News of Friends of Grasslands

Supporting native grassy ecosystems

March-April 2003

Program

Saturday 22 March - FOG Grasses Display at Australian Native Plants Society sale. This will be held all day at the Australian National Botanic Gardens, Canberra. Ring Margaret if you can come and help talk to the throng about grassy ecosystem conservation and the grasses we will have on display. If you just want to know more just come along. You should come along in any event and see, we hope, our new posters.

Saturday 5 April 9:30am - FOG Working Bee at Old Cooma Common Grassland Reserve. We will be removing and doing some herbiciding of woody and other weeds. Contact Margaret for further details.

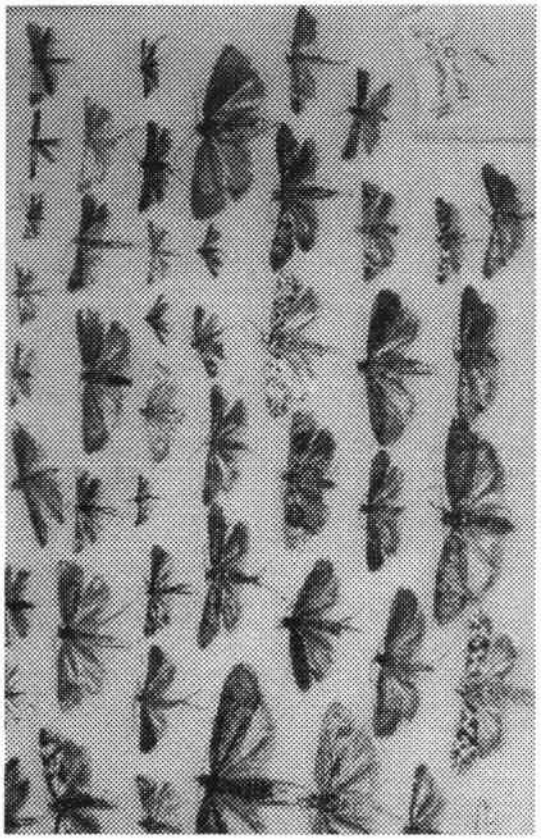
Saturday 12 April at 2 pm - FOG bushfire fallout working bee at Conder 4A. For the background to this working bee see *Bush Fire Fallout at Conder 4A* on page 5 of this newsletter. We will be gathering near the corner of Charterisville Ave and Handasyde St in Conder. Anyone who would like to help for a few hours is welcome to come. Please bring along spades, shovels, rakes and other tools to move the topsoil from the scrapes back onto the disturbed areas. This is in the hope that in the next growing season, dormant seeds in the topsoil will germinate and minimise the long-term impact of the machine's work. For further details contact Margaret Ning on 6241 4065 or 6454 6064, or Michael Bedingfield on 6294 1872. All welcome.

24 May at 11am - FOG visit to Warren's nursery and landscaping projects. Warren Saunders' Nursery, Seeds and Plants Australia, 8 Beltana Road Pialligo, has more local species than any other nursery. He will explain his operation followed by a visit to some of his revegetation landscaping projects. BYO lunch.

27 and 28 November - Third Native Grasses Conference, Cooma (See advertisement, page 5.)

Membership renewal

Many thanks to all our members who have renewed. For those of you who might have overlooked this, we are including a final renewal form with this issue. We hope you will complete it. If you don't intend to renew please drop Kim or Margaret, whose details appear on the back page, an e-mail, or make a phone call, saying this and it will save us following you up.



Part of one of the many boxes of moths collected by Ted Edwards at FOG's recent workshop.

Other activities of interest

Saturday 22 March at 1:30pm - Woodlands Bird Seminar: the good news stories hosted by the Canberra Ornithologists Group (COG) at CSIRO Discovery Centre Theatrette off Clunies Ross Street, Black Mountain, ACT. Speakers are from the ANU, ANPS, CSIRO and COG. Friends of Grasslands members will be aware of the plight of our woodland birds and so are encouraged to attend after you visit our display at the ANBG. Why not make it a combined outing. The seminar is free but you need to book by 18 March to ensure a seat. Contact cogoffice@ozemail.com.au.

Wednesday 2 April - Launch of the Monaro Grassland CMN The Monaro Grassland Conservation Management Network (CMN) will be launched on 2 April by Pam Green, Chair, South East Management Catchment Board at Neville Locker's property near Adaminaby. A light morning tea or luncheon will be served. FOG members are welcome to attend. Contact David or Margaret for further details (contact details are on back page).

Friday 4 April 5pm - Insect and possum night. Canberra Field Naturalists will visit the CSIRO Insect Collection and then go insect and possum spotlighting. Please note details need to be confirmed. Contact Benj on 6278 3225.

In this issue:

News Roundup: Special Fire Edition

Editor's Comment

When putting the news roundup together for this issue so much of the news was related to the January 2003 fires, which may forever change our perceptions about nature and therefore, for an organisation like Friends of Grasslands, committed to the conservation of grassy ecosystems, the way we approach issues.

This issue is dominated by fire for several reasons. First, it occupied the time of many committed to grassy ecosystem conservation in many ways. Second, for those who lived near the fires, which includes the bulk of our membership, it meant personal loss, fear and anxiety, deprivation of essential services, followed by a period of grieving which will be with us for some time to come. We need the opportunity to talk it through. Third, it will take time to accept what has happened, to absorb the learning, and to adapt out thinking and behaviour. Many important and urgent issues have had to be put on hold but these will need to be resurrected and our thinking adapted to take on board the personal, economic, social and environmental consequences of the fire.

As we know the fires as we know started from lightning strikes in our national parks. On Saturday 18 January a lethal combination of drought, wind, low humidity, temperature, and already widespread fire brought together the circumstances for a one in 100-200 year fire event. Whichever way you look at it, it is unlikely that we could have avoided it. For the ACT, over 500 houses and other buildings were lost and five lives. Looking at the devastation caused on Saturday 18 January, it is amazing that there was not more loss of property and lives. The week that followed was an anxious one as people across the region and Victoria prepared for a second onslaught. Luckily, our worst fears were not realised.

There may be many lessons to be learnt and there will be much discussion and refocussing in the coming months. But some lessons may already be apparent. We should not take nature for granted and we need to learn to live with nature. While this was an infrequent event, the fear is that it may become, with global warming, less infrequent.

Our Southern Tablelands, and similar communities elsewhere, showed how we can pull together in a time of crisis. While there has been some unhelpful community debate, on the whole people have been sensible. There was always a huge risk of fires being started by fire bugs, though this did not eventuate.

We may come to appreciate what we have. January was an anxious time because of the fires but the anxiety surrounding the possible war in Iraq added to this. Many people likened the fires to being in a war zone because we had our front line fire-fighting troops out there, but we were anxious that the fire, whose exact location was never quiet known, may get over or around them. People could also see, given how vulnerable our infrastructure proved, how prone we are to circumstances beyond our control.

Many people who like the land or the bush were closest to the fires. All of us have close friends and relatives who suffered loss. One of our FOG members lost their house and all their possessions. Amazingly, those who have lost are proving highly resilient and committed to rebuilding their lives and creating a greater harmony with nature.

Exciting late news

Chief Minister and Minister for Environment, Jon Stanhope, has written to the Australian Native Plants Society and Friends of Grasslands saying that he supports our application for funding for a feasibility study relating to conservation and restoration of ecosystems in the Southern Tablelands. Our last issue (page 2) ran the story of a bid for a feasibility study which would examine establishing a restoration strategy and program, and a regional botanic garden, education and research centre. More in next issue. This was announced at FOG's AGM (next item).

Annual General Meeting

Friends of Grasslands held its AGM on Saturday 22 February at the Mugga Mugga Education Centre. The existing committee was largely re-elected, although Di Chambers takes over as Vice-President and Michael Treanor returns to the backbench. Kate Nielsen, Richard Langdale-Smith, Warren Saunders and Susan Winder stood down from the committee and Roger Farrow, Sandra Hand, Geoff Hope, Cathy Robertson and Betty Wood joined it. Details of committee members appear on the back page.

In his President's Report Geoff pointed out that Friends of Grasslands has continued to meet and evolve its core functions. There were many achievements in 2002, including four workshops, each pushing out the grassy ecosystem envelope, visits to four regions outside the Southern Tablelands, numerous submissions, a stay of the demise of East O'Malley, and assistance in the birth of two CMNs.

Geoff went into some detail on the contribution made by many members. He said he was particularly pleased with the letter from Jon Stanhope supporting the Friends of Grasslands and Australian Native Plants Society bid for a feasibility study on biodiversity initiatives. He outlined issues that we need to face in 2003. His report will be published in the next issue.

The meeting passed a resolution to support the successful completion of the feasibility study.

Drought and fire around Cooma
June and Bob Wilkinson

Drought is a common occurrence on the Monaro but this is by far the most severe drought in our lifetimes. Mature *Eucalyptus rossii* and other native vegetation are dead or dying on the hills surrounding Cooma and the wider region. This is something we have never seen before. The drought of 1979-83 while very severe for farmers had none of the threat from fires because the Snowy Mountains were and usually are too moist to burn or be a danger.

In the autumn of 1965 the fires in the Kiandra area did not come much further south than Adaminaby so most of the grazing land from Cooma to Bombala was not threatened. This year the Snowy Mountains vegetation was unusually dry and the fires started by lightning on 8 January are still burning and require constant vigilance. A day like 18 January could quickly start them flaring again. Most of the fire on the plain is started by lightning, mechanical failure, human error, or spontaneous combustion in haystacks. This year there is another problem that is burning embers travelling several kilometres from the main fires on a high wind and starting spot fires or new fires.

The strain of five weeks of fighting fires is very hard on the crews often doing long shifts. The farmers among them are also responsible for their own properties and livestock, many of which are being hand-fed due to the drought.

Rain on the mountains will relieve the fire threat virtually overnight but the farmer's plight will not be so easily relieved. Our best chance is a cyclone coming down the coast but they are very rare and even more so after March.

Tidbinbilla
Geoff Robertson

On 12 February, a busload of community group representatives were taken to Tidbinbilla Nature Reserve, south west of Canberra. I represented Friends of Grasslands. We travelled via Point Hut and returned via Cotter. Terence Uren (Environment ACT) started briefing us on the bus and to forewarn us as to what to expect. At Tidbinbilla the fires had been of mixed intensity. Ranger cottages, historic homesteads, animal enclosures, breeding houses (which housed Corroboree Frogs, Grassland Dragons and Striped Legless Lizards), and the Education Centre were destroyed. Later we were able to see this for ourselves. One ranger cottage, the Visitor's Centre, and the Depot, which houses many records, were saved. Of the captive animals in the enclosures, ninety-five per cent were destroyed. However, six Rock Wallabies, possibly crouching in the rocks, survived out of thirty, and this can be the basis of a breeding program. One Koala survived but it is on the critical list.

The operation of Environment ACT has fundamentally changed. Fire fighting and cleaning up is occupying huge numbers of people, and numerous recovery teams have been established. The impact on the staff has been very personal. Personal involvement in fire fighting and cleaning up has been an intense experience and no one has welcomed the removal and burial of animals. Many have lost their life's work and not a few have lost their homes and possessions. Environment ACT is to be commended on its response. Not only has it thrown its resources into fire fighting and recovery, it has kept the community informed. This bus trip was an example. Some weeks earlier, a large number of community representatives attended a meeting where they were given frank accounts by Environment ACT of what had happened and tentative plans at that time.

When we drove into the Tidbinbilla Valley, the full impact of the fire became apparent. For the most part the hills were occupied by the apparently dead trees. The pine trees in the adjacent pine forest were merely burnt sticks. While we had been observing this phenomenon since the beginning of the bus trip, the enormity struck home as people observed the valley. The emotion on the bus was one of horror. While eventually the area will recover, it will not be in our lifetime. Many bemoaned the fact that they will never see those wet sclerophyll forests again, and that so many animals had been lost. Some bigger birds were seen, Wedgetails and a Lyrebird, no small birds – no food?

Aftermath of fire at Tidbinbilla, burnt sticks and ash on the ground. Photo by Jenny Horsfield

The description of the fire on Black Saturday was equally horrific. Looking at the aftermath one can only ponder how more lives and property were not lost. However, there were signs of regrowth. The grassy areas showed little sign of the fire that had raced over them. In the forest and shrubby area the ground was covered with ash. Despite this there are plans to reopen Tidbinbilla at Easter so that the general public can visit some more limited parts at least. However, recovery will be slow. Little attempt has been made even to take stock of the natural assets, because cleaning up is still a major priority. However, Don Fletcher has estimated that fifty per cent of the wild kangaroo population has survived.

On the way home, the sorry story unfolded. In one area all that was left of the forest were a few half tree trunks. The low grass areas showed little sign of fire while weedy roadsides and shrubby areas looked very devastated. The Cotter, apart from one area of green where the fires had missed was but a shadow of its former self with many buildings destroyed and many trees burnt or dead as a result of the heat.

I kept telling myself that this was a natural phenomenon, a periodic event, from which the plants and animals would recover. We are likely in the months and years to come have many pleasant surprises. However, there is no denying the huge impact on nature and people and the fact that many dreams and plans will need to be put on hold.

Namadgi
Ian Fraser

Today (3 February) I accompanied Environment ACT officers into the Brindabella section of Namadgi National Park. This was the first time anyone had been up there since the fires. I was asked along in order to improve my ability to report accurately to the community (eg you!), both directly and via the ABC.

A disclaimer to start with. I am very aware of the importance of reporting 'objectively' and non-sensationally, but I doubt that I am able to do that. For over 20 years the Brindies and Namadgi have been my 'back yard' and my work place. Through the books that I (and of course Marg) wrote about them, and through 18 years of Environment Tours, I think that I know and 'feel' the area, especially between Coree and Gingera, better than many. I always felt that one of the more useful things I did with my life was write a report which had a (minor) influence on the inclusion of the northern Brindabellas in 1991. All of this is just to explain that this is very personal to me, and you must take that into account in this report. As with the Tidbinbilla fire (same fire actually, of course) both the extent and intensity of the blaze are quite shocking.

Today we drove (and walked) along Brindabella Road and Mt Franklin Road to the Ginini Gate, down to Ginini Flat, down to Bendora Dam and out along Warks Road. In all that I would not have seen a square metre of unburnt ground. (Prior to that too, from the road closure on Cotter Road near Weston to the ranges, everything is scorched.)

That is actually not quite true; the gully across the road from The Boulder on Bendora Road contains a ribbon of tree ferns about a metre wide. And this is really ALL there is left that I saw, though as I shall explain there are variations in the intensity of burning.

There are potential positives. Sections down slope of the Mt Franklin Road between Bulls Head and Aggie Gap, on both sides, have intact green canopy. This suggests some hope for arboreal animals in these areas. I emphasise the 'green' because in vast areas dead leaves persist, but leaf fall has begun.

In addition, I saw and heard more bird species (in very low numbers) than I'd have expected in the conditions. In particular, a source of amazement to us all was the number of lyrebirds seen (close to 20 altogether); how the hell (literally) did they survive? Where? I have to assume that somewhere there are gullies that the fire leapt over. Most of those seen seemed to be foraging in roadside soaks, presumably the only source of ground surface invertebrates? How long will these areas be able to support them? Next most widespread were W-t Treecreepers; against the odds, inverts must be surviving in bark crevices. Also more Brown Falcons than I've seen in Namadgi; I'm aware of their reputation as fire 'associates'. Also in the high burnt Snow Gums, Gang-gangs, Crimson Rosellas, Sp Q-thrush, Flame Robin, Striated Pardalote, Brush Cuckoo, Kestrel, pair of Wedgies, White-browed Scrubbie; lower down (including Bendora) Pied Currawongs, Sacred Kingfisher, Yellow-faced and White-eared Honeyeaters, Common Bronzewing. In each case, one or very few.

Higher up were Red-necked Wallabies, lower were Swampies (ie Black, Black-tailed, depending on your origins!). I can't imagine what they've been living on, though along the lower burnt creeks Carex (a sedge) is shooting. Murrumbidgee (at the Cotter): River Oaks *(Casuarina cunninghamiana)* are all burnt; does anyone know of their longer-term fire response? I'd guess that they die and reseed, but it is a guess.

I am sure that most of the 1939 stands of Alpine Ash *(Eucalyptus delegatensis)* will die and reseed. In some areas (eg past Bulls Head) many of them will survive. The fate of the regrowth from 1983 is a real worry though; they may well not able to seed at this age.

We don't know much, I think, about Snow Gum *(Eucalyptus pauciflora)* recovery. My guess (again! - this is very frustrating) is that most in the widespread intensely burnt areas will die; I'm hoping that the largest will have sufficiently protected underground shoots.

Riverine vegetation along the Cotter River below Bendora Dam: burn to ground level and to the water line. Mt Franklin: the Chalet doesn't resemble a burnt building - the closest I can come to it is like a section of a rural rubbish tip. The ancient Snow Gums are in tatters, some just held up by a ribbon of trunk.

Ginini Flat: one of the worst shocks of the day. The earlier reports are now obsolete; obviously another fire front arrived, or perhaps a smouldering peat fire persisted. Perhaps 25-30 percent of the swamp vegetation remains in the sections we visited, and saw from the top of Franklin. Of the rest, up to 30cm of sphagnum is burnt. This represents centuries, perhaps a millennium or more, of growth. I don't even want to speculate on the impact of the already greatly-diminished Corroborree Frog population.

Lees Creek area: I had hopes that this lower area (ie without a fire roaring up to it) may have been spared. Instead it is close to the worst that I saw at Tidbinbilla. In a few places (eg where Warks Road descends from the west into Bulls Head Ck) there are some shrivelled but intact tree ferns; these will reshoot. Elsewhere though, down Bulls Head Ck, Blundells Ck and Lees Ck, the tree ferns have essentially vaporised and the fishbone fern beds are just blackened stumps. We have little experience of this I think; perhaps there are some records from the Dandenongs from the '39 fires?

Not much more I can add, especially in the way of good news. We must just trust that this must have happened any times before, though not, I think, in European times. It will recover, though I for one will not see it. I am so sorry to be the bearer of such grief; I don't for a moment think that my love for this place is unique.

Now for a valerian and a very large brandy.

Ian is also doing an orchid course shortly (11 and 18 March). *See page 13.*

ACT forests audit

In December 2002, the ACT Commission of Audit released Report (number 2) on the state of the ACT's finances, including ACT forests. The following is based on a report appearing in the *Southern Tablelands Farm Forestry Network, Newsletter January 2003.*

The Commission reported that earlier reviews had generally focussed on improving the business and operational performance, rather than assessing the business viability, or the opportunity costs associated with forestry operations in the ACT.

Commercially, forestry in the ACT is at best marginal. Despite recent significant improvements in staff productivity, and silviculture practices, the following factors remain:

- Low forestry productivity due to site and climatic conditions with some areas not expected to be capable of providing a return on investment;
- Current age and quality profile of forests;
- Variable past management regimes;
- Very small plantation and small-scale resource in a region with more competitive resources.

The local mills compete with larger, more efficient mills outside the ACT and overseas. As the timber industry becomes more global, the pressure is on smaller regional to reduce costs. A high level of urban integration and national capital influences place considerable restrictions on commercial operations that other operators do not face. Urban proximity also poses a higher risk of arson. Due to the scale of ACT Forests, commercial prospects are limited, as is the capacity to absorb fluctuations either in supply or demand.

The article details existing problems (before the recent fires) to meet existing contracts and attempts to by ACT Forests to fill its supply gap. The article also examines opportunity costs. "A large proportion, possibly up to fifty per cent of the plantations, could be made available for urban sub-division, rural residential, hobby farms, and eco-farms." The ACT *Economic White Paper*, currently being drafted, is likely to elaborate on the opportunity costs.

Some benchmark information which gives an indication of the potential value relates to Isaacs (a suburb in Canberra), which was built on a former pine forest. Today, a development of this size would generate revenue of $65m with a profit to the Government of $38m.

The Executive Officer of ACT Forests replies that the report is very flawed. "It never considered the wider regional implications, and concentrated on the economic bottom line only." The ACT Government has played a key role in encouraging regional forest development and the ACT plantations underpin the regional processing industry. The EO states that ACT Forests plays an important environmental role, providing protection from erosion, for weed control, carbon sequestration, etc. Socially, forests provide employment and recreational resources. However, he concedes that with seventy-five per cent of the forests destroyed in the recent fire, the future is looking bleak.

Friends of Grasslands has been taking an active interest in this issue. On the one hand, we do not wish to see the demise of a local industry and employment, and certainly timber is needed and takes pressure off remnant forests. On the other hand, with the continued onslaught on threatened grasslands and woodlands (eg in North Gungahlin and East O'Malley) an alternative land supply may remove this development pressure.

Gale Precinct

Friends of Grasslands has been supporting Queanbeyan Landcare's efforts to get together a group to take an active interest in protecting and actively managing Gale Precinct for conservation. We have visited the site on several occasions. Gale Precinct, Portion 50, is 120 hectares of high conservation woodland.

Tom Baker has reported that the Department of Land and Water Conservation (DLWC) has now given approval to refencing and related works. Queanbeyan Landcare will shortly receive $2,000 under the Grassy Box Woodlands project and a further $5,300 from Greening Australia under the Vegetation Investment Project (VIP). While the Gale is under the control of DLWC, the Department is happy for Queanbeyan Landcare to hold the money for the cooperative effort to get this work done and hopefully also set some very broad ongoing management arrangements. Tom reports that Ready Mix may donate large rock material and Queanbeyan City Council have informally indicated they might be able to help with placing rocks. These rocks will offer protection against unwanted motor cycle intrusion. The recently established Greencorps team has the Gale on its list of activities, assisting with fencing repairs. There will be a meeting to start this process with the formation of a management committee on Monday 3 March (4pm), venue to be decided. Contact Tom Baker 6297 4920 (h) 0415 839 017 for further information.

Cat impact

Andrew Kazar, the Chronicle, 14 January, ran a story on the Conservation Council's, Environment ACT's, ACT Planning and Land Management's and the Australian National University's plans to investigate options to minimise the impacts in nature reserves such as Mulligan's Flat as new suburbs such as Forde are developed. Environment ACT's Murray Evans was pictured examining a sand pad, one of the methods that could be used to monitor the number of cats at Mulligan's Flat. That issue also ran a story by Lisa Brill on noxious weeds spreading in Canberra nature reserves, illustrating that the level of funding for weeds is insufficient.

Grassfires

In an interesting articles on various types of fire by Dean Graetz (Canberra Times) 16 January, Dean states "managed, unmanaged and grassland fires are carbon-resilient fires. On burning, the carbon in the biomass, principally cellulose, is oxidised to Carbon Dioxide and enters the atmosphere. However, as the fuel regrows, the Carbon Dioxide is withdrawn from the atmosphere and converted back to cellulose. For grassland fires this occurs within about a year; for managed and unmanaged fires it usually occurs in five years. However, clearing fires used in the process of converting a forest fire into pasture cause a permanent transfer of woody carbon to the atmosphere."

Put this in your calendar NOW

The Stipa Native Grasses Association

Supported by Friends of Grasslands

THIRD NATIONAL NATIVE GRASSES CONFERENCE

27 & 28 NOVEMBER 2003
COOMA, NSW

"Sustainability and Beyond"

Producers, conservationists and horticulturalists will present papers on Australian Native Grassy Landscapes.

For those wishing to submit a paper and/or poster presentation, please send expressions of interest to Christine McRae, Conference Coordinator, 1480 Bocoble Rd, Mugdee NSW 2850 or cmcrae@hwy.com.au by 30 March 2003.

Bush Fire Fallout at Conder 4A

The bush fire crisis of 18 January and the week following was a trauma for many people of Canberra and also for some of our grassland and woodland remnants. Some good remnants were burnt in the fires, which may be a blessing in disguise if plant growth responds to the roasting. Also, in the state of emergency of those days of intense fire risk our fire workers did what seemed appropriate to protect houses and property. In so doing they used heavy machinery to create many kilometres of firebreaks throughout Canberra to maximise the effectiveness of the fire fighters.

A patch which is very dear to FOG and Michael Bedingfield in particular, namely Conder 4A, was not burnt. Unfortunately however, it was damaged when a heavy machine was used to cut firebreaks to protect nearby housing. About 500 metres of topsoil were scraped in the Conservation Area. So, we would like to repair the damage, as best we can. Details of where we shall be meeting and what to bring are included on page 1.

The event has been reported to Environment ACT and they will be looking at this issue, along with many others.

Hydrological impacts of bushfire
Ros Wallace

In response to many requests for information about the hydrological impacts of the recent bushfires, the CRC for Catchment Hydrology has quickly established a website to deliver information that may be useful to catchment and water supply managers. The site is a modest resource at this point and will evolve as more contributions are made. The site initially features a FAQ section designed for land and water managers, an overview of the hydrologic impacts of fire, a news page for information about related activities and reference lists that will be of particular interest. The site was launched on 12 February - http://www.catchment.crc.org.au/bushfires. The site is the work of a number of internal and external staff coordinated by Rob Vertessy. The CRC welcomes contributions from all individuals and organisations to the site to expand its value to land and water management.

Railway heritage grant

Members of the Cooma Monaro Railway have been very supportive of Friends of Grasslands efforts to create the Old Cooma Common Grassland Reserve, especially as Cooma Station borders the Reserve. We were delighted to read in *The Land*, 2 January, that the group has received a $50,000 grant to employ a business manager.

Second Insect Workshop

Geoff Robertson

On Saturday and Sunday, 11 and 12 January, Friends of Grasslands held its second insect workshop, this time at Garuwanga near Nimmitabel. The first insect workshop was held on 1 June at Mugga Mugga Education Centre (see July-August 2002 Newsletter, page 2). The aim of the second workshop was to assist FOG members to become more aware of insects: their identification, behaviour and ecology; to record the insect species found during the workshop; and to lay the groundwork for further FOG involvement in insects in grassy ecosystems in the Southern Tablelands. The workshop was conducted by Ted Edwards, Roger Farrow, and Kim Pullen, FOG members and entomologists. Twenty people attended.

Many of the participants arrived on the Friday evening and watched Ted set up a light sheet and light trap. The first is simply a white sheet hanging from a frame, with an electric light. Ted used a mercury vapour bulb, attractive to moths, suspended in front of one side of it. A generator powers the bulb. The light trap consists of a battery-powered fluorescent or "black light" tube above a funnel set in a bucket which contains a killing agent. Flying insects, especially moths but also beetles and a variety of others are attracted to the light, collide with the transparent vertical pane, and fall down into the bucket that is emptied the following morning.

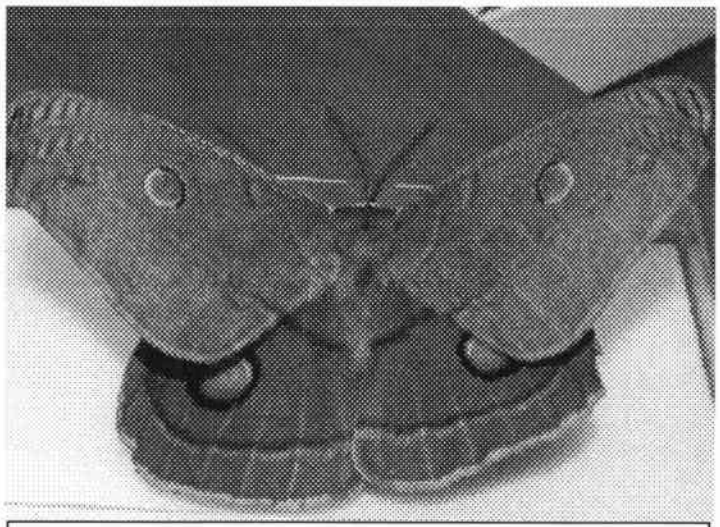
Meanwhile, attention was diverted away from insects when Margaret produced some rat droppings and Alan Scrymgeour started to separate them into three groups, suggesting that three species may be present: the European Rat, the Southern Bush Rat *(Rattus fuscipes)* and possibly the Swamp Rat *(R lutreoleis)*. He then gave a dissertation on the native rats of the Southern Tablelands, provided descriptions of each species in terms of their morphology, behaviour, habitat and ecology. This evolved into a more general discussion of what other small mammals may be present.

Then Ted ventured outdoors and most of the group followed and watched him in action at his light sheet. The weather was cold so not many insects were turning up. Nevertheless, Ted kept capturing moth specimens by placing a jar over individual animals that landed on the light sheet and dropping them into one of his killing jars - one for larger and one for smaller moths. Using this method, Ted collected one or two specimens of each moth species - he doesn't bother with non moth species. It is truly amazing how he eyes off each animal on the sheet and then moves quickly with the catching jar after uttering "that one is different". There were several Helen Moths *(Opodiphthera helena)* present. These are large moths several centimetres across - new to most of us. A Brush Tail Possum in the nearby trees also provided another talking point.

After breakfast Ted found a comfortable spot outside the house, out of the fresh breeze, and started to sort out and mount the specimens he had collected the previous night. He answered a continuous barrage of questions as he patiently went through the specimens and carefully mounted them, separating them into two groups, large and small. Ted was able to name the genera and species of the larger specimens. He was familiar with the smaller species but as he explained, he attempts to identify the larger specimens to genera and species level, but the smaller ones are kept by broad grouping in the Australian National Insect Collection at CSIRO waiting for a researcher to sort them out. As Ted mounted the specimens and stretched out their wings an amazing diversity of patterns and colours emerged.

Then it was time for a more formal session. This was given by Kim. His talk at the first workshop had been on diversity and taxonomy, and on this occasion he talked about insect habitat and collection methods. He stated that insects may be found from deep within the soil all the way up to the upper air. Insects had the ability to occupy small niches in space and time. Temporal differences are illustrated by the fact that each species may prefer a different time of day and a different time of year. Some species have very specific and narrow requirements while others are broad ranging, and of course, insects at different stages in their life cycle may occupy very different types of habitat.

Kim said the following places are all inhabited by insects: air, below-ground, soil, water, sea coasts, leaf litter, rocks, in and on other organisms, and in/on nests and or homes of other animals. There is a huge array of insects living in association with other organisms. Plants, animals, and fungi, alive, dead, or in any stage of decomposition, are all inhabited. Many internal and external parasites of other insects, birds and mammals (including people) are insects, and the nests or homes of animals provide a habitat. When



Helen moth, the largest of the moths captured, new to most of us. The insect photos were taken by Margaret Ning.

it comes to plants, insects may be found on any part - foliage, flowers, fruits, seeds, stems, trunks and roots. We can use the term 'parasite' for plant-feeders too. Insects occur in the air, soil, water, and at the interfaces between the spaces - the soil surface, where the leaf litter is a rich habitat, the water surface, and the margins of water bodies including the seacoast. Practically the only space not heavily occupied by insects is the open ocean, but even there a few insects live on the surface of the sea.

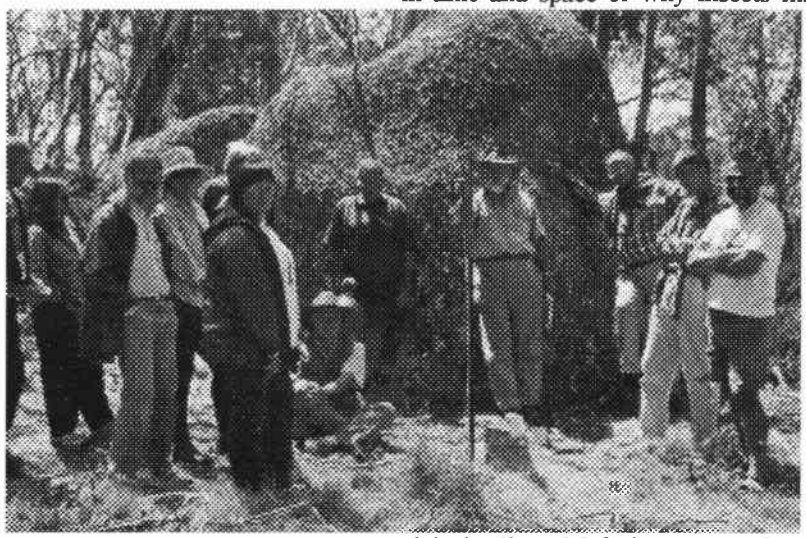
Kim then described the various ways to sample and/or collect insects. These included:

- Hand collecting using nets, trays and umbrellas;
- Traps such as light traps, pitfall traps, flight intercepts (including Malaise traps where insects hit a surface and fly or walk up to be trapped in an inverted funnel contraption);
- Attractants - light and chemicals are examples;
- Sifting using a Tullgren or Berlese Funnel - in the Tullgren Funnel, a collected soil sample is heated at the top (using a light globe), encouraging the animals to move down through

the soil sample to be collected in a jar at the bottom of the trap;
- Rearing insects to see what adult species emerge; and
- Fogging using, for example, an insecticide such as pyrethrin.

Kim finished by describing the various methods of keeping specimens such as pinning, alcohol, slides and chemical treatment. He then answered a host of questions. Kim's session was followed by Ted providing a run down on what animals had been collected, and inviting participants to take a look at the collection for themselves. Roger had been delayed in arriving at the workshop and did not appear until after this session.

After lunch, various nets appeared and led by our three professionals we wandered around in search of insects. Due to the drought and the cold weather, our entomologists said that many insects that should be present weren't. Nevertheless there was still plenty to see and we were led largely by Kim from one secret insect habitat to another. The flowering Leptospermum, Epacris and Banksia were attracting a wide range of nectar-feeding insects including several species of jewel and longicorn beetles. Ted was called in when an unusual caterpillar was found. On one occasion, a bright yellow cocoon was found and Ted announced that this was an Anthelidae moth. Anthelidae are becoming a bit of interest of mine. I had two such moths, which were collected in November 2001 by Kim, and several more turned up in the traps over the weekend. These are largish moths, although they vary in size, with very varied colours, and with several distinctive dots along the outer edge of their wings. Ted explained that Garuwanga could have around 9-11 species of this group. Ted also mentioned that he had seen five species of butterfly, including the only introduced insect recorded at Garuwanga that weekend, the Cabbage Butterfly. Ted duly recorded the names in my notebook, as he had been for many other animals he had been identifying. Roger' speciality was collecting insects by sweeping a net through the cover of grasses, forbs and low shrubs, but the expected array of grass feeding Hemiptera (bugs) and Coleoptera (beetles) were largely absent due to the dry conditions and sparse state of the grass cover.



There were several distractions: a large echidna strutted his stuff, while a Swamp Wallaby nonchalantly grazed on eucalyptus saplings. The remains of a Jacky Lizard were closely examined. We also came across a hole three to four centimetres across which Alan S said he considered was a Bush Rat's hole; several more were spotted over the course of the weekend. Possibly due to the drought and consequential short grass, these were more evident than usual. We took a photo.

Late in the day, Ted again set up his light traps and Kim set up a Malaise trap and a pitfall trap. Just after dinner, Ted described the previous night's moth collection, rearranging it so that the moths were put into family groups. Then the pattern of the previous evening was repeated with Ted collecting animals from the sheet and answering many questions. Next morning people crowded around as Ted mounted the specimens from the previous night's catch.

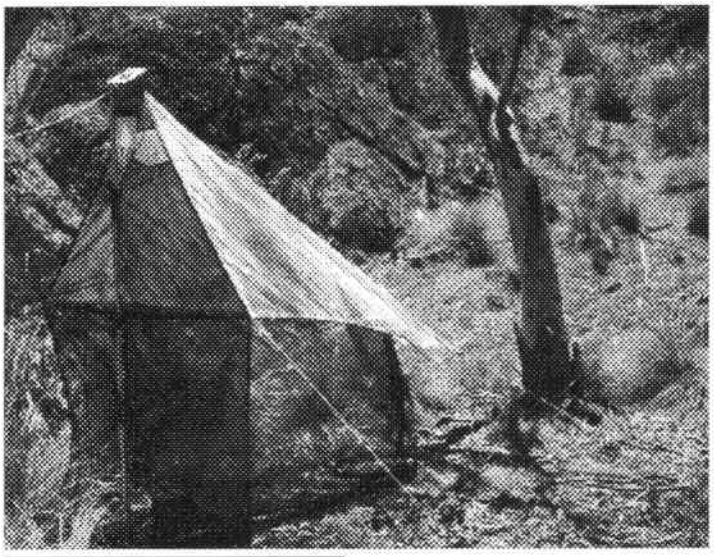
By that time many discarded insect specimens, including beetles and ants, had been accumulated and as I was mulling over these, Helen Tongway, an ant specialist, gave me an impromptu lesson in ant identification. One of the great experiences of such weekends is the huge amount knowledge that participants have and share. Margaret was busy taking photos and Kim and Roger started identifying the various specimens.

Then it was over to Roger who provided a formal session on something totally different - population dynamics. He posed the question - why does the earth stay green? He described both the top-down and bottom-up way of looking at insect herbivores. The top-down approach examines how natural enemies (predators and parasites) determine the numbers of insect herbivores, who in turn determine what plant matter exists. In a bottom-up approach, one examines how the quality of plant food controls the number of herbivores that in turn supports the predators/parasites. Various theories have been proposed to account for the regulation of insect numbers and persistence of populations. In density-dependent models, scientists believe that environmental factors push up or push down population numbers around a theoretical equilibrium. In density independent models, it is the control of reproductive success and mortality by the interaction of factors such as weather, food quality and predation that ultimately regulate numbers. However, these theories have never explained the actual dynamics of insects and other animals in practice, ie as to why populations vary in time and space or why insects migrate. Much of this is to do with frequent extinction and re-establishment of local populations. One problem is the scale at which one studies insect populations. Looking at insect populations on the small scale may lead to very different conclusions compared with looking at insect populations on a broader scale. So we had been led on a mystery tour, only not to find the jewels at the end, or had we? For my part, I am very wary of theories which neatly explain it all, and I feel more comfortable with the conclusion that many theories give us useful insights but that there may never be a theory of everything (with apologies to particle physicists).

Then it was time for some summing up before we headed outdoors again. Ted said that he had collected about 160 to 170 moth species for the weekend - around one hundred on the first night. If we had more normal weather, the number may have been up to four hundred. The moths that had been collected were collected because they were attracted to light. Many moths weren't however attracted to light and we have not collected any day moths. Given that many moths have short life spans and are seasonal, the numbers collected would rise if one collected over the whole season. When questioned, Ted said that he was familiar with all the species collected and described the behaviour of some. Only one was "of interest", ie he was not familiar with it. Then came the important point about description (the formal process of publishing a description of a "new" species and giving it a scientific name): while Ted was familiar with all but one moth, many, especially the smaller ones, had not been described. Ted, supported by Kim and

young taxonomists were not emerging - this was an area where funding had been drying up.

Then it was off to see Kim's flight intercept and pitfall traps. The former was a little the worse for wear. Unfortunately, little was collected by the traps over night, but they brought home, yet again, the great diversity of animals and the variation in collection methods we had been talking about. Again, Kim, Ted and Roger pointed out a host of fascinating insect habitats along the way. Alan S. was able to point out a variety of evidenc e of possums.



Malaise trap set by Kim.

After lunch, it was time to pack up and go home. The big question is where do we take this in Friends of Grasslands? I have been keen that members of Friends of Grasslands start to acquire an understanding of grassy ecosystem insect ecology. Many members are well versed in plants and know how to assess sites, the basis of any proper management, in terms of vegetation structure and plant species present. But we know that plants are but one dimension and we need a much better understanding of the diversity of the animals (vertebrates and invertebrates), and of cryptogams, fungi, lichens and mosses, bacteria and the non-biotic elements of ecosystems. So where to from here? Roger has been pondering this question and after discussion with Kim and Ted proposed that we establish a reference insect collection for Garuwanga which would comprise a specimen from each insect family, as far as possible, and has offered to donate insect boxes to house the collection. So the next step forward is emerging.

Thanks to Kim and Roger for their assistance with this article and for their and Ted's contributions to the workshop.

Carnarvon Station Reserve

Don and Betty Wood

We spent a month at Carnarvon Station Reserve in November-December 2002 doing a flora/mammal survey. This reserve was bought in 2001 by the Bush Heritage Fund, a private organisation founded by the Greens Senator, Bob Brown, with money he received from an international prize. Its motto is "We don't beat about the bush. We buy it." They buy properties of ecological significance that are not being preserved by governments or other organisations.

The reserve shares its western boundary with the three western sections of Carnarvon National Park. It is three to four hours drive (about 200 kilometres) north of Augathella. Being on the Great Divide, it has plants and animals from both west and east. It also has many plants and animals at the northern or southern ends of their ranges, so it has a very diverse flora and fauna.

The rocks are ancient sandstones overlaid by tertiary basalt. The sandstone in contact with the basalt has been metamorphosed, and is very hard, but the underlying non-metamorphosed sandstone is soft and erodes easily. Water erosion has formed flat mesas with precipitous sides, and a long broad valley.

There is often dry rain forest (scrub) at the base of the slopes. We caught two bush rats (*Melomys cervinipes*) in one of these areas, in live traps. This was a first record for this reserve. The scrubs are very dense and can be very difficult to walk through. One had seven different species of shrubs with thorns or prickles. There is also brigalow (*Acacia harpophylla*) at the base of the slopes. It is a tall tree with silvery phyllodes. A lot of this has been chained (dragging a chain between two tractors to knock over the trees) many years ago in the mistaken belief that the soil where the brigalow grew was rich. It is now regenerating.

A lot of the property is a long broad valley. This is a natural grassland because of frosts (temperature minimums get down to minus 13!). It had been enlarged around the edges by previous owners by chaining, which leaves numerous fallen logs. The soil here is black soil which becomes a deep gooey mess after rain and makes the roads impassible.

The reserve is in the intake area of the Great Artesian Basin, and has about 20 springs either formed by overflow from the intake system in the sandstone, or in basalt areas. There is a lot of calcium in this rock, which leaches out and forms calcrete ledges. The spring clogs up with calcrete and then comes out again higher up the hill. The calcrete also clogs up the drinking water pipe from the nearest spring, 12 kilometres from the homestead. The pipe thus has to be repaired at least once a week. One of the big donors has given $50 000 recently to find and put in an alternative source of water nearer the homestead.

In 2002, volunteers fenced two of the springs where the vegetation had been destroyed by animals (especially pigs, horses, and cattle). The area around these springs is already starting to regenerate. One of the springs is known as Fig Tree Spring because of a huge *Ficus virens* that grows above it. The multiple trunks would be a good five metres in diameter. As well, there is the biggest *Callistemon viminalis* we have ever seen. One normally thinks of these as shrubs. It has fallen down but is still sending up new growth. The original trunk is about two metres in diameter, and the original height at least twenty metres.

The property has been de-stocked, but there are still about a hundred cattle. Other feral animals include pigs, a plague of horses, and the occasional rabbit.

Bush Heritage staff had previously plotted about a hundred vegetation plots and done initial identifications of the big trees and the grasses. It was our job to do a more thorough survey. Luckily there had been 50mm of rain two days before we arrived. There was nothing flowering before then, but while we were there the kurrajongs *(Brachychiton populneus)* and a wattle (*Acacia muelleriana*) flowered. A lot of forbs flowered, starting about a week after the rain, including the white daisy *Brachyscome basaltica*, yellow false hibiscus *Melhania oblongifolia*, yellow peas *Zornia dyctiocarpa* (growing upright, not prostrate as it does on the NSW south coast), *Rhynchosia australis*, and another we could not identify, and mauve *Brunoniella australis*. Lilies included yellow *Tricoryne elatior*, *Bulbine bulbosa*, and *Hypoxis hygrometrica*, and blue *Dianella caerulea*. However, nearly all of the shrubs were not flowering, and we either could not identify them at all, or made educated guesses.

On the higher parts of the slopes and on the tops of the mesas in the basalt areas, the palm-like *Macrozamia moorei*, endemic to a small part of Queensland, was common. Some of them were seven metres tall. There are a couple in the Australian National Botanic Gardens on the path near the Visitors Centre, small in comparison with the ones in Queensland, but still very impressive. They can be transplanted easily even when very big.

The south eastern half of the property did not have any basalt. The soil there was very sandy, and there was a very different flora there, including lots of woody pear (*Xylomelum pyriforme*), budderoo (*Lysicarpus angustifolius*), with Baeckea like flowers in the spring, the shrub *Calytrix longiflora*, which has spectacular pink flowers in the spring, and the thorny *Acacia macradenia*. This part of the reserve had terrific sandstone formations, including the White Stallion, which looks like a horse rearing from some angles. The base of it is formed of a layer of clay and pebbles so it is eroding quickly.

We used the CD-ROM Ausgrass, mentioned in the January *FOG Newsletter*, to try to identify some of the grasses. The measurements it used appeared to be for mature seeds, and gave false results with material that was just starting to flower. However, it was a surprisingly powerful tool with scrappy material that had lost its seed and just had glumes left. The illustrations varied from excellent to minimal. There were better illustrations in *Plants of Western New South Wales* in many cases. Grasses included three-awned grass (*Aristida*), which fortunately for us had mostly lost its awns, *Themeda triandra*, porcupine grass (*Triodia*) and a number of others, including a sorghum, naturalised after being grown on the black soil for fodder. They were mostly well past seeding or occasionally just coming into flower, so we could not identify most of them beyond the genus level, and often not even that.

The volunteer diary mentioned that there are Aboriginal paintings on the reserve, but we did not find them. An ochre cliff had been mined by Aborigines for centuries.

The temperature while we were there was a humid forty degrees every day, dropping to a pleasant 15 degrees or so each night. We had a wonderful time, and would urge members to think about going there as volunteer rangers. There are lots of jobs, even for people without particular skills. It is a great way to get away from it all for a while. There is also a public camping area beside a billabong, dry while we were there, with a new long drop toilet and a new water tank. They are planning to put in a barbecue there and supply it with wood. People should contact Bush Heritage before camping.

If members are interested in more information for volunteers staying at Carnarvon please contact Margaret on 6241 4065.

My Favourite Grasses

Jenny Anderson

This article is reprinted from the Winter 2002 issue of the Stipa *Newsletter.*

What we started with

Neil and I took over our bit of "Avoca" in 1989, calling ourselves "Nostones Partnership" (no stones were left unturned to settle the family division of the property). Once "Avoca" was 36,400 ha; we managed to keep 1,400 ha of a very rundown remainder. We have now expanded to 2,800ha running 1,500 medium and finewool Merino ewes and 250 cattle in our Murray Gray stud. We have never cropped; that was in the past. The average annual rainfall is 504 mm.

The country is totally flat, most at the source of Merri Merri Creek. It is dominated by open woodland of Belah, Bimble Box, Myall, Rosewood, Whitewood, Wilga Supplejack and Cypress. The associated grasslands now have a great mix of species, with Curly Umbrella Grass *(Enteropogon acicularis)* and Windmill Grass *(Chloris truncata)* being common throughout.

What we are trying to do

We have concentrated on improving the diversity of the vegetation, especially the native grassland-forb part. Getting back the perennial grasses was the aim. Initially we hand collected a lot of seed and hand broadcasted it from the back of a fast-moving truck. We still do this occasionally; it is good for the soul.

The first lesson – plant identification

Grasses and forbs need to be identified and their growth period known. Many samples were sent to the National Herbarium and a rather motley plant collection was started. I made many notes (in pencil) in "the Bible" - *The Plants of Western NSW*. I started a photographic record and did one, only one, year of transects in four paddocks.

The second lesson - what animals eat

I spent many pleasant hours observing sheep and cattle munching and did my best to know what they had bitten off.

The third lesson - how to best graze

The aim was to find a grazing strategy that allows the preferred plants to seed and spread. Failures were numerous, but overall success was achieved with what I now call a *resting strategy*. To increase plant diversity we need to rest paddocks, hopefully at strategic times.

We put all our ewes together and that is the way they have stayed. No idea how many we have in each age group. We cull for wool production now, not the age of the animal.

We keep the cattle in big mobs as far as practicable, but being a stud, with one-sire matings, it is not always possible. Lambing poses more limitations as management is difficult with big mobs.

We move these mobs according to vegetation eaten (or left). We do not make strict rules on the length of time stock graze or the length of rest for any paddock. It depends mainly on rainfall. As a general rule, one-third of the property is resting at any time.

We have had to agist cattle and put them on the road. We have had to feed sheep and sell sheep to keep the grasses at a reasonable height to ensure quick regeneration when rain comes. *There is no place for flogging country in this resting strategy.*

We know this strategy could be improved with smaller paddocks and we have done quite a bit of fencing but it is limited by finance. We also have 40ha of Old Man Saltbush, used exclusively as a resting strategy for the grasses, and a large number of stock at high stock density of about 2,000 dse/ha. Here we graze the saltbush and this gives some respite to the other paddocks. At present (July 2002) 560 weaners are moving through the area. It is sub-divided by electric fencing and has given the other paddocks an eleven week grazing rest. I plan to plant more saltbush, but it is expensive.

The grasses

During learning these lessons that helped to hone the resting strategy, I observed and identified many, many beautiful grasses and forbs that sheep and cattle found delicious. Three of these grasses which were uncommon on "Avoca", and are now common, are described below.

***Silky Browntop* (Eulalia aurea)**

With its bright coppery-red seed heads, just sighting a few clumps back in 1991 made me wonder. I noticed that the cattle preferred this grass over all others, and at times ate it to the ground. We rested this paddock for a year during which we luckily had excellent late spring and autumn rains. My eyes opened as it flourished. I had it identified and read that it was probably more common in the past. I found other small areas in our heavier gilgai country. These were rested after rains.

In May 1999, Andrew Briggs, using the "Grasshopper" grass harvester was able to harvest a huge amount of seed from one 100 ha. area, where it is increasing dramatically.

It has not been as thick or spectacular since but it can now be found in nearly every paddock on the property, and even in 2002 it has been found in new swards.

***Hoop Mitchell Grass* (Astrebla elymoides)**

The literature concentrates on the virtues of Curly Mitchell Grass. We have Curly, Barley and Hoop Mitchell Grass on " Nostones Avoca", but Hoop Mitchell Grass is the one I prefer. We are in a shallow bowl here, and Hoop Mitchell is fond of shallow bowls and hard flood-out country. I observed that the cattle (and less the sheep) loved it, and on continually grazed country, it never "hooped" and it has never spread. It does now and our area of this grass has increased enormously. It is a summer grower and we never graze it down as we did in the past.

Phil Brock of Curlew Native Grasses harvested some for me this year. It came out in the form of rope as the hoops tangled in the machine. These have to be ripped apart and hand broadcast. This is much easier than gathering the hoops by hand as we did in the past.

***Slender Panic* (Paspalidium gracile)**

No, it's not box grass, but it looks the same to me. The stock simply love it, especially the sheep. It is now found all over "Nostones Avoca" and seed was harvested in May 1999. It has not been in sufficient quantities recently, since I have overgrazed the main areas where it flourishes. Hence I feel this beautiful, delicious soft grass has not been given a fair go.

It grows where (I assume) trees grew, and in areas between the trees and on light soil. The hard grey-black soils that dominate the property are where Hoop Mitchell grass and Silky Browntop proliferate.

Conclusion

Well, that describes three perennial native grasses that I find interesting and that have been promoted by my *Resting Strategy*. There are many other grasses and forbs too, worthy of investigation.

I would encourage anyone to get to know the plants that grow in certain areas, when they seed, and which are palatable to stock. It may not be possible to run a whole farm around its grasses and forbs as I have, but a small area devoted to the study and development of a *Resting Strategy* could lead to much bigger things!

Thank you Andrew Briggs, Darryl Cluff, Phil Brock and here at "Nostones Avoca", Tony Jones and Neil Anderson. Jenny's address is "Nostones Avoca", Gulargumbone NSW.

The Bushfire Recovery Debate

Many Friends of Grasslands members have been very concerned in the aftermath of the bushfire that whatever recovery action is undertaken, it should be based upon sound ecological science. While Friends of Grasslands does not have a formal policy on the recovery, it is considering its views and the following contributions by members will assist. Geoff Bulter's contribution is an extract from a slightly longer article appearing in the Conservation Council of the South East Region and Canberra's Sustainable Times. *The readers will note many common themes.*

Geoff Butler

Fire is an essential part of the Australian landscape, and has been, and will continue to be, a part of the environment in which we live. This part of Australia is a highly fire prone area, and severe fire activity can be expected every three to five years somewhere in our region. This challenge involves not only managing bushfire to protect human life and property, but to protect the life and property of the wildlife that resides here. We must manage fire regimes (the season, intensity and frequency of fire over time) to maintain the diversity of flora and habitats upon which wildlife and we totally depend.

Regular burning at the broad landscape scale has been practised across the Australian continent since European settlement. This regular (and sometimes annual) burning often had the opposite effect to that intended. For example, before the establishment of Kosciuszko National Park, high country graziers would burn their leases at the end of each summer, to encourage grasses and herbs and to suppress the growth of shrubs. Ironically, this type of burning can actually favour certain fire adapted and highly flammable mid-storey shrubs, and therefore also exacerbate shrub germination and regrowth. Regular burning can also increase the rate of drying of the remnant herbaceous and litter cover, actually in-

Plain Sun Orchid

Michael Bedingfield

The Plain Sun Orchid is a stunningly beautiful plant when seen in flower. It is hard to imagine why anyone would call it 'plain', but I suppose in this case it relates to a comparison with more decorative species, such as the Spotted Sun Orchid, which has freckles on its flowers.

The Sun Orchids are so named because for almost all species, the flowers open only on hot, sunny days. The scientific name for this species is Thelymitra nuda. Thelymitra comes from the Greek - 'thelys' meaning 'woman' and 'mitra' meaning 'cap or hood'. Together this refers to a common feature of the genus in which the column (the reproductive structure in the centre of the flower) is said to resemble a woman's headwear; 'nuda' comes from the Latin for 'bare or naked'.

This species is widely distributed, occurring in most states, and in the local area it prefers grassy woodlands or dry eucalypt forests. A single long leaf of up to 30cm emerges from the ground in the cooler months, followed in spring by the flower stem, producing flowers in about November. Those I have seen were about 40cm tall but they can grow to about 60cm. The flowers are up to 30mm across and are normally blue with a hint of violet. When the flowers open it is usually several together, producing a conspicuous display to attract pollinating insects. However, most species of Sun Orchids are capable of self-pollination, and do so if the right insects don't come along.

The Slender Sun Orchid, (Thelymitra pauciflora), though uncommon, is the most often seen Sun Orchid of local grasslands. Its looks and colouring are similar to the Plain Sun Orchid but it is much smaller. It usually grows 20-30cm tall, though it can be up to 50 cm, and the flowers are 10-20mm across. However, it is unspectacular because it is almost always self-pollinating, and the flowers are very rarely seen to open.

In the drawings, the flowers of the Plain Sun Orchid are shown at normal size, with the full plant at quarter size.

Like most orchids, this species is very tasty to herbivores and tends to disappear under even light grazing. So though it is widely distributed it is quite uncommon in our local woodlands. The not so plain Plain Sun Orchid - another reason why our grassy ecosystems need to be more highly valued.

***Orchid course with Ian Fraser**, see Ian's amazing slides and hear his many insights. Tuesdays 11 & 18 March, 6.30 - 8.45pm with a break for refreshments. Canberra Seniors' Club, Watson Street, Turner (across Barry Drive opposite Environment Centre). Cost $40. Bookings essential. Inquiries: 6249 1560. Cheques payable to Environment Tours, GPO Box 3268, Canberra ACT 2601.*

creasing the capacity to burn each year. These two factors can lead to a greater risk of uncontrolled wildfires.

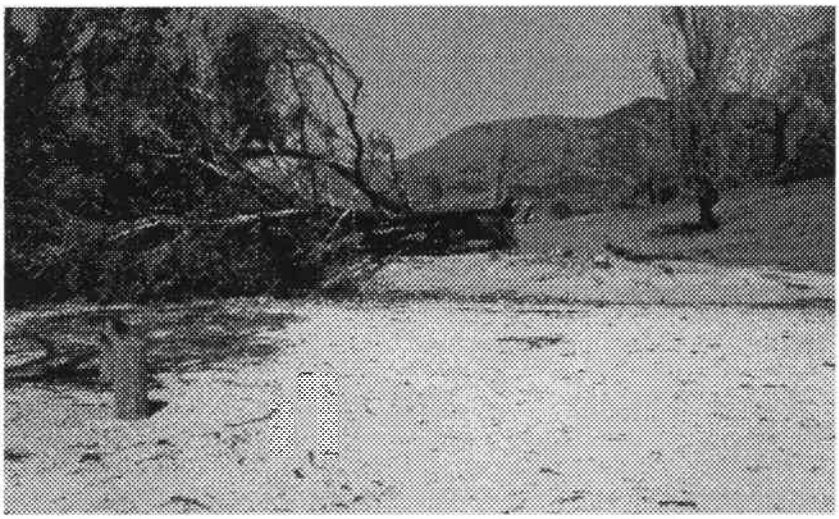
It is true to say that over the last decade or so, prescription (controlled) burning practices in broader natural landscapes have changed. This is primarily because the ecological and fire sciences have provided us with a greater understanding of the actual and potential impacts of burning practices. These impacts include effects on biodiversity, water quality (something we may yet have to face with all the water catchment burnt), erosion and fire escape risk. Most conservationists have not opposed strategic, risk based and ecologically based burning in natural areas, and in fact, have been in the forefront of demanding better burning practices to meet the needs of the whole community.

Today, the strategy for burning large, natural areas takes into account risk management (and indeed what is feasible in the limited opportunities to conduct controlled burns each year), and is done on the basis of greater scientific evidence of the fire impacts, so it most effectively achieves a multiplicity of outcomes. The Rural Fire Service, conservation land managers, and State Forest agencies, plus a multitude of smaller land management authorities, have supported this approach.

The Conservation Council has contributed in many ways to ACT bushfires issues over many years. The Council was represented on the original 1995 taskforce reviewing fuel management practices in the ACT. The task force presented 24 recommendations to the ACT Government (the Glen Report), which makes interesting reading in the light of recent events. More importantly the Council has been represented on the Bush Fire Council.

David Eddy

Friends of Grasslands should be among those who make some representation to government about the relationship between natural fire and the vegetation that surrounds and punctuates Canberra's layout. There have been and will continue to be a variety of 'arguments' presented which clearly demonstrate a very poor understanding of vegetation, logic and the place of fire in the Australian landscape and ecology. There are also a number of very strong and logical arguments which are often overlooked yet which we could present to those who need to hear them.



Fire at Tidbinbilla. Foreground is ash and in the distance are black tree trunks, more like sticks. Photo by Jenny Horsfield.

The landscape supports vegetation which thus supports virtually all other life forms (on this planet). The only way to have no fire is to have no vegetation, and thus no other life. Vegetation burns when lit, the drier it is the better it burns. Drought and fire are unavoidable parts of living in most parts of Australia. Anyone who doesn't want to experience them is free to leave now. So the only real question is what sort of vegetation, where, and how should it be managed (if at all).

I've also looked around a bit and seen to my surprise that after such 'devastating' fires, in most places the fires were essentially ground layer fires. Most of the Eucalypts in grassland and woodland have retained their leaves. Even more surprising is that a significant proportion of the crown foliage (pine needles) in the Stromlo forest remains - the fuel load was not exhausted by the 'fire storm'. My conclusion to these observations is that a rapid ground fire was driven along the ground by high winds and in most places did not 'crown' or burn foliage well above the ground. The high winds were the only reason that these fires jumped containment lines and got anywhere near Canberra and that they burnt houses. Perhaps we should legislate against wind?

I've been looking at some fire science stuff published by the Emergency Services Bureau (ESB) on their web site. Their apparent understanding of fire, its behaviour and control is impressive. It appears that 50 T/ha (tonnes per hectare) of dry matter is regarded as a modest fuel load and 100 T/ha or more is common in forest communities. Grasslands (native) on the Southern Tablelands tend to oscillate between about 500 and 5000 kg/ha (or 0.5 and 5 T/ha), whereas 10 t/ha would be rare, even in dense exotic pasture on good country (ie deep soil). So it would seem logical that if we want to maintain modest fuel loads adjacent to built areas (as the Tuckey brigade would suggest) then the natural vegetation of these areas (native grassland and grassy woodland) would seem more suitable than plantations of Pinus or exotic Eucalypts. Having natural vegetation communities adjacent to Canberra would also give some justification to the notion of a Bush Capital (as opposed to a Contrived Vegetation Capital) and provide significant biodiversity and other conservation outcomes - dare I say even assist the ACT government meet its obligations under Commonwealth biodiversity conservation targets.

I dare say there will be much more discussion ... but we should be rationally and unemotively part of it.

Roger Farrow

In my opinion the title bush capital is a complete misnomer. Although the site chosen by the wise men for the capital was, by Sydney and Melbourne standards, in the bush half way between the two, it was not in fact a particularly bushland setting. At the beginning of the previous century most of the plain ("the limestone plains") was naturally treeless, Much of the remainder was open parkland of scattered mature eucalypts ie around Tuggaranong homestead and elsewhere and intensivley grazed, and even the hills like Ainslie and Black were grazed and logged for firewood and comprised relatively open woodland. Not a particularly fire prone condition.

Successive governments and authorities have not sustained the open parklands, largely by excluding stock and allowing natural regeneration to produce dense fire-prone coppices such as in the Majura and Mugga regions.

Hills like Mt Taylor have been heavily replanted and even the treeless plains have been extensively replanted with small woodlots, ie Gordon and Fyshwick where trees have, not surprisingly, performed very poorly. Tree planting programs all around the sub-

urbs have been encouraged, all of which have contributed to an increasing fire risk. Much of the farmland NW of Canberra was resumed for pine plantations and the presence of a dense tree cover connecting with the native forests of the Brindabella Range has made urban Canberra much more fire prone than in the past. Only the horse paddocks hark back to Canberra's past.

I believe that retaining the parkland setting around Canberra's fringes, that is of grazed native and exotic grasses beneath scattered Eucalypts, where they would naturally occur, would go a long way to reducing the fire risk and we may have to sacrifice some local biodiversity to achieve this: so be it if saves the lives and homes of hundreds of families. There are plenty of natural vegetation associations further out from Canberra's fringes that sustain high biodiversity. I would even go so far as to suggest planting woodlots of deciduous trees on pine plantations burnt out in 2002 and 2003 around Canberra's NW fringes ie Yarramundi, Duffy and Stromlo in sites of nil conservation value. This would be anathema to some groups but removal of Duffy's pines was also opposed by residents in the past.

Benj Whitworth

Fire was an important landscape management tool in pre-European times. Managing fire will become increasingly important in our current and future climate due to global warming, more frequent El Nino events, less mosaic burning, and periodic droughts that are likely to create greater frequency of such events. It is important to prepare for the future through a well-researched and implemented fire strategy or as part of a broader regional strategy. This fire strategy needs to understand and express the value of biodiversity and particularly native grasslands, in helping to manage and control fires in the region.

Australian biodiversity is in general well-adapted to fire, with a few exceptions being wetland, wet forest and rainforest ecosystems. A close link between fire and native biodiversity was created in this region about 130,000 years ago. Around this time casuarinas, araucarias and rainforest species were replaced mainly by eucalypts and grasses probably as a result of a dryer climate and because fires became far more common. This link was probably strengthened after Aboriginal people colonised Australia, with people reaching this area at least 20,000 years ago. The exact time that Aboriginals arrived in the region and their use of fire has been debated for many years (references available on request).

Biodiversity in the main, is not only adapted to fire, it can be used to manage fire. A fire strategy needs to include biodiversity as a major component of its management. I suggest the following needs to occur:

- Create a mosaic of native ecosystems to ensure that Canberra is protected and can recover after fire. A mosaic of ecosystems means that fires will more often be interrupted by riparian areas, wetlands, and wet forest gullies. A mosaic of ecosystems reduces the chance of fires developing into large firestorms.
- Ensure that money is put into research and implementation of appropriate mosaic burning where 'patches' of native areas are burnt for ecological and fire management reasons. Aboriginals used mosaic burning to flush food animals, create new growth, and reduce chances of large-scale fires wiping out their food source and environment. The frequency and timing of this burning should differ for different ecosystems. In general native grassland burning in autumn, winter or spring helps reduce fuel loads, creates green growth, while also allowing for ecological processes to occur such as encouraging forb growth, encouraging seeding and germination (for some species) and re-colonisation of burnt areas from plants and animals in unburnt areas. A risk is that colonisation of weeds may occur. Burning woodland and forest inappropriately may actually increase fuel load in the medium term (eg 3-40 years) by encouraging peas and other low shrub layer growth increasing the heat/intensity of subsequent fires. Burning should be increased before 'El Nino predicted years' to ensure fuel loads are low during very hot summers. Using burning in a mosaic pattern reduces fuel loads and retards fires, making them easier to control naturally or by human methods.
- Ensure that in areas of natural vegetation, natural regeneration should largely be allowed to take its course.
- Ensure that threatened species and communities are protected and managed to reduce potentially catastrophic effects of fires.

More specifically native grasslands are supremely adapted to fire and can assist with fire management for the following reasons. Native grassland:

- Allows greater accessibility for fire control vehicles, helicopters, and firefighters;
- Creates low intensity fires and this makes fires easier to extinguish;
- Results in low intensity fires that are less likely to create firestorms and spot fires, and because grass fires burn-out quickly this reduces the chances of later resurrection of fires; and
- Is adapted to fire and quickly regenerates after fire.

For these reasons I suggest that where possible native grassland is conserved or restored, particularly in the west and north-west of Canberra to enhance our ability to manage fires. This could be achieved by:

- Not replanting pine trees in Canberra. As the bush capital we should focus on planting native species that are adapted to fire.
- Using Stromlo as a land swap for native grassland in Gungahlin, Lawson, Tuggeranong and elsewhere, to ensure that each major town centre has retained grassland to buffer suburbs from fire. Stromlo currently has minimal to no ecological value as a result of being under pine forest for many decades and its development would be a win-win for the community and environment.
- Alternatively, restore Stromlo or parts of that area particularly the West, as native grassland and/or grazed land to be used as a buffer to ensure Weston Creek and Woden are protected from westerly summer fires. Fires in this area have developed into fire storms, due in part to pine forest and heavy fuel loads and these have threatened central-west town centres.
- Mosaic burning/patch burning selected native grassland during autumn, winter and early spring, particularly in El Nino predicted years, which reduces fuel load to a minimum for summer as well as encouraging new growth, greatly reducing the chances of fire reaching Canberra.

Further reading

CSU, *Australian Bushfire Conference Proceedings*, Albury, 6-9 July 1999, Charles Sturt University. Web address <http://life.csu.edu.au/bushfire99/>.

Smith, A. (1995), *The contribution of fire in dramatising the Australian landscape.* ANU, Canberra http://sres.anu.edu.au/associated/fire/ecol/fir-ecol.htm#returnhome.

FRIENDS OF GRASSLANDS INC Web address: http://www.geocities.com/friendsofgrasslands

Supporting native grassy ecosystems

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