

BURDEKIN MAJOR INTEGRATED PROJECT GULLY MAINTENANCE AND MONITORING PROJECT



STRATHMORE STATION

SITE FEATURES AND RESTORATION EFFORTS

Strathmore grazier Paul Fry recognised the urgent need to address a severely eroded and gullied area, that was rapidly deteriorating and threatening to spread onto more productive grazing land.

The Strathmore Station rehabilitation project aimed to preserve productive land, prevent further topsoil loss, and stabilise eroded gullies, allowing them to recover and be restored as functioning ecosystems over time.

Unlike other gully rehabilitation projects in the region that focused on linear gullies, the Strathmore site presented a broad amphitheatre of erosion. This 'badlands' area featured a line of scarps upslope of wide, eroded gully floors and significant topsoil loss across large expanses.

Much of the soil material that remained in the lower parts of the 'badlands' was so hostile to plant growth it was considered not cost-effective to undertake a comprehensive remediation. Instead, the on-ground works concentrated on revegetating the catchments above the gullies to prevent further expansion of the gullied areas and promoting vegetative growth through low-disturbance remediation works in the scarps and upper parts of the 'badlands'.

Works included:

- Construction of a bund wall to divert overland flow from direct entry over the scarps to a rock chute.
- Construction of a rock chute to take the diverted runoff safely onto an existing stable drainage line.
- Construction of permeable hay sediment traps (leaky weirs, check dams) in the upper gully floors to slow sediment movement until vegetation could be established. Hay bales were also rolled out in drainage channels to slow down water and catch sediment to help establish vegetation. Over a couple of years, the hay bales break down and are replaced in their function by vegetation. The hay mulch also protects the gully floor from direct raindrop impact and rain splash, which displaces soil particles and destroys soil structure.
- Soil improvement (using gypsum and mill mud) and revegetation (with a mix of grasses and legumes, including hardy species like saltbushes, halophytes and other salt-tolerant plants, and other tough pioneer species) were carried out across six hectares of the contributing catchment area.
- Stock exclusion fencing to achieve optimal ground cover.



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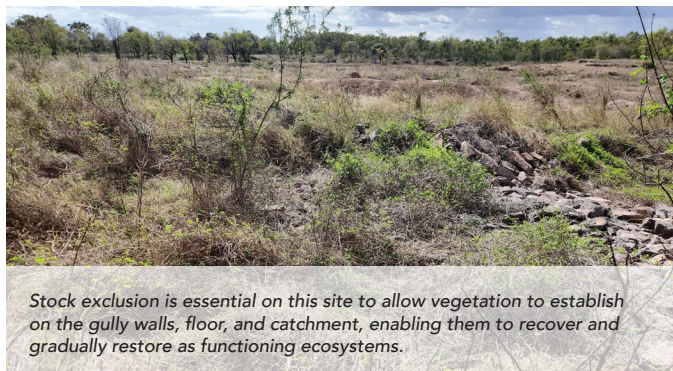
REHABILITATION BENEFITS

- It shows the value of having a design developed by experts to determine the appropriate action for a large-scale gully rehabilitation site. Being included in discussions with the design team throughout the process from start to finish helped the landholder understand why methods were adopted. For example, the common treatment of gully reshaping, amelioration, and seeding wasn't undertaken for the 'badlands' area because of the extreme infertility of the soil; soil amelioration was deemed uneconomical due to the amounts required.
- The bund is preventing overland flow from directly entering the gullies. Water is now being held in the landscape, improving water infiltration and promoting vegetation growth.
- The hay sediment traps protected the gully floor and trapped sediment that promoted vegetation growth. Using old hay bales is a cost-effective measure, and would be considered to treat other scald and erosion areas on the property.
- Ground cover in, around, and above the erosion features has improved. The landholder is impressed with the species diversity of vegetation because virtually all topsoil was eroded from the surface of the southern gullies. Before being treated, the area "looked like a moonscape".
- It is critical to consider input costs because fixing large-scale gullies is a massive undertaking, and you want to know if the treatment will work and hold up for the long term.



GRAZING LAND MANAGEMENT

- Stock exclusion fencing is an effective management tool that supports the restoration and maintenance of native vegetation, boosting species diversity. The area has been excluded from grazing for four years since the completion of the works, with no plans to graze it in the near future. This decision is partly because the paddock is not essential to the property's current grazing management plan.
- Stock exclusion is crucial to allow vegetation to establish on the gully walls and floor, helping to improve ground cover and reduce soil erosion.
- The long-term aim is to regain grazing land and restore land function.



LANDHOLDER OBSERVATIONS

Paul Fry Grazier, Collinsville

"This area needed attention because we've been losing soil from the catchment for a long time. Because it's located next to a main road it also became a dumping ground for all sorts of rubbish from passing travellers.

When NQ Dry Tropics started the project, we agreed to fence it off as our contribution. That would help stop the illegal dumping and keep stock out, allowing the site to recover.

At first, I wasn't sure how it would recover. There was nothing here; it was just bare ground, and the gully floors were pretty hard and compacted. Plus, the soil is sodic and dissolves when it touches water. But when Neil Haplin from Verterra suggested we try putting out old bales of hay to jumpstart biological activity and change soil structure more quickly, I was keen to see how it would work. He added a seed mix and things like mill mud and gypsum, and it's looking pretty good now – there's a fair bit of vegetation growing.

I'm really happy with how many different species have established themselves. We had a few dry years, but 2023 was great for rain – regular storms, good for the grass to grow. We'll probably put some cattle in here eventually, but I'm not rushing it. I'd rather leave it for now and let it recover. Excluding stock from the area means we're improving the landscape for the long term. You can't just fix a gully – you've got to manage the whole catchment.

Fixing large gullies is a massive job. It costs millions, with bulldozers, machinery, and operators all adding up. There are so many variables to consider, like whether it's cost-effective, and if you're not planning to maintain the work, it's a waste of time.

Locals need to be involved in the design process so they can learn about different rehabilitation techniques for different gullies, and carry that knowledge forward. If they're not involved, they won't feel any ownership, and they won't understand why certain gullies are targeted for remediation in the region.

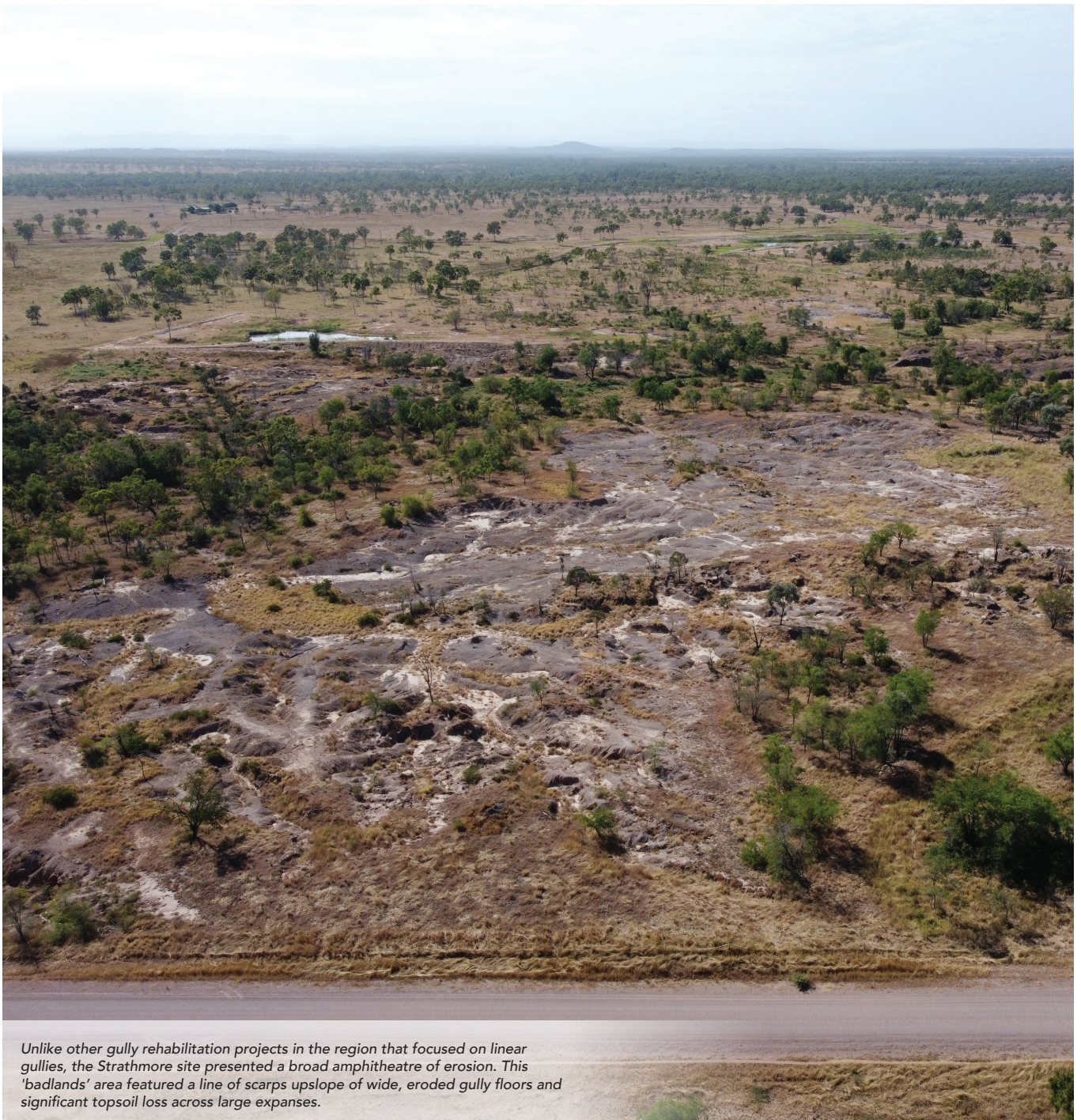
It's also crucial to have a skilled local workforce. Local operators must receive proper training to carry out the work and ongoing maintenance. This is important for building knowledge and skills, and to support a thriving local economy. We want opportunities for our young people.

Machinery like bulldozers has its place, but it's not the fix-all solution. We need to consider the landscape and ecology as well. Using hay bales, building a bund wall, and adding a rock chute in this section of the gully on Strathmore has worked well so far. It'll be interesting to see how it holds up.

It all comes down to managing the land properly – being mindful of stock numbers, knowing your paddocks' carrying capacity, spelling them, managing weeds, and placing infrastructure like fencing and water points in the right spots."

LESSONS LEARNT

- It's important to reduce the risk of erosion during construction works. For example, where possible, do not remove or disturb badly eroded areas with little or no topsoil when the soil is fragile (sodic or slaking).
- Sometimes, low-cost, minimal intervention (for example, permeable hay sediment traps), is more cost-effective than using machinery in highly erodible sodic soils.
- Hay aids remediation of badly eroded areas by reducing water flow speed, capturing sediment, and creating a foundation for vegetation growth, which can help prevent further erosion.
- Excluding stock from the site has helped ground cover vegetation establish. Controlling livestock grazing pressure is a primary method of gully erosion control that can deliver substantial reductions in sediment yield.
- A skilled, local workforce is critical to support jobs in the community and to build knowledge and skills in landscape remediation techniques. This can be achieved by working collaboratively with technical experts. Practical workshops aimed at local contractors, as well as skilled landholders who own their own machinery, would help improve skills.



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MONITORING TOOLBOX AND FINDINGS

The site was monitored each year after the wet season (April – July) to evaluate the effectiveness of treatment.

Site monitoring applies industry standard tools Land Condition Assessment Tool Advanced (LCAT) and Gully Maintenance Tool (GMT). These tools enable finer scale changes to be measured.

1. Land Condition Assessment Tool Advanced (LCAT).

A minimum of two LCATS are carried out immediately upslope of the gully, in the base of the rehabilitated gully, and opportunistically depending on local conditions.

LCATs indicate many biophysical aspects demonstrating the process of gully stabilisation.

Gully Maintenance Tool (GMT).

2. GMT surveys take into account a range of biophysical elements, including gully head movement, treatment type, treatment stability, ground cover and composition, species, rainfall, and photo-points targeting key gully and erosion features.

Landholder feedback about stocking data and environmental influences, such as rainfall, was also collected.

Monitoring showed that vegetation at this site was slower to establish compared to other sites, but it is well adapted to harsh conditions and may prove to be more resilient over time.



Strathmore grazier Paul Fry (second from left) discusses his observations with NQ Dry Tropics staff Damian Flinham (left), Brad Martin, and Bernie Claussen.

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In response to the 2016 recommendations of the Great Barrier Reef Water Science Taskforce, the Queensland Government, in partnership with NQ Dry Tropics, implemented the Burdekin Major Integrated Project (BMIP), also known as Landholders Driving Change (LDC), from 2017 to 2021. The project focused on the Bowen, Broken, Bogie (BBB) catchment, and worked with graziers to reduce sediment and nutrient runoff affecting the Great Barrier Reef.

Key achievements included 25 gully remediation projects – five large-scale and 20 small-scale – treating over 11,000 linear metres of eroding gullies and preventing an estimated 10,600 tonnes of fine sediment per year from reaching the Reef.

Following the completion of the BMIP, the Queensland Government reinvested in the monitoring and maintenance of the remediated gullies through the Burdekin Major Integrated Project Gully Maintenance and Monitoring project.

Running across three wet seasons from June 2022 to April 2025, this project evaluated erosion control strategies, cost-effectiveness, and sediment reduction. The results will inform future gully remediation efforts, with a focus on treatment durability and ongoing maintenance needs.



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The Burdekin Major Integrated Project Gully Maintenance and Monitoring project is part of the Landholders Driving Change project funded by the Queensland Government through the Queensland Reef Water Quality Program.