News of Friends of Grasslands

Supporting native grassy ecosystems

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November & December 2021

Events

Thurs 4 Nov, 8:30am – 3pm
Scottsdale Monitoring contact: linda.spinaze@fog.org.au

Sat 13 Nov, all day
FOG visit to Canberra grassy on-ground project. Register with andrew.zelnik@fog.org.au

Sat 20 Nov, all day
FOG visit to Dacelo, south of Braidwood. Contact Margaret.ning@fog.org.au

Tues 14 Dec, 5 – 7pm
FOG Christmas Celebration. Inquiries: geoff.robertson@fog.org.au

Work Parties

Budjan Galindji (Franklin Grassland)
Nov 3 & 24, Dec 19
Wednesdays 9-11.30am
Register: Margaret.ning@fog.org.au

Hall Cemetery
6 Nov
Saturdays 9-noon,
Register: john.fitzgerald@fog.org.au

Gurubang Dhaura Park
Nov 21 & Dec 19
Sundays 9am-noon.
Register: jamie.pittock@fog.org.au

The latest updates are found on our website at Calendar

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

Welcome new members!

Meg Holesgrove, ACT

ACF Community Group Canberra, ACT

Dr Arnagretta Hunter & family, ACT

Tim Collins & Tanya Howard, NSW

From the President …

In coming weeks it looks as if the ACT will emerge from lockdown and enable FOG to resume our work parties, field trips and other in-person events to conserve grassy ecosystems. The wet winter and spring have brought forth some wonderful wildflower displays, as well as a huge crop of weeds (St John's Wort is having a big year, unfortunately) so there is plenty to see and do. A fabulous array of activities are planned, as outlined in this newsletter, and I look forward to seeing many of you in the grasslands.

The ACT Government budget announced this month is a mixed bag for the environment. As Geoff Robertson's article outlines, overall environmental, climate change and energy expenditure is set to fall this financial year. This is disappointing given the backlog of basic conservation works required in our nature reserves, such as weed control. Combining my interest in water, I am disappointed that more investment is not being made in draining the walking and management-vehicle tracks in our nature reserves. After each rain event I see muddy water coursing down these tracks, spreading weeds through the reserves and exacerbating the poor water quality of our urban waterways.

Yet there are also some great initiatives in the ACT budget. In addition to the $3 million that will be spent on Franklin Grassland Reserve, it is great to see better funding for the ACT catchment management organisations, an increase in the ACT environment grants and an additional volunteer support officer in ACT Parks. This should increase community engagement in looking after nature in the ACT.

In NSW, the state government budget has allocated $75 million over five years to continue the Saving Our Species Program. The NSW Government's commitment to zero extinctions within the state's national parks is also welcome. However, more systematic action is needed to conserve the biodiversity of our grassy ecosystems that are fragmented and under-represented in conservation reserves.

Speaking of conservation in NSW, the government has released a draft Kosciuszko National Park Wild Horse Heritage Management Plan for community feedback up to 2 November 2021: Wild horse manangement plan The draft plan proposes to increase areas of Kosciuszko free of feral horses from 47% to 68%, and to reduce the population from around 14,000 down to 3,000 horses. Unfortunately, it would lock in long-term environmental damage from permanent horse populations at the Long Plain, Currango Plain and Snowy Plains in the north and Byadbo, Snowy River and Pilot areas in the south. This will continue threats to alpine grassland species, including the Alpine she-oak skink and Tooarrana (broad-toothed rat). The most humane and effective control method, aerial shooting, has been ruled out but ground shooting is proposed. Please see Reclaim Kosci for more information on making a submission. https://reclaimkosci.org.au/

See you soon in our grasslands!

Jamie

Advocacy Report

Naarilla Hirsch

August 2021 The NSW Department of Planning, Industry and Environment released the *Snowy Mountains Special Activation Precinct: Draft Master Plan June 2021* for comment, together with the *East Jindabyne Alternative Structure Plan Option*. FOG supported the objective to "Protect environmentally sensitive areas" but considered that this objective needs to clearly state that offsets would only be considered in extraordinary circumstances. FOG's view was that the biodiversity values of the East Jindabyne headland area should be left intact and enhanced rather than destroyed, as will inevitably occur with the proposed structure plan options. Particular concerns about the structure plan included the impacts of fragmentation of remaining woodland areas and the shift in the emphasis of the structure plan from conserving the grassland areas to retaining some patches of Snow Gum woodland and using the grassland area for "passive recreation, walking and cycling trails, seating nodes, small scale nature play".

A recent taxonomic revision of the Grassland Earless Dragons (GEDs), the *Tympanocryptis lineata* species complex, has split the group into several species: the Canberra GED (*T. lineata*), the Monaro GED (*T. osbornei*), the Victorian GED (*T. pinguicolla*) and the Bathurst GED (*T. mccartneyi*). If you are interested in the details, there's more information in Melville et al (2019) *Taxonomy and conservation of grassland earless dragon: new species and an assessment of the first possible extinction of a reptile on mainland Australia* at https://royalsocietypublishing.org/doi/10.1098/rsos.190233. As a result of this, the NSW Threatened Species Scientific Committee is considering the status of the Monaro Grassland Earless Dragon (*Tympanocryptis osbornei*). FOG is aware that a number of populations of *T. osbornei* exist but that these are highly fragmented with the size of each population appearing to be very small. It supported the listing of *T. osbornei* as endangered, but noted that, based on the fate of three other closely related Grassland Earless Dragons, the species may well become Critically Endangered in the near future.

A draft environmental impact statement (EIS) and a development application on the William Hovell Drive duplication were released concurrently, and FOG responded to both. FOG was pleased to find that many points which FOG made in its submission on this project last year have been put forward for consideration, that many other points were considered, e.g. excessive habitat fragmentation, and that impacts have been avoided to some extent. Our biggest concern was the lack of information about offsets for the destruction of some Box Gum Woodland alongside the current road, and called for immediate analysis of offset-multiple factors and at least the skeleton of an offset management plan being released for public consultation before the proposition is considered further. FOG recommended that the development application be set aside from decision until the EIS is released in final form for public consultation and approved.

FOG provided input to the NSW government on its inquiry "Integrity of the NSW Biodiversity Offsets Scheme" from a general perspective. The scheme appears to allow developers to buy off their biodiversity impacts without there actually being a suitable offset available, so FOG suggested that the inquiry investigate if there are payments into the Fund where there are no like-for-like credits available. FOG drew attention to the lack of public information on any ecological measures that indicate whether or not Biodiversity Stewardship Agreements are meeting their aims to enhance the ecological values they cover, putting the view that most offsets do not deliver the full amount they are meant to, leading to net loss in biodiversity over time. FOG also expressed its opposition to the concept of non-additional offsetting practices that do not provide any additional conservation values or increase in biodiversity values.

There were no submissions in September or early October. *The full text of these submissions appears on our website.*

Donations to support FOG

FOG makes small grants to researchers, educators and on-ground projects, known as grassy ecosystem grants, a highly effective way to support grassy ecosystems. It also supports FOG's TSR project.

To support these projects, you can make a tax-deductible donation to FOG Public Fund by:

Direct debit: BSB 633 000, A/c 153493960 (Bendigo Bank).

Please include your name and advise our Treasurer treasurer@fog.org.au.

Cheque: payable to 'Friends of Grasslands Public Fund' & mailed to Treasurer

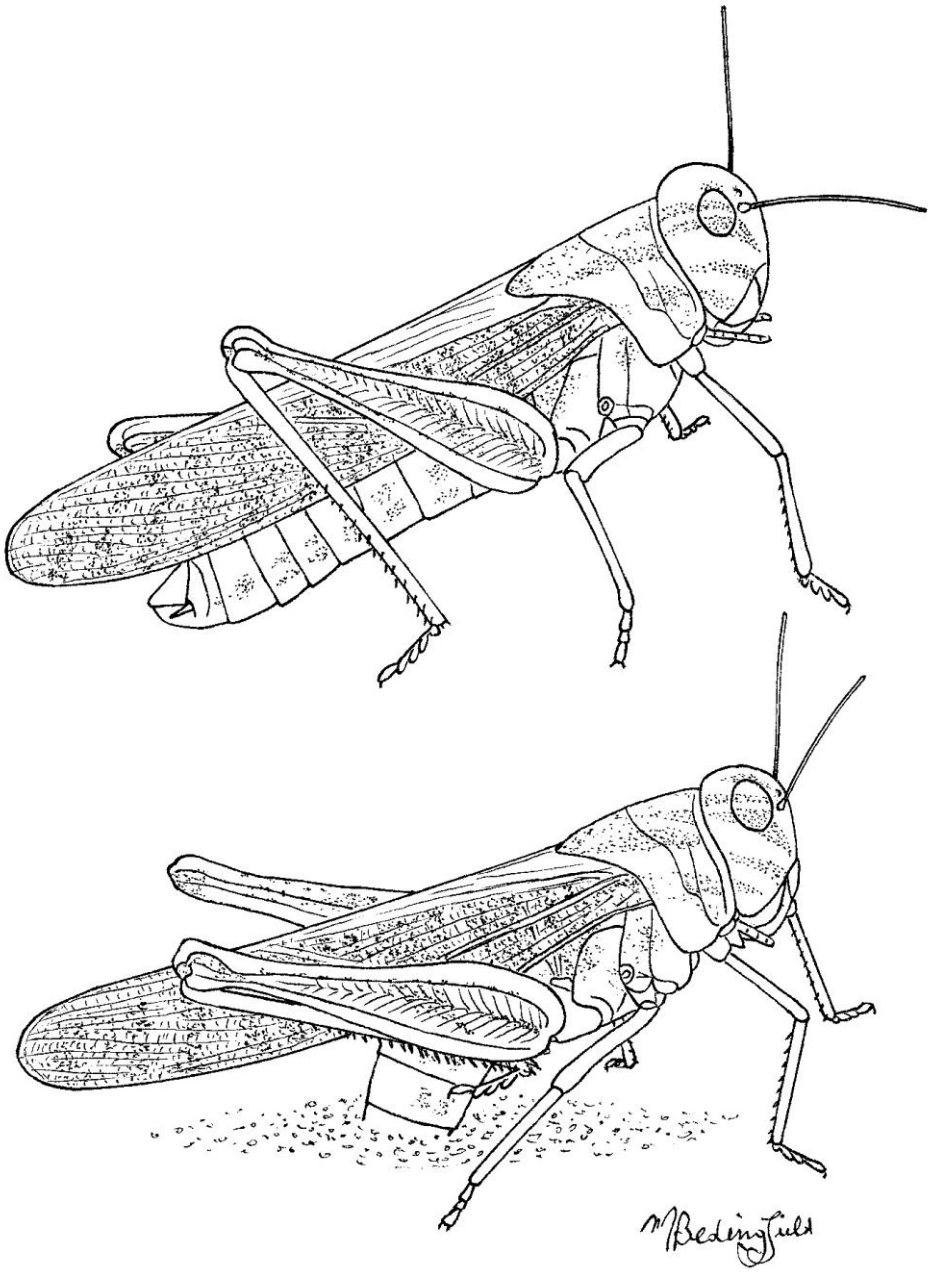
*Note: if you want your donation to go to the TSR project please indicate this when you make your donation.*A receipt for tax purposes will be sent to you.

Yellow-winged Locust or Grasshopper, *Gastrimargus musicus*, a musical grasshopper?

Michael Bedingfield

The male Yellow-winged Locust takes to flight with a loud "click-click-click… " and a flash of yellow from its colourful hind wings. These have a large yellow patch and a band of black. It is very common in our region and in a good year the species can be very numerous. On such occasions when walking I have seen more than a hundred of them along my path. The female's flight is quieter and she grows to about 6 cm while the smaller male grows to about 4cm. Although this insect can occur in large numbers, it only rarely makes the transformation from grasshopper to locust. Swarms are localised, spread slowly and have occurred only in Queensland. Yellow-winged Grasshopper would be a more accurate common name for our region, and the scientific name of *Gastrimargus musicus* is a curious choice.

The species has two different coloured forms, one is various shades of brown and the other green and brown. Both colour schemes are good camouflage for their grassy habitat. It occurs in all states of Australia, but with greater numbers recorded in the south-east. In Queensland it is regarded as an agricultural pest because when the numbers build up they will damage crops and pasture, therefore the Queensland government provides information about how to control the numbers with pesticides.



Locusts look the same as grasshoppers, and are basically the same except that locusts can take on two forms with quite different behaviour. In the solitary form they are just like grasshoppers. But if there is a very good season with abundant green vegetation the insects can multiply quickly and then they may develop into the gregarious form. This happens when there are dense populations in a particular area and they tend to congregate. The body of the gregarious form is smaller and the wings are longer and stronger. This enables them to fly greater distances. In this migratory or swarming phase they also reproduce at a faster rate, so you can get vast swarms with millions of members, travelling quickly and stopping to devour any patches of green vegetation along the way. In this way damage to crops and pasture can be devastating. From a survival point of view this strategy is very good for a species, which can spread far and wide during a plague. Fortunately for us however, most grasshoppers do not turn into locusts.

The drawing I have provided is of two female specimens, one in the act of laying eggs. The female can be distinguished from the male by the

shape of the tip of the abdomen. In the male it is roundish, but in the female it is more pointed due to the presence of two pairs of spade-like ovipositor valves at the tip of her abdomen. These valves are used to dig a vertical tunnel in the soil. When laying eggs she is able to extend her abdomen to twice its normal length, depositing the eggs in a pod well below the surface. The hole is plugged with froth and a capping of dirt. After egg laying the female dies, but this is the beginning of the lifecycle for the new generation. On the Southern Tablelands the species relies on these underground cavities for protection from the cold winters. The eggs hatch and the tiny nymphs emerge from the soil when the weather is warm enough and rain has come to soften the soil and bring growth to the grass. The nymphs have no wings and grow by a series of moults to eventually become winged adults who seek out partners for breeding. After mating more eggs are laid and the cycle is completed.

We've heard about John the Baptist from biblical times living in the wilderness on locusts and honey. This is a poetic simplification of how he would have survived in the wild, but still today some Arabian people eat locusts. While the Australian indigenous peoples are known to have eaten a variety of insects, such as Bogong moths and honey ants, Orthoptera species (grasshoppers, crickets and katydids) were not eaten widely.

Grasshoppers and locusts can generally make music of a kind. On the inside of their large back legs they have a row of tiny pegs. By rubbing a leg against the hard edges of a forewing a quiet chirping sound is made. This type of singing is called stridulation and is usually done by the males to attract females. In only a few species do females use stridulation. Grasshoppers also have hearing organs on each side of the abdomen. You will find a short video with audio of a grasshopper making its music entitled "Grasshopper Sound" by Diogo Oliveira Photography at the YouTube reference. I hope you find it interesting.

References:

https://www.youtube.com/watch?v=nyglT-rWE5c ; https://www.safehavenpest.com/blog/difference-between-locust-and-grasshopper

https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/pests/invasive-animals/other/yellow-winged-locust

OPINION PIECE

Post-fire regeneration: a remarkable phenomenon or natural occurrence?

Part 2: Plant Recovery

Words and pictures by Roger Farrow

In Part 1 of this discussion in the previous newsletter, I described how fluctuations in climate, characterised by sustained dry spells broken by short periods of heavy rainfall plus the high incidence of fire, have shaped the evolution of Australia's flora. In this, the second part, I will describe how plants are adapted to survive fire.

Observations

I have been following the unfolding situation in fire-affected areas of Morton National Park. Five sites were selected along the Nerriga Road in Morton National Park, namely, Bulee Pass, Touga Road, Pylons, Nissan and Kris's Knoll.

February 2020

Our first survey in Morton National Park from the Nerriga Road was about a month after the end of the Currowan fire. It was an eerie scene of leafless blackened trees and largely bare, ash-covered ground, with a total absence of any shrub remnants (1).

1. Bulee Pass. Note the accumulation of top soil (mud) in foreground, washed downslope.

This certainly gave the impression of a dead landscape but life stirred. A close examination of the trunks of the Silver Top Ash, *Eucalyptus sieberi* (a stringy bark), at Bulee Pass showed that some trees already had epicormic shoots appearing as well as basal sprouts from the lignotubers (2,3,4).

2. Epicormic regrowth at Bulee Pass, 22 February

3. Epicormic regrowth further afield

4. Sprouting from the lignotuber

A range of other species were also regenerating from basal shoots, including *Banksia spinulosa* and *Leptospermum obovatum* (5).

5. Leptospermum obovatum, basal regeneration, Bulee pass

An association of shrubs, forbs, sedges, lichens and mosses normally grow on the peat layer covering the rock shelves.

6. Peat layer on a sandstone rock shelf with a green edge of recovering moss

Although the shrubs had totally disappeared apart from a few remnant burnt sticks, the mosses (amazingly) were starting to recover (6) and there was a carpet of cotyledons from germinating seedlings of many yet-to-

be-identified species but including acacias, eucalypts and hakeas (7,8).

7. Germinating acacia

8. Germinating seedlings of hakeas & eucalypts

Whereas the seeds of the acacias, peas and heaths had been accumulating in the seed bank over the preceding years, others were shed during the passage of the fire front as heat opened up the woody capsules of banksias, hakeas, isopogons,leptospermums, callistemons and petrophiles, and more (9).

9. Open seed capsule of a leptospermum

Further on, we checked out the Touga Rd site. Again a bleak view, but signs of life from numerous germinating seedlings and a robber fly (9,10,11).

9. Touga Road site

10. Germinating seedlings at Touga Road

11. First insect seen, a robber fly, Miltinus viduatus

The next site examined along the Nerriga Road was Nissan, which had a well developed short green sward of emerging leaves of sedges and mat-rushes. This was formerly a dense and impenetrable heathland of low shrubs (12,13).

12. Reshooting sedges & mat-rushes

13. Mat-rush, Lomandra longifolia, reshooting from basal meristem

The meristem (the growing point) of monocotyledons (grasses, rushes, lilies, grass trees, etc.), is basal whereas that of dicotyledons is typically apical. The leaves of the former can quickly respond to damage by fire whereas the shoots of the dicots must regrow from basal or epicormic buds.

This area was dominated by the gum-barked scribbly gum, *Eucalyptus sclerophylla* (14). Although smoothed-barked, this species is just as fire-resistant as the rough barked ashes nearby as its bark does not catch fire.

14. Epicormic regrowth of scribbly gum, Eucalyptus sclerophylla

Our final stop beyond Sassafras was at Kris's Knoll, an area of rock shelves surrounding a casuarina-dominated knoll. *Allocasuarina* spp. rarely produce epicormic shoots after fire but instead rely on seed to regenerate (15).

Flowers had already appeared on several herbaceous species in this area and were characteristic of species with taproots or corms and bulbs (16,17,18).

15. Dead trunks of casuarinas on knoll, incinerated shrubs in foreground

16. Blue Yam, Brunoniella australis, growing from taproot. Never seen previously in the area. Probably a fire-dependent flowerer.

17. Golden Star Hypoxis hygrometrica, bulb

18. Lagenifera gracilis, regrowing from taproot

Germination from seed had also commenced here with seedlings of acacia appearing, among others, but also an unidentified species shown below (19).

19. Unknown species of seedling at Kris's Knoll

At all sites, the conspicuous open capsules of the burnt banksias, callistemons, eucalypts, hakeas, melaleucas and leptospermums, among others, indicated that there had been an abundant seed shed over the landscape.

March-April observations

I made several visits in March and April with colleagues to the four areas visited in February and added a fifth one, namely, the rock shelves known as the Pylons (20). All five areas are known for their populations of midge orchids, *Corunastylis* spp.

20. The Pylons site in March 2020

21. Corunastylis densa at the Pylons.The plants are spattered with sand grains after heavy rain.

During this month, there was a mass emergence of these orchids, comprising six species, some of which had not been recorded before, presumably because they were concealed among the shrubs (21,22).

22.Corunastylis superba, a threatened species at Bulee Pass

Germination of other plant species also continued apace. Acacias, eucalypts, grevilleas, and many others were readily identifiable at this stage of development, at least to genus, although others were not (23,24,25).

23. Grevillea baueri seedling

24. Unidentified seedlings with finely divided leaves at Bulee Pass

25. Unidentified plant at Kris's Knoll continues to grow

September 2020

The first mass flowering event occurred at Kris's Knoll where the unidentified seedling, shown above (25), was quickly identified from its flower as *Commersonia (Rulingia) hermannifolia* (26). It has never been seen here before and is thought to be a fire-dependent ephemeral, disappearing between fire events when its seeds remain dormant on the ground.

26. Commersonia (Rulingia) hermannifolia

More spring-flowering orchids appeared in great abundance; some of them, such as *Prasophyllum australe, Paraprasophyllum brevilabre* and *P. odoratum*, had not been seen by us in this area before (27).

27. Paraprasophyllum odoratum at the Pylons

January 2021

Flowering among a range of herbaceous plants continued throughout spring and into summer. In January, a mass flowering of one of the previously unidentified seedlings occurred over large areas of sandstone country in Morton National Park. Coincidentally this mass flowering was also reported in the Blue Mountains where it had not been seen for decades. The plant was the Pink Flannel Flower, *Actinotus forsythii* (24,28).

28 Pink Flannel Flower, Actinotus forsythii at Bulee Pass

This species has never been seen in the two decades we have been visiting this region. It appears to be another fire-dependent ephemeral surviving in the seed bank and relying on the occasional catastrophic fire to resume its brief life cycle.

One Year On

The Pylons February 2020

The Pylons March 2021

Kris's Knoll February 2020

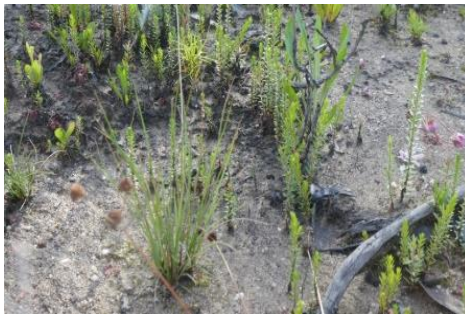
Kris's Knoll March 2021

Bulee Pass February 2020

Bulee Pass March 2021

Many hundreds of plant species are recovering from the fires by a variety of mechanisms. As they grow and are progressively identified it is becoming clear that all the species that were previously there are likely to regenerate. Their relative abundance is changing as herbaceous species are out-competed but not eliminated by the slower-growing woody shrubs. This follows the well-known path of ecological succession (29).

Concerns about the loss of plant species due to high intensity fire are probably unfounded. Undoubtedly, the abundant rainfall received during 2020 aided plant recovery.



29. Regenerating shrubs, Touga rd

Mass regeneration of Dampiera stricta along the Bullee Pass trail, March 2021, one of several previously unidentified plants at the seedling stage.

Vegetation changes over 125,000 years

Patrick De Deckker

In this article, Patrick De Deckker, Emeritus Professor at the Research School of Earth Sciences, ANU, discusses a 125,000 year record of vegetation changes in the Murray Darling Basin, with emphasis on grasses and herbs.

Climate is ever changing and we are experiencing this today. The major difference with the past is that since the industrial revolution, atmospheric CO_2 and other gasses have increased significantly at an unprecedented, fast rate compared to the past. However, broad climatic change patterns over long periods of time are linked to astronomical cycles engendered by changes in the position and tilt of the Earth with respect to the Sun. These are called Milankovich cycles and they operated in the past at a much slower pace than that which we've experienced over the last 100 years or so (https://en.wikipedia.org/wiki/Milankovitch_cycles).

Therefore, when examining a particular landscape, one has to be aware that its vegetation was not always the same. Principally, changes in temperatures and rainfall will induce vegetation changes, be they rapid or progressive. Fire can also induce vegetation changes.

Although this article will be discussing climatic and vegetation changes spanning thousands of years, it is important to remember that there were people already inhabiting this continent for well over 50,000 years. This represents some 2000 generations of people who will have witnessed dramatic changes, with one extreme around 20,000 years ago when average temperatures in Australia and at sea had dropped by 9°C, and mean annual rainfall had also significantly decreased. At that time also, sea level had dropped by some 125 metres; this meant that people could walk from Tasmania to Papua New Guinea. Locally in the Canberra region, the tree line had dropped down to about 800 metres, so there were no trees on Black Mountain and in the Snowy Mountains there was a small glacier (~15 km^2) that occurred at Mt Twynam and flowed down the valley and dug a depression that is now filled by Blue Lake (Barrows et al., 2001). After that time, climate improved, vegetation changed accordingly and sea level rose to its present position about 6,000 years ago. At that time, eastern Australia was much wetter than today and temperatures about 2°C above the pre-industrial conditions. At Blue Lake, the tree line was above the lake, in contrast with today. We know this as tree pollen were found in the sediment of Blue Lake (Raine, 1974; Kemp and Hope, 2014).

In order to better comprehend patterns of climatic and environmental changes (that may help perhaps also predict future trends), it is necessary to obtain a good set of environmental archives that (1) rely on a sound chronology, (2) are continuous, and (3) cover a long period of time. Such an archive was found by extracting from the sea floor a 32.95 m long core of sediments, with the upper 13.5m spanning the last 125,000 years. Such a core was obtained offshore Kangaroo Island in South Australia. Pollen and charcoal were recovered from 120 samples from this core, spaced basically at 1000 year intervals. Other analyses were conducted on this core, with one proxy providing information on sea-surface temperatures based on organic compounds secreted by minute planktonic organisms, that became buried on the sea floor and were also recovered from the core. A total of some 200 analyses were performed for the last 125,000 years interval.

Two diagrams are provided here that sum up floral and charcoal changes of the last 125,000 years. This lengthy period in fact covers a full climatic cycle that commenced with oceanic temperatures and sea level similar to today. This period is called the 'last interglacial'. After that time, temperatures and rainfall fluctuated widely, with the extreme culminating around 20,000 years ago, a period that lasted some 4,000 years and which we refer to as the 'Last Glacial Maximum' (=LGM). Australia was very cold (see Figures) and there was a significant hydrological deficit that would have greatly affected the vegetation everywhere on the Australian continent. The large longitudinal dunes in the arid zone were on the move. They were no longer fixed by vegetation in contrast with today. In fact during the LGM the dune fields had expanded, with dunes even occurring in what today are suburbs of Melbourne and northern Tasmania (Sprigg, 1979).

As the core is located on the sea floor in the vicinity of the mouth of the River Murray, we have determined that the vegetation changes reconstructed from the pollen recovered in the core relate to conditions that changed in the entire Murray Darling Basin (=MDB). For more information refer to De Deckker et al., 2021, published online in the *Australian Journal of Earth Sciences* (De Deckker et al., 2021), extracts from which paper are presented here.

Two new figures presented here sum up environmental and floral changes that occurred in the MDB over the last 125,000 years. Figure 1 clearly illustrates the following: (1) Poaceae grasses increased during the cold and dry phases; (2) there is a clear alternation between *Eucalyptus* sp. and *Callitris* sp. with the latter taxon being more predominant

during dry and cold phases; (3) when *Eucalyptus* sp. % were high, charcoal counts were also high. These counts had significantly dropped when *Callitris* sp. % had increased.

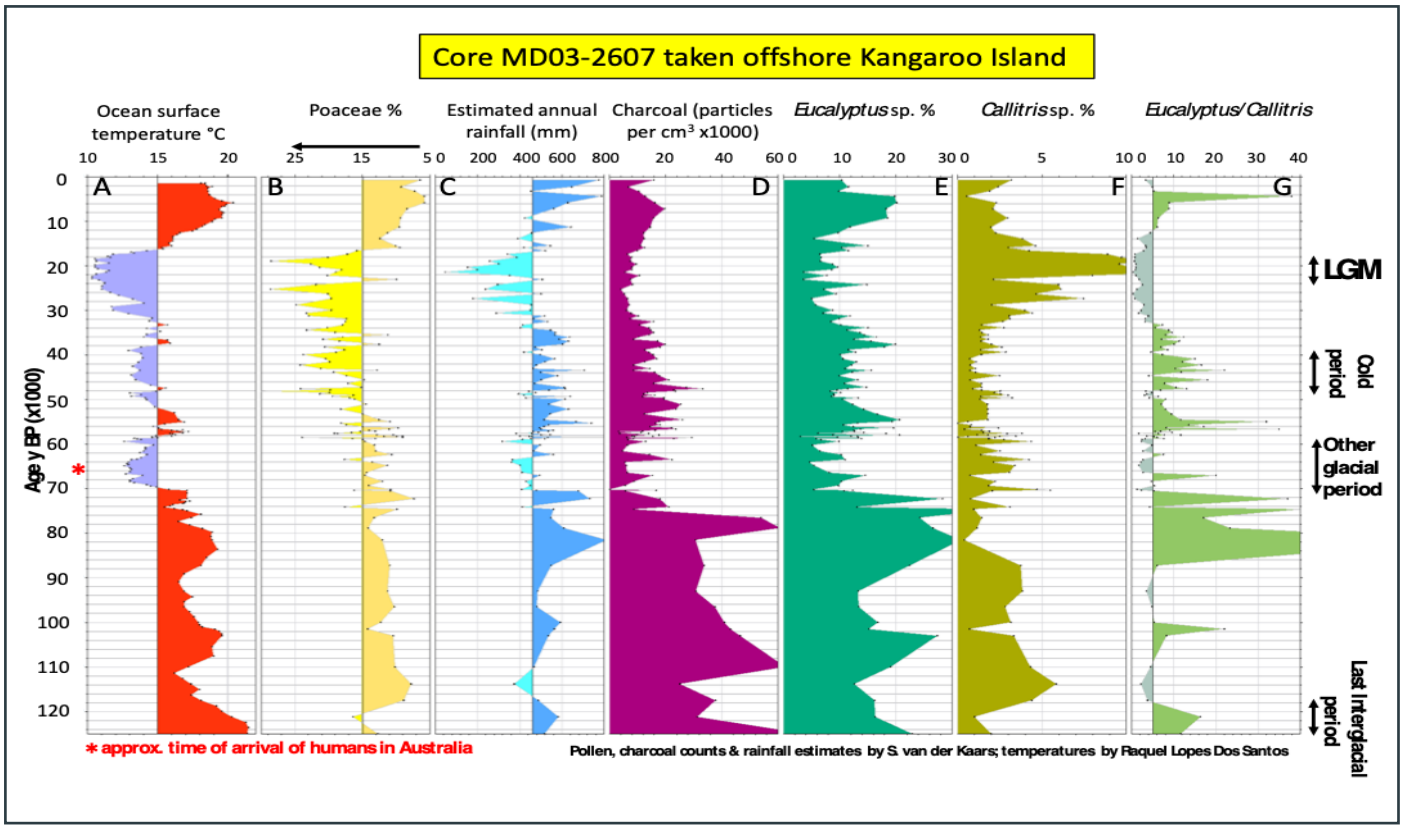


Figure 1 *represents a plot of various parameters detailing changes recognised through time in deep-sea core MD03-2607. The vertical axis is the time axis that spans the last 125,000 years. Note, on the right of the diagram, that significant climatic phases are labelled: the Last Glacial Maximum (=LGM) spanning between 24 and 18 ka [ka= 1000 years]. There was also another cold period between 48 and 39 ka that followed a much colder one between 71 and 59 ka. The last interglacial period is the one equivalent to what we are experiencing today, viz. high sea level and warm temperatures. The plot in* ***A*** *represents sea-surface temperatures [SST] offshore Kangaroo Island obtained from 200 analyses. A vertical bar is placed arbitrarily at 15°C to show variations on either side of this line, with red patterns relating to much warmer temperatures. Note that SST progressively dropped by the order of 2°C after 6 ka ago and at the LGM was 9°C, similar to inland temperatures (see above).* ***B*** *represents the varying percentages of all Poaceae grasses recognised from their pollen; the horizontal axis was reversed so as to better visualise that, during warm SSTs, Poaceae % were lower. This trend also follows the estimated annual rainfall shown in* ***C*** *calculated from the pollen assemblages (for more information, refer to De Deckker et al., 2021).* ***D*** *represents the charcoal counts.* ***E*** *represents the Eucalyptus spp. %. It is obvious here that high % of Eucalyptus coincide with high charcoal counts, whereas the Callitris sp. % in* ***F*** *show the reverse with charcoal levels, and also that this taxon increased during cold and drier phases to the detriment of Eucalyptus. This is further documented in* ***G*** *when compared with column* ***A****. Note the percentages represented here are calculated against all pollen counts.*

Figure 2 provides a compendium of the herb pollen represented in the deep-sea core. Only the major groups are listed in A to D. It is interesting to note that different groups responded differently to temperature and rainfall conditions. It is possible that different groups were more dominant in different parts of the MDB. De Deckker et al. (2021) elaborate on this phenomenon.

In summary, the data presented here show that vegetation spectra varied quite extensively over the last 125 ka in the MDB. Climatic conditions frequently alternated, and the vegetation changed accordingly. Concerning what to expect in the near future, vegetation spectra recognised during the warmest phases (~125 ka and ~6-7 ka) may help us foreshadow what the future may hold. However, as climate modellers predict much drier conditions for large parts of eastern Australia, past analogues of climate may not be reflective of what vegetation changes to expect in the future.

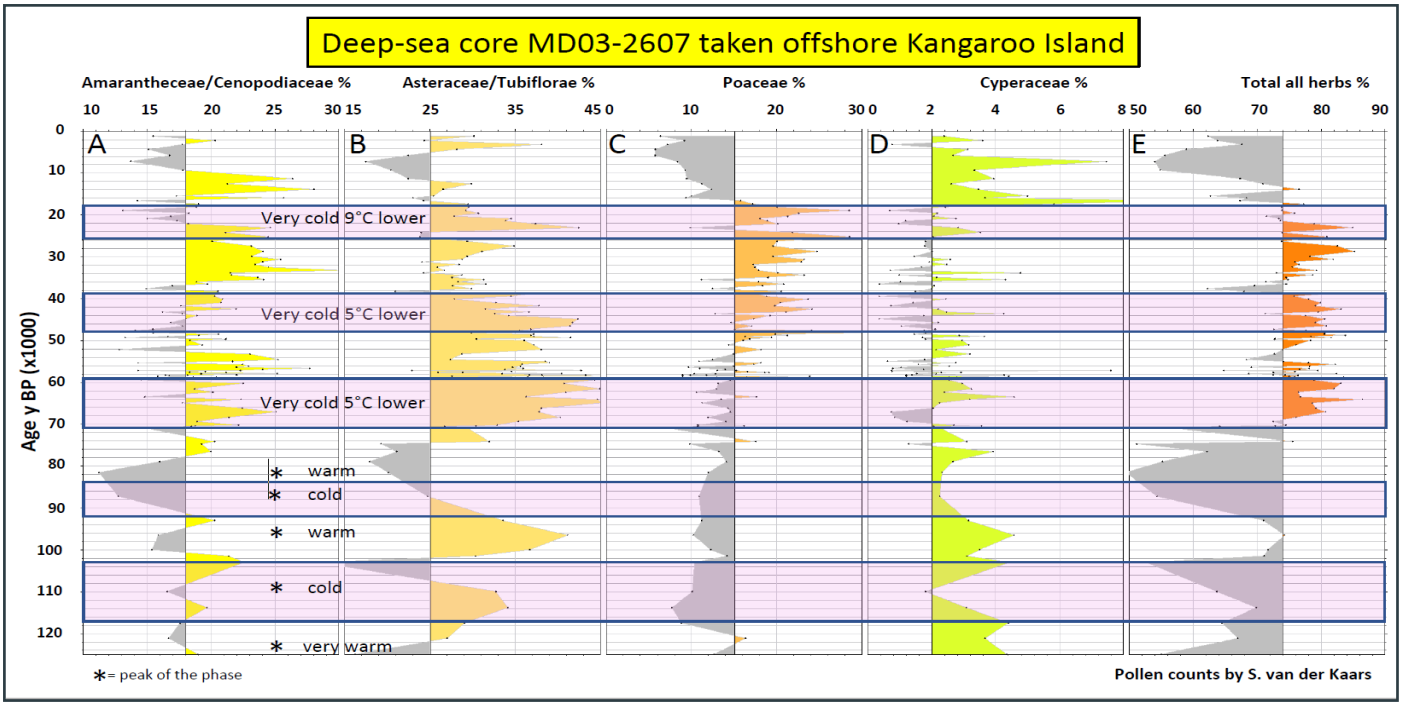


Figure 2 *shows the various % of the major herb pollen groups recovered from the deep-sea core. Once again, the vertical axis is the time axis. The horizontal pink boxes cover the various cold intervals over the last 125 ka. Note that the percentages of the different herbal groups (**A - C**) responded differently to temperature. The Cyperaceae in **D**, although overall in low %, are clearly more common during warm and wet phases (see Fig. 1 A, C). Perhaps they relate to the riparian vegetation. The % of all herbs in **E** (represented by a total of 20 taxa, see De Deckker et al., 2021) indicate a clear decrease during the warm and wet phases for the overall 71-18 ka period. This belongs to what is often referred to as the 'glacial period'.*

References

Barrows, T.T. et al., 2001. Late Pleistocene Glaciation of the Kosciuszko Massif, Snowy Mountains, Australia. *Quaternary Research* 55, 179–189.

De Deckker, P., van der Kaars, S., Haberle, S., Hua, Q., Stuut, J-B., 2021. The pollen record from marine core MD03-2607 from offshore Kangaroo Island spanning the last 125 kyrs; implications for vegetation changes across the Murray-Darling Basin. *Australian Journal of Earth Sciences* doi.org/10.1080/08120099.2021.1896578 [+ large supplement].

Galloway, R.W., 1965. Late Quaternary climates of Australia. *Journal of Geology* 73, 603-618.

Kemp, J., Hope, G., 2014. Vegetation and environments since the Last Glacial Maximum in the Southern Tablelands, New South Wales. *Journal of Quaternary Science* 29, 778-788.

Miller, G.H., Magee, J.W., Jull, A.T.J. 1997. Low-latitude glacial cooling in the Southern Hemisphere from amino-acid racemization in emu eggshells. *Nature, 385,* 241-244.

Raine, J. I., 1974. Pollen sedimentation in relation to the Quaternary vegetation history of the Snowy Mountains of New South Wales. PhD Thesis, The Australian National University, Canberra, 373 pp.

Sprigg, R.C., 1979. Stranded and submerged sea-beach systems of southeast South Australia and the aeolian desert cycle. *Sedimentary Geology* 22, 53-96.

Recent FoG Events

Hints on identifying grasses

Michael Robinson

At our joint Bellarine GIG/FOG session 0n 29 Sept, Geoff Robertson (FOG) spoke on hints for identifying grasses.

This presentation is positioned as a pointer to assist in learning how to identify native grasses. With superb pictures and illustrations, Geoff provided the over 38 participants with something for everyone, from the beginner to the most experienced.

For someone starting out, grasses are a daunting prospect, even more so when you learn that there are over 1200 grass species in 12 different families! However, they are the major terrestrial food source for humans, animals, insects, birds and even microbial life. Geoff uses photos to illustrate how grasses are flowering plants, and that, while the flowers may be small and clustered together, they are very diverse, giving important hints to ID species.

By illustrating the different parts exhibited by grass species – their diaspores, inflorescence (or arrangement of flowers on the floral axis), awns, nodes and other grass structures – Geoff encourages us to look and learn more. He then discusses where different grasses grow in the landscape, beautifully illustrating some of the more common species and their habitat preferences e.g. Kangaroo grass, Wallaby grasses, Spear grasses & Weeping grasses. Photos also show how grass structures may change over the seasons or wet and dry periods.

For the more experienced, there is discussion on C3 & C4 (carbon) pathways and taxonomy with a phylogenetic classification of the Poaceae family. Geoff then goes through the grass sub-families and tribes before finishing with some suggested resources with more detail. This is a broad topic and the presentation whets the appetite to explore more afterwards.

For those who wish to view the session, please contact Michael mrob3@mac.com.

Sustainable water management & grasslands

Geoff Robertson

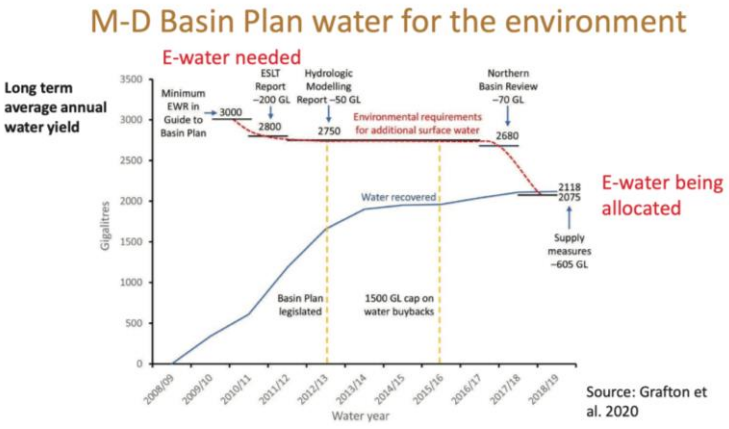
FOG's online session (7 Sept) with Jamie Pittock on *Sustainable water management in south-east Australia and links to grasslands* was attended by twenty-six people. Jamie's highly fascinating and informative session covered recent research into water, climate and carbon sequestration and posed many questions about the value-judgements and science involved in water management and climate change policies.

He started with a description of the ice age continent of Sahul (Australia & New Guinea), describing our Murray-Darling region as a grassland paradise, although much wetter than now - Jamie's honours research was in palynology (the study of plant pollen, spores, microscopic plankton organisms and charcoal that tracks the evolution of plant communities). Now, we have a much warmer and drier climate with extreme weather variability. An amazing fact: with the 2010-11 Australian wet, average world oceans fell 7mm.

Jamie spent much time explaining the intricacies of the Murray-Darling Basin Plan which, based on historical data, assumes evapotranspiration (evaporation plus transpiration) of 94% of precipitation (rainfall), leaving 6% for the rivers. So, small changes in land use and vegetation management could increase the level of evapotranspiration and decrease river inflows. There have been many signs of the failings of the plan, or a reluctance to implement it. For example, the graph shows the agreed E(environmental)-water and water entitlements recovered, through buy-backs, to meet those targets. The volume of water recovered has been continually reduced and is inadequate to meet environmental targets.

The failings centre around poor management of water-inception points like farm dams, allowing turkey-nest dams and floodplain harvesting. Jamie also explained many of the environmental tragedies caused by a mix of climate and human factors.

Jamie spent his remaining time discussing government policy to capture carbon and manage water and its occasional inconsistencies. He focussed on tree planting, regenerative agriculture and biochar. These, while attractive policies, may have negative impacts - the underlying value-judgements and science need more attention. Jamie mentioned the government obsession with tree planting may have both positive and negative evapotranspiration impacts.



I hope I have encouraged the reader to dig deeper into these issues. The full presentation and slides are available on FOG's website.

Weeding for beginners with Margaret & John

FOG held this on-line session on the 29 July. The purpose of the session, aimed at beginning weeders, was for John Fitz Gerald and Margaret Ning to talk about their experience with weeding. The idea for the session arose from FOG volunteers at the Budjan Galindji (Franklin Grassland) landcare group, who were seeking a session on weed identification and methods to deal with individual groups of species - not something that is covered in Chemical Certification courses.

Those who know John and Margaret are well aware of their amazing knowledge of weed species and weeding techniques. Twenty-five people attended the session. We won't say much on the content here as that is covered in Bellarine GIG session on weeding.

Twenty-six people attended the session and numerous questions were asked. Rainer Rehwinkel collated the questions and he, John and Margaret chipped in with answers. There were many comments on the breadth of the material covered and the practical way in which the information was given, particularly on the identification of a weed through its various phases of growth, on how to treat different types of weeds, and on what techniques are appropriate, with their strengths and weaknesses. Some interesting general discussion took place about the proposed ban by the Greens to phase out herbicide, the impact of weeding on soil disturbance, and how to deal with particular weed infestors such as periwinkle.

One issue that was raised was how to identify Chilean needle grass, African love grass and Serrated tussock. It was arranged for a follow-up field session at Lindsay Pryor Arboretum where all three grasses were present.

Bellarine GIG session on weeding

Michael Robinson

The Bellarine Grassland Interest Group asked John and Margaret to re-present the very informative FOG session on weeding for beginners on Wednesday 25 August. With Geoff replacing John, a modified version of the presentation was well received by around twenty GIG members.

The wide range of topics discussed included: weed identification, species' life cycles, weed-management strategies, treatment methods and when to use them, ways of avoiding collateral damage, and weed succession. Geoff and Margaret shared many practical tips and examples from their own weeding experience including, for example, the importance of having a vision or longer-term objective in mind when organising a weeding session with volunteers. For example, does the group want to focus on a bigger landscape, a site, or a patch within a site? Depending on the objective (or what you are trying to create), you could start by focussing on those weeds that have the capacity to transform an area. If, however, the group is weeding a new site, you might choose just one weed to target. Very practically, Margaret suggested that you decide what weeds you won't walk past, carrying a tape (to mark), secateurs, chipper and dauber, and picking off seed heads as you go - useful tips.

By understanding the different life cycles of various weed groups, Geoff illustrated how you could plan an intervention or treatment for maximum impact - when to use herbicide, when to mow, when to remove roots or tussocks etc. He also pointed to a number of resources that can assist in this, such as weeding calendars for seasons and species, the time-honoured Bradley method, the Australian Association of Bush Regenerators, and also local Landcare Group weed ID and treatment guides. The different treatment or control methods were discussed including the organic but expensive alternative - SLASHER. Geoff also touched on those weeds of national significance and other invasive weeds, such as Chilean needle grass, Serrated tussock and African lovegrass, which are destructive of grasslands.

The presentation also recognised that any plant can be beneficial in the right place …. but is it growing in the right place? It is also useful to identify environmentally-harmful weeds that are destructive of grasslands and contribute nothing back such as briza and vulpia, which are allelopathic (i.e. create environments that repel other plants). By contrast thistles, plantains etc. do add something back to the soil. In the presentation two case studies were covered – Franklins Grassland Reserve and Hall Cemetery Woodland (both in the ACT).

Thanks John, Margaret and Geoff for sharing your experience with us.

For those who wish to view the session or obtain a copy of slides, please contact Michael mrob3@mac.com.

Bluebells at Murrumbateman

News Roundup

ACT budget: no major statement on biodiversity

Geoff Robertson

While there may be much to applaud in the ACT government's 2021-22 budget announced on 6 October (health, schools, infrastructure, housing and progress on climate change), the word "biodiversity", or more simply "nature", is not mentioned in the headlines, the budget speech or in high-level promotions, and certainly there is no vision statement on Canberra being the home to critically endangered grassy ecological communities and a raft of endangered and vulnerable species. Also there is no mention of major threats such as bushfires. It is amazing that early last years fire wasted so much of our natural environment and "that was a lesson". How quickly we forget.

Without a healthy nature humans cease to exist. Maybe our aim should be to have a statement in the next budget to highlight expenditure on nature, giving it equal status to health, schools, infrastructure and the like.

In FOG's budget submission dated 11 May we made the case for a biodiversity vision for Canberra under the heading of "nature in our city" in support of a paper published earlier by the ACT government. We received no feedback on this. This would have been an opportunity for government to provide a vision on biodiversity - we should probably press the issue with government and hopefully next year …! In the same submission we pressed for expenditure on other matters and did get a positive response on Franklin Grassland Reserve (see below, '$3 million to be spent on Franklin Reserve').

It takes some digging to find the money spent on biodiversity (referred to as "environment" in the budget papers). We find information in Budget Statement E, Environment, Planning and Sustainable Development Directorate. This statement opens with the words

> "Yuma, Dhawura Nguna Dhawura Ngunnawal, Ngunnawalwari dhawurawari, Nginggada Dindi yindumaralidjinyin, Dhawura Ngunnawal yindumaralidjinyin (Hello, This is Ngunnawal Country, We always respect Elders, male and female, We always respect Ngunnawal Country)".

Congratulations ESPDD, this is absolutely tremendous. However, these words should be the first sentences in the budget speech and in every piece of promotion - not relegated to Statement E. Maybe next year!

From Statement E and elsewhere, we learn that the ACT government plans to spend $242m on the environment, sustainable development and climate change and $30m on infrastructure. This represents just 3% of government spending and 1% of infrastructure spending. The environment spending is a fraction of these amounts.

As we dig deeper we discover that staffing levels across the directorate will be less than that budgeted last year although slightly better than what was achieved in 2020-21. We also learn that output class 2, environment expenditure, will fall from $157m to $93m. Interestingly, output class 3, climate change and energy, also falls significantly from $185m to $89m. However, it should be borne in mind that these two items do not include separate funding from the Commonwealth.

Budget documents are complex and difficult to understand but gaining some understanding of them is worth the effort.

$3 million to be spent on Franklin Reserve

The ACT budget shows that $3m will be spent on Franklin Nature Reserve enhancement over a four year period ($310k in 21-22, $2.529m in 22-23, $147k in 23-24 and $69k in 24-25). FOG has long been an advocate for the newly-proclaimed reserve being a fascinating place for recreation, putting grassland conservation first.

The reserve, or to call it by its Ngunnawal name *Budjan Galingi* (referring to water bird), is a 20ha reserve within the suburb of Franklin and may be seen from the light rail on Flemington Road. It is home to extensive areas of natural temperate grasslands, remnant yellow-box woodland, an ephemeral wetland and a large pond, with habitat for golden sun moth, striped legless lizard, perunga grasshopper, Latham's snipe, keyacris grasshopper, superb parrot, olive legless lizard, blue devil, lemon beauty head, Canberra pepper-cress, and many more. The enhancement will pay for pathways, signage, fencing and the like, and removal of the soil dump. The reserve will also be home to seed orchards which are already installed. In 2020, FOG established Budjan Galingi Parkcare group, which, COVID permitting, is holding regular work parties.

In FOG's view visitors, and especially neighbours, will have an opportunity to learn about our indigenous grasslands, woodlands and wetlands in a somewhat unique landscape which has distant views of the mountains to the south of Canberra - a place for ideal interaction between humans and nature. It will be an opportunity to observe changes in the reserve as grasslands and habitat are restored through the use of weeding and advanced restoration techniques.

Barton Highway alignment

In late September FOG supported the Onerwal Land Council, Ginninderra Catchment Group and Yass Area Network of landcare groups (YAN) in calls for a review of

the proposed Barton Highway alignment from the ACT border towards Murrumbateman, a distance of about 8km. Under threat are Aboriginal heritage sites and remnant Box Gum Grassy Woodland. A significant area of critically endangered woodland would be destroyed in and around the Hall TSR and at other roadside places along the highway.

Members of each the organisations mentioned, concerned about aspects of the highway duplication, formed a group to discuss alternative options. This group contacted the Barton Highway Upgrade Alliance in May 2021 and has since passed on comments, objections and alternative plans.

A Canberra Times article by Toby Vue (July 25, page 2) shows Wally Bell and John Connelly next to a cultural ring tree alongside Hall TSR. They and others present at the inspection, including Ken Hodgkinson, Santo Lolicato, Sonya Duus (YAN's coordinator), Bob Richardson (local Hall resident) and John Fitz Gerald briefed the media. A petition is one of the actions arising from the campaign.

FOG urges its members to sign the petition put online by the Ginninderra Catchment Group, and to spread its message and possibly make a donation. The petition may be found here: https://chng.it/9yYyFspMVF. For further inquiries and information contact John Connelly percyconnelly@yahoo.com.

Boorowa LLS News

Margaret Ning

It's good to see FOG members turning up when you least expect it, and to hear them spreading grassland conservation information. This six minute video titled *Thinking inside the Box Gum Grassy Woodlands project* briefly features Rainer speaking on woodlands. It also includes landholders from the Boorowa, Upper Lachlan and Yass areas. It is part of Save our Species program organised by SE LLS, BCT and the NSW Government.

Seedlings for Budjan Galindji seedbank

Vanessa Goss

As a volunteer at the Budjan Galindji (Franklin Grassland) Landcare Group I was given an opportunity to grow forbs for planting into the seed production area on the site. *Leucochrysum albicans*, *Linum marginale* and *Bulbine bulbosa* were chosen for this purpose because they are relatively easy to propagate from seed. The aim was to sow 160 of each variety. These 160 plants were grown in four trays of forty large cells rather than 160 singular forestry pots due to personal preference.

Leucochrysum albicans

The first batch of *Leucochrysum albicans* was planted into small cells on 7-3-21 and then pricked out into three larger cell trays after the cotyledon stage.

Four trays of Leucochrysum albicans *seedlings on 31-8-2021.*

This worked well; however, the remaining seeds were sown directly into the fourth larger cell tray on 28-4-21 as there were no more small cell trays available to follow the pricking out process. This direct sowing appeared to have a better success rate for propagation because the death rate due to pricking out was eliminated. See Picture 1 for the tray of direct sown seedlings (left) and the three trays that had been pricked out (right). The size difference is due to the fact that the direct sown seeds were germinated seven weeks later than the others. Next time I will direct sow them all and eliminate the pricking out component.

The three trays of advanced seedlings started to flower in August and it was proposed to plant them into the seedbank in early September. This timing did not eventuate due to the COVID lockdown in Canberra, so I cut the flowers off the seedlings to encourage foliage growth and delay the seed setting. I still have nightmares about turning into Morticia Addams.

Linum marginale

Four trays of Linum marginale *seedling on 31-8-21.*

The process for propagating the *Linum marginale* was the same as that undertaken with the *Leucochrysum albicans* – three trays of pricked out seedlings, with the fourth tray direct sown on 28-4-21. The outcome was the same as that of the *Leucochrysum albicans*, so I will direct sow them next time too. See Picture 2 for the tray of direct sown seedlings (left) and the three trays that had been pricked out (right).

Bulbine bulbosa

Four trays of Bulbine bulbosa *seedlings on 31-8-21.*

The first two trays of *Bulbine bulbosa* were direct sown into the larger cell trays on 16-4-21 as there were no small cells available to follow the pricking out process. The final two trays of *Bulbine bulbosa* were direct sown on 5-5-21. There was a fairly poor success rate for this variety with only 70% of the April sown batch and 60% of the May sown batch alive in September 2021. Part of this low success was due to a low germination rate and the rest was due to death of the germinated seedlings. I am uncertain why this variety did not fare as well as the other two varieties and will probably direct sow them all in March next time. See Vanessa's video here

Fascinating fasciation

Sue Ross

I expect many FOG newsletter readers know about 'fasciation 'in plants but I had no idea what was happening with my *Bulbine glauca* when it produced two unexpected growths. So my first point of call was to Margaret Ning who approached Roger Farrow regarding the condition. He identified the weird growth as "fasciation". My dictionary explains it as a botanical term meaning 'an abnormal fusion of parts, resulting in a flattened ribbon-like structure'. In the photo the normal flower head is on the left. There is also a photo below of a fasciated *Sclerolaena muricata*, taken by Andrew Zelnik on a FOG activity. Margaret said she had seen a Patersons Curse with the condition. Wikipedia indicates that causes may be hormonal, genetic, bacterial, fungal, viral or environmental. Yet another thing I've learned through FOG connections.

Fasciated *Bulbine bulbosa*

Fasciated Black Roly-poly
Sclerolaena muricata

FOG grassy ecosystem grants update

Andrew Zelnik

The COVID-19 situation in the ACT and NSW and/or various other issues and delays have impacted progress with both 2021 and uncompleted previous year grant projects. However, at this stage we are pleased to report that since our previous update (Jul-Aug issue) the FOG Committee approved our recommendation that all seven 2021 applicants be offered the full grant amounts requested for their projects. This came to the total amount of $9,792 (six projects at $1500 and one at $792), well above our typical annual budget maximum of $5,000.

This decision, while not the norm, was made based upon the assessed merits of all projects and the relatively small range of assessment scores, and upon due consideration of FOG's current financial position. The funding will consist of at least $4,500 from the FOG Public Fund (the maximum available at the time) with the remainder to come from FOG Publications Account. Grant offers have been made to all applicants (three each in the ACT and NSW, one in SA) with acceptances received from most and a couple still to be firmed up.

With the anticipated easing of COVID restrictions in the ACT and NSW we expect that all 2021 grant projects will have commenced or be able to commence. Stay tuned for a more detailed update on all projects (new and existing) in future newsletter issues. In the meantime we encourage you to consider making a tax-deductible donation to FOG's Public Fund – click *Donations*.

June Wilkinson talk on brumbies

Geoff Robertson

22 Aug. ABC Landline ran a segment, by national regional affairs reporter Jess David, on the battle over brumbies in Kosciuszko National Park, the cause of division and debate for decades. The program reported that tensions are running high in the NSW high country, as their fate is decided - plans for brumby management are emerging - yet again. The show some beautiful scenes of the high country grasslands, the damage being done by brumbies, and the on again-off again history of brumby management.

I was delighted to see my friend, mentor and FOG member June Wilkinson, talk on the matter. June is a great horse lover and has ridden horses all her life. As reported on the program, she remembers her days as a child droving in the Snowy Mountains, where her family grazed their cattle and sheep in the summer months. "It was much talked about if a brumby was even sighted and I actually was always hoping to see one but never did," she says. That's not the case anymore.

"Not long ago I did go for a ride in the hills and

couldn't believe it, there were brumbies just everywhere." Like many others, she is concerned about the impact they are having on the national park.

Quoting June, "They're absolutely beautiful creatures, but I don't think that's got anything to do with the fact that they shouldn't be allowed in our fragile high country. It just seems wrong to me that the wild horses are protected when there are so many threatened animals up there that are being kept on life support." The program stated that June is not afraid to say what she really thinks. Many landholders and locals told the ABC they would not speak on the record for fear of retribution, with reports of death threats, vandalism and abuse. It quoted June "Like any other animal that's out of control, they have to be brought back in control. They have to be shot, of course they do."

June and her brother helped with droving up to the family's snow lease at Currango Plain. When Kosciuszko was declared a state park in 1944 and became a national park in 1967, June's family was one of the first to lose their snow lease, but she says her father understood it was time and was never angry or bitter about it.

June holds no such sentimentality for the feral horses and she doesn't believe Banjo Paterson would either. Her grandmother was a first cousin of the famous poet. June said "I think Banjo Paterson would be absolutely horrified if he … came back and saw what was happening now."

Richard Swain, well known Monaro conservationist also spoke on the program. The program which provides a factual and fair account of the issues, and anyone interested in brumbies and their plight should look at the segment found here.

Changes in Griffith Woodland

Libby McCutchan

Many people have commented on the changes in the vegetation at the woodland since January 2000, as illustrated by these photos taken on 9 Jan, 9 May and 9 Nov 2020 and 9 Aug 2021. The photo centres on the rocky outcrop with the spear grass foreground. The roped off areas are those where we have planted.

9 May 2020

The first photo taken in drought shows the spear grass merely holding its own, the second shows the grass following the post-fire rain, the third shows the grass totally reestablished, and the final dense dried-off herbage.

9 Nov 2020

9 Aug 2021

Monaro grasslands respected and protected

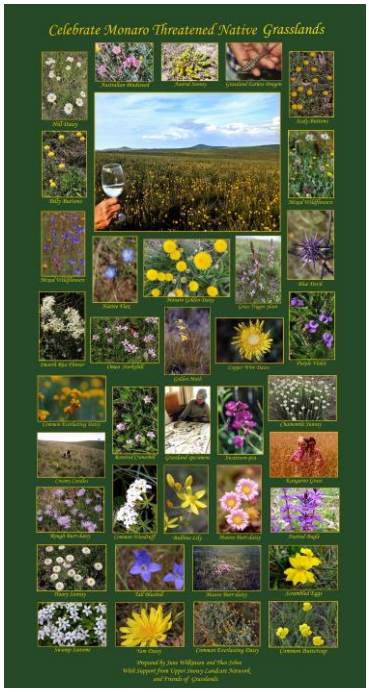
This was the title of an item appearing in the Monaro Post on 22 September. It reads "the Snowy Monaro community will be in for a treat the spring, having been doused with great rain, and soon, warmer temps. The grassland wildflowers are sure to put on a great show. Upper Snowy Landcare Network and Friends of Grasslands are overjoyed to have ready for this special season a poster that showcases Monaro wildflowers and native grasses." It mentions that the poster (see Monaro Grassland Poster) will soon be displayed at Info Centres and libraries.

The article goes on to describe the Biodiversity Conservation Trust's targeting of the Monaro grasslands and woodlands and the income that graziers can earn from that, which FOG's events and notices have been promoting.

Monaro Grassland Poster

In this issue we are pleased to include an image of the poster prepared by June Wilkinson, Lauren Van Dyke and Theo Schoo with support from Upper Snowy Landcare Network (USLN) and Friends of Grasslands. It will be displayed in Cooma Information Centres and libraries.

Congratulations from USLN and FOG to June, Lauren and Theo - June and Lauren for conceiving the idea and working to assemble the material, and Theo of Schoo's Studio, Cooma for putting it together so excellently. Also thanks to Margaret and Lauren for the many hours put into its production, and to June, Theo, Andrew and Rainer for the images.



Bursting with life - Murrumbateman Village Grassy Woodland

Annaliese Caston

Like many areas of box-gum grassy woodlands, the Murrumbateman village reserve is bud-bursting and critters are extremely active. The reserve is an important corridor connecting with similar habitats including Murrumbateman Bush Cemetery and the old Hawthorn property (now Council owned) containing old paddock trees and grasslands.

The crown land reserve is approximately 4 hectares and currently under licence to the Murrumbateman Landcare Group (MLG) for environment protection activities.

View from the path

MLG recently received an independent ecological report and survey results confirming the reserve has a very high biodiversity conservation significance. The results will assist future protection and planning and inform updates for natural diversity mapping of Yass Valley Local Environment Plan. The ecological survey and other activities are funded by a grant from the Australian Government's Commonwealth Community Environment Program.

Activities completed this year include: planting of native tube stock and grass seed by local children and parents (consistent with MLG/NSW Crownlands agreed planting plan), aimed at enhancing and restoring vegetation, improving habitat for woodland birds and other native animals; a conservation mow in August with a cut level at 200 mm to be above emerging wildflowers and allowing removal of bulk native grass growth and hazard reduction; continuing monitoring and recording of native plants and animals; and weeding tasks.

New fencing, gates and safe access points have been installed funded by a grant from the NSW Government Crown Reserves Improvement Fund. Yass Valley Council also supports the MLG community projects.

The NSW Department of Education recently announced a new primary school for Murrumbateman, to be constructed at the corner of East St (Barton Highway) and Fairley St for opening in 2023. The new school site is walking distance to the reserve, and it is hoped future programs will enable students to visit and be involved in studies of the flora and fauna.

Historically, the land of the reserve was known as the school paddocks being temporarily (1878) then finally approved (1909) for school purposes. The old one-room school operated from 1869 to 1973 and the paddocks were used for tethering horses/sulkies of children riding to school and by the schoolteacher for keeping a horse or cow, with a waterhole sunk in about 1915-16. The land was occasionally leased for low intensity grazing but (thankfully) no ploughing or agricultural disturbance has occurred.

Anyone can visit the reserve on the corner of West and Hercules Streets and if you would like a guided tour, please contact Murrumbateman Landcare Group.

Legal destruction of critical habitat

Sue Ross

How many people realise just how environmentally valuable are those sections or reserves of land that lie between roads and, usually, farm lands? Apparently not the decision makers in NSW according to an article in The Conversation on 17 September - see Destroying vegetation along fences and roads.

The issue is that these areas are often the only critical remnant natural habitat within a manageable distance for native animals and insects. Yet in early September 2021 the NSW government allowed landholders to clear these areas by up to 25 metres for fire asset protection, or fire breaks, without approval.

The four authors of this article explain why these roadside areas are so critical to native flora and fauna and give examples of those likely to be affected. They call for comprehensive assessments of the areas to enable informed decisions, and formal approvals, if landholders want to clear into them. The authors also give examples of where other rural land clearing has been insufficiently regulated with consequent significant losses. There is no reason to expect the roadside areas will fare any better.

The authors accept that fire breaks are needed but that these areas should be subject to specific approval where measurable fire risk reduction is demonstrated. This probably would not include areas many kilometres away from homes.

Is this another environmental disgrace in the making?

Threatened Species Day focus on Lawson and GSM

FOG President Jamie Pittock marked National Threatened Species Day on 7 September by calling on Defence Housing Australia to abandon their development plans at Lawson in an interview on WIN TV News. The proposed housing would impact around a hundred hectares of the best remaining native temperate grasslands, habitat of a number of threatened beasties. He asked FOG members and friends to support the Conservation Council of the ACT's campaign to preserve the Lawson grasslands.

The Guardian also had a focus on moths and grasslands in its feature 'Threatened Species Awareness Day sends a sweet message on Australia's vulnerable natural heritage' by Rafqa Touma. She quotes Helen Oakey, executive director of the Conservation Council ACT: 'Beyond the ACT's gregarious and iconic gang-gang cockatoo, Oakey says all of the state's threatened species are "precious and essential pieces of a much larger picture". The golden sun moth is one of them. The species live in natural temperate grasslands, an ecosystem already endangered by urban development. "What little remains of the golden sun moth's habitat is highly fragmented," Oakey says'.

This year the Threatened Species Commissioner ran a bake-off (see the Conservation Council entry and the Commissioner's statement on the golden sun moth). Cake-maker Fiona Smith, the Conservation Council's office manager, also quoted by Touma, says she had "never even heard of the golden sun moth" before working at the Conservation Council. She said "I take every opportunity I can get to decorate cakes. To do so for such a good cause was especially motivating." Smith says she likes to "push the boundaries" in cake making, "so when I had the idea of making a cake that appeared to be suspended in mid-air, I just had to put my mind to it and find a way."

The levitating golden sun moth cake has a chocolate base and hand-painted fondant icing and is the centrepiece of the Conservation Council's Threatened Species Day campaign to educate people about the developing threat facing grasslands in the ACT's Lawson North.

FOG's Top Hut project

Margaret Ning

As we gear up for what promises to be another fine season within the region, and specifically at Top Hut TSR, I thought it would be appropriate to recap what's been happening at the site so far.

FOG proceeded to sign a lease for the management of Top Hut Travelling Stock Reserve in July 2020, and made a payment of the first year's fees in October later that year. To date, we have paid South East Local Land Services just over $300 for the first and second years' lease fees. There will be three more payments of $150 for the remainder of the lease, making a total of $755 in lease fees.

Several FOG members have generously donated towards this TSR project through the FOG public fund, contributing to the TSR management fees, weeding expenses and some fencing repairs that are envisaged over the course of the lease.

Below is a summary of our efforts at Top Hut to date.

Progress report

Prior to signing the Top Hut lease, we assessed the site to see what we would be getting ourselves into, and after deciding everything was 'finite', we went ahead with the offer and signing of the lease. Over the 12 months since we signed the lease, FOG has held four working bees on the site, two last year and two earlier this year. By the time this newsletter is released, a further two working bees will have been held, in late September and late October 2021.

While there are very few 'major' weed species on the site (a small amount of St Johns Wort and nodding thistles), there are ample weed species we would like to get on top of simply because they detract from the quality and beauty of the site! (Tragopogon, other thistle species and Hypochaeris come to mind). We have a small hard core of enthusiastic work party members who have already put in many hours at the site working towards those goals, and contributing their hard work and fuel costs.

We would like to attract further in-kind interest from other FOG members for managing the TSR.

Work parties

We have always tried to combine a day's effort at the TSR with the following day being spent at a nearby beautiful site, whenever possible. The TSR is not far from

Kosciuszko National Park after all! It is always satisfying to combine a bit of fun with a day's hard work.

We hope to have at least one more working bee over the remainder of 2021, COVID permitting, of course, and we would love to see new faces at these working bees. If you have any queries, please contact me on 0427 788 304.

FOG PUBLIC FUND

If you would like to support FOG's TSR project, please make a tax deductible donation to the FOG Public Fund by:

Direct debit: BSB 633 000, A/c 153493960 (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.

Contact us

General inquiries: info@fog.org.au

Media inquiries: 0407 265 131 (Jamie Pittock)
alt. 0403 221 117 (Geoff Robertson)

Membership to join or renew, inquiries: membership@fog.org.au

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

Advocacy: Read latest submissions. To inquire and assist, contact: advocacy@fog.org.au

Tax deductible donations: Donations

Website matters: webmanager@fog.org.au

Projects, work parties & contacts:
- **Hall Cemetery**: john.fitzgerald@fog.org.au
- **Scrivener's Hut, Gurubang Dhaura (Stirling) Park, Blue Gum Point & Yarramundi Grassland**: jamie.pittock@fog.org.au. More info.
- **Franklin Grasslands**: margaret.ning@fog.org.au
- **Travelling stock reserves & Old Cooma Common**: margaret.ning@fog.org.au
- **Scottsdale monitoring**: linda.spinaze@fog.org.au
- **Ginninderry scrape monitoring**: john.fitzgerald@fog.org.au

Health & Safety: info@fog.org.au

Correspondence:
- **Postal**: PO Box 440, Jamison Centre, ACT 2614
- **Email**: secretary@fog.org.au

Payments & accounts: treasurer@fog.org.au

More info on FOG: annual reports. For info on committee, contact: secretary@fog.org.au

Friends of Grasslands Inc.
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