



Puckley's Creek gully—one of the sites earmarked for ongoing remediation works

Case study

Gully remediation at Normanby Station

Working with land managers to reduce sediment loss

Background

On the plains of Cape York's Normanby catchment, gully erosion is a chronic problem. Due to the highly dispersive nature of soils here, what begins as a cattle pad or a washed-out section of road can very quickly become a deeply incised gully, washing away valuable topsoil into waterways.

Cape York NRM is partnering with land managers across the Normanby catchment to tackle gully erosion, thanks to funding from the Australian Government delivered through the Reef Trust IV program (2017–2021).

At Normanby Station, a 31,400-hectare pastoral lease situated between sandstone escarpments and the floodplains of Rinyirru (Lakefield) National Park, gullies are a major issue.

From small linear gullies branching off management tracks, to large, 'amphitheatre' gullies that span several hectares, the Normanby Rangers, who manage land management activities at the station, are tackling even the most challenging gully sites.





Vince Harrigan installing a four-strand barbed wire fence around a gully site

Aims and motivation

Since starting up as a Ranger group servicing Normanby Station in 2016, the Normanby Rangers have expertly taken up the task of restoring and improving country, through reducing feral animal impacts, building new infrastructure, controlling weeds, managing fire and reducing erosion.

Station Manager Vince Harrigan stressed the importance of identifying and dealing with erosion issues on the land.

“Having the capacity to focus on these gullies and look after country is key, not only for ourselves but for our kids and future generations.”

When it comes to fixing gully erosion problems, regardless of the size and shape of the gully, the basic aims remain the same

1. Remove any disturbances that might cause ongoing erosion
2. Reduce water flowing to the gully
3. Stabilise the gully
4. Encourage revegetation



Mustered feral cattle in yards

Approaches

The Normanby Rangers are combining tried and tested methods with new and innovative approaches for gully control. Vince says, “it’s a matter of trial and error, using different methods to see what works best.”

1. Removing disturbances

Smaller gullies have been completely fenced off from livestock, with at least a 20-metre set back from the gully. Rangers also conduct boundary burns of these areas to reduce the chance of wildfire destroying ground cover.

For larger gullies where fencing is difficult, camera traps are set up to monitor feral animals, and the Rangers conduct yearly musters to reduce feral cattle numbers.

2. Reducing water flow to the gully

Rangers have built diversion banks surrounding the gully heads to divert water away from the gully to a flat, well-vegetated spot. In other cases, banks are used to direct water towards the gully head, where a rock chute or other grade control structure guides water safely through the gully.



Constructing a diversion bank

3. Stabilising the gully

Reshaping: several gullies have been completely ‘flattened’ by battering down walls and capping with less erosion-prone soil. Reshaping work is planned for the banks of large gullies at Clayhole Creek and Puckley’s Creek.

Leaky weirs: slow down the flow of water and trap sediment on gully floors. At Normanby, leaky weirs have been built using a variety of materials—rocks, timber, hay bales, steel pickets and jute matting. They need to be sturdy enough to survive the wet season and wide enough to prevent gully outflanking around the structure.



Drop structures: for a linear gully branching off a road, rock chutes are being used at gully heads to stop gully migration and safely transfer water from top to bottom.

Cattle mobbing: Normanby Station is conducting an innovative trial of keeping a small herd of cattle in fenced shallow gully areas overnight. The aim is to have cattle trample down gully walls and fertilise the area, encouraging revegetation.

4. Encouraging revegetation

Gully areas are treated with gypsum to counteract sodicity (high exchangeable sodium level in a soil, which makes it erosion-prone). Rangers then spread mulch and native seeds over the gully area to encourage revegetation. This works best close to rainfall events to stimulate new growth.

Impacts

The remediation works completed so far have done an excellent job of stabilising active gullies and reducing sediment flowing to waterways. Some gully sites are already showing impressive vegetation cover.

“It’s good to see country stabilising and coming back to life again”, Vince says.

“In areas that were eroded, you can see native grasses moving back in. Places that used to look like giant holes in the ground are starting to look healthy. That all comes from the work we’ve done and from good ongoing management—keeping fire under control, managing weeds and feral cattle”

Cape York NRM’s Sustainable Industries and Water Quality Manager Michael Goddard says the biggest impacts are yet to be seen.

“The Rangers will be starting machine work on a much larger gully this season. Restoring gullies of that size is a labour- and time-intensive process, but it will have substantial water quality benefits.”





Drone photograph of leaky weirs installed at Puckley's Creek gully using hay bales and timber

Monitoring

Every gully site has permanent photo monitoring points to measure change in each season. Every six months, the Rangers gather data on the integrity of any structural features and any changes to ground cover, vegetation composition and soil condition.

Monitoring is expected to continue long after remediation works are completed, especially for large gully sites which will require long-term remediation strategies.

Several gully sites are fitted with water quality samplers to measure changes in sediment runoff over time.

Drones are also being trialled as a way to monitor gullies.

Project delivery

The project has several delivery partners working together to achieve positive outcomes. Cape York NRM oversees the project, liaising with technical partners, planning, monitoring and reporting project progress.

A qualified engineer provides site remediation designs, while CSIRO gives valuable technical input and approvals for the project. Monitoring and on-ground works is done by the Normanby Rangers with the support of South Cape York Catchments.

Vince believes this partnered approach has added real benefit to the project.

“Working with Cape York NRM, South Cape York Catchments, scientists and experts has been really valuable. It means we can do the job properly with the right equipment”.

“Without this partnership, we wouldn't have the resources or capacity to do this work. Having funding for our Rangers has given us Traditional Owners a real chance to get out on country, but also to get our young people involved and employed looking after the land.

“For me that is a big plus of this project”.



Vince Harigan

Sharing lessons

Normanby Station has hosted annual gully remediation workshops, bringing together ranger groups, land managers, erosion control experts and NRM officers to share learning on gully remediation techniques and participate in hands-on remediation work.

The Rangers also provide training opportunities for South Cape York Catchments school-based trainees. The trainees regularly visit Normanby Station to gain practical experience in land management activities.

On top of this, Normanby Traditional Owners run tours for visitors to Cape York through Culture Connect.

“We get people from around Australia, but also internationally,” Vince says.

“Having tourists out here, it is not only showcasing our country, it is also a great educational tool. We show tourists our rock art sites and cultural heritage, but we also take them to the gullies and explain the work we are doing.

“We’re giving visitors insight into what country can look like if it’s managed properly.”

Vince says that working around the constraints of the wet season is always one of the biggest challenges, along with the sheer scale of erosion issues.

“Getting people and materials up here is always hard, particularly in the wet season.

“For the big gullies, there are always limits on what we can do. We can always do more. Being able to work with Cape York NRM and do as much as we have has been great.”

“Our work at Normanby really goes to show that you can have conservation and cattle management working hand in hand”

Vince says he hopes to continue improving land management activities at Normanby, as well as providing training and employment opportunities for young people on country.

Remediation work is set to commence on the Clayhole Creek gully this dry season.

“ For us, this gives us a chance to tell our story. That’s what makes us proud. ”



Participants at the Normanby Station Gully Remediation Workshop in 2019



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