Warning – engineers at work

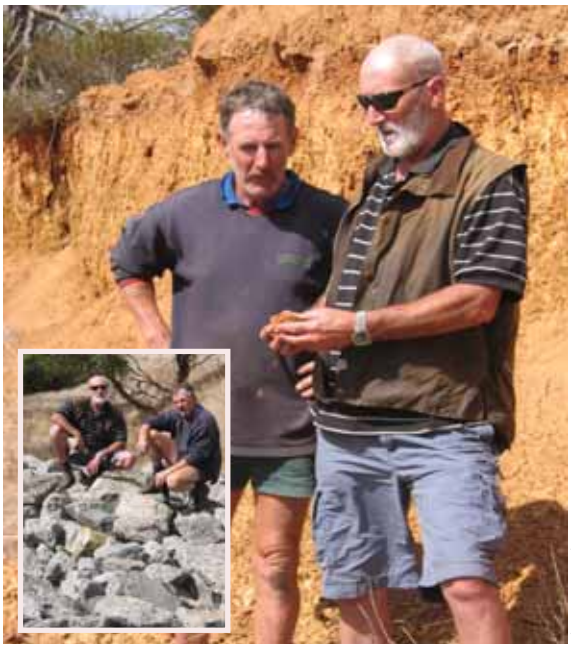
Trevor Carter farms at Edillilie on South Australia's southern Eyre Peninsula where he is chairman of the Cummins-Wanilla Streamcare Group. This is a partnership between the Edillilie, Wanilla and Marble Range landcare groups that have been involved in managing the watercourses in the Cummins-Wanilla Basin for the past eleven years. Trevor took Bruce Munday on a tour of the region, explained the issues, and showed how the group's actions have led to significant recovery of important components of the landscape.

"One of the features of the Cummins-Wanilla Basin is the large flat valley floors, generally with sandy loam topsoil over tight sodic clay. Some of these valley floors are very prone to waterlogging and many of the drainage lines are salt-affected.

The threat of waterlogging in a wet year has always been a worry for farmers who just want to get rid of the excess water in winter as quickly as possible. Back in the 1950s and '60s they encouraged this with earthworks to straighten Glengyle Creek and its tributaries and removed all the obstacles such as snags and meanders.

Like a lot of technical 'fixes', this helped manage one problem but seems to have created several others. The exposed sodic subsoil in the watercourses eroded badly, causing banks to subside and depositing thousands of tonnes of silt further down the catchment.

Case study: Cummins-Wanilla Streamcare Group
Location: Southern Eyre Peninsula, SA
Catchment size: 850 km^2
Mean annual rainfall: 420–500 mm
Soils: Mainly duplex — acidic sandy loam over sodic clay
Enterprises: Cereals, pulses, lupins, sheep, oysters in estuary



Photos: B Munday

Trevor Carter (l) and Mark Sindicic in the deeply eroded Glengyle Creek INSET: A rock chute that has helped stabilise the creek and reduce erosion

Key points

- Salinity issues are closely interwoven with other NRM and production issues
- A catchment-based approach is more effective than individuals acting alone
- Engineering 'solutions' to water management must be planned taking into account possible unintended consequences.

After a very wet year during 1992 another problem became apparent. We noticed the lower parts of the catchment west of Edillilie were becoming increasingly affected by waterlogging and salinity. Mark Sindicic, at that time with PIRSA and now with Rural Solutions SA, was brought in to investigate the situation. He surveyed the whole area and showed that much of the problem could be traced back to the eroding creeks.

In 1996 Mark pointed out that the watercourses in the lower catchment had become completely choked with sand, silt and debris, so that water was pooling for long periods, the saline water table was rising, and much of the local tea-tree vegetation was dying.

Mark explained that first we needed to remove this sediment from the blocked watercourses. But he also stressed that the problems at the bottom of the catchment could be tracked right back to actions we had taken further up, and that we had to prevent further siltation.

He showed that the most immediate need would be to slow down the rate at which water moved along the creeks in the upper catchment and so reduce the erosion. This called for a complete change of mindset for many of us who had been pretty focused on getting rid of water as quickly as possible.

During the past few years, with investment from the Natural Heritage Trust, we have trialled a range of erosion control structures with varying degrees of success. On the one hand we wanted something that was economically feasible, but it also needed to be durable and effective.

We started with hay bales anchored with droppers which were cheap enough, but they simply could not handle the volume of water and silt. Coconut fibre logs are quite good for small scale work but it is always difficult to key these structures into the bank without setting up turbulence that leads to undermining and bank collapse.

Overall the most enduring result came from rock chutes and by fencing off the watercourses, revegetating the banks and protecting them from livestock. In fact the rock chutes have been so successful we can now use the hay bales and fibre logs in the slower moving stretches between chutes.

All up we have installed about 60 structures of one type or another which has

greatly reduced the erosion.

At the bottom of the catchment, at Coffin Bay, there is an important oyster industry that could potentially be seriously impacted by run-off from farming land or by disturbance of acid sulfate soils. By fencing off watercourses, reducing erosion and excluding stock from Lake Wangary we have all contributed to further protecting this resource.

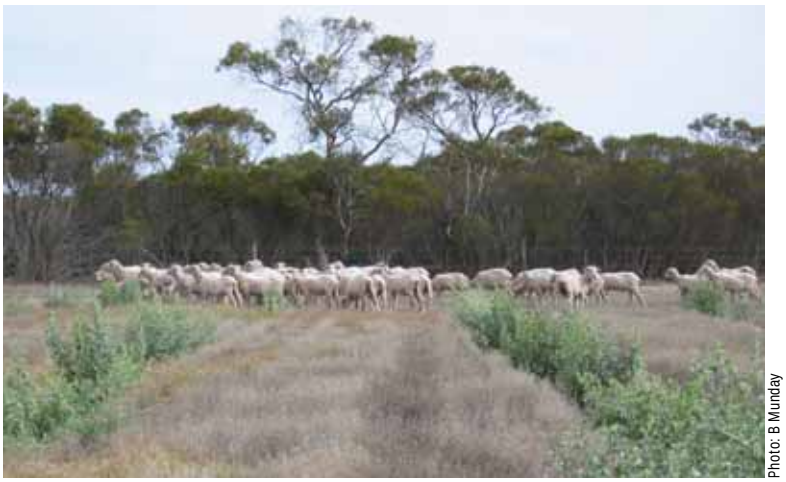


Photo: B Munday

Saline flats can be productive with sheep on saltbush and puccinellia

Farming in the Basin

Farming in this area has certainly changed over the past decade or so. There is now much more annual cropping, but the enterprise mix is quite well targeted to the appropriate land classes and soil types, particularly by those farmers with a property management plan.

No-till cropping is almost universal here now. As well as greatly reducing soil erosion it also appears to have reduced runoff and hence the 'pressure' on watercourses. A huge benefit has been the ability to get the crop in before soils become too wet, so the waterlogging problems we were faced with are no longer such a threat.

There has been some increased interest in livestock recently, spurred on partly by improved prices, but also because of the increasing threat of herbicide resistance, particularly with ryegrass.

On some of the heavier clay soils, particularly where salinity is an issue, farmers have had success with saltbush and with puccinellia pastures. On the deep sandy soils and where crops are very problematic more people are now having a crack at lucerne. But we have to be careful establishing lucerne on sand because if it fails there is a big risk of erosion.

The increased interest in perennials, including Italian ryegrass, is encouraging because the salinity risk is always present. There is a history of salinity along almost all creeks and drainage lines suggesting that the water table is generally quite close to the surface. A series of wet years could again see seasonal expansion of saline land, so any vegetation that serves as a buffer against that is a good investment."

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The science behind the story

By Dr Glen Walker

The Cummins Basin is a deep sedimentary system characterised by sluggish surface and groundwater flow. Salinity was first documented in a 1903 survey map, and salt now covers about 10% of the Glengyle Creek catchment.

CSIRO Land and Water undertook groundwater modelling studies in the nearby Wanilla catchment, showing that a 50% reduction in recharge would stabilise salinity levels in local flow systems, and halve the predicted future spread of salt in intermediate (more regional) systems.

To achieve recharge reductions of this magnitude effectively requires targeted revegetation of comparable areas with perennials. Some farmers have had success with lucerne, mainly on land that is marginal for cropping, and there has been considerable revegetation with local native species. But currently we do not have profitable perennials that can be integrated into farming systems on a scale that will halt the spread of salinity in wet years.

Engineering solutions often appeal because they make intuitive sense — shallow drains can be seen to quickly remove surface water, reducing inundation and recharge, whilst deep drains can sometimes prevent water tables from rising.

The experience of the Glengyle Creek Streamcare Group shows such approaches are seldom so simple. On the one hand, as this case study demonstrates, there can often be serious downstream consequences from drainage upstream. Secondly, groundwater drains will only influence water tables in the near vicinity of the drain unless the subsoil is highly transmissive, which is rarely the case in this region.

The Streamcare Group has had success overcoming the problems inadvertently caused by earlier actions when less was known about catchment hydrology and salinity. However, they have been compelled to undertake quite costly engineering works to overcome problems created by earlier engineering works.

The use of salt-tolerant pastures and fodders on mildly salt-affected land shows there are sustainable and profitable uses for this land and this represents an appropriate way of tackling salinity along with recharge reduction where practicable.

• *Dr Glen Walker leads CSIRO Land and Water's* Better Basins Futures *theme of the* Water for a Healthy Country *Flagship. He is also a member of the Future Farm Industries CRC's Biodiversity and Water Program.*

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