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Project No RRD058: A novel biological method of monitoring herbicides

Project Leader: **Ben Kefford**,
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Technology, Sydney (UTS)

In collaboration with Qld Department of
Environment & Resource Management
(DERM)



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Department of the Environment, Water, Heritage and the Arts
Department of Agriculture, Fisheries and Forestry





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Summary of Issue

- Pesticides, including herbicides, are a threat to the Reef
- Pesticides typically occur as pulses
 - Unless sample during the brief pulse, miss peak
 - Passive samplers measure mean concentration not peak, require several assumptions and costly
- Measure concentration, not toxicity
- Existing biomonitoring indexes detect general reduction/loss, not specific to pesticides
- New stream invertebrate index SPEAR (SPECies At Risk) for specific stressors e.g. pesticides
 - Invertebrates relative tolerant of herbicides

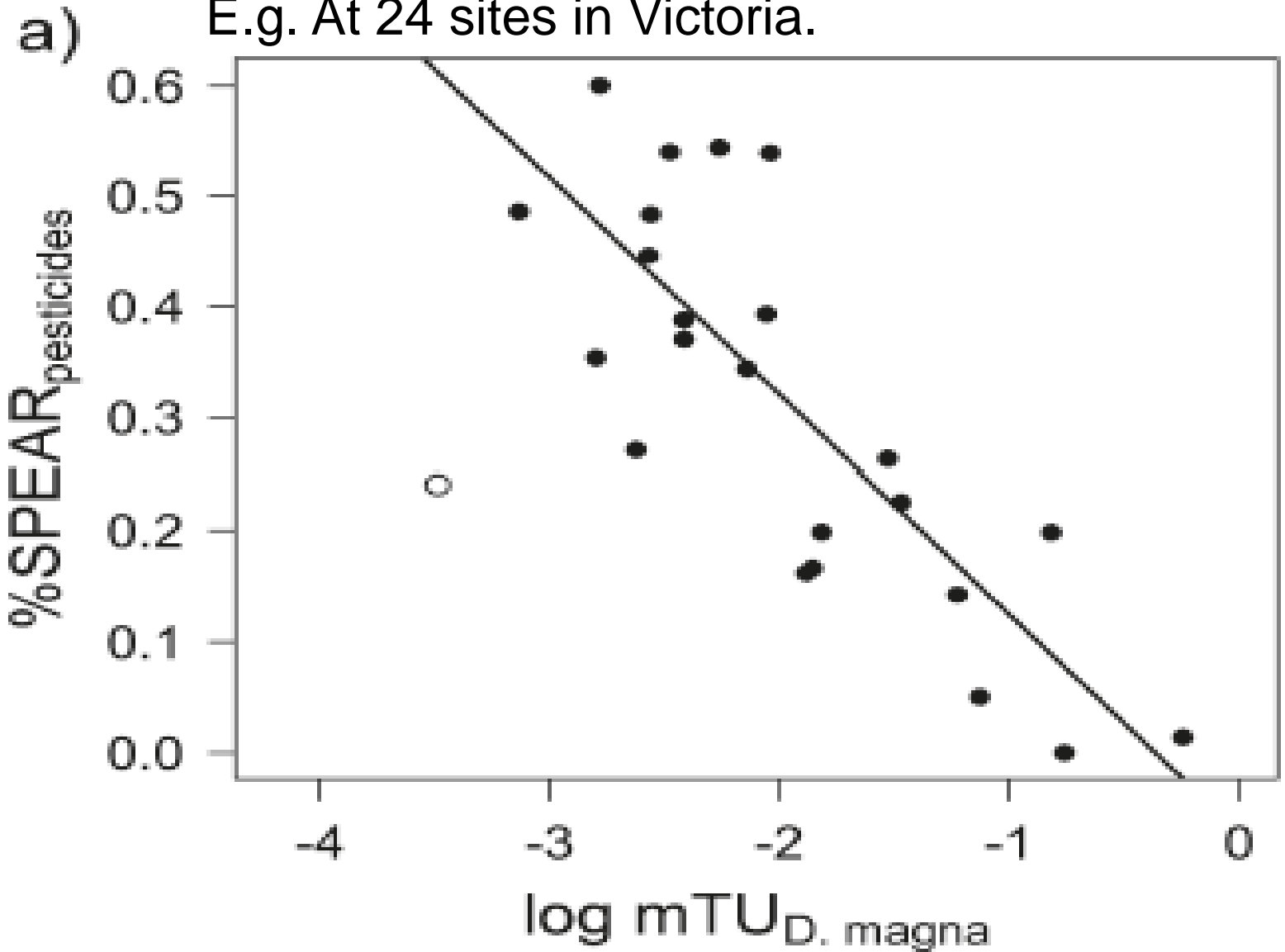




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Project objectives

E.g. At 24 sites in Victoria.





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Approach: Team, Methods

- UTS: **Ben Kefford** (ecotoxicologist & aquatic ecologist), **Simon Mitrovic** (algal ecologist) & **Rebecca Herron** (Masters Student)
- DERM: **Satish Choy** (aquatic ecologist & group leader), **Melanie Shaw** (ecotoxicologist) & **Glenn McGregor** (algae taxonomist)
- The SPEAR index is the proportion of the community that is at risk (SPECies At Risk)
- Whether a taxa is a SPEAR is determined based on their
 - Physiological sensitivity (from toxicity tests)
 - Ecological ability to recover after pesticide pulse





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Geographic scope

- Rivers and stream draining onto the Great Barrier Reef
- Anticipate the project will have relevance to rivers elsewhere, especially for northern Australia



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Outputs

Two methods

1. To estimate herbicide toxicity in streams and rivers draining on to the Reef by monitoring benthic diatoms
2. To estimate pesticide (mostly insecticide) toxicity in streams and rivers draining on to the Reef by monitoring stream macroinvertebrates



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Synergies – Reef Rescue & external

- Jon Brodie's projects
- Existing stream/river biomonitoring (conducted by DERM)
- Potential ARC Linkage project
- Related work in Europe conducted in the Department System Ecotoxicology, UFZ - Helmholtz Centre for Environmental Research, in Leipzig, Germany
 - Who invented the SPEAR indexes
 - Where Ben Kefford is now





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Management Implications

- More cost effective than traditional chemical methods
- Existing biological monitoring programs (since 1990's)
 - Can mine existing data to look for spatial & temporal pattern in herbicide & pesticide toxicity
- Can identify “hotspots” of herbicide and pesticide toxicity
 - Target (chemical) monitoring and management





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End user engagement & delivery

- DERM part of the project team
- Invite potential end-users on steering committee
- Targeted communication with key decision makers
- Communicate to difference audiences using appropriate communication products

For further information please email us:

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