



Magela Creek is home to important native fish populations, photo Supervising Scientist Branch, Australian Government.



**Northern Australia
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National Environmental Science Programme

Fish movement and sensitivity to contaminated mine water

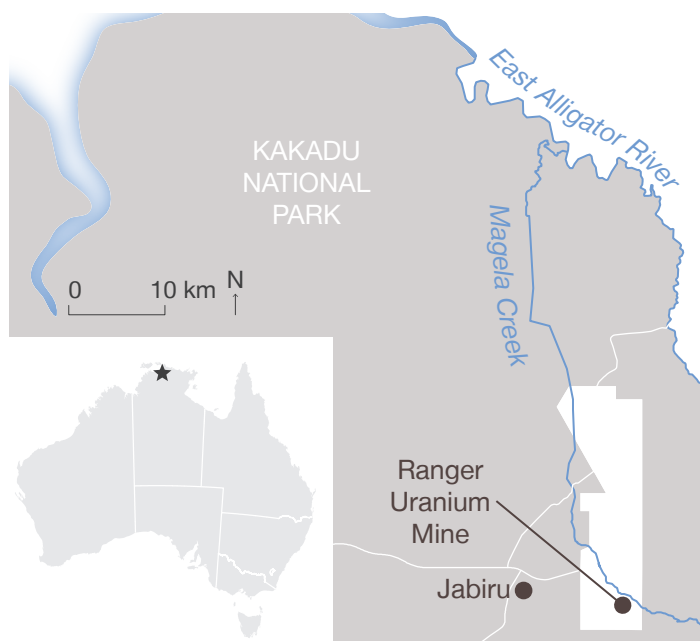
Start-up factsheet

Salty water from mine waste rock may affect fish movement and other ecosystem processes

Flowing through the Ranger Uranium Mine lease and into Kakadu National Park, **Magela Creek is home to important populations of native fish species** that need to be able to move between the river, floodplain and escarpment country at different times of the year. Fish movement

around floodplains during the wet season facilitates the transport of large amounts of nutrients and energy from floodplains to creeks as flood waters recede. This process supports important food sources for Traditional Owners and protects the World Heritage values of the Park.

Weathering of waste rock from the Ranger Uranium Mine releases contaminants, including magnesium sulfate. These contaminants are washed out by the rain and are predicted to move through the local groundwater towards Magela Creek. Depending on the concentration, the



Fieldwork will take place in Magela Creek, both upstream and downstream from Ranger Uranium Mine.

Overview

This project will:

- investigate fish movement and abundance in Magela Creek and its floodplain at different times of year
- determine the risks to fish movement from current magnesium sulfate concentrations in Magela Creek from regulated releases of mine tailings water
- analyse the future risks to fish movement from magnesium sulfate contamination
- inform mine rehabilitation options and monitoring activities
- improve our understanding of tropical food web dynamics by using the Magela Creek findings to build on previous work.

magnesium sulfate (a salt) has the potential to affect fish, trees and other ecosystems in and near Magela Creek downstream from the Ranger mine site.

Knowing how fish use Magela Creek and the risk to them from saline plumes will inform mine closure

The Ranger Uranium Mine is due to cease operations in 2021 and this study will lead to better knowledge about how mining waste-related salty plumes may affect ecological processes and connectivity. Researchers will study fish migrations in the Magela Creek catchment to determine the extent to which magnesium sulfate plumes could interfere with fish movements and related ecological functions and processes. They will also recommend ongoing monitoring and evaluation activities to inform mine closure activities and trial new-generation monitoring equipment and infrastructure.

More specifically the project will identify where different fish species come from (e.g. downstream billabongs or upstream below-escarpment permanent waterbodies) to colonise Magela Creek each wet season. Researchers will characterise where different fish species live and their seasonal movements, as well as estimate the biomass transported through fish migration. They will observe how fish respond to current approved mine water releases to Magela Creek, noting the key times when a particular species may be at risk. Researchers will use this understanding to assess future risks to fish and associated ecosystem processes.

Project activities

- Tag 100 fish with acoustic transmitters to characterise their seasonal movements between the floodplain and refugial billabongs
- Use imaging sonar to generate near-video-quality images of fish to observe their behaviour and estimate their abundance
- Deploy underwater video cameras to obtain species-level information on fish abundance and migration
- Quantify the biomass transported between floodplains and main channel habitats by fish migration
- Link fish movement data to models of surface and groundwater movement and literature review findings
- Quantify responses of migrating fish to current approved mine water releases.

Anticipated outputs

- A conceptual model of how different fish species use the creek based on quantitative information
- An assessment of the risks to Magela Creek fish species associated with mine waste water
- A report outlining future ecological risks and options associated with rehabilitation of the Ranger Uranium Mine site and downstream areas
- Recommendations for a monitoring program and ongoing assessment of potential impacts to fish communities from the predicted salty water
- Scientific papers and summary factsheets.



This project will improve understanding of fish migration and the possible effects of salty mine water on fish movement, photo Supervising Scientist Branch, Australian Government.

Who is involved?

This project is being led by Associate Professor David Crook from Charles Darwin University (CDU). A/Prof Crook will be assisted by researchers from CDU and the Supervising Scientist Branch of the Department of the Environment and Energy.

This project has been approved by Gundjeihmi Aboriginal Corporation.

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For further information and project updates, visit the project webpage at www.nespnorthern.edu.au/projects/nesp/fish-movement-and-sensitivity



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