News of Friends of Grasslands

supporting native grassy ecosystems

September - October 2000

FOG'S COMING EVENTS

SPRING 2000

Thursday 7 September – National Threatened Species Day FOG will commemorate this occasion again on Radio Hill (Cooma Common) this year. A party including WWF, FOG, NPWS, local people and media will be able to see the progress FOG has made in woody weed control as part of establishing a native grassland reserve on this important site. A number of people will be available to guide others through the site and help identify and explain its features. Proposed starting time is 11:00 am at the top of Radio Hill. Enquiries to David Eddy on 6242 8484.

Saturday 23 September, 2pm - Another Conder Wander We have chosen Mount Rob Roy Reserve for our afternoon walk. We shall meet at the (Parks and Con.) triangular gate just off Tom Roberts Ave, from where you can see a dirt track winding up past a water tank to Mount Rob Roy.

Saturday 7 October – White Box Woodlands at Cowra Dr Donna Windsor will take us to several Grassy Box Woodland remnants in central-western NSW. This will be an opportunity to see something a little different and compare our experiences. Donna has an article in this newsletter and we will publish a second article in our next issue. We plan to meet Donna in Cowra at 10am: so we'll depart Canberra at 7.30am from the carpark of the Gungahlin Lakes Golf Course at the intersection of Gundaroo Rd and Gungahlin Dr. Carpooling available.

Saturday 28 October – Halloween northern grasslands tour Meet outside the Lake George Hotel in Gibraltar St, Bungendore (parallel to the coast road) at 9am. We'll be led by Rainer Rehwinkel who writes this about his intentions for this year. "This year's "northern" trip is not so much northern as eastern – the Braidwood area. My last season's surveys revealed some true gems in the TSRs and other remnants in this region. Our first stop will be the tiny, but lovely Six Mile TSR just south of Bungendore. Here we will see a profusion of *Podolepis* in Yellow Box grassy woodland. An optional stop at Turallo would be possible for those who haven't seen this gem - our newest proposed nature reserve. Then on to the Kings Highway to Boro, where we can spend a good deal of time at Reedy Creek TSR; large expanses of diverse *Themeda* grassland and Snow Gum woodland. After a lunch stop at Braidwood, it will be on to Back Creek TSR. This should be the day's highlight – extensive wetlands, Snow Gum woodlands and *Themeda* grasslands with some very rare and unusual plants. If time permits, we'll stop at Doughboy TSR on the way home (after afternoon tea at Braidwood, of course!).

Saturdays 4 AND 18 November 2000 - FOG RAIL EASEMENT SURVEY Plans are still progressing for a rail easement survey of areas between Williamsdale and Cooma. The survey will be led by Rainer Rehwinkel, David Eddy, Sarah Sharp and Andrew Paget. Please contact us if you can help us with this activity. Specifically, we are looking for help on the Saturdays with identification, data recording, photography and transportation, and later with the compilation of results and final report. So, look ahead at your calendar and contact Margaret if you can help with any of the above.

Saturday 11 November – Mulligans Flat grassland Mulligans Flat contains large areas of open forest, grassy woodlands and grassland areas. We'll visit the grassland this year.

Saturday/Sunday 5/6 January 2001 – Weekend camping visit to Tantawangalo (half an hour south of Nimmitabel) to see the newly-described Wilkinsons' Leek Orchid *(Prasophyllum wilkinsoniorum*) growing in a basalt cap grassland within Tantawangalo National Park. This orchid was discovered by Rainer Rehwinkel last December, and we shall feature it in a future newsletter.

ALSO OF INTEREST

Brooks Hill Reserve Spring Events Program Preliminary dates are:

22 October: Birds, bugs, bacon and eggs
10 November: Night life (spotlighting)

3 December: Removal of *Phalaris*, woody weeds and litter on main path. More details on contacts and times later.

Major FOG Workshop and Case Study Trip: Friday 1 and Saturday 2 December 2000 Cooma and Monaro. This provides an opportunity to hear some of Australia's best grassland conservationists and to see some of Australia's best grassland sites. It is at a very low cost and you can pick and choose what you want to do including:

- Attending the one-day workshop - $15 including registration, morning and afternoon tea and a light lunch.
- Attending the dinner with speaker - $17.
- Participate in the case study half day trip including lunch - $27
- Obtain a copy of proceedings - $8
- Total $66.

We have organised reasonable deals for accommodation in Cooma and can help out with transport. Plus we will help arrange additional visits to grassland sites, especially for visitors outside the region.
Workshop brochure is enclosed. Please complete the application form contained in it and return it to us. Please assist us by promoting the workshop. We can get more brochures to you. Inquiry details are in brochure.

For information about activities (including carpooling details), please contact Margaret Ning on 6241 4065 (home) or 6252 7374 (work).

IN THIS ISSUE

NEWS ROUNDUP

FOG Membership Growing

At our latest count, FOG had 139 memberships and allowing for family memberships, the actual number of FOG members now exceeds 150. Our very latest addition is Katharina Rose Inveen who has already visited Mugga Mugga to get acquainted with environmental issues, so Dad, with this additional assistance, we expect a really great newsletter. Congratulations to Heather and Will.

New Leek orchids

FOG members are delighted that a new orchid *Prasophyllum wilkinsoniorum* has been found on June and Bob Wilkinson's property near Tantawangalo by Rainer Rehwinkel. Its description was written up by David Jones of the Centre for Plant Biodiversity Research in the June 2000 edition of *The Orchadian, Official Journal of the Australasian Native Orchid Society* (web address www.anos.org.au). David describes ten new species of Leek Orchid found in south-eastern Australia. He describes the *P. wilkinsoniorum* as a robust species with large greenish-brown to reddish-brown flowers arranged in an untidy spike. At the type of locality this species grows in a low, flat, treeless plain (a basalt cap or frost hollow). He states that it is a distinctive species with unclear affinities. The article also states that the species has been "named after Bob and June Wilkinson, long-time farmers on the Monaro with strong conservation values. They purchased the block of land where the new *Prasophyllum* grows purely for conservation purposes."

Grassy ecosystems applications close 13 October

The WWF/NHT Devolved Grants for Grassy Ecosystems close on 13 October. Helen Ryan (in places assisted by David Eddy) has been touring the countryside to make people aware of the scheme. If you want to know more please contact Geoff Robertson or talk to David.

African Love Grass strategy

Following the development of a control strategy for African Love Grass in the Murrumbidgee River Corridor in 1998/99, ACT Government funding has been provided to purchase materials and equipment to establish a demonstration site on a rural property in the corridor. The emphasis will be on non-chemical control using sustainable grazing methods. Murramore has been chosen as the site and a vegetation survey will be undertaken before portable fences and crash grazing takes place. The site will be continually monitored over the next several years. FOG has agreed to assist with monitoring five demonstration paddocks to identify any changes in species composition as a result of rotational grazing. A yearly report will be produced – the first in June 2001. If you are interested in being involved, contact Geoff Robertson. FOG obtained a species list for the Point Hut to Pine Island East Bank, which shows that this is a highly diverse area (pity about the Love Grass). The list shows sixteen species of trees (12 native, including eight introduced Eucalyptus, and 4 exotic), 32 species of shrubs, heaths and mid-storey plants (25 native/7 exotic), 88 grasses and herbs (55 native/33 exotic), 14 species of aquatic and semi aquatic species (12 native/2 exotic), and four parasites (3 native/1 exotic).

Urban Services replies

In our last newsletter we mentioned that we had written to the Department of Urban Services regarding two of the sites listed in Action Plan 1. We mentioned that Site 4, a small site in Gungahlin had been demolished and that construction work was taking place in the vicinity of Site 10 which is to the north of Mitchell. Since then we have received two replies from the Department and a further letter on statements made in our last newsletter.

We welcome this correspondence. First the government's letters assist in clarifying government policy and achievements. Second they indicate that community concerns are listened to. Third Environment ACT has given a clear signal that its staff are happy to answer questions on the status of any site. In this news round up we are quoting fairly extensively from these letters to provide members with a better understanding of the ACT government's position.

Stray Leaf - Site 4

Site 4, a *Stipa* grassland, was identified in Action Plan 1 as having low botanical significance (containing native grasses but few forbs). In the Action Plan, such sites were recommended for protection within the urban fabric where feasible. Quoting from the Action Plan (page 19), "planning and site management mechanisms will be applied as required to sites of low conservation value, so that wherever possible, the natural grassland values are conserved in the context of the primary land use." The Stray Leaf site was recommended in the Action Plan to be protected as part of the road reserve.

In February 1997 Environment ACT was asked to provide comment on the proposed gas pipeline extension south of Mulligan's Flat and along the road reserve to the west of Gundaroo Road which includes Site 4. As the site was located within the road reserve it was not considered possible to retain the site within the urban fabric. The government's letter adds, while it is important to retain as much of the natural vegetation as possible, especially when it is identified as an endangered community, consideration also needs to be given to the primary land use of the area and the resources required to maintain small, highly fragmented sites of low quality. In this instance it was considered that resources would be better spent on maintaining sites that were larger and of higher conservation value. Site 4 is less than 5 hectares and better examples of *Stipa* grassland exist nearby.

Site 10

Concerning the impact of road works near Site 10, the government has advised that, prior to the road work commencing, there was extensive consultation between relevant government agencies, including Environment ACT, Planning and Land Management, ACT Roads, ACT Stormwater, ACTEW and ACTION. The aim was to investigate a range of options to determine the alignments of Flemington Road and Wells Station Road taking into account a wide range of constraints.

The agreed alignment, in its view, has mini-

mised impact on the grasslands and a small group of trees to the north, while meeting transport and engineering requirements. The resulting alignment will not fragment the grassland, although a small portion of the south-east corner will be lost. A stormwater retardation pond to the west of the grassland will be an integral part of the resulting open space. This is regarded as an optimum outcome.

Commitment to conservation

The government takes the view that one should look at the big picture. Its aim is to retain as many grassland sites that are assessed as being viable in the medium to long term, with consideration given to other areas with lower conservation value where these can be integrated into existing or planned land uses. Some areas of low value will require an unwarranted commitment of management resources that are then not available for sites with a far higher conservation value. Consideration is also given to conserving the grassland habitat of plants and animals identified as being threatened with extinction.

Its achievements to date include the creation of four reserves in Gungahlin and Dunlop to protect 206 hectares of native temperate grassland. A high level of management effort has enhanced the quality of these areas significantly. Threatened species have been found in these areas subsequent to reservation, thus emphasising the importance of protecting significant areas of grassland. Memoranda of Understanding have been signed with three major Commonwealth landholders (Department of Defence, National Capital Development Authority and CSIRO). These require a commitment to a high level of conservation management of grassland sites, thereby protecting a further 550 hectares of moderate to high value native temperate grassland. Forty hectares are being retained as Urban Open Parks and Spaces designed to maintain conservation values. Negotiations are continuing for the protection of the remaining grassland sites.

Environment ACT is an active participant in the planning process for the Very High Speed Train and the proposed prison. However, it points out, due to previous government commitments and many years of forward planning for the development of Canberra, Action Plan No. 1 anticipated that not all grassland sites, particularly those with lower conservation value would be saved.

Heritage listing for Conder 4A

In our last newsletter, it was mentioned that we understood that Conder 4A has received interim listing under the ACT Heritage list. Environment ACT has advised FOG that a nomination for the Conder 4A listing has been received and it is subject to the assessment processes of the Heritage Council. The Council may then decide to place the site on the Interim Places Register.

High country still draws us

A warm heater, good company, and an afternoon tea at Mugga Mugga were the setting for our (FOGers and Field Natters) slide afternoon on 8 July. The theme was the high country and we shared the experiences of three people who have spent many a long period there. Michael Treanor, now we hope permanently ensconced as a ranger in the ACT, showed us slides of the Victorian high country based on his several months as a ranger there earlier this year. He showed a variety of landscapes, vegetation communities and plants. For those who had made the trip to the Victorian Alps earlier this year this was a pleasant reawakening. Michael Bedingfield's slides showed the NSW Alps and were based on his many walks of 20 years ago. In those days he was more into landscapes and less focused (as he is now) on individual plants. His artistry was also apparent capturing both the landscapes and those incredible alpine skies. Ian Haynes, a walker of the Alps for many a year, brought yet another perspective showing spectacular shots of landscapes, gnarled snow gums, and weather – not to mention landscapes, vegetation communities, and plants. His most memorable shots are his ice caves. He and Dierk also gave accounts of their recent (winter) walk through this country, Dierk carrying 70 pounds and Ian 130. According to Dierk, Ian's extra load was taken up by cameras – well we were the beneficiaries of all those extra pounds. Many thanks to our slide presenters for making this county so familiar and enticing.

New Weapon for Serrated Tussock

The National Registration Authority for Agricultural and Veterinary Chemicals (NRA) has approved registration of a new product that will help combat several notorious weed species including Serrated Tussock. This was announced by the Parliamentary Secretary for Agriculture, Fisheries and Forestry, Senator Judith Troeth. The new product Taskforce® is a water soluble, liquid herbicide produced by Vee Dri Australia that can control Serrated Tussock and certain other grasses in both pasture and non-crop situations. Serrated Tussock is probably the best-known of a prolific and widespread group of weeds that have been difficult to combat since the herbicide Frenock® was withdrawn from the marketplace in mid-1999. Taskforce® is also effective against African Love Grass, Chilean Needle Grass and Giant Parramatta Grass. The Senator stated "this is an important new product to come onto the market and will be used widely in Australia on these weeds." Serrated Tussock was listed in the register of weeds of national significance last year.

Taskforce® contains the active ingredient flupropanate in the same concentration as Frenock®. The advantage of products based on flupropanate is that they act selectively against these weeds. While the NRA has given Taskforce® the go-ahead, and is satisfied that it meets all health, safety and environmental criteria, NRA considers that chemicals should always be regarded as only one of the weapons in our armoury, but when we have weeds as widespread and invasive as Serrated Tussock, farmers, local government authorities and land managers need every bit of help they can get. Further inquiries: NRA Peter Raphael (02) 6272 5412

WGWG

The Woodland and Grassland Working Group (WGWG) remains active but unfortunately, due to a clash of commitments and taking holidays, our intrepid reporters have not caught up with the latest developments. However, plans are well afoot to organise a workshop and to lobby on other issues. More news next issue.

Conder 9/Banks 3 Development

On 9 July, FOG wrote to Tony Winsbury (Project Manager for the Conder 9/Banks 3 Estate, Department of Urban Services) expressing our appreciation that the *Report On Public Consultation* accepted FOG's main suggestions for the protection of the native grassy woodland area near Eaglemont Retreat. We also raised a number of other issues to protect the grassy woodland when it becomes a reserve. These covered inadequate fencing to prevent motor bike access, dumping of rubbish, and inappropriate plantings, and we made a number of suggestions

to address these matters. Tony Winsbury contacted FOG and subsequently wrote us a letter. He welcomed these suggestions which, together with a number of others, are being actively pursued. We look forward to some good outcomes.

Radio Hill update

After six working bees to this site we can report that all Hawthorn plants have been cut down (apart from one or two we may have missed) and many Briar Rose plants have also been cut. Twenty three FOG and WWF members have been involved so far. The next part of weed management at the site will focus on preventing regrowth and seedlings being established, and also on the herb nasties.

FOG receives an ABN

This is not an award but like all non-profit organisations, we have had to apply for an Australian Business Number and we received ours on 13 June. In case you need to know it is 64 120 946 763.

ACID SOILS IN THE CANBERRA REGION

Margaret Ning

This was a well-organised and popular half-day field day held on Tuesday 20 June 2000. A healthy mix of around 60 farmers and agency employees attended. I was lured along by the impressive program of speakers even though I had never previously given soil issues a thought. However I knew that the Reedy Creek Landcare Group addressed very interesting topics (I had attended their willow workshop last year), and that Griffin Promotions ran a smooth show. I was not disappointed.

Major presenters included Kerrin Styles (Agronomist with ACT Parks and Conservation), Bill Schuman (Agronomist, NSW Agriculture, Queanbeyan), Chris Houghton (Consultant, Chris Houghton Agricultural), Peter Simpson (Regional Director, NSW Agriculture, Goulburn), and Stuart McMahon (Farming for the Future). Their presentations complemented each other, and discussion of native grasses often featured, as *Microlaena* and most *Austrodanthonia* species are acid resistant species. FOG even rated a mention, when Stuart McMahon gave us an example of groups he had facilitated for.

Australian soils are old and have been subject to weathering over millions of years which has encouraged leaching. The leaching process tends to acidify soils. Indeed, soils in the ACT and Southern Tablelands are inherently acid even before we introduce changes due to agricultural activities which generally increase acidification. However, because most agricultural production in the ACT is fine wool production, based on low inputs/ low outputs on native pastures, there is only a small proportion of ACT rural land with induced acid soils. Indeed, it was stated that the soils most at risk in the ACT are the special purpose paddocks used for hay or oats crops.

Acidification can be reversed by the application of lime, although liming may not necessarily be economical in a production sense. It may simply be that the application of lime will only be sufficient to prevent production and income falling, i.e. at least the property will remain productive. Another strategy for dealing with soil acidity is the use of plants that are acid tolerant. Peter Simpson suggested farmers should accept the situation of having high soil acidity and simply get on with managing their soils and pastures accordingly. In order to do this, a soil test should be carried out.

Acid Soil Action (ASA) which is a NSW Government initiative, encourages farmers to do their own testing. ASA provides instructions on soil sampling, subsidises tests and runs interpretation workshops on the results, generally through Landcare groups.

Chris Houghton stated that pasture issues should be top of every farmers' list, ahead even of labour efficiency or livestock productivity. He suggested farmers should learn to read their farm landscapes in relation to soil depth, soil structure, soil acidity, erodibility, slope, aspect and exposure. This knowledge will lead to better land use decisions once the different land classes on the property have been identified. Chris also encourages farmers to learn to identify pasture and weed species, map weed infestations, conduct soil tests every 3-5 years to monitor changes over time, and to develop a master plan with development strategies matched to the different land classes. He mentioned cases of native pastures growing on Class 3, 4 and 5 land on the hills and slopes, which kept stock alive in the drier times. These species included *Bothriochloa, Themeda, Microlaena, and Austrodanthonia*.

Stuart McMahon outlined aspects of the Farming for the Future program that helps participating families to gain the right skills and information to be able to plan the future for their families and farm businesses. If acid soils are identified as an issue, program participants will hear from specialists in acid soils identification and management. Management of the farm's acid soils can then be integrated into the overall farm business plan to ensure the effective use of the family's resources.

Peter Simpson also stressed that farmers need to know their soil condition, including soil acidity. He spoke against the use of monocultures in today's agricultural systems. He named *Microlaena* and *Austrodanthonia* as acid tolerant native grass species, which are fertility responsive and tolerant of grazing. *Bothriochloa,* on the other hand, doesn't like acid soils. Peter further mentioned native grasses, specifically *Themeda* and *Microlaena* when discussing grasses exhibiting strong growth over winter.

Literature handed out included the latest Australian Landcare Farm Journal (June 2000), an issue which focused on how landowners can better understand the importance of soil health in achieving sustainable land and water systems. We also received a set of the papers presented at the field day - which was blissful in that it minimised my note-taking efforts.

ECOLOGICAL INVESTIGATIONS OF MAISIE FAWCETT

continued

The following is the continuation of an article we included in the July-August 2000 newsletter. It was presented by Linden Gillbank on Scientific exploration of the botanical heritage of Victoria's alps: nineteenth- and twentieth-century contributions of Ferdinand Mueller and Maisie Fawcett, at a symposium on the Cultural Heritage of the Australian Alps held at Jindabyne, New South Wales, 16-18 October 1991.

The Pretty Valley exclosure

Fawcett's and Turner's quantitative measurements of grazed and ungrazed vegetation on the Bogong high plains since 1945 indicated that regeneration following the removal of cattle was sometimes extremely slow. However the Pretty Valley plots provided dramatic and unambiguous evidence of soil and vegetation recovery (Carr & Turner 1959).

Cattle are discriminating eaters. They graze selectively and include some herbs and shrubs as well as snowgrass in their diet. Since this includes many pretty wildflowers cattle have significantly reduced the prettiness of Pretty Valley, which was named by Gray's Cobungra stockmen in the middle of the nineteenth century. After the Pretty Valley exclosure was fenced, beautiful but palatable alpine daisies, especially *Celmisia* species, and the yellow alpine star-bush, *Australasia trymalioides*, were soon flowering in much greater abundance inside than outside the exclosure. Thanks to Fawcett's and Turner's endeavours, the prettiness of Pretty Valley, munched away for so long by cattle, was returning to one small acre.

Data from the Pretty Valley plots was included in a report of the Australian Academy of Science (AAS). An AAS Committee on High Mountain Catchments, which included both Turner and Costin, interviewed state officers involved in land management in the Victorian and NSW alps, reviewed the 54 scientific papers published on the alps, and, guided by Costin, inspected the NSW grazing leases in the Kosciusko area - where the activities of the Snowy Mountains Authority had sparked scientific interest in the ecological health of the catchment. Turner (1960:30) spent three months in 1957 collating published and field data on the vegetation of the alps in relation to soil erosion for the AAS report.

The report of the Australian Academy of Science (1957:16) noted that: In the extensive treeless parts of Pretty Valley the vegetation largely consists of an admixture of herbs (some introduced) and snowgrass forming small tussocks. This vegetation has poor catchment value, and there has been a good deal of sheet erosion. Local graziers were of the opinion that the poor quality of this vegetation was natural and was associated perhaps with soil deficiencies or with the severe local climatic conditions. Following the exclusion of cattle by fences eleven years ago, there was very little change in the fenced plots for three years. Since then, however, there has been a most striking and progressive improvement in the vegetative cover. The Snow Daisy in particular is tending to replace other herbs, and the whole aspect of the ungrazed plot is now completely changed. It appears almost certain that cattle grazing (with very occasional fires) over the last fifty years has led to the deterioration of this type of vegetation, which was widespread in the alpine areas. The result of fencing has been a considerable improvement in cover, accompanied by much greater flowering and seeding, and an increase in soil humus.

In 1958, a year after the publication of the AAS report, Fawcett (now Mrs Carr) and Turner completed their analysis of 12 years' Levy point data from the Pretty Valley plots and submitted two papers to the *Australian Journal of Botany (Carr* & Turner 1959). They provided the first published scientific evidence of the effects of grazing removal on Victoria's high mountain vegetation and soil, and the resultant water catchment capacity, and confirmed the interpretations of damage discussed in Costin's and the AAS reports. Now three important scientific reports highlighted the ill effects of grazing on Victoria's high mountain ecosystems.

At the end of 1959, Mrs Stella Maisie Carr left Melbourne for Belfast, where her fellow senior lecturer and husband had accepted an appointment to the Queens University.

Soil Conservation Authority (SCA) involvement

In 1949 Victoria's Soil Conservation and Land Utilization Act included provisions for the establishment of a Land Utilization Advisory Council as well as the SCB's successor, the Soil Conservation Authority. Under the act, on the recommendation of the Council, water catchment areas were proclaimed. This required the subsequent determination by the SCA of acceptable land-use practices on all land within the proclaimed area. At its first meeting in April 1950 the Land Utilization Advisory Council decided that the first water catchment area to be proclaimed under the 1949 act would be the Victorian catchment of the Hume Reservoir in which Maisie Fawcett had already carried out ecological investigations. Furthermore all important catchments to country reservoirs should be similarly treated (Thompson 1981:91).

The importance of the detailed ecological work of Fawcett and Turner reverberated across the State. In recognition of the need for a thorough understanding of the soils and vegetation prior to any determination of land use, the SCA's Research Division, for several years under Costin, proceeded to carry out a series of comprehensive and detailed regional land surveys across the state, including high mountain catchments. By 1960 most of Victoria's important water supply catchments had been proclaimed and the SCA had commenced surveys of the Glenmaggie, Hume and Eildon catchments. The report on the Hume Catchment (Rowe 1967) reiterated the findings of Fawcett, Turner and Costin. Subsequently the Mount Buffalo National Park and catchments of the Kiewa, Ovens and King rivers were surveyed. On the recommendation of the Land Utilization Advisory Council, the government pre-empted a recommendation of the AAS report and made the SCA responsible for land-use decisions in high mountain catchment areas (Downes 1962). By 1959 grazing was no longer permitted around Mts Hotham, Loch, Feathertop and Bogong, but the AAS recommendation of the complete exclusion of cattle in catchments above 4500 feet was not realised.

The involvement of the SCA in the Bogong high plains ecological investigations continued. After Mrs Carr's departure from Australia, the SCA continued to maintain and monitor the Rocky Valley and Pretty Valley exclosures, repairing damaged fencing and removing any offending cattle. It also continued the annual fence-dropping before the onset of the ski season (for skier safety) and refencing after the winter. In the 1960s and 1970s the SCA twice helped to bring Mrs Carr back to survey the plots.

In 1977 Victoria's Land Conservation Council (LCC), which in 1970 superseded the Land Utilization Advisory Council, reviewed land use in the alpine area. Both Mrs Carr and Dr Costin were commissioned to report to the LCC on the vegetation and soils of Victoria's alps. Their reports were influential in establishing a national park and also prompted a flurry of further research-botanical surveys, studies of the diet and behaviour of cattle, and continued ecological investigations in Victoria's alps.

A never-ending experiment

An ecological explanation is not revealed quickly. It has taken decades to elaborate the ecological relationships sufficiently to understand the 'natural' (minus cattle) rhythms of the vegetation. As Carr (1962b) suggested, in the short term (less than about 50 years), removal of cattle does provoke an increase in shrub regeneration in eroded grasslands. However the initial cause of this vegetation-healing process of shrub invasion would appear to be the cattle themselves. Thus cattle have two superficially contradictory roles. On the one hand they are primary perpetrators of environmental damage which is healed initially by the proliferation of shrubs and herbs rather than grasses. On the other hand, by their grazing

and trampling, cattle also limit the spread of some of these regenerating shrubs, especially the palatable seedlings of the shrubs *Grevillea australis and Asterolasia trymalioides*. Thus on the Bogong high plains cattle appear to be effecting the ecological balancing act of maintaining some grasslands in an eroded but reasonably shrub-free condition.

If given enough cattle-free time (over 50 years) certain shrubs senesce to allow snowgrass to regenerate under them (Ashton & Williams 1989). These shrubs not only stop soil erosion but provide a nursery for regenerating snowgrass. Thus the invasion of cattle-free grasslands by shrubs appears to be the initial stage of a vegetation-healing process which will eventually lead to the re-establishment of shrub-free and erosion-free grasslands.

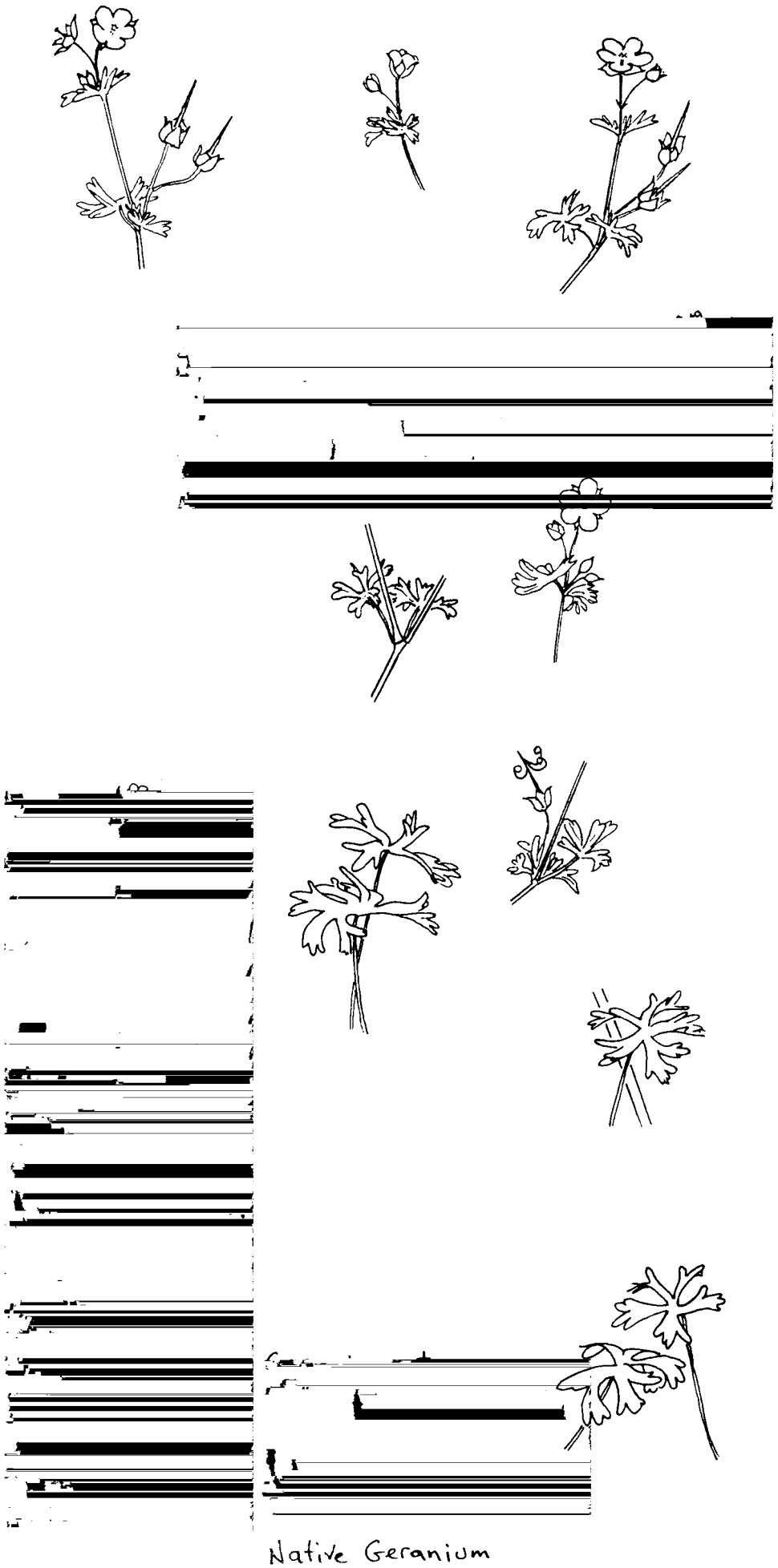
The ecological investigations which Maisie Fawcett initiated in the mid-1940s was one of the first such investigations in Australia. As such it forms one of the foundations of Australian ecology. Its importance is biological as well as historical. In setting in train what should be recognised and valued as a never-ending experiment, it highlights the need for long-term ecological experiments and shows the ways in which one such experiment has provided data pertinent to various issues. While the initial questions related to soil erosion, more recent questions have touched on nature conservation. Fawcett's plots provided data for the LCC during its deliberations on land use in Victoria's alps - protracted deliberations which eventually culminated in the establishment of Victoria's Alpine National Park.

FAMILIAR GERANIUMS

Michael Bedingfield

Grassland Geranium or Grassland Cranes-bill (*Geranium retrorsum*) has pink flowers and is common in suburbia. It is very frost tolerant and prefers the lower flat areas. *Geranium solanderi* looks very much like *G. retrorsum* but it is less frost tolerant and prefers the grassy woodland areas on slopes.

The main difference between the two species is in the hairs that grow on the stems. *G. solanderi* has a lot of tiny hairs which project out from the stem. *G. retrorsum* also has tiny hairs, but they are difficult to see with the naked eye because they cling to the stem in a downwards direction.



THE HISTORY OF WOODLAND COMMUNITIES IN CENTRAL WESTERN, NSW

Donna M. Windsor, Greening Australia (Central West).

Historic Factors

Since the arrival of Europeans, the Australian landscape has been substantially modified for human settlement, agriculture and other development. This has resulted in significant changes to the extent, condition and composition of native vegetation particularly throughout the wheat-sheep belt of south-eastern Australia, including the Central West Region.

The remnant vegetation is highly fragmented and often confined to marginal areas not considered to have much value for primary production (e.g. ridgelines, inaccessible areas). Remnants are characterised as relatively small patches, narrow linear corridors, or isolated paddock trees in cropping and grazing lands. In many cases, the natural understorey component is missing completely, compounding the degradation of remnant areas.

Degrading processes

Hard-hooved animals (ungulates) particularly cattle and sheep, have also contributed to the degradation of native vegetation and loss of species. They continually browse, trample, rub and chew native plants causing sensitive and more palatable plants to diminish, particularly in more heavily stocked areas. High concentrations of animals also contribute to increased nutrient levels (via their excrement), increased soil compaction as well as spreading weed seeds, especially in areas where they seek shade, shelter and water.

Livestock grazing, intense competition from vigorous introduced pastures and weeds and elevated nutrient levels (which often favour introduced plants) inhibit regeneration of native plants. In addition, pastures are often treated with fertilisers to sustain introduced species and are cultivated repeatedly, thereby also increasing soil compaction and increasing the risk of soil erosion. Insecticides and herbicides also contribute to the decline of native species.

Woodland communities

Areas most severely affected by agriculture are the grassy Box woodlands. These communities dominated by Yellow Box (*Eucalyptus melliodora*) and White Box (*E. albens*) grow on the undulating and more naturally fertile soils in the Tablelands and Slopes. Grey Box (*E. microcarpa*), Fuzzy Box (*E. conica*) and Bimble Box (*E. populnea*) characterise the woodlands of the flatter, more flood prone areas in the western areas of the region. Grassy Box woodlands are characterised by having widely spaced trees and have an understorey dominated by native grasses such as Kangaroo Grass (*Themeda triandra*) and contain a diverse range of other plants such as orchids, lilies and daisies. Because of these attributes grassy Box woodlands made ideal farming country. Areas of relatively untouched grassy Box woodland are now considered rare. These small remnants can mostly be found in cemeteries (such as the Woodstock cemetery which contains White Box woodland and has recently been listed as a site of national significance), along roadsides and railways or in small, rocky areas on private farmland. These small remnant communities are significant for the conservation of the diverse array of woodland flora and fauna.

Many remnant woodlands occur on farmland but are under threat by continuing agricultural practices. Many Yellow Box/ Blakely's Red Gum and White Box communities in the Central West are significantly degraded and are at imminent risk. Even areas defined as having relatively high conservation value at present may be slowly degrading to a non-sustainable state under current management regimes. Goldney *et al.* (1997) estimated that 310 - 620 million trees are at risk of being lost from an area of 65 000 km^2 within the next 10 - 30 years. In addition, 5-25 million isolated farmland trees are also estimated to be at risk (Goldney *et al.* 1997).

Often the trees are dying or sick, little regeneration is occurring and the native understorey is infested with weeds. These areas are however, nonetheless important to woodland conservation and are also very important in controlling watertables and reducing dryland.

IMPERATIVES FOR CONSERVATION AND MANAGEMENT OF WOODLANDS

Denis Saunders

This paper was presented at the Woodland Birds seminar held in Forbes on 11 April. Denis is from the CSIRO Wildlife & Ecology, GPO Box 284, Canberra ACT 2601

Ecological consequences of clearing and fragmentation of native vegetation

The removal of native vegetation on a broad scale is a non-random process that leads to a collection of fragmented vegetation patches in a matrix of different vegetation and/or land uses. The result is a series of fragments or remnants located in different positions in the landscape, on different soil types, possessing different vegetation types and associated fauna, and varying in size, shape, isolation and type of ownership. What are the ecological consequences of this reduction and fragmentation of native vegetation?

Removal of native vegetation results in changes in radiation fluxes with increases in solar radiation leading to higher temperatures during the day. There are also increases in re-radiation at night resulting in lower night temperatures. Surface and soil temperatures increase in range and may be very much greater by day and lower at night than before clearing took place. There also may be an edge-effect in relation to solar radiation depending on the angle of the sun; the higher the latitude, the more it penetrates the edge of the remnant. The implications of these

factors alone are significant. Changes in microclimate may result in changes in the species composition at the edges of remnants and may have major impacts on the soil biota with potential effects on ecological processes such as nutrient cycling. In addition, species present before clearing may not be able to be re-established because the changed microclimate may not provide a suitable environmental for them.

Clearing native vegetation also results in changes to the pattern of wind flow across the landscape, with less resistance and protection. Species that established themselves when the vegetative cover was continuous were relatively well-protected from the effects of wind. Increased exposure often results in increasing rates of wind throw and wind pruning of dominant plant species. This creates gaps in cover with increased chances for invasive species to establish. Increased exposure to wind can lead to increases in evapotranspiration, reduced humidity and increasing dessication rates. Increased wind may also lead to increases in fall of litter with potential for changes in the litter fauna. In addition, there may be increasing movement of dust and seed into patches from the outside, further increasing the chances of invasion by species from outside the remnant.

Major changes in the hydrological cycle result from the removal or thinning of native vegetation. Deep-rooted perennial vegetation uses much more water than the annual plants that largely replace the former vegetation. More rain falls directly to the ground in cleared areas than under uncleared land, with the potential to damage the soil by impact. There may be less buffering and more extreme run-off events. More water flows across the landscape, moving topsoil around, in some cases into the remnants themselves, while in other cases soil and litter is removed from the remnants; this depends on the position of the remnant in the landscape.

Native vegetation is often resistant to invasion, but is less so when disturbed and enriched. Water moving soil from areas surrounding remnants into remnants can constitute a major disturbance. The soil is usually accompanied by seed and nutrients (e.g. fertiliser, droppings from domestic livestock). This provides ideal enriched conditions for the establishment of weeds.

In extensively cleared areas, more water enters ground water resulting in a rise in the water table, in some cases very rapidly. Water-logging occurs when the water table reaches ground-level. Rising water tables are often accompanied by salt (sodium chloride) that has been stored deep in the soil profile leading to increasing soil salination, destroying otherwise productive agricultural land and remnant vegetation. The effect depends on the position in the landscape. Dryland salinity is now a major problem in many parts of Australia. In addition, saline waters flow into watercourses leading to destruction of freshwater ecosystems and loss of potable water. It is ironic that in the driest continent after Antarctica, some of our environmental problems stem from too much water in the landscape.

Loss of native vegetation and its fragmentation has a number of biotic consequences that can be moderated by a number of factors. For example, time since isolation or creation of the remnant is a major modifying factor. The Theory of Island Biogeography states that at the time of isolation the island (in this case remnant patch) is carrying more species than it is capable of carrying over time and so species will be lost. This is the process of species "relaxation." The longer a remnant has been isolated the more species it will lose. Obviously for some species, such as those dependent on native vegetation with requirements for large areas, the process of relaxation will be rapid, probably a matter of years. However, for long-living, sedentary species, like the dominant tree species, it may take centuries. The point to note is that remnants will lose species over time and this will pose major management problems.

The number of species lost will also be modified by the distribution of native vegetation and the dispersal mechanisms of the plants and animals of the remnant. The shorter the distance between remnants and the greater the number of species with the ability to cross that distance, the greater will be the chances of the species remaining. Some species, which require other species to help them move around the landscape, are doomed if their transport is lost from the area. This may be the case with some species of the genus *Santalum* when the emu is lost from an area.

Remnants now occur in a matrix of human-dominated land uses. Every one is likely to be affected by what is happening in the surrounding land. This means that what happens in that land can have a major impact on the remnants. Nutrients and seeds being deposited in the remnant have been mentioned earlier. Species that depend on the surrounding land can also have an effect. Domestic stock are obvious examples but there are other more subtle ones; like the galah that has expanded its range because of human activities and competes with remnant-dependent species for nest hollows, damages and kills trees, and introduces the seed of invasive species via its droppings.

There are a number of characteristics of remnants that help to modify some of the degrading processes. Remnant size is an obvious one. The larger the remnant the longer it will be able to resist some of the degrading processes. Unfortunately we have no general information on how large remnants should be; that will be determined on a case by case basis, depending on position on the landscape, etc. Larger remnants will contain more species than smaller remnants. However, the non-random nature of clearing of native vegetation will almost always ensure that the larger privately owned remnants are on the poorer soils and are not representative of the original vegetation associations.

The shape of the remnant will also help modify the effects of degrading processes, as will the position of the remnant in the landscape. Larger remnants have less edge compared with their area than smaller remnants and are therefore subject to fewer edge effects. Those remnants lower in the landscape can be exposed to more of the impacts from the surrounding matrix.

The ultimate remnant is the individual tree isolated from other elements of native flora by "parkland clearing." This vegetation type needs urgent protection and management. We are faced with vast areas of these "living dead"; aging trees with no replacements. What will these landscapes look like in 50 or 100 years without extensive management? They will be vastly different and, on present trends very much species poorer than at present.

What follows from the ecological imperatives?

History tells us that clearing is no longer the major degrading force. The era of broad-scale clearing has finished; if only because most of the land suitable for agricultural, horticultural, etc (but not for urban development) purposes has been cleared. There is still the danger of whittling away at the remainder; the supposed "death of a thousand cuts." There is no doubt that both education and legislation are required to halt this process. Legislation needs to put all applications for clearing into a perspective that shows transparently that the planned clearing will not result in the loss of a remnant of high con-

servation value or of high ecological value. That means identifying and weighing its value as part of the ecological function of the area; in its water use, moderation of erosion, etc. Individual trees also require this type of protection.

We also need to value remnant vegetation better in an economic context. At present, remnant vegetation on agricultural land is valued on the basis of the economic value of the land on which it occurs, if put into agricultural production, or on the contribution it adds aesthetically to the resale price of the property. This valuation system is fundamentally flawed because it takes no account of the contribution the remnant vegetation makes by providing a range of ecosystem services from local to regional scales.

The critical need in relation to native vegetation is that of management. Most remnants are degrading. Simply putting a fence around them to stop domestic livestock from grazing them will not be sufficient to halt the loss of species. Management of internal dynamics of remnants is necessary in order to halt the process. This management will depend on the size of the remnant. With larger remnants it may be necessary to manipulate disturbance regimes like fire as well as the population dynamics of key organisms. In addition it will be necessary to examine external influences and see if they can be moderated. On smaller remnants it will be necessary to concentrate on the external influences. Management of remnants is essential. This means integrated landscape management on an ecological basis with knowledge of what each remnant contributes to the ecological whole.

Managers of native vegetation need to concentrate on the practical issues relating to the impact of fragmentation on natural ecosystems and managing fragments for their retention. This means understanding both the physical and biological consequences of the fragmentation of landscapes, and the options available to mitigate the processes leading to the degradation of the fragments.

HELP FOR RESTORING OUR DEGRADED GRASSY ECOSYSTEMS

[A SA PERSPECTIVE]

Ask the average person in the street to describe "Australian bush" and they will talk only of trees and shrubs. Yet biologists and historians know from the descriptions of early European explorers and surveyors, that alongside the forests and mallee, extensive areas of southern Australia had few or no shrubs or trees at the time of European settlement. For example, in 1849 Explorer Charles Sturt encountered "immense tracts of land ... rich in soil and abundant in pasture [with] scarcely a tree upon them ... and covered with a profusion of orchidaceous plants." We now know that these native grasslands covered over 10,000 square kilometres in the Mid North of South Australia, north of Clare.

Even larger areas from the mouth of the Murray River, to the Southern Flinders Ranges had a sparse tree cover, but few shrubs, instead with an understorey of mainly native grasses and forbs (such as daisies, lilies and orchids). Where the trees were mainly peppermint box, mallee box, grey box or river box, such areas are referred to as "Box Grassy Woodlands".

These Temperate Lowland Grassland and Box Grassy Woodlands are now amongst the most threatened habitats in Australia. As well as having been almost all cleared for agriculture or severely degraded by prolonged heavy grazing, the relatively fertile soil on which they occurred made them highly vulnerable to weed invasion. Thus, most surviving examples are heavily weed invaded.

However, the protection and management of such areas is of paramount importance since a wide range of species is largely confined to these vegetation types. This includes many threatened species, such as the small scurf-pea *(Cullen parvum)*, perennial blown grass *(Agrostis limitanca)*, pygmy blue-tongue lizard *(Tiliqua adelaidensis)*, the plains wanderer *(Pedionomus torquatus)* and white-veined skipper butterfly *(Anisynta albovenata albovenata)*.

These endangered habitats are the subject of a newly released report titled **"Weed Management in Temperate Native Grasslands and Box Grassy Woodlands in South Australia".** This study results from three years of experimental research by botanist Rick Dayies, funded by a Save the Bush Research Grant.

This report contains the **first** comprehensive review of weed research relevant to temperate native grasslands and box grassy woodlands, undertaken in Australia. It also contains pioneering experimental research for these ecosystems in South Australia. Since the study extensively reviewed research undertaken in South Australia, NSW, Victoria, ACT and Tasmania, the report is highly relevant for researchers throughout south-eastern Australia. This report is particularly aimed at regenerators and managers of temperate native grassy ecosystems, the native and weed species index in the back of the book making it user friendly for such people.

Bushland managers are increasingly adopting an ecological approach, rather than a single species approach, in their bushland regeneration strategies, and this study is no exception. Rick Dayies has utilised data collected over a decade of vegetation surveying in South Australia to determine which native species most commonly occur in surviving grassy ecosystems, and which are the most widespread and highly competitive weeds.

He found that 72% of highly invasive weed species of temperate native grasslands and box grassy woodlands in South Australia are annuals, while 90% of common indigenous species are perennials. In degraded grassy ecosystems this absence of native annuals is particularly prevalent, and in such areas management activities which favour perennials over annuals have the potential to reduce weed cover.

The study also found that a great diversity of native perennial forbs occur in native grasslands and box grasslands woodlands, despite their general grassy appearances. This must be taken into account whenever treatments such as broadleaf herbicides are considered.

Rick Davies also studied experimentally the phenology of a representative sample of common weeds and native species of grassy ecosystems to determine the timing and frequency of treatments most likely to deplete weeds while maintaining native species diversity.

He found that while most annual weeds and weed bulbs grow actively during winter to early spring, and die back at the end of spring, many of the hardier native perennials were found to be still actively growing in late spring, as well as after good summer rains and immediately following opening rains in autumn. However, he also found a significant number of native bulbs and annuals grow at the same time as the annual weeds, and a group of perennial grass and broadleaf weeds grow at the same time as most native grasses.

The report concludes that weed management strategies which favour summer-growing

over winter-growing species will disadvantage most annual weeds, while benefiting many native perennials, in particular grasses. However, it also warns that such management also favours some highly invasive perennial weeds, while disadvantaging many native annuals and native geophytes (including many orchids) if present.

Thus there is a need for regenerators of grasslands and grassy woodlands to know all the native species and highly invasive weed species occurring at a site before they burn, spray or slash. Not only do they need to know where sensitive natives and serious weeds occur, they must also know which of these species is actively growing when determining weed management strategies.

Methods trialed experimentally in this study included the use of the grass specific herbicide fluazifopbutyl (tradename Fusilade). This was found to have great potential in the control of exotic annual grasses in native grasslands and box grassy woodlands. It was found that of the 15 native perennial grass species on which the higher rate was trialed all were found to be resistant, as were all 43 native non-grass species on which it was tested.

In comparison, all but one of 35 native species on which the commonly used broad spectrum herbicide glyphosate (tradename Roundup) was trialed were found to be highly susceptible.

Carefully timed slashing was also found to have the potential to control exotic bulbs, annual grasses and saffron thistle, while increasing native grass cover. Significantly, only three of 45 native grassland/grassy woodland species slashed in late winter, were unable to regenerate by reshooting at the base.

The report also discusses the potential of using plastic sheeting to artificially produce late breaks to the season, or prolong dry spells in winter, as a method of favouring perennial native species and disadvantaging winter growing exotics.

A major component of the report is the literature review. Rick Davies has analysed in detail other research that has been done relevant to the use of fire, grazing, and the herbicides atrazine (tradename Atrazine) and metsulfuron-methyl (tradenames Brush-off and Ally), to manage weeds in grasslands and box grassy woodlands. He also discusses ways of preventing further weed invasion, and minimal impact methods such as handpulling, digging and cutting and swabbing.

"Weed Management in Temperate Native Grasslands and Box Grassy Woodlands in South Australia" (Davies, R.J.-P., 1997), was published by the Black Hill Flora Centre of the Botanic Gardens of Adelaide, and is available for $15 (plus$2 postage) from National Resources Information Centre, Department of Environment and Natural Resources, GPO Box 1047, Adelaide, South Australia, 5001. Telephone: (08) 8204 1910 Fax: (08) 8204 1919

WEBSITE ADDRESS TO LOOK AT

Enviromap: **www.earthsystems.com.au**

FLORA BANK

Naarilla Hirsch continues her summary of FloraBank guidelines

The second FloraBank guideline is *Basic methods for drying, extraction and cleaning of native seed storage*. Seed is rarely fit for immediate storage following collection, requiring either drying or de-pulping, extraction from the fruit and further cleaning. The methods for drying and extraction are many and varied and depend very much on the type of fruit, seed and equipment available.

The drying process is used to avoid the development of mould, open the fruit and prepare the seed for extraction. Natural drying is ideal for warm to hot dry conditions, but you need to be careful about condensation and ensure the seed is not accessible to pests. An alternative is using solar extractors, glasshouses or artificial heat from ovens or drying rooms. One popular and low cost method for drying seed is to use a greenhouse or purpose-built propagation igloo. The temperature must not exceed 35°-38°C and must be combined with good air circulation to quickly reduce humidity as the fruit dries.

After drying, most fruit will require some form of extraction to separate the seed from the rest of the material. Methods include shaking or beating of the dried material, threshing the fruit by hand or with an implement or machine (although threshing can damage the seed), extreme heat extraction (for certain species), or de-pulping fleshy fruits.

Once the seed is separated from the fruit it is ready for final cleaning before storage. The aim of cleaning is to separate the full, viable seed from impurities, which may include empty seed and fruit, sticks, leaves, dirt, and so on. Methods of cleaning seed include natural cleaning, sieving, blowing, winnowing and flotation.

The guideline also outlines some safety guidelines, since some plants are toxic or may cause allergic reactions. These include not consuming food or drink in the seed preparation area, wearing gloves (latex) and a respirator during the cleaning process, and cleaning seed in a well-ventilated area or using an extractor fan to remove dust.

For a copy of this guideline, contact the FloraBank coordinator, Warren Mortlock, on 02-6281 8585 or email greenaus@ozemail.com.au.

NEWSLETTERS RECEIVED

'Grass Clippings' mentions the release for public comment of draft strategies on each of Australia's 20 "Weeds of National Significance". The draft strategies already released include Chilean Needle Grass and Serrated Tussock. The strategies are available at http://www.weeds.org.au, or you can ring John Thorp on 03 6344 9657.

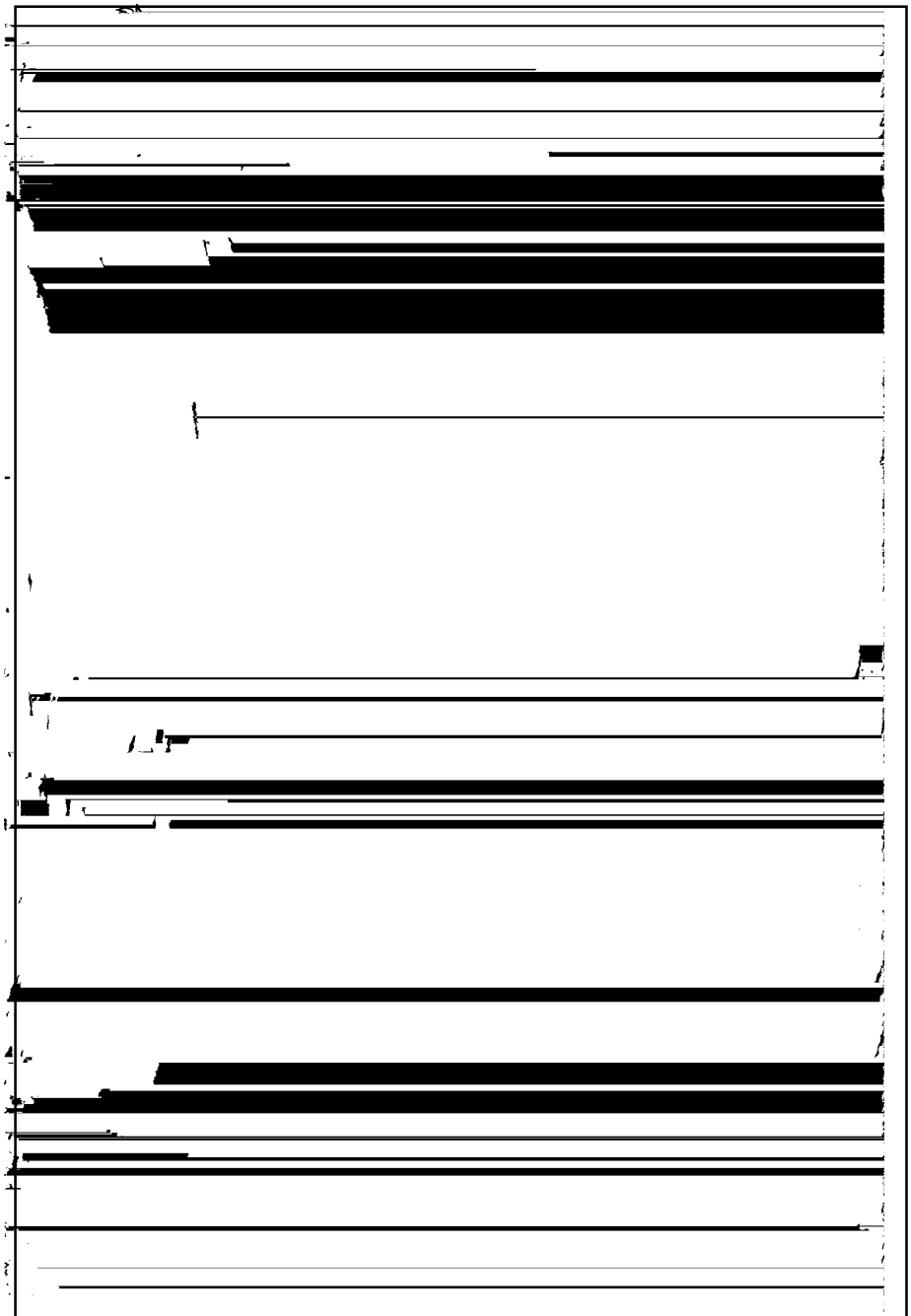
Flora Bank is involved in a collaborative project with the Australian Centre for Mining Environmental Research, to produce a database of plant species containing information from a wide range of people and sources. The aim is to compile the essential information needed to successfully grow a species (based on what is already known in the community) and present it in a way that is easy to understand and available to everyone (in a manual and on CD). The project, called Floradata, will contain reliable data on the collection, storage, germination, propagation and field establishment using seed of Australian plants. For further information about the project, contact the Flora Bank Coordinator on 02 6281 8585, or email greenaus@ozemail.com.au. The Flora Bank newsletter also contains an article outlining a strategic framework for local seed supply for revegetation in Australia.

Sustainable Times reports that a draft list of ACT native plants is available at the Environment Centre. The database includes information on name changes, habitat, location and any Aboriginal use. The newsletter also has a report on the work the Conservation Council has been doing on firewood, which leads to air pollution in the ACT as well as threatening remnant vegetation such

as box and ironbark woodlands. The Conservation Council is pursuing licensing of firewood merchants to encourage a sustainable firewood industry based on hardwood timber plantation. The article has further details on this issue, and suggests writing to the ACT Environment Minister, Brendan Smyth, to encourage him to support licensing of firewood merchants in the ACT.

Danthonia has a couple of articles on northern grasses. The first is on conserving *Coix gasteenii*, a rare grass on Cape York Peninsula. Given the lower disturbance in this area, it isn't clear why this grass is so rare. Is it very specific in its habitat requirements, is it a remnant of a larger population that has declined due to grazing or changed fire regimes, or has it grown opportunistically from seed from, say, Papua New Guinea or Indonesia excreted by a migrating bird? The second article is about control of Buffel Grass (*Cenebus ciliaris*) which is a major environmental weed in central Australia. Buffel Grass is changing the composition, structure and function of some diverse ecosystems in central Australia. Research indicates that the most effective control method may be hand removal with follow-up spot spraying of regrowth with glyphosate. NSW NPWS are coordinating a database on the flora and fauna of NSW and are especially interested in records of endangered and vulnerable plant species. For a list of the species and further details, contact the Wildlife Data Unit on 02 9585 6694 or 02 9585 6684. The Australian Network for Plant Conservation have developed a plant conservation email list. If you are interested in information about it, contact Jeanette Mill at anpc@anbg.gov.au.

Don't forget that you can contact Margaret if you want to have a look at any of the newsletters discussed in this column.



New Leek Orchid as described in *The Orchadian* June 2000.

ISOBEL CRAWFORD'S ANU CONTINUING EDUCATION COURSES

Botanising in Canberra

7-9pm on 3 Thursdays from 5 October, plus field trips 9-11am on 2 Saturdays 7 and 21 October.

$115

Learn to enjoy and recognise the diversity of plants in Canberra. The field trips will include visits to the Australian National Botanic Gardens.

Grass identification

7-9pm on 3 Thursdays from 9 November, plus field trips 9-11am on 2 Saturdays 11 and 25 November.

$115

This course is for those who already have a basic knowledge of plant identification. Learn to recognise local grasses in the field, and to distinguish them from sedges and rushes, and in the laboratory learn to use microscopes and botanical keys.

FRIENDS OF GRASSLANDS INC
Supporting native grassy ecosystems
Address: PO Box 987, Civic Square ACT 2608
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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, you might encourage friends to join, or even make a gift of membership to someone else. We will also send one 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.

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