

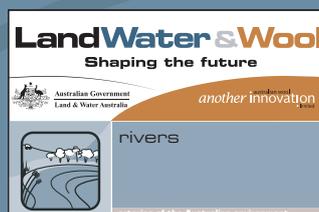


rivers and water quality



Insights

Case studies on how farmers are successfully managing rivers, streams and creeks on wool properties



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Introduction and Acknowledgements

Healthy rivers, creeks and streams are the arteries of the Australian environment - they provide the water to sustain many different plant and animal communities and they are the lifeblood of our agricultural enterprises. Without healthy water bodies, Australia does not have a sustainable future. Seventy-eight per cent¹ of Australia's woolgrowers have properties that adjoin a waterway of some type (this includes gullies and creeks that may run only occasionally) and managing these is a key component of running a profitable and sustainable wool producing enterprise. Sheep need access to high quality water for maximum productivity and many wool businesses have recognized this as vital for their continued viability. Water quality is affected directly by how well small creeks, streams and gullies are managed, including those located on farms. As a result, woolgrowers have a strong financial, as well as environmental, interest in achieving best practice in river and riparian management.

The 10 woolgrowers featured in this Insights publication value the creeks, streams or rivers on their farm, and manage them as different, yet integrated parts of their wool enterprise. They recognise that riparian areas (the land alongside rivers, creeks and streams) and waterways have multiple uses and values. For example, riparian vegetation protects streams by slowing surface run-off, absorbing nutrients and trapping sediment and other contaminants before they reach the waterway. Livestock can shelter from harsh weather and graze understorey grasses and shrubs. Riparian areas and their streams and creeks are also special places for people, and are often highly valued for recreation, their beauty and as a place to relax and enjoy nature. The case studies in this publication demonstrate how woolgrowers can reap this range of benefits, as well as feeling satisfaction and pride about protecting and managing parts of the farm that are special, distinctive and often central to that 'sense of place' that defines a person's connection to their land.

As the case studies demonstrate, the key to sustainable management of waterways and riparian areas is to treat and manage them as a sensitive zone that requires a different management approach from other areas of the property.

Land Water & Wool *Rivers & Water Quality* is working closely with some of the woolgrowers featured in these case studies to learn from their practical experience and investing in science to further develop sound management practices. The matching of good science with the experience of woolgrowers is a powerful combination, as it enables information to be developed that is highly relevant and can be practically applied within the context of a commercial wool enterprise.

A range of other products have also been developed to complement this Insights publication. 'Wool Industry River Management Guides' are available for both the High Rainfall and Sheep/Wheat zones of Australia, as well as tools and techniques to assist woolgrowers manage the rivers, creeks and streams on their farms for both production and environmental benefits. For further information about the program please visit the website www.landwaterwool.gov.au or contact Land & Water Australia.

I offer my sincere thanks to all the woolgrowers featured in this publication, as well as the people who assisted them to write such inspirational stories. Each story is as special and distinctive as the rivers, creeks and streams that run through their properties. As readers we are privileged to gain an 'insight' into what motivates these woolgrowers and their families to manage their wool growing enterprises the way they do. I trust you will enjoy reading their stories, and feel inspired to adopt some of the approaches they recommend on your farm.

Dr Siwan Lovett
Rivers & Water Quality Sub-Program Coordinator
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Published by: Land & Water Australia
Postal address: GPO Box 2182 Canberra ACT 2601
Office location: L1, The Phoenix
86 Northbourne Avenue Braddon ACT 2612
Telephone: 02 6263 6000
Facsimile: 02 6263 6099
E-mail: landandwateraustralia@lwa.gov.au
Internet: www.lwa.gov.au

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Mark Gubbins, 'Coolana', Western Victoria

Case 1

River focus inspires landscape rebirth

Mark and Anna Gubbins, 'Coolana'
Chatsworth, Western Victoria.



Business overview

Average rainfall: 530 mm

Property size: 2630 ha (650 ha cropping)

Enterprises: 10,000 composite breed sheep for prime lamb and wool production; 1000 pure bred Angus cattle for stud and commercial beef production; annual cropping program comprising wheat, barley, oats and canola

River management: 13 km of Hopkins River frontage

Soil types: ironstone gravels and basalt

River Management – Key Points

- Entire length of the Hopkins River on 'Coolana' was fenced off six years ago to limit stock access to the river and to halt erosion caused by the stock and lack of vegetative cover
- As a result of the fencing, there has been a marked increase in native tree and wildlife species along the riverbanks (e.g. River Red Gums). Erosion has been all but halted
- Tree planting is ongoing at 'Coolana'. Currently there are more than 40 km of shelterbelts that play a vital role in stock management
- The river re-generation and tree planting is aesthetically adding value to the property, has increased the amount of native wildlife species such as birds and platypus, is a shelter for stock and provides many social benefits

Birth of a re-generation at 'Coolana'

Six years after completing a major fencing program to close off most of the Hopkins River frontage on his family property, Mark Gubbins is astounded at the re-growth of natural vegetation along the river's banks.

"It's amazing to see how well the river banks have regrown," Mark says.

"Nature has the biggest band aid of its own if you give it a chance. Things have grown in places where we thought they never would."

"Nature has the biggest band aid of its own if you give it a chance. Things have grown in places where we thought they never would, for example, River Red Gums.

"I just can't believe how quickly the river has said 'thanks'."

The Hopkins River is not only a watering point for sheep and cattle at the Gubbins' property 'Coolana', located at Chatsworth in Victoria's Western District. According to Mark, it is aesthetically adding value to the property, has increased the amount of native wildlife species such as birds and platypus, is a shelter for stock and provides many social benefits.

"Apart from increasing the general health of the river system, our family enjoys being able to go for walks along the river and observing echidnas and the like," Mark says. "Plus it's a great spot for fishing and for showing friends and guests some of the indigenous habitat.

"The river is a valuable asset and while many trees and shelter belts have been planted throughout our property for many years, we had not really focussed on the river. We realised we had to change our ways."

Stock had unhindered access to the river, resulting in erosion, reduced water quality and difficult mustering due to stock wandering in and out of the river. Mark decided to fence off the river to address these problems, leaving a few strategic watering points where the stock would have minimal impact on the river bank.

In a relatively short period of time, a vigorous re-growth was evident and Mark was so pleased with the results he began a long-term plan of fencing and direct seeding of trees. Then he had the good fortune to access the Corridors Australia project in 1996 and this accelerated his twenty-year plan into just two.



Fencing has been effective along riparian areas.

"Today we have a terrific river system that supports the stock, wildlife and fish, as well as the management of the river fitting into the whole property management plan," Mark says.

Mark manages the 2630-hectare 'Coolana' with his wife Anna and Mark's parents, who are now semi-retired. There are three permanent staff and a casual staff member. Mark and Anna have two children, Ben and Max.

'Coolana' is a mixed enterprise comprising beef, prime lambs and cropping. Stock numbers include 1000 beef cattle (all pure bred Angus) and 10,000 sheep (composite breeds from a Corriedale background for prime lamb and wool production).

The cropping program covers 650 ha with a variety of cereals (wheat, barley and oats) and canola. The winter wheat and barley crops are usually grazed.

The average rainfall on the property is 530 millimetres. The topography includes 13 kilometres of frontage to the Hopkins River. The country on the northern side of the river is mostly ironstone and gravel and to the south of the river, the ground is mostly basalt.

'Coolana' is also home to about 40 ha of natural wetlands and more than 40 km of trees in shelter belts. Mark and his family are currently, or have been, actively involved in many on-farm revegetation programs such as Landcare and the local catchment management initiative Water Shed 2000.

Mark's approach to property management places an emphasis on the long-term survival of the land.

"We no longer see these fenced off areas as wasted country," he says. "They are a real asset. Some people question the value of the trees and the revegetation but I can't remember the last time we had any problems with stock during cold snaps and high winds.

"The benefits of shelter are obvious. It cuts wind velocity and provides a haven for lambing and for shorn sheep. In fact all our shorn sheep are now moved off shears into sheltered paddocks as part of standard practice.

"As for the cost of fencing, when you spread it out over two generations, it is almost negligible, especially when you consider it will allow us to keep farming here in the future.

"In my opinion, the benefits of the fencing and tree planting far outweigh the costs. Aside from the fencing, we spend about \$500 a year on seed for trees and shrubs. That's a tiny price to pay for something like an established River Red Gum.

"And we have created an environmental barrier for the river, for example, we are no longer spraying along the river's edge. This means we are minimising the chemical input into the river and that has made us think a lot more about doing a better job of farming in general, particularly when it comes to applying fertilizers and other sprays to our paddocks."

While Mark and his family have followed their own plan for the past 30 years or so, they have had some advice and inspiration along the way from other like-minded producers in the district and Catchment Management Authority staff.

"We had no real scientific approach to our tree-planting and fencing. We kept to a sensible plan that we knew we could achieve," Mark says.

The fencing program along the 'Coolana' Hopkins River frontage has seen stock access cut from 100 per cent to about 10 per cent. The river fencing is a six-wire, standard design fence, although three of the six wires are electric. There are two bridges and two other river crossings on the property.

Looking back at the work so far, Mark says he probably could have got away with not direct seeding trees along the riverbank.

"With the amazing natural re-growth of red gums, we probably did not need to direct seed. It seems that as far as the river goes, just letting the ground have a chance is the best way," he says.

"I would also recommend being as cost-effective as possible with fencing and to not use insul timber posts, as we found they do not last very long."

Mark says another important lesson he learnt the hard way was to not squib when it comes to chemical control in establishing the trees.

"If you want to direct seed trees, establishment and preparation has to be done right," he says. "You will get a much better result, so don't be afraid to get advice from experienced operators."



Case 2

Healthy river, healthy farm

Mark Wootton and Eve Kantor,
'Jigsaw Farms' Hamilton,
Western Victoria.



Eve Kantor and Mark Wootton believe biodiversity is a big part of today's farming practices.

Business overview

Average rainfall: 675 mm

Property size: 4900 ha (all grazing) comprising 11 holdings

Enterprises: 50,000 Merino sheep for fine wool production (18.5 micron); 3,000 cattle, including 1,200 breeders

Stocking rate: 18-20 DSE/ha

Pasture base: phalaris/fescue and clover

River management: 500 km of waterways and creek fencing

Soil types: Country at Hensley Park (40 per cent of the farm land) is predominantly flat to gently undulating heavy basalt country, commonly known as "crab hole". The remaining 60 per cent of land at Melville Forest ranges from lighter sandy country on the edge of Mount Dundas to undulating loamy clays

River Management – Key Points

- Virtually every creek and waterway on the property (comprising 11 separate farms) has been fenced off in the past decade to prevent stock access. The fenced off areas are re-vegetated with native species of trees and shrubs or planted for agroforestry
- More than 900 ha of trees and shrubs have been planted. A marked increase in pasture productivity, lambing and calving percentages (through the provision of shelter) and the general diversity of wildlife (native birds for example) have been achieved
- Typical re-vegetation is 50 m wide strips (preferably wider) with a seven wire fence, three of these strands are electrified
- A stock watering system has been installed that is gravity fed and uses deep dams running into turkey nests that fill a network of troughs across each property

"We've got more work to do but we believe that 'Jigsaw Farms' is a great work place where the stock is content and healthy - and so are the people that work here."

Improved riparian management and revegetation no puzzle at 'Jigsaw Farms'

Trees and the re-vegetation of creeks and waterways play just as an important role as the 50,000 sheep and 3000 cattle run at 'Jigsaw Farms', south-west of Hamilton in Victoria's Western District.

Owners Mark Wootton and Eve Kantor say that while 'Jigsaw Farms' (a group of 11 properties comprising 4900 hectares) is focussed on high inputs and maximum production from modern pastures, they adhere to strict environmental guidelines. This is to ensure the properties remain healthy and sustainable.

That means since 'Jigsaw Farms' started about a decade ago, more than 930 ha have been planted out to re-vegetation or agroforestry. And that figure will continue to grow, as Mark and Eve believe they still have much more to do.

"The trees and re-vegetation fulfil several roles," Mark says.

"Not only do they provide a valuable source of off-farm income, they are instrumental in building biodiversity, controlling salinity and increasing productivity by, for example, providing shelter for stock.

"We also know that the trees and revegetation help lift winter pasture dry matter levels by six to eight per cent.

"This is paramount to our bottom line, so we have no qualms taking farmland out of production and planting it out to trees or shrubs. We may soon see up to 30 per cent of our property planted out to trees and revegetation."



Some of the 50,000 Merino sheep run at Jigsaw Farms in Victoria's Western District.

Another important benefit of fencing off and planting out all access to waterways involves Ovine Johnes Disease (OJD) and its control.

"With the re-growth and plantings along the waterways, we now have a boundary to protect others and ourselves against spreading or receiving OJD as it, and other water-borne diseases, can be carried along creeks and rivers," Mark says.

Mark and Eve are acutely aware of the productive potential of 'Jigsaw Farms'. The stocking rate is 18-20 dry sheep equivalents per hectare, nearly double the district average. The average rainfall is 675 millimetres and the pasture base is a phalaris/fescue/clover mix.

They are also not afraid of change. Not being from a farming background - both Mark and Eve are trained secondary school teachers - the couple enjoy the challenge of doing things 'a little differently'.

"At the end of the day, we are grass growers," Mark says. "We generate 60 to 70 per cent of our production in about three months, so we do all we can to ensure the maximum amount of dry matter per hectare is available to stock. But we love the bush and its native animals so we are encouraging as much biodiversity as possible."

According to Mark and Eve, the tree planting and re-vegetation at 'Jigsaw Farms' was inspired by the work of several individuals and various groups. One of the first properties purchased as part of 'Jigsaw Farms' was 'Helm View' - a property owned by the Milne family which was renowned for its sustainable approach to farming and involvement in the Potter Farmland Plan.

"'Helm View' was a great inspiration and played a big part in shaping our land management philosophy," Mark says.

"We have had advice and learnt from Landcare and the RIST (Rural Industries Skill Training) program. The tree planting involves a number of organisations and schemes such as the Australian Greenhouse Office, the Trees for Greenhouse program, Greenfleet and Trust for Nature grants, as we offset the cost of planting where possible."

'Jigsaw Farms' also employs a specialist to monitor bird numbers throughout the properties which,

according to Eve, is a great indicator of species diversity and growth.

Every creek and waterway on Jigsaw Farms is fenced off and has been planted for re-vegetation or agroforestry. In removing stock access to the riparian areas, Mark and Eve have installed new water management systems, which are based on large, deep dams that are filled by natural drainage. These in turn feed turkey nests that are placed strategically around the properties. The turkey nests supply troughs via gravity for stock watering.

Fencing has had to change as well and more than 500 kilometres of seven-wire electric fencing has been installed to match the re-planting and re-vegetation.

Mark says the approach to fencing for plantations is basically 'the wider the better'.

"We aim to provide a 50 metre corridor but in practice the tree and shrub re-growth is much broader than that," he says. "For example, in re-charge areas, the plantations will be much wider.

"In any case, we have a minimum of six rows of trees either side of the waterway. Everything is direct-seeded and sourced locally. There is no specific mix, but most corridors include eucalyptus, callistemon, melaleuca and hakea varieties."

The direct seeding involves two controlled sprays for weed management, and then a rip line is put in to a depth of one metre. Seed is then placed directly into the rip line.

And while Mark and Eve are not fans of the traditional long rows of cypress pine trees (as featured on many Western District properties) they are very protective of red gum tree remnants, as they believe they provide a fantastic habitat for birds and other wildlife.

"We have four kids and when we decided to start farming we thought it would be great to have a place where we can demonstrate how to farm productively while working in with nature at the same time," Mark says.

"We've got more work to do but we believe that 'Jigsaw Farms' is a great work place where the stock is content and healthy - as are the people that work here."

Looking back on the work to date, Mark and Eve say the results have been inspiring.

"Anyone thinking about planting trees and revegetation should just get on with it and have a go," they say. "Get the plants in the ground and once it starts happening, the results can be quite amazing."



Trees provide vital habitat for birds, insects and other animals.

Case 3

River focus breeds environmental and social benefits

Mike and Cathy Wagg, 'Jarrapool',
Hamilton, Victoria

Business overview

Average annual rainfall: 650 mm

Property size: 200 ha

Enterprises: wool, 19 micron average, meat — export wethers, some prime lambs out of Merinos

Stocking rate: 15 DSE/ha

Pasture base: pastures mainly a mixture of phalaris, perennial ryegrass, leura and trikkala subclover

Soil types: clay loams and sandy loams over heavy clay

River management: Wannon River

River Management – Key points

- The river frontage formed the boundary of a 50 ha paddock but was difficult to manage as it was filled with prickly acacia (*Acacia Paradoxa*) and other pest plant and animal species like rabbits
- As part of their management plan, the Wagg's fenced out the river frontage along with 23 ha of native vegetation, extended the reticulated water supply so stock no longer required access to the river and ripped rabbit warrens to try and control pest species
- By altering their management of the river the Wagg's are no longer experiencing difficulties mustering stock out of waterways, their wool has significantly lower vegetative matter content and the family enjoys the river as a special part of their property

The farm

Mike and Cathy Wagg have run a wool and meat sheep enterprise near Hamilton, Victoria, since 1983. The property comprises rolling red gum country with a 650 millimetre average annual rainfall.



“The local field naturalist and bird observer clubs have both had excursions along the river and a local nursery uses the area for seed collection. We also get a tremendous amount of enjoyment as a family from the area including camping, fishing, swimming and horse riding.”

In 1989 they purchased 'Jarrapool', a 200 ha block adjoining their main farm with a two kilometre frontage to the Wannon River.

When the property was surveyed for soldier settlement in the late 1940s, the title was extended to the edge of the river in places as there was no other water supply. This means that the frontage is a mixture of private and crown land.

“When we purchased 'Jarrapool' the river frontage formed the boundary of a 50 hectare paddock, but was difficult to manage as it was filled with prickly acacia (*Acacia paradoxa*) and other pest plant and animal species like rabbits,” said Mike.

“Stock from the neighbouring property would often cross the river into our place and visa versa. It was a management headache with significant implications for disease control. In addition, the wool became contaminated with prickly acacia and the classer had to wear gloves when classing wool off the sheep from the river paddock.



One of the special spots along the Wannon River as it meanders through Mike and Cathy's property.

"Controlling the rabbits was difficult as we couldn't bait during the autumn unless we took the sheep out of the paddock, right when our feed reserves were lowest."

"We put up with this situation for four years as the wool industry was going through another downturn and the issue wasn't at the top of our priority list.

"In 1993, we applied to the Natural Heritage Trust (NHT) for funding to fence out the river frontage along with 23 ha of native vegetation. We also applied for assistance to extend our reticulated water supply to replace the river for watering stock. The funding pretty much covered the materials and we provided the labour and machinery needed.

"At the same time, we got a 50 per cent subsidy for ripping rabbit warrens and the State government ripped the warrens on the crown land area. We are very lucky that there aren't many weed issues in the native vegetation (no blackberries but some phalaris in the more fertile areas) and regeneration of red gums and tea tree has been good.

"When we fenced the area out we were careful to leave vehicle access for laying rabbit bait which we do every autumn. This has kept rabbit numbers very

low and even the casuarinas are getting a chance to regenerate.

"A condition of the NHT funding was not to graze the area for 10 years which we have complied with, however, I now feel that intermittent grazing may be beneficial and would like more information on the best time of year to do this.

"We put 180 tail-end prime lambs in there off-shears this year, straight out of the shed so that they wouldn't carry weed seeds in. While they were in there we had a 125 millimetre thunderstorm and didn't lose a single lamb.

"We have now pretty much addressed the management problems that the river was causing.

"The local field naturalist and bird observer clubs have both had excursions along the river and a local nursery uses the area for seed collection. We also get a tremendous amount of enjoyment as a family from the area including camping, fishing, swimming and horse riding."



Richard Weatherly, 'Connewarran', Mortlake

Case 4

Unique approach reaps whole farm rewards

Richard and Jenny Weatherly, 'Connewarran', Mortlake, Western Victoria.



Business overview

Average rainfall: 600 mm

Property size: 1680 ha (1000 ha grazing, balance cropping)

Enterprises: 10,000 Merino sheep for fine wool production, shorn every eight months and averaging 5.9 kg wool cut per head/annum; 280 Hereford-Simmental cross cows for beef production; and annual cropping program comprising raised bed farming of wheat, barley and canola using a three-year rotation

Stocking rate: 14 DSE/ha

Pasture base: phalaris and sub-clover; heavier country has fescues and lighter country has cocksfoot; balance comprises areas of native pasture

River management: 16 km of Hopkins River frontage

Soil types: tertiary sediments, gravels and sands, some black clay and basalt

River Management – Key Points

- Entire length of the Hopkins River on 'Connewarran' was virtually all fenced off a decade ago due to increasing levels of salinity in the river and degradation of the riparian zone. Fencing both banks creates wildlife corridors and a series of wetlands that link various regions of the property (in conjunction with shelter belts and tree plantations)
- A marked increase has occurred in native fauna species along the river (e.g. platypus) as well as greater numbers and diversity of birds, reptiles, mammals but also in general with birds, reptiles, mammals and beneficial insects which all play an important role in the whole property ecosystem
- The 45 km of shelterbelts on the property contain anywhere from 65 to 120 species of plants – almost all native, and indigenous to the area

"There is no doubt in my mind that a fundamental way to make money is by improving your asset, for example, by providing protection from wind and sun for the stock. A bare shorn sheep in a 5km/hr wind will use double the energy to stay alive than in still conditions."

Productivity brings farmer to his knees

On any given day at 'Connewarran' in Victoria's Western District, you could find Richard Weatherly in the middle of a paddock on his hands and knees.

This is Richard's way of keeping an eye on the status of the soil and its surrounds: he could be counting insect species or the number of plants per square metre or even how many earthworms are in that particular patch of soil. This is how things are done on this remarkable property.

He also keeps a close eye on the 10,000 Merino sheep and 280 Hereford-Simmental cattle that call the 1680 hectares of 'Connewarran' home. And by any standards, it's a pretty good home.

Pastures are improved and productive, the property is virtually drought proof and there are more than 40 kilometres of shelterbelts. It's a thriving farming ecosystem that includes livestock, trees, shrubs, wetlands, insects, birds and native wildlife with 16 km of river frontage.

It has not always been that way. When Richard took over 'Connewarran' 20 years ago, he described it as: "basically 11 paddocks that were historically swamp land and large areas that had not seen superphosphate. There were no yards, no homestead and very little infrastructure."



*Family of Brolgas in Coonewarran wetland.
(Photo credit: Richard Weatherly)*

Dramatic changes at 'Connewarran' are thanks to Richard's responsible approach to the land and the diversity of life that inhabits it. A world-renowned artist of landscapes and wildlife, and respected authority on birds, Richard's philosophy of farming is "that you are managing an open plan ecosystem to harvest the excess production."

An important part of the ecosystem at 'Connewarran' is the Hopkins River, and like many other parts of 'Connewarran', its role in the property's management has changed over the years.

"The river is now fenced off from stock so that it can protect and improve the biodiversity and sustainability of the property. River and waterway management should be a part of the whole farm ecosystem and not a separate issue," Richard argues.

"For example, we had noted a rise in the salinity of the river water, so to water the stock efficiently and provide the stock with clean water, the best thing we could do was to shut them away from the river altogether and water them from another source. There is a strong correlation between water quality and livestock productivity."

Stock watering is now from concrete troughs or dams (troughs are fed from reticulated water, sourced from dams or underground bores).

Since fencing off the river - an ongoing process for the past 15 years or so - Richard says the re-growth of native trees including red gums has been impressive.

"We direct-seeded some river banks, but thought we were better to just fence it off and let nature sort itself out," he says. "To date this appears to be working. The river and its banks today provide a vast habitat that links into the many wildlife corridors on the property."

Fencing off the stream has also restricted human access, as Richard explains. "It is a big difference from when we were kids, as the fishing holes and swimming spots have become more removed. I still want to be able to access some of the river so I can understand what's happening in the environment. I guess I will have to just clamber over all the new re-growth!"

Other whole-property changes according to Richard include a very noticeable species 'flow' back onto Connewarran in terms of mammals, amphibians, reptiles, birds and beneficial insects.

"This all adds to the diversity," he says. "An example is the increase in dragon fly numbers - while I don't understand a great deal about them, dragon flies are a tremendous predator of blowflies and as such a very valuable asset on a wool-growing property.

"There are other more subtle benefits, such as the increased number of predatory insect species like wasps, which help control the pasture grubs or saw flies. All these small signals are part of a much grander pattern."

The 'grander pattern' of course includes running a profitable farm and while some may struggle to see the benefits of the changes introduced to a diverse property like Connewarran, Richard says they are very obvious.

"There is no doubt in my mind that a fundamental way to make money is by improving your asset, for example, by using riparian areas to provide protection from wind and sun for the stock. A bare shorn sheep in a 5km/hr wind will use double the energy to stay alive than in still conditions," he says.

"And it's the same for the pastures. Less wind means less evaporation and less stress on grasses, so there are big production gains there.

"It's not being a greenie, it's just good business management."

Richard has examples where shelter for the stock and paddocks has lifted lambing percentages by 11 per cent. He also cites recent research that shows up to 30 per cent increases in production (wool grown) from sheep that were protected from windy conditions.

He urges anyone looking to make similar changes to be confident and not afraid to have a go.

"We have found that we can put a lot of land under some form of vegetation (non-grazing) and still generate an increased income."



Case 5

Taking a united approach

Kate and Tony Charlton, 'Cedar Park',
Ballimore, Central West NSW



Tony Charlton (centre) explains how Rhodes grass has stabilised the banks of the Talbragar River on his property 'Cedar Park', Ballimore.

Business overview

Average Rainfall: 600 mm

Property Size: 1358 ha (grazing and cropping)

Enterprise: 3000 (2500 at present – recovering from drought conditions) Merino sheep joined to Border Leicester rams, shorn once a year and averaging five kilograms wool cut per head per annum, and 100 breeding cows

Pasture base: Improved pasture with tall fescue, lucerne and clover. Presently moving to address the management of natural pastures

River management: 11 km frontage to the Talbragar River, which is central to the Talbragar Catchment Area

Soil Types: light loamy river flats predominantly, with some rocky knob areas on gently undulating country

River Management – Key points

- The introduction of fencing six years ago on 'Cedar Park', fronting the Talbragar River, enabled the restoration of the riparian area
- Kate and Tony enlisted the support of three other farmers resulting in a restorative revegetation program covering a total of 32 km on both sides of the river
- Stock access to the creek has been managed and stock now use troughs in 45 of the 50 paddocks on 'Cedar Park' using water pumped to the highest point on the property and then gravity fed
- Restoration efforts have resulted in the riparian area becoming a haven for bird and other wildlife, with the site a popular place for conservation and Landcare groups to visit and see what can be achieved using a cooperative community approach

The Charltons recognised that the return of a significant section of the river bank to good health would need a cooperative approach from the farming community.

United approach the key to overcoming Talbragar River erosion

In 1999, former Landcare Co-ordinator Kate Charlton and husband Tony decided to focus their energy and money on solving a major river erosion problem caused in part by the invasion of European Carp. The carp were busily burrowing into the banks of the Talbragar River on their property 'Cedar Park' on the NSW western plains at Ballimore, north-west of Dubbo.

The now 1358-hectare 'Cedar Park' has been in the same family since the 1840s when just 12 ha were initially farmed. The Charltons, fifth generation farmers, are justifiably proud of the family tradition of caring for the land and were prepared to put their own money on the line to help save the river from further degradation.

The Charltons recognised that the return of a significant section of the river bank to good health would need a cooperative approach from the local farming community. At risk were significant numbers of huge River Red Gums, many of them hundreds of years old. The trees were seriously threatened by a combination of stock access to the river trampling any regrowth and compacting the soil, declining river flows and European Carp damaging roots exposed by erosion (due to a lack of ground cover on the banks of the river).

Kate and Tony knew a strategy was needed to revegetate the area, save the Red River Gums and better using the riparian areas along the Talbragar. They invited farmers with river frontages, along with anyone who had an interest in the health of the river, to attend a public meeting to discuss such a strategy.



Naturally regenerating river red gums along the Talbragar River, 'Cedar Park', Ballimore, NSW.

A group was formed and with support, enthusiasm and strategic input from representatives from the (then) Department of Land and Water Conservation (DLWC), they secured funding through the Rivercare Program and National Heritage Trust to kick-start a 'Save the Talbragar River' project.

Three neighbouring landholders joined with the Charltons to add momentum and scale to the project, which was officially called the Combined Talbragar River System Strategy. In preparing the strategy the group sought advice from a range of regional specialists to ensure that it could maximize environmental outcomes.

More than \$270,000 in external funding was received and matched by the landholders on a dollar-for-dollar basis. This money was used to fence 25 km of the river and six km of smaller creeks. Once fenced out, more work was undertaken to plant trees and shrubs, protect existing vegetation and install a trough-based watering system for the four properties that fronted the river. Stock no longer required access to the river as water was reticulated to paddocks, enabling better feed utilization, reduced mustering time and no stock losses due to flooding or wandering through the creek onto other properties.

Before the project began, the banks of the Talbragar River and its adjacent waterways were either narrow strips of old trees or completely bare of trees. In some places, there was no vegetation at all. It was quite clear to everyone that if stock access continued the rapidly eroding banks would have lost many old trees, there would be further loss of nesting sites and the total absence of tree and shrub regeneration.

After the huge task of fencing the total 32 km area had been completed, the project team then addressed the installation of trough-watering systems on the four properties. The system uses one pump

to pull the water out of the river and a second pump to push the water to the highest point of the farm where a 200,000 gallon (44,000 litre) tank was installed with 25 millimetre piping using gravity to feed the troughs along the river.

During the project it became apparent to the Charltons and the other farmers involved that stock are more productive on trough rather than dam or river water. This finding led the Charltons to reticulate water across the whole property at a cost of \$50,000 - money they believe is well spent due to productivity gains and better feed utilization.

Planting 4400 trees and shrubs along the river has resulted in the reintroduction of a wide range of indigenous species, including wattle, casuarinas (Bull Oak and River Oak), eucalyptus (Yellow Box, River Red Gum, Grey and White Box and melaleuca). These results have pleased Kate and Tony who say their Talbragar River project has been a stunning success, with all the farmers involved proud of their efforts and the river and its banks looking healthy again.

The project has largely achieved its aims of improving water quality, with the rehabilitated riparian area now trapping sediment, nutrient and salt before it enters the river. The river banks are stable as the ground cover of vegetation is binding the soil and reducing erosion. Biodiversity benefits have also been gained as the riparian area is wider and is providing a habitat corridor for wildlife, as well as enabling plant regeneration to occur due to a better seed bank and a mix of species.

They see their farming community-based project as one of the most exciting works-in-progress they have been involved with.

"The amazing transformation of this extensive riparian area is a graphic demonstration of what can be done with the full support of the local community and, especially, the skills and experience available from organisations such as Landcare, DWLC and those interested in preserving our heritage," Kate and Tony say.

Kate Charlton says: "Public meetings are the key to finding those with a similar commitment to upgrading water quality, biodiversity of riparian areas and reducing erosion. Importantly, it took a huge commitment in time and money by the four landowners for the project to achieve its objectives."

Story prepared by Leanne Wheaton



Lindsay and Biz Nicholson

Case 6

Working with Nature

**Biz and Lindsay Nicolson,
'Bonneys Plains', Conara,
Northern Midlands, Tasmania**



Business overview

Average annual rainfall: 500 mm

Property size: 5000 ha, 20 per cent property arable with balance native grasslands and rough hill country

Enterprises: 8500 fine wool Merino, native plant nursery

Pasture base: 80 per cent native pasture, 20 per cent ryegrass, cocksfoot, clover

Soil types: dolerite-based clay loams

River management: seven km South Esk River, eight km Buffalo Brook

River Management – Key points

- The Nicolsons are working with nature by incorporating enterprises that are compatible with the environment, not trying to change nature to suit themselves
- Double-fencing the river to prevent stock access has resulted in regeneration along the stream banks, wildlife returning and vastly improved water quality
- An on-farm native plant nursery established as part of a diversification plan is now a major farm enterprise

The farm

Lindsay and Biz Nicolson know and understand the physical and environmental limitations of their Conara property, 'Bonneys Plains'. It is that knowledge which forms the basis of their farming practices and a preparedness to live and run their farm within those constraints. The Nicolsons are not taking on the losing battle of trying to change nature to suit themselves but, instead, are working with nature by incorporating enterprises that are compatible with the environment.

“Many different tree and shrub species have regenerated along the stream banks, the wildlife has returned including fish, birds and platypus and the water quality improving dramatically. We had no idea of the impact the stock made until we fenced them out.”

The couple has run 2310 hectares of the original 'Bonneys Plains' property since 1988 when Lindsay's father Jock retired and the family property was split in two. Lindsay's brother Robert operated the other half of the property until February 2005 when it was purchased by Biz and Lindsay.

“When my father Jock ran 'Bonneys Plains' he believed Buffalo Brook, which dissected the property, was the lifeblood of the grazing operation,” said Lindsay. “All the paddocks along the creek had stock access, and during dry summer spells every paddock was opened to the stream as it always had water.”

Much to Jock's concern, Lindsay and Biz double-fenced their section of Buffalo Brook to prevent stock access. Biz and Lindsay believed the water could still be used but managed differently. Preventing the loss of soil from serious stream bank erosion along the entire length of Buffalo Brook was considered the highest priority as the alluvial and dolerite soils were unstable.

“The sheep walked along the banks creating tracks. After a good rain the banks would fall in as far as the sheep track and the whole process would start again,” Lindsay explained.

Buffalo Brook had cut an entirely new course through the valley floor following the 1929 floods, approximately 200 metres east of its original course. The banks were severely eroded, there was little or no riparian vegetation, water quality was very poor and there was no sign of aquatic life.



Buffalo Brook in 1986 (left) and 2004

"We asked Greg Pinkard from the Department of Primary Industries to come and look and he was pretty horrified. He said we could spend a lot of money putting in capital works and then if we got a flood it would all be washed away, so we just double fenced and excluded all the livestock and the amount of repair has been amazing," Lindsay said.

"Many different tree and shrub species have regenerated along the stream banks, the wildlife has returned including fish, birds and platypus and the water quality has improved dramatically. We had no idea of the impact the stock made until we fenced them out," Lindsay said.

"The reduction of manure and nutrients leaching into the stream has meant the water stays cleaner with little algae. We also lost quite a few sheep, mainly those with fly-strike and staggers. The sheep went down for a drink but were too weak to get up the bank. Now that isn't a problem."

In the past 50 years the stream meanders had eroded 50 m of streambank, so with this as the benchmark, the fences were positioned approximately 50 m from the existing streambank.

"We planted a few trees in the first year but soon realised that was a waste of time and effort as natural regeneration soon outstripped our meagre efforts," said Lindsay.

"With native bush a few kilometres upstream there was a plentiful supply of seed from native species. The species range from early colonisers such as silver wattle, *Acacia dealbata*, through to later colonisers such as *Micranthemum hexandrum* and grasses and sedges have established along the water edge. We believe these grasses and sedges are vital for trapping sediments and creating conditions to allow for regeneration to take place."

After fencing, the Nicolsons found willows and briar rose became a management issue as stock had kept these weeds in check. Teams of young people through the Australian Volunteers for Conservation and Green Corps have been employed every few years to handle weed outbreaks.

The Nicolsons also realised it was not enough to just fence the main stream as the small tributaries contributed to erosion and nutrients, so these have also been double fenced to exclude stock. "To provide alternative stock water we constructed a three megalitre dam in the higher country. This dam gravity feeds a series of troughs that supply water to stock in a rotational grazing system," said Lindsay.

"This project was implemented with assistance from Ian Bell, Department of Primary Industries and Land & Water Australia. Water from Buffalo Brook is also pumped to supply troughs in paddocks close to the pump and four waterholes were put in to supply more distant paddocks. This water would've ended up in Buffalo Brook: it's the same water just used differently.

"We have looked at putting in a large storage dam for irrigation of crops but many of the tributaries are naturally saline. We have had three experts look at this over 15 years and all have said we were playing with fire," said Biz. "Although there is no evidence of scalding or salt indicator plants, there is a moderate level of salt in the soil profile which will become a problem if we start an irrigated cropping program."

To overcome these constraints, the Nicolsons developed a different 'crop' with the establishment of their on-farm native plant nursery. The nursery started as a hobby and has ended up as a major farm enterprise.

"When we started a native garden 32 years ago we had difficulty sourcing native plants that would survive in our climate and then we realised that the plants that were actually surviving were plants that grew on 'Bonneys Plains'," said Biz.

Over the years the Nicolsons have expanded their nursery, growing tubestock, long stems and advanced plants for farm and environmental projects. To implement on-ground works they have a tractor-drawn tree planter, a direct seeder and a native grass seed harvester.

"We are now concentrating on producing plants for the nursery and garden trade, local councils, tourism and housing developments," said Biz. "We sell state-wide, which means we are growing a greater number of species and learning about their growing requirements and how they perform under different situations."

With the next generation of Nicolsons now part of the farm operation, changes are certain to take place.

"We are extremely fortunate to have our children making a career in farm management, there is a renewed sense of optimism and energy and we are looking forward to seeing their vision for 'Bonneys Plains' implemented," said Biz.



Case 7

Riparian protection 'sound business management'

Maurice and Barbara Collins, 'Ironstone Range', Mt Lofty Ranges, South Australia.

Business overview

Average rainfall: 500 mm

Property size: 1100 ha

Enterprises: Merino (16-18 micron) and crossbred sheep for fine wool and prime lamb production. Average wool cut four kilograms per head; stock rate 9 DSE/ha

River management: Nearly 70 ha of native vegetation excluded from livestock and a program to fence off five km of creek banks and waterways now 10 per cent complete

Soil types: Sandy loams to loam over clay, with large rocks covering at least half the property

River Management – Key Points

- A major fencing program is currently underway to exclude stock from areas of remnant vegetation and waterways. Fencing creeks will improve water quality, halt creek bank erosion and reduce run-off from fertilisers, livestock and chemicals
- A comprehensive regrowth and re-vegetation program relies on direct seeding of a variety of trees and shrubs – a mixture of 12-15 species of locally-collected acacia and melaleuca

The farm

Farmer and grazier Maurice Collins is a passionate man when it comes to the long-term viability of his property 'Ironstone Range', east of the Mount Lofty Ranges in South Australia.

Maurice has embraced a program to fence off more than five kilometres of creek beds and waterways on the family farm to allow for natural re-growth and re-vegetation.

"My desire is to ensure future generations can enjoy this property," Maurice says.

Maurice Collins is passionate about the future of his farm.



Maurice's plan for sustainable farm management started in earnest about a decade ago through his involvement with a local Landcare group. Since then, his drive to reclaim native vegetation and wildlife on the property has blossomed.

"We have embarked on a program of long-term change to ensure the whole farm's health, this includes planting trees and letting the creeks and water ways grow back to their natural state."

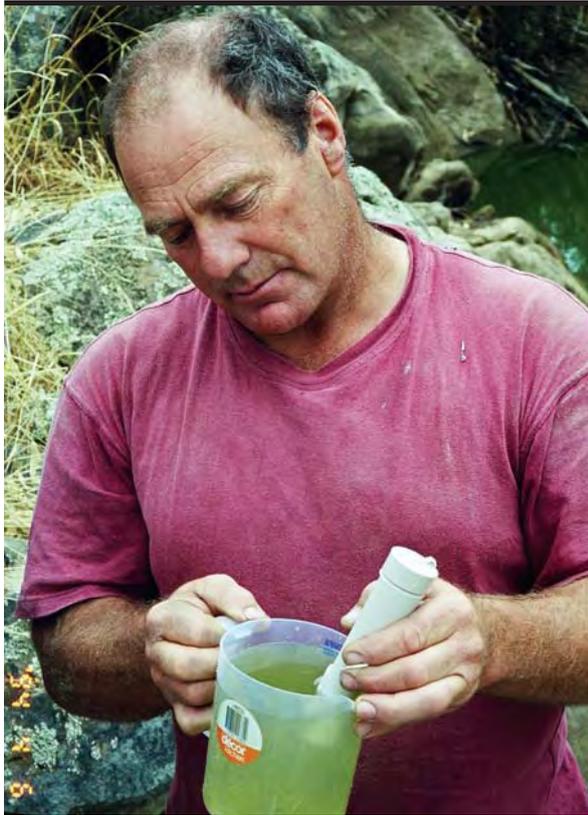
Maurice's program of re-growth and re-vegetation is balanced by the need for the 1100 hectare farm and its flock of 16-18 micron Merino sheep to remain productive. The average wool cut is four kilograms per head and the property is stocked at a rate of nine dry sheep equivalents per hectare. Pastures are mostly native grasses but there are introduced species such as annual grasses and clovers.

Maurice runs 'Ironstone Range' in partnership with his wife Barbara. The property has been in the family since 1880 and today is solely used for grazing Merino and crossbred sheep.

Topography varies considerably, ranging from 400 metres above sea level to 330 m above sea level. The soil varies from sandy loams to loam-over-clay. There are large rocks that cover at least half of the property. The average rainfall is 500 millimetres.

Maurice's plan for sustainable farm management started in earnest about a decade ago through his involvement with a local Landcare group. Since then, his drive to reclaim native vegetation and wildlife on the property has blossomed.

It's somewhat of a quantum leap for Maurice, who was raised on the farm in the belief that clearing the land was the way to go.



*Maurice checking water quality.
(Photos courtesy: B and K Munday)*

"When we started the fencing project, we originally shut up 170 acres (68 ha) and re-sowed it to natural vegetation. The growth was, and still is, quite amazing. Some of the trees in there are now eight to 10 metres high, and that's even after they were devastated by a bush fire about five years ago.

"After seeing these results, I have decided that I will never put stock back in there. The areas of re-vegetation will create their own environment and I know that will be better for the farm in the long term."

The fencing-off program started when Maurice realised that his 'old' management style of allowing stock access to the creeks was not sustainable.

"While the creeks have played an important role in watering stock for many years, the long-term effects would have been a downfall of management," he says.

"We decided it was time to act for a variety of reasons, including improving water quality, halting creek bank erosion and reducing the run-off of fertilisers, animal excrement and chemicals and the like.

"We wanted to create an environmental barrier and once the stock was removed from the creeks, we saw results almost straight away, especially in the halting of erosion."

The re-growth and re-vegetation at 'Ironstone Range' relies on the direct seeding of a variety of trees and shrubs – a mixture of 12 to 15 species of acacias and maleleucas that are collected locally.

Maurice prefers to run the fence out from the creek bank, rather than closer to it, as he likes to fence in as many straight lines as possible.

"If that happens to be 50 m from the creek bank, that's OK as this means more re-growth," he says.

The fencing is a standard star post/cyclone wire combination with two strands of barbed wire on top and one strand of barbed wire on the bottom. Main posts are about 12 m apart with two star posts in between.

Once the area selected for re-growth has been fenced off, Maurice will spray the groundcover out with glyphosate a few months before seeding time.

"Then we go in with the direct seeder and basically leave the rest up to nature," Maurice added.

"The plants seem to respond very well to this system. The quality of the re-vegetation is tremendous."

In the long-term, Maurice plans to install pumps on the creeks where there is permanent water and pump that water to holding tanks, which will in turn feed stock troughs.

He is also planning to build feeder dams, but says that will happen when the budget can accommodate it.

"All this work has to fit in with the running of the farm, in terms of labour and money," he says.

And for all his work to date, Maurice (and the farm) has already reaped considerable rewards.

'Ironstone Range' has been a runner-up in the State Landcare awards twice in the past five years and a winner of a State Catchment Award in 2001.

Maurice said apart from the recognition of these types of awards, he can also see marked improvements on the farm.

"These types of 'mini-ecosystems' support a great deal of wildlife that definitely was not there before," he says. "For example we have a great deal more birds, including some that prey on nuisance and harmful insects.

"Anecdotal evidence in the district from other farmers has also shown that fencing off 20-25 per cent of the property for re-vegetation, a 15-20 per cent increase in stock productivity has occurred.

"We are only about 10 per cent through our fencing, so we are not at that point yet, and we intend to start looking closely at pasture management as well. Obviously there is a point where cost becomes an issue, but from the work to date, I would say the benefits far outweigh the costs."



South Australian graziers John and Sue Holt.

Case 8

Changing riparian management reaps rewards

John and Sue Holt, 'Burn Brae',
Eden Valley, Lower North,
South Australia



Business overview

Average annual rainfall: 525 mm

Property size: 405 ha

Enterprises: 600 merino ewes averaging 22.5 micron and 5.5 kg of wool cut per head per annum, and 85 breeding cows

Pasture base: predominantly phalaris, cocksfoot, fescue and clover pastures

Soil types: sandy loam, slightly acidic

River management: three kilometres of creek frontage which is a tributary of the North Para River in the Mt Lofty Ranges catchment area

River Management – Key points

- A change in the management of their riparian areas has reduced erosion and silting, with water quality, ground cover and weed management significantly improved
- Revegetation of these areas has also provided effective shelter for livestock, particularly lambing ewes, as fencing following the creek line has produced 'rooms' which provide protection from the elements no matter which way the wind is blowing
- The Holts are so satisfied with their riparian results that they plan to continue a conservation program on other areas of their farm

The farm

Fencing off creeks and creating wider belts of riparian vegetation has paid dividends for South Australian graziers John and Sue Holt. According to the Holt family, a change in the management of their riparian areas has reduced erosion and silting, while water quality, ground cover and weed management has significantly improved.

The dam and part of the watercourse feeding into the dam was fenced off during 1995 and revegetated with a mix of local plant, shrub and tree species. Sue said since fencing-off the area, the bare ground has disappeared and they are seeing native grass and plant species growing where they have never been before.

John and Sue Holt along with their sons David and Andrew own a 405 hectare property at Eden Valley, running a self replacing Merino flock, first cross lambs and Poll Hereford cattle. They also run a hay-cutting enterprise for additional stock feed supplies. The average annual rainfall is about 525 millimetres.

During 1992, John and Sue planted a shelter belt on their farm which was so successful that it encouraged them to investigate the rehabilitation of their dams and creek. The main watercourse on their farm is a tributary of the North Para River. The creek is ephemeral, running about twice every five years.

The first step was to fence off a major dam along the creek which had been causing problems as a result of the erosion caused by stock going up and down the bank to drink. Water quality in the dam was declining due to the erosion and the Holts recognized this would negatively impact on stock productivity.

The dam and part of the watercourse feeding into the dam was fenced off during 1995 and revegetated with a mix of local plant, shrub and tree species. Sue said since fencing-off the area, the bare ground has disappeared and they are seeing native grass and plant species growing where they have never been before.



A chain-type floodgate forming part of the fenced section of the creek.

Many of the banksias and wattles that were originally planted have also started to re-generate. This initial on-ground work prompted John and Sue to continue, and they have now completed more than three kilometres of fencing along their creek system.

From 1995 onwards, work started along the remaining farm creek lines. The first stage was knocking in the fence posts, spraying for weeds and then direct seeding during spring. John and Sue have made a conscious effort to plant a wide range of local tree, shrub and ground cover species to create a layered and densely vegetated riparian area.

Over the years, the seed for revegetation has been supplied through various seed collectors including State Flora and Trees for Life and, where possible, the Holts have collected local seed themselves. The fencing was completed after the direct seeding using a 5-wire electric fence with two live wires. Due to the twists and turns of the creek, each strainer was knocked in on an angle to help reduce fence movement. Several lift-up gates were installed along the creek to ensure easy access.

John built two different types of floodgates using lengths of chain or small sheets of mesh which water can still flow through. He believes the chain floodgates have worked more successfully, as they withstand the impact of large amounts of debris being washed down the river in heavy floods.

As part of the creek rehabilitation, the Holts have also had to move the stock watering points.

Before the Holt family started fencing off their creek, Salvation Jane (*Echium plantagineum*) was a significant weed problem through the riparian areas and in adjacent paddocks. John estimates that the population of Salvation Jane could have reached 100 per cent in

some areas, if left untreated. Since fencing off the creek, the Salvation Jane infestation within the fence line has nearly disappeared mainly due to the increased competition from other native vegetation.

Rotational grazing is now used in riparian paddocks and this has allowed weeds to be controlled. Phalaris continues to be a problem, however high density, short-term grazing during spring has been found to be quite effective in managing it.

Benefits outweigh costs

According to the Holt family, fencing off the creek areas has provided a huge range of benefits including reduced erosion, increased water quality, improved creek bank stability, weed management and increased biodiversity. Revegetation of these areas has also provided effective shelter for livestock, particularly lambing ewes, as fencing following the creek line has produced what Sue likes to call 'rooms' which provide protection from the elements no matter which way the wind is blowing.

They believe the riparian land acts as an environmental corridor for wildlife and are encouraged by the number of bird species returning to their farm to live in these areas.

John and Sue are active members of their local Spring Valley Landcare Group and Barossa Catchment Group and are also involved in an Australian Land Management System pilot project on Environmental Management Systems being run through the Eastern Hills and Murray Plains Catchment Group.



Natural regeneration from the remaining mature trees has been prolific once stock access was controlled.

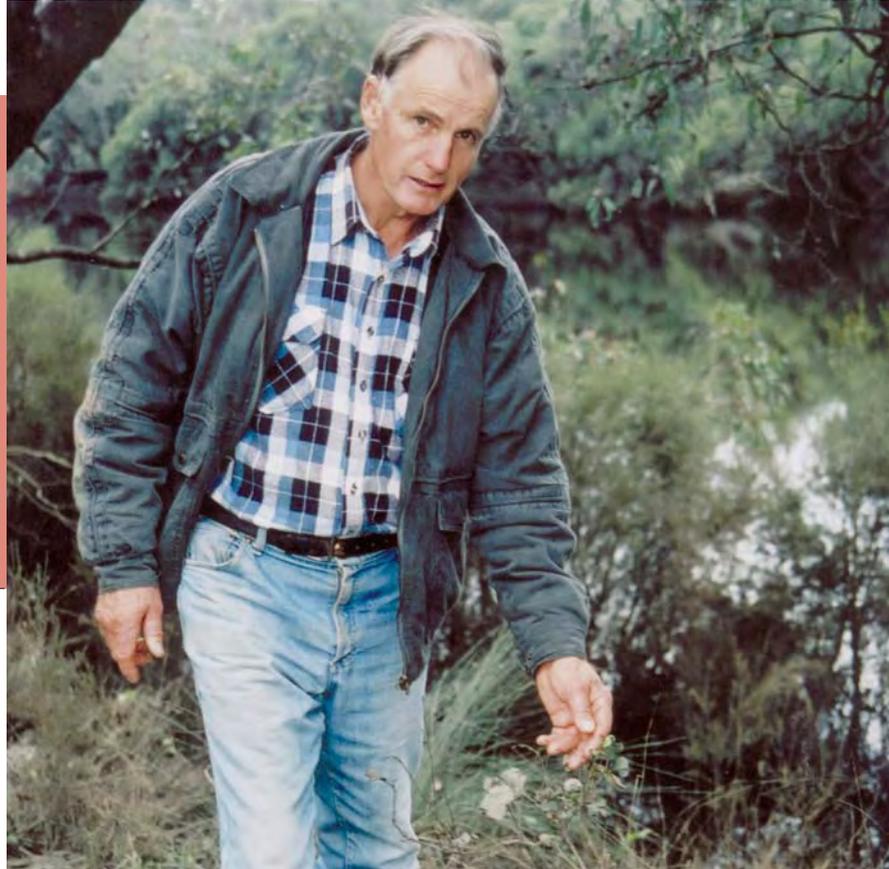


Trevor Sprigg points out a very young Flooded Gum that has regenerated since stock access to the Blackwood River was closed off.

Case 9

Solar energy powers regeneration

'Marton', 10 km east of Boyup Brook, WA



Business overview

Average rainfall: 600 mm

Property size: 300 ha (mostly for grazing, 60 ha still uncleared)

Enterprise: 2000-2500 Peppin Merino sheep for fine wool production. Numbers on the low side at present (2005) following two dry years

Pasture base: Improved pasture with trikkala sub-clover

River management: One km frontage to the Blackwood River, now fenced off

Soil types: Red soil, gravel and sandy banks near river

River Management – Key points

- Trevor Sprigg had been concerned about stock damage to the river bank for many years on his home block of 52 ha, which had no alternative water source for stock
- A Natural Heritage Trust grant enabled the area to be fenced off. A power source for pumping water to a tank and troughs for the sheep was a primary need, with solar the winner for its reliability and low-cost maintenance
- After 10 years, river banks have stabilised and regeneration of riparian vegetation close to the river has been encouraging

Banking on the Blackwood

As a young boy, Trevor Sprigg came to live 10 kilometres east of Boyup Brook on the banks of the Blackwood River, Western Australia's longest river, when the largely uncleared property was used as a dairy farm and orchard.

"Reeds are colonising the bare ground, and the flooded gums and melaleucas are gradually returning. But it is a long process, and may take 40 years before it is complete. I just hope that when I move on, any new owners will continue the process."

More than 50 years on, he fondly remembers milking cows before school and scooping marron (WA freshwater crayfish) from the bank by the light of a tilly lamp with his father and brothers.

Today marron, dairy cows and good quality water in the river are now all distant memories. By the early 1960s, following extensive clearing upstream, the Blackwood River was becoming increasingly saline. Cattle deaths on the property were mystifying even the local vets until a post-mortem revealed the cause - salt poisoning from the only available water source.

A history of dairy cattle accessing the river bank for water, up to four or five times a day in summer, later followed by equally thirsty mobs of sheep, caused considerable erosion along Sprigg's bank of the Blackwood River. Crown land on the opposite bank near Asplin Bridge provides a marked contrast - vegetation down to the water's edge on a gradual slope and no gullies or siltation.



Freshly shorn sheep near the tank that has replaced direct river access to supply water.

Trevor now runs between 2000 and 2500 fine-wool Peppin Merino sheep, depending on the season. His wool averages about 18 microns, some of it down to 15 microns, which is sold at auction in Newcastle, NSW and Fremantle, WA.

Opportunity to overcome the erosion problem came in 1995 through the Boyup Brook Landcare District Committee and a four-year restoration project. Funding was provided for a solar pump, solar panels, pipes and fittings, a 22,500 litre tank and troughs, plus materials to fence off about one km of river frontage at the high water mark.

Trevor realised that keeping the stock from the river was essential for its rehabilitation, so fencing combined with a tank and troughs as an alternative water supply, was obvious. The main question was power for the system: mains, diesel or solar?

Although solar was slightly more expensive to install, over four years the maintenance was minimal and no meters had to be read with on-going charges. In addition, as this was a demonstration site, lack of access to mains power was more realistic for other potential adaptors. Hence, solar won the day!

The combination of fencing and a solar-powered pump on the river bank, piping up to 5000 lt of water a day to a tank near the homestead enables sheep on Trevor Sprigg's home block of 52 hectares to carry-on drinking without damaging the river bank.

Each year in late autumn Trevor removes the pump and solar panels from the river bank to ensure they are not swept away by heavy rains and flooding. They are placed back in position in late spring. Maintenance has been minimal (replacement of only two nylon buckets in more than eight years) and he is enthusiastic about the technology.

Because the river water becomes increasingly saline each summer Trevor shears in late May to early June and lambs in July (late for this area). This ensures that the ewes don't face too much salt in the river water in late pregnancy. Lambs are weaned in November and then moved to other blocks on the farm with alternative water supplies as they have much lower tolerance of high levels of salt.

Similarly, while Trevor rotates sheep among paddocks on his 'home block', he retains the same group there overall, enabling them to adjust to increasing salt levels over the summer, which a fresh mob of sheep would find hard to tolerate.

It is now 10 years since stock were quarantined from the river bank, but natural regeneration has been slower than expected. New growth of melaleucas, flooded gums and reeds is obvious along parts of the bank, but in other areas regrowth has been minimal, although erosion has ceased.

"I expected to see more regeneration on the higher slopes rather than close to the river," Trevor said. "But it seems that the competition from the barley grass, spear grass, wild oats and others has been too much for the native species on those sandy areas." Natural regeneration here appears to be a very long-term process.

An advantage of fencing off the river has been greater safety for the sheep. Losses of at least a few head, stuck in mud, were typical each autumn. This problem and associated losses no longer exists.

"The river bank has stabilised beautifully in eight to ten years," Trevor commented.

"Reeds are colonising the bare ground, and the flooded gums and melaleucas are gradually returning. But it is a long process, and may take 40 years before it is complete. I just hope that when I move on, any new owners will continue the process."



Case 10

Riparian solutions for salinity

Terry and Andrea Stacey, 'Rocklands', 10 km north of Quairading, Western Australia

Business overview

Average rainfall: 300 mm

Property size: 4000 ha

Enterprise: prime lambs, wool and cropping (wheat, barley and lupins)

Pasture base: subterranean clover mixture plus ryegrass and capeweed

River management: fencing off the Conallan Creek and revegetation to prevent erosion and create a wildlife corridor

Soil types: loamy duplex, some grey clays

River Management – Key points

- The Conallan Creek is typical of many streams that flow briefly following winter rains, but are mostly dry, even in winter
- Fencing off the creekline in 2001, helped by a Natural Heritage Trust grant, has led to much more efficient land use. Good land is now separated from the poorer low-lying saline land near the creek. Larger areas can now be cropped and grazed sustainably compared with the original sub-division of the land which made no allowance for soil type
- After four years, growth of planted species above the creek has been disappointingly slow although survival rates of the trees and shrubs have been high. However, fencing out the stock has allowed the regeneration of bluebush, samphire and other native species within the creekline area - easily outdoing the planted species

Terry Stacey showing saltbush that has performed well on the riparian zone



Salinity is a fact of life in the central wheatbelt, which has a flat landscape and very few permanent waterways. The Conallan Creek which traverses the Stacey property flows briefly for a few days after winter rains but is mostly dry.

The challenge of managing Conallan Creek

'Rocklands', near Quairading in the Western Australian wheatbelt, is owned by Terry and Andrea Stacey. The Staceys have lived in the area since it was opened up nearly a century ago. Terry and his brother Russell run a total of about 4000 hectares.

Prime lambs are the main output from about 3000 Merino ewes crossed to Poll Dorset rams. About 2500 lambs are sold off each year when they reach 40 kilogram liveweight — usually in September or October. Wool and about 2300 ha of wheat barley and lupins are additional enterprises

Salinity is a fact of life in the central wheatbelt, which has a flat landscape and very few permanent waterways. The Conallan Creek which traverses the Stacey property flows briefly for a few days after winter rains but is mostly dry.

The area was cleared for farming nearly a century ago and since then the water table has risen, killing many trees along the creekline. The creekline, like most low-lying areas, is saline and dominated by samphires (very salt-tolerant plants).

The Staceys, members of the Conallan Creek Catchment Group, aimed to fence off the saltland near the creek to exclude stock, encourage regeneration of vegetation and create a wildlife corridor.



After four years, growth of planted species above the creek has been disappointingly slow although survival rates of the trees and shrubs have been high. However fencing and hence stock exclusion has been a major catalyst for regeneration of bluebush, samphire and other native species within the creekline area – easily outdoing the planted species.

The first step was to fence off the low-lying creekline areas from the good cropping and grazing land, allowing it to be managed separately. This was completed over several months in 2001 involving removal of old fences as well as building approximately four kilometres of new fence.

About 20 ha was excluded from the rest of the farm's operations, which had the advantage of extending the useful grazing areas available in what had been very large paddocks. Rabbits were cleaned out with 1080 poison to make sure they provided no threat to young plants.

The Water and Rivers Commission (now part of the Department of Environment) established a two ha demonstration site on a flat area in 2001 using a wide variety of shrubs and trees. With the help of local volunteers and Green Corps participants they planted about 30 different species over two years, aiming to put in as wide a range as possible to see what worked. Individual species were chosen for tolerance to salinity, drought, floods and attractiveness to native fauna.

At the same time Terry Stacey began planting by machine five ha of land beginning with 9000 trees and shrubs and eventually extending to 16,000. With such large numbers of trees involved, planting by hand would not be practical. Survival rates with the machine are also better than by hand.

Growth of most of these young trees and shrubs has been very slow, although survival rates are high. Closer to the creekline, natural regeneration of jam (*Acacia acuminata*) and other wattles has been

excellent. Many are several times larger than the planted trees and shrubs in the rip-lines a few metres away.

Wavy-leaf saltbush (*Atriplex undulata*), old man saltbush (*Atriplex nummularia*), small-leaf bluebush (*Maireana brevifolia*) and samphires in the creekline, have been among the more successful species. Although this is normally York gum (*Eucalyptus loxophleba*) country, new plantings that went in during a dry 2002 had a hard start and are still only about 30 to 40 centimetres high after several years.

The management plan for the area includes riffing of sections of creekbed - lining it with rocks to guide water to the centre, rather than allowing it to spread more widely. An area near the bridge on the Quairading-Tammin road was completed with Green Corps assistance to help prevent erosion.

Two boreholes were drilled to monitor changes in water table level. To date, overall changes have been minimal.

Being able to access Natural Heritage Trust funding, particularly for the four km of fencing, has made a big difference to the rate at which this work has been done, although the Staceys' commitment to restoring their section of the creek would have motivated them to do the work unassisted.

Terry Stacey is disappointed that growth of many planted species has been slow to date, especially compared with the natural regeneration that has occurred following fencing and exclusion of stock.

A couple of field days have been held on the property and this has been useful for other farmers to see which approaches to re-vegetation are working and the plant species that are making the greatest gains.

Since the creekline area has been fenced off, kangaroos have returned, with fences providing no barrier to their movement. Terry is very happy to see this, but believes that birds are unlikely to be attracted for some time until vegetation growth is much more advanced. He has seen examples on other local properties, where substantial re-vegetation with eucalypts, wattles and other native species has taken around 10 years.

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Further Information

Land Water & Wool Rivers and Water Quality has a National Sub-program Coordinator, as well as Project Coordinators in NSW, Tasmania and South Australia.

National coordinator

Dr Siwan Lovett

River Management and
Water Quality
Sub-Program Coordinator
GPO Box 2182
CANBERRA ACT 2601
t (02) 6247 4994
e siwan.lovett@lwa.gov.au

NSW

Fleur Flanery

Placing Nature
PO Box 458
Yass NSW 2582
t (02) 6226 2959
e fflanery@greeningaustralia.org.au

TAS

Biz Nicolson

'Bonney Plains'
PO Box 117
Conara TAS 7211
t (03) 6384 2165
e bnicolso@tassie.net.au

SA

Kylie Nicholls

Full Bottle Media
PO Box 488
Clare SA 5453
t (08) 8842 3275
e fullbottlemedia@rbe.net.au

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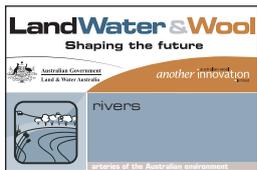
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Land, Water & Wool
GPO Box 2182 CANBERRA ACT 2601
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