

Bioavailable nutrients from sediment data (BAN data) – Queensland Government

This document contains the description of projects that provided data to this database and contact for each project.

RP128G Phase 2 – Sources of Bioavailable particulate nutrients: Phase 2 – Indicators of bioavailable particulate nutrients

This project was developed to determine the indicators of bioavailable particulate nutrients that could be measured on source soils and fine sediments and are related to algal growth in both fresh and marine waters. These indicators can then be used for routine measurement, monitoring and modelling of bioavailable particulate nutrients. This in turn enables consideration of bioavailable particulate nutrients future prioritisation and target setting in the GBR.

Contact: Soil Catchment and Riverine Processes – Department of the Environment, Tourism, Science and Innovation DETSI (dl-sciencetech_ls_scrp@des.qld.gov.au)

RP178a – Contribution of eroded soils to dissolved inorganic nitrogen export in Great Barrier Reef catchments

The key objectives of this project were to 1) evaluate if dissolved inorganic nitrogen (DIN) generation from eroded soil contributes a significant proportion of the total DIN measured at the end-of-catchment in a dry tropics grazing catchment (Bowen River catchment) and a wet tropics mixed land use catchment (Johnstone River catchment); 2) provide a framework for how DIN generation from sediment could be modelled; and 3) Analyse the Great Barrier Reef Catchment Load Monitoring Program's (GBRCLMP) existing particle size dataset to improve understanding of what size fractions of sediment reach the end of GBR catchments.

Contact: Soil Catchment and Riverine Processes – Department of the Environment, Tourism, Science and Innovation DETSI (dl-sciencetech_ls_scrp@des.qld.gov.au)

NESP 1.7 – Bioavailable nutrients and organics in alluvial gully sediment

In this report, results are presented for various key indicators of bioavailable nutrients and organics analysed for four gullies (three alluvial and one hillslope gully) in the Normanby River catchment. The nutrient fractions and organic pools associated with different particle size fractions (total soil, <63 um, and 10 um) were determined for different gully geomorphic units including terrace surface soil, bank surface soil, bank subsurface soil and gully floor deposits. The total sediment, organic and nutrient exports from the three alluvial gullies and their geomorphic units, were estimated using detailed annual sediment budgets coupled with nutrient and organic composition data from this study.

Contact: Soil Catchment and Riverine Processes - Department of the Environment, Tourism, Science and Innovation DETSI (dl-sciencetech_ls_scrp@des.qld.gov.au) or – Precision Erosion and Sediment Management research Group – Griffith University (gsc_admin@griffith.edu.au)

NESP 3.1.7 - Nutrient export from Strathalbyn station alluvial gullies

The objectives of this study were to:

1. Continue monitoring nutrient export during high-flow events at various Strathalbyn Station gullies (control, treatment 1 and 4 of the Northern Gullies) and start monitoring nutrient export during high-flow events at gully 13-Southern Gullies.

2. Integrate newly acquired sample data with historical monitoring data (2018-2019) (Garzon-Garcia et al., 2019).
3. Expand our understanding of the effectiveness of gully remediation at reducing nutrient export.
4. Develop a methodology to estimate particulate nutrient and bioavailable nitrogen loads and yields exported from active gully systems (e.g., the application of baseline data in-order to replace the monitoring of control gullies)
5. Apply this methodology to the Northern gullies and gully 13 at the Southern gullies site - Strathalbyn Station.

Contact: Soil Catchment and Riverine Processes – Department of the Environment, Tourism, Science and Innovation DETSI (dl-sciencetech_ls_scrp@des.qld.gov.au) or Precision Erosion and Sediment Management research Group – Griffith University (gsc_admin@griffith.edu.au)

ARC Nutrient equivalency

This ARC Linkage project has focussed on strengthening the scientific basis for nutrient offsetting. The project conducted experimental work to determine the environmental equivalency between different catchment nutrient sources in a standardised way and provided preliminary findings on delivery ratios for nutrient offsetting. It is a multiple year collaboration between Griffith University, Queensland Department of Environment, Science and Innovation (Qld DESI), Queensland Department of Agriculture and Fisheries (Qld DAF), Urban Utilities, Sydney Water, and Healthy Land and Water.

Contact: Australian Rivers Institute – Griffith University (ari@griffith.edu.au)

BCR Project

The Building Catchment Resilience (BCR) Project set out to address this challenge by developing a world-leading, deliberative decision support tool that explores options for optimal investment in river and catchment rehabilitation to reduce erosion and associated pollutants, minimise flood risk and capture other benefits, such as carbon sequestration and biodiversity. An innovative digital interface was also proposed to enable realistic visual representations of management actions that facilitate discussion and build confidence with investors and the local community.

Contact: Australian Rivers Institute – Griffith University (ari@griffith.edu.au)

Laser Project

The objectives of this project, commissioned by Seqwater/HLW to the Department of Environment and Science (DES), were to:

- develop a series of maps, including soil erodibility, soil P, soil N, and BAN.
- provide a suite of soil data analysis to better inform soil erosion, sediment generation, characterisation of BAN and nutrient management.

Contact: Soil and Land Resources – Department of the Environment, Tourism, Science and Innovation DETSI (DL-ScienceTech_LS_Soi&LandResources@des.qld.gov.au)

References

Garzon-Garcia, A. et al. (2018) 'Indicators of phytoplankton response to particulate nutrient bioavailability in fresh and marine waters of the Great Barrier Reef', *Science of the Total Environment*, 636, pp. 1416–1427.

Garzon-Garcia, A. et al. (2019) *Towards the standardisation of bioavailable particulate nitrogen in sediment methods*. Brisbane: Department of Environment and Science.

Garzon-Garcia, A. et al. (2024) 'The bioavailability of particulate nitrogen in eroded sediment: Catchment sources and processes', *Journal of Soils and Sediments*, 24(3), pp. 1402–1419. Available at: <https://doi.org/10.1007/s11368-024-03740-x>.