Sorting Australian Rivers by ecology and flow

Ecohydrological regionalisation of Australia: a tool for management and science

Going with the flow

Flow regimes or put more simply: when, where and how much water flows in and out of tropical rivers, have a major effect on aquatic habitats, plants and animals. Changes to flow regime due to land-use change, impoundment, water extraction and from projected climate change, have the potential to impact on the health of tropical rivers, wetlands and estuaries. To manage water resources effectively, we need to be able to understand and predict how altered flow regimes will affect aquatic life.

River classifications identify the key features that make rivers different or similar and so provide a tool by which the insights and knowledge gained in one river or region may be meaningfully applied or transferred to another. This project proposes to develop a regional classification of Australia's rivers based on ecologically relevant aspects of their hydrology (i.e. an ecohydrological classification).

Crunching the numbers

How do you go about developing an ecohydrological classification? The approach being used by the project team relies on the collation of large quantities of existing data such as flow data (collected automatically at gauging stations), climate data, topographic and vegetation data (derived from satellite images). To ensure consistency and allow particular calculations to be made, some stringent rules have been set to assess the suitability of data. For example, for a given site there must be at least 20 years of continuous daily flow data with no gaps. This has meant that less than half the gauges that are set in rivers to record flows across Australia have sufficient data to be of use in the research.
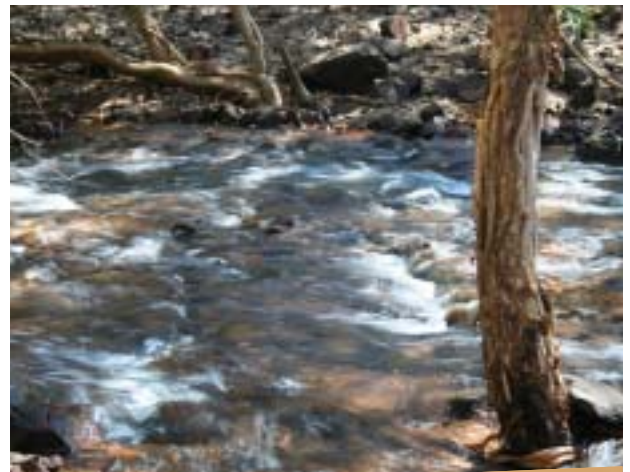

Photo: Ian Dixon

Contrasting approaches

Regions will be grouped using two methods. The first uses flow data from rivers without major water resource development. Previous work in Australia and overseas has looked at which characteristics of flow are important to aquatic life and these are features such as seasonality, timing and size of high flows. Rivers or regions with similar, ecologically relevant flow characteristics will be grouped together.

The second approach will use environmental attributes (climate, topography and vegetation) to group similar rivers. This approach will use a continent-wide catchment framework developed at the Australian National University to define catchment areas and stream segments.

Photo: Ian Dixon

River and Coastal Settings

The two classifications will then be compared to test whether the classification based on environmental attributes can explain variation in hydrological character of rivers. If river classification can be done meaningfully with just environmental attributes it would make life easier for river managers since flow data is not always available, particularly in more remote areas like the tropical north.

Who is on the team?

Brad Pusey, Mark Kennard (Griffith University), Michael Hutchinson and Janet Stein (Australian National University) are leading the project in collaboration with researchers from a variety of other institutions.

Where is the research happening?

The classification will be for the whole of Australia. It is a desk-top exercise relying on data collected by state and territory agencies over many years. Work commenced in June 2006 and will finish in 2008.

Photo: Ian Dixon

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How will this research help?

This research will help enable the important findings of other TRaCK research projects in catchments such as the Daly, Fitzroy and Mitchell Rivers to be transferred and applied with confidence, to other catchments in north Australia

For government natural resource managers the findings from this research will greatly improve understanding of how remotely sensed data on the environmental attributes of catchments can be used to define water flows. By inferring the water flow characteristics of rivers, where actual flow data would be otherwise unavailable or limited, water planners will be better placed to determine environmental water requirements and manage water allocation across Australia in an ecologically sustainable way. An improved understanding of the relationships between hydrology, environmental characteristics and ecology will also assist in predicting how water flows will respond to global climate change.

Team Contacts

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River and Coastal Settings