



Case study: Centralian Project

Project location: Australian Central Rangelands, NT.
Country: Anmatyerre & Arrente
Size: Approx. 8,000 hectares across four properties, all within 200kms of Alice Springs.

The intent of this project is to demonstrate drought resilience at scale and assess the environmental and economic outcomes of landscape rehydration in this arid, pastoral landscape. Working landscape rehydration demonstration sites were designed and constructed on creek catchments at the four participating stations.

All properties had various degrees of historical heavy grazing pressure degrading the topsoil, with subsequent reduction in ground cover resulting in overland flows that concentrated into incised and actively eroding channels that dehydrated the floodplains.

The results of this project will be widely communicated to encourage adoption of the proven drought resilience methods throughout arid rangeland regions of Australia.

Above – Erin and Lance setting up survey equipment in the early morning sun at Glen Helen station.

Right – Constructing earth banks using a front-end loader for bulk earthmoving and a skid steer for placing woody material.

PARTICIPANTS

- Aileron Station (Aileron Pastoral Holdings)
- Ahakeye Aboriginal Land Trust (old Ti Tree Station)
- Glen Helen Station (Hewitt Cattle Co)
- Narwietooma Station (Hewitt Cattle Co)





Problem

Set stocking and overgrazing in arid, rangelands environments rapidly leads to a decline in vegetation cover. Without adequate vegetation to protect the soil and slow the flow of water, the high velocity of water movement washes away topsoil and incises watercourses. During heavy rainfall events (which are predicted to increase in intensity, followed by longer periods of drought due to climate change), this degenerating process significantly increases the volume of water that drains away instead of pooling in the floodplain and infiltrating into soils, thereby dehydrating the

broader landscape. Without adequate access to water stored in the soil, vegetation cover further declines, leading to hotter, drier and less biodiverse landscapes. The cycle of degradation continues and eventually the landscape becomes dysfunctional and far less productive.

Solutions

After consulting with Traditional Owners and Station managers to determine the critical issues and site data collection, Mulloon Consulting's Landscape Planners developed reports containing detailed designs for on-ground solutions and advice for long term management of each demonstration site. The solutions needed to be technically and economically feasible, with access to construction materials and earth moving machinery a key issue in these remote locations.

Brush-weirs are a good example of small scale, low-risk solutions that can be repeated across the landscape. Depending on the location and site conditions, the brush weirs constructed for the Centralian project varied in scale and complexity



Above – Inspecting a contour bank at Narwietooma station.

Left – Shane guides a grader during the construction of a contour bank.

and are all classed as ‘flow-through’ structures as water flows through them. Brush weirs ranged from the placement of heavy logs and large branches to form ‘leaky weirs’ within a deeply eroded water channel, to fine branches and brush placed against steel pickets or natural features such as trees, bushes or the bank in minor gullies and headcuts. This technique enables vegetation to regenerate and repair eroded channels and gullies, restoring ecological function back into the landscape.

Shallow riplines across scalded areas of the floodplain are another simple, low risk, but very effective solution for increasing the surface roughness of the soil. This technique slows the flow of water across formerly compacted and bare soil surfaces, increasing infiltration as well as deposition of seeds and organic material.

To complement in-stream structures such as earth banks and further spread water across the landscape, **contour banks** were installed at key locations. These are designed to capture and slow water flow and re-distribute water away from the lower landscape and out onto the scalded floodplains and drier ridges. The contours are designed with emergency overflow sills for extreme flood events, ensuring their longevity and reducing the risk of bank failure.

Earth banks are an example of a ‘flow-around’ structure and were constructed within highly eroded



channels to absorb the energy of the flowing water and force the water to pool upstream of the bank. Rising water can safely overflow to the side and around the bank out onto the floodplain with far less destructive energy, where it will infiltrate into the soil and rehydrate the landscape. The pooling water re-establishes a ‘chain of ponds’ with successive earth banks occurring along a particular watercourse. This stored water remains accessible to wildlife and livestock for longer periods, and slowly infiltrates to increase groundwater recharge and soil moisture. With increased soil moisture, vegetation soon regenerates, increasing productivity and the resilience of the ecosystem.

Above – Six months after these riplines were made, vegetation has established within the ripped area and upslope where seeds deposited after rain.

Below – Lance and Erin work with James and Clayton, Aboriginal Rangers from the Central Land Council to construct a simple brush weir.



Services provided



Site assessment

Landscape Planners visited the four stations and discussed the critical issues with Traditional Custodians and Station Managers. Field and geographical data was collected and analysed.



Detailed design

Landscape rehydration and repair works were designed using GIS software and a plan was produced for each demonstration site. Mulloon Consulting used the designs to discuss and plan recommendations for interventions, earthworks and ongoing management of the sites with the land managers.



On-ground works

A range of landscape rehydration solutions were implemented including earth banks, contours, brush weirs, and riplines. Mulloon Consulting surveyed the sites, set out interventions and supervised

construction and earthworks to ensure a quality outcome.



Education

Two events (a field day and workshop) were held to explain landscape rehydration and discuss the solutions implemented at the demonstration sites to local land managers. On-ground training was provided to station workers and Aboriginal Rangers to increase their capacity to plan, survey and construct structures. A comprehensive *Rehydrating Landscapes in Central Australia* field manual provided land managers an understanding of landscape rehydration theory and practical guidance for implementing techniques and solutions in the arid zones of Australia.

Below: An earth bank constructed along an incised channel at Glen Helen Station. 8mm of rain fell the day after construction.



Funding

The Centralian project is funded by the Australian Government's Future Drought Fund - Drought Resilient Soils and Landscapes Program through the Charles Darwin University. It is a collaboration with members from Mulloon Institute, Northern Western Australia and Northern Territory (NWANT) Innovation Hub and Tierra Australia and station managers and owners from the central Australian rangelands.

Mulloon Institute acknowledges Aboriginal & Torres Strait Islander peoples as the First Australians & Traditional Custodians of the lands & waters where we live, learn & work.

