News of Friends of Grasslands

Supporting native grassy ecosystems

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March & April 2022

Work Parties

Budjan Galindji (Franklin Grassland)
Mar 30, Apr 6 &27
Wednesdays 9-11am
Register: Margaret.ning@fog.org.au

National Lands
Apr 10; 8.30 – 1pm
Gurubang Dharu / Stirling Park
Register: jamie.pittock@fog.org.au

Top Hut
Mar 26
Saturday 9.30- 3.30
Register: Margaret.ning@fog.org.au

The latest updates are found on our website at Calendar

Visit our website -
http://fog.org.au/

Welcome new members!

Peter Chandler, NSW
Angela Rymer, ACT
Lewis Mcpherson, NSW
Gus MacFarlane, ACT
Brett Howland, ACT

AGM Update

Thanks to all those who organised and attended the AGM on 17 March.

Returning President – Jamie Pittock

Vice Presidents – Sarah Sharp and Andrew Zelnick

Secretary – Helen Sims

Treasurer – Janet Russell

Committee members – Margaret Ning, Heather Sweet, Rainer Rehwinkel and Alice Hathorn.

A big thanks to outgoing members Maree Gilbert and Linda Spinaze and to Naarilla Hirsch and Geoff Robertson who are taking a step back in their involvement.

From the President …

The waving fields of native grasses in the plains of Canberra and region have been slashed to scattered remnants. FOG's mission involves conserving and relinking this core surviving habitat where possible to form viable reserves for these threatened flora and fauna.

Differing land tenures and management greatly increase the challenge of conserving our remaining grasslands. In 2021, FOG was helped by students from the Australian National University to undertake a rapid assessment of 15 remnants outside the ACT parks system and identified as significant by the ACT Government. We found some really encouraging moves to conserve some of the larger remnants by bringing them into the park system via the development of offsets policy. We also found urgent management needs, including for weed control, removal of misplaced tree plantings, protection from off-road vehicles and mountain bikes. One site was so degraded that it has lost most of its conservation significance.

Whenever I meet ACT Government conservation and natural resource management staff I think that we are blessed to have such committed and effective people working for the ACT community. However, there are gaps. Significant grassland remnants in the ACT are managed by at least three Federal Government and four ACT Government agencies, as well as many private leaseholders. Not all these landholders have environmental management expertise and most have too few resources. The grassland remnants are further impacted by a plethora of utility and other service providers who can do great damage.

In 2022 FOG intends to redouble our efforts to conserve and link where possible all the remaining remnants of grassy ecosystems in the ACT. We are working with the Conservation Council to propose that the ACT Government establish a protected area network. This would use all the different types of protected areas recognised by the International Union for Conservation of Nature to reserve the remnants and link them. For example, conservation agreements or easements on private leasehold land, and conservation zoning of ACT TCCS land could protect and enable cross-tenure conservation of remnants and restoration of corridors to link key sites. We will be talking to ACT Natural Resources Management to see how their future program may further support non-government organisations – including FOG – to help conserve grassy ecosystem sites outside the park system. FOG will also be urging the ACT Government to allocate resources to enhance grassy ecosystem management in its budget, for example to enhance ecological burning across land tenures.

Recently the ACT Government established a six-person strong team to improve control and eradication of emerging weeds in the Territory. This excellent initiative is exactly the kind of cross-land tenure conservation work that is required. FOG intends to make 2022 a year in which further advances will be made to conserve grassy ecosystems across all land tenures in the ACT. And then there is the need for more conservation work in New South Wales …

Jamie

Advocacy Report

Naarilla Hirsch

February 2022

The ACT Legislative Assembly has invited the public to comment on its Inquiry into Environmental Volunteerism. FOG provided information on the types of activities it undertakes to protect and conserve our unique native grassy ecosystems, and the manner in which it works with government to do so. FOG's comments included the view that the lack of a simple clear vision of protecting grassland biodiversity has resulted in increments and amendments to programs rather than a clear commitment by government on these matters. Better long term protection to sites of conservation value would also lead volunteers to feel confident that their on-ground work is of long-term benefit.

FOG commented on a proposal for an EIS exemption for the development of the Denman Prospect 2 Estate. This area was deferred under the original Molonglo Strategic Assessment, and includes the area known to many as Bluett's Block. FOG's view was that the EIS exemption should not be granted – the area's values are such that further assessment is warranted and that the area be conserved and managed as part of a larger conservation reserve to be established at Bluett's Block-Piney Ridge. Reasons for this view included vegetation assessments undertaken by FOG, demonstrating that the values of the deferred area might be higher than concluded in the Ecological Impact Assessment, and that some areas appear to meet the criteria for EPBC-listed critically endangered Box-Gum Woodland, even though other parts are weedy. The area is rich in birdlife and a more detailed analysis of the impacts on threatened and rare woodland birds is needed. Other considerations were connectivity values, the impact of edge effects on the remaining woodland if development went ahead, and the use of the area by residents of Molonglo and others undertaking citizen science work.

The full text of these submissions appears on our website

White-Stemmed Gum Moth, *Chelepteryx collesi*, a large and prickly subject

Michael Bedingfield

A few summers ago I was working in my garden when I picked up a branch that I had previously pruned from one of my trees. I immediately felt intense pain in my right hand. Looking at my hand in disbelief I saw that it was covered in tiny prickles that had penetrated the skin. The branch I had picked up had a very large cocoon on it belonging to a White-stemmed Gum Moth. After doing my best to try to remove some of the sharp spines, I trimmed the branch to make it smaller and neater then placed it in my kitchen to see what would emerge. Meanwhile my hand swelled up and was painful for several days before returning to normal.

The caterpillar of the White-stemmed Gum Moth is one of largest in Australia, up to about 12 cm in length and as thick as a human finger. It is covered in lots of tiny spiky bristles containing toxins that cause pain. These are barbed, brittle and break off, becoming embedded in the skin of any unlucky person who mishandles them. The colouring of the caterpillar is in bands of grey, black and brown with yellow or orange spots from which protrude tufts of the stiff hairs. When the mature caterpillar pupates it sheds the spines and they are pushed out through the tough external covering of the silken cocoon. It is well camouflaged and also up to about 12 cm in length.

One autumn evening two months after my encounter with the cocoon, the adult moth emerged. It was very slow-moving when I noticed it and its wings had not fully developed. I put the branch and moth outside near a suitable tree and photographed it as it gradually transformed into a healthy adult. Slowly it crawled up the branch into the tree. The next morning it was gone, presumably flying off to complete its destiny and find a mate.

These insects have a regular annual lifecycle. After mating, the female lays her eggs in a

suitable location in autumn. This may be a branch of the food tree but she may also go walkabout to find a more protected location. The eggs hatch in spring and the larvae grow through spring and summer. The caterpillars feed on the leaves of trees of the Myrtaceae or myrtle family, especially eucalypts. When mature they pupate in the cocoon described above, emerging as adults the following autumn. The adults mate soon after emerging. They live for only a few days but leave behind the next generation in the females 'eggs.

Adult White-stemmed Gum Moths are big, the female being larger with a wingspan of up to 16 cm and the male up to 14 cm. Sometimes in poor light they are mistaken for small bats. They are also known by the name Prickly Gum Moth, with their scientific name being *Chelepteryx collesi.* They belong to the family Anthelidae for Anthelid moths. The adults 'wings are marbled with wavy patterns in different shades of brown and grey. The males have large pinnate or feathery-looking antennae and the female's antennae are narrow and simple. This is common for many moth species. My photographs show a female adult soon after emerging, and the cocoon that was its home for a few months during pupation. Note her fine narrow antennae and the very plump abdomen she has in preparation for mating and egg laying. To attract attention the females give off particular sex pheromones which the male is able to detect with his elaborate antennae.

Like other Anthelids, adult White-stemmed Gum Moths have no proboscis or functional mouthparts so they don't feed, hence their brief adult life. The family Anthelidae occurs only in Australia and New Guinea. The caterpillars of the family are generally quite hairy and can cause skin irritation on contact, so it is wise to handle them with care.

White-stemmed Gum Moths are distributed widely along the south-east of Australia, in Queensland, New South Wales and Victoria. They occur in woodlands, forests, urban areas and heath and are relatively common locally. The caterpillars are quite an amazing sight and well worth looking at on Canberra Nature Map. My initial contact with this insect was not so pleasant. But it was a great experience to witness its transformation from within the leathery and prickly cocoon to the handsome adult moth beginning her journey towards maternity.

References:

https://australian.museum/learn/animals/insects/white-stemmed-gum-moth/
https://blog.csiro.au/insect-of-the-week-white-stemmed-gum-moth/
http://lepidoptera.butterflyhouse.com.au/anth/collesi.html

Pollens – airborne or not – a close up

John Fitzgerald

In early September last year, local Acacias put on a fabulous show of flowers. At the same time, hay fever and allergy sufferers fled inside and much of the chatter on radio and elsewhere put the two together. This is an annual battle around Wattle Day and I searched on the web and found a fine one-page article in 2014 published in South Australia [link1]. It and other sources point out that Acacia pollens are too big and heavy to get airborne, so have to be spread by insects and birds.

I decided to collect some pollens then (during lockdown) as a potential close-up topic. I've eventually been able to image some and find the story is more complex than I'd realised.

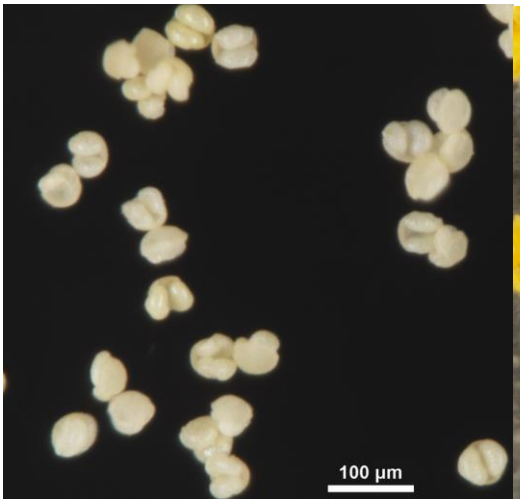
I firstly collected yellow powdery material dropped onto pavers at my home by overnight rain on 19th September. It is airborne pollen taken by wind into the rain clouds. My first image shows the uniform small particles in this 'dust', which seem to readily separate from one other. They are Pine pollens, presumably *Pinus radiata* in this part of the world, each of which has an air-filled sac at both ends, helping their pick-up by wind. [Link1] tells this same story. So these particles are certainly small.

I then collected material from newly opening flowers of *Acacia cultriformis*, one of the common species in our Canberra gardens and open spaces. I imaged the 'dust' and was initially satisfied that yes the granules were much larger in size than those above. However, a bit more check-up using various web sources told me that I was not imaging just pollen but that most of the material was from my wattle's anthers. There are pollens in my image and I have arrowed them for clarity [image2], and I expect the anther material includes more of them.

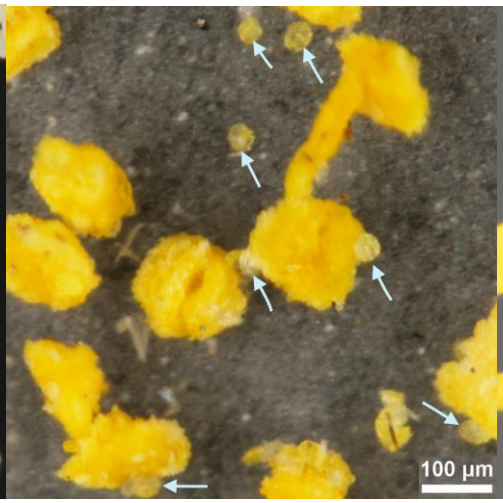
Readers who compare will see that the Acacia pollen grains are actually a bit smaller than those from Pinus. I recommend you chase up some of the many beautiful images of Acacia pollens (at high resolution from electron microscopes) reproduced on the web - one showing striking images is [Link2] though it has few Australian examples. So I progressed to the local repository of Australian pollen facts, held locally by the ANU [Link3], to be informed that our Acacia pollens too are small, less than or about 50 micrometres diameter. The story is a little complicated in that Acacia pollens are all compound and consist of multiple pollen cells grouped in a beautiful dispersal unit named a polyad. However, that polyad diameter is still 50 micrometres or so when fully hydrated. So all this suggests to me that Acacia pollen is really not too big or heavy to be blown, contrary to a popular explanation, but that pollen in Acacia remains lightly attached to coexisting anther structures which are most certainly relatively large - see my Acacia image again.

In January this year, I noticed pollens of *Typha domingensis* flying from native Bullrush plants, and I collected some of the abundant bright yellow pollen. Again this went under the microscope [image3] and readers will see each pollen grain is actually smaller than the Pinus pollen structures and well dispersed. So it readily becomes airborne but it is not a lifestyle problem - maybe it is not allergenic?

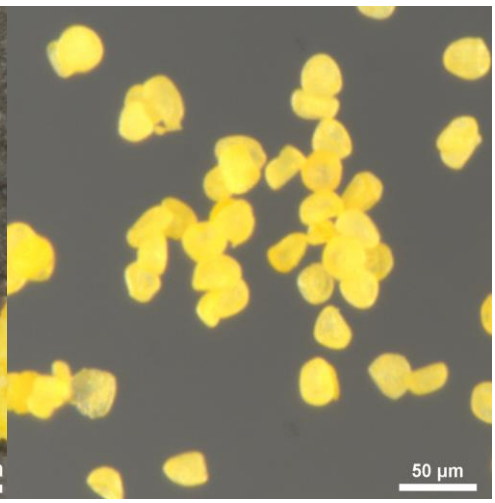
To summarise, I am now leaning to suggest that Acacia pollens are not bigger than those of Pines, but that the primary character which stops them becoming airborne is the way they cling to other flower structures - ie they are 'sticky'. The web has plenty more material to satisfy those who remain curious.



Pic 1. Airborne pollen



Pic 2. Acacia pollen



Pic 3. Typha pollen

Micrographs were taken at the National Seed Bank of the Australian National Botanic Gardens. They can be reproduced freely if attributed and linked to the Creative Commons licence CC BY. The scale bars near the right side of each image represent: Pinus and Acacia images 0.1, and Typha image 0.05 millimetres.

Links:
[1] https://know.ourplants.org/the-plant-press/pollen-in-the-air/
Pollen in the Air, The Plant Press, for Friends of the State Herbarium of South Australia
[2] https://www.paldat.org/search/genus/Acacia
Society for the Promotion of Palynological Research in Austria
[3] https://apsa.anu.edu.au/samples/family.php?family=MIMOSACEAE
Australian Pollen and Spore Atlas

Uncovering soil microbial communities of native and weedy grasses

Part III

Sarah Bates

This is the third in a series of three articles by Sarah, a FOG member and PhD candidate researching the role of interactions between plants and soil microorganisms in weed invasion. Parts I and II are found on page 8 in our Nov-Dec 2020 *and* Jan-Feb 2021 *issues. You may find these earlier issues on our website* http://www.fog.org.au/newsletter.htm. *Thank you for these articles Sarah. They provide deep insights into the relationship between native and non-native grasses and their respective microbial communities - important to our understanding of weeding, managing and restoring native grassy ecosystems. However, as you point out, we are only just beginning to understand this relationship. ED.*

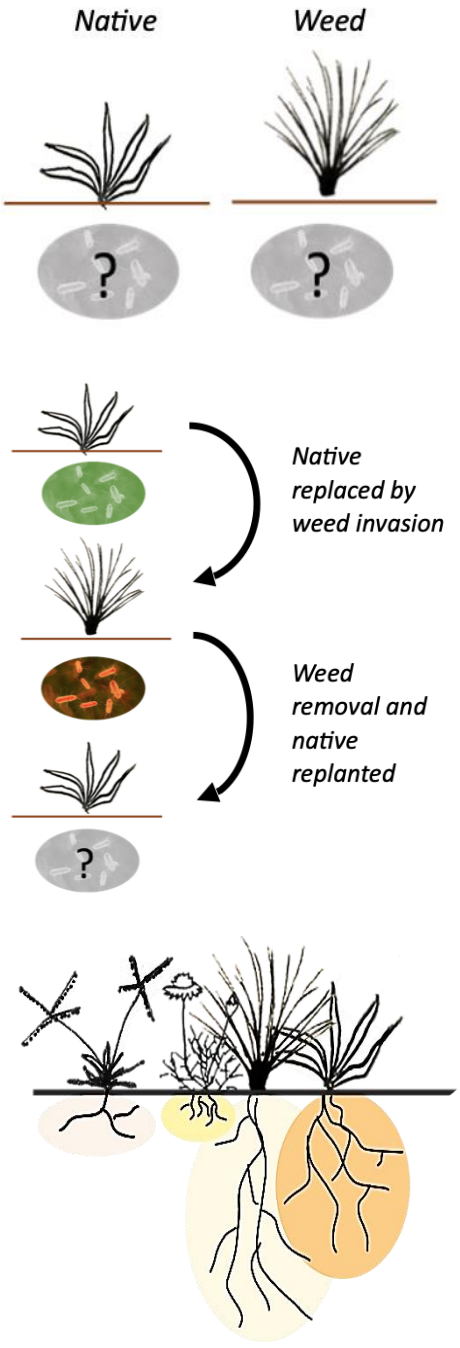
Recapping briefly, in the first article I introduced some of the key soil microorganisms and the significance of their interactions with plants, and in the second I outlined my key research questions and experiments to address these questions in relation to the interactions between native plants and weeds, and native soil microbial communities. This article primarily focuses on the results and findings of the soil sampling done to characterise the soil microbial communities for the native and weed grass species used in my experiments. FOG's grant of $1500 partially contributed to the soil microbe DNA analysis in this part of the project, which I am very grateful for.

Highly diverse soil microbial communities are shaped by a range of environmental factors, as well as the plants growing in the soil. Plants can influence their soil microbial communities by releasing compounds (such as sugars) into the soil via their roots. These compounds can favour growth of some soil organisms while other organisms can be suppressed (for example by plant-produced antimicrobial compounds). The influences of plants on soil microbial communities can differ between plants, which means there is potential for different species to have different soil communities in the soil around their roots. I am interested in changes in soil microbial community composition because these changes can affect plant growth and therefore could have consequences on the survival and abundance of plants in native ecosystems. In particular, I am interested in examining if weeds entering native grassy ecosystems alter soil communities and if these changes affect native and weed plant growth. In my research I measured the soil microbial communities of different native and weed species and asked the following questions: are weeds altering soil communities? If so, once weeds are removed and natives re-established in the soil, do soil communities revert back to their original composition? I wanted to understand if weeds have a lasting impact on native grassy plant and soil communities beyond their presence in the landscape. To address these questions, I set up a glasshouse experiment. I grew several native and weedy grasses in pots that had a proportion of soil taken from the native grassy ecosystem in Fraser ACT. This proportion of soil was used to introduce all the soil organisms that would be found in native grassy ecosystems into the glasshouse pots. Native and weedy grasses were grown on these soils for three months to allow each plant species to influence the soil microbial community. The grass species I used included natives - *Themeda triandra* (kangaroo grass), *Poa sieberiana* (snow grass), *Austrostipa scabra* (corkscrew grass); and weed species - *Eragrostis curvula* (African lovegrass), *Nassella neesiana* (Chilean needlegrass), *Phalaris aquatica* (phalaris) and *Lolium perenne* (perennial ryegrass). I then took each of these potentially unique soils and grew a second generation of each plant species in these different soils, to understand the influence of the second generation of plants on each soil microbial community. I took soil samples across these experimental treatments to quantify the soil microbial community of each generation and each plant species. To quantify the soil microbial

community, I isolated the DNA from each pot of soil in the laboratory and analysed the DNA to identify what organisms were in each soil sample, a process called metabarcoding.

Metabarcoding uses the DNA found in soil organisms to detect and measure what is present in the soil. This process requires isolating, replicating and measuring the DNA of target organisms. This ends up identifying a long list of target DNA which I analysed in my soil samples to characterise the soil microbial communities of the native and weed species. There were 170,108 copies of DNA strands from around 24,800 bacterial organisms in my soil samples. So, it was a very long list and with that came some complex analysis to understand how soil microbial communities changed between grass species. An analogy of these analyses would be if you wanted to quantify and compare the differences between plant communities at different grassland sites. First you would make a species list and record species abundance at each site and then compare species occurrence and abundance between sites. The aim is to understand how different the sites are from each other. To do that you can look at things like: the most common species across all sites; species unique to each site; any dramatic changes in the abundance of certain species between sites. Now imagine this analysis with 170,108 copies of DNA strands (species abundance) from around 24,800 bacterial organisms (species list) across 7 plant species (the equivalent of 7 grasslands sites) at two points in time.

My first question was: do weed species have different soil communities compared to native species? I found that some weed species (*Eragrostis curvula*, *Nassella neesiana* and *Phalaris aquatica*) do have different soil microbial communities compared to native grasses. Other less impactful weeds (*Lolium perenne*) have a similar soil microbial community to natives. In particular, soil microbial communities of the more impactful (invasive) weedy grasses have lower bacterial diversity than native soil microbial communities, meaning there is a loss of soil bacteria when these weed species grow in soils of native grasslands. The changes I found in the soil microbial communities occurred in a relatively short time period e.g. in my experiment I grew the plants for only three months. This suggests that impactful weeds do change soil microbial communities relatively quickly when invading native grasslands. These results also show that different plant species have different effects on soil microbial communities, with some having greater effects than others.



My second question was: do soil microbial communities revert back to similar composition prior to weed invasion if a native plant is grown in weed soil microbial communities? For example, if we remove weed species and plant a native in that soil what happens to the soil microbial community? I saw that soil microbial communities that had been cultivated by weed species did not clearly revert back to native soil communities after a native species was grown in those soils. In fact, soil communities after two generations of plants were distinctively different to those after one generation. This suggests that soil communities readily change depending on the plant species and are not solely explained by the current plant growing in the soil but rather are shaped over time by the different plants that occupy a patch of soil.

From these findings we can expect that in any grassland there are multiple different soil microbial communities in the landscape that occur around different plant species' root zones. Much like we see above ground with mosaic patterns of plant species and their abundance across the landscape, soil microbial communities are likely to be a patchy mosaic.

In terms of conservation, from these findings we can expect that weed invasion in native grasslands will impact their soil microbial communities, but it is not guaranteed that these changes will have a negative overall impact on native plants. More work is needed to identify key soil organisms and their effects on native plants. These results in conjunction with plant performance experiments in another part of my PhD research, highlight that multiple generations or large-scale infestations of a weed are more likely to change the soil microbial community more dramatically than a shorter

history of weed invasion. In some cases, I found these soil changes did advantage weeds, by increasing their competitive performance and therefore their ability to invade and reduce native plant growth performance. This was the case with the highly invasive weed *Eragrostis curvula*. Therefore we have another compelling reason to remove weeds earlier rather than later in their infestation.

I also found that plant performance can be impacted by plant-specific soil microbial communities. For example, a native grass like *Austrostipa scabra* performed better on soil with a prior history of *Austrostipa scabra* compared to a soil with a prior history of a weed species like *Lolium perenne* but, surprisingly, performed best on soil with a prior history of *Eragrostis curvula*. When we revegetate it is important to note what native species are performing well in the immediate area to help shape our species planting list and to modify this list if, during the revegetation process, a particular species fails to avoid negative local soil microbial community effects. However, if a certain native species fails at the initial planting, that species may be successful if replanted once the revegetation has established, the soil microbial community has altered to be more favourable, and the associated negative effects have been ameliorated.

FOG support for *Okehampton* grasslands

Jason Brown

FOG support for 'Okehampton 'grasslands - Jason Brown

Dr Jason Whitehead, Managing Director, Cape Herbert Pty Ltd, expresses his appreciation to FOG for supporting the Okehampton grassland project and looks forward to a future opportunity when a FOG field trip might be hosted on site and additions made to their species lists. FOG's support came in the form of a grassy ecosystems supported grant.

Friends of Grasslands' assistance to Cape Herbert Pty Ltd has been greatly welcomed. Cape Herbert Pty Ltd, a Tasmanian family-owned company, recently acquired part of the historic 'Okehampton '1,385ha property 10km north of Triabunna on Tasmania's east coast. These are the traditional lands of the Laremairremener, Palawah people, who had once carefully managed the area's native grasslands and grassy woodlands. Since 1825 the area has been run as a sheep-farming enterprise; the former fire-managed grasslands and grassy woodlands have been set-stocked with sheep and the woodland trees cleared from much of the land. Set-stocking has probably caused excessive grazing pressure on more palatable plants and grasses, and diminished the extent of the original kangaroo grass (*Themeda triandra*) sward, leaving fewer palatable and productive native grasses. It has resulted in the conversion of much of the area's native pastures to introduced sown pastures.

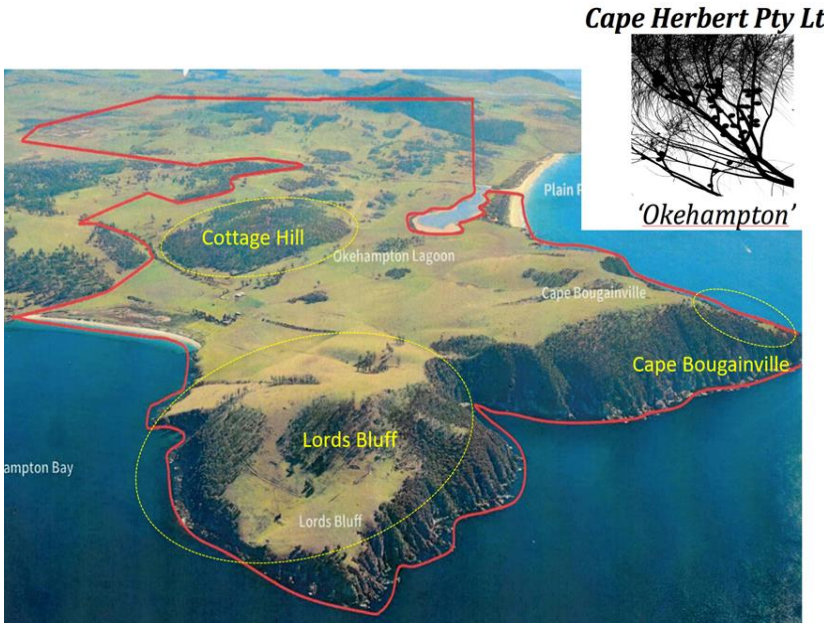


Figure 1: *Okehampton* property boundary and key remnant native vegetation conservation area

Friends of Grasslands, through their 2019 grant support of $1,000, assisted with the mapping and identification of important remnants of native grassland and grassy woodland (see Figure 1). Funds were used to engage Dr Kerry Bridle to assess the condition of about 300ha of this remnant native grassy vegetation at three

locations (Lord's Bluff, Cottage Hill, and Cape Bouganville) and to devise fencing, grazing and weed management options and priorities to improve their natural values.

Broadscale mapping and data collation for the southern part of Okehampton used in Kerry's report were provided with the assistance of Professor Jamie Kirkpatrick, Dr Karen Johnson, Louise Gilfedder, and students from the University of Tasmania. My colleague Tom Whitehead and I carried out most of the pasture condition assessments over 12 months, based on a survey methodology provided by the Tasmanian Institute of Agriculture. Among the eight mapped native vegetation communities in the three locations, three are threatened, with six threatened plant species (listed as rare) under the Tasmanian Threatened Species Protection Act 1995. There are records of at least three native orchid species and possibly more species to be found. The state-listed threatened vegetation communities include *Eucalyptus globulu* dry forest and woodland, *E. amygdalina* forest and woodland on sandstone, and the Commonwealth EPBC Act listed critically endangered lowland *Themeda* grassland. Lowland *Poa* tussock grassland is also found on the property but is not considered to meet the EPBC Act listing criteria. Endangered native fauna records across these three locations on the property include Spotted-tail Quoll, Tasmanian Devil, Wedge-tailed Eagle, Eastern Quoll, and White-bellied Sea-eagle.

The report's management recommendations address fencing, grazing and weed control. The fencing plan includes the whole property as this is important for planning future livestock-grazing rotations. It focuses on separating higher conservation value assets from sown or degraded pastures, restricting stock access, and implementing strategic grazing to promote restoration of degraded grasslands. A stepped approach has been taken to fencing, focusing on the highest value conservation assets in the first instance and assigning priority by site characteristics and funding requirements.

The fencing design has been implemented at the Cottage Hill site containing 60ha of threatened grassy woodland. Efforts are now underway to apply appropriate rotational sheep grazing and fire management here. More recently, the Cape Bougainville area has been split into three paddocks with a total grazing exclusion fence installed around part of the *Themeda* grassy woodland. This will be monitored as part of a regenerative/drought-resilience project partly supported by the Commonwealth Dept of Agriculture, Water and the Environment.

Response from Minister Vassarotti

On p16 of our Nov-Dec newsletter, I included an item on the ACT budget, including a reference to Budjan Galindji (Franklin Grassland). Following conversations with her office, we received this response from Minister Vassarotti. While it doesn't directly respond to some of the issues that I raised, we discussed these and many other matters with Ian Walker when members of FOG met with him recently (as referred to in the Minister's response). We would like to thank the Minister, her office and Ian for their work on grassy ecosystems and recognition of FOG's role in that. GR, Editor

Thank you for the opportunity to contribute to the *News of Friends of Grasslands* in response to the News Roundup article on the 2021-22 budget.

The Australian Capital Territory (ACT) is Australia's Bush Capital. Its natural environment is both beautiful and important from an ecological and landscape perspective. It is important we continue to pursue fully integrated management of our urban, bush and rural ecosystems, waterways and wildlife corridors, to increase the diversity and strength of our ecological communities and to provide resilience to climate change.

The ACT Government is committed to protecting Canberra's unique environment and has demonstrated this through our recent Budget (Statement E), specifically strategic objective *Enhance Canberrans' quality of life by conserving and experiencing nature and culture* .

This is further described in Strategic Indicators:

2.1: Effectively manage and mitigate risks to the ACT's environment, culture and people to increase resilience and adaptation to climate change and other stressors;

2.2: Respect and enable Traditional Custodians' aspirations and build capacity to Care for Country together; and

2.3: Create opportunities and improve access to natural spaces to enable people to experience nature and culture to improve people's physical, emotional and social well-being. Collectively, the key actions outlined under this strategic objective demonstrate a substantial commitment by ACT Government to improve the natural and cultural values of the ACT in particular grassland and woodland ecological communities that are nationally significant.

The ACT Government is providing more resourcing to help maintain and improve our environment. Invasive species such as weeds are one of the biggest threats to biodiversity in the ACT. Climate change, and the higher-than-average rainfall on the back of years of drought and bushfire, have created favourable conditions for invasive species. In recognition of this, the 2021-22 Budget allocated funding of $3 million over four years to the intervention and management of invasive species, addressing this key threat to grassland ecological communities.

Further, the ACT Government continues to support local conservation groups and individuals. The Canberra community plays a critical role in caring for the ACT's environment. Hard-working volunteer organisations provide localised and dedicated care of the environment from people who truly love and understand their neighbourhoods. The 2021-22 Budget allocated funding of $3.5 million over four years for local volunteer groups (such as catchment groups, FrogWatch and ACT Wildlife) and more funding will also be allocated to expand the ACT Environment Grants. This support will help maintain and improve our iconic landscape and progress important priorities for nature conservation.

In relation to Franklin Nature Reserve enhancement, $6.2 million was secured in the 2021-22 ACT Government Budget to deliver threat management, reserve establishment and restoration initiatives across three separate reserves in the ACT: Budjan Galindji, Nadjung Mada and the Gooromon Grasslands Reserve Complex. A large portion of this funding is earmarked for the finalisation and implementation of the Budjan Galindji Landscape Plan, realising the joint vision of ACT Government, Friends of Grasslands (FOG) and the ACT community for conservation and engagement at Budjan Galindji Nature Reserve.

The ACT Government will be finalising the Budjan Galindji Landscape Implementation Plan in the new year. We recognise the significant contribution FOG has already invested in this plan and site and look forward to continuing our strong working relationship with you and the Budjan Galindji Park Care group as we advance this work.

Mr Ian Walker, Executive Group Manager, Environment Heritage and Water will be meeting with FOG in the coming weeks to answer any requests for further information.

I have also established the Biodiversity Conservation Forum this year, of which FOG is a member, to promote a shared dialogue among conservation stakeholders and Government. This will help us build a strong community of practice to provide a cohesive and strategic approach to nature conservation in the ACT as we continue to work together. I want to thank all the FOG members, volunteers and Committee for all your hard work and commitment to conserve, and restore, natural temperate grassy ecosystems in the ACT and across our borders. I look forward to meeting more of you in the field next year, and to reading the next FOG newsletter to hear more about the important work you all do

Vale Geoff Hope

We repeat our tribute to Geoff Hope first published in a recent Events and Notices release.

It is with great sadness that we learnt that, over Christmas, our friend and mentor Emeritus Professor Geoff Hope died. He is known world-wide for his work on palaeoecology in Australia, Asia and the Pacific. We remember him as someone truly learned, humble, and sympathetic to those around him. He led a number of FOG trips where he demonstrated his tools of trade and explained the evolution of the landscapes around us. We express our deep sympathy to Bren and Jules. We will all miss him.

We also include two images of our friend Geoff given to us by friends. The first is from Facebook and the second is labelled 'First contact at Perau berths. Geoff Hope playing the harmonica to the children of Fife Besar, Aru Islands, 1998'. Photo courtesy P. Veth. Published in *Australian Archaeology, Number 50, 2000.*

From Lovely Greens website

I think we often need to remind ourselves that most of our neighbours do not share our love of indigenous plants. On the contrary they are attracted to non-indigenous plants and extol their benefits: as food; as soil-builders, as good for insects and for their beauty - I have to admit dandelions are amazing. This item on Facebook got 6.8k likes and 465 comments when I read it. ED.

A lot of people call me a weed but I'm a friend and come to help you!

When you see me, remember that I'm the ONLY one who wants and can grow in that particular spot.

Because: Either the soil is too compact/hard / stomped and I want to loosen it for you with my roots. Or there is too little calcium in the soil - don't worry, I will replenish that for you with the dying of my leaves. Or the soil is too acidic. But I will also improve that for you if you give me the chance. Or a mixture of the above reasons, of course

I'm here because your soil needs my help so best you let me grow without disturbing me! When everything is fixed, I will disappear again, I promise!

Are you trying to remove me prematurely with my root? However meticulous you are, I will return 2x as strong! Just until your soil is improved.

You can even tell by my growth at which stage my help is at. If my leaves are flat on the ground then I'm far from ready but if they all reach up then I'm already a long way on my way.

Something completely different is that I am 1 of the first bloomers in spring so I will announce spring/summer for you.

During the day when it's hot, I open my flowers but in the evening when it cools off I close them again quickly. In fact, if it's not hot enough during the day I won't open them at all!

My flowers are some of the first food for insects after hibernation and unlike most other plants, I have pollen AND nectar, not merely one OR the other! And I am generous with them!

My flowers are even delicious for you people by the way, did you know? I used to be called ''honey (or gold) of the poor'' because my flowers are so sweet in e.g. jam, sauce or salad!

But wait until the end of May or later before you start picking and even then, don't pick everything yet! The biodiversity and bees will be very grateful!

Have a dandy day

Comments were mostly supportive: they reminded people of their grandmothers; they grant wishes when you blow their seed heads; they are good for detoxifying one's liver; their roots make good coffee; they have diuretic qualities; they are not weeds after all.

Ecosystem Seed Mixes - another Facebook ad

These are a blend of wildflower seed varieties selected for their nectar-producing and aromatic properties.

As well as being visually stunning, these mixtures are expertly designed to attract insect biodiversity, helping build a sustainable environment for the bees and butterflies to thrive in.

Recent FoG Events

Budjan Galindji

In 2021, the Budjan Galindji Parkcare group, organised by FOG, held 15 work parties. The last was on 1 December, and in 2022 we held our first 2022 work party on Australia Day, and shall continue our two hour Wednesday morning work parties on the first and fourth Wednesdays each month.

Nature has not been that kind, and in common with other on-ground groups, the fires in early 2020, rain and COVID, have set back the efforts of government and volunteers to make progress on managing the reserve.

However, several matters stand out. First, one is that the lessons learning that have clarified future strategies. Second, the seed production area has been established. Third, the ACT Government announced that $3 million will be spent on re-structuring the earth mounds, and installing paths and signage to fulfil FOG's vision of a recreation reserve that places grasslands first.

We continue to appeal to the public including a clean-up date in March.

Seed garden, including great flowering of button wrinklewort (GR) and Blue devil (AZ)

Visit to Dacelo

Sat 11 Dec. Thirty FOG members visited Clare and Larry's property 'Dacelo', near Braidwood. Clare and Larry are well known to FOG members as each has been the executive director of the Conservation Council in the past, and continue to practise their many skills caring for country.

This trip had already been scheduled and postponed, but despite heavy rains in the days leading up to the visit and possibly more rain forecast, various carloads of people were met by Clare about 10km south of Braidwood on the Araluen Rd at the turn off to their property.

Once we made our way down the bottom of the hill on their track, exited our cars, we gathered to be met by a smiling Larry who explained what they are doing to sustainably manage the small farm where they run a few alpacas and other small animals, grow vegetables and so on, as well attempt to remove invasive weeds. We then went for a FOG slow walk, observing, checking out plants and listening to Larry about features of the

delightful and varied property and what work they had been doing.

Then it was lunch time. Clare and Larry are well known for their catering skills, especially from their days of directly catering, or at least organising catering, of large Conservation Council dinners. It was a very stylish and superb lunch.

As our hosts explained to us, Dacelo is the genus name for kookaburra of which there are four species, two in Oz and two in NG, and a fifth if you include the genus *Clytoceyx*.

Thanks Clare and Larry for a fantastic day and an amazing lunch and to Margaret for organising the event. Margaret, Andrew and Janet had previously visited the property on a reccy to proffer advice and identify plants. Also thanks to Helen Macartney and Andrew Z for photos, including one of a favourite fireweed *Senecio minimus*.

After our walk on Dacelo, a remnant of the group then made a brief visit to neighbouring Bells TSR. It was quite a steep walk with heavy vegetation, as you can see from photo. We were rewarded with *Hackelia latifolia* which is rarely seen on a FOG activity.

Hall Cemetery - John Fitz Gerald

On an uncharacteristically cool morning for early February, ten volunteers went to work around the woodland and put in a total of 33 hours.

A wide range of unwanted plants were tackled from Ribwort Plantain, to Cleavers, Umbrella Sedge, Thistles, Fleabanes, a Blackberry patch, Pigeon Grass, Rough Dog's Tail and Fog Grass (seeds removed). Unwanted flowers and seeds were taken off site.

This work backed up solo work over the last three months totalling 49 hours. Thanks to all for their efforts.

One woodland area that needed no work is featured in the photo from Andrew Zelnik - healthy Eucalypt trunks with lush Weeping Grass growing under their canopy, also a few plants of Silver Wattle and Smooth Flax Lily.

National Lands group update

In late December (19th), a hardy group of FOG volunteers met at Attunga Point to maintain our past plantings, which are thriving, and continue dispatching lake side woody weeds heading towards Blue Gum Point (pictured). Rain brought our efforts to a premature close.

On 16 January, 6 FOG volunteers worked to maintain our past restoration work at the lovely woodland between the western sides of State and Capital circles. A plague of regrowth Cootamundra wattles were slain, thistles and fleabane dispatched, and St John's Wort sprayed.

Top Hut

FOG commenced its 2022 work at Top Hut TSR with a work party on 15 January. As can be seen from first image, volunteers took bags to fill with unwanted seed heads. Also weeds were removed by herbicide. Recently a query was raised about a bee keeper placing bee hives on the site. Following discussion within FOG, FOG said that it did not support bee keeping on the TSR and as a result the application by the bee keeper was denied. FOG's reason was that the aim of TSR management was for its biodiversity. Non-native bees could do damage by changing the composition of plants present and also outcompeting native insects, including bees, for food.

Our images by Andrew show why the reserve is such a treasure: these include the pink and blue splashes of Grass Trigger Plants and Native Bluebells and other flowering forbs amongst kangaroo grass swathes; Australian Carraway *Oreomyrrhis eriopoda*, and Vanilla Lily *Arthropodium milleflorum*.

FOG Christmas celebration

14 Dec, despite a threatening storm, FOG held its Christmas celebration from 5-7pm at one of its favourite sites, Blue Gum Point, on the southern bank at the western end of Lake Burley Griffin. This was the second year that FOG held its annual Christmas celebration at one of its on-ground sites. Hence we manage to combine celebrating the season, our friendships, and our achievements.

We set up under our marquee, which provides great shade from hot summer suns, but on this occasion it would protect us from a potential storm. There was

plenty of food and drink, organised by Margaret and Geoff, and many great conversations. Thirty of our members attended.

After attending to the food, it was time for a walk and Jamie led a largish group, first taking us to the grassland slope rising up from the lake. He pointed out what was being achieved by removing many exotic and weedy trees - truly remarkable. It was superb scene as many flowers were blooming and the weather was very pleasant. Elsewhere on the site is a population of Queensland blue grass - this lovely flowering grass is somewhat rare in Canberra.

In recent years FOG's National Lands Group has taken on Blue Gum Point (managed by ACT Governments ' Transport Canberra and City Services Directorate - TCCS) which adjoins Stirling Park. The group is removing exotic woody vegetation along the edge of the lake, weeding elsewhere, planting rare Buloke to establish a breeding population of that species, and generally managing the site to improve and restore the mix of grasslands and grassy woodland. Button wrinklewort is another important focus at the site. FOG has received substantial funding to remove the woody vegetation and there is a report on our first grant in *FOG's Blue Gum Point Project Grant is Completed* in our previous newsletter. A second grant to continue the work was received in 2021.

The weather did not disappoint and the sky opened. Luckily we were able to shelter. Photos by Kat McGilp.

STOP PRESS!

We would like to thank our FOG members and friends Jamie Pittock, Charlie Massy, Don Fletcher, Pam O'Brien and Richard Swain for their contribution to 4 corners on 21 Feb on the mountain brumbies.

Both appeared as informed, measured, strong and brave advocates for biodiversity without resorting to abuse and threats which too many resort to in debates.

Truly heroes and models for each of us to be a little braver.

Editor

News Roundup

ACT Landcare map

ACT Landcare have released a map showing distribution of "landcare groups" - a great initiative. The map may be found here (https://www.landcareact.org.au/get-involved). It includes some 81 groups.

Conserving Ainslie grassland - Jamie Pittock

The planning of Canberra has been a blessing in retaining substantially intact, high conservation value remnants of grassy ecosystems within the city. This becomes a curse when developers seek to parse the definition of 'significant 'in order to minimise the area of land to be conserved and to justify their development proposals. One such site is the old CSIRO headquarters land on Limestone Avenue in Ainslie.

The Ainslie (formerly called the CSIRO) grassland is dominated by Kangaroo Grass and is Golden Sun Moth habitat covering three hectares. It is largely on ACT City Services land but grades into former CSIRO land, including areas that should be conserved. All remaining natural temperate grasslands greater that 0.2 hectares in area are meant to be conserved in the ACT and this site has been identified as a conservation priority since at least 2005.

The CSIRO land included a limestone outcrop facing Limestone Avenue. In 2016 the land was sold to the Doma Group. Recently, members of the Ngambri community and several academic experts identified a number of petroglyphs on the limestone outcrop after Doma's environmental and heritage consultants had advised that the site was of limited significance. The ACT and federal governments gave final planning approval in 2021 for a housing complex named "The Foothills". Regrettably, last December, Doma bulldozed the limestone outcrop. CT report found here.

The ACT and federal development approvals allow destruction of 0.47 hectares of grasslands and 0.78 hectares of Golden Sun Moth habitat. The development was approved with some conditions for on-site landscaping and offsets elsewhere.

FOG supports the efforts of the Ngambri community, academic experts and others for conservation of the site. The Ainslie grasslands on City Services land were belatedly protected by bollards to limit damage from off-road vehicles. Otherwise, the grassland has been largely unmanaged and weed control is urgently needed. The restoration of the broader Ainslie grasslands by the ACT Government, including undeveloped portions of the former CSIRO land would provide a wonderful grassy ecosystem showcase reserve close to Civic. The site is adjacent to the Mount Ainslie portion of Canberra Nature Park. It would be fitting for the Indigenous traditional owners of Canberra to have a substantial role in the ownership and management of this land.

In line with its objectives, FOG seeks to collaborate with all members of the ACT's Ngambri, Ngunawal and Ngunnawal communities, and notes that in some instances Indigenous perspectives differ on traditional ownership or cultural significance of sites. FOG acknowledges and celebrates the Traditional Owners of the lands and waters on which we live and work. We pay our respect to their elders past, present and emerging. We recognise the important role of Aboriginal people as stewards of grassy ecosystems on country for over 60,000 years, and their continuing connection to land, waters and culture. We also recognise the need to manage healthy landscapes to support traditional and ongoing social, economic, cultural and spiritual values. FOG respects traditional knowledge for the management of natural resources and the achievement of sustainable development. We are committed to mutual learning between scientific and traditional knowledge holders to enhance outcomes. We look forward to continuing to work alongside Aboriginal people to improve the health of our nation's grassy ecosystems for the benefit of all Australians. - JP

Barton Highway update

We learnt from John Connelly that progress has been achieved. The Barton Highway Upgrade Alliance (BHUA) has agreed to make changes to the highway alignment in the area of the Kaveneys Road intersection. This alteration will remove almost all impact on the outstanding group of Aboriginal Heritage trees on the southern corner of Kaveneys Road. This change was announced with a very low key media release on 22 Dec 2021. The group of Landcare organisations, including FOG, lobbying for changes to the alignment are very heartened by this alteration.

Further south where the proposed upgrade traverses the Hall TSR, the BHUA is still working on alterations to the alignment. John is optimistic that they will come up with a good alignment which does not involve significant clearing of the TSR and does not impact any Aboriginal heritage trees.

The Hall TSR area contains many significant heritage trees. The latest information indicates that there may be up to fifteen heritage trees in this area both in the

Hall TSR itself and further north adjoining the existing Barton Highway. The group considers it is imperative that all these trees be retained. Clearly this area is highly significant from an Aboriginal Heritage point of view.

The group has produced a discussion paper regarding the Hall TSR. The proposal envisages restrained and respectful entrance to the ACT showcasing Aboriginal Heritage, an ideal complement to the Ngurra Aboriginal Heritage Centre currently proposed for the lake foreshore in the parliamentary triangle. An information area at the north end of Victoria Street could be included where visitors to the ACT could conveniently stop and learn about the significance of the area. Possibly, walking trails could be constructed through the Hall TSR leading visitors to the whole range of heritage trees.

Bluetts Block

In Naarilla's advocacy report she mentions that FOG put in a submission on Bluetts Block. Naturemapr (Canberra Nature Map) is lobbying against a proposed development mooted for the site.

In a novel way to make its point, NatureMapr has created a polygon of the site (shown here) so that one can easily see what species make up its biodiversity, along with a list of all the records. NatureMapr has also asked people to add more records.

Commissioner's report on volunteers

On 8 Feb, Dr Sophie Lewis, ACT Commissioner for Sustainability and the Environment, announced that her Office has recently published a web-based report on environmental volunteering in the ACT, pointing out that in her role as Commissioner for Sustainability and the Environment, she acts as an independent voice for environment and sustainability in the ACT.

It is delightful that prominence is given to acknowledgement of Country - *Dhawura nguna ngurumbangu gunanggu Ngunnawal, Nginggada dindi dhawura Ngunnawalbun yindjumaralidjinyin, Mura bidji mulanggaridjindjula, Naraganawaliyiri yarabindjula.* (This country is Ngunnawal ancestral, spiritual homeland, We all always respect elders, male and female, as well as Ngunnawal country itself, They always keep the pathways of their ancestors alive, They walk together as one.)

The report (found here) provides a good description of what volunteers do to manage our biodiversity. The Commissioner states that "we are extremely lucky in the ACT to have many volunteers and organisations working to preserve and protect our natural areas and species… For instance, the report estimated that the equivalent wage cost for environmental volunteering work in the ACT would be over $21.5 million per year." It points out "The environmental volunteering space in the ACT is complex, with many government agencies and non-government organisations involved in supporting the thousands of people who give their time to protect, restore, and expand our knowledge of the natural environment".

It is pleasing that FOG receives many favourable comments throughout the report. The report also includes a case study on FOG, entitled *Championing critically endangered grasslands - Native grasslands have been decimated since European invasion, and this groups works tirelessly to protect what remains.* The full text may be found here This was prepared by the authors of the report with assistance from FOG members.

FOG urges its members to familiarise themselves with the report.

Resources to identify native grasses

In the recent newsletter of Grassland Interest Group (GIG, a member of FOG), it was mentioned that new members or those wishing to refresh their grass ID skills can find links to introductory material and webinars from last year as follows:

- Why care about grasslands? An introduction from Victorian Volcanic Plains here;
- Introduction to grassland species identification by Geoff Robertson, FOG here;
- Grass ID - Part one by Beth Ross here.

Those wanting to know more about GIG should contact Sophie (sophie@bcn.org.au) or Michael (mrob3@mac.com).

Jam Land saga continues

An article headed *Company part-owned by Angus Taylor challenges 'critically endangered' listing of grasslands it poisoned* by Lisa Cox and Anne Davis (*The Guardian* 15 Jan, found here) reported on a legal challenge to the findings of a 2020 ministerial review. The review found that Jam Land had illegally cleared 28.5 hectares of natural temperate grassland on a

property in Corrowong in southern NSW in 2017, and required the company to take remedial action.

In its appeal, the company is challenging the remediation determination and is seeking a declaration that the listing of the grasslands as critically endangered in 2016 by the then environment minister, Greg Hunt, was invalid.

The article reminds us that Minister Angus Taylor is a part owner of the company along with his brother Richard Taylor. It also refers to Angus Taylor's lobbying of Minister Frydenberg about the issue in 2019.

The myth of 'wilderness' - Geoff Robertson

An article I would highly recommend is *Indigenous knowledge and the myth of "wilderness"* by Michael-Shawn Fletcher, Rebecca Hamilton, Wolfram Dressier & Lisa Palmer published on Mon, 11 Oct 2021 by the University of Melbourne. It may be found here. It is a succinct presentation which debunks the word 'wilderness' (defined as a romantic notion of pristine or healthy nature devoid of human management) and reminds us that we live in what was, until very recently, a landscape managed by First Nations people.The framing ignores the fact that Indigenous and local peoples have been actively creating, managing and maintaining most of the Earth's inhabited landscapes for thousands of years. I have to say, I cringe when I hear the word 'wilderness'.

Human impacts on the environment are almost always viewed as threats to ecological health, but the article points out that "Aboriginal people in Australia view Wild Country -' wilderness ' - as sick country, land that has been degraded through lack of care". Once the myth of 'wilderness' falls away, we open ourselves to a new way of thinking about land-management, and the importance of applying Indigenous knowledge as we seek to adapt to climate change and a better future, in Australia and throughout the world.

Turtle rescue at Lake George - Geoff R

Following our visit to Dacelo, Andrew, Marg, Jiyan and I decided to visit Lake George and it was near full - we were not disappointed. Andrew took many great landscape photos, but we have included just one taken from one of the many small grassland remnants on the lake's edge - the wind farm on the opposite shore. At one roadside spot we saw many long-neck turtles. Most were dead, but we "rescued" one - not sure if it was heading to the water or away? Such a pity that motorists do not seem to care, and turtles are living shorter lives as evidenced by the fact we saw no full size turtles.

Yarramundi Grassland Brief - John Fitz Gerald

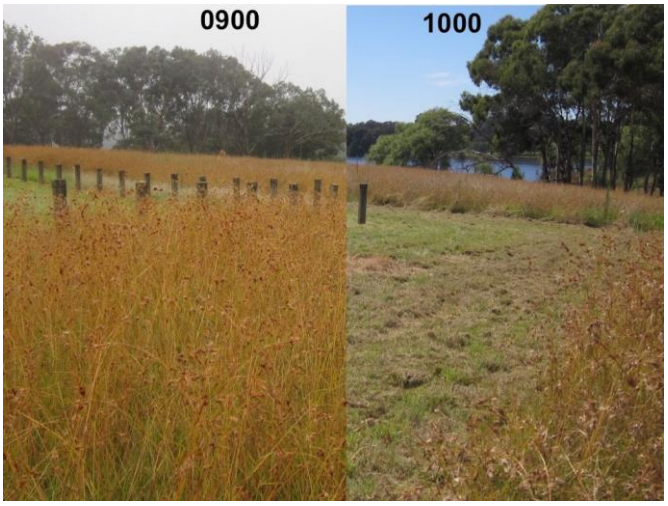
In short, vegetation grew particularly vigorously this spring and summer. Also, the 2021 component of the burning management schedule did not go ahead for various reasons. FOG is in discussion with National Capital Authority about trying to catch up by planning extra burns in 2022.

Weeds of course have been very active in the lower-quality patches and St John's Wort has flowered and set seed at its worst level for many years. Volunteers have sprayed this in priority areas mainly, as have NCA contractors, but they have mostly been busy elsewhere. In addition to SJW, Blackberry and African Love-grass (on path borders) have also been partially controlled.

Themeda grew tall and lush in all higher-quality patches at Yarramundi. Despite the cool wet season, it started to drop seeds as normal around 25 December and that has gone to completion. In a defined pattern close to the Cultural Centre buildings at Yarramundi, Themeda has been mown with FOG oversight once per year and this has invigorated the Themeda and reduced the presence of Wild Oats in an area totalling about 0.1ha. Unfortunately wet weather and health restrictions overlapped so that the mow planned for November 2021 did not proceed. Mowing was done, after seed

release, in the first week of February by NCA's contractor Burhor with mowing set high at 12cm. The photo here is a composite of an area just outside the bollard fence of the Cultural Centre. On the left is tall Themeda on a foggy damp start of the day, on the right the mown zone can be seen one hour later in full sun with Lake Burley Griffin in the background.

The two small scrapes that FOG was able to implement at Yarramundi with the help of an ACT Environment grant have significantly matured. The vegetation cover in these areas is now almost 100% with just a minor presence of weeds. Daisies, initially prolific after sowing, are being replaced by native grasses and it is especially pleasing that many Themeda tussocks have grown to 1 metre plus, flowered and dropped seeds. FOG's revegetation work, aimed at recovering seriously weedy areas with diverse native grasses and forbs, is looking good.



Hand lenses available

FOG has purchased a small quantity of 10X hand lenses which of course are wonderful for magnifying the tiny plants and flowers we come across on our travels.

If you are interested in purchasing one for $10, pls let me know. I assume I can link up conveniently with purchasers to hand them over, as the price does not include a delivery fee. Contact: margaretning1@gmail.com

Donations

FOG makes small grants to researchers, educators and on-ground projects such as FoG's TSR Project. You can make a tax-deductible donation to the FOG Public Fund:

Direct debit: BSB 633 000, A/c 15343960 (Bendigo Bank). Please include your name and advise our Treasurer treasurer@fog.org.au

Or Cheque: payable to 'Friends of Grasslands Public Fund', mailed to Treasurer, Friends of Grasslands Inc., PO Box 440, Jamison Centre, ACT 2614. Include your name and postal address.

Note: if you would like your donation to go to the TSR project please indicate this when you make your donation. A receipt for tax purposes will be sent to you.

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Events & work parties: Calendar. To attend an event, register with event organiser.

Book sales: Order forms: Grassland & Woodland Floras. Inquiries: booksales@fog.org.au.

Small grassy ecosystem grants: Latest on grants. Inquiries: supportedprojects@fog.org.au

News of Friends of Grasslands: Latest & past issues. To submit articles & news items newsletter@fog.org.au

Events & notices bulletin: to submit material ebulletin@fog.org.au

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