December 2016

Grassy Groundcover Gazette

News, updates and on ground action

Dr Paul Gibson-Roy
Lead Scientist
Greening Australia (NSW)

Paul's Piece

Hello once again to all our readers. As always I'm grateful to have this opportunity to communicate with you all at this hectic time of the year and reflect on 'things grassy' as we do in this newsletter. Each year I tend to comment on 'steps forward or backwards' for our sector, and while acknowledging there continues to be serious limitations that restrict progress for restoration and conservation in general, this year I'm going to try and focus more on the positives (many of which will be made clearer in the articles that follow).

In the last year's edition there were a number of stories focussed on sites that had recently been restored. Cath Olive spoke about her Euroa Arboretum site seeded by Rod and Dave. Cath and I crossed paths recently at this year's ANPC national conference held at the Botanic Gardens in Melbourne. I was thrilled to hear her report on how much things have progressed there. Likewise, I caught up with Shaun Kennedy from SA Water earlier in Sydney, and he told me how the grassy restoration works he's initiated in South Australia in recent years are looking fine and robust. The same could be said from a conversation I had with Geoff Robertson from FOG. Geoff had been to the Heritage Trust's Scottsdale property south of Canberra to look at a wildflower seeding undertaken by GAs Canberra team. He said it was looking wonderful and now represents a rare patch of dense wildflowers in a district otherwise dominated by African Love Grass.

A wildflower roadside near Austin Texas

Each of these examples demonstrates that the new approaches developed to restore native ground layer are creating robust and diverse plant communities that are capable of persistence over time. These things are no small feats and I very much believe they should be talked about loudly and widely by our sector wherever and whenever possible. We need them to become not odd examples of success, but part of a large movement to initiate similar projects across the country. It's only by doing this that we will have any chance of enhancing and restoring our native flora - the alternative being to watch it dwindle and disappear.

And on the topic of success and brilliant outcomes. I was able to visit the US early this year to meet with restorationists and seed growers as part of a Churchill Fellowship. I am eternally grateful to the Churchill Trust for this opportunity. What I saw transformed my belief about what is possible! Putting it as briefly as I can, I saw a restoration sector that has achieved astounding outcomes in terms of ground layer vegetation.

The US government has created incredible incentives for farmers and transport agencies and other groups to embrace and use native species in their landscapes. This in turn has created incredible demand and opportunity for the restoration sector. I visited huge restoration sites in many states. The large ones were on farms, but I stopped and marvelled at many established on highways and the like where kilometres of native wildflowers and grasses stretched before me. I also toured native seed farms across the US. Several were up to 1000 ha in size and growing a huge number of ground layer species (to 500!). These Americans have developed impressive techniques, technology and infrastructure to produce, process and distribute seed at these scales.

And with this level of capacity, they were producing tens of thousands of tonnes of native seed each year to be used in various restoration programs across the country. I do not have the space to cover all aspects of what I saw in that time, but the report of my trip can be accessed from the Churchill Trust website. I would encourage anyone who wanted to understand how another country has actually achieved things we dare not dream of here in Australia to download and read this report. I will finish on this point. In terms of biodiversity outcomes, through their Conservation Reserve Program alone, the Americans have restored 23 million acres (say 9 million hectares) of prairie-type vegetation on farms since 1985. This has been done with the farmers deriving an income on every part restored. This would equate to a large chunk of Victoria!! Imagine if we could tell a similar tale?

Churchill Trust Website
https://www.churchilltrust.com.au/fellows/?page=2

Wildflower crops from Shooting Star Seeds in Minnesota

Rod White
Program Manager Grassy Ecosystems
Greening Australia (Victoria)

Restoration in the Western Grassland Reserve (WGR), Victoria

The Victorian Government is reserving 15,000 hectares of land to protect native grasslands in Melbourne's west. The 'Western Grassland Reserves' (WGR) will cover two large areas around Mt Cottrell and Little River. The primary aim of the WGR will be nature conservation, and the goal of project manager's is that it is undertaken to the level of international standards for protected areas (IUCN; Dudley 2008).

The establishment of the two reserves is linked to the expansion of Melbourne's Urban Growth Boundary (UGB). This urban expansion will sadly destroy some areas of native vegetation which provide habitat for plants and animals. Some of these are listed as threatened under the federal Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

As part of the ongoing 'adaptive management' approach that guide's the development of the WGR, Greening Australia have been commissioned by the Department of Environment Land Water and Planning to carry out the restoration of approximately 1.2 ha of land within the WGR with the goal that it acts as a buffer around a patch of high quality remnant grassland.

These works were undertaken in 2016. The site was first prepared by removing high nutrient and weedy topsoil to a depth of approximately 100 mm. The restoration area was then direct seeded with a diverse suite of grasses and wildflower species.

This soil removal depth was determined after conducting soil tests investigating nutrient levels and weed seed/propagule loads. These informed an appropriate removal depth with the aim of leaving soil which displayed the characteristics corresponding to those in a reference grassland site. The restoration area was subsequently direct seeded using a newly developed 'grassland air seeder'. This machine was based on Greening Australia existing grassland seeding machine. The new configuration allows for delivery of a diverse suite of grassland species (as was the case with the early design) but does not require the use of sand as a seed carrier, which we feel is a huge innovation and a great leap forward. This new seeder was designed and developed by David Franklin (Grassland Flora - Woorndoo), a long-time collaborator in grassy groundcover projects. The seeder recently won David the major prize for innovation at the 2016 'Sheepvention' show held in Hamilton. The award was a fantastic recognition of David's skills and visionary approach to improving outcomes for native restoration.

Once established, the creation of this 50 m restored buffer around the existing 0.5 ha remnant grassland will provide added protection for the high conservation values of this increasingly rare vegetation. We also hope it will encourage more of this type of restoration approach to be undertaken by Greening Australia and others in the restoration sector throughout the WGR.

Grassland buffer restoration: showing remnant grassland in foreground and the scraped area

Launch of a Conservation Action Plan for the Victorian Volcanic Plain

A new conservation action blueprint designed to assist the threatened plants and animals of the unique Victorian Volcanic Plains has been launched by Greening Australia and Trust for Nature. The 'Conservation Action Plan for the Victorian Volcanic Plain' (CAP) was developed with input from local stakeholders and experts in the field. It captures the shared vision and conservation goals required to conserve the plain's critically endangered ecological communities.

Stretching from Melbourne's west to the South Australian border, Victoria's Volcanic Plains are home to 65 nationally threatened species and 173 threatened species. The landscape also contains eleven Ramsar listed wetlands and striking landmarks including the famous swagman's lighthouse volcanic cone.

Over 100 people were involved in the development of the plan which aims to build and expand on the significant conservation work that has already been undertaken in the region over many decades. These goals include projects to protect and enhance key Brolga nesting sites within grassy wetlands and the rehabilitation of stony rises to increase populations of the threatened Corangamite water skink.

John Riddiford, Interim CEO of the Corangamite CMA said, "One of the exciting things about this program is to see the hard work and collaboration between CMAs, other government agencies, Greening Australia, Trust for Nature and farmers coming together to protect threatened species across a range of ecosystems."

Alistair Phillips, Greening Australia's Director of Conservation said "This plan has brought together all of the groups involved with protecting this unique landscape to agree on the highest priorities for action".

Now available online only, the CAP is a 'living' document which will be regularly reviewed and updated (every six to twelve months) to ensure key objectives are being met. "The aim is for the CAP document to always be up-to-date and readily available to all land managers interested in protecting and enhancing this unique environment," said Alistair.

"Greening Australia and Trust for Nature see a bright future for the Victorian Volcanic Plains, and with the CAP in hand, we are ready to work towards a new era for helping the landscape's people and rare and precious species to thrive."

Participants at the launch in front of an iconic River Red Gum at Inverleigh, Victoria

L –R: Rod White (Greening Australia), Donna Smithyman (Corangamite Catchment Management Authority), Aggie Stephenson (Glenelg Hopkins Catchment Management Authority), Paul Koch (Greening Australia), Alistair Phillips (Greening Australia), Nathan Wong (Trust for Nature), Gavan Mathieson (Corangamite CMA), Adam Merrick (Trust for Nature), John Riddiford (Acting CEO Corangamite CMA), Stuart McCallum (Victorian Volcanic Plains Biosphere), Tim Hill (land manager – 'Tiverton'), Rani Hunt (Department Environment Land Water & Planning), Kate Hill (Flora Victoria) and Anna Carrucan (Greening Australia).

The full 'Conservation Action Plan for the Victorian Volcanic Plain' can be downloaded at https://www.greeningaustralia.org.au/news/securing-the-future-of-the-victorian-volcanic-plains

For further enquiries or to find out how you can contribute please contact Rod White from Greening Australia at rwhite@greeningaustralia.org.au

Martin Potts
Gippsland Project Manager (Victoria)

Gippsland's Grassy Woodlands Update

Who would have thought that we would be seeding in November! But given the above average rainfall over winter, our sites scheduled for grassy seeding were looking more like dams in early spring so sowing had to be postponed. But the wind kept blowing and the soils dried out and so three sites (approximately 1 ha each) were successfully sown by David Franklin and his fantastic new seeding machine. Then the rain kept falling with 10 mm recorded just after sowing. There was also some over-spraying required (as needed) and then a further 40mm of rain fell two weeks later! So the sites are off to a great start! All this restoration work was made possible through our Grassy Woodlands project funded by the East Gippsland Catchment Management Authority and the National Landcare Program.

For interest sake I'll briefly describe the intention for each site as they vary considerably in the desired outcome within the landscape. The goals are of; revegetation enhancement, a grassland seed orchard, and a flora reserve enhancement with a living cultural story.

The revegetation enhancement site is a 4-year-old 'trees and shrubs' direct seeded woodland featuring a ground layer dominated by exotic pasture species. We have sprayed-out between the tree lines and now have sown that area with native grasses with the aim of re-introducing this significant but missing part of the vegetation. There is a strategic goal for this site to show (via our monitoring) that a site that is successful in terms of trees and shrubs but which can still be considered low in vegetation quality at the ground layer can, by reinvesting in 'upgrading' such sites, show how it's possible to lift the overall quality score considerably.

Seeding between the lines

The second site is being developed as an in-ground seed orchard. This area was initially prepared using the scalping technique to reduce weed seed load and nutrients, following which it was seeded with a mix of grasses and wildflowers. The site will also be planted out with tube stock featuring species that were difficult to collect in the wild such as Early Nancy (*Wurmbea dioica*) and Milkmaids (*Burchardia umbellata*) along with Pale Grass-lily (*Caesia parviflora*) and Blue Grass-lily (*Caesia calliantha*) to mention a few. These will be planted as clusters into the emerging grassland and monitored for seed collection during the year by the landowner.

The third site is located within a Parks Victoria (PV) Flora Reserve where a large area has been re-acquired from old farmland. With very little change in composition over the last 10 years DELWP and PV approached GA to look at restoring a grassland within this site.

The in-ground grassy seed orchard

If successful this area will then act as an 'island' for future seed dispersal. The other important element to this site is that we have created a 'living culture' program, which has attracted complementary funds and community interest for incorporating Indigenous participation in the ongoing management of the grassland. If you have read the excellent 'Land of Sweeping Plains' (http://www.publish.csiro.au/book/7219/) you will see the wonderful story of Aileen Blackburn and the Bundian Way. Well, we got Aileen's support and the interest of Gunaiurnai women and headed up to Eden to learn about their techniques and protocols around Yam management. We have also introduced these women to our site and have also now employed a Gunaikurnai woman to learn from Aileen and from us to gain knowledge of the local plants. She will also be instrumental in helping to engage her community into this new 'gathering place'.

Aileen and the Yam teachings

Chamomile Sunray *(Rhodanthe anthemoides)*

Kieran Kinney
Project Officer
Greening Australia (NSW)

Cumberland Plain SPA

Firstly, let me paint you a picture. A wide blue sky dotted with cotton wool clouds. Shimmering in the distance, a low mountain range coloured with a violet and blue haze. The range is cleft by deep gorges, peaked with ancient volcanoes, and clothed in a forest that stretches a thousand kilometres.

High in the thermals above, two young eagles spar on the wing. Beneath them, on a forest edge, a falcon slams into a hapless pigeon, there is a flurry of feathers and the pigeon dies instantly. The falcon rises to a low altitude with deliberate and heavy wing beats. With prey hanging from talons, it disappears into a meadow of tall Themeda grass.

Nearby a juvenile magpie sits on a low branch, lording over its new kingdom, practicing the marvellous song of its ancestors. Beneath her lies a wondrous swathe of wildflowers of every shape and colour. A myriad of bejewelled insects fill the voids. Tiny bird's zit and zip here and there, building nests of straw and spider web. All around them tall grasses with heads of gold and stems of green, sway rhythmically in the morning breeze. A hot Australian sun fills this amazing place with an incandescent light.

Where is this place? It is our Greening Australia Seed Production Area at Richmond, in Western Sydney. This is where I work alongside a dedicated team to produce large quantities of native plant seed for restoration. woodland in Sydney's west.

Now several years old, covering approximately 4ha and with over 100 native species growing as seed crops, it's become something of a real magnet for other fauna in its own right.

We are always trying to increase the number of species we can get into production. This year has seen the introduction of some new and spectacularly flowered ones from the vast Asteraceae family.

Chamomile Sunray (*Rhodanthe anthemoides*) is a perennial forb growing to around 30 cm in height. It features lovely yellow flowers with white papery bracts - a classic daisy. Once common, but now almost extinct on the Cumberland Plain, it was apparently used by early settlers as a substitute for Chamomile tea. Personally, I have seen Red-rumped Grass Parrots feeding on its seeds. During the heat of the day the SPA cells where it grows are absolutely alive and buzzing with insects. Obviously it had an important habitat function in the landscape.

Billy Buttons (*Craspedia variabilis*) are my personal favourite. This species is a small tufted forb that throws a remarkably tall scape (or stem). Atop the scape sits a globular shaped compound head of flowers richly coloured in a deep golden yellow. According to historical accounts it was another of the once abundant daisies in the landscape of Western Sydney and a particular favourite food of the Emu flocks (also once common). Sadly, now it is reduced to a few tiny pockets of bushland and so could easily become locally extinct in the future. This is a prime reason why we believe the SPA and restoration work we do is so important.

Billy Buttons *(Craspedia variabilis)*

Yet another spectacular daisy flower now among those in the SPA is that of the Showy Podolepis (*Podolepis jaceoides*). In some ways it resembles a dandelion, but the Podolepis flower is held atop a much taller scape (stem). It is a beautifully structured, bright and sumptuous yellow, surrounded by golden brown papery bracts. We constantly see native bees tending to the flowers of this species.

This is a very quick summary of some of the exciting new arrivals to the SPA during the past year. These new daisy-like species will become part of our restoration seed blends and when established in restorations will provide great habitat for all the animals that move in and a lovely visual treat for people. We would also like to see them planted by local councils in installations such as roundabouts and parks (imagine the fun if this were to be done with interaction with local residents and school kids!) We have a lot of work to do yet, and this is just the beginning of something we hope will be an ongoing feature of our Australian landscapes.

Showy Podolepis *(Podolepis jaceoides)*

Janet and Justus Hagen's new '*Pycnosaurus* Plain'

Cath Olive

Newly Emerging Grasslands (Euroa Arboretum)

Euroa Arboretum, working with Greening Australia, sowed three grassy groundcover sites in August 2015. We have loved watching their evolution as they establish. Janet and Justus Hagen's property –'Wetlandia' had a 15 cm topsoil scalp undertaken early in 2015, removing Rye Grass predominantly. Initially, the site remained relatively dry, but eventually a diverse range of species germinated and emerged from the sowing including grasses, daisies, peas and some lilies.

Through the winter of 2016 the site turned into a swamp – we had created a seasonally herbaceous wetland and the mosquitos thrived! Unfortunately, the peas were not so impressed with the inundation and very few *Glycine*, *Desmodium* or *Kennedia* can be found this spring. Thankfully, the Drumsticks (*Pycnosaurus globulus*) and Lemon Beauty Heads (*Calocephalus citreus*) have found the conditions suit them ideally, and Janet now has a crop of Drumsticks to rival any in the district. Interestingly, the conditions have also encouraged Purple Bladderworts (*Utricularia purpurea*) that were not sown, but were obviously present in the soil profile and with the pre-existing weed flora removed, have now emerged.

Wetlandia' looking – wet. The silver foliage of Drumsticks (*Pycnosaurus globulus*) is very evident.

In 2015 the Euroa Arboretum also trialled a 1.2 ha scalp – and now we are seeing brilliant results. Despite a harsh start with little spring or summer rainfall in 2015 and early 2016 initial germination and emergence was encouraging. Daisies have flourished, in particular the Hoary Sunray (*Leucochrysum albicans*) found locally in Avenel. Clustered Everlasting (*Chrysocephalum semipapposum*), and Common Everlasting (*Chrysocephalum apiculatum*) are also hitting their straps now and starting to flower. Some of the pea species have thrived, in particular Glycine (Glycine tabacina), Running Postman (*Kennedia prostrata*), Slender Tick Trefoil (*Desmodium varians*), and Purple Coral Pea (*Hardenbergia violacea*) although there are less to be found over the site than the initial flush in 2015. Of interest, Bush Peas (*Pultenea* spp.), Spreading Flax Lily (*Dianella admixta*), Bulbine Lily (*Bulbine bulbosa*) and Chocolate Lily (*Athropodium strictum*) have not yet emerged – despite hefty contributions of their seed in the initial seeding mix. I'll continue watching avidly for these stragglers. The grass tussocks are beginning to contribute heavily to the site now, and are just setting seed.

Kate Stothers and Lance Williams property was a different trial. Here it was an over-sowing of saltbush, peas, daisies and lilies and some grass species into a paddock of Bristly Wallaby Grass (*Rytidosperma setaceum*) aiming to increase species diversity at the site. The area was fenced to protect it from rabbits and kangaroos, and the initial herbicide treatment targeting Onion grass (*Romulea rosea*) proved very effective at removing that weed and opening inter-tussock spaces. Initially in 2015 there was minimal emergence from the seed mix with only five or six plants identified by December 2015 (and sadly these perished over the harsh summer).

We have been hopeful with a wet winter and spring that the seed may still germinate and emerge under better conditions. However, the native grasses are now so dense, vigorous and competitive, it seems that other forb species will struggle to get a foothold. The only identifiable emergence in spring 2016 is from the daisies and only a few of those have appeared. There were Sticky Everlasting (*Xerochryseum viscosum*), Hoary Sunray (*Leucochrysum albicans*) and Grey Everlasting (*Ozothamnus obcordatum*). This only partial success is perhaps instructive in itself, and a small scalp within the grasses where forbs can establish in the absence of grass competition (and hopefully spread out) may be an option for the future.

Hard for forbs to get a toe hold amongst the grasses!

Establishing grasslands at Euroa Arboretum

Grazing pressure from kangaroos at the site is evident from the exclusion plot.

Geoff Robertson

Thoughts from Friends of Grasslands (FOG)

At the recent Australian Network for Plant Conservation conference speaking from Friends of Grasslands' (FOG) perspective I gave a presentation on how involvement in conservation can benefit both nature and the person.

FOG was launched in 1994 and the events that led to its creation are still relevant today. It was created by the efforts of scientists (ecologists, botanists, herpetologists and entomologists) with a passion for grasslands linking up with land managers, who had responsibility for grassland remnants, and enthusiastic activists. The founders saw the need to identify what grassland patches remained in the ACT region and to lobby to preserve them, while at the same time improving our understanding of how to manage these remnant grasslands. However, it also took the concerted effort of a series of committed visionaries to make FOG a reality. Once established, FOG members consciously established a framework for operation as a group which was based on science and research, mutual respect for differences (in disciplines, values, experience and practices), and emphasis on advocacy, education, communication, citizen science, on-ground work, community building and networking.

While FOG as an organisation has been a powerful influence for increasing the focus on grassland conservation much of what has been achieved has been due to individuals or small groups from within the organisation deciding to push out the envelope in little ways which have summed to a great collective effort. FOG has gone through several setbacks but has so far re-emerged each time committed to its founding ideas. While it has its base in Canberra and the Southern Tablelands of NSW, its representatives have visited grassy ecosystems sites across south east Australia and where possible lent support.

To those involved in grassy ecosystem conservation, and FOG in particular, there are many rewards. These include: the discovery of beauty, intricacy, complexity and behaviour of individual species; the discovery of interrelationships between species and between species and habitats; a sense of connectedness with nature (such as nature as teacher) and belonging to Country; a sense of achievement when one's campaigns, lobbying, experiments, research and on-ground work comes to fruition; a strengthening of one's values (such as valuing of landscapes, vegetation, flora and fauna, and spiritual connection with First Australians); the learning of new skills and a sense of purpose and self-worth; friendships with fellow self-discoverers; and, longer term, a sense of

life achievement from mentoring, passing on knowledge and experience.

We are fortunate in the grassland movement, to have many people, institutions and community groups who may range from quiet achievers to larger than life visionaries, tackling the many diverse issues thrown up by grassland conservation and who provide excellent models for our own behaviour.

For those who want to find out more about FOG you may find our website at: www.fog.org.au

Threatened Monaro Golden Daisy (*Rutidosis leiolepis*)

Image: FOG's Monaro Golden Daisy project is run with support from the South East Local Land Services. It aims to manage three remnant grasslands containing the Monaro Golden Daisy (a threatened species). Featured in the image are Terry Myers (weeding contractor), Margaret Ning (project coordinator) from FOG, Jo Powells (SE LLS) and Brett Jones (Snowy Monaro Regional Council). (Photo by Margaret Ning)

Photos above: In 2015, Friends of Grasslands received a three year $32,000 grant from South East Local Land Services, a NSW Government Agency, to manage three adjacent natural temperate grassland sites containing populations of the threatened Monaro Golden Daisy (Rutidosis leiolepis) near Comma NSW. The project allows FOG to contract professional weeders and FOG volunteers supervise the project, assisted by staff from the Snowy Monaro Regional Council, as well as monitor the impact of the weeding on the condition of the grassland and the daisy. Additional weeding support has been provided the Green Army and Conservation Volunteers Australia on a pro bono basis. FOG has held working bees at one of the sites, the 45 ha Old Cooma Common Grassland Reserve, since 1999.

Candice Parker
Geelong Project Officer
Greening Australia (Victoria)

Victorian Volcanic Plain 3 Day Grassland Event

As part of the federally funded National Landcare Program, Greening Australia (in partnership with the Corangamite CMA) hosted a three day grassland event focusing on the Victorian Volcanic Plain region (VVP). The event was extremely well attended attracting 127 participants from a range of NRM agencies and private environmental contractor services across the three days. Day 1 included an exploration of the unique geology that makes up the landscape of the Volcanic Plains led by Professor Bernie Joyce from the University of Melbourne. Geoff Carr, Principal Botanist from Ecology Australia then gave the audience some valuable insights into the current plight of remaining grasslands before the group headed out to Rokewood cemetery for a tour of a remnant grassland and an identification session.

Day 2 group photo at Lake Corangamite

This was a key highlight for many participants. In the afternoon Rod White from Greening Australia led the group out to one of the grassy groundcover restoration sites near Cressy to view the success of the Hoary Sunray (Leucochrysum albicans var. tricolor) reintroductions.

Day 1: Geoff Carr presenting to the group at the Rokewood Cemetery

Day 2 had the highest number of attendees with 47 participating. Tya Lovett from Aboriginal Affairs Victoria presented in the morning giving some very interesting background into Aboriginal cultural heritage legislation and showing participants some of the artefacts that may be encountered when out in the field. The rest of the day was spent with both Tya and John Clarke from Parks Victoria. For this participants were bused to different sites around the western district lakes, gaining invaluable advice, stories and information on the significance that this landscape played in Aboriginal heritage. The day was well received with rave reviews from attendees.

Damien Cook from Rakali Ecological Consulting provided a fantastic day three on all things grassy wetlands. The morning session provided some great background information for participants before heading out once again into the field to tour two grassy wetland sites. The most memorable site was privately owned, and here the group were able to pull on gumboots and get amongst the swamp daisies while listening to Damien. They were also privileged to see a pair of Brolga's!

Day 2: The participants at Lake Corangamite were huddled in close to listen to John Clarke

I would like to thank all the participants and presenters across the three days for making the event such a success.

Day 3: Participants take a walk through the grassy wetland with Damien Cook

The Green Army participants: Jackie, Tegan and Christie planting out Yam Daisy (*Microseris lanceolata*)

Victorian Volcanic Plain Demonstration Sites and Geelong Botanic Gardens Seed Production Area

As part of the 2016/2017 National Landcare Program and supported through the Corangamite Catchment Management Authority's "Biodiversity across VVP landscapes" project, targeted funding has allowed Greening Australia in partnership with the Geelong Botanic Gardens to design and implement a grassland Seed Production Area (SPA), located within the Botanic Gardens. Surety of seed supply is a critical limiting factor in the restoration of native grasslands. By using seed production approaches - including in-ground and containerised production systems to grow native plant crops, seed can be grown and harvested in greater quantities for restoration (while also reducing stress on field populations). The SPA specifically aims to provide native seed for grassland restoration activities within Geelong and the surrounding Victorian Volcanic Plain. It will also play an important role in community engagement by developing further educational activities and partnerships.

There is a large amount of labour needed to establish an SPA. The project was wonderfully assisted in the SPA set-up by a Green Army team of 10 who assisted by installing 150 metres of retaining walls, over a 1000 metres of irrigation, rolls and rolls of weed matting and planting 3000 grassland tubestock across the six garden beds.

A team effort to get the *Bulbine bulbosa* (Yellow bulbine lilies) planted

The green army team operated as part of a larger project (supported by the Corangamite CMA, Conservation Volunteers Australia, Golden Plains Shire, Geelong Botanic Gardens and Geelong Landcare Network groups) that is focussed on increasing biodiversity across the

Victorian Volcanic Plain and engaging Green Army participants in a range of activities focused on grassland management and conservation.

With funding from the Corangamite CMA and Sunshine Foundation seed collected from the SPA will be used to establish wildflower corridors within two degraded grasslands sites. The funding will also facilitate additional works to increase species diversity using of approaches that include ecological burns, pest animal control (rabbit proof fencing) and weed control. Both restoration sites are located on private land and will be used for continued research and as demonstration sites for community engagement. There has already been a great response at both sites just to exclusion fencing (set up by the Green Army Team) with stands of wallaby grass, spear grasses and kangaroo grass now present.

To celebrate the successful implementation of the Seed Production Area and to showcase it to all who had assisted throughout the year, a launch was held on December 15th. A gathering of representatives from the Geelong Botanic Gardens, Corangamite CMA, Department of Environment, Land, Water and Planning and the Gordon TAFE all enjoyed a cuppa and slice to celebrate.

Right: The Green Army team working to install the retaining walls for the seed production area

The next stage of the SPA has already begun with seed collected to begin the growing of the next batch of important threatened grassland species including Button Wrinklewort (Rutidosis leptorrhynchoides), Hoary Sunray (Leucochrysum albicans var. tricolor) and iconic species such as Featherheads (Ptilotus macrocephalus) and Blue Devil (Eryngium ovinum). This increase in the diversity of the SPA output promises to open up new possibilities for restoration in the region.

Below: One of the grassy woodland demonstration sites, after a nice drop of rain over winter the River Red Gum (*Eucalyptus camaldulensis*) seedlings have emerged

Restored Themeda at Dave Franklin's property Chatsworth Vic. This took two years to develop to this stage

Dr Paul Gibson–Roy
Lead Scientist
Greening Australia (NSW)

Something about Mary (I mean *Themeda)*!

Many of the readers of the Grassy Gazette will have used, or thought about using Kangaroo Grass (*Themeda triandra*) for propagation or in a restoration. It's seen by most people in the sector as the fundamental ingredient in grassland and grassy woodland restoration. Not using it is viewed as almost a punishable offence. Yet those who have dealt with this iconic species will most likely be aware that it has its frustrating quirks which result in varied outcomes - whether that be in a germination cabinet, a nursery tray or as seedlings emerging in the field. There is 'something about *Themeda*' that makes using it less straight forward than initially thought.

Over the years I've done many germination tests of Themeda seed lots. Rarely have I got very high germination rates (i.e. >80% over 28 days), even under what I considered to be optimal conditions. I remember testing back in 2003 showing a germination percentage of 25% which seemed a relatively modest figure. However, further viability testing (using tetrazolium) showed that same batch was 69% viable. So only 1/3 of the viable seed was germinable under those test conditions, while 2/3 remained dormant. This sort of result was typical for many of the subsequent tests I've done on Themeda batches over the years.

I've spoken to many others who have had similar outcomes. Recently Professor Wal Whaley (from the University of New England) reminded me of work done by Richard Groves and Brian Sindel of CSIRO. They found that seed from different Kangaroo Grass populations displayed different degrees of dormancy. In fact these two then selected seed from plants that displayed low dormancy (high germination) to develop a strain that produced readily germinable seed. This is not something that I look to do in our restoration work, but it highlights one of the reasons why we might see variation in dormancy across different Themeda batches.

I was considering another angle recently. The harvested product. Most would know that the quality of harvested seed can be influenced by many factors including the maternal conditions under which the seed was produced, the timing of harvest, the method of harvest, and handling and storage. Despite these many factors, people often (me among them) are tempted to think that when lined up side to side, one wool pack of Themeda is of equal 'quality' to the next. This is especially so when it may have been harvested from the same or nearby paddocks. However, closer examination through purity testing can show that the seed, chaff and weed characteristics from one bale to another can (and do) alter - sometimes dramatically.

These thoughts converged in my head recently as I looked over a restoration we'd sown the year earlier. Across much was a relatively even cover of Kangaroo Grass. However, there were also bare or less evenly covered areas. I mused, was this due to some variation in dormancy of the seed used or was it a result of variation in the amount of seed contained in the sowing mix (i.e. one Themeda bale was not equal in seed content to the next), or perhaps a bit of both. I should note that across the whole site, it had established at an average of 8 plants per square metre, which I thought a passable score after a relatively short period.

The 'harvest/seeding-quality angle' had prompted me to spend much more time and effort early this year processing each bale of Themeda in preparation for seeding this past spring. We have built a 'seed tumbler' which I've spoken about in an early Grassy Gazette edition. The tumbler has proved very effective at separating seed that is harvested by mechanical brush harvesters from the other stem and chaff (and also much weed seed). This means for each bale, whatever the amount of seed that is present, this is separated from the rest of the material. The net result is that across for example, 50 bales of harvested material you get a consistent amount of seed, say 300-400kg which is made up of seed, some of the associated fruit structures, but little to no chaff. This is a much more consistent product to use in a seed mix (and a more knowable unit per area seeded).

The seed tumbler used to more effectively separate seed and chaff

Is one bale of *Themeda* equal to the next? How much does the seed and chaff content vary?

What do I now hope to gain from all this extra time and effort? This year when we did our seeding I was much more confident of the actual amount of Themeda that was being used and that this seed was being delivered more consistently across each restoration. There may still be variation in the emergence of plants due to dormancy, lack of moisture, seed predation, compaction etc. However, I think by processing the large batches of Themeda to a much purer product, we have helped to lessen these many 'factors' by one. Will they be 'less patchy'? Will we get more plants on average per unit area? I guess I'll see this time next year.

There is something about Themeda. Be that a dense stand of remnant or restored vegetation. It's an appealing species yes. But one that has its frustrating quirks. We seem to be constantly trying to refine the way we harvest, process, store and seed this species; all to achieve more predictable outcomes. Maybe that's a folly. Perhaps it's a species that wants to remain unpredictable. Frustrating yes, but perhaps also part of it charm.

Below: While plant emergence across the site was generally consistent, there were some barer patches

Danny watches the seed flow as we seed into a very 'shaley' soil at Wianamatta Regional Park.-

Dr Paul Gibson–Roy
Lead Scientist
Greening Australia (NSW)

Western Sydney restoration update 2016

This year in Western Sydney we seeded five new sites (totalling nearly 6.5 ha), and have a remaining 10ha lined up to seed in autumn 2017. The five were located on a range of land tenures including council, national park, crown and private land. As usual, each presented unique challenges to get ready for seeding. This was due to varying site-specific parameters among them; topography, soil and weed characteristics. However, the team is getting much more used to dealing with these issues and tailoring our actions appropriately, so in the end all were ready for seeding through September and October.

This year all sites were scalped. That was not the case last year where at one location we also seeded into areas that had been herbicide sprayed only, or were burnt. I was looking at both a week ago and saw almost no seeded species establishing in the sprayed out area and only a limited number in the burnt sites. There was however high cover of weeds. This was strongly contrasted in the adjoining scalped area where the seeded natives were establishing in good numbers and weeds were a minor component.

Below: Half the area seeded at the Ponds, with jute-matted scalp spoil zone obvious to the left.

We of course saw this type of outcome time and time again in the early days of the GGRP in Victoria, where we compared these approaches experimentally. However, I and people we work with continue to hope that seeding natives can be successful without resorting to something like scalping. Sadly, in areas where weed and/or nutrient loads are high we have not had a successful outcome (compared to scalping) using these approaches.

Back to this year's works. At a restoration at Wianamatta Regional Park (a National Park) the site was shallow scalped primarily to remove weed seed loads (nutrients were low already). But because of the high proportion of exposed shale we had to rip and then plough the surface prior to seeding to get a sowable surface. Even then our little seeder, as tough as it is, was bumping and bouncing the whole time and Danny must have felt like he was on a bronco at a rodeo.

We undertook another interesting restoration within a new housing development at "The Ponds". Located in a retained but degraded bush-block we removed a weedy area adjoining a grassy woodland and seeded in complex ground layer. This was a long and relatively narrow area, so we took the scalp spoil across to one edge, covered it in jute matting which was then planted with shrubs. I'm really hopeful that the wildflowers when they establish in the restored area will prove very attractive to nearby householders and that they will also spread into and increase diversity in the low diversity remnant.

Others sites presented different challenges such as working on very sandy soils (Macquarie Park Hawkesbury), or along riparian corridors near to creek lines (Elizabeth MacArthur Reserve – Camden Park). Both of these were undertaken with support from the local councils and we are very hopeful that with success more of these types of works utilising ground layer native species will be undertaken in the urban footprint.

We have already lined up with the Camden Council to trial a planting wildflowers in several roundabouts in 2017. How exciting would it be if that type of approach took off at large scale in our big cities?

Above and below: Returning complex native vegetation to the urban footprint at Camden and Hawkesbury.

I mentioned returning to look at last year's seeding efforts. Three that really stood out for me were at Parrot Farm – Narellan, Bungarribee in the Western Sydney Parklands and at Scheyville National Park. Parrot Farm had previously been covered in African Olive trees. Now it is open with a native ground layer and retained large native trees. It's been an amazing transformation in a very short period of time. Both Bungarribee (10 ha) and Scheyville (1ha) were scalped and seeded, and now only 12 months later are showing very promising native cover/diversity and low weed content. I monitored Bungarribee and this showed 30 natives per m2 across the 10 ha (and 4 per m2 of weeds).

This equates to around 3 million native plants established over that site. The cost of doing this using traditional planting approaches would be astronomical, and using tubestock would be unlikely to give such survival outcomes. Please don't think I'm gloating here. I am constantly nervous that restorations will not succeed in the way we want. But these two sites seem to show yet again, that given appropriate site conditions, and the availability of seed from a range of species, and on top of that appropriate equipment and knowhow, it is indeed possible to reinstate our vanishing native flora.

Above and below: Twelve months post seeding, open grassy woodland recreated at Parrot Farm, and grassland (at this point) at Bungarribee.

Want to know more about the GGRP?

Please Contact:

Dr Paul Gibson-Roy
New South Wales

Mobile: 0437 591 097
Email:
PGibson-Roy@greeningaustralia.org.au

Rod White
South-West Victoria

Mobile: 0447 585 574
Email: rwhite@greeningaustralia.org.au

Jess Gardner
Western Victoria

Mobile: 0437 958 259
Email:
jgardner@greeningaustralia.org.au

Would you like to subscribe to the Grassy Groundcover Gazette?

Please email:

Candice Parker
cparker@greeningaustralia.org.au

Visit the Grassy Groundcover website page:

https://www.greeningaustralia.org.au/project/grassy-groundcover-restoration

Follow Greening Australia on Facebook:

www.facebook.com/GreeningAustralia.org

and Twitter:

www.twitter.com/GreeningAust

#GGRP

or for more information about Greening Australia:

www.greeningaustralia.org.au