W(h)ither Grasslands?
Opening Address to 'The Great Plains Crash'

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Some years ago I had the privilege of visiting the great vegetation mapper, A.W. Küchler at his laboratory and home in Lawrence, Kansas. Truly Great Plains country. Two things are firmly fixed in my mind about that visit. The first was the number of young trees in the "prairie" landscape (yes, they are coming back now that the management regime has been changed was the answer to my question). Secondly, when I commented on the untidy, if floriferous, lawn in his back yard, he simply said 'Oh that is my reconstructed Prairie.'!

The relevance of this to grassland conservation in Australia is that:

- Victoria is not alone in experiencing grassland problems
- Management is of critical importance to ensuring survival
- What has been done may be able to be undone
- Grasslands are not boring, but extremely rich ecological systems which contribute mightily to biodiversity

Grasslands are an international conservation issue. Internationally, the major problems grasslands face are from unsustainable agriculture, urban consolidation, and changed management practice. Within this country, we have a number of quite difficult problems.

The distribution of natural grasslands in Australia around 1788 (Date from AUSLIG, 1990) shows large areas in the north of *Astrebla* (Mitchell grasses) — with smaller areas of *Dichanthium* (Bluegrass) dominating the more coastal areas in the northeast, while *Danthonia*, *Themeda*, *Stipa* and *Poa* predominated in the smaller areas of grassland in the south and southeast.

From satellite, present distribution of grasslands has the Mitchell grasslands relatively unaffected by post-Cook settlement but shows extensive "new" grasslands, created by the clearance of forests, woodlands (mainly) and mallee for cropping and improved pasture for grazing.

Roughly half of the areas of Mitchell grass have been invaded by the African Prickly Acacia (*A. nilotica*). The remaining area of Mitchell grassland is almost entirely grazed and its cover thinned. The smaller areas of grassland in the east and southeast have now been almost entirely replaced by exotic sown pasture and crops and extensive areas of "new grassland" on cleared land now covered by exotic sown pasture and crops (predominantly graminaceous).

Virtually all grassland areas are agriculturally used. Any small areas not agriculturally used are small or slender corridors of road reserves or stock routes (most of these are also grazed in times of drought). Only one small area on the edge of the Barkly Tableland is held in a reserve. Table 1 summarises the difference between 1788 and the present.

Using the *Astrebla* conservation area as the Barkly Tableland, an analysis was made of percentage green plant cover (using AVHRR data for 1991) of this small reserve in comparison with an adjacent (presumably grazed) area of similar size. Both areas show the typical Astrebla growth response to heavy rains in January and February and the subsequent decline as the dry season progressed. However, the grazed area declined far more rapidly than the conserved. The average green plant cover for the year was 21.0% in the conserved area compared with 17.9% in the grazed, despite a considerably higher peak in the grazed area (probably due to management practices, such as late dry season burning, to enhance the growth response in the grazed area).

At the end of the dry season the grazed area was uniformly almost bare, while the conserved area had a 50% denser average cover and, in places, seven times denser than the grazed. The grazed area had, at all times, a much more spatially uniform cover than the conserved, reflecting the 'lawn-mowing' effect of grazing, thereby creating much less variety for faunal habitats.

All this demonstrates that Australian grasslands are truly the Cinderella of Australian ecosystems, and the fact that "grasslands" increased enormously over the last 75 years due to wheat planting and clearing of woodlands is scant comfort!

Grasslands of Victoria, while still structurally grasslands, have faired worse still because of biodiversity replacement and reduction. To the uninitiated, the fact that the

Table 1. Results of an analysis of digital data at 4km pixel size for 'Natural Vegetation' (c. 1788), 'Present Vegetation' (c. 1988), Land Tenure (c. 1991; based on AUSLIG data and NOAA AVMRR satellite data (CSIRO Div. of Oceanography)).

	Area (million ha)	
	1788	Present
Major natural grasslands (1)	43.3	34.9 (2)
Grasslands invaded by *Acacia nilotica* (3)	–	4.8
Floristically altered grasslands (4)	–	3.6
"New grasslands" (5)	–	75.2
Conserved natural grassland (6)	–	0.09

(1) Major areas dominated by tussock grasses with little or no tree or shrub cover. Largely *Astrebla* and *Dichanthium* in the north, *Danthonia*, *Themeda*, *Stipa* and *Poa* in the south.
(2) Remaining areas are in the north and consist of *Astrebla* (predominantly) and *Dichanthium* grasslands. Except for a very small conserved area, they are entirely grazed. They now have a thinner average cover as a result.
(3) *Astrebla* grasslands invaded by the African Prickly Acacia (*A. nilotica*). Generally changed to low open woodland.
(4) Native vegetation of the southern and eastern natural grasslands has been largely replaced by exotic sown pasture species and crops (mostly graminaceous).
(5) Resulting from tree and shrub clearance of forests, woodlands (mainly) and mallee for cropping and sown pasture. The crops are mostly graminaceous (eg cereals and sugarcane) and the pasture species are all exotic.
(6) The only conserved area of *Astrebla* grassland of any significance (~40,000ha.) is on the edge of the Barkly Tableland (NT). The total conserved area of major natural grasslands represents only 0.26 % of the remaining area, less than 1/20th of the national average of ~6%.

western districts are still grassy, may give comfort — but it is the enormous change in species composition, structure and growth form that is critical.

While protection for remaining remnants is clearly a priority, all areas are important to the conservation of biological diversity. Integral to the conservation of biodiversity (grassland or whatever) is the connectivity of landscapes. Protected areas, within the concept of biosphere reserves, and elements of remnant vegetation connected by corridors or "greenways" can provide the reservoirs of biodiversity and avenues for adaptive responses to environmental change. If protected areas are isolated, their purpose is defeated. Also, living associations and their environments change. Corridors or "greenways" reduce landscape fragmentation and assist in the rehabilitation of degraded areas.

Conservation outside reserves not only conserves biodiversity, but has significant influence on the landscape matrix. Erosion control, catchment security, land reclamation, soil fertility improvement, modifications to air temperature and humidity, control of soil salts, water table levels — all are affected by properly placed and designed landscape infrastructure, which then needs careful management .

Conservation outside reserves cannot be a haphazard affair; done properly, it will be education and information intensive and require appropriate resources for better and increased levels of management. Resilience provided by adequate ex reserve conservation will alleviate the problems which may spring from global change.

My own organisation has attempted to help grassland conservation through the Endangered Species Program, where $237,000 has been spent on grassland related projects since 1989, with well over half going to Victorian projects. Save the Bush funding has been more modest, with around $36,000 funding for the last two years. We have also funded a project at the University of New England on this topic, which aims to develop a strategy for management of native plant diversity (grasslands) in an agricultural landscape.

Establishment or revitalisation of extension services sourced at the Local Government level should be given serious consideration. Such a service should provide the link from research scientists and area managers to local communities. Without the goodwill, cooperation and participation of local communities, there can be little hope of achieving ecological sustainability.

As Mott and Bridgewater (l992) note, we must link ecology with economics, sociology and politics, and ensure that good policy intentions do not yield inappropriate results. Agency and institutional missions must be clearly defined by tasks, not by infra-organisational or professional subculture, so that performance and achievement can be evaluated on a regular basis as part of a greater whole.

The reversal of history and a return of the biosphere to some earlier real or imagined state is not possible. Ecological rehabilitation techniques, however, may be of great value for maintaining biodiversity in the face of global (and local!) change.

Obviously, there is a role for restoration and rehabilitation by caring and sympathetic landholders — or even those who can see that some native grassland, with associated forbs, and fauna, can act a useful ecological buffer to overly rapacious farming. But we need to get the process right, and we need to ensure there are ad-

equate supplies of propagules of appropriate species of both fauna and flora.

Addendum

Since The Great Plains Crash provided what amounted to a snap shot or status of Australia's native grasslands and grassy woodlands in 1992, a number of significant developments have provided opportunities to address the issues we raised. While it may not seem relevant, even the change in the name of my organisation from the Australian National Parks and Wildlife Service to the Australian Nature Conservation Agency (now Environment Australia) is indicative of the extraordinary institutional and cultural changes our society must make before biodiversity conservation is accepted as the responsibility of the entire community, and not something which can be safely compartmentalised into those parts of our landscape which have no apparent economic use.

To summarise the key events with which I have been involved:
In 1992, the then Prime Minister announced the establishment of the National Reserves System Cooperative Program within ANCA with the aim of ensuring Australia develops a comprehensive and representative system of conservation reserves. Since its inception, the program has acknowledged the protection of grassy ecosystems as a first priority, and has contributed to the acquisition and management of significant grassland sites. In Victoria specifically, these include the Victorian Government's recent announcement of its intention to declare a number of grassland conservation reserves, including the Terrick Terrick property in the Northern Riverine Plains, and the Craigieburn grasslands on the outskirts of Melbourne.

ANCA's Grasslands Ecology Program was established 1993 to identify significant native grasslands and grassy woodlands, and to develop management strategies to ensure their protection. In meeting these objectives, this program has particularly sought to break down the institutional barriers between programs, agencies and institutions, government at all levels and the community. The program has actively sought to develop partnerships and information exchange networks between those organisations active in grassland conservation, and those with a more production orientated focus, including the Murray Darling Basin Commission, the Land and Water Resources Research and Development Corporation, the Meat Research Corporation and Landcare and industry groups.

The model provided by the Victorian Grassy Ecosystems Reference Group process, in which the four key ANCA programs with responsibilities relevant to grassland conservation and management have combined to support and assist conservation groups, land managers, research institutions and State agencies in coordinating the full range of activities essential for grassland conservation is just one example of the initiatives of the Grasslands Ecology Program.

The impetus stimulated by events such as The Great Plains Crash conference, has been affective in gaining recognition for native grasslands at the institutional level, yet we in the conservation movement have been ineffective in explaining the processes and benefits of landscape conservation to the broader community. This is no more apparent than in the events following the late 1995 introduction of the State Environmental Planning Policy 46 - Protection and Management of Native Vegetation in NSW.

In a first for any vegetation protection legislation; SEPP 46 included provision for the protection of "specified native grassland", targeting native grasslands in 22 identified local government areas. While the intention behind the legislation was admirable, subsequent events demonstrated that those drafting the regulations of the complexities, had a poor understanding of the ecological processes operating in grassy ecosystems, their conservation and their management. In turn, as land managers, the rural community did not fully appreciate the benefits they derive from nature conservation, nor did they understand the validity and integrity of the concepts behind landscape ecology.

The subsequent removal of the "specified native grasslands" from direct regulatory protection under SEPP 46, to be replaced by protection through the development of Regional Grassland Management Plans, should not be seen as a victory of economic development over conservation. Rather, this has provided an opportunity to gain community support for a comprehensive survey of grassland resources in NSW, and to develop an ongoing dialogue with land managers aiming towards the cooperation of conservation and economic objectives. Perhaps we should plan for a further addendum in another four years to assess how effective and creative our responses to such opportunities have been.

References

AUSLIG (1990) Data from the Australian Surveying and Land Information Group, Department of Industry, Science and Tourism, Canberra.

AVHRR (1991) Advanced Very-High Resolution Radiometer data from the Earth Observation System Project, US National Aeronautical Space Agency.

Mott, J.J. & Bridgewater, P.B. (1992). Biodiversity conservation and ecologically sustainable development, *Search*, **23**, 284–287.