



# Managing salinity in a local system

**Case study:** Collins family, Tungkillo  
**Location:** Eastern Mt Lofty Ranges, SA  
**Property size:** 1040 ha  
**Soils:** duplex, sandy loam over clay  
**Rainfall:** 600 mm  
**Enterprises:** fine wool, prime lambs



**P**erennials are paramount in any grazing system at risk from salinity, however for the Collins family in South Australia's Mount Lofty Ranges, native pastures are playing an equally important role as introduced species, as Maurice Collins explains to Bruce Munday.

Tungkillo is in the eastern Mount Lofty Ranges and is under a rain shadow, which apparently explains why there is still a lot of salt in the landscape – there just hasn't been sufficient rainfall to flush the salt through.

There has always been evidence of salinity in the region, hence names such as Salt Creek, but the areas affected seem to have expanded and certainly in the very wet year of 1992 lots of new saline areas appeared and existing areas expanded.

The area affected by salinity is not great and tends to be mainly along drainage lines. Sometimes this will appear as bare scald, often it is just sea barley grass, but this then fades into normal pasture that is most noticeable for its relatively low productivity.

In many places the groundwater is within less than a metre of the surface and certainly if you dig a post hole on the flats in winter you always strike water. Given the undulating nature of the landscape the overall area affected by salinity cannot really be expected to increase dramatically. Far more likely is that if recharge increases the seepage of saline groundwater into the watercourses could increase, resulting in an added salt load to the Murray.

The Tungkillo Landcare Group has been monitoring piezometers for 14 years and we know that the fractured rock aquifers respond very quickly to rainfall events, indicating that we have very local groundwater flow systems.

This has encouraged us to act locally and revegetate many of the ridge tops (with assistance from the Natural Heritage Trust). So far I have direct seeded about 25 hectares of these ridge tops using locally collected



Photos: K Munday

seed, not just because it should help reduce recharge but because it also provides many other benefits.

For a start it provides cover on exposed sites that usually just grew capeweed and barley grass and were likely to blow in autumn, so we have lost little in productivity.

It also provides stock shelter, it contributes to biodiversity and it dramatically improves the general appearance of the property.

We have now fenced off one of the saline seeps and planted native vegetation out beyond the waterlogged area. An earlier trial on a neighbour's property showed that this works quite well, the trees looking very healthy after 17 years and the saline area dried out and completely covered with rushes and sedges.

An interesting feature of these mildly saline areas is that they often support quite extensive stands of strawberry clover and have done so for as long as most of us can recall. It is always fairly stunted and interspersed with sea barley grass, but we have never really done anything to improve it, partly because the areas are generally small and it is difficult to justify fencing it off and looking after it.

This year the Landcare Group has commenced a Land, Water & Wool Sustainable Grazing on Saline Lands project on one of my sites to see if we can improve the productivity of the strawberry clover, either by itself or in combination with other salt-tolerant pasture species.

A couple of years ago I completed a Prograze course that gave me a much better idea of pasture management, and particularly the role of perennials and how best to manage them. As part of our property plan we are now trying to gradually eliminate annual grasses by hard grazing with large mobs of stock for short periods rather than set stocking as we have always done. The problem of course is that when the annuals are going to seed we have far more feed than we have mouths to put on it.

One issue I am particularly keen to pursue is the role of native grasses in the pasture mix. After a very wet year in 1992 a huge number of river red gums germinated in one unstocked paddock. We shut this paddock up for a couple of years only to discover

## Key points

- A local groundwater system gives us an opportunity to affect recharge
- Salinity management can be integrated with other NRM issues
- We need to ensure that a positive impact on salinity does not result in a negative impact on water resources



**Opposite page:** Water quality and flow will now be monitored as part of an EMS.

**Above:** Strategic grazing pressure is being used to increase perennial composition of pastures.

that there was also a very healthy sward of native grass – mainly *Danthonia*, but also *Microlaena*. A fire in 1996 gave these grasses an even stronger hold and we are now looking at grazing strategies to encourage them firstly to survive and then to flourish. Our approach at this stage is again to graze the annuals hard to reduce their seeding and then let the perennials come up to seed.

The streams in the Tungkillo region, whilst brackish (varying from about 3 to 15 dS/m in summer), are generally seen as a valuable resource. We need to be very careful that our revegetation activities and the increased use of perennial pastures does not so reduce recharge that the creeks dry up in summer or so reduce run-off that they become excessively salty.

These streams are often a major source of stock water and have usually been left unfenced. There are three problems with this approach: firstly stream banks and riparian vegetation are damaged by stock and the water fouled; secondly, waterholes sometimes become so salty as to be dangerous to livestock; and finally, some of these creeks have acid sulfate soils that become very unstable if disturbed by grazing activity.

Over the years the Landcare group has encouraged us to fence off our creeks. This now gives us an opportunity to monitor water quality more reliably, which is something we will be doing as many of us in this catchment are now undertaking an EMS on our properties.

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## The science behind the story

**By Dr Jim Virgona**

In hilly or otherwise non-arable country native grasses are often the only perennials available for grazing. Recent research in eastern Australia has found that in many pastures dominated by annual species there is still a base of useful native perennials such as wallaby grass, red grass, common wheatgrass and spear grass. The question is: How do we manage these paddocks to allow the native grasses to dominate and provide better groundwater management?

I believe the Collins are on the right track. Grazing the annuals hard in spring reduces competition when native grasses are beginning to grow (e.g. red grass) or beginning to flower (e.g. wallaby grass). Maurice rightly points out that this is difficult on farm because pasture growth rate is very high at or just before flowering.

In our research aimed at increasing red grass and wallaby grass in hill pastures of southern NSW and northern Victoria (600-700 mm annual average rainfall) we use 25-30 DSE/ha to put pressure on the annuals, but do this from the start of spring well before ear emergence. Then after eight weeks we lock up the paddock to allow the native grasses to seed down.

This five-fold increase in stocking rate is not easily achieved on farm, but an option might be to cut other paddocks for silage. Research has found that early flowering grass species, like silver grass, are decimated by a well-timed cut in early October.

Annual species can also be reduced by combining lax grazing in winter with hard grazing in spring. Under lax grazing the growing point of the plant will be higher and more vulnerable to grazing than when continuously grazed. Timing should be determined locally as it will depend on plant development and not date.

In encouraging our native grasses to seed down and thicken-up, care must be taken to manage the developing seedling. Late spring or early autumn rainfall will determine whether or not these species germinate and establish. So too will management – grazing young seedlings will almost certainly result in high plant mortality and a failure to improve the native grass content of the pasture.

The CRC Salinity is providing valuable data on how these species respond to grazing management, but much on-farm experimentation will be needed as well. Grazing management strategies to improve native grass content should be built on three principles: control the competition, allow the native grass to flower and look after the seedling.

• Dr Jim Virgona, Charles Sturt University, leads the CRC's research project 'Managing Perenniality in Permanent Pastures to Improve Catchment Hydrology'.

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