salt magazine

The Magazine of Australia's National Dryland Salinity Program

ISSUE No. 9

New groundwater uses – communities thinking about the future

Personal stories of Australians combating and learning to live with dryland salinity

National DRYLAND SALINITY Program
Know-how to tackle salinity

Welcome to SALT magazine

Welcome to what promises to be a very exciting year for the National Dryland Salinity Program!

After a decade of driving Australia's salinity research, communication and networking at the highest level, the National Dryland Salinity Program (NDSP) in 2003-04 embarks on potentially one of its biggest communication challenges to date.

Richard Price

The Program has just finished its second five-year phase, and over the next 12 months everyone associated with it will be bending over backwards to increase the flow of useful information to you about managing dryland salinity.

Over the past 10 years, the NDSP has supported around 50 research projects valued at almost $25 million. The second phase of the Program, which commenced in 1998, has supported 30 projects valued at around $15 million. During this time, nearly 300 researchers, technical assistants, consultants and policy makers have contributed to the program, and have significantly enhanced our understanding of dryland salinity – and our knowledge of what might be done to manage it.

Much of this research has been ground breaking, and has changed the way we look at, and manage, salinity today. The research has inspired new ways of thinking and acting and aims to build confidence in our communities and individuals to better manage the dryland salinity risk.

The observant one's among you may have noticed an addition to the Program's logo. It states simply "Know-how to tackle salinity". That's what we aim to do over the next twelve months – keep you in the know while keeping it simple. *SALT* magazine will be just one of the means by which we will deliver to you the experiences of farmers around the country who reckon they've got the know-how and want to share their experience.

You don't finish a program without reviewing what you have learnt. What we've learnt over the past five years, whether from the Program's farm-based research, policy research, engineering research or landscape research, is that all roads lead to a need to develop more profitable options for farmers to manage salinity.

The scale of the salinity issue, and the fact that managing it is often left in the hands (and wallets!) of individual farmers, means that extensive landscape solutions will only come from making a difference on many, many individual properties. This is why the stories in *SALT* have been, and will continue to be, based on inspiring examples of farmers who are making a difference where they can.

This year, NDSP will be working closely with your local advisors to provide the tools, products, networks, capacity and people to help you to determine the most appropriate option for managing your salinity problem. The program will also be facilitating a series of field days, conferences, training seminars, publications and other practical tools to provide you with the know-how to tackle salinity in your region.

SALT, of course, will not be the Program's only avenue for providing producers with useful information. Over the next 12 months we will be working with industry groups to improve their access to the kind of advice they want. We call this 'networking'. You may call this 'getting off our backsides'. Whichever, we trust that we can deliver to you the solutions that you are looking for.

I wish you all the very best,

Dr Richard Price
National Manager, NDSP

Our cover

Groundwater pumping to manage saline water tables is proving more profitable than the people in Victoria's Wimmera region previously imagined. Under the guidance of Victorian Department of Primary Industries salinity officer, Susie Kelm (pictured), Jeparit district farmers Rob and Sally Kruger are trialing the farming of seaweed – hundreds of kilometres from the sea – in special storage ponds using saline groundwater pumped from a windmill. Seaweed is used for emulsifying products and to feed farmed abalone.

• See full story page 6

Photo: Jo Curkpatrick, NDSP Communication Coordinator (Vic.)

National DRYLAND SALINITY Program
Know-how to tackle salinity

Any recommendations contained in *SALT* magazine do not necessarily represent the policies of the National Dryland Salinity Program partners. No person should act on the contents of this publication whether as to matters of fact or opinion or other content, without first obtaining specific independent professional advice which confirms the information contained in this publication.

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Learning to live with salinity at Theodore

Case study: Allan Anderson
Location: 'Avonmore', Theodore, Qld.
Property area: 1619 ha
Rainfall average: 675 mm
Enterprises: Cattle and mixed grain cropping

Allan Anderson has a lifetime of memories of his farm and his country in central Queensland and part of those memories are learning to deal with encroaching dryland salinity.

Standing in the middle of his most salt-affected land, Allan relates his story to *Mark Warnick.*

"I started farming this land in 1954. In 1965, large swags of country were cleared by bulldozer, stacked and burnt. It was solid brigalow and softwood. We had no problems farming it at first. We were getting 22 bags to the acre from our grain crops after that first clearing. Now my land is not returning as well.

The largest area of salinised land is around 15 hectares. It is on a drainage line and for this reason some timber was left in the 1965 clearing. We noticed though it was full of water after rain and then the trees started to die.

At first, we didn't realise what it was. But then in the late 1960s, it started to hit us and we worked out it was dryland salinity. There was no publicity then about this.

We ploughed the area and then planted it out to Rhodes grass but unfortunately the plane doing our other aerial weedicide spraying accidentally flew over the salinised land. So that killed off all the Rhodes grass and the salinity came back!

We have been lucky though, with saltbush coming in voluntarily and starting to provide ground cover.

We got a backhoe out and dug a five-metre trench but we gave that away after a while, as it wasn't doing the job.

We also did a major tree plant on the upside of the salinised flat through the Dawson Valley Agroforestry group but most of the trees died and we feel it was too dry for them at the time. But we intend to do more treeplanting.

This year we had six bores drilled and two piezometers installed by Natural Resources and Mines. This gives us immediate information as to standing water levels and what strata underlies the property. We intend to monitor these every three months for the next 10 years."

An electromagnetic induction survey was also conducted over the entire property to further pinpoint where the salinity build-up was occurring.

Photo: Mark Warnick

Above: Allan Anderson discusses dryland salinity with (from left) Bruce Courie, NR&M and Stuart Buck, DPI, on 'Avonmore', Theodore.

This year, a major training workshop was conducted in Theodore that used 'Avonmore' as the case study.

The workshop was conducted collaboratively with Natural Resources and Mines, Wesfarmers Landmark, Cooperative Research Centre for Plant-based Management of Dryland Salinity and Australia's National Dryland Salinity Program.

Workshop participants divided into teams and drew up 'whole of property' salinity management plans that will be presented to the Anderson family.

The workshop outline stated: "Avonmore was chosen because it was a good example of the rising groundwater table and an expanding saline discharge area encroaching on valuable cropping land. Importantly, the owners have a commitment to adopting practices that will manage the salinity problems."

Workshop participants were asked to prepare a Salinity Management Plan.

The options drawn up by the participants included the use of leuceana, buffel grass, agroforestry, conversion to full grazing and major hydrogeological work to remedy the salinity.

Allan was delighted with the efforts of the workshop participants and is confident his son will benefit from the work and be able to continue to farm the land for as long as he has.

• *Allan Anderson spoke with Mark Warnick (NDSP Communications Co-ordinator, Qld).*

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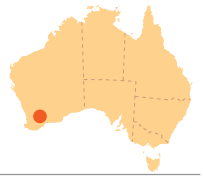
Photos: Georgina Wilson

Win-win from water harvesting

By Georgina Wilson

Case study: Farms with a Future Vision Inc.
Location: Wagin, 220 km south-east of Perth, WA
Property area: Five adjoining farms totalling 5200 ha
Rainfall average: 450 mm
Enterprises: Traditional sheep, crops and new ventures



Take a group of five farmers with adjoining properties, all concerned about salinity and it makes good sense to join forces. After all, humans may observe a farm boundary and choose to begin or end an activity at the fenceline, but creeks, water tables and salinity show no such respect.

So it was that Farms with a Future Vision began formally in 2001, incorporating five like-minded families. The total domain is roughly five kilometres by 15 km and includes about five major water systems. Apart from focusing the minds about cooperation instead of working independently, an incorporated body can also make the group eligible for funding schemes.

Chairman Ian Pederick has lived at 'Yalabringa' for nearly 40 years. Over that time he has seen water quality decline and water tables rise despite conventional landcare activity. In the late 1990s he saw successful water harvesting at Ron Watkin's property at Frankland, further south, and decided to try the technique.

While most farm dams aim to provide water for stock or irrigation, water harvesting relies on large dams built primarily to capture the water high in the landscape before it can contribute to recharge or mobilise salt in the ground. A secondary benefit is that good water is available for many uses during the dry months – growing lucerne, aquaculture, vines, cut flowers, jojoba, trees or whatever niche industry appeals.

For the Pedericks marron alone provides very useful extra income, when a single pond can provide $15,000 from a ready market.

Ian Pederick and wife Liz have four water-harvesting dams from the current group total of seven. One dam alone holds up to 30,000 cubic metres. During the summer, water is piped out to flood irrigate lucerne, and for marron and yabby ponds. Part of the deal is that all of the water must be used over the summer to ensure dams are ready to capture excess water from the following winter rains.

About 50 km of interceptor banks channel water across the paddocks and into the dams, each bank supported by four rows of trees and shrubs on the downhill side. So if water does escape the banks, it is unlikely to get far. A mix of 16 varieties avoids the dangers of monoculture and provides a feathering effect to wind eddies - two rows of commercial varieties, aesthetically attractive street trees and finally shrubs such as bottlebrushes – great

for attracting the birds and less likely to rob the ground from adjoining crops. Electric fencing keeps sheep out, making the areas a haven for small birds, which is another bonus.

"Some estimates suggest that to prevent the progress of salt we need to sow 60 per cent of the land to trees," Ian says. "But with the combination of engineering and trees, we are shooting for 20 per cent. And even with 20 per cent of the land out of normal production we are increasing yields due to the lack of waterlogging."

Sheep numbers have remained similar to before, but management has become more intense – verging on a cell grazing system where larger paddocks are now intersected by banks and trees.

"Another major advantage is the windbreak shelter for sheep, where we have seen lambing percentage rise from around 75 per cent to the high 90s."

All up, Ian and Liz reckon they've probably planted more than 200,000 trees of different varieties. Some drowned, but a Master Treegrower course for Ian has helped ensure that they are in the right locations with a long-term view to commercial harvest. Block plantings of maritime pine and sandalwood are included and even salt-tolerant sheoaks (*Casuarina obesa*) are pruned to ensure better long-term value for commercial use.

In all, the group has seven water-harvesting dams and a long-term plan to double that number. Combined with another 43 km of interceptor grade banks, perennial vegetation and fencing, the goal is to harvest an additional 803 megalitres of water each year, reducing flood flows and salt loads into downstream waterways.

And if you are anywhere downstream, that news can't be bad!

• *Georgina Wilson is NDSP Communication Coordinator (WA).*

Above: A solar-powered aerator (invented by Ian Pederick) increases the efficiency of marron ponds, a profitable sideline to water harvesting.

Left: Ian Pederick with young sandalwood tree and host jam.

Opposite page (top): Maritime pine and sandalwood planted on the flats help to use excess water.

Opposite page (bottom): Bottlebrushes grown below banks help attract birds while reducing adverse effects on adjoining crops and pastures.

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Toxic trenches to green grass

Stud breeder Peter Scanlon is equally enthusiastic about the success of water harvesting with dams, banks and trees. In a few years, he has seen white salt crystals on the creeks running through his farm replaced by near-potable water.

"Never in my wildest dreams, did I believe I would be treading on grass here," he enthuses. "From toxic trenches, we now have good quality water with shrubs and trees regenerating, and large numbers of birds.

"It doesn't happen overnight – about five years at least before you really see results.

"On pure economics, I should have just bought extra land and walked away, but turning the country around is really rewarding – a real buzz."

Peter's salinity meter is never far away, and he has seen levels in the house creek fall from more than 1600 parts per million a decade ago to about 600 ppm today.

He believes that about 100 hectares of land has been brought back into pasture production, and further improvement should soon make it ready to crop in a few years.

Paddock management for salt is a waste of time, Peter argues. It must be landscape management; otherwise you merely move the problem from one area to another.

Peter Scanlon checks salinity levels in a creek that was previously encrusted with salt.

COVER STORY

Something fishy is happening in Victoria's Wimmera

Case study: Rob and Sally Kruger
Location: Jeparit, Victoria
Property area: 1200 ha
Rainfall average: 350 mm
Enterprise: Cropping, prime lambs, seaweed trials

A groundwater pumping trial on Rob and Sally Kruger's property at Jeparit in Victoria's Wimmera is providing an opportunity to look at the potential for seaweed production using saline water pumped from the water table.

Susie Kelm is Department of Primary Industries Salinity Officer at Horsham and manages the productive uses of saline resources program in the region; she shows *Jo Curkpatrick* around the Kruger's trial site.

Photos: Jo Curkpatrick

"Rob Kruger is always looking for ways to tackle the spread of salinity on his property. Back in 1980 he fenced off the 60 hectare wetland now being used for the trial and sowed tall wheat grass. Over the years he's put about 40,000 saltbush plants onto the wetland and another 150 ha of land he believes has been reduced in production by dryland salinity. The farming of seaweed presents another opportunity.

The groundwater pumping trial was set up three years ago with support from the National Action Plan for Salinity and Water Quality as part of its Wimmera salinity funding, on what Rob remembers as a wetland thriving with wildlife but is now a degraded saline wasteland.

To protect the nearby cropping land from the spread of salinity he was keen to trial groundwater pumping. The groundwater is pumped from the Parilla Sand aquifer, which extends across the western part of the Murray-Darling Basin. The aquifer can be up to 50 metres thick and quite permeable, so the water moves through it freely.

We saw the groundwater as a resource waiting for something to happen. Instead of seeing it pumped into an evaporation basin we were keen to see it used productively, hence the seaweed trial.

The water is pumped by a windmill from 24 m and runs 280 m along a PVC pipe that has been cut in half, into the first of two settling ponds.

The water is very salty, almost seawater (50,000 µS/cm) and contains high levels of iron (52 mg/L). By running the water along the pipe quite a lot of the iron precipitates out in the sludge, with more staying behind in the two settling ponds. By the time the water reaches the third pond, where we hope to grow seaweed, the iron levels have fallen to 4-5 mg/L.

Initially we tried to grow the seaweed in the second settling pond, but iron was the limiting factor. It slows the growth but also makes the seaweed brittle.

Our current trial is being run by Rob Cordover from Seaweed Traders in Canberra. He is trialing two varieties of the

Key points

- Seaweed is being trialed as an alternative crop in hypersaline groundwater in the Victorian Wimmera.
- Groundwater pumping to protect nearby cropping lands from encroaching salinity has provided a feasible water source.
- Seaweed is not difficult to grow - it can double its size in 10 days - and requires similar skills to those needed to grow a grain crop; it needs to be planted, fertilised and harvested.

same species; varieties that can be used for industrial purposes such as thickening and emulsifying products, and for pet food products.

It's a very small trial at this stage but we want to make sure we get the water chemistry right and if the growth rates are good we will make an economic assessment and hopefully scale up to a small commercial operation.

Seaweed isn't difficult to grow. Like any plant it needs water, air and nutrients and, under optimum conditions, should double its size in seven to 10 days. We have found that we need to fertilise the seaweed, because by the time the water reaches the pond it has lost most of the nutrients in the process of precipitating the iron out.

Local farmers relate well to the use of seaweed as a crop. It requires similar skills to those needed to grow a grain crop - it needs to be planted, fertilised, harvested, however it doesn't require extra resources at the traditional harvest time."

• *Susie Kelm spoke with Jo Curkpatrick, NDSP Communication Coordinator (Vic.)*

Above: Groundwater flows through two settling ponds to a 90m2 settling basin.

Left: The groundwater flows 280 metres down an open pipe, leaving iron in the sludge.

Opposite page (top): Rob Kruger and Susie Kelm.

Opposite page (bottom): Bumper crop...seaweed is used for emulsifying products and to feed farmed abalone.

Below: Iron stains the pond edges with dead paperbarks in the background.

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Photos: Murray-Darling Basin Commission, Arthur Mostead

Re-sowing the seeds of productivity to stop salinity

Case study: Leon and Bubbles Garry
Location: 'Weilora', Binalong, NSW
Property area: 1025 ha
Rainfall average: 637 mm
Enterprise: Merino wool

In 1989, a devastating bushfire killed 1600 sheep and destroyed most of the native vegetation on Leon Garry's NSW Southern Tablelands property 'Weilora'. The loss of vegetation resulted in rising groundwater, salinity and soil erosion. Since then, Leon has transformed his property by planting over 200 kilometres of trees using a cost-effective sowing technique.

Leon Garry describes his story to *Lisa Gray*.

"We took over this property in 1953. At the time, it was common practice to clear dead timber and increase the carrying capacity of the land. The dry timber was cleared, dams were built, bores were drilled and the paddocks were subdivided and sown to pasture.

But, the excess fertiliser and nutrients from the sheep affected the growth of native vegetation and most of the bluebell scrub and casuarinas were eliminated from the paddocks. We didn't know it at the time, but this resulted in a lot of water leaking through the soil into the groundwater system.

In 1989, a bushfire destroyed most of the green eucalypts on the property. The next winter the water table rose alarmingly. It became so wet, the eucalypts that had survived the fire began to disappear and some of the low-lying areas became waterlogged.

We contacted Greening Australia and they told us the problem was dryland salinity. In hindsight, the signs of salinity had always been there. We had areas that were wetter than usual, and salt-tolerant plants such as sea barley grass, pin-rushes and Yorkshire fog started to grow. Salinity had affected the pastures generally and there

was erosion along the gully lines. Once we understood how important the trees were in maintaining the natural water balance of the area, we set about finding a solution - for us that meant strategic tree planting.

Our first project involved planting 2000 tagasaste seedlings on the top of a hill to stop the saline discharge at the base of the hill. We planted four large blocks of red gum seedlings and 300 seedlings around a discharge site near a dam. Individual seedlings were also planted in strategic positions around the property.

Growing and planting the seedlings was expensive and time consuming, so we began to look for an alternative. After a bit of experimenting, we found that sowing seed was more effective than planting tubestock. We developed a practical and low-cost method of sowing using a hydraulic seed distributor attached to a two-furrow plough.

Since 1992, we've planted over 200 km of seed. The most important thing is to get enough trees in the right place. We usually plant six rows of trees spaced four metres apart using a variety of local species.

Overall we've managed to get very good results in a relatively short time.

Following planting, the trees grew rapidly, the water table lowered and the paddocks dried up. Some of the old eucalypts that had almost died from the salt and insect attacks survived and are now showing excellent signs of regrowth. Native grasses started to come back and areas that were bare now have a rich cover of grasses.

The diversity of trees and shrubs is providing valuable habitat and birds that haven't been seen for years are returning to the area. The wattles flower most of the year and their seeds provide a valuable source of feed (protein) for the weaners.

Key points

- Devastating bushfires prompted significant revegetation program to reduce erosion and salinity risk.
- Quick and cost-effective methods make light work of tree planting.
- Surface soil salinity has decreased considerably since tree planting commenced.

There has also been a tremendous turnaround in surface soil salinity. Soil samples have been taken from several sites since 1994 and the salinity readings have definitely lowered. The surface soil salinity has virtually disappeared in some places. For example, in one area, the tests show that salinity has reduced from 3.04 dS/m to 0.07 dS/m and the results are similar in other areas.

The CSIRO and the Murray-Darling Freshwater Research Centre are currently doing some research on the property and we're confident the results will continue to confirm that what we've been doing has worked well on our property.

In a way we've been fortunate because our problems originate from localised recharge sites. This means that water entering the groundwater system doesn't travel very far before it comes back to the surface, so we can see the results of what we've been doing fairly quickly.

Recently I heard someone say that if everyone did this much planting, the Murray (river) would run dry. But from our experience, the trees exhaust the available water supply after a few years and 20-30 per cent of them die-off. The remaining trees help maintain the natural water balance.

After the fire, someone said 'something good will come out of this'. For me, it was an awakening to the problem of salinity. If we had realised the nature of the problem 20 years ago, we'd be light years ahead now. The good news is, in some cases, salinity can be reversed quickly and economically and the work you do will improve the situation globally."

• *Leon Garry spoke with Lisa Gray, NDSP Communication Coordinator (NSW).*

Above: Several projects have been carried out to put more trees back into the landscape on 'Weilora'.

Opposite page (top): The tree line in the top right hand corner of the photo was planted to stop the erosion caused by run-off.

Opposite page (bottom): Since increasing the diversity of trees for salinity and erosion control, Leon Garry has also noticed birds are returning to the area.

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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.

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

"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 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 intially, 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 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).*

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

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

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.

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

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.

"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.

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.

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.

"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*.

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

“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.

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 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).*

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.

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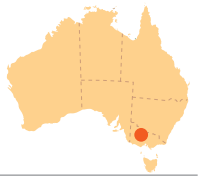
Pumping trials reduce risk to 'top drop'

Case study: Mount Langi Ghiran Wines
Location: Ararat, Victoria
Property area: 70 ha at two sites
Enterprise: Wine grapes (mostly Shiraz), 50 per cent of bottled product exported



The Mount Langi Ghiran vineyards are planted on the eastern slope of the mountain they are named after in the Pyrenees region of western Victoria. It's a stunning scene of rolling hills and big gums, but under the granite is the potential for damage. There is already evidence of dryland salinity in small discharge areas close to the vineyards and vineyard manager Damien Sheehan wants to stop it spreading.

Working with Mark Hocking, a contract hydrogeologist with the Wimmera Catchment Management Authority, Damien has authorised a groundwater pumping trial to take the water out of the water table before it becomes saline.

Mark Hocking takes up the story with *Jo Curkpatrick*:

"The aim of the project is to stop the groundwater picking up the salt on its way to the discharge site.

We've measured the salinity levels at the pumping site at about 1,250 µS/cm and 12,500 µS/cm at the discharge site. By pumping the groundwater out and into a dam at low salinity levels we are reducing the area of land that is at risk of becoming saline.

The groundwater is being pumped with an electric submersible pump and, using off-peak power, we're pumping about a litre a second from an initial groundwater level of seven metres into a storage dam.

For the first 12 months we used a solar pump but it didn't pump enough water. This set-up is a lot more efficient although it's early days yet with the electricity. Currently, more than 1 ML has been pumped from one of the bores over the past two weeks since we've had power and expect to pump more than 15 ML from the aquifer.

The quality of the water is quite good and

Photos: Jo Curkpatrick

Damien expects to be able to use it for the vineyard, but also to maintain environmental flows in the creek. He normally uses about 30 ML for irrigation. This year there will be none, so the dam becomes a bonus.

There are a number of monitoring bores and we are monitoring weekly. We see monitoring as critical to the project and we're measuring salinity downstream to keep an eye on what's happening. At the main discharge site we are monitoring aquifer pressures at 10, 30 and 60 metres to see the change in water level over time, and the change in area of the discharge site."

• *Mark Hocking spoke to Jo Curkpatrick, NDSP Communication Coordinator (Vic).*

Above: Fill 'er up...Mark Hocking and Mount Langi Ghiran vineyard manager Damien Sheehan watch good quality groundwater flow into one of the vineyard storage dams.

Opposite page (top): Contact hydrogeologist with the Wimmera Catchment Management Authority, Mark Hocking, inspects a pumping trial to reduce the risk of saline water supplies to Mount Langi Ghiran vineyard in western Victoria.

Opposite page (bottom): Small saline discharge site at Mount Langi Ghiran vineyard.

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Wine industry giant and conservation group join forces against salinity

By Bruce Munday

In July 2000, Southcorp Limited entered into an alliance with the Australian Conservation Foundation (ACF) to assist with the development of solutions to salinity. One of the tools to emerge from this alliance is an information kit titled *Salt: Nature in the Balance*.

The 54-page booklet aims to educate Australians about the causes of salinity, the costs, and the impact particularly on the natural environment. However there is also a very positive message, with plenty of attention given to government initiatives, opportunities for community and individual involvement and of course the role that Southcorp and the ACF are playing.

A feature of the information kit is its focus

on the impact of salinity on biodiversity and other conservation issues. It also shows how industry can play a role, profiling the steps that Southcorp takes when establishing its vineyards. This includes mapping the salinity hot spots so that vineyard management can be adapted to ensure that salinity problems are avoided or repaired. Southcorp recently reasserted its right to reject grapes from its 900 contracted grapegrowers if they fail to meet quality and environmental standards. This renewed push to protect the industry from salinity is further underlined by Southcorp's recent renewal of its alliance with the ACF.

Salt: Nature in the Balance provides a useful set of references for further information as well as a list of salinity and related environmental websites.

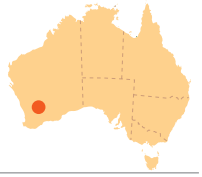
To order a copy or to find out more, call (1800) 332 510 or visit: www.acfonline.org.au

• *Bruce Munday is NDSP Communication Coordinator (SA).*

Above: The local Chinganning Brook shows clear evidence of salinity. **Below:** Fore! Jeff Austen and saltene green.

Rain is great on this parade

Case study: El Caballo Golf Resort
Location: Wooroloo, 60 km east of Perth, WA
Property area: 126 ha including 35 ha of grass
Rainfall average: 600 mm



Let it rain, the more the better – it's a catch cry of many farmers, but none more than Jeff Austen at El Caballo Blanco Golf Resort in Western Australia.

Not only will rain help his crop of fine grasses, but helps to dilute the ever increasing salinity levels in the irrigation storage lakes.

To many Western Australians, the name El Caballo Blanco recalls a family fun park with Spanish dancing horses. But while a resort still exists, the white horses are long gone and have been replaced by a golf course.

Unknown to many, the former kikuyu horse paddocks, irrigated by abattoir effluent, were causing unfavourable weeds, run-off and mosquito plagues. New environmental laws in the early 1990s resulted in the threat of abattoir closure and a means was needed to discharge large quantities of effluent water in an environmentally friendly manner. A golf course was deemed to be the answer, grass being a very efficient filtering system for the water.

When Jeff Austen arrived in 1995 the irrigation water was only slightly saline with salt levels about 800 to 1200 ppm and the scheme was going well. But each year, salinity has increased through evaporation, and now the levels exceed 7,000 ppm – about twice the comfort level of most grasses.

But forget pumping as a solution; the local groundwater is in the 15,000 to 16,000 ppm

range, about half as salty as sea water. And the Chinganning Brook which flows through the resort and links to the Swan River carries a similar salt load.

Instead, the golf course must rely on rainfall and waste water trucked from an abattoir and prison. So any rain to help flush salts and provide extra water is very welcome.

To survive, the golf resort has had to make dramatic changes in plant species and management, or face becoming a saline wasteland. And this led to Jeff winning the Claude Cockburn Environmental Award in 2002, from the Australian Golf Course Superintendents Association.

Salt water couch, seashore paspalum or saltene (*Paspalum vaginatum*), is now the main grass on the greens and some fairways, combined with Green Lees Park and Santa Ana couches, rather than the usual bent grasses. Winter dormancy of these species is a major challenge but winter grass (*Poa annua*) helps fill the gaps.

"But on the positive side, salt water is killing the weeds!" Jeff jokes.

Along the fairways, salt-tolerant trees and shrubs have replaced earlier selections that died and irrigation systems have had to be modified so that irrigation water no longer falls directly on the leaves.

"Wandoo has been good, but blue gums can't cope," Jeff comments. "Bushy yate is okay, as are salt water gums, casuarinas and *Anigonis flexuosa*, even though it only lasts about six years." A low-salt fertiliser regime has also been important, because conventional choices such as superphosphate are high in salt. A calcium nitrate mix with potassium sulphate seems to be working well, especially as ample phosphorus is provided through the abattoir effluent.

Above: Golf course superintendant Jeff Austen checks out some fairway repairs using saltine.

Below: A 'verti-drainer' with solid tynes has been a boon in improving drainage.

Photos: Georgina Wilson

Good drainage is essential, as without it salt builds up and kills the grass. Very coarse sand is used for topdressing so that drainage from greens and fairways is as fast as possible. A verti-drainer has also proved invaluable to ensure better drainage and greater aeration in the heavy soil.

Seepage on the hillside is a major problem, especially in wet years when about half of the golf course can be affected. To help counter it, about three kilometres of sub-soil drains have been installed – digging a trench, filling with railway ballast (better than the normal blue metal which washes away), then topping with geotextile fabric, sand and grass. These drains feed into open rock drains, of which there are also more than 3 km, or directly into the storage lakes.

Attractive lakes and wetland are part of the landscape, however it is not merely scenic, but part of 3,365 kL in water storage. Wetlands are also attracting birds and animals such as turtles and yabbies, indicating the health of the system, and mosquito plagues a dim memory.

Moving water around to minimise evaporation is another important strategy, reserving the less saline supplies for summer if possible. But stringent economies are necessary.

"An average golf course uses about 300 million litres of irrigation water over 18 holes each year," Jeff says. "In 2002 we used less than 90 million litres.

"In future, many golf courses will have to change their water usage. We are already doing it."

• *Georgina Wilson is NDSP Communication Coordinator (WA).*

CONTACT:

■ Jeff Austen, El Caballo Golf Resort Superintendent, Ph: (08) 9573 1496.

Photo: Land & Water Australia, Ian Rutherfurd

New manual demonstrates on-farm riparian land value

Riparian land on farms is critical for habitat, plant diversity and protecting the quality of water and its in-stream life. Riparian land is any land that adjoins, directly influences or is influenced by a body of water, including wetlands, dams, creeks, streams and rivers.

Salinity threatens riparian land because it is low in the landscape where the groundwater discharges to the surface. Where salinity is concerned, it's necessary to look outside of the riparian environment itself to the greater catchment area to protect its important values. *Lisa Robins* explains.

The Joint Venture Agroforestry Program (JVAP), in partnership with Land & Water Australia and the Murray-Darling Basin Commission, recently published a guideline to help farmers and extension providers in managing riparian lands with this bigger picture in mind.

"You need to start with the big picture view of the catchment before deciding on specific management objectives for riparian land," comments Dr Russell Haines, JVAP acting manager.

The guideline described as an 'excellent resource' by ABC-TV's 'Landline' outlines four key layers of catchment information – asset protection, target-setting, groundwater flow systems, and salt stores – to inform riparian land management at the farm level.

Dr Haines explains that "this information is not always available, but where it exists, it can inform riparian management". For example, once an asset has been identified, like town water supply, it is easier to see how riparian land helps to protect or enhance its value.

"Failing to protect an asset can be costly," he says.

Once farm and catchment assets have been identified, a decision on the level of protection (target-setting) and how this will be measured is needed. Riparian land tends to be a focal point for target-setting because it is where a small investment can result in a large environmental benefit.

Dr Phil Dyson, a specialist hydrogeologist, urges land managers to understand how their groundwater system behaves, as it may indicate whether riparian land is at risk from fresh or saline high water tables.

Dr Dyson helped mastermind the National classification of groundwater flow systems, which can be used to see how water moves in a particular catchment,

Photo: Land & Water Australia

Above: Riparian land is the last line of defence for the protection of water quality and in-stream life.

Opposite page: In undisturbed rivers there is often a large amount of woody debris present on streambanks and in the channel – this provides for a range of habitats for fish, birds and other plant and animal species.

where and when (response time) salinity is expressed at the soil surface and how it might be addressed.

He warns: "it's not suitable for assessment at a farm level, but it will give an idea about the sorts of options appropriate to a particular catchment."

Knowing where salt is stored in a catchment and its potential for movement will pinpoint a threat to the stream and its riparian land. Once areas of high salt stores with potential for movement have been determined, vegetation can be retained or replanted to keep it in place.

The riparian guideline tackles 10 specific management objectives, each with a table of management practices to assist in making trade-offs against competing objectives.

Dr Haines emphasises that the summary of the research underpinning these principles and practices is provided to support on-farm decision-making with the best available information. Although it mainly draws on information about southern Australia, it can be adapted for use more broadly.

More information about the JVAP can be found at:
www.rirdc.gov.au/programs/aft.html

In addition, there are more than 70 reports for free download at:
www.rirdc.gov.au/fullreports/aft.html

• *Lisa Robins, Robins Evirnomental Consulting, is the author of 'Managing Riparian Lands for Multiple Uses.'*

CONTACT:

- For a copy of the riparian management guideline, contact Joint Venture Agroforestry Program (JVAP), Ph: (02) 6272 4819.

Why are riparian lands important?

Riparian land usually supports a higher diversity of plants and animals than non-riparian land, and sometimes harbours endangered or vulnerable plants. It provides habitat for wildlife, and acts as a corridor for their movement between patches of vegetation. It is generally more fertile and productive, with better quality soils, and is the last line of defence for the protection of water quality and in-stream life. Riparian plant life is in itself unique and diverse, with vegetation that is often taller, denser, and more structurally complex than the surrounding native vegetation. Its microclimate is often more humid, and is strongly influenced by the width of the riparian vegetation.

Farm forestry demonstration manual welcomed by advisors

Photos: Lisa Robins

Dave Carr has been trialing species for farm forestry for the past three years as Greening Australia's national coordinator of the farm forestry network. Recent catchment plans identify tree planting and vegetation protection for reducing leakage to groundwater for salinity management.

"Farmers need specific information to be confident about making a go of farm forestry."

Farm forestry provides a means of putting trees back into the landscape, and offsetting the costs by offering a future commercial return.

From Dave's perspective, the purpose of a species trial is to provide critical information about how a species, and potentially its individual provenances, can be expected to perform in a particular environment.

"A lot of research targets the top five commercial best-bet species, like blue gums, but there are over 600 species of eucalypts, as well as many other species, many of which have potential in Australia for profitable returns to farmers," he says.

"Environments vary significantly across Australia – dry and salty, wet and cold, dry and alkaline – and farmers need specific information to be confident about making a go of farm forestry in their particular conditions."

The Joint Venture Agroforestry Program (JVAP) has produced a manual on the establishment of field trials and demonstration plantings for farm forestry. It is one of a series to support extension advisors and farmers in developing a stronger farm forestry industry in Australia.

"Greening Australia uses the manual in every State at present, and we particularly use it to train new staff unfamiliar with managing trial sites," says Dave.

Above: Dave Carr near Greening Australia's Reedy Creek catchment species trial just outside of Canberra, ACT.

Left: Insect attack varies between species being trialed for farm forestry and represents an important indicator of long-term growth and survival.

Three more manuals will be released in forthcoming months. The others will address the topics of site selection, silviculture and growing rainforest trees.

Designing farm forestry trials for species and provenance selection is available from JVAP, Ph: (02) 6272 4819.

•The Greening Australia fact sheet *On-farm research for farm forestry – simple methods to obtain quality information* can be downloaded from the Greening Australia web-site: www.greeningaustralia.org.au

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Dry dirt, green grain using EMS process

By Brendan Cant

One of Australia's big 'green obstacles' is its ongoing struggle with salinity, which results from the draining of water through the soil profile and into the water table, especially under annual cropping systems. Customers may not always accept these production systems, which surrender between 10 and 100 times the water recharge that natural flora did, before being cleared.

The Grains Research and Development Corporation (GRDC) has supported national programs piloting environmental management systems (EMS) to help provide those assurances. Dr Anna Ridley of the Department of Sustainability and Environment, Victoria, has begun incorporating salinity management into EMS. Her model Riverina EMS package aims to have all farm land not under grain crops growing perennials, to dry soils to maximum depth over summer and optimise their moisture holding capacity for the impending autumn showers.

Leakage generally occurs over winter, when heavy rain events escape shallow annual plant roots. Group members therefore calculate leakage using annual rainfall figures for that period and subtracting crop water use and the soil moisture holding capacity.

Soil moisture storage capacity is determined by entering variables such as cropping history and soil type into a matrix. This determines the amount of rainwater the soil can hold above what plants absorb, before it begins leaking into the water table. Soil water holding capacity is greater after perennial crops.

After using this system to determine the leakage escaping their farms, growers can manipulate perennial rotations to manage it, with a goal of complete cessation. It also quantifies growers' water management practices and helps qualify EMS accreditation.

Pre-emptive marketing endeavours such as EMS and salinity management will help Australian grain retain its reputation as a quality and safe product, no matter what the criteria.

• *Brendan Cant is GRDC Western Region Communicator*

CONTACT:

■ Dr Anna Ridley, Ph: (02) 6030 4500

Tell your story in SALT...

Australia's National Dryland Salinity Program (NDSP) is a partnership in research, development and extension tackling the salinity risk to Australia's land and water resources.
Every success story in the battle against salinity should be told - your experiences and solutions might help others. Do you have a story to tell about your experiences in tackling salinity? If so, SALT magazine wants to help you share it. Contact your nearest NDSP Communication Co-ordinator:

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For further information about Australia's National Dryland Salinity Program, visit our web-site on-line at www.ndsp.gov.au

salt

The Magazine of Australia's National Dryland Salinity Program

"On pure economics I should have just bought extra land and walked away, but turning the country around is really rewarding – a real buzz. Never in my wildest dreams, did I believe I would be treading on grass here...from toxic trenches, we now have good quality water with shrubs and trees regenerating, and large numbers of birds."
Peter Scanlon, wool grower, WA
(see story page 5)

"For me, it was an awakening to the problem of salinity. If we had realised the nature of the problem 20 years ago, we'd have been light years ahead by now. The good news is, in some cases, salinity can be reversed quickly and economically and the work you do will improve the situation globally..."
Leon Garry, grazier, NSW
(see story page 8)

SALT Magazine brings you success stories from people tackling dryland salinity on their land or in their area. Dryland salinity has emerged as a major threat to the long-term sustainability and profitability of Australian agriculture and is increasingly impacting on infrastructure in urban and regional areas. However, success in managing salinity is being achieved across Australia, through a variety of means.

Australia's National Dryland Salinity Program (NDSP) is a partnership in research, development and extension tackling the salinity risk to Australia's land and water resources. NDSP regularly publishes SALT Magazine to share personal stories of success in managing dryland salinity in a straightforward style.

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