News of Friends of Grasslands

Supporting native grassy ecosystems

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July–August 2015

FOG annual mid-winter meeting for talks & tea

Saturday 18 July

Come and chat with other FOG members and two interesting speakers on Saturday 18 July, 2–5 pm, at Mugga Mugga Environmental Education Centre, Narrabundah Lane, Symonston, ACT. The two illustrated talks will be followed by afternoon tea and time to chat. The log fire will be alight (unless the weather is unseasonable) making the room cosy.

Dr Annie Lane, who is now the ACT Conservator of Flora and Fauna (and the ACT Government Executive Director – Environment), will be telling us about her activities in a previous life as a project coordinator for a global conservation project, based overseas. The objective was to conserve *in situ* wild relatives of crops. Dr Lane took up her current role in November 2014 after work in natural resources management in South Australia and Victoria. During her career so far she has been responsible for water management, conservation, agriculture and national parks, working variously in the conservation, mining and agriculture sectors, private industry, state and federal government and international organisations.

Andrew Zelnik, a FOG committee member and keen photographer, will be taking us on a photographic journey through grassy and other landscapes, from urban surrounds and coastal fringes to national parks and mountain peaks, which he visited during his trip to Tasmania last spring. He hopes you will enjoy this as a voyage of discovery and education, or as an opportunity to see familiar places through new eyes. Andrew's stunning photos of flora, fauna, people and landscapes have been in a number of recent and past FOG newsletters. Of course projected onto a screen at Mugga Environment Centre his photos will be much larger!

Venue: 129 Narrabundah Lane – through the farm gate that is nearly opposite the Therapeutic Goods Administration building, and up the bumpy drive to the green Education Centre.

Time: 2–5 pm including clean up.

Wear: Nothing special.

More detail: David.crawford@fog.org.au

FOG's activities in July, August and early September are summarised on p. 14. Details are on page 2.

We've planned:

– the Tree Week walk;

– a night-time walk with Bettongs;

– the second visit to Umbagong Blue Devil Grassland; and

– several workparties.

Contents of this issue also are listed on p.14.

Image courtesy of www.farmingsecrets.com

David Tongway AM

Friends of Grasslands congratulates David Tongway on being appointed a Member of the Order of Australia in the Queen's Birthday Honours in June 2015. David is recognised for his 'significant service to science and research in land management through the development of Landscape Function Analysis'.

David is a FOG member based in Canberra, and will be well known to many of you. The photo above shows him speaking at the Stipa 8th National Native Grasslands Conference: 'Potential of native grasses', at Murray Bridge, November 2013. You may have received training from him in how to measure and then improve, landscape function – that is, the way organic matter, groundcover (especially grasses), soil fauna and microbes, combined, enable soils to naturally balance nutrients and absorb and retain rainfall, rather than being washed away. Personally I have worked closely with David, and have learnt a great deal from him. He was a research scientist at CSIRO for many years, and has published extensively. His latest book, *Restoring disturbed landscapes: Putting principles into practice* by Tongway D.J. and Ludwig J.A., 2011 (Island Press, Washington) may be of interest to members. I am thrilled that he has been given this award.

Sarah Sharp, President of FOG

Sarah Sharp led the group visiting Umbagong Park Blue Devil Grassland in May. Here she is explaining the principles of vegetation survey. See page 6. Photo: John Baker.

FOG activities *continued*

ACT Tree Week – FOG walk with friends. Stirling Park, ACT

Saturday 25 July, 2–3.30 pm

This year, a series of tree-focused events called ACT Tree Week will precede National Tree Day, Sunday 26 July.

FOG is contributing on Saturday 25 July – a short walk in Stirling Park for the general public and FOG members. The walk will be jointly led by Sarah Sharp (for FOG), and Steve Thomas and Jim Laity (for the Friends of ACT Trees, FACTT), and Wally Bell, Ngunawal Aboriginal Cultural Heritage Consultant.

These experts will explain the significance of the trees, the Aboriginal heritage of this important area, and the understorey species, and how the vegetation has changed over time and how FOG members and Yarralumla residents have been improving the condition over the past years.

We thank the National Capital Authority for permission to hold the walk in Stirling Park.

Park: At the Parliament House end of Fitzgerald Street, behind the Norwegian Embassy.

Time: Walk will start at 2 pm and end at 3.30 pm approximately.

Wear: Footwear and clothes suited to unpaved tracks and the weather.

More details: paul.archer@fog.org.au or phone him on 0434 070 770.

This event will be of interest to all Yarralumla residents and to anybody who is interested in our natural environment, Aboriginal heritage and the preservation and restoration of special places like Stirling Park.

Night-time Bettong walk, Mulligans Flat, ACT

Thursday 6 August

Mulligans Flat Woodland Sanctuary is a grassy woodland at the northern border of ACT with NSW. It is partly fenced to exclude predators and is the site where Eastern Bettongs *Bettongia gaimardi* have been reintroduced recently. Eastern Bettongs are rabbit-size kangaroos which curl up their tails to carry dry grasses and bark for building nests on the ground. By night, Bettongs roam widely in search of underground fungi (truffles) and the tubers of grassland forbs. Staff of the Woodlands & Wetlands Trust run night-time walks to show the Bettongs and other nocturnal wildlife to the public.

FOG has booked a private tour for our paid-up members and partners only, for **Thursday 6 August.** The walk lasts about 2–2.5 hours and starts just before sunset. The cost for us will be $37 per head. (This is 25% less than the normal public Friday night-time walks.)

IMPORTANT. To book your place(s) in this group for 6 August, be sure to register with ann.milligan@fog.org.au on or before Thursday 23 July.
We shall be paying cash individually to the Sanctuary staff on the day.

Second visit to Blue Devil Grassland, Umbagong, Latham, ACT

Monday 7 September

On this second visit to the Blue Devil Grassland at the end of winter, we expect to see some germination of forbs and grasses. This visit we plan to go for a ramble across the range of microhabitats in this grassland to see what we can find, but will also check the 20 m x 20 m plot we surveyed last time.

The walk will again start at 4 pm, and sunset is expected around 5.45 pm.

REGISTER: Margaret.Ning@fog.org.au, and if you were at the first visit please tell her your thoughts and feedback.

The photo (left) from the first visit shows plot markers. Other photos: pp. 1 & 6.

On-ground workparties, June–September

Sunday 28 June, Stirling Park
Sunday 26th July, Stirling Park

Join us on the north-eastern side of Stirling Park, which enjoys the morning sun and is sheltered from any breezes – a lovely place to be on a Canberra winter Sunday morning.

Work will start at 9.30 am, about 50 m into the treed area at the Alexandrina Drive end of the gravel road from Alexandrina Drive to the corner of Forster Crescent and Empire Circuit. Look out for our new FOG sandwich-board sign. Wear clothing and footwear suited to gardening outdoors in spiky vegetation. Tools and gloves are provided, along with an excellent morning tea.

Park: At the corner of Forster Crescent and Empire Circuit. (The NCA no longer permits parking on Alexandrina Drive.)

REGISTER: pmcghie@optusnet.com.au, for catering and planning reasons, and so you can be informed if plans change.

Sunday 30 August, Yarramundi Reach grassland

Work will start at 9.30 am at the native grassland at Yarrmundi Reach (behind the Aboriginal and Torres Strait Islander Cultural Centre buildings at 245 Lady Denman Drive, ACT). Wear clothing and footwear suited to working outdoors with herbicides or mattocks. Tools and gloves are provided, and FOG will provide morning tea.

REGISTER: Jamie.Pittock@fog.org.au, for catering, planning & notification.

Saturday 12 September, Hall Cemetery, 10–12 noon

We shall continue to work on fleshy weeds and patches of exotic grass, with spot application of herbicide through the grassy woodland, and some grubbing out. Please dress for the weather and tall grass. The gate to Hall Cemetery, ACT, is on Wallaroo Road, near the intersection with Barton Highway.
FOG will provide morning tea.

REGISTER: john.fitzgerald@fog.org.au on or before 10 September.

FOG advocacy

Naarilla Hirsch

May

FOG made a submission to the Inquiry into the Register of Environmental Organisations by the House of Representatives Standing Committee on the Environment. FOG argued against calling into question activities of environment groups that are not 'on the ground' activities, pointing out that environmental groups are permitted at law to conduct both 'on the ground' and advocacy activities in pursuit of their charitable purpose to protect and enhance the natural environment. FOG's view was that the advocacy work of environmental organisations enriches public debate in Australia and contributes to good policy-making by both government and business. Environmental organisations are uniquely placed to take a considered long-term approach in formulating policy tasks and goals, and this is ultimately in the public interest.

June

1. The construction of a link road on the new Majura Parkway in Pialligo was released for comment under the EPBC Act. FOG noted that this proposal minimises impact on the Striped Legless Lizard (SLL) and Golden Sun Moth, and strongly supported the proposed mitigation program for both species. However, in FOG's view the impact of the link road should have been included as part of the initial approval of the development of the IKEA site (even though the quality of the vegetation on the site itself is poor).

*The exposure draft of the National Capital Plan is at http://www.nationalcapital.gov.au/index.php/commitment-to-community-engagement/national-capital-plan-exposure-draft-2015

2. The National Capital Authority (NCA) is updating the National Capital Plan. The exposure draft* is open for public comment until 22 July. FOG advocacy group members attended an information session on 10 June. The plan brings up to date the roles and responsibilities for the management of national land and 'designated' land. One of the NCA's roles is to ensure the landscape character and environmental values of that land are maintained. These lands include the hills, ridges and buffers (most of the nature reserves that are on the hills, but not all nature reserves), major roads entering Canberra and other matters of national significance. An important element that the proposed new plan addresses is the previous lack of heritage protection for designated land under the EPBC Act. Heritage places within 'designated areas' will now 'be considered as Commonwealth areas for the purposes of protecting the environment in the manner currently afforded under the ... (EPBC Act)... .' This will give the NCA a legal basis on which to require heritage management plans and heritage impact statements for major development applications for a heritage place. Such applications should be prepared to meet the requirements of the EPBC Act.

The plan also aims to reduce double handling by the NCA and the ACT Government which is likely to be of benefit to everyone and make it easier to address conservation concerns. When preparing its submission to the NCA, FOG will be examining the proposed changes carefully to ensure that any changes in responsibility will not give rise to inadequate consideration of conservation issues.

The full text of FOG submissions appears on our website.

News roundup

New path system at National Arboretum includes STEP's Forest 20 Regional Botanic Garden

Andy Russell

A new system of earthen walking paths is in the process of construction at the Arboretum. The intention is for a circular path to link the Village Centre, events terrace, carparks and some forests that are adjacent to these destinations. One of these new paths leads walkers into our STEP Forest 20.

The paths are about a metre wide and have been constructed by scraping off the surface vegetation. In our area there are heaps of the residue at present but they will be removed in due course. The path enters Forest 20 from the Mesa Oaks of Forest 21 and joins our gravel paths to then cross in a loop to our Casuarina Nook (a picnic spot), and returns to our gravel paths.

Photos: Andy Russell June 2015

News roundup *continued*

FOG assistance at The Poplars Grassland, Queanbeyan, 2 May

John Fitz Gerald

Backing up 2014's event at this iconic grassland, FOG again pulled together a small team for more work on weed control at this site. Five FOG members attended alongside a similar crew from Queanbeyan Landcare. Most of our morning's efforts went into cutting and daubing of large woody weeds (Firethorns, Hawthorns, etc.) with a little chipping of Serrated Tussock in high-value areas. We all enjoyed a short stroll through some areas of the best native vegetation at tea-break time. Thanks to those who attended and helped to pull this marvellous site back towards its inherent high quality.

One of several plants of Slender Mint *Mentha diemenica* (leaves ~1 cm long) still in flower in early May. Photo: Andrew Zelnik

The group strolling at tea-break, watched by three local residents at right. Photo: Ann Milligan

Stirling park work progresses

Jamie Pittock

On 3 May at Stirling Park, 14 volunteers (photo above) worked together to clear around 150 cubic metres of woody weeds out of a gully. Wonderful work!

Then on 16 May, a fuel-reduction patch burn was managed and operated by the NCA and Rural Fire Service volunteers (photo at right) . FOG is very pleased to have the help of these groups in restoring Stirling Park.

(Photos: Jamie Pittock)

News roundup *continued*

LandcareACT – a new peak body for natural areas of the ACT region

LandcareACT was launched on Saturday 13 June, in Canberra. It represents and supports the interests of the 60 or more groups of people actively at work under a range of titles including Landcare, Parkcare, Waterwatch, Frogwatch, rural landholders and Aboriginal traditional custodians.

This new peak body was initiated by the three ACT Catchment Groups (Ginninderra, Molonglo and Southern ACT), and its development is funded by the Australian Government. LandcareACT links the ACT region to the National Landcare Network, which itself provides a community voice for landcare programs at the national level. The national network formed after the Landcare conference in 2008, and its purpose is to work with natural resource management bodies and to lobby the Federal Government for supportive funding.

LandcareACT is intended to promote the benefits of landcare to the wider community, seek new partners and funding, encourage more people to get involved, and build the capacity of existing groups. It is a central forum where local innovation and collaboration can flourish, and in which local landcarers can share knowledge and experience across the region and discuss issues related to government policy and programs. Currently (June) LandcareACT has a draft constitution and a website (http://actlandcare.org.au/regionalpartners/LandcareACT) and is completing its business plan and communication and marketing plans. An annual event is planned, to showcase Landcare, share knowledge and experience and communicate with members.

FOG is not yet part of LandcareACT. The FOG Committee will be discussing a possible formal or informal relationship with this new body.

For more information about LandcareACT, contact: Anne Duncan, ph. 0466 108 432, or the Catchment Group Coordinators – Bernie Bugden (Molonglo) ph. 6299 2119, Karissa Preuss (Ginninderra) ph. 6278 3309, or Martine Franco (Southern ACT) ph. 6296 6400.

Top: The cutting of the (delicious) green cake after Nicole Lawder, ACT Shadow Minister for the Environment, had formally launched LandcareACT.
Below: After the launch everyone helped in a planting bee across the hill and hilltop occupied by Hughes–Garran Woodland.
Photos: Ann Milligan

Jean Geue, Professor Ian Falconer AO who MC'd the LandcareACT launch, and Sarah Sharp, in discussion on the hilltop after the launch and planting bee.

New listing of a grassland community as 'threatened'

Natural Damp Grassland of the Victorian Coastal Plains has been officially listed under national environmental law as 'critically endangered'. It is one of six new listings announced in the latest (June) *Communities for Communities* newsletter no. 19.
Details, including full conservation advice, are at:
www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities

This grassland community occurs in low (0–100 m altitude) plains in Gippsland and the Otway area on fertile clay soils where there is high rainfall and few droughts. It is 'associated with boggy soils and has a unique assemblage of dryland and moisture-loving native species'. It is typically dominated by Kangaroo grass or tussock grasses, with other graminoids and forbs, and few or no trees or large shrubs. It potentially provides habitat for threatened species that include *Caladenia fragrantissima* subsp. *orientalis* (Cream Spider-orchid), *Dianella amoena* (Matted Flax-lily), *Prasophyllum frenchii* (Maroon Leek-orchid) and the southern brown bandicoot.

Articles

Urban planning issues for grasslands in the ACT region

Naarilla Hirsch

For the recent Native Grasslands Sustainability Symposium held by Kosciuszko to Coast and the Myer Foundation (on 21 May 2015), I was asked to speak about urban planning for grasslands in the ACT region, with particular reference to offset issues. This article is a summary of that presentation.

Our native grasslands are prime urban development sites. In fact, much of what is now urban Canberra was originally Natural Temperate Grassland (NTG) or Box–Gum Woodland, and what we have left now are small unconnected fragments. As anyone who reads the Advocacy column regularly would be aware, this is not just a historical issue. There are continuing urban pressures on our remaining NTG sites: of the 48 NTG sites identified in Action Plan 28 in 2005, three have been approved for either partial or full development, and there have been other development proposals with the potential to impact on NTG sites.

As well as the direct impact of putting buildings on grassland areas, urban development can have other impacts. An obvious one is urban development immediately adjoining high conservation areas. Nearby housing can result in informal tracks being made across NTG areas by joggers, dog walkers and others, garden escapees becoming weeds, rubbish being dumped in these areas, and reptile habitat rocks being removed for garden landscaping. As we have seen with York Park in central Canberra, multi-storey commercial or office blocks can also have an impact by shading NTG and Golden Sun Moth (GSM) habitat.

Another planning issue is bushfire management around the urban fringe. Bushfire management regimes are often not compatible with conservation management, so asset protection zones need to be outside conservation areas. In the recent review of the ACT Bushfire Strategy, there has been a change to narrower more intensely managed asset zones, a plus as it minimises the area on which bushfire management impacts.

Piecemeal urban development has been a major issue in the ACT. For example, initially developments in Gungahlin were approved suburb by suburb, so that the environmental impact of each development was assessed in isolation, and incrementally small patches of NTG, Box–Gum Woodland and associated threatened species habitat were being lost. Assessment in isolation of the importance of each patch was extremely difficult. The recent strategic assessment of North Gungahlin gave a better outcome as it allowed the value of each grassland or grassy woodland site to be assessed relative to all others in the area. Connectivity values were also assessed at the same time. While some natural areas will be lost, the overall result is better than it might otherwise have been, e.g. the Throsby neck area will be retained and connectivity enhanced in this area. In this context, the ACT–NSW border creates an artificial barrier to a strategic approach, since planning processes on either side of the border occur in different timeframes and use different frameworks.

When urban development planning processes set aside high quality grassland areas for conservation, these areas then need resources for management, resources that are in addition to existing resources for conservation management. Offsets are now being seen as a way to fund conservation site maintenance.

My view on offsets is that the jury is still out. The principle of offsets is 'no net loss', but offsets are applied when an urban

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News roundup continued: Visit to Umbagong Blue Devil Grassland, 25 May

We had clear autumn sunshine for the first of FOG's three planned 2015 visits to the Blue Devil Grassland at Latham ACT in Umbagong Park. The open grassland covers several hectares of this large parkland separating houses and main roads from Ginninderra Creek. On this visit, FOG members joined several of the Umbagong Landcare group, including its convenor Caroline Wenger, John Baker, Chris Watson and Robert Cruikshank who takes a personal interest in weeding the Blue Devil grassland. In all there were around 16 of us.

Sarah Sharp led most of of the group zigzagging through a 20 m x 20 m permanent survey plot, noting and counting the mainly native forbs that we found by parting the thick cover of Kangaroo Grass *Themeda triandra*. Margaret Ning and Robert meanwhile discussed and identified particular species. It was almost dark when the last of this group of enthusiastic visitors left the area. (Photos: at right and on pages 1 and 2.)

Please email margaret.ning@fog.org.au to tell her what you thought of the visit.

'*What is that*?' Foreground, l–r: Andrew Zelnik, John Fitz Gerald (recording results), Margaret Ning (in light grey beany), and Sarah Sharp and Robert Cruikshank in conference.
Photo: John Baker.

Urban planning issues for grasslands in the ACT region, continued

development will result in loss of all or part of an NTG area, or another negative impact will occur. As a result, improvement in the quality of remaining conservation areas is needed before offsets can be said to actually be successful – otherwise the situation is one of net loss. As well, FOG's view is that some high quality areas should always remain 'no go', but it remains to be seen if this is acceptable to urban planners.

There are three main types of offsets in the ACT and region: placing an area into reserve with some funds for ongoing management, research projects, and restoration to improve the conservation values of a site. A number of NTG offset packages have been approved already. We have information about both the package and the progress being made with some of these, and a couple of examples follow. Others we have no or very limited information about, and no idea of outcomes – a task for the Advocacy Group to follow up.

One NTG example that includes both an offset site and restoration is the offset package for developments (including the new taxiway) at Canberra Airport. The Parlour Grassland near Braidwood has been purchased and is being managed for grassland conservation. As well, Canberra Airport Group is undertaking restoration work on lower value parts of the airport. After a couple of different attempts, the recent trial restoration work being undertaken by Greening Australia is producing results, but it is a long and expensive process. However, the results will assist greatly in achieving better restoration outcomes elsewhere – a definite positive.

A couple of offset packages have focused on GSM protection and research, the research being into translocation of moth larvae and GSM habitat requirements (in particular replacing the Chilean Needlegrass habitat where some moths are found with native species). Research is important as it provides information about NTG and grassland fauna that we currently lack. However, it has some drawbacks in terms of an offset. Research is expensive and takes a long time to get results. Results may be negative (which is useful information to have, but means there is a net loss on the ground), or if positive, additional resources are needed to implement the results.

Another issue in terms of offsets is that of 'advanced offsets', a relatively new concept. The idea is to identify potential offset sites in advance, allowing them to be managed better rather than deteriorating before being used as an offset. It also means that they become, essentially, 'no-go' areas, as mentioned above. A register of such sites has been proposed. The Advocacy Group will be taking this up further with the ACT Government.

From a planning perspective, public access to high value NTG sites is another issue to be addressed. Grasslands are often small and vulnerable to disturbance by visitors, so there is a strong culture of protecting grasslands from visitors and the community rather than educating people about them and how to interact appropriately with them. For example, only one grassland (Umbagong) has a dedicated friends group. What we see in the ACT is different access strategies at different sites. York Park in central Canberra is a small NTG site with GSM present. It has been fenced off, with informative signs about the site. In Jerrabomberra East Nature Park there is a nature walk with informative signage – because of its location, low visitation rates are expected, so disturbance to the NTG and Grassland Earless Dragon habitat should be minimal. Along the Molonglo River corridor is a population of the Pink Tailed Worm Lizard that is adjacent to the current urban development there. In this case, planning included development of a Plan of Management, Management Guidelines and site operational plans. As well, compatible plantings and land uses next to conservation areas have been decided. However, at the time of writing these documents are not yet finalised, although urban development has started. At Canberra Airport the NTG site is inaccessible by the public, but grassland information is included in the Airport's schools tour program, and the Airport recently sponsored a grassland art exhibition.

In conclusion, I think that there has been some improvement in the way planning issues for grasslands are addressed in the ACT over the last few years. For example, development proposals usually contain adequate construction mitigation sections, something that was not always the case when I became Advocacy Coordinator. Another improvement is that, via offsets, we now see a monetary value being placed on high quality grassland areas – in the past these areas were developed without regard to their environmental values.

However, urban pressure on NTG sites in the ACT region will continue indefinitely and will need to be counteracted. While offsets offer some advantages (such as money to manage grassland reserves, and the advanced offset concept), there is a danger that offsets will become a way of 'buying off' environmental concerns, to the disadvantage of our endangered Natural Temperate Grasslands and grassland fauna.

'Two ancient denizens of the outback – lightly clad Miss Jacky Jacky lizard snuggled up to shiny, dark-plated Mr Shingle-back. I stroked them both but not a flinch or an eye-lid roll. They were in torpor for the night.'

So writes (FOG member) Klaus Hueneke of this photo above from his stay at Dry Tank camping area on 'a dark night at Gundabooka National Park, Darling River near Bourke'.

He found these two when pulling a flitch of wood off a 'decent termite-hollowed mulga log', and quickly put it back. Next morning, both his 'scaly friends' had gone.

Climate resilient restoration of Box Gum Woodlands*

Suzanne Prober, Jacqui Stol, Melissa Piper, V. Gupta & Saul Cunningham, CSIRO

Box–Gum Woodlands are an endangered plant community which is also major habitat for a long list of threatened species, including birds (from large raptors to small firetails), reptiles, amphibians, mammals, invertebrates and a range of native vegetation. These woodlands were once widespread across south-eastern Australia from Queensland to Victoria. The small number of high quality patches now remaining have groundlayer flora comprising a diverse range of native tussock grasses and forbs, sparse mid-storey shrubs or small trees, and an overstorey of eucalypts that are mainly Yellow Box *Eucalyptus melliodora* and Blakely's Red Gum *E. blakelyi* (and in some areas White Box *E. albens* or Grey Box *E. microcarpa* or *E. moluccana*). Some Box–Gum Woodland is actually secondary grassland with no remaining trees ('derived native grassland'). However, most Box–Gum Woodland patches nowadays, like other grassy landscapes, are under threat from weed invasion, and urban or agricultural development and fragmentation, with soils that are degraded, compacted and nutrient enriched.

For our research we are interested in restoring these woodlands and enhancing their resilience to a drying climate. At sites that have become degraded (e.g. top photo at right) we are testing ways to improve the soil physical and biological conditions which control a soil's capacity to capture and store limited rainfall. We are comparing them with 'reference sites' (e.g. lower photo) that are in relatively good condition.

Characteristics of degraded sites

Based on the results of earlier research we identified two main types of degraded patches of woodland, which we call 'depleted' and 'enriched' sites. Soils in 'enriched' sites have more soil nutrients, particularly available nitrogen and phosphorus, and the ground-layer is dominated by annual weeds. Soils in 'depleted' sites have little carbon and nitrogen, sparse ground cover and reduced activity of soil microbes and soil invertebrates compared with high quality reference sites. Rainfall is slow to infiltrate these soil profiles and they store considerably less water than soils at the reference sites.

On 'depleted' sites the dominant groundstorey species tend to be Spear Grass *Austrostipa scabra*, short Wallaby grasses *Rytidosperma* spp. and Wire grasses *Aristida* spp., whereas there is Kangaroo Grass *Themeda triandra* and Poa Tussock *Poa sieberiana* on the reference sites.

Experimental treatments

To improve soil condition (soil carbon, soil biological activity and soil moisture holding capacity) we are testing five treatments at three 'depleted' sites:

- aerating soil using a drum rolling spike aerator, to reduce compaction (photo below right);
- adding biochar to introduce carbon and microhabitat (photo overleaf);
- adding mulch to protect the soil surfaces and introduce carbon (photo top right);
- sowing native Red Grass *Bothriochloa macra* to increase carbon; and
- adding phosphorus (addition of superphosphate is a common practice in farms on these soils).

As one of our measures of improvement, we have hand-sown a range of native forbs to see how well they establish.

Findings so far

With mulch and biochar, after two years of treatment, we are observing less compaction, better infiltration, occasionally greater soil moisture, more soil carbon and higher pH (less acidity), and at one site the soil

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Climate resilient restoration of Box Gum Woodlands, continued

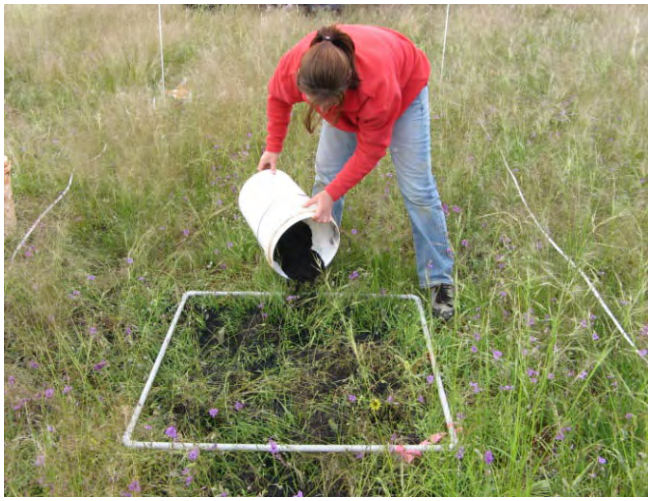
surface is softer. We are also finding better establishment of hand-sown Bulbine Lily *Bulbine bulbosa* (which has large seeds).

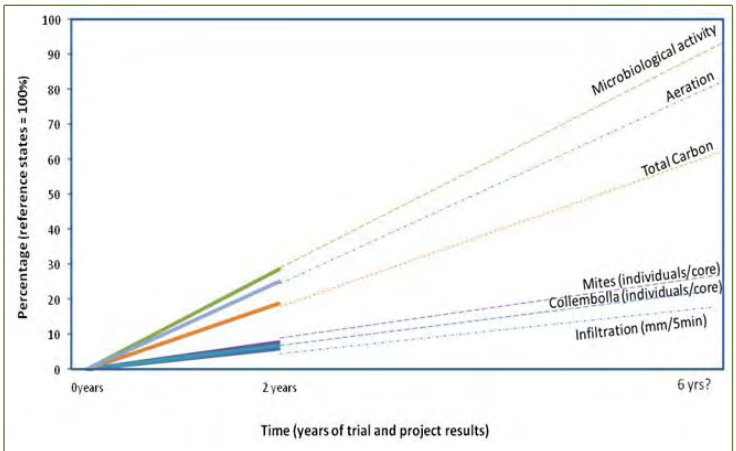
The addition of mulch is improving the rate and diversity of metabolic activity by the microbial community and increasing the abundance of the common soil microinvertebrates, especially Springtails (Collembola). However, the mulch is also inhibiting germination of small-seeded forbs.

While these effects are a substantial improvement over the degraded starting point, comparison with reference sites suggests the effects achieved so far are, on average, around 25% of those required for restoration to reference conditions. The graph at right shows the average improvements in soil condition in the first two years (solid parts of the lines) relative to the soil condition in the reference sites. Dashed lines show the projected outcomes at six years if improvements continue at the same rate. Further monitoring may determine if the benefits continue to accrue as projected in the graph, as biochar and mulch become better incorporated in the soil.

Our additions of phosphorus have had predominantly negative effects from a woodland restoration perspective. There is marginally more total plant material, mainly from exotic annuals and therefore less from native grasses. Rates of microbial activity are also poorer at these sites, although mites are now more abundant.

The plots sown to Red Grass are not showing many significant effects and nor are the plots we have aerated, at this stage. As Red Grass plants were still small and not fully established when the sites were last measured it may be that effects will become evident over longer time frames.





Percentage improvement in soil conditions in years 1 and 2, relative to those conditions measured in the reference sites.
The lines, top–bottom, show responses in: microbial activity, aeration, total carbon, mites, collembola, water infiltration.

Conclusions

Mulch and biochar are the most promising treatments so far as ways of improving soil biophysical condition and associated soil water for increasing resilience to a drying climate. We will continue to monitor the sites to determine whether the benefits seen so far can lead to ongoing improvement towards reference conditions.

References

Prober S.M., Stol J., Piper M., Gupta V.V.S.R., Cunningham S.A. (2014) Enhancing soil biophysical condition for climate-resilient restoration in mesic woodlands. *Ecological Engineering* 71: 246–255.

Prober S.M., Stol J., Piper M., Gupta V.V.S.R., Cunningham S.A. (2014) Towards climate-resilient restoration in mesic eucalypt woodlands: Characterizing topsoil biophysical condition in different degradation states. *Plant and Soil* 383(1–2): 231–244.

'Communities in Landscapes' field day at the experimental site near Cowra.

Partners

This project is part of the Communities in Landscapes project led by Landcare NSW and funded under the Australian Government program Caring for Our Country. Partners include: CSIRO; Landcare NSW; Grassy Box Gum Woodlands Conservation Management Network; NSW Office of Environment and Heritage; Industry & Investment; Capital Region Greening Australia's Florabank; University of Sydney; STIPA Native Grasses Association Inc; NSW Department of Primary Industries.

All images: courtesy of the CSIRO research team.

*For this article, the CSIRO flier of the same title has been edited by Ann Milligan, Jacqui Stol & Suzanne Prober.

Micrographs of grassy landscape species

John Fitz Gerald

On 2nd of May during weeding work at the Poplars grassland in Queanbeyan, we noticed that spaces between some large grass tussocks were covered by an open branched network just a few centimetres thick. These looked to be areas of lichens, some parts of which were still distinctly green; others near the surface of the cover were quite brown, possibly due to either the frosts or the dryness of the season, or maybe to both.

Getting closer, the network seems to have a delicate and soft branched structure, possibly fitting the description of a fruticose lichen. Interested readers could dig deeper into the very informative website about Australian Lichens posted by the Centre for Australian National Biodiversity Research, at http://cpbr.gov.au/lichen/index.html/. The material is complex. The lower-magnification image (top left) shows complex branched structures; the higher magnification (lower left) shows hollow stems punctured by ellipsoidal openings that reveal a loose skeleton of thin fibres inside.

Themeda triandra (photos above and at left). Each fertile floret in this species is tailed with a magnificent bristled awn 5 or so centimetres long, but the bristled head of each lemma is an equally attractive feature when viewed with a microscope. It is easy to imagine that the bristles aid each seed to wedge into the ground, or into a gap, increasing the chance for germination.

All four images on this page were taken at the Australian National Botanic Gardens seedbank by John Fitz Gerald ©ANBG.
The scale bars represent 1 mm length, except the top left bar which is 5 mm long.

Native grasslands sustainability symposium, and review of *Land of Sweeping Plains*

Geoff Robertson, Barbara Payne, Kathryn Wells

A busy and informative day of networking and talks on 21 May was run by Kosciuszko to Coast and the Myer Foundation grasslands project. Project coordinator (and FOG member) Kathryn Wells assembled a number of influential speakers from science and the general community, Indigenous and non-Indigenous, with Wally Bell welcoming everyone to Country. FOG members Naarilla Hirsch (see article on pp. 6–7), Sarah Sharp and Sue McIntyre, were among the speakers, and the MC was John Fitz Gerald, Chair of Kosciuszko to Coast (K2C).

The newly published book on native grasslands, *Land of Sweeping Plains*, in which many of the day's speakers are authors, was launched at the end of the symposium.

The book is one of the outcomes of the Myer Foundation Native Grasslands Project.

***Geoff Robertson writes**:* Appropriately the book was launched by Dr Richard Groves, whose work on native grasslands in south-eastern Australia commenced in the 1960s. He also wrote the informative Foreword to the book. During the launch, Richard made several important observations. First, that the book addresses the many facets of grassland management and restoration, embraces many scientific disciplines and describes the experiences of a wide range of institutional managers and community organisations. Second, it includes a delightful mosaic of descriptions, text boxes, informative illustrations and images.

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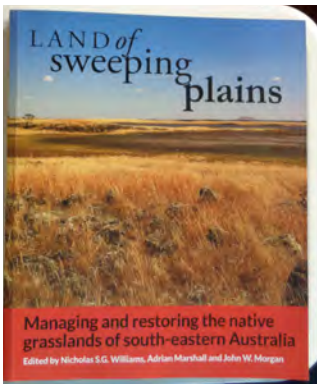
Native grasslands sustainability symposium, and book review, continued

Third, it is easy to read. Fourth, it is possibly best read some-at-a-time. He had been reading a little each day.



The Introduction, by Nicholas Williams and Adrian Marshall, is a useful essay in its own right. It heralds the beginning of the scientific community's consciousness of the need to conserve grasslands some 35 years ago, and traces some of the major contributions since, although the focus is largely on Victoria.

The book aims at a very broad readership, including anyone with a link to grasslands. It makes some key statements such as:

> 'Grasslands are distinctive in that they require active management. To not act is to fail. … Many of the weeds we have introduced must be controlled to maintain ecosystem integrity and function. And on our farms we must embrace the possibilities native grasslands and native pastures offer… Native seed supply is critical… [B]y looking to urban design and landscape architecture … we can ensure remnant grasslands are better integrated into our residential suburbs and industrial areas.'

Each chapter is exciting, but Chapter 1, by Beth Gott, Nicholas Williams and Mark Antos, is one that has special appeal to me because it discusses grassland origins, Aboriginal people's occupation and the impact of European settlement. It starts with a brief sketch of the evolution of the grassland vegetation and fauna in south-eastern Australia, with a map illustrating how the mainland and Tasmania were linked in the last ice age. It highlights the importance of seeing our landscapes and vegetation as evolving through time.

The chapter sketches Aboriginal presence, and importantly talks of their plant and animal use, their use of fire and life styles. It has an excellent illustration on page 13 showing the various tubers, most of which belong to now rare plants used by Aboriginal people. It includes a special article on Aileen Blackburn's work on reviving traditional methods of cultivating yam daisies and encouraging their use. Aileen was a speaker at the symposium, accompanied by three women trainee rangers, and showed some of the digging sticks. We often view Aboriginal occupation of grasslands as history but I think of it as being past, present and future.

We in Friends of Grasslands have been very fortunate to learn from Rodney Mason about traditional land management and food sources. Both the recent FOG Forum and the Sustainability Symposium demonstrate a growing convergence of grassland scientists' findings, grassland managers' practices and traditional land management practices. It seems to me that as part of this convergence, the adoption of many traditional practices would speed up our recovery and restoration of grasslands. It is also within our grasp to learn how to grow these tuber plants and possibly develop them in fascinating bush tucker opportunities – in fact they might provide important commercial food industries.

Chapter 1 also covers European settlement and their early observations of grasslands; the gradual destruction of the grasslands' structure, function, fauna and flora as the use of grasslands changed; the replacement of natural grasslands by 'improved' agricultural methods; and early attempts to conserve what was left of the original vegetation. This is a very useful section which helps us understand how we transitioned from Aboriginal to modern day land management. We may be appalled by how British culture destroyed our natural temperate grasslands, but I think there are many and more complex stories to be told, some in later chapters.

Chapter topics (not titles)

1. Humans and grasslands
2. The native temperate grasslands of south-eastern Australia
3. Ecology and dynamics
4. Wildlife of grassy landscapes
5. Planning, documenting & monitoring grasslands
6. Understanding the social context
7. Grassland management in the community
8. Biomass management
9. Weed management
10. Grassland conservation and farming practice
11. Seed for grassland restoration
12. Restoration of native grasslands
13. Designing and planning for native grassland in urban areas
14. The future.

I suggest that this book is excellent value for money for anyone at all associated with grassy ecosystem conservation. It is extremely informative, collates many different experiences and explains the latest research. I would not say it is definitive; grassland conservation and restoration is a work in progress.

The book should be used, as it was intended, as a resource on grasslands. It is worth collective study and would be an authoritative source for our advocacy work. Learn and enjoy!

Barbara Payne writes: Chapter 13, Designing and planning for native grassland in urban areas, by Adrian Marshall, skilfully guides and inspires the reader through the essential steps involved in protecting biodiversity and ecosystem processes present in native grasslands, through good design. Adrian helps us understand that a key part of this is educating and engaging the community in the care and stewardship of their grasslands into the future. We are guided through design development to construction and maintence, starting – and this is the key – with the grasslands. Two case studies show that it can be done. A section on 'the biodiverse suburb' by Georgina Garrard and Sarah Bekessy outlines why it is important to meet the challenges of protecting biodiversity in urban environments and of balancing biodiversity and development.

Who should read this chapter? Anyone involved in the care of grasslands, developers, planners, landscape architects and municipal landscape managers.

Kathryn Wells writes: A few copies of this book are available until the end of June at the launch price of **$48**. Contact me on kathrynwells29@gmail.com.

Land of sweeping plains: Managing and restoring the native grasslands of south-eastern Australia. Eds Nicholas Williams, Adrian Marshall and John Morgan. CSIRO Publishing (2015). $59.95, at http://www.publish.csiro.au/pid/7219.htm

Cultivation corner: about grassland species

Love at first sight!

Janet Russell

I first met Kevin Thiele* in the late 1990s when my husband Andy as President of the local Landcare group in Cootamundra invited him to speak at one of their meetings. We learnt about the work he and Suzanne Prober were doing regarding the preservation of Box–Gum Grassy Woodlands. He recalled how initially they were granted the funding but they were unable to find any woodlands that met the criteria on which to spend the grant.

The next day Kevin and Suzanne took us to Monteagle Cemetery (near Young, NSW) where they had been trialling burning compared to other plots left unburnt. I was amazed to see the beautiful grassland that had grown from the burnt plots. My first view was of a mass of fine grass with yellow, pink and white flowers dotted through it. I saw fringe lilies and other native forbs for the first time. It captured my imagination and I have never forgotten it.

Whenever I read about explorers like Allan Cunningham making their way through these landscapes for the first time, I can imagine what it must have looked like. That experience at Monteagle also gave me a keen appreciation of how much grassland had been lost.

Since then I have seen how vulnerable remnant grasslands and grassy woodlands are to invasions of weedy grasses and herbs. The removal of grasses such as Sweet Vernal *Anthoxanthum odoratum* can be impossible. They like acidic soils but do not like dry or water-logged soils. This would make many grasslands the perfect environment for them at certain times of the climate cycle. The grass may not be apparent until a good rain at the right time.

This opportunism of plants can also bring rewards. In December 2010 at Hall Cemetery there were fine dark blue flower heads appearing through the grasses in the cemetery and the surrounding woodlands. The Blue Grass-lily *Caesia calliantha* was not sighted when the initial plant list was drawn up in 2005 as part of the management plan. FOG started working at the site two years later, and it was 2010 before we saw this. It has not been as abundant since. I had not seen the flower in Canberra before although according to the mapping of the species on the Canberra Nature Map (http://canberranaturemap.org) it is not uncommon.

Blue Grass-lily *Caesia calliantha*. Photo: Andy Russell

I would like to see how Monteagle Cemetery is faring. It would be interesting to see how the intervening years and seasons have impacted on the grassland. We went there with a few FOG members some years ago but it was the wrong time of the year to see it at its best.

* Kevin Thiele is curator of the Western Australian Herbarium; Suzanne Prober is a researcher at CSIRO.

Oxalis perennans (above) at Hall Cemetery (right) in 2012. Photos: Janet Russell

The Rufous Whistler, a woodland bird and cheerful songster

Michael Bedingfield

One of life's great pleasures is listening to the music of birdsong. It is most obvious in the early morning when birds are most active. But whether it is in town or in a quiet country place, the cheerful songs of birds can uplift the heart and mind. One of the more musical of our local birds is the Rufous Whistler *Pachycephala rufiventris*. It has a strong and clear voice, and the ringing notes carry for some distance. Its song is rich and varied, with strident musical notes, clever whistling, and a number of phrases, such as joey-joey-joey, e-chong and a-whiskey. There are also two other Whistlers that occur locally: the Golden Whistler *P. pectoralis*, and the Olive Whistler *P. olivacea*. They have clear melodious songs as well.

It is a worthwhile exercise to go out into the great outdoors, just to observe and listen to the birds. In days gone-by, wise people would advise that if you have a problem, go out to nature, believing that nature could inspire us with its unspoken wisdom. They would say: 'Climb a mountain and sit there for a while. The mountain will have a message for you. Or walk along the bank of a river. The sound of the water washing over the pebbles will tell you something. Or go and sit under a tree and listen to the birds singing. The birds will have some secret to impart to you.' But it is not the mountain or the river or the birds that give a solution to your problem. It is being in nature, feeling its richness, absorbing its quietness, or listening to its music. There your mind and emotions become more harmonious and peaceful. And in that quietness and clarity of mind, the solution comes to you from within yourself of its own accord.

The Rufous Whistler occurs through most of the Australian mainland but is absent from Tasmania. Its range extends into Papua New Guinea and New Caledonia. Its habitat includes various types of woodland and open forest, and even mulga scrub, but it does not like dense forests or treeless plains. It can be seen in towns or on farms with suitable tree cover. Locally (ACT region) it is regarded as a migratory woodlands bird, but in the north it is sedentary. The male's colouration is quite distinctive. He has a rusty coloured breast and belly, white throat, a band of black below the throat extending to the face, and upper parts in various shades of grey.

The female's underparts are buff coloured, but streaked, and she is grey-brown above. She is not so easy to recognise because of her similarity to other birds. I have provided photos of both: the male in the top photo and the female's photo below that. They have a stocky build, with a largish head and long tail, and their body length including the tail is about 170 mm.

The male and female are equally talented singers. They form monogamous pairs, and are at their most vocal during courtship and nest building when they display frequently, bowing to each other and calling. Their food is mostly insects, captured while foraging in the trees and tall shrubs, and sometimes seeds, fruit and leaves. They are rarely seen on the ground. The female builds the nest, but the duties of sitting on the eggs and feeding the young are shared, and they may produce two broods during a season. Some of the local population migrate north in autumn, returning in spring, while a few remain here. These fortunate birds are not considered to be under threat, but like other woodland birds they are affected by land clearing.

There is much that we can learn from nature. The joyful singing of the Rufous Whistler is a lesson in itself. It is common in our region during the warmer months. Such performances remind me that the natural world around us is truly marvellous, and is worth looking after.

References

Readers Digest complete book of Australian birds (1976), by numerous authors

Field guide to birds of the ACT (2013), by McComas Taylor and Nicolas Day (2nd edition)

Birds of Canberra gardens (2009), by the Canberra Ornithologists Group (2nd edition)

<birdsinbackyards.net> and <climatewatch.org.au>

Contacts for FOG groups and projects

Refer to the website, www.fog.org.au, for more information

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Old Cooma Common, NSW, margaret.ning@fog.org.au

Education: Southern Tablelands Ecosystems Park (STEP) at National Arboretum Canberra: secretary@step.asn.au

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FOG activities in July, August & early September

Date	Activity	Contact
Sun 28 June	Stirling Park workparty	pmcghie@optusnet.com.au
Sat 18 July	Mid-winter talk at Mugga Mugga with guest speakers	david.crawford@fog.org.au
Sat 25 July	Tree Week walk in the Parliamentary Triangle	paul.archer@fog.org.au
Sun 26 July	Stirling Park workparty	pmcghie@optusnet.com.au
Thur 6 August	Walk with Bettongs	ann.milligan@fog.org.au
Sun 30 August	Yarramundi Reach workparty	jamie.pittock@fog.org.au
Monday 7 September	Umbagong Blue Devil grassland visit	margaret.ning@fog.org.au
Sat 12 Sept	Hall Cemetery workparty	john.fitzgerald@fog.org.au

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