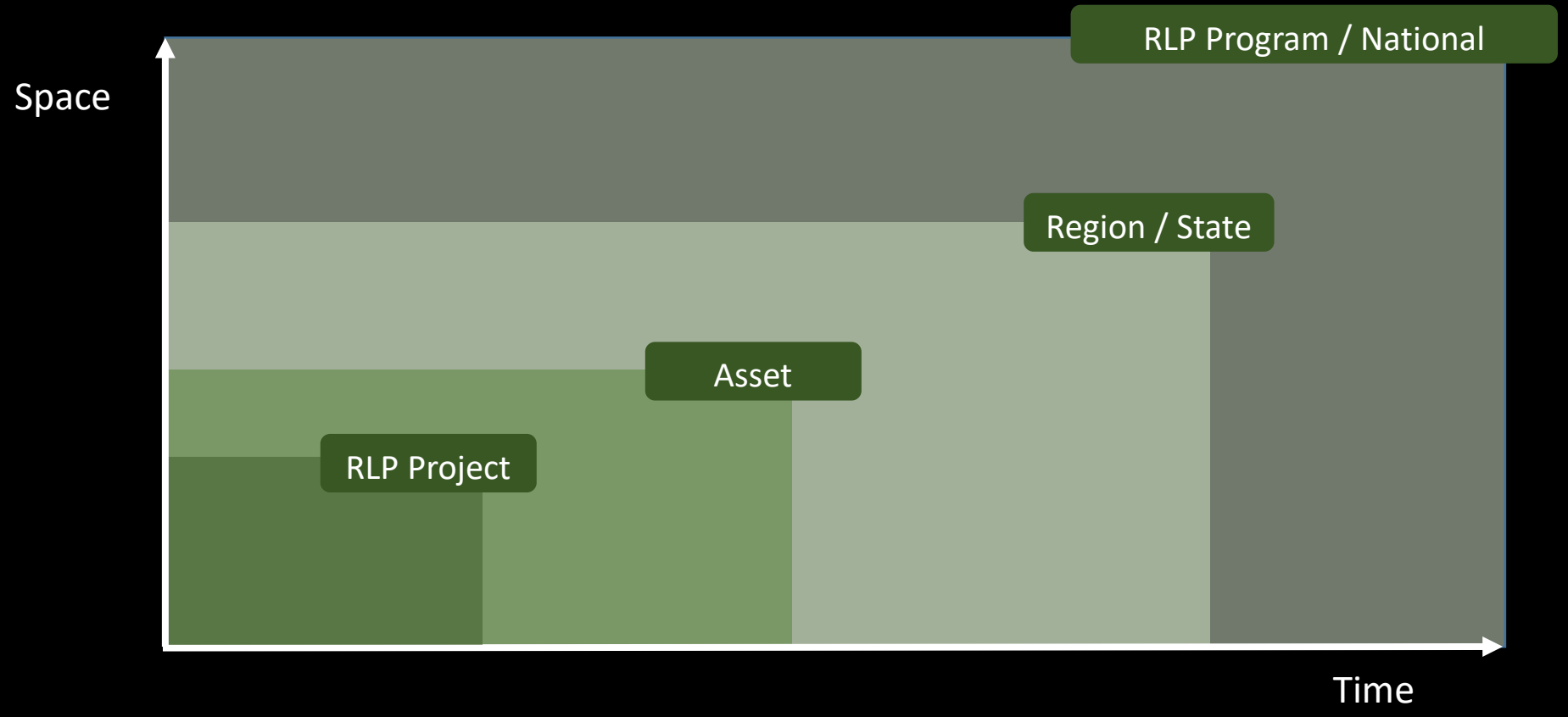
Core goal of RLP LTMF is to cultivate a national culture of ecological M&E!

RLP LTM Framework design



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

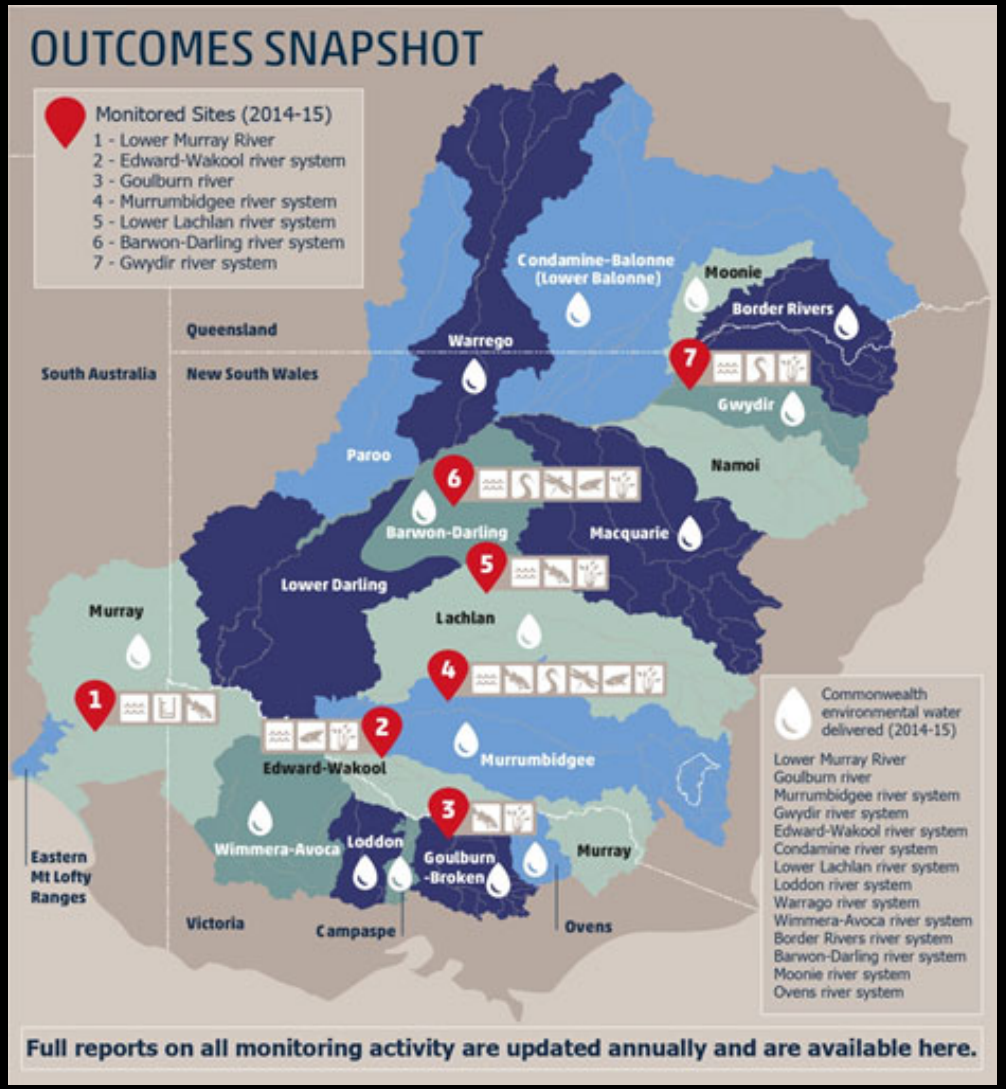
- Hydrological variability
- Periods of flood and drought (boom and bust)
- Ecological variability not taken into account when establishing restoration objectives
- Monitoring inconsistent, opportunistic

RLP LTM Framework design principles

- Needs clear roles & responsibilities, especially data management pathways
  - Clear metadata
  - Effective, centralised data storage
  - Accessible, visualisable, real-time data

RLP LTM Framework design principles

- 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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