



Many tools being brought to bear on salinity

Salinity is a significant issue in much of the Upper South East (USE) of South Australia, and one property, 'Clover Ridge', is no exception. The owners of the property, Greg and Kellie Fisher, have undertaken a whole range of steps to manage the problem and now appear to be on the brink of a major breakthrough. *Bruce Munday* investigates.

"Until recently about 1000 hectares of our land had been affected by salinity. Not much of this was bare scald – perhaps about 40 ha, mainly at low points in the paddock where groundwater would come to the surface annually. The more common feature was greatly reduced productivity, the land only supporting salt-tolerant pastures.

Over the years we have done a lot, trying to manage recharge on the property. The most important and valuable tool has certainly been lucerne, mainly Hunterfield, and this has been a vital component of our grazing system.

We planted about 240 ha of tagasaste on sandy rises, also to help manage recharge. This has been good cattle fodder, particularly in dry years, although it needs to be slashed every couple of years to keep it within the reach of cattle. But the greatest disappointment with tagasaste is that it is relatively unpalatable in autumn, the very time when we are looking for something to fill the feed gap.

Native scrub is probably our greatest environmental asset, including recharge control, and we have about 200 ha that we have put under a heritage agreement, ensuring that it will always be well managed. Along with this we have also fenced off our wetlands.

We have also established trees, originally in narrow shelter belts, but we have now swung over to blocks of vegetation as these provide better habitat for birds and other fauna. Our technique has also evolved from tube planting, to more efficient direct seeding that was pioneered in this region by a neighbour, John Del Fabro.

We are well aware that groundwater in the USE is dominated by a very large groundwater flow system. So whatever we

Case study: Greg and Kellie Fisher

Location: Marcollat, SA

Property area: 3900 ha

Rainfall average: 500 mm

Soils: Deep, non-wetting sand on dunes; sand over clay and sand over limestone on flats

Enterprise: Cattle (1000-head, self-replacing Murray Grey herd; growing out steers for feedlot) and sheep (3000-head, self-replacing Merino flock; cross-bred lambs)



Photos: Kellie Fisher

do trying to manage recharge is unlikely to have much impact on its own. But we are lucky that all of our neighbours on the Woolumbool Road have also been very active in trying to address this problem. Collectively, we have always taken a catchment approach to salinity problems.

A feature of salinity in the USE is that the saline flats have probably contributed more to recharge than the sandy rises. This is particularly because the flats are so prone to

flooding, much of that ponded surface water eventually finding its way back into the groundwater system. We have planted salt tolerant *E.occidentalis* (yate) on some of the worst salt-affected sites and these have performed particularly well. Aside from the fact that they will be a good source of firewood, they are also another component in the overall biodiversity of our farming system.

On the less severely salt-affected flats we

have generally concentrated on puccinellia and tall wheat grass. The pucci has done well and provided good feed, but the tall wheat grass struggled to survive and was always difficult to manage, with its tendency to grow rank and become clumpy.

We have also sown balansa clover on many of these sites. Whilst the balansa has done well initially, it seldom persists, because the soil becomes so salty in spring that the clover is unable to set seed.

The great breakthrough for us has been the recent construction of the Ballater East and the Wongawilli drains. These are part of the USE Dryland Salinity and Flood Management Program, and the five kilometres of drain through 'Clover Ridge' have transformed the property.

These are deep drains that actually intersect the water table, the groundwater salinity being about 10 dS/m (depending on the seasonal conditions). Because the soils are so transmissive, they have enabled salt to be flushed out of the root zone up to 2.5 km from the drains. As a result, most of the previously salt-affected land is now relatively salt-free. Ironically, the downside of this is that good puccinellia stands have actually died out due to lack of summer moisture. The upside is that we are now able to establish much more productive pastures on this land.

Lucerne is again our main species and we are now sowing some of the flats, where we are confident that they will no longer be threatened by salinity or waterlogging. All up, we now have about 1000 ha of lucerne on the property. In line with our focus on lucerne, we are trialling other varieties (such as Super 7 and Septre) in collaboration with the CRC for Plant-based Management of Dryland Salinity.

The big issue that faces us now is that the land that has been reclaimed from salt due



Above: Deep drains have relieved the impact of rising water tables but introduced soil management challenges.

Opposite: Lucerne is the main tool for profitably managing salinity.

to the drain is presenting new management challenges. Dr Rob Fitzpatrick (CSIRO Land and Water) has done some research at 'Clover Ridge' with the National Dryland Salinity Program, showing that when saline soils are drained they do not necessarily return to their 'pre-salinity' state. It seems that these soils actually become very sodic, and we are doing some trials now with Tracey Strugnell (Saltland Agronomist with the combined SE soil boards) to see what our best pasture species will be. This year we will do some broadacre trials with perennial grasses and clovers. So far we have been very satisfied with the way lucerne has established on the flats, although we realise that we could still face a waterlogging risk in a wet year with hard-setting sodic soils.

Managing soils is as important as managing water tables for us. Last year, being so dry, we had problems with wind erosion on sandy rises where we had grown lupins. We stabilised this by spreading clay, which also deals with the non-wetting property. We are now moving to use an

Ausplow D-B air seeder for sowing lucerne and crops so as to minimise the soil disturbance and the risk of erosion.

The drainage scheme offers great benefits to the USE because the soils are generally very suitable. But we are not looking to engineering to solve all our problems. We are continuing with all our other recharge control strategies, and we have fenced the drain 30 m back on each side and planted the corridor with local native trees and shrubs. Along with all the other landowners on the Woolumbool Road we realise that we need to manage all our natural resources if we are to have sustainable and productive grazing systems."

• Greg and Kellie Fisher spoke with Bruce Munday (NDSP Communications Coordinator, SA).

Key points

- Lucerne is the key to profitable grazing and water table management in this region.
- Deep drains have given us new grazing options on land that was previously salt-affected.
- Drained soils don't just return to 'normal', but bring with them a new set of challenges.

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Photos: Patrick Francis

Farm forestry keeps a check on salinity risk

Patrick Francis took up his 50 hectare block in 1988, some time after the first signs of salinity had emerged. With an upstream spring on his brother's block measuring 10,000 EC units and the creek running through his property at 4,000-5,000 EC units in the summer, he was determined to make some big changes on the property. Patrick describes to *Lisa Robins* how he tackled the threat of salinity while maintaining farm profits and improving the sustainability of the property.

The basalt plains cover an enormous area to the west of Melbourne, with a ribbon that extends north through Romsey at the headwaters of the Maribyrnong River, where Patrick and Anne Francis farm 'Moffitts'. It's an old settler's block converted to pasture land in the 1880s. Patrick's parents carved up the 220 ha they'd farmed since the Second World War and sold it to the family.

"We started developing a whole farm plan, together with an environmental management plan, in the early 1990s," explains Patrick.

Case study: Patrick and Anne Francis

Location: Romsey, Victoria

Property area: 50 ha

Rainfall average: 700 mm

Enterprise: Yearling beef production, farm forestry for sawlogs



"Our long-term aim is to integrate trees for salinity management, farm forestry, livestock shelter and biodiversity into the landscape.

"It's a bit of a balancing act wanting to manage salinity, but also wanting to harvest sawlogs, shelter my cattle and get some biodiversity benefits besides. I'm confident that it's possible though, and I'm some way down the track of achieving that."

The windy, flat plains were a big influence in the whole farm planning approach taken. Putting trees back into the landscape for salinity control and sawlog production needed to protect cattle from high winds.

Patrick reflects that "on purchase, there were only four local acacia trees (*A. melanoxylon*), three manna gums (*E.*

viminalis) and some introduced pines (*P. radiata*) and hawthorn bushes abutting riparian land, and not much more elsewhere on the farm.

"We only had about one kilometre of stream frontage dissecting three of the four paddocks, and all were eroded from livestock access.

"We've staggered farm forestry blocks across the property and joined them with corridors that connect the blocks together, so wherever you go on the place you're protected from the wind. We started out with three rows of plantation species, but when they were high pruned for sawlogs it got pretty drafty underneath!

"I've learnt my lesson now and plant five or six rows with tubestock for sawlogs and

Key points

- Plant at least five-six rows with tubestock for sawlogs and add another two rows of conservation plantings on the outside by direct seeding.
- Leave some conservation areas free from grazing.
- Use rainfall where it falls to stop leakage to groundwater.
- Try the leakage calculator developed as part of the Riverina EMS package to estimate your leakage rates.

add another two rows of direct seeding on the outside. On top of their biodiversity benefits, they also provide shelter and understorey when the middle rows are high pruned and sometimes I get a bonus log from the conservation planting that's straight enough to high prune for logging.

"Cattle graze and shelter in the blocks but I do think there's a role for leaving some conservation areas free from grazing.



Above: The long-term aim at 'Moffitts' is to integrate trees into the landscape.

Opposite page: Farm forestry blocks (left) are staggered across 'Moffitts' and are connected by corridors. High pruning logs (right) increases their sale value.

Below left: Harvesting pruned logs.

"I notice little tracks in the corridors and believe that they do provide habitat for animals that might not exist if I let the cattle in.

"I found the Joint Venture Agroforestry Program's Design Principles for Farm Forestry a great help in working through the process of designing trees on the property to meet the range of management objectives I wanted.

"Moffitts is now 100 per cent perennial with forests and pastures to use rainfall where it lands and stop leakage to groundwater.

"We've got cocksfoot, continental tall fescue (summer-active), some ryegrass and a bit of lucerne as the pasture base. Some summer-active native perennial grasses will also be introduced when seed becomes commercially available.

"I've used Anna Ridley's leakage calculator developed as part of the Riverina EMS package and I reckon the property achieves zero leakage."

Patrick concludes that while the rainfall for the last 12 months has been a low 410 mm for the region, he has been able to maintain nine DSE/ha without supplementary feeding and close to 100 per cent grass and litter cover.

"I'm convinced that the plantings for salinity control and sawlogs aren't taking away any carrying capacity and are

probably improving it by providing pastures with shelter from hot dry winds," he says.

• Patrick Francis spoke with Lisa Robins, Robins Environmental Consulting.

NOTE: The publication Design Principles for Farm Forestry is available from the Joint Venture Agroforestry Program (JVAP), Ph (02) 6272 4819. More information about JVAP can be found at:

www.rirdc.gov.au/programs/aft.html or contact Rosemary Lott, Ph: (02) 6271 6671.

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Photos: Lisa Gray

‘Lazy farming’ lowers salinity risk, improves farm health

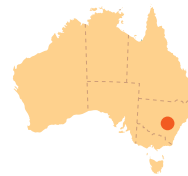
The Maynard family has developed an innovative method of cropping that allows native pastures to be incorporated into their cropping practices. This practice, in combination with cell grazing and saltbush pastures, has dramatically increased productivity and improved the health of the land. The long-term benefits include lowering the water table and salinity risk.

Bruce Maynard tells his story to *Lisa Gray*.

“Our family has been managing ‘Willydah’ for four generations. Traditionally the farm was used to run first-cross ewes, trade and breeder cattle and cereal cropping. But in the last 15 years, we’ve changed our farming practices and taken a much more holistic approach to managing the farm with the aim of improving the environment and our economic situation.

The soils on our property are red earths, red-brown earths and grey clays, but they were hard and degraded by past land use. In 1987 we started using conservation farming techniques to farm on a seven-year rotation of three years cropping followed by four years of lucerne. But we were disappointed with the results because we just weren’t seeing much improvement.

Case study: The Maynard family
Location: Narromine, NSW
Property area: 1476 ha
Rainfall average: 520 mm
Enterprise: Beef cattle and mixed cropping



From an economic perspective, we knew that improving any specific efficiency would only increase production by five per cent - which is not enough to combat the declining terms of trade. So, we had to question whether our farm practices were sustainable in the long-term.

In 1996, we developed a method of cropping called ‘Advance Sowing’ where we dry-sow crops directly into the pastures instead of cultivating or spraying them in preparation for sowing.

There’s nothing new in the technology we use – but we have a new way of applying it. Acraplant discs are used to cut a one-centimetre slot in the dry soil and we Advance Sow 30 kilograms of seed per hectare.

The crop yield is lower with advanced cropping, but our costs are low and there is virtually no risk. Because we sow in the dry,

we can time the whole process better. Others have called it ‘lazy farming’ because we now sow ‘nine to five’. There is very little soil disturbance and we’ve reduced the need for chemicals because the crops can out-compete the weeds when the weeds aren’t given a head start.

We don’t expect to harvest a crop every year. In good years, the crops grow above the grasses and are easy to harvest. In other years, we get good quality additional feed for the cattle. When we combine this method of cropping with cell grazing we can surpass production under normal grazing practices.

The idea of cell grazing is to match grazing requirements to plant growth. Paddocks are grazed intensively for a short period of time and then given adequate time to recover. This keeps the grasses growing actively and ensures that they are

Key points

- Unique 'lazy farming' practices offer low-cost, low-risk broadacre options for lowering water table and reducing salinity hazard.
- 100 per cent groundcover policy has eliminated erosion problems and minimised sub-soil leakage.
- Native grass regeneration is incorporated into cropping practices.

not overgrazed. We have 120 paddocks, but usually only one mob of cattle and only one paddock is grazed at a time. The cattle are generally moved every one to three days and we adjust our stocking rates according to carrying capacity. Our set-up is pretty flexible because we have a few large paddocks that have dams as well as bores for stock watering, so can leave the cattle a bit longer if we need to.

Pastures are often grazed fairly heavily but seldom given time to rest, and that affects their productivity. Our mixed pasture paddocks are more productive than the traditional lucerne paddocks. We've tripled our stocking rate since 1996 and will increase this by another 300 head as our pastures continue to improve.

The pastures regenerate naturally and consist of a complex mix of mostly native grasses including wallaby grass, lovegrass and curly windmill grass.

We have a high proportion of perennial grasses and a mix of both summer-active and winter-active species, so water is used productively all year round. Our aim is 100 per cent groundcover, 100 per cent of the time. This is very important in areas where you want to reduce leakage to the groundwater.

This year has been one of the toughest years on record, but we still have plenty of good feed compared to what we've had in previous droughts. By increasing the organic matter in the soil, we are improving the water holding capacity of the soil and reducing leakage to the groundwater system. We have very little surface run-off and virtually no erosion.



This has reduced stock water to dams, but the water use patterns have probably returned to what used to happen naturally.

Some of the paddocks are also planted to saltbush. Block planting can be expensive on a large scale. So we tend to plant the saltbush in alleys - that way you get more 'bang for your buck' and can spread your investment over a much larger area.

Seedlings are planted in rows of three and the alleys are spaced 20 metres apart. That way they provide a good windbreak as well as increasing water use. The alleys also provide a more balanced approach to saltbush grazing because the greater mix of grasses and saltbush means cattle do not overly graze one or the other.

In the next couple of years we'll plant more saltbush, but will try different patterns of planting and will monitor the groundwater to see what changes occur before and after planting. This will be assisted with funding from the 'Environmental Services Scheme' - a trial program being run by the NSW Department of Infrastructure, Planning and Natural Resources to provide farmers with long-term payments for services to environment.

In hindsight, it's easy to see the benefits of what we've done, but making a start wasn't

Above: Alley planting of saltbush increases water use and provides a valuable windbreak.

Opposite: Cattle are moved through laneways; troughs are placed in between the fences to increase stock access to water.

Left: Oats that have been sown into native pastures can out-compete the weeds when given the same start.

so easy. Each time we got a small victory we became more confident about what we were doing and gradually moved onto bigger things.

We started by changing our grazing practices. It helped us increase production and stop soil erosion - and because such a large proportion of agricultural land is used for grazing, it has an enormous potential to improve the health of the land."

• Bruce Maynard spoke with Lisa Gray, NDSP Communication Coordinator (NSW).

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