TRaCK
Tropical Rivers and Coastal Knowledge

Integrating knowledge to support adaptive management

Scenarios for tropical rivers and coasts: integrating the TRaCK research program

The world is a connected place

Many connected processes – both natural and man-made – occur in catchments. This often makes managing natural resources such as water a complex task. Trying to predict what effect our management actions will have is also difficult because of the many uncertainties involved: how will use of groundwater for irrigation affect river flow? How will fish respond?

Figure 1: Some of the many connected processes in catchments

Adaptive management or "learning by doing", (illustrated in Figure 2), is one approach to help deal with such complexities.

Pulling together TRaCK research

The TRaCK research program is seeking greater knowledge and understanding about some of these connected catchment processes. However, it was recognised at the outset that the individual outputs of science projects would need to be integrated in various ways to make them useful to different end-users.

This project is one of three developed in TRaCK with the aim of integration. In this case, knowledge from TRaCK projects and stakeholder organisations will be integrated into a package of computer models, based on a conceptual framework known as Management System Evaluation (MSE). A software package, implementing the MSE principles will be one of the more visible outputs of the project.

The different elements of the framework are illustrated in the figure below. The framework incorporates many of the features of adaptive management.

MSE – a tool for adaptive management

The MSE tool allows us to integrate the knowledge available to support management. It can be used to "operationalise" the adaptive management of a catchment i.e. define clear processes and actions to get adaptive management working on the ground.

The MSE tool can be used to help decision-makers explore different scenarios or situations for the development and conservation of our natural resources while dealing explicitly with uncertainties. This goes to the heart of questions facing natural resource managers such as "What are the likely consequences of policies, management decisions and actions?"

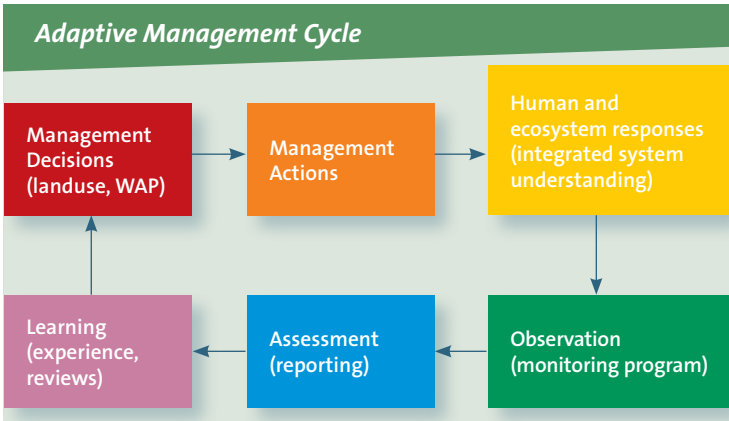


Figure 2: The MSE framework, incorporating key elements of adaptive management

An example of an existing MSE framework is the one developed and applied in collaboration with the Healthy Waterways Partnership in south-east-Queensland: **http://www.healthywaterways.org**

How does it work?

The MSE tool contains a wide range of information from different sources. Some of the key information includes:

1. Information on what stakeholders value in a catchment;
2. Our 'best knowledge' on how ecosystems and people respond to management actions e.g. how do fish species respond to muddier water? What are the economic impacts of water allocation options?;
3. Results from monitoring programs e.g. rain and water flows;
4. A range of feasible management actions such as those found in catchment management strategies e.g. water allocation, land-use management; and
5. Assessment of monitoring results e.g. in reports

Knowledge from TRaCK projects will largely feed into the response models (yellow box in Figure 2). This could include information like the relationship between river flows and sediment loads or between river flows and fish numbers.

By adapting the various models within the MSE tool, we generate management scenarios. For instance: reducing sediment input to rivers increases the available light in the water– how might the algae and fish respond? How might we detect this? Will it help us reach our overall management objectives?

Daly River crossing (photo: Francis Pantus)

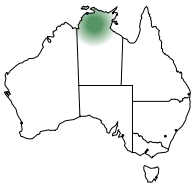
The MSE tool helps us comparing the results of those scenarios and informs stakeholders about the tradeoffs of different management scenarios.

Who is on the team?

The project is lead by Associate Professor Francis Pantus from Griffith University. He is supported by a team with a range of modelling and software development skills based at Griffith and Charles Darwin Universities.

The project will work with the NT Department of Natural Resources, Environment the Arts and Sport (NRETAS) the Daly River Management Advisory Committee (DRMAC) and other groups with an interest management of the Daly River, to produce a set of management scenarios of interest to local stakeholders.

Where is the research happening?



This first stage of the project will focus on the Daly River catchment in the Northern Territory. This catchment has the most knowledge available. This makes it a good case study that can be adapted to other catchments in the future.

The research started in April 2009, later than most TRaCK projects. It is due to finish in early 2011.

How will this research help?

Development of appropriately-scaled decision support tools such as the MSE is an important step in the determination of what is sustainable for our waterways. In the Northern Territory, DRMAC and Territory government water managers (NRETAS) will be able to use the framework to:

- Help stakeholders to better understand the dynamics of the river catchment;
- Use best available knowledge (including TRaCK outputs) to support the process of negotiating viable and feasible management options between stakeholders;
- Design efficient and effective monitoring and assessment programs; and
- Test different approaches to better learn from our experiences.

Team contacts

For more information on this project contact:

A/Prof Francis Pantus
Griffith University, Brisbane
francisp@uqconnect.net
phone: 07 3735 7963

Australian Government
Department of the Environment, Water, Heritage and the Arts
Land & Water Australia
National Water Commission

To find out more about TRaCK
visit **www.track.gov.au**
email **track@cdu.edu.au**
phone **08 8946 7444**

Scenario Evaluation

TRaCK receives major funding for its research through the Australian Government's Commonwealth Environment Research Facilities initiative; the Australian Government's Raising National Water Standards Program; Land and Water Australia; the Fisheries Research and Development Corporation and the Queensland Government's Smart State Innovation Fund.