Grass Clippings

Native grasslands and grassy woodlands newsletter

November 2000 Number 12

Grass Clippings is an occasional newsletter to provide brief updates on initiatives and activities aimed at conserving and managing grassy ecosystems.
Please send comments, contributions or requests for further information to:

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WWF/NHT Grassy Ecosystems Grant

The second round of the grants has now closed, and the response has been enthusiastic and gratifying. This was largely due to the efforts of Helen Ryan, who ran 14 workshops on the grants, in Victoria, SA, and NSW.

The State Assessment Panels will be meeting early this month and the National Panel in January 2001.

Thank you to everyone who applied to the grants. While there appear to be fewer applications this year, the standard is undoubtedly higher.

If you ran out of time to apply, don't forget that the NHT grants are still a possibility!

Rail surveys

Last year, NRE began a project to re-survey rail lines throughout the State. Since Victoria's rail lines were privatised, there are now a number of companies that are responsible for rolling stock, line maintenance, rail reserves and so on, and the environmental responsibilities of these companies are still being negotiated. To assist the process, NRE has undertaken to help identify the biodiversity values of all Victorian rail reserves – hence the surveys. Major freight lines in the north of the State were surveyed in October, and surveys of lines in the South-West have just commenced.

For further information call Vanessa.

Spring activities

Spring has sprung and Victoria's native grasslands and grassy woodlands are exploding with colour. On native grasslands all around the state, walks, talks and field days are being held. Those involved include Trust for Nature, NRE, Parks Victoria, Greening Australia (Victoria), Melbourne and Werribee Zoos, Catchment Management Authorities, "Friends" groups, Field Naturalists and proud landholders. Don't miss out on the opportunity to see where some of Victoria's (and Australia's) rarest plants and animals live.

November

1 Nov - Wildflower walk
at Evans Street Grasslands, Sunbury
Contact: Vanessa Craigie 9412 4199

5 Nov - Wildflower walk
at Wooragee
Contact: Trust for Nature Jim Blackney 5728 6620

9 Nov - *Exploring Opportunities for Environmentally Sustainable Agriculture* - including biodiversity in your sustainable farming practices
at Jarklin Area
Contact: NRE Peter Morison 5430 4361

11 Nov - Grassland wildflower walk
at Old Laverton airfield (future Westpoint Business Park)
Contact: Werribee River Catchment Management Protection Association (RiverRun) Peter Wlodarczyk 5369 5221

11 Nov - Grassland walk and field day
at Bullengarook near Gisborne
Contact: Shelagh Curmi, TfN or Katie McCracken, GAV 9457 3024

12 Nov - Grassland Wildflower walk
at Evans St Grassland
Contact: Friends of Evans St Grassland Karen Wilson ph 9744 3858

12 Nov - Gippsland Plains Grassy Woodland wildflower walk, including the endangered *Rulingia prostrata*.
at Bush Family Reserve Bengworden via Bairnsdale
Contact: Trust for Nature Robyn Edwards 5153 0457

19 Nov - Conservation and production of native grasslands
at To be advised
Contact: TfN Peter Moulton 5222 8139

25 Nov - Return of the Kingfisher Festival
at CERES Environment Park, East Brunswick
Contact: Merri Creek Management Committee Ray Radford 9380 8199

December

10 Dec - Striped Legless Lizard Trapping and Information Day
at: Albion Grassland, St Albans

Contact: Friends of the Striped Legless Lizard Megan O'Shea 9365 2711 or Steve Parker 9365 2617

Grassland Ecology Course

The course will be held from 10-14 November 2000 at the Grampians Retreat and Field Study Centre, Dunkeld. Cost is $825 per participant - all inclusive (includes GST), and all meals and accommodation will be provided.

Greening Australia has developed the course, with the assistance of Victoria University, NRE and other leading researchers, experts and land managers working with grassland and grassy woodlands. The course is designed for land managers, educators, landholders, local government employees and those interested in gaining a better understanding of the ecology of our grassy ecosystems. The course will be field based and it will cover the following topics:

Distribution and History
Aboriginal Land Use
Soils and Geomorphology
Fauna
Flora
Disturbance Assessment
Threats to Grasslands

If you require any further information on the course, a program or you would like to register a participant call Brenda Scicluna on 9457 3024 or email: bscicluna@gavic.org.au.

More "Development" news

As reported in the May issue of *Grass Clippings* (#10), a fibre optic cable was planned to be laid between Melbourne and Sydney, partly along the main rail line. NRE was concerned about possible impacts on threatened native species and communities along the line from Melbourne to Albury rail line, and negotiated with the environmental engineering companies on the route and any impacts.

The project planners received planning permits with strict environmental conditions, and all seemed well – except that in certain areas the cable-laying contractors ignored the permit conditions. North of Melbourne, the significant rail reserve south of Beveridge Road was completely destroyed, and the one north of Beveridge Road had a massive swathe, up the 30m wide, bashed through it. Huge boulders were piled up, trees knocked over, and tracks cut everywhere. The highly significant Hernes Swamp was also disturbed, with a cable track placed squarely down the middle.

NRE and the relevant local governments are presently negotiating with the responsible companies on restoration and re-vegetation of the salvageable parts of the line, compensation for biodiversity losses, and sites for re-establishment of the nationally threatened Basalt Pepper-cress, a small population of which previously occurred on the southern rail reserve.

This is yet another example of how environmental concerns are often discounted or ignored during large infrastructure or construction projects. Things have got to the point where there is a total lack of trust in the promises of environmental care, by development and construction companies, because we've been disappointed so often.

Why does this keep happening? We suggest a few reasons and identify some lessons learnt:

- There is inadequate enforcement and/or penalties for such breaches. Existing legislation provides for only small financial penalties under the FFG Act. The Federal *Environment Protection and Biodiversity Conservation Act* carries significant penalties, but to date no Victorian grassland communities have been listed under this legislation.
- There is increased use of contractors, so there is poor information transfer and no "ownership" or commitment by the parent company.
- Late changes to permit conditions can lead to confusion and mistakes.
- There is inadequate monitoring and reporting on works progress.
- Environmental induction/training is often carried out by non-biologists, at a time of year when many native plants are not flowering or even visible.
- In many cases construction companies face heavy penalties for late completion of projects. To date fines or compensation payouts for environmental damage have been tiny in comparison to these penalty clauses, so there is an economic incentive for a company to work "fast and rough".

If these problems are to be avoided, there have to be stringent conditions on construction contracts. **We would like readers' feedback on the following ideas**:

- All construction staff and contractors must attend a comprehensive training course, provided by approved trainers. This shouldn't look only at native vegetation issues, but should focus on responsible land management, considering all land and water issues on and around the works area, and emphasising weed prevention**.**
- Practical completion date for the contract should be when the whole job, including any environmental reparation works, is completed.
- Presence on site of an independent, competent environmental monitor.
- Wherever works occur, there must be temporary fencing erected to keep works to a specified area. Penalties would be incurred if the fence was breached or moved.
- Ensure that penalties for breaching environmental requirements are greater than the gain to the contractor in ignoring them. Penalties should adequately reflect the costs associated with the loss and re-instatement and long-term problems e.g. ongoing weed management costs.
- Re-instatement costs must be realistic, including labour, long-term maintenance, plant propagation and establishment, monitoring etc.

New Conference

Grassland Beyond the Reserve: a workshop on "off-reserve" conservation of native grassy ecosystems Cooma, Dec 1-2.

Many grassland remnants will remain outside government reserves on farms and other areas such as cemeteries, and road and rail verges. Farmers and rural communities will therefore play a key role in their survival. This workshop will address the vision of off-reserve conservation and evaluate our experience to date.

The workshop speakers will talk about what farming communities, state and local government, Rural Lands Protection Boards, and conservation organisations have been going in grassland conservation, and the strategies and resources available to farmers and the community to combine their usual pursuits with conservation.

The workshop will be held in Cooma on 1 December at the Exservices Club, and costs $15 including lunch. A dinner on the Friday night and visit to three grassland sites is being organised on the Saturday 2nd. For more details contact: Geoff Robertson on (02) 6241 4065 or contact Friends of Grasslands margaretning@primus.com.au.

Conference report

Northern Grassy Landscapes Conference 29-31 August, Katherine, NT

The successful Northern Grassy Landscapes Conference was held in Katherine in August. As in the 1999 Clare conference, the theme was striking a balance between production and conservation in the grassy landscapes of north Australia.

When the conference attendees were asked to name the key issues for the future of the grassy landscapes, a common theme emerged: the wide range of people with a stake in the northern grasslands and woodlands wanted to be involved, kept informed and have their knowledge used.

The conference explored:

- Managing for conservation and production at local and landscape levels.
- Best practice management of grassy landscapes for pastoral, Aboriginal, mining, defence, tourism and conservation managers.
- Integrated regional planning, extension and community action.
- Management tools for tackling fire, weeds and feral animals.
- Future prospects for the northern grasslands.

A CD of the conference proceedings will be available. **For more information** contact: Peter Jacklyn, Tropical Savannas CRC Tel: (08) 8946 6285. Email: peter.jacklyn@ntu.edu.au

Australian Rangeland Society's "Centenary Symposium" Broken Hill, August 2000
By Bill Semple, PO Box 53, Orange 2800

What's a report on a rangeland conference doing in *Grass Clippings*; isn't rangeland equivalent to "arid land"? According to the Australian Rangelands Society, "rangeland" refers to land that is not devoted primarily to the production of cultivated crops or timber. In terms of *area*, most of Australia's rangeland is located in the arid and semi-arid zones. But significant areas also occur in the subhumid and humid zones - particularly on the tablelands where grazing of native pastures - either in grasslands (natural or derived) or in uncleared country - occurs.

Why was the Australian Rangelands Society's most recent conference called a "Centenary Symposium" when the society is only 25 years old? It was a commemoration of the establishment, in 1900, of a Royal Commission to inquire into the management of NSW's western lands. This landmark inquiry not only documented personal hardships and land degradation but also considered some of the reasons for it (e.g. overgrazing, rabbits, over-optimism and the failure to appreciate climatic variability). Tom Griffith's keynote paper, "A hundred years of environmental crisis", cleverly took us through some of the evidence presented to the 1900 inquiry by having some of the audience play the role of pastoralists of the past. After hearing the evidence, many of us wondered what has changed as woody weeds, low commodity prices, droughts, low rural incomes and rabbits are still with us.

But much has happened since 1900. For reasons that elude me (but perhaps associated with the attraction of harsh, relatively undisturbed landscapes), Australia's semi-arid, arid and alpine ecosystems are probably better understood (and this includes the role of domestic livestock) than those elsewhere. Similarly, native plants, which form the basis of most rangeland enterprises, have been the subject of much research. Though such studies still form a significant part of rangeland research, a variety of other issues are now being investigated as was apparent at Broken Hill: e.g. conservation, archaeology, art, climatology, history and palaeontology (and should we re-introduce browsing megafauna as was suggested by the ever-provocative Tim Flannery).

Despite the above, a perusal of recent rangeland conference topics indicates an increasing emphasis on regional planning, policy formulation, economics and other social issues. Even some well-known rangeland scientists, Margaret Friedel of Alice Springs for example, stepped out of their usual ecology "comfort zone" at Broken Hill. Social matters were of primary concern to the 1900 inquiry - has the wheel turned full circle?

Copies of the Proceedings can be obtained from Sarah Nicholson Tel: (08) 8357 3378. Email: nicholson@w130.aone.net.au

Contribution:

"The Great Salinity Debate Part I. Controlling the salinisation process."

Water is a great solvent, especially for salts, and most moving water carries a variety of dissolved salts to an ocean, inland sea, or a salt lake. When water evaporates it leaves much of the salt behind, hence water bodies subject to salt inflows and evaporation become progressively saltier. The world's oceans are the result of a "natural" salinisation process that has been going on for millions of years. Soils are also subject to salinisation when soil water carries dissolved salts close to the surface and then evaporates, thereby concentrating the salt.

High salt loads are characteristic of much of the Australian environment. The sources of innate, connate and cyclic salt will be discussed in Part II. Suffice to say, historical records indicate that there were saline scalds, brackish springs and brackish creeks in many parts of the landscape at the time of European settlement. However, the salinisation process in both rivers and on dry land has rapidly accelerated over the last 200 years. That is, the movement of salt has become more active due to changes in soil hydrology (water balance) since European settlement. To this point we all agree. When it comes to **why**, and how to fix it, we enter the great salinity debate.

I believe that many incorrect assumptions have been made about dryland salinity, and therefore many ill-conceived and simplistic "solutions" have been proposed. So let's start with what we know. Two hundred years ago, most of the areas currently affected by dryland salinity were open grassy woodlands (widely spaced trees with a grass/forb understorey), grasslands (no trees) or shrublands. Much confusion regarding this pre-European vegetation exists. For example, due to a complex of interacting factors including changes to burning and grazing regimes, many grassy woodland areas on the Tablelands and Slopes of eastern Australia experienced an increase in woody vegetation in the mid to late 1800s. Clearing of this "regrowth" was a widespread activity in the late 1800s and early 1900s, partly to re-open areas for grazing and partly coincident with the expansion of cropping enterprises and the development of a railway system. This resulted in a misleading emphasis on trees when people tried to recall the nature of the original vegetation. To assess the pre-European vegetation as accurately as possible, the diaries and other records made by explorers and early surveyors need to be consulted.

There is absolutely no doubt that an increase in dryland salinity is closely linked to the loss of perennial native vegetation – but I believe it is the "overlooked understorey" which has undergone the most dramatic changes. That isn't to say that too many trees have not been removed from the landscape in some areas. However, in the majority of cases the reduction in soil health has been a function of declining organic carbon levels BELOW ground more so than above ground, due to the loss of perennial groundcover and/or the inappropriate management of the groundcover which remains. The "root causes" of the problem, so to speak, have been reductions in root biomass, soil organic matter and surface litter on our agricultural land. These changes can also be linked to other degradation processes such as soil structural decline, nutrient decline, and increased soil acidity and sodicity.

Let's put the other land degradation issues to one side for the moment and focus on the salinisation process. There are two important pieces of information provided in the publication entitled "Assessing the causes, impacts, costs and management of dryland salinity" by Lin Martin and Jenni Metcalfe (LWRRDC Occasional Paper 20/98), which are worth repeating here:-

- In a healthy catchment, salt is **slowly leached downward** and stored **below** the root zone.
- In some dryland areas - especially those with winter rainfall patterns – **recharge may have increased up to 100 times** since clearing [of native vegetation] and the introduction of [annual] crops or pastures.

In other words we need a little bit of water going into deep drainage but not too much. If too much goes down it will come back up – with salt! Let's go through that again. In order to reverse the salinisation process, water has to be flushed **downwards** in the soil profile to take salts below the root zone, while at the same time **not adding significantly** to groundwater recharge. A fine juggling act indeed! This is only possible in the presence of a permanent groundcover of plants which enhance the infiltration of rainfall, have fibrous root systems with a high water holding capacity but low water use (thus holding water in the root zone for both plants and soil biota) and which facilitate the very slow percolation of some rainfall to groundwater.

You guessed it! Perennial native grasses fit these requirements perfectly, especially the tussock species which once inhabited many of the areas of Australia now plagued by accelerating dryland salinity. When grazed appropriately, a diverse stand of native tussock grasses (such as kangaroo grass, *Themeda*), inter-tussock grasses (such as *Microlaena*, *Elymus*) and forbs (such as native legumes, wild geranium, native plantain and wildflowers) can provide reliable year-round production and, if required, form an excellent base for direct-seeded grain or fodder crops. Crop production undertaken in conjunction with native groundcover has been shown to enhance, rather than compromise, both the crop and the grassland.

I'm not ignoring the ecosystem function of trees. Apart from the areas that are natural grasslands, up to 30% cover of trees and shrubs in the landscape can be extremely beneficial both ecologically and economically. Scattered trees may also help contain recharge. However, recent research has shown that plantation tree-lots, widely promoted as bandaids to utilise saline discharge water, often use the fresher water from the top 1–3 m of the soil, leading to an upward movement of the saltier groundwater from below, and slowed tree growth rates. That is, the movement of groundwater upward becomes self-

defeating. If you're relying on trees alone to **solve** your salinity problems, you'll be waiting a long time.

It surprises many people to discover that both root mass and microbial biomass can be much higher in a healthy perennial grassland soil than in a healthy sclerophyll forest soil. For a grassland to be healthy, however, requires much more than just the presence of grassland species. The biomass of the tops and the roots of grasses are roughly equal, forming a mirror image. Short grasses have short roots. Vigorous grasses have vigorous roots. The energy for root growth and metabolism can only come from sunlight trapped by the leaves during photosynthesis. A small leaf area cannot possibly support a large root system.

In addition to increased soil water holding capacity and reduced groundwater recharge, large, fibrous root systems provide a multiplicity of other benefits including erosion control, soil aeration, habitat, and a continuous food supply for soil biota. The compromised root system of overgrazed or overrested plants cannot perform those functions very well. If there are no permanent roots in the soil at all, a whole suite of soil degradation problems will ensue, including soil structural decline and nutrient loss, and of course, in areas prone to salinisation, dryland salinity.

When perennial grasses are provided with an appropriate rest period and then defoliated in a single grazing event (using high stock densities such as in pulsed grazing), a large proportion of roots cease respiring and die in order to equalise the top and root biomass. These "pruned roots" provide an extremely important source of organic matter that improves the physical, chemical and biological attributes of the soil. The "pulsed" root pruning effect is therefore regenerative rather than degenerative. In the context of controlling recharge, the large volume of fibrous roots added to the soil system with each grazing pulse is invaluable. Even though the plant tops have been removed, the pruned roots continue to hold water, like sphagnum moss added to the soil. This is a difficult concept for many people to grasp, because conventionally grazed grasses and annual grasses have shallow root systems that allow excessive leakage of rainfall to groundwater.

It is fundamentally important that perennial grasses be rested prior to the next graze, to rebuild new root systems. If conditions are favourable, leaf regrowth will begin within hours of removal. However, re-grazing in the sensitive early stages will severely deplete plant reserves, resulting in either death or the formation of a steady-state type of equilibrium, where both tops and roots remain restricted in size, such as is found with mown turf and continuously grazed grassland.

Continuous grazing, that is, continuous root pruning, is a degenerative process. When pastures look like bowling greens, not only is the water cycle completely out of balance, but natural nutrient cycles can't function, plants are extremely vulnerable during droughts, and the low level of groundcover encourages weed invasion, erosion, and off-site impacts such as sedimentation and salinisation of dams and rivers. These degenerative processes also occur where the pasture base is annual, because groundcover and root biomass are not permanent. The severe nature of soil degradation, including salinisation, in the areas of southern and western Australia where annual crops, grasses and weeds have replaced perennial vegetation, bears witness to this. When there is no groundcover in the landscape at all (e.g. bare crop fallows) …… need I go on? A special message for those croppers who have neither perennial groundcover nor livestock – think carefully about where you're headed in the next decade or so!

Like all ecosystem processes, salinisation is something we can control, provided we understand it. Reversing salinisation isn't easy, but we know it can be done. My key message is that bare ground, annual crops and pastures, and continuously grazed perennial pastures (in decreasing order) result in excessive groundwater recharge. High water use plants such as trees can be useful for lowering water tables, but the downside to high water-users is that they concentrate salt in the root zone. Let's start treating causes rather than applying bandaids to symptoms.

Plants with root systems which are "water-holders and slow drippers" are required. **The inescapable solution for many of our agricultural areas is a permanent cover of fibrous-rooted, native perennial grasses**, either as part of a diverse sward for grazing, or as a productive base for a multiplicity of other land use systems including cropping, horticulture, viticulture and alley-farmed silviculture. Because native grass roots hold water in the root zone, but the plants are themselves water-use efficient, other plants can be profitably grown in a native pasture base. Native trees and shrubs can also form a valuable component of the vegetation in areas which were originally grassy woodlands, for ecological, economic and aesthetic reasons, albeit ineffective for controlling the "root causes" of salinity.

Whatever your enterprise choice, think carefully about what's stopping YOU from controlling the salinisation process on your property. Remember, there are NO EXCUSES for bare ground outside the arid zone.

Perhaps you'd like to send your comments on either problems or solutions to the GrassEcol email discussion group, or to *Grass Clippings*?

Part II. Why the recharge-discharge model is fundamentally flawed (next issue).

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This article was originally published in the Australian Quarterly Newsletter July 2000.

Acknowledgments: The ideas presented here result from discussions with many people. In particular, I'd like to thank Darryl Cluff and Colin Seis.

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