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# Solving a salty problem

While the drought brings anguish to most rural Australians – and now city folk as well – there are some exceptions. For water drilling contractors it is boom time. They are being run off their feet as desperate landholders look beneath the dry earth for a solution to the water crisis.

Sinking the bore and finding useful quantities of water is one thing but low levels of total dissolved salts (TDS) are required for successful irrigation use.

Around the Ballarat and Bendigo districts of Victoria only a few areas provide bore water of this quality. Elsewhere water is often accessible but suitable only for livestock - beef cattle, for example, can tolerate salt levels up to 9000 parts per million (ppm).

But desperate times require desperate measures and many from both town and country have taken the borehole gamble, usually to be faced with a dilemma. They find water but with high salt levels rendering it useless for irrigation.

**Cut your losses**

What do you do? Cap the bore and cut your losses? Or spend more money to equip it and give the salty water a try, knowing you are probably committing botanical genocide? It's a case of damned if you do and damned if you don't because there is no other water available anyway.

This was the problem facing Jack Moore from Strathfieldsaye near Bendigo last September when his bore came up at 5000 ppm.

"I knew about reverse osmosis but also knew it was complex and way out of our price range. I'd vaguely heard of other treatments but had a general impression they weren't very effective.

"I started searching on the Internet, initially without any success, but then stumbled on a report on the Federal Department of Agriculture's site about a water treatment trial in South Australia. It was about solving calcification problems caused by hard water but it mentioned salinity and led me to the equipment's manufacturer, Hydrosmart in Adelaide," he said.

Hydrosmart's technology incorporates some of the latest advances in particle physics research. It uses computer generated resonance frequencies focused in the flow via antennae wound in tight coils around the treated water pipe. There are no flow restrictions.

**Molecular level**

It works at the molecular level to neutralise the bonding ability of any minerals or chemicals in the water.

Without their bonding mechanism, large mineral crystals become unstable and reduce to tiny sub four micron particles. The flow takes on the properties of soft water and becomes readily available to plants without blocking their capillaries.

"Suddenly I thought I was onto something," Jack said. The explanation of how the conditioner worked and why it was developed seemed very plausible, and there was plenty of evidence of successful use especially in vineyards," he said.

The Moore's installed a 20 mm unit on the output pipe from the bore and connected it to the existing irrigation system on their one acre block. They have been very happy with the results.


A 20mm Hydrosmart installed on the Moore's property at Strathfieldsaye, near Bendigo, showing the free flow through the unit.

"We simply wouldn't have had a garden by now without the bore and the Hydrosmart. Everything is growing well and some things have really thrived on the conditioned water. We have a small lemon tree that has been struggling for years. Suddenly it's taken off. It's grown more in the last three months than in the last three years.

"And it's been great to look at a bit of green lawn in the backyard instead of dust," Jack concluded.

**Word spreads**

Word of the Hydrosmart technology soon spread. At nearby Sedgewick Pam and Brendan Drechsler were facing a similar problem with the extensive garden on their 40 acre horse property – plenty of water from their newly drilled bore but with high iron levels and 3500 ppm TDS. Their dam was getting low and for the first time in living memory there would be no 'run' from the channel. Users on Coliban Water's rural system were on zero allocation.

Based on the Moore's experience they opted for a Hydrosmart unit and in Pam's words "couldn't be happier".

Trees are thriving and the lawn areas are magnificent. "We could have let the lawns go but they were done with turf and we didn't really want to have to do it twice.

The Drechsler's magnificently lush front garden.

“The odd plant hasn’t liked the treated water. The hydrangeas look a bit second-hand but the rest are fine. Our veggie garden is in great shape – everything coming out of it tastes great,” Pam said.

Pam Drechsler's vegetable garden watered with Hydrosmart conditioned saline bore water. Pam reports that everything tastes great. The bore and conditioning unit is housed in the shed.

According to Paul Pearce it hasn’t just been people with gardens looking for solutions to salty water. Hydrosmart conditioning units have gone to the Ballarat Golf Club and more recently an apple grower in the Harcourt Valley south of Bendigo.

**Massive savings**

The bore at the orchard is producing almost 11,000 litres per hour, enough for the 20,000 trees, but with 2800 ppm too saline to use safely.

“The owners were very close to ordering a reverse osmosis plant before they found out about us,” Paul said. “That would have cost almost $80,000. Instead, we were able to sell them an 80mm unit for around $8,000.

“And now they will get to use all the water from the bore. Reverse osmosis produces a briny water waste by-product that in this case would have been 45% of the total output.”

At Ballarat Golf Club the background to the story is a little different but with a similar outcome. Their bore was put down in 1959. Salt levels have varied between 900 and 1200 ppm, reasonably low but higher than ideal.

Over the years water from the bore has only been used as a backup in drier years and always mixed with stormwater collected on the course. Their five storage dams have a total capacity of 40 megalitres.

But this summer there was no stormwater for mixing. As the course dried out the Club tried to buy water but there was none available. Closing the course seemed the only option because the bore water would be too salty for the delicate greens.

**Golfing on**

However, course superintendent, Jeff Powell, remembered reading about the use of Hydrosmart technology in Western Australia some years ago. He put the idea to the Board who were sceptical about the concept but in the circumstances felt it was worth trying.

"We installed a conditioning unit for them at the end of November," Paul Pearce said, "and all the comments are positive. Jeff tells me the winter grass (Poa annua) on the greens is very susceptible to salt but in his words they are 'healthy as'. He is putting on half a megalitre each night.


A 40 mm Hydrosmart unit installed at Pam and Brendan Drechsler's property near Bendigo.

"The bore puts 400 litres a minute into a storage dam and from there it's pumped through the Hydrosmart. Jeff is cutting the greens twice a week and says he is getting lots of comments about how well the course looks."

Another observation reported by Jeff Powell is that the ground seems to remain wetter for longer with the conditioned water. He is also looking at installing injection equipment so that a wetting agent can be added to further improve effectiveness.

Jack Moore agreed with Jeff's observation when told about it. "I hadn't really taken much notice, but he's right. We water at night and you expect the ground to be damp in the morning but it stays damp for a fair while even on hot days."

Hydrosmart is now shipping units into the region on an almost daily basis. The application of the technology is being driven by a desire to bring saline bores into production during extreme drought circumstances, but it could have far reaching consequences.

In the future large reserves of previously unusable groundwater could become available for productive agricultural use. Droughts always teach us something!

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Further information: Paul Pearce, 08 8357 3334.