Grassy Groundcover Gazette
NEWS, UPDATES AND ON-GROUND ACTION
December 2018

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

Paul's Piece

Greetings all, to our 2018 Gazette. How quickly another year passes but happily another opportunity presents to highlight some of the activities we in the field of grassland and grassy woodland restoration have been involved in over the past 12 months. At this time, I always take heart that there are remarkable and committed people doing what they can, with whatever resources and support are available, to achieve positive outcomes. Some of these will be highlighted in this edition.

During the year I've travelled to several states visiting restoration sites, attending conferences and forums and catching up with others in our field. On most occasions I find people still enthused and eager to progress the concept of ecological restoration. Equally there are still many opinions on what approaches and techniques are thought to be most effective (and what are not), but this is fine if on-ground action is still occurring (and of course there is unlikely to ever be one best approach or method for all situations). Another thing that continues to strike me, is the ever-growing focus and interest on the use of seed production. I am convinced that unless we embrace seed production approaches right across Australia, then we have no chance of ever restoring our grassy ecosystems at the scales that we must. But as I have commented in earlier editions, unless there are markets for restoration and seed, then neither will develop beyond cottage industries.

So, what of our current markets – what stands out? Federal programs remain the main drivers for restoration, but these continue to focus on trees and shrubs (i.e. the 20 million trees program), and so sadly we can expect little advance of grassy restoration in that sphere. Interestingly, offset schemes may become important incentive mechanisms for high diversity restoration and seed production if 'active restoration' is accepted by regulators as a means of creating biodiversity gains – which is soon to be the case under the NSW Biodiversity Assessment Mechanism. I also learnt while attending a recent Friends of Grasslands (FOG) forum that the ACT government is now keenly promoting the use of restoration to achieve grassland increases as part of development offset obligations - which is another remarkably important outcome. I'm unsure if other states have followed these positive trends.

Another potentially important market driver looks to be rising in Sydney's west, where the development of its second airport at Badgerys Creek and the associated road and rail infrastructure build (and offset requirements) could see a call for scales of grassy restoration that have to-date not been witnessed. Whether or not the local restoration sector can meet such a challenge remains to be seen. I have not heard of similar opportunities in other states leading to firm outcomes. For example, friends in Victoria continue to voice disappointment that large public infrastructure projects such as highway duplications to Melbourne's west, or the development of Melbourne grassland reserves, both of which offer the potential for grassland restoration at large scale and for achieving biodiversity, functional and amenity outcomes, have not to-date done so.

Finally, I also should also mention the mining sector as another potential candidate market for grassy restoration. I was asked to present at the NSW Minerals Council Mine Conference in the Hunter this year on the topic of grassy woodland restoration. Many mines (of different types) in eastern Australia are called upon to rehabilitate land that once supported grassy communities. There was great interest shown in the topic by delegates and in the successes of grassy restoration I spoke to. I believe that the resource sector could become a large market for grassy restoration if we can clearly demonstrate to regulators and miners (and public) that high quality restoration is not only feasible but should be part of conditions of mine project consents.

That's it for me. I hope you enjoy this edition of the Gazette. I/we have certainly enjoyed bringing them to you these many years. Merry Christmas and best wishes for the coming year. Let's hope these restoration markets I clearly dream of finally materialize!

Carpet of Kidney-weed (Dichondra repens)

Rod White
Manager Environmental Services (VIC), Greening Australia

Pleasant Surprises

One of the many rewarding experiences associated with grassland restoration are the often-unexpected little gems that re-appear post-scraping and seeding. Those surprise species that emerge on site but which weren't in the restoration seeding mix. It is a reminder of the capacity for persistence in the soil seed or bud bank that some species exhibit, just biding their time and waiting for the opportunity to again express themselves when the time is right.

A great example of this is Kidney-weed - *Dichondra repens*, which has reappeared without fail at all the restoration sites that I have been involved in. *Dichondra* means two-lumped and refers to the two-lobed ovary, and *repens* means creeping or stoloniferous. This reliable little herb occurs in a wide variety of vegetation communities including riparian woodland, plains grasslands, Red Gum woodlands, Coastal banksia woodlands, dry and valley sclerophyll forests and grassy lowland open forests.

Blushing and Slender Bindweed - *Convolvulus angustissimus ssp. angustissimus/omnigracilis*, are another relatively common component of our grasslands. With their pink funnel-shaped flowers they are a welcome sight in a lot of clapped-out grasslands across the VVP. Due to its extensive woody taproot and long lasting hard coated seeds it's another of those species that will 'reappear' in restored grasslands, even if it was absent from the sowing mix.

In the last edition of the Grassy Gazette I talked about the appearance of Austral Trefoil - *Lotus australis var. australis,* in our restoration site at Mount Cottrell, west of Melbourne. At last count there had been close to 12 individuals identified at the site. This species was not in the original seeding mix and further to this, the site had been cropped for close to 50 years prior to the restoration taking place (where site preparation involved the removal of approximately 100mm of topsoil). This species is considered rare in the Melbourne region and only occurs in Plains Grassland EVC's.

Austral Trefoil - Lotus australis at the Mount Cottrell restoration site now managed by Parks Victoria.

I'm sure that loads of you out there who are involved in grassland restoration have your own stories of these 'pleasant surprises' appearing unexpectedly, and no doubt share in my joy of their discovery. It is just so wonderful to be able to allow these dormant species to re-express themselves after what are sometimes long periods of time and again be allowed to play a role in our unique and beautiful grassy communities.

Left: Slender Bindweed - Convolvulus angustissimus ssp. omnigracilis

North Mitchell Grassland, a future conservation and recreation reserve.

Geoff Robertson
Friends of Grasslands, ACT

An update from the Friends of Grasslands (FOG)

As president of FOG (which is based in the ACT and focusses on preserving grasslands of the region), I do try to keep abreast of its many activities. And while I do my best and spent most days couch-sitting devoted to grasslands reading, writing and arithmetic, and attending as many activities as I can, I find the task near impossible. Fortunately, FOG has developed a management model where small groups or individuals, including me, take responsibility for individual areas of FOG's activities.

Our News of Friends of Grasslands continues to amaze with its quality and diversity of material published within its pages. Check it out on our much-visited website fog@org.au, which carries much material of interest, including our huge activities program.

Our grassland advocacy work covers a large number and diversity of issues. These are published in our newsletter and listed on our website. On some issues we are attempting to draw a line in the sand saying enough is enough when it comes to grassland destruction. Our on-ground projects are producing amazing results in restoring a number of sites in Canberra, where we work with the National Capital Authority and Hall Cemetery, monitoring work at Scottsdale, a NSW Bush Heritage property, and on-going on-ground work at several Cooma grassland sites.

Our small grants program is now two years old and by advertising and providing grants we can encourage and influence grassland research, education and on-ground projects. Our activities program provides many and diverse range of visits to public and private sites which we regard as workshops-in-the-field.

Added to this, we have a once a year afternoon session where invited speakers update us on their research. Our members have given presentations on grassland issues at several forums and/or group meetings. We have had some very good press and media coverage, although this requires some organising to make it happen and effective.

In October we partnered with other groups and agencies to hold a grassland forum and field day. Paul Gibson-Roy was one of our many inspirational presenters. One hundred people attended the forum and sixty people the field day. Our inquiry line gets many and various queries and we do our best to be helpful. Our administrative and financial responsibilities, which often take much effort, are ably spread across many highly competent people.

Some new initiatives are being undertaken. Earlier this year we circulated our annual report to many politicians - this has opened several doors and assisted us with some of our other advocacy work. We obtained a grant to undertake our first soil-scraping exercise, removing Chilean Needle Grass and replacing it with a natural temperate grassland at a National Capital Authority site. We are taking a proactive role into researching the populations of Monaro Golden Daisy. We are also preparing a submission for converting a weedy high-quality urban grassland site into a conservation and recreation reserve.

Image 1. Sub dominants facility pan

Kieran Kinney & Rob Millgate
Project Officer's, Greening Australia (NSW)

Highlights from the Richmond SPA

This past year has seen exciting changes and expansions at the Richmond SPA. Over the same period, we have endured just about everything nature could throw at us, from record low and high temperatures, to gale force winds, drought, dust storms and kangaroo plagues! But despite all that, tens of thousands of grasses have been installed as seed crops, planted both by hand and machine.

One new cropping area has been designed, developed and planted to sub-dominant grasses (Image 1). This area features some higher-tech components that our earlier sub-dominant beds lacked such as a fully automated computer-controlled irrigation system. Such features not only increase our seed production capacity, but also save our field crews many hours of labour, allowing us to focus hard-won skills in other vital areas such as seed harvest, seed cleaning and seed quality control.

The expansion of crop areas didn't stop with the sub-dominant grasses. This year we were finally able to fully utilize a 3-ha area intended for dominant grasses. Here with the aid of a planting machine specially designed and built by the renowned Victorian grassland specialist David Franklin we have now installed *Themeda*, *Cymbopogon*, *Sorghum* and *Capillipedium* (with David himself helping our teams with the installation).

To ensure these expanded crop areas receive adequate water we have installed four new 'Rodney' travelling irrigators which allow us to service these larger areas with less labour.

Perhaps even more exciting (at least to our SPA team) is the installation of ten large raised corrugated container beds. These are used to grow seed crops of difficult to manage and/or delicate forb species (Image 2). These containers are built to specification for ease of maintenance and harvest (and are large enough to allow appropriate population numbers). The bed surfaces are covered in matting to suppress weeds and to catch and contain the precious seed! Importantly, they also feature automated computer-controlled drip irrigation. Around the area where they are located a high perimeter wind break has been built to shield the precious plants from harsh winds and afternoon sun.

As we write the SPA team are in full swing for the spring/summer harvest. Rob (our irrigation specialist) is flat out managing the irrigators and getting water where it is most needed, and I (Kieran) am making sure the forb beds are free from weeds, so our collections are free from contaminants. Our prediction is that the SPA will produce excellent seed this year. This is thanks mainly to our beefed-up irrigation systems, our increased footprint and some very timely spring rains.

Image 2. The newly established raised container beds.

John Delpratt
Honorary Fellow, University of Melbourne

There is no doubt – a healthy and diverse Kangaroo Grass – *Themeda triandra* grassland does love a good burn

Since becoming involved with the Woorndoo Land Protection Group in early 2017, I had only known the three-chain Woorndoo-Streatham Rd roadsides as stretches of rank exotic and native grasses, and roadside cropping, with just the occasional flash of colour; usually, seemingly small populations of Common Everlasting - *Chrysocephalum apiculatum*. Even when the uncropped portions of the road were burnt in autumn this year (Image 1), my expectations of the returning vegetation were low. I learnt later that portions of the road had been targeted in summer 2017/18 as part of the Linear Reserves Program, which focused on controlling dominant exotic pasture grasses such as Phalaris and Cocksfoot.

The returning spring vegetation across long sections of the road was magnificent. Presumably this is the result of many decades of regular burning. However, members of the team responsible for the exotic grass spraying were also ecstatic at the absence of both Phalaris and Cocksfoot in areas where it had been sprayed and subsequently burnt.

Image 1. A burnt Kangaroo Grass roadside community in the Woorndoo-Chatsworth district, summer 2018. Photo: John Delpratt.

Image 2. Grassland Candles - Stackhousia subterranea flowering in early spring on the Woorndoo-Streatham Rd., south-western Victoria. Photo: Liz Fenton.

Image 3. Diverse flowering native grassland species in spring - Woorndoo-Streatham Rd., south-western Victoria. Species include Sun Orchids (purple), Scaly Buttons and Common Everlasting. Photo: Liz Fenton.

In early spring, large populations of Billy Buttons - *Craspedia spp.*, Early Nancy - *Wurmbea dioica*, Native Buttercup - *Rannunculus spp.*, Riceflower - *Pimelea spp.* (including Spiny Rice-flower - *Pimelea spinescens*, the rare species), Grassland Candles - *Stackhousia subterranea* (Image 2), Bulbine Lily - *Bulbine bulbosa* and Scented Sundew - *Drosera aberrans*, along with numerous less showy but equally fascinating species, carpeted the roadsides. Later in spring came extensive areas of Common Everlasting - *Chrysocephalum apiculatum*, Scaly Buttons - *Leptorhynchos squamatus*; Plantains - *Plantago spp.*, Bluebells - *Wahlenbergia spp.*, Chocolate Lilies - *Arthropodium spp.*, Milk Maids - *Burchardia umbellata*, Flax Lilies - *Dianella spp.*, Mat-rushes - *Lomandra spp.*, Yellow Rush-lily - *Tricoryne elatior* and an exquisite display of orchids – Golden Moths - *Dirus spp.*, Sun Orchids - *Thelymitra spp.*, Onion Orchids - *Microtis spp.* and Leek Orchids - *Phrasophyllum spp.* (Image 3). We've even located a healthy population of Murnong – Yam Daisy - *Microseris walteri*, with occasional plants at other locations along the road. This iconic species, now extremely rare on the volcanic plains, can now be secured in our seed production area and introduced into our restorations, a few kilometres south-west along the same road (Image 4).

Image 4. Murnong – Yam Daisy - Microseris walteri. Photo: John Delpratt.

These are precious roadsides, both for their diverse species and large populations. However, they are increasingly threatened by inappropriate management, incremental damage and subsequent invasion by dominant pasture and other exotic species. They represent a vegetation community that is now extremely rare on the Victorian Volcanic Plains but that perfectly matches our need for low biomass, easily managed and beautiful native vegetation. And it occurs nowhere else in the world.

It was a beautiful spring. It will be followed by a beautiful summer as the Lemon Beauty-heads - *Calocephalus citreus* glow in the mid-day heat, the Kangaroo Grass rusts and the Blue Devil - Eryngium ovinum shines its metallic blues and purples. Long may it be so.

Image 1. David Allan, Deputy Group Officer, Westmere CFA Group, Member of the Woorndoo Land Protection Group and local landholder, addressing the 2nd Annual Woorndoo Project Community Day. Photo: Liz Fenton

John Delpratt, continued…

The Woorndoo Project One Year On

In the previous edition of the Grassy Gazette (December 2017), I reported on the launch of the Woorndoo Project; a two- year native grassland restoration project funded in 2017 under the Victorian State Government's Biodiversity On-ground Action – Community & Volunteer Action Grant scheme. The Woorndoo Land Protection Group (WLPG) has recently held its 2nd Annual Community Day to mark and review the first year's activities. Around seventy registrants heard excellent speakers representing the State Government (DELWP), Moyne Shire Council, VicRoads, the Glenelg Hopkins Catchment Management Authority, the Country Fire Authority, Ballarat Environment Network and local landholders discuss the opportunities and challenges associated with managing native grasslands on rural roadsides and other public reserves (Images 1 & 2).

Image 2. Attendees of the Woorndoo Project 2nd Annual Community Day inspecting the restored grassland. Photo: Liz Fenton.

In the first year of the project's operations the WLPG and interested volunteers have established three long-term experiments investigating methods for enhancing species diversity in an existing restored native grassland, collected seed, established a seed production area (SPA) (Image 3), and propagated seedlings for the on-going experiments. In March, the 1.25 ha restored grassland was slashed and raked to reduce biomass (it had been burnt in the previous autumn) and to prepare the site for the enhancement experiments (Image 4).

For the next couple of months, seed collecting, from both the field and the SPA, and tube stock production will be the main focuses for the project. In autumn 2019, a further 1.25 ha will be prepared for direct-sowing in spring, following the principles and practices developed by the Grassy Groundcover Research Project. A second round of enhancement experiments are scheduled to be planted and sown in autumn and spring 2019.

In autumn 2018, Moyne Shire Council generously installed a light steel fence to define the restored grassland area and to separate it from the adjoining cropping (Image 5).

Image 3. The Woorndoo Project above-ground seed production area, November 2018. Photo: John Delpratt.

Image 4. The restored Woorndoo grassland, slashed and raked in preparation for the experimental plantings and sowings in 2018 and 2019. Photo: John Delpratt.

During 2018, the Group were awarded a GHCMA Landcare Grant. These funds will allow for detailed vegetation surveys of the Woorndoo-Chatsworth Rd and the expansion of the Group's seed production capacity. It is planned that these two activities will set the groundwork for the Group's next major activity – repairing, where necessary, and reconnecting the very high-quality remnants that occur along this three-chain road and other, similar roads in the district.

If you would like to take part in these ongoing native grassland restoration activities, or simply want to keep in touch with our projects, please register your interest on our Facebook page, or by adding your contact details to our email list.

Contact John Delpratt (ceciljd@unimelb.edu.au), David Franklin (davidfranklin@grasslandflora.com.au), or our secretary/treasurer Jodie Leske (jodie.leske@bigpond.com).

Image 5 (below). Steel fence installed by Moyne Shire Council in March 2018 to define the Woorndoo restored grassland and to separate it from the adjoining cropping operations. A further 1.25 ha of the cropped area will be direct-sown to a native grassland community in 2019. Photo: John Delpratt.

Image 1. The newly arrived 'Thresher' machine.

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

Seed Cleaning in Sydney Receives Danish Assistance

In a recent national on-line native seed survey (conducted by the ANPC) respondents from our sector clearly felt that seed standards were lacking in our sector. As someone taught by one of the most articulate advocates for understanding the characteristics of seed for use in restoration – John Delpratt of Melbourne University Burnley fame, I have always tried to be cognizant of seed quality in the restoration work we've been involved with.

To my thinking there are essentially two main issues relating to seed use in restoration. The first is the state of the seed – what is the composition of the seed-lot? The second is the viability of the seed – is this seed capable of germination (under given set/s of circumstances)?
Both issues require some characterization or testing of the seed lot (such as through purity, germination or viability assessment). Jane and Tegan have written on the topic of seed testing in this edition, so I'll focus on the state of the seed lot – in particular, to cleaning bulk harvest to a defined state.

The state of the bulk harvest can have a large impact on how it is used. For example, if a single species lot or mixed species lot is in a very chaffy state, or has awns and other attachments in place, it might not be able to pass effectively through many types of conventional seeding equipment. The same characteristics create difficulties when trying to propagate plants in a nursery – bulky batches may contain few actual seeds and so germination may be inconsistent in trays or awns may 'pop' the seed up and out of the propagation media (as opposed to in). These situations are prime reasons why many collectors go to considerable lengths to prepare harvested material for sale - most often a very time consuming and laborious task especially when working with 100s or 1000s of kg of material (as an aside, another gripe from the seed survey respondents was that they felt seed buyers rarely pay for the true cost of this painstaking effort).

Despite having long ago developed a restoration seeder that can easily cope with bulky or uncleaned seed, I still clean our harvests to a purer state because I'm convinced this gives us a more consistent spread of seed across a site as it passes through the seeder (and hence an improved restoration outcome). Because we commonly clean quantities up to tonnes, over the years we have developed a larger suite of seed cleaning equipment types, some custom built and others produced by seed companies (i.e. KimSeed) which allow us to clean and grade our harvests (wild or SPA) to defined states with more ease. Essentially, we grade to propagation, seeding mix and chaff-blend states. I've written about some of these machines (and provided images) in past editions of the Gazette if you are interested.

Now in 2018/19 we are about to take our seed cleaning learning to new heights with the acquisition of two new Westrup cleaners from Denmark (finally the story title makes sense!). We were only able to do so with generous funding support provided by Infrastructure Australia. One machine is a 'thresher' which will act as a first-pass for batches to separate seed from the bulky chaff (Image 1). The second, much larger machine is a sieve/aspiration separator which will remove light chaff and separate seed of different species and grade to size, seed of the same species (Image 2).

It is essentially a supercharged version of those cleaners often seen in botanic garden seed labs but with up to 30 sieve combinations rather than 3! Both are built as large-scale cleaners for processing huge volumes of agricultural seed products. We have worked with the manufactures so that ours have slight factory modifications with the view to working with wild native seed.

It is very early days for this new adventure. The machines have only recently arrived and setting them up for operation will take extra time and effort. However, we remain hopeful, confident and a bit nervous (to be honest) that when in action they'll allow us to clean our seed to desired states more effectively and quickly than ever before. Of course, there will always issues to be considered with such technological advances. For example, grading small from large seed of a given species is a form of selection bias, and it may be that smaller seed could be associated with slightly different genetic traits than those in larger seed (an area for more research as they say in the classics). However, such considerations/conundrums are things our sector must have the courage to address as we strive to improve the way native seed is processed, handled and used.

Image 2. Sieve / Aspiration separator.

Jane Kenny and Teagan Hartenthaler
Project Officers, Greening Australia (NSW)

Understanding Seed Harvest Characteristics and Quality

This has been an exciting year for the SPA team at Richmond as we've been able to expand our seed testing and storage capabilities. Over the year our testing capacity has been significantly improved though the establishment of a purpose-designed seed testing room that features two new specialised germination cabinets, purpose-built work benches, high-quality scales and related equipment. We can now conduct high quality purity and germination testing on all the seed batches produced in our Seed Production Area (or taken from wild populations). On top of this, the installation of air conditioning units in each of our insulated shipping containers (1 x 20 ft and 2 x 40ft) used for seed storage means we can hold batches to appropriate relative humidity and temperature, potentially increasing the duration of seed viability.

Purity testing our seed batches is important because it provides us with a clear picture of what proportion of each batch is, pure seed, inert matter (chaff) and in some cases other/non-target species. This information complements our germination data and gives us some confidence we can deliver high quality on ground restoration results (i.e. the seed we are using is capable of germination) and support for our plant production nursery who use this seed to propagate plants for internal and external works (i.e. they get high grade seed of known germination characteristics for propagation). Our enhanced capacity has also furthered our ability to assist various students from Western Sydney University (including masters, PhD and post-docs) through the supply of plants and/or seed from a range of native species, accurate germination data and detailed technical knowledge for their research programs.

This is all in stark contrast to our capacity in past years where we conducted simple germination testing of seed batches in our nursery polytunnels. While these methods still gave us important basic understandings of batch quality (i.e. germinability under nursery conditions) the process had limitations due to a lack of control over various conditions. Whereas in our new cabinets, we can test known seed numbers or mass in petri dishes under specific sets of temperatures (and lighting). We have also compared nursery and cabinet testing and routinely found much higher germination outcomes in cabinets for the same species.

Image 1. Mucus formed on Plantago gaudichaudii seed when exposed to moisture

Our cabinets have given us increased confidence in our capacity to characterise the quality of our seed batches. They also give us a unique opportunity to watch the germination process in action across a wide range of species (up close and personal with nearly 150 species!) (Images 1 and 2). We have also used the cabinets to help us work out what might be the most suitable conditions for some of our 'harder to germinate species' to good effect. Very recently we even used them to try and improve propagation outcomes for the threatened Spike Rice Flower - *Pimelea spicata* because we have had poor outcomes using our nursery set-up.

Image 2. Germinating Kangaroo Grass - Themeda triandra

Cabinet testing is also revealing some very interesting outcomes in terms of variation in germination across seed batches of the same species. For example, we tested two different batches of *Vittadinia cuneata* which came from different beds in our SPA. After testing a known mass of each we found that batch one (73% purity) gave 119 germinants per gram while batch two (60% purity) gave 1139 germinants per gram. Such clear differences in germination potential could have resulted from a range of factors including growing conditions, time of harvest, harvest method, handling etc.

Image 3. Two batches of Vittadinia cuneata give quite different germination outcomes under the same set of cabinet conditions.

But regardless, they highlight how each seed batch must be seen/tested on its own merits and that it is not reasonable to assume that all seed of a given species, from a single location (or region) harvested in a single season will have the same germination (or purity) characteristics. This is an important advance in our understanding of the seed we use in our restoration works.

We're excited for a new year and the opportunity it brings to continue to expand our seed knowledge of the species we grow at the Richmond SPA. We have learnt so much in the year past and hope to continue to improve our understanding and capacity as time goes on!

Inverleigh scrape site with Common Everlasting - Chrysocephalum apiculatum establishing well under the remnant red gum.

Candice Parker
Project Officer, Greening Australia (VIC)

UPDATE: Inverleigh Grassy Restoration Demonstration Site

The Inverleigh grassy woodland demonstration site has been previously funded through the Corangamite CMA under the National Landcare Program which has since finished in June this year. We were able though to conduct an autumn ecological burn to reduce biomass and help promote wildflower to re-colonising at the site. A subsequent spring walk identified 4 additional Golden Sun Moth orchids to early counts along with a lovely display of common everlastings in flower.

Image: Sundew germinating amongst the Common Everlasting in the scrape site, this species was not included in the seed mix.

The scrape area has also shown great germination with Common Everlastings - *Chrysocephalum apiculatum*, beauty-heads - *Calocpehalus spp*. and a handful of Pussy Tails - *Ptilotus spathulas*. Yam Daisies - *Microseris lanceolata* were also planted as tubestock at the site from seed collected and grown at the Geelong Botanic Gardens Seed Production Area, as was Common Tussock-grass - *Poa labillardieri* (positioned around a remnant Red Gum).

Ecological Burn underway at Inverleigh Grassland site.

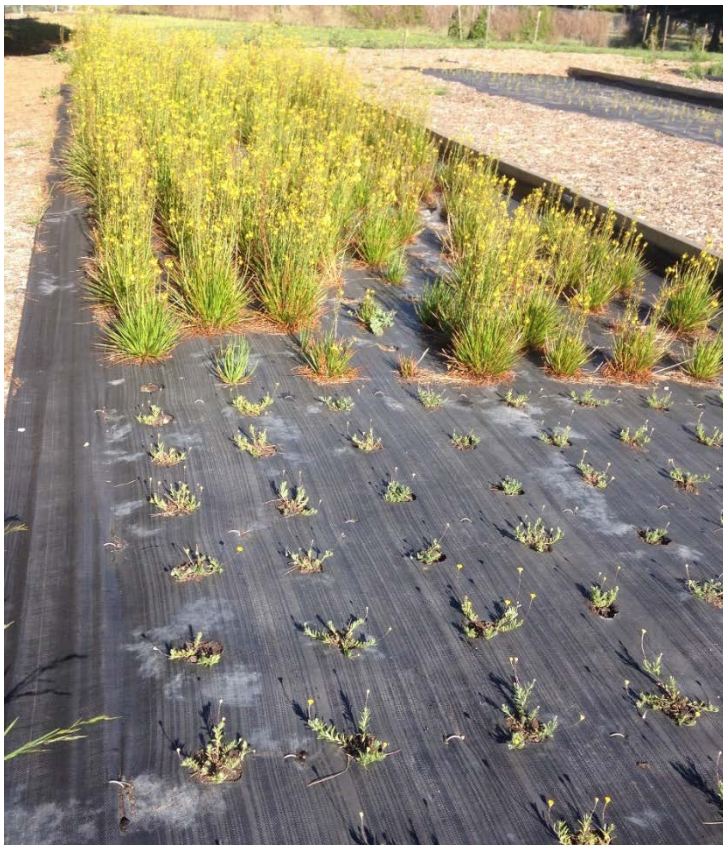
Candice Parker, continued…

Geelong Botanic Garden Seed Production Program: Season 3

The aim at the seed production area this year was to 're-fresh' after a plentiful harvest of Yam Daisy -*Microseris lanceolata*, Pale Everlasting - *Helichrysum rutidolepis*, Pussy Tails - *Ptilotus spathulas* and Blue Devil - *Eryngiums spp*. The primary focus this season was to extend beds holding the Nationally threatened Hoary Sunray - *Leucochrysum albicans var. tricolor* and Button Wrinklewort - *Rutidosis leptorrhynchoides* and to add some Chocolate Lily - *Arthropodium spp.* to the mix to establish a more diverse seed supply for future sowings.

Nationally threatened Hoary Sunray - Leucochrysum albicans var. tricolor planted out into the SPA beds.

Geelong Botanic SPA: Yellow Bulbine Lilies - Bulbine bulbosa and Scaly Buttons - Leptorynchos squamatus.



Yam Daisy - Microseris lanceolata in flower and producing valuable seed.

Thanks to the local CFA for conducting the burn, reducing Phalaris and Chilean Needle Grass biomass to provide ease of access for Wadawurrung consultants to undertake a cultural heritage survey of the site. The site will be scraped in February next year and sown in Autumn with a mix of Poa, Rytidosperma and Themeda seed.

Limeburner's Lagoon Grassy Woodlands Restoration Site – 20 Million Trees

Funded through the National 20 Million Trees program and partnering with the City of Greater Geelong, Limeburner's Lagoon is undergoing some major revegetation and grassland sowing works over the next few years. This year the site has been planted with 5000 woodland trees and a section burnt and prepared for a scrape and autumn sowing in 2019.

Image: The Gordon Tafe students assisting with numerous planting days to plant a section with 5000 trees and shrubs.

DELWP Project Officer, Ammie Jackson explains the weed control requirements to contractors.

Aimee Jackson and Rani Hunt
Department of Environment, Water and Planning, Barwon South West

Linear Reserves Project

Today less than 5% of the previous extant of native grasslands remain on the Victorian Volcanic Plains (VVP), with remaining sites largely limited to small, isolated pockets on roadsides and rail reserves. The linear formation of these reserves makes them more susceptible to threats of weed invasion and creates challenges for management. The Linear Reserves Project (LRP) aims to improve the quality of these native grasslands and associated species on linear reserves by undertaking selective weed control and helping facilitate ecological burning across the VVP.

A native grassland roadside responding well to a recent burn.

Funding

DELWP's Linear Reserves Project, in partnership with the Glenelg Hopkins and Corangamite CMAs, commenced in 2014 as part of the Commonwealth Government's National Landcare Program. This partnership with the Commonwealth Government will continue with the National Landcare Program #2 (2018-2023). Further funding has also been secured through State Governments Biodiversity Response Plan (BRP) and Biodiversity On-Ground Action (BOGA) grants processes, which are aimed at helping achieve some of the key goals in Biodiversity 2037 https://www.environment.vic.gov.au/biodiversity/biodiversity-plan

Weed Control

Environment Program Officers from the LRP have engaged qualified and experienced contractors to improve the condition of high-quality grasslands by undertaking herbicide weed control.

Weed control works through the LRP targets invasive introduced species (mainly pasture grasses) to help reduce seed spread and lower biomass. The project liaises closely with the CFA to maximise efficiency of our weed control work (i.e. which roadsides have been burnt or are proposed to be burnt). Contractors carry out spraying work during spring whilst weeds are actively growing and most responsive to herbicide treatment.

Ecological Burns

The project recognises the valuable work that CFA volunteers have undertaken for decades in maintaining the condition of grasslands by carrying out regular fuel reduction burns on roadsides. We continue to work closely with the CFA to identify sites that are a priority for ecological burning and provide support to the local brigades to undertake burns on these highly significant roadsides.

Dr John Morgan and CFA volunteers at Woorndoo Common.

We recently held several field days to educate the local CFA volunteers about the value of native grassland linear reserves for community safety and biodiversity. Dr John Morgan from LaTrobe University lead participants through a grassland and spoke about the role that fire plays in enhancing biodiversity values and reducing risks to local communities.

Image 1: Collection of wildflower seed

Jess Gardner
Ecologist, Greening Australia (VIC)

Jallukar Native Grassland Project

The Jallukar Native Grassland Project started in 2016 as a partnership between Greening Australia, Jallukar Landcare Group and the Grampians branch of the Australian Plant Society. Our vision is to create a 'capable and informed community actively engaged in the restoration and management of native grasslands'.

To date we have been addressing seed supply barriers by undertaking field collection and plant identification workshops (Image 1) and establishing our community-run grassland seed production nursery in Pomonal. Regular volunteer events are held which provide informative and practical activities for members including seed collection, nursery propagation, nursery maintenance and weeding (Image 2).

One of the great inspirations for our group has been to all jump in a bus once a year and head over to Woorndoo and become further inspired by David Franklin and John Delpratt's roadside grassland re-instatement project. With their project being a couple of steps ahead of ours, the Woorndoo folk have been consistently motivating for us. Another great volunteer driven 'sister' project.

Three years later and we now have enough seed in storage to undertake at least 5 hectares of complex grassland restoration! So now our focus is to try to secure funds and to identify the highest priority restoration site in our region. We hope we can be more successful in our grant writing now that we're heading to the on-ground action phase. I'm so proud of everyone's effort with this first barrier removed!

Image 3 (right). Nationally endangered Pussy Tails Ptilotus erubescens.

Image 2. The group enjoying a day out amongst the grasslands.

The Jallukar Landcare area is in the northern Grampians shire surrounding the townships of Stawell, Pomonal and Moyston. Our project thanks the Wimmera Catchment Management Authority and the Victorian Landcare Program for their ongoing support. And not forgetting that the WCMA was one of the original co-funders of the Grassy Groundcover Restoration Project over 14 years ago with 5 of PGR's trial sites still existing to this day in the Wimmera. These are a great resource for our current project as collection sites (and 14 years later is still my favourite project!).

During our travels looking at regional grasslands we find some rare and amazing treasures such as rare orchids and fauna (Image 3). Unfortunately, illegal orchid theft remains a problem and so the exact location for some of these special grassland sites we'd prefer to keep as local secrets. More information can be found on our Facebook page 'Jallukar Native Grassland Project'. Feel free to follow what we're up to.

Seeding wildflowers close to pedestrian pathways in Jordan Springs

Dr Paul Gibson-Roy
Lead Scientist, Greening Australia (NSW)
Samantha Craigie
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Grassy Restoration for Urban Settings

Over the greater part of 2018 the western Sydney area was horribly dry. This created terrible problems for the restorations we undertook through spring 2017 to autumn 2018. Essentially seed needs moisture to begin to germinate or establish – and even if the site preparation and seeding are perfect in the absence of rain, very little will happen.

Later in 2018 we undertook three new restorations – two in Jordan Springs (in partnerships with National Parks and Lend Lease) and one at Camden (in partnership with Camden Council). These were small in scale (0.1 to 0.8ha) and embedded in the built environment as land between housing developments and national parks or on council reserves in urban areas. The goal for each was to establish distinct areas of highly floristic native wildflowers and separate areas of native grasses. The species used were from a threatened ecological community, so the sites also provided significant biodiversity benefits.

Interestingly, at two of the sites the soil surface was already bare (i.e. scalped) from past development activity. This precluded the need for any further soil works to control weeds or nutrients. At the third site only, a sparse cover of vegetation existed, which was lightly scraped with a bobcat to take off the weed load.

These sites were seeded coming into or during spring with highly diverse seed mixes (all seed generated through the Richmond SPA). This timing is ideal for seeding as soil temperatures increase. At the third site we also laid 30 square meters seed infused matting. This is something we have been trialling at small scale for the past two years with good success and this is the first large single area we've done to that. The matting was laid near to a pedestrian pathway, so it will really catch the public eye when the wildflowers begin to emerge. Most importantly for each of the restorations, the drought conditions that have plagued us for a year have eased and following each sowing there has been decent rains.

Due to their size and proximity to urban infrastructure (i.e. water mains) we have been able to set up semi-permanent irrigation at two of these sites. This allows us to deliver moisture on a reliable basis for the establishment period. It has not been long since seeding, but our monitoring has already shown terrific emergence from the two earlier sown sites demonstrating quiet clearly just how important a factor water is. Having access to irrigation is a huge boon. It is seldom the case this can be done for large or remote sites. But where it is possible, and where seed quality and site preparation/seeding have been undertaken in the most appropriate fashion, access to a reliable irrigation can almost guarantee good restoration results. This is a critical outcome when working with clients who expect vegetation to appear promptly and reliably and where non-native landscaping is known to be effective and low cost.

Above: Species rich seed mixes ready for seeding day.

Left: Ecological restoration is very much possible in our cityscapes.

Preparing a small urban reserve for the installation of a glorious wildflower meadow

It is still very early days for these sites, but I am confident that in the next twelve months they will develop into some of our most important and persuasive showcases for how native wildflowers and grass can and should be embedded within our urban landscapes.

Cath Olive
Euroa Arboretum

Traditional burns on the Burge Family Reserve

I first met Mervyn Shaw in 2002. It did not seem a particularly auspicious occasion. He was cranky as hell. He thought I was a government official who would stop him from clearing, ploughing and sowing his 90-acre paddock to Phalaris. It turned out he was correct.

Merv's 90-acre paddock is a beautiful Grassy Woodland. It has mature River Red Gums, Yellow, Grey, White and Red Box trees, Red Stringybark – an enormous variety for so small an area in good health. Kangaroo grass is the dominant ground cover and there are surprisingly few weeds. Back in 2002, there were lovely patches of Chocolate, Bulbine, and Milkmaids, Lilies and Sun orchids. We have located Striped Legless Lizards, Bibrons Toadlet, Plump Swamp Wallaby Grass and Diamond Firetail Finches on the property – all listed as rare or threatened species.

Merv, after many discussions, donated his property to Trust for Nature in 2012. It is known as the Burge Family Reserve, and can be found in Gobur – near Merton, Victoria.

Ray watching his burn – what seemed quite ineffectual at the time has had a brilliant result in cooking the Sweet Vernal Grass.

Trust for Nature have been actively managing the site for weeds and some of the thickets of tree saplings have been thinned to a more natural density for a woodland. However, from my initial visits, I have observed the lilies and orchid cover deteriorating, and the Kangaroo Grass looks thick and rank. With that in mind we prioritised 2 areas for burning in 2018 – one area where lilies were present, but swamped with kangaroo grass, the other area had kangaroo grass, but in it Sweet Vernal Grass was encroaching on every available niche space, and there was no evidence of lilies or orchids.

Shane Monk checking temperature soil immediately after flame has passed.

We contacted the local Traditional Owners the Taungurung, and found they were keen to be involved in reinvigorating traditional burning practises. There has been huge interest by Taungurung and Yorta Yorta to reinstate 'burning on country', but many hurdles remain for them when it comes to undertaking these practices on crown or parks land – and particularly burning in a traditional way. Happily, Phil Hawkey, our local CFA vegetation officer, has been championing the re-introduction of traditional burning techniques and so together with the traditional owners, the Burge Family Reserve committee and Trust for Nature, we were able to conduct traditional burns safely and easily– during autumn for the area with the lilies and orchids, and during spring – for the area with the Sweet Vernal grass. Results so far have been really pleasing. The autumn burn site was invaded by cockatoos 3 days after the burn. They picked over the ground for roasted Onion Grass tubers, digging it over so much that the soil was loose and friable to about a 10cm depth. There have been some annual weeds that have re-appeared, but the rejuvenated Kangaroo Grass looks lush and healthy. We will eagerly await Spring 2019 to assess the response of the lilies and orchids.

The spring burning site is even better. The Kangaroo Grass was barely singed, and the Sweet Vernal Grass has been almost eliminated from within the burn patches this season. It seems the rank Kangaroo Grass had just enough dry matter to carry a flame which then 'cooked' the emerging Sweet Vernal grass.

A great side benefit to this work has been the involvement of Traditional Owners. Two clans have been involved in the burn days, and the enthusiasm and excitement they share in burning on country is palpable. Grassy Woodlands have evolved as a cultural landscape, where burning was a constant tool in managing country.

Reinstating a burning regime is as much about healing people as it is about healing country. It is an honour to be learning the skills to be able to read and manage grasslands with the help of Traditional Owners and social networks. Indeed, we have found the learning developed and shared on burn days have been as important as the on-ground results.

Want to know more about the GGRP?

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