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Tropical Rivers and Coastal Knowledge

Scenario Evaluation

Visions of tropical river futures for northern Australia.

Neil Collier, Hmalan Hunter-Xenie, Stephen Garnett, Bruce Campbell, Michael Douglas.

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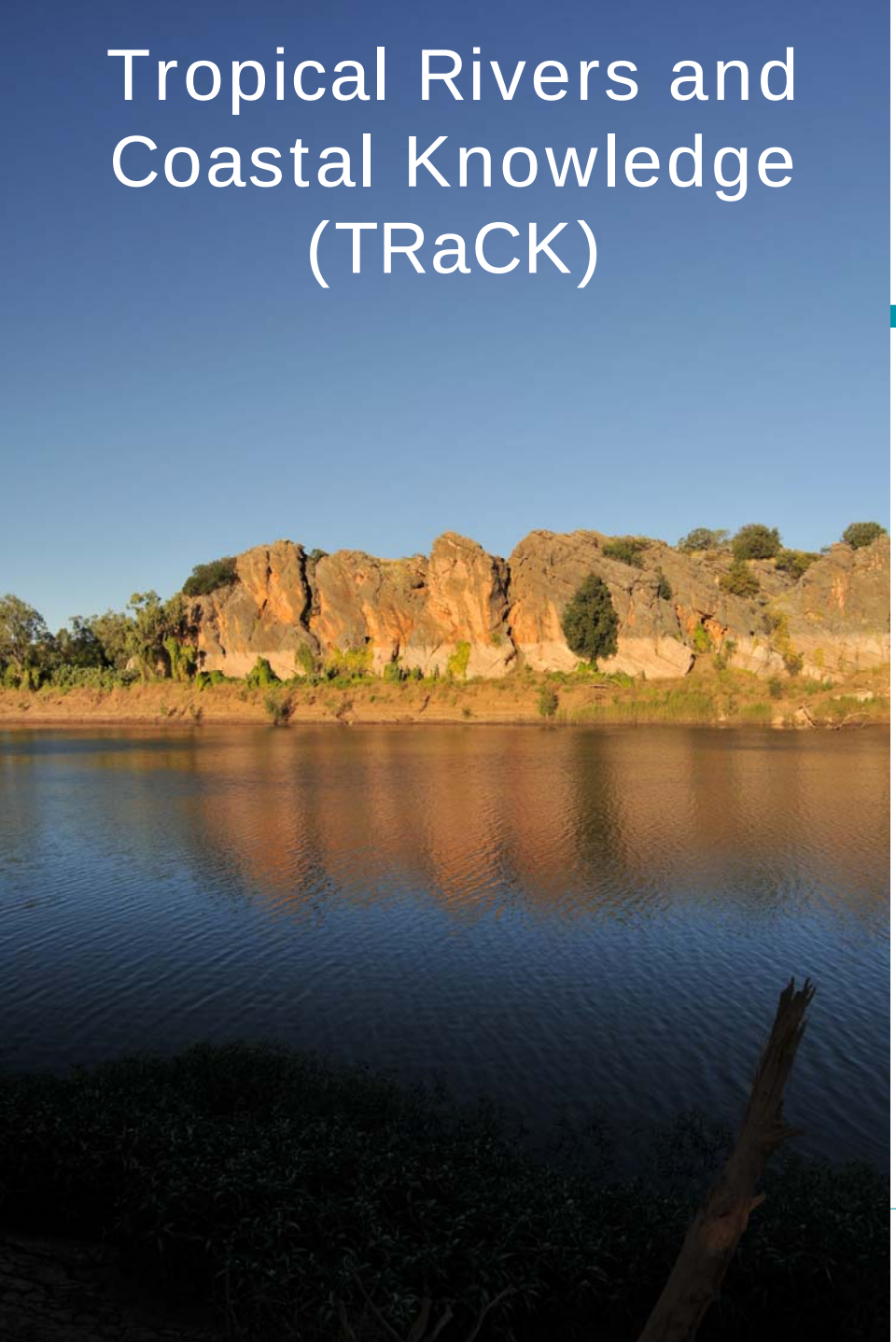

Program

- CERF research facility
- $30 Million AUD
- Large investment
- Enormous scale
- 70 researchers; universities, agencies, and governments.
- Research themes
  - Biophysical, economic, Indigenous, social (demography)

Wet-dry tropics

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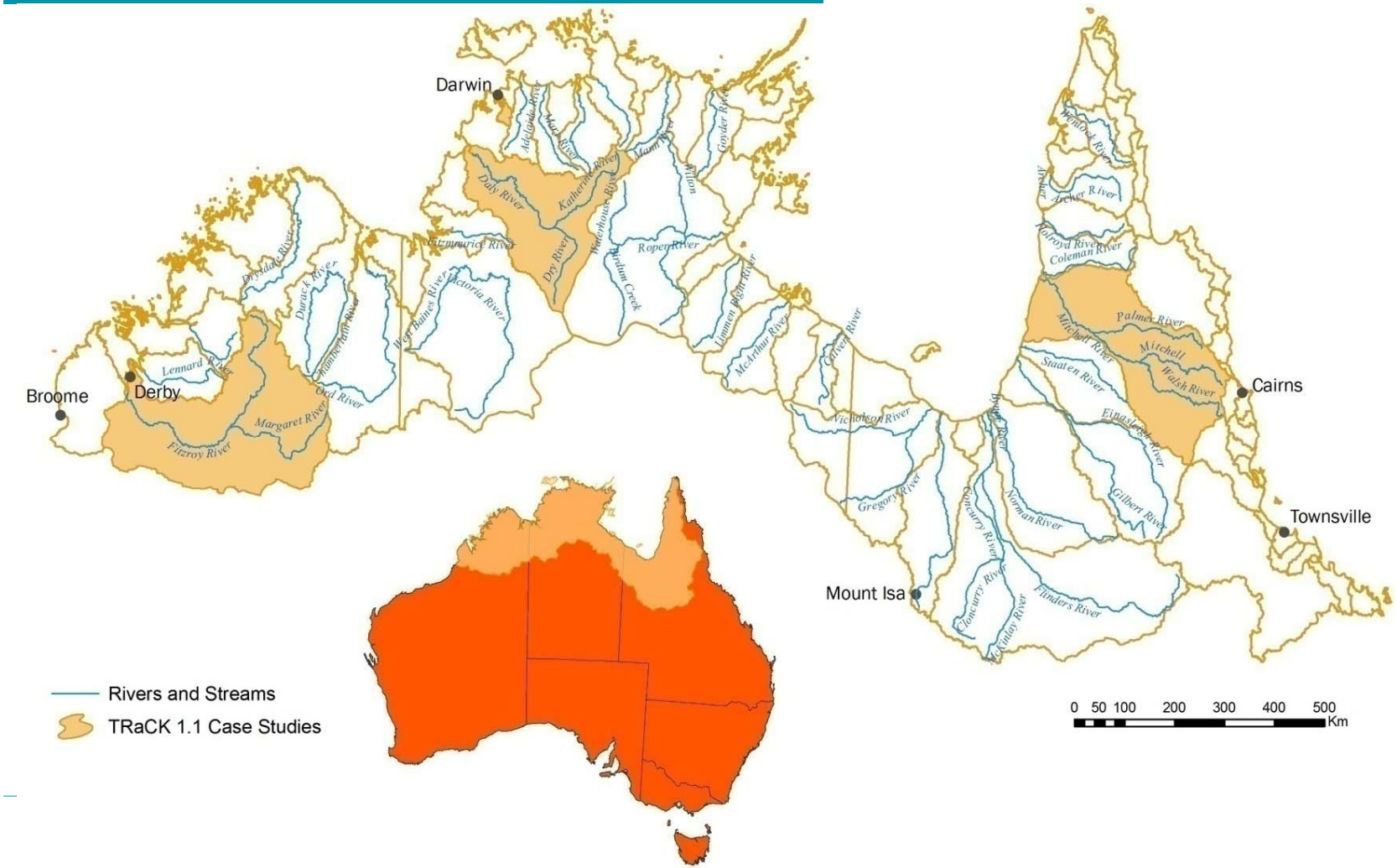

Northern perspectives

- Water resources
  - 'Wasted' water - 70% Australia run-off
  - Support southern drought relief
    - "let's pipe it south!!"
- Under-development
  - 'Food bowls',
  - Agricultural expansions
    - Cotton, biofuels, rice etc.
- None are realities
  - BUT, pressure remains
  - Precautionary approach

- Need <u>more evidence</u> to support decision-making

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What are the constraints?

- Agricultural development
  - Poor soils for agriculture
  - Highly seasonal water
  - Biodiversity values
  - Remote locations
- Indigenous ownership
  - Cultural values & water/land
- Social aspects
  - Non-market value of water and rivers

- What is acceptable to stakeholders?

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What are we dealing with?

- Complex social-ecological systems
  - Stakeholders
  - Economic development
    - Daly & Fitzroy
  - Indigenous ownership and values
  - Conservation of rivers and coasts
- Diverse interests + Competing demands

= Trade-offs!

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Theme 1: Scenario evaluation

- Develop scenarios of futures
  - Stakeholder perceptions, visions
- Explore futures
- Navigate trade-offs
- Integrative approach
  - Create systems models
    - TRaCK research outputs
    - Three focal catchments
    - Daly (NT), Fitzroy (WA), Mitchell (Qld)

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Modelling for management

- Integrative
  - Action research
- Management focus
- Flexibility
  - Stakeholders
- Stakeholder engagement

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Modelling approaches

- System dynamics (Stella)
  - Mechanical model
  - Feedback loops
  - Easy to bring together quantitative outputs from disparate themes
- Bayesian belief networks (BBNs)
  - Quantify risk
    - Important for policy/decision-making

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Modelling objectives

- Stakeholder engagement
  - Diverse interests, views, aspirations
  - TRaCK research
- Identify and explore solutions to conflicting stakeholder aspirations
  - What future visions?
  - Trade-offs!
- Inform policy makers
- *'Develop realistic scenarios for the future of riverine and coastal ecosystems'*

Why these models?

- Stakeholder learning
  - Increased system understanding
  - Social learning
  - Risk and uncertainty
  - Complimentary qualities
- Integration
  - TRaCK research outputs

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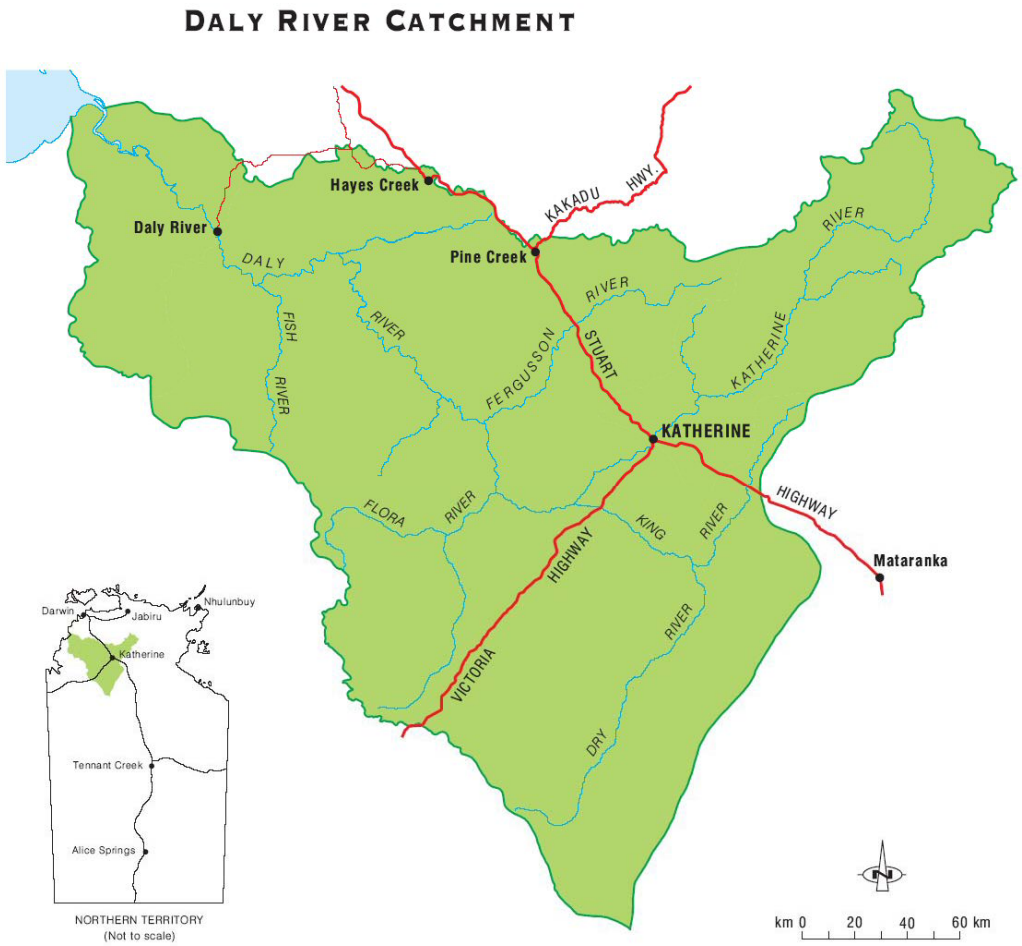
The Daly River catchment

- ~53,000km^2
- Low population density ~15-20,000
- 8 Indigenous language groups
  - Own large proportion of catchment
- Perceptions
  - Land and water in abundance
  - Target for development



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Daly River

- Stakeholder engagement
  - Daly River Management Advisory Committee (DRMAC) - Catchment stakeholder group
  - Daly River Aboriginal Reference Group (DRARG) - Indigenous representation

- Series of workshops and updates
  - 1 - Visioning of futures
  - 2 - Drivers of change
  - 3 - ‘Interest variables’

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Indigenous engagement

- Daly River Indigenous people
  - 8 language groups
  - Advisory group
    - 2 representatives/language group

- Modelling
  - Identify sectors
  - What is important
    - River shape (cultural sites)
    - Access to river
    - Common aspirations
      - Employment, economic benefits

Stakeholder visions

- Scenario narratives
  - Stories of change
    - Good *and* bad
  - Major ‘drivers’
    - e.g. Water use, emissions trading, forestry….Government policy!
  - Coherent with stakeholder concerns & aspirations.

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Scenario narratives

- Daly River scenarios
  1. Intensive agriculture and water-based development

     Irrigation, land clearing, forestry.
  2. ‘Steady as she goes’

     Status quo
  3. A diverse future

     Mixed development, PES, Indigenous co-management.

Reconciling visions with models

- Scenarios
  - Run models based on Scenarios
  - Stakeholder workshops

- Explore the future
  - What may happen to:
    - River, estuarine fisheries, land use.
    - What's the relative economic benefit?

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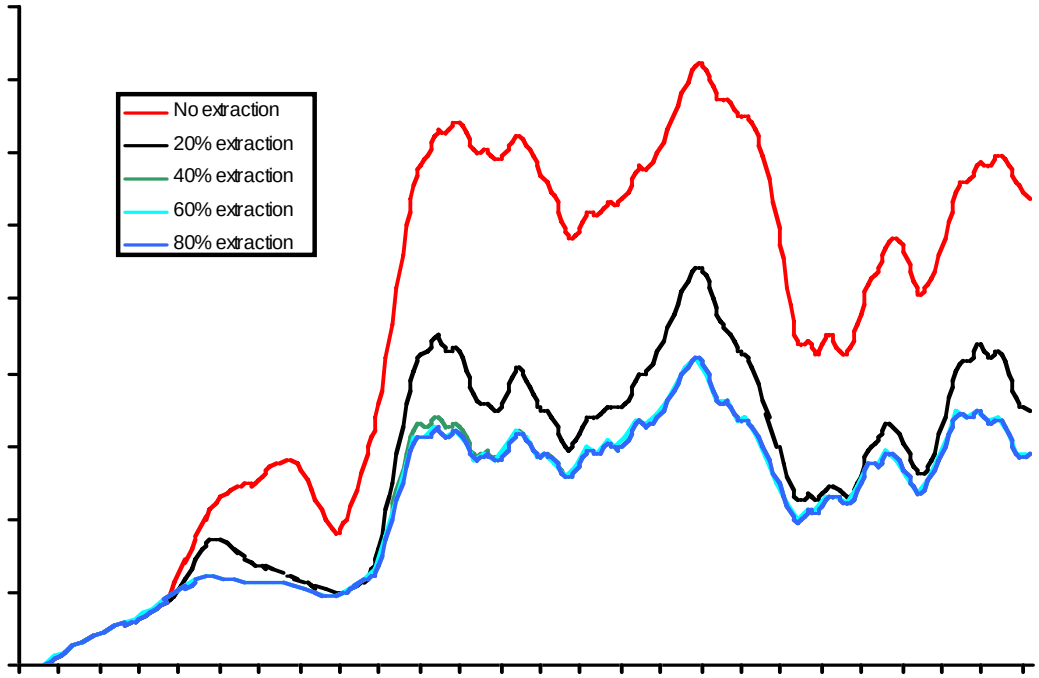
Some progress.....



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Bayeliss et al. unpublished data

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