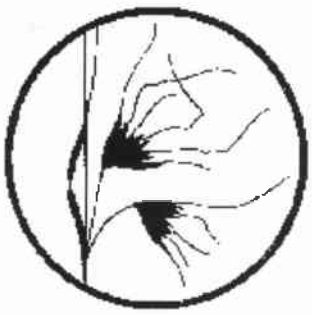
News of Friends of Grasslands

Supporting native grassy ecosystems

January-February 2002



MEMBERSHIP RENEWAL TIME

Did you get a **red dot** on your label? It means that you are not financial. So it is time to get out the chequebook and renew your membership for 2002. Thanks to the large number of members who have already done so. Any inquiries please contact Margaret whose details are on the back page.

Membership is $20 individuals and families, $50 for corporate members and $5 concession for students and those on social security benefits. A membership renewal form was enclosed with your last newsletter but if you need another contact Margaret. We do need your continued support.

FOG AGM

Geoff Robertson

The Annual General Meeting will be held at Mugga Mugga Education Centre, Symonston, on **Saturday 23 February at 4pm.** Traditionally we have attempted to keep the formal meeting to one hour in which time the President provides a written (and an informal verbal) report, the Treasurer presents the audited accounts, and the election of the new committee is held. There is ample time for those attending to raise any issues they consider may benefit FOG. This is followed by an informal BBQ provided by the committee – meat, salad, cordial, tea and coffee will be provided. We suggest you might also like to bring some wine or whatever to add to the celebration. **Please make the effort to come.** To assist with catering, it would help if you could let Margaret Ning know if you are coming. (6241 4065 (h) or 6252 7374 (w)).

FOG has chalked up a rather successful year with good outcomes on many fronts. We face no serious immediate problems. What emerged in 2001, which is appropriate given this is the beginning of a new century, is a good sense of our vision, objectives and strategies (see article on page 13). A good knowledge of grassy ecosystems and their complexity is fast emerging. In Canberra, we are experiencing a tsunami of conservation planning and development issues and our responses need to be informed and well judged if we are to pursue the best outcomes. We are also picking up members from the Coast, across the Southern Tablelands, the western slopes, and much further afield. We need contact with these members to support them - this will require developing some new strategies. Any ideas?

Our success to date relies on the efforts of many people both on and off the committee. Some of you may like to consider how to become more involved or may wish to raise an issue you would like FOG to consider. If so, please contact Geoff Robertson on 6241 4065. However the aim of the AGM is to fulfil our legal obligations, give members the opportunity to discuss broad directions for FOG, but most of all, to enable us all to catch up with each other and have a good time

JANUARY-FEBRUARY PROGRAM

19-20 January - Restoring native vegetation to the landscape. This will be a small informal workshop on the why and how of native revegetation and the skills required, using 'Garuwanga', near Nimmitabel as a case study. It will attempt to marry two approaches to nature conservation: protecting threatened species and communities (with an emphasis on remnants and connectivity) and revegetation (eg Landcare and Greening Australia models), and may assist to develop FOG's thinking. It should be of interest to conservationists, landcare and parkcare volunteers, and land owners and managers. Families are welcome and cost will be minimal. Contact Geoff Robertson on 6241 4065 for further information and booking (you will need to book early).

Saturday 23 January - Visit to Badja Nature Reserve. We will meet at Countegany turn off east of Numeralla at 10:30am. Contact Margaret for further details.

Saturday 23 February - AGM. See article in previous column. For catering purposes, please let Margaret know if you are coming. We need you there.

Saturday 2 March - Visit to Bega Swamp. Details in next newsletter.

For any information about activities (including times, venues and carpooling details), please contact Margaret Ning on 6241 4065 (home) or 6252 7374 (work). To make program suggestions for 2002, also contact Margaret.

Please note that many of our activities are outdoor, and therefore good footware (especially boots), sunblock, sensible clothing and hats, and water are essential.

PROGRAM AFTER FEBRUARY

The program for the remainder of 2002 is being put together and, from past experience, will evolve during the year. Several elements make up the program:

- **Workshops:** A second small workshop is planned for 6-7 April at Garuwanga near Nimmitabel. David Tongway, will lead the workshop titled *learning from a landscape walk: what is happening on the soil surface*, which will describe Landscape Function Analysis. While rigorous, landscape analysis is easy to apply and should appeal to professional ecologists and to enthusiastic amateurs wanting to have another dimension of knowledge open to them. We are also considering other workshops options for later in 2002.
- **Regional visits:** We hope to plan visits to Sydney (to look at remnant restoration), and New England, Western Slopes and Riverina Highlands, and Coast to see some more grassy sites.
- **Visits to ACT, Southern Highlands and Monaro Hot Spots.**
- **Two winter slide afternoons.** One on PNG Grasslands and on one reptiles and frogs.

NEWS ROUNDUP

Mulwaree to Monaro

FOG's major effort this spring was a series of field days from the northern to the southern end of the Southern Tablelands days, jointly organised with NSW National Parks and Wildlife Service (NPWS). The title of these workshops in the field was *Grassy Ecosystems: from Mulwaree to the Monaro, a series of field days across the Southern Tablelands.* As the program advertised, the following centres were visited: Adaminaby, Bombala, Braidwood, Boorowa, Bungendore, Canberra, Collector, Cooma, Goulburn, Gundaroo, Jindabyne, Nimmitabel, Queanbeyan, Sutton, Tarago, and Yass.

Normal practice was for two sites to be visited each day. At each site, there was a workshop, usually lasting an hour, followed by a walk and talk in the grassland or woodland visited. Rainer Rehwinkel (NPWS) spoke on four issues: recovery planning, conservation management networks, the listing of box woodlands, and the grassy ecosystem management kit. He provided a paper on each of these issues - these are summarised later in the newsletter (see article on *Developments in grassy ecosystems conservation* on page 9). Geoff Robertson spoke on the role of FOG.

For the ACT sites, Environment ACT co-sponsored the program. Sarah Sharp and colleagues spoke about the management of Crace Grassland. In the Monaro, David Eddy (on behalf of the Monaro Grasslands Advisory Committee) spoke on Monaro grassland developments.

A sprinkling of FOG members attended the field days and their input was very worthwhile, illustrating how knowledge of grassy ecology is within grasp of all of us and what FOG is doing on the ground. These members were very helpful in identifying local issues. A number of members' properties or land care sites were used as sites in the field days. A special thanks to Alan Ford for his efforts in getting to almost all of the sites and whose write-up appears on page 9.

Documentation for the field days was excellent. The main brochure contained three maps showing the sites to be visited. Maps, showing significant grassy ecosystem sites on public lands, were also provided for the following regions: Sutton-Gundaroo, Yass and Boorowa, Crookwell, Goulburn and Collector, Bungendore and Tarago, Braidwood, Queanbeyan, Cooma, Nimmitabel, Adaminaby and Jindabyne. Plant lists were also provided for many of the sites visited. While many people participated in putting the program together, special recognition should be given to Steve Priday (NPWS) who produced excellent documentation and most of the behind the scenes advertising. The program also caught the local press thanks to the effort of Environment Australia.

Sessions were attended by 359 people. Eliminating double counting, we estimate 245 people, including on one occasion 22 enthusiastic school students, attended one or more sessions. If we add the October field days in the Riverina Highlands, total session attendance is 447 and after eliminating double counting the overall number is 305 people attending one or more sessions. About half of these people were subsequently sent a free FOG newsletter.

For the record, the regions, dates and sites are shown below. The number in brackets shows the number of people attending the session and a '(P)' indicates that a plant list was provided.

- Yass-Boorowa, 23 Oct, Namina TSR (8)(P), Pudman Creek TSR (11)(P);
- Gundaroo-Sutton, 24 Oct, Sutton Common (10 adults and 22 school students)(P), Gundaroo Common (10)(P);
- Crookwell, 29 Oct, Binda Cemetery (8)(P);
- Goulburn-Collector, 30 Oct, Collector TSR (18), Kenmore Dam Woodland (23)(P);
- Bungendore-Tarago, 31 Oct, Turallo Grassland (15)(P), Duck Flat TSR (11);
- Braidwood, 6 Nov, "Nithdale" (20)(P), Long Flat Reserve (Majors Creek Common) (7)(P);
- Queanbeyan, 7 Nov, Gale Precinct Woodland (16)(P), Royalla TSR (9)(P).
- Canberra, 13 and 15 Nov, Gungahlin Grassland Reserve (17)(22)(P);
- Cooma, 20 Nov, "Quartz Hill", property of June and Bob Wilkinson, "The Twin" (16)(P), "Pimelea Place" (16)(P);
- Nimmitabel, 21 Nov, "Garuwanga", property of Margaret Ning and Geoff Robertson (16)(P), Avon Lake TSR (20);
- Adaminaby-Beloka, 26 Nov, Adaminaby Old Cemetery (16)(P), Beloka Cemetery (12)(P);
- Bombala, 4 Dec, Bibbenluke Common (15)(P), Steve's TSR (11)(P);
- Jindabyne-Dalgety, CobbinTRS (5)(P), Numbla (5)(P).

A biproduct of the field days was the discovery of a new leek orchid species *(Prasophyllum* sp. nov. aff. *Petilum)*, two new populations of *Thesium australe* and two new populations of the Monaro Golden Daisy.

ACT has a new government

Since our last newsletter, the results of the ACT election have been finalised. The Australian Labor Party (ALP) now holds eight seats, Liberals seven seats, and Greens and Democrats hold one seat apiece. Canberra turned against independents and none was elected. The ALP is now in government with the support of the cross bench.

As mentioned in our previous issue, the Conservation Council was actively involved in the election campaign seeking candidates' views on a range of issues. FOG was caught up in this, pushing for a better outcome for grassy ecosystem sites, especially East O'Malley in the short-term.

Of the minor parties, the Greens and Democrats were very committed to planning and conservation, and of the major parties, the ALP gave qualified yeses to most planning and conservation issues, the Liberals much less so.

Since the election, the Government has signalled support for conservation of the North Watson Woodland and, according to Simon Corbell "is committed to a thorough review of East O'Malley".

So congratulations are in order to all candidates who stood and have been elected. FOG would like to take this opportunity to thank those in the previous Assembly who have been very helpful and responsive to FOG. These include Simon Corbell (who by the way is a long-standing FOG member), Kerry Tucker, Brendan Smyth, John Hargreaves and Gary Humphries.

Two ministers will be hearing a lot from FOG in future: Simon Corbell (Planning Minister, responsible for PALM and land release) on conservation planning issues, and Bill Wood, Minister for the Environment. However, it will be important for FOG to ensure that all Assembly members are well informed on issues dear to our hearts, especially as in the ACT there has always been good cooperation between Assembly members despite political differ-

ences, and the Assembly is an important place for public discussion.

Scabby Range Nature Reserve

This Shangri-la to the south of the ACT has some stunning forest, grassland and wetland areas and these were in full display for the eleven person FOG visit on Saturday 9 December. Scabby Range is not accessible directly so the group drove drive through private land and then the forest section of the Reserve before arriving at the lower grassland/wetland sites.

The main grassland site visited was a little gem covered in the new leek orchid (*Prasophyllum sp*) that was discovered a year ago. It sits on a low spur above the wetland which also contains examples of Australian Anchor Plant *(Discaria pubescent)* as well as other orchid species. It was practically weed free. The group spent the greater part of the day in the immediate vicinity. Kim Pullen found Key's Matchstick grasshopper as well as a number of other interesting arthropods. Some in the group advanced into the wetland, finding a Comesperma species on its edge, a restio rush and a range of wetland plants, including a Gentian and a tiny *Hypericum japonicum*, a native relative of St John's Wort.

Later in the day, the group stopped at another spectacular grassland outside the reserve, with large patches of Copper-wire Daisy *(Podolepis jaceoides)* and Native Flax *(Linum marginale)*. There was an opportunity to observe the effects of a burn earlier in the year. Kim drew the group's attention to a weevil introduced as a bio control for Nodding Thistle. The weevils were effectively preventing flowering of these plants. Our thanks to Rob Perry and Rebecca Hall from the NPWS for making the day possible.

St Marks in October
Benj Whitworth

Cindy Royston and I led this lunch time walk through St Marks grassland on 18 October. St Marks was burnt twice in autumn 2001 and the regeneration was of interest, but unfortunately Sarah Sharp could not attend and explain the management regime. Sixteen people mainly from Environment Australia and Agriculture, Fisheries and Forestry Australia turned up and we proceeded into the grassland.

The grassland was stunning with many species of forbs. Billy Buttons *(Craspedia variabilis)*, Scaly Buttons *(Leptorhynchos squamatus)*, Goodenia *(Goodenia pinnatifida)* and Bulbine Lilies *(Bulbine bulbosa)* added broad splashes of yellow, while Creamy Candles *(Stackhousia monogyna)* added most of the white. Other less obvious displays were Early Nancy *(Wurmbea dioica)*, Greenhood Orchids *(Pterostylis sp)*, and Drosera *(Drosera peltata)*.

We had an extensive discussion on managing grassland and grassland species and David Eddy answered many questions. Other interesting discussions focussed on the plantago species and clover. The clouds enclosed and we managed to get a peek at the Button Wrinklewort *(Rutidosis leptorhynchoides)* although these were not flowering, and the Yam Daisy *(Microseris lanceolata)* which was largely finished, before escaping back to the office in the rain. Apart from these two species almost every other species was in flower. Concern was raised over the amount of quaking and shivering grass after the burn, where the open spaces may have provided an opportunity to invade.

In this Issue:

A more recent trip by myself (3 December) has revealed the Button Wrinklewort in full flower; it seems to have really benefited from the fire. Other species now in flower include the Curved Rice-flower *(Pimelia curviflora)* and the Blue Devil *(Eryngium ovinium)* are looking great.

Theodore in November
Richard Langdale-Smith

Six FOG members visited Theodore Grassland on Saturday 17 November. The weather was excellent, cloudless and 25 decrees. Michael Bedingfield kindly gave us a list of the plants in the area which included a measure of their frequency. Michael Treanor gave us an interesting account of the history of the area. We then wandered in the rich flora which included a young *Eryngium ovinum*, (not yet fully suffused with its characteristic blue), within a few meters to the north of the Mealy Bundy (*Eucalyptus nortoni*), a new tree species to me. Two kurrajongs, one meter high, were close to the Mealy Bundy (*Eucalyptus nortoni*). There were two *Lomandra* species and a Tiger Orchid *(Diurus sulphuria)*. It was enjoyable to have ready access to identification of unfamiliar species by Michael Bedingfield.

I estimated that we saw approximately sixty species of plants including shrubs and trees. Weeds, such as *Plantago media*, *Verbascum thapsus* and *Hypochaeris radicata* were not as widespread as in some ACT grasslands. It is fortunate that this area has neither been heavily grazed nor cultivated and therefore reflects the indigenous flora.

Lawson in December
Alan Ford

On a bright sunny Saturday, 1 December, eleven members and friends visited the Belconnen Naval Station at Lawson. Blue Devils (*Eryngium ovinium*) turning blue, an *Alternathera* sp (finally, I might be able to recognise it) and a Goodenia (*Goodenia pinnatifida*) were among the thirty odd species I managed to see in the morning. I even saw the special Lepidium that hides there.

Of course, plants are only part of the glory of this place. We went looking for the Golden Sun Moth (*Synemon plana*) and found a number of males flying around. The party also managed to sight both the green and brown forms of the Perunga grasshopper. Thanks to Kim Pullen for making the insects visible.

While we were there Michael Parker gave us a briefing on the fibre optic endoscope that is placed into wolf spider holes in an attempt to seek the elusive Grassland Earless Dragon. So far, no luck. He also acquainted us with many aspects of the vegetation and its management.

Recent FOG submissions

FOG penned three submissions in November. The first was in response to a request to contribute to a *Conservation Strategy for the Southern Tablelands*. As this submission was considered to bring together many years of FOG's thinking, it was copied to NSW Minister for Environment, Bob Debus, and ACT Ministers for Environment (Bill Wood) and Planning (Simon Corbell). The submission is described on page 12.

The second submission was on the proposed development for Lawson in the ACT. The five page submission highlighted some general concerns about the overall planning process in Canberra, flaws in current conservation action plans, and sensitive grassy ecosystem areas in Lawson that need proper consideration. We also provided some evidence we had gathered on

some of the grassland sites in Lawson. FOG will hold discussion with PALM and Environment ACT on its submission in February. On 11 December, PALM held a further public meeting. For further information from PALM, contact Steven Gianakis 6207 1714.

Concerning Gungahlin, PALM has been considering its overall strategy for the proposed suburbs of Casey, Moncrieff, Jacka, Bonner and Forde. It has published a pamphlet *North Gungahlin, Planning for New Suburbs*, held a series of business and community consultations and conducted a bus trip to two parts of the area. PALM contacts on North Gungahlin are Alison Stringer or Anne Moroney 6207 2532.

FOG has welcomed statements that the important wetland area of Horse Park will be protected and Mulligan's Flat Reserve extended. However, we have stated that we do not know what other ecological resources exist within the site and these should be ascertained quickly.

In its three-page submission, FOG urged proper conservation planning and resourcing. "It is important that planning strategies include: retention of remnant vegetation, linking remnant vegetation, restoring these areas and other areas of open space to original vegetation patterns (except where the space is designated for some other purpose) and ensuring that these goals are adequately planned and resourced."

In its submission FOG expanded on these objectives and how they might be achieved. These included PALM employing someone who could plan conservation outcomes, setting up a small infrastructure unit which could leverage restoration, and establishment of a regional garden devoted to ground storey plants which would have many positive spin-offs.

Copies of submissions are available from Geoff Robertson, for details see back page.

South East Catchment

Some FOG members were asked to join the bus ride organised by the South East Catchment Board on 11 December. The Board has now prepared its draft *South East Catchment Blueprint*, which was distributed to participants, along with a copy of *Draft Murrumbidgee Catchment Management Plan*. These are important documents in which biodiversity (saving of remnants and threatened species) has an important role to play. The chief organiser of the tour, Kerry Pfeiffer, is putting together a funding application to fund the *Blueprint*, and he is adopting as the theme, "Saving the Monaro Grasslands". Over some sixty people took part. The day was well organised with a variety of speakers on the bus and at sites visited, providing natural history, conservation, forestry and land management information.

Serrated Tussock

The Serrated Tussock Control Field Days on 6 and 13 December opened my eyes to some new possibilities. Your Ground Storey reporter was truly impressed by the research being undertaken by Masters student, Brigette Verbeek, which illustrates the effect of different herbicides, Lupropanate and Glysophate, and the recovery of the 'background species' (eg native/ introduced grasses and forbs under the Serrated Tussock) depending on the time of spraying.

The key when using Roundup is to spray when Serrated Tussock is active but background plants are dormant. While the day was organised for replacing badly infected Serrated Tussock paddocks with pastures, I wondered about its application to native vegetation remnants.

Another important lesson was use of calibration methods when applying poison to avoid using more than the required dosage and save on costs. For more information, contact Fiona Leech 6226 2199 (YASS) and Kerrin Styles 6207 2278 (ACT).

Conder 4A

FOG members will remember the successful campaign to have the extension of Templestowe Ave diverted to protect the grassland on Conder 4A. The new road and bridge on the recommended route are almost completed and are expected to be finished before this newsletter goes to print. Construction of adjacent wetlands is also going well with the future ponds taking shape.

Report from WGWG

The Woodlands and Grasslands Working Group (WGWG) reports that it has concentrated on three matters in recent months.

It has taken an active interest in the future of the proposed development of East O'Malley and will continue to monitor outcomes. In this context, it coordinated, on behalf of the Conservation Council, a letter, signed by thirty groups, to candidates seeking their commitment on the preservation of the remaining natural environment in the ACT.

Following the public consultation on the development of Lawson (the Belconnen Naval Station) the group sought a PALM briefing on the issue. This site is one of the last remaining large areas in Action Plan 1 to be subject to development. While these are early days in relation to the site it is clear that there are a number of issues to be resolved before development can proceed. At the present time PALM is proposing that around 100 hectares be saved with up to a further 20 hectares subject to investigation. However, the station is still extant and there is no guarantee that anything will be saved.

The Group was recently briefed by Greening Australia (South East NSW/ACT Region) on the Vegetation Investment Project and other relevant Greening Australia projects in the region. While it is clear that there has had considerable success, much remains to be done. The briefing should assist WGWG to further the Council's strategy for the development of conservation corridors in the region.

Caterpillar tracks at Conder 9

In the last issue we reported the damage done by a large earthmoving machine which took a short cut through the Conder 9 site. It has been reserved in Canberra Nature Park and the flora was damaged by the three metre wide caterpillar tracks. The event was reported to Environment ACT who laid an Environment Protection Order on the developer. This required him to repair the damage and pay for any follow up remedial work.

The developer had difficulty understanding that any damage had been done, but in his enthusiasm to make good he started doing the repair work without waiting for instructions. Grass seed and mulch were spread on the worst patches, and for one creek crossing, more vehicles were brought onto the site and a layer of bitumen was added to the mulch. Government officers were naturally horrified. The developer was given a list of instructions, most of which were followed, but the worst was already done.

The seed introduced was a well used mix of exotic grasses which is standard for repairs in development work. However, it is totally out of place in a high quality native remnant. It rained almost immediately and the seeds germinated well, and they have unfortunately added to the diversity of weeds and may require follow up work for their removal. Indeed, the repair work may be worse than the original damage.

The event shows that current methodologies need to be adjusted when dealing with

native remnants. It also requires expertise and motivation to do a good job.

Orchid conservation meeting

Some FOG members attended an orchid conservation meeting at Mount Annan Botanic Gardens on 30 November. Who's who in orchid conservation, representing government agencies, universities and non-profit organisation, were present or sent apologies. Issues covered in a series of short presentations were on listing and conservation processes, resources devoted to conservation, current taxonomy and projections, micropropagation, population and genetics, pollination syndromes, mycorrhizal fungi, and phylogeny and pollination biology.

The clear message emerging is that current approaches cannot cope with the enormity of the problem. Many orchids are grassland and woodland specialists, and David Jones estimates that hundreds of species have gone extinct even before discovery and description. There are a hugh number of new orchid species turning up - FOG can vouch for this. Two new species have turned up at sites during FOG's presence there: both are yet to be described. Given small population sizes of orchids and the fact they tend to turn up in vulnerable sites, they are immediately threatened. Given existing threatened species procedures and resources, the future is not bright.

Dananbilla biodiversity results

NSW NPWS released the results of the Dananbilla Biodiversity Survey under the heading, *Koorawatha wildlife survey yields treasure trove of biodiversity.* Twenty NPWS staffers and fifty volunteers, including many FOG members, took part over three days on the October long weekend. Phil Gibbons (NPWS) described the findings as interesting but concerning.

Ninety species of birds were recorded on Koorawatha and outlying properties, while thirteen frog species and nine reptiles, including a blind snake and a legless lizard, were also recorded. Some interesting moths turned up, one common in the survey area is undescribed and was previously known only from four specimens from a beach suburb of Perth.

Mammals findings were mixed. Besides the common species such as the eastern grey kangaroo and the brushtail possum, less common species for this area were recorded (common wombat and wallaroo). In addition, the large-footed myotis, a small fish-eating bat, was recorded - this is the most western occurrence known. The threatened Squirrel Glider was recorded near but not on the reserve. Of great concern was that ground mammals were absent, except for a Yellow-footed Antechinus.

Botany was rewarding. Koorawatha Cemetery proved to be an extremely important remnant containing a rare sample of grassy white box woodland with a ground layer of kangaroo grasses and a diversity of wildflower species including many lilies, orchids and daisies. The site contains numerous species considered to be in decline across the region. A creekline surveyed within the nature reserve revealed extraordinary diversity with some thirteen species of orchid recorded, a number of which were in flower.

Watson woodland restoration

The Chronicle reported on 4 December that the Watson Community Association has been given a grant of $3000 to restore the understorey in the 5ha Hope Park. The group hopes to receive additional funding, assuming that the whole 15ha woodland will become available for regeneration. FOG has indicated that some of its members would like to participate in the project to learn about restoration.

When bush comes to shove

This is the catchy title of a long article by Bob Beale in a recent *Bulletin* (Nov 20). The leading comment is "the importance of remnant vegetation to the future profitability - indeed the very survival - of Australian agriculture has been starkly demonstrated by new research on landscape ecosystems." He quotes research undertaken by Land and Water Australia. The message is that areas of less than 10 percent of their original cover will go extinct, as will their inhabitants, unless there is active human intervention. Without native vegetation, agriculture is itself under threat. The rule of thumb is now for landscapes to retain at least 30 percent of their original plant cover. This is worth a read.

Bringing birds back

Congratulations to Greening Australia and Canberra Ornithologists for the Birdwatch project and the publication of *Bring Birds Back: A Glovebox Guide.* This little (free) book has twenty common woodland birds and ten decreasing woodland birds. It also presents the findings of the bird project. We hope that Greening Australia will not object to us using one of the photos from the book. For further information contact Greening Australia on 62533035.

Hooded Robin

Tales from a Grassland Traveller, Part I

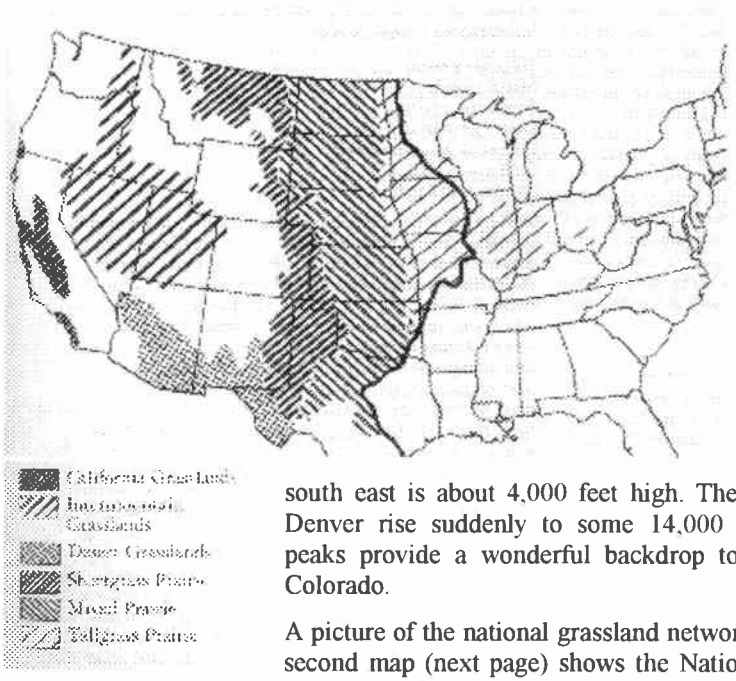
Geoff Robertson

During my recent three-month stay in the USA, I did not forget about grasslands, and in fact I was able to do some research and visit three national grasslands, Comanche, Kiowa and Rita Blanca National Grasslands. Of course, in that time it was not possible to acquire a comprehensive understanding of US grasslands and management practices, so this article is largely a series of impressions, with some intellectual odyssey and travelogue thrown in for good measure. I hope that some of the US contacts I made may correct and add to what I say.

As a frequent visitor to bookshops, and Washington DC where I was staying has some of the best in the world, I hoped to find some good books on US grasslands. But alas, the pickings were very lean. In the large bookshops there were hundreds of metres of books on the new age, religion, self-help, history, science fiction and other fiction, etc., but if you were interested in ecology, most of the time was spent just finding the small selection of books on the subject. Nevertheless, I found three books over many visits, which were very helpful, but very broad in their approach. In Colorado there were several good books on regional wildflowers and I purchased one.

Lauren Brown's *Grasslands* provides the best framework for understanding the various vegetation communities that make up US grasslands and a map from that book is shown below. The best known grasslands are the prairies where three broad communities are identified: Tallgrass Prairie, Mixed Prairie, and Shortgrass Prairie. The boundaries between different communities are not strict because, from different things I have read and been told, in wetter periods the tall grasses move westward and then retreat in drier periods. In addition, one may see examples of the different grasses in some sites, with variation occurring in response to moisture levels. In the tall prairies, grasses can grow very tall, over head height, whereas in the mixed areas grasses are a foot or so tall, and ankle height in the short grass prairies. Tall grass prairies have largely disappeared, and are now less than one percent of their former expanse. But in short grass areas the story is much better, with over fifty percent retained in the areas of the US I travelled in.

The map records three other types of grassland: Inter mountain, California and Desert. In the past I had visited examples of the latter two, but alas that was before I knew anything about grasslands – but next time I shall pay much closer attention. *Grasslands* also mentions eastern grasslands, few remnants of which now exist. Again, in the past, I had seen some Florida examples before I knew anything about grasslands. While in Washington DC, I visited a remnant which had a sign post that mentioned that some prairie grasses were present – it was a pretty shrubby and woody grassy ecosystem. However, the focus for this trip was on prairies.



The second book I read on *Restoration ecology* also whetted my appetite. I would like to quote from it:

> 'Just over fifty years ago, ... workers began replanting tallgrass prairie on a played-out piece of farmland ... that had recently been acquired by the University of Wisconsin for an arboretum. ...The 24ha prairie is today the aesthetic and ecological centrepiece of the UW Arboretum. ...Against a background of catastrophic drought and economic depression, Leopold (the director of the project) himself undertook the restoration of another piece of derelict farmland. The idea of **ecological restoration** (my emphasis) was a new one in 1935. Elsewhere, ... CCC boys were at work helping to repair the ravages of an exploitative system of agriculture. But in the vast majority of cases these efforts involved **mere revegetation** of the landscape. What was distinctive ...was the commitment to the actual, painstaking restoration of the plant and animal communities native to the area. This was revegetation carried out in the most precise and meticulous imitation of nature, and so represented ...the novel combination of agriculture and ecology out of which has grown the science and art of ecological restoration.'

The theme of the book is that ecology should not be merely descriptive, but should be based on scientifically designed experiments in restoration – if you can imitate nature then you must understand it. The book contains a plethora of lessons learnt from restoration, including prairies, mining sites and other degraded land. It provided many valuable explanations for many of my casual observations. The question in my mind was: have Americans really learnt the secret of grassland restoration? I was eager to find the answer to this question and the similarity and difference with Australian temperate grassy ecosystems. But what was the best way to find suitable examples of prairies?

I turned to the web and I found much information on US grasslands. Amongst the information were names and contacts for different grasslands. Narrowing down the possibilities, I contacted the Comanche National Grassland office in Springfield, Colorado. The person I spoke to was very helpful and I decided that I should visit there first. The other grassland office I called was not encouraging.

I purchased a map of Colorado which had two national grasslands marked on it, Comanche in the south east and Pawnee in the north east. The first thing I noticed was that each national grassland is like a series of large and smaller islands – often the sites are not contiguous. At this time I also perused some travel books of Colorado, which showed some excellent scenery of the Rockies, and decided to extend my planned stopover from two nights to five – a good decision. If you have an atlas you may care to look at the route I eventually took. Denver is roughly in the centre of Colorado and is called the mile high city (about 5,300 feet above sea level). It is on the west of the Great Plain, which falls in height, and the Comanche Grassland in the south east is about 4,000 feet high. The Rockies to the west of Denver rise suddenly to some 14,000 feet. The snow-covered peaks provide a wonderful backdrop to any touring in central Colorado.

A picture of the national grassland network started to emerge. The second map (next page) shows the National Grasslands managed by the US Forest Service. I hope that readers can make some sense of it (the National Grasslands are the shaded areas in the map). A comparison of the two maps shows that areas covered by the national network are largely short grass prairies and, to a lesser degree, mixed prairies. The national grasslands were acquired in the 1930s during those drought and depression years when the Federal Government assisted farmers to leave their dustbowl farms. So another observation, the grasslands started from very degraded land. The US Forest Service looks after national forests, which have always belonged to the Federal Government, and grasslands acquired largely as a result of events in the 1930s.

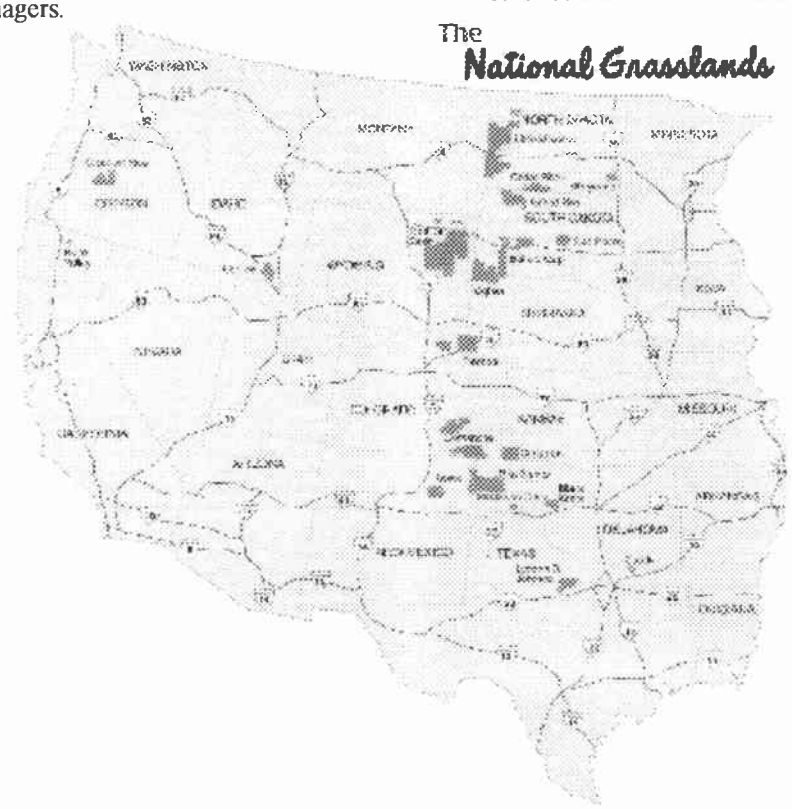
The emphasis in the literature on national grasslands is that they are managed for grazing, recreation, bird watching and conservation – often in that order. To an amateur grassy ecologists like me, this seemed a strange set of priorities. There was little emphasis on plant lists and weeds – again this seemed a little strange.

My colleagues in Washington were a little intrigued by my enthusiasm and took an interest in my proposed trip. However, just before I was due to leave Washington, the weather in Colorado turned cold, dumping lots of snow and rain. Wet muddy roads, rain, cold, and no wild flowers were now on offer. I considered

whether I should cut my losses and return home, but decided thought I should give Colorado a chance.

When I arrived in Denver (9:30am Saturday morning, May 4, 2001) the wet weather was delaying regional flights. My flight to Pueblo was scheduled for 10am and should have arrived in Pueblo around 10:30am but alas it was closer to 1pm when I arrived and my luggage and I were pretty wet by the time I got into my hired car. By that time I had been travelling for eight hours since leaving my Washington apartment earlier that morning. But during that time I had finally managed to finish reading the book on ecology I had purchased in Washington. While grasslands did not get a mention, it helped get many things into perspective – I had purchased it to get some idea of the intellectual underpinning of American grassland managers.

After an hour or two of orientation and a bite to eat, I visited the Greenway and Nature Centre in Pueblo where I thought I should obtain some useful information about the general ecology of the area and places of interest. There was a raptor recovery centre there and after explaining the purpose of my visit I was warmly welcomed and given a tour of the small establishment to see the many raptors that were being cared for. The coordinator, whose name I didn't catch, had spent three months at Barren Grounds in NSW – small world isn't it?



The most impressive birds were Swainson's Hawk (*Buteo swainson*), Golden Eagle (*Aquilia chrysaeta*), and American Kestrel (*Falco sparverius*). The Golden Eagle is a close relative of our Wedgetail, and Swainson's has some remarkable colouring, as does the American Kestrel. The latter two were a common sight on my journey and the American Kestrel was very similar in size, colour and behaviour to the Australian Kestrel. The owls at the centre were also very impressive. My favourite anecdote was about a Kestrel which was demanding and spoilt and which could never be released. He was often taken for walks in the grassland, an apparently enjoyable past time, except for the escort holding the bird, who was constantly attacked by every bird in the vicinity – I did not inquire why the walks were continued. Raptors are well established in the general area and the strong link between raptors and grasslands was becoming apparent.

The staff at the centre gave me some travelling tips about the vicinity and as the Comanche National Grassland Office was not open until Monday, I decided to spend the Sunday exploring the foothills of the Rockies. Before leaving the area, I drove around looking at some of the Sagebush and grassy landscapes in the area.

On Sunday morning I had a hearty breakfast and leisurely talk with Sam the eighty-one year old owner of the restaurant. His wife was a little younger and involved in everything, including arranging the publication of a book on Sam's life. After his mother had died at a young age and his father could not cope, Sam and his brother were fostered out twice, the second time successfully. He started life in New York City but his foster parents were Texans or from nearby. His life story – a somewhat complicated one (he eventually re-established contact with his father and younger sister) – was very interesting, especially as he had grown up on a poor farm and saw the Depression and the Dust Bowl. When he got married, he and his wife adopted two sons and then had a daughter of their own. So we found we had a few experiences in common. He was slowing up a little, his health a limiting factor, but nevertheless he remained active and did the restaurant's books as well as organising other business activities. But I digress.

The weather on Sunday was superb; bright and sunny in the morning, cloudy in the afternoon, but no rain or snow. I headed west to Canon City travelling through natural grasslands most of the way, although I did not stop because I thought I would see better examples later. I did stop for supplies. After loading the groceries into the trunk of the car, I paused, awed by the towering snow-clad Rockies in the background, and took a photo. Then I drove to Royal Gorge Bridge and Park and saw the longest span bridge in the world – the bridge is 1000m above the river below. The Park had a wonderful nature centre filled with taxonomic examples of the wildlife. One window looked out on a bird-feeder which had five native species feeding there. The area is the home of the Ponderosa Pine which appears to have little or no understorey. While returning to Canon City I stopped at several small grassland sites which had a fair sprinkling and variety of wildflowers. Canon City, in part an old Western Town, was having a spring fair and people were generally having a good time, but I spent little time there.

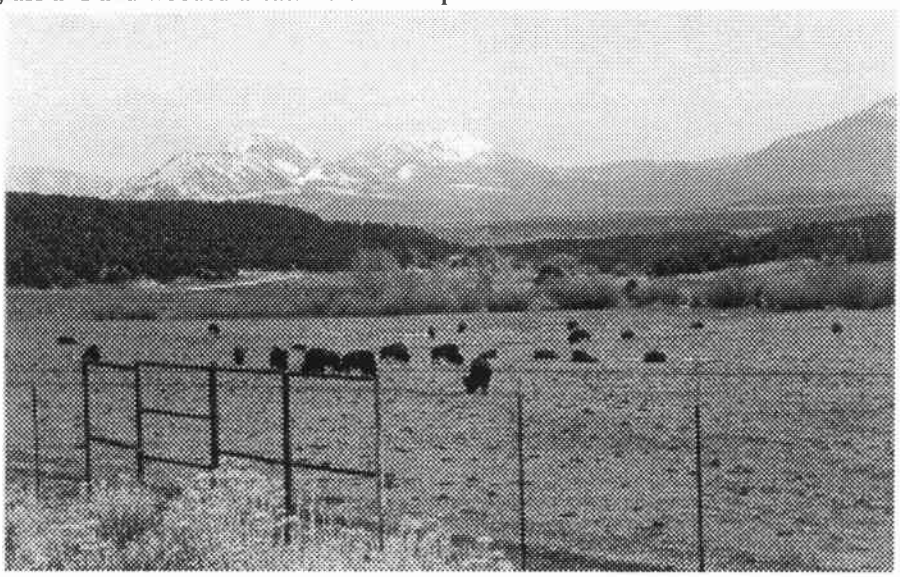
From Canon City I travelled south to Florence, south west to Silver City, south east to Walsenberg (50 miles south of Pueblo), and north east to La Junta (65 miles south east of Pueblo); this section of the journey was 180 miles. The initial leg to Silver City took me to the foothills of the Rockies. Apart from the road everything was snow covered. The mountains around me were just superb with interesting snow-clad and icy formations. Silver City was very pretty, again with the Rockies as a backdrop beyond a snow-covered grassland. Despite the cold, there were many active birds of varying species foraging – spring was in the air. Once or twice there was a choice of road and I was concerned about getting lost.

Just after Silver City, at Westcliffe, I turned south east with the Rockies on my right, everything still white, but after a while the nearby snow receded, then the grasses were a bright green and there was a lot of bird activity including many raptors, several grasping prey. Along this road I saw my first Proghorn, a medium size deer and a grassland specialist. There are four deer: the Elk, White-tailed, Proghorn and Mule Deer. The latter was introduced but seemed not to cause any concern. I read somewhere: 'the Mule

Deer were released into the Grassland and found it to their liking'. During my travels I would occasionally come across small groups (two to four) of deer. I saw each species except for the Elk. How did they manage the fences? The fences were generally similar to the wire and barbwire varieties that cover rural Australia.

Next came one of the delights of the trip - seeing a large area containing some fifty buffalo just grazing, lying about and doing their own thing. This was the only occasion I saw them, apart from one taxonomic example later. They were contained by a huge fence which stretched for many miles. The backdrop was the Rockies (see photo).

From Walsenburg to La Junta the country was flat with fenced grasslands as far as the eye could see. There were the occasional rises and falls in the grassland and wooded areas. I did not stop as it was getting late and I planned to see my first National Grassland the following day. I checked into the motel and asked as many questions of the proprietor as I could, to get my bearings and to see whether there was much interest in the local ecology. Not much. I also picked up whatever literature was on hand to assist. After unpacking I drove a little distance to see the Arkansas River but it seemed somewhat degraded. The waitress at the restaurant where I had breakfast on the Monday was somewhat more helpful in assisting me to figure out what to see in the northern section of the Comanche Grassland.



Not many miles south of La Junta I saw the sign saying Comanche Grassland and not long after, another to say you are now leaving Comanche Grassland. I remembered a turn off back along the road and returned to it. I travelled along it to the sign, which showed the turn off to Vogel Canyon while ahead lay Picket Wire Canyonlands. I travelled to Vogel Canyon. The dirt roads were smooth and dry. On the way there I noticed that the grasslands were flat with good, but short, grass cover and the occasional patch of wild flowers.

Vogel Canyon picnic area was delightful and I knew immediately that my highest expectations would be met. There were good picnic facilities, a drop-toilet, and information signs. The picnic area had lots of different grasses and wildflowers and because of poor soils, lots of inter-tussock space. I took several photos, including one of a spear grass. The area was very open, although in places there were many juniper or cedar trees. These small trees grow up to 15 feet. There were a number of reasonably marked trails, although I did lose my way on occasion. The walks led one from the canyon edge down into a very wide but not too deep canyon.

The landscape kept changing as did the mosaic of the grassland. I felt very much at home. The canyon had many Indian rock carvings and paintings and the occasional reminder of European settlement. One picture was starting to emerge. Generally the grasslands were fairly flat but well vegetated with a reasonable sprinkling of forbs. The canyons, including the ridges, were probably poorer soils, except along the river flats. These areas were probably not good for grazing and possibly contained a greater seed store. In these areas, vegetation cover was lower. Knowing I had a long day ahead, I found my way back to the picnic area after about 90 minutes. As I was about to leave, to my delight, I saw the Texas Horned Lizard. Unfortunately, I had used the last of my film.

I then headed for Picket Wire Canyonlands. The roads were much worse with large wet patches and very deep ruts. I pulled over several times to take a sticky beak and noticed subtle vegetation changes. Many areas were covered with tussock grasses but in wetter muddier spots there was a very low matted grass which I later learnt was Buffalo Grass. I saw many species of wildflower, with Daisies and Peas predominating. Some areas, on private land, seemed less cared for, but this was unusual. This part of the trip was long, roads had been badly affected by the rain, and when I re-entered a part of the park, the roads were very bad. I later read in a brochure, four wheel drives were advised. By this time, after hitting the odd water hole, and probably travelling a little fast for the conditions, because of the distance to be travelled, I had a car coated with mud in many places and felt somewhat embarrassed.

When I arrived at Picket Wire Canyonlands, I could see it was an area for the hiking enthusiasts and it promised much, including dinosaur tracks. I signed the visitors' book, which was present at most sites, and it provided clear evidence that these sites are not frequent visitor stops. In fact, another part of the jigsaw was that there was not much interest in grasslands, apart from hiking and birding activities. In none of the sites I visited did I ever see anyone.

I did not have the time for walking long distances, as the weather was getting overcast. Earlier it had been lovely, and I was concerned that I faced an arduous drive out. So I poked around a little and headed out. Again, there was no film in the camera. I did stop once or twice to look at some areas and in particular one that had been burnt. The burn had obviously damaged the Juniper trees.

Half an later I was back on the main (tarred) road heading for Springfield, still about 85 miles away. The landscape was grassland with grazing, very similar to the non-canyon areas in the Comanche Grassland. From what I had observed on my map, many areas I passed through belonged to the Comanche Grassland network but it was impossible to tell the difference between the actual Grassland and private land. There were occasional areas that were cropped, maybe irrigated.

In the next and final part, Geoff gets to talk to some grassland managers and to visit more grasslands.

Developments in Grassy Ecosystem Conservation

Ground Cover Reporter

An important element of the Riverina Highlands and Mulwaree to Monaro Field Days were presentations by Rainer Rehwinkel on four developments taking place in this region. This is a brief outline of each of the four matters.

Recovery Planning

The Commonwealth has listed Natural Temperate Grasslands of the Southern Tablelands and ACT as Endangered Ecological Communities under the Commonwealth Environmental Protection and Biodiversity Conservation Act. The region is defined to include the ACT and local government areas of Crookwell, Mulwaree, Goulburn, Gunning, Yass, Yarrowlumla, Tallanganda, Snowy River, Cooma-Monaro and Bombala.

Natural temperate grasslands are generally found on the cold, poorly drained low-lying country of the tablelands, or on the rolling basalt downs of the Monaro. Natural temperate grasslands are generally defined as having a low (or no) tree density and are dominated by a variety of grass species.

A recovery plan is being prepared for this community. Because much work has already been done on temperate grassland conservation, many of the actions to be included in the Plan have been largely achieved.

Box Woodlands

In June 2001, the NSW Scientific Committee made a preliminary determination to list White Box-Yellow Box Woodland as an Endangered Ecological Community under the NSW Threatened Species Conservation Act. This follows the listing of Grassy White Box Woodland as an Endangered Ecological Community under the Commonwealth Environmental Protection and Biodiversity Conservation Act.

This is a rare and highly fragmented vegetation community found along the tablelands and western slopes from the Queensland to Victorian borders. The dominant tree species are White Box, Yellow Box and Blakely's Red Gum, either as pure stands or as mixtures; other trees may also be present. Grasses and wildflowers usually form the understorey in high quality patches; shrubs understorey is rare. FOG understands that the definition may include patches where the understorey has gone 'troppo', and patches devoid of trees, 'secondary grasslands'.

Listing means that environmental impact statements will need to be prepared for any development that potentially impacts on this community. A recovery team will need to be established to prepare a recovery plan.

Conservation Management Network

While physically reuniting grassy ecosystem fragments is a long way off, a conservation management network (CMN) is a useful model to hasten protection and effective management of remnants. The concept of a CMN has been developed and is successfully working for Grassy Box Woodlands of the western slopes of NSW. NPWS has receiving funding to establish a CMN for grasslands and grassy woodlands in the Southern Tablelands.

The CMN would allow landowners and managers that have various conservation management agreements in place (eg Joint Management Agreements, Voluntary Conservation Agreements) to join the CMN and to share information on management issues. The CMN would include the services of an extension worker, publish regular (eg half yearly) newsletters, and maintain a database about the sites. Details such as how the proposed ACT and Monaro CMNs will fit into the overall structure are still being considered.

Management kit

After we have been learning things the hard way, Josh Dorrough, David Eddy, Rainer Rehwinkel and Sarah Sharp are getting together to put together a management kit for grassy ecosystems, funded under a WWF/NHT Grassy Ecosystem Grant. The aim of the kit is to assist landowners and managers to identify native plants and vegetation communities, present information on conservation management, facilitate defining objectives and outcomes, provide decision strategies, suggest monitoring measures, outline restoration methods, present case studies, and provide a list expert help. The authors will be seeking comments on the draft kit in the first half of 2002.

For more information on any of these issues, please contact Rainer Rehwinkel, Threatened Species Unit, NSW NWPS Southern Directorate, PO Box 2115, Queanbeyan NSW 2620. Phone (02) 6298 9745; fax (02) 6299 4281; e-mail rainer.rehwinkel@npws.nsw.gov.au.

Riverina Highlands and Mulwaree to Monaro: A Personal View

Alan Ford

This is a personal perspective of the Riverina Highlands and Mulwaree to Monaro field days organised by NPWS and FOG, an earlier report of which appears in the News Roundup.

Riverina Highlands

October 17 saw the series of field days commence at crown land on what is known as Yaven Hill to the west of Adelong. It attracted around 45 people to what is a stunning little remnant. Seven orchids were spotted without really trying, two species of *Dianella*, one in the higher forested zone and the other in the woodland, Yam Daisies (*Microseris lanceolata*) as common as dirt, and so it went on.

The second site, about an hour down the road, was Rosewood Cemetery, a real credit to the managing committee. This little gem contained a range of native plants and the place appears to be well managed to assist in the continuing prominence of the native vegetation.

Of course, these days are not just meant as field excursions but contain sessions on grassland recovery plans, grassy box woodland vegetation, conservation management networks, the grassland management kit and FOG. At Yaven Hill one expert provided a tale of soil degradation and illustrated it by examining soils in lightly and heavily grazed areas.

Yass-Boorowa

On 23 October the party headed north to Nanima Travelling Stock Reserve. It is usually fairly interesting but on this occasion there was more on the adjacent road reserve than on the TSR itself. Whether that is the vagaries of the season or the effect of the timing of recent stock grazing is a moot point. It does have distinct vegetation sectors on what is a fairly small piece of land - forest, a more open woodland and a wet swampy area. There are problems such as a salt scald, now fenced off to protect the area as it recovers and, in the wetter section, an infestation of the dreaded Chilean Needle Grass.

On to Pudman Creek TSR in the afternoon. This was a spectacular TSR with a range of vegetation, including Yass Daisy *(Ammobium craspedioides)* and Blue Devil. But management is the name of the game on these visits and we heard from interesting people doing interesting things, including one from Orange who happened to be in the vicinity and one local farmer who was interested in restoring the vegetation to bring back a range of finches that had disappeared in recent years.

Goulburn-Collector

I missed Gundaroo-Sutton-Crookwell legs, but I caught up with Rainer and Geoff at Collector TSR on 30 October. On display were lots and lots of Lemon Beauty Head *(Calocephalus citreus)*. This was followed by a brief stop at the spectacular Gundary TSR, just south of Goulburn. This giant among little gems contains the Button Wrinklewort (*Rutidosis leptorhyncoides*) among other things. That day concluded with a visit to an innocuous looking area just north of Goulburn known as Kenmore Dam Woodland. It showed that if you search hard enough in the hinterland there are still special places close to the towns. All it needs is appropriate management for preservation.

Bungendore-Tarago

On a very very windy 31 October, the party commenced at Turallo, a new nature reserve outside Queanbeyan. The survival of Golden Cowslips Orchid (*Diuris behrii*) and the presence of Blue Devil everywhere provided an indication of a low intensity grazing regime and a tribute to the survival of the native vegetation. A truly amazing place which will require careful management to survive. We then drove to Duck Flat TSR and were blown away by the wind. We observed a Yellow-tailed Black Cockatoo literally flying backwards at one point.

Braidwood

And the pace is getting lively by 6 November 2001. A paddock of Themeda, on "Nithdale", was subject to some grazing, but with orchids galore and a range of other native vegetation, an example of how to manage for production and conservation. While not on the schedule, this was followed by the stunning cemetery at Majors Creek, mown to the right height some time ago and now producing little fields of a purple Diuris (yet to be described), a Caesia, to say nothing of the Thesium in a quiet corner. The day concluded with a visit to Long Flat Reserve and a neighbouring property at Majors Creek.

Queanbeyan

Botanising in the rain was the experience for sixteen people at Gale Precinct near Queanbeyan on 7 November. A spectacular array of orchids with a large population of Blue Devil made for an interesting remnant. It has a Yellow Box woodland on the higher flat ridge with a Scribbly Gum/Red Stringybark community below that on the slopes and another Yellow Box community on the flat ground below that. Quite strange to find a Yellow Box community above the others, but probably the result of better soils on the wide ridge at the entrance to the site. The afternoon was taken up with a visit to Royalla TSR, with its Themeda/Poa base and its own special Copper-wire Daisy, not a bad spot for a grassland freak.

Canberra

I attended the second of the Crace Nature Reserve sessions, home in the ACT to a legless lizard *(Delmar impar)*, and an important place for flora as well as vertebrate and invertebrate fauna. The afternoon concluded with a short presentation by Roger Farrow about the relative merits of Austrodanthonia grasslands, rich in invertebrates, and Themeda based grasslands which are apparently much less rich. The reserve is a series of patches of exotic flora and native flora managed under a pulse grazing regime which attempts to maintain the biomass at a reasonable level for both flora and fauna. It is one of the great experiments in the country, aimed at preserving one of the city's hidden assets.

Cooma

Quartz Hill, the Wilkinson property south west of Cooma. Rain, sleet, and a biting wind did not stop the quite considerable party from wandering over these marvellous sites (20 November), and appreciating their Hairy Button *(Leptorhyncos elongatus)*, Blue Devil and three species of Swainson Peas plus other things to numerous too mention. Our thanks to Bob and June for the invitation, for lunch and for preserving these marvellous native vegetation sites.

I did not get to the Nimmitabel leg next day, which I understand was a mixed day weatherwise (warm and dry and then very cold and windy) but very rewarding for the scenery and flowers.

Adaminaby-Beloka

The Old Cemetery at Adaminaby, a stunning drive accompanied by Hoary Sunray (*Leucochrysum albicans* var *tricolour)*, everywhere, completed by examination of a site with two species of Copper-wire Daisy (*Podolepis* spp). The trouble was we kept adding to the plant list, the additions including *Leptorhyncos elongatus*. The Snowy River Shire was generous with their time and resources and we went on to Beloka Cemetery. Only two *Swainsona* species in this lot. The party spent some time with Shire officers discussing management and mowing regimes to best address both biodiversity and local concerns about management. A truly stunning little site!

Jindabyne-Dalgety

Two days out there on the end run. The massively impressive Bibbenluke Common was the first site visited on 4 December. Swainson Peas, Podolepis and Leucochrysum daisies, to say nothing of Australian Anchor Plant - all in the cold and rain. This was followed by Steve's TSR, under Mt Delegate, not far from the Victorian border. We just kept adding to this list, a new leek orchid species, *Thesium australe*, Yellow Centaury *(Sebaea ovata)*, a truly awesome place, showing the range of diversity that may have inhabited the landscape. From there the party dashed down the road to McKay's TSR.

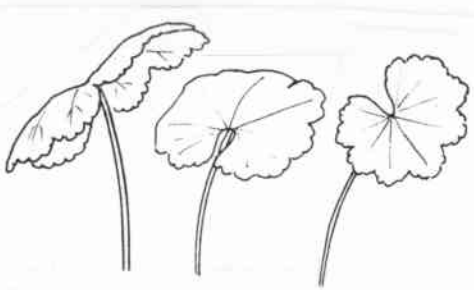
Wednesday 5 December concluded the program with a visit to Cobbin TSR (with me trying to learn my Swainson Peas) and the quietly impressive Numbla TSR, Blue Devil in a rich plant environment threatened by the fields of thistles next door.

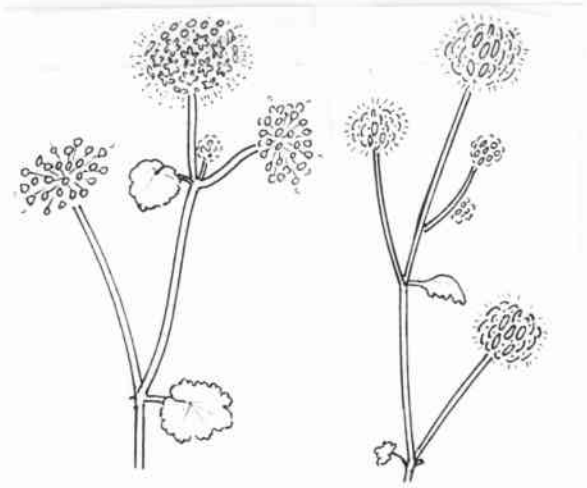
A Penny for Your Worts

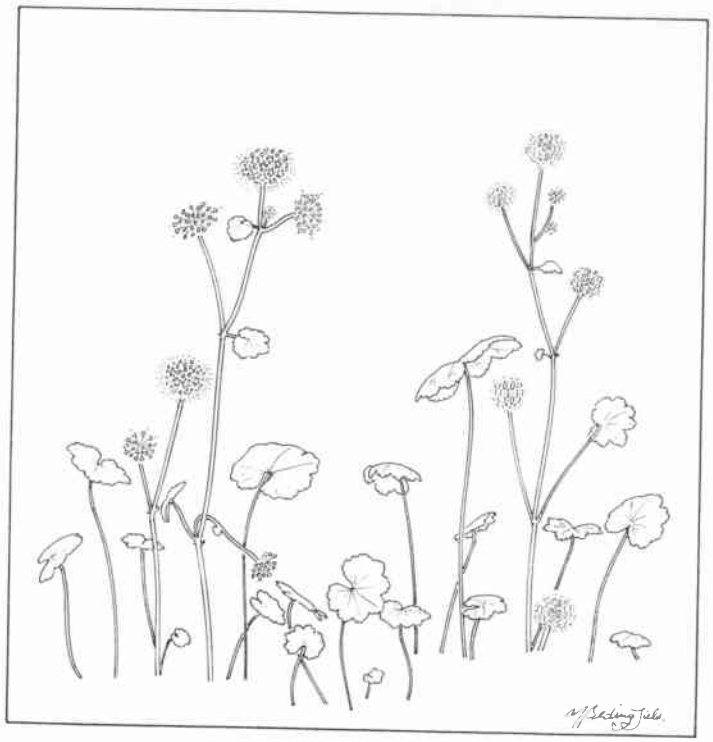
Michael Bedingfield

Stinking Pennywort *(Hydrocotyle laxiflora)* has a poor reputation and seems quite unspectacular, but on a closer look it is an interesting and visually attractive plant. However, sometimes you have to put a peg on your nose to appreciate it, because the yellow/green flowers emit an unpleasant odour, especially when wet.

The flowers are tiny, with 30-50 grouped in spherical heads up to 25 mm across. They have male and female forms, both occurring on the same plant. The main stems of the plant are underground (rhizomes) and leaves arise as single stems above the soil, sometimes growing densely to form a mat. The flower stems are more complex and taller, up to about 15 cm. This is a good method of survival and the plant is tolerant of high levels of disturbance.







Hydrocotyle laxiflora
Stinking Pennywort
Size: x½, Left: ♂, Right ♀
© Michael Bedingfield, 1999

The derivation of the name *Hydrocotyle laxiflora:* from hydro, because this genus has an affinity with water; cotyle meaning cup, for a small hollow in the middle of the leaf; laxiflora meaning loose or open flowers. This pennywort is common in grassy woodland and is widespread in the region, and is often found in a bit of shade or among rocks. It is worth a closer look.

The drawings show the whole plant drawn at a fifty percent scale, the flowers (left female, right male) and leaves are drawn to one hundred scale.

Locking-up is Not the Answer To Regenerating Native Grasslands

Alison Bowman, NSW Agriculture, Trangie

The view is often put these days that to "lock country up", ie to exclude grazing stock, is the key to regenerating native vegetation. In this article I would like to present a case for an alternative point of view for one grassland community.

Locking-up some grassland communities can actually be detrimental to community health. It will lead to large, inert perennial grass plants (ie they just shut-up shop). These inactive plants just eventually die. Locking-up also prohibits the recruitment of new plants and leads to a general decline in diversity of perennial grass species found in that community.

The example of a grassland community to which this applies is Curly Windmill *(Enteropogon acicularis)* Grassland found on the hard-setting red soils of central western NSW. These grasslands contain a number of other native perennial grass species including Wallaby Grass (*Austrodanthonia caespitosa*), summer grasses *(Digitaria* species), Box Grass *(Paspalidium* species), the perennial lovegrasses (*Erargostis* species), native panics (*Panicum* species), spear or corkscrew grasses (*Stipa* species) and the biennial Windmill Grass (*Chloris truncata).*

These perennial grasses are interspersed with annual forbs and grasses, most of which are 'naturalised' (ie non-native species that

act like native species as they spread and grow without human intervention). Annual species dominate in certain seasons as they are usually temperate or cool season species that grow when the mainly spring/summer growing perennial grasses are dormant or have slow growth. Visually, in these cooler months, it appears that there are few native species and the "native grassland" is called degraded. However, there can often be grass butts that lie dormant for long periods and plenty of seed waiting for the right recruitment conditions that will change the grassland composition again. These fluxes in composition can occur with every change of season.

Research was commenced by NSW Agriculture in early 1999, in conjunction with local landholders, in the Trangie/Warren region of central west NSW to investigate grazing management strategies that could be used by landholders to improve the composition of native grasslands. Four sites have been established on properties in the region that are situated in these Curly Windmill Grasslands. These sites are on properties where landholders felt that the density of desirable native perennials had declined to a point where grassland paddocks were less productive and stable than they should be and that weeds were dominating the pasture base.

At each site a range of seven grazing management strategies have been imposed with the aim of finding those that will help increase the density of native perennial grasses. These strategies range from set-stocking as part of the landholder's paddock, through to strategies that involve locking stock off at key times and to the opposite extreme, locking areas up permanently. The sites have been up and running for three years with seasonal monitoring of plant cohorts.

In the first year in the locked up areas, native perennial grass plants responded by continued growth with each rainfall event until the plants were very large and set seed. For the next two years those same plants stayed in that state, with little new growth and very few have flowered or seeded again. Old dry material remains on the plants and they have become inactive. By the third year a number of curly windmill grass and spear grass plants had died. During these same three years no new seedlings of perennial grasses have been recorded in the locked up plots despite the low initial plant densities and the good summer rains.

In contrast, areas that had managed grazing applied to them (ie they were locked up if plants became stressed in any way or started to suffer from grazing pressure), had constant recruitment of new plants, particularly windmill grasses, wallaby grass and spear grasses. Although not all survived, in general the density of native perennials has slowly increased in these areas.

These areas of managed grazing have not been locked up for long periods of time or frequently, but usually at a couple of key times over the summer. The lock-up operates as a form of targeted rotational grazing based on the utilisation levels (how much of the plant the animals have removed) of the grasses.

The original grass plants in the grazed areas have never reached the size of those in the ungrazed areas but they have flowered and seeded numerous times (usually twice a summer when allowed) and have produced constant green leaf. Young green leaf is also the key to animal production as it is provides higher quality feed than mature leaf, stems or seed heads

It is likely that the grass species in this grassland community have become adapted to grazing and that the community that now exists will respond to grazing management. If the desire is to keep the whole spectrum of native grass species found in these grasslands, then managed grazing is probably the key. Locking these areas up will certainly lead to a reduction in native grass species diversity in the short-term that may be hard to recover even in the longer term.

This article was publishes in a recent issue of Stipa.

A FOG Conservation Strategy

Ground Storey Reporter

FOG has been considering for some time just what its overall conservation strategy should be. This issue was moved up a peg or two, when we were asked to make a submission on a *Conservation Strategy for the Southern Tablelands*, a NHT funded project being undertaken by the NSW and ACT Governments.

Ground Storey considered that it would be useful to provide a summary of FOG's ten page submission to stimulate discussion of what FOG's conservation strategy should be.

FOG commenced its submission by stating that any strategy should be based on a clearly stated vision and set of objectives. The vision could describe a landscape that maximises the extent of natural vegetation communities, offering the greatest protection for threatened species, and allowing economic activity focused on creating wellbeing and equity, or some such.

The objectives should, in FOG's view, include: reversing the decline of threatened communities and species; harmonising conservation objectives (biodiversity, revegetation, salinity, global temperature change, etc.) and social objectives (based on reconciliation and equity); restoring the natural vegetation to the landscape; providing a predictable economic environment; and involving stakeholders. In turn, these objectives need to be based on a clearly explained scientific framework and agreed social objectives.

The strategies, in FOG's view, should aim to: strengthen threatened communities and species (biodiversity); make biodiversity the centre piece for conservation strategies (eg revegetation, salinity and temperature change); harmonise fire, land and water management; link conservation, economic and social issues; restore remnants, create corridors, and return land to natural vegetation (where such land is not required for some other purpose); focus energies on weed and feral animal control; develop infrastructure to underpin previous strategies; fill in the knowledge gaps; and ensure community education and participation and public accountability.

The foregoing emphasises that the threatened communities and species strategy is central to conservation and is not just one of many conservation issues. In our view, there is a new wave of thinking about conservation which overcomes some of the pitfalls in earlier thinking, and we must be prepared to say so and to change our patterns of behaviour accordingly. However, we are only beginning to understand this new thinking and there may be many gaps in our knowledge to fill in.

FOG believes that the emphasis on threatened species and communities is central, and this strategy has many runs on the board. On the other hand, FOG's experience reveals shortcomings in this strategy that need addressing. Therefore the approach needs strengthening. Areas that need strengthening include: finding ways

to overcome anomalies, putting a greater focus on restoring and linking remnants, linking vegetation and animal strategies, moving beyond a purely vegetation focus, putting a greater emphasis on naturally functioning ecosystems, recognising 1788 as a benchmark, and reconciliation with Indigenous peoples. The latter has historic, current and future dimensions that are finely inter woven with conservation.

Native vegetation communities and their animal inhabitants are our store of biodiversity and our best protection against salinity and temperature change. However, biodiversity, salinity and global temperature change seem to be treated as separate objectives with differing over-simplistic solutions. Revegetation is at the core of restoration of biodiversity, but it needs to be re-focused to maximise biodiversity and not to destroy or limit it. Revegetation protocols need to be developed, and somewhat urgently.

Weeds and feral animals are a major threat to conservation. We need to support efforts in this area, get governments to manage their own lands properly and also look at some of the economic and social causes of weeds. This illustrates the point that we need to harmonise conservation with economic and social policy.

We need to look at strengthening infrastructure to avoid many 'Catch 22' situations in conservation. Among suggestions are small government units to develop restoration infrastructure and possibly a regional garden focusing on ground-storey plants. The latter could have many positive scientific and practical spin-offs. We need to keep under examination the most effective means of public education and involvement and government accountability.

If you want a copy of FOG's submission, please contact Geoff Robertson (for contact details see back page).

The Importance of Native Grasses in Australia

Greg Martin

We often overlook important vegetation types in the environment for more newsworthy symbols such as rainforests. The significance of the loss of native grasses over much of Australia is largely ignored.

Michael Hyde writes "they were once extensive, and contributed significantly to the rapid establishment of settlement in the central districts of South Australia... Most accounts of the early explorers and surveyors contain glowing references of lush pastures, and large unobstructed meadows suitable for ploughing". The exploitation of the grassy communities throughout Australia was rapid and comprehensive.

A Victorian pastoralist in the late 1800s observed: "throughout the continent the most nutritious grasses were those originally the most common; but in consequence of constant over-stocking and scourging the pastures, these, where not eradicated, have been very much decreased, their place being taken by inferior sorts and weeds introduced from Europe and Africa."

Australia's native grasses are mostly perennial and form clumps or tussocks. These clumps protect the root systems from drying out enabling them to survive the sometimes sporadic and variable rainfall. The early grasslands also contained lilies, daisies and forbs and in between the tussocks lichens and mosses grew which bound the soil and recycled the nutrients. The grasses provided seed for birds such as quails, pigeons and finches. The leaves and flowers were eaten by insects and grubs, which in turn were food for reptiles and birds. Many of our endangered animals thrived in these areas such as Bettongs, Bandicoots and Bilbies eating the tubers, fungi, seeds and insects. They in turn with their foraging scratched and dug the soil, which aerated it, and allowed the rainfall to penetrate deeply, providing a perfect bed for seeds to germinate in. This natural biodiversity however was changed.

In hot, dry, arid Australia, early South Australian settler Fred Ragless records in 1881 what the vegetation of an area and its rapid destruction was like. Callabonna was situated on the shore of Lake Callabonna near the Flinders Ranges in SA. Fred records, "it was one vast and never-ending sea of sand ridges, all trending in a north-east and south-westerly direction. The timber, if such it could be termed, grew on the ridges and consisted of pine, mulga, and needle-wood of a more or less stunted description. One of its redeeming features, as a horse and cattle country, was strong cane-grass that grew on the ridges. After summer rains this grass was a marvellous fattening fodder for all stock. It produced a long succulent leaf like that of a wheat plant, and was a prolific seed bearer, the seed being about the size of rapeseed. At intervals large cane-grass swamps were met with, into which the water collected during the wet seasons. The species of cane-grass that grew in these swamps reached a height of five or six feet. Horses and cattle were particularly fond of the papyrus-like tassel that contained the seed. The natives also collected the seed and ground it up for food. Salt, cotton and blue-bush grew sparsely in the valleys between the ridges. In all seasons, except droughty times there was an **abundance of winter and summer grasses**". Fred's description continued in glowing terms. "I have ridden for days through miles of flowering winter herbage, and during early summer, through miles of blazing parakeelya. I have termed it blazing, because it gives that impression, the flower being a bright red".

In 1888 Aborigines caught the first rabbit. Fred was soon paying them for rabbit scalps, but they increased at such a rate that payment had to cease. In 1895, 50,000 sheep were shorn on *Callabonna*, but within two years, drought and overstocking had reduced the number to 14,000. During one night of 1899, Fred killed 1,400 rabbits by poisoning the water. He wrote "with the drought and the ravages of these pests (rabbits), which stripped the scanty bushes of every green leaf till they were nothing more than bundles of bare sticks, the surrounding country presented an appearance of desolation that defies description". In 1899 Fred surrendered Callabonna Station. The battle was lost. Continuous overstocking and the relentless invasion of rabbits had reduced the land to being virtually worthless. It would never recover.

Most of Australia has been badly damaged. That process has been **continual and relentless** even in areas such as our National Parks. In many regions it is still occurring. Healthy vegetation is necessary for a healthy animal population. By fencing its sanctuaries and eradicating all feral animals, Earth Sanctuaries aims to bring species back into its protected areas and values vegetation types such as the grasses, as important as any other.

The very best to all our members and readers in 2002

FRIENDS OF GRASSLANDS INC
Supporting native grassy ecosystems
Address: PO Box 987, Civic Square ACT 2608
Web address: http://www.geocities.com/friendsofgrasslands

Your committee:

Geoff Robertson	President	6241 4065 (h & fax)	margaretning@primus.com.au
Michael Treanor	Vice President	6281 4168 (h)	micwin@bigpond.com
Benjamin Whitworth	Secretary	-	benjamin.whitworth@brs.gov.au
Alan Ford	Treasurer	-	alford@cyberone.com.au
Rosemary Blemings	Committee	6258 4724	roseble@tpg.com.au
Di Chambers	Committee	-	di.chambers@abs.gov.au
David Eddy	Committee	6242 8484 (w) 6242 0639 (fax)	deddy@ozemail.com.au
Richard Langdale-smith	Committee	-	langdalesmith@bigpond.com
Kate Nielsen	Committee	6286 8525 (h)	kate.nielsen@abs.gov.au
Margaret Ning	Committee	6252 7374 (w) 6241 4065 (h & fax)	margaretning@primus.com.au margaret.ning@abs.gov.au
Kim Pullen	Committee	6246 4263 (w)	kimp@ento.csiro.au
Dierk von Behrens	Committee	6254 1763 (h)	dierk.von.behrens@immi.gov.au

Membership inquiries: Please contact Margaret Ning whose details appear above.

FRIENDS OF GRASSLANDS NEWSLETTER

You have read this far, so we must have kept your interest. If you are not a member of Friends of Grasslands why not subscribe to the newsletter? It comes out six times a year and contains a lot of information on native grassland issues.

You can get the newsletter by joining Friends of Grasslands. You do not need to be an active member - some who join often have many commitments and only wish to receive the newsletter.

However, if you own or lease a property, are a member of a landcare group, or actively interested in grassland conservation or revegetation, we hope we have something to offer you. We may assist by visiting sites and identifying native species and harmful weeds. We can suggest conservation and revegetation goals as well as management options, help document the site, and sometimes support applications for assistance, etc.

Of course you may wish to increase your own understanding of grasslands, plant identification, etc. and so take a more active interest in our activities. Most activities are free and we also try to arrange transport (or car pool) to activities.

If you are already a member, why not encourage friends to join, or make a gift of membership to someone else? We will also send a complimentary newsletter to anyone who wants to know more about us.

HOW TO JOIN FRIENDS OF GRASSLANDS

Send us details of your name, address, telephone, fax, and e-mail, etc. You might also indicate your interests in grassland issues. Membership is $20 for an individual or family; $5 for students, unemployed or pensioners; and $50 for corporations or organisations - the latter can request two newsletters be sent. Please make cheques payable to Friends of Grasslands Inc.

If you would like any further information about membership please contact Margaret Ning, or if you would like to discuss FOG issues contact Geoff Robertson. Contact details are given in the box above.

We look forward to hearing from you.

Friends of Grasslands Inc
PO Box 987
Civic Square ACT 2608