Tropical Water Quality Hub

National Environmental Science Programme

Project 4.9 Gully Characterisation Framework to underpin GBR Catchment Water Quality Management

Project Summary

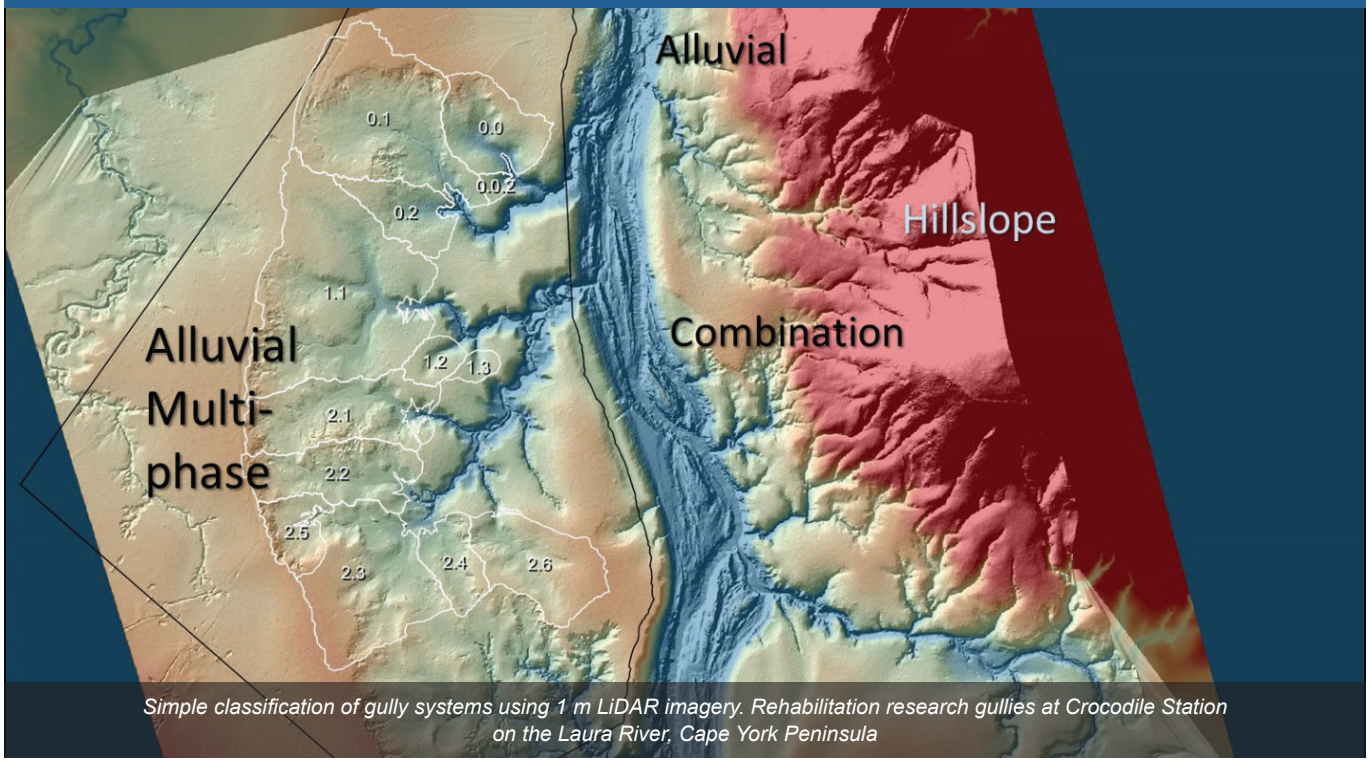
This project will compile a database of gullies from across Queensland as a tool for communicating the diversity of gullies that exist in the landscape, but also the common elements from within this diversity, where they exist. Using this database, the project will develop a gully classification system to ensure that there is a common language used by researchers, landholders, land managers and practitioners when identifying gullies for management intervention. This will form the basis for subsequent automated gully mapping according to gully type. The project will also develop a first order decision tool to guide land managers towards the sorts of management options that may be appropriate for the gullies in question. A checklist of design considerations will also be developed that will ensure that managers undertake the appropriate level of design work for the required intervention. Whilst this will not be a design guideline, it will help to ensure that the range of management options are narrowed down by managers before specialist advice is sought.

Problem

With major investments from Australian and Queensland Governments there is a pressing need to identify the different types of erosion gullies in the landscape, and to prioritise management effort and resources such that the appropriate treatments are applied to different gullies in the most cost-effective manner. As more groups have become involved in gully rehabilitation, and gully mapping (often involving people with little background in geomorphology, soil science, or soil conservation) it has become obvious that we first need to ensure that we have a common language and approach to gully characterisation and management.

How Research Addresses Problem

The research addresses this by i) compiling a database of gully types from literature, existing data, and from data provided by other specialists, and ii) developing a classification scheme for the major gully types found in Great Barrier Reef (GBR) catchments based on the range of gullies represented in the database. The classification scheme acts as a reference guide to indicators of erosion activity, mapping and description methods, appropriate terminology, and a broad framework for the sorts of treatments that might be appropriate for rehabilitating the different gully types.



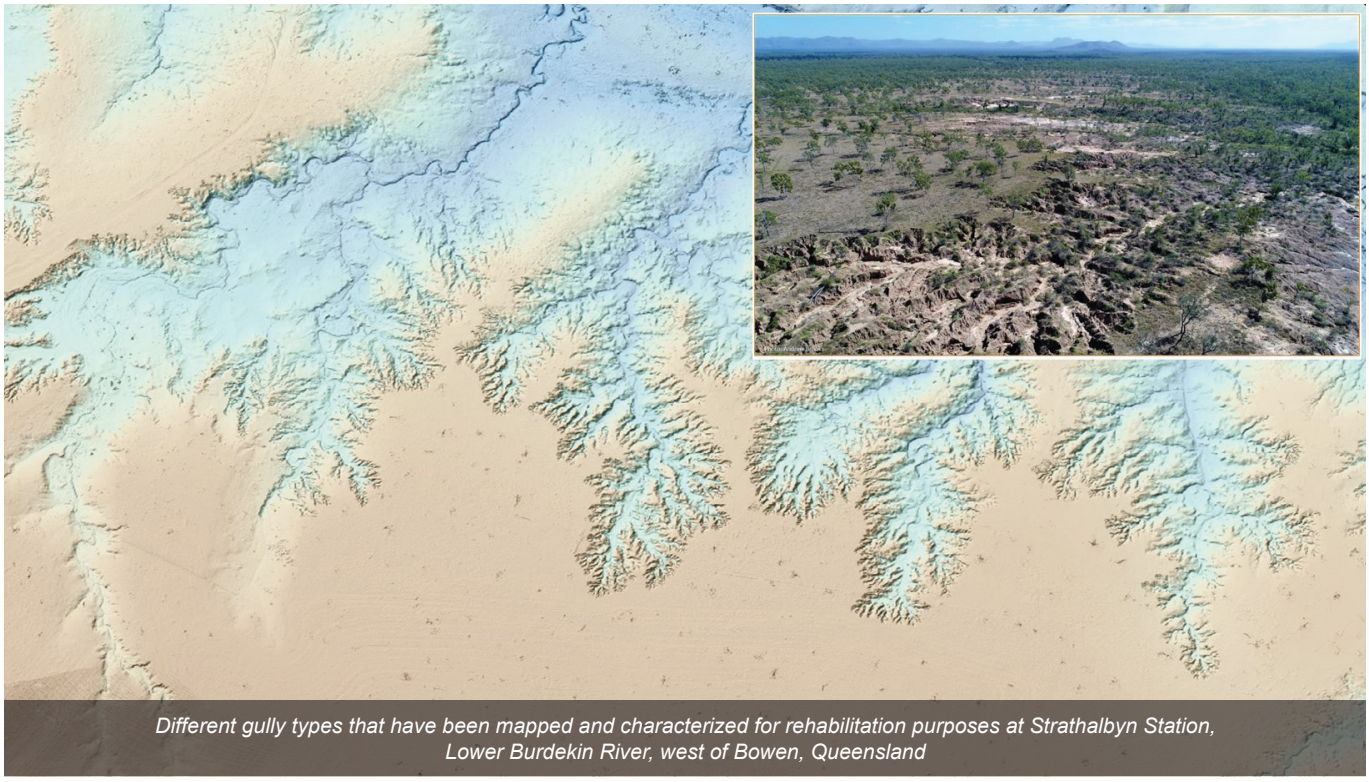
Simple classification of gully systems using 1 m LiDAR imagery. Rehabilitation research gullies at Crocodile Station on the Laura River, Cape York Peninsula

Photo: Robin Thwaites

Gully rehabilitation efforts are arguably the most direct means of improving catchment water quality to the GBR in the short to medium term. The output from this project will help managers and policy staff to better target resources to the appropriate gully types that are going to achieve the largest sediment reductions, and in the most cost-effective way.

To achieve this, the project will focus on the following:

1) The database, which will include a broad range of information on the different gullies, such that a non-expert user could identify a similar gully in the field (or from remotely-sensed data), based on reference to the gully database.
2) Definition of channel forms that are not gullies, and field characteristics to provide an indication of when a gully has effectively transitioned to a stream channel.
3) A reference guide to indicators of gully activity.
4) Developing a classification scheme for the major gully types found in GBR catchments based on the range of gullies represented in the database (and Queensland more broadly).
5) Deriving a broad framework for the sorts of treatments that might be appropriate for rehabilitating the different gully types (with knowledge gaps identified where appropriate).
6) Develop a checklist of design requirements for the different treatments/gully types.
7) Outline key knowledge gaps that will enable the development of a full design guideline for Queensland gullies.



Different gully types that have been mapped and characterized for rehabilitation purposes at Strathalbyn Station, Lower Burdekin River, west of Bowen, Queensland

Photo: Andrew Brooks

Further information

See **www.nesptropical.edu.au** or contact:

Assoc Prof Andrew Brooks – GU
T: +61 (0)427 232 709
E: andrew.brooks@griffith.edu.au

Dr Robin Thwaites – GU
T: +61 (0)408 986 957
E: r.thwaites@griffith.edu.au

Griffith UNIVERSITY

Queensland Government

Reef & Rainforest RESEARCH CENTRE

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