



Bruce and Mark Whitby with saltbush planting on discharge site.

Photo: E Madden

Salinity experience can be beneficial

Much has changed for Bruce and Mark Whitby after 19 years of managing their 50 hectare saline discharge area. Bruce has found that having a bit of salt is not the end of the earth and, that at the end of the day, you could actually end up better for the experience. For Mark, coming to grips with salinity has left him more environmentally aware. Bruce and Mark tell their story to *Elizabeth Madden*.

It was the poor performance of the first barley and wheat crops sown on the new property that led us to suspect we had a problem. Bare areas showed up in parts of these crops. We also lost 10 lambing ewes early on, as the water table intersected the dam. At 60 dS/m the dam water was as salty as the sea.

Like a lot of farms across Australia, dryland salinity is found around here as over time the once predominately perennial plant cover has been replaced with annuals, although that's changing now. The fact that

Case study: The Whitby family

Location: Narrandera, NSW

Property size: 2000 ha

Rainfall: 340 mm per annum

Soils: Gray clay / red brown earth

Enterprises: Sheep (wool & lambs), cereals and irrigation



the property is located in a low lying area in a small closed basin affects where and why salinity occurs. Groundwater flows in our direction through sand aquifers that are fed to a degree by the Murrumbidgee River.

During wet years in the late 1980s, water would pool on a lot of the property. Other signs of salinity appeared such as bare scalded areas, stock licking scalded areas, waterlogging after light showers, and salt-tolerant plants such sea barley grass. The dam water was a bluish colour, had an unusual odour, and was so clear you could see to the bottom. Fortunately we had access to water from the Murrumbidgee

River. After 10 to 15 years of revegetation works the dam water quality has improved greatly as the water table has fallen. It is now 19 dS/m which is still 3.3 dS/m above the limit for adult sheep on dry feed.

First off we approached the then Department of Water Resources for advice. We continued to learn more about salinity from the newly formed Strontian Road Landcare Group, installed nine piezometers and a Land and Water Management Plan for the Landcare area was produced. Natural Heritage Trust funding was then available which helped cover the cost of the saltbush plants, at almost \$500/ha.

Key points

- Lucerne is the preferred perennial plant for recharge areas
- We keep learning more about managing salinity through trial and error
- Stabilising this discharge site has been a costly exercise even with some Natural Heritage Trust funding support

We've aimed to increase perennial plant cover using trees, saltbush and lucerne to manage salinity. To fit in with the cropping program, our 2000 trees have been planted around paddock perimeters and mainly in recharge areas.

More lucerne has been put in recharge areas over the last 19 years and we now

prefer lucerne over trees for a number of reasons: short term financial gain, no need to fence it off, land use can be alternated and it's less of a financial commitment. Lucerne has definitely had a good effect reducing recharge.

In the 50 ha saline discharge area, we have planted roughly 100,000 saltbush (*Atriplex nummularia*) over 40 ha. This work has also helped improve the productivity of an adjacent paddock which had signs of salinity.

The first saltbush planting has four metres between single rows of plants with one metre between each plant. Double rows of plants two metres apart with the same four metres between rows were used in the second planting to improve productivity and stock access.

If we were putting in saltbush today, we would increase the row spacing so other plants could be sown between the saltbush. The saltbush needs no other management other than grazing control and sheep maintain their weight while grazing the saltbush.

The saltbush is crash grazed annually with

1200 ewes put on 8 ha blocks for about two weeks. Electric fencing is used with a trough as the central watering point. Sheep are sometimes run through the saltbush, for example, before lambing to eat the rye grass, barley grass, strawberry clover and trefoil growing between the rows.

Over the years we have got plant cover on what was a bare discharge area, we have more perennial plants on recharge areas and the water table has been lowered.

We wanted to at least get cover on the bare ground as every morning we'd drive past the discharge site and it looked like it was spreading and we didn't know where it would end.

Now we know all is not lost and that we appear to have controlled the salt problem.

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The science behind the story

By Ed Barrett-Lennard

1. Lowering of water tables using saltbush. As the groundwater becomes more saline there are real problems with the use of trees as 'biological drains'. In general, farm trees only use substantial groundwater at salinities less than about 10 dS/m (~15 per cent of the salinity of seawater). However, halophytic (salt-loving) plants like saltbushes can use more saline groundwater. We have preliminary evidence that commercially-managed saltbush stands near Lake Grace in WA are drying out soil profiles to depths of 2 m over groundwater almost as saline as seawater. Better documenting the design criteria for saltbushes as 'biological pumps' is a continuing focus of our activities in the Land, Water & Wool Sustainable Grazing on Saline Lands (SGSL) WA2 project.

2. Incorporating under-storey species into saltbush stands. Nutritive analyses show that while saltbush fodder is very high in crude protein, it has limitations as a sheep feed because of its relatively low digestibility and high salt content.

Therefore saltbushes should be fed off with other fodders of somewhat higher digestibility that will also dilute the salt in



Photo: M. Lloyd

Saltbush can lower groundwater locally to enable establishment of legumes such as Balansa clover.

the diet. The use of saltbushes to lower water tables and encourage the growth of higher value understorey plants can be a useful way to expand the range of plants growing on saltland. 'Crash grazing' also seems to be important - it ensures that the sheep eat the palatable and unpalatable components of the feed on offer simultaneously.

3. Ideal spacing for saltbush? The tally of 100,000 saltbush plants over 40 ha works out at 2500 plants/ha. This is a fairly high

density for saltbush.

Similar levels of production of saltbush leaf per hectare might be achieved with lower planting densities. Lower planting densities may also decrease establishment costs. Some farmers are adopting alley farming planting layouts (several closely spaced rows of saltbush, with a wider bay between).

These layouts may enable farmers to drill in higher value under-storey species once water tables have been drawn down.

• Dr Ed Barrett-Lennard, Dept of Agriculture WA, leads the CRC's SGSL research project 'Optimising the saltland pastures system for profitable use.'

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