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NATIVE AND NATURALISED GRASSLANDS:

Riverina Grasslands - A Personal History

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Summary: Riverine Plains Grasslands have been derived from a mosaic of different pre-European settlement vegetation communities. The grasslands represented today are the result of historical management and gross disturbance. They are still represented in a number of distinct forms and structures with variable species diversity and density. They are productive low-input, low-output systems that are co-adapted to natural climatic variation and will respond positively to management manipulations and rest. These 'natural' vegetation communities have many values including biodiversity, production, aesthetic and landscape stability. These systems are worth managing for the full range of values for long term sustainable utilisation. To do this requires empathy, understanding and community will to preserve their inherent values.

Droving Days by Banjo Paterson

> For those that love it and understand,
> The Saltbush plain is a wonderland,
> A wondrous country, where natures ways.
> Were revealed to me in the droving days

While Banjo Paterson may not have been describing the particular plains that I am discussing here, the points that he makes are at the crux of relating my perspectives on the Riverine Plains Grasslands.

These perspectives also relate closely to the title of this conference - "The Art of Grazing Management". The Oxford Dictionary defines 'art' as 'a skill especially as applied to representation, design or imaginative creation'. The Macquarie defines 'art' as 'the production or expression of what is beautiful (especially visually), appealing, or of more than ordinary significance', or 'a skill or knack; a method of doing a thing, especially if it is difficult'. I think that it is immediately apparent that in managing landscapes ('imaginative creation') and, in particular managing natural grasslands that are of 'more than ordinary significance' that we are talking about an 'art' as well as a 'science'. There are guiding principles but no absolute hard and fast rules or prescriptions. There are variable outcomes, personal dilemmas, and grazing management is 'difficult'.

As in any art form there is the element of personal appeal or appreciation. To many people the flat and often open plains of the Riverina are boring. To Patterson you had to 'love and understand' the country to really be sensitive to its qualities - its virtues and limitations. Personal and management empathy to me are intrinsically linked, and dependent on the understanding of the relationships between soils, plants, climate and their interactive responses with the external application of domestic grazing animals under naturally fluctuating conditions and markets. It is also about setting your objectives for your landscape, your production from the land and your lifestyle and financial constraints based on your knowledge and appreciation of the landscape.

Part of this appreciation is in recognising and managing your property as a non-uniform mosaic of different soil types and a diverse range of species. In the Riverina there are a range of trees, shrubs, forbs and grasses that have adapted to different soil types of the alluvial plain deposits. This mosaic has always existed, though the specific components can and have changed in location, distribution and density over time. They can also change dramatically in character over the seasons. The Riverina Grasslands as we see them today are the products of domestic livestock grazing and other human induced disturbances (*e.g.* rabbits) and incremental management changes. They are derived from probably more complex open shrubland, grasslands, mixed shrublands, and in the extreme case, grassy or shrub woodlands that have been modified over time.

These modifications can be seen in what are perhaps the best historical description of the evolution of a property 'Steam Plains' recorded in the Pastoral Review of November 16, 1931. These were made by R. G. Kiddle reflecting on some eighty years of

pastoral management.

> "Steam Plains is an oblong block about 15 miles long by 5 miles wide, and consisted of open plain lands intersected by pine ridges and belts of timber, a wide, very shallow creek and various shallow lignum swamps, which in very wet seasons fill and overflow and form other shallow creeks. The pine ridges, or sandhills as they were called, were covered with a forest of Murray Pines of all ages from seedlings to mature trees, interspersed with various kinds of acacias and similar trees, such as needlewood, wild irishman, hopbush, deadly nightshade, sandalwood and willows (cuba), and below these were numerous kinds of the smaller blue and salt bushes. In this condition the sandhills were not good feeding grounds for sheep, as the grass was not as sweet nor as plentiful as in the open country. Also they were a great harbour for noxious animals, dogs and marsupials *etc.*

On the edges of the pine ridges and extending out on to the plains, in some cases perhaps only two or three hundred yards, and in other two to three miles, were timbered areas generally of a hard red soil, carrying grasses which were very sweet and quick growing after a dry period, and timbered with large quantities of edible trees, mostly boree (myall), cuba (willow), quandong and wilga *etc.* Beyond these timbered areas and sometimes amongst them were swamps timbered with box (eucalypts) and gum trees, and the balance of the country was open plain interspersed with swamps and depressions, the biggest of which grow large quantities of lignum, growing in many cases ten feet high. Such lignum swamps produce very little useful fodder. The wide shallow creek, generally dry, crossing the property was also heavily timbered with box, and it and similar box swamps produced very little grass. Towards the southern end of the run there occurred one large and two small swamps filled with a heavy growth of cane grass.

The open plain country, which when dry is either crumbly red or grey clay, and the open boree hard red country, were generally bush country with annual and perennial grasses growing around and between the bushes. These bushes consisted mostly of Old Man saltbush, and considerable areas of bluebush and smaller saltbushes and cottonbushes. At this time, taking a line from Narrandera to Corowa, which would run along about 70 miles east of Steam Plains, the country all to the east of that line was forest country. Today, so much timber has been killed that, generally speaking, that forest line is now 100 miles further to the east.

About 1850 fencing was started in the district and Steam Plains was fenced about then. This enables more stock to be carried, but as a result the bush was more severely eaten during dry periods, and the less there was the more it was punished, so that by 1874 the bulk of the saltbush had been eaten out and killed and only certain areas of the cottonbush remained. The exception to this is about 400 acres close to the homestead was preserved and retains its original cover of Old Man saltbush, bluebush and other natives.

However, large numbers of sheep were successfully carried, for though the bush was gone the country was not eaten out, and responded to rains quickly; also thousands of edible trees were continually dropping edible leaves and branches. Large sums of money were spent in killing the box trees in the creek and swamps, and the sandhills were cleared of much useless scrub (needlewood, hopwood, wild irishman), and the pine trees were pollarded to a height of eight feet. These operations meant a largely increased growth of grass in the timbered areas. Further, the water supplies were improved and the lignum was cut and killed in the swamps. This period of improvements lasted approximately until 1897.

Rabbits were first known on Steam Plains in 1880, and in 1882 29 scalps were paid for a 2s. 6d. each; in the same year 884 kangaroos and 136 emus were paid for a shilling each. In 1890 the property was rabbit netted on the boundaries, and continual but ineffective methods of destroying the pest were adopted, and the whole district became very badly infested, it being nothing unusual to poison from 10 to 12 thousand at one waterhole. The result was that during any dry period both the rabbits and sheep were underfed and the country was being eaten out. It was not fully realised the damage the rabbits were doing, but many of the edible trees were ringbarked and killed, and practically all bush and perennial grasses were killed.

In 1897 the autumn was very dry, and over 13,000 lambing ewes were fairly successfully fed on branches of boree and cuba trees until June, when the season broke. The years 1898 and 1899 were dry, and the country became very bare, and started to drift. During 1900 - 1901 the rabbit burrows were all dug out and all rabbits destroyed, since when there have been practically none on the property.

Unfortunately, before the country could recover, the 1902 -1903 drought started, and during that summer the whole country was in effect a moving sand-drift, with most netting fences and yards covered in sand. Blinding sandstorms occurred frequently, and many of the excavated dams were

practically filled with drift.

As mentioned previously, in 1897 13,000 sheep were satisfactorily fed on the leaves and branches of boree and cuba trees. In places these trees were so thick that in mustering sheep it was not possible to see more than 300 yards, but generally the boree country was more open than that. About this time it was first definitely noted that the tent caterpillar (very hairy and living in woven bags during the daytime), was attacking the boree trees and killing them by eating all the leaves. This caterpillar has continued its destruction, and 90% of the boree trees are now dead. A bush fire swept the property in 1918, burning many of the dead borees, and today it is practically clear country. Though there is an abundance of young boree trees growing, which would soon reforest the country if protected from sheep, such precautions would only result in fostering them for the benefit of the caterpillar.

Today the sandhills are clear of all useless scrub and the pines have been considerably thinned out, and the two principal sandhills have been fenced in paddocks by themselves. The result is that during the growing season they produce a heavy crop of herbage, mostly crowfoot and barley and corkscrew grasses, which can then be eaten, and the more suitable country reserved to a limited extent for summer use. The trees in the box swamps and creeks have nearly all been killed, and most of the dead timber has disappeared. This part is now the heaviest carrying country on the property, the growth generally being a mixture of trefoil and barley grass. The boree country is now mostly very open and forms the main areas of the perennial grasses, such as whitetop and corkscrew, together with the local herbage. The lignum swamps carry a good mix of herbages -mostly trefoil, barley, blue and small crowfoot.

The open plains, where it has been possible to treat them generously, are now well covered with cottonbush to an extent of about 12,000 acres, and are growing the usual herbage and grasses, while in several areas large quantities of wild oats grow in good seasons to a height of 3 feet, and to an extent of several hundreds of acres. The cane grass swamps have been burnt at times and are now producing more feed than in the past.

Where the sand-drifts of 1902 covered the fences and other obstructions, these drifts now grow similar grasses to the sandhills. This is the case, even to a large extent, where the drifts were held on fences crossing grey clay plains."

My personal interest in this reference is more than academic in that 'Steam Plains' adjoins a property held in partnership by my family. This property, 'Barrabool', was purchased by my grandfather in 1912 from Sir Samuel McCaughey from a portion of 'Goolgumbla' station. A later portion was added to the property with a purchase from 'Moonbria' station.

The same soils and relict vegetation mosaics are common to both properties. The evidence would indicate that it is probable that the same management practises were employed across both properties, and indeed over all adjoining properties to varying degrees.

This reference, along with my own observations, family recollections and current fenceline vegetation contrasts has helped me understand and acknowledge that the vegetation structure and composition in this area are in the main, management induced. The structure, diversity and productivity of this landscape can be manipulated depending on your objectives, the site/paddock potential, and the seasons.

The personal evolution of thinking about management and past management history has certainly influenced the strategies that we use for vegetation management over the property. It is probably important to cover some of this to get to where we are today.

By the time the 1918 wildfire burnt out 'Steam Plains', and much of the district including our property, most of the perennial woody vegetation had already been destroyed or at least highly modified. There had obviously been a general increase in grass cover related to the decline in trees and shrubs and less competition for moisture. That increase would appear to be as a result of expansions of the native perennial grass species onto the previous shrubland and woodland areas. It seems to have also already included some exotic annual grass and forb invasions. The greater grass cover is also directly related to the increased extent of fire and fire intensities, if not frequency. This had helped further open up the woodland areas and lead to further extension of the grassland. This process in combination with continuous grazing is still in progress as the evidence from the extensive 1987 wildfires will attest.

Immediately after the 1918 wildfires my grandfather removed grazing from a paddock immediately to the west of our homestead. The standing adult boree (*Acacia pendula*) and thorny saltbush (*Rhagodia spinescens*) dates from that period of stock exclusion. The paddock has been consistently rotationally grazed since that period and has shown on-going tree and shrub regeneration. The paddock has also maintained a high degree of perennial grass

cover and continues to be productive grazing. Adjoining paddocks on the whole were, until recent times, devoid of trees and shrubs except for the type of relict indicator species and the fenced areas referred to in the article. Fenceline comparisons have also indicated a decline in both perenniality, cover and diversity in the consistently grazed areas.

The loss of perennial trees and shrubs has been significant as they are adapted to high seasonal variability in rainfall and provided valuable browse. Wool not only runs on grass but also a lot of other things. Plant species and structural diversity adds to the productivity by individual plants extracting their resources (*e.g.* water, nutrients *etc.*) from different soil depths or different times of the year. Diversity of species and strata also gives differing palatabilities and varying selective grazing pressures and opportunities. There is at least some evidence from the early records that the loss of perennial shrubs and fodder trees resulted in lower stock carrying capacity or at least increased volatility of fodder production and hence stocking. Seasonal rainfall variation is actually exacerbated by the boom and bust fodder cycles. This is still very much in evidence today with generally high spring feed surplus and autumn troughs in the Riverina. The trend is further exaggerated where perennial grasses are replaced by annuals. On our own property today our most structurally and species diverse country is also our most reliable and consistent carrying country while our least resilient and under-performing country is that which has been depleted of structural and species diversity and perenniality. It is obvious from the historical record and our own experience that persistent stocking will deplete this diversity and ultimately has negative effects on the biodiversity, character, production utilisation and stability of the paddock.

This is really highlighted to me by the Kiddle references to drought, my father's stories of the '40s', and my own recollections of the 1966 drought. All our consistently grazed shrub-free grassland country was bare and moving and had to be single tyne ripped on a twenty metre chequerboard to catch soil and seed from moving off-site. The first post drought germination response and colonisation all occurred from those rip lines. By contrast those same areas were destocked over the 1994 drought and maintained continued cover right up till the occurrence of January thunderstorms which produced green feed within ten days. This further increased perennial grass biomass, seed set and subsequent germination, as well giving regenerating borees a real growth spurt. In short, spelling the paddock has given us a great many benefits which we are already utilizing.

This same paddock directly adjoins 'Steam Plains' boundary which at the same time in 1994 was covered with soil to the top of the fence.

There are long-term production and stability benefits to resting paddocks but we do have a range of objectives that have arisen because of increased understanding based on observation.

Having been brought up on what at least in the most part is thought of as a well vegetated property on what is consistently referred to as a 'treeless' plain, you can't help but appreciate what you have. That appreciation for me started with the white cypress pines (*Callitris glaucophylla*), mainly because they were big, beautiful and still there (if somewhat a shadow of the former system). Everything else was of little consequence and although my father had always had small fenced plots, the significance of them didn't hit me until much later. What the stock ate was irrelevant. Stock are for most people the production measure, not the pasture or browse resource. It was only after a run of wet years in the mid to late seventies and seeing the establishment response of a wide range of grasses, trees and shrubs that changed my view. These responses were mostly in paddocks rested because these areas were too wet for stock, or, because of surplus feed elsewhere, there was capacity to rest areas. My interest started with guarding individual tree seedlings and then fencing out whole groups and ultimately areas of paddocks and destocking entire paddocks.

From that point on areas have been enclosed purely for tree regeneration for an increasing range of species that we are developing regeneration strategies for. Other paddocks have been rested to allow for an increase of tree regeneration (particularly groved boree) and the bulking up of depleted grass, shrubs and forb pastures. I am also convinced that within these acacia woodlands/grasslands that the trees play a significant role in nutrient recyling. Much of the boree seed must have been present in the soil seed bank for over fifty years. The vegetation structure and tree/shrub/grass ratios resulting from stock exclusion is dependent on the length of exclusion. The longer the exclusion of stock, the greater the density of trees and shrubs to the detriment of perennial grass production. Setting the balance depends on the objectives and management for the site. Increasingly the means of providing this management flexibility and capacity for spelling areas has been provided by Old Man saltbush plantations, and this program is continuing.

These Old Man saltbush areas are generally sited on lower productivity sites close to our bores or on

bore lines. They provide shelter for the watering points, seasonally intensive grazing reserves and the capacity to better manage our native pastures to allow seed set or reduce sheep chasing new fresh-pick with the autumn breaks. Although the primary objectives have been for autumn seasonal feed troughs (for up to 12 weeks) they can be used in short duration bursts for a number of different objectives at any time of the year. Severe weather or fire shelter (when blitz grazed) and reducing grass seed contamination are just some of the options that management manipulations can produce. They mimic the original structure and functioning of the system described by Kiddle and are regenerating with the rotational crash grazing regime within three years of establishment. The difference now is that they are rested as opposed to the consistent grazing described by Kiddle which resulted in the long-term loss of perennial species.

The saltbush plantations are a low-input resource that perfectly suits low-input, low-output pastoral management. At reduced planting densities (about 250 plants/ha) with increased grass ratios you are halving recommended establishment costs with about 80% of the sustenance feed value but the increased grass ratios provides greater overall protein intake enabling better utilization of the saltbush. These blocks of saltbush can be established every year (weather permitting) in a planned way out of normal cash-flow, without having to resort to borrowings. They are not about trying to increase our stocking rate but about more effectively and reliably manage current stocking while allowing the entire property resource to be self-sustaining.

There is a lot of talk about green and sustainable production and the future of agriculture. If sustainability is attainable at any timescale it has to be about matching production to land system capability. There has to be control, regulation and recyling of resources and minimal external inputs. There will be an increasing moral and ever increasing community obligation to protect and manage for a full range of biological resources represented on private properties. Perhaps not entire property scale, but at least viable representations of vegetation communities and ecosystems within them. There will also, I believe, be an ever increasing need for retention of natural areas or at least approximations of 'natural' areas and regions. In all these areas I believe the Riverine Plains Grasslands come into their own and will increasingly be seen as 'the expression of what is beautiful... appealing; or of more than ordinary significance'. A creation to value.

The Riverina is all these things but like all 'creators', unless you have a benefactor, you have to pay for your creations or they have to pay for themselves. And while the dictates of short-term economics are not always right, those same market forces can work for you as well as against you.

The 'clean and green' market trend is something the broadacre, low-input pastoral industry can really capitalise on. Mad Cow Disease and the result of pushing a factory agricultural system too hard have permanently tainted the perception of feedlots. Perception is everything, and we should be literally cashing in on it with food and fibre accreditation and marketing programs. Niche markets such as the Saltbush Prime Line of Merino hoggets is worth ardently pursuing as a premium product. Marketing and promotion of the aura and ethos of the Riverine Plains as a regional food and fibre production province could, and should be persued as a marketable commodity. The same is true of other areas for other distinctive reasons. The promotion and linking of consumption and production with consumers consequently being aware and prepared to pay a premium for goods produced under environmentally effective or sustainable systems is, I believe, a future trend. This sort of trend was first seen with fears of chemical food contamination and subsequent accreditation schemes.

I also believe these natural plains areas can pay for themselves through their direct production which as yet remains unmarketed. Tourism or regional awareness in all its forms and markets has huge potential to sell the region and the products. There is scope for property historical tours of homesteads, towns and pubs. Landcare/pastoral tours. Ecological, education and wildlife tours. Wildflower tours. The list goes on and on and there is definitely a market already that just needs to be tapped. Production from our properties can come in many forms if only we can see the opportunities and grasp them professionally.

Just recently I stood on the beach at Phillip Island with my family (and about a thousand others from around the world) to watch the penguins come to shore as they have for tens of thousands of years on the Southern Coast. The thought occurred to me that perhaps one day in this mad world we'll be doing the same thing looking at Plains Wanderers on the last patch of suitable habitat in the Riverina. Or perhaps overlooking the last hectare of wildflowers on the plains in spring. The Riverina Plains Grasslands are a spectacular and productive resource that have, to a large degree, been modified by management over the years. They can be self-sustaining and should, to the greatest extent, be maintained in their current form without further depletion or substantial agricultural intensification. To do otherwise would

be a negligent response to the lessons of history and ecology.

To quote Aldo Leopold (1987, in his response to the loss of the American prairies to the plough) -

> 'No living man will see again
> the long-grass prairie,
> where a sea of prairie flowers
> lapped at the stirrups of pioneers'.

I hope the same will never be said of the loss of the Riverine Plains Grasslands through either neglect or apparent short term economic opportunism.

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