Natural Resources
SA Arid Lands

CASE STUDY

Tackling erosion at Willow Springs

Brendan and Carmel Reynolds own and manage 'Willow Springs', a pastoral station located 21 kilometres north-east of Wilpena Pound in the Flinders Ranges region of South Australia. Willow Springs operate merino sheep (primarily for wool production) and beef cattle enterprises, and a tourism enterprise which offers accommodation and a four-wheel drive tour known as 'Skytrek'.

This case study tells how Brendan and Carmel became involved in Ecosystem Management Understanding (EMU)™ and outlines some of the intervention works undertaken to improve land management and production.

BESTPRAC

Willow Springs landscape, May 2013

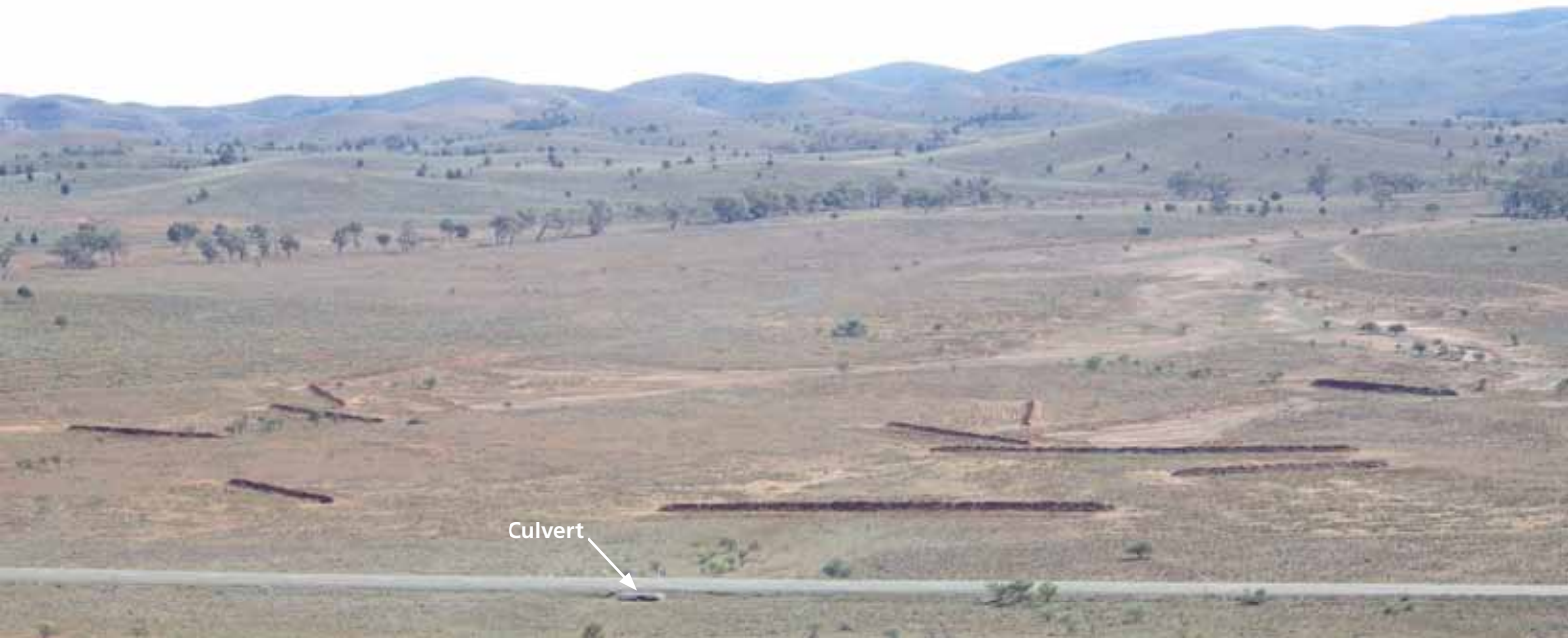
A MOTIVATION TO CHANGE

Brendan and Carmel commenced EMU™ in 2011 as part of a pilot program being run in the SA Arid Lands region. They were aware of a number of land management issues. However, the EMU™ process helped them to focus on their erosion problems which were causing the greatest impact to their land and business.

WATCH THE VIDEO

BUSINESS SNAPSHOT

Name	Brendan and Carmel Reynolds
Property Name	Willow Springs
Location	21km north-east of Wilpena Pound, Flinders Ranges, SA
Size of Property	28,300 hectares
Enterprise Focus	Wool, beef and tourism
Number of people working in the business	Three full time equivalents, and casual labour as required
Rainfall	Average annual rainfall is 300mm at the homestead, and it drops to 175mm towards the eastern edge of the property Previous annual rainfall recorded for Willow Springs include: 2010 – 559mm 2011 – 348mm 2012 – 220mm



The view from Stokes Hill Lookout towards the soil banks developed on Willow Springs to re-direct water flow and spread it across the landscape. This will prevent further erosion as water moves through the road culverts. Brendan and Carmel plan to install a sign at the public lookout to describe the works undertaken.

HOW IT WORKS

What is EMU™?

Ecosystem Management Understanding (EMU)™ is a holistic approach to land management which incorporates land manager knowledge and experience with scientific expertise.

Developed by landscape ecologists Ken Tinley and Hugh Pringle, EMU™ has been adopted by pastoralists in Namibia (southern Africa), the Gascoyne-Murchison catchments of Western Australia, the southern Northern Territory, and more recently in the Marla-Oodnadatta, Gawler Ranges, and North Flinders districts in the SA Arid Lands region.

Experts involved in the delivery of EMU™ work closely with the land managers, utilising their local knowledge about the land, its processes, condition and trends, and also what needs attention.

This information is used to provide advice and guidance in the development of a specific program for the property, with the information first summarised using a series of maps (clear overlay sheets) laid over a satellite image of the property.

On-ground and aerial inspections add further detail with the resultant map a permanent and invaluable record for measuring and monitoring the land and tracking changes and strategic management interventions.

All information collected and developed is confidential and remains the property of the participating landowner.

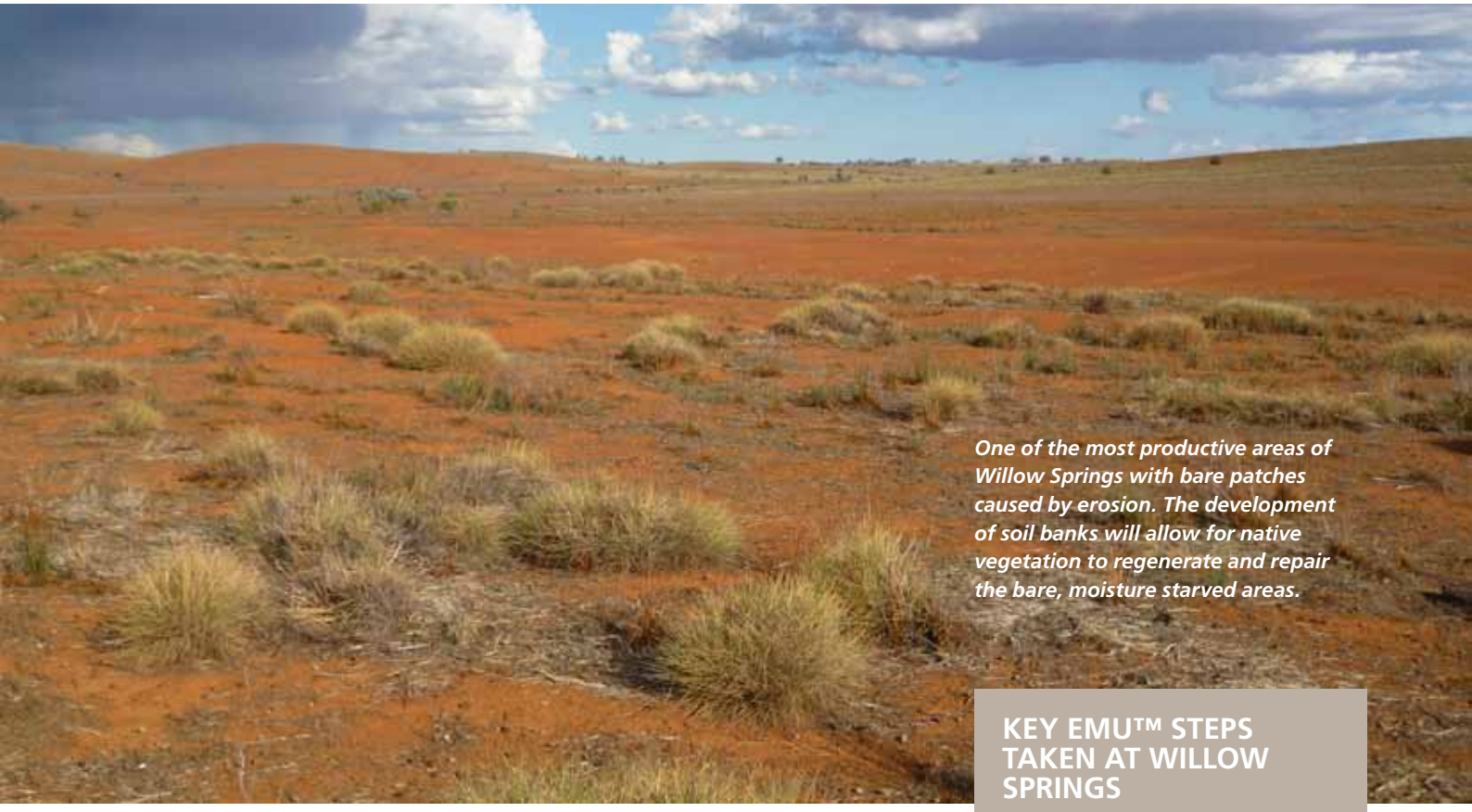
Following the mapping process, key activities are identified, often addressing priority issues which require on-ground management change. EMU™ activities may include:

- developing whole-of-property grazing strategies
- preventing and halting erosion of productive landscapes
- redesigning infrastructure to protect fragile landscapes
- monitoring landscapes and specific management issues
- redirecting water from tracks to allow it to move across the landscape
- protecting special areas
- pest and weed management.

Finally, after works have been undertaken, monitoring points are installed. The collected data provides a measure of the project success and, if issues arise, they can managed in a timely manner.

BENEFITS OF EMU™

- **Builds trust and confidence**
- **Embraces local knowledge**
- **Develops confidence to implement change**
- **Provides knowledge and sharing of information, creating landscape-literate managers and communities**
- **Generates more productive and healthy landscapes**
- **Highlights other business opportunities and enhances or reinforces key values of the participating businesses**
- **Improves understanding of what the landscape can offer, its limiting factors/issues, and promotes 'mindful management'.**



One of the most productive areas of Willow Springs with bare patches caused by erosion. The development of soil banks will allow for native vegetation to regenerate and repair the bare, moisture starved areas.

How EMU™ works at Willow Springs

The initial property inspection looked at the roads, fence-lines and creek-lines to understand the impact of current natural processes and assessed the impacts from Brendan and Carmel's tourism enterprise.

The 'fly over' identified key areas and issues for attention. Priority was placed on developing projects to address those issues which would offer the greatest benefit to landscape and production outcomes. Cost effectiveness was also considered, as was focusing the projects in areas of the most productive country, rather than patching or investing in less productive areas.

One issue Brendan and Carmel have focused on is the impact of erosion near the Blinman-Hawker Road, one of the most productive areas of their property. During heavy rainfall events, the road blocks the water, allowing it to build up behind. The water moves through culverts and, according to Brendan, at times 'shoots from the culverts like fire hydrants'. The water then moves quickly across the land, causing further erosion and gully formation, and starving surrounding productive land of moisture.

In 2011, Brendan and Carmel developed soil banks which will slow and spread water flow across the land, thereby reducing erosion impacts, rehydrating areas and encouraging native vegetation growth.

In time, it is expected that the damaged area will fix itself through the process.

Brendan Reynolds reviewing the overlay maps that were created as part of the EMU™ process. The maps plot Brendan and Carmel's knowledge of land condition, processes and problem areas across Willow Springs.

KEY EMU™ STEPS TAKEN AT WILLOW SPRINGS

1. An initial meeting between Brendan and Carmel Reynolds, a Natural Resources SA Arid Lands representative, and EMU™ director Hugh Pringle, identified the landholders's objectives, management history and key issues
2. Overlay maps were created which plotted Brendan and Carmel's knowledge of land condition, processes and problem areas.
3. An aerial survey was undertaken based on this mapped information with photos taken to show significant or problematic areas. Key issues and points of interest were then mapped as a result of the aerial tour.
4. On-ground site visits were undertaken to more closely inspect areas of interest using the maps and aerial photos for reference.
5. The major review period identified the most valuable production areas across Willow Springs as well as any associated issues. The review also considered the works that might be undertaken, the expertise required to carry out on-ground works, and how to fill any knowledge gaps.
6. The monitoring and evaluation period installs monitoring systems, prepares project proposals, implements projects, and reviews, revises and refines practices as a result of ongoing learning and observations.

'V-drain' (left) compared to a 'flat blade/ flat bottom drain' (right) constructed on a high traffic road on Willow Springs. The angles of sides of the 'V-shaped drain' is more likely to create erosion issues due to the design leading to water running faster down a narrow passage. The flat bottom drain however is broader, with less severe angles leading to a more gentle water flow.

BEST PRACTICE GRADING

Through their involvement in EMU™, and after receiving advice from soil conservation expert Colin Stanton, Brendan and Carmel have changed their grading practices for track and road development and maintenance.

Brendan first learned grading a number of decades ago but he has since become more familiar with key factors leading to erosion, one of them being human activity.

Previously, Brendan had graded a six kilometre road as preventative maintenance which he thought would divert water off the road. However, he has since learned that the way he was grading was in fact likely to cause erosion and potentially lead to creek development.

Through EMU™, Brendan discovered how poor track formation (eg windrows and drains) can change the natural flow of water across the landscape and thereby starve groundcover and shrubs of water.

Brendan has also improved his technique of developing whoa-boys on roads, by building them at right angles, rather than on 45 degree angles for example. Whoa-boys are constructed to divert water off a track or road without causing erosion, while allowing vehicles to pass over them.

By constructing whoa-boys at right angles to the road with level platforms, the water will slow and spread, reducing the rate of erosion.

Brendan is keen to share his experience with other land managers and, in future, he would like to assist Colin Stanton to deliver track development training which focuses on how to utilise the grader effectively to prevent erosion.

LOOKING FORWARD…

Brendan and Carmel's land management practices have been enhanced through their involvement in EMU™. While it is currently 'early days' to see the benefits of their current project, they are optimistic about the long-term benefits.

Further bank development is planned at the site which borders the Hawker-Blinman Road and, with the site located across from Stokes Hill Lookout, an interpretive sign will be installed to educate tourists about the land management practices being undertaken.

The next stage of Willow Spring's involvement in EMU™ will involve working with two neighbouring pastoral leases to implement erosion reduction projects which have a whole-of- catchment focus. Land management issues like erosion often spread across more than one station and are not confined by boundary fences so there is significant value in working collaboratively.

KEY POINTS

- Identify the most appropriate placement of roads and tracks.
- Avoid 'V drains – 'V' shaped drains collect and channel water flow which increases erosion, whereas flat drains spread the water which reduces the energy and erosion potential.
- Leave a flat bottom drain and, where practical, break windrows from the side of the track and brush vegetation from the site. If done correctly, this will ensure the water can spread over the landscape and improve water infiltration for vegetation, rather than race across the landscape and past thirsty plants.
- Avoid breaking the crust of the soil to retain the natural land topography.
- Avoid leaving windrows when creating a road, track or fence-line by lifting the blade. This will avoid cutting below the soil surface. By doing this, down-slope vegetation will not be starved of water and water will not concentrate along the windrows and lead to erosion.

THE FINAL WORD

Brendan and Carmel reiterate the importance of implementing best practice techniques to create efficiencies, promote success, and achieve long-term benefits for the property and business.

They recognise the value of working collaboratively to achieve long-term outcomes and will continue to work with other landholders in the area to focus on land management issues. Brendan and Carmel also work in cooperation with other tourism operators in the Flinders Ranges to promote their accommodation and 4WD tours.

RESOURCES

Centralian Land Management Association **'Ecosystem Management Understanding EMU™ – empowering pastoralists to manage for sustainable and productive landscapes'** Fact Sheet
www.clma.com.au

Department of Natural Resources, Environment and the Arts, 2006. **'Repairing tracks, firebreaks and fence lines to minimise erosion'** Fact Sheet
www.lrm.nt.gov.au

Department of Natural Resources, Environment and the Arts, 2006. **'Road Drainage Whoa-boy Construction'** Fact Sheet
www.lrm.nt.gov.au

Department of Natural Resources, Environment and the Arts, 2006. **'Water movement and drainage'** Fact Sheet
www.lrm.nt.gov.au

Pringle, H.J.R. 2009, **'Ecosystem Management Understanding (EMU) pilot in northern South Australia'** Report to SAAL NRM Board
www.naturalresources.sa.gov.au/aridlands

SA Arid Lands NRM Board, 2011 **'EMU™: land management using local knowledge'** Fact Sheet
www.naturalresources.sa.gov.au/aridlands

SA Arid Lands NRM Board, n.d, **'Monitoring Photo Points'** Fact Sheet
www.naturalresources.sa.gov.au/aridlands

Walton, J. and Pringle, H.J.R. 2010, **'The Ecosystem Management Understanding (EMU) pilot project: building landscape literacy using local knowledge to improve rangeland health in the Neales River Catchment of South Australia'**
www.austrangesoc.com.au

BESTPRAC

Bestprac (co-funder of this case study) is an Australian Wool Innovation network providing support for pastoral wool, sheep meat and cattle producers to improve their business and production performance. Pastoralists benefit from the tools, information and innovative ideas presented by Bestprac via a dedicated website, at forums, in e-newsletters and case studies. Visit www.bestprac.info for more information and to register for the monthly electronic newsletter.

BESTPRAC

Rural Directions Pty Ltd is the National Coordinator for Bestprac. For more information contact Pene Keynes or Carlyn Sherriff on (08) 8841 4500 or email bestprac@ruraldirections.com.

Natural Resources
SA Arid Lands

FURTHER INFORMATION

On behalf of the SA Arid Lands Natural Resources Management Board, Natural Resources SA Arid Lands is delivering various regional projects in cooperation with local land managers, industry, government agencies and environmental and community groups to manage water resources, native vegetation, threatened species, weeds and feral pests. These activities aim to develop sustainable management practices which support communities, drive business activities and address processes that threaten valuable natural resources in the region.

ACKNOWLEDGEMENTS

Rural Directions Pty Ltd acknowledges the contribution of Brendan and Carmel Reynolds of Willow Springs Station in the development of this case study. For more information about accommodation and four-wheel drive tours at Willow Springs visit www.skytrekwillowsprings.com.au or www.stationstayssa.com.au.

CARING FOR OUR COUNTRY

Natural Resources SA Arid Lands
8648 5300
SAAridlands@sa.gov.au
www.naturalresources.sa.gov.au/aridlands

May 2013

Government of South Australia
South Australian Arid Lands Natural Resources Management Board