

Friends of Grasslands

supporting native grassy ecosystems



Abstracts and Proceedings of a Workshop
held on 26th May 1998 - Canberra

Development and Native Grasslands



Resolving Conflicts

FRIENDS OF GRASSLANDS

Development and Native Grasslands

Resolving Conflicts

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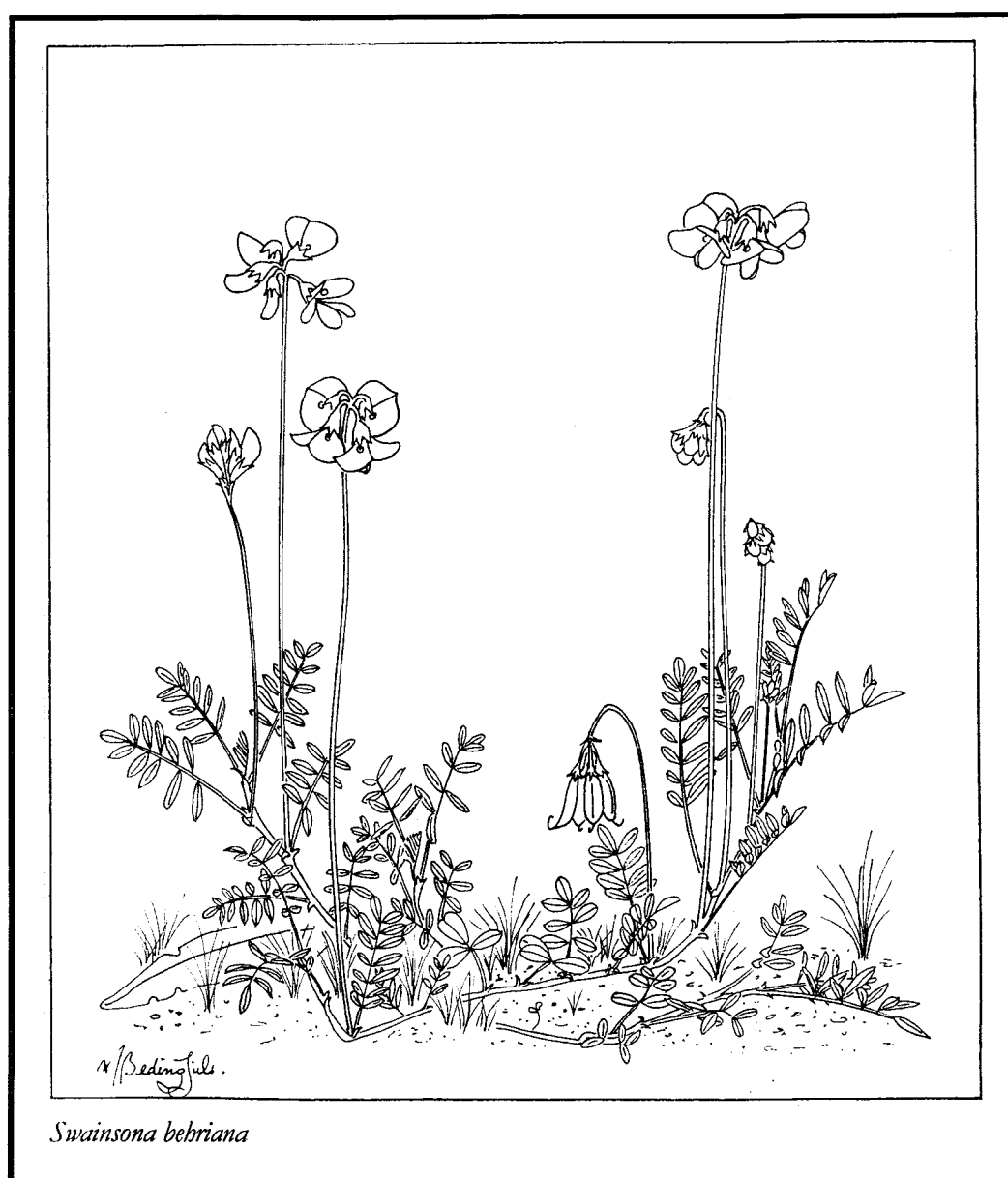
M. Beding J. L.

Kangaroo Grass - *Themeda triandra*

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FORWARD

Brendan Smyth

Minister for Urban Services and Environment

It was with great pleasure that I accepted the Friends of Grasslands invitation to open their 1998 workshop on Development and Native Grasslands – Resolving Conflicts. I welcomed this initiative by a community group as representing a growing interest and concern for conservation of native grasslands and other grassy ecosystems. Since European settlement, demand for land suitable for development and rural production has reduced the area of native grassland in the ACT to about 4% of its original extent. As a consequence some plants and animals are recognised as being threatened with extinction.

In opening the workshop I highlighted some of the positive steps that the ACT Government has taken to conserve and manage this important resource. For example, the ACT was the first jurisdiction in Australia to declare Natural Temperate Grassland and Yellow Box/Red Gum grassy woodland as endangered ecological communities. Also, several Natural Temperate Grassland Reserves have been established in Gungahlin and Dunlop and the ACT Government is establishing a Rural Conservation Trust to fund conservation measures on rural leased land to enhance off-reserve biodiversity conservation.

However, much remains to be done and for this reason I was pleased to support the Friends of Grasslands in the organisation and running of the workshop. Avoiding conflict requires good information, forward planning and co-operation by all involved. Governments can facilitate this process, but it is critical that all stakeholders participate in a conservation partnership.

The workshop proved valuable by focussing on the features of native grasslands and the requirements for their conservation. It exposed the many issues that impact on the successful management of this ecological community. The workshop allowed the issues affecting native grasslands to be considered by all sectors of the community. This builds trust and confidence that augurs well for the secure future of this important environmental resource.

I wish the Friends of Grasslands well in their endeavours and I am sure these proceedings will continue the valuable momentum generated by the 1998 workshop.

ACKNOWLEDGEMENTS



Friends of Grasslands would like to thank several people and organisations that were critical in ensuring this workshop was a success.

Federal and Australian Capital Territory Governments provided financial support for this and a previous workshop through their agencies Environment Australia and Environment ACT and the Save the Bush grants scheme. Over the last four years they have recognised the importance of communicating the need for conservation of Native Grasslands. They have also recognised that small community groups do not always have the human resources required to meet the deadlines that are normally demanded by bureaucracies. Without this understanding it is unlikely that the workshop and this publication would have eventuated.

CSIRO Wildlife & Ecology provided considerable support in kind. They provided facilities and the venue. Perhaps more importantly they provided the time of several staff. Art Langston was the primary organiser for the workshop, much of which was done during business hours. Nick Abel, Steve Cork, Jill Landsberg and Steve Morton each facilitated sessions during the workshop. David Salt provided media liaison and reviewed press releases and brochures. Trizia Ojansuu and Kate Ransley provided support with catering and organisation on the day.

Within Friends of Grasslands several people played organisational roles. Geoff Robertson, Dierk von Behrens, Kim Pullen and Art formed the steering committee for the workshop. Margaret Ning organised the advertisement of the conference through extensive phone contacts and use of print, radio and television media. Naarilla Hirsch organised refreshments and on the day ensured that the registration desk, catering and inquiries all ran smoothly. Geoff coordinated posters and displays. Art, Naarilla and Kim formed the editorial committee for these proceedings. Illustrations of native grassland species that appear throughout this proceedings were kindly contributed by Michael Bedingfield.

Courtney Kraus and Carmel Kuzlap helped at the workshop. Both worked tirelessly throughout the day.

Lastly, we would like to thank the participants, both speakers and audience. The presentations were well prepared and extensive in their coverage of conflict in native grasslands. Comments from the audience were well-thought through and provided insights and ideas for how we might organise development better in the future. It is the workshop participants who are involved in development conflicts. Ultimately without their enthusiastic participation this workshop would not have been a success.



INTRODUCING FRIENDS OF GRASSLANDS

Friends of Grasslands is a community group who supports the conservation of grassy ecosystems.

Friends of Grasslands (FOG) is a community group formed in 1994 in response to a lack of community attention to the conservation of native grassy ecosystems. The group was established with funding assistance from the Wildlife Research Unit of Environment ACT under the umbrella of the Society for Growing Australian Plants. FOG continues to work closely with Environment ACT as well as NSW National Parks and Wildlife Service.

Membership includes a range of people and interests. Most have a non-professional interest in grasslands. Approximately twenty percent of the membership consists of a mix of botanists, herpetologists, entomologists and reserve managers from organisations such as CSIRO, Environment ACT, NSW National Parks and Wildlife Service and private consulting companies.

FOG concentrates on two key areas of grassland conservation. Firstly, education of the community through field days, displays, courses and lectures. In 1996 this included a two-day conference which was attended by a range of local and interstate people. Prof. Jamie Kirkpatrick, a renowned grassland ecologist from the University of Tasmania, opened the conference. Secondly, FOG seeks to resolve conflict in relation to the loss of native grassland communities. It aims to find conservation solutions that will benefit all grassland stakeholders. In the past FOG has prepared submissions relating to development proposals and action plans for listed grassland species. It is represented on a range of scientific steering committees and recovery teams dealing with both grassland flora and fauna. Because of active involvement in grassland issues, FOG has been accorded a high profile in Environment ACT's consultative process.

THE PLIGHT OF GRASSLANDS IN THE ACT AND SURROUNDING REGION



It is critical that we protect our grassy ecosystems, they are an endangered environmental resource.

Most people when thinking about conservation think about trees. Yet the majority of the floral species and communities endangered in Australia are found in the grassy ecosystems of grasslands and grassy woodlands. Globally it is grassland communities that have most often been impacted by widespread human agricultural systems and these are the ecosystems that are most actively threatened by extinction.

The same is true in Australia where it is estimated that only 0.5 percent of the original two million hectares of temperate grassland remains. Most of our open grassy woodlands have been cleared and converted into wheat and sheep producing farms. In contrast, our forest resources are more intact such that we can still hope to achieve 15 percent representation of pre-1780 distributions. The proportion of grassland that remains in the Australian Capital Territory, around four percent, is similar though slightly better than the rest of Australia. However, here our grasslands are also threatened by urban development. Of the remaining grassland sites in the ACT only six are greater than 100 hectares in size.

There are key animal species within our grassy ecosystems that are also threatened or endangered. Typically the greatest threat is the destruction and fragmentation of the grassland habitats that these species rely on. Names such as the Grassland Earless Dragon, the Striped Legless Lizard, the Golden Sun Moth and the Superb Parrot represent important focal species in our region. However a range of other avian, reptile and invertebrate fauna from our grassy ecosystems are either endangered or threatened with extinction.



ABOUT THIS WORKSHOP

Why, where and how the workshop was run.

Why hold this workshop

Native grasslands hold value for many people: farmers, urban and rural developers, governments and the public. The values of these people sometimes differ, but are often similar. In the past where developments in their various forms (rural and urban) have been proposed, those differences have generated conflict amongst us.

Unfortunately, the way we address development proposals magnifies this conflict. As individuals and as organisations we may be forced to deal with these situations in a “knee jerk” or unplanned way. Worse still is the need to take sides in an attempt to protect our values and interests. This is a recipe for mistrust and entrenched positions. It increases the level of conflict we experience and inhibits constructive outcomes.

Friends of Grasslands would like to see this change. We want stakeholders to share their values and explore solutions that provide good outcomes for all of us. To help this along we hosted a workshop where representatives of stakeholders and scientists gave short presentations on past and future developments in native grasslands. Audience participation was encouraged through question time, brainstorming sessions and also providing considerable time for free conversation and experience sharing over lunch and tea breaks.

Science offers information and services that can support stakeholders and governments in their efforts to make sensible decisions on how to proceed with development. Organisations such as CSIRO, resource agencies and local universities all contribute to this science. As well as invited speakers, relevant science was presented in the form of poster displays.

Workshop venue

Held in the seminar rooms of CSIRO Wildlife & Ecology, the workshop took place on the 26th May, 1998. The workshop was attended by 119 people, with a total of 138 people subscribing to receive a copy of the proceedings. The composition of the participants included members of Friends of Grasslands, graziers, land holder representative groups, land carers, a range of Federal and State agency representatives (conservation, agriculture and urban development), as well as representatives from building industries, transport industries and councils.

Workshop process

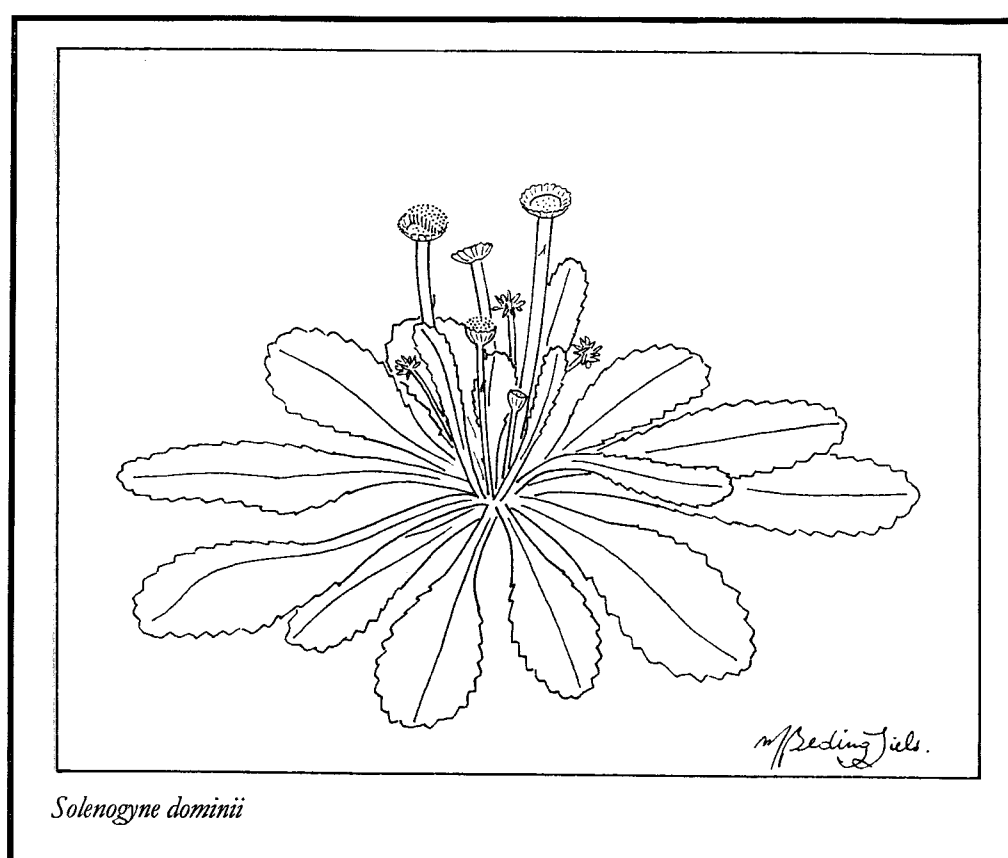
The workshop was opened by a group of speakers who provided the context and scope within which the day proceeded. Following this, in each of four theme sessions, speakers presented their ideas and values. The themes were “Science, providing information for decisions”, “Stakeholders one, low intensity land use”, “Stakeholders two, high intensity land use”, and “Governments, managing the community’s resources”. Each speaker was allocated ten minutes, eight for their presentation and two for items of clarification from the audience.

The presentations seeded many ideas amongst the audience and it was important that all participants were given a chance to voice their ideas and viewpoints. Therefore, twenty minutes were allocated in each session where audience ideas were captured by facilitators. Participants were given three ways to give their ideas exposure. First, ideas could be raised verbally during the forum times. Secondly, ideas could be written down on sheets that were provided on the back of the workshop handouts. These were left in a box provided in the seminar room. Ideas that showed common trends among the audience were raised by facilitators in the final session of the day. Thirdly, participants were encouraged to use refreshment breaks to talk about grasslands with other participants.

Throughout the day there were many shared ideas and values on which most participants agreed. Although the workshop focused on resolving conflict, it was important that we acknowledged the common ground that existed. This can be used as a starting position from which we move forward. These areas of agreement as well as examples of what doesn't work, what does work and what we need to try in the future were recorded by facilitators throughout the day.

In the final session the group used the ideas raised during the day to build a set of actions that need to be taken in the future. We included those ideas expressed in the theme sessions, those left as notes, and any new ideas that were raised in this session. The actions were designed to minimise conflict and achieve acceptable outcomes for all of us who value native grasslands or the land where they exist.

Throughout the day posters of research and information on grasslands were on display. This display area provided a focal point for ad hoc discussions about development conflict and grassland conservation in general. Displays were varied and included paintings and drawings, live plant specimens, pictures from field days and books for sale. Our aim was to show that grasslands are valued in a range of ways by different stakeholders. Understanding those differing values is a key step in resolving conflict between stakeholders.





WHO SAID WHAT

Structure and organisation of spoken presentations

SPOKEN PAPERS

Note

All speakers were given the opportunity of providing an abstract or full paper of their presentation. However, some speakers did not speak to notes and were unable to provide a written summary. Those papers are highlighted with an ⊗ in the list below.

The editors recommend that each section of spoken papers be read in conjunction with the corresponding summaries of audience participation. These summaries are provided in the chapter titled "The community, moving to the future".

OPENING

Workshop introduction - Geoff Robertson *Friends of Grasslands* ⊗

Workshop open - Brendan Smyth *ACT Urban Services Minister* ⊗

Australian context - Theo Hooy *Environment Australia*

Local context, workshop scoping - Art Langston *CSIRO Wildlife and Ecology*

SCIENCE, PROVIDING INFORMATION FOR DECISIONS

Grassland survey - Rainer Rehwinkel *NSW National Parks and Wildlife Service*

Threatened reptiles - Lyn Nelson *Environment ACT*

Invertebrate fauna - Kim Pullen *CSIRO Entomology*

Mediation processes - John Ive *CSIRO Wildlife and Ecology*

Incentives - Carl Binning - *CSIRO Wildlife and Ecology*

STAKEHOLDERS, LOW INTENSITY LAND USE

Agriculture - Harold Adams *ACT Rural Lessees Association*

Agriculture - Jim Ryan *NSW Farmers Association*

Conservation - David Eddy *World Wide Fund for Nature*

Landcare - Charles Litchfield *Upper Snowy Catchment Landcare*

STAKEHOLDERS, HIGH INTENSITY LAND USE

Local council - Peter Gillard/Robert Rosenstrauss *Gungahlin Community Council*

Landcare - Chris Watson *Umbagog Landcare*

Urban development - Tony Carey *Housing Industry Association*

Conservation - Geoff Robertson *Friends of Grasslands*

GOVERNMENTS, MANAGING THE COMMUNITY'S RESOURCES

Conservation - Sarah Sharp *Environment ACT*

Agriculture - Peter Simpson *NSW Agriculture*

Conservation - Roger Good *NSW National Parks and Wildlife Service*

Conservation - Rob Adam *NSW Land and Water Conservation*

Urban development - Peter Liston *ACT Planning and Land Management*

THE COMMUNITY, MOVING TO THE FUTURE

Discussion, review and action

POSTERS AND DISPLAYS

Survey techniques for studying an endangered reptile - Don Fletcher *Environment ACT*, Lyn Nelson *Australian National University*, Warwick Smith *NSW National Parks and Wildlife Service*

Effects of established trees on native temperate pasture growth - David Williams & Paul Wallace *University of Canberra*, Mutjinde Katjiua *University of Namibia*, Nick Abel *CSIRO Wildlife and Ecology*

Rocky outcrops in grasslands: Living habitats - Chris Watson *Umbagog Landcare Group*

Communicating conservation on roadsides - Tim Barlow *Grassy Ecosystems Reference Group*

Landscape function analysis - David Tongway *CSIRO Wildlife and Ecology*

Queanbeyan Landcare - Megan Cousins *Queanbeyan Landcare*

Grassland plants of Lanyon Valley - Michael Bedingfield *Friends of Grasslands*

Grassland plants - Leon Horsnell *Native Nooks*

Grassland plants - Sue Walker *Australian National Botanic Gardens*

Book stall - Murray Dadds *Society for Growing Australian Plants*

Grassland painting and drawings - Helen Fitzgerald

Introducing Friends of Grasslands - David Eddy & Naarilla Hirsch *Friends of Grasslands*



OPENING

GRASSLAND CONSERVATION - A NATIONAL PERSPECTIVE

Theo Hooy *Environment Australia*

Most of Australia's temperate native grassland and grassy woodland have been altered since the arrival of Europeans. Much of the remaining temperate native grassland is on privately owned properties or lies scattered along roadsides and railway lines, or in old cemeteries. Only 0.002 per cent of the original area of native grassland in south-eastern Australia is protected within the conservation estate.

Under the Australian Constitution, natural resource and land management responsibilities lie principally with the States and Territories. However, through environmental programs under the Natural Heritage Trust the Commonwealth provides funding to relevant community groups for on-ground work. There are three Commonwealth programs directly involved in grassland conservation; Bushcare, the National Reserves Systems Program and the Endangered Species Program.

With the introduction of the Natural Heritage Trust, 'Bushcare' is now the primary Commonwealth program for conservation of Australia's native vegetation, including grasslands and grassy woodlands.

Under the National Reserve System Program a number of projects have been funded with the aim of extending the representation of grassland and grassy woodland under the National Reserve System and developing best practice management of grasslands.

The national goal of the Endangered Species Program is to protect and conserve Australia's native species and ecological communities. Of relevance to grasslands, one of the desired national outcomes of the program is the long-term recovery of species and communities that are considered nationally threatened.

Environment Australia is also looking at other mechanisms, such as incentives, as a means of preserving native vegetation including grasslands.

Native grassland and grassy woodland ecosystems are becoming increasingly recognised by some within the pastoral community as a valuable economic resource. Native grass and pasture allow for diversification of the farm enterprise and should be considered as a component of sustainable production.

The particular suite of species within a grassland is the result of the current and past managerial practices and environmental conditions. To adequately manage native grasslands and to maintain their viability we need to have a better understanding of all these factors. Environment Australia is exploring options to continue support for research into the management of native grasslands and grassy ecosystems.

Grasslands are rich in biodiversity, both flora and fauna. As a significant and fragile ecosystem it is important that grasslands and grassy woodlands are properly managed in a coordinated approach at

the regional and national levels. With capital investment in grassland conservation through key Natural Heritage Trust Programs and through funding key research, it is hoped that the future of grasslands can be enhanced.

SETTING THE SCENE FOR THE WORKSHOP

Art Langston *CSIRO Wildlife and Ecology*

The reason we have come together today is to talk about conflict. Specifically, we are interested in the conflict that occurs when development is proposed or takes place in or in proximity to native grasslands. I define development very broadly in this context: from the low intensity predominantly rural land uses where development may take the form of clearing for crops, or pasture seeding and fertilisation; through to the high intensity mainly urban land uses which may include clearing for building or transport or alternatively revegetation with exotic or inappropriate native species.

There is no doubt that conflict exists in the grasslands. I have only been involved in grassland ecology since 1994. Yet in this time I have seen numerous examples where development has divided the community. I cite here such things as the NSW SEPP46 clearing controls, the Gungahlin Town Centre, grasslands within the suburb of Dunlop, the original siting of the Australian Government Survey Organisation building near Narrabundah and the subdivision of Poplars property near Queanbeyan.

There is also no doubt that conflict is looming in the future. Such things as the new vegetation clearance legislation in NSW, housing developments in the Jerrambomberra and Majura Valleys, expansion of the Canberra Airport, routing of the Very Fast Train and possibly the building of the Majura Parkway are variously planned for the short and long term future.

Friends of Grasslands is concerned that conflict is inevitable unless all of us are pro-active and as stakeholders take part in the planning and implementation of such legislation and development. Note that stakeholders include landholders, community groups, researchers and agency representatives. Less obvious perhaps is the need to firstly acknowledge the existence of conflict. Without such acknowledgment we cannot do something about the conflict itself. That is why we have invited you here. We have not invited you to sit and listen to experts tell you what to do. We want you to work with us, Friends of Grasslands, so that as a combined stakeholder group we generate actions that will reduce future conflict and hopefully achieve outcomes that advantage us all.

Certainly, those people speaking today do not see themselves as experts. They see themselves as sharing knowledge and experience that contributes only partially to the solution. Their role is to seed ideas, not define and then constrain those ideas. They will talk about their experiences and describe the conflict in which they have been involved. If you will excuse me continuing the metaphor, your role as participants is to grow those seeds to generate the ideas and actions that will give better outcomes in the future.

When you arrived this morning you were given a handout that outlines a program of four theme sessions followed by a forum session. In each theme session four or five speakers will each speak for eight minutes. They will each be allocated two minutes to answer points of clarification about their talk. Time today is critical and our facilitators will enthusiastically strive to keep to time.

Note that the two minutes of questions for each speaker is for points of clarification only. Ideas and discussion about conflicts and how we handle them should be held for the last twenty minutes of each session. During this time we would like you, the audience, to think about what the speakers have discussed, their ideas and experiences. We would like you to combine these with your own experiences and help us generate lists of "Successes", "Failures", and "Things we need to do". We should limit discussion at this time to the broad theme of the particular session.

This is the time to have your say and the facilitators will write these points on the whiteboards provided at the front of the room.

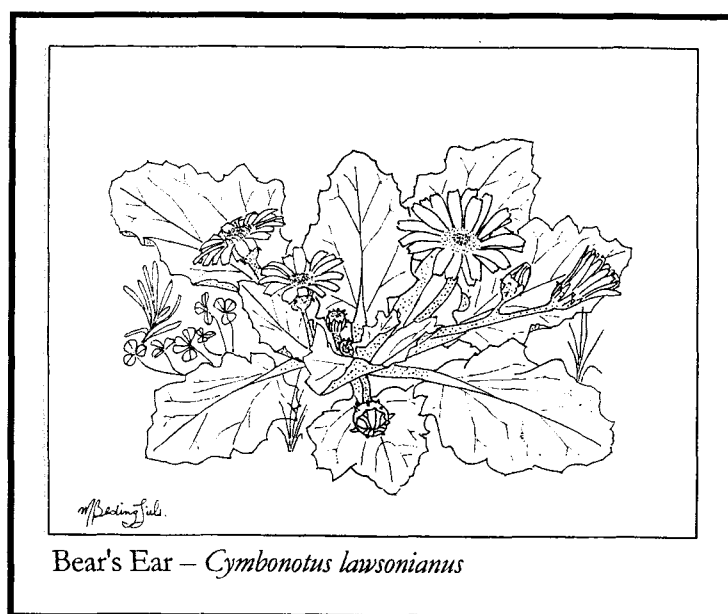
Some of you may not feel comfortable speaking in front of a group of people. So please write any comments or ideas you have on the sheet provided at the back of your handout, tear them off and at the end of each session place them in the box at the foot of the overhead projector. Any trends that emerge from these ideas will be included in the final forum session.

Throughout the day there are likely to be points where there is strong agreement amongst the audience. Please be vocal and express your agreement, as we want to know what these points are. Not everything is conflict in the grasslands and knowledge of our common ground will give us a place from which to move forward.

In the final forum session each of the whiteboards from the theme sessions will be displayed on the walls of the room. We want to use these plus any other discussion raised in this session to generate concrete actions that can be taken to resolve conflict, or at least understand it. Generating those action statements is the key focus of this session. Where possible we would like to identify which people or agencies should take those actions and what level of urgency we need to place on them.

I have described the formal part of today's proceedings. However, the informal part is just as important. In total we have allocated two hours of the day to refreshment breaks. But don't think we don't expect you to work. What we achieve here today is likely to only be a start in the process of resolving conflicts with grassland development. For the process to continue it is vital that you continue to talk and correspond with other stakeholders. Your job then in these breaks is to meet new people, share your experiences and generate ideas.

I have spoken for long enough and I am impatient to hear views and ideas of others.



SCIENCE, PROVIDING INFORMATION FOR DECISIONS



GRASSY ECOSYSTEMS SURVEYS IN THE SOUTHERN TABLELANDS OF NSW AND ACT

Rainer Rehwinkel *NSW National Parks and Wildlife Service*

Abstract

In south-east NSW, a number of surveys were undertaken in the early 1990s. Since 1995, a number of grassland and grassy woodland sites have been added to the knowledge base across the south-east. Recent NSW survey work has used a rapid assessment procedure that allows for comparison of conservation values of sites regionally. Only grassland sites have been given a conservation rating, not the grassy woodland sites at this stage.

A concentrated survey effort has been undertaken in the ACT to identify grassland and grassy woodland sites by the Wildlife Research and Monitoring Unit of Environment ACT, including quantitative floristic survey of grasslands, targeted threatened fauna survey and mapping of grassy woodlands, with follow up conservation ratings applied to all sites.

Mapping of pre-settlement grassland boundaries has been undertaken across the region, adding to earlier work on the Monaro and the ACT, highlighting extensive areas that once supported grasslands in the Yass, Goulburn and Bungendore areas.

Continuing funding from the Natural Heritage Trust and Environment Australia's Threatened Species and Communities Program will allow for further survey work to be carried out, particularly on crown land in the Yass area and also in other regions.

Across the region, some of the best grassland and grassy woodland sites exist on public land, with good remnants having been also found on private and leasehold land. However, in total, these sites make up a very small percentage of the land area within any region. A brief review of the status of threatened grassland species and ecological communities is given.

In both the ACT and NSW, data from grassland and grassy woodland surveys are held on databases which are invaluable for servicing a number of needs, including development planning and planning for the identification of further sites for targeted survey of particular threatened species and for recovery and management planning.

Introduction

This is a brief overview of survey work conducted to date on grassy ecosystems in the Southern Tablelands of NSW. A fuller account is in Rehwinkel (1997). Planned surveys are also described. Work undertaken in the ACT is briefly summarised. The status of the grassland fauna and flora

and of the grassy communities is briefly discussed. The use of survey information in the decision making process is also discussed.

Completed surveys

NSW - In south-east NSW, Surveys undertaken in the early 1990s include (i) those in grasslands on the Monaro (Benson 1994; Rowell 1994), (ii) a regional survey of cemeteries on the Southern Tablelands (Jones, unpubl.), and (iii) an extensive survey of travelling stock reserves in the area to the north-west of the ACT (Hibberd and Taws 1993).

A number of other grassland and grassy woodland sites have been surveyed since the early 1990s (eg Barrer, 1993, Rehwinkel 1996, Gunninah, in prep). These have included sites across the Monaro, areas closer to the ACT, particularly in the Shires of Queanbeyan, Yarrowlumla and Gunning, in the Braidwood area, and most recently in the Goulburn area. They have resulted in the discovery of a number of new populations of threatened species including the Button Wrinklewort *Rutidosia leptorrhynchoidea*, Monaro Golden Daisy *R. leiopis*, Creeping Hopbush *Dodonaea procumbens*, Little Whip Snake *Suta flagellum*, Striped Legless Lizard *Delma impar* and Grassland Earless Dragon *Tympanocryptis lineata pinguicollis*. Some of these species are turning up in areas where they were previously unknown. Additionally, recent work by McDougall (pers. comm.) has relocated populations of the threatened Yass Daisy *Ammobium craspedioides* at all known previously recorded locations and in the process, added a number of new grassy sites to the database.

The majority of the survey work that has been undertaken has used a rapid assessment procedure that allows for comparison of conservation values of sites regionally (Morris and Rehwinkel 1997; Rehwinkel 1998). Conservation rating allows for a regional comparison of grassland sites according to their essential values, using criteria such as native plant diversity, species richness and extent of weed cover.

The conservation rating process includes the collection of data on the flora of each site, noting both native and exotic species, and taking note particularly of highly invasive weeds, particularly African Lovegrass *Eragrostis curvula*, Serrated Tussock *Nassella trichotoma*, Chilean Needlegrass *N. neesiana* and St Johns Wort *Hypericum perforatum*. A suite of significant plant species is also used in the assessment process. Significant species are defined as being regionally rare or those known or thought to be highly intolerant to various forms of disturbances, such as continuous grazing. A fauna habitat assessment is another important part of the site assessment process, taking note of particular habitat variables for such threatened fauna as the Grassland Earless Dragon, Striped Legless Lizard, and the Golden Sun Moth *Synemon plana*.

Only the grassland sites in NSW have been given a conservation rating at this stage. It is hoped that the grassy woodland sites will be rated in future. The conservation rating has also been applied to sites that were previously surveyed by Benson (1994) and Jones (unpubl.).

ACT - A concentrated survey effort by the Wildlife Research and Monitoring Unit has been under way to identify natural temperate grassland sites since 1991. Information on the vegetation has been collected at each grassland site using a quadrat-based, quantitative data collection method (Sharp 1997). Research undertaken to identify floristic associations in the ACT native grasslands, and related attributes (Sharp 1997) has been used to group sites by their associations. Additionally, surveys to identify the presence of threatened or uncommon plants have also been undertaken throughout all ACT natural grassland sites (Crawford and Rowell 1996).

A grassy woodland survey has been completed in the ACT (Ingwersen et al. 1997), and, though less detailed than the grassland surveys in terms of the floristic information gained, this survey has resulted in the production of a woodland map for the entire ACT.

Intensive fauna survey work has been completed for threatened reptiles and other fauna at many sites, using various quantitative methods. Nelson (this volume) discusses in more detail the fauna surveys that have been undertaken in the ACT.

All vegetation survey information, as well as relevant information on sites and a bibliography, are held on a database and maintained regularly. The ACT Vertebrate Atlas is regularly maintained and includes information on all vertebrate recordings for grasslands and grassy woodlands.

All grassland and grassy woodland sites in the ACT have been given a conservation rating that assists with strategic planning. The ratings can also be used regionally, for comparison with NSW sites (Sharp and Shorthouse 1996; ACT Government 1997).

Grassland mapping

NSW - Major revisions have now been made to early mapping of pre-settlement grassland boundaries by Costin (1954), who mapped the Monaro, and the mapping of grassland boundaries in the ACT by Pryor in the 1930s (see Burbidge and Gray 1979). This was part of the on-going regional biodiversity survey project that was funded by a partnership including the ACT Government, the NSW NPWS, Yass Shire and Queanbeyan City Councils, and supported by the ACT and Southern NSW branch of the Housing Industry Association (see Rehwinkel 1997).

The boundaries of pre-settlement grassland for areas to the east, north and north-west of the ACT (see Figure 1) have now been mapped, including extensive areas that once supported grasslands in the Yass, Goulburn and Bungendore areas.

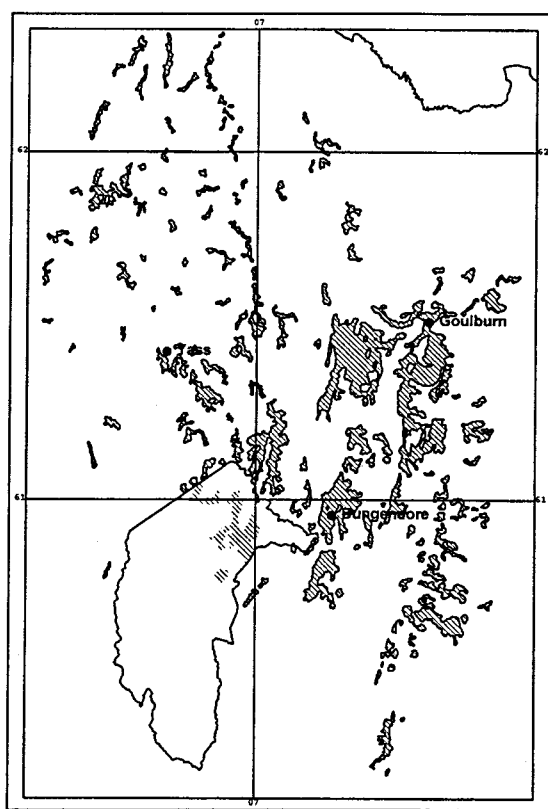


Figure 1. Pre-settlement grassland boundaries W, N and E of the ACT

ACT - All boundaries of grassland sites in the ACT have been mapped (ACT Government 1997). Currently this is being further revised, using a Geographical Positioning System to accurately map

boundaries, vegetation associations, weed infestations and conservation ratings, so that management plans can be drawn up to indicate requirements, and so that in future these can be reviewed to see if changes have occurred.

Grassy ecosystems review

NSW - Other major initiatives of the biodiversity survey project (see above) include the production of a literature review, an audit of data on grassy ecosystems information and the production of grant applications to the National Heritage Trust for further funding to conduct surveys of grassy ecosystems across the region. This project has been an example of inter-agency and private sector co-operation, particularly designed to reduce the sort of conflicts that have been a feature of development projects in the recent past and that are the focus of this workshop.

Planned surveys

NSW - Continuing funding from a successful Natural Heritage Trust application and from Environment Australia's Threatened Species and Communities Program will allow the carrying out of further survey work.

Currently planned for the 1997-98 survey season are the following:

1. A conservation assessment survey of crown lands in the Yass area - this will complement a remnant vegetation survey planned by the Yass Shire Council;
2. Follow-up threatened reptile surveys in the Yass area;
3. Continuation of surveys on the Monaro, especially focussing on woodland TSRs;
4. An initial, small-scale survey of TSRs in the Bombala area; and
5. An initial, small-scale survey of TSRs in the Bega area.

Additionally, it is planned to follow up on a number of sites on private land across the region at the invitation of landholders.

ACT - In the ACT, the major focus is now on long-term monitoring of vegetation and threatened species in selected sites, to discriminate between short term fluctuations in the biodiversity and longer term changes as a result of management and other disturbances (Sharp and Shorthouse 1996). The monitoring is aimed primarily at management planning. Surveys of invertebrates in selected sites are also being undertaken.

Status of fauna and flora species and the communities

NSW - While only a broad estimate of how much of the pre-settlement grassland or grassy woodland ecosystems remains in a relatively good condition across the region, it is clear that both the natural grasslands and various communities of grassy woodlands are under threat. Much of the large native grassland plains have been destroyed or disturbed, leading to significant fragmentation and modification.

By illustration, in the last 3 years of grassland survey work in south-eastern NSW, some 216 remnants of grasslands and grassy woodlands have been surveyed. The total area of these remnants is estimated to be 4875 hectares. This figure not only includes sites of high conservation value, but also those of lesser quality, ranging to a small number of sites of little or no value. This figure

excludes a number of narrow sites, such as roadsides and rail reserves, which are too small to register on the NPWS geographic information system (GIS), and are in most cases too small to be effective for long-term conservation of the ecosystem, except for their use as linkages. This 4875 hectare area needs to be seen in the light of the map in Figure 1, which shows that natural grasslands alone occupied some 460,000 hectares of the south-east prior to European settlement. This estimate is conservative.

ACT - About 1000 hectares of grassland of moderate to high conservation value remain in 39 locations, from an estimated 20,000 hectares of pre-settlement grassland (Sharp and Shorthouse 1996).

Regionally, some of the best grassland and grassy woodland sites have turned up on public land tenures, such as travelling stock reserves, cemeteries, army and airport lands, council reserves and road reserves. Additionally, some very good remnants have been found on private and leasehold lands. However, in total, all these sites make up a very small percentage of the land area within any region.

The threatened status of grassy ecosystems has been recognised in the ACT by the formal listing of both the Natural Temperate Grassland Community and the Yellow Box-Blakely's Red Gum Grassy Woodland as threatened ecological communities. There are currently no moves to list these communities as threatened communities under the NSW Threatened Species Conservation Act.

Several grassland fauna and flora species are listed as threatened, in NSW under the Threatened Species Conservation Act, 1995, in the ACT under the Nature Conservation Act 1980, and under the Commonwealth's Endangered Species Act 1992 (Tables 1a&b).

A number of threatened species use the grassy woodland habitat regionally. They include the Superb Parrot *Polytelis swainsonii*, Brown Treecreeper *Climacteris picumnus*, Swift Parrot *Lathamus discolor*, Regent Honeyeater *Xanthomyza phrygia* and the Rosenberg's Monitor *Varanus rosenbergi*.

Table 1a. Grassland fauna listed under ACT and NSW threatened species legislation

Striped Legless Lizard	<i>Delma impar</i>	ACT, NSW, Comm.
Golden Sun Moth	<i>Synemon plana</i>	ACT, NSW
Grassland Earless Dragon	<i>Tympanocryptis lineata</i> <i>pinguicolla</i>	ACT, NSW
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	NSW, Comm
Little Whip Snake	<i>Suta flagellum</i>	NSW
Perunga Grasshopper	<i>Perunga ochracea</i>	ACT

Table 1b. Grassland flora listed under ACT and NSW threatened species legislation

Small Purple Pea	<i>Swainsona recta</i>	ACT, NSW, Comm.
Button Wrinklewort	<i>Rutidosia leptorrhynchoidea</i>	ACT, NSW, Comm.
Austral Toadflax	<i>Thesium australe</i>	ACT, NSW, Comm.
a leek orchid	<i>Prasophyllum petilum</i>	ACT, NSW
Monaro Golden Daisy	<i>Rutidosia leiopis</i>	NSW
Mauve Burr-daisy	<i>Calotis glandulosa</i>	NSW
Creeping Hopbush	<i>Dodonaea procumbens</i>	NSW
Yass Daisy	<i>Ammobium craspedioides</i>	NSW

The formal listing procedure in both the ACT's and NSW's threatened species legislation ensures that a number of recovery actions are carried out for each of the species or ecological communities. Sharp (this volume) discusses ACT Action Plans in more detail.

How survey information used in the decision making process

In both the ACT and NSW, data from grassland and grassy woodland surveys are held on databases that are invaluable for servicing a number of needs. These are listed below:

- **Development planning** - The NPWS database, in association with the NPWS's GIS, streamlines the assessment of proposed rezoning and development applications in NSW, and assists in the production of Local Environment Planning and corridor planning (eg. NPWS 1997), and potentially, for vegetation management planning under the new Native Vegetation Conservation Act, 1997. Information from surveys of the vegetation and threatened species of grassland sites in the ACT has assisted in the development planning process.
- **Reserve planning** - Several reserves are in the planning process in NSW (eg. Rehwinkel 1996). Several grassland sites are under negotiation for Voluntary Conservation Agreements across the region. In the past six years new reserves have been established in the ACT to protect native grassland and grassy woodland. Memoranda of Understanding are being negotiated for other sites in the ACT (Sharp, this volume).
- **Identification of further sites for targeted survey of particular threatened species** - An example is the use of grassland site data provided to Campbell (1998) who subsequently surveyed for and found a number of new populations of the threatened Golden Sun Moth in these and other nearby sites.
- **Action planning and recovery planning** - Information from surveys has assisted in the process of developing Recovery Plans (NSW) and Action Plans (ACT) that are required for all species and ecological communities declared under the threatened species legislation. Draft recovery plans have been prepared in NSW for the Striped Legless Lizard, Grassland Earless Dragon, Button Wrinklewort and Small Purple Pea.

- **Management planning** - Surveys and subsequent monitoring of sites of conservation significance provide input to the development and implementation of conservation management plans.
- **Grassland field guide** - Survey data are being used to assist in the preparation of a field guide for the grasslands and grassy woodlands of the Southern Tablelands.

Conclusion

Large amounts of work have been and are currently being undertaken in both NSW and ACT in surveying grassy ecosystem sites and their fauna and flora over the past seven years. This has enabled government agencies to understand the status of threatened communities and their associated fauna and flora species. Survey data have been used in many ways to assist with the conservation, planning, management and educational processes.

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The views expressed in this document are those of the author and do not necessarily reflect those of the Director-General, NSW National Parks and Wildlife Service.

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**RESEARCH, SURVEY AND MONITORING FOR THE CONSERVATION
OF THREATENED GRASSLAND REPTILES**

Lyn Nelson *Environment ACT*

Abstract

In a perfect world we would not only know the distribution and abundance of native plant and animal species within native grassland communities, but we would also understand the: precise ecological requirements of each species; structure and dynamics within populations of these species; relationships with other components of their environment; agents and processes

which threaten their survival; most appropriate management strategies to conserve these species; and best methods for monitoring the effectiveness of management strategies in achieving the long-term survival of the species.

This presentation will focus on recent survey, research and monitoring work on two prominent, but threatened, grassland reptiles (the Striped Legless Lizard *Delma impar* and the Grassland Earless Dragon *Tympanocryptis lineata pinguicollis*) to illustrate how we are seeking to answer these important conservation questions.

Background

Natural temperate grasslands provide habitat for a number of frog, reptile, bird and a few mammal species like Eastern Grey Kangaroos and Wombats. In view of the focus of this workshop, this paper concentrates on two threatened reptiles in the region: *Delma impar* (Striped Legless Lizard) and *Tympanocryptis lineata pinguicollis* (Grassland Earless Dragon). Table 1 outlines the current conservation status of these two lizards at the state/territory, national and international levels.

The threatened status of these lizards is linked to the clearing and modification of their grassland habitat. The taxonomy of *T.l. pinguicollis* is currently being reviewed and it is expected that it will be elevated from a sub-species to a species. This will also elevate the importance of its conservation at the national level.

In the ACT *T.l. pinguicollis* and *D. impar* also have Special Protection Status (SPS) which requires:

- the highest level of statutory protection;
- conservation requirements to be a paramount consideration;
- only activities related to conservation of the species or serving a special purpose are permissible; and
- the Conservator of Flora and Fauna to only grant a licence for activities affecting a SPS species where satisfied that the action:
 - is required for scientific, educational, propagative or similar purpose,
 - is required to protect persons or property and impact will be minimum to the species,
 - is merely incidental to other acts, and will not appreciably reduce chances of survival or recovery in the wild of the species concerned, or
 - is of particular significance to Aboriginal tradition and will not appreciably reduce the chances of survival or recovery in the wild of the species concerned.

Action Plans have been prepared for both species in the ACT and Victoria and are well advanced in NSW. National Recovery Teams, comprised of representatives from government, specialised interest groups and the scientific, rural, and academic communities are established for each species. National Recovery Plans for each species are nearing completion.

Table 1: Status of *Delma impar* and *Tympanocryptis lineata pinguicolla*

	<i>Delma impar</i>	<i>Tympanocryptis lineata pinguicolla</i>
ACT	Vulnerable (Special Protection Status)	Endangered (Special Protection Status)
NSW	Vulnerable	Endangered
Victoria	Threatened taxon	Endangered (extinct?)
National	Vulnerable	nil (expect Endangered)
International (IUCN 1994)	Vulnerable	Vulnerable

Conservation requirements

How do we know what a species needs to survive and recover from their endangered or vulnerable to extinction status? In a perfect world we would not only know the distribution and abundance of native plant and animal species within native grassland communities, but we would also understand the:

- precise ecological requirements of each species;
- structure and dynamics within populations of these species;
- relationships with other components of their environment;
- agents and processes which threaten their survival;
- most appropriate management strategies to conserve these species; and
- best methods for monitoring the effectiveness of management strategies in achieving the long-term survival of the species.

Thus a common feature of Action Plans and Recovery Plans is to undertake comprehensive survey work to identify the location of surviving populations. However, the "... present distribution cannot be assumed to represent the species optimal habitat" (Caughley 1994).

These plans also identify the need for more research to improve our understanding of the biology and ecology of these species and thus provide a basis for informed conservation management decision making. As Caughley (1994) so ably put it: "An important first step in understanding why a species is declining and what recovery actions are appropriate, inevitably involves study of the natural history of the species".

At present we know very little about the ecological requirements of *D. impar* and *T.l. pinguicolla* and thus the management challenges exhibited by these two species are even more difficult, as

expressed by Parma et al. (1998): "Worse than uncertainty itself is the fact that we tend to underestimate uncertainty." Nevertheless, given that we need to work in this framework of limited knowledge and uncertainty, we still need to move forward.

Survey techniques

Whilst surveys are an obvious first step for recovery action (i.e. we need to know where the species occurs before we can take action to assess and conserve populations), they are expensive and need to be conducted as efficiently as possible.

Where to survey: A considerable survey effort has been conducted in the ACT and Victoria for *D. impar* and *T.l. pinguicolla* and a few surveys, related to specific development projects, have been undertaken in NSW. Surveys to identify the location of natural temperate grasslands have assisted in the identification of potential habitat for threatened reptiles. However, relatively new technology such as satellite imagery can help to identify grassland habitat areas for more intensive survey effort in large areas like NSW (Langston 1986).

How to survey: Traditionally, pit-fall traps with a drift fence have been used for reptile surveys. This technique is labour intensive, expensive and the installation of the drift fence, in particular, causes disturbance to grassland habitat. A captive population of *D. impar* at Tidbinbilla Nature Reserve has been used to trial different trap designs. Other designs have been field tested in Victoria. Following the location of *D. impar* individuals under a lump of bitumen in the Gungahlin area, the use of bricks and tiles as alternative survey methods is being trialed in the ACT. However, unfortunately to date, none of these new methods has proved as efficient or effective as the pit-fall traps for catching *D. impar*.

The situation with *T.l. pinguicolla* is more positive with the accidental finding by an ANU student that smaller insect pitfall traps also captured Grassland Earless Dragons. These traps have been refined with a small metal drift fence and a lid to offer protection for the trapped lizards. In addition to this, the observation of *T.l. pinguicolla* using natural holes (also used by wolf spiders, crickets and a number of other arthropods), led former officers at Wildlife Research and Monitoring to develop artificial holes, known as "spider tubes". These plastic tubes, together with a small metal roof, have proven to be highly successful in capturing and recapturing Grassland Earless Dragons. "Spider tubes" are also relatively cheap and easy to install, cause less damage to the environment, and have enormous animal welfare benefits. Specifically, they do not catch a large number of non-target species, nor do they require daily checking as the lizards, which appear to use them as homesites, are able to climb in and out of the tubes at will. Research work undertaken by Wildlife Research and Monitoring during surveys in the ACT have shown that "spider tubes" with roofs have the same chance of catching *T.l. pinguicolla* as the small pitfall traps, but the chance of recapturing the same individuals is significantly greater in "spider tubes" (Nelson et al. 1996). This means that the tubes are more useful in studies that require the same individuals to be recaptured; for example if growth rates are to be determined.

This season "spider tubes" were successfully used to trap *T.l. pinguicolla* at sites near Cooma, although these sites were rocky and thought to contain numerous natural homesites for the lizards.

Survey work in the ACT has shown that capture patterns for *T.l. pinguicolla* differ from year to year, and that pitfall traps and "spider tubes" do not always record presence. Examination of natural burrows with a torch or optic fibrescope is another survey method that has been used in the ACT to determine presence and absence of the lizards. The challenge with this technique however, is to find the natural burrows.

During work with the optic fibrescope, *D. impar* are occasionally observed utilising natural arthropod burrows.

When to survey: Timing of surveys is critical. It is useless to invest resources in conducting a survey if the reptile is not active. Painstaking work in the ACT over several seasons has indicated that November-December are the best months to survey for *D. impar* and January-March for *T.l. pinguicolla*. However, this does not necessarily mean that these are the most appropriate times to survey in NSW and Victoria. Preliminary survey work on *T.l. pinguicolla* near Cooma suggests that hatching may occur later than in the ACT as more young animals are captured in April compared with February (Nelson, unpubl.). Nevertheless, this is by no means certain, and larger numbers of captures are required to test this.

From survey data we know that *D. impar* and *T.l. pinguicolla* occupy the same areas in some locations, but at other sites, only one of the two species is present. We do not know precisely why this is the case and require more information on the microhabitat requirements of each species to answer this.

Research

As far as their use of habitat is concerned, student projects at both the under graduate and post graduate levels have provided most of the information so far. Past and present student projects have examined:

- diet;
- movement of *D. impar* and *T.l. pinguicolla* using fluorescent dyes;
- movement of *T.l. pinguicolla* using radio-transmitters;
- thermal suitability of burrows and tussocks using data loggers to measure temperatures during the year;
- presence and absence in terms of past land uses.

Honours students have undertaken genetics projects on *T.l. pinguicolla* and *D. impar*. Other student research has focused on temperature preferences and behaviour.

Apart from the work undertaken by Environment ACT on different trap designs to capture *D. impar* and *T.l. pinguicolla*, we have also undertaken significant work on captive individuals of both species. In particular, the captive *D. impar* population at Tidbinbilla was used to confirm that cloacal spurs, observed under vestigial hind limb flaps of some adults, were present only on males. Until this work was undertaken, x-raying was the only method available to sex individuals and, due to the additional cost, animal welfare and time constraints, tended not to be used during surveys for this lizard. The identification of this external sex characteristic allows adult males to be identified during surveys relatively quickly and easily.

Captive *T.l. pinguicolla* were used to confirm that back patterns of individuals do not alter as the animals grow and shed their skin. This knowledge has allowed us to dispense with the traditional toe clipping technique that is used to mark individual frogs and lizards. Instead we identify individuals from photographs taken with a digital camera - a more humane, reliable and quick method of identification.

Monitoring

Traditionally governments have taken responsibility for monitoring although community groups are now taking a greater role in this area. Also, students from the University of Canberra have monitored one ACT *T.l. pinguicolla* population over recent years. In the ACT the *D. impar* monitoring program is in its early stages whilst the *T.l. pinguicolla* program has so far focused on the

survey phase. Nevertheless, a fire last February at the Majura Field Firing Range has provided an opportunity to monitor an event we probably could not have engineered. We know that both species of lizard survived the fire and that they are still there a year later. However, we do not know the longer-term impact of the fire on breeding and recruitment of each species. At another ACT location, where *T.l. pinguicollis* were reported to have run to a rubble heap ahead of a fire, no animals were subsequently captured in a survey at the spot where they were observed. However, two animals were captured elsewhere on the burnt site. We therefore need to be cautious about making generalisations about the effect of fire on endangered species based on data or records from only one or two sites.

Conclusions

Whilst scientists have a tremendous responsibility for providing advice on the management of these species, we are also conscious that there is much that we do not know. However, we cannot sit on the fence and not do anything as doing nothing is also a management action that may have deleterious consequences. Therefore we are implementing an adaptive approach to management whereby we:

- use available information and expertise;
- recognise that there is a huge degree of variability between sites, within sites, and from year to year;
- acknowledge what we do not know, and apply the precautionary principle;
- monitor the response of threatened species to management actions so that we can learn from those actions.

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Other reference material

Environment ACT's homepage can be found at: <http://www.act.gov.au/envirom>

INVERTEBRATE FAUNA

Kim Pullen *CSIRO Entomology*

Abstract

The invertebrates are that enormous group which includes small animals ranging from bacteria and protozoa through the various kinds of worms to molluscs and arthropods. Included in this latter group are the insects, which on current estimates comprise more than half the species diversity of all living organisms. Despite this diversity, or perhaps because of it, invertebrates are poorly known compared to plants and vertebrate animals. Their small body size coupled with their often cryptic habits and the perceived lack of importance to man of the majority, have meant that few people study them. Generally, the few that come to public notice are those that affect man either medically or economically.

Given our lack of knowledge of the biology and conservation status of the vast majority of grassland invertebrate species, their conservation management can only be by way of management of their known habitats. Recent studies on three insect species of Canberra region grasslands, previously identified as of conservation concern due to apparent range contractions since their discovery, have revealed 'new' populations which will, at least in one case, go towards removing that species from the list of threatened fauna. It is hoped that further studies will enhance our knowledge of the invertebrate fauna enough that they can take their place beside the vertebrates and plants in influencing grassland management decisions.

Discussion

Note

Kim Pullen talked to slides for his presentation. Unfortunately, we are unable to reproduce them in this volume.



SIRO-MED: AN APPROACH FOR ASSISTING WITH CONFLICT

RESOLUTION OVER USE OF NATURAL RESOURCE AREAS

John Ive *CSIRO Wildlife and Ecology*

Abstract

The dwindling areas of natural resources are under relentless and increasing pressures from competing land uses which jeopardise the natural resources of such areas and therefore in particular their conservation value. In a complex plural society there are sound logical reasons for ensuring that our natural resources are allocated to the competing land uses so

as to meet to the fullest extent possible the expectations and demands of current and future generations. These expectations are collectively expressed by the full spectrum of private and public interest groups and stakeholders.

CSIRO has developed an approach to resource use and management which provides a framework for assisting stakeholders to develop land use allocations which best capture the stakeholders' interest as a precursor to combining these contrasting allocation plans into a consensus plan with the assistance of a group of negotiating aids. In so doing, limited land resources are spatially allocated between the uses championed by stakeholders so that the issues identified by the stakeholders are addressed whilst being mindful of the importance the stakeholders attach to those issues. This approach, known as SIRO-MED, has been developed through involvement with state and federal resource agencies with responsibility for resource allocation and applied both locally and overseas.

The SIRO-MED approach is supported by a custom designed computer program (LUPIS) which has been developed to support the issue-driven approach to land use allocation in a diverse range of settings by either individual stakeholders or multi-stakeholder planning teams.

Introduction

Population growth and life style changes continue to put increasing pressure upon remaining areas of natural resources. Our native grasslands, which have been much sought in the past for agriculture and urban development, are a case in point with little remaining in the more developed and highly populated areas of the nation. There is growing public recognition of the importance of setting aside areas in a conservation network (including reserve and off-reserve areas) to limit the risk of losing further natural landscapes, communities, species and genetic resources. As a result, conservationists have now joined other stakeholders including agriculturalists and urban developers in debate over how these remaining areas of native grassland are used. Land use planning is one technique that can assist in resolving the resource claims of competing stakeholders.

Land use planning

Land use planning involves a blend of science and political judgement to create a land use mosaic which efficiently satisfies stakeholders' environmental, economic and social values. The important points to note from this concise statement are that:

- science and politics both have a legitimate role in land use planning;
- a mosaic of land uses is required rather than a single land use;
- scarce resources need to be allocated efficiently;
- stakeholders are the ultimate legitimate customers of planning;
- environmental, economic and social values all need to be taken into account.

For some time CSIRO has been researching land use planning techniques for the efficient allocation of natural resource areas between competing land uses to meet stakeholders' demands. A product of this research has been the SIRO-MED method.

The SIRO-MED method provides a framework which seeks to ensure that all participating stakeholders have an opportunity to register the particular resource issues that they value and the

extent to which they are valued, as a precursor to the development of a plan reflecting the preferred land use pattern for each stakeholder group. Once all stakeholders have developed such plans these plans then become the input into the second phase which seeks to resolve, in an atmosphere of mediation assisted by information-rich negotiation aids, land use differences in accordance with the political support each stakeholder group attracts. In recipe-form the steps of SIRO-MED are:

1. Seek agreement from participating stakeholders on the components to the planning problem including issues, land allocation guidelines, and data requirements and study area.
2. Acquire data needed to implement guidelines.
3. Generate and evaluate individual stakeholders' plans.
4. Blend stakeholder's plans and then adjust as required to create a consensus plan.

In various forms the method has been used both locally and overseas in a number of applications involving a wide range of natural resource issues. The designed generality of the method fosters its use between competing parties for the efficient allocation of any spatially distributed land resources.

An example: Batemans Bay

This study undertaken in the early 1990s provided a practical demonstration of the method. At the time, the use of our native forests was a major resource issue with public opinion split between forestry interests who wanted to retain access to the native forests for on-going timber removal and conservation interests who wanted the dwindling native forest areas closed to further logging.

Over a period of three months the CSIRO undertook an exercise with the participation of stakeholder representatives with an interest in forestry or conservation. In all, 10 land uses were identified (four conservation-oriented and four forestry-oriented uses were candidates for the forest province; two further uses provided for non-forest use of the cleared portion of the study area). For these land uses the stakeholders identified in total 148 guidelines. Collectively the guidelines articulated in detail the resource characteristics that each group of stakeholders believed was important in delineating the issue-relevant resources that they valued most highly. Once these guidelines were finalised the data required to operationalise the guidelines was acquired for each mapping unit into which the study area had been divided- in this case 3439 grid cells each approximately 1km². This data was used to calculate ratings for each guideline on each mapping unit. A rating is a numerical value on a scale of 0 to 1 that reflects the relative ability of a mapping unit to meet the expectations of a particular stakeholders' guideline. The stakeholders developed a land use plan after assigning a vote to each guideline to reflect the relative importance the guideline was to play in shaping the plan. The votes, combined with the respective ratings, determine the preference ranking of the land uses on each mapping unit; the top ranked land use is nominally regarded as the preferred use. Interim plans were reviewed and the vote profiles adjusted to generate allocations more consistent with stakeholder's objectives. This phase involved a number of iterations. As this current paper is not concerned with the detail of the allocation to each of the ten land uses, the allocation maps have been simplified to portray allocation of the forested area to either conservation (Figure 1) or forestry (Figure 2).

The two stakeholder plans provide the inputs for the final stage in the process that seeks to mediate the identified differences between the plans. This is assisted with a number of negotiation aids. Amongst these is the opportunity for both parties to view maps which show, for each mapping unit, the relative value each party has implicitly placed upon the land resource should the mapping unit be used for the purpose preferred by the party (Figures 3 and 4).

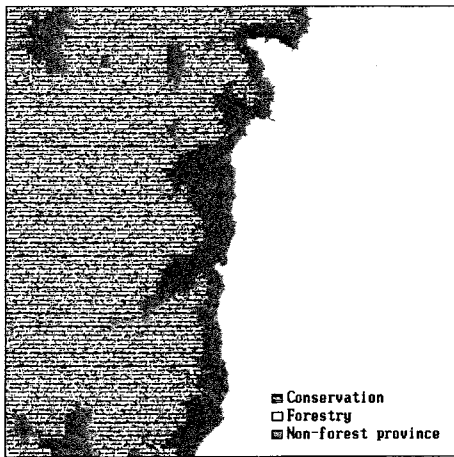


Figure 1. Conservation stakeholder's plan

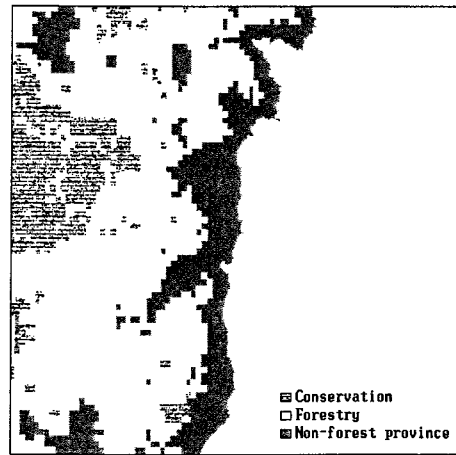


Figure 2. Forestry stakeholder's plan

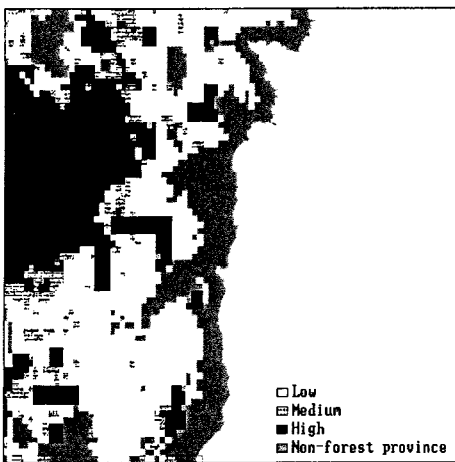


Figure 3. Conservation- relative land value map

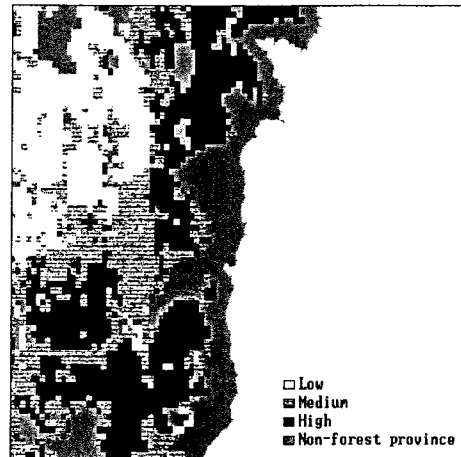


Figure 4. Forestry- relative land value map

These two maps highlight differences in the spatial pattern of values afforded each mapping unit in the study area by each stakeholder. The information from these two maps enable the mapping units to be identified where stakeholders prefer a common or compatible land uses or, if preferred uses are incompatible, then the mapping units where the values held by the stakeholders for their respective preference have the greatest value differences. Such mapping units are the least likely to attract further conflict and therefore are allocated to the use preferred by the stakeholder holding the highest value (Figure 5). In this situation the stakeholder holding the lower value for a competing and incompatible land use would find it difficult to mount a convincing case for the final allocation to be made in their favour without at the same time risking challenge from other stakeholders to the allocation they prefer on their more highly valued sites. Such challenge will serve only to prolong uncertainty and social disruption and jeopardise the entire process.

On the other hand the most contentious mapping units are those where the stakeholders not only prefer incompatible land use, ie. a conservation-oriented land use and a forestry-oriented land use, but also where the values held by the respective stakeholders are not only similar but also relatively very high.

The map differentiating the contentious mapping units is referred to as the hotspot map (Figure 6). Interestingly and noteworthy, only a relatively small proportion of the total forested area that is valued very highly by both stakeholders is preferred for incompatible uses and therefore represents hotspots. In a variant of the triage concept, the method, with input from the stakeholders, has identified the mapping units that are the most obvious candidates for conservation and those

mapping units that are equally obvious candidates for forestry. Finally, and arguably most importantly, the mapping units where it is not so clear which stakeholder's preferred use should prevail have been identified and it is to these most contentious and relatively few mapping units that attention can now be directed while both parties can go about their activities on the less contentious mapping units allocated to their respective causes.

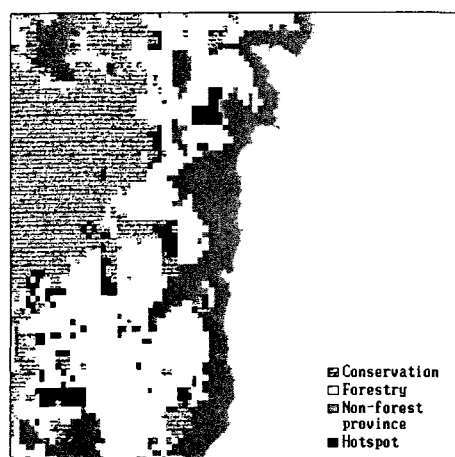


Figure 5. Allocation plan less hotspots allocation

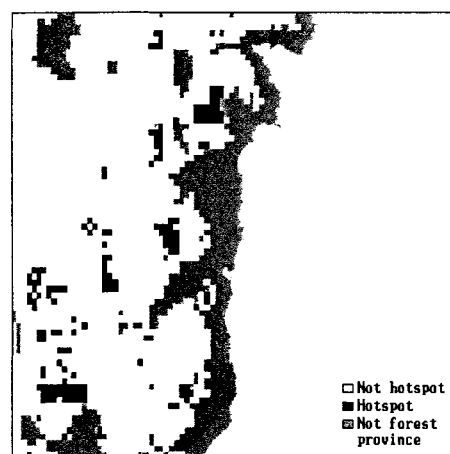


Figure 6. Hotspot map

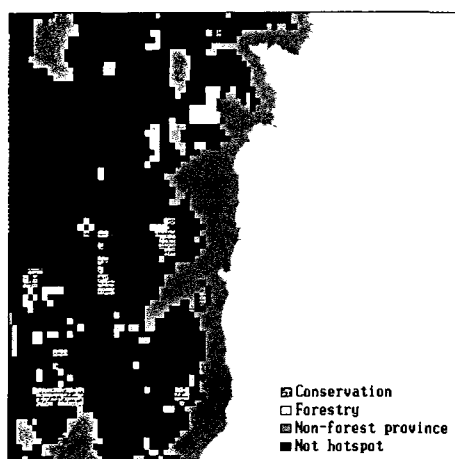


Figure 7. Conservation and forestry allocation to hotspots

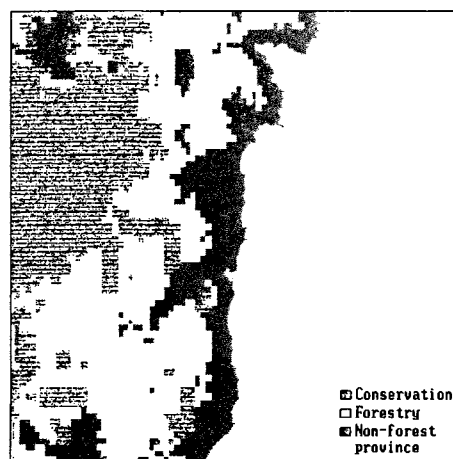


Figure 8. Consensus plan

The identification of hotspots has concentrated the previously diffused focus on land use conflicts onto that part of the forested area where competition is greatest and in so doing has freed from conflict much of the resources allowing all parties to continue their activities with some certainty. It has also bought time for the authorities to work with the stakeholders in refining the issues and knowledge base on the most contentious areas to arrive at a settlement (Figure 7).

Conclusion

Parties to land use conflicts frequently resort to rhetoric and ambit claims in an attempt to sway public opinion and support for their cause. This approach is adopted in part because of a lack of resource-related knowledge and understanding, not only from the perspective of the other

stakeholders, but somewhat surprisingly, often also from the stakeholders' own perspective. The SIRO-MED method provides a framework which facilitates the identification and addressing of all issues as a prelude to focusing and resolving land use conflicts by fostering an enhanced appreciation of the variation in resource values to all parties (Figure 8). While a forest resource case study has been used to illustrate some features of the approach the method is equally applicable to other resource-related conflicts including those involving our remaining native grasslands.

Further reading

Cocks K.D., Ive J.R. & Clark J.L. eds. (1995) *Forest processes and tools for evaluation, mediation and allocation: Report on a case-study of the Batemans Bay area, New South Wales, Australia*. CSIRO Division of Wildlife and Ecology in collaboration with CSIRO Division of Forestry. Canberra, CSIRO Division of Wildlife and Ecology Project Report No 7. pp 128.

Cocks K.D. & Ive J.R. (1996) Mediation support for forest land allocation: The SIRO-MED system. *Environmental Management* 20(1): 41-52.

Ive J.R. (1997) Realised and forgone values- A comparative analysis of five land allocation strategies. In: *National parks and protected areas: Selection, delimitation and management* (eds. J. Pigram and R. Sundell). UNE, Armidale. pp 251-269.

BEYOND RESERVES: OPTIONS FOR ACHIEVING NATURE

CONSERVATION OBJECTIVES IN RURAL LANDSCAPES

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Abstract

This paper reviews the role of off-reserve management in meeting conservation objectives. It is shown that in isolation public reserves will not be able to meet the objectives of a comprehensive, adequate and representative national reserves system. Off-reserve conservation mechanisms are required that can provide secure protection of fragmented ecological communities in rural landscapes. Such mechanisms must be focused on the aspirations of landholders in addition to addressing ecological priorities. The role of information and motivational programs, management agreements, revolving funds, financial incentives, regulations and regional planning processes is reviewed.

It is found that the mechanisms required to achieve a vision of strong off-reserve conservation are developing well in each State and Territory. What is missing is: firstly, the institutional structures that integrate on and off-reserve policies; and secondly, a culture which promotes nature conservation as a mainstream land management issue rather than the exclusive domain of public agencies. The development of a Protected Area Network and mechanisms for devolving the delivery of nature conservation programs to a wide range of government and non-government organisations offer options to address these challenges.

Introduction - The role of off-reserve management in meeting conservation objectives

This paper reviews the role of mechanisms for off-reserve management in conserving ecosystems that are fragmented within a rural landscape. However, before discussing how off-reserve management may play a more effective and formally recognised role in meeting conservation objectives it is useful to reflect on past approaches to nature conservation, to evaluate their

effectiveness in a rural context and from this basis identify what the objectives of off-reserve conservation should be.

Past approaches to nature conservation

Approaches to nature conservation have traditionally been focused on management of large areas of public land in reserves. Pressey (1995) argues that approaches to reservation policy, hence the location of public reserves, have been guided by factors largely unrelated to biodiversity conservation. Firstly, 'perceptions of conservation value' have been influenced by the beauty and wildness of areas and secondly, reserves tend to have been drawn from steep or infertile crown lands that were unallocated. In other words, reserves have tended to be located where there have not been strongly competing landuses.

This strategy has not served rural landscapes well in terms of formal public reservation. Many ecosystems are poorly represented within the reserve system: 'Ecosystem types, such as temperate grasslands, coastal heathlands, mangrove communities, and a variety of arid communities have been identified as urgently requiring protection' (Howard and Young 1995, p.23). Development pressures have been strongest on fertile lands that have been suitable for agricultural development leaving relatively few remnants that are of conservation value. Further, the remnants that do remain are typically on the land that is: 'the most rugged, the least desirable for agriculture or the most inaccessible areas' (Strom 1979 cited in Pressey 1995, p.49). This has meant that natural ecological communities on fertile agricultural lands are not only poorly reserved within the reserve system but are generally very rare.

This should not be surprising because remnant vegetation can be given an economic as well as ecological interpretation. Bowers (1996) identifies three characteristics of remnants: they are small; are only a small fraction of the original distribution of vegetation of their type; and, without active management they are not sustainable in the long term. Remnants may be viewed as both relics of natural ecosystems and as a function of past and continuing land uses and management practices (Binning and Young 1997). In many cases it is more useful to consider conservation of remnants in the context of securing and adapting existing management, which by implication has been broadly appropriate in the past, rather than viewing remnants as relics of pre-European settlement.

More recently nature conservation policies have shifted to focus on the conservation of biodiversity as the primary objective of management. In Australia this has been given effect through the National Strategy for the Conservation of Australia's Biodiversity (Commonwealth of Australia 1996) and the National Forest Policy Statement (Commonwealth of Australia 1992) which call for the establishment of a National Reserve System based on the principles of comprehensiveness, adequacy and representativeness.

Whilst long recognised by ecologists, this shift in emphasis has only recently become the major driver of reserve selection processes. The increasing emphasis on objective regional assessment of conservation values is perhaps best evidenced by the Regional Forest Agreement process where Comprehensive Regional Assessments have been undertaken to assess how comprehensive, adequate and representative the existing reserve system is. Ironically, this may have led to increased conflict over which areas are worthy of conservation as many favourites of the conservation movement are being overlooked in preference to poorly represented forest communities (Department of Prime Minister and Cabinet, pers. com.). For other biomes, the Australian and New Zealand Environment and Conservation Council (1997) has only this year endorsed Interim Scientific Guidelines for the National Reserve System that will guide reserve establishment under the Natural Heritage Trust program of the Commonwealth Government

Pressey summarises:

A new rationale for biodiversity reserves needs to be established through policy development and coordination of agencies and lobby groups. It should require two key questions to be asked about new reserves: 1. In a regional context, will the proposed reserve protect features that are presently poorly represented in the system?; [and] 2. In a regional context, will the proposed reserve cover features that most need this form of protection? If the answer to either of these questions in "no", then conservation resources are about to be misplaced (Pressey 1995, p.24).

The need for a new approach

As the conservation needs of rural regions begin to be objectively assessed by government, the poor representation of many ecological communities in the existing reserve system will be highlighted (see for example, NSW Department of Land and Water Conservation 1997). Further, many of these communities will be comprised of scattered remnants across large geographic areas. For example, Grassy White Box Woodlands now only occur in small, often degraded, remnants scattered across their former range of 'several million hectares along the western slopes of the Great Dividing Range of NSW, extending also into Queensland and Victoria' (Prober and Thiele, in press). The small size and scattered nature of these remnants makes acquisition and management by public agencies inappropriate.

Prober and Thiele propose:

A new type of reserve system for the grassy white box woodlands and other similarly fragmented ecosystems, in which both local protection instruments and a centralised conservation authority, have a role to play. The optimal reserve structure for grassy white box woodland remnants would be a single reserve with individual sites retaining their existing tenure and management bodies, but with an overarching management structure provided by a centralised agency (Prober and Thiele, in press).

This paper argues that this view needs to be more widely acknowledged and, moreover, greater emphasis placed on defining a formal role for off-reserve conservation.

For too long off-reserve conservation has been perceived as the poor cousin of public reserves. There remains a perception amongst policy makers that our public reserve system should be comprehensive, adequate and representative within its own boundaries. Whilst a noble objective, can we envisage scattered remnants in the rural landscapes of Australia being acquired from private landholders and effectively managed for conservation? The difficulties associated with managing small remnants surrounded by agricultural land, and associated threatening processes, are at best problematic. Further, if placed in the context of a strong culture of private ownership and autonomous management by landholders, a vision of acquiring large areas of public land for the public reserve seems unrealistic.

In this case, off-reserve conservation has to do more than play a complementary role to the public reserve system. Conservation values will also need to be securely managed off-reserve and be formally accounted for. It is this second more formal role for off-reserve conservation that has been inadequately recognised in Australia. Meeting this objective requires new approaches, policy tools and institutional structures, the seeds of which lie in small innovative programs currently developing in most States and Territories. What is required is a shift in policy emphasis and much closer coordination and integration of the mechanisms available for off-reserve conservation. These issues are explored in the remainder of this paper.

Developing effective policies to secure conservation values off-reserve

Policy tools for off-reserve conservation

A wide range of mechanisms is available to secure the conservation of fragmented ecosystems. These can be grouped in the following categories (Young et. al. 1996):

Information and Motivational Programs: Motivational programs which provide education and information, and establish networks of interested landholders, are an essential component of any off-reserve conservation program. These programs rely on voluntary participation and do not generally provide any direct financial assistance to landholders. An excellent example in Australia is the Victorian Land for Wildlife scheme that is discussed in detail in Platt and Ahern (1995).

However, there are also strong arguments that information and motivational programs will not in themselves secure conservation outcomes. Brasden (1991) cites evidence that whilst programs of this kind do raise awareness and create a culture of change, they do not in themselves lead to widespread changes in the behaviour of landholders. It appears that attitudinal change, whilst necessary, may not be sufficient to secure changes in behaviour that result in improved land use.

Management Agreements: In broad terms a management agreement is a contract between a landholder and a third party regarding the use and management of their land (Crompton 1990). Entry into agreements is generally voluntary but may be binding in perpetuity once entered. Management agreements can play two important roles in conserving biodiversity. Firstly, by changing property rights a management agreement limits or changes a landholder's ability to exercise one or more entitlements to land use, for example by restricting grazing rights. Secondly, management agreements put in place mechanisms for developing a plan of management that secures the management intent of a particular site and places management activities in an adaptive framework that strives for continual improvement. Binning and Young (1997) define three broad types of management agreements:

1. Landowner-Initiated Agreements - landholders with a strong commitment to vegetation protection are encouraged to voluntarily enter into agreements to ensure ongoing protection of vegetation they value;
2. Transition Agreements - Policy or legislative change is accompanied by incentives that assist landholders in meeting new vegetation management obligations. The emphasis is on equity so as to retain landholder support and motivation for the transition to a new management standard; and
3. Unique-Site Agreements - Management agreements may be used to secure conservation for priority ecosystems that are of high conservation value.

Financial incentives are often used to encourage landholders to enter management agreements. Incentives may involve reimbursement of costs associated with management, compensation for foregone land-use opportunities or indirect payment such as through the taxation system.

Revolving Funds: One innovative mechanism for increasing the use of voluntary agreements is the establishment of revolving funds. The fund is used to purchase land, place a covenant on it and then re-sell to a buyer who is sympathetic to conservation management. As the property right is changed, via the covenant, it is more likely that a landholder committed to conservation will purchase the land. In this way the market works to put a "willing" landholder in the place of an "unwilling" landholder. This mechanism has the potential to significantly lower the cost of protecting special areas. The Trust for Nature (1997) in Victoria has now successfully managed a revolving fund for a number of years.

Financial Incentives: There is a wide range of potential mechanisms for providing incentives to landholders to manage for off-reserve conservation. These include: payment for acquisition of rights, up-front payments for management, competitive bidding, reimbursement of incremental costs, performance based payments, trusts, discretionary funds, advisory services, tax deductions and rate relief.

It is difficult to generalise the circumstances as to when particular incentives should be provided. Ongoing payments should generally only be used for securing high quality remnants of “reserve-like” status. Likewise, large, once-off payments should be tied to permanent changes in landuse achieved through legislation and/or entry into a covenant (Binning and Young 1997).

Non-financial payments such as extension services and indirect incentives such as tax deductions and rate relief provide a strong message of government support for the conservation of native vegetation. For this reason, their impact is potentially much larger than their costs in terms of foregone revenue. In particular, rate relief is consistently raised by stakeholders as a significant incentive that could be provided at modest cost.

A range of local governments now provide rate relief to landholders' entering management agreements. Fencing assistance is provided in South Australia, Western Australia and within the Murray Catchment in NSW (Binning and Young 1997).

Regulations and Regional Planning Processes: Regulations and their associated legal institutions play a critical role in conservation management because they define the entitlements and obligations associated with landownership. Binning and Young (1997) distinguish between a landholder's “duty of care” for sustainable land management and the provision of a “public conservation service” by landholders for which they should receive reimbursement from the community.

Determining where “duty of care” stops and “public conservation service” begins is a difficult issue. It is suggested that the dividing line should be drawn between those management practices required to achieve landuse objectives at a landscape or regional scale and any additional practices required to sustain sites of unique conservation value. Hence, a public conservation service is provided when the community's interest lies in securing active and ongoing management of a particular site.

Binning and Young (1997) find that State based regulatory frameworks that put in place mechanisms for the development and implementation of regional vegetation management plans have the potential to be the most equitable and effective approach to meeting broad conservation management objectives. In a budget constrained environment, there is opportunity for significant savings in avoiding selection of inappropriate sites through State wide prescriptions.

Further, Regional Management Plans can play the role that a Code of Practice plays in other natural resource based industries, by defining appropriate standards for land management in a framework that can be adapted and evolve through time. These plans should:

- be developed in close consultation with all stakeholders to ensure they have ongoing community and political support;
- take into account differences in the quality and conservation status of areas of vegetation;
- provide the practical and enforceable definitions of land management practices required for sustainable vegetation management; and

- be reviewed on a regular basis to allow for sustainable management and hence ensure land management keeps pace with scientific understanding and community expectations.

Table 1 summarises the use of major off-reserve programs involving management agreements, covenants, and associated incentives in each State and Territory.

Table 1. Summary of State Off-Reserve Conservation Programs April, 1997

State	Scheme	Number/Area Covered	Incentives
New South Wales	Voluntary Conservation Agreements	33 – with 160 being actively pursued	Discretionary Fund (\$100 000)
Queensland	Nature Refuges	11 – some of which bind successors in title	Funding for priority regions and rate relief in some areas
Victoria	Trust for Nature Covenant	200 covering over 6,000 ha	No incentives
South Australia	Heritage Agreements	1,050 covering over 550,000 ha	Assistance Payment, Fencing, and Management Fund, (\$76 million)
Western Australia	Remnant Vegetation Protection Scheme (30 Year)	1,094 covenants covering 38,000 ha	Fencing Assistance (\$2.25 million)
Tasmania	Conservation Covenant	none	No incentives currently
Northern Territory	Conservation Agreement	2 covering 11,000 ha	Some fencing assistance

Source: (Binning and Young 1997, p.16).

Integrating mechanisms for off-reserve conservation

The preceding section identified a wide range of mechanisms for promoting off-reserve conservation. Too often such policy tools are seen as competing mechanisms which should be offset against one another. Young et al. (1996) find that a mix of these policy instruments are most likely to effectively conserve biodiversity by seeking to: address multiple land use objectives; retain landholder support; and, manage for uncertainty and the prevention of irreversible loss. A framework that integrates the various mechanisms available for off-reserve conservation is shown in figure 1. The core components of successful policy development can be characterised in the following way:

- People - the tools that can be used to motivate and retain landholders support for biodiversity programs;
- Security - the mechanisms that can be used to provide secure adaptive management of biodiversity; and

- Finance - the incentives that can be provided to share the costs of managing biodiversity.

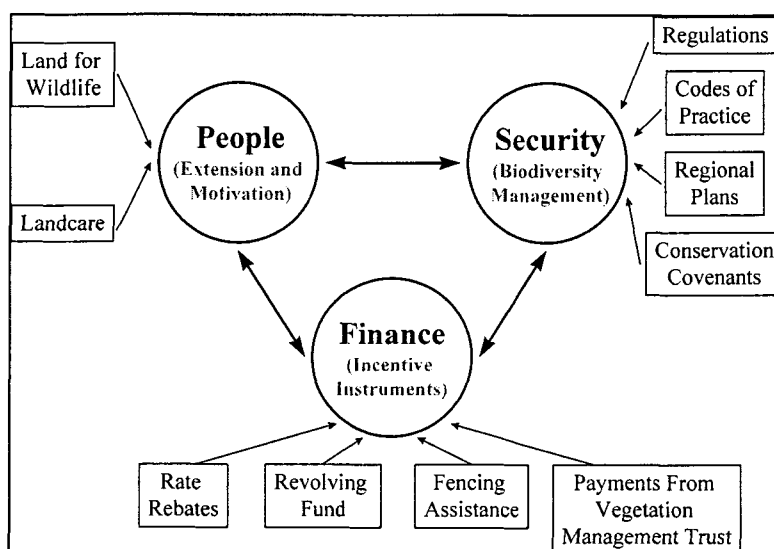


Figure 1. Components of an effective policy mix for off-reserve conservation

People - The need for a Stewardship Focus: The initial reaction of many people to policies for off-reserve conservation is that they are a form of disguised regulation, with government seeking to impose land use restrictions on landholders. However, if these policies are to be successful, they must seek to achieve and retain strong landholder support and commitment. For their part, governments will need to provide funding and service to demonstrate their commitment on behalf of the community to the contract. Incentives that retain the motivation of landholders during periods of changing community expectation are critically important for the attainment of conservation objectives across diverse areas. Effective policy mixes are therefore built upon a partnership between the landholder and the organisation administering the policy. Farrier (1995) has developed the concept of stewardship based upon this notion of a partnership between private individuals and the community.

Conservation planning for public lands is strongly focused on maintaining the ecological integrity of sites through the management of threatening processes. Conservation plans are generally developed exclusively from this viewpoint. However, in the case of off-reserve management, where tenure remains unchanged, the landholder will remain the primary manager of the land. For this reason, management arrangements must also take account of the human dimension in addition to ecological considerations.

It must not be forgotten that landholders who participate in off-reserve conservation are making a significant contribution. In many cases, it is useful to recall that a remnant exists only because of prior decisions made by the landholder. Opportunities for maintaining existing land uses should be actively pursued where they can be shown to be compatible with conservation objectives. For example Crosthwaite (1997) demonstrates the importance of native grasslands in a whole farm context in northern Victoria.

Because the probability of conservation is higher if landholders are motivated, landholders should feel that they are being rewarded for sympathetic management and not have rigid management regimes imposed upon them. Whilst not always scientifically based, local knowledge of an individual site and the broader landscape is often the best source of management information.

Management inputs from a public agency should seek to harness local knowledge and complement it with an understanding of ecological principles (Young, et al. 1996).

Security - Revolving Funds, non-binding, fixed term and in perpetuity agreements: No individual policy tool can by itself provide security of conservation outcomes. In the face of irreversible loss, a wide range of mechanisms will be appropriate. Management agreements can involve various commitments from landholders ranging from non binding agreements where participation continues to be voluntary after entering an agreement to in perpetuity agreements which are binding on current and all future landholders and are registered on the title to land via a covenant. Each of these agreements has an important role to play in securing management objectives over time. Non-binding schemes have the potential to act as a starting point for landowners with an interest in nature conservation. Over time a landowner may become more comfortable with the concept of a binding agreement.

The role of regulations supported by regional planning processes in reflecting community expectations and establishing a base line code of practice has been discussed above.

Finance- Incentive Payments: It is important to recognise that landholders entering into formal arrangements to manage areas for nature conservation are providing a service to the community. In the case of costs associated with managing a unique site Binning and Young (1997) find that ongoing incentives for conservation incentives can be justified.

A number of options for extending the use of incentives are identified by Binning and Young (1997):

- **Fencing Assistance:** it is recommended that fencing assistance be provided to landholders entering agreements on a sliding scale, depending on the security provided by different types of management agreement, ranging from 33% for a non-binding agreement to 100% for in-perpetuity agreements
- **Rate Rebates:** Rate rebates may be provided to landowners. A proposal for Federal and State governments to supplement local government providing rate rebates is put forward as an interim measure while mechanisms for including rebates in the rating base of Councils are developed
- **Vegetation Management Trust:** A vegetation management trust could be established to provide funding for ongoing management costs and the extension and monitoring requirements of management agreement programs.

Providing institutional recognition of off-reserve conservation

Defining a protected area network

Drawing on Prober and Thiele (in press), Binning and Young (1997) have developed the notion of establishing a Protected Area Network that includes all public and private land managed for conservation. The Network would create an institutional mechanism that formally recognises the role that land outside the public reserve system plays in meeting conservation objectives (figure 2). Criteria for priority ecosystems to be included in the Protected Area Network would be required to efficiently guide expenditure of limited public funding and target the use of financial incentives towards ecological communities of the highest conservation value.

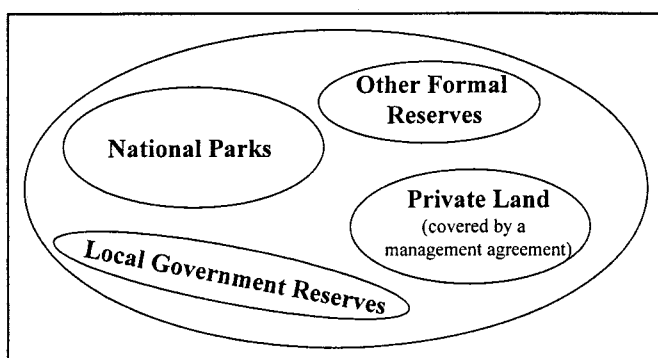


Figure 2. Components of a Protected Area Network

A protected area network based on private management is likely to be more cost effective and politically acceptable than an approach based on acquisition alone (Howard and Young 1995). Indeed, the costs of meeting the objectives of the National Reserve System through acquisition of private lands is likely to be prohibitive and politically unacceptable. Issues of acquisition aside, the costs of managing publicly owned reserves are significant and generally thought to be under-resourced. In fragmented and widely dispersed communities, such as woodland remnants, the costs associated with management for a public agency are likely to be higher than for larger reserves. In such circumstances, a strong case can be made for making payments equivalent to the costs of public management. Conceptually, regular and more timely management input can be provided most efficiently by people who live near such sites. Management agreements coordinated through a Protected Area Network have the potential to provide cost effective and secure conservation through time.

For any region, a Protected Area Network could have the following characteristics:

1. In the case of fragmented ecosystems it would provide a coordinated approach to the conservation of sites which are widely dispersed across a large region;
2. A wide variety of tenure and managerial arrangements would be encouraged to allow people to learn which strategies are most effective;
3. Entry into the network would be voluntary but may be binding once land is committed. The full range of mechanisms available for encouraging conservation on all tenures would be utilised. Whilst secure protection through a covenant, or equivalent, would be the ultimate objective, landholders would be encouraged to participate in any way they were comfortable. Formal status would be limited to those who commit to secure protection via a permanent arrangement;
4. Although potentially widely dispersed, the Protected Area Network for each ecological community would be managed as a single unit. A management plan for the Network could be established to guide the development of management plans for each site; and
5. Each element of the Network would be formally recognised as contributing to the objectives of the National Reserve System. Further it would form a part of the inventory and auditing processes for the national reserve system. In this way monitoring and management advice could be provided within an integrated framework (Binning and Young 1997; Prober and Thiele, in press)

Providing institutional recognition for protected area networks

The development of a publicly-funded private protected area network may seem well in advance of existing policy development for promoting conservation on private land. However, as regional planning and priority setting develops, these issues will become increasingly important. For example, as a part of the Regional Forest Agreement process the Tasmanian Public Land Use Commission in Tasmania (1997) has recommended the development of "Stewardship Agreements", with associated payments, to be used as the primary mechanism for implementing a forest reserve system on private land in Tasmania.

Mechanisms for formally recognising off-reserve conservation are beginning to evolve. The Interim Scientific Guidelines for the National Reserve System (ANZECC 1997) note that the objective of the NRS is: 'to establish a comprehensive, adequate and representative system of protected areas to conserve Australia's native biodiversity'. A protected area is defined as:

An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (ANZECC, 1997, p.11).

Management agreements that are in perpetuity would meet this definition. This is recognised in the interim guidelines which note that implementation of the National Reserve System will include inter alia:

identification of opportunities for public lands managed by local government and other statutory authorities to be included in the NRS; and, identification of opportunities for including in the NRS private and leasehold land covered by a voluntary binding conservation agreement which secures biodiversity conservation as the primary objective. Noting that the core reserve system needs at least to be comprehensive (ANZECC, 1997, p.9)

Concerns have been raised that "private reserves" will not provide the same security as public reserves and may not preclude future land uses such as mining. Clearly any reserve system will require a variety of reserves of differing status, hence the use of IUCN categories I - VI (World Conservation Union 1994). However, it is important to note that each category has an important role to play. For example, whilst a Protected Area Network that includes public and private land secured by a management agreement could be the most effective approach for fragmented remnant vegetation in rural landscapes, public management will remain the most effective approach for large wilderness areas.

Addressing cultural conflicts

Perhaps the most significant impediment to achieving widespread management for nature conservation off-reserve, is the pervasive culture that nature conservation is a public responsibility with little or no role for private individuals. Approaches focused on public acquisition and public management have disenfranchised many landholders from nature conservation. A major reason for this is that nature conservation has been institutionally isolated within Parks and Wildlife Services, which are more often than not locked in "mortal combat" with Primary Industry departments, as politicians are pushed by stakeholders from one natural resource crisis to the next.

In an environment of constrained budgets, off-reserve programs can be seen as a threat to reserve programs that are already under-resourced. The policies of one agency will ignore agreed policy objectives that are the responsibility of another agency. Perhaps the best example of this is the limited funding provided for nature conservation under the Landcare program. The allocation of over \$250 million to vegetation management under the Natural Heritage Trust is an encouraging development, particularly given the unprecedented cooperation between Environment Australia

and the Department of Primary Industries and Energy in developing programs under the Trust (Commonwealth of Australia 1997).

Designing effective institutional arrangements for off-reserve conservation raises a number of important challenges. They:

- require a high level of information on the conservation value and status of remnants;
- require close cooperation and trust between the body entering the agreement and the landholder, who may be suspicious of government involvement;
- are seeking to secure objectives of a very long term nature, and hence the programs themselves require long term support;
- are resource intensive in terms of the extension effort and personal contact required; and
- involve complex documentation which often takes a long time to negotiate. For example, it is not unusual for an agency to take up to 5 years to negotiate a covenant.

The government agencies that currently manage off-reserve conservation do not have the culture and hence the capacity to adequately address all of these challenges. At the same time, there is considerable potential to broaden the client base of conservation programs. Most programs have focused on promoting conservation of privately owned family farms. It is possible, however, that a large proportion of Australia's most valuable remnants are held by people who manage land for a wide range of reasons in addition to agricultural purposes. Other clients who could be targeted include: government agencies such as pasture protection boards and road authorities; local governments; large resource-based industries; agribusinesses; and lifestyle farmers.

In order to effectively deliver to all relevant landholders, programs will have to be able to address each client group's needs. Large companies will generally prefer a direct and business like approach, whilst many farmers may be suspicious of government involvement in managing their land. To effectively capture the diversity of landholders there is a strong case for involving a larger number of government and non-government organisations. Binning and Young (1997) propose a model for devolving the delivery of off-reserve conservation programs based on the approach of the US Nature Conservancy. The Conservancy places primary importance on developing partnerships with a wide range of organisations and encouraging innovation.

Programs could be developed with local governments, companies, farming organisations, regional catchment/vegetation committees, conservation organisations and so on. Partnerships could involve a wide range of activities from general promotional support to formally accrediting other organisations to negotiate and enter management agreements on behalf of the nature conservation agency. State legislation and administrative arrangements could be changed so that any organisation can enter into a management agreement or take out a conservation covenant over land. In particular, there is an important opportunity for local governments to become involved in this process.

Within the proposed model there is still an expanded role for the government agency. The agency will be required to coordinate the program, devote significant resources to develop partnerships, register agreements, develop conservation priorities and provide a core extension service to "train the negotiators". Significant expansion is possible if programs receive increased funding and seek out new directions.

Concluding remarks

There is both an urgent need and great potential to increase the role of off-reserve management in meeting conservation objectives. There is little option but to look to mechanisms such as management agreements, financial incentives and revolving funds in rural landscapes that are characterised by small remnants of ecological communities that are poorly represented in the public reserve system. Landholders will need to play an integral "stewardship" role in the development of any successful approach to off-reserve conservation.

The mechanisms to achieve a vision of strong off-reserve conservation are developing well in each State and Territory. What is missing is: firstly, the institutional structures that integrate on and off-reserve policies; and secondly, a culture which promotes nature conservation as a mainstream land management issue rather than the exclusive domain of public agencies. The development of a Protected Area Network and mechanisms for devolving the delivery of nature conservation programs to a wide range of government and non-government organisations offer options to address these challenges.

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Native Geranium – *Geranium retrorsum*



STAKEHOLDERS, LOW INTENSITY LAND USE

NATIVE GRASSLANDS

Harold Adams *ACT Rural Lessees Association*

Abstract

This paper includes discussion on:

- Place of ACT rural leaseholders in management of ACT land - 23% under lessee management;
- Rural and grazing enterprises;
- Productivity related to land classification, grass nutrition and climate;
- Economic viability of farms dependant on introduced grass species;
- Comparison of economic utility of introduced versus native species;
- Utility of some native species; and
- Threat from feral plants - serrated tussock.

Introduction

The ACT Rural Lessees Association was formed in 1927 to represent the interests of ACT landholders in the development of the National Capital. Over time much rural land, particularly productive rural land, has been resumed for urban use.

At the present time ACT landholders manage about 23% of the Territory. This is held under short-term lease or on very short-term agistment (3 months).

Most agricultural pursuits are grazing, specifically beef and wool production as well as some prime lamb and a dairy. A few intensive farms at Pialligo are involved in orchardry and lucerne production. Some recent developments include vineyards and strawberry growing.

Horse agistment is undertaken by some rural lessees and by the ACT Government, the demand being greater than the supply of horse agistment opportunities.

Soil degradation issues

The shortcomings evident in land management in the ACT can be attributed primarily to the Commonwealth Government's inept system of land tenure and management going back years. This shortcoming was identified in the ACT Decade of Landcare Report 1991. Long term planning has

been virtually nonexistent, while the 'land bank' mentality of the government has discouraged genuine care for the land.

Most ACT farms, with some exceptions, require careful management as they are located on soils that are thin and generally highly dispersable. Invasive feral plants are a feature of most ACT farms (and government managed areas such as forestry and nature parks).

ACT farms and the grazing environment

Where conditions allow - eg. class 4 and 5 land - the establishment of improved pasture offers the best economic return to the farmer. This involves the sowing of perennial grasses such as phalaris, cocksfoot, clover, lucerne and pine chicory, usually by direct seeding into 'chemically ploughed' land. These grasses are responsive to rain and fertiliser and offer the best return to the farmer. Well-established pastures can be conserved for feeding out in times of low pasture growth. Also, well-established pasture tends to resist invasion from feral plant species

Native pastures do have a place in ACT farms and although not as nutritious as introduced species are generally drought resistant and complement introduced species. However, they are not bulky enough to be harvested for fodder. Many native grasses are not particularly palatable to stock and will only be eaten as a last resort. Many respond very well to summer rain, and provide a valuable source of vitamin A. Some native grasses, such as wallaby grass, have high nutritional value and are particularly suited to sheep used for fine wool production. However they are not easily established and seed is expensive and often infertile.

The need for balance

In making value judgments involving grass species there are many factors to be taken into account:

- the return to the farmer;
- the type of grazing operation;
- land types and accessibility;
- soil productivity;
- rainfall and availability of water;
- climate and aspect and tree cover;
- application and responsiveness to fertilisers; and
- access to advice.

One driving factor is the pressure on pasture from invasive feral plants. Apart from thistles, briars and hawthorn, the greatest threat is that posed by serrated tussock which is spreading at an alarming rate and which threatens most areas, including government managed land, in the ACT.

Issues such as overgrazing, drought management and farm production generally become irrelevant in the long term unless these major problems are addressed. Therefore while the place and utility of native grasses is an important consideration in farm planning, and while issues such as scientific assessment of biodiversity and soil biota, as well as soil and water condition, are fundamental to living off the land, these pale into nothing if threats such as that posed by serrated tussock are not addressed head on.

Did the land ever really recover from the rabbit plagues of the first half of this century?

A LANDHOLDER'S PERSPECTIVE

Jim Ryan *NSW Farmers Association*

Abstract

The theme for today's workshop is about resolving conflicts arising from development. "Development" from a landholder's perspective is about achieving more cost effective and sustainable production. To resolve the problems or conflicts associated with this usually requires an understanding of the causes of the problems or conflicts. If the root cause of the problem isn't understood, the remedial action may be inappropriate. I will concentrate on some of the causes of conflict with native grasses from a landholder's point of view because if we understand the cause of the conflict the solutions may become more obvious. In particular, I will look at conflicts regarding native grasses in agriculture and possibly other areas that can be attributed to a single cause - ignorance.

Discussion

There is considerable misunderstanding and misinformation about the vegetation in Australia at the time of European settlement and unfortunately for the grasses component of the vegetation, much of the focus at least this century has been on trees. There were extensive losses of at least some types of native grasses in the latter part of the last century and I don't think we have a good understanding as to why that happened. Even now, we only have a limited understanding of how to manage native grasses and the benefits of those grasses.

Native grasses were widespread at the time of European settlement both as open grasslands and as wooded grasslands. Governor King (1805) in a description of "brush", "scrub" and "forest land" stated that

"Forest Land - is such as abounds with grass and is the only ground that is fit to Graze:- "

The term "Forest Land" to describe what we would now refer to as a woodland or wooded grassland was still being used when Mossman and Banister (1853) travelled through Victoria and New South Wales in 1852.

Estimates of the number of trees per hectare in this "Forest Land" in various regions of New South Wales at the time of European settlement range from 4 to 30 trees per hectare (Rolls 1981); Pilliga area, 4 - 7 trees/ha, (J C G Banks pers. comm.); Yellow box - red gum woodlands, 10 - 15 trees/ha, (Wilson et al 1997); Buckinbong State Forest, 15 trees/ha (Pulsford 1991); and Lower Snowy, 20 - 30 trees/ha. To put it into urban terms, 10 trees per hectare is one tree per quarter acre or 1,000m² block, not a very high density.

There is little doubt that hills near Canberra that presently have a dense cover of trees, such as Mount Ainslie, were an open woodland with a grass understorey at the time of European settlement. We now have a lot more trees and little, if any, native grass understorey.

One of the easily identifiable native grasses was Kangaroo Grass (*Themeda triandra*) and there are a number of references to *Themeda* in Victoria, New South Wales and Queensland being like fields of

wheat or rye. One of these was by William Crisp describing changes at Jimenbuan on the southern Monaro following free selection, who stated that:

"I have seen the kangaroo grass, when in seed, like a field of wheat three feet high. This disappeared..."

There are also references to Kangaroo grass being good for fattening livestock whereas most New South Wales farmers presently regard Kangaroo grass as being little better than a weed.

This leads into a second area of ignorance. There is very little practical, user friendly information on native grasses and grasslands covering matters such as identification, management, re-establishment etc. This is especially so for material relevant to production based grazing enterprises as opposed to management on usually ungrazed public lands. One of the interesting results that came out of the Community Grasses Project was that some landholders found that the rough hill paddocks used to hold stock while the areas of "improved" pasture recovered were providing more grazing value than generally assumed.

On the other side of the coin, there is often a lack of understanding, especially from urban based people, of the benefits that can be achieved by grazing. Current "World Wide Fund for Nature" studies on the Monaro have shown that on some adjoining sections of grazed and ungrazed land, the grazed land has the greater biodiversity.

Drought tolerance is one attribute of native grasses that is generally acknowledged by landholders. They are also aware that there is a quick response from some native grasses following summer storms.

The off-farm benefits of native grasses, on the other hand, are not as well understood or recognised. As some people in this room are aware, I believe that the loss of deep rooted, summer active perennial shrubs and grasses, such as salt bush and *Themeda*, is a significant factor contributing to rising water tables in some dryland areas. Other off-farm benefits include the attenuation of overland flow and the fact that at least some native grasses burn much less intensely than timbered areas and exotic grasses such as lovegrass. This in turn reduces the risk of erosion, as there is a strong correlation between the intensity of a fire and the potential for subsequent erosion (Prosser 1990)

Looking at the threats to native grasslands in agricultural areas, there is a perception in some areas and especially urban areas that the greatest threat is the actual landholders. I'm not aware of any high conservation grasslands being deliberately destroyed on the Monaro. While one of the high value sites that had been identified on private land on the Monaro was subsequently ploughed, this was an inadvertent rather than a deliberate action. The landholders had not been made aware of the conservation value of the site and were deeply distressed when they found out that it was considered to be a high conservation value site. Fortunately, they didn't breach SEPP46 because the site had been ploughed less than 10 years prior to that.

Landholders on the Monaro believe that the greatest threat to the grasslands on the Monaro are the two exotic weeds - serrated tussock and African lovegrass. The threat posed by these two weeds is compounded by other similar weeds that continue to be introduced to Australia and this should be a major concern to everyone.

A recent study by the Co-operative Research Centre for Weed Management (1998) found that an additional 295 weeds are known to have naturalised in Australia during the 25 years from 1971 to 1995, an average of almost 12 additional weeds each year. The majority of the plants were introduced deliberately with some 65% being for ornamental horticulture. Despite this, the ever-increasing burden of trying to control these weeds will continue to fall on the individual landholders. This is occurring at a time when landholders' ability to control even existing weeds is

decreasing. As landholders have had little responsibility for the introduction of the various weeds and the native grasslands are being preserved as a public benefit, one must question why the landholders are being asked to meet the full cost of weed control.

On the question of costs, one must also question whether landholders should meet costs that may be involved in maintaining a high conservation site. If these sites are being maintained for the general benefit of the community, then surely the community should share the cost of maintaining these sites.

On the positive side, there is more information becoming available on native grasses and a greater awareness of the benefits of native grasses. In addition, some of the high conservation sites have been identified and there is also a greater level of interaction between scientists involved in conservation and landholders. On the production side, we also have people such as Peter Simpson espousing the benefits of the mix and match philosophy where production inputs and outputs are more closely related to the land capability. As we gain more knowledge on native grasses, I believe they will play an increasing role in a number of areas and that they will help in achieving more cost effective and sustainable agricultural production.

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NATIVE GRASSLANDS: INTEGRATING SUSTAINABLE

AGRICULTURE AND CONSERVATION

David Eddy *World Wide Fund for Nature Australia*

Discussion

Native grasslands were subject to preferential settlement and development by our agricultural pioneers because they were the most productive parts of the landscape and they provided the least resistance to development. Because there were few or no trees or shrubs in them, and because changes under traditional low intensity stocking rates were relatively slow and subtle, changes in the botanical composition and structure of the vegetation under rural development were less obvious than the changes in other vegetation communities. For

similar reasons grasslands have attracted relatively little attention from the conservation movement until recently. Therefore the conservation of native grasslands has until recently been largely overlooked. These influences have resulted in native temperate grasslands now being one of the most poorly conserved native vegetation communities in south-eastern Australia.

It is now widely recognised that the conservation of native species, communities and landscapes is of fundamental importance to Australia. However production of agricultural commodities is also essential, both for our consumption and for export income. It is also recognised that agriculture can damage the landscape and conversely, that a healthy landscape can enhance agricultural productivity and profitability. So the relationship between productive use and conservation of the landscape can form either a positive or a negative feedback loop. In managing our native grasslands we have the choice of continuing with the negative feedback loop which has operated by default in the past, or establishing a new positive feedback loop in which species, communities and landscapes are retained and all sustainable land uses flourish.

Landholders have become much more aware and appreciative of native grasses and grasslands in recent years, partly because of their observations of the response of different pasture types to drought conditions and partly because of the acceleration of research and extension into native grasslands and grassland plants. A number of research and extension projects have been conducted or are currently underway, across all States within south-east Australia. Most of these have focused on the agricultural potential and management of the dominant grass species of native pastures. The growth rates and patterns, and nutritional value of some of the most promising grass species have been measured, and provide evidence that productive and sustainable pastures based on native grasses are within reach. Several native grass species have been domesticated and new varieties released to seed producers and on to the community. We're also beginning to understand the responses of some grass species to the major pastoral management parameters. This knowledge is likely to help us to manage and manipulate native pastures for sustainable and profitable production.

Most graziers in this region now aim to achieve a practical balance of exotic and native pasture areas on their land, because native pastures offer some advantages over exotic pastures and because most tableland properties have substantial areas unsuitable for exotic pastures. In my experience many graziers are quite receptive to the idea of developing productive native pastures through management, in preference to sowing exotic pastures, at great expense, which don't live up to either biological or financial expectations. This is in spite of several decades of scientific pressure to establish exotic pastures and after only one decade of serious native pasture research.

Conservation of relatively unaltered native grasslands is also beginning to occur both on privately owned agricultural land and grazed public land such as travelling stock reserves. A number of grassland conservation projects involving landholders, community groups and public land managers are in progress throughout south-east Australia. Remnant native grasslands of conservation value are being identified on a variety of public lands including; rural cemeteries, travelling stock reserves, roadsides and rail easements, crown lands and even airfields. Negotiations are under way with the managers of these areas and management plans and agreements are being drawn up. Many farmers are becoming interested in conserving small remnants on their land, changing their management of larger areas used for production, and even revegetating some areas to integrate conservation with their property management. These sorts of projects are helping to identify areas of remnant vegetation of high conservation value, disseminate knowledge and appreciation of native vegetation and its conservation, and dissolve animosities between previously opposed groups of people.

WWF believes that both conservation and sustainable agriculture can be fully satisfied within the same landscape. This will only be achieved when we have enough knowledge of the requirements of each of these objectives. Progress toward this goal will be more rapid when people involved in

agriculture, public land management and conservation understand and accommodate each other and overcome current fears and animosities.

COMMAND AND CONTROL IN THE GRASSLANDS - A RECIPE FOR CONFLICT

Charles Litchfield *Upper Snowy Catchment Landcare*

Abstract

The unprecedented scale and pace of socio-economic, technological and demographic change has surpassed the ability of government agencies to anticipate future needs and priorities and regulations, not to mention enforce them (Crabtree 1995).

Natural resource or ecosystem management (depending on your world view) operates in a realm of conflict where outcomes are decided by bargaining between different viewpoints. To complicate the issue, ecology often gets confused with environmental dogma in the political context.

At the moment, commercial production imperatives are in deep conflict with a concern for our environment and future. Political decisions are reflecting a growing concern for our grasslands by the wider community. The result of 'consultation with stakeholders' has been to construct a regulatory framework that fails to make economic or environmental sense to many of them, and has proven to be a potent recipe for conflict.

The present regulation of grasslands reflects our limited understanding of the ecological processes at work in the paddocks. In fact regulation of grassland management has proven to be a bit like regulation of speeding down the highway - only nobody knows the speed limit, nobody has a speedo and you couldn't read it even if you did. What's more you cop a hefty fine if you get it wrong. The plethora of environmental regulations also reflect a reactive response to single issue problems, rather than an understanding of the complex biophysical and human processes vital to the intelligent management of grasslands.

Regulatory instruments governing decision making in the grasslands also impose economic costs to land managers, regardless of their previous environmental performance, and do not reward good stewardship, leaving little incentive to do better than the law requires. Isolated examples of intentional vandalism are occasionally detected and acted upon at great cost to the community, but the truth is, that for every hectare saved by regulation, hundreds more will disappear.

The management of our grasslands for their ecological and economic values remains one of the biggest challenges facing us all. Before this can happen we must come to terms with who will meet the cost of managing them ecologically. At the moment there is little incentive to do this, regardless of community or political expectations. No matter how hard we spell out hypothetical cost to future generations, the attitudes and perceptions of managers will not change and be reflected in ecologically sensitive management, until the rewards for doing so are greater than the current costs.

Defining the conflict

Before we talk about conflict in the grasslands we have to try and define where the conflict lies. Some people would argue that in fact there is no conflict about whether we should be trying to conserve our 'high value' grasslands. There is however disagreement about how to define what they are and where they are. The greatest source of conflict has been how government has gone about trying to achieve these goals.

Managing grasslands for their production value is a human centred decision making process which relates directly to the needs, values and goals of the manager.

On the other hand, managing grasslands for their biodiversity value is an ecology centred process, that relates to the limitations of recruitment characteristics, seed dispersal and nutrient availability.

In situations where management happens to satisfy both grazing demands and the limited reproductive capabilities of grasslands, it might be possible to find some middle ground.

But the picture at the moment in the grazing or pastoral context would appear to be one of conflict between the production imperatives and the biophysical needs of native grasslands.

Political decisions are now reflecting the growing concern for the needs of grasslands by the wider community. The result has been construction of a regulatory framework to protect native grasslands, which has proved to be both a *symptom* and a *source* of conflict.

If we are here today to look more deeply into these conflicts and learn from them, I believe that we need to look very carefully at the wisdom of building a regulatory framework for something as complex as our native grasslands, for the following reasons;

Firstly, regulation of grassland management has proven to be a bit like regulation of speeding down the highway where nobody knows the speed limit, nobody has a speedo and you couldn't read it even if you did. What's more you cop a hefty fine if you get it wrong. Micro management by prescription, of complex ecological or production system is almost certainly self defeating. We must develop adaptive ways of managing systems that change composition and structure every day, in response to random stimuli we may never even understand.

Secondly, the regulatory paradigm will never adequately accommodate the complex human and social processes at work in the grasslands. It is unlikely that any environmental conflict will ever be resolved until priorities are worked out in the context of social fairness and equity - and grasslands are no exception.

And thirdly, regulatory instruments governing decision making in the grasslands impose economic costs to land managers while not necessarily rewarding good stewardship, leaving little incentive to do better than the law requires. Isolated examples of intentional destruction, of native grasslands will occasionally be detected and acted upon at enormous cost, but the truth is, that for every hectare saved by regulation, hundreds more will disappear.

How to avoiding conflict in the grazing or pastoral system

Having got that off my chest - I am obviously obliged to provide what I consider to be some realistic alternatives which will help avoid future conflict in the grasslands and I will say firstly it is not necessarily about acquiring more knowledge or building reserve systems and recovery plans, as much as investing more in the social capital that is our land managers, harnessing the power of incentive and making ecologically sensitive management a positive decision rather than a compliance measure.

The answer is policy that integrates all of the following elements.

Long term planning

Firstly, we must work out what level of ecological integrity constitutes high conservation value. There must be a broad acceptance of what is high conservation value grassland, high production value grassland and recognition of the greatest cost/benefit from land use for grasslands that sit in the grey area between the two.

We need to help managers work out what areas of grassland might be high conservation value and what areas they should be developing to increase productivity. We must avoid the situation where managers are unwilling to identify valuable remnants for fear of prescription. People's willingness to embrace the changes in thinking and management that this would require, relates in part to the time available to make the adjustments. A long-term view is required, and the precautionary principle must be invoked carefully - not as an all-encompassing reason to remove past rights or the ability to survive economically.

A manager who is unable to capture the gains from long-term decisions has no reason to make them.

Cultivating "real" stakeholder input

Token consultation has been a major source of recent conflict and anxiety in the grassland regions. While governments appear to be making efforts to 'consult' with communities before decisions affecting them are made, there is no point in making the enormous investment in goodwill and trust, if the final decisions do not adequately reflect the local input.

Consultation must be genuine and make people feel that they have the ability to exercise their own judgment and creativity without over burdening or under resourcing them.

Good Science

While we are learning more about the ecology of grasslands all the time, we will never have all the facts. Part of the source of conflict in the grasslands has been due to the belief that it is a technical issue - when it is in fact a social issue. Science will never have all the answers, so we must nurture ability in our managers to adapt to each new set of problems.

Incentives

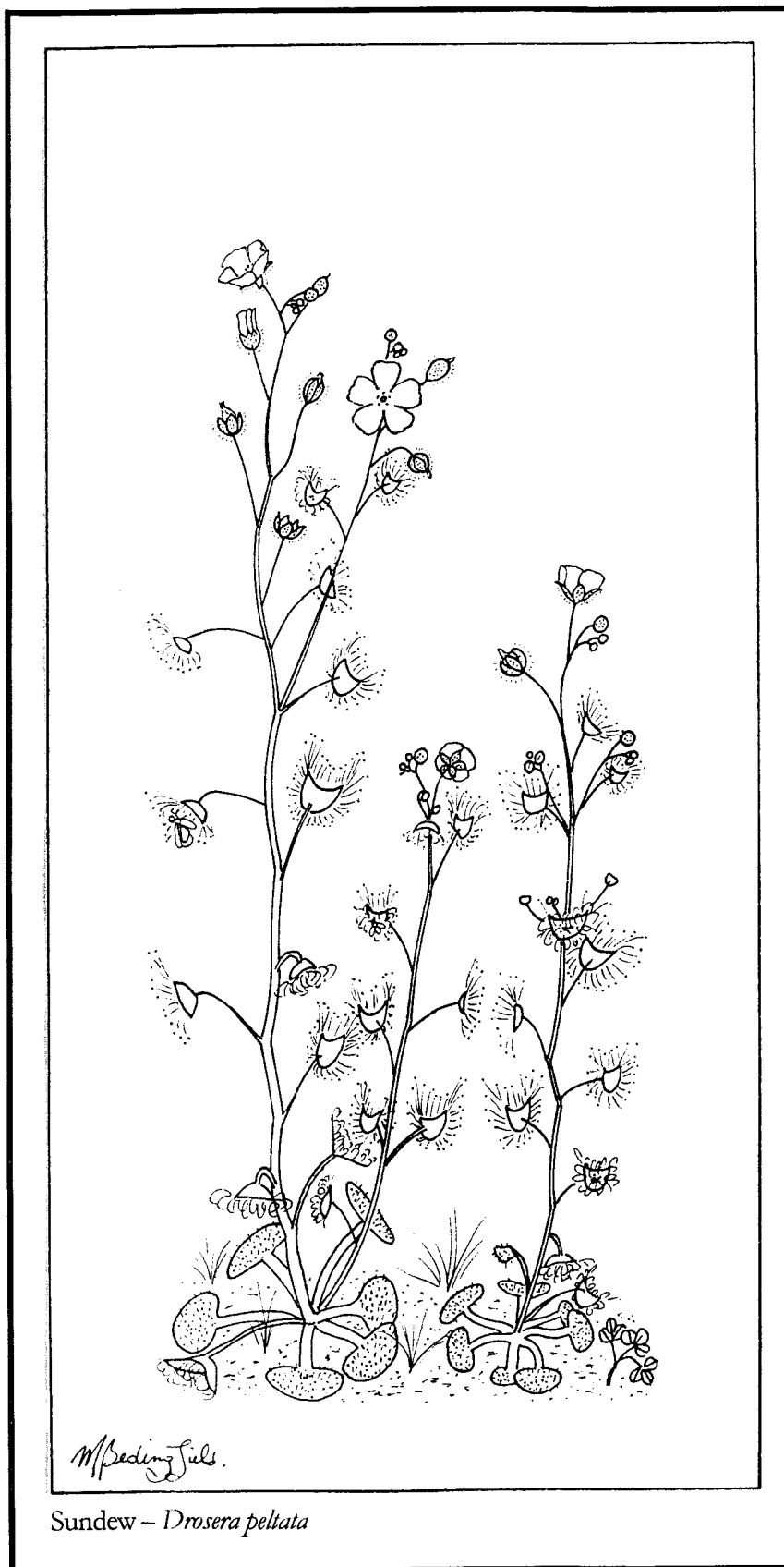
The wider community may have the right to demand greater accountability from resource managers, but they must accept some responsibility as well. The fact that city people benefit from cheap food and fibre - at some cost to the environment is not lost on farmers. Fundamental changes to the costs of production and the retail value of farm output is necessary before farmers will be able to adequately factor in the ecological costs. In the meantime incentives linked to production, rather than tax or rate relief can play a useful role.

No matter how hard we spell out hypothetical cost to future generations, the attitudes and perceptions of managers will not change and be reflected in more ecologically sensitive management, until the rewards for doing so are greater than the current costs.

Most importantly we must nurture managers who:

1. can handle change in the face of uncertainty;
2. continue to feel responsible and accountable;

3. are financially secure; and
4. are driven by positive motives not fear.





STAKEHOLDERS, HIGH INTENSITY LAND USE

GUNGAHLIN URBAN DEVELOPMENT

Peter Gillard & Robert Rosenstrauss *Gungahlin Community Council*

Introduction

We are here today to share with you my organisation's experiences of the development process and how we have had to deal with conflict in the past, particularly in the planning and development for the Gungahlin Town Centre.

As way of background my organisation, the Gungahlin Community Council, is a product of a group of residents, who were feeling that they were being ambushed by Government at almost every turn and first got together in May 1993. We are now into our fifty-sixth meeting, about to publish and distribute the 5,500 strong thirty fifth issue of our newsletter, are administering two community halls, and are a partner in running a child care centre. Our credibility and commitment to the development of Gungahlin is public and well recognised, so much that we have just had the Leader of the ACT Opposition address our last public meeting and have lined up the Chief Minister to come to the next one. In short our community group has achieved a great deal in the last five years.

Gungahlin township is the new growth centre in the ACT, situated in the northern portion of the ACT between the Federal and Barton Highways and the ACT/NSW border, and about 12 kilometres north of Civic, Canberra's central business district (Figure 1). It covers an area of approximately 90 square kilometres and is enclosed by a rim of hills, which forms the northern tip of the ACT (approximately 4,700 hectares of land in Gungahlin has been assessed as generally useable for urban development). Gungahlin consists of four different zones of topographic character the uplands, the north-west valleys, the tablelands and the wide plains. The closest established urban areas of Canberra to Gungahlin are Belconnen and North Canberra - otherwise adjacent land consists of predominantly large rural holdings, the Village of Hall to the west itself retains this rural character. Tourist (Gold Creek) and industrial (Mitchell) areas are well established in the south-west and south-east portions of Gungahlin, respectively.

Gungahlin has been on the drawing boards since 1965 (in the NCDC's so-called "Outline Plan"), but only as a possible future urban area (along with Weston Creek, and Majura). The NCDC's Y-plan of 1970 also confirmed Gungahlin as a possible future urban area. In 1984, with existing serviced land in Tuggeranong being rapidly depleted, the NCDC actively began the necessary planning process to enable land to be available in Gungahlin to satisfy future demand. Five years after the introduction of ACT self government the ACT Planning Authority came up with its 1994 publication "Gungahlin Town Centre Discussion Paper".

Now, as the newest township, Gungahlin has been planned to accommodate the majority of Canberra's growth in the next 20 to 30 years.

Construction of the township's first suburb, Palmerston, commenced in 1991. At that time the plan for Gungahlin was twenty neighbourhoods and a town centre linked to Mitchell by an extension of Flemington Road. The plan was to have group centres and other large scale facilities (such as high schools) located on the arterial roads and open spaces associated with main road corridors, drainage lines, service easements, special recreation facilities, National Capital open space (prominent hills & ridges), urban open space and suburban open space. A lot of this hasn't changed.

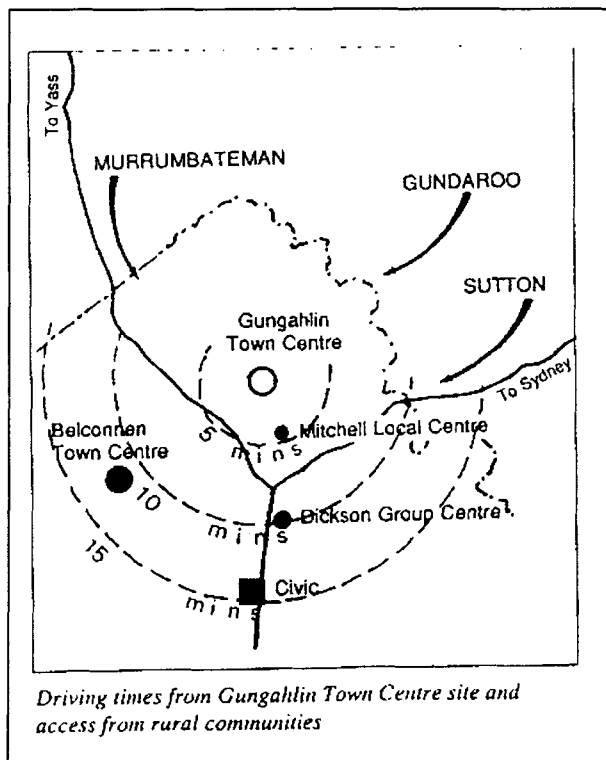


Figure 1 Road access times

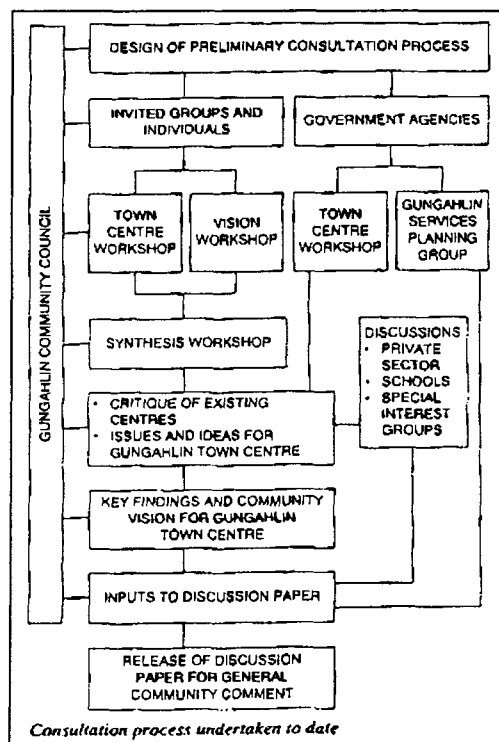


Figure 2 Consultation process

The planning of Gungahlin has been undertaken on the basis of evaluating past and present planning practices and assessing innovative planning processes, the key environmental objective being to ensure that the existing cultural and natural physical features of the area are protected and enhanced by urban development.

The Gungahlin Town Centre: How did it occur?

The Council started before any talk of the Town Centre became reality, although all residents knew that there would be a large shopping centre just over the way. We were all eager to find out what it was going to look like. In October 1993, we were invited to the first community consultation on the Gungahlin Town Centre (GTC) in Narrabundah, the National Botanic Gardens and then onto Campbell. Over the next twelve months community, bureaucrats and planners further consulted over the plot of land that was to be our shopping centre (Figures 2, 3).

The result of those discussions was initially the ACT Planning Authority's "Gungahlin Town Centre Community Brief" in June 1994 and subsequently, the "Gungahlin Town Centre Discussion Paper" later in 1994. Both papers encapsulated and brought together all the ideas that were acceptable to the majority of those who attended and got involved in the consultation process. The main theme was that we wanted a friendly place - an urban village setting. As a set of guidelines for future planning, all involved felt it was good (Figure 4,5,6). Many members of the community that had been involved felt that their job had been done and now sat back to wait for the next stage of

the process, that of the town centre ideas being put to paper. The planners rubbed their collective hands together gleefully, realising that they had been given a challenge that they really wanted.

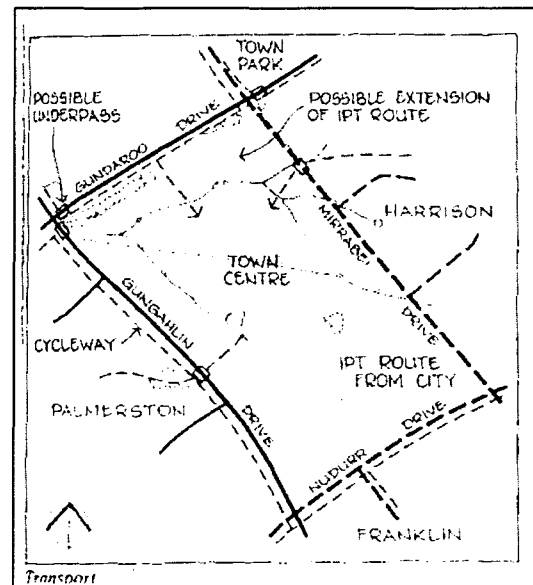
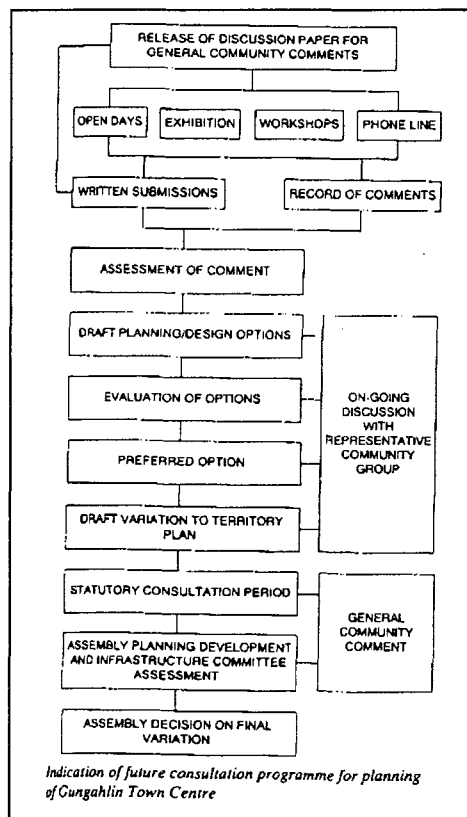


Figure 3 Planned consultation

Figure 4 Transport planning

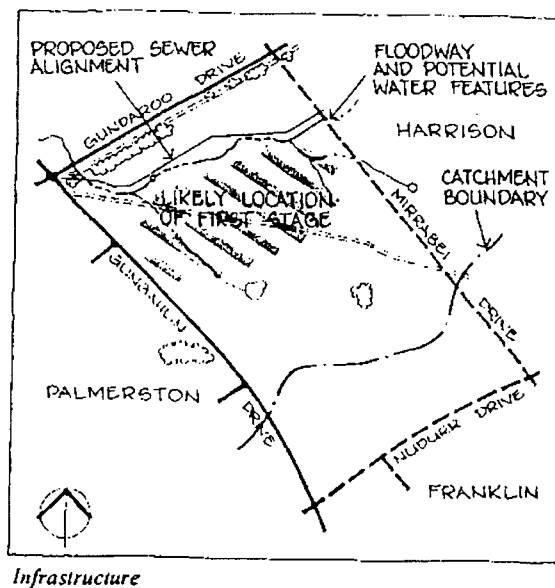


Figure 5 Infrastructure planning

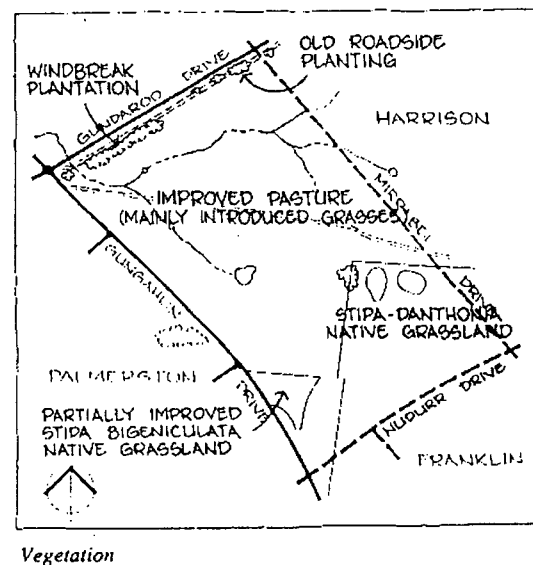


Figure 6 Vegetation planning

During 1994, the ACT Legislative Assembly Planning Committee received submissions on the GTC as part of its responsibilities with the Territory Plan. That committee acknowledged the Conservation Council's findings that Gungahlin possessed some of the most significant populations of the Striped Legless Lizard in Australia and its conservation being essential to the continuing survival of the species in the ACT and region. Importantly, one of the sites under threat from urban development was situated on the site of the GTC. It was recommended that the GTC site be moved about 500 metres and that three other sites around the John Dedman Parkway, Gungaharra water pollution control ponds and the southern extension of Gungahlin Drive be protected. These also had further significance as they provided habitat for the Golden Sun Moth and are significant native grassland areas (Figure 6). The recommendations were accepted by the Legislative Assembly and the ACT Government implemented conservation zones for some 500 hectares of native grasslands in Gungahlin (with 92 hectares in the Central Gungahlin zone), as a result, the whole planning process for the GTC went into a tail-spin. As well as much time, many thousands had been spent surveying, prodding, probing, documenting and discussing the site, but we started the consultation, planning and development process yet again.

I don't think that anyone would accept that those twelve months were totally wasted, whether they were involved or not. The documents which evolved from those discussions are now considered quite valuable as an example of how different individuals and interest groups can work together to achieve a worthy outcome.

This decision literally stopped the GTC for what seemed a long time. We can only speculate as to why the inordinate length of time, but that's history now. After a while movement began to emerge again, but the agenda and direction was quite different.

However, since then new directions have emerged on the horizon and the vision, understanding and breadth of those early sensible consultations now need to be revised. Consultation meetings were for a start run in Gungahlin over a five-month period to ensure better access for residents and interested groups. Consultants and DELP staff provided information on Gungahlin, the issues and concerns, and the community provided criticism and feedback (embodied in the ACT Planning Authority's "Draft variation to the Territory Plan" in August 1995). A list of participants from the 1993-94 consultation process was used together with a list of local community groups for the Gungahlin area. Notices of the meetings were advertised more widely, including through the Canberra Times, the Chronicle and my organisation's newsletter. There was also a letterbox drop to all Gungahlin residents.

The Government was now stating that we could have what we wanted but there was no money to pay for it. Infrastructure costs were too expensive, the Government was downsizing and not servicing land any more. The Gungahlin Development Authority was established in 1995 to take the heat off the ACT Government's inadequacies and broken promises about establishing the GTC.

The GTC is now developed through the GDA, which uses a substantial part of that revenue from land sales in the Town Centre precinct for infrastructure. This approach provides little scope for imaginative and creative urban planning, but focuses increasingly on the "fast buck" and selling off land that requires the least development of infrastructure.

Committees on traffic, people movement, community safety and general well-being presented reports on Gungahlin throughout 1993, 1994, 1995 and 1996. All say that Gungahlin should be given a chance to develop properly, safely, friendly and sensibly. But here we stand, a supermarket complex nearing completion, three sites levelled and waiting for something to happen on them, and a partially staffed "best in the world" (according to Gary Humphries in a 1998 Canberra Chronicle article) Joint Emergency Services Centre but fully built structure.

How could it be done better in the future?

The community is not a single, cohesive entity but comprises a wide range of individuals and groups, each with a different set of interests. In the 1993-94 process while it was clear there may be a degree of consensus about the type and form of centre people envisaged, there were many strongly held divergent approaches expressed of how to achieve it. In line with the range of issues to be addressed, these consultations did not focus on detailed design, implementation or management of the GTC. To start off there was some discussion of what we did not like about existing town centres. It was agreed that the GTC while maintaining strong links with other centres should not repeat their form. This would result in a difference in centre design and management, thereby offering an alternative shopping and lifestyles choice to Canberra residents.

Specific conflict arose in issues such as the placement of the bus interchange, the role of cars and therefore car parking, the form and design of retail shops (including shopping malls), the density of the urban centre versus preservation of the present ecology. On-street parking (rather than vast car parks), reduced speeds through traffic calming, emphasis on non-car modes of transport, walkable human scales. Not isolated from the community and without the problems small traders in other town centres experience. Whether to include a mall or not focussed on issues of single-ownership (and abuse/control, and lack of diversity), and the generation of structures that appeared un-open, monolithic and unnatural. While there was a dominant opposition to malls, acceptable solutions such as defining malls in terms of arcade style and strata title accommodated recognition of the dictates of Canberra's climate and the needs for grocery shopping (Dickson shopping centre used as an example). Participants wanted the community to have a say not only on the town centre's initial design but also in the continuing development of it. There was also a strong general consensus on the idea of an urban village, integrating retail (both large and small), commercial and community facilities, high-density housing and employment centres in a largely pedestrian-based urban setting with a significant number of public open space areas. Nonetheless, we get the lingering feeling that Gungahlin has paid for the planning mistakes of the past, and that we are a social lab and the pay-back area in the ACT.

Some lessons we have drawn from the Gungahlin Town Centre processes are:

- Greater benefits can be obtained for all parties if the community, including affected stakeholders/interest groups and individuals, is engaged in a participative and interactive process;
- It is imperative to work with the community rather than just lecturing to it;
- Presentation of information kept simple and clear;
- Minutes or records of previously discussed issues and concerns provided to participants before preceding further;
- A useful workshop format is one which can initially divide into groups of 10-20 (reflecting the overall composition) to focus participants in constructive dialogue (ie. take on what they have to say) and then reform and discuss further;
- Meetings or workshops need adequate resourcing, facilitation and scope to take down divergent/dissenting views;
- Forums need balance in control by participants and facilitators to avoid "rent a crowds" (ie. one group derailing constructive discussion) or imposing their views on others; and

- The process is not rushed, leaving participants adequate time to meaningfully discuss their concerns and issues of importance to them. Equally the process is not railroaded by the schedule.

NATIVE GRASSLANDS IN AN URBAN PARK

Chris Watson *Umbagog Landcare*

Discussion

Remnants of native grassland - some over a hundred hectares in extent - exist in Umbagog District Park situated between the suburbs of Latham and Macgregor in Belconnen ACT. The Park is part of the Ginninderra Creek corridor.

We must thank those NCDC planners of the 1960s for setting aside this relatively large strip of open space in an urban setting - even if it was not legally gazetted at the time, and the presence (or significance) of these native remnants went unrecognised. In fact some of the areas have been overplanted with trees!

Recognition was left to a handful of local residents, who encouraged the then landscape section of the ACT government (ACT Public Works) to commission a flora and fauna survey in 1992.

This survey was good ammunition when in 1993 we appeared before the ACT Assembly Planning Committee to argue for legal protection of the open space.

Unfortunately, the most significant native remnant (Sect 129, Latham) was not gazetted. Why? Anecdotal evidence says that the visiting Committee could not bring themselves to include a field of 'wild oats' - in fact a bonny field of kangaroo grass! Let us ask the current Assembly to make amends; the area is still un-designated open space and has had some years of seasonal monitoring.

Large areas of exotic grasses, especially *Phalaris*, invariably surround the remnant areas; seed invasion by all manner of exotic biota is an ever-present threat. Other impacts to biodiversity are the plethora of eroding walking and bike tracks, random fires, weed dumping, rock removal (see poster), etc.

An educational campaign was much overdue so the Landcare Group recently delivered a well-produced brochure to surrounding homes. Also, over recent years we have mounted displays at school fetes.

The Park perforce is used by the community for a whole host of activities - playgrounds, walkers (and their dogs), joggers, bikes (the odd trail bike!), picnics, etc. So, it is important to minimise their impacts and get these people on side.

We need a ranger cum biologist to be located in the area to work with residents and schools. A start has been made with the appointment in 1991 of a Ginninderra catchment coordinator. A management plan for each of the major remnant areas is wanted, but lack of financial resources is hampering this task. The Landcare group also has to be mindful of restoring biodiversity to the willow-studded creek line, let alone the exotic grassland!

APPROPRIATE URBAN DEVELOPMENT

Tony Carey *Housing Industries Association*

Abstract

Housing Industries Association (HIA) is Australia's largest building industry organisation with over 30,000 members nationally. Locally, it has taken a proactive step in attempting to avoid conflicts associated with native grasslands, by initiating and supporting the Joint Regional Biodiversity Survey in the ACT and southern New South Wales bio-region.

The HIA's attitude is to promote the equitable consideration of all relevant factors affecting land use related decisions and to provide an environment of certainty and security for the businesses of its members.

HIA looks forward to the progressive development of an open and co-operative approach between all relevant stakeholders where development and conservation interests can be reconciled.

Note

Tony Carey talked to pictorial overheads for his presentation. Unfortunately, we are unable to reproduce them in this volume.



CONSERVATION OF NATIVE GRASSLANDS

Geoff Robertson *Friends of Grasslands*

Abstract

Native grasslands are biodiverse ecosystems, dominated by grassland plants and associated non-plant communities. Unfortunately, they are threatened and there is a real danger they may be lost. Recognition of the importance of grasslands is relatively recent and FOG believes we all still have a lot to learn. Such learning can be both exciting and awe inspiring.

While recognising that other stakeholders in grasslands have legitimate other uses for land, FOG considers that Australians are generally pre-disposed to conservation and that stakeholders can be won over to a greater understanding of the importance of grassland conservation. In any event, there already exist some shared values by FOG and other stakeholders.

FOG's main objective is to educate people about grasslands, starting with its members. Such education should be based on a sound ecological framework, scientific knowledge, respect for stakeholders and hands-on experience. It should promote active involvement in conservation. FOG's role should complement that of other groups and provide a grassland focus, specialist

assistance to farmers and other groups, and a link between government and community on grassland issues. FOG has a wide range of activities to achieve its objectives. Future directions will involve balancing many potential demands against its limited resources and concentrating on building the membership size and skills so that it may be responsive and effective. In particular it needs to build up a framework for evaluating and helping conserve grassland sites.

Introduction

FOG welcomes the opportunity to express its views on the relationship between development and native grasslands and the resolution of potential conflicts. I believe we should start by asking the question, why conserve native grasslands? From the answer to this question emerges FOG's basic beliefs, its objectives, its activities and possible future directions.

Why conserve native grasslands?

Native grasslands are important biologically diverse ecosystems that are dominated by grassland plants and other vertebrate and invertebrate communities. Unfortunately, native grasslands, especially temperate grasslands, are only a small fraction of what they once were and are regarded as threatened.

'So what', you may say. To many people, grasslands are not particularly appealing and the value of grassland plants as pasture is not considered high. Let us take an analogy and compare grasslands to libraries. A cursory look inside a library may not be exciting and many of the books may be beyond us. Imagine what would happen if people destroyed the libraries and replaced them with something "more useful". The knowledge, experience, pictures and illustrations in the books would be lost. Without books, our knowledge (in all forms), technology and society would cease to exist.

Grasslands are like libraries and their plants and animals are like books. A book, in the hands of a committed reader, is a source of knowledge and wonderment. Likewise, when a person examines a life form closely (maybe using a microscope or hand lens), its knowledge and secrets begin to be unravelled and the person starts to appreciate the wonder that is nature and the meaning of biodiversity. Each species lost is the loss of a great treasure; including species which may have potential for pasture, food, destroying disease and prolonging life.

Basic beliefs and approaches

The poor understanding of grasslands partially results from their recent recognition as a separate important ecosystem. We have a lot to learn about grassy ecosystems and about the species they contain. We also do not understand the best methods for managing them - should we fence them off, continue current use, use fire and/or other methods to reduce biomass? More research is obviously necessary but part of the equation is to avoid overgrazing and to remove weeds and feral animals.

A basic value shared by many members of FOG and others is that learning about grassland communities is exciting and awe inspiring. I constantly see examples of this. Whether it be; choosing educational material for a poster, attending a plant ID course and peering through a microscope to see the structure and colour of different species, listening to a leader on a field trip explaining the structure and ecology of a site, learning to paint plants, reading about the unusual behaviour of plants and animals, or discovering how aboriginal people survived in this land. While I have talked about plants, the same awe and excitement are present in studies of non-plant species and the relationships between the plants, the birds, invertebrates, and other species.

Grasslands have many uses and there are many stakeholders with legitimate interests. These may cover uses such as farming and grazing, urban development, manufacturing, roads, airports, water management, fire management, etc. Stakeholders may include governments and government agencies at various levels, business, community groups, and individual land owners and citizens. It is important to understand each of the stakeholders and their values if there is to be dialogue on conservation.

We in FOG believe that Australians are pre-disposed to conservation. In all of us there is a love of the bush or some part of it. So we believe that the best approach is to create understanding through education of stakeholders, the wider community and ourselves. We prefer persuasion to confrontation.

We in FOG believe that stakeholders already share common values. We want:

- our region to grow and prosper;
- to increase scientific knowledge to assist conservation and production;
- to control noxious weeds and feral animals; and
- to be smart, properly informed, and sensible (not emotional) when entering into dialogue and negotiation.

Objectives

We in FOG aim to educate people about grasslands starting with ourselves as FOG members. Some of our members have a wide variety of skills and expertise that is a good start. Nevertheless, we are on a steep learning curve. We aim to include other stakeholders and the wider community in this education. This education draws on other stakeholders and persons who often know more about grassland conservation than we do.

We believe that education should be based on a sound ecological framework, scientific knowledge, hands-on experience and a respect for stakeholders. This provides us with a challenge - if we are to be of use we must develop a framework of knowledge and skills so that FOG teams can visit a grassland site and:

- identify the species present (common, threatened and weed species);
- recognise the structure and ecology of the grassland;
- provide an evaluation of the conservation status;
- offer some insight into appropriate management strategies; and
- assist in practical ways with weeding and rehabilitation.

We are still a long way from achieving this objective and we need to stress that such assistance should be supplemented with follow-up visits and more expert advice. As methods develop they need evaluation and improvement.

An important objective of FOG, is not to see FOG as an end in itself, but to promote active involvement in conservation by:

- other organised groups - such as Landcare and Parkcare;
- individual effort - on farms, roadsides, etc;
- government and community sponsored efforts; and
- research, etc.

A role for FOG

In many ways, FOG is a new kid on the block and needs to define a niche that complements and does not compete with existing conservation groups. Therefore, we have not copied the successful program formulae adopted by other groups such as Field Naturalists, Society for Growing Australian Plants (SGAP - our parent), Canberra Ornithologists Group (COG), etc. as this would be a form of competition, but rather we have attempted to work with and around them. Nor do we see ourselves as another Landcare or Parkcare group. Many of our members already belong to these groups.

We see that our key role is to provide a grassland focus. To do this our role is to:

- develop a framework for grassland issues;
- build support for grasslands;
- provide an educational program;
- act as a ginger group and raise issues;
- provide policy input and representation;
- disseminate information; and
- encourage research.

Another key role is to provide specialist assistance to landowners and other groups by:

- identifying grassland communities;
- making suggestions for management;
- helping with weeding, etc;
- promoting plant ID and other courses;
- encouraging networking; and
- supporting their efforts with publicity and lobbying.

While not a Landcare or Parkcare group that focuses on a particular site, FOG can nevertheless, help get such groups established or strengthened.

Finally, and importantly, FOG can provide a link between government and community on grassland issues. FOG applauds the work of the NSW and ACT governments in grassland

conservation, the professionalism, commitment and competence of their staff, and their assistance to FOG and other conservation groups. Nevertheless, there are limits on their resources and time, and there are areas where they cannot comfortably intrude. FOG can complement government in many ways, assist in making its contact with the community more effective, articulate issues, etc.

Activities

Our first responsibility is to our members and meeting their needs. Many of our members wear a variety of hats. They include professional scientists, members of other conservation groups, property owners and/or other stakeholders in grasslands. They are obviously interested in increasing their knowledge and skills in plant ID, weeding, management, etc. They may also need support for their endeavours. To meet these demands FOG needs to be well organised. New members (and old members) need to feel included and their interests served.

The main way we endeavour to meet members' needs is through our diverse range of activities that may serve many purposes. Activities that we consider important are:

- the newsletter and other forms of communication;
- field visits to grassland sites with experts;
- workshops, slide nights, and meetings;
- public education activities;
- hands-on activities;
- visits to sites to provide assistance - while the aim is to assist others we also learn by doing;
- plant ID and bush regeneration courses;
- submissions on policy and lobbying;
- networking with stakeholders and publicising issues and events;
- getting FOG representation in other groups; and
- maintaining links with other regional groups.

Future directions

FOG has only been in existence for three and a half years, yet has had some notable successes. This is largely due to several factors. There is a lot of government and community support for grassland conservation in this region, FOG enjoys good community support, and FOG has some very talented members who have so far never said no when asked for assistance.

FOG's committee consists of dedicated people. It is receptive to new ideas, responsive to members, committed, but aware of its limitations. It is realistic about what can and cannot be achieved. This is necessary, especially as the challenges facing us outweigh our resources.

Nevertheless, we are committed to building the membership size and skills and providing the range of activities just mentioned. Keeping in touch with the membership and stakeholders is very important.

We must also build our knowledge fast so that we may be responsive and effective to meet members' needs and those of grasslands. In particular, we want to build up a framework for evaluating and helping conserve worthwhile grassland sites.





GOVERNMENTS, MANAGING THE COMMUNITY'S RESOURCES

THE ROLE OF ENVIRONMENT ACT IN THE CONSERVATION OF NATURAL TEMPERATE GRASSLAND SITES

Sarah Sharp *Environment ACT*

Abstract

In the ACT since 1991 there has been a concerted approach to identify conservation issues in natural temperate grasslands and other related grassy ecosystems. With assistance from the Commonwealth's Threatened Species and Communities Program, Environment ACT has undertaken an extensive program of native grassland studies and ecological research, including surveys of native grasslands and grassland species. In 1996 natural temperate grassland was declared an endangered ecological community in the ACT, and several associated species were declared endangered or vulnerable. Action Plans that identify conservation needs of the community and associated species have been prepared.

Implementation of the Action Plans requires management and protection measures to be undertaken. Actions are undertaken within a regional context.

The Action Plan for natural temperate grassland recommends that protection be achieved through reservation and off-reserve conservation. To date, reserves have been established at Gungahlin and Dunlop Hills. Off-reserve conservation mechanisms include the negotiation of memoranda of understanding to achieve long-term protection equivalent to reservation while maintaining current land use; management of sites as urban open space and management through property management agreements. The cooperation of stakeholders is essential to achieve conservation outcomes, while enabling compatible land uses to continue.

Environment ACT applies adaptive management practices, based on clearly stated objectives. Best practice management is implemented, change over time is monitored and, if required, management actions are readjusted.

Background

Prior to 1991 there was little awareness within the government or within the conservation, public and scientific arenas that native grasslands contained any conservation values and were threatened with extinction. Much of the lack of recognition may have been related to the absence of trees, and the attitude that natural grasslands are 'degraded or abandoned sheep paddocks'. Since 1991, there has been an extensive program of survey, research and conservation management implemented in the ACT, initially in reaction to the impending urban development of remaining grassy ecosystems, particularly native grasslands.

In 1991 a strategic approach to conservation of native grasslands was developed in a recovery plan for natural temperate grasslands in the ACT. Subsequent funding from the Commonwealth's Endangered Species Program (now the Threatened Species and Communities Section) complemented faunal surveys in native grasslands undertaken by the ACT Government's Wildlife Research Unit. The Commonwealth funding enabled further surveying, ecological studies and management studies to be undertaken. This information was used to develop conservation plans and implement conservation management at some sites. Cooperation between government agencies and research organisations both from the ACT and interstate also increased the level of knowledge about native grasslands and associated species.

Documentation of the remaining 39 fragmented native grassland sites in the ACT indicates that they cover about 1000 hectares, out of a total of 20 000 hectares estimated to have existed prior to European settlement (a total of 5% remains, compared to an estimated 1% in south-eastern Australia). The majority of sites are less than 5 hectares in size, with only four sites over 100 hectares. Land use and management are variable, as is the degree of modification.

In 1994, amendments were made to the Nature Conservation Act 1980 that provided for the declaration of threatened species and ecological communities. This legislative initiative has provided the basis for the development of a range of mechanisms to protect threatened species and ecological communities. A Flora and Fauna Committee, consisting of experts in fields of biodiversity and ecology, was established. The Committee assesses nominations for listing and makes recommendations for the declaration of endangered species and communities, vulnerable species and threatening processes. The Committee takes a regional perspective when considering nominations.

Subsequently, in 1996 natural temperate grassland was declared an endangered ecological community. Several associated species were declared endangered, including the Eastern Lined Earless Dragon (*Tympanocryptis lineata pinguicollis*), Button Wrinklewort (*Rutidosia leptorrhynchoides*), Small Purple Pea (*Swainsona recta*) and Golden Sun Moth (*Synemon plana*). The Striped Legless Lizard (*Delma impar*) and Perunga Grasshopper (*Perunga ochracea*) were declared vulnerable. The related community, Yellow Box/Red Gum grassy woodland, was also listed as an endangered ecological community. At many sites more than one listed species occur together.

Listing of species or communities requires the preparation of Action Plans by the Conservator of Flora and Fauna. Action Plans for native grasslands and for all these species have either been produced or are in preparation (Table 1).

The Action Plans provide the basis for implementing conservation actions. They identify survey and management requirements (including research) and protection mechanisms that can be implemented in specific sites. Any potential land use conflicts in sites containing threatened communities or species are identified in the Action Plans.

All declared endangered species have Special Protection Status (SPS). Activities affecting a species with SPS status can only occur where the Conservator of Flora and Fauna is satisfied that an action will not appreciably reduce the survival or recovery of the species in the wild.

Table 1. Threatened grassy communities and associated species that have been listed in the ACT under the *Nature Conservation Act 1980*. A full list of declared species and communities is available on the ACT Government website, <http://www.act.gov.au/environ>.

	Common Name	Declaration	Action Plan
Natural temperate grassland		Endangered ecological community	Yes
Yellow Box/Red Gum Woodland		Endangered ecological community	In preparation
<i>Tympanocryptis lineata pinguicollis</i>	Eastern Lined Earless Dragon	Endangered	Yes
<i>Synemon plana</i>	Golden Sun Moth	Endangered	Final draft
<i>Rutidosia leptorrhynchoides</i>	Button Wrinklewort	Endangered	Final draft
<i>Swainsona recta</i>	Small Purple Pea	Endangered	Final draft
<i>Delma impar</i>	Striped Legless Lizard	Vulnerable	Yes
<i>Perunga ochracea</i>	The Perunga Grasshopper	Vulnerable	

Implementing native grassland conservation

Environment ACT anticipates and facilitates governmental requirements regarding conservation. Environment ACT has the responsibility to implement management and protection actions for wildlife conservation. Environment ACT develops policy, strategies and conservation planning for the protection and management of wildlife and ecological communities for nature reserves and for off-reserve conservation.

Wildlife Research and Monitoring, a business unit within Environment ACT, undertakes ecological assessments and provides technical information and science-based advice on potential impacts on sites of conservation significance. Management research, surveys and a long term monitoring program for natural temperate grassland are also undertaken.

Conservation of grassy ecosystems requires off-reserve conservation to complement the establishment of nature reserves. The cooperation of land managers, including a range of Territory and Commonwealth agencies, rural lessees and others is an essential component of off-reserve conservation.

Off-reserve conservation mechanisms to protect sites include Urban Open Space (eg parks), implementation of Property Management Agreements and integration of sites within the urban fabric (eg as roadsides). For significant native grassland sites that occur on Commonwealth land Memoranda of Understanding are being developed that enable compatible land use to continue

while ensuring the protection of important native grassland sites. These latter sites, together with reserves, form the core conservation areas.

The ACT Government has announced that a Rural Conservation Trust is to be established to pay for special conservation works on rural leases. Biodiversity conservation measures such as revegetation and maintenance of wildlife corridors and the rehabilitation of habitat are likely to be targeted specifically.

Cooperation among stakeholders, including landholders, the government, scientists and the community, is essential to achieve conservation outcomes for native grassland and grassy ecosystems. The Action Plans identify that a regional approach is required to achieve conservation of remnant grassy ecosystems. Close liaison is maintained between the NSW NPWS, Shire Councils, community groups and Environment ACT, in identifying issues, undertaking surveys, monitoring, providing consistent advice, and developing an integrated conservation approach.

In the ACT representatives of the public and scientific community take part in many of the committees that have a role in native grassland conservation. These committees include the ACT and NSW Regional Recovery Team for natural temperate grassland; the National Recovery Teams for the Eastern Lined Earless Dragon, Striped Legless Lizard, Small Purple Pea and the Button Wrinklewort; the Grassland Management Working Group; and the Weeds Working Group. Additionally, during the preparation of the Action Plans stakeholders were contacted and given the opportunity to comment on the Plans.

Conservation management objectives for grassy ecosystems include the maintenance and enhancement of biodiversity and threatened species, control of weeds and maintenance of natural processes, such as drainage patterns. Growth of the dominant grasses has to be controlled as the grasses can inhibit the establishment and growth of other native inter-tussock species. Biomass control may be by grazing, burning, slashing or a combination of all. However, a characteristic vegetation structure may be an important component of the habitat for some threatened species. Where several threatened species occur in the same site, there may be apparent conflicts in their habitat requirements and this creates particular management challenges. Weed management is also of major concern, as several highly invasive species, such as Serrated Tussock and African Love Grass, occur in many sites. While significant progress has occurred in the past five years about our knowledge of the ecological requirements and the dynamics of this community and associated species, there is still much to be learnt.

The approach taken by Environment ACT, therefore, is to apply 'adaptive' management (Figure 1). This means that clearly defined objectives are developed, based on current knowledge of the vegetation community, associated species and their responses to management. Best practice management is applied, and monitored. Monitoring provides information that can be used to improve management regimes designed to enhance the native species. Monitoring assists in distinguishing between seasonal fluctuations in the abundance of particular species, and long term changes to the species and site characteristics. The results can then be reviewed and management practices adapted as required. Long-term monitoring is being undertaken in selected sites that are subject to a range of management practices and land uses and are of varying size and conservation value. Adaptive management requires an integration of knowledge and experience of research scientists and a range of practitioners, including farmers, other landholders, agronomists, horticulturalists and conservation managers.

Management plans that integrate adaptive management are being developed for all remaining native grassland sites. Canberra Urban Parks has prepared and is implementing management prescriptions for all native grassland sites under its management control. Management plans are being prepared for all sites of high conservation significance. In the interim, until management

plans have been developed and are being implemented, advice is given by Environment ACT staff, to assist with the retention of conservation values in grassland sites.

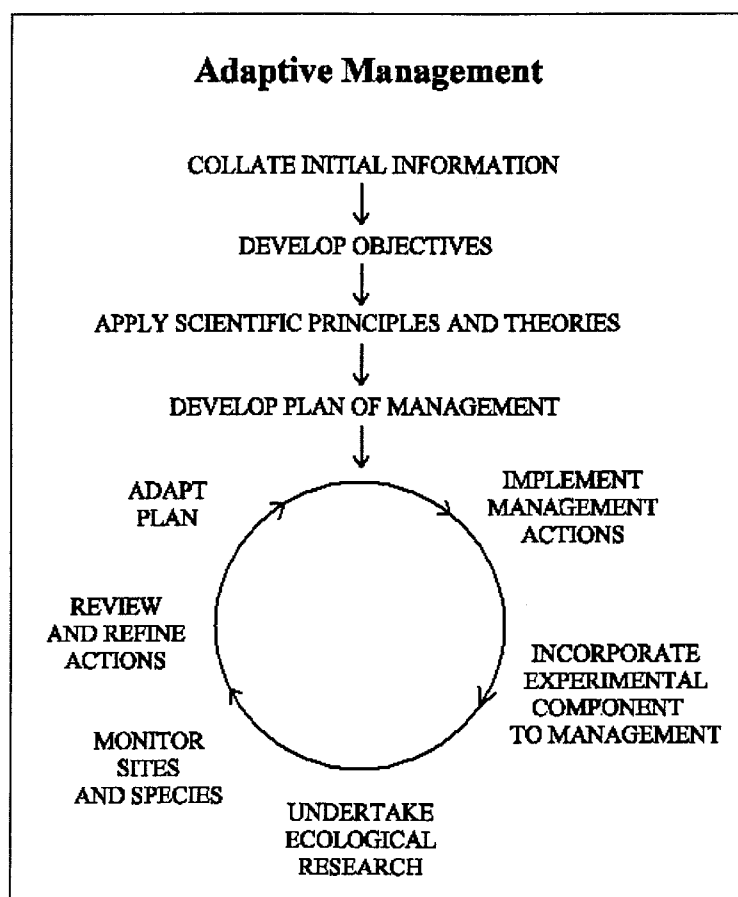


Figure 1. The process of applying adaptive management. There is continuous feedback between research, monitoring and management. Stakeholder involvement and government commitment is necessary for this model to work.

Conclusions

The current emphasis by government is to retain, where possible, existing land uses in sites that have conservation values. Thus, reservation has been considered only for those grassland sites that have the highest values, and where current land uses, or planned land uses, are incompatible with maintaining conservation values. To retain conservation values in sites where landholders have other objectives and requirements for the land is a great challenge, which requires considerable effort and cooperation amongst the government, landholders and the community.

Suggested reading

ACT Government (1997a) *Natural temperate grassland: An endangered ecological community. Action Plan No. 1.* Environment ACT.

ACT Government (1997b) *Striped Legless Lizard (Delma impar): a vulnerable species. Action Plan No. 2.* Environment ACT.

ACT Government (1997a) *Eastern Lined Earless Dragon (Tympanocryptis lineata pinguicollis): an endangered species. Action Plan No. 3.* Environment ACT.

THE ROLE OF NSW AGRICULTURE

Peter Simpson *NSW Agriculture*

Abstract

NSW Agriculture has over the past decade developed a diverse range of research and advisory activities associated with native grass based pastures relevant to the Southern Tablelands. These activities include:

Research:

- On farm surveys identifying major species present and factors influencing their distribution;
- Seasonal growth, persistence, and herbage quality compared to introduced species;
- Acid soil tolerance compared to introduced grasses; and
- Herbicide tolerance.

Advisory:

- Farmer demonstrations on non-destructive development and management of native pastures;
- Farmer education on identification and management principles;
- Catchment management and whole farm management group work; and
- Grazing management of *Poa*;
- Released publications and articles on native grass identification and management.

Introduction

The following is a brief summary of the current work being undertaken by NSW Agriculture into native pastures in the high rainfall areas of the Murray-Darling Basin, south of Sydney. This work involves staff located at Goulburn, Queanbeyan, Yass, Cooma, Tumut, Canberra and Orange.

Research

Grazing

Two major grazing projects are under way, one at Yass on a predominantly *Danthonia* based pasture which is part of an Interstate program being coordinated by Bill Johnston, Land and Water Conservation, Wagga Wagga.

The project aims to look at the effects of varying the phosphate, lime and sewage ash inputs under grazing on such aspects as:

- Pasture ecology and changes over time;
- The economics of modifying the native pastures by fertilisation and grazing management;
- The effect of lime and sewage ash on soil chemistry and heavy metals in both soil, plant and animals; and
- To measure and monitor water quality run-off, as affected by treatments.

A replicated grazing trial is being established at Gundaroo on a primarily *Danthonia* based pasture on a very acid soil, funded under the NSW Agriculture Acid Soil Action program and treatments will be looking at similar aspects to those at the Yass site above.

It is hoped to be able to obtain the cooperative support of Dr David Dumaesq from the Australian National University (Department of Botany) regarding the ecological surveys on both these sites.

Grazing value

Replicated trials have been sown during the last 2 to 8 years at Bungonia, Goulburn, Bungendore and Tumut, where a range of introduced perennial grasses are being compared to *Danthonia*, *Microlaena* and *Stipa*. Measurements are being undertaken regarding establishment, persistence, seasonal growth, herbage quality and acid soil tolerance to plus and minus incorporated lime at 2.5t/ha.

Herbicide tolerance

Work recently completed evaluated the herbicide tolerance of *Danthonia* and *Microlaena* to a range of commonly used pasture herbicides. Dr Malcolm Campbell from the Research Station at Orange is continuing his evaluation of Frenock®, the registered herbicide for use on Serrated Tussock on a range of native grasses.

Acid soil tolerance

As mentioned above, the acid soil tolerance of a range of introduced perennial grasses and *Danthonia* and *Microlaena* on acid soils with and without lime is under way at Goulburn, Bungendore and Tumut.

Funding under the NSW Acid Soil Action program has recently been approved for the appointment of a PhD student to look at a range of acid soil tolerance of the various *Danthonia* types present in the Central and Southern Tablelands.

Farmer demonstrations

A series of farmer demonstrations (partly funded by National Heritage Trust) has been under way for two years looking at different fertiliser inputs with legumes on a range of native grass based pastures on different soils and under different environments. Sites are located at Tumut, Ournie, Wodonga and Warrenbayne.

There will also be other sites established on a range of pasture types under the Acid Soil Action project, looking at the economics of liming acid soils by topdressing with both acid soil sensitive species and acid soil tolerant species. These sites will be located at Braidwood, Bathurst, Binalong, Tumut, Narrawa and Gundaroo.

Grazing demonstrations

Yass

Phil Graham, Sheep & Wool Officer, has been evaluating a *Danthonia* and *Microlaena* based pasture with annual legumes with a low fertiliser input under grazing, where the stocking rate has been adjusted periodically to maintain constant body weight between treatments. During the last three years the stocking rate between treatments has varied from 6 to 12 DSE/ha, and wool production from 20 to over 36 kg/ha. Pasture composition has maintained the diversity present at the commencement, with an increase in the annual legume component on the fertilised treatment and a decrease in the portion of weeds and bare ground.

Bombala

Poa labillardieri in some areas (eg. Braidwood, Cooma) is seen by some landholders as an invasive weed. Current work is investigating how to make better utilisation of *Poa* by supplementation under drought conditions.

Advisory

For some years now, NSW Agriculture has had an active and ongoing program of farmer and community education on the role and place of native grass pastures and their management, that is harmonious to different landscapes, on a whole farm basis. Surveys carried out by Ms Dianne Munnich at Goulburn and Messrs Garden and Dowling at Canberra and Orange, have identified the significance of native grass based pastures in both the Central and Southern Tablelands, and factors influencing their presence.

The culmination of most of the work listed above has resulted in the publication of a technical booklet (Managing high rainfall native pastures on a whole farm basis, ISBN 0 7310 5778 3) which is available from NSW Agriculture at a cost of \$7.50 per copy. Alternatively they are available through organisations that sponsored the booklet. These include: Total Catchment Management groups: Snowy Genoa, Upper Lachlan, Wollondilly, Upper Murrumbidgee, Upper Shoalhaven; NSW Department of Land & Water Conservation; ACT Parks & Conservation; Farming For the Future; Prime Pastures; Trust for Nature (Victoria); Department of Conservation & Natural Resources (Victoria); National Landcare Projects & Community Grasses Project.

Prograze

NSW Agriculture currently provides an opportunity for landholders who wish to target their pasture, livestock and landscape management in a more sustainable and cost effective way to participate in a series of on-farm workshops called PROGRAZE.

The program involves participants in eight half-day workshops on-farm with a strong hands-on participation and covers all pasture systems including the identification, understanding and management principles associated with the major native grass species, naturalised species, and introduced pasture species, common throughout the area. It is strongly linked to targeting livestock performance.

The cost of the course is \$100 per farm family unit and a minimum of 10 to 15 farms is required. Evaluation of the PROGRAZE program in NSW during the last three years has shown that over 90% of the participants have substantially increased their knowledge of pastures and livestock management.

Summary

I believe the above precis of research and advisory activities indicates the broad range and depth of the current work of NSW Agriculture.

The ultimate goal is to identify those landscapes and native pasture systems that can be managed and modified with non-destructive methods by a combination of management options including grazing, fertiliser, and over-sowing.

The vision is to improve agricultural productivity with methods that are harmonious to the concept of sustainable agriculture, accepting that there will always be winners and losers with any management approach be it a high input, low input, or no input system, over time.

This paper only covers the current research and advisory activities on native pastures in the high rainfall areas of south eastern NSW. For further information to better understand the balance between introduced, native pastures and the role and place of trees, I recommend the papers listed under "Further Reading". Please contact me for copies.

Acknowledgments

Part of the research and advisory work listed above has been financially sponsored by:

ACT Electricity & Water Authority, National Heritage Trust Fund, Department of Land & Water Conservation and the Murray-Darling Basin Commission.

Further reading

Simpson P. (1996) *Mixing & Matching Land Resources & Inputs for Sustainable Agriculture*. Landscapes for the Future Forum. Murrumbidgee Catchment Management Committee, Canberra.

Simpson P. (1998) *Trees and Pastures - Finding A Balance*. Bushcare Seminar. Greening Australia, Goulburn.

RURAL COMMUNITY PROGRAMS FOR THE CONSERVATION OF GRASSLANDS

Roger Good *NSW National Parks and Wildlife Service*

Abstract

The National Parks and Wildlife Service (NPWS) is involved in a several "off-park" programs for the conservation and maintenance of areas of remnant native vegetation on rural and local government lands. These include input to local government planning (local environment plans); the inter-Departmental Farming for the Future program and the Voluntary Conservation Agreement program.

The most commonly known of these is the Voluntary Conservation Agreement program, which provides the opportunity for rural landholders to gain assistance from the NPWS for the maintenance and enhancement of native vegetation on their lands. Through this program a collaborative management plan is prepared for the area of remnant native vegetation, which may include a fencing program together with a planned grazing regime and fire management program to enhance the potential of the native vegetation to survive. The voluntary agreement between a landholder and the NPWS may also cover water supply, and weed and feral animal control programs, where these would contribute to the long-term conservation of the vegetation. Under the VCA program financial assistance can be provided to landholders and rate relief can be claimed from local government as an added incentive to landholders to participate in the scheme.

Incentives are recognised as important in encouraging landholder involvement in programs such as the VCA program but other complementary and supporting voluntary programs must also be pursued to ensure effective retention and conservation of native vegetation on a regional basis. The most effective and notable of these involves NPWS input into local government planning (Local Environment Plans) where significant native vegetation remnants are identified and mapped for appropriate zoning under the LEP. This mapping may include the identification of vegetation linkages, providing a basis for Landcare Groups, Greening Australia and other voluntary groups to carry out revegetation programs and the establishment, over time, of vegetation/wildlife corridors.

While the above programs are the cornerstones of the NPWS native vegetation conservation program, it is recognised that there is an increasing desire for, and commitment to native vegetation retention and conservation in the rural community. Not only for conservation but as a functional component in salinity control, erosion control etc. The most significant contribution the NPWS can make here is through face-to-face extension programs to increase the knowledge base of the rural landholders. This necessitates the dissemination of information to landholders through field days, on farm extension and input to field interpretation programs where Landcare groups are undertaking rehabilitation/revegetation and conservation projects.

Extension programs and contributions to community based Landcare projects are rewarding for both the NPWS and the rural participants but most importantly ownership of the native vegetation conservation programs remains with the rural community ensuring their long-term success.



Note

Roger Good talked to pictorial overheads for his presentation. Unfortunately, we are unable to reproduce them in this volume.

GRASSLAND MANAGEMENT: THE DECISION-MAKING PROCESS IN NSW

Robert Adam *NSW Department of Land and Water Conservation*

Abstract

On 10 August 1995 State Environmental Planning Policy (SEPP) No. 46 was introduced, placing restrictions on the clearing of native vegetation in NSW. It imposed for the first time restrictions on the clearing of native grasslands in five regions in NSW, one of which was the Monaro. The hostility this measure provoked resulted in an amendment on 1 January 1996 that provided for the development by local communities of grassland plans of management, allowing for "self regulation" by landholders. These plans established thresholds that must be met for any clearing of native grasslands to occur through "self regulation".

On 1 January 1998 the Native Vegetation Conservation Act was introduced to replace the range of existing legislation controlling clearing of vegetation, including SEPP No. 46, and to provide a range of options for native vegetation management. Under the new Act the grassland management plans remain in place over the five regions for two years. The new Act also extended restrictions on clearing native grasslands to cover the whole state. In areas outside the five grassland plan regions development consent is required from DLWC for broad area clearing of grasslands.

Assessment of development applications to clear native vegetation, including grasslands is against the 34 heads of consideration (or 54 if sub-heads are counted) given in Section 90 of the Environmental Planning and Assessment (EP&A) Act 1979, and the EP&A Regulation 1994. The assessment process is basically one of weighing the environmental significance of an area of grassland against the social and economic benefit likely to accrue from the clearing and development of the area.

The introduction of legislation made the conservation status and management of native grasslands a high profile natural resource issue, and provided protection from clearing for high value areas as well as security for developers. However, legislation cannot always protect the most significant areas, generates conflict and is not a substitute for good grassland management.

The greatest gains in the conservation and management of grasslands are likely to come when those involved move beyond defensiveness, take ownership of the issue and become active in its management.

Legislative requirements for clearing grasslands

On 10 August 1995 State Environmental Planning Policy (SEPP) No. 46 was introduced, placing restrictions on the clearing of native vegetation in NSW. It imposed for the first time restrictions on the clearing of native grasslands in 5 regions in NSW. One of these regions was defined as

..... land known as the Monaro that is within any of the following Local Government areas: Bombala, Cooma-Monaro, Snowy River.

The hostility this measure provoked resulted in an amendment on 1 January 1996 that provided for the development by local communities of grassland plans of management, allowing for "self regulation" by landholders. In February 1996 plans of management for native grasslands were approved by the Minister for the five regions listed in SEPP No. 46, including the Monaro Grasslands Management Plan.

This plan established thresholds that must be met for any clearing of native grasslands to occur through "self regulation". These thresholds are:

- Sites of known high conservation value will be retained.
- Clearing must comply with the requirements of relevant nature and land conservation Acts, specifically the Threatened Species Conservation Act 1995, National Parks and Wildlife Act 1974, and the Soil Conservation Act 1938.
- Self-regulation does not apply where clearing of grassland (meeting the definition in SEPP No. 46, designated 'specified native grassland') would reduce it to a level below 15% of the property area.
- The current exemptions in SEPP No. 46 continue to apply.

If the proposed clearing of 'specified native grasslands' is outside the thresholds then "self regulation" is extinguished and development consent from the Department of Land and Water Conservation (DLWC) is required for clearing.

On 1 January 1998 the Native Vegetation Conservation Act was introduced to replace the range of existing legislation controlling clearing of vegetation, including SEPP No. 46, and to provide a range of options for native vegetation management. Under the new Act the grassland management plans remain in place over the five regions for two years. The new Act also extended restrictions on clearing native grasslands to cover the whole state. In areas outside the five grassland plan regions development consent is required from DLWC for broad area clearing of grasslands meeting the definition of "native groundcover".

The assessment process

Assessment of development applications to clear native vegetation, including grasslands is against the 34 heads of consideration (or 54 if sub-heads are counted) given in Section 90 of the Environmental Planning and Assessment (EP&A) Act 1979, and the EP&A Regulation 1994. Without listing all these, the relevant considerations for assessing proposals to clear grasslands include:

- The impact on the environment, including whether the affected vegetation/area:
 - is a remnant in an extensively cleared region;

- acts as a corridor;
- is a migratory route;
- is not adequately represented in the conservation reserve system;
- has a high biological diversity;
- contains an isolated population of a native species, or one at the geographic limit of its distribution;
- contains aboriginal sites;
- contains riparian or wetland vegetation;
- the effect on landscape or scenic quality of the area;
- whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats;
- effect on protected flora or fauna;
- the social and economic effect in the locality;
- whether the land is unsuitable for the development;
- whether the development will cause soil erosion;
- etc.

The assessment process is basically one of weighing the environmental significance of an area of grassland against the social and economic benefit likely to accrue from the clearing and development of the area.

Results of the assessment process

To date nine development applications for clearing native vegetation have been received from the area covered by the Monaro Grasslands Management Plan, and required consideration of whether they complied with the plan.

Of these, four did not comply (ie. they proposed to reduce grasslands below 15% of the property area). One application was refused outright because of the significance of the vegetation. The other three were given partial consent. This did not include consent for clearing to reduce grasslands below 15% of the property area.

Consent conditions required the reservation of grassland areas of high environmental value adjacent to, or included within areas reserved from clearing for other reasons (eg. drainage reserves; and in locations that provide connectivity to other areas of grassland, woodland or forest).

Strengths of using legislation to protect grasslands

- The introduction of SEPP No. 46 and the Native Vegetation Conservation Act made the conservation status and management of native grasslands a high profile natural resource issue.

- Legislation can provide protection from clearing for high value areas.
- Legislation can provide security for developers.

Weaknesses of using legislation

- Legislation can not always protect the most significant areas.
- While it can provide incentives, legislation is not a substitute for good management of grasslands.
- Legislation can generate conflict.

The future

In many areas of natural resource management an improvement in the sustainability of resource use has only come about through force of legislative requirement, and has often been bitterly resisted by those affected.

However, the greatest gains in sustainability come when those involved move beyond defensiveness, take ownership of the issue and become active in its management.

I believe this is where the greatest gains are to be made in the conservation and management of grasslands.

PLANNING AND GRASSLANDS

Peter Liston *ACT Planning and Land Management*

Abstract

The Planning and Land Management Group of ACT Urban Services must plan for a range of community resources in the ACT. Included is the responsibility to consider ecological resources, of which lowland native grasslands are an important component. How does this occur?

In the planning process two major sorts of decisions are made:

- determining land uses for a particular area; and
- construction approval on a particular site.

The former decision is the most crucial for environmental planning. These are the decisions that determine development in new urban areas (green field areas). Decisions are guided by the Land Act 1991 which requires consideration of ecological matters, and by the Nature Conservation Act 1980 which requires consideration of endangered species or communities.

Process for a particular green field area (eg. Gungahlin Town Centre):

- information component; ecological resources, plus other matters - service infrastructure, housing demand, community facilities, transport requirements;
- advice from Conservator;
- public consultation and development of preferred option;
- often - environmental impact assessment; and
- variation to Territory Plan put to the Assembly for approval.

Additional process: Environmental Impact Assessment. Impact assessment often occurs for large developments, depending on scale and type of changes involved. It is essentially an information gathering exercise; it does not result in a decision on whether a proposal should proceed. As such it assists the planning decision. How does it work?

The proponent prepares an impact assessment that details:

- the sorts of resources which may be impacted;
- the extent of potential impacts; and
- possible amelioration of those impacts.

This information is then fed into the planning process to inform the decision made.

Are we meeting our planning responsibilities? It is inappropriate for PALM to determine unilaterally. We seek feedback from other parts of Government, principally the Conservator of Flora and Fauna, from the Commissioner for the Environment and from the community.



Note

Peter Liston talked to pictorial overheads for his presentation. Unfortunately, we are unable to reproduce them in this volume.

THE COMMUNITY, MOVING TO THE FUTURE



WHAT DID WORK

Note

The points listed from this session are not meant to provide a summary or critique of the discussion provided by presenters. They represent activities and organisations that the audience felt needed greater emphasis. As such they should be read in conjunction with the notes from the presenters.

Points are listed under the heading of the session in which the editors believe they relate and not necessarily the session in which they were raised. Within a session points are sorted alphabetically.

Science, providing information for decisions

- Catchment management.
- Considering social and economic values as well as biophysical.
- Fantastic science in NSW and ACT in last seven or eight years. Directed towards:
 - What's there?
 - Is it significant?
 - Is it viable?
- Increased financial support for research and development/survey.
- SIRO-MED process for land use planning.

Stakeholders, low intensity land use

- Attitude shift =>> ecology (conservation has become less threatening).
- Control of rabbit populations.
- Emergence of incentives/support.
- Farm for the future.

- Landcare.
- Native species being investigated for use despite lack of selection.
- Some breeding success/native grasses.

Stakeholders, high intensity land use

- Establishment of FOG.
- Native species becoming more utilised relative to European ones.
- Umbagog!

Governments, managing the community's resources

- Integration of successful introduced and native pastures.
- Local government as a sorting house for different agencies.
- Some legislation.
 - ACT's approach; all up front
 - NSW's recovery plans
- Strategic approach at local community level (eg. Cootamundra).

WHAT DIDN'T WORK

Science, providing information for decisions

- No one believes the "experts".
 - Politicians believe everyone believes all conservation organisations think like Environment Australia.
 - Science has to pay its own way. This can lead to bias because of dependence on commercial interests.
 - Science is led by the political view.
 - Scientists are thin on the ground and can't speak out because they have no tenure or job security.
 - Scientists don't communicate well, for example CSIRO didn't tell community and agencies about tools like SIRO-MED.
 - Scientists don't recognise social issues as technical.
-

Stakeholders, low intensity land use

- No financial incentives exist for managers/custodians of non-reserved conservation lands.
- Serrated tussock and African love grass have got out of control.
- There is a lack of effective consultation by governments.
- We fail to recognise true cost of loss of environmental resources.

Stakeholders, high intensity land use

- A them and us mentality exists between government and the public, for example politicians and us - bureaucrats and us.
- Stakeholders have lost trust in each other.

Governments, managing the community's resources

- As stakeholders we have to talk to too many agencies.
- Dealing with governments always means delays.
- Government controls have followed a "jackboot" approach.
- Our nation is rushing into global economics.
- Public Service follows a "managerialism" style.

WHAT WE SHOULD TRY

Categorising the actions arising from this session

Actions arising from this session were organised by the audience into several categories or major themes. Themes are listed at the end of each action item. The themes are:

A - Reduce conflict between production and conservation on farms by

- developing appropriate management guidelines
- targeting weeds;

B - Set goals for (ecological) sustainable management by

- identifying who are the different stakeholders
- defining ecosystem values in southern tablelands
- determining the extent to which each ecosystem and landuse/tenure can be managed jointly for conservation and productive land uses

- determining the roles of biophysical and social science;
- C - Enhance communication, education, incentives, legislation and coordination by
 - forming community-based committees to liaise with agencies (two-way information flow), for example advisory committees
 - making better use of existing communication channels
 - providing a centralised clearing house for development approvals and information, for example the Queensland commuter/phone-based multi agency shopfront
 - encouraging government departments to support mechanisms for off-reserve conservation, for example Voluntary Conservation Agreements;
- D - Participation in goal-setting and ownership of the values;
- E - Research and development and information gathering.

Note

Inclusion of an action item under a particular sub-section does not necessarily place an obligation on that group to perform the action. The actions listed represent suggestions for how to improve the operation of that group and to provide better conservation outcomes. In many instances the application of an action will be initiated from outside that group of people.

Actions are sorted by theme within each session.

Some action items appear conflicting. This reflects the differing viewpoints of the workshop participants.

Science, providing information for decisions

- Investigate the role of forbs/herbs - A,B,E
- Communicate tools like SIRO-MED to promote incorporation of social and environmental input into land use planning - A,C,E
- Look for new useful native species - A,E
- Acknowledge social issues - B
- Measure social value alongside economic - B
- Recognise the rights of non-humans - B
- Find out how to achieve sustainable production - B
- Define where grazing is sustainable or has been detrimental - B

- Strongly encourage application of incentives/tax reform - B,C
- Reward scientists for communication - C
- Leadership from science - information to individuals - C
- Remove user pays for information - C
- Educate community regarding true costs of conservation and degradation - C
- Create more tenured positions for scientists - E

Stakeholders, low intensity land use

- Work out how to trade off degraded and/or improved pastures against native grasslands - A
- Support/incentives to help landowners to survive - A,C
- Facilitate conservation by farmers (social rather than scientific issue) - A,C
- Make native seed available - A,E
- Reinstate extension services - C
- Improve consultation with stakeholders - C,D

Stakeholders, high intensity land use

- Reconsider development ranking process - reasons and application - need for an adaptive approach - A,B
- Make native seed available - A,E
- Find a shared vision about the future of grasslands in the region - B
- Find ways of managing conflicting uses of grasslands (eg. mountain bikes vs. walkers) - B,C
- Find examples of successful enforcement - C
- Encourage education and communication rather than enforcement - C
- Improve consultation with stakeholders - C,D
- Citizens to educate themselves about acts and planning processes - C,D
- Try "355" committees (NSW) and local area planning committees (ACT) - must have decision-making powers - C,D
- Reduce uncertainty through information (more surveys) - C,E
- Ask the question "to grow or not to grow?" and if so "how to grow?" - D

Governments, managing the community's resources

- Focus debate on resource management rather than political stance - A,B,C
- Breeding program for native vegetation - A,E
- Give priority to the management of the most invasive weeds - A,E
- Resist multilateral agreement on investment - B
- Recognise the rights of non-humans - B
- Define/achieve sustainable use of grasslands - B
- Provide application of incentives/tax reform - B,C
- Recognise and analyse ecosystem services - B,E
- Develop legislation as part of overall strategy rather than being standalone - C
- Equitable cost sharing, identify what can be done now - C
- Provide more support for community groups - C
- Have an agency that represents all agencies (approvals and advice) - C
- Community-based agency to keep bureaucrats honest - C,D
- Better funding for local government - C,D
- Improve consultation with stakeholders - C,D
- Extend strategic planning at community levels – D

POSTERS AND DISPLAYS



SURVEY TECHNIQUES FOR STUDYING AN ENDANGERED REPTILE

Don Fletcher *Environment ACT*

Lyn Nelson *Australian National University*

Warwick Smith *NSW National Parks & Wildlife Service*

The importance of reducing the impact of research on species that are threatened with extinction is recognised by the scientific community. Therefore, part of the challenge in conducting studies on such species is to devise and adapt techniques that reduce stress on the animals being studied. Artificial burrows have been developed to “trap” the endangered Eastern Lined Earless Dragon (*Tympanocryptis lineata pinguiicola*). Unique back patterns of these animals allow individual identification. Captured animals are photographed and the stored photo images used for identification of individuals. This technique removes the need for any form of artificial marking of individuals.

EFFECTS OF ESTABLISHED TREES ON NATIVE TEMPERATE

PASTURE GROWTH

David Williams & Paul Wallace *University of Canberra*

Mutjinde Katjiua *University of Namibia*

Nick Abel *CSIRO Wildlife and Ecology*

The planting or retention of trees in temperate pasture systems has been advocated to address the broad environmental effects of forest clearance and pasture improvement. These effects are now seen to threaten the sustainability of pasture systems through modification of water and nutrient cycles. Native tree cover is still present in many pasture lands of Australia, especially on steeper slopes and poorer soils. The pasture in these situations is commonly rich in native grass and forb species, whose agronomic potential and response to tree cover has been poorly studied. This study aimed to determine the effects of established tree cover on native pasture production under grazing on the Southern Tablelands of New South Wales. We made comparisons between treed (basal area 10-20 m² ha⁻¹) and open fixed plots, and also between survey plots which covered the range (0-30 m² ha⁻¹) of tree basal area within a paddock. Pasture biomass, production and offtake were measured seasonally, as well as pasture digestibility, protein content, soil nutrient status and microclimate. Overall we found that the treed pasture had

higher seasonal productivity, mainly seen in relatively greater winter growth, and consumption was also higher under the trees. Pasture standing crop in the presence of stock tended to be higher in the open, mainly arising from spring growth flushes that are enhanced by short-lived species. The results suggest that trees in these pastures provide additional environmental heterogeneity that operates on the available species to influence their biomass contributions. Given the desirability of having deep-rooted perennial components in pasture lands, this study suggests that, in some places at least, tree cover can provide wider environmental services without compromising current levels of pasture production.

ROCKY OUTCROPS IN GRASSLANDS - LIVING HABITATS

Chris Watson *Umbagog Landcare Group*

Rocks in grasslands, if undisturbed, provide a unique habitat for native biota ranging from reptiles to micro-organisms.

These outcrops are a common sight on the Southern Tablelands; they need to be categorised according to the quality of their remnant flora and fauna.

The availability of educational material about the inhabitants of rocks in native grasslands – let alone appropriate options for their management – is scant. None appears to be available in the ACT!

However, a well-produced brochure on bush rocks is available from the NSW Parks and Wildlife Service; unfortunately, the pamphlet still condones rock sales from sources other than from Parks or Crown land. The Dept. of Conservation and Land Management in Western Australia has put out an excellent booklet and poster on the management of their widespread granite outcrops.

For the grassland (and woodlands) of the ACT and Region there is an urgent need to have:

- educational material on the biological significance of rock outcrops; and
 - legal teeth to prevent their removal and or sale for home-use or institutional landscaping.
-

COMMUNICATING CONSERVATION ON ROADSIDES

Tim Barlow *Grassy Ecosystems Reference Group*

Some of the most significant grassland remnants in western Victoria are on roadsides that have historically formed strategic firebreaks for the region. These roadsides are burnt on a frequent (near annual) basis, support a number of threatened species and produce inspiring wildflower displays each spring. As a result of changes to management by roadside managers, and poor communication of the conservation values, substantial damage occurred to remnants during the 1980s. By establishing rapport with key people, and communicating 'the values' rather than 'the regulations', common ground was reached and both local fire protection objectives and conservation outcomes were significantly improved.

LANDSCAPE FUNCTION ANALYSIS

David Tongway *CSIRO Wildlife and Ecology*

Landscape Function Analysis is a technique developed for measuring range condition in the semi-arid regions of Australia. Its utility for pastoral and mining rehabilitation is already widely accepted and it has now been successfully adapted for measuring soil condition in other grassy landscapes. The condition and trend of grasslands can now be assessed not only with respect to the composition and cover of the grass species themselves, but also in terms of the more fundamental, and therefore less reversible, changes in the stability of the soil system. The technique has worked well in tropical grasslands and is currently being trialed in local temperate grasslands.

QUEANBEYAN LANDCARE

Megan Cousins *Queanbeyan Landcare*

Queanbeyan's bushland comprises 2,200 hectares of dry sclerophyll woodland and forest that covers the prominent Queanbeyan eastern escarpment and the minor fault through Mount Jerrabomberra to the west. In 1992 a joint application between Queanbeyan City Council, Trees for Queanbeyan and the Monaro Conservation Society was successful in receiving funding under the National Landcare program to conduct a survey and inventory entitled "Bushland, Grasslands and the Ecological Resources of the City of Queanbeyan".

Although not a comprehensive ecological survey of fauna and flora, this study recorded two hundred and seventy plant species. Of these, three are listed as nationally rare or threatened, 24 are formally listed as uncommon in the ACT region and a further 24 species are considered "locally" significant. Time did not permit an extensive faunal survey, however field notes recorded 15 native mammals of which at least two are "regionally" uncommon and 3 nationally threatened reptiles including the Grassland Earless Dragon.

This research document is a preliminary ecological database for Queanbeyan and contains recommendations and guidelines to facilitate the conservation of Queanbeyan's natural resources. Further to, and based on the information held in this inventory, is a bushland management plan for the Queanbeyan area. The intention of the management plan is to convey the significance of these natural resources and to provide a strategy for the development of an action plan to maintain their integrity and promote their recreational and scientific importance to the community at large.

GRASSLAND PLANTS OF LANYON VALLEY

Michael Bedingfield

The plants depicted in the display are all native and local to the ACT region. Specimens were collected in the grassy areas around the suburbs of Banks and Condor and near Point Hut Crossing.

I've been collecting and drawing these plants over the last few years after being inspired by some volunteer work I did with Greening Australia. The primary purpose of these drawings is to present native grassland plants to the general public in an aesthetically pleasing way for easy identification. I would like people to appreciate how beautiful these humble plants are and help improve public awareness of grasslands. For a few of the drawings a little extra botanical detail is required to define exact species. This can be provided if necessary.

I would be happy to talk to anyone who is interested in using these drawings, or is interested in adopting the style I've used for some related purpose.

NATIVE NOOKS

Leon Horsnell *Native Nooks*

Leon Horsnell is a member of Friends of Grasslands and has provided a display of native grassland plants. Through his landscaping business, Native Nooks, Leon promotes the establishment of native gardens, with an emphasis on grassland species. Leon is an active member who is known to be generous with his time, commitment and advice within many conservationist organisations.

AUSTRALIAN NATIONAL BOTANIC GARDENS

Sue Walker *Australian National Botanic Gardens*

Sue Walker of the Australian National Botanic Gardens kindly supplied native grasses for our display. She is undertaking research into aspects of seven native grasses, including their seed collection, propagation and germination. Her work should lead to more robust species that can underscore natural pasture and be used in site rehabilitation.

SOCIETY FOR GROWING AUSTRALIAN PLANTS

Murray Dadds *Society for Growing Australian Plants*

Murray Dadds from the Society for Growing Australian Plants (SGAP) kindly brought along a selection of books, with special emphasis on grassland species where possible. SGAP has an excellent selection of books for sale at its regular meetings. This is one of the many services SGAP provides to its members. Murray also provided some SGAP posters. SGAP helped start Friends of Grasslands and remains a strong supporter.

PAINTINGS OF GRASSLAND FLORA AND FAUNA

Helen Fitzgerald

Helen Fitzgerald is a wildlife painter and illustrator. She has been travelling, teaching and exhibiting her work for over 25 years and is widely represented in Australian and overseas collections. Her strong interest in the preservation of Australian flora and fauna is reflected in her stunning botanical and zoological art works. She is a member of two Australian Societies of Wildlife Artists. She is illustrator of many books - many will be familiar to you "Wildflowers of the Bush Capital", "Over the Hill and Tharwa Way", "Above the Cotter", "Neighbours in Trouble", and "Wildflowers of the Snow Country".

For the workshop she exhibited several previously unseen paintings, posters and cards:

- Parsons Bands Orchids
 - Blue Bells
 - Parsons Bands among Kangaroo Grass
 - Blue Wrens in Kangaroo Grass, and
 - A grassland impression
-

INTRODUCING FRIENDS OF GRASSLANDS

David Eddy & Naarilla Hirsch *Friends of Grasslands*

Before European settlement native grasslands occupied large expanses of south-eastern Australia. Grassland areas were easily and rapidly settled and during the ensuing development, conservation of this 'low profile' ecosystem was overlooked. Today only a fraction of the original area of native grassland remains close to its original condition.

These scattered remnants harbour many hundreds of species of native plants and animals - some of these are nationally threatened. Without effective conservation now, this ecosystem and many species of plants and animals may be lost forever.

FOGs objectives are to: improve understanding and appreciation of grassy ecosystems and their conservation, assist practical management of grasslands, identify policies that will improve conservation of grassy ecosystems, work with other organisations addressing the decline of grassy ecosystems and to pursue the protection of grassy ecosystems under appropriate laws, policies and planning measures.

Our activities include: field trips; active grassland management; conferences, seminars and lectures; provision of information; seed collection and plant propagation; visiting and assisting other community groups; assisting in surveys; political lobbying; and input into management plans, recovery teams and other working parties.



REGISTRANTS



Affiliations are listed where provided.

Nick Abel <i>CSIRO Wildlife and Ecology</i>	Tony Carey <i>Housing Industry Association</i>
Rob Adam <i>NSW Land and Water Conservation</i>	John Clark <i>Canberra Urban Parks</i>
Harold Adams <i>ACT Rural Lessees Association</i>	Frances Clifton
Ingrid Adler	Ann Connolly <i>Environment ACT</i>
Odile Arman <i>ACT Parks and Conservation Service</i>	Steve Cork <i>CSIRO Wildlife and Ecology</i>
Linda Ayres <i>NSW Agriculture</i>	Trevor Costa <i>Environment Australia</i>
Jason Barker <i>NSW Land and Water Conservation</i>	Alison Crawley <i>Queanbeyan Landcare</i>
Tim Barlow	Glenn Crawley
Michael Bedingfield	Murray Dadds <i>Society for Growing Australian Plants</i>
John Begg <i>CSIRO Plant Industries</i>	James Dawson <i>NSW National Parks and Wildlife Service</i>
John Betts	Leonie Dennis <i>Housing Industry Association</i>
Carl Binning <i>CSIRO Wildlife and Ecology</i>	Ros Dixon
Bill Blacker	Garth Dixon
John Briggs <i>NSW National Parks and Wildlife Service</i>	Peter Dowling <i>NSW Agriculture</i>
Frank Bullen	Mark Dunford <i>Environment ACT</i>
Anne Burhop	Michael Dunn
Winston Burhop	John Eadie
Geoff Butler	David Eddy <i>World Wide Fund for Nature</i>
Stephen Byron <i>Capital Airports Group</i>	Ted Edwards
Rosemary Cameron	Ken Eldridge <i>CSIRO Forestry and Forest Products</i>

Robyn Elphinstone <i>Maunsell Pty Ltd</i>	Warren King <i>Orange Agricultural Institute</i>
Graeme Evans	Frances Knight <i>NSW National Parks and Wildlife Service</i>
Anna Farnham <i>Canberra Nature Park South</i>	Courtney Kraus
Helen Fitzgerald	Harry Kroon
Alan Ford	Carmel Kuzlap
Kevin Frawley <i>National Capital Authority</i>	Jill Landsberg <i>CSIRO Wildlife and Ecology</i>
Anne Gardner	Art Langston <i>Friends of Grasslands and CSIRO Wildlife and Ecology</i>
Jean Geue	Steve Lewer <i>NSW Land and Water Conservation</i>
Peter Gillard <i>Gungahlin Community Council</i>	Peter Liston <i>ACT Planning and Land Management</i>
Roger Good <i>NSW National Parks and Wildlife Service</i>	Charles Litchfield <i>Upper Snowy Catchment Landcare</i>
Graham Griffin <i>CSIRO Wildlife and Ecology</i>	Candido Lopez-Castaneda <i>CSIRO Plant Industries</i>
Barry Griffiths <i>Environment ACT</i>	Katy Mallett <i>Environment Australia</i>
Ray Gurney <i>National Capital Authority</i>	Josephine Martin <i>ACT Rural Lessees Association</i>
Ann Herbert	Kirsten McCarthy
Petrus Heyligers	Geoff McFarlane
Naarilla Hirsch <i>Friends of Grasslands</i>	Bernard Morris <i>Murrumbidgee River Corridor</i>
Paul Hodgkinson <i>Friends of Grasslands</i>	Steve Morton <i>CSIRO Wildlife and Ecology</i>
Linda Hodgkinson <i>Friends of Grasslands</i>	Steve Mueck <i>Biosis Research</i>
David Hogg	Monica Muranyi <i>Murrumbidgee River Corridor</i>
Theo Hooy <i>Environment Australia</i>	Stephen Murphy
Leon Horsnell	Patricia Murray
Margaret Howitt	Lyn Nelson <i>Environment ACT</i>
Barry Hughes	Tina Nevins
Will Inveen <i>Mugga-Mugga Education Centre</i>	Margaret Ning <i>Friends of Grasslands</i>
John Ive <i>CSIRO Wildlife and Ecology</i>	Jim Noble <i>CSIRO Wildlife and Ecology</i>
Audrey Jones	
Walter Kelman <i>CSIRO Plant Industries</i>	
David Kemp <i>Orange Agricultural Institute</i>	

Bernadette O'Leary <i>Environment Australia</i>	Brendan Smyth <i>ACT Legislative Assembly</i>
Megan O'Connor <i>ACT Legislative Assembly</i>	Fiona Spier-Ashcroft
Trizia Ojansuu <i>CSIRO Wildlife and Ecology</i>	Jeanette Stanley
Mary Ormay <i>North Belconnen Landcare</i>	Kerrin Styles <i>ACT Parks and Conservation Service</i>
Ray Polglaze	Roberta Thorburn <i>Environment Australia</i>
Dave Pritchard <i>NSW Land and Water Conservation</i>	Maree Timbs <i>Queanbeyan Landcare</i>
Kim Pullen <i>Friends of Grasslands and CSIRO Entomology</i>	David Tongway <i>CSIRO Wildlife and Ecology</i>
Rainer Rehwinkel <i>NSW National Parks and Wildlife Service</i>	Kathy Tracy <i>Environment Australia</i>
Suzanne Ridley <i>Yarrowlumla Shire Council</i>	Peter Tuckerman
Geoff Robertson <i>Friends of Grasslands</i>	Heather Vallance <i>NSW Agriculture</i>
Robert Rosenstrauss <i>Gungahlin Community Council</i>	John Van Der Straaten <i>Weeroona Alpacas</i>
Mark Rowe	Dierk von Behrens <i>Friends of Grasslands</i>
Alison Rowell	Paul Wallace
John Rumph <i>Goulburn Rural Lands Protection Board</i>	Chris Watson <i>Umbagog Landcare</i>
Jim Ryan <i>NSW Farmers Association</i>	Nick Webb <i>ACT Parks and Conservation Service</i>
David Salt <i>CSIRO Wildlife and Ecology</i>	Richard Webb
Sarah Sharp <i>Environment ACT</i>	Owen Whitaker
Darren Shelly <i>NSW Land and Water Conservation</i>	Sarah Wier <i>NSW National Parks and Wildlife Service</i>
David Shorthouse <i>Environment ACT</i>	Helen Willett
Peter Simpson <i>Federal Airport Group</i>	Jim Williamson
Peter Simpson <i>NSW Agriculture</i>	Trish Williamson
Warwick Smith <i>NSW National Parks and Wildlife Service</i>	Ray Willis <i>NSW Land and Water Conservation</i>
	David Willoughby <i>Queanbeyan Landcare</i>