Liaison

NEWSLETTER

NATIVE PLANT REGENERATION STUDY GROUP
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THE GRASS-ROOTS OF NATIVE PLANT REGENER-ATION

Contents

EDITORAL

At th begining of the year I was saying how you would be re-cieveing four newsleter a year. Due to an increase in demands from me I had to cut this back to two newsleters a year. To make sure that you get value for money I increased the size of the newsletter aswell.

I am interested to find some some member of the study group who would be interested helping me put together the newsletter.

Mainly preparing some artile for me to put in the newsletter. Or handleing the tresureary side of the Stufy Group for. By now some of you would of realised that I am not the fastest at putting money into the bank manily becuse I so busy all the time.

Now turning to the conference well I did not make to the confer-nce in Adelaide and I hope no one went over specally to meet your study group leader. I sorry about not going to the conference but from reports that I have herd it was a huge success.

Cheers for now

Matt Pearson

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Caring for palatable Native Grasses

by Ken Hodgkinson,
CSIRO

Researchers are developing strategies which will allow farm managers to improve the composition of native grass pastures while maximising livestock production and farm profits.

The key to maintaining healthy native pastures is to understand when the vegetation is most vulnerable to damage and what encourages grass growth and reproduction.

Management plans should identify when stock need to be moved to avoid grazing during vulnerable periods and when non-domestic animals should be controlled. This can lead to improved livestock yields and farm profitability.

Wool production

Perennial grasses are essential for maintaining sheep production in the woodland pastoral country of New South Wales and Queensland. During rare years when there is abundant growth of annual forbs (short-lived winter-growing plants) perennial grasses are not needed, but in the average and dry years grasses are critical.

Perennial grasses provide a source of `green pick' for stock in dry times. Sheep weight gain and wool growth are very sensitive to small changes in green leaf when it is in short supply. Green leaves are a rich source of proteins essential for dry feed digestion in the rumen. Without this green pick, digestion slows, feed intake drops, sheep begin to lose weight and wool production falters.

Perennial grasses respond quickly to rainfall and produce leaves from even small falls of rain at any time of the year. Annual forbs on the other hand, although an excellent source of green leaf, only germinate in abundance with soaking autumn rains. With the first dry winds of late spring, they shrivel and blow away. Maintaining the palatable perennial grasses, together with the less abundant perennial forbs, is critical for sustaining wool and meat production during the average and dry times. Soil improvers

Perennial grasses.also act as `wicks' in the landscape by channelling water into the soil. This is particularly important on the hard red soils where moisture infiltration is slow. Bare slopes shed more water than vegetated areas and this leaking of surface water accelerates erosion and wastes water which could be promoting pasture growth, livestock wool and weight gains, and thus farmer profits. Accelerated runoff onto flats usually boosts the growth of trees and shrubs and only temporarily benefits the grasses and forbs. Keeping the grasses on the slopes greatly reduces nutrient and water leakage out of the landscape.

Grazing effects

The key to increasing palatable perennial grasses is knowing how grazing causes grass plant death and how much it reduces seed production of preferred grasses. Researchers have found that too much grazing at particular times weakens the ability of grasses to survive. If all green leaves are snipped from a grass plant, its roots immediately stop growing and the plant goes into shock. If drought begins, a heavily grazed grass plant has a small and weakened root system for extracting the scarce water from a drying soil. Such a weakened plant cannot survive the tough times. CSIRO studies in mulga country north of Cobar in western NSW have shown that heavily grazed grasses are more likely to die in the early stages of a drought. Grazing during dry periods sets up the 1st step of what is known as a `death-trap' situation; the trap is sprung if drought follows the initial dry period. Rules for resting native grass pastures from grazing are being trialled in a collaborative study involving pastoralists, NSW Agriculture,
Queensland Department of Primary Industries and CSIRO. Grazing also affects the ability of grasses to the growth of trees and shrubs and only temporarily benefits the grasses and forbs. Keeping the grasses on the slopes greatly reduces nutrient and water leakage out of the landscape.

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Rules for resting native grass pastures from grazing are being trialled in a collaborative study involving pastoralists, NSW Agriculture, Qeensland Department of Primary Industries and CSIRO. Grazing also affects the ability of grasses to reproduce. If eaten when flowering, the plant misses out on producing seed, resulting in the store of seed in the soil declining. When good rains eventually come, the seed of the palatable perennial grasses may be in such short supply that few plants germinate. This creates growing space for less desirable plants such as shrubs and low quality grasses.

Tactical rest

The risk of losing valuable grasses can be reduced by spelling paddocks early in drought (tactical rest). This may require livestock to be moved to another paddock or property, feral animals trapped and kangaroos harvested or culled. High quality pastures can be built up by reducing grazing to a minimum while palatable grasses are flowering and setting seed.

Through modelling, researchers also have ; shown that tactical rest by agistment is more profitable than set stocking. Agisting avoids the high cost of replacing drought-killed sheep and maintains sheep production. More sheep can be stocked during times of better rainfall because perennial grasses will have set enough seed to achieve a high rate of germination. If fmances do not allow sheep to be agisted for the duration of the drought, the most profitable option in the long term is to sell the stock, even if a short-term loss is incurred. If the farm manager instead overgrazes the pasture to avoid selling stock, potential profts will be lost as the land will be degraded and will not sustain grazing even when soaking rains return. The modelling has demonstrated that grazing management based on meeting the survival needs of the plant (through tactical rest by agistment during dry periods) is profitable.

Acknowledgements:

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CONTENTS CONTINUED

THE CHALLENGE OF CREATING A GRASSLAND/ GRASSY WOODLAND GARDEN IN CANBERRA

BY IAN ANDERSON

The Readers Digest tells us `Have you ever noticed that all that is needed to grow healthy indigenous grass is a crack in your front path? This year, for the first time, after eleven years of growing local native grasses in my formerly large exotic garden, three Kangaroo Grass plants came up in a crack in my path. Did this mean I had achieved some grassland goal deserving high praise? Or should I merely try to fill in the cracks in the path? Was this a hint to record some experiences for the SGAP Journal?

Trying to grow native grasses can have its unexpected repercussions. In the early years, an Aerial taxi cab driver dropping me off at the front drive noticed the uncut seed heads of Kangaroo Grass (*Themeda triandra*) and Wallaby Grass (*Danthonia spp.*) in the drive and offered without any prompting to lend me his lawn mower to clean up the overgrown garden. I decided any reference to deliberate planting and any attempt at education would be met with the utmost incredulity and kept silent.

I have had the impression, especially in those early years, that my letterbox received more than its fair share of those fliers of the type 'young man looking for work specialises in restoring abandoned gardens'.

Attitudes have changed considerably now public planting's of native grasses, for example near the entrance of the new Foreign Affairs and Trade building, have received complimentary words from people who I thought may not have cared or might have been negative. Native grasses are an increasingly attractive alternative to traditional lawns in a user-pays water situation as they do not need any watering once established.

The main motivating force for me during all those years has been the knowledge that grasslands/grassy woodlands are the indigenous vegetation of Canberra and that much has been destroyed. Anything that can be done to put some of this heritage back no matter how little, is a positive step. Local grassy woodlands form an amazingly diverse and beautiful landscape. There is the choice of so many plants from these landscapes for the gardener at all three levels. The upper canopy usually consists of eucalypts but perhaps includes tree sized plants such as *Allocasuarina verticillata* and *Acacia melanoxylon* in moister gullies. The shrub layer includes many fine garden plants - *Grevillea spp.*, *Hakea spp.*, *Callistemon spp.*, smaller *Acacias, Banksias* and woody pea plants like *Daviesias spp.*. The lower layer is of native grasses mixed with herbs such as wahlenbergias and members of the daisy family for example *Chrysocephalum spp.* Attractive plants with straplike leaves such as *Dianella, lomandra* or that excellent landscape and good cut flower, *Stypandra glauca*, can also be found in the grassland layer, not to mention the striking appeal of the grass tree *Xanthorrhoea spp.* Ground orchids are found in this layer and present a special challenge to the suburban gardener trying to cope with high populations of slugs and snails.

Grasslands without shrub and tree layers are another option for the Canberra gardener, mimicking those natural grasslands of the limestone plains, now so rare. I prefer a garden where the main part has elements of a grassy woodland but with a drive strip which of necessity is a grassland so that cars can readily pass over it. They can do this without much damage even when the native grasses are flowering.

The *Eucalypts* in the upper canopy shedding their old leaves regularly provide a continuous mulch, filling in the gaps between the grass tussocks and helping reduce weed growth to some extent. These trees also provide food and perching spots for birds, an attractive feature of any garden. A suburban woodland may not seem so out of place to many when surrounded by the immaculate watered, close shaven green lawns common to lots of gardens.

MERRI CREEK GRASSLANDS

Western (Basalt) Plains Native Grassland is on the verge of extinction in Victoria. Less than one percent of its pre-settlement extent of 300,000 hectares remains, often in tiny cattered patches beside roadsides or in corners of back paddocks. Yet within the Merri Creek catchment, flve sites totalling 1000 hectares remain intact, linked by bushy stream corridors. In spring and summer wide swathes of rust-coloured Kangaroo Grass (Themada triandra) carpet the plains, dotted with brightly coloured wildflowers and punctuated by majestic 250 year-old Red Gums (Eucalyptus camaldulensis). The Merri Creek Management Committee (MCMC), along with the Victorian National Parks Association, the Trust for Nature and the Friends of Merri Creek, have proposed the creation of a park based on these sites and have worked on a number of fronts to gain government support for the idea. Two key problems need to be resolved. Only 24 hectares of the total area are in public hands and funds for land acquisition are very scarce, and alongstanding proposed freeway alignment runs through two of the sites.

The focus of the action to date has been to secure the largest and most significant of the sires-the 400 hectare Craigieburn grassland. This site is owned by Brick and Pipe, a vision of Pioneer, and is held primarily as a buffer to a large quarry operated nearby. Many rare species of flora and fauna have been recorded on the site, including Curly Sedge (Carex tasmanica), Plains Wanderer (Pedionomus torguatus) and Striped Legless Lizard (Delma impar).

The campaign to acquire the site was buoyed during 1995 by a contribution of $250,000 from the Federal Government's National Reserve Systems Program, and a further $200,000 has been allocated by the City of Whittlesea. Prior to the 1996 State election, the Government announced its intention to acquire the site and to move the proposed F2 freeway from an alignment through the site. Clarification is expected soon of further State Government action. The other sites in a proposed chain of grassland reserves are also the subject of negotiations involving MCMC or its member groups.

At Bald Hill, a covenant between Boral Resources and the Victorian Trust for Nature will ensure protection and management of 250 hectares of grasslands as an integral part of a new quarry within the site; at Mt Ridley the landholders are negotiating a development trade-off, resulting in higher residential densities on part of their land in return for ensuring the conservation of up to 200 hectares of native grasslands and grassy woodland; the fate of the Cooper Street grasslands hangs in the balance with MCMC and other parties negotiating with VicRoads to move the proposed freeway alignment out of this site and into disturbed quarry land nearby; and the smallest site at Central Creek is surrounded by houses but is botanically distinct from the other sites. It also provides a great opportunity to raise public awareness about native grasslands and wildflowers.

MCMC has proposed a development trade-off with consolidation of holdings into a grassland reserve. The future of native grassland species will depend on conservation of viable habitat. In the Melbourne region, this may depend on the success of efforts by the MCMC, Friends and VNPA in achieving their long term vision for a Merri Grasslands and Wildflower Park.

MAINTAINING NATIVE PLANT DIVERSITY

You might be forgiven for thinking that trying to maintain native grass and herb diversity in a landscape subjected to grazing by stock for over 150 years would be a lost cause. Not so, say Sue McIntyre and her colleagues from the Department of Ecosystem Management at the University of New England. For some years now, funded by Save The Bush and the Australian Research Council, they have been researching the ecology of the grasslands and grassy woodlands of the New England Tablelands. They have found that natural pastures still predominate which, in the absence of extensive reserves or other protected areas, indicates a need for off reserve conservation strategies. The native pastures are important as a major biological resource and play a pivotal role in the conservation of grassy ecosystems.

Their objective is to develop a plant classification based on form and life-history that group plants by ecological function. These groups will reflect the species' major habitat and management requirements. Not to put too fine a point on it, plants will be grouped according to their tolerance of present-day human `disturbances' such as fertilisation and grazing. This should make it possible to identify the range of habitat types necessary to maintain viable populations of most native species. The same plant data set was subjected to three different analyses (species richness, composition and plant form).

Some common features emerged. Disturbance caused native species loss and the few opportunists were mainly exotics. Species intolerant to disturbance tended to absent themselves altogether and, while those species more able to tolerate disturbance increased their presence, they did not necessarily increase in number. Amongst the natives, the rare species tended to be the most intolerant and disappeared at even moderate levels of disturbance.

The researchers regard their present functional classification as no more than a first
approximation, but even at this stage they feel that some general principles for anagement can be derived from it. `Because of the positive relationship between native species richness and rare species richness we suggest that managing for species richness at a local scale is a useEul approach'. They acknowledge that at the 1 ocal level managing for individual rare species may be possible but `the most efficient way of handling rare species conservation at a regional scale, especially in these poorly known (plant) communities, would be to develop strategies to maximise local species richness.' McIntyre and her colleagues conclude that pasture improvement (involving cultivation, exotic species and heavy fertilisation) and intensive grazing are the activities most likely to be hostile to communities of native plants.

The management strategies most likely to reduce their impact are to vary the intensity of grazing, cultivation and fertilisation within the production system and to buffer species rich vegetation from adjacent intensive land uses. `Farm planning and community landcare activities seem the most likely way to achieve management that is compatible with production', they say, but
`financial incentives may be necessary to achieve change on a largc scale.'

(McIntyre S., Ecological Functional Groups in Grassland Vegetation: A Strategy for the Study and Management of Native Plant Diversity iu an Agricultural Landscape, University of New England, Armidale,1993 for the Australian Nature Conservation Agency. Copies of the full report of this project can be obtained through interlibrary loan from the ANCA Library).

Pygmy Bluetongue Endangered Grassland Dweller

Tim Milne

The pygmy bluetongue (Tiliqua adelaidensis) was thought to be extinct until rediscovered in native grassland near Burra in 1992. Until this time it was thought to be Australia's first extinct reptile since white settlement. It is has been found in ten native grassland areas of varying quality ranging from just south of Burra to Peterborough. The current population estimate is approximately 5000 adult lizards.

Pygmy bluetongues use spider holes as retreats, basking sites and ambush points. During active months (September - April), they bask at the burrow entrance, feeding mainly on medium sized insects along with some vegetation. During other months, burrows are used to overwinter. This reliance on spider burrows is one of the main reasons for the low number of pygmy bluetongues. Any profound ground disturbance (eg ploughing) leaves lizards isolated from their burrows

Being relatively small (less than 11cm body length), soft skinned and slow, they are at the mercy of predators such as the brown snake (Pseudonaja textilis), and various raptors. They can run, but they cannot hide!

Pygmy bluetongues are only known from sites that are, at least in part, unploughed. Unfortunately unploughed native grasslands in South Australia's Mid-North are rare. To maintain current levels of pygmy bluetongues, it is of vital importance that these grassland remnants are correctly managed. Obviously, preventing cultivation is the primary concern, but the spread of non grassland species in native grassland may also effect its suitability as pygmy bluetongue habitat. It is for this reason that trials are currently being initiated to test the effect of different land use practices (eg grazing levels) on pygmy bluetongues and their grassland habitat.

Revegetation with Tasmanian Snow Grass at Ben Lomond

Mike Cooper- Land Rehabilitation Officer, Parks and Wildlife Service (TAS)

Ben Lomond is a dolerite mountain in north-east Tasmania. The access road ends at a small alpine village which includes several ski tows, a village dam, a sewage treatment facility, and some walking tracks. Trafficking and construction have produced several small areas above 1200 metres which are either disturbed, eroded or bare. This paper reports on attempts to re-establish native vegetation on these areas, for the purposes of erosion and sediment control and stabilising the area for sküng. The District Ranger, Andrew Napier, explains that he "concentrated on Tasmanian snow grass (*Poa gunnii*) as it seems to grow strongly on a wide range of soils including clay subsoil. It also seems to be the most suitable native species from a skier's point of view to establish on slopes damaged by skiers or disturbed by slope grooming. It is hard wearing and holds snow well." Important to the success of later works were the obsexvations he made i on some early pilot trials.

One series of trials involved transplanting:

(i) *Poa gunnii* and *Carpho alpina* cores with soil - 75 mm diam;

(ii) *Poa gunnii* clumps with soil - 75 mm diam;

(iii) *Poa gunnii* clumps with soil - 30 mm diam;

(iv) *Poa gunnii* crowns without soil - , 12 mm diam.

Many of these plants are growing well to this day, with the best survival by the small cores and crowns.

Another series of trials involved direct seeding of Poa gunnii. A small quantity of seed was collected in late March 1991, dried, and stored. It was sown on well prepared ground in April '91, and again in November '91, but without success.

FENCED TRIALS

Mr. John Hill, the proprietor of a large brassica propagation nursery at Don Heads and also a keen skier, offered to grow some P.gunnii as an experiment, free of charge. While it was possible to obtain a good strike rate from cuttings, he found the best results using seed.

The method used was to plant three to four seeds in plashc, multi-tube trays and grow them in a controlled environment seedling shed. Planted in August, over 2000 seedlings were delivered in late November. They averaged 30 mm in height with about eight to ten leaves, each growing in a potting mix wedge 20 mm x 20 mm x 40 mm deep. Planting took place in late November and early December.

It was thought that fertiliser might speed up establishment, so this was trialled. Only one fertiliser was used, an organic based "Gro-wel" orchard and vineyard mix with a declared analysis of N(total) 3.6%, P 4.0%, K 1.0%. The rate was one handful per square metre.

Browsing by native animals was anticipated, so fencing was made part of the hial. The ski field and village area has a dense population of Bennetts Wallaby with several resident wombats, and it is not possible to remove them from the national park. Previous fencing attempts had been of limited success as wombats forced runs under the wire mesh allowing access for wallaby. So the method used was to support two widths of one metre wide chicken wire on star pickets with 1200 mm above ground and 600 mm secured on the ground out from the fence. This has been most successful, with no apparent security breaches to date.

On the village dam wall approximately 1000 seedlings were planted at 150 mm spacing in rows 150 mm apart. The first six rows from the southem end were then fertilised and marked. The next six rows were not fertilised. The next six rows were fertilised and so on, making a total of three fertilised blocks and three unfertilised blocks, all marked top and bottom with orange pegs.

Random measurements of plant size were made in early' March 1992. Averages were as follows:-

- Fertilised: height 78 mm; diameter 86 mm.
- Unfertilised: height 44 mm; diameter 44 mm.

There was no doubt as to the value of fertilising, as the differences could be seen with the naked eye. Fertilised plants had many more leaves and a healthy green colour.

Unfertilised plants were obviously slower growing, and a glaucous blue colour.

UNFENCED TRIALS

In the unfenced trial areas:

- Many plants were pulled out by animals before the seedlings were established - that is before their roots had anchored them in the ground. This problem was reduced when the crowns were cut back from 125 mm to 20 mm.
- Fertilised plants became established quicker.
- Unprotected plants often showed signs of repeated browsing, but plants which were not pulled out could survive heavy browsing.
- The extent of browsing damage varied from place to place.

In these areas, fencing is difficult and costly due to rocky, uneven ground and the numerous small plots involved. Fences on the ski field would have to be removed prior to the ski season anyway, and rather than erect fences Andrew suspected it might be cheaper to replace plants lost due to browsing. Further he sought to reduce losses due to animals pulling out plants by using a repellant and using fertiliser to encourage rapid establishment.

Over 60 000 seedlings were grown and sprayed with D-TER, an animal and bird repellant. Many types of disturbed areas were planted out, and fertiliser was broadcast over the areas. The photos show that the plantings were generally successful two years later. It was found that:

- Some losses occurred due to animals. These losses were light and confined to the first few weeks. Possibly the repellant helped.
- Some losses occurred on very steep slopes due to erosion.
- Some losses occurred due to frost heave. These plants are still lying where they were lifted and are still alive. These sites are wet, low-lying, covered in coarse gravel rather than soil, and may be quite shallow. These sites, like the rock outcrops nearby, may be naturally bare. Heaved seedlings could be planted on better sites.

Snow grass seedlings were planted at one place on a damaged ski slope. Instead of a fence, a heavy plastic mesh was laid directly on top of the plants to protect them from wallabies. No losses were seen at this site, and the mesh does not appear to have inhibited the growth of the plants.

CONCLUSION

At Ben Lomond generally it seems that fencing is not really necessary, and that losses can be replaced by replanting. Planting of seedlings and broadcasting fertiliser works well at this site. The method would probably work well in other places, but only those involved in similar projects can determine whether the costs of this method are warranted for their particular circumstances.

REFERENCE

Napier, A.B. (1992). Revegetation Trials, Ben Lomond. Intemal report, Parks, Wildlife and Heritage, Tasmania.

Native Grasses of the Wimmera

Neil R. Marriott

Durine the 1970,s and 80,s there is no doubt that the greatest environmental thrust was for the protection, and for SGAP'ers, the re-establishment of rainforest. Vast areas of this diverse ecosystem were cleared and Iogged leaving every small remnant worthy of a blockade to save it.

However, about the same time a handful of botanists and scientists began studying an entirely different ecosystem - Australian Grasslands and Grassy woodlands. These originally covered vast areas of Australia and accounted for 34% of the area of Victoria. Tragically today all that remains covers less than 0.3% of the state. This makes it the most threatened ecosystem in the state, and conseguently has thc highest number of rare or endan- gered plants and animals for the state.

The reason for this massive decline is because the open grassland and grassy woodlands proved to be perfect for grazing and later, cropping. As a result, the vast open areas of the Western Basalt Plains. the Wimmera, the Northern Grasslands and the Gippsland Red-gum Woodlands were rapidly settled, with virtually no good sized areas being retained as Crown Land. The majority of this 0.3% remnant of native grassland is now to be found on private property.

During the mid 1990,s the well known and respected naturalist John Landy compiled a report on the future directions for the Trust for Nature. He found that the conservation of grasslands and grassy woodlands should be given our highest priority. At the same time the Federal Government, through the former Australian Nature Conservation Agency commit- ted a large amount of funding for the conservation and proper management of Grasslands and grassy woodlands throughout Victoria. This was done through a coordinatina body - GERG (Grassy Ecosystem Reference Group) which was set up to streamline and monitor all grassland studies across the state. The Trust for Nature, whose aim is to help the private landholder protect and manage natural areas on their property was involved with GERG from the outset. As a result, in 1995 the Trust for Nature received funding to employ botanists to survev remnant grasslands on private property in the Wimmera, the Western District and the Gippsland Plains.

Native Grassland : Natures Gardens

Anne Presscott

Native grasslands are naturally occurring areas covered with native grasses and other low- growing plants, with few or no trees. They can be ablaze with colour in spring. Grassy woodlands are covered with native grasses and other low-growing plants with some widely scattered sheoaks, wattles, gums and native pines.

Where Can You Find Native Grasslands?

Many areas in South Australia were covered with native grasslands or grassy woodlands 200 years ago. The map below shows how widespread grasslands were in the mid-north, for example. Patches are still quite widespread on some properties, mainly in rough grazing areas. Most of these are currently grazed. The best bits are often on public land such as council reserves. Estimates are that there is less than 2% left, the rest having been ploughed for crops.

Recognising Native Grasslands and Grassy Woodlands - Some Indicators

You can recognise native grasslands by:

1. clumps or tussocks of native grasses such as Kangaroo Grass, Spear Grass, Wallaby Grass, or Porcupine Grass;

2. clumps or tussocks of tough grey-green Iron Grass, Black Grass or Saw-Sedge;

3. scattered Sheoaks, Christmas Bush and occasional gums.

4. areas that have never been ploughed

Sometimes Tree Planting May Be Counter-Productive

Planting trees into grasslands lessens both their heritage and intrinsic value. It adds a further burden on native birds, reptiles, butterflies and other animals that are found only or mainly in.grasslands. You may be shading grasses which are the seed source for the local finches and small parrots.

Plant trees by all means but be careful where you do it!

What Can You Do?

1. Do not plant into areas that have native grasslands.

2. Choose indigenous local species from local seed. Try planting native grasses, sedges and Lomandras instead of trees. Trees when present were often sheoaks, not gums.

3. Remember that planting trees might harm nature conservation values.

4. Spend your time wisely. Protecting existing grasslands from fertilisers, grazing and road works may be a better way to keep your heritage and local birds than tree planting.

Who Can You Contact for Further Information?

Ann Prescott and Millie Nicholls are working in the Mid-North of SA on a temperate native grasslands project supported by the World Wide Fund for Nature (WWF). The Native Grasslands Project is working alongside land holders and local government in the region to improve the condition of native grasslands.

They can talk to groups in the mid- north about grasslands, make sn- site visits to properties with grasslands and hold workshops or field days about native grasslands.

Phone Millie on (08) 8846 2183 or Ann on (08) 8269 2429.

Ann Prescott
WWF Temperate Grasslands Project

Willow"s by Bob Prounce

Willow trees establish easily and protect wriverbanks but their value has been questioned recently, following their explosive spread to many agricultural areas.
In the Bega River region of New South Wales more than a million feral willows established and grew to about three metres tall over a three-year period. Thousands of seedlings also have been found in many rivers in NSW, Victoria and Tasmania - from sea- level to the alps.

The major concern is that willows form thickets which can cause floods and erode vulnerable banks, especially on flood plain areas. There are fears too that willows will displace native vegetation and destroy native animal habitats. When established, willows develop a dense root system which can extend into the water and trap silt. As this process continues and silt levels build up, willows have even more ground on which to grow and collect more silt. This is how the original structure of the stream can be altered completely.

Willows can grow in the centre of a stream and, in small streams, the congestion can be so severe that water can no longer be contained within the original watercourse so that the stream is altered or frequent flooding occurs.

Unlike native vegetation which sheds foliage throughout the year, supplying stream organisms with a constant supply of nutrients, willows shed their foliage over a shorter period and break down more readily than native vegetation. Even large branches of willows decompose quickly, whereas eucalyptus not only persist in water but will hollow out, providing important fish habitats. Trees become weeds

All willows in Australia have been introduced. They are imported and grown as cuttings which means the offspring are identical genetically (clones) to the tree they were taken from.

Willows can propagate freely along streamsides from practically any vegetative part except the leaves.

In the past it was believed willow trees were only entirely male or entirely female and would rarely or never produce seed. This was because the chance of meeting a compatible 'partner' was low.

Unfortunately this is no longer true. Of the 300 willow species worldwide, at least a dozen have already reached rural Australia - some Trees...only as male trees, some as both male and female trees and some as bisexual trees.

Nearly all have started to breed here, not only with their own kind, but also with other willows, providing they flower at the same time (September-October) and belong to the same group of species - tree species do not usually breed with shrub species. The offspring are mostly hybrids and often virtually impossible to identify precisely.
Offspring trees also tend to breed readily when they are 2-3m tall - sometimes as soon as two or three years after germination. Seed spread

Willow regeneration depends on three crucial factors - a male tree, a female tree and an appropriate seedbed. The seeds only live for one or two weeks, so favourable conditions are needed as soon as the seeds fall, usually during November. Conditions need to remain favourable for several months because the roots grow slowly. In most situations willows will establish on the edge of a stream because this area is wet continuously.

While most seeds carried in the air can fall within 300m of a seed tree, some travel at least a kilometre. When seeds of aggressive species, such as the Black willow, are released in huge quantities, a few offspring can arise as far as 50-l00km downwind.

Transport by water also is important both for seed and broken branches.
Seedlings will germinate every year but not all will survive - floods carry off or bury small seedlings growing on mobile sediments. Falling water levels will reduce the chance of seedling survival.

The introduction of the male and female clones of Matsudana x alba hybrids from New Zealand in the 1980s and their widespread sale will cause many problems over the next 10 years. The number of feral willows is about to escalate because the female produces abundant seed and the male even fertilises the Weeping willow - a willow that has rarely produced seed till now because it rarely had a `partner'. Taming the willow

Total eradication of willows is not desirable but controlling their spread in streams is possible and in the community's interest. Willows should be tamed, managed and prevented from breeding.

The two basic aims are to eliminate any feral willows and reduce their sources of spread to acceptable levels. Avoid establishing fragile willows where their broken branches are likely to take root easily. Keep males more than 500m from any compatible females or at least keep seeding females more than 2000m from suitable seedbeds.

Because seed can travel many kilometres, minimising the seed supply to rivers requires a community approach. Landcare and other catchment groups provide a good source of o information and collective effort to reducing seed spread. Assessing the nature and source of feral willows sometimes requires knowledge, advice and the support of others.

Whether a willow presents a problem or not depends on individual situations.
Try to eliminate all feral willows. If willows grow from seed, half of them are likely to become seed producers and usually none are needed where they establish. In some rivers feral willows are already the main seed producers.

In the Bega River region, seeding feral willows became established in about 1960.
Where a11 the ferals grew from broken branches their elimination is less urgent, but desirable in rough streams where they are likely to take root.

Do not plant willows unless it is reasonably safe to do so. What is safe depends on the individual situation. For instance, plant only one type of willow, such as the weeping willow, and no other willow species.

Try not to bring in any new willow species that might start breeding with others already established. Do not plant male Masudana x alba hybrids within 500m of Weeping willows or anywhere else to ensure seed does not spread.

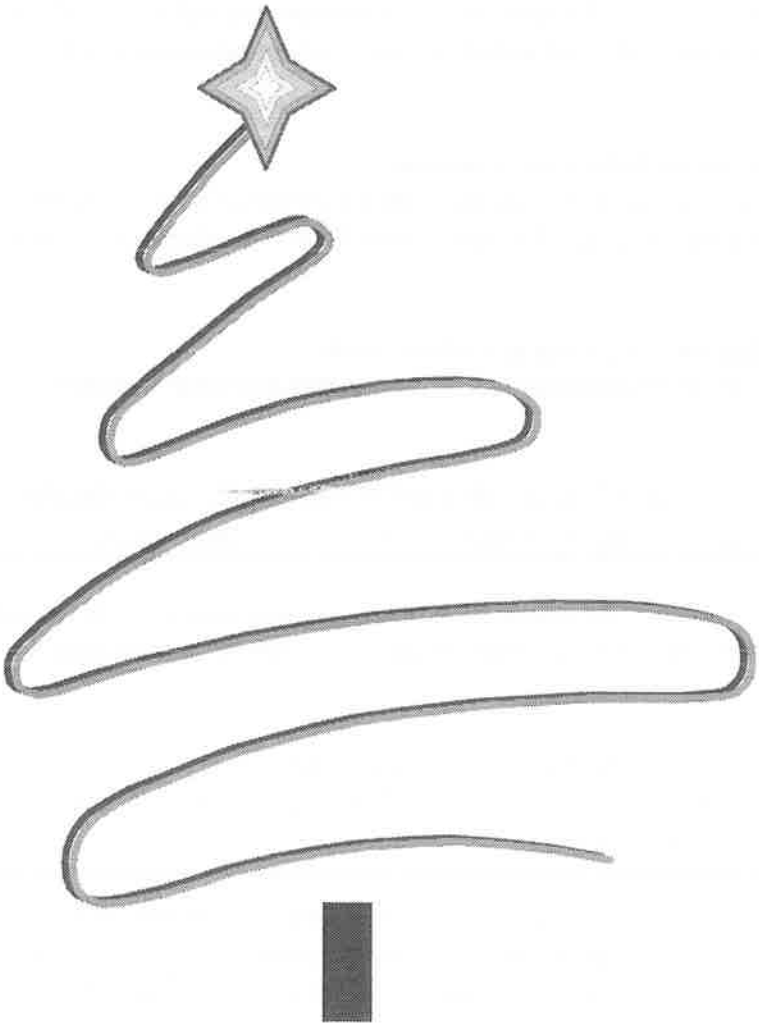
Keep willows out of streams where they are currently absent and not needed and make every effort to eliminate them from pristine streams, especially in National Parks. It is best for a Landcare group to develop a catchment- wide willow management plan and act accordingly.

Where willows are clearly preferable to native plants, use only identified male or sterile willows. For planting in rivers use only clones with non-fragile branches and preferably with many short stems. Where one desirable tree predominates, the true weeping willow for example, eliminate all others and make sure that all retained trees are of the same gender.

Totally eradicate aggressive species including the Black willow and also the Common osier and Grey osier.

Where spread from seed occurs, examine all trees for flowers in spring to identify and remove the source. An example of a seed source would be an Upright golden willow (female) growing near a Crack willow (male). There are many areas where willows have little chance to spread - manage them like any other tree but keep out the most aggressive species and look for seedlings. Similarly, Crack willow (male) more than 20m from a stream and more than 500m from a compatible female is quite safe.

Where an extreme infestation occupies a site and has reached a tolerable equilibrium, willow removal can be costly and could open the site to new invasion. It could be preferable to defer clearance and only limit extension of the infestation. The simplest strategy is to pull out all seedlings when it is easy to do so, one or two years after germination. This works best if done regularly, provided seed rain or seedbed is scarce.



Merry

Christmas &

have a happy

New Year