

# e-Flow Synthesis Project:

enhancing uptake of environmental flow research for water planning

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# Overview

- Much current (& past) research on ecological responses to changes in river flows in northern Australia (~ flow-ecology response models)
- But research is often limited to particular catchments, small spatial extents/scales, particular species and/or over relatively short time periods
- This project will identify constraints and opportunities for transferring this flow-ecology knowledge to new areas, different species, and over different space/time scales.
- This will help decision-makers make the best use of available knowledge and understand where knowledge could be improved to reduce uncertainty
- Critical for robust, defensible and environmentally sustainable water planning in northern Australia.

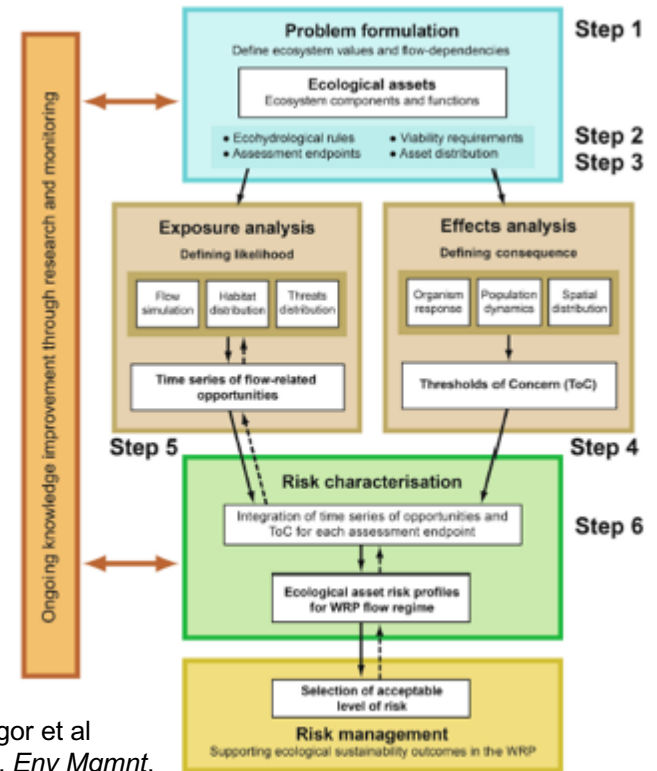
# Opportunities

## Qld Water Resource Planning

Stages in the water plan development process



## Ecohydrological risk assessment



regor et al  
7). *Env Mgmt.*

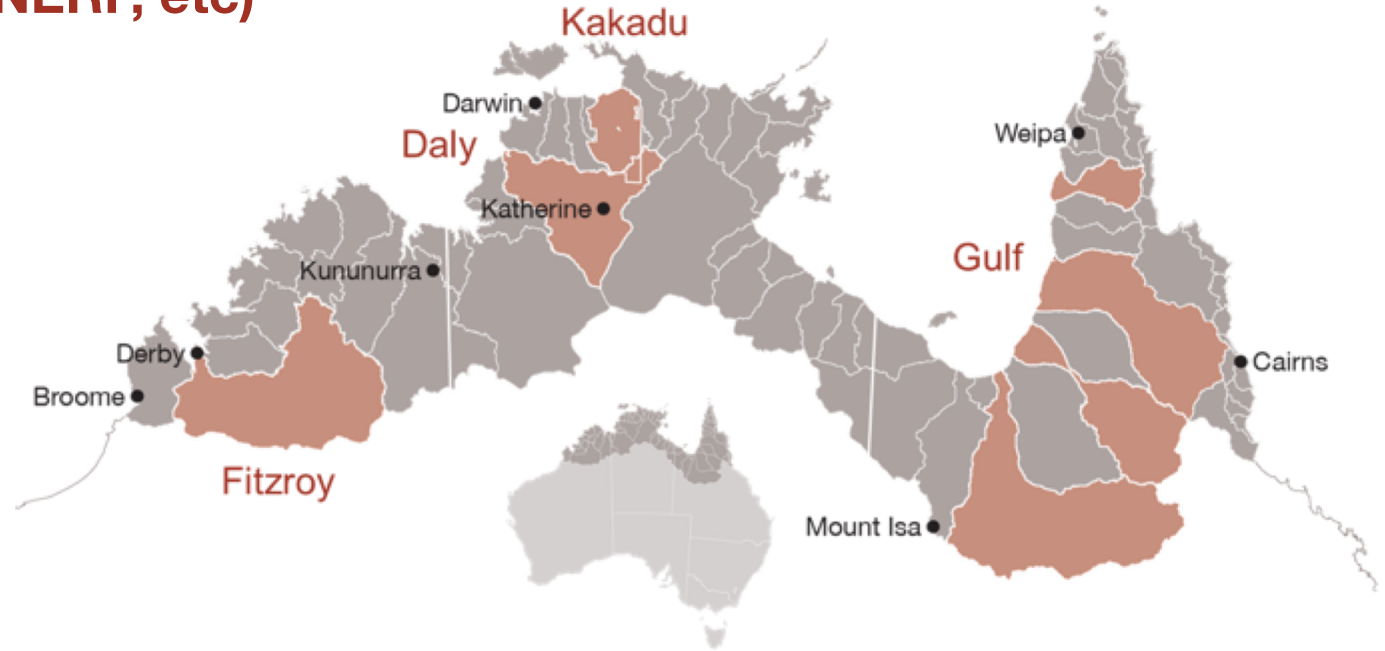
## Qld Wetlands Program



WetlandInfo—your first-stop-shop for wetland management resources in Queensland

# Focus regions for flow-ecology research

(through NESP, NERP, etc)



## Example projects:

### *Current (NESP)*

- Environmental water needs for key ecological assets in the Mitchell / Daly / Fitzroy River
- Links between Gulf rivers & coastal productivity

### *Past (NERP)*

- River to landscape connections sustaining biodiversity and productivity in Kakadu wetlands
- Water, sediment and nutrient movement in the Alligator Rivers estuaries
- etc...

# Flow-ecology response models

## Different types:

- Narrative reviews
- Conceptual models
- Ecohydrological rules
- Maths/Stats models, etc

Based on information/data from:

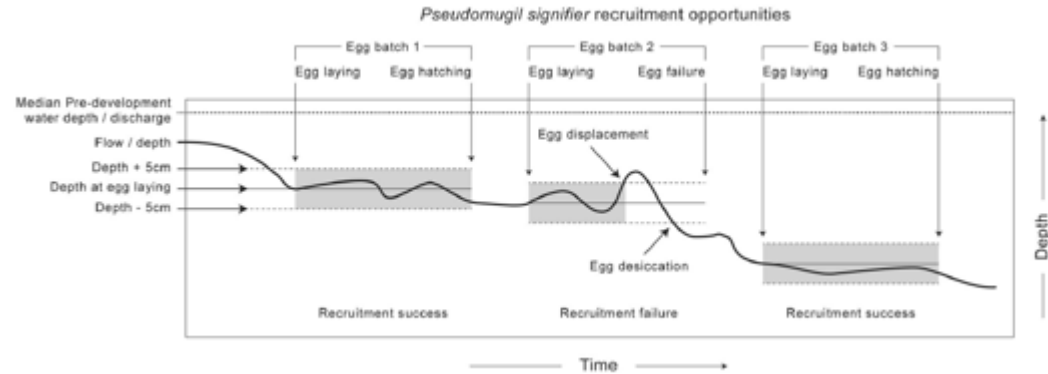
- field studies,
- laboratory experiments,
- expert opinion,
- desktop reviews

Each approach is valid but each has strengths and weaknesses in terms of:

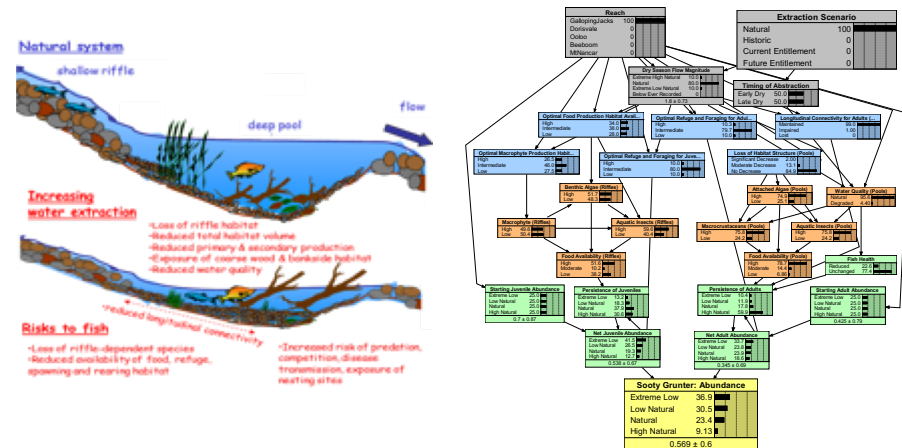
- Inferential strength (how true?)
- Transferability (where/when else?)

## Understanding knowledge uncertainty can help to:

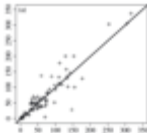
- efficiently prioritise science information needs and priorities
- improve robustness and defensibility of decision-making



Mcgregor et al (2017). *Env Mgmt.*



$$\mu_{jk} = \beta_{j0} + \beta_{j1}X_{jk1} + \beta_{j2}X_{jk2} \dots \beta_{jl}X_{jkl}.$$



# Approach

- Is flexible (depends on respective jurisdiction priorities & interests)
- But constrained by capacity, information availability, etc...

In general, will use a series of targeted Expert/Stakeholder workshops and desktop analyses to...

1. characterise and synthesise flow-ecology responses developed through current/past projects in northern Australia (i.e. geographic location, type, scope, scale, etc)
2. characterise and quantify spatial similarity in ecohydrologic characteristics to inform transfer of flow-ecology responses
3. identify key considerations, challenges and opportunities for transfer of flow-ecology responses
4. generate maps, conceptual models and other products to evaluate and communicate transferability of key flow-ecology responses from current/past e-flow research

# Project outputs

Outputs will be tailored to relevant water management agencies in each jurisdiction (i.e. Federal, Qld, NT, WA)

Can include:

- Flow-ecology conceptual models with guiding principles to evaluate and communicate transferability of key flow-ecology response models
- Ecohydrologic rules and Threshold of Concern for key environmental assets (for WRP's)
- Maps of ecohydrologic classifications/regionalisations to facilitate flow-ecology model transferability
- Stakeholder presentations, factsheets, publications, etc

To best inform water planning & wetland management in Queensland, project outputs will be:

- Developed in collaboration with Qld DES scientists & planners
- Presented in a form suitable for decision support tools & models (e.g. ecohydrologic risk models, wetland/*Info* conceptual model updates?)

# Timelines

## Feb – Sep 2018

- Expert/Stakeholder Workshop # 1 to identify, review and synthesise existing flow-ecology response models and their utility
- Commence desktop review and data analyses to inform transfer and scaling of flow-ecology responses

## Oct 2018 – Mar 2019

- Expert/Stakeholder Workshop # 2 to identify key considerations, challenges and opportunities for transfer & scaling of flow-ecology responses

## April – Sept 2019

- Complete desktop review and data analyses to inform transfer and scaling of flow-ecology responses
- Expert/Stakeholder Workshop # 3 to review and refine draft project outputs

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Department of the Environment and Energy



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## WetlandInfo—your first-stop-shop for wetland management resources in Queensland

### Home

- ▶ About us
- ▶ Facts & maps
- ▶ What are wetlands?

### Management

Wetlands and disaster management

#### ▶ Wetland values

Nationally (DIWA) and internationally important (Ramsar) wetlands

Wetland projects search tool

Wetland management tools and guides

- ▶ Changes in climate
- ▶ Construction and rehabilitation of wetlands
- ▶ Pressures
  - Water management
- ▶ Programs, policy and legislation
- ▶ Management of shorebirds and other waterbirds
- ▶ Assessment monitoring and inventory
- ▶ Ecology
- ▶ Resources

## Wetland management

Wetlands are managed differently for different reasons. In some cases their conservation values may be of high priority, while in others they may be managed to provide important monitoring information. Many landholders are also interested in managing wetlands on their property as part of their production systems, while others might be more interested in rehabilitation. To assist in wetland management a variety of tools and resources are required.

This section of *WetlandInfo* provides information related to these management resources.



Brisbane River  
Photo by Cathy Ellis

### Quick facts

#### One

of the challenges in wetland management is the division of responsibilities between different authorities in a catchment.

Wetland management requires a multidisciplinary process that integrates the technical, economic, environmental, social and legal aspects of water management on a catchment-wide scale.

Wetlands need to be managed in a [whole-of-landscape](#) approach as many of the [processes](#) and [values](#) are best appreciated at a [landscape](#) level.

## Wetland management topics

Managing wetlands requires the consideration of many aspects. Some questions to consider are...



[What are wetlands?](#)

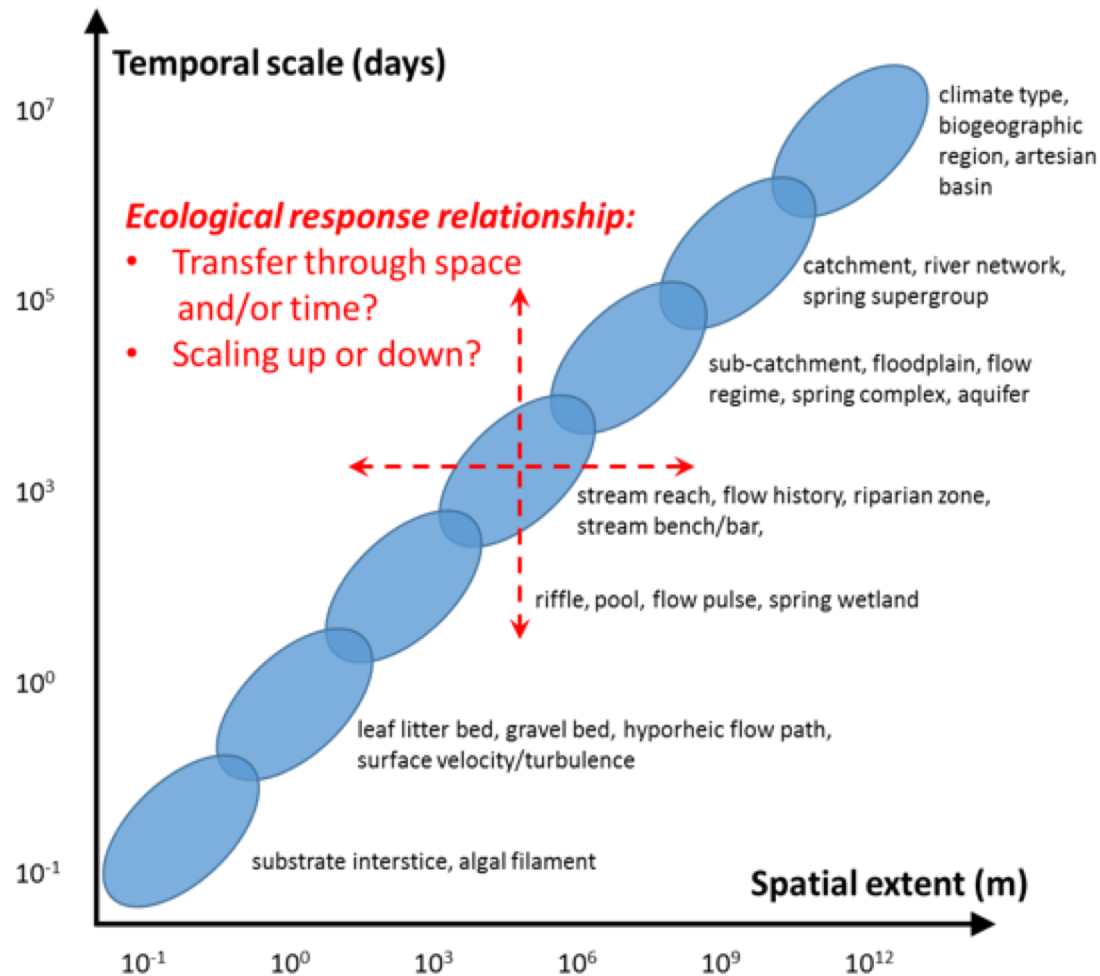


[Where are the wetlands?](#)



[How do you assess and monitor wetlands?](#)

*The inferential strength of ecological response relationships generated at a particular scale will decline with increasing departure from the spatio-temporal domain(s) from which data were collected and the ecological response generated*



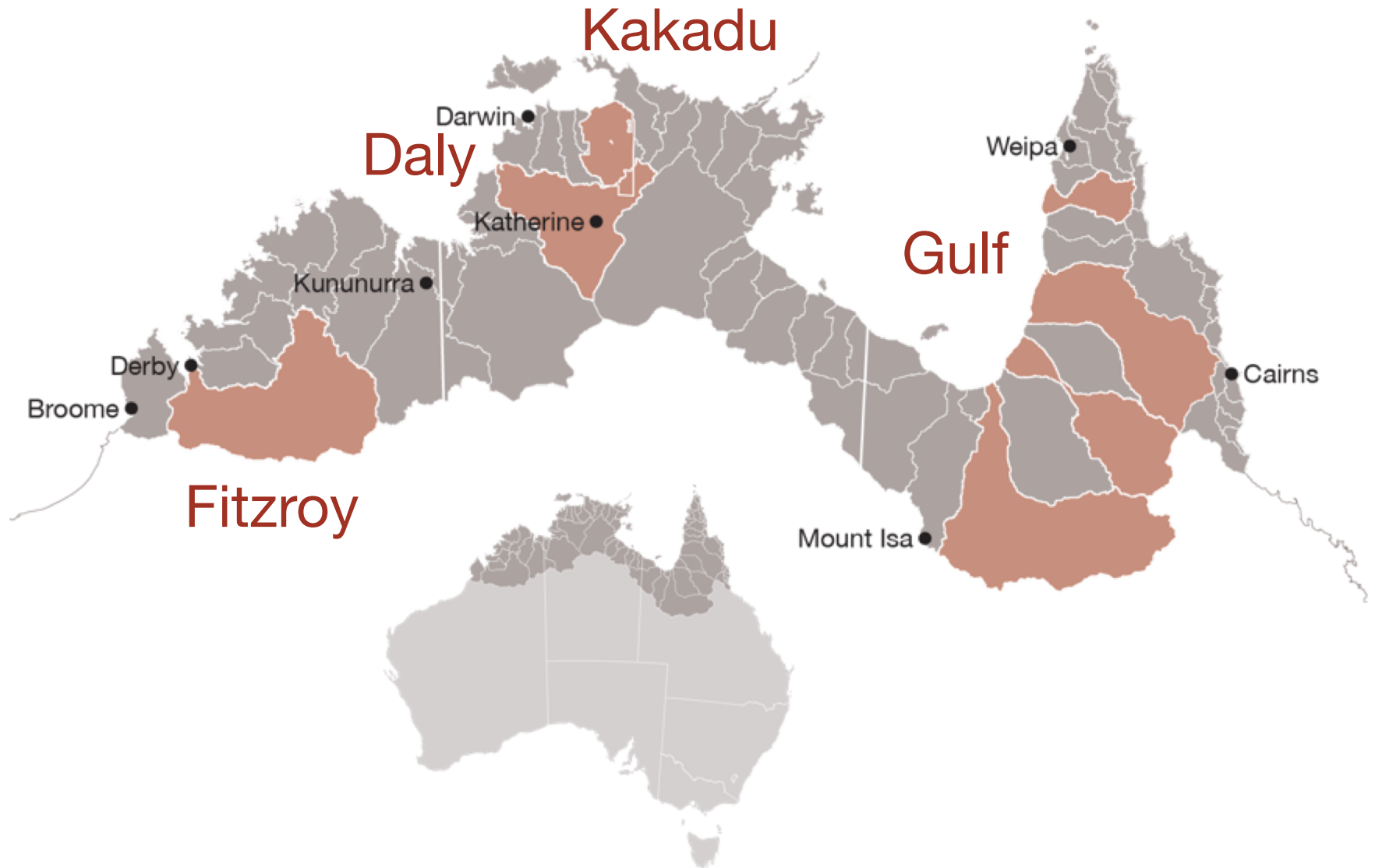
- *Overview the project with a focus on links between assets and freshwater flows (what's important – flushing of poor quality after dry season; overbank flooding for food stocks; connectivity between fresh and marine; persistence of waterholes as critical habitat in dry season).*
- *What products will be generated (eg report, model, communications tools, assessment matrices etc)?*
- *Timing of when the work will be ready (including draft reports or critical points in the project).*
- *What can the project do to help us in decision making and planning?*
- *What can DNRME water staff do to help ensure the research is relevant to regional needs (eg regional DNRME needs, regional stakeholder needs) and to ensure that regions get good input from projects along the way. Can DNRME assist with contacts etc, can we provide regular updates etc?*

# Partners



*World-class research to support sustainable development in northern Australia*

# Focus regions



# Hub research projects

## Planning for development

- Environmental water needs for the Mitchell River
- Environmental water needs for the Fitzroy River
- Environmental water needs for the Daly River
- Links between Gulf rivers & coastal productivity
- Multiple objective planning in northern Australia
- Tools & models to support sustainable development decisions
- Waste & marine debris in remote communities

## Indigenous natural resource management

- Knowledge brokering for Indigenous land management
- Multiple benefits & knowledge systems of Indigenous land management programs
- Indigenous water needs in the Fitzroy catchment
- Indigenous natural resource management in Kakadu National Park
- Identifying research priorities for Indigenous Protected Areas
- Economic values of Indigenous Protected Areas

# Hub research projects

## Mapping, monitoring, measuring

- Developing eDNA methods for tropical waters
- Remote environmental monitoring techniques
- Prioritising threatened species in north Australia
- Methods to measure temporal change to soil carbon
- Savanna carbon sequestration method
- Mapping, monitoring & safeguarding West Kimberley bilbies
- Mapping to manage littoral rainforest
- Assessing Gulf of Carpentaria mangrove dieback

## Ferals, weeds and fire

- Defining metrics of success for feral animal management
- Fire and weeds in the Top End
- Managing savanna riparian zones
- Kakadu National Park's threatened species
- Protocols for Indigenous fire management
- Investigating feral cats and small mammal decline

# Guiding documents



## Northern Australia Environmental Resources Hub



### Draft Indigenous Research Collaboration Strategy

NESP NAER Indigenous Research Collaboration Strategy V.09

VERSION CONTROL REVISION HISTORY			
Version	Date revised	Reviewed by (Name, Position)	Comment (review/amendment type)
V0.9	28/4/15	Michael Douglas/ Brendan Edgar	First Draft
V2	225/6/16	Michael Douglas/ Brendan Edgar	Second Draft

NESP Northern Hub Draft Indigenous Research Collaboration Strategy, August 2016

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## Northern Australia Environmental Resources Hub

### Knowledge Brokering and Communications Strategy

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NESP Northern Hub Knowledge Brokering and Communications Strategy, May 2015



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NESP M&E Plan June 2015

## Monitoring and Evaluation Plan

For the  
National Environmental Science Programme (NESP)

Australian Government  
Department of the Environment



2 June 2015

Prepared by Vista Advisory (Caroline Spencer, John Hawley and Hayley Stone) with the assistance of Warrash Partners (Norman Laing and Kellyanne Stanford).

Version Control History		
Version	Date	Comments
V0.1	2 June 2015	Final draft submitted by Vista Advisory
V0.2	13 July 2015	Approved for release
V1.0	16 July 2015	Version 1 released

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Australian Government

