

Looking after the bush: Natural regeneration is better than planting

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Introduction

Well-intended but inappropriate planting has occurred within native vegetation for many years. However, planting has become more of an issue recently due to the Native Vegetation Management Framework (NRE 2002) which is Victorian government policy requiring an 'offset' for legally permitted clearing of native vegetation. Offsets usually include 'recruitment' plants which are in practice mostly planted rather than obtained by natural regeneration, although natural regeneration is allowable under the policy. Where planting occurs within native vegetation it is referred to as 'supplementary planting'.

Inappropriate planting reduces the ecological integrity of native vegetation. If it is an offset site this only adds to the total impact given that the site generating the offset was cleared in the first place. Consequently, remnant native vegetation is under significant threat from poorly conceived or applied offsets throughout Victoria. Here I give examples of adverse impacts followed by a discussion on how to avoid this problem, which is basically to avoid planting in native vegetation except in certain circumstances. Native vegetation is best managed by weeding and facilitating natural regeneration.

Inappropriate species

Recently I came across a conservation reserve south-east of Melbourne supporting grassy woodland, swampy woodland and swamp scrub vegetation. From the age of some trees, planting appears to have been going on for some years. As part of an offset for vegetation cleared elsewhere, plants were also recently planted within part of the reserve. These plantings were placed within plastic tree guards, which at least made them easy to recognise.

Unfortunately, few or none of the plantings were appropriate. In particular, species that do not naturally occur in the reserve were planted, including Messmate Stringybark *Eucalyptus obliqua* (Figure 1). Some *E. obliqua* seedlings were planted below existing mature Silver-leaf Stringybark *Eucalyptus cephalocarpa* and Swamp Gum *Eucalyptus ovata*. Such plantings below or near existing trees compete with and stress these trees, or else fail and waste resources. They also undermine the ecological integrity of the site, turning it into a plantation rather than authentic self-sown natural vegetation that has undergone natural selection.

Species that occur within the reserve were also planted outside their natural habitat within the reserve, such as Common Tussock-grass *Poa labillardierei* in grassy woodland where none naturally occurs. Not surprisingly many of the plantings died, particularly the *Poa* as it needs more moisture than is generally available in grassy woodland, especially during drought. The correct *Poa* for the site is Soft Tussock-grass *Poa morrisii* which is already present.

Another reserve in southern Melbourne was identified as an offset site for clearing elsewhere. In this case the natural vegetation is plains grassy woodland dominated by River Red-gum *Eucalyptus camaldulensis*. The proposal was to extensively plant the reserve with shrubs. Firstly some of these shrubs do not naturally occur in this plant community in this area, and secondly the vegetation is a grassy woodland not a shrubby woodland and such plantings may

stress the existing trees. Fortunately the management agency recognised the risk and prevented the planting. Many more sites are subject to such disastrous proposals.

Naturally treeless grasslands are often at risk of misguided tree planting, in both northern and southern Victoria, for example in a flora reserve near Echuca, where tree planting has occurred, possibly over endangered Red Swainson-pea *Swainsona plagiotropis*.

Other issues

There are other issues with planting besides introducing species that are not site-indigenous.

The identity of plants used in planting can be an issue. The species may not be the one intended due to misidentification during the collection of propagation material or some other mistake in the nursery. A classic example is the planting of South African Angled Pigface *Carpobrotus aequilaterus* instead of Karkalla (Pigface) *Carpobrotus rossii* in coastal revegetation. Angled Pigface is widely naturalised as a result.

The provenance of species, even if they are the correct species for the site, can be an issue. Non-Victorian forms of Spiny-headed Mat-rush *Lomandra longifolia* are often seen in plantings and they perform poorly in drought conditions, affecting the reputation of indigenous plants. The provenance should be from the same or similar geology and climate. The issue of local versus non local provenance has long been debated (see Hufford & Mazer (2003) and McKay et al. (2005)). However, that debate important as it is assumes the actual species are correct for the site (site-indigenous). This article makes the point that the species themselves can be inappropriate, which is more fundamental than the provenance question.

Site preparation for planting can be damaging to existing native vegetation. Spraying and mulching can kill or smother native plants, native grasses frequently being affected. This is also likely to promote weeds. One site in southern Melbourne was heavily mulched, killing wallaby-grass, and then planted with Manna Gum *Eucalyptus vimimalis* where only Swamp Gum *Eucalyptus ovata* naturally occurs. Furthermore, seedlings were planted below the canopy of the existing trees, where they will either die or compete with the trees.

Spraying herbicide during the maintenance of plantings can damage existing indigenous species. For example in one reserve herbicide was applied around the plantings (Figure 2) apparently even where one of the plants was dead and the tree guard had fallen over. This killed areas of indigenous Weeping Grass *Microlaena stipoides*. Weeds such as Panic Veldt-grass *Ehrharta erecta* subsequently established within the bare areas, increasing the impact.

In many cases planted tubestock contains nursery weeds in the tube soil and these can be introduced into native vegetation. Common nursery weeds often found in tubestock include Glandular Willow-herb *Epilobium ciliatum*, Creeping Wood-sorrel *Oxalis corniculata* and Annual Meadow-grass *Poa annua*. Good nursery management should prevent this.

The genetic quality of propagated material may be an issue but it is poorly understood. Eucalypt seed collected from a single isolated tree is likely to have a high proportion of inbred seed. If they germinate, inbred seedlings of species with a high 'genetic load' of mutations are likely to be weak and would tend to die out in nature, but in optimal nursery conditions they may survive and be planted out. Nursery propagation can therefore bypass the early stages of the plant life cycle which are an important part of natural selection.

Natural recruitment is better than planting

Natural recruitment is preferred to planting because the result is authentic site-indigenous native vegetation that has undergone natural selection rather than an anthropogenic plantation.

Inappropriate planting related to the Native Vegetation Management Framework could be averted if the recruitment were to be obtained by natural regeneration only, which is allowable under the Framework but not usually undertaken. This would mean that the plants are site-indigenous, assuming they are not the progeny of wrong plantings themselves. However, some sites do not need additional plants, such as many grassy woodlands where there is already too much biomass due to lack of fire or grazing, and additional plants may further shade out species diversity. There are also implications for fauna as the habitat becomes more woody and overgrown. Planting is usually undertaken rather than facilitated natural recruitment, and seedlings in tree guards are now all too familiar within bushland. It is simpler and sometimes cheaper to plant rather than to manage a site over several years to facilitate recruitment. This is called 'tree guard dreaming' by botanist Geoff Carr.

When planting is appropriate

Revegetation (planting or direct seeding) on cleared land with predominantly introduced vegetation does not affect existing native vegetation, but the species should be site-indigenous. If a site is next to native vegetation, natural colonisation is preferred to planting.

Supplementary planting (or direct seeding) within native vegetation can be appropriate where there is little or no potential for natural recruitment of the species, either where (a) the species is site-extinct or (b) appropriate site management has not resulted in regeneration and the species is not waiting for a natural episodic event such as flood or fire. Alternatively there may be a land protection reason where vegetation cover is needed in the short term, for example planting site-indigenous scramblers on a slope exposed by woody weed removal.

Amenity landscape plantings of locally indigenous species are fine and appropriate around infrastructure such as buildings and carparks, but plantings within the core of a reserve should be strictly site-indigenous. A clear distinction should be made between locally indigenous species, which may occur in any plant community in the local area, and site-indigenous species, which are indigenous to the site itself.

Site-indigenous principle

Where planting is within introduced vegetation, or where planting within native vegetation is appropriate (as above), it should be site-indigenous otherwise the result is strictly horticulture rather than revegetation. Determining what is site-indigenous has two aspects:

- Firstly it is necessary to determine the natural plant community of the site. In the terminology of the state government (DSE) this is the floristic community of the ecological vegetation class (EVC). The DSE biodiversity interactive map indicates the EVCs that occur in the local area, but the mapping, whilst it is a valuable introduction, is not always accurate. Several more EVCs may be present in a local area than is indicated, and the EVC boundaries may not be correct, noting the mapping is mostly at only 1:100,000. A range of evidence may be required including observations on the existing vegetation of the

site and adjacent sites, interpretation of geology maps, and review of historical survey plans. It is important that an expert with local knowledge is consulted.

- Secondly it is necessary to determine the species composition of the plant community once it is identified. This requires knowledge of the local vegetation as there is no comprehensive guide for most of Victoria. The EVC benchmarks provided by DSE are valuable in understanding EVC vegetation but they only give a short list of some typical species. Furthermore, not every species within an EVC occurs on every site, for example Snow Gum *Eucalyptus pauciflora* has restricted occurrences within grassy woodland. Some local governments have fairly accurate EVC planting guides based on detailed analysis of vegetation data from their areas, but others have little or no such information.

Assisting migration due to climate change

Species that would ‘migrate’ across the landscape due to climate change but are unable to do so because of barriers such as extensive cleared land could be introduced to new areas. This has not been undertaken to my knowledge but may be appropriate in future.

Need for expertise

Consultants who prepare offset management plans and bushland management contractors who implement these plans require a high level of training and experience in order to produce ecologically sound plans and achieve good results on the ground. Professional development of practitioners in these areas should be encouraged and supported at all times. We should also forgive (but not forget) management mistakes, as we all make them at times.

Dealing with poor attempts at revegetation

Substantial areas of ‘revegetation’ often occur within and on the edges of reserves but many of the plantings are not the original species of the site so strictly speaking these plantings constitute horticulture and not revegetation. Many reserves are too small to accommodate horticulture and the emphasis should be on conservation and natural regeneration of the native vegetation. In these cases all planting should cease and natural recruitment should be facilitated to obtain new plants. Conservation reserves should support authentic self-sown natural vegetation and should not become gardens or anthropogenic plantations.

Inappropriate plantings and progeny of such plantings should be removed, while site-indigenous plantings and their progeny should be retained. This requires a good understanding of the distribution of each plant community within an area and species composition of each plant community. In areas where ‘revegetation’ has taken place a review of the revegetation should be undertaken. The political sensitivity of this issue is acknowledged as there may be people who have worked hard with good intentions but whose work has been counterproductive to conservation due to limited knowledge of the vegetation. These people should participate in reviews and in any corrective actions if possible.

Conclusion

Native vegetation is too valuable to be subject to inappropriate planting and maintenance of plantings. Every site is unique in terms of its intrinsic site characteristics (geology, climate, aspect, slope, drainage etc) and its site history (disturbance, colonisation events etc) and consequently in terms of its species composition and should be treated accordingly.

Facilitated natural recruitment is the preferred means of obtaining new plants, with planting a last resort that needs careful consideration. Vegetation management should be based on good knowledge of local vegetation and its requirements in order to ensure its ecological integrity.

Patches of remnant native vegetation may be regarded as local ecological masterpieces of nature. Just as we would not allow unsupervised people into the art gallery to restore the collection with polyfilla and dulux, we should not allow botched attempts at bushland restoration. A scientific and informed approach to vegetation management is called for, based on weeding, facilitated natural regeneration and appropriate supplementary planting.

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References

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Figures



Figure 1. Messmate Stringybark planted where it does not naturally occur.



Figure 2. Sprayed now dead indigenous Weeping Grass around a planting.