

Pulling the plug

Success stories are always good news, and David Liddicoat's experience in managing salinity is certainly a success. David has shown that understanding how natural systems work on your land is a great start to solving problems. He told his story to Bruce Munday.

"When our family moved here in the early 1970s we were aware of salinity along the drainage lines, not just on this property but throughout the district.

Locals will tell you the wet years in the mid-fifties really kick-started the problem and it took off again in the late '70s. We estimated that on our property the area affected was expanding at an average rate of between one and two hectares per year, and by the mid '80s we had about 140 ha badly salt-affected.

Our problem is magnified because five creeks enter the property and leave as two, so we are right at the bottleneck. Over the years widespread clearance of native vegetation and excessive tillage in the upper catchment resulted in large amounts of silt clogging up our creeks. This caused the surface water to pond and I thought it probably also restricted the lateral flow of groundwater.

In the vicinity of the drainage lines the water table can be as little as 300 mm below the surface, and the water salinity is about 20 dS/m (approximately one-third that of sea water).

Case study: David Liddicoat

Location: Ungarra, Eyre Peninsula, SA

Property size: 647 ha

Mean annual rainfall: 400 mm (winter dominant)

Soils: Saltland is predominantly clay; creek flats a mixture of clay and sand; subsoil strongly alkaline

Enterprises: Cropping; sheep for wool and meat



Finding an answer

My parents started planting trees along the creek banks when this seemed to be the generally recommended practice. The hope was these would reduce the recharge that seemed to be causing the problem. Of course we have since realised a problem like this was never going to be solved with 10,000 trees.

I changed my thinking after a discussion one day with Trevor Dooley from PIRSA who described the groundwater system here as being a bit like a bathtub that was filling up. So I thought, 'why are we trying to mop this up with towels — shouldn't we be looking for a way to pull the plug?'

All up we have excavated almost 10 km of drain, essentially removing the years of accumulated silt and digging down into the groundwater. We have also dug a series of shallow spur drains that feed into the main channels.

The experience was amazing — the water ran in the drain continuously for nine months and we had a sense that the whole landscape was being reborn.

Six years after we began the drain the water table near the creeks has fallen by more than a metre, and encouragingly there is now regrowth of eucalypts and melaleucas along the creek banks. So we have pulled the plug but we still have the mops to help manage the recharge.

Where once we had samphire or bare scald we now have 18 ha of old man saltbush with puccinellia and balansa clover understorey as part of an SGSL Producer Network project. This has done extremely



David Liddicoat - "the water ran in the drain continuously for nine months"

well, and we even have ryegrass and medics emerging in the pasture.

Another 42 ha paddock really looked as if it was about to go out to salinity if we had another wet year. The middle of this paddock was bare scald and one corner was just samphire. We ripped the scalded area after the drains began working, and two years later we cut 400 small squares of lucerne from this 4 ha of what had been the most useless bit of dirt on the property. The rest of the paddock now carries an excellent stand of lucerne and oats.

All up we have reclaimed 115 ha of salt-affected land that had contributed practically nothing to the farm's productivity. Of the remaining 27 ha, we are renovating a further nine, with the final 18 ha along the creek lines to be revegetated.

What has it meant for the farm

Until we undertook his work we had practically got out of sheep. We had a token 150 head running on very poor saltland pastures at about 1 DSE/ha.

Key points

- Restoring natural drainage lines has opened up opportunities for worthless land
- Previously worthless saltland is now highly productive
- A combination of engineering and agronomy has been a winning formula.

We now have 700 ewes and lambs on the same area with very little need for supplementary feeding. This has the added advantage of giving us sufficient sheep to have an impact on summer weeds in the cropping paddocks.

Solving salinity problems with a drain is not as simple as it might seem. Our soils are pretty clayey, particularly when you move away from the creeks. So getting rid of surplus water along the drainage lines is no guarantee that water tables further away will benefit.

As well, removing saline water from our property could have produced an unwanted problem for neighbours and the environment downstream. We consulted the neighbours and got their OK, and in fact they are undertaking similar drainage work. There are no wetlands or other environmentally important areas between us and the final outfall of Salt Creek into the sea near Lipson, which was the natural discharge for the creeks in the days when it used to flow uninterrupted.

I suspect we have had success with saltland because we got several things right. Firstly we got rid of the excess saline water that had made even salt-tolerant pasture difficult to establish. The saltland pastures



Photo: © Liddicoat

David Liddicoat (I) and Linden Masters — medic in pucci where once there was bare scald

such as saltbush and pucci then further contributed to rehabilitating the land by providing cover and reducing evaporation of soil moisture and concentration of salt.

As the salt has slowly been leached back past the root zone we have been able to get going with less salt-tolerant plants like lucerne.”

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The science behind the story

By Linden Masters

The landscape of David Liddicoat's property at Ungarra is relatively flat and situated where five creeks merge into two, which eventually join to form Salt Creek.

Past district farming practices using excessive cultivation to kill weeds, particularly grasses (prior to chemical use), caused significant waterlogging and the fine tilth allowed run-off of soil into the streams. Summer rainfall events on fallow did not help the situation and by the time contour banks were introduced a lot of soil had moved down the landscape.

Silting of the waterways occurred over a fifty year period, slowing stream flow and causing brackish water to accumulate in the lower lying areas. The wet year of 1956 and then the 1966-67 floods saw intense waterlogging and the rising water tables caused scalding on many properties.

Draining the system has been somewhat

fortuitous in David's case. As he points out, the extent of the impact of a drain depends very much on how well the soil transmits water, and clayey soils do not. Fortunately in this case there are alluvial seams of gravel and sand in the creek flats. The excavation has cut through these seams and released the water held back through the silting of the stream. When breached, waves of water flowed down stream for some months. The excavation got the main stream flowing and subsidiary drainage lines and surface drains enabled quite a large area to be drained.

The lowering of the water table by a combination of drainage and vegetation has seen a marked transition from bald scalded areas to being able to grow pucci then tall wheatgrass and salt bush with medics and rye grass as understorey.

ECe measurements on the SGSL site have shown the soil salinity has gradually decreased as salts have been slowly flushed

from the soil. Eucalypts and melaleucas have started re-shooting and there has been a new regeneration of paperbark teatree (*Melaleuca halmaturorum*) along the main creek line.

Where David has sown lucerne the stock are not eating the new eucalypts as his careful grazing management removes stock before they become too hungry.

- *Linden Masters is a Sustainable Agriculture Systems consultant with Rural Solutions SA and contributes to the CRC Salinity as part of the SA Department of Water, Land and Biodiversity Conservation input to the CRC.*

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