

# Conservation Management Notes

Managing bushland and wildlife habitat

## Revegetation

This note looks at ways of reconstructing native vegetation and habitat through planting, direct seeding, brush matting and transplanting.

When native vegetation is highly degraded or has been totally cleared so that natural regeneration is no longer possible, revegetation is necessary to reinstate native vegetation and habitat.

The choice of method will depend on the size and nature of the site, the time and money available, and the purpose of the revegetation. The most commonly used methods are planting and direct seeding. Additional methods for small areas include broadcasting seed by hand, brush matting, transferring leaf litter or plugs of topsoil and transplanting.

Advice from someone with local experience is valuable, as it can take trial and error to work out the most effective methods for each site. Revegetation can be costly in both time and money if the work is not planned and implemented well.



Tubestock protected by tree guards, planted to form a buffer around an area of regenerating forest. Photo: V Bear

### Locating and designing revegetation

Wildlife will benefit from any revegetation that increases the total area of habitat on a property, but it will have particular strategic value if it is designed to:

- create buffer zones around native vegetation to protect it from edge effects (include an expansion zone of at least 20 metres between native vegetation and planting to allow for natural regeneration)
- create buffer zones around waterways and wetlands to protect the banks and enhance habitat
- create corridors that link two or more areas of native vegetation
- increase the size of patches of existing native vegetation
- replace lost or underrepresented habitat types (it is best to have at least some native vegetation on all the different landscapes on the property or in the local area, such as river flats, hillsides, and ridgetops)
- control dryland salinity (and therefore protect native vegetation) by lowering water tables

With good planning, re-establishment of native vegetation can meet nature conservation objectives and address property management issues at the same time.

#### **Plant a shelterbelt**

*On a farm, revegetation is particularly beneficial when it creates shade and shelter for stock, pasture and crops. Corridors and shelterbelts that run north-south provide both morning and afternoon shade. Shelter from prevailing winds is best provided by locating corridors and shelterbelts at right angles to the prevailing wind.*

#### **Choosing species**

Species selection is critical for plant survival as well as for maximising the ecological value of the project. Part of the value of each bushland area is in its unique character, and this should be maintained by using plants that occur there naturally and are of local provenance (i.e. are found in the local area). An individual property may have, or once have had, a range of different bushland types in different environments, such as sheltered gullies, exposed ridges, low lying moist areas. Salt tolerant species will need to be considered for areas that have become unnaturally saline.

A range of understorey and ground cover species — not just trees — should be planted. To determine appropriate species, find an area of native vegetation in the vicinity which is in good condition, on land with similar soil type, landform and position, and note the

species present. If the area has been extensively cleared, vegetation remnants on roadsides or stock routes can be extremely useful.

When re-establishing native vegetation, it is important to provide the food and structural resources that are used by local fauna, such as shrub and ground layers, nectar and fruit producing plants, and trees that eventually produce hollows or have particular bark types.

### *Speed up habitat creation*

If logs and fallen timber need to be moved from somewhere else, they will be of great value if placed in a revegetation area.

Tree hollows may take 100 years to form — consider introducing nest boxes.

## Obtaining plants

Appropriate plant stock and seed for restoring bushland are rarely available off the shelf. This can be frustrating for people accustomed to planting for landscaping or gardening, but restoring local ecosystems has different aims, and its own rewards.

- some local councils, landcare groups and Greening Australia run nurseries specialising in indigenous plants, have seedbanks and may provide advice — in some locations there are specialist commercial nurseries which propagate local species and provide advice
- many landholders do their own seed collection (often from their own property) and plant propagation
- commercial nurseries sometimes keep stocks of local plants, or may be able to collect seed and grow the plants required, or grow from seed collected by landholders.

## Structure, order and timing

In nature, plants are not evenly spaced, but grow in groups or random patterns. Where possible this should be replicated in planting. Groundcovers do best if planted close together, trees may be more widely separated.

Depending on plant availability and weed control needs, it may be best to plant all layers at once, or to let either trees or shrubs and groundcovers establish first.

Weed control and watering are critical while the plants are establishing — planting may need to be done in stages so that maintenance is manageable.

Where possible, time planting to take advantage of the best climatic conditions, mild weather and rainfall.

In grassy woodlands, the best results are often gained from scalping the weedy topsoil then revegetating the ground stratum first, so that these species proliferate well before being shaded out by shrubs and trees. However this should only be done where there is no risk of soil erosion.

## Preparation and maintenance

Preparation and maintenance are usually critical for revegetation success, so it is worth investing time and resources to get it right.

**Weeds.** Weed competition is one of the most serious threats to planting success. Depending on the type of weed growth expected, management prior to planting might include:

- scalping off the top 10 centimetres of weedy topsoil before planting (where there will be no soil erosion)
- weed removal by light cultivation, hand pulling, digging before planting and or during the first few years
- multiple herbicide applications before planting or seeding, spaced a few weeks or months apart, to completely exhaust the weed seedbank
- mulch or weed mat around all seedlings, generally after initial weed control (will also help with moisture retention) — local bush leaf litter is an excellent mulch with added benefits (see below).

**Water.** Seedlings need moist soil to establish in, so sufficient rainfall or watering prior to planting or seeding and during the first few months is critical.

**Grazing.** Fencing, tree guards and / or rabbit control may be needed. Grazing or browsing animals, including native grazing species, should be excluded from new revegetation for at least two years.

**Soil compaction.** The site may need to be machine ripped or, on a small scale, dug over with hand tools.

**Erosion.** Steep slopes and actively eroding areas may need soil stabilisation prior to planting.

## Planting

Planting nursery-raised tubestock or seedlings is one of the most commonly used revegetation methods. Good site preparation is essential. Tubestock should be planted well into the soil. In some cases planting will be more successful when part of the stem and lower leaves are buried.

Specially designed tools such as the Hamilton Tree Planter make the job much quicker when planting by hand in soft ground. Mechanical tree planters become cost effective for plantings of over 5000 seedlings, but they are unsuitable for steep or rocky ground. With two operators, they allow up to 5000 seedlings a day to be planted.



Planting lomandra and native rosemary as tubestock to reinstate native habitat on an exposed coastal site. Invasive kikuyu has been treated with herbicide. Photo: OEH/Stuart Cohen

## Direct seeding

Direct seeding is a widely used technique, and is particularly useful for large areas. A mix of native seed is sown by a mechanical seeder towed behind a ute, tractor or 4WD vehicle, which may also scalp the soil, sow at a preset depth and cover the seed with soil.

It generally results in a more irregular, and therefore natural looking, arrangement of plants. No plant propagation is required but it does require large amounts of seed, and germination rates vary.

For small areas where weed competition is not a problem, seed can be broadcast directly onto prepared ground by hand and then raked or otherwise integrated lightly to ensure good soil/seed contact.

## Brush matting

Branches of trees and shrubs such as hakeas or casuarinas laden with woody fruits can be lopped from another site and laid directly on the revegetation site. The seed-laden brush not only introduces seeds for regeneration, but can also act as a soil protection layer. By slowing overland water flow, water can infiltrate the soil and provide ideal conditions for germination. Wind blown seed from other species can also collect in the brush and germinate. It may also deter unwanted visitors from trampling or degrading the site in high use areas. On steeper sites, sand dunes or windy sites, brush can be pegged with branchlet forks.

This is likely to be effective only for small areas. The seed must be ripe, and the ground surface of the revegetation site is suitable as a seedbed (e.g. not compacted or weedy).

Disturbance to the source site should be kept to a minimum, and branches should only be collected if they are plentiful.

## Transferring leaf litter

Leaf litter and topsoil can contain a huge diversity of native seed as well as fungi, bacteria and other small organisms that are a vital part of the bush ecology. If there is a source site that is weed-free, and on land similar to and close to the revegetation site, leaf litter transfer can be an effective revegetation method for small sites, particularly for understorey and ground cover species. However, it is important to take only small quantities to minimise disturbance to the source site. It is best to collect litter in areas under native shrubs or ground covers that have recently seeded, although it is still worthwhile collecting at any time, as seed could well be present from previous seasons.

The method may be useful where there is a need to reduce fuel loads, or where it is known that a part of the source site is soon to be severely disturbed.

*Take care not to disperse infectious diseases if transferring soil: check that the plants at the site are not showing symptoms of poor health, such as dieback.*

## Transplanting

When natural recruitment of shrub or tree seedlings is at very high densities, it may be feasible to transplant some of them if conditions (such as soil moisture) are suitable. This method is particularly useful for water plants, plants growing in moist areas, and ground covers that have rhizomes, taproots or tubers. Transplant only when conditions are favourable (such as moist soil or cool weather). Where appropriate, transplanting can involve translocating some topsoil with the plants, which is an additional way of reintroducing other species that may be in the topsoil of the donor site.

It may be necessary to reduce water loss from the transplants by pruning some lower, older leaves from shrubs and trees, or cutting foliage from grasses, forbs and herbs. Ensure leaves remain at the growing tips for the plant to function. With ground covers, try to leave some foliage emerging from new shoots, but remove some of the larger, older leaves. Tussock grasses, however, can be cut back hard, and this can reduce transplanting shock. Like any plantings, transplants benefit from watering in.

### Do you even need to plant?

*When planning restoration works it is important to have a good understanding of the type and condition of natural areas on the property and consider:*

- *it is cheaper and easier to protect healthy sites than it is to regenerate degraded sites*
- *it is cheaper and easier to regenerate degraded sites than it is to revegetate totally cleared land*
- *where possible, only revegetate cleared land after all healthy sites are protected and degraded sites are regenerating.*

*Planting should be avoided where natural regeneration is possible.*

## Useful references

Related Conservation Management Notes:

- Restoring native vegetation: regenerate or revegetate?
- Natural regeneration
- Wildlife corridors

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