

Environmental flow tools

Environmental flow tools for tropical rivers

What are environmental flows?

One of the ways river managers look after our rivers is by controlling the amount and timing of water flows. A range of water planning methods across tropical Australia guide how much water can be extracted from rivers and the ground and how much water is released from dams and when. These plans try to ensure water is “delivered” to people living on the land, but another “user” is the environment which includes river channels, floodplains, wetlands and estuaries. River managers call this water allocated to the environment “environmental flows”.

How much water is enough?

There is growing interest in developing and allocating the water resources of tropical Australia. The big question is how much water does the environment need? In particular how much water can we extract for water development and how much do we need to retain to sustainably manage the ecological health of aquatic systems? In tropical river systems, the variability and unpredictability of natural flows has made the determination of environmental flows very difficult.

This project is all about deriving a set of “rules” for people managing tropical rivers that help them decide on how to allocate water to the environment.



Photo: Danielle Warfe



Photo: Michael Douglas

Why flows are important for rivers

A river’s flow regime refers to the amount of water within it and the timing of river flows (i.e. when floods occur, how long they last, whether floods are followed by drought periods, etc).

Some of the ways in which we know flows are important are:

- flow is a major determinant of physical habitat in streams. Habitat in turn is a major determinant of which plants and animals can live in a stream;
- the life cycles and behaviour of many river dwellers has evolved to suit the flow regime;
- high flows connect rivers with floodplains allowing movements of animals and nutrients; and
- altered flow regimes can help the invasion and success of exotic species in rivers.

Turning TRaCK research into flow tools

This project will use the outputs from four of the TRaCK themes (scenario evaluation, values and assets, material budgets and, foodwebs and biodiversity) to derive rules and guidelines focussed on answering a critical river management issue – how to determine environmental flows.





Photo: Danielle Warfe

The process for developing the rules will be to run three workshops bringing together TRaCK researchers and representatives from the State and Territory agencies that have primary responsibility for water planning and management. Together they will identify the options for environmental flow requirements and responses to differing flow regimes, and to decide on a methodology to be used to determine environmental flows.

The data gathered in the Daly (NT), Mitchell (Qld) and Fitzroy (WA) catchments by the other TRaCK researchers will provide important information for this project. It will be consolidated and synthesised by the workshop participants, who will also draw on information from previous environmental flows studies.

Who is on the team?

The project is led by Professor Peter Davies who is working with a team of other researchers from the University of Western Australia. Dr Danielle Warfe will play a key coordinating role to bring in researchers from Charles Darwin University and Griffith University as well as State and Territory agency representatives.

Where is the research happening?



This project will not conduct its own field-based research but will draw on the work of other TRaCK projects working in the three focal catchments. The workshops will be held in Darwin, Kununurra and Queensland.

How will this research help?

The outputs of this project combine existing knowledge with new knowledge and data generated by TRaCK in a form directly usable by river managers and water planners. That is, rules to help determine the environmental flow requirements for tropical rivers.

With this improved knowledge of how rivers “work”, government agencies will be in a better position to manage tropical rivers.

Through the workshops the project provides a direct means for collaboration and transfer of knowledge between researchers and government agencies.

Team contacts

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