



Fitzroy River, photo Michael Douglas.



**Northern Australia
Environmental
Resources
Hub**

National Environmental Science Programme

Research overview

West Kimberley

June 2018

Our regional focus

The West Kimberley's mighty Fitzroy River is of high environmental, economic and cultural significance. Areas within the catchment have been listed as National Heritage for a mix of biodiversity, Indigenous, historic, geological heritage and aesthetic values. There is increasing interest in the Fitzroy's significant land and water resources for development, and the need for environmental research to inform land use and water allocation decisions is critical. A planning approach that explores multiple alternative uses of land and water in the catchment is a key research focus, as are identifying environmental and Indigenous water needs for the Fitzroy River and supporting Traditional Owners in decision-making. Researchers are also investigating riverside plants and weeds, as well as bilby populations in the catchment, to inform management efforts. Other Hub research across northern Australia, on topics such as carbon, eDNA and threatened species, is also generating information to support development decisions in the West Kimberley.



What is the Northern Hub?

The Northern Australia Environmental Resources Hub supports sustainable development in northern Australia and is assisting decision-makers to understand, use, manage and safeguard northern Australia's outstanding natural environment through world-class science. Current research focuses on:

- Landscape-scale studies covering savanna and freshwater ecosystems and biodiversity.
- Land and water planning for new developments, e.g. agriculture and infrastructure.
- Indigenous land management including Indigenous Protected Areas.

The \$24 million Hub collaborates with government, Indigenous, environment and industry bodies. Projects build on past work by the Tropical Rivers and Coastal Knowledge research hub and the National Environmental Research Programme, and link with other research in the region.

Environmental water needs for the Fitzroy River

As the largest catchment in the Kimberley, there is increasing interest in the Fitzroy River's significant water resources for development. Working in collaboration with the Western Australian Government, the project team is improving the available information on the water requirements of key natural assets in the Fitzroy River. This knowledge will underpin water allocation and planning decisions to help protect environmental values.

Indigenous water needs for the Fitzroy River

This research is identifying customary uses of water and waterways in the Fitzroy River catchment, revealing links between Indigenous values, practices and water regimes, and eliciting knowledge and objectives for the future management of land and water resources. The information generated from this project will contribute to water planning and allocation, and enhance Indigenous capacity to influence regional water policy decisions and development solutions.

Knowledge brokering for Indigenous land management

This project is supporting Indigenous land managers to strengthen their use of scientific and Indigenous knowledge for improved environmental and land-use decision-making. Collaborative case studies in WA's Fitzroy River Catchment and with Waanyi Garawa Traditional Owners in the NT are designing and testing Indigenous-driven knowledge-exchange tools and approaches which, together with input from other Indigenous knowledge case studies, will inform "Our Knowledge Our Way" guidelines.

Multi-objective planning in northern Australia

Planning approaches that explore multiple alternative uses of land and water can help overcome tensions generated by development proposals in northern Australia. This project is using participatory scenario planning to explore different development pathways and their consequences. The project will help to build shared understandings of what is happening, understand what changes could happen and their positive and negative impacts, create an opportunity to develop connections, and facilitate group learning about strategic planning to support decisions about future land-water uses. It's being applied in WA's Fitzroy River catchment and is transferable to other areas in northern Australia and beyond.

Multiple benefits and knowledge systems of Indigenous land and sea management programs (ILSMPs)

As well as generating environmental benefits, ILSMPs generate many social, cultural and economic benefits.

While we can clearly value some ILSMP benefits, we lack information to value many of the less tangible benefits, for example those relating to culture or to whole communities. This project is providing quantified or comparable data about these co-benefits of ILSMPs, with case studies in the Kimberley and north Queensland.

Monitoring, mapping and safeguarding West Kimberley bilbies

This project is providing an accurate understanding of where bilbies occur and how they use their habitat in the Fitzroy River catchment. This information will be used to identify and implement on-ground actions that will help safeguard this threatened species. It will also contribute to recovery planning and threat abatement programs, and support environmental impact assessment and conservation planning.

Managing savanna riparian zones

Riverbank vegetation supports important ecosystem, economic and cultural values. It is however vulnerable to pressures such as invasive plants, feral animals and fire, which can be compounded by new development. The project is using case studies in Kakadu National Park and the West Kimberley to deliver improved knowledge on the role of riparian zones in supporting savanna systems, and on where resources could be directed for improved riparian health.

Increasing research impact by integrating across science disciplines and users

Four Northern Hub projects in the Fitzroy catchment with water resource management as a common theme are adopting a transdisciplinary approach, better integrating their research processes and outputs and developing strong links with research users. Researchers are also developing a 'theory of change' and using formative and summative evaluation to enhance their impact beyond individual project outcomes. Project findings will be used to inform the design and approach of future environmental research efforts.

Developing eDNA methods for tropical waters

Analysing environmental DNA (eDNA) is a relatively new technique for detecting the presence of species from DNA left from hair or skin, etc, which has many advantages over traditional monitoring, such as increased efficiency and safety. This project is developing eDNA technology for aquatic environments and trialling field methods for several species of conservation and management significance through case studies across north Australia. It aims to significantly improve the efficacy of field surveys and monitoring, hence providing a cost-effective tool to dramatically improve our knowledge and management of aquatic biodiversity in northern Australia.



Other projects relevant to the West Kimberley

Northern Australia environmental flow needs – synthesis project

Previous and current Hub research is quantifying the ecological responses to changes in flow regimes in rivers across northern Australia such as the Fitzroy, Daly and Mitchell. This project is evaluating how transferable these relationships are to other locations and scales, and identifying the key factors that water planners need to consider when applying this knowledge. Project outputs will be targeted to underpin sustainable water resource management in northern Australia.

Guiding non-government investment in Indigenous resource management enterprises

This research will investigate the performance motivations and the monitoring and assessment requirements of key non-government investors in Indigenous cultural and natural resource management (ICNRM) enterprises. It will identify investor needs, and options to meet these, to help practitioners articulate ICNRM benefits in investor-friendly ways, showcase the multiple benefits, reduce monitoring loads by aligning needs, and support more non-government investment in ICNRM.

Savanna carbon sequestration method

By accounting for carbon stored in dead grass, leaves, twigs and coarser woody debris, as well as the non-CO₂ greenhouse gases, we can better quantify the value of improved fire management to greenhouse gas abatement. This has the potential to increase the incentive for land managers to adopt improved fire practices by allowing them to earn additional carbon credits. This project is improving our ability to calculate the carbon benefit in dead organic matter from changed fire regimes in lower-rainfall savannas across northern Australia.

Prioritising threatened species in northern Australia

This research will guide improved management and investment to bolster threatened species recovery in high-priority areas of northern Australia. The team is modelling and mapping the distribution of threatened species, and the pressures on these species, across the north. This can be used to help prioritise investment and to inform assessments for future development. The project team will provide guidelines and training so models and maps can be updated and applied in everyday management activities.



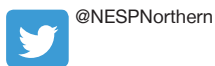
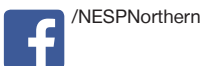
Kimberley landscape, photo Michael Douglas

Completed projects relevant to the West Kimberley

Please see the project wrap-up factsheets on our website for information on

- Lessons and protocols for Indigenous fire management partnerships
- Remote environmental monitoring techniques
- Research priorities for the north's Indigenous Protected Areas
- Supporting development decision-making in northern Australia

In the West Kimberley, Bunuba Dawangarri Aboriginal Corporation PBC, Gooniyandi Aboriginal Corporation PBC, Kija Claimant Group, Kimberley Land Council, Jaru Claimant Group, Ngarrawanji Claimant Group, Nyamba Buru Yawuru, Tiya-Tiya Aboriginal Corporation PBC, Walalakoo Aboriginal Corporation PBC, Warrwa Claimant Group, Wilinggin Aboriginal Corporation, Yi-Martuwarra/ Yanunijarra Aboriginal Corporation PBC and Yungngora Aboriginal Corporation PBC are collaborators in this research.



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For further information, including our North Queensland and Top End factsheets, visit nespnorthern.edu.au or contact Karen Dayman (karen.dayman@klc.org.au, 0429 502 564) or Clare Taylor (clare.taylor@cdu.edu.au, 0405 730 999).



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