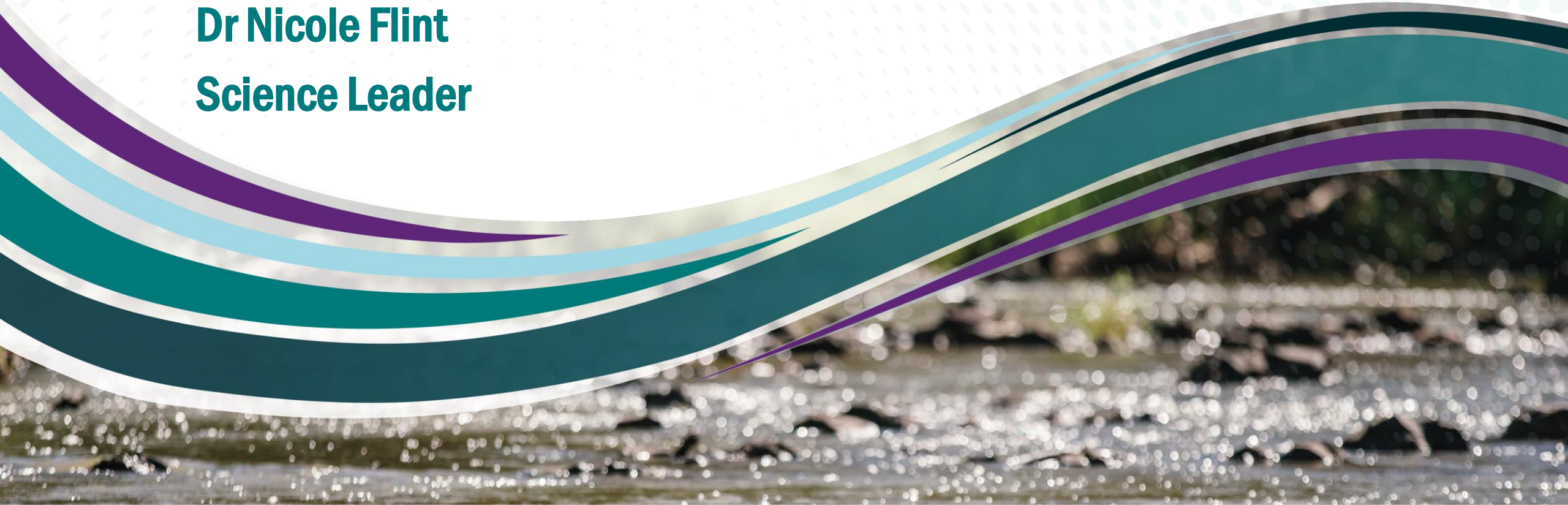


A snapshot of Fitzroy Basin waterway research

Dr Nicole Flint
Science Leader



Monitoring techniques, monitoring efficiency and prediction

Research underpinning the Fitzroy Water Quality Improvement Plan

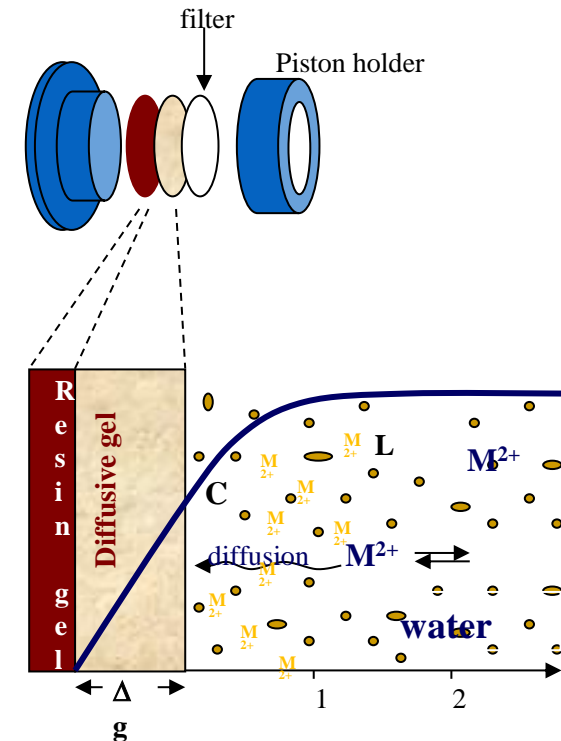
Salinity model, FPRH, BMT-WBM, Alluvium, Queensland Government

Monitoring Efficiency Review, [FPRH and DNRM](#), Contact: Dr Nicole Flint, CQUni

- Recommendations for future monitoring investment
- To be considered as part of the Strategic Review of the Program Design 2016-17

Application of the diffusive gradients in thin film technique (DGT) to determine bioavailability of heavy metals. [ACARP Contact, A/Prof Sue Vink, UQ](#)

- Bioavailable metal concentrations measured by the DGT lower than sampled concentrations.
- Some metals not detected by grab sampling methods but detected by DGTs.

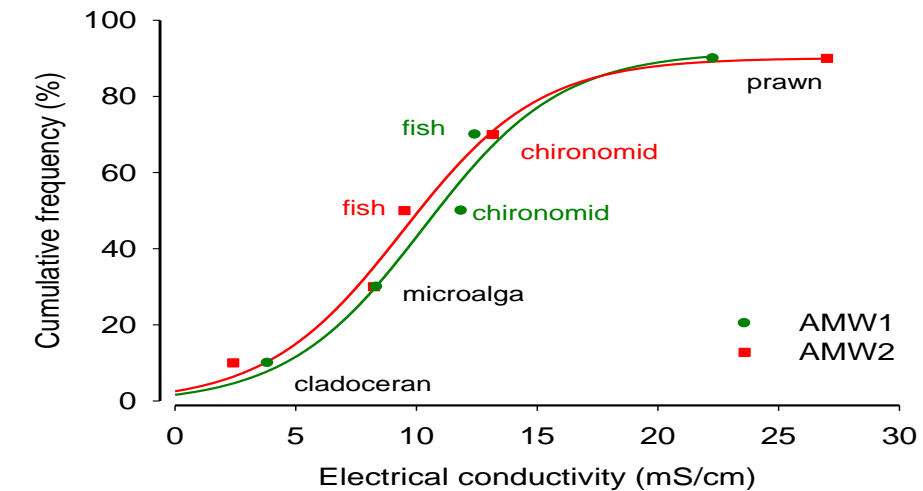
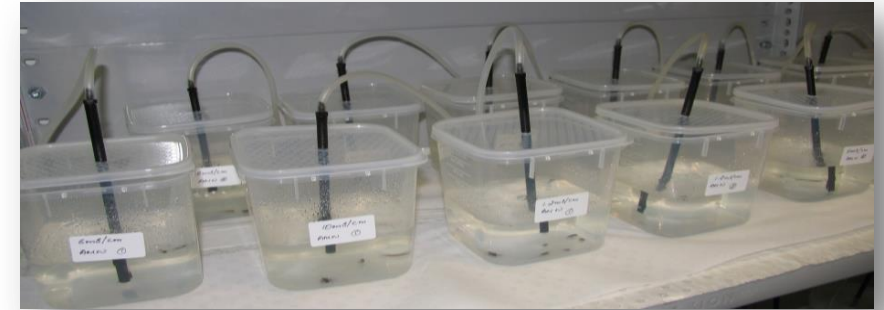


Assessing Impact of Sulphate in Saline Mine Site Discharge in Seasonally Flowing Streams in the Fitzroy. ACARP Contact: A/Prof Sue Vink, UQ, Hydrobiology, DERM

- Used field caught and laboratory reared organisms to determine sulfate trigger values
- Project extension - Determining the impacts of salinity on freshwater organisms in the Fitzroy - used field caught and laboratory reared organisms to determine salinity trigger values

Guidelines for Ecologically Sustainable Discharge in Seasonally Flowing Streams. ACARP Contact: Dr Sue Vink, UQ

- Showed that salinity differentially affected microbial ecosystem processes in stream biofilms



Water quality and ecotoxicology

Improved Morphometric and Genetic Tools for the Better Identification and Management of Blue Green Algae. ACARP, Contact: A/Prof Larelle Fabbro, CQUni

- Identified toxin producing species of cyanobacteria in CQ.
- New discoveries were made in relation to species previously thought to be non-toxicogenic. These include *Limnothrix* and *Sphaerospermopsis*.

Autecology, allelopathy and toxicity of *Limnothrix* (strain AC0243): Multiple-organism studies using laboratory cultures, PhD Candidate Olivia Daniels, CQUni

- Colonisation success of this strain of cyanobacteria due to its adaptations to flooding events and potential ability to colonise water pipes or soils.
- Toxicity trials - strain can contribute to the decline in frog/toad populations by causing mortalities in developing larvae.

The ecology of Baffle Creek: monitoring and management of human and environmental health risks, Gladstone Regional Council, PhD Candidate Adam Rose, CQUni

- Examining the seasonal variation in water quality and chemistry of Baffle Creek
- Analysing microbial and algal populations and tests for toxicity.
- Identifying potential human and environmental health risks associated with this creek system.



Water quality and ecotoxicology

Fitzroy Aqua-Eco Health Projects. Contact: Dr Larelle Fabbro, CQUni and Dr Sue Vink, UQ

- Various mining industry funded projects that investigate aquatic ecology and health of the Fitzroy River system
- Analysing water, sediments and biota (especially macroinvertebrates) in detail.



Water Quality Management of Queensland Coal Mining Activities: Investigating Chronic Effects of Mine Water Releases on Aquatic Biota. QRC Coal Minesite Rehabilitation Trust Fund, PhD Candidate Chantal Lanctot, CQUni and GU

- Comparative sensitivity of coal mining waste water on native fish and amphibians
- Researching behavioural, developmental and reproductive endpoints



Water quality and ecotoxicology

The chemistry of heavy metals in a river associated with coal mine affected water releases in the Fitzroy Basin. [QRC Coal Minesite Rehabilitation Trust Fund](#), PhD Candidate Catherine Jones, CQUni

- Spatial changes in sediment, metal concentrations and metal speciation along the Mackenzie.
- Interactions between coal mine-affected waters and the Mackenzie River receiving waters using laboratory experiments.
- Corresponding grab water samples, time-averaged passive water samples, suspended sediment samples, sediment grabs and sediment core samples, and investigate the distribution of metals between these phases.

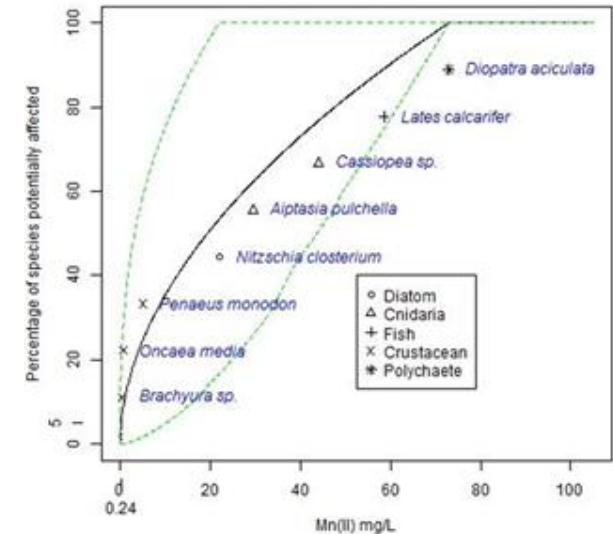


Ecological Risk Assessment of Manganese in the Subtropical Estuarine Harbour of Port Curtis, Queensland, Australia. PhD of Dr Amie Anastasi, CQUni

- Oxidative kinetics of manganese in seawater
- Derivation of a water quality guideline for Mn in marine waters
- Probabilistic risk assessment of Mn(II) in subtropical estuarine systems.

NEW! Impacts of un-burnt coal on marine water quality and impounded fish. Gladstone Ports Corporation, Honours Candidate Nicole Bonney, CQUni

NEW! Polycyclic aromatic hydrocarbons (PAHs) in marine and estuarine environments along the Queensland coal supply chain. QRC Coal Minesite Rehabilitation Trust Fund, PhD Candidate Helen Darlow, CQUni



River ecology: animals and habitats

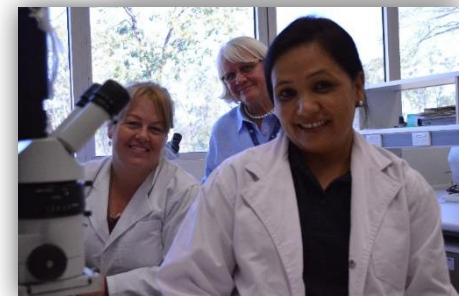
Tool to assess mining impacts on river condition. **ACARP**, Contact: Dr Claire Sellens, CQUni

- Existing guidelines and predictive models for river health are not suitable for assessing mine site impacts because they are typically determined from steady state conditions.
- Developing a regionally relevant predictive modelling tool for assessing condition of temporary streams on CQ mines.



The importance of macroinvertebrates in freshwater tropical systems: Ecological patterns, monitoring and management. **QRC Coal Minesite Rehabilitation Trust Fund**, PhD Candidate Leigh Stitz, CQUni

- The succession of bug patterns during different flow and the response of bugs to increased conductivity.
- Can we use them to assess the health of our streams?



River ecology: animals and habitats

Development of a Toolbox for Assessing Fish Habitat and Health Associated with Coal and Gas Industry Land Practices in the Fitzroy Basin. **QRC Coal Minesite Rehabilitation Trust Fund, ACARP, FPRH HeART of the Basin, PhD Candidate Evan Chua, CQUni and UQ.**

- Using fish assemblages, fish condition and fish habitat as indicators of waterway health in the Fitzroy Basin.
- Local sentinel species that are sensitive to change, or more tolerant.

NEW! Short term socio-ecological effects of a localised change in commercial fishing pressure in the Fitzroy River and Capricorn Coast. **APA and IPRA, PhD Candidate Sabiha Sultana Marine, CQUni**



River ecology: animals and habitats

Biodiversity values (fauna and flora) of marine plain wetlands and environmental drivers. QPWS, [Contact: Wayne Houston, CQUni](#)

- Marine plain wetlands of NE Curtis Island at the mouth of the Fitzroy River evaluating:
 - Wetland vegetation condition with respect to feral animals, geomorphology, soils, topography, hydrology and salinity of groundwater
 - Biodiversity values for vertebrate fauna
 - Seasonal abundance and habitat use of wetland associated birds such as the Capricorn Yellow Chat

Conservation of marine and alluvial plains in the Lower Fitzroy River.

[Contact: Wayne Houston, CQUni](#)

- Trialling efficacy of mealy bugs for controlling *Harrisia* cactus infestations on marine plains and bordering alluvial areas, with some success.
- Saltfields are important dry season habitat for waterbirds

NEW! Riparian restoration: a methodological framework for improving marine water quality through catchment sediment, nutrient and pollutant sequestration. [Masters Candidate, Julie-Ann Malan, CQUni and CVA](#)



Contacts



Dr Nicole Flint, CQUni (n.flint@cqu.edu.au)

A/Prof Sue Vink, UQ (s.vink@smi.uq.edu.au)



A/Prof Larelle Fabbro, CQUni (l.fabbro@cqu.edu.au)

A/Prof Eva Abal, UQ (e.abal@uq.edu.au)



Wayne Houston, CQUni (w.houston@cqu.edu.au)

Co-Investigators and RHD supervisors include: Robert Black, Wayne Elder, Andy Hammond, Andrew Irving, Emma Jackson, James Chapman, Victoria Vincente-Beckett, Rod Elder, Alison Craig, Geeta Gautam Kafle, Karuna Shrestha, Aleicia Holland, Steve Melvin, Scott Wilson, Frederick Leusch, Sandrine Makiela, Paul Monis, Chris McGrath, Josh Larsen, Marc Hockings, Patrick Moss, Catherine Bernard-Pattinson, Susan Kinnear and John Rolfe.