



A glass three-quarters full: regenerating native grassland landscapes with holistic grazing management ⁺

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Abstract: Regenerating native grasslands is fundamental to broadscale Australian agriculture addressing the Anthropocene era. This pathway addresses the issues of healthy soil and groundwater, healthy landscapes, and healthy people.



I would like to acknowledge the traditional owners of this region and their elders past and present. There is no doubt, they knew how to manage grasslands and I know some of that knowledge is still around. I really wish I had had some of it when I started my farming career at the age of 22 because, with set stocking and so on, I did a lot of damage which we are now trying to undo.

Many of you would be aware that there is a growing consensus among scientists around the world that we have now moved out of the safe Holocene period into the Anthropocene where humans now determine the future of the planet. We have crossed three of 10 safe operating boundaries: 1, Rate of biodiversity loss; 2, Climate change; and 3, Changes to global nitrogen cycle (Rockstrom et al. 2009). It is also widely recognised that industrial agriculture is a major contributor to either crossing or threatening the first nine of those 10 boundaries.

As has been already mentioned today, farmers have to produce a great deal more food whilst our ecosystem services and other ingredients are in savage decline. Julian Cribb said, in *The Coming Famine* (2010, p. 13):

The challenge facing the world's 1.8 billion women & men who grow our food is to double their output of food – using far less water, less land, less energy & less fertilizer.

About 61% of Australia is managed by farmers; much of this is grassy ecosystems and much of it is degraded. This degradation is not just historical, it is ongoing, as can be seen in the Millennium drought. Thankfully the ACT Capital Region, including the Monaro, has some of Australia's best temperate grasslands but, as has also been stated already, many of them are also still in decline.

*The complete list of 10 boundaries (Rockstrom et al. 2009): 1. Rate of biodiversity loss. 2. Climate change. 3. Changes to global nitrogen cycle. 4. Freshwater use. 5. Land system function change. 6. Ocean acidification (through excess CO₂). 7. Atmospheric ozone. 8. Phosphorus cycle. 9. Chemical pollution. 10. Atmospheric aerosol loading.



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I will use as an example: the 'Chandler paddock' on granite country at my property on the Monaro, southern NSW (photo at the top of this paper). It was grassy woodland. Using a method called VAST analysis (Thackway 2015), we have tracked a historical timeline of modification in our area, from the Ngarigo people onwards (graph at right). VAST analysis assesses 22 different landscape functions. We found a savage decline, particularly in vegetation

structure and status (see graph). Much of that would have been a stripping out of diversity in both the grasslands and also the shrub component and trees.

The basalt soils of the Monaro are naturally treeless, according to Alec Costin (Costin 1954), based on his years of study. Probably 60% of our 2500 acres is on basalt soils, and there are remnant shrubs scattered in pockets throughout that. However, large parts of the margins of the Monaro are granitic, and that was definitely grassy woodland and it has been devastated.

The big challenge now is to bring back the grassy ecosystems. I do not believe we are going to get there by just carrying on as we are, by being conservative or avoiding risk (top photo at right). I think we have to do something different, like the guy in the lower picture at right!

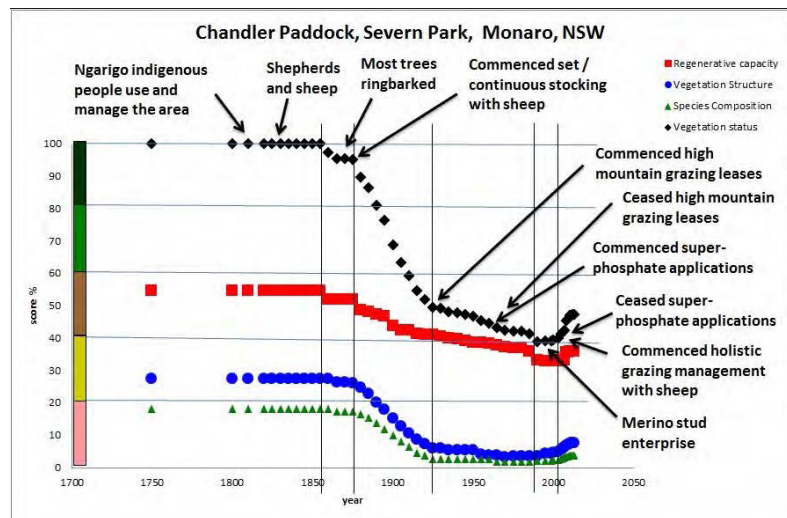
Managing native or mixed grasslands

As I see it we have at least three options. First, locking up or 'preservation'. This can be valuable but tends to be effective only for relatively small areas. Anyway, just locking up areas that already have, for example, African Lovegrass and Serrated Tussock perennial weed invasion, is not enough; they are only going to continue deteriorating.

The second option is regeneration via active management, which is the subject of this talk. This method can be applied across much broader areas of our grassy ecosystems. The third option is to combine the first two options.

Appropriate grazing by ruminant animals is key to agro-ecosystem regeneration – 'regenerative grazing'. Sir Albert Howard, the father of organic agriculture said (in *The Soil and Health*, 1947): 'Mother Earth never attempts to farm without livestock. ... The greatest care is taken to store the rainfall...'

The converse of that, according to Allan Savory, who founded 'Holistic Planned Grazing', is: 'Wrong grazing methods, which cause desertification, result in us contributing as much to climate change as fossil fuel emissions' (TED talk, 3 June 2013).





Holistic grazing management

Holistic grazing management has been shown to work in tropical, sub-tropical, temperate, semi-arid and even arid areas, so it is broadly applicable. It is known under various names. I like the term 'holistic' because when it is properly applied it really is a complex management system for a dynamic ecosystem; you have to be constantly adapting and changing.

The system was developed during the late 1960s by Allan Savory, a Zimbabwean landscape ecologist and, for many years, a wildlife park ranger. He observed the health of grasslands underneath the big African migratory herds, and from those observations he evolved a grazing system based on agronomic science and an understanding of dynamic systems as well as animal behaviour and business planning.

In brief, its key elements are an attempt to replicate the animal impact of a large mob. For example, the trampling-in of organic material; the recycling of dung and urine; and the rapid rotation so that the valuable plants are not being continually grazed, as they are in set stocking. And depending on whether the grassland is growing or not growing and seasonal factors – what we call open or closed season – you vary your rest and recovery period and your grazing period. It is quite complex; you have to assess and adjust constantly to maintain a balance, to have an understanding that animals and plants co-evolved and that animals can detect compounds in plants, phytochemicals, for example, that we cannot. If possible, a rule of thumb is to try to leave a fair amount – 40–50% – of organic material in the paddock, either trampled or left uneaten. The aim is to regenerate the four main landscape cycle functions: solar, mineral, water and ecosystem dynamics.

To make an impact on the carbon cycle we aim for 100% groundcover with deep roots, great diversity of plants, better hydration, and reducing soil temperatures by maintaining a good level of ground cover or biomass. There is now startling evidence that you can increase your ground temperatures through winter by four or five degrees once you get the system working and the converse in summer, and that is vital for effective soil microbe activity. We are also seeing startling results with rehydration. There is a net benefit in healthy food and fibre through the process.

The geography books have much to say about the large water cycle of the ocean, but the major cycle in our hands as landscape managers is the small water cycle. With good plant diversity – forbs and other species as well as grasses, particularly perennials – you can start to change your whole soil function, especially by increasing groundcover and biomass.

The importance of establishing stable groundcover and working soils is pretty obvious if you think about our hot summer 2013–14. The annual evaporation rate in Canberra is 1400–1600 mm/year, and in the central west of NSW it is 1600–1800 mm/year. The weather is getting hotter and the more that happens the more hot days there are. Unless you really protect your soil and get it working, the evaporation rate will go up. In many places the possible annual evaporation is at least double the annual rainfall.

Earlier this year (2014) I stayed with one of Allan Savory's long-term clients in the Karoo region in South Africa, where the annual rainfall is 175 mm (like the western district of NSW). Since the late 1960s, he has been regenerating a semi-arid desertified landscape with Holistic Grazing Management. In this picture, the land on the right of his boundary fence is what his country was like when he started, lucky to have 10% groundcover, and only a perennial plant every kilometre or so. His land, to the left of the fenceline is typical of all his country now – over a hundred thousand acres and a couple of properties. He has tripled his livestock carrying





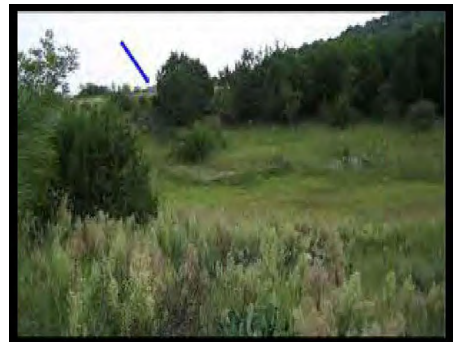
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capacity and production over the 40 years. The ground is soft, soils absorbent, and there is huge diversity and biodiversity across the spectrum.

Similar results are now appearing around the world where Savory's methods have been applied: in North America, Australia, other parts of Africa. These two pictures (right) show an example in Mexico. The blue line points to the same hill in both photos. Once you stop animals destroying biomass and start to cycle and rotate grazing, you can dramatically transform landscapes. There are extreme cases where this is happening. In one example – an alliance comprising farmers, the Nature Conservancy and the Savory Institute – the farmer is running 38,000 sheep in one mob in Patagonia aiming to regenerate 6 million hectares.



Co-evolved grassy ecosystems

Going back to those co-evolved grassy ecosystems and that Chandler granite paddock of ours, which was grassy woodland, one of the key things we have lost is the shrub component within that ecosystem, as well as diversity in the grassland and some trees. I think in many ways this shrub/tree component has been overlooked when we talk about grassy ecosystems.

Our property has been involved in a Future Farm Industries CRC program called 'Enrich'. Our property and also Mulloon Creek at Braidwood are two of the seven national sites taking part in this trial of edible shrubs in grazing systems. Just over 100 species were trialled across Australia, looking at productivity, grazing times, etc. (photos grouped at right).



Where properties have been focusing on shrubs for a few decades, the results show good benefits in profitability and resilience to drought as well as ecological benefits. Then there are other effects, such as the positive influence on climate change from the phytochemical compounds in some shrubs which suppress methane production in sheep. Self-medication – the killing of intestinal worms, for example, by tannins in wattles – could have profound implications on productivity. The shrubs also influence water movement through the landscape, bring up nutrients from much deeper in the soil, reduce the susceptibility of the soil to erosion, and produce shade and shelter.





The photos of roots (previous page, from America) show annual (left) and perennial (right) root systems in all seasons. The summer pair illustrate the situation found in the Mediterranean-climate zones of Australia, especially when annual subterranean clover is the main pasture. By the time you reach summer, the annuals and their roots are dead, but not the perennials. Research at the University of New England and the universities of Western Sydney and Sydney are finding biodiversity benefits in these landscapes – insects and other fauna as well as plant species.

Summary

To conclude, if we are entering the Anthropocene we have to think outside the square, and the thinking that got us into trouble is not going to get us out of it.

I believe that diverse grassy ecosystems have a huge role to play in the agriculture of the future and that holistic grazing management has a place in regenerating them, when it is well-executed. Healthy diverse grassy ecosystems can help turn around some of those 10 big issues for the planet – especially biodiversity loss, climate change and a destabilised nitrogen cycle – and may also have other positive impacts on human health.

Here is a quote by Lynne White (1967): 'Our ideas are part of the ecosystems we inhabit.'

It is really only our habitual thinking that is holding us back in regenerating some of these landscapes. In a nutshell, as in the title of my paper, I believe that the glass is actually three-quarters full; there is a lot of potential here yet.

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+ This record of the talk given at the forum has been checked by the presenter, but not peer-reviewed. To find out more, contact the presenter, via their institution or by email to: info@fog.org.au.