Case study:
Weetalaba Station

Project location:	Glendon Rd, Newlands QLD
Size:	20,800 ha
Participants:	Reid & Julie Muirhead
Project completion:	June 2023

The Weetalaba landscape rehydration site is an old alluvial fan which has eroded into a deeply incised gully system, cutting a shortened path down to Rosella Creek, lowering the flowline and eroding into productive agricultural land.

This creates hundreds of tonnes of sediment flowing into the Great Barrier Reef lagoon.

The last community of remnant vegetation on the property is threatened by advancing erosion and a head-cut.

Above – Water formerly flowed through these incised gullies carrying sediments into the Great Barrier Reef lagoon.

Right – Mulloon Consulting team conducting a site assessment of a five-metre deep erosion gully on Weetalaba Station.

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Key project points

Showcases: how landscape rehydration works can reduce the amount of sediment reaching the Great Barrier Reef.

Co-benefits: increased soil moisture and agricultural productivity, improved biodiversity and protected remnant vegetation.

Primary aim: preventing 100 tonnes of sediment reaching the Great Barrier Reef lagoon.

Implementation: landscape rehydration techniques were used to improve the function and resilience of the site, which had previously been impacted and modified by gully erosion.

Problem

- Active erosion.
- Reinstate historic overland flows and hydrological function present prior to channelisation.
- Raise eroded stream bed level.
- Save threatened remnant vegetation community.
- Improve agricultural production through enhanced nutrient cycling and increased soil moisture.
- Engage and enthuse landholders about landscape rehydration through community workshops.
- Provide practical skills in reading the landscape, designing interventions and constructing infrastructure.
- Provides landholders with advice on integrating their management with landscape rehydration goals.

Above – Highly eroded flow line incising into grazing land.
Left – Dam construction to reinstate overland flow patterns.

Solution

Mulloon Consulting and NQ Dry Tropics collaborated to select the site for the Weetalaba Gully Rehabilitation and Rehydration project.

Various landscape rehydration interventions were implemented to complement existing alluvial geomorphology, including: earth walls (dam walls), diversion banks, rock ramps (rock chutes) and a leaky weir.

Earth walls – are reinstating overland flow patterns by discharging water on the alluvial features. This is arresting the progress of advancing headcuts, restarting depositional processes across overland flow pathways and providing water for grazing cattle.

Diversion banks – are starving gullies of water flow and reducing the movement of headcuts and sidewall erosion. They are also reinstating depositional processes in the landscape, diverting flow from landscape features vulnerable to erosion and acting as dam spillways.

Rock ramp (rock chutes) – were built to armour an existing headcut at the bottom of an intact flowline to prevent further incision, and to safely step water down from surface level to bed level.

Leaky weir – acts as a return structure downstream of the rock chute. This reinstates the depositional process, creates a backwater for the rock chute to flow into.

Below – Rock ramp under construction.

Outcomes

The Weetalaba demonstration site showcased the interaction of infrastructure and management to facilitate positive sediment, ecological and productive changes on grazing lands.

As a result of restoring the alluvial hydrology, water will be available as soil moisture to a much wider surface area of plants, which will improve the photosynthetic productivity of the landscape.

The initial project aim was a reduction of Total Suspended Sediment (TSS) of at least 100 tonnes/year. At completion of the project TSS reduction has been finalised through GECAT resulting in a saving of 257.24 t/yr. The cost effectiveness of the erosion control measures as constructed was $602.55/t.

Services provided

Site assessment

Farm visit to discuss erosion and productivity issues that landowners wanted to improve.

Design services

Landscape rehydration and repair works designed using GIS software, taking into account a hydraulic assessment of the catchment.

- Demonstrate erosion control measures which slow, spread and infiltrate surface water flow.
- Reinstate hydrological function present prior to channelisation.

On-ground works

Site survey conducted and on-ground works were constructed to complement existing alluvial geomorphology.

- Earth walls
- Diversion banks
- Rock ramps
- Leaky weir.

Vegetation

- Enhance primary production through improved nutrient cycling and increased soil moisture
- Improve biodiversity through habitat enhancement
- Ultimately rebuild landscape function and resilience.

Materials

- Rock – obtained from quarry
- Soil – obtained on-site
- Coir mesh
- Seed
- Plants & transplanted grasses.

Below – Discussing landscape rehydration with landholders at a *Rehydrating Your Farm Landscape* workshop held on Weetalaba Station.

Education

Rehydrating Rural Landscapes and *Rehydrating Your Farm Landscape* workshops were held to help community members understand the water cycle of a farm and to learn approaches for rehydrating rural landscapes.

Partners

The project was funded by NQ Dry Tropics through the Great Barrier Reef Foundation.

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