

Wet soils for less salt

In big scale terms, salinity is not a serious problem on *Berowra*, Steve Francis says, being limited to around four hectares near the house. But those few hectares, apart from appearing to be spreading, also occur above a large dam supplying water for stock and for a small irrigation system to provide water for his father's vineyard.

The SGSL sponsored site also has one of the highest salt concentrations recorded in the area. In fact, Steve was told it would be next to impossible to grow pastures on it.

That was a challenge Steve Francis was prepared to take up when he spoke with Matt Crosbie.

"When the groundwater salinity level was first measured, it came out at something

Case study: Steve Francis, *Berowra*

Location: Dunedoo (Central West NSW)

Property size: 1010 ha plus 2400 ha leased

Mean annual rainfall: 600 mm (evenly spread over summer and winter)

Soils: Granite pH 5.5–6.0

Enterprises: 2000 Merino ewes, 700 cows, cropping



higher than sea water — I was told I probably wouldn't be able to grow anything on soil affected by such high salt concentration.

It's only a small area of salinity, perhaps a bit over four hectares. I fenced off about 12 ha around it, put trees in and looked at managing it as a salinity site. I am also planning to establish perennial pastures of fescue, cocksfoot, lucerne and clovers into the salt area's catchment zone. The aim is to use the water and prevent recharge which is lifting the water table under the salinity site.

The problem is the trees were never going to beat the salt — the salt's already there as part of the soil.

During the 1950s there were big rains in this area and the topsoil eroded. This was followed by a bit of clearing, and it may have been that a culmination of these factors created an environment for salt to come to the surface.



Photo: M Crosbie

Steve Francis with the remains of 240 round bales of straw spread on a salinity site on *Berowra*, to mulch the area and successfully establish salt-tolerant species

Key points

- Innovative thinking and advice helps to beat the salinity problem
- Mulching with cereal straw creates a niche environment in which salt-tolerant plants can grow

The science behind the story

By Luke Beange

Almost by definition, salinity sites have high concentrations of salt on the soil surface which is obviously not an ideal environment for germinating seeds. This salt has been brought to the surface by underground water and deposited where the water evaporates and leaves the salt behind.

The key is if you can reduce the evaporation at the surface you can make that environment less salty. And mulch is a very good way of reducing evaporation as well as helping to create a favourable micro-environment for seed germination.

On Steve Francis' site, what is going to happen as time goes on is that the salt-tolerant pastures will be using the salty water which will help alleviate the salt problem.

The more salt-tolerant pastures, such as tall wheatgrass, will be the ones which survive. The trick will be to employ strategic grazing to use these salt-tolerant species in their active stage of growth when they are palatable and using moisture.

One of the problems with managing pastures for high water use is that people either under graze or over graze. The key is

to keep the pasture with fresh leaves so the plant is actively using soil moisture.

• Luke Beange is the Project Officer for the NSW SGSL Producer Network based with NSW DPI.

CONTACT

■ Luke Beange, NSW DPI

T: (02) 6881 1294

E: luke.beange@dpi.nsw.gov.au

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Communications Manager (National & SA)

Dr Bruce Munday
T: (08) 8538 7075
E: bruce@clearconnections.com.au

WA Communications

Georgina Wilson
T: (08) 6488 7353
E: gwilson@fnas.uwa.edu.au

Victorian Communications

Jo Curkpatrick
T: (03) 9328 5301
E: jo@spancom.com.au

NSW Communications

Matt Crosbie
T: (02) 6926 2817
E: nativegrass@bigpond.com

Corporate Communications

Liz Wheeler
T: (08) 6488 8553
E: ewheeler@fnas.uwa.edu.au

Extension team

Trevor Lacey, DAFWA
T: (08) 9690 2101
E: tlacey@agric.wa.gov.au

Trevor Dooley, PIRSA Rural Solutions
T: (08) 8568 6418
E: dooley.trevor@saugov.sa.gov.au

Carole Hollier, DPI Victoria
T: (02) 6030 4582
E: carole.hollier@dpi.vic.gov.au

Deb Slinger, NSW DPI
T: (02) 6938 1901
E: deb.slinger@dpi.nsw.gov.au

I'm trying to create a new environment that discourages the salt from being drawn up to the surface and even encourages it to be leached back down. And that involves trying to get pastures to grow on an area which is extremely hostile for them.

Initially I tried to sow pastures on the salt site and got some establishment on the fringe zones, but nothing would grow on the really salty areas.

My aim then became to stop that salt coming to the surface. The idea was to keep the soil wet so the salt would not be drawn up to the surface and we would end up with plants that could grow over a shallow saline water table but in soil that was hopefully not too salty.

My plan was almost the opposite to what I had initially thought was the right way to go, namely to dry out the soil. I realised that what I really needed to do was to prevent capillary action so that salt would not concentrate — essentially to dilute the salinity at the surface so that plants would have a chance to establish.

I baled a paddock of cereal stubble and got 240 round bales to roll onto the salt block — it was mulched like a garden with the idea of keeping the ground cool and wet.

The mulch was then left for nine months before being sown in June last year.

I spread a total of 7.3 tonnes of gypsum on top of the mulch in a concentrated area which equates to around 2 t/ha and sowed a pasture mix of puccinella, tall wheatgrass, Palestine strawberry and balansa clovers, Puna chicory and plantain Tonic were sown with Granula 15 fertiliser. The sowing method was simply to run a combine over the area and drop the seed into the mulch.

In the surrounding areas around the salt the mixture was Rhodes grass, Quantum tall fescue, Holdfast phalaris, Palestine strawberry clover, balansa and Paradana clovers plus paspalum. This was all sown with minimum tillage.

It was a bit of a brew to see what would happen.

This is the second attempt, as without mulching the plants did not survive, and I was anxiously watching the weather because salty, sodic soils are hard to handle but luckily we got good rain after sowing it.

SGSL organised site measurements through the Department of Primary Industries and Department of Natural

Resources, and they came out and did soil tests and a plant population count — at the moment tall wheatgrass seems to be standing out.

Why bother?

Why did I bother with trying to fix the area? For a start it's ugly — I don't like to see a salt problem.

The salty area comes and goes with the severity of the season. In a drought it looks worse as the salt concentration increases.

You don't want to see these things get bigger.

And there's no doubt that, well managed, some of your salt country can be the most productive country you've got and why not make the most of that production — it's not all just about the 'feel good' things.

At the moment things seem to be growing quite well, despite the drought starting to bite again.

I have crash grazed it once and will continue to manage it both for production and to keep good groundcover on the site.

However, I may have to mulch the site again. The mulch appears to have broken down much faster than I initially thought.

The key though is what will survive in the long term. I know I can get plants to establish into the mulch, but once the plants get their roots down into the salt? — in the long term I'm not sure.

I did get clovers established initially, but they seem to have disappeared, perhaps due to the seasonal conditions — but what comes through this winter will be really interesting."

CONTACT

■ Matt Crosbie, CRC Salinity (NSW)

T: (02) 6926 2817
E: nativegrass@bigpond.com



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