

The Innovative Gully Remediation Project



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The Innovative Gully Remediation Project is a collaborative project supported by the Queensland Government's Reef Innovation Fund and Greening Australia's Reef Aid™ Program.

This project's purpose is to identify more innovative and cost-effective gully remediation techniques applicable to the Great Barrier Reef (GBR) catchments and communicate the outcomes of the trials to ensure broad uptake of best practice gully remediation techniques.

The remediation trials under the project are being conducted in collaboration with the Hughes family on Strathalbyn Station, in the East Burdekin priority sediment reduction catchment.

More information on the Innovative Gully Remediation Project can be found at <https://www.greeningaustralia.org.au/projects/rebuilding-eroding-land-2/>



What was the Innovative Gully Remediation Forum

The forum was organised as a part of the Innovative Gully Remediation Project, funded jointly by the Queensland Government Reef Innovation Fund and Greening Australia's Reef Aid™ Program.

Gully remediation experts from a range of backgrounds, including organisations and individuals from the academic, research, government, and private sector (specifically landscape and mine site remediation and sodic soil treatment specialties), were invited to attend a one day forum in Townsville on 9th May 2017.

The intent of the forum was to harness the collective knowledge of scientists, researchers and remediation experts to facilitate fresh thinking to tackle the challenges of large scale alluvial gully erosion in GBR catchments.

A report of the outcomes of the forum discussions is available at https://www.greeningaustralia.org.au/wp-content/uploads/2018/04/Forum-Outcomes-Report_FINAL_20180427.pdf



What practical results came out of the forum?

A number of the key points made during the forum discussions have led to further investigation and action. The pursuit of these actions under the Innovative Gully Remediation Project has improved the outcomes of the remediation trials at Strathalbyn Station. Five areas of further action are described in this communique.

ACTION AREA 1: IMPROVED SOIL MAPPING

The forum identified that an understanding of soils is critical to alluvial gully planning and remediation or rehabilitation. After a review of existing soil mapping covering the site, it was recommended that further soil sampling and analyses be undertaken at Strathalbyn Station to improve the understanding of gully processes and also to assist remediation planning and evaluation of treatment effectiveness. This work was commenced in October 2017 and the full results of the soil sampling and soils mapping for the site will be released in April/May 2018.

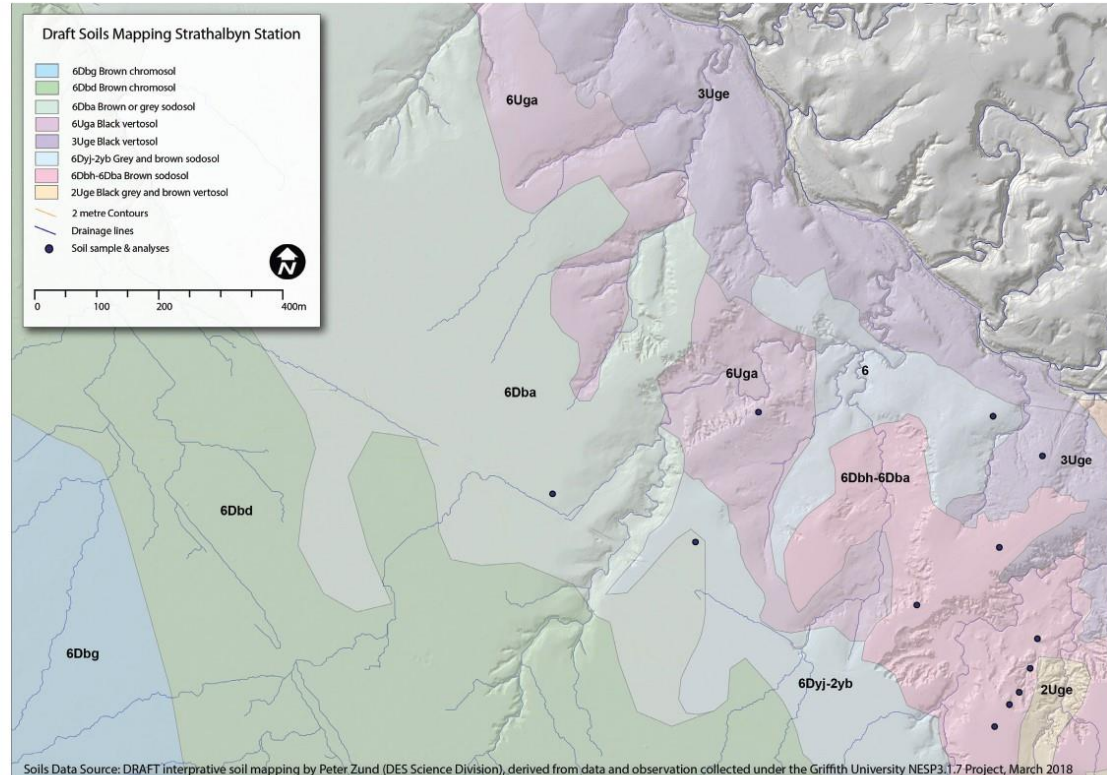
Comprehensive soil sampling and mapping has been undertaken by Griffith University under the NESP 3.1.7 project in conjunction with DES Science Division and DES Office of the Great Barrier Reef. As part of the NESP 3.1.7 project a 3D soils map of the Strathalbyn project site is currently being produced.

For further information on this project check out <http://nesptropical.edu.au/index.php/round-3-projects/project-3-1-7/>



The new dataset has been useful in a number of ways:

- A draft soils map over the project site has allowed the identification of areas within the footprint of treatment gullies that have valuable topsoil resources, allowing rehabilitation designs to identify areas where topsoil can be stripped prior to bulk earthworks. The stripped resource is to be stockpiled and used on regraded batters to improve vegetation establishment.
- The extensive soil sampling undertaken and the sample analyses have been particularly useful for identifying levels of sub-soil sodicity, salinity, and nutrient and mineral deficiencies. This information is critical for calculating application rates and methodologies for ameliorants such as gypsum and organic matter.





ACTION AREA 2: AMELIORANTS AND SOIL CONDITIONING

The forum identified that the type of ameliorants used, methods of application and incorporation into the soil, and subsequent capping of treated areas are all factors which should be further evaluated in the context of large scale alluvial gully remediation in the GBR catchments.

These recommendations have been adopted for treatment trials at Strathalbyn which will explore optimal approaches to the use of different ameliorants on reducing ongoing erosion at alluvial gully sites.

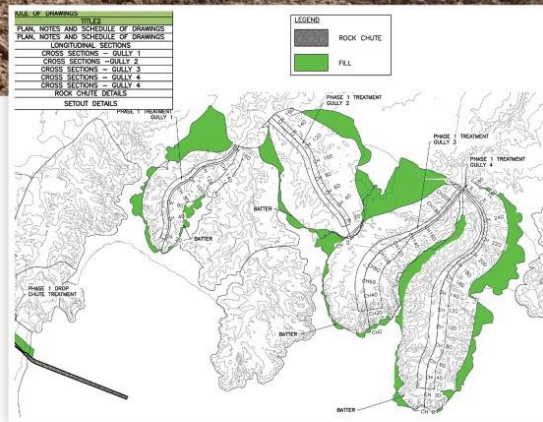
These approaches will include the application of powdered and liquid gypsum, direct application of organic matter (mulch, mill mud), hydro-mulching, and other innovative methods such as high intensity low duration controlled stocking trials.

ACTION AREA 3: ENGINEERING DESIGN

Although there is extensive local experience in the design of stabilisation works in eroding agricultural and mining landscapes, there are still elements of alluvial gully remediation/rehabilitation design which could be better refined.

These elements include design and construction specifications around the cost-effective treatment of tunnel erosion, the length and slope of regraded gully batters, the thickness of capping required on different batter slopes, the design of within channel check structures, and the potential for innovative low-cost approaches.

These elements will be investigated during the Strathalbyn remediation trials on 7 sites covering over 10Ha of direct interventions in 2018. The results of the trials will be used to develop rules of thumb and guidelines for consideration in future projects.



ACTION AREA 4: VEGETATION RE-ESTABLISHMENT

There is a great deal of expertise in pasture management in the local region, particularly related to grazing. In terms of optimal approaches to re-establishing vegetation within larger scale remediated alluvial gully systems (ie. 1-5 ha) the areas identified for further investigation include:

- the role of stock management in improving groundcover and soil health (specifically soil carbon, organic matter, and fertility)
- the most appropriate species for seeding programs,
- the most appropriate types of ameliorants to improve revegetation success (eg. mulch types and application thickness)
- the appropriateness of specialist equipment which may improve revegetation success or cost effectiveness (for example bale shredders, hydro-mulchers, seeders, etc).

Trials involving the application of 225 tonnes of mulch over 5 ha using a Tomahawk 8500 bale shredder, hydro-mulching of a 2ha site, compost and mill mud application, and the use of various seeders will be undertaken in 2018.



ACTION AREA 5: MONITORING AND EVALUATION

Existing technologies for monitoring storm water run-off quality have been adopted to monitor the reductions in sediment loads coming from treated gully catchments (using a Before After Control Impact design). These methods will assist the evaluation of the effectiveness of the various remediation/rehabilitation strategies implemented in the project.

In addition, a number of emerging or improving technologies will be evaluated. To date there has been several data capture efforts covering the pre- and post-treatment gully forms at Strathalbyn using both high resolution aerial LiDAR (Griffith University) and terrestrial LiDAR (DES Science Division and Griffith University).

It is hoped to further trial and evaluate these technologies at Strathalbyn Station under the Innovative Gully Remediation Project.



PARTNERS



CONTRIBUTORS



**PRIOR FAMILY
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