

Ecological risk assessments for Australia's Northern Tropical Rivers



Sub-project 2 of Australia's Tropical Rivers – an integrated data assessment and analysis (DET18)

Renée Bartolo, Peter Bayliss & Rick van Dam

Environmental Research Institute of the Supervising Scientist, Darwin, NT

A report to Land & Water Australia

June 2008



Australian Government
Department of the Environment,
Water, Heritage and the Arts
Supervising Scientist

national
centre
for
tropical
wetland
research



Authors

R Bartolo – Environmental Research Institute of the Supervising Scientist, GPO Box 461, Darwin NT 0801, Australia

P Bayliss – Environmental Research Institute of the Supervising Scientist, GPO Box 461, Darwin NT 0801, Australia

R van Dam – Environmental Research Institute of the Supervising Scientist, GPO Box 461, Darwin NT 0801, Australia

This report should be cited as follows:

Bartolo R, Bayliss P & van Dam R 2008. *Ecological risk assessment for Australia's northern tropical rivers. Sub-project 2 of Australia's Tropical Rivers – an integrated data assessment and analysis (DET18)*. A report to Land & Water Australia. Environmental Research Institute of the Supervising Scientist, National Centre for Tropical Wetland Research, Darwin NT.

Example of citing a paper in this report:

van Dam R, Bartolo R & Bayliss P 2008. Chapter 1 – Introduction. In *Ecological risk assessment for Australia's northern tropical rivers. Sub-project 2 of Australia's Tropical Rivers – an integrated data assessment and analysis (DET18)* (Bartolo R, Bayliss P & van Dam R). A report to Land & Water Australia. Environmental Research Institute of the Supervising Scientist, National Centre for Tropical Wetland Research, Darwin NT, 1–13.

Contact information

The Supervising Scientist is part of the Australian Government Department of the Environment, Water, Heritage and the Arts.

© Commonwealth of Australia 2008

Supervising Scientist

Department of the Environment, Water, Heritage and the Arts

GPO Box 461, Darwin NT 0801 Australia

Funding statement

This project was funded by the Natural Heritage Trust Phase 2 (NHT2) and Land & Water Australia (LWA) as part of the Tropical Rivers Inventory and Assessment Project (TRIAP).

Copyright statement

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Supervising Scientist. Requests and inquiries concerning reproduction and rights should be addressed to Publications Inquiries, *Supervising Scientist*, GPO Box 461, Darwin NT 0801.

e-mail: publications_ssd@environment.gov.au

Internet: www.environment.gov.au/ssd/tropical-rivers/publications-reports.html

Disclaimer

The views and opinions expressed in this report do not necessarily reflect those of the Commonwealth of Australia. While reasonable efforts have been made to ensure that the contents of this report are factually correct, some essential data rely on the references cited and the Supervising Scientist and the Commonwealth of Australia do not accept responsibility for the accuracy, currency or completeness of the contents of this report, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the report. Readers should exercise their own skill and judgment with respect to their use of the material contained in this report.

Contents

Acknowledgments	v
1. Introduction Rick van Dam, Renee Bartolo & Peter Bayliss	1
2. Identification of ecological assets, pressures and threats Rick van Dam, Renee Bartolo & Peter Bayliss	14
3. Semi-quantitative risk assessments – The Relative Risk Model Renee Bartolo, Rick van Dam & Peter Bayliss	162
4. Quantitative ecological risk assessments for the Daly River Peter Bayliss, Renee Bartolo & Rick van Dam	271
5. Synthesis Peter Bayliss, Renee Bartolo & Rick van Dam	416

Acknowledgments

Many people contributed in many ways to the preparation of this report. Before acknowledging those who contributed to specific chapters, it is important we first thank a number of people who were instrumental in the conceptualisation, development and implementation of the overall TRIAP project in various significant ways. These significant contributors are: Professor Max Finlayson (Charles Sturt University; formerly Director of *eriss* and the original Principal Investigator of the TRIAP before moving to the International Water Management Institute in Colombo, Sri Lanka); Dr Arthur Johnston (formerly Supervising Scientist, Supervising Scientist Division); Mr George Lukacs (Australian Centre for Tropical Freshwater Research); Dr George Begg (formerly *eriss*); Mr Bruce Gray (Department of the Environment, Water, Heritage and the Arts; DEWHA); and Dr Colin Creighton, Dr Ian Prosser and Dr Brendan Edgar (formerly or currently Land & Water Australia). Also, we would like to thank the Board of Management and the Advisory Committee of the National Centre for Tropical Wetland Research (NCTWR) for supporting the project.

Technical reviewers and others who contributed information, feedback and assistance for specific chapters are acknowledged below.

Chapter 1: *Reviewers* – Dr David Jones (*eriss*); *Contributions and assistance* – Prof Max Finlayson.

Chapter 2: *Reviewers* – Dr David Jones (*eriss*), Dr Andrew Storey (University of Western Australia), Dr Damien Burrows (Australian Centre for Tropical Freshwater Research), Dr Stuart Blanch (WWF – Australia), Mr Chris Wicks (Northern Territory Department of Natural Resources, Environment and the Arts); *Contributions and assistance* – Prof Max Finlayson; Mr Ben Bravery (DEWHA); Dr John Dowe (Australian Centre for Tropical Freshwater Research); Tanya Vernes (WWF – Australia); Dr Claire Taylor (DEWHA/DAFF), Professor Stuart Bunn and Dr Michelle Burford (Australian Rivers Institute, Griffith University); Gill Holmes (Kimberley Development Commission), Mike Maslen and Phillip Steer (Environmental Resource Information Network, DEWHA), Dr Janet Stein (Australian National University).

Chapter 3: *Reviewer* – Prof Wayne Landis (West Washington University); *Contributions and assistance* – Dr Keith Hayes (CSIRO Mathematical and Information Sciences), Andrew Edwards (Bushfires NT), Ian Lancaster, Dr Peter Whitehead, Peter Jolly, Dave Howe, Ian Smith, John Gilmour, Chris Wicks, Donna Lewis, Kate Richardson (Northern Territory Department of Natural Resources, Environment and the Arts), Fergal O’Gara (Northern Territory Department of Primary Industry, Fisheries and Mines), Dr Stuart Blanch (WWF – Australia), Dr Michael Douglas (Charles Darwin University), Matt Daniel (Greening Australia), Damian Shepherd (Western Australia Department of Agriculture and Food), Brad Moore (Department of the Environment, Water Heritage and the Arts), Rosemary Niehus (Queensland Herbarium), the stakeholders who attended the consultations in Derby (WA) and Richmond (Qld).

Chapter 4: Dene Moliere and Dave Walden (*eriss*) for collation and quality control of Daly River stream gauge data and Katherine Post Office rainfall data; James Boyden (*eriss*) for collating floodplain data and drafting maps; Peter Whitehead, Keith Saalfeld and Robyn Delaney (NRETA/Parks & Wildlife Commission NT) for providing access to magpie goose aerial survey data; Steve Wingrave and Neil Schmidt (NRETA/Weeds Management Branch) for access to unpublished helicopter survey data of weeds, and for review of actual mimosa

control costs, on the Daly River floodplain, respectively; Keith Ferdinands (CDU & NRETA/Weeds Management Branch) for review of wetland weed control-cost models developed on the Magela floodplain (Kakadu National Park) and applied to the Daly River floodplain; Paul DeLestange, Blair Grace and Rik Buckworth (DPIFM Fisheries Research) for access to commercial and recreational (Classic Tournament & Tours) barramundi catch and effort data for the Daly Fishing Zone, and for review of risk assessment models; and lastly Peter Jolly (NRETA) and David Jones (*eriss*) for review of the section on risks to water quality from land clearing for land use.

Chapter 5: *Reviewers* – Dr David Jones (*eriss*); *Contributions and assistance* – Dr Ken Evens (*eriss*) and Dr Keith Hayes (CSIRO Mathematical and Information Sciences).