

NATIVE SEED COLLECTION & PLANTING GUIDE

KYEAMBA VALLEY AND SURROUNDS

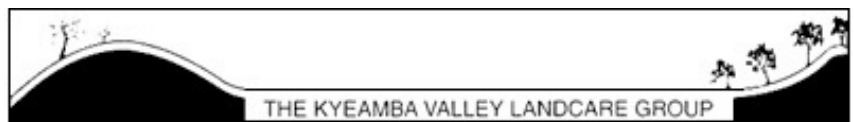


Collecting and germinating local seed is a great way to grow plants for revegetation. It is also a rewarding and enjoyable activity!

The information in this guide will give you some tips to get started. For further information, contact Kyeamba Valley Landcare Group to find out how you can get involved in the group's seed collection and propagation activities.



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NATIVE VEGETATION COMMUNITIES

Higher slopes and ridgelines: Tumbledown Gum and White Cypress Pine woodland

Trees

- *Allocasuarina verticillata* (Drooping Sheoak)
- *Callitris glaucophylla* (White Cypress Pine)
- *Eucalyptus albens* (White Box)
- *Eucalyptus dealbata* (Tumbledown Gum)
- *Eucalyptus goniocalyx* (Long-leaf Box)
- *Eucalyptus macrorhyncha* (Red Stringybark)
- *Eucalyptus polyanthemos* (Red Box)

Mid to upper slopes: White Box woodland

Trees

- *Acacia doratoxylon* (Currawang)
- *Acacia implexa* (Hickory Wattle)
- *Allocasuarina verticillata* (Drooping Sheoak)
- *Brachychiton populneus* (Kurrajong)
- *Callitris glaucophylla* (White Cypress Pine)
- *Eucalyptus albens* (White Box)
- *Eucalyptus blakelyi* (Blakely's Red Gum)
- *Eucalyptus melliodora* (Yellow Box)
- *Eucalyptus polyanthemos* (Red Box)
- *Eucalyptus sideroxylon* (Red Ironbark)

Shrubs

- *Acacia buxifolia* (Box-Leaf Wattle)
- *Acacia deanei* (Deane's Wattle)
- *Acacia decora* (Western Silver Wattle)

Shrubs

- *Acacia decora* (Western Silver Wattle)
- *Acacia genistifolia* (Spreading Wattle)
- *Acacia langera* (Woolly Wattle)
- *Indigofera australis* (Austral Indigo)
- *Pultenaea foilosa* (Bush Pea)

Groundcovers and Grasses

- *Burchardia umbellata* (Milkmaids)
- *Cheilanthes sieberi* (Rock Fern)
- *Hardenbergia violacea* (Purple Coral Pea)
- *Hibbertia obtusifolia* (Grey Guinea Flower)
- *Stypanandra glauca* (Nodding Blue Lily)

Shrubs (cont'd)

- *Acacia paradoxa* (Kangaroo Thorn)
- *Acacia pycnantha* (Golden Wattle)
- *Acacia verniciflua* (Varnish Wattle)
- *Bursaria spinosa* (Sweet Bursaria)
- *Daviesia leptophylla* (Slender Bitter-Pea)
- *Pultenaea foliosa* (Bush Pea)

Groundcovers and Grasses

- *Chelianthes sieberi* (Rock Fern)
- *Dianella longifolia* (Smooth Flax-Lily)
- *Dianella revoluta* (Spreading Flax-Lily)
- *Einadia nutans* (Climbing Saltbush)
- *Glycine canescens* (Silky Glycine)
- *Hardenbergia violacea* (Purple Coral Pea)
- *Lomandra multiflora* (Many-Flowered Mat Rush)
- *Vittadinia cuneata* (Fuzzweed)
- *Wahlenbergia stricta* (Bluebell)
- *Xerochrysum viscosum* (Sticky Everlasting)

Lower to mid slopes: Yellow Box and Blakely's Red Gum woodland

Trees

- *Acacia implexa* (Hickory Wattle)
- *Allocasuarina verticillata* (Drooping Sheoak)
- *Brachychiton populneus* (Kurrajong)
- *Callitris endlicheri* (Black Cypress Pine)
- *Callitris glaucophylla* (White Cypress Pine)
- *Eucalyptus albens* (White Box)
- *Eucalyptus blakelyi* (Blakely's Red Gum)
- *Eucalyptus bridgesiana* (Apple Box)
- *Eucalyptus macrorhyncha* (Red Stringybark)
- *Eucalyptus melliodora* (Yellow Box)
- *Eucalyptus microcarpa* (Grey Box)
- *Eucalyptus polyanthemos* (Red Box)

Shrubs

- *Acacia buxifolia* (Box-Leaf Wattle)
- *Acacia deanei* (Deane's Wattle)
- *Acacia decora* (Western Silver Wattle)
- *Acacia genistifolia* (Spreading Wattle)

Shrubs (cont'd)

- *Acacia paradoxa* (Kangaroo Thorn)
- *Acacia pycnantha* (Golden Wattle)
- *Acacia verniciflua* (Varnish Wattle)
- *Calytrix tetragona* (Common Fringe Myrtle)
- *Indigofera australis* (Austral Indigo)
- *Pultenaea foliosa* (Bush Pea)

Groundcovers and Grasses

- *Aristida* spp. (Wire Grass)
- *Bothriochloa macra* (Red-Leg Grass)
- *Bracteantha viscosa* (Sticky Everlasting)
- *Bulbine bulbosa* (Bulbine Lily)
- *Chelianthes sieberi* (Rock Fern)
- *Chrysocephalum apiculatum* (Yellow Buttons)
- *Dianella revoluta* (Spreading Flax Lily)
- *Geranium solanderi* (Austral Cranesbill)
- *Hardenbergia violacea* (Purple Coral Pea)
- *Hibbertia obtusifolia* (Grey Guinea Flower)
- *Lomandra multiflora* (Many-flowered Mat Rush)
- *Maireana microphylla* (Eastern Cottonbush)
- *Microlaena stipoides* (Weeping Grass)
- *Stypandra glauca* (Nodding Blue Lily)

Creeklines and flats: Yellow Box and Blakely's Red Gum woodland

Trees

- *Acacia dealbata* (Silver Wattle)
- *Eucalyptus blakelyi* (Blakely's Red Gum)
- *Eucalyptus camaldulensis* (River Red Gum)
- *Eucalyptus melliodora* (Yellow Box)
- *Eucalyptus microcarpa* (Grey Box)
- *Eucalyptus polyanthemos* (Red Box)

Shrubs

- *Acacia decora* (Western Silver Wattle)
- *Leptospermum continentale* (Prickly Tea-Tree)

Groundcovers and Grasses

- *Carex* spp. (Sedge)
- *Danthonia* spp. (Wallaby Grass)
- *Juncus* spp. (Rush)
- *Phragmites australis* (Common Reed)
- *Poa* spp. (Tussock Grass)
- *Typha* spp. (Cumbungi)

Lower slopes: Grey Box woodland

Trees

- *Brachychiton populneus* (Kurrajong)
- *Callitris glaucophylla* (White Cypress Pine)
- *Eucalyptus albens* (White Box)
- *Eucalyptus blakelyi* (Blakely's Red Gum)
- *Eucalyptus melliodora* (Yellow Box)
- *Eucalyptus microcarpa* (Grey Box)
- *Eucalyptus polyanthemos* (Red Box)

Shrubs

- *Acacia deanei* (Deane's Wattle)
- *Acacia decora* (Western Silver Wattle)
- *Acacia pycnantha* (Golden Wattle)
- *Pultenaea foliosa* (Bush Pea)

Groundcovers and Grasses

- *Aristida* spp. (Wire Grass)
- *Calotis cuneifolia* (Purple Burr-Daisy)
- *Chelianthes sieberi* (Rock Fern)
- *Chrysocephalum apiculatum* (Yellow Buttons)
- *Dianella longifolia* (Smooth Flax Lily)
- *Dianella revoluta* (Spreading Flax Lily)
- *Geranium solanderi* (Austral Cranesbill)
- *Lomandra multiflora* (Many-flowered Mat Rush)
- *Poa* spp. (Tussock Grass)
- *Xerochrysum viscosum* (Sticky Everlasting)

Creeklines and floodplains: River Red Gum woodland

Trees

- *Acacia dealbata* (Silver Wattle)
- *Acacia melanoxylon* (Blackwood)
- *Brachychiton populneus* (Kurrajong)
- *Casuarina cunninghamiana* (River Sheoak)
- *Eucalyptus blakelyi* (Blakely's Red Gum)
- *Eucalyptus bridgesiana* (Apple Box)
- *Eucalyptus camaldulensis* (River Red Gum)

Shrubs

- *Acacia decora* (Western Silver Wattle)
- *Acacia paradoxa* (Kangaroo Thorn)
- *Acacia pycnantha* (Golden Wattle)
- *Callistemon sieberi* (River Bottlebrush)
- *Eremophila deserti* (Turkey-Brush)
- *Leptospermum continentale* (Prickly Tea-Tree)

Groundcovers and Grasses

- *Carex* spp. (Sedge)
- *Geranium solanderi* (Austral Cranesbill)
- *Lomandra multiflora* (Many-Flowered Mat-Rush)
- *Phragmites australis* (Common Reed)
- *Typha* spp. (Cumbungi)
- *Vittadinia cunneata* (Fuzzweed)
- *Wahlenbergia stricta* (Bluebell)



SEED COLLECTION

Preparation

Before commencing any seed collection, determine which species you want to collect, and when these are likely to have seed ready (see the Seed Collection Calendar on pages 8-9 for approximate timings for a selection of local species).

Check the maturity of seeds before collecting - the seed should be brown, not green. Note that it is possible for maturity to vary from one plant to its neighbour, and even across a single tree, so check each time.

Some of the equipment which may come in handy includes:

- Buckets
- Paper bags or envelopes
- Secateurs
- Long-handled pruner
- Gloves
- Pencil and paper.

If you are collecting from land belonging to another landholder (including private, Crown and State Forest land), you will need prior approval. You will also need a licence if you are collecting threatened species or ecological communities.

Collection

It is generally best to collect from a site with similar conditions to the site you would like to revegetate (eg soil type, aspect, climate, etc). However you may also like to include plants from further west and north, to prepare for future climate.

Some tips to maximise the genetic diversity and quality of seed collected include:

- Collect from a wide range of plants - at least 10 individuals of each species is recommended
- Only collect from healthy plants
- Collect from plants scattered throughout an area, rather than from adjacent plants
- Avoid collecting seed from isolated plants, as seed from these plants may be in-bred from self pollination
- Collect only as much seed as you need, and make sure you don't damage plants when taking seed
- Do not remove more than 10% of the fruit of any one plant, or more than 1% of the overall biomass.

To collect seed from tall trees, you may be able to reach lower branches using a long-handled pruner from the back of a truck or ute. If possible, you may also be able to take advantage of fallen limbs and branches, provided the seed has not already been released. Never cut down branches just to get the seed!

Seed and pods on small trees and shrubs can be hand-picked or cut with secateurs. You can also place a drop-sheet or tarpaulin under the plant, then shake the branches so seeds fall on the drop-sheet.

When collecting native grass seed, run your hand along the stem - ripe seed will come off, while unripe seeds will stay on the stem.

For species which release their seed very quickly upon ripening (such as Wattles and Bush Peas), it may be worthwhile to tie paper bags or nylon stockings around the branches before the seed pods ripen.

Collect seeds in paper envelopes or bags, and label with as much information as you can, including species, collection date, collection location, etc.

Drying seed

After collecting seed, you need to ensure it is completely dry before storing it. To do this, you can simply place the paper bag containing the seed on a window sill in a sunny position. For larger volumes of seed, you can keep them in a bucket and just stir it around with your hands every few days to dry it out.

Cleaning seed

Once the seed is dried, clean your collection by separating the seeds from seed pods and any other material. Note that for native grass seed, it is best to keep the awns attached; when planted in soil with moisture, the awns will help the seed to hold the soil.

The easiest way to clean seed is to sieve it, using progressively smaller sieves, to get rid of everything except the seeds. Kitchen sieves work fine, or you can purchase specialist seed sorting sieves. To get rid of chaff, gently blow it away from the seeds. A good tip is to collect the leftover seed pods and chaff, and spread it around a revegetation area - you may get some germination from it, so don't waste it!

Storing seed

Store your seed in a labelled ziplock bag (double bagging helps prevent loss of seed to spills), jar or other airtight container. Be sure to remove all contaminants from your container by wiping it out with a cloth before use.

Use a funnel to pour the cleaned seed into your bag or container.

Store seed in a cool, dry and dark place where they are not likely to be reached by insects or mice. Most seed can be stored at temperatures up to 20°C for several years, although with some loss of viability.



SEED GERMINATION

Preparation

The best time to propagate is usually spring to early summer.

Cell containers, punnets, pots or shallow trays are all suitable for germinating seeds in. Use either a commercial seed-raising mix which is free draining, or make your own.

Some good seed-raising mixes are:

- Equal parts of coarse washed sand and vermiculite, or
- A 4:1 mix of washed sand and coir fibre.

Germination

Some species need to be pre-treated before germinating. Information on this is included in the details for specific species, on pages 10-15.

To sow the seeds, put the potting mix in the pots and wet it. Sprinkle the seeds on the surface, then cover lightly with sand or some potting mix.

Sit the pots in a warm spot, and make sure they stay moist. A good technique is to sit the pots in a tray of water, so they won't dry out (just keep the trays topped up with water!) Otherwise water around once a day. Most species should germinate within about 1 to 4 weeks (some take longer).

Transplanting seedlings

Once the seedlings have grown big enough to be handled (at least 2 leaves), it's time to transfer them into individual tubestock pots or similar (if you germinated individual seedlings in separate pots, you don't need to transplant them).

Use native potting mix in the pots, either a commercial mix or make your own (eg a 3:2 mix of regular potting mix and washed sand). It helps to add a small amount of controlled-release native plant fertiliser to the potting mix before transplanting, but this is not essential.

Carefully remove each seedling using a flat knife or spatula, and place into a partly filled pot. Gently firm potting mix around the seedling, and water with a light spray, such as from a spray bottle.

Keep the pots in a protected area for a few weeks, then harden them by gradually moving them to an area where full sun is available for at least part of the day. Make sure they don't dry out; you may like to use a tray of water as before.

Your seedlings should be ready to plant out in about 3-4 months. The best time to plant is winter.



SEED COLLECTION CALENDAR

Autumn & Winter

Trees

- *Brachychiton populneus* (Kurrajong): Mar
- *Casuarina cunninghamiana* (River Sheoak): Mar
- *Eucalyptus albens* (White Box): Mar
- *Eucalyptus blakelyi* (Blakely's Red Gum): Mar
- *Eucalyptus bridgesiana* (Apple Box): Mar
- *Eucalyptus camaldulensis* (River Red Gum): Mar to May
- *Eucalyptus macrorhyncha* (Red Stringybark): Mar to May
- *Eucalyptus melliodora* (Yellow Box): Mar to Apr
- *Eucalyptus microcarpa* (Grey Box): Mar to Apr
- *Eucalyptus polyanthemos* (Red Box): Mar
- *Eucalyptus sideroxylon* (Red Ironbark): Mar

Shrubs

- *Bursaria spinosa* (Sweet Bursaria): Mar

Groundcovers and Grasses

- *Bothriochloa macra* (Red-leg Grass): Mar to Apr
- *Calotis cuneifolia* (Purple Burr Daisy): Apr
- *Danthonia* spp. (Wallaby Grass): Mar
- *Dianella longifolia* (Smooth Flax Lily): Apr
- *Einadia nutans* (Climbing Saltbush): Apr
- *Lomandra multiflora* (Many-Flowered Mat Rush): Mar
- *Maireana microphylla* (Eastern Cottonbush): Apr
- *Phragmites australis* (Common Reed): May to Jul
- *Typha* spp. (Cumbungi): Apr to May
- *Vittadinia cunneata* (Fuzzweed): Apr
- *Wahlenbergia stricta* (Bluebell): Apr

Spring & Summer

Trees

- *Acacia dealbata* (Silver Wattle): Dec
- *Acacia doratoxylon* (Currawang): Nov to Jan
- *Acacia implexa* (Hickory Wattle): Dec to Jan
- *Acacia melanoxylon* (Blackwood): Jan to Feb
- *Allocasuarina verticillata* (Drooping Sheoak): Jan
- *Brachychiton populneus* (Kurrajong): Feb
- *Callitris endlicheri* (Black Cypress Pine): Dec to Jan
- *Callitris glaucophylla* (White Cypress Pine): Dec to Jan
- *Casuarina cunninghamiana* (River Sheoak): Jan to Feb
- *Eucalyptus albens* (White Box): Jan to Feb
- *Eucalyptus blakelyi* (Blakely's Red Gum): Jan to Feb
- *Eucalyptus bridgesiana* (Apple Box): Jan to Feb
- *Eucalyptus dealbata* (Tumbledown Gum): Jan to Feb
- *Eucalyptus goniacalyx* (Long-Leaf Box): Dec
- *Eucalyptus macrorhyncha* (Red Stringybark): Jan to Feb
- *Eucalyptus melliodora* (Yellow Box): Feb
- *Eucalyptus microcarpa* (Grey Box): Jan to Feb
- *Eucalyptus polyanthemos* (Red Box): Feb
- *Eucalyptus sideroxylon* (Red Ironbark): Dec to Feb

Shrubs

- *Acacia buxifolia* (Box-Leaf Wattle): Dec
- *Acacia deanei* (Deane's Wattle): Dec
- *Acacia decora* (Western Silver Wattle): Dec
- *Acacia genistifolia* (Spreading Wattle): Dec
- *Acacia lanigera* (Woolly Wattle): Nov to Dec
- *Acacia paradoxa* (Kangaroo Thorn): Dec
- *Acacia pycnantha* (Golden Wattle): Nov to Jan
- *Acacia verniciflua* (Varnish Wattle): Nov to Dec
- *Bursaria spinosa* (Sweet Bursaria): Jan to Feb
- *Callistemon sieberi* (River Bottlebrush): Dec to Feb
- *Calytrix tetragona* (Common Fringe Myrtle): Nov to Dec
- *Daviesia leptophylla* (Slender Bitter-Pea): Dec to Jan
- *Indigofera australis* (Austral Indigo): Nov to Jan
- *Leptospermum continentale* (Prickly Tea-tree): Nov to Dec
- *Pultenaea foliosa* (Bush Pea): Dec to Jan

Groundcovers and Grasses

- *Bothriochloa macra* (Red-Leg Grass): Feb
- *Bulbine bulbosa* (Bulbine Lily): Dec to Jan
- *Burchardia umbellata* (Milkmaids): Dec to Jan
- *Carex* spp. (Sedge): Dec
- *Chrysocephalum apiculatum* (Yellow Buttons): Dec to Jan
- *Danthonia* spp. (Wallaby Grass): Dec to Feb
- *Dianella longifolia* (Smooth Flax Lily): Dec to Jan
- *Dianella revoluta* (Spreading Flax Lily): Dec to Jan
- *Hardenbergia violacea* (Purple Coral Pea): Dec
- *Hibbertia obtusifolia* (Grey Guinea Flower): Dec
- *Juncus* spp. (Rush): Dec
- *Lomandra multiflora* (Many-flowered Mat Rush): Dec
- *Stypandra glauca* (Nodding Blue Lily): Nov
- *Vittadinia cunneata* (Fuzzweed): Dec
- *Xerochrysum viscosum* (Sticky Everlasting): Dec



COLLECTING SEED OF LOCAL SPECIES

***Acacia* spp. (Wattles)**

- Hand-pick seed pods when they are turning brown
- Remove the seeds by splitting the pods open along the seam of the pod and shaking or gently scraping the seeds out
- Before sowing, pour boiling water over seeds and allow to stand for up to 24 hours (discard any seeds that are floating after this time). Alternatively you can scarify the seeds, by nicking or rubbing each seed with sandpaper
- Seeds take 1 to 3 weeks to germinate

***Allocasuarina* and *Casuarina* spp. (Sheoaks)**

- Collect cones by twisting off the branch when they are brown but valves are still closed (can be collected throughout the year, as cones are retained on the tree indefinitely)
- Store cones in a paper bag in a warm, dry place until the valves open and the seeds are released. Shake or sieve to clean the seed
- Seed is best used fresh, or stored in the fridge
- Seedlings require a bacterium (mycorrhiza) for optimum growth. The easiest way to provide this is to collect a small amount of nodules from the roots of the parent plants, just below the soil surface. Grind the nodules using a mortar and pestle, dilute in a watering can and water the seedlings with it
- Seeds take 2 to 5 weeks to germinate

***Aristida* spp. (Wire Grasses)**

- Harvest seed heads by cutting stalks with secateurs when seed heads are reddish-purple
- Place stems upside down inside paper bags to dry
- Mature seeds will fall off but, due to their three-branched awns, the seeds will form a tangled mass. Thresh lightly, then shake or sieve to clean the seeds as much as possible
- Seeds take 2 to 4 weeks to germinate

***Bothriochloa macra* (Red-leg Grass)**

- Cut stalks when they turn red-purple, and when the spikelets at the tips of the seed heads are just beginning to fall off
- Dry in paper bags or buckets
- Seeds take 2 to 5 weeks to germinate

***Brachychiton populneus* (Kurrajong)**

- Hand pick the large woody fruit capsules before they open, and place in a paper bag in a warm, dry place to open
- Once fruits open, seed can be tapped out, or eased out with a pencil
- Use gloves and mask to protect yourself from the hairs surrounding seeds
- Before sowing, pour boiling water over seeds and soak for 1 minute, or scarify (rub the seeds between sandpaper to abrade the seed coat)
- Seeds take 2 to 4 weeks to germinate

***Bulbine bulbosa* (Bulbine Lily)**

- Harvest seed heads by hand or secateurs when papery capsules turn brown and brittle
- Place stems upside down inside paper bags, and dry until the capsules have opened. Thresh lightly, then shake or sieve to clean the seeds
- Store seeds for 2 to 3 months before sowing
- Sow in autumn, as high temperatures inhibit germination
- Seeds need light to germinate, so sow at the surface
- Seeds may take 8 weeks to germinate

***Burchardia umbellata* (Milkmaids)**

- Hand-pick seed capsules when they turn red-brown and brittle
- If possible, collect a small amount of soil from under the parent plants when harvesting the seeds, and mix this with the potting mix when germinating seeds. The soil fungi is thought to aid germination
- Place them in a paper bag and dry until the capsules have opened. Thresh lightly, then shake or sieve to clean the seeds
- Store seeds for 2 to 3 months before sowing
- Sow in autumn, as high temperatures inhibit germination
- Smoking may enhance germination
- Seeds take 4 to 8 weeks to germinate

***Bursaria spinosa* (Sweet Bursaria)**

- Hand pick ripe, papery capsules when they are rattling
- Seed can be shed quickly once ready, so it is helpful to place a bucket directly under the capsules, or enclose with a stocking or similar
- The seed can be removed from the capsules by shaking or gently scraping the seeds out
- Use seed fresh (don't store)
- Seed germinates best with cold stratification, to break dormancy. To do this, sow seed in potting mix (as described on p 11) and water with a fine mist, making sure it does not become waterlogged. Place the entire container in a plastic bag, and put it in the refrigerator for 28 days
- Seeds take 4 to 8 weeks to germinate

***Callistemon sieberi* (River Bottlebrush)**

- Hand-pick the woody seed capsules from the plant, by running your fingers along the rows and collecting them in a bucket or paper bag
- The seed usually remains within the capsules indefinitely, so they can be collected throughout the year
- It is best to pick capsules when they are at least 12 months old
- Leave the capsules to dry in a warm, dry place, then shake or sieve to clean seed
- Seeds take 2 to 4 weeks to germinate

***Callitris* spp. (Cypress Pines)**

- Hand pick cones just before they open
- Lay cones out to dry for a few weeks, then shake in a sieve; the papery seeds should release easily
- Use seed within 12 months
- Seed germinates best with cold stratification, to break dormancy. To do this, sow seed in potting mix (as described on p 11) and water with a fine mist, making sure it does not become waterlogged. Place the entire container in a plastic bag, and put it in the refrigerator for 14 to 28 days
- Seeds take 2 to 6 weeks to germinate

***Calytrix tetragona* (Common Fringe Myrtle)**

- Collect seed capsules when they turn bronze and begin to fall
- Germination from seed is unreliable; propagation by cuttings is recommended instead

***Carex* spp. (Sedges)**

- Cut stalks with secateurs when they are dry and golden-brown
- Place them upside-down in paper bags. to dry, then rub the seed heads to extract the seed. Wear gloves when doing this, as leaf margins can be sharp
- Shake or sieve to clean the seeds
- Seeds take 2 to 4 weeks to germinate

***Cheilanthes sieberi* (Rock Fern)**

- Propagate from division or spores

***Chrysocephalum apiculatum* (Yellow Buttons)**

- Hand pick capsules when they are red-brown and brittle
- Dry the seed capsules in a paper bag, then break up the seed head by hand and shake or sieve to clean
- Seeds need light to germinate, so sow at the surface
- Seeds take 2 to 4 weeks to germinate

***Danthonia* spp. (Wallaby Grasses)**

- Cut stalks with secateurs, when spikelets become fluffy white
- Rub the heads between your hands (or two rubber car mats for large quantities) to extract seeds, then clean by sieving
- Store seed for at least a year before sowing
- Seeds take 2 to 4 weeks to germinate

***Daviesia leptophylla* (Slender Bitter-pea)**

- Hand-pick ripening seed pods when they are light brown and rattling
- Seeds are released very quickly following maturity, so it is beneficial to place a bag or nylon stocking around maturing pods, or a dropsheet under plants to catch seed
- Before sowing, pour boiling water over seeds and allow to stand for up to 24 hours (discard any seeds that are floating after this time). Dry seeds before sowing
- Seeds take 3 to 8 weeks to germinate

***Dianella* spp. (Flax Lilies)**

- Hand-pick ripe fruits
- Soak fresh fruit in water to soften, then clean fruit from the seed with sieves
- Use seeds fresh
- Before sowing, soak seeds in soapy water for 24 hours, or gently scratch with sandpaper. Smoking also improves germination
- Seeds may take up to 6 months to germinate

***Einadia nutans* (Climbing Saltbush)**

- Hand-pick the berries when they turn red and soft
- Store fruit in a plastic bag until the seed is released. Each fruit contains a single black seed
- The flesh can be left on the seed, but should be thoroughly dried soon after collection to avoid becoming mouldy. Alternatively, seed can be soaked to remove attached fruit flesh
- Seed is best used fresh
- Seeds take 2 to 4 weeks to germinate

***Eremophila deserti* (Turkey-Brush)**

- Hand-pick the fruit, and dry completely in a warm, dry place
- To extract the seeds from the fruit, place the dried fruit in a small vice, and tighten until the nut cracks; the seed should drop out intact
- Sow seed fresh
- Note: Germination from seed is unreliable, and can take many months; propagation by cuttings is recommended instead

***Eucalyptus* spp. (Gums)**

- Hand-pick seed capsules (gumnuts) when they are brown. It is best to pick capsules when they are at least 12 months old, so they can be picked throughout the year
- Place the gumnuts in a paper bag in a warm, dry area until the seeds are released (2 to 3 days), then shake or sieve to clean the seeds
- Gumnuts will contain both viable seed and a large amount of infertile seed, or chaff. It is not necessary to separate the seed from the chaff; simply sow both together, with the chaff becoming part of the propagating mix
- Seeds take 2 to 4 weeks to germinate

***Geranium solanderi* (Austral Cranesbill)**

- Hand-pick the fruits when they are well developed
- Leave fruit to dry in a warm, airy spot, then separate seeds from fruit
- Before sowing, soak seeds in hot (not boiling) water for 30 minutes, then dry
- Seeds need light to germinate, so sow at the surface
- Seeds take 1 to 4 weeks to germinate

***Glycine canescens* (Silky Glycine)**

- Place a bag or nylon stocking around maturing fruits, or a dropsheet under plants to catch seed
- Seedpods can be hand-picked close to maturity, when they turn brown
- Dry pods completely in a warm, dry area
- Before sowing, soak seeds in boiling water for a few hours, then dry. Sow only seeds that have swollen to double their size
- Seeds take 3 to 4 weeks to germinate

***Hardenbergia violacea* (Purple Coral Pea)**

- Hand-pick pods close to maturity, when they turn brown
- Dry pods completely in a warm area, then shake or sieve to extract the seeds
- Before sowing, soak seeds in boiling water for several hours, then dry
- Seeds take 3 to 4 weeks to germinate

***Hibbertia obtusifolia* (Grey Guinea Flower)**

- Seed is difficult to collect, due to a combination of typically low seed production, and regular consumption of seeds by insects
- Dormancy also causes issues with germination, although smoking may improve results
- Propagation by cuttings is recommended instead

***Indigofera australis* (Austral Indigo)**

- Hand pick ripening pods
- Seeds are released quickly following maturity, so it is beneficial to place a bag or nylon stocking around maturing pods, or a dropsheet under plants to catch seed
- Place pods in a warm place to ripen, then extract the seeds
- Before sowing, pour boiling water over seeds for 30 seconds, then dry. Alternatively you can scarify the seeds
- Seeds take 3 to 4 weeks to germinate

Juncus spp. (Rushes)

- Hand-pick seed heads when they are fully formed and brown. Monitor plants closely as maturity approaches, as seeds shed quickly once ripe
- Dry seed heads in paper bags, and sieve to clean
- Seeds take 2 to 4 weeks to germinate

Leptospermum continentale (Prickly Tea-Tree)

- Hand-pick the woody seed capsules from the plant, by running your fingers along the rows and collecting them in a bucket or paper bag
- The seed usually remains within the capsules indefinitely, so they can be collected throughout the year
- It is best to pick capsules when they are at least 12 months old
- Leave the capsules to dry in a warm, dry place, then shake or sieve to clean seed
- Seeds take 2 to 4 weeks to germinate
- To minimise "damping off" of seedlings, keep germinating seeds moist but not wet

Lomandra spp. (Mat Rushes)

- Cut stems with secateurs, using gloves to avoid the spines
- Place stems upside down inside large paper or muslin bags, and dry until the capsules have opened. Thresh lightly, then shake or sieve to clean the seeds
- Use seeds fresh (don't store)
- Before sowing, soak seeds in warm water for 24 hours
- Seeds may take 8 to 10 weeks to germinate

Maireana microphylla (Eastern Cottonbush)

- Collect seed heads when they turn dark brown and start to dry out
- Dry completely in paper bags, and sieve to clean
- Use seeds within 12 months

Microlaena stipoides (Weeping Grass)

- Mature seed drop from the stem, so monitor plants closely as they approach maturity
- Harvest seeds by holding the stem over a bucket or bag, and running the stem lightly between your fingers to remove seeds
- Seeds need light to germinate, so sow at the surface
- Seeds take 2 to 5 weeks to germinate

Phragmites australis (Common Reed)

- Store seed for several months before sowing, to allow for the after-ripening period
- Seeds need warmth and light to germinate, so sow at the surface
- Seeds take 1 to 2 weeks to germinate

Poa spp. (Tussock Grasses)

- Cut stalks with secateurs when seed heads turn from green to light brown
- Rub the seedheads between your hands (or two rubber car mats for large quantities) to extract seeds, then clean by sieving
- Cold stratification for 3 weeks improves germination in cold areas
- Seeds take 2 to 6 weeks to germinate

Pultenaea foilosa (Bush Pea)

- Hand pick pods when they are brown and rattling, just before they split open
- Dry pods completely in a warm place, then crush to separate the seed from the pod
- Before sowing, pour boiling water over seeds and soak overnight, or scarify
- Seeds take 3 to 6 weeks to germinate

***Stypantra glauca* (Nodding Blue Lily)**

- Hand-pick the fruit as it approaches maturity. Fruit is a black, leathery-like capsule
- Store in paper bags to dry, then sieve to clean the seeds
- Best results are achieved when seed is sown directly into the soil in Autumn
- Seeds take 3 to 4 weeks to germinate, although it has been known to take several months
- Propagation by division is more reliable

***Typha* spp. (Cumbungi)**

- Cut the large flower spike when it approaches maturity, indicated by the colour of the densely-packed flowers changing from light brown to a dark brown or black
- Place the entire spike in a large paper or chaff bag to dry. The many thousands of fluffy mature seeds will release naturally
- Sieve to clean the seed
- Seeds require very wet 'muddy' conditions to germinate
- Note that *Typha latifolia* is an introduced species, and a weed in many places. Before propagating, ensure you have a native species - either *T. domingensis* (Narrow Leaf Cumbungi) or *T. orientalis* (Broadleaf Cumbungi)

***Vittadinia cuneata* (Fuzzweed)**

- Hand-pick the entire seed heads and store in a paper bag to dry
- Break up seed heads by hand, or rub against fine wire screens, and sieve to clean
- Store seeds with the fluffy pappus attached
- Before sowing, soak seeds in water for 10 days
- Seeds need light to germinate, so sow at the surface
- Seeds take 1 to 3 weeks to germinate

***Wahlenbergia stricta* (Bluebell)**

- Cut stalks with the papery seed capsules on them when the capsules change from green to tan brown and become brittle
- Store upside down in paper bags in a warm, dry place and leave to dry, then lightly thresh or crush capsules to release the fine red-brown seed, and sieve to clean
- Store seeds for at least 6 months before sowing, to allow for the after-ripening period
- Cold stratification for 3 months at 3 to 5 degrees Celsius may improve germination
- Seeds take 3 to 4 weeks to germinate

***Xerochrysum viscosum* (Sticky Everlasting)**

- Hand-pick the whole flower head when the florets become darker in colour
- Store in paper bags in a warm, dry place and leave to dry, then lightly thresh and sieve to clean
- Cool stratification may be necessary for successful germination
- Seeds take 1 to 4 weeks to germinate



PREPARING & PLANTING FOR REVEGETATION

Winter to Summer

The year before you plan to plant

Select and order plants

- Locally indigenous species are always recommended, as they are most suited to the local conditions and climate. Where possible, use seedlings grown from seed collected locally
- Order plants before Christmas (February at the absolute latest) to help guarantee supply.

Control weeds

- Poor weed control accounts for most planting failures, due to their competition for light, moisture and nutrients
- Before spraying, check if there is good native groundcover to preserve; if there is, use targeted spot spraying for weeds
- Eliminate weeds early, before they use up stored water – ideally, keep the planting area free of weeds for a year or more prior to planting
- If using chemical control, apply a knockdown herbicide like Glyphosate well before planting.

Fence the site

- Fencing should be used to protect seedlings from stock for at least the first three years
- Fencing also preserves the leaf litter at ground level, and protects low leafy shoots.

Autumn

Prepare the ground

- Deep ripping the soil helps root development, as it improves aeration and infiltration of water. This allows deeper penetration and faster growth of plant roots
- Rip before the Autumn break, while the ground is hard and dry, to optimise shattering of the soil
- Rip planting lines 4 m apart, to a depth of at least 45 cm, if possible 60 cm or more
- On slopes, rip along contours to reduce erosion risk. On flatter sites, cross ripping on a grid layout will guard against roots growing in one direction along a single rip line (which can result in trees blowing over)
- Don't rip under the drip-line of existing trees
- If ripping brings up big clods or creates large open cracks in the soil, break up and compress by driving over them with the tractor wheels, or using a rotary hoe, to prevent deep drying of the subsoil.

Control weeds

- If Phalaris and/or Cocksfoot are present, spray one month after the Autumn break, when the plants are actively growing (before frost, but 10 days after rain). These plants are very hard to kill so seek appropriate advice on sprays and rates.

Winter

Control weeds

- Apply a residual herbicide such as Simazine one month prior to planting, but before the end of July. This will control competition from weeds throughout spring
- If weeds have emerged since the first spray, spray with a knockdown herbicide in conjunction with the residual.

Plant the seedlings

- Plant from mid-July to utilise winter rains and allow seedlings to establish slowly over the cooler months, enabling quick growth as soil temperatures warm up
- Ideally, time your planting with forecast rain to avoid the need to water at planting
- Give seedlings a good soaking in their pots the day before planting
- Fertiliser is generally not necessary for natives
- Plant seedlings between the rips. Where a single rip line is used, plant seedlings on the shoulder of the rip line, as those planted in the bottom of the rip line can get waterlogged in wet years (although this can be beneficial in dry years)
- Recommended spacing between seedlings varies, but generally trees should be spaced around 10 m apart. Smaller trees and shrubs can be spaced 3-4 m apart, while grasses and groundcovers can be planted in groups of 3 or 4, or spaced at around 1 m. Aim for a maximum of 625 seedlings/ha
- Consider planting dense native grasses and herbs if the site is heavily covered in weeds
- To plant tubestock, dig a hole slightly larger than the tube, then remove the seedling from the tube, trying to minimise root disturbance
- Place the seedling in the hole, with the base of the seedling's stem just below the surface

- Place the soil back around the hole, and firm down to collapse any air pockets and give good root to soil contact
- A Pottiputki planter can be used to more easily plant mini hiko cell tubes, while a Hamilton tree planter can be used to plant hiko cell tubes or standard forestry tubes
- If no rain is forecast and the soil is particularly dry, one litre of water (or more) poured slowly around each seedling will help overcome transplant shock and remove air pockets. In most cases, no further watering should be required.

Guard your seedlings

- Placing guards around your seedlings can help prevent grazing by rabbits, hares and kangaroos. It also protects the seedlings from wind and maintains a warm and moist environment
- The cheapest guards are milk cartons held in place by two bamboo stakes. Another common guard is a plastic sleeve, held in place by three hardwood stakes.

Check your site

- In the first week after planting, check your site for vermin or stock damage, to ensure you are able to deal with any interference as quickly as possible.

Spring

Check your site

- Make sure there are no weeds within 0.5 m of plants through spring and early summer
- If the summer is especially hot and dry, seedlings may benefit from watering; one litre per seedling should be sufficient, and watering should be limited to once a month at most, so as not to weaken the seedlings
- Watch regularly for grasshoppers, particularly in dry years – spray if they are causing damage.



DIRECT SEEDING

An alternative method to revegetating a site by planting tubestock is to use direct seeding. This involves directly placing the seed into the prepared planting area.

Direct seeding can involve simply spreading seed by hand, then raking over it to cover with soil. For large areas, a mechanical seeder is essential. These machines scalp the soil, then drop and cover the seeds in a single pass.

This can be a very cost-effective method of planting, however the results can be less reliable than with planting tubestock. You may find seeds germinate in patches, creating a high density of plants in some areas and little coverage in others. This can be dealt with through infill plantings, and thinning of dense patches if required, to even out the coverage.

As with revegetation by tubestock, preparation of the site is essential, especially weed control. Prepare your site following the same basic steps as outlined on pages 16-17.

When broadcasting seed, either by hand or machine, include seed from a mix of suitable species, together with a bulking agent. The bulking agent can be anything from sawdust or sand through to the chaff you collected when sifting seed you have collected.

Where seed requires a pre-treatment (see pages 10-15 for details), be sure to complete this prior to sowing.

While sowing rates will vary, a good rule of thumb is that 300-400 g of seed per kilometre should produce around 1 plant per metre. So for a site that is one kilometre long and 25 metres wide, with four rows, you would need around 1.2 kg of seed to cover the 2.5 hectares.

In terms of timing, it is always best to sow into moist soil if possible. Sowing in early spring can help avoid potential loss of germinating seedlings to late winter frosts. However in lower rainfall areas, you may need to sow in winter to ensure the site receives sufficient rain after sowing. In either case, weed control through spring and the following years is vital.

Species suitable for direct seeding

The following species are some of those that are suitable for direct seeding.

- *Acacia* spp. (Wattles)
- *Allocasuarina* & *Casuarina* spp. (Sheoaks)
- *Bothriochloa macra* (Red-Leg Grass)
- *Brachychiton populneus* (Kurrajong)
- *Callitris* spp. (Cypress Pines)
- *Danthonia* spp. (Wallaby Grasses)
- *Einadia nutans* (Climbing Saltbush)
- *Eucalyptus* spp. (Gums)
- *Leptospermum* spp. (Tea-Trees)
- *Microlaena stipoides* (Weeping Grass)
- *Poa* spp. (Tussock Grasses)
- *Vittadinia cuneata* (Fuzzweed)



REGIONAL NURSERIES

AUSTRALIAN NATIVE FARM FORESTRY

Contact: Ron
A: 6 Cobrawonga Road Cobram East VIC
P: 0417 123 432
W: iwanttrees.com.au

RIVERINA WILDFLOWERS NATIVE NURSERY

Contact: Mike Schulz
A: 2068 Griffith Road & Boyers Crossing
Leeton
P: 0427 535 914
E: natives@riverinawildflowers.com.au
W: riverinawildflowers.com.au

JAYFIELDS NURSERY

Contact: Kelly and Tim Glass
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P: (02) 6036 7235
E: tumutlandcarenursery@gmail.com
W: jayfieldsnursery.com

SANDY CREEK TREES

A: 416 Gap Flat Road Allans Flat VIC
P: (02) 6027 1497
E: info@sandycreektrees.com.au
W: sandycreektrees.com.au

RIVERINA HIGHLANDS LANDCARE NURSERY

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W: riverinahighlandslandcare.com.au

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RIVERINA NURSERY

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WAGGA NURSERY

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Acknowledgements

This guide was developed by Nicole Maher and Jade Auldist (Murrumbidgee Landcare Inc), with valuable input from Mason Crane (Australian National University), Martin Driver (Australian Network Plant Conservation) and Janet Wild (Eastern Riverina Landcare Group).

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KYEAMBA VALLEY LANDCARE GROUP



The Kyeamba Valley Landcare group is a community volunteer organisation that was formed in 1989 by a group of Kyeamba Valley landholders with a common concern about the protection of our natural resources. Kyeamba Valley was one of the first Landcare groups to establish in NSW and now has a membership of around 100 rural landholders.

Our community vision is: *Working toward a better future.*

Through education, field days, on-ground works and collaborative projects, we aim to achieve a viable, sustainable and productive environment through a planned approach to the rehabilitation of degraded land, water and vegetation, and the implementation of more sustainable land use practices.

For more information, or to find out how to get involved, contact your Local Landcare Coordinator: bidgeesouth@mli.org.au



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This initiative made possible by the NSW Landcare Program. A collaboration of Local Land Services and Landcare NSW Inc. supported by the NSW Government.

The funding for this guide was provided through the Wettenhall Environment Trust's Small Environmental Grant Scheme, and the Local Landcare Coordinator Initiative

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