

Australia's tropical rivers – an integrated data assessment and analysis

A project funded under Land and Water Australia's Topical Rivers Program

Project Scope

Purpose of Document

To communicate the scope of the Tropical Rivers Inventory and Assessment Project (TRIAP) to all stakeholders and interested parties in the context of the resources available for the project. The TRIAP team is unable to undertake work outside of the scope outlined in this document. The scope has been produced from the detailed work plans developed for each of the three sub-projects.

Project Context

Australia's tropical river systems are unique and form one of the last great river networks in less-impacted condition in the world today; together, they are an internationally significant asset. In achieving sustainable development and growth in northern Australia, utilisation of the water resources of our tropical rivers will need to be balanced with maintaining their ecological character – for example, protection of the aquatic ecosystems and the many benefits they provide to society. The rivers and wetlands of northern Australia are considered public resources and yet are increasingly subject to degradation, restrictions on access, and claims for development. However, decisions made about access to and development of water resources will affect various industries including cropping, pastoralism, mining, fisheries, Aboriginal enterprises, tourism and conservation.

For the vision of sustainable development to be effectively realised, a better understanding of the aquatic ecosystems is required. These ecosystems have yet to be studied in a systematic manner. Across the Australian tropics, generally only those catchments with mining, industrial, or intensive agricultural development have information available on the ecology, biology, geomorphology, hydrology and management opportunities. This information is fragmented and insufficient for addressing the management needs of the future. The key knowledge gaps include: ecological character; assets and threats; and management structures.

In order to address some of these knowledge gaps, the Australian Government (Land & Water Australia, and The Natural Heritage Trust 2) has funded a National Rivers Consortium project titled '*Australia's tropical rivers - an integrated data assessment and analysis*'. This project is being conducted by the National Centre for Tropical Wetland Research (NCTWR) and will: establish an information base for assessing status and change; undertake ecological risk assessments of major pressures; and trial a framework for the evaluation of goods and services provided by wetlands, as perceived by multiple stakeholders, including local and indigenous people, private sectors and governmental agents.

Project Objectives

The project will provide an information base for determining and applying management priorities and land use practices of relevance to stakeholders, including local and indigenous people, private sectors and governmental agents. Specific objectives are to:

- Undertake a multiple-scale inventory of the habitats and biota of the rivers and wetlands of tropical Australia, where necessary developing and/or ensuring

consistency with other suitable typologies based on hydrological and landform features (**Sub-project 1: Inventory of the biological, chemical and physical features of aquatic ecosystems**).

- Undertake risk assessments of the major pressures on the habitats and biota of the rivers and wetlands of tropical Australia (**Sub-project 2: Assessment of the major pressures on aquatic ecosystems**).
- Provide a framework for analysis of the ecosystem services (e.g. provision of water for multiple uses), provided by the habitats and biota of the rivers and wetlands of northern Australia (**Sub-project 3: Development of a framework for the analysis of ecosystem services provided by aquatic ecosystems**).

Focus catchments

In refining the project details, three focus catchments were agreed upon, these being the Fitzroy (WA), Daly (NT) and Flinders (QLD). These catchments will be the major focus of the risk assessment sub-project, and will also be subject to greater inventory and mapping detail in the inventory sub-project.

Scope of work undertaken by the sub-projects

Sub-project 1: Inventory of the biological, chemical and physical features of aquatic ecosystems

The main aim of this sub-project is to undertake a multiple-scale inventory of the habitats and biota of the rivers, floodplains and estuaries of northern Australia. The specific tasks in achieving this aim, involve collation of **existing** data and interpretation of this data. In the majority of instances **no new data** will be collected. The following list of existing data will be collected, evaluated and interpreted:

- Topographic, biophysical, infrastructure etc data at continental (1:2.5M; eg. drainage, infrastructure, vegetation, geology and fauna), catchment (1:250K; eg. infrastructure, drainage, tenure, vegetation (especially riparian), hydrology, geology, land use and elevation) and focal catchment (1:50K-1:100K) scales.
- Additional data for river reach attributes (geomorphology, water quality, hydrology, vegetation, birds, fish, invertebrates, reptiles and amphibians) which includes the following activities:
 - Collate and assess the extent of information available for their taxa group across the northern rivers.
 - Provide a description of the taxa (species occurrences and locations, assemblages and or populations, key or significant species, ecological interactions) and their status.

From these data a classification of rivers will be developed for ecological characterisation and inventory purposes, and output in Geographic Information System (GIS) format. During this process, estuarine information will be linked with inland data. Those river reaches not classified through existing data will be 'coded' by using expert opinion.

A sampling program will be undertaken. However, the sampling is **not extensive** and will be **very selective**. The sampling exercise is being carried out for both for the inventory and risk assessment sub-projects.

Outputs from this sub-project will include a final report along with hard copy maps and posters.

Sub-project 2: Assessment of the major pressures on aquatic ecosystems

The objective of this sub-project is to develop a risk assessment framework applicable to the key focus catchments and significant locations that meet stakeholder needs, within the region of the TRIAP. As well as providing a broad overview of the major pressures on tropical Australia's aquatic ecosystems, the key component of this study is more detailed risk assessments for the focus catchments, being the Daly River (Northern Territory), Flinders River (Queensland) and Fitzroy River (Western Australia). Throughout this sub-project, stakeholders will be involved in providing input and feedback.

There a number of key elements in developing the risk assessment framework that will be addressed. Firstly, identification of assets and threats within the focus catchments will be undertaken through a combination of consultations with stakeholders and a review of existing reports and management plans. Both spatial and aspatial data related to assets and threats will also be collated. The spatial data will then be compiled in a GIS, and linked to the inventory. Secondly, conceptual models for each of the focus catchments will be developed, focussing on the interactions between key assets and threats. Finally, both semi-quantitative and quantitative risk analysis will be conducted on selected threats.

The tasks for the semi-quantitative risk analysis are:

- *Effects/consequence analysis* – collate data/information on documented effects of key threats to key assets (possibly applying a semi-quantitative 'consequences' ranking scheme), and document the associated level of confidence in the data/information.
- *Exposure/likelihood analysis* – integrate relevant GIS layers to determine extent or likelihood of exposure of key assets to key threats, and document the associated level of confidence in the data.
- *Risk characterisation* – integrate outcomes of effects and exposure analyses to estimate risks of threats to assets. Outputs include: identification of relative risks (and, therefore, highest risk threats); assets least/most under risk; initial indication of cumulative risks; and articulation of uncertainty.
- Describe applications of semi-quantitative risk outputs to catchment management and NRM bodies – i.e. how do they inform risk management/risk reduction?.

The quantitative risk assessment will follow on from the semi-quantitative risk analysis. Based on outcomes of semi-quantitative risk analyses and stakeholder views, **one** threat/issue will be selected for quantitative risk analysis, and the conceptual model for this threat/issue will be reaffirmed/revised accordingly.

Major outputs within selected major catchments and at important sites will include: specific analyses of major pressures (e.g. weeds, feral animals, infrastructure, water pollution); recommendations for risk reduction/management steps and monitoring; and a database of available information.

Sub-project 3: Development of a framework for the analysis of ecosystem services provided by aquatic ecosystems

The main goal of this sub-project is to trial a framework for analysis of the ecosystem services provided by the habitats and biota of the rivers and wetlands of northern Australia. The framework has been developed by Dr Dolf de Groot, an expert on evaluation of ecosystem services from the Netherlands, and is linked to the UN supported Millenium

Ecosystem Assessment (MEA). The framework will entail identification of key services for different habitats and a description of the methods that can be used for evaluating these at compatible scales as used in the sub-projects described above. The framework will also contribute to the Ramsar Scientific and Technical Review Panel (STRP), which is preparing a report on Guidelines for evaluating the values, functions, goods and services provided by wetlands.

The six components of the research and framework are:

- Function analysis and ecological valuation;
- Social-cultural valuation;
- Economic valuation;
- Policy and institutional aspects;
- Stakeholder interests and trade-offs; and
- Management and planning implications.

The work related to this sub-project has been carried out by six Masters students from the University of Wageningen, The Netherlands and was supported by *eriss*. The catchments selected for developing the ecosystem framework were the **Mary** and **Douglas-Daly** (NT).

Outputs from this sub-project will include a synthesis report that integrates the analysis and outcomes of the six Masters theses.

Communication and consultation

Consultation to date has involved establishing and maintaining contacts with agencies, boards and representatives panels in WA, QLD and the NT to introduce the project and seek collaboration and support, and access to information. All consultation is based on a communications plan, which includes the ongoing exchange of information, collaboration, reporting and demonstrating initial analyses and outcomes.

Workshops are also a formal part of the project, whereby stakeholders can provide input to the sub-projects. A stakeholder workshop was held in November 2004 and a geomorphic classification mini-workshop relating to sub-project 1 was held in July 2005. A further project workshop will be held and stakeholders will be notified accordingly.