

Monitoring and Evaluation of Investment in NRM

Living Laboratories

Thursday May 31st 2007

Purpose

- Explore real NRM monitoring and evaluation problems and challenges, identified by the people who have the imperative to solve them
- Discuss these challenges and problems with a diverse range of researchers with relevant research interests and expertise
- Apply research expertise in novel ways, outside traditional areas of application
- Identify research required to fill the knowledge gaps and scope funding opportunities to pursue them
- Make contacts and network with new people

**A devils advocate look at
resource/biophysical monitoring:
can it work and why would you
bother**

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Monitoring & Evaluation of Investment in NRM

Why bother with resource condition monitoring?

- Why would we monitor anything?
- Why it is expensive to have inadequate monitoring?
- What is inadequate monitoring?
- Some explanation for inadequate monitoring?
- Can we fix it?

Why monitor anything?

- to inform managers when the system is departing from the desired state
- to measure the success of management actions
- to detect the effects of perturbations and disturbances

Why monitor anything?

- Decisions
- Decisions
- Decisions

Monitoring serves Evaluation serves Decisions

The four outcomes from monitoring

A change:

- **occurs** and is detected – GOOD
- **occurs** and is not detected – BAD
- **does not occur** and is detected – BAD
- **does not occur** and is not detected – OK

The four outcomes from monitoring

A change:

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- **does not occur** and is detected – BAD
- **does not occur** and is not detected – OK

The “power” of a monitoring program is the ability to detect changes when they occur.

Bad monitoring is worse than no monitoring

Incorrect management decisions based on monitoring incur a cost:

either

The cost of taking action when it was unnecessary

or

The cost of undesirable but preventable change

and

The cost of the monitoring program

Three characteristics of good monitoring

- Objective focused – inform decisions
- Cost efficient – justified spending
- Robust design – provide confidence

Three characteristics of good monitoring

- Objective focused – inform decisions
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Inadequate monitoring is any monitoring which does not have all three of these characteristics

Inadequate monitoring

Objectives not clear – decisions not pending

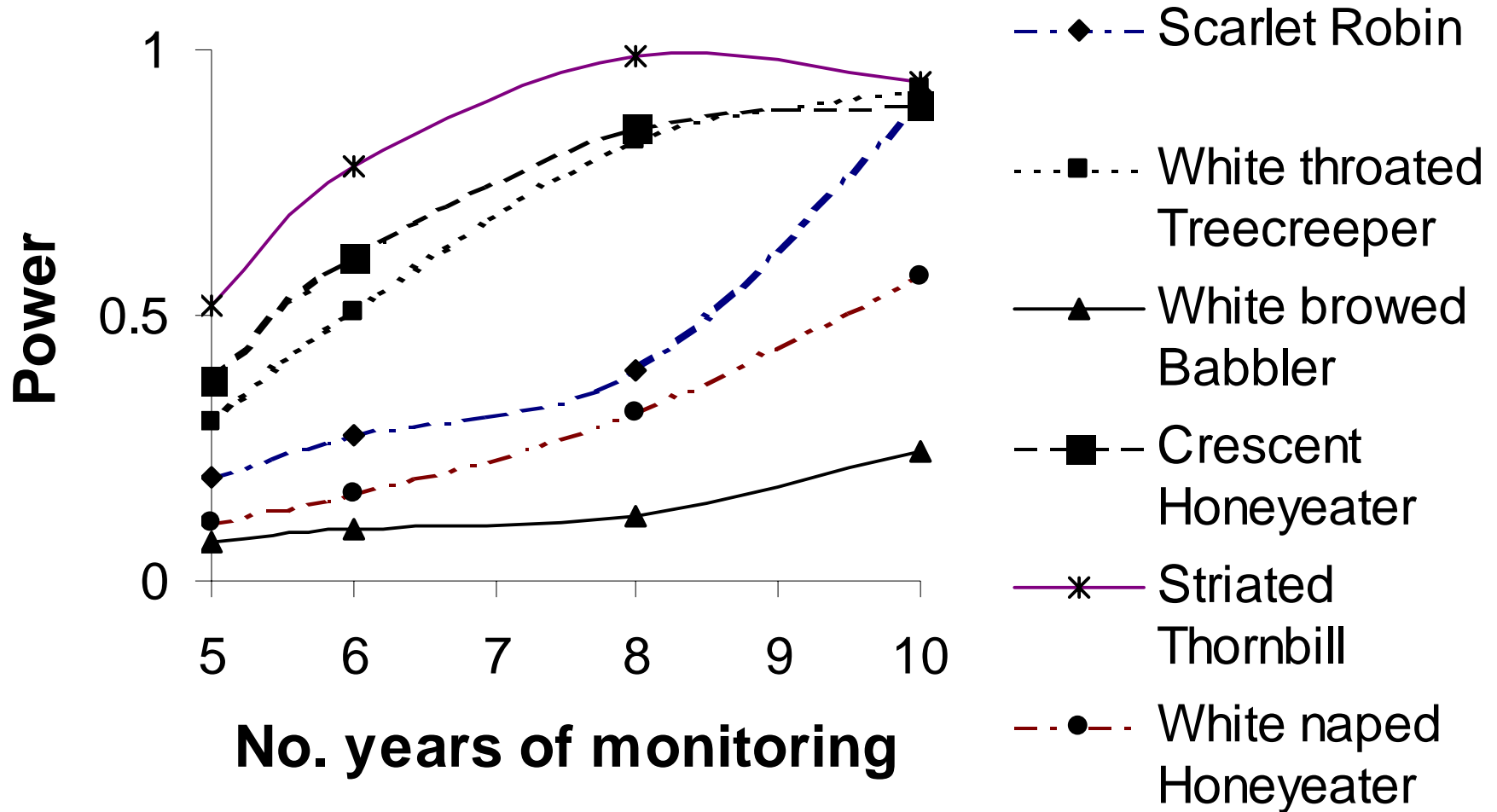
- By definition, a monitoring program cannot possibly succeed without a clear articulation of what success would mean (ie. effect size of “significant” change)

Inadequate monitoring

Cost inefficient – unjustified spending

- It will usually be better to invest in management than in inefficient monitoring
- The higher the cost of the monitoring, or where the value of the asset exceeds the cost of recovery of the asset, the more likely that monitoring expenditure will be inefficient
- It is usually necessary for monitoring to be sufficiently long-term to allow a change to be detected over and above the natural temporal fluctuations in the system

Time to establish adequate power

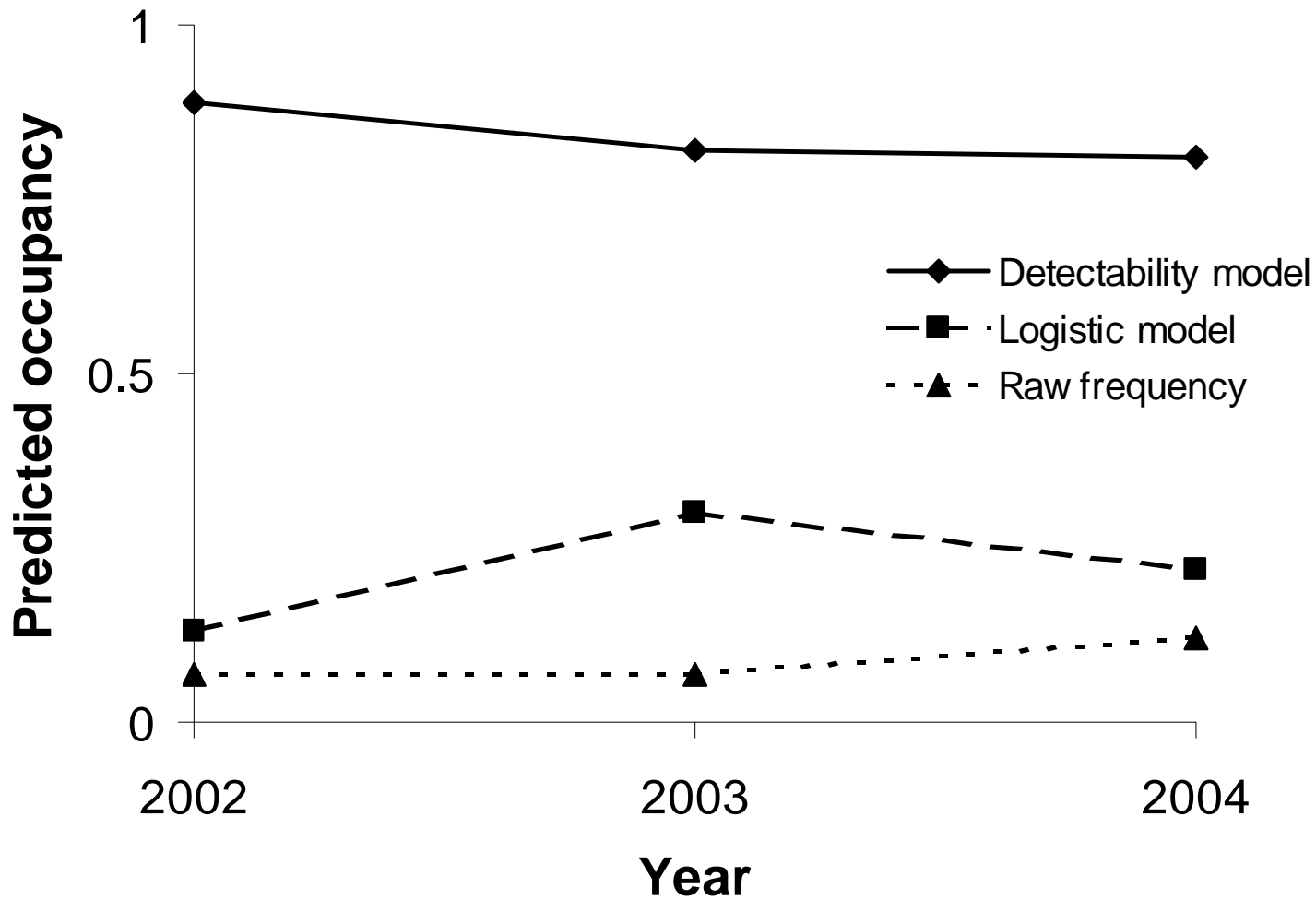


Inadequate monitoring

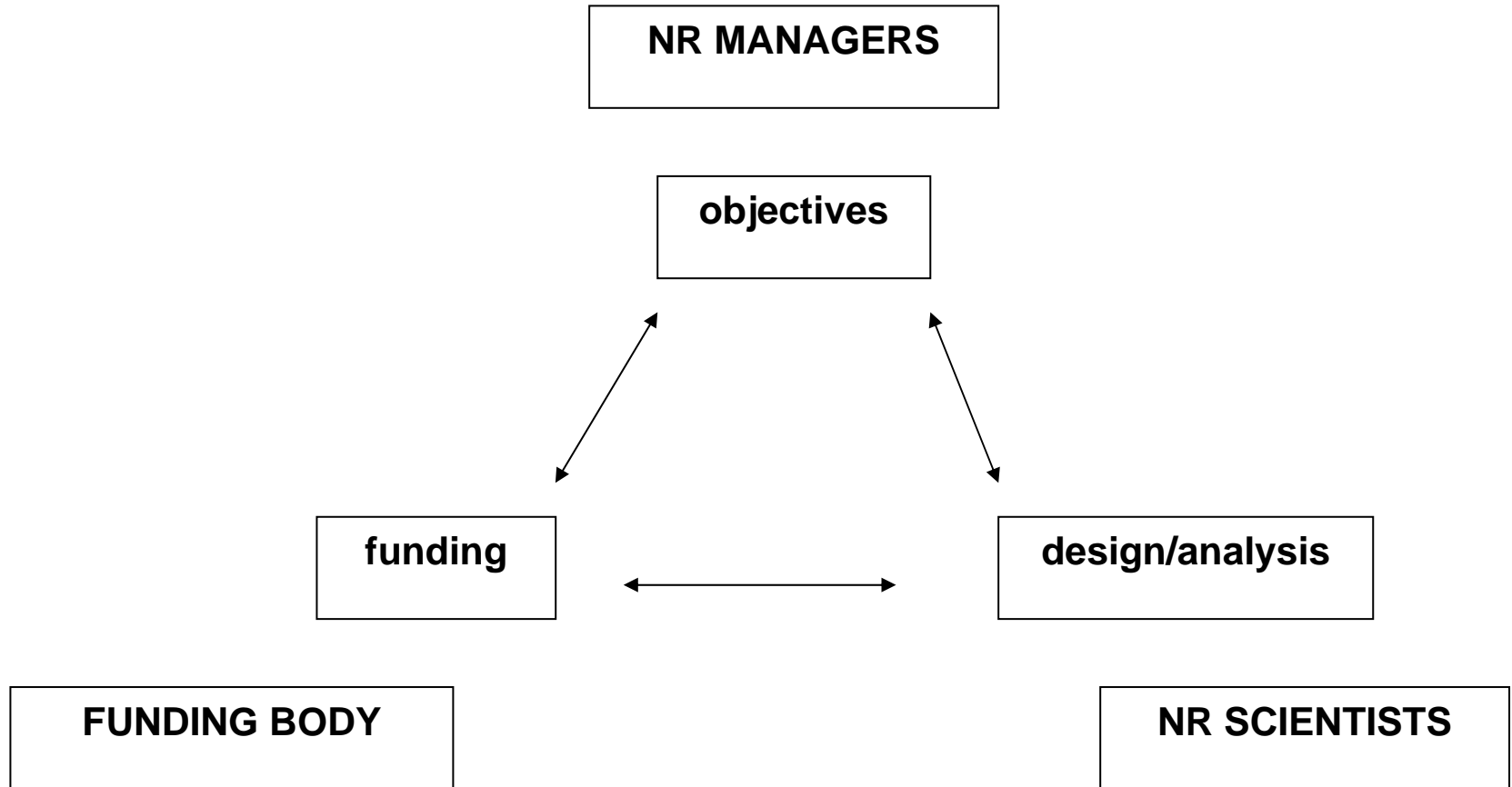
Design not robust – provides low confidence

- sampling design is not capable of detecting the specified change if it actually occurs, *i.e.*, inadequate statistical power
- monitoring program is not adaptive – not approached with learning and improvement explicitly in mind – early results are not analysed promptly and deficiencies remain undetected and the sampling regime is not revised to make it progressively more efficient

Fox occupancy (Elliston – Eyre Peninsula)



Why monitoring fails



Can we fix it?

Some basic improvements:

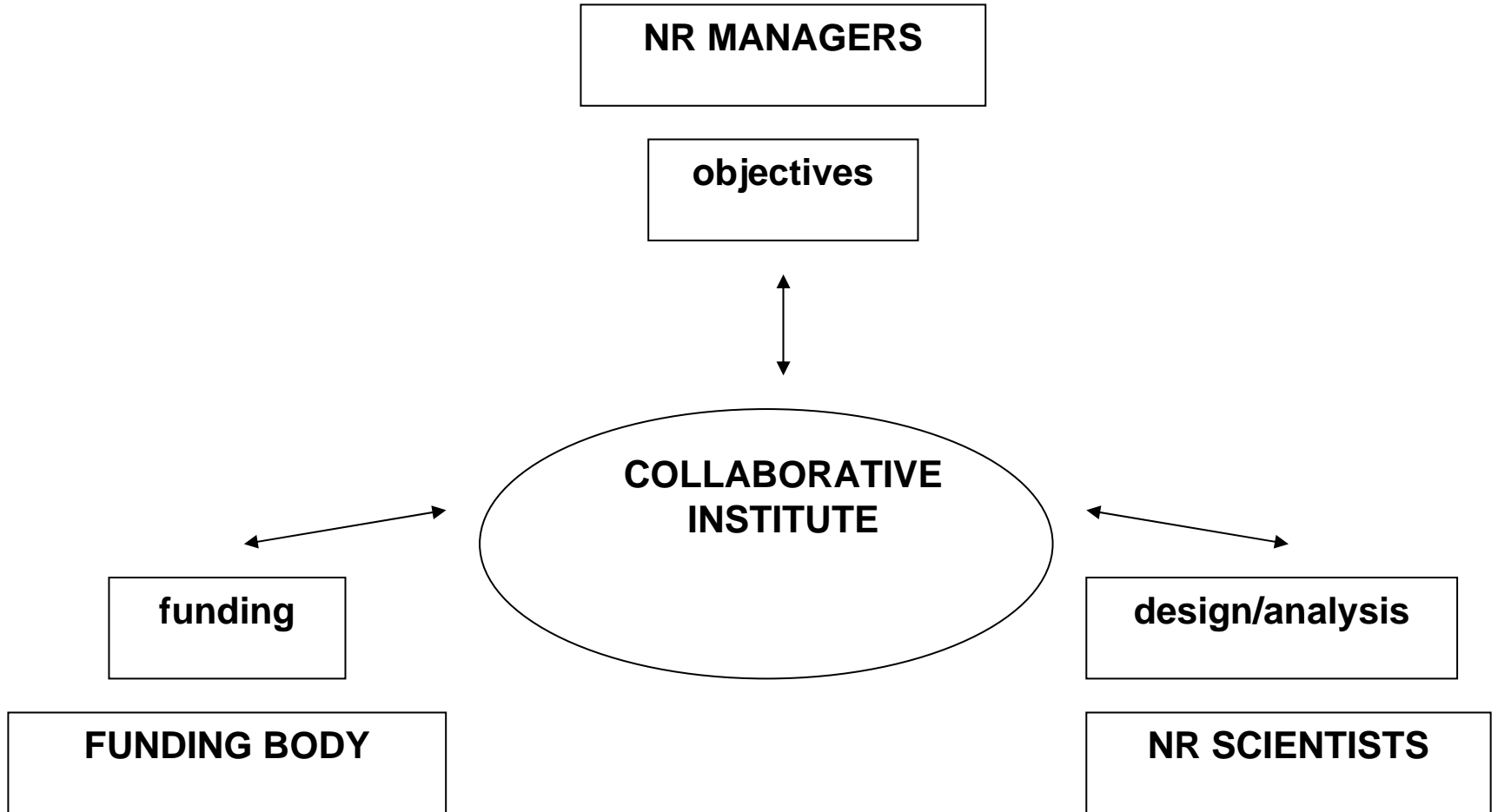
- set clear objectives including effect size of interest
- set level of power in design – trade off significance for power where necessary and monitor for long enough to establish required power
- subject data to rigorous analysis at the first opportunity – can help to estimate the *quantity* of data required and assist adaptive monitoring to improve *quality* of data in future

Can we fix it?

A cultural change is required

- cultivation of more collaborative relationships among researchers, natural resource managers and bureaucrats

Cultural change is required



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Speed Networking

- Please move into your group
- 2 minutes to meet each other person
- Exchange
 - your names
 - your background and employer
 - what you do
 - business cards or contact details
- At the signal, please move to the next person

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Speed Networking

Note:

- listen to each other
- try to memorise something about each person which will help you remember them
- Follow-up contacts at lunch or after the workshop to further establish your connections

Workshop to discuss questions:

- What is the problem or issue really about?
- What knowledge are we missing that helps address the problem?
- How could the issue/gap be filled/resolved through research

Discussion items for workshop

1. Monitoring tools for active adaptive management (SAMDB)
2. Evaluating water resource improvement
3. Discovering and utilizing community knowledge and monitoring systems

Discussion items for workshop

4. Measuring the impacts of large scale environmental pressures on biodiversity
5. Placing an economic value on natural resource changes
6. Evaluating the River Murray Act

Presentation of findings

- 10 mins per group
- Focus on the knowledge gaps identified

Research gap outline

- Description
- Purpose of Research
- Possible Funding Sources
- Primary contact(s) for further information

Research gap outline

Description

Describe what the research would involve: what questions it will answer, what information it seeks to obtain, examples of methodologies that could be used. Give an indication of the scale of research required to achieve the research objectives (years to complete research, financial cost, area of research activity)

Purpose of Research

List how the research will be used to underpin investment in natural resource management and describe how it will improve investment outcomes

Possible Funding Sources

List possible funding sources for the research

Primary contact(s) for further information

Nominate a researcher contact and NRM policy/implementation contact for this research priority

Monitoring tools for active adaptive management (SAMDB)

- Linking project/on-ground actions to resource condition change
- Methods of assessing resource condition change and attributing causation
- Use of risk assessment to formulate priorities, particularly looking at specific locations
- Scenario analysis of the likely future conditions of the NRM region

Evaluating water resource improvement

- Understanding the links between water management, ecosystem management and biodiversity: threatened and iconic species
- 'Net' water quality - what does it mean, what assets should it include, parameters it might include, is it possible to measure realistically? Do we need an aggregation model or integrated indicators - what could they be?
- State wide wetland condition indicators developed through a State system of wetland conceptual models.

Discovering and utilizing community knowledge and monitoring systems

- What is the role and how can we best utilise community monitoring to support monitoring at various scales
- Community Monitoring - How to overcome QA issues, what is its value, what are realistic expectations, how to achieve long-term commitment?

Measuring the impacts of large scale environmental pressures on biodiversity

- Biology, tolerance and adaptation of native species to extreme temperature, trends in temperature changes and salinity of water/soil
- Tackling salinity as a biodiversity issue
 - Basic ecological processes in terrestrial ecosystems to refine our conceptual models of how terrestrial ecosystems function and respond to pressure
 - Threatened species and communities monitoring across the state - how do we combine these datasets?
- Determining biodiversity benefits of a coordinated fox baiting program

Placing an economic value on natural resource changes

- Using and linking NRM resource monitoring results to economic information: being smarter with and getting the most out of NRM monitoring and evaluation data
- Monitoring data is ultimately information that needs communicating to various audiences – economic data will have more resonance with some audiences, as many landuses are associated with production.
 - Can we put the \$ value on resource change and thus more easily demonstrate the economic consequences of improvement, no change or decline in ecosystem services?
- The public v private benefits of On-Ground-Works

Evaluating the River Murray Act The River Murray Act has been put in place to protect, enhance and restore the River Murray in South Australia - but how do we know that it is working? Through specific project or river monitoring we can detect changes in the environment at any given point of time but how do we know what was responsible for this change? We can predict, hypothesise and assume that changes resulted because of a particular project or program but how do we know for sure? Could some or all of the changes that have been seen be attributed to some other parameter such as a change in land use upstream? How can we make causal links between particular projects or programs and changes that are seen in the environment?

Workshop to discuss questions:

- What is the problem or issue really about?
- What knowledge are we missing that helps address the problem?
- How could the issue/gap be filled/resolved through research

Not just Australia

- Approx €3.7 billion on agro-environment schemes in 2003 in EU
- In the majority of studies, the research design was inadequate to assess reliably the effectiveness of the schemes.
- 31% did not contain a statistical analysis.
- Most designs were biased to positive results from schemes
- 34% of studies collected baseline data
- adequate controls (16%)