REVEGETATION WITH NATIVE GRASSES IN CONSERVATION/AMENITY AREAS

J.L. Stafford
East Torrens Animal and Plant Control Board

Summary. In the East Torrens district where approximately 50% of the land is now no longer cropped or grazed having been cleared or otherwise disturbed to varying degrees, weed invasion is a continual problem. Much of the land is also very steep and is not accessible to conventional equipment. Trials and pilot projects have demonstrated that native grasses such as kangaroo grass (*Themeda triandra*) can be successfully established on almost any terrain and thereafter used to counter weed invasion. The challenge now is to develop more efficient methods of growing, harvesting and sowing seed on a scale that will make it possible for significant areas of degraded vegetation to be revegetated and put under post-establishment management practices.

THE NEED FOR REVEGETATION

When confronted with a weed problem it is easy to fall for the trap of thinking that if the weed is removed the problem is solved. So often the removal of one weed simply lifts the lid of a Pandora's box to reveal a dozen others that were not obvious when the situation was first assessed.

Weed control is an occupation that appears to have an inbuilt perpetuity. Once a commitment is made to a project the need for resources to maintain it never seem to abate. As the program expands and finite resources are spread over an ever increasing area the advance must eventually be halted if adequate follow-up is to be maintained. Only as "reclaimed" areas are put under a form of stable management that virtually eliminates the need for follow-up weed control can resources be fully deployed at the front line of attack.

This is the basic strategy behind revegetation insomuch as it applies to an extensive weed control program. Revegetation is like the asphalt seal on a newly constructed road. It stabilizes the surface and enables equipment that would otherwise be tied up with maintenance to resume work on construction.

This paper has been prepared with the hind sight of twelve years endeavour with the East Torrens Animal and Plant Control Board in using native perennial grasses as a means of restoring stability to degraded land exposed to continual weed invasion.

WHY NATIVE GRASSES?

To capitalize on any progress in weed control, revegetation needs to be incorporated early within the control program. In effect an interface is created between exotic plants on one hand and native vegetation on the other. The native vegetation however must be resilient enough to withstand the treatments needed to control the weedy exotic plants in order to obtain the vital early foothold that is necessary to gain ascendancy over the weeds.

Being natural colonizers, some native grasses have the required characteristics to fill this role;

Because they mature relatively quickly they are able to establish within a season or two and occupy space that would otherwise be taken by weeds.

Their fibrous root system helps bind the soil on sites where weed removal has left the soil bare and vulnerable to erosion.

They provide dense foliage cover close to the ground for optimum suppression of weeds by shading.

Unlike most other plants, growth is not produced at the tips but at the base of the foliage, thus they generally produce a favourable response to slashing and burning.

Being monocotyledons, many selective herbicides that control the weed species (most often dicotyledons) do not harm the grasses.

They produce easily ignited fuel which, strategically placed close to the ground, is ideal for suppressing weeds by fire.

Only grasses produce favourable responses to a variety of treatments within an integrated control program (see Fig. 1).

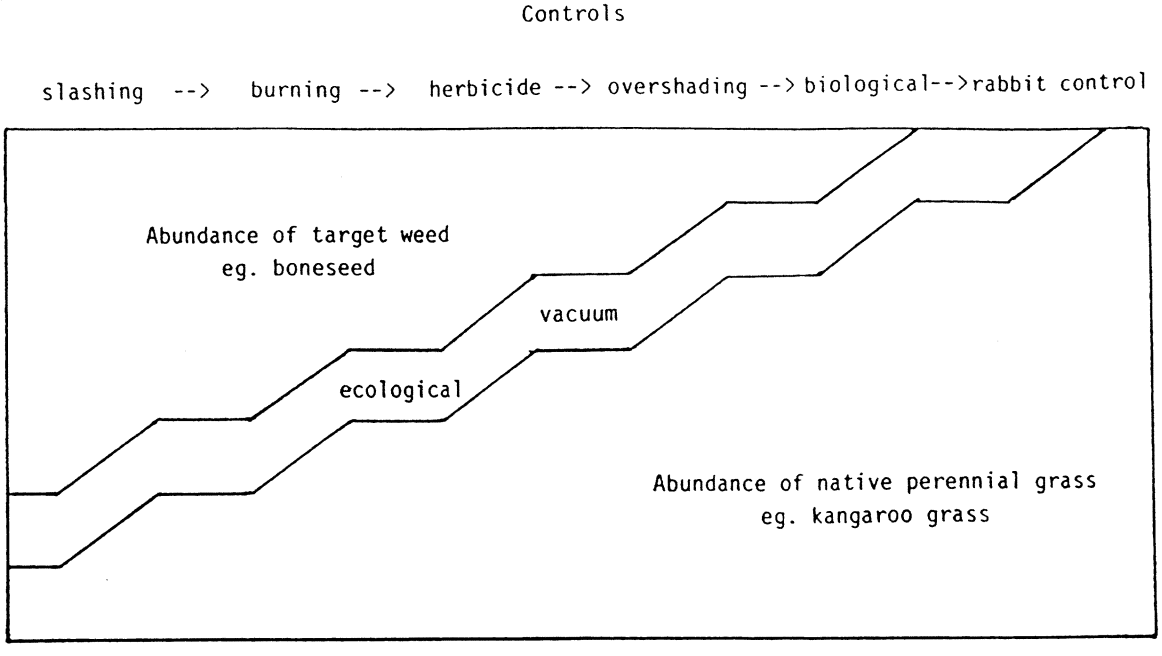

Figure 1. Weed control/revegetation interface. Diagrammatic summary of losses of target weed and gains of native perennial grasses through a series of controls.

In implementing a program against a weed such as boneseed (*Chrysanthemoides monilifera*), slashing might be used as an initial control. While reducing the abundance of boneseed it simultaneously aids the development of seeded or regenerating grasses.

A control burn will further reduce the dominance of boneseed. This control also produces a favourable response from the grasses.

Next the use of a selective herbicide to control the woody dicotyledons will assist the monocot grasses to gain dominance.

Because grasses produce a positive response to the series of control treatments, the ecological vacuum between the dominance of weeds on one hand and grasses on the other is minimized, thus reducing the opportunity for further weed invasion.

THE ROLE OF NATIVE GRASSES IN A WEED SUPPRESSION PROGRAM

Most of the weed problems that I encounter in the hills adjacent Adelaide are a result of disturbance to the native ground cover. In many cases the stands of trees are still intact. Because a void in the ground cover gave rise to weed invasion in the first instance, long term weed

control will only be achieved as this matter is addressed. Thus the establishment of native grasses becomes the spearhead of a thrust to restore ecological equilibrium to these areas.

Many post-weed control revegetation initiatives have been less than successful simply because of the large gap between weed removal and maturity of the reintroduced native plants. The use of quickly maturing grasses in preference to shrubs and trees for initial planting reduces this gap.

Native grasses have an important role to play in controlling both the target weed and other weeds that may subsequently invade an area. As remnants of original vegetation, they have been used at Cleland Conservation Park to burn areas infested with boneseed and french lavender (*Lavandula stoechas*). The fire that reduces the weed population simultaneously assists in developing the grass sward. Once established, either through natural regeneration or reseeding, grasses are used for maintenance burning every two to three years to exhaust seed reserves and kill weed seedlings before they mature. A well established sward of kangaroo grass (*Themeda triandra*), weeping grass (*Microlaena stipoides*) or tussock grass (*Poa* spp.) makes excellent ground cover to discourage further germination of weeds.

Once a site has become stable and there is little or no need for weed control treatments, other plants such as shrubs and trees can be encouraged. Observations suggest that native grasses act as a nurse crop for the next succession of native plants.

PROPAGATION OF KANGAROO GRASS

Most of the grass propagation work done by the East Torrens Animal & Plant Control Board has been confined to kangaroo grass. This particular grass has a number of attributes that suit it to geographically and botanically broad weed control programs.

Kangaroo grass is one of the most widely distributed plants in Australia growing in a variety of soil types.

It can be found on most aspects in the Adelaide Hills except on very steep south facing slopes where tussock grass is more likely to be dominant.

Being a spring/summer growing plant it can be established at the opposite end of the season to many autumn germinating weeds thus avoiding direct weed competition in its early establishment.

Kangaroo grass is a vigorous perennial that produces excellent shade for weed suppression.

It can be burnt just prior to summer to provide an attractive fire resistant green sward during the high fire danger season.

Technique The method developed by the Board over the past 12 years for seeding kangaroo grass is based on broadcast seeding as distinct from drilling the seed into a cultivated seed bed or direct seeding into uncultivated ground. No ground preparation is required. Nor is it necessary to separate the seed, in fact it is essential that the awn and seed remain intact. Almost any terrain or soil type can be sown by this technique.

Harvesting Kangaroo grass has a non-synchronous development of its seed which is controlled by moisture availability and temperature. In December/January as the seed matures and is shed from the panicle new buds continue to form. A measure of skill and good fortune is needed to harvest this grass at an optimum stage of seed development.

There are basically three approaches to harvesting kangaroo grass seed;

The culms can be cut by sickle, brushcutter, sickle bar mower etc.

The seed panicles can be stripped from the standing culms.

The spikelets can be shaken from the panicles.

Experience at East Torrens has shown the first method to be very labour intensive while the third produced a very low yield of seed. A tractor-mounted stripper is currently being used to harvest the seed within the panicle.

Seeding As a rule of thumb the seed harvested off one unit of land is sufficient to seed another, however a good cultivated crop can seed up to three times its own area. To avoid seed loss the harvested product is usually taken to the revegetation site within 24 hours of harvesting.

Hay is spread as a light lattice over the ground at the rate of one cubic metre per 150 square metres, while one wheat sack of panicles will seed the same area. Within a few weeks of broadcasting the hygroscopically activated awns have removed the seed from the panicles and drilled it into a crevice in the soil into which the seed is locked by the hair like barbs at the pointed end of the seed.

Germination Subsequent to seeding in December/January no further work is required on the site for approximately nine months when in September/October all herbaceous weed growth is sprayed with a mixture of glyphosate and atrazine at sufficient rates to control both standing and dormant weeds. Rates in excess of 4kg. active atrazine per hectare have had no adverse effect on the germinating kangaroo grass. About three weeks later when the sprayed weed growth has dried off it is burnt. Although kangaroo grass requires warm temperatures to germinate the bare undisturbed soil acts like a solar panel and soon lifts its temperature sufficiently to produce germination of the seed.

Management The most critical period in establishment is usually the first winter after germination when winter growing plants regain their dominance. To check their growth selective herbicides can be applied in autumn soon after the break of the season. Close mowing in spring just before new culms are produced will assist the grass in gaining dominance which it should maintain thereafter.

An early spring burn every two to three years will further assist kangaroo grass to increase its cover at the expense of herbaceous and woody weeds.

DISCUSSION

Trials and pilot projects have demonstrated that native grasses such as kangaroo grass can be successfully established on almost any terrain and thereafter used to counter weed invasion. The challenge now is to develop more efficient methods of growing, harvesting and sowing seed on a scale that will make it possible for significant areas of degraded vegetation to be revegetated and put under post-establishment management practices.