



Australian Government

WATER for the FUTURE

Northern Australia Aquatic Ecological Assets Project (Northern Australia Water Futures Assessment)

Project Overview

Northern Australia boasts a range of significant aquatic ecosystems and ecosystem types, including estuaries, rivers, lakes and wetlands. These ecosystems not only provide clean water, food and recreation, but also support high biodiversity, including many unique species of aquatic plants and animals.

To increase knowledge about these aquatic ecosystems the Australian Government funded the Northern Australia Aquatic Ecological Assets project as part of the Northern Australia Water Futures Assessment (NAWFA).

The objective of the NAWFA is to provide an enduring knowledge base to inform the protection and development of northern Australia's water resources, so that any development proceeds in an ecologically, culturally and economically sustainable manner. Further information on the NAWFA can be found online: www.environment.gov.au/nawfa

The aims of the Northern Australia Aquatic Ecological Assets project were to:

- map and identify aquatic ecosystems across northern Australia using the draft Australian National Aquatic Ecosystem (ANAE) Classification Scheme
- evaluate these aquatic ecosystems against draft framework developed by the Australian, state and territory governments for identifying High Ecological Value Aquatic Ecosystems (HEVAEs)
- provide an assessment of risks to these aquatic ecological assets
- undertake an initial assessment of ecological thresholds in relation to flow regimes and maintenance of catchments nominated by state and territory jurisdictions as high priority or planned development areas.



Project Location

The geographic area considered by the project extends more than 3000 km, from Broome in the west to Cairns in the east. This area includes three drainage divisions: Timor Sea, Gulf of Carpentaria, and part of the North-East Coast (north of Cairns).

Figure 1. Geographical area of the Northern Australia Water Futures Assessment.

Water for the Future is preparing Australia for a future with less water. The 10-year initiative is addressing four key priorities:

- Taking action on climate change
- Using water wisely
- Securing water supplies
- Supporting healthy rivers

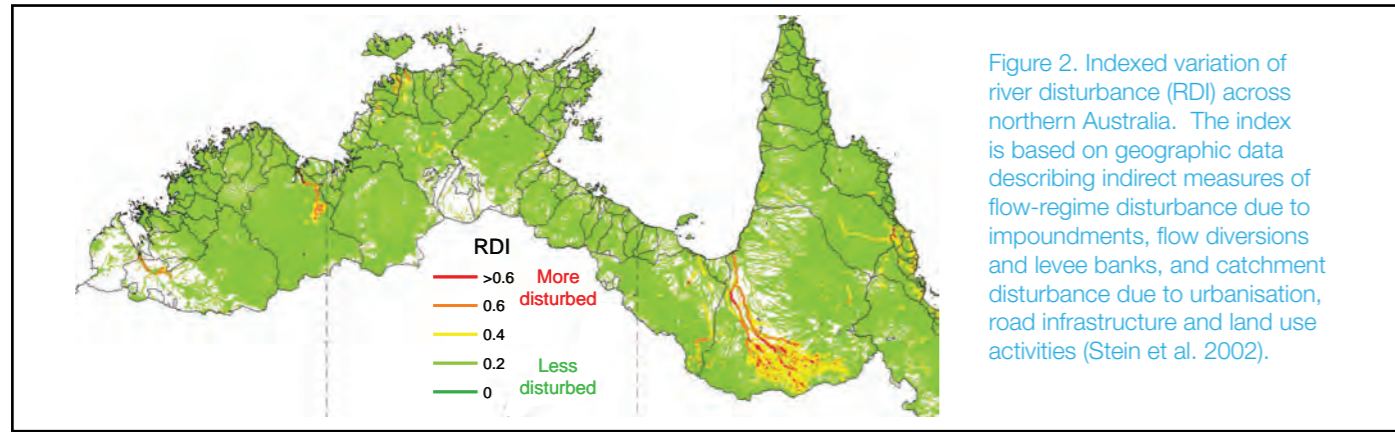


Figure 2. Indexed variation of river disturbance (RDI) across northern Australia. The index is based on geographic data describing indirect measures of flow-regime disturbance due to impoundments, flow diversions and levee banks, and catchment disturbance due to urbanisation, road infrastructure and land use activities (Stein et al. 2002).

Assessment value and threats

Most waterways (rivers, streams, lakes, wetlands and estuaries) in northern Australia have natural water flows that are not modified by barriers such as dams and weirs. Ecologically, this puts them in contrast with rivers in southern Australia which are typically highly regulated and experience modified flow patterns. In providing an initial assessment of these aquatic ecosystems in northern Australia, the project found that:

- natural seasonal water flows of northern Australia, including the extreme wet and dry seasons, are critical to native plants and animals.
- floodwaters are not wasted, but rather distribute sediments and nutrients that support a range of ecosystems, including floodplains that are some of the most productive ecosystems on earth and estuaries that support northern Australia's prawn and fishing industries.
- climate change is predicted to decrease aquatic biodiversity due to increased variability and severity of floods and droughts, increased water temperatures,

seawater intrusion into lowland freshwater wetlands and increased fragmentation of aquatic habitats.

- maintaining natural water flow patterns is the best way of protecting the good condition of northern rivers.

The project's full assessment of values and threats of northern Australia aquatic ecosystems is available in the Northern Australia Land and Water Science Review: http://www.nalwt.gov.au/science_review.aspx

Mapping Aquatic Ecosystem types

The project identified, mapped and classified the various aquatic ecosystem types (e.g. rivers, lakes, floodplains, estuaries) for all river basins of northern Australia (e.g. Figure 3). This mapping exercise used the draft Australian National Aquatic Ecosystem (ANAE) Classification Scheme, which is being developed by the Australian, state and territory governments to provide a consistent approach to classifying aquatic ecosystem types. The mapping process revealed the extraordinary diversity and extent of aquatic ecosystems in northern Australia and provides base level mapping for aquatic assets for northern Australia at a scale of 1:250,000.

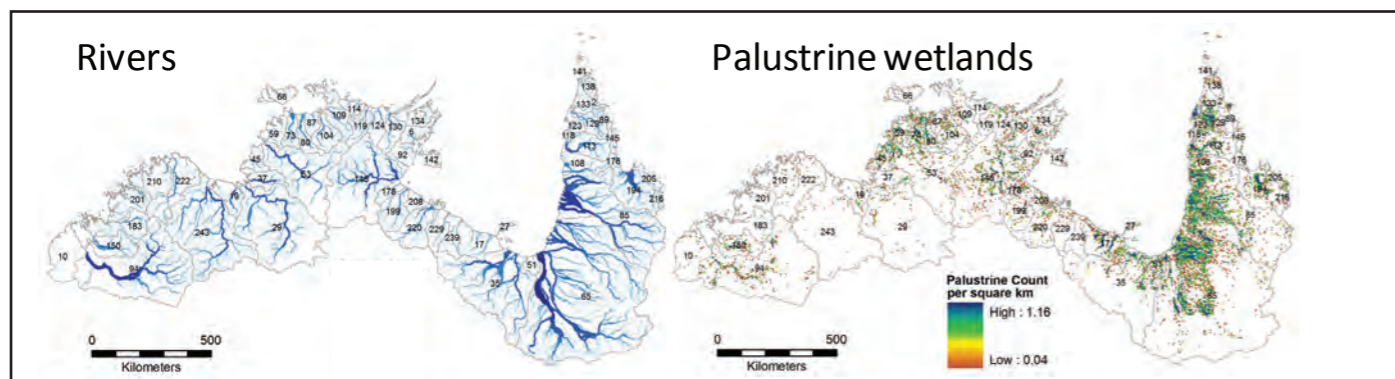


Figure 3. Distribution of rivers and palustrine (floodplain) wetlands across northern Australia.

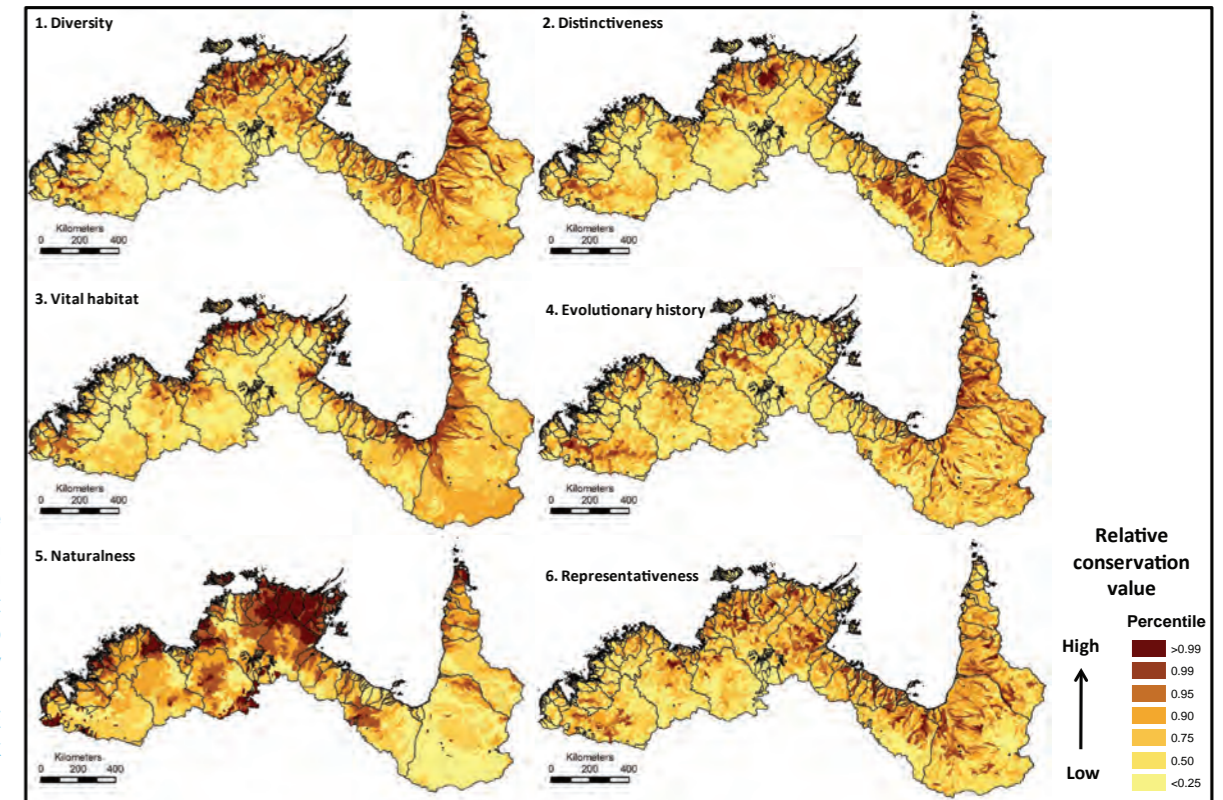


Figure 4. Relative conservation value for each planning unit (referential to the entire study region) based on each HEVAE Framework criterion.

Identifying high ecological value aquatic ecosystems (HEVAEs)

To assist states and territories identify aquatic ecosystems of high ecological value, the Aquatic Ecosystems Task Group, representing the Australian, state and territory governments, is developing a common framework for the various governments to use.

This project undertook a trial of the draft HEVAE framework across northern Australia to identify and prioritise aquatic ecological assets. The relative ecological value of each sub-catchment was assessed against six criteria (results provided at Figure 4). The key findings against each of these criteria were:

- **Diversity** – Diversity was highest near the coast, decreasing further inland. This pattern corresponded with smaller headwater streams flowing into the large lowland rivers and extensive flood plains which support high aquatic biodiversity.
- **Distinctiveness** – Key regions containing distinct aquatic ecosystems (e.g. those that are rare, threatened or unusual) were the southern Gulf region in Queensland, the western half of the Top End of the Northern Territory and the Fitzroy River in the Kimberley region of Western Australia.

- **Vital Habitat** – Areas containing vital habitat were similar to those identified for distinctiveness but were more concentrated in the lowland and coastal parts of river basins.
- **Evolutionary history** – Areas of notably high evolutionary history occurred in: the Alligator Rivers region and the Daly River in the Northern Territory; the Drysdale, Edward and Fitzroy Rivers of the Kimberley region; and throughout the southern Gulf region and western Cape York Peninsula, including the Jardine River.
- **Naturalness** – Vast areas of northern Australia were rated highly with respect to naturalness (i.e. have not been adversely affected by modern human activity to a significant level). Rivers of the southern Gulf of Carpentaria (e.g. Flinders, Norman and Mitchell), the Darwin region and parts of the Ord and Fitzroy Rivers in the Kimberley scored lower for this criterion.
- **Representativeness** – Areas that were representative of particular northern Australia aquatic ecosystem types were distributed across northern Australia in small patches.

Fine Scale Assessment

In collaboration with the northern State and Territory jurisdictions and DSEWPaC, the project team held a series of regional expert panel workshops to assess key focal regions (or specific catchments) identified by jurisdictions as high priority or planned development areas. These fine scale assessments had a number of key aims, including identifying high priority aquatic ecological assets and understanding ecological thresholds in relation to flow regimes and maintenance of aquatic ecosystem assets.

Fine scale assessments were held for the study areas of: the Mitchell and upper Fitzroy River catchments in Western Australia, the Daly River catchment in the Northern Territory, and the Flinders, Gilbert and Norman River catchments in Queensland.

A consistent outcome of the expert panel workshops conducted in each region was that while flow-related threats to aquatic assets are well understood in a generic sense, quantitative data and understanding of ecological thresholds for particular fine-scale assets is lacking. The greatest impediment to quantifying ecological thresholds is limited technical understanding of most of the study areas, and of the mechanisms and consequences of the flow-related threats. These issues will be addressed in the next NAWFA Ecological project, *Assessing the likely impacts of development and climate change on aquatic ecological assets in northern Australia*, which seeks to quantitatively model and assess development and climate change impacts and identify relevant ecological thresholds of concern.

The Team

The project was led by Dr Mark Kennard who is working with a team of researchers from Australian Rivers Institute - Griffith University, Charles Darwin University, the Australian National University, the Australian Government's Environmental Research Institute of the Supervising Scientist (ERISS) and CSIRO.

What comes next?

A key objective of this project was to identify the aquatic ecological values across northern Australia. The next phase of the Northern Australia Water Futures Assessment Ecological Program will assess the likely impacts of development and climate change on aquatic assets and consider management options to minimise the impacts.

Further information

The full final report for this project is available online: www.environment.gov.au/water/publications/policy-programs/nawfa-ecological-assets-report.html

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Northern Australia Water Futures Assessment

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NAWFA is a multidisciplinary program being delivered jointly by the Department of Sustainability, Environment, Water, Population and Communities and the National Water Commission, in close collaboration with relevant state and territory government agencies. Through the Raising National Water Standards program under Water for the Future, the Australian Government will allocate up to \$13 million for projects under the assessment from 2007-08 to 2011-12.

Published by the Department of Sustainability, Environment, Water, Population and Communities, May 2011.