GrazingFutures Case Study

Spreader banks for water retention (Glenn Landsberg)

Enterprise details - Landsberg Family (Glenn) "Sunset" Charleville QLD 4470

Average annual rainfall – 450mm/18"

Enterprise type – Small scale research opportunity running sheep and horses

Property size and country type/s - 40 ha red loam Mulga/Box

Description of the management/practice change

Glenn attended a Ray Thompson water ponding and spreader bank field day at Avondale Cunnamulla in August 2019 to learn about designing and building spreader banks. This event was a collaboration between Southern Queensland Landscapes (SQL) and the GrazingFutures project.

The field day consisted of a theory session focusing on surveying and spreader bank design. This was followed by a practical demonstration where attendees observed the property owner construct banks with a grader. A Q & A session allowed producers to seek advice on correct and efficient use of machinery.

Glenn said, *"The on-property demonstration at Avondale was very informative and made it easy to put what we learnt during the theory presentation into the practical sense.*

I only had two spreader banks in use prior to the field day and whilst working well, have since put in another five with a slightly different design."

These five new banks are closer together and incorporate offset gaps in the design to further slow and spread water from high flow zones over a greater area. The ground slope for water spreading banks ideally ranges from 0 – 3%. On steeper slopes, the spreader banks must be closer together, construction costs will increase and bank breaches are more common.

"My banks are much smaller in base width and overall height than what Ray recommends, but I only have a small tractor so I am making do. I have found that the banks don't have to be massive as long as you take care in the placement and distance between each bank. In saying that some of the rain that fell on the fresh banks was from incredibly heavy storms. Due to a neighbour's dam wall blowing I did have to go back and do some repairs. Levels are critical and I did borrow a hand level to get them right. There are relatively cheap units available that mount directly onto a machine and would significantly speed up the process."

Presenter Ray Thompson discussed the crucial aspects of long-term monitoring including site selection to assist with future monitoring of soil and pasture rehabilitation. Glenn took this a step further to prove the benefits of installing new spreader banks by using a rod to assess water infiltration levels down the soil profile.

"After finally receiving steady soaking rain in March 2020 (260 mm) I decided to use the rod as a comparison test comparing the original site (A), the improved site (B), and a control site (C) that

hasn't had spreader banks installed. It was about 10 days after the rain when things were a little less soggy."

The benefits of making the change

Site A - At the oldest site with two original banks installed in 2015 Glenn could push a rod down 90-120cm. Pastures were well established at this site (Appendix; Figures 1 and 2).

Site B - In the area where Glenn constructed five new banks closer together, a technique learnt at the field day, he could push the rod down 70-90cm with ease in bare areas that were previously rock hard (Appendix; Figures 3, 4, 5 and 6).

Site C - In the control paddock without banks, under similar rainfall conditions, Glenn said he was unable to push the rod in more than 5cm (Appendix; Figure 7).

A big learning curve for Glenn was when he looked across the paddocks all the areas looked much the same in relation to pasture health. But these soil moisture tests clearly showed that the soil underneath was telling a different story.

"Making the most of every rainfall event is so important as it may be the only one that you get for the year.

Along with increasing water retention from every fall of rain, which then increases my grass cover, I also make sure that I take all the stock off after rain by agisting or feeding them by hand for a period of time. Sometimes this requires a sacrificial paddock which is hard on a little block. This then allows pasture to grow as much bulk as possible while there is soil moisture before grazing again.

The more bulk above ground, the bigger the root system (Appendix; Figure 8) → the deeper the root zone of pasture the deeper water can infiltrate → leads to a greater soil moisture/water storage bank → leads directly to how long pasture continues to grow or survive after a rain event. This is very relevant during the drought when we often only had one rain event for the year.

These management practices have allowed me to be as well prepared as I can be for the inevitable dry years. By increasing soil moisture I have been able to overtime rehabilitate pasture and increase ground cover, grow bulk standing hay, and run conservative rotational stocking numbers with minimal inputs through drought years.

If you graze your pasture too early the roots don't get that chance to develop. It's a fine balance as grass does need to be fed off to allow for new growth.

This year the rain came earlier then I feed budgeted for. One paddock, which hadn't been grazed before it rained, didn't respond as well as the rest due to the volume of old growth. Also, not as many annual plants grew here either as the older grass acted like a weed matt.

Another paddock that wasn't grazed before the rain came actually really improved, it must have generally needed more recovery time. Just part of the process of assessing and evaluating feed and ecosystem health and balancing with tools available e.g. Stock."

The costs of making the change

"I only have a 67hp tractor with a 3 point linkage grader blade set up (Appendix; Figure 9). Which required 3 passes on each side. So, someone with a bigger machine could potentially build the same sort of banks as mine in two passes very cheaply.

The new spreader banks cost me probably 30 litres of diesel and 2/3rds of day on the tractor and 2.5 hours doing levels. I probably did between 2.5-3 km of new bank in that time. It has the added advantage of taking water from high flow areas and spreading it out over a large area."

Would you do it again? Or do anything differently?

"These are just areas that hadn't recovered using other techniques - there was too much slope and water just raced off. I had also previously tried running a combine over these crook areas 4 years ago to try and rehabilitate the country. In comparison, spreader banks look like having much greater results simply by slowing the water and spreading it over a large area.

I will put in more spreader banks at some point – they are very good value for money compared to other methods such as blade ploughing. I will make sure I seed all the banks while the soil is freshly disturbed and dry. There isn't a very good strike rate with seed after the first rain sets the banks.

I would also potentially modify the blade I'm using so it shifts more dirt in one go which would result in fewer passes required to make the bank. I would also put more effort into creating a deeper channel on the bottom side of banks to move more water. The oldest banks have worked brilliantly, the new design with gaps and a trench on the bottom side I think will work even better."

Any unintended consequences/impacts/outcomes?

"As the soils are improving, we are starting to see weeds normally associated with higher rainfall areas such as mimosa. But on the other hand, we are seeing new plants and trees growing including kurrajong, beefwood, bloodwood, wild orange, narrow leaf box, and numerous others I'm not familiar with – these all seem to grow better pasture around them. I'm also seeing native grasses and legumes returning that are not often seen in the area due to long term overgrazing."

What discussions about the change have you had with your friends or neighbours?

"I have had quite a few conversations within the district, including several landholders that have called into my property to have a look at how the banks are working. I also discuss things over forums/internet with others from all over the world.

Facebook sites such as Soil Food Web Alliance, Regenerative Agriculture, Australian Natural Farming and Gardening are a trove of information.

I like to talk to anyone associated with the land, and I'm always keen to learn new things."

Glenn is happy for people to contact him in person via email ellandocontracting@bigpond.com

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Date: 15.07.2020

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Appendix:

Figure 1: Pasture in Site A is very thick and healthy around old spreader banks.

Figure 2: (Site A) Moisture probe still going down 90-120cm around old established spreader banks 26 March 2020.

'This area must have great root systems established as pasture held on and remained productive right through the drought.

The older banks in Site A were a different design to the new banks I have created after attending the Avondale field day. Except at road crossings, they are all under 30cm. The main trench is on the uphill side and they are designed to spread water flow over a large area and water gently flows over the banks. My soil sets very hard so water trickling over the length of the whole bank has not caused any damage once they were settled. If I'd made them higher, I'm sure they would have eroded. They are now very stable with pasture. With the exception of road crossings, the banks have been maintenance free for 5 years.

Figure 3: (Site B) Installing new banks on 14 February 2020 in country that had received 160mm in January.

These banks included two cuts with an angled blade with the loose dirt forming the ridge in the middle. The top of the dirt is approximately 50-40cm and since the rain, this has settled down to approximately 30cm. The banks that settled less than 30cm or were built in the harder areas, where my machine couldn't form the bank, failed in the big storm and needed repairs.

This is why Ray Thompson suggests its ideal to make the banks 100cm high to allow for settling. Banks were built using 3 passes each side with the bottom pass being most important to get correct.

Figure 4: Five shallow spreader banks up the side of a slope made with the blade on the back of a small tractor. It is critically important to be spot on with levels when banks are so low.

Figure 5: (Site B) Bank failure following 160mm of rain at the end of February and then 107mm in early March 2020.

Six hours after the last of the rain, water was still spreading and slowing as it meandered through the maze of banks.

Figure 6: (Site B) Soil moisture probe 19 March 2020, 10 days after rain.

Figure 6 shows the soil moisture probe still going down 70-90cm 10 days post rain anywhere in the paddock where the new spreader banks had been installed.

Any bare ground is still soft and moist to dig. Pasture is going to grow for a long time yet, there may be enough stored moisture for grass to green up again after winter. This had been some of the least productive country before installing new spreader banks. By spreading out and slowing the water coming off the main road this area has the potential to be some of the most productive. I'm quite confident the new design will outperform the old spreader banks.

Figure 7: Site C, the next paddock over had the same rainfall but no spreader banks have been installed.

Couldn't get the rod more than 5cm into bare ground. No sign of moisture when digging on bare ground, water ran off too quickly 19 March 2020.

Do you have a bit of 10mm rod in the scrap heap at home? Simple easy way to test your soil moisture and future grass growing potential.'

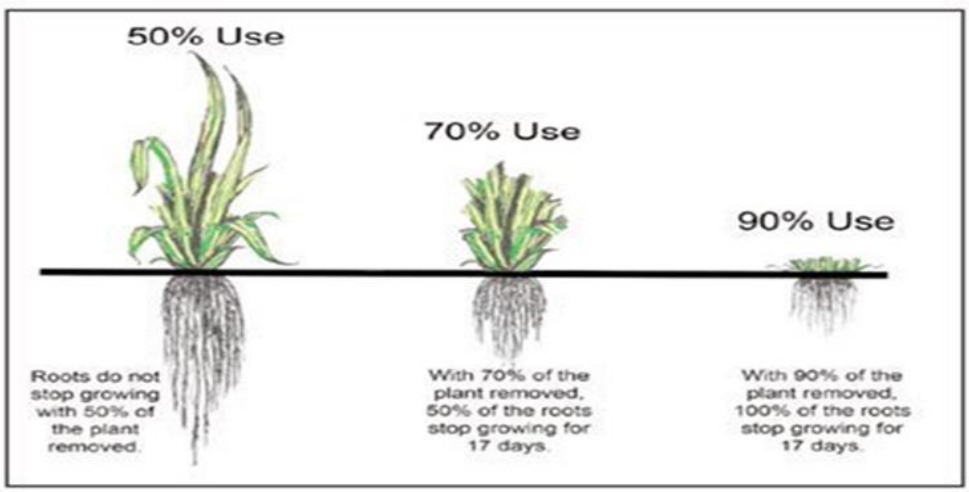

Figure 8: Great "Grass Farmers" Grow Roots (Kathy Voth 2015)

Figure 9: The 67hp tractor with set up with a 3-point linkage grader blade used to make the banks.

Reference:

Kathy Voth 2015, Great "Grass Farmers" Grow Roots. Digital image, accessed 31 March 2020, " Great grass farmers grow roots