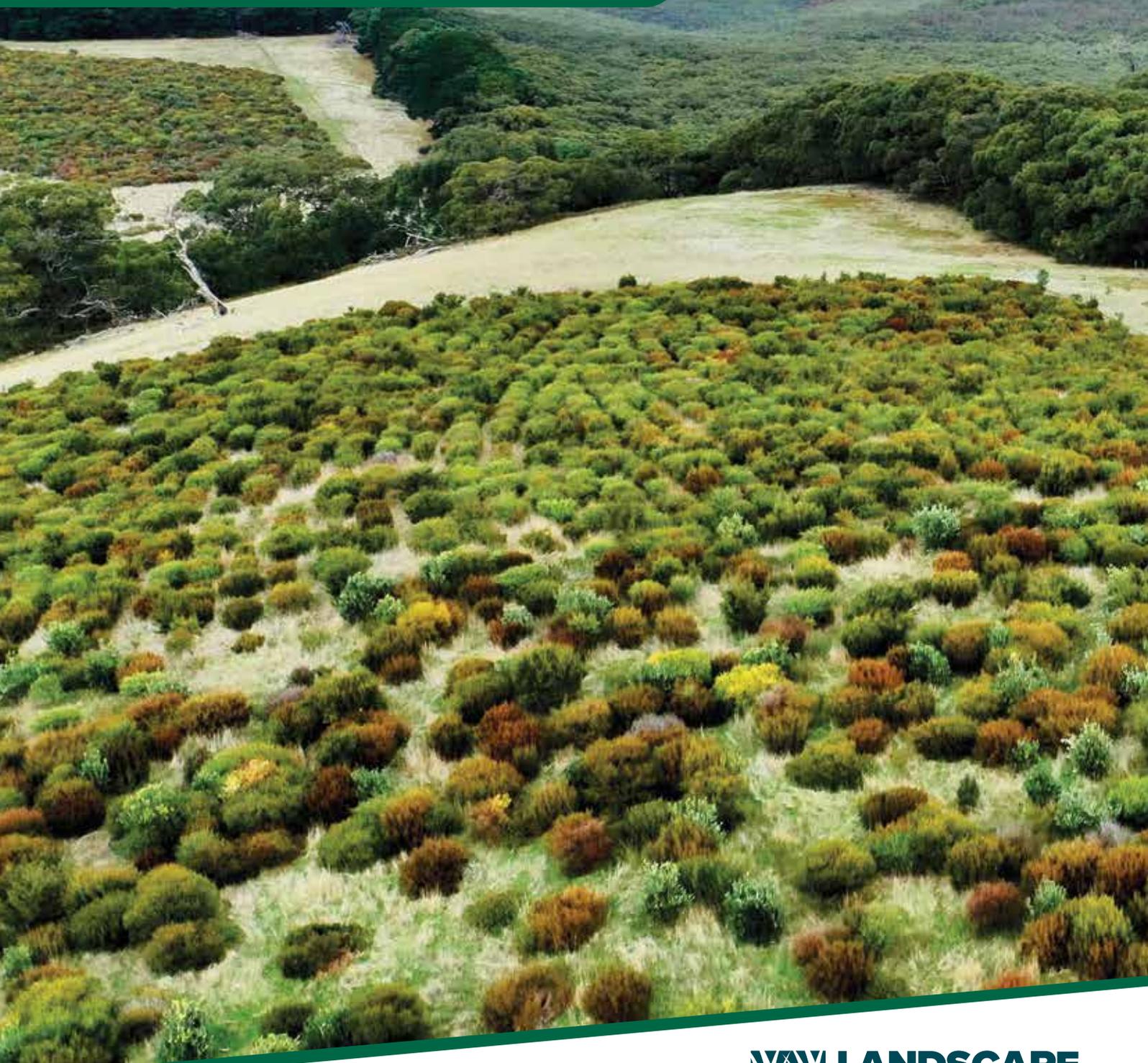
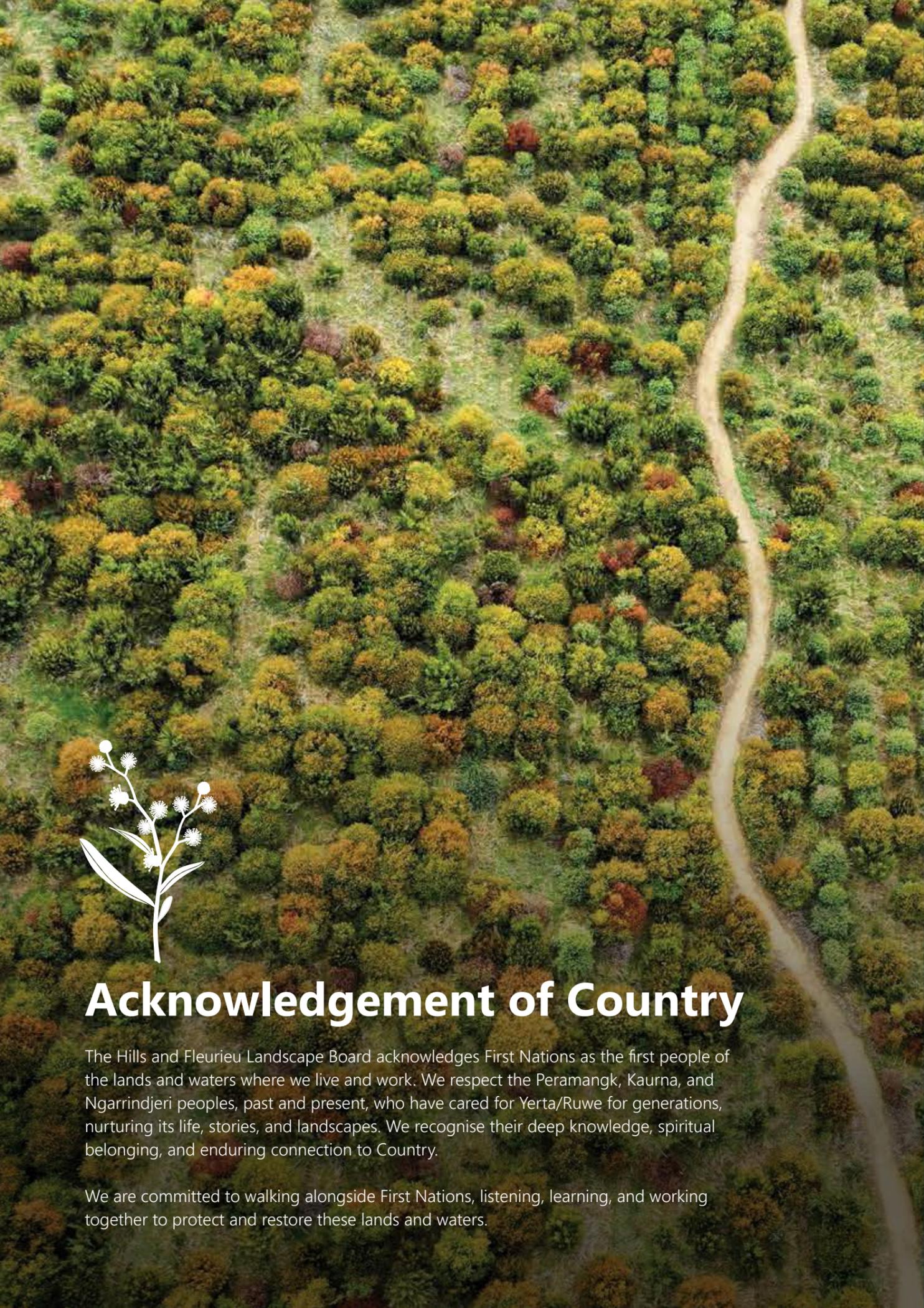


# Five steps to **Thriving Revegetation**





# Acknowledgement of Country

The Hills and Fleurieu Landscape Board acknowledges First Nations as the first people of the lands and waters where we live and work. We respect the Peramangk, Kurna, and Ngarrindjeri peoples, past and present, who have cared for Yerta/Ruwe for generations, nurturing its life, stories, and landscapes. We recognise their deep knowledge, spiritual belonging, and enduring connection to Country.

We are committed to walking alongside First Nations, listening, learning, and working together to protect and restore these lands and waters.

# Welcome



You're here because;

- You're serious about doing a revegetation project
- You want your revegetation to have real purpose and make a positive change on your property
- You want your revegetation to survive
- You are willing to make a time and money commitment to your revegetation project now and for years to come.

This guide walks you through five key steps to help your revegetation project succeed and avoid common pitfalls.

Revegetation plays a vital role in tackling land management challenges across the Adelaide Hills and Fleurieu - like erosion, degraded waterways, and loss of native wildlife.

Download the Thriving Revegetation Action Plan template from our website to map out when and where to take action. It links directly to sections in this guide.

When done well, revegetation is one of the most rewarding things you can do for your land. When it fails, it can be costly, exhausting and deeply disheartening.

Limitations: advice on the revegetation design requirements for carbon off-setting and in-setting is beyond the scope of this guide.

# About this guide



This guide is part of a series designed to support smart, well-timed land management actions for key areas on your property and programs:

- Soil
- Native vegetation
- Watercourses
- Weed control
- Revegetation

Using one or more of these guides will help you make informed decisions, care for natural resources, and boost your efficiency as a land manager. Choose the guides that suit your needs - or use all five to create a complete stewardship plan for your property.

The content draws on the knowledge and experience of our stewardship team, local landholders, and partners working across the Hills and Fleurieu region.

We wish you every success.

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# STEP 1

## Plan to succeed

Creating a plan will help guide your revegetation project. You can download the **Thriving Revegetation Action Plan** template from our website. It ensures your work is well-timed, organised, and manageable. A plan can help you stay in control and set you up for manageable amounts of preparation, planting and maintenance.

### Manage your expectations

Writing down a comprehensive action plan will bring full visibility to the time and financial budget required to do successful revegetation, with no nasty and expensive surprises.

### Consider:

- Plant orders: Order plants at least 9 months in advance.
- Fencing costs: Fencing to keep kangaroos out or buying tree guards can cost more than the plants themselves.
- Site preparation: If you're using direct seeding, you may need two years to control weeds.
- Water access: You may need to water plants for several summers, especially if the site is very dry.

These considerations will help you form a vision of what your plan is trying to achieve. The rest of the guide will help you create a realistic action plan schedule for your revegetation project.

Native grass tubestock



# STEP 2

## Design your revegetation

### Know your revegetation site

Understand your site through observation and investigation. This will help you choose the best plants species and methods. Good planning saves time, money and plants!

#### Consider:

- Low-lying and flat – Seasonal watercourse, floodplain or dam.
- On a hillside - knowing the main aspect; north, south, east or west will help your plant selection.
- Local prevailing wind direction and seasonal change.
- Soil – sandy, loamy, clay, shallow, rocky.
- Do you have a complex site with a combination of any of the above?

The site's micro-climates (localised climate that differs from surrounding area) are important for plant survival. For example, water-loving plants don't do well on rocky hills, and sandy soil plants don't like too much water. Once you have defined your site, now is the time to set up some photo-points of your revegetation site so that you can watch the changes over time.



### Define your purpose

Knowing why you're doing the revegetation will help with planning. It will guide plant placement, the types of plants, and how many you need.

**Size matters** Larger vegetation areas support more wildlife. If you intend to revegetate a large area, break the site into manageable units and plant at different stages. Account for tree size when fully grown. Don't plant trees near powerlines or fences to avoid future damage.

You can learn from the outcomes of each planting and improve each subsequent stage.

**All types of planting can be designed to provide biodiversity benefits**, even if that is not the main purpose. Shelter planting to protect livestock can also benefit wildlife if it's done with appropriate native plant species and is of sufficient width.

Consider further the **purpose** of your revegetation and some of the benefits it can provide with some of the examples to follow.

### Creating and expanding native vegetation

**Key benefit:** biodiversity, weed management

Planting new patches or expanding existing ones supports biodiversity. Use local plant species to improve survival rates. Make sure you're planting the right types of plants for the right areas (e.g. don't plant grassland species in wetland areas).

**Consider:** Revegetation patches which are squarer or rounder in shape have a larger interior area relative to their edge areas. Narrow patches are harder to maintain and suffer more from weeds, wind, and frost. These impacts contribute to 'edge effects'. A phenomenon that occurs at human-made or natural ecosystem boundaries and creates different ecological and physical characteristics on the edge compared to the interior.

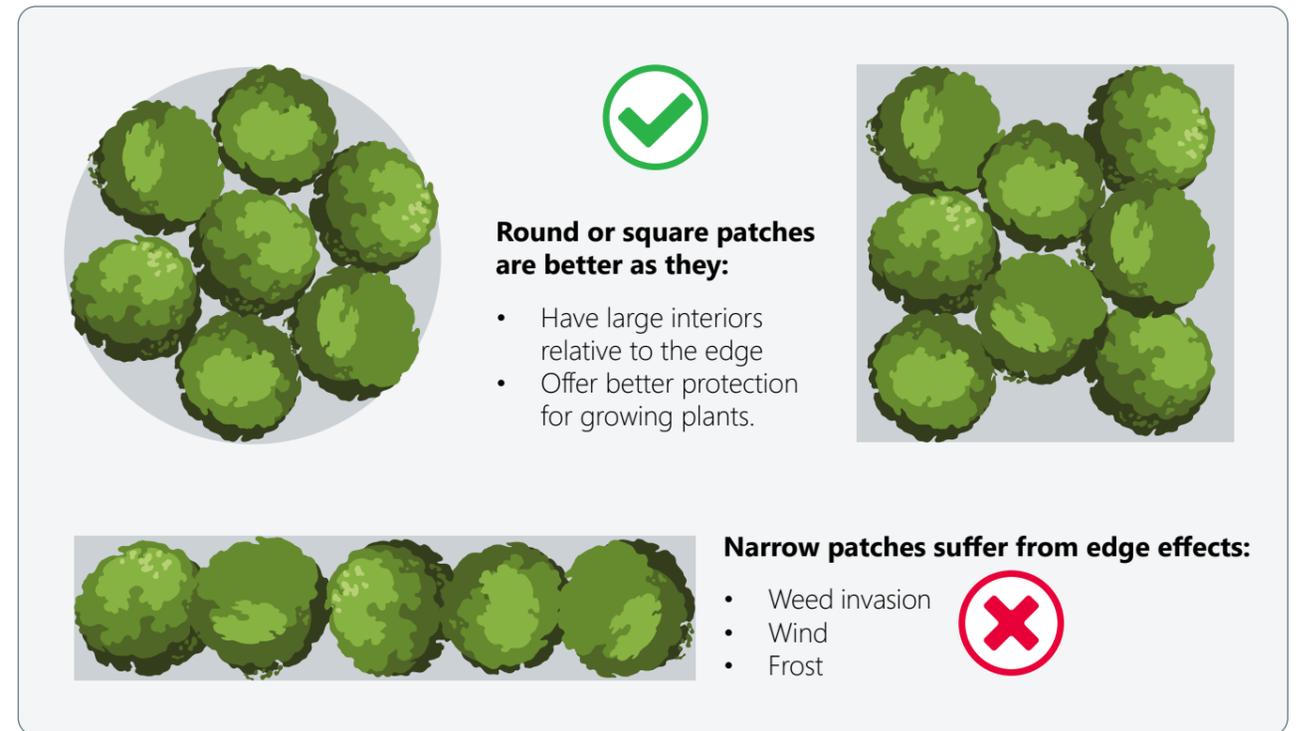


Figure 1: Revegetation patch shapes - shapes with larger interior areas suffer less from 'edge effects'.

#### Revegetation as a buffer zone

Planting around or next to existing native vegetation helps protect it from negative impacts like farming or development. The benefits of buffer plantings include:

- Reducing soil loss
- Less weed growth
- Fewer harmful effects from herbicides and fertilizers

The new revegetation area also benefits from being close to existing vegetation, as it may naturally regenerate from seeds nearby. To make buffer plantings more effective, make them as wide as possible to reduce edge effects.

**A note on wetlands and estuaries.** Wetlands and estuaries are very sensitive to damage from livestock. They can suffer from trampling and pollution. Fencing these areas is important, especially on grazing properties.

- If the area isn't too damaged, wetlands can naturally recover after removing livestock or other threats (like weeds, such as blackberry).
- Monitor the area for a few years to see if planting is needed in the wetland or estuary.

Designing revegetation for wetlands and estuaries is similar to watercourses and dams because they have variable moisture levels. When choosing plants, make sure to select those that can handle different moisture conditions and plant them according to respective tolerance from water-deficit through to water-logging.



Expanding existing remnant native vegetation

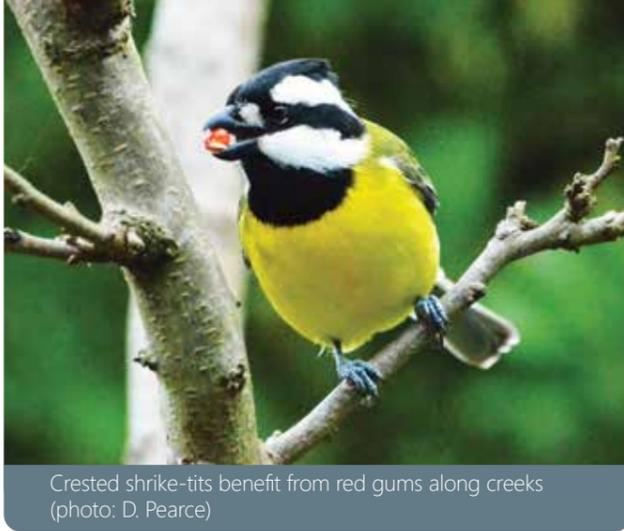


Successful wetland revegetation

## Wildlife corridors

**Key benefit:** biodiversity

Wildlife corridors are established by using revegetation to help connect existing native vegetation patches. This helps wildlife to move through areas more safely whilst searching for food and other resources. Where possible you can reduce edge effects by planting wide corridors rather than narrow. Wide corridors that have a low, dense vegetation structure are better for less vagile (mobile) species, such as small mammal and bird species.



Crested shrike-tits benefit from red gums along creeks (photo: D. Pearce)

## Scattered paddock trees

**Key benefit:** shade and shelter for livestock and woodland bird, small mammal, reptile and insect habitat.

Scattered trees can be planted within grazing paddocks to provide shade and shelter for livestock. They will also have biodiversity benefits such as habitat for ground foraging woodland birds and insectivorous bats. Scattered paddock trees will require appropriately designed and constructed tree guards for protection from livestock, kangaroos, deer, goats and/or rabbits until the tree is mature enough to withstand them (see Step 3).

### Consider:

- Establishing scattered trees between existing patches of remnant native vegetation to help replace ageing paddock trees and increase woodland habitat across the landscape.
- Livestock will be attracted to the shade offered by mature trees in the future, therefore avoid planting shade trees for livestock in steep, wet or erodible areas where soil compaction or tracking will easily degrade land.

To allow trees and shrubs to grow properly and form full canopies that block wind and provide shade, you'll need to fence the area to keep livestock out. Be sure to include a gate for maintenance access!

Windbreaks should be planted at right angles to the direction of the wind.

Wind tunnelling happens when wind is forced through a gap in the shelter, which is common in single-row shelterbelts. Planting in three to six rows helps prevent wind tunnelling and provides better protection.

### Consider:

- Crops: Need protection from hot, drying winds, often from the north.
- Livestock: Need protection from cold winds and rain, typically from the south or southwest.
- If you need protection from multiple directions, you may need plantings in different orientations or a corner planting (right-angle).
- Planting on higher ground (like a ridge line) provides more wind protection.

## Shelter plantings for shade

If your shelter plantings are meant to provide shade for livestock, plant them **inside** the paddock, running **north-south**. This allows livestock to access shade on both sides of the shelterbelt during the early morning and late afternoon.

On the other hand, if the shelter plantings are along the **paddock perimeter**, they will only provide shade on one side, limiting access to shade for livestock.

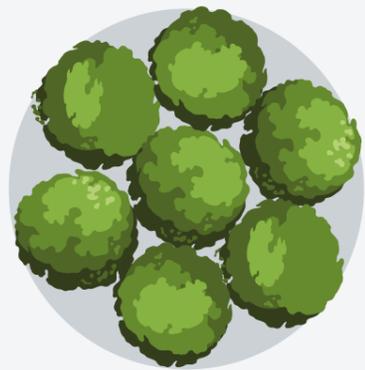
## Shelter plantings

**Key benefit:** wind protection for livestock, crops and infrastructure

Shelter plantings, or 'shelterbelts,' are areas of revegetation designed to protect livestock and crops from wind, provide shade, and reduce frost damage.

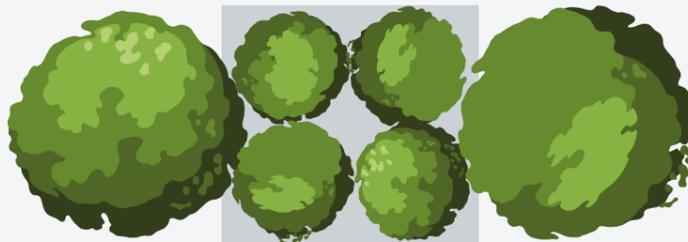


Shelterbelt revegetation



### Buffer plantings:

- Around the edge of existing native vegetation
- Existing native vegetation and new plantings benefit from closeness to each other



### Corridor plantings:

- To connect existing native vegetation patches
- Wide and short are better than long and thin corridors

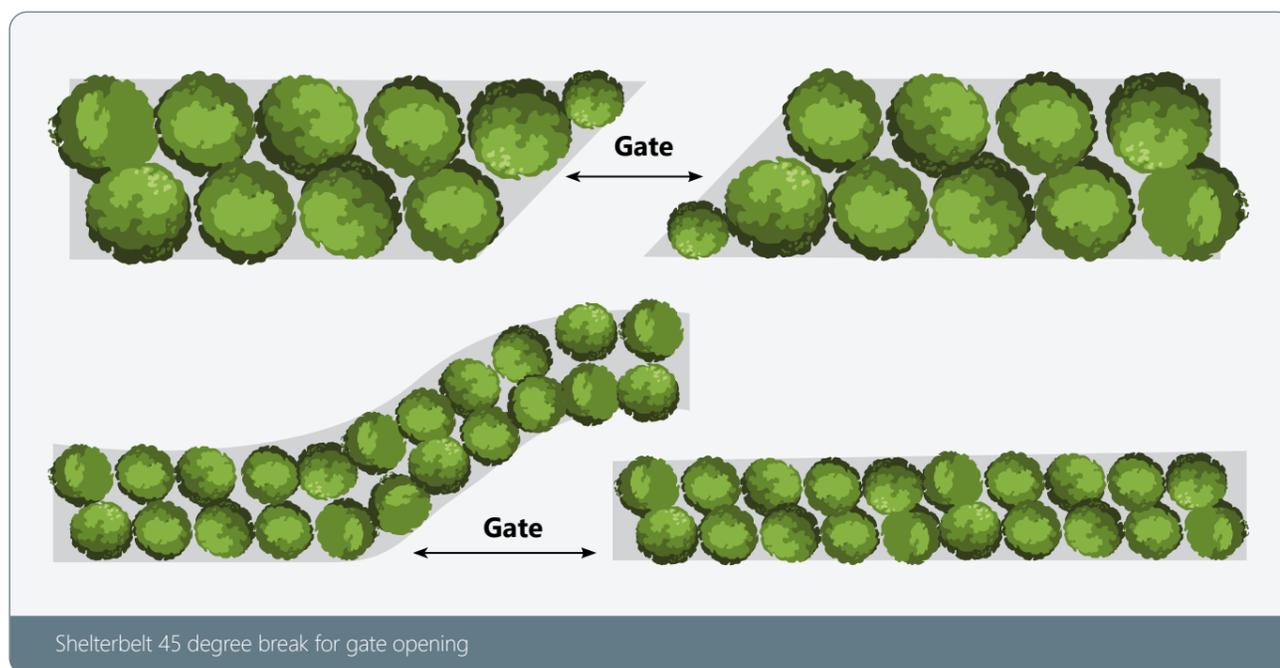
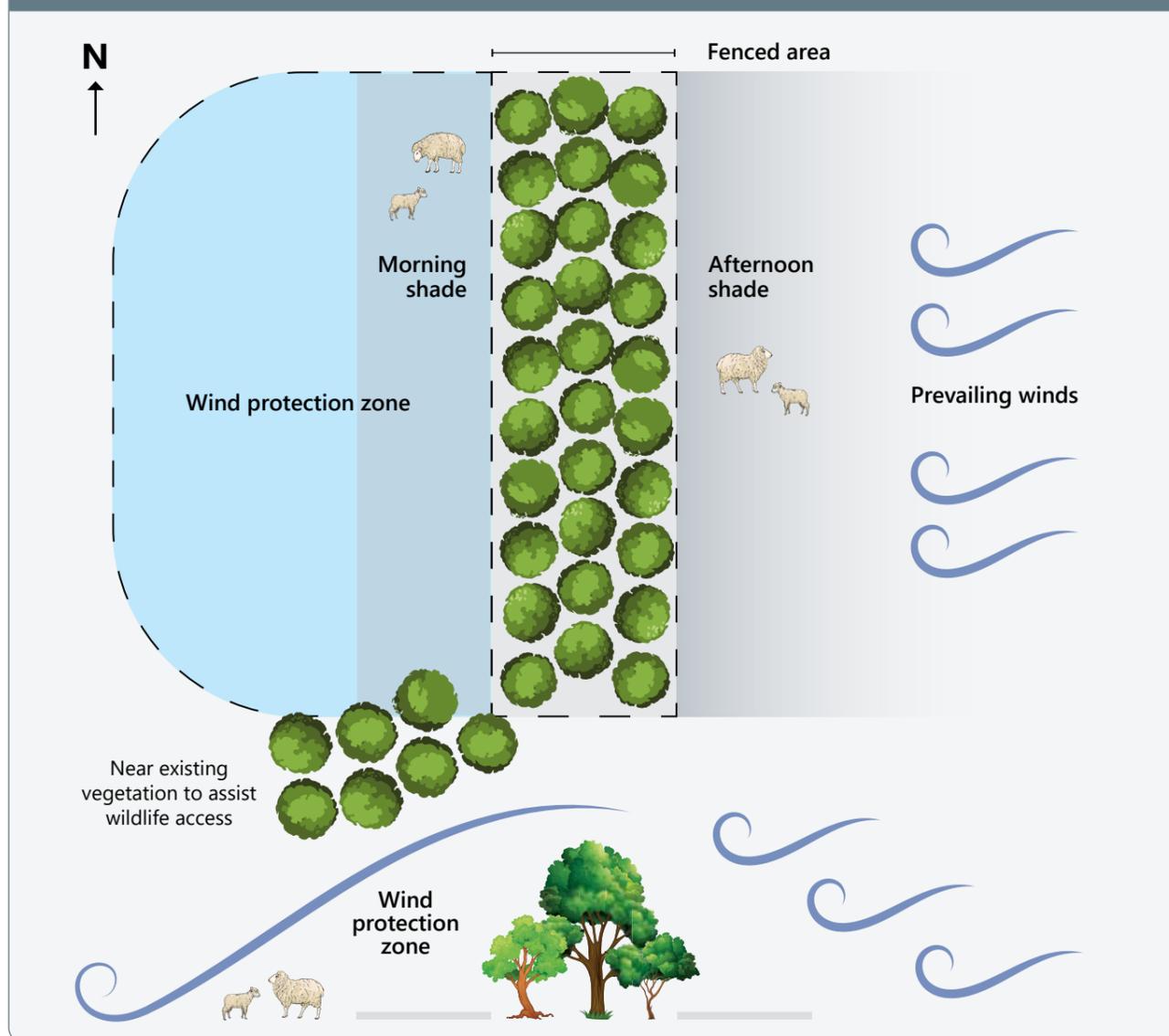
Figure 2: Expanding existing native vegetation patches - buffer plantings and corridors.

## Planting habitat to support a particular wildlife species

**Key benefit:** habitat

Consider the food, shelter and breeding needs of the species that naturally live in your area.

- Southern brown bandicoots: They need low, dense undergrowth for shelter, such as yacca, wire raper-sedge, pink ground-berry, hop goodenia, *Hibbertia spp.*, common Flat-pea and mount lofty bush-pea.
- Native butterflies and moths: These species need specific plants for their caterpillars to feed on, as many adult butterflies and moths don't eat at all. Native grasses and sedges are key plants for them.
- Native bees: Different bee species have different needs. Plant a variety of native plants that flower from spring to autumn to provide nectar and pollen.
- Native birds: Birds have different diets—some feed on nectar, insects, or seeds. They also need different types of nesting places, such as tree hollows, shrubs, or even on the ground. When planting, make sure to provide the right food and shelter. Avoid attracting more aggressive species like noisy miners and rainbow lorikeets.
- Native fish: Aquatic insects or insects with an aquatic larval stage are a main part of the diet of many native fish. Sedges and grasses planted on the edge of water and aquatic plants help provide important habitat for fish and insects.



## Revegetating a watercourse or dam

Are you managing watercourses - creeks, rivers, swamps and dams? If so, be sure to fully familiarise with our "Five Steps to a Thriving Watercourse" BEFORE making the decision to revegetate these areas.

Successful revegetation near watercourses requires excluding livestock using permanent fencing. This helps protect the vegetation, prevents soil compaction and erosion, and keeps waste from contaminating the water.

### Consider:

- Some types of fencing around watercourses may require a permit. Check your local regulations or visit our Five Steps to a Thriving Watercourse to ensure you comply.
- Wider is better: A wider fenced buffer zone will increase the benefits for watercourse restoration.
- Sometimes, fencing alone can allow the area to naturally regenerate.
- If livestock fencing is in place, tree guards may also be needed to protect against grazing from kangaroos, deer, or rabbits. Banksias and sheoaks are especially attractive to kangaroos!

**Wet areas have additional challenges** - maintain realistic expectations about the viability of planting a native understorey of plants along watercourses. If the watercourse is surrounded by pasture grasses, then establishing native grasses and herbs will be highly challenging.

Focus on establishing sedges in small, manageable patches (a few square metres). Begin establishing these patches starting upstream, so that seed can flow downstream. The goal is to ensure the banks of the channel are protected from erosion by a continuous layer of grasses, herbs and sedges.

A mix of native and pre-existing grass species may be the most sensible option.

For more information about watercourse vegetation management to reduce bushfire risk, go to the Hills and Fleurieu website and see Caring for Your Creek-lines to Reduce Bushfire Risk.

## Make a map of your revegetation site

A map of your revegetation site can be helpful to visualise the extent of the project and to mark positions for different types of plants. You can simply hand draw a 'mud map' for small areas or annotate over an aerial map of your property snipped from Google Maps. Free online mapping tools, such as NatureMaps allow you to add 'Layers' to show contours, watercourses and other landscape aspects which will help to create a highly accurate snapshot of your site.

Refer to the Landscapes Hills and Fleurieu website ([landscape.sa.gov.au/hf/nativeplants](http://landscape.sa.gov.au/hf/nativeplants)) for instructions on how to use NatureMaps.

## Choose your method(s) of planting

The methods available for planting include tubestock planting, direct seeding or a combination of both.

- Tubestock planting: Hand planting of seedlings grown in pots, tubes or small cells.
- Machine direct seeding: A purpose-built machine used to sow native seeds on a prepared site (or the machine may prepare the site as it sows seed). Requires a specialist contractor.
- Hand direct seeding: Seed is sown by hand after preparing the site to remove weeds and reduce weed seeds in the soil. This method is best suited to small sites.

The method you choose will depend on site characteristics, time and the budget available (Table 1). Consider engaging a contractor to assist if you are revegetating a large area or undertaking machine direct seeding.



Planting method			
Situation	Tubestock planting	Machine direct seeding	Hand direct seeding
Small site (<1 Ha)	✓	✓ Not always economical	✓ Only for micro-sites
Large site	✓	✓	X
Steep sites	✓	X	✓
Rocky, shallow soils	✓ May be difficult.	X	✓
Boggy, wet soils	✓	X	✓
Some existing native vegetation e.g. grasses, trees	✓	X	✓
Common species e.g. Eucalypts, wattles, sheoaks	✓	✓	✓
Native grasses	✓	✓ Specialist contractor recommended	✓
Rare, large seeded or difficult to grow species	✓	X	X
Volunteer involvement in planting	✓	X	✓

**Table 1:** Comparison of establishment methods. ✓ indicates recommended establishment method. X indicates that the method is not recommended for that situation.

Machine direct seeding native grasses and forbs



## Working out your plant numbers

The number and of variety of plants required for your project is critical to accurate project budgeting of finance, time and labour. You will need to identify your preferred plant species, their planted spacing requirements, and total number based on the size of the planting area to be revegetated.

### Work out the area of your revegetation plot

To work out how many plants you will need, the first step is to calculate the size of the revegetation plot in square metres.

You can calculate planting area using the formulas in the Thriving Revegetation Action Plan, or you can use the measure function in a mapping program, such as NatureMaps.

### Create a list of appropriate species

Optimal survival and biodiversity results will be achieved with local, native plant species that naturally occurred on your site prior to the introduction of non-native species. These are often referred to as 'indigenous' plants.

The following two steps will allow you to access a description of your vegetation community type from a scientific database, as well as a list of native plants that historically grew at your location and are generally available from local native plant nurseries.

**Step 1:** Go to [landscape.sa.gov.au/hf/nativeplants](http://landscape.sa.gov.au/hf/nativeplants) for instructions on locating your revegetation site on NatureMaps, and obtaining the code of the pre-European species community for your location. Your property may have more than one vegetation community depending on landscape characteristics (for example, hill tops versus creek lines). If so, take care to accurately select the location of the revegetation site within your property to obtain the correct code.

**Step 2:** Use that code to find and download your plant list from [landscape.sa.gov.au/hf/nativeplants](http://landscape.sa.gov.au/hf/nativeplants). You are ready to create your planting list!

### Calculate plant numbers

After selecting the species appropriate to your site, you can now calculate how many of each plant you need to order.

Select the type of revegetation project that you are undertaking from the categories below. Then use the formulas to estimate the number of each plant species required.

Note: some formulas are provided in this guide but the full suite of formulas appear in the Thriving Revegetation Action Plan. The formulas allow for a 5m planting buffer distance from your site boundary!

### Creating and expanding native vegetation

Fewer trees and shrubs will be present in a grassy woodland, with a greater number of understorey species, whereas a forest will generally have a higher density of trees and shrubs.

	Upper storey/canopy trees (tall and small)	Mid storey shrubs	Understorey grasses and herbs
<b>Open forest</b>	Plant trees at 5 to 6 m apart (for example 200 per ha)	Plant each species in groups of 15 to 25 plants. Scatter groups evenly across the site. Place each individual shrub 3-5 m apart	Plant understorey plants in groups of 50. Scatter groups evenly across the site. Plant seedlings 1-2 m apart within each group
<b>Grassy woodland</b>	Plant trees at 10 to 30 m apart, e.g. approximately 100 trees per ha.	Plant each species in groups of 10 plants. Scatter groups randomly and well-spaced across the site. Place each individual shrub 4 to 5 m apart	Plant understorey plants in groups of 50 to 80. Scatter groups evenly across the site. Plant seedlings 1 to 2 m apart within each group.

**Table 2:** with the following 'Example of 'tubestock only' planting design for two contrasting vegetation types - Open forest and Grassy woodland.

**Eucalyptus open forest** in the Hills and Fleurieu region are generally dominated by Eucalyptus tree species, whereby crowns shade 50-80% of the ground below (imagine looking down from above). The midstorey may only be sparse with Banksia, native cherry and blackwoods and the understorey dense with low often-prickly shrubs, lilies, orchids and some grasses.

*Eucalyptus* open forest: Trees planted 5-6m apart:  
 $(\text{planting area (m}^2\text{)} / 10,000) \times 200 = \# \text{ of trees to order}$

**Grassy woodlands** in the Hills and Fleurieu region may typically be dominated by *Eucalyptus* tree species, with gaps between their canopies. Although tree density can vary with rainfall, around 100 trees per hectare creates the open areas needed for grasses and scattered woody shrubs to thrive in between.

Grassy woodlands. Large and medium trees, planted 10 to 30 m apart:  $(\text{planting area (m}^2\text{)} / 10,000) \times 100 = \# \text{ of trees to order}$ .

The formulas provide a starting point and assume the site has no native vegetation. Adjustments will be needed to account for site-specific circumstances. The following factors will affect the numbers of plants required.

- Order numbers should be reduced proportionally according to existing plants onsite.
- If the revegetation site is rocky, the area covered by rock will proportionally reduce the available planting area and order numbers will be reduced.
- It is often better to plant fewer plants than too many.

Challenging sites - If the understorey is dominated by exotic pasture grasses, establishment of native grasses and herbs will be very challenging. Without major

intervention, it may be more realistic to accept that exotic pasture grasses will continue to be the grassy understorey. Instead attempt to establish/encourage native grasses and herbs in small, manageable patches of a few square metres in size.

## Scattered paddock trees

Choose larger tree species that suit your site. When planting scattered trees, space them 15 to 30 metres apart. This allows enough room for the trees to grow wide canopies that provide shade for livestock.

If trees are planted too close together, their shade will reduce pasture and native grass growth, which lowers soil cover and food for livestock throughout the year. Well-grown canopies also provide important shelter, food, and nesting spots for wildlife.

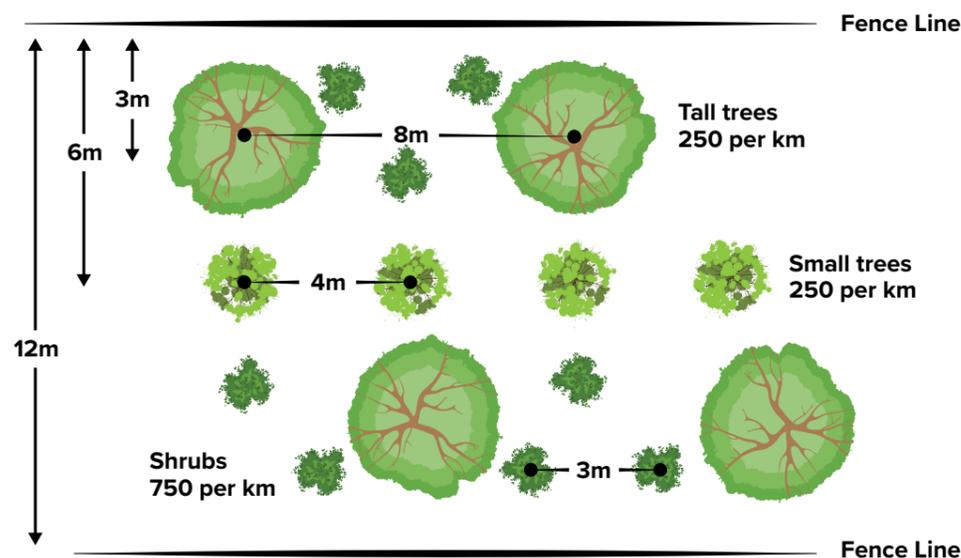
Scattered paddock tree calculations:  $(\text{planting area (m}^2\text{)} / 10,000) \times 10m = \# \text{ of trees to order}$

## Shelter plantings

To create an effective wind barrier, shelterbelts should ideally be 30m wide and planted so that the canopies of plants of various heights knit together to make a screen.

Tall trees should be planted about 8 metres apart, small trees 4 metres apart and shrubs 3 metres apart. Grasses and small understorey plants are best planted in groups close together. Figure 3 below suggests positioning of tree and understorey planting in a three-row shelter planting. A five-row or six-row shelter belt should have tallest trees in the center with decreasing plant heights as rows move outwards.

Minimise the number of short-lived genus *Acacia* trees and shrubs used in the shelter planting.



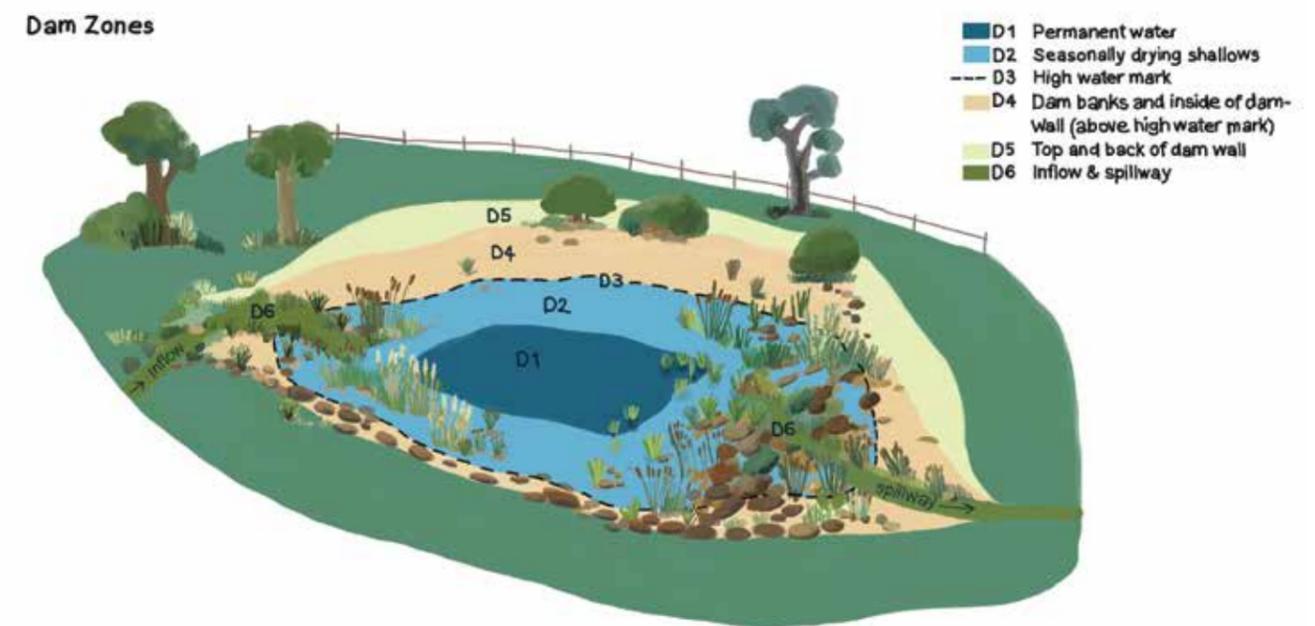
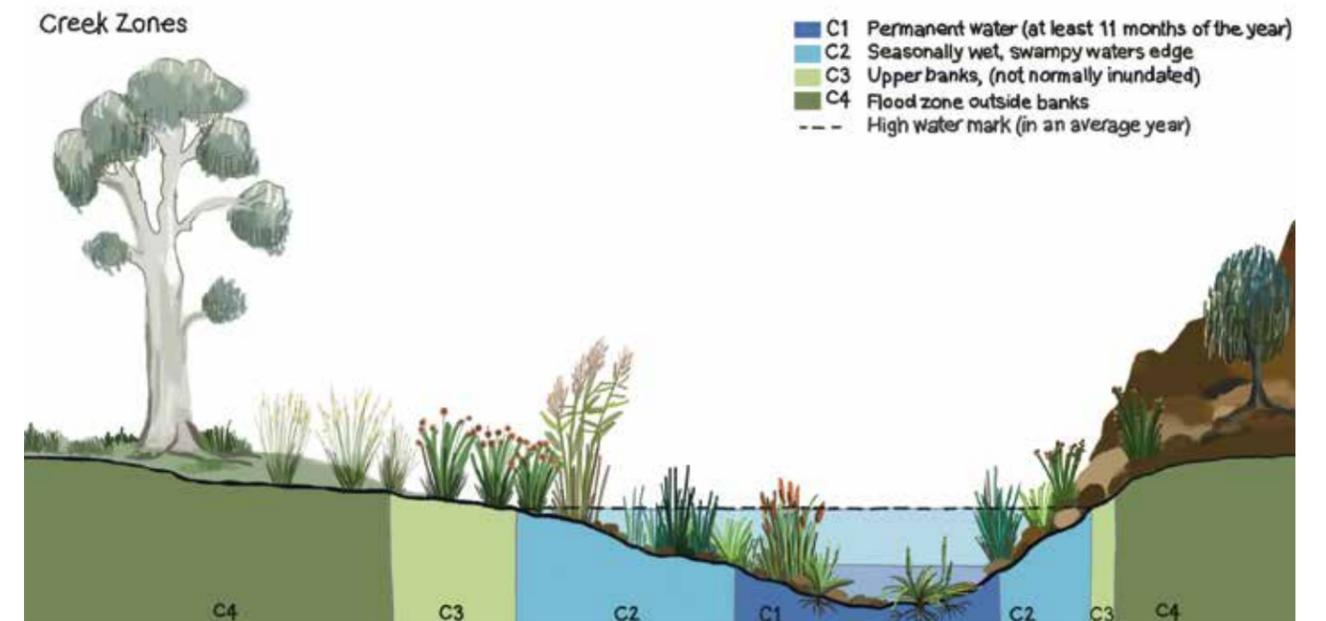
**Figure 3:** An example '3-row' planting design for shelterbelts (or windbreaks) that will benefit both agriculture and biodiversity (Taken from the "Special purpose planting booklet" by Trees For Life [treesforlife.org.au/resources](http://treesforlife.org.au/resources)).



## Watercourse and dam plantings

Choosing the right plant species for the right location is critical when revegetating a watercourse, because different plants prefer different moisture levels.

**Sedges and rushes** - Important in any watercourse or dam revegetation project, their root mass helps stabilise banks and reduce erosion, and their shoots stay green throughout summer. These species should be planted at 0.5 m to 1 m apart. See our 'Sedge and Rush Planting Guide for Creeks and Dams' to learn where individual species prefer to be planted around a dam or watercourse.



**Figure 4:** Ideal design for watercourse (creek zones) and dam (dam zones) planting.

**Watercourse planting** - Iconic large tree species, such as river red gums, can be planted above the top of the bank approximately 30 m apart along watercourses. River red gum seeds float, so they'll naturally spread and grow along flood lines. See zones C and D in figure 5.

Well-spaced trees allow them to grow wide canopies that provide shelter, food, and nesting spots for wildlife. Avoid planting red gums on steep banks, as they can change water flow and cause erosion. Trees planted too closely together will

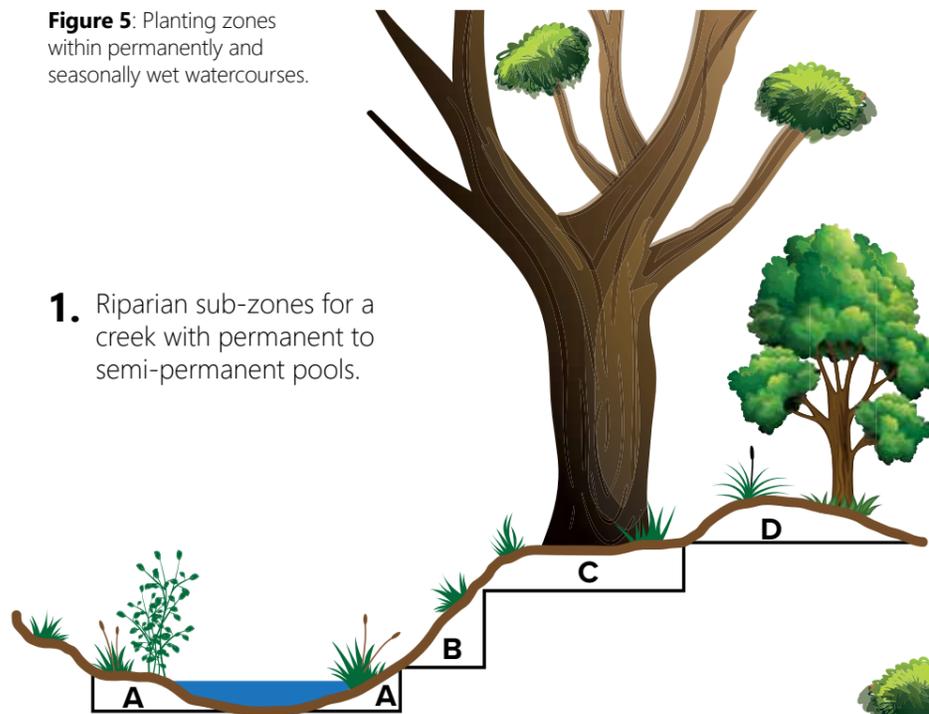
grow tall and thin, blocking sunlight for shrubs and other plants beneath them.

Plant shrubs in groups of 3 - 4 of the same species, spaced 2 - 3 m apart. Plant medium-sized trees 10 to 12 metres apart, ensuring enough space so they won't be shaded as they grow. See zones B and C.

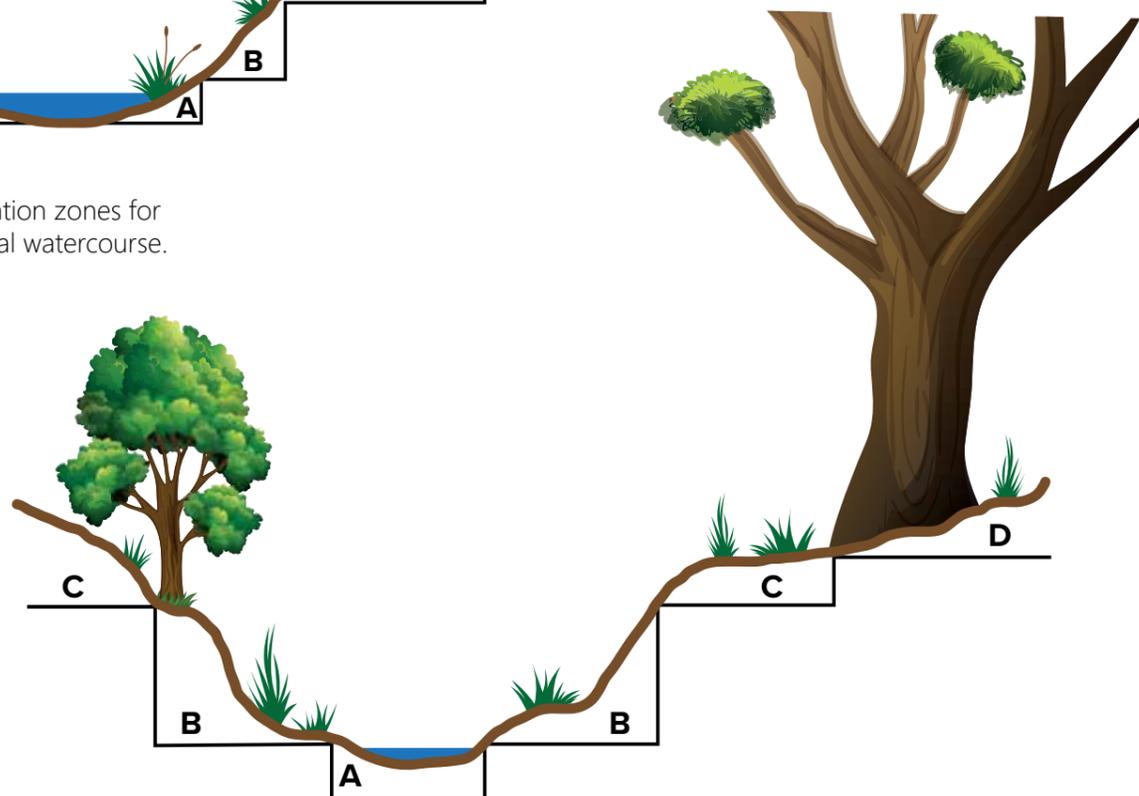
Start by planting sedges in small patches, about 4x4 metres in size, with plants spaced 0.5 metres apart. Begin planting upstream so seeds can float downstream and grow along the watercourse over time. See zones A and B.

**Figure 5:** Planting zones within permanently and seasonally wet watercourses.

1. Riparian sub-zones for a creek with permanent to semi-permanent pools.



2. Revegetation zones for a seasonal watercourse.



### Zone A

Water's edge and swampy areas

### Zone B

Lower banks

### Zone C

Upper banks and floodplain

### Zone D

Well drained soils on floodplains

## Dam planting

Sedges and grasses can be planted 0.5 to 1 metre apart anywhere around or in a dam. These plants thrive in different moisture zones (see Figure 6 for details). For specific planting tips, refer to our Sedge and Rush Planting Guide for Creeks and Dams. Here are some general guidelines:

- For the inflow region, plant sedges and grasses here to protect soil from erosion and reduce sediment and nutrients entering the dam.
- Minimize planting trees and shrubs in this area, as their shade will limit grass and sedge growth.
- Along the spillway, plant or allow sedges and grasses to grow to reduce erosion. Never plant trees and shrubs in this region.
- Never plant trees or shrubs on the dam wall as their roots will create leaks over time.

- On the side of the dam that gets the most sunlight and summer wind, plant trees and shrubs about 10 metres above the high-water mark. This will:

- Reduce wind and provide shade
- Help reduce evaporation and algae growth
- Provide shelter for wildlife

To calculate the number of sedges needed, consider which of the three regions around the dam are to be planted, then estimate the total combined area.

Calculating number of sedges and grasses: total planting area (m<sup>2</sup>) x 2 = # of sedges and grasses to order

See the shelter planting formulas under Step 2 for dam shelters.

**Figure 6:** Plan for planting a dam.

## Dam planting

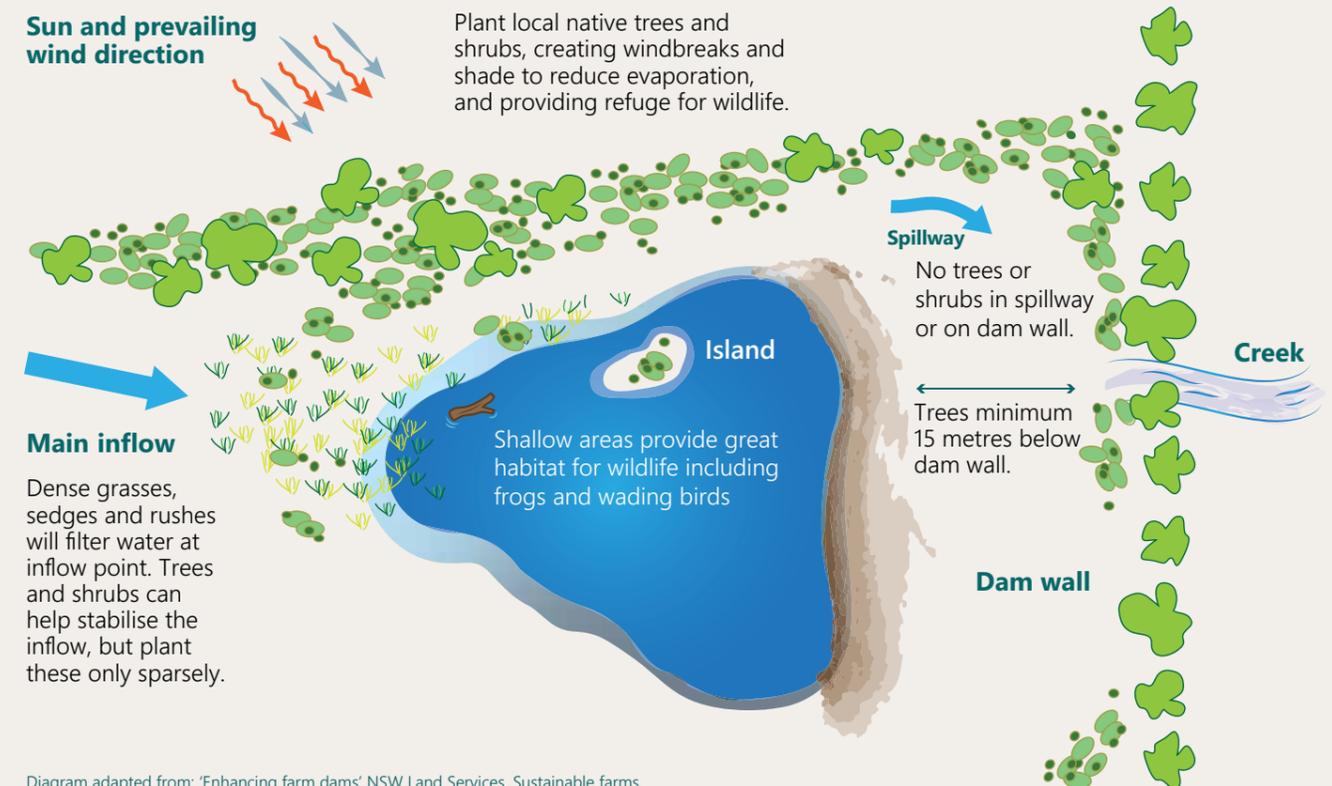


Diagram adapted from: 'Enhancing farm dams' NSW Land Services. Sustainable farms.

# Order your plants and/or seed

## Choosing plant species for your site

Now that you know how many trees, shrubs, and understorey plants you need, it's time to choose the right plant species for your site.

Use your local plant species list from the relevant pre-European vegetation community profiles that occur at your site to find the best species suited to your site conditions (e.g. watercourse vs. rocky hilltop).

## Sourcing seeds

### Sourcing plants

Seed can be purchased from a commercial contractor and should be ordered more than a year in advance due to short collection windows and diverse timing of seed maturation for many plant species. You can collect seed yourself subject to permission from the land owner/manager before collecting seed. A permit must also be obtained from the Department for Environment and Water before collecting any plant material from public land and any threatened species on private or public land. If you are purchasing plants directly from a grower, you are unlikely to need to buy seed unless you require a specific provenance they don't have in stock.

Local provenance plants (native to the area) are best, as they're adapted to the local climate and conditions.

### Ordering plants

- Tubestock seedlings should be ordered by October to be ready for planting in autumn the following year.
- Some species (like *Banksia*, *Bursaria*, native pines, flax-lilies, *Hakea*, and grass trees) must be propagated in winter, so order them by mid-winter.
- Most other species are propagated in spring or early summer.
- For some specialist species, propagation may take up to 2 years so check with your nursery for lead times.

## Machine direct seeding

Machine direct seeding requires the use of specialist equipment. There are a variety of seeders from modified agricultural units to bespoke designs. They vary depending on the type of vegetation being established, e.g. broadacre native grasses and herbs to create grassland, versus more widely spaced rows of shrubs and trees to create shrubland, woodland or forest.

Not all species of plants have seed that is suitable for direct seeding and tubestock propagation is usually better suited to these species and those where limited quantities of seed can be sourced.

Different types of target vegetation require different amounts of seed and site preparation. Broadacre direct sowing of understorey species typically requires 2.5-5 kg / ha. Direct sowing of shrubs and trees into 1 to 3 metre spaced rows typically requires 0.5-1.5 kg / ha depending on desired density of mature plants.

Large quantities of native seed can be expensive. Seek the advice of a professional contractor when planning to machine direct seed native vegetation.



Drooping she-oak  
(*Allocasuarina verticillata*)



Black-anthered flax lily  
(*Dianella revoluta*)



Grassland



Christmas bush  
(*Bursaria spinosa*)



# STEP 3

## Prepare for planting

Seedlings are soft and well-watered, which makes them tasty and irresistible to herbivores like rabbits, goats, deer, livestock, and kangaroos. Without proper protection from these animals, your planting efforts will be wasted. This problem has become more common in recent years due to the increase in kangaroo numbers and the spread of feral deer.

**Protecting your revegetation from grazing animals is the most expensive part of revegetation projects in the Hills and Fleurieu region.** Be sure to include the cost of fencing or plant guards in your budget.

Depending on the size of your project, either fencing or guards may be more suitable. Fencing works well for large revegetation areas where it's more cost-effective to keep grazing animals out rather than using individual guards. Order your fencing or guard materials before starting your planting.

Guards are better for smaller projects, scattered trees, or for protecting seedlings from frost. Below are some considerations for fencing and tree guards based on your project and the animals you're protecting against.



## Fencing

Different types of fencing are needed depending on the animals you're trying to keep out. Choose a layout that uses less fencing and takes advantage of existing native vegetation within the fenced area. For more detailed advice on fencing needs and costs, speak to a fencing contractor.

### Consider:

- Kangaroos: Standard livestock fencing won't stop kangaroos. Build your fence at least 1.6 metres high to keep them from jumping over.
- Deer: Deer-proof fencing must be strong enough to handle antler damage and jumping. The minimum height should be 1.8 metres.
- Rabbits: Use small mesh (around 4 cm) and wire that's 1.2 mm thick to stop rabbits from chewing through. The fence should be at least 1 metre high and partially buried or have an apron extending horizontally outwards on the ground's surface to stop burrowing.

### Tree guards:

Plastic and corflute guards should be removed after 1-2 years, as they break down into micro-plastics. Corflute guards can be reused, but when they degrade, take them to a recycling facility. Biodegradable guards are a better option as they can be composted or left to break down naturally. Ensure they're well-constructed to avoid collapsing and smothering the plant. These guards can sometimes be chewed by kangaroos or birds.

## Watercourse Fencing

- Fencing: Place fencing above the flood level and run it parallel to the flow of water. Make sure the fence is wider on the outside of bends, as these areas tend to widen over time.
- Crossing a watercourse: If your fence crosses a watercourse (like a boundary fence), it must comply with the Current Recommended Practice (CRP) to prevent damage. Check our website for more details on the requirements.

Along straight sections of watercourses the width of the fenced planting area is ideally at least 10 m and a minimum distance of 6 m as watercourses are naturally dynamic and will change position over time. Along the outside bends of watercourses, the ideal width of the fenced planting area is at least 15 m and a minimum of 10 m to avoid natural erosion or major flood events from undermining fence posts and plantings. Every watercourse site will be different and should be assessed on a case-by-case basis.

## Creek-line fencing plan, indicating buffer widths and fire breaks.

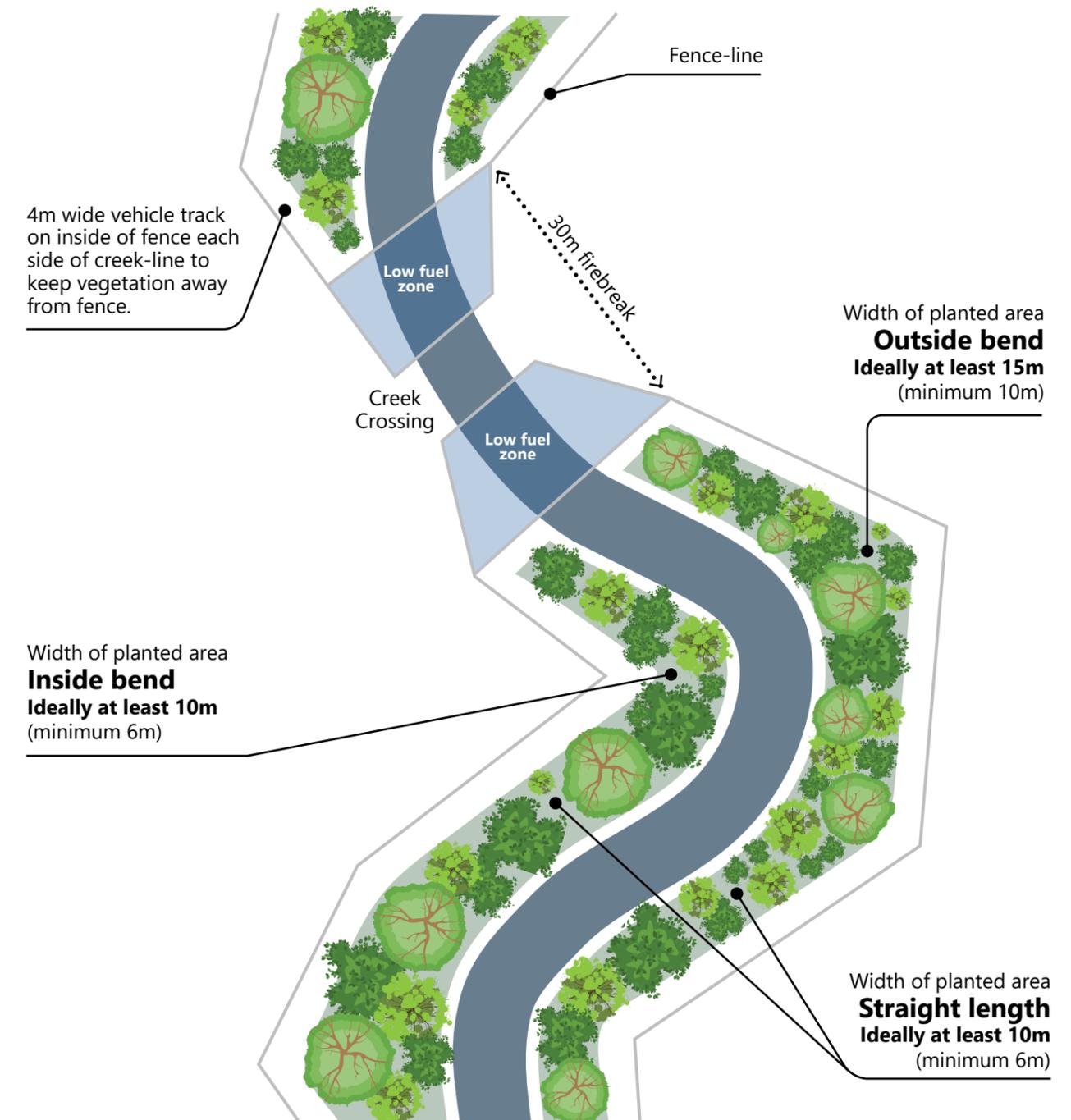


Figure 7 Creek-line fencing plan, indicating vegetated areas, vehicle access and crossing with fire break

## Dam fencing

Fencing dams to exclude livestock makes sense from an environmental perspective and an animal health perspective. Having livestock in dams can cause costly damage to the integrity of the dam while animal faeces and urine pollute the water. Instead, you can improve animal health and condition by providing clean water from troughs. See Figure 8 for fence design considerations.



## Plan for fencing a dam

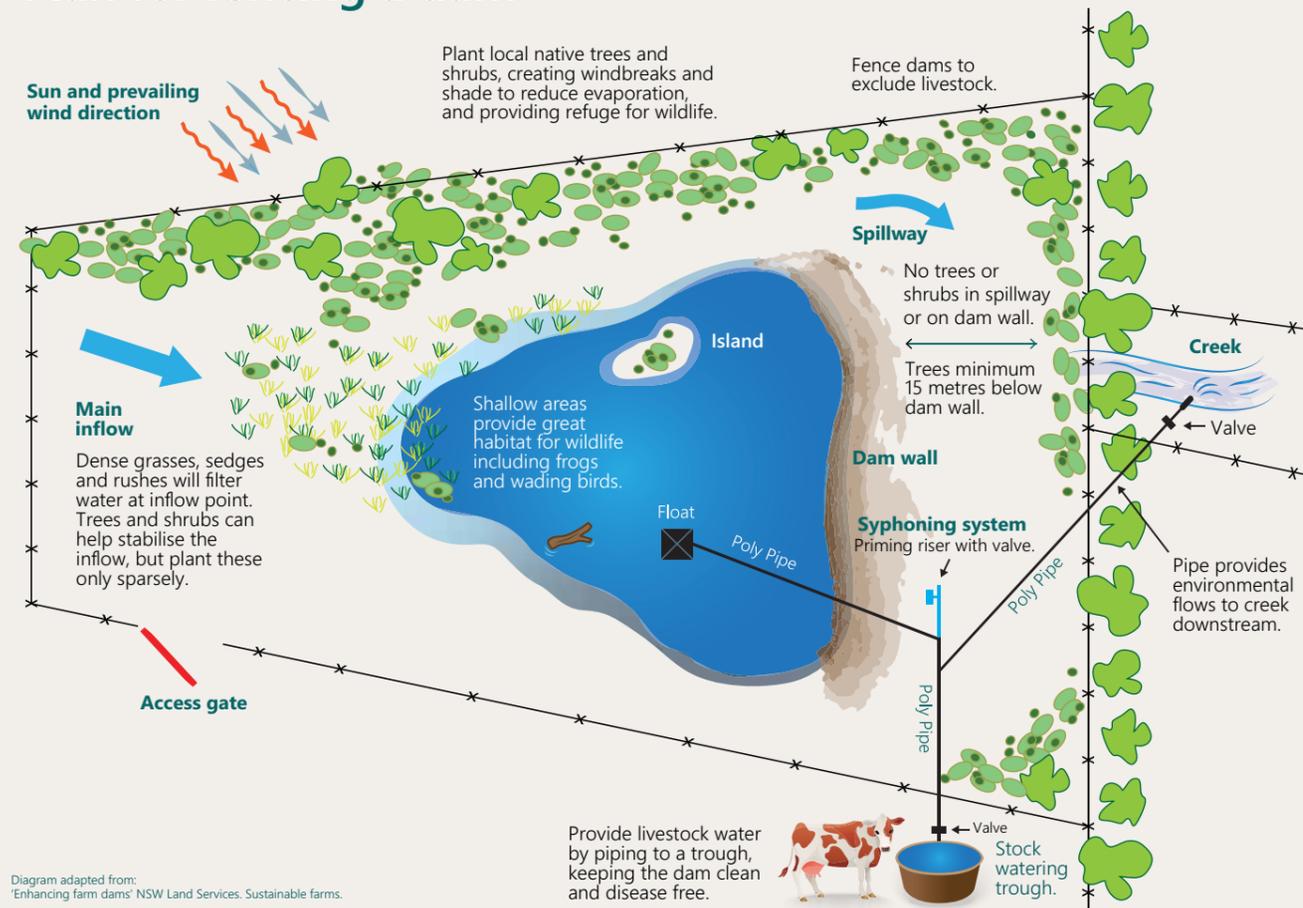


Diagram adapted from: 'Enhancing farm dams' NSW Land Services. Sustainable farms.

**Figure 8:** Plan for fencing a dam and provision of livestock water supply

## Guards

Selecting the right guard for the herbivore you are excluding is critical to ensuring plant survival and success of your revegetation project. There are commercially available pre-made guards for common animal types and they can be reused.

- Kangaroos: Mesh tree guards 1.2 m high are ideal to prevent kangaroos grazing on leaves through the sides and over the top of the plant.
- Rabbits: Plastic or biodegradable tree guards

can help protect against rabbits.

- Livestock: Ensure the guard is sturdy enough to withstand livestock rubbing or pushing against them and are tall enough to be above browsing range. Cattle are tall and love to rub against tree guards. Wrapping barbed wire around strong 2 m high solid mesh guards is needed, preferably with four dropper posts.
- Goats: Because goats can stand on their hind legs to browse high foliage, often bracing themselves using their forelegs,, tall strong guards that won't collapse under their weight are needed.

## Decide when you will plant

For most revegetation projects, the best time to plant is between May and August. However, the timing depends on the rainfall patterns in your area. It's best to plant as soon as possible after good early rains. If you live in areas with high rainfall, you might be able to plant a bit later in the season. Early planting gives seedlings enough time to develop strong roots before the hot, dry summer.

For planting aquatic or semi-aquatic plants (such as in dams, wetlands, or watercourses), it's best to do this in spring, summer, or early autumn, when water levels are lower and the plants are less likely to be washed away by high water flows.

## Prepare your site

Once you've selected your site, and your guards or fencing, it's time to prepare the revegetation site by:

## Controlling weeds

Weeds in a revegetation area can compete with your plants and become harder to manage over time. Proper site preparation can reduce both the time and cost of managing weeds later.

Here's what you can do:

- Identify the weeds on the site and plan your control methods before planting.
- Choose the right control method for each weed species and the type of planting you are doing.
- There are various ways to control weeds, including hand-pulling, cutting, grazing (using livestock), biological control (like insects or disease), and herbicides. If using herbicides, be very careful to avoid harming native plants. It's best to either avoid herbicides or hire a professional with experience in selective herbicide use in areas with native vegetation.
- If using machine direct seeding, the contractor will guide you on site preparation, which could start up to two years before planting.
- Avoid spraying herbicide near dams or creeks because most herbicides can harm aquatic life. If you must use herbicides, make sure they're approved for use near water and follow the instructions carefully.

- Weeds may provide habitat for native wildlife. For example, blackberry can be important for southern brown bandicoots. If there is no other habitat nearby, remove weeds slowly and replace them with native plants over time.

For further help with weed identification and control, refer to Five Steps to Effective Weed Control.

## Natural habitat features

- Retain existing habitat features such as dead trees with hollows as these provide nesting and perching sites for native birds and mammals. Logs and rocks also provide habitat for native fauna such as lizards and insects.

## Pasture weeds and grasses

- If exotic pasture weeds and grasses dominate your revegetation site they will quickly outcompete and smother your seedlings if not controlled before and after planting.

- Initially, pasture grasses can be grazed by livestock or mechanically slashed to make the site more accessible.
- Use herbicide a few weeks prior to planting to strip spray or spot spray individual planting positions prior to planting. Spot spray an area of 1 square metre per plant.
- Alternatively, individual planting positions can be scalped to remove the top 5 cm of soil, along with the weed seeds it contains. Scalp an area of 1 square metre per plant using a fire rake or shovel. This can be done prior to planting or at the time of planting.

## Pest animal control

- Undertake control of pest animal herbivores (such as rabbits, goats and deer) and overabundant kangaroos. Please note that a destruction permit must be obtained from National Parks and Wildlife Service SA in order to cull over-abundant kangaroos. Visit our pest animals web page ([landscapes.sa.gov.au/hf/pestanimals](http://landscapes.sa.gov.au/hf/pestanimals)) for more information on control of feral deer, rabbits and goats.

# STEP 4

## Plant your site

### Tubestock planting

- **Tubestock care:** Once you have your seedlings, it's important to keep them healthy until planting time. While in the nursery, they were kept in full sun and watered regularly, even twice a day during hot weather. You'll need to maintain this level of care until they're ready to be planted out.
- **Watering:** Seedlings in tubes dry out quickly, so daily watering is essential. The bigger the plant, the faster the potting mix will dry out. If the mix dries out completely, it can be hard to re-wet.
- If the plants dry out, submerge the tubes in water until air bubbles stop rising, ensuring the potting mix is fully moist. Once the tubes are re-wetted, they'll feel noticeably heavier.
- **Timing:** Autumn planting, after the first good rains, is ideal. It gives your seedlings enough moisture and time to establish their roots before the hot, dry summer. Even if the plants don't seem to grow much above ground in winter, their roots will be actively growing.
- Don't underestimate the time and effort needed to plant a large number of seedlings. Even with the best intentions, many plants die in their tubes because landowners struggle to find the time to plant them out.
- Do plan ahead! Set a planting date and get help from family and friends. Make sure to show your helpers the correct planting technique to give the seedlings the best start.

When planting into remnant vegetation, remember:

- Pay attention to what is regenerating naturally. You do not want to disturb areas of soil where local native vegetation is naturally colonising.
- Don't plant an understorey species that requires a lot of sunlight directly under a mature tree or close to a regenerating tree seedling that will eventually shade it.



Desert banksia tubestock ready for planting



### Planting technique

1. **Loosen the soil:** Use a planting tool like a hand mattock, garden fork, or shovel to loosen the soil. Dig a hole that's slightly deeper than the pot but much wider than the tube.
2. **Moisture check:** Ensure the soil in the hole is damp. Dry soil will quickly absorb water from the root ball and dry out the plant. If the soil is dry, pour 5 litres of water into the hole and wait for it to drain before planting.
3. **Remove the seedling:** To easily remove the seedling from its tube, hold the plant upright and gently tap the top of the pot with a hand trowel. The plant should pop out, leaving the tube intact for reuse.
4. **Check the roots:** Ensure the potting mix is fully wet. If it's not, place the plant back in the tube and immerse it in water for a few minutes until air bubbles stop rising and the tube feels heavier. If the roots are tightly packed, gently loosen them to help them spread out into the soil.
5. **Place the plant:** Put the seedling in the hole, ensuring it's about 5 cm deeper than the surrounding ground level. The natural soil should completely cover the potting mix the plant is growing in.
6. **Create a water basin:** Sculpt the soil around the hole to form a bowl-shaped basin. This will allow water to flow in from uphill and help retain moisture around the roots, making summer watering easier. The basin should be at least 30 cm wide and 5 cm deep.
7. **Water:** Water the plant with 2 litres of water immediately, if possible.
8. **Long-term care:** By following this planting method in autumn or early winter, the plants should survive and thrive during the summer with minimal watering (around once a month, depending on the summer's severity).
9. **Plant guards:** Install guards around individual plants if needed to protect them from grazing animals.



## Machine direct seeding

Generally, this will be undertaken by a specialised contractor who has access to machinery. Some machine direct seeding methods create rows of vegetation, whilst other methods sow evenly throughout the site. Different contractors use different methods. Supplementary tubestock seedlings can be planted (1) between the sowing rows to fill the gaps, or (2) throughout the sowing site to introduce plant species that cannot be machine direct seeded.



Heathland area direct seeded and ready for infill planting with tubestock

## Hand-direct seeding

- Weed Control: To reduce weeds, use herbicide to control them for a year before sowing, which will help reduce the seasonal weed cycle.
- Soil preparation: Once the site is ready, loosen the soil surface with a mattock, spade, or similar tool. This will create a rough surface for sowing.
- Seeding: Scatter the seed evenly across the soil. Lightly rake the soil afterward to cover the seed.
- Mixing seed: To ensure even spreading, mix the seeds with sand or sawdust. This helps in spreading larger seeds (like *Dodonaea* and *Acacia*) along with finer seeds (like *Eucalyptus* and *Leptospermum*). Be careful not to sow too much seed to avoid overcrowding.
- Protecting the seeds: Shelter the hand-seeded spots with fallen branches to protect the seedlings from animals and to prevent seeds from being washed away by rain or wind.
- Native grass seeding: For larger areas, you can hand-broadcast native grass seed directly from the grass heads. There's no need to remove the seed as it will naturally drop out.
- Native daisies: Native daisies can also be seeded in this way.



Golden wattle seed (*Acacia pycnantha*)



Area direct seeded with native grasses

# STEP 5

## Maintain, monitor, review, adapt



### Monitoring

Observing changes over time. Regular monitoring will identify issues early and minimise plant losses by providing the opportunity to change existing management actions or implement new ones.

- Regularly check how plants are doing and monitor the growth of plants for signs of water stress and grazing.
- Monitor extent of weed populations to determine the effectiveness of weed control efforts and to quickly identify any new weed species.
- You may also like to take note of how wildlife increasingly uses the planted site over time.

## Essential site maintenance

### Watering

Access to water is crucial for successful revegetation. When planning your project, consider any water limitations to determine how many plants you can include or the size of the area to revegetate. Many species will require supplementary watering if their isn't sufficient rainfall, particularly in summer, during their first few years. Depending on rainfall, plant species, and soil drainage, your plants may need manual irrigation, especially if planted in drier months (spring/summer).

### Ongoing weed control

Regular weed control is essential to ensure native seedlings aren't smothered. If the area becomes overrun with weeds, they can spread across the property. Weed management will need to be more frequent during the first few years until plants are established. Grazing can only be used if plants are protected from herbivores (refer to Step 3 for protection details).

### Plant protection

Fence inspections and maintenance: Regularly check fences to ensure they continue to exclude livestock or other unwanted animals. Conduct repairs as necessary.

### Maintenance and removal of tree guards:

- Inspect tree guards for damage and replace or reinforce them as needed.
- Tree guards should be removed when plants are large enough to prevent them from strangling. The best time for removal depends on the guard type and plant growth.
- Tree guards can often be reused in future revegetation projects.
- Address pest animal issues if required.



## Monitoring

- Photo-points are a simple form of monitoring – this is where photos are regularly taken from the same position to detect change over time. Ideally, set up photo-points before you begin work on a site. Choose camera positions that won't get overgrown once your revegetation grows. See long-term photo-point example images below.
- Over longer time scales aerial photography (such as from Google Earth) can be used to track progress of revegetation.



## Infill planting (if required)

You may need to fill in gaps over time due to plant death, or to add more species diversity.

- Tubestock planting: Infill planting can be undertaken in subsequent planting season(s) to replace any plant losses that have occurred and increase species diversity within the planting site.
- Direct seeding: Wait a couple of years to see what seedlings emerge before considering whether additional planting is required.





## Would you like to learn more?



For a full suite of links and additional information, tools and references aligned to the topics in this guide, please visit the native vegetation page on our Landscape Hills and Fleurieu website at [landscape.sa.gov.au/hf/nativevegetation](https://landscape.sa.gov.au/hf/nativevegetation). This is also where you will find your **Thriving Revegetation Action Plan** template.

Following the steps in this guide will help you address the key challenges faced by revegetation projects in the Hills and Fleurieu region. A key focus should be on effective plant protection from herbivores and ensuring seedlings are watered in their first summer.

As climate change progresses, some plant species may struggle to thrive in their current locations. It's important to monitor plant health and adjust by focusing on species that are adapting well to the changing conditions. This includes preserving remaining native vegetation and continuing efforts to revegetate.

Now that you've got the knowledge, it's time create a tailored action plan and order some plants.

Download your **Thriving Revegetation Action Plan** template from our website and get started today!



**Connect with us**

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