Weed control

Experienced treeplanters often say that the three most important stages in a revegetation project are 'Weed control, weed control, weed control...'. Of course there are other important tasks, but weed control is surely one of the most vital! It is important to achieve good weed control in the 1m^2 around each seedling. However the amount of ground disturbance should be kept to a minimum as open ground is an invitation to fresh weed establishment. Therefore spot spraying of 1m^2 plots is more advantageous than spraying a continuous 1m strip, though the former approach is more time consuming. Care should also be taken not to damage any existing native grasses and herbaceous plants in the area. Weed control may include a range of methods, including grazing to reduce weed seed set, cultivating and mulching. Usually, however, herbicides will be used at some stage to reduce weed competition prior to planting or sowing due to their effectiveness and low labour requirement. Many landholders will feel some resistance to the use of herbicides on environmental grounds, however one needs to balance any negatives against the vast tracts of vegetation establishment that, in practical terms, are only possible due to the strategic use of herbicides.

For seedling establishment, the first application of herbicide should occur in the spring prior to planting, with a follow up application a couple of weeks before planting. For direct seeding, weed control is even more vital as the tiny emerging seedlings are so easily outcompeted by more vigorous weed species. Two herbicide controls are considered a minimum, and a third control 6-12 weeks after the second control (and just before seeding) is advisable. If woody weeds are present (for example blackberries, boxthorn or gorse), particular herbicides will need to be used which take several months to take effect, and this will need to be factored into your planning schedule. The exact choice of herbicide will depend on the weeds present, and should be discussed with your local farm supplies retailer.

Effective pest plant and animal control is an essential part of preparation.

Pest animal control

Pest animal control, where necessary, should occur some months before planting. In heavily rabbit infested areas, a reduction in rabbit numbers must be achieved prior to planting. This is usually done using a combination of destruction of harbour (boxthorn, gorse), shooting, baiting, fumigating and warren ripping. Individual plants are then protected using rabbit guards. In areas with fewer rabbits, guarding alone may provide sufficient protection. In some instances guarding may not be necessary, particularly in higher rainfall areas where alternative food sources may exist for the rabbits in the form of lush pastures. Rabbit guarding is an expensive and labour intensive part of your project, and consideration needs to be given to its' benefits. When establishing seedlings, guards not only protect plants from rabbits, they also serve an important role in reducing stress from high winds and are therefore useful on exposed sites. Direct seeded areas cannot be cost effectively guarded making comprehensive rabbit control essential.

Native animals such as kangaroos and wallabies can sometimes be a problem during revegetation establishment, however the destruction of native wildlife is prohibited without a permit. Exclusion fencing may be necessary if the problem is severe, however this is an expensive option. Wallabies can be deterred with the use of a spray on product, WR-1, however this needs to be re-applied every 6-8 weeks during establishment. Various insects, including red-legged earth mite, slugs and snails can impede plant establishment, and may require control both before and during seeding or planting.

Fencing

The need to fence out areas under revegetation needs to be carefully considered due to the high costs involved. Consideration of proposed future land use and layout will help ensure that any new fences are located to best effect.

Some of the factors to consider with regard to fencing and tree planting are listed below:

- smaller shrubs and understorey plants will always require protection from stock
- larger shrubs and trees will need protection from stock for the first 5-6 years, possibly longer in slower-growing conditions
- In a farm forestry plot, most trees will require protection for at least 5-10 years
- stock will generally inflict less damage if an area is 'crash-grazed' for a few days at a time, rather than being constantly stocked with fewer animals
- if windbreaks are exposed to stock, the lower branches will be stripped of foliage, reducing the windbreak effect
- Consider whether a larger block planting would remove the need for additional fencing
- Consider the use of electric fencing for cost-effective, reusable protection.

Austrodanthonia duttoniana | Carex appressa | Lepidosperma laterale *var. majus* | Lepidosperma laterale | Lomandra longifolia | Lomandra longifolia

Ripping and mounding

On clay soils and compacted soils, deep ripping is advisable to aerate the soil, assist in moisture penetration and to assist root growth. Ripping should occur on dryish soils during summer or just after the autumn break, the aim being to achieve a 'shatter' of the soil. Do not rip wet soils as this will result in a 'slicing' rather than 'shattering' effect. Driving a tractor tyre over the ripped line will assist in breaking up large clods and reconsolidating the soil to avoid large air pockets. A winged ripper should be used to a depth of 30-60cm.

In poorly drained soils, mounding will improve drainage and provide a greater depth of topsoil for the establishing seedling. This will improve establishment and growth rates, however mounding is expensive and may only be feasible in farm forestry projects where there is an expectation of a direct monetary return.

Planting

Good planting technique helps to get your plants off to a good start. The main points to observe are as follows:

- Water plants thoroughly the night before planting
- Loosen soil in an area slightly larger than the pot to provide a friable soil bed for the seedling
- Remove the plant from the pot by tapping the edge of the pot on a hard surface (your boot, or a rock, for example). Do not pull the plant out by the stem
- Ensure the stem is planted to the same depth as in the pot (i.e. don't bury the stem, and don't leave roots exposed)
- Ensure good contact between the plant root ball and the surrounding soil (i.e. break up large clods of earth and gently 'firm-in' the plant to avoid large air pockets underground which have a drying effect).

Ripping improves moisture penetration and soil tilth, mounding improves drainage and topsoil depth.

Watering

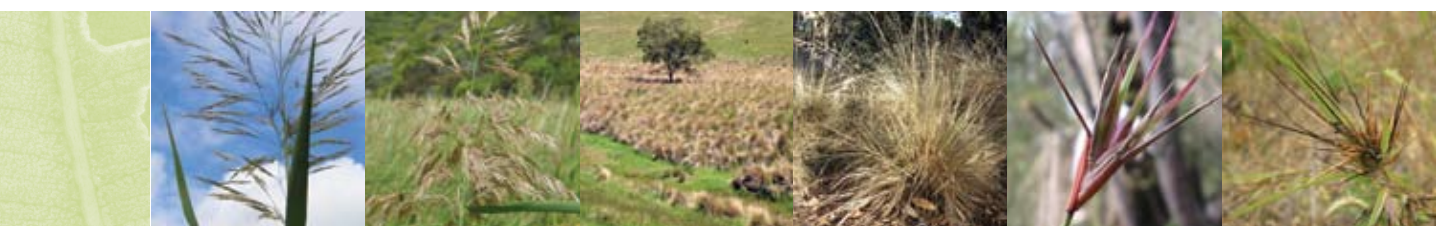
Ideally, seedlings should be watered (or rained upon) within one day of planting. The primary purpose of this watering is to reconsolidate the soil around the seedling, removing large air pockets in the root zone which will otherwise contribute to ongoing root drying. A secondary purpose is to reduce transplant shock by ensuring the plant has adequate moisture for the first few days post-planting. In some cases, this initial watering is not possible, in which case extra care should be taken to ensure that plants are well watered the night before planting. Extra care should also be taken to manually break down large clods of earth in contact with the root ball and adequately 'firm in' each seedling at planting time. Subsequent watering should not be necessary to the survival of indigenous plants, provided they are planted at the correct time of year and assuming that drought conditions are not prevalent. On smaller scale projects, however, a landholder may wish to water two or three times in the first summer to increase survival rates and speed growth.

Don't just walk away: the importance of ongoing maintenance

It will be a very long time before a revegetated area can fully look after itself. With a history of site disturbance due to farming activities, and the disturbance which occurs during revegetation, weed control will be necessary for some years. The site will probably not be grazed for several years following planting, and during this time weeds will flourish if given the opportunity. For this reason, revegetation is often done in lines to allow for slashing for both weed control and fire prevention.

Maintain regular surveillance of your site, checking to ensure that rabbit populations are not causing excessive damage, that tree guards and fences are in place, and that additional watering is not required. Monitor plant losses so that you can plan for any follow up plantings which may be necessary in the following season.

Farm forestry plantations require significant additional maintenance in the form of thinning and pruning over several years. Additional information should be sought regarding the appropriate maintenance of farm forestry sites.



Phragmites australis | Phragmites australis | Poa labillardierii | Poa sieberiana | Tetrarrhena juncea | Themeda triandra

Species Selection

This section will assist you in choosing the correct indigenous plant species for your site. Firstly, you will need to determine which Native Vegetation Group(s) (NVG(s)) originally occurred on your project site, then you can use the species selection list to choose species belonging to those NVG(s).

A Word of Explanation: Ecological Vegetation Classes and Native Vegetation Groups

Ecological Vegetation Classes (EVCs) are a classification system for the many different types of vegetation found in Victoria. Areas of vegetation belonging to the same EVC will be similar in several ways:

- Vegetation structure (i.e. the way that trees, shrubs, grasses and herbs are distributed and combined in the landscape)
- Position in the landscape (e.g. plains, foothills, slope etc.)
- Occurrence in the landscape in terms of geology, soil type, aspect
- Floristics (i.e. the number, distribution and relationships of plant species).

Each EVC includes a collection of floristic communities (i.e. groups based on co-occurring plant species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating. Approximately 300 EVCs have been described for Victoria. For simplicity, these have been grouped into just 20 Native Vegetation Groups (NVGs). Detailed information regarding EVCs and related matters is available from DSE (see Resources and Contacts Guide, page 56).

There are 35 EVCs within the Shire of Moorabool, grouped into just 14 Native Vegetation Groups. The species list in this booklet is grouped into these NVGs, because the quality of vegetation mapping currently available in the Moorabool Shire area is insufficient to accurately define the locations of individual EVCs.

This guide will enable you to determine the NVG(s) which originally occurred on your site, and to compile a species list which includes typical species from these NVG(s).

The Shire of Moorabool covers many different vegetation types which are classified into some 35 different EVCs.

How to select the right species for your land

Step 1 >

Try to build a picture of the kind of remnant vegetation which originally occurred on your land: talk to neighbours, DPI and Local Government staff (see Resources and Contacts Guide on page 56). Look at local vegetation remnants which occur on similar soils and topography to your site and try to assess the 'percentage cover' of trees, shrubs and groundcovers. Find out what the most common species were.

Step 2 >

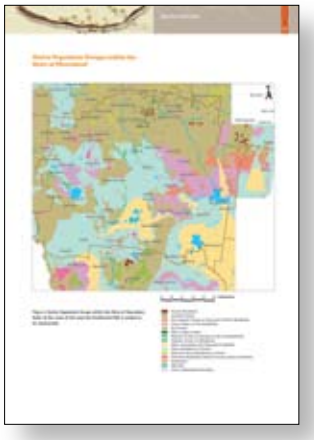
Using your knowledge from Step 1 and the Catchment Descriptor on page 28, choose which section of the catchment you are in.

Step 3 >

Select the Native Vegetation Group(s) which most correspond to your situation (pages 29-36).

Step 4 >

Use the NVG Map on page 37 to verify your NVG selection. Note that the NVG map is based on modelling of limited accuracy and should be used for indicative purposes only.



Step 5 >

Finally, use the Indigenous Species Selection List on pages 38-55 to select species suitable to your NVG, topography and project needs.

Catchment Description Chart

Which part of the Werribee River or Moorabool River catchment are you in?

Upper Reaches

- Swift flowing streams and rivers — Go to page 29
- Protected upper slopes, moist gullies and steep valleys — Go to page 29
- Dry slopes and ridges — Go to page 30

Mid Catchment

- Valleys and gentle slopes — Go to page 31
- Streamsides — Go to page 32
- Dry slopes and ridges — Go to page 33

Lower Reaches

- Valleys and gentle slopes — Go to page 34
- Streamsides — Go to page 35
- Plains above flood level — Go to page 36

Upper Reaches: Swift Flowing Streams and Rivers

Your site is likely to be in the following Native Vegetation Group:

Riparian Forests or Woodlands

Includes Riparian Forest EVC.

Upper Reaches: Protected Upper Slopes, Moist Gullies and Steep Valleys

Your site is likely to be in one or more of the following Native Vegetation Groups:

Herb-rich Woodlands-Alluvial Terraces and/or Creeklines

Includes Creekline Herb-rich Woodland EVC.

Dry Forests

Includes Herb-rich Foothill Forest, Shrubby Foothill Forest, Valley Grassy Forest EVCs.

Heathlands

Includes Wet Heathland EVC.

Wetlands

Includes Sedge Wetlands EVC.

Upper Reaches: Dry Slopes and Ridges

Your site is likely to be in one or more of the following Native Vegetation Groups:

Box Ironbark Forests or Dry/Lower Fertility Woodlands

Includes Box Ironbark Forest and Rocky Chenopod Woodland EVCs.

Dry Forests

Includes Heathy Dry Forest, Shrubby Dry Forest, Grassy Dry Forest EVCs.

Heathy Woodlands

Includes Heathy Woodland EVC.

Plains Woodlands or Forests

Includes Plains Woodland EVC.

Mid-Catchment: Valleys and Gentle Slopes

Your site is likely to be in one or more of the following Native Vegetation Groups:

Herb-rich Woodlands- Alluvial Terraces and/or Creeklines

Includes Damp Sands Herb-rich Woodland EVC.

Dry Forests

Includes Herb-rich Foothill Forest, Shrubby Foothill Forest, Valley Grassy Forest, Grassy Forest EVCs.

Lower Slopes or Hills Woodlands

Includes Grassy Woodland EVC.

Lowland Forests

Includes Lowland Forest EVC.

Plains Woodlands or Forests

Includes Plains Grassy Woodland EVC.

Wetlands

Includes Red Gum Swamp EVC.

Mid-Catchment: Streamsides

Your site is likely to be in one or more of the following Native Vegetation Groups:

Herb-rich Woodlands-Alluvial Terraces and/or Creeklines

Includes Creekline Herb-rich Woodland EVC.

Plains Woodlands or Forests

Includes Escarpment Shrubland EVC.

Riparian Scrubs or Swampy Scrubs and Woodlands

Includes Swamp Scrub, Swampy Riparian Woodland, Stream-bank Shrubland EVCs.

Riverine Grassy Woodlands or Forests

Includes Sedgy Riparian Woodland EVC.

Mid-Catchment: Dry Slopes and Ridges

Your site is likely to be in one or more of the following Native Vegetation Groups:

Box Ironbark Forest or Dry/Lower Fertility Woodlands

Includes Box Ironbark Forest and Rocky Chenopod Woodland EVCs.

Dry Forests

Includes Heathy Dry Forest, Grassy Dry Forest, Shrubby Dry Forest EVCs.

Heathy Woodlands

Includes Heathy Woodland EVC.

Plains Woodlands or Forests

Includes Plains Woodland EVC.

Lower Reaches: Valleys and Gentle Slopes

Your site is likely to be in one or more of the following Native Vegetation Groups:

Plains Grasslands and Chenopod Scrublands

Includes Plains Grassland EVC.

Plains Woodlands or Forests

Includes Plains Grassy Woodland, Escarpment Shrubland, and Plains Woodland EVCs.

Wetlands

Includes Red Gum Swamp EVC.

Lower Slopes or Hills Woodlands

Includes Grassy Woodland and Lowland Forests EVCs.

Herb-rich Woodlands- Alluvial Terraces and/or Creeklines

Includes Damp Sands Herb-rich Woodland EVC.

Dry Forests

Includes Grassy Dry Forest, Herb-rich Foothill Forest, Shrubby Foothill Forest, Valley Grassy Forest EVCs.

Lower Reaches: Streamsides

Your site is likely to be in one or more of the following Native Vegetation Groups:

Herb-rich Woodlands-Alluvial Terraces and/or Creeklines

Includes Alluvial Terraces Herb-rich Woodland, Creekline Herb-rich Woodland, Damp Sands Herb-rich Woodland EVCs.

Plains Woodlands or Forests

Includes Plains Grassy Woodland, Escarpment Shrubland and Plains Woodland EVCs.

Riparian Scrubs or Swampy Scrubs and Woodlands

Includes Swamp Scrub, Streambank Shrubland, Swampy Riparian Woodland EVCs.

Riparian Forest or Woodlands

Includes Swampy Woodland and Riparian Forest EVCs.

Riverine Grassy Woodlands or Forests

Includes Creekline Grassy Woodland and Sedgy Riparian Woodland EVCs.

Lower Reaches: Plains Above Flood level

Your site is likely to be in one or more of the following Native Vegetation Groups:

Plains Grasslands and Chenopod Scrublands

Includes Plains Grassland EVC.

Plains Woodlands or Forests

Includes Plains Grassy Woodland, Escarpment Shrubland, and Plains Woodland EVCs.

Wetlands

Includes Lignum Swamp, Plains Grassy Wetland, Sedge Wetland, Sedge-rich Wetland, Cane Grass Wetland, Red Gum Swamp, Plains Sedgy Wetland, Aquatic Herbland, Spike-Sedge Wetland EVCs.

Native Vegetation Groups within the Shire of Moorabool

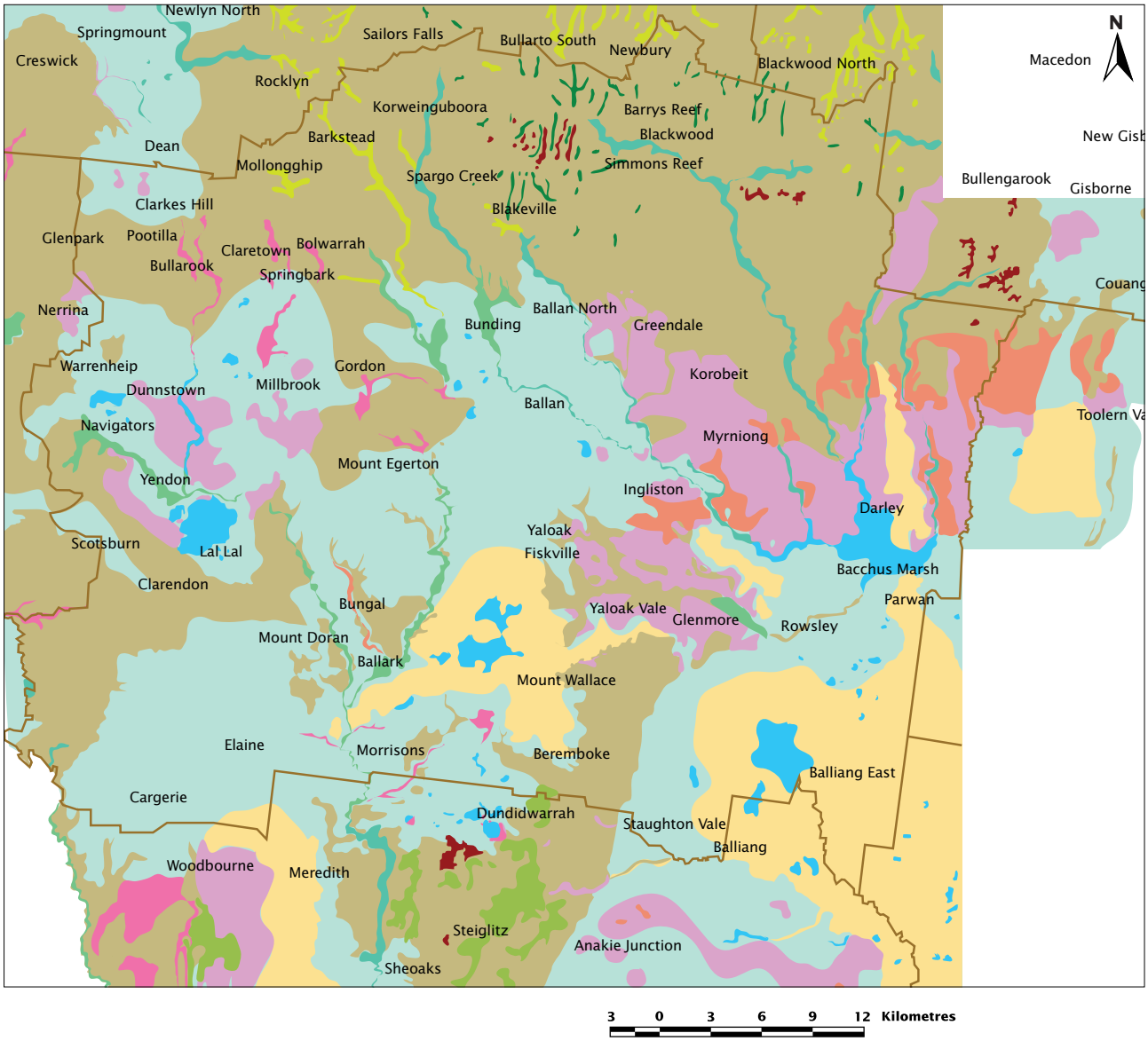


Figure 4 Native Vegetation Groups within the Shire of Moorabool. Note: At the scale of this map the Heathlands NVG is unable to be represented.

Indigenous Species Selection List

Trees and Tall Shrubs	Common Name	Height	Width	Native Vegetation Group								
				Heathy Woodlands	Lowland Forests	Box Ironbark Forests or Dry/Lower Fertility Woodlands	Lower Slopes or Hills Woodlands	Dry Forests	Wet or Damp Forests	Riparian Scrubs or Swampy Scrubs and Woodlands	Riparian Forests or Woodlands	Plains Grasslands and Chenopod Scrublands
Acacia dealbata	**Silver Wattle**	**> 15m**	**> 6m**		■		■	■	■	■	■	
Acacia implexa	**Lightwood**	**8-15m**	**4-6m**			■	■	■				
Acacia mearnsii	**Black Wattle**	**8-15m**	**> 6m**	■	■		■	■		■		
Acacia melanoxylon	**Blackwood**	**> 15m**	**> 6m**	■	■		■	■	■	■	■	
Acacia mucronata subsp. longifolia	**Narrow-leaf Wattle**	**3-6m**	**2-4m**	■	■				■	■	■	
Acacia pycnantha	**Golden Wattle**	**3-6m**	**2-4m**	■	■	■	■	■				
Acacia verniciflua (Bacchus Marsh variant)	**Varnish Wattle**	**1-3m**	**1-2m**	■	■	■	■	■				
Allocasuarina littoralis	**Black Sheoak**	**6-8m**	**2-4m**	■	■		■	■	■			
Allocasuarina luehmannii	**Buloke**	**8-15m**	**> 6m**									■
Allocasuarina verticillata	**Drooping Sheoak**	**6-8m**	**4-6m**				■					
Bursaria spinosa subsp. spinosa	**Sweet Bursaria**	**3-6m**	**2-4m**	■	■	■	■	■	■	■	■	
Eucalyptus aromaphloia	**Scentbark**	**> 15m**	**> 6m**	■	■			■				
Eucalyptus baueriana	**Blue Box**	**> 15m**	**> 6m**		■							

	Plains Grassy Woodlands or Forests	Riverine Grassy Woodlands or Forests	Herb-Rich Woodlands	Heathlands	Wetlands	Tolerances, Preferences, Uses, Seed Collection and Establishment	Topography: Hilly country, open plains, various aspects	Open plains and foothills	Sheltered	Predominantly southern aspect	Aspect and exposure variable
		■				Frost tolerant, prefers open to shady position, dry to moist soils. Collect seed in January. Establish via direct seeding or seedlings. Useful for shelter, erosion control on streamsides and valleys, honey production, butterfly and moth habitat.	■				
	■					Drought and frost tolerant, prefers full sun, dry to waterlogged soils. Collect seed late January-early February. Establish via direct seeding or seedlings. Useful for shelter, erosion control on hillsides, plains and drier sites, butterfly and moth habitat.		■			
	■	■	■			Drought and frost tolerant, adapts to wide range of conditions. Collect seed January-early February. Establish via direct seeding or seedlings. Useful for shelter, erosion control on hillsides, plains and drier sites, honey production.	■				
	■	■	■			Adapts to a wide range of conditions. Collect seed late January-February. Establish via direct seeding or seedlings. Useful for shelter, general erosion control, timber production, butterfly and moth habitat.	■				
						Frost sensitive, prefers half sun to shade, dry to waterlogged soils. Collect seed January-February. Establish via seedlings. Useful for shelter, erosion control on streamsides and valleys.	■				
	■		■			Frost sensitive when young, adapts to a wide range of conditions. Collect seed in January. Establish via direct seeding or seedlings. Useful for shelter, erosion control on hillsides, plains and drier sites, honey production, butterfly and moth habitat.		■			
						Drought and frost tolerant, prefers full sun and dry to moist soils. Collect seed late December-January. Establish via direct seeding or seedlings. Useful for shelter, erosion control on hillsides, plains and drier sites.			■		
						Drought and frost tolerant, prefers full sun, dry to moist soils. Collect seed January-December. Establish via direct seeding or seedlings. Useful for shelter, general erosion control.				■	
	■					Drought and frost tolerant, prefers full sun, dry to moist soils. Collect seed March-early April. Establish via direct seeding or seedlings. Useful for shelter, erosion control on streamsides and valleys.		■			
	■					Drought and frost tolerant, prefers full sun, drier soils. Collect seed January-December. Establish via direct seeding or seedlings. Useful for shelter, erosion control on hillsides, plains and drier sites.					■
	■		■			Drought and frost tolerant, mildly salt tolerant, prefers half sun to shade, dry to moist soils. Collect seed April-early May. Establish via seedlings. Useful for shelter, erosion control on streamsides and valleys, honey production, butterfly and moth habitat.					■
						Drought and frost tolerant, prefers full sun, dry to moist soils. Collect seed January-December. Establish via direct seeding or seedlings. Useful for shelter, general erosion control.				■	
						Drought and frost tolerant, prefers full sun, dry to moist soils. Collect seed January-December. Establish via direct seeding or seedlings. Useful for honey production, shelter, erosion control on hillsides, plains, drier sites.				■	

Indigenous Species Selection List

Trees and Tall Shrubs	Common Name	Height	Width	Native Vegetation Group								
				Heathy Woodlands	Lowland Forests	Box Ironbark Forests or Dry/Lower Fertility Woodlands	Lower Slopes or Hills Woodlands	Dry Forests	Wet or Damp Forests	Riparian Scrubs or Swampy Scrubs and Woodlands	Riparian Forests or Woodlands	Plains Grasslands and Chenopod Scrublands
Eucalyptus baxteri	**Brown Stringybark**	**> 15m**	**> 6m**	■	■			■	■			
Eucalyptus behriana	**Bull Mallee**	**8-15m**	**> 6m**			■						
Eucalyptus camaldulensis	**River Red-gum**	**> 15m**	**> 6m**	■			■			■	■	
Eucalyptus cypellocarpa	**Mountain Grey-gum**	**> 15m**	**> 6m**		■			■	■		■	
Eucalyptus dives	**Broad-leaved Peppermint**	**> 15m**	**> 6m**	■				■	■			
Eucalyptus globulus subsp. pseudoglobulus	**Gippsland Blue-gum**	**> 15m**	**> 6m**					■	■		■	
Eucalyptus goniocalyx s.l.	**Longleaf Box**	**> 15m**	**> 6m**	■	■	■	■	■				
Eucalyptus leucoxylon subsp. connata	**Melbourne Yellow-gum**	**> 15m**	**> 6m**									
Eucalyptus macrorhyncha	**Red Stringybark**	**> 15m**	**> 6m**	■		■		■	■			
Eucalyptus melliodora	**Yellow Box**	**> 15m**	**> 6m**			■	■	■				
Eucalyptus microcarpa	**Grey Box**	**> 15m**	**> 6m**	■		■	■					
Eucalyptus obliqua	**Messmate Stringybark**	**> 15m**	**> 6m**	■	■			■	■		■	
Eucalyptus ovata var. ovata	**Swamp Gum**	**> 15m**	**> 6m**				■					