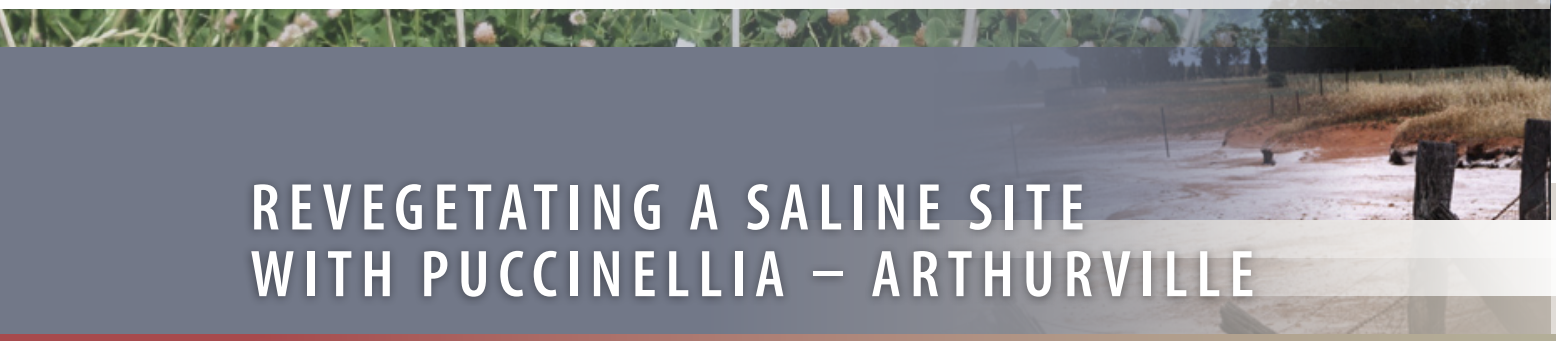


REVEGETATING A SALINE SITE WITH PUCCINELLIA – ARTHURVILLE

Case study – Wellington

FARMER: BERNARD SHERIDAN, ARTHURVILLE, NEAR WELLINGTON, NSW (IN COLLABORATION WITH HIS NEIGHBOUR, TREVOR OWENS)

QUICK FACTS

Area of site: 2 ha

Soil type: deep, heavy-textured soil (light to medium clay)

Groundwater system: fractured rock geology underneath

Watertable: always salty and close (about 50 cm) to the surface

Soil salinity (EC_e): surface is very saline (up to 30 dS/m), interspersed with fresher areas. All parts of the site are saline at depth (at least 13 dS/m at 0.5 m)

Pastures: puccinellia, plus tall wheatgrass

Grazing: absolutely minimal; priority is to preserve pasture

Features: This site is unusual for NSW in that puccinellia dominates, probably because the subsoil is permanently salty **and** wet, a condition that is not common in NSW.

The problem

From spring 2001 to autumn 2003, this 6 ha saline site was expanding (by about 500% in 18 months), even under drought conditions. The problem area is in the flow line at the bottom of a large bowl-like catchment where groundwater comes to the surface, leaving the subsoil permanently wet (the 'wet area'). There are patches of very saline land (EC_e up to 30 dS/m at the soil surface) interspersed with less saline regions, and areas of recent tree death. The outskirts of the area (not in contact with the groundwater) are non-saline. The area is typical of other sites within a 200-km radius.

In 1997, a salt-tolerant pasture mix was sown. It was successful at first but then died back. Some tall wheatgrass and puccinellia survived.

Actions taken at the site

In March 2004, the site was given a light grazing by 300 ewes. There was only a light covering of barley and rye grass present because of the dry conditions. A trial area was mulched with wheat straw before sowing, to see whether it would make any difference to pasture establishment. There was no weed control before sowing because there were very few weeds.

The inner, wet area was sown on 6 April on 30 points (8 mm) of rain, although the soil was still dry. The pasture mix included Salado lucerne, Paradana balansa clover, Tyrell tall wheatgrass, pioneer Rhodes grass, puccinellia, Palestine strawberry clover, Australian phalaris, cocksfoot and Aurora lucerne. The total rate was 8 kg/ha. This sowing was successful.

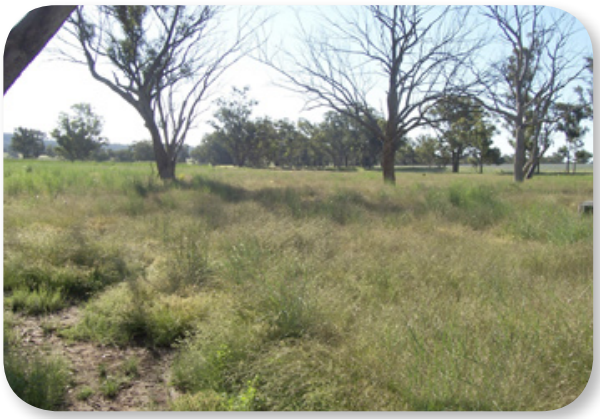
The outer (drier) area was sown on 6 June on good moisture. Antaz clover was added to the April mix, again sown at 8 kg/ha.

The mix was sown with a Duncan combine converted to direct drill, with presswheels. The row spacing was 25 cm. Granulock 12® fertiliser was applied at 100 kg/ha.

The new pasture was sprayed on 24 June to control earth mites. Five hundred trees were sown around the site on 10 July.

Luke Beange

Before: *Bare salt site in March 2004 (Central NSW salt team conducting soil testing)*



Luke Beange

After: *Puccinellia had covered the scald by November 2005*

By December, the ground cover was 75% to 80% in the previously bare areas and 90% to 100% on the fresher outskirts. There were still bare areas where nothing had been sown. The sown puccinellia was growing very well in the bare core scalded area. Not much difference could be detected between the wet and the drier areas in terms of sowing results. Locusts were thick at this time. Grazing had not been started, as the landowners were waiting for the trees to get higher and the grasses to seed and die to produce ground cover and mulch.

Twelve months later (in December 2005) the average ground cover had reached 95%. There was an average of 25 puccinellia plants/m^2; they were growing very well in the saltiest area and continuing to thicken each year. Tall wheatgrass had shown up this year and had reached a density of 2 plants/m^2. Bernard remarked that, "The tall wheatgrass has all of a sudden taken off. It is spoiling my clean stand of 'Pucca'."

Lucerne, clover and phalaris were growing only on the outskirts or away from the hotspots. Again, there had been no grazing while the landowner waited for the trees to become established. Weeds present were a little Wimmera rye grass and some barley grass. The first half of the year was very dry, but it was followed by a good spring. Surface areas were only wet after rain, although they were still moist under ground cover. Bernard was very pleased to have living pasture where before there had been bare ground.

The next year (2006) was very dry; this reduced plant dry matter and ground cover (average cover 62%). Grasshoppers, hares, rabbits and kangaroos all grazed the site as well. Puccinellia was still the dominant pasture. Pasture dry matter averaged about 0.5 t/ha.

Comment from Industry & Investment NSW

This is the only Sustainable Grazing on Saline Lands (SGSL) site in NSW where puccinellia dominates. Presumably this is due to the high salinity and relatively constant subsoil wetness of the site. Puccinellia dominates in South Australia on this type of site, but there are few sites in NSW that are both salty and wet continuously.

The great care that Bernard has taken to nurse his pasture from successful establishment has really been worthwhile. These areas are difficult to establish pasture on, and it is very easy to lose that pasture if you don't control grazing. Bernard has basically eliminated grazing from the site, except for very limited periods. Considering how difficult it had previously been to get pasture, he has proved the importance of this technique.

Final comments from the landholder

The success of this site has shown that you can improve saline sites with grass and not lose the productivity of the paddock by revegetating with trees or saltbush. The site has changed from an area with large, bare patches to an area with productive pasture on much of it. The dry conditions have meant that the pasture has struggled, so in better years we may have a more productive pasture. At least the scald area is not expanding now, we have established some plants.

What is the best thing about the site? The puccinellia – it is much better to have grass growing on a salt site than trees or saltbush. Trees are not profitable, and grass can be grazed.

Where the salt scald could have devalued my property, now having the scald covered in grass, it is not an eyesore anymore and will not devalue my property.

I am very pleased with the present stand of puccinellia, because it has been a real battle to get something growing on the site. I am not so pleased to see the tall wheatgrass which is starting to appear across the site. I am only going to graze the salt pasture very conservatively to protect the area, as I understand it is very fragile.

Bernard Sheridan

Prepared by Luke Beange, Advisory Officer, Industry & Investment NSW, Dubbo

Note: A video about this project can be viewed on the *Saltland Genie* website www.saltlandgenie.org.au/my-region/nsw.htm

Acknowledgments

NSW Salt Teams.

APPENDIX

Surface soil data (0–10 cm, late summer 2004)

Good patch[B]	Bad patch[B]	Bulk[A]
pH at surface ($CaCl_2$)		
4.9	8.2	6.0
Salinity, late summer (est. EC_e, dS/m)		
0.6	20.5	8.1
Organic carbon %		
1.6	1.0	1.7
Sulfate sulfur (KCl) mg/kg		
8.2	470	170
Phosphorus (Colwell) mg/kg		
15	21	15
CEC meq/100 g		
8.9	37.7	19.1
Ca/Mg ratio		
2.5	0.63	1.4
Sodicity, ESP %		
1	29	8.9
Soil texture		
LC	LC–MC	LC–MC

[A] *Samples used for measurements were taken from at least six holes (0–10 cm deep) made in locations with a range of salinity symptoms (visually assessed).*

[B] *Samples used for measurements were taken from one hole (0–10 cm deep) made in a location with no salinity symptoms and one in a location with extreme salinity symptoms (visually assessed).*

Notes:

CEC, cation exchange capacity

ESP, exchangeable sodium percentage

LC, light clay; MC, medium clay

Salinity: 0–Non-saline: <1.5 dS/m; saline >1.5 dS/m.

Non-sodic, ESP < 6%; sodic 6%–14%; strongly sodic >14%.

For further information, see the *Glove Box Guide to Salinity* (NSW DPI) for your part of NSW, on the page headed 'Soil testing for salinity and sodicity'.

Rainfall during trial (mm) (average annual rainfall = 619 mm at Wellington)

	Jan	Feb	Mar	Apr	May	Jun
2004	38	21	19	7	50	87
2005	40	34	10	0	0	106
2006	36	40	45	12	1	30

	Jul	Aug	Sep	Oct	Nov	Dec	Total
2004	70	37	30	75	55	141	**630**
2005	36	27	90	94	97	52	**586**
2006	49	6	9	3	23	50	**304**

Case study – Wellington