Multiple values of tropical rivers

Michael Douglas
Tropical Rivers and Coastal Knowledge Hub (TRaCK)
Charles Darwin University
Australia’s wet-dry tropical rivers

- 55 Catchments
- 20% of Australia
- 0.8% of Aust. population
- 25% Indigenous
Research to support river and estuary management in northern Australia
Climate is wet-dry tropical: Monsoonal, highly seasonal rainfall

Rainfall (mm)

Jan | Mar | May | Jul | Sep | Nov
--- | --- | --- | --- | --- | ---
400 | 300 | 100 |  0 |  0 | 100

Total: 1665 mm

Climate is wet-dry tropical: Monsoonal, highly seasonal rainfall
>60% of Australia’s water resources
Heffernan touts the “Ord as the food bowl for the region”

Rudd touts Ord River expansion as 'new food basket'

Posted Tue Dec 16, 2008 2:10pm AEDT
Updated Tue Dec 16, 2008 3:05pm AEDT

The Prime Minister, Kevin Rudd, has described the Ord River expansion in the Kimberley as a bold step towards securing a potential new food basket for Australia.

Mr Rudd toured the Ord Valley this morning and met farmers to discuss the expansion.

He outlined the detail of the $200 million commitment the Federal Government made to expanding the Ord River Irrigation Scheme.

The funding was announced as part of the Federal Government’s $4.7 billion infrastructure package.

Mr Rudd said the money would begin flowing

The Australian
National Affairs

Tony Abbott's plan for northern foodbowl

by: Sid Maher
From: The Australian
September 17, 2011 12:00AM

TARGET RIVERS IN COALITION PUSH FOR DAMS

Daly River
Gilbert River
Darwin
Kununurra
Cooktown
Cairns
Karumba
Broome
Research to support sustainable management

• Continued interest in developing northern Australia
• Need to avoid the mistakes made in the south
• Lack of basic knowledge of the full implications of future scenarios

⇒ Fundamental need for research
⇒ Historic opportunity
TRaCK Research Consortium

- Over 80 researchers from 18 organisations
  - CDU, GU, UWA, UQ
  - JCU, ANU, Uni. Canberra
  - North Australian Indigenous Land & Sea Management Alliance (NAILSMA)
  - CSIRO, eriss, AIMS, GeoScience Australia
  - NT, WA, Qld Governments

- 2006-2012
TRaCK’s Aim

To provide the science and knowledge that governments, communities and industries need for the sustainable management of Australia’s tropical rivers and estuaries.
TRaCK’s key research questions

1. Why do people value tropical rivers?
2. How do tropical rivers differ across the region?
3. How do tropical rivers work?
4. What are the economic opportunities for Indigenous people?
5. How can we make good decisions about managing tropical rivers?
Feature session: outline

- Socio-economic values of Australia’s tropical rivers - Douglas
- Conservation values of Australia’s tropical rivers - Kennard
- Indigenous and western values and environmental flows - Liddy and Douglas
- Accommodating different values in catchment management planning: Fitzroy River catchment, WA - Cook
- Management strategy evaluation as a tool for integration and examining trade-offs between competing values of tropical rivers – Pantus

- Discussion session – Speakers & John Childs
Discussion

1. How can the never-ending push for a ‘North Australia Foodbowl’ be achieved without undermining the other essential values and needs associated with tropical rivers and landscapes?

2. How do we compare/accommodate such diverse values in planning?

3. How can we ensure that regional communities and their values are essential participants in deciding the fate of tropical rivers and landscapes?

4. Will this research make any difference to the debate and decisions about northern development?
TRaCK
Tropical Rivers and Coastal Knowledge

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New research on the socio-economic values of Australia’s tropical rivers

Michael Douglas¹, Sue Jackson² & Natalie Stoeckl ³

Tropical Rivers and Coastal Knowledge research hub (TRaCK)
¹Charles Darwin University, Darwin, NT, Australia
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³James Cook University, Townsville, QLD, Australia.

Collaborators:
Anna Straton, Kitrstin Zander, Marcus Finn, Emma Woodward, Pippa Featherston, Michelle Esparon, Owen Stanley, Marina Farr, Aurelie Delisle, Zulgeril Altai.
Research to support river and estuary management in northern Australia
TRaCK’s socio-economic research

1. Valuing ecosystem services of Australia’s tropical river
2. Indigenous socio-economic values and river flows
3. Socio-economic activity and water use in Australia’s tropical rivers
The value of Australia’s tropical river ecosystem services

Prepared by Anna Stratona and Kerstin Zanderb

August 2009

a CSIRO Sustainable Ecosystems
b Charles Darwin University


Study catchments

Research to support river and estuary management in northern Australia
Survey method

- ‘Willingness to pay’ questionnaire
- Interviews: Daly, Fitzroy, Mitchell
- Capital cities: Darwin, Perth and Brisbane
- Southern cities: Sydney, Melbourne and Canberra
- 1073 respondents (~30%)
General attitudes

• The most important issue in the management of Australia’s tropical rivers?
  ~ 40%  Preserving for biodiversity and natural habitat
  ~ 20%  Preserving rivers for the people who live there and visitors
  ~ 30%  Producing food for Australia
  ~ 6%   Developing northern Australia
  ~ 4%   Providing food for the world
Tropical river ecosystem services
Willingness to pay for ecosystem services

1. Most prefer moderate rather than high level of use for irrigated agriculture.
2. But not at the expense of cultural, environmental & recreational values.
3. Highest value placed on managing rivers in the best condition for Indigenous people to undertake customary activities at waterholes.
4. Responses similar from catchment, capital cities, Indigenous and non-Indigenous people.
Study catchments
Methods

- Household surveys of resource use
  - Quantitative information on spatial & temporal distribution of resource use
  - 82 households (16 sampling periods 2009-10)
  - Semi-structured surveys - recall harvest/catch over previous 2 weeks

- Calculation of replacement value
10 most valuable species harvested & consumed - Daly River
Most of the valuable species have strong flow links

- Top 5 species have flow linkages that span the entire flow regime

- Long neck Turtle:
  - Nest underwater
  - Require distinct wetting/drying regime

- Magpie Goose
  - Migrate from wet season breeding sites to dry season feeding sites
  - Flood dependent
Some are at high risk from dry season water extraction – Daly River

From Chan et al 2011
But have been largely ignored by water planning

Initially, only Barramundi was selected as a target in the assessment of the Daly River’s water requirements.
Indigenous management objectives may be quite different

- Subsistence strategies rely on **abundant** species
  - Hidden ‘economic value’
  - Related to catch, and catch per unit effort/cost
  - Can be substantial for Indigenous households e.g. Daly
Valuation results can identify priority sites

Most economically valuable site in the Daly

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of trips</th>
<th>Species</th>
<th>Value for 2 year period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elizabeth Downs</td>
<td>57</td>
<td>Long-necked Turtle</td>
<td>$27,849</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Barramundi</td>
<td>$3,802</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short-necked Turtle</td>
<td>$1,971</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magpie Goose</td>
<td>$1,694</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shark</td>
<td>$38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>Total</strong></td>
<td><strong>$35,354</strong></td>
</tr>
</tbody>
</table>
Challenges for water planners

• **Challenge 1**
  • Indigenous harvest species and sites should be explicitly included in environmental flow assessments.

• **Challenge 2**
  • The likely effect of flow alteration on a “catch per unit cost” metric should be considered for important Indigenous harvest species and important sites.
Socio-Economic Activity and Water Use in Australia’s Tropical Rivers: A Case Study in the Mitchell and Daly River

Prepared by Natalie Stoeckl¹, Michelle Esparon¹, Owen Stanley², Marina Farr¹, Aurélie Delisle¹ and Zulgerel Altai¹

February 2011

¹ School of Business, James Cook University
² School for Environmental Research, Charles Darwin University
Study catchments

Research to support river and estuary management in northern Australia
Methods

- Developed an Input/Output economic model based on
  - Australian Bureau of Statistics data
  - 500 household surveys (Indigenous and non-Indigenous)

- Examined the outcomes of development scenarios on
  - Employment, economic
  - Water use
Using the model to assess development scenarios: some examples ...

<table>
<thead>
<tr>
<th>Industry</th>
<th>Implied Mitchell River GVA ($m, 2006-07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>79</td>
</tr>
<tr>
<td>Mining &amp; Manufacturing</td>
<td>42</td>
</tr>
<tr>
<td>Electricity</td>
<td>5</td>
</tr>
<tr>
<td>Construction</td>
<td>17</td>
</tr>
<tr>
<td>Wholesale &amp; Trade</td>
<td>24</td>
</tr>
<tr>
<td>Accommodation</td>
<td>9</td>
</tr>
<tr>
<td>Transport</td>
<td>13</td>
</tr>
<tr>
<td>Finance, Communications &amp; Business</td>
<td>21</td>
</tr>
<tr>
<td>Government, Education &amp; Health</td>
<td>61</td>
</tr>
<tr>
<td>Cultural &amp; Personal</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
</tr>
</tbody>
</table>
5% Growth in Agriculture
Mitchell River Catchment
Asymmetric divide of economic systems

Resources Used

Amenity and other ecosystem services

Waste

Indigenous Economic System

Households

Businesses

Non-Indigenous Economic System

Households

Businesses

Businesses, Government & Households outside the region
Economic activity

- Increasing agriculture will increase income and employment in the catchment (as well as water use!).
- There is an asymmetric divide between Indigenous and Non-Indigenous economic systems.
- The lack of employment and business opportunities, workplace skills, and the other infrastructure prerequisites for development, means that...
- Indigenous people are likely to see little financial benefit from the expansion of agriculture.
Conclusions

- Society values tropical rivers for multiple reasons
- Indigenous values are very important to everyone, as is equity between groups
- Communities are looking for balance – underpinned by healthy ecosystem services
- Clear trade-offs between different values

- Robust water law, policy and plans needed to address multiple objectives, trade-offs and conflicting values
  - Daly River Management Strategy Evaluation (Francis Pantus)
Acknowledgements

TRaCK brings together leading tropical river researchers and managers from Charles Darwin University, Griffith University, University of Western Australia, CSIRO, James Cook University, Australian National University, Geoscience Australia, Environmental Research Institute of the Supervising Scientist, Australian Institute of Marine Science, North Australia Indigenous Land and Sea Management Alliance, and the Governments of Queensland, Northern Territory and Western Australia.

TRaCK receives major funding for its research through the Australian Government’s Commonwealth Environment Research Facilities initiative; the Australian Government’s Raising National Water Standards Programme; Land and Water Australia and the Queensland Government’s Smart State Innovation Fund.