

HEALTHY FARM DAMS: IMPROVING YOUR PROPERTY'S WATER FUTURE



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WHY HEALTHY DAMS MATTER

Dams are a key asset for agricultural properties, supplying water for livestock, irrigation, spraying, and general farm use. Reliable water storage underpins both farm productivity and environmental health. With the South Coast becoming hotter and drier, and rain events more unpredictable, traditional dams are increasingly at risk of not holding enough water when it's needed.

Many farmers are now seeking ways to get more value and water security out of their dams. Some simple changes to dam design or management can produce cleaner, longer-lasting water supplies that benefit both farm operations and the surrounding landscape.

ENHANCING DAMS TO IMPROVE YOUR FARM'S WATER FUTURE

Fencing and revegetating around dams provides a practical and effective way to overcome the issues often observed in dams that are accessed by livestock, particularly cattle. Unfenced dams are vulnerable to siltation and poor water quality, but by fencing the water body to limit livestock access and establishing native vegetation around its perimeter, you can significantly improve water quality and dam longevity.

A healthy dam typically includes secure fencing, reliable pumping systems to supply clean water to troughs or irrigation systems, and a buffer of native vegetation that provides shade, reduces evaporation, and protects soil integrity in the dam bank. A hardened, fenced access point can also be added to enable livestock to directly access a section of the dam if necessary.

These simple modifications to existing dams can deliver big benefits such as:



Improved livestock health as water quality improves



Stable dam banks as native vegetation establishes and improves soil structure



Improved biodiversity as native vegetation supports local wildlife



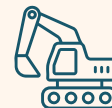
Reduced weeds as native vegetation outcompetes invasive species



Reduced water contamination by limiting livestock access, reducing pugging, siltation and contamination by faecal matter



Reduced greenhouse gas emissions as vegetated dams have lower levels of nitrogen and phosphorus, with higher levels of dissolved oxygen, reducing methane emissions from the water body.



Decreased siltation and reduced dam cleaning costs as livestock are no longer disturbing the soil around the dam and fringing vegetation captures sediment inflows

DID YOU KNOW

that livestock are five times more likely to defecate while standing in water than they are on land?

FARM DAM ENHANCEMENT

KEY ACTIONS & BENEFITS

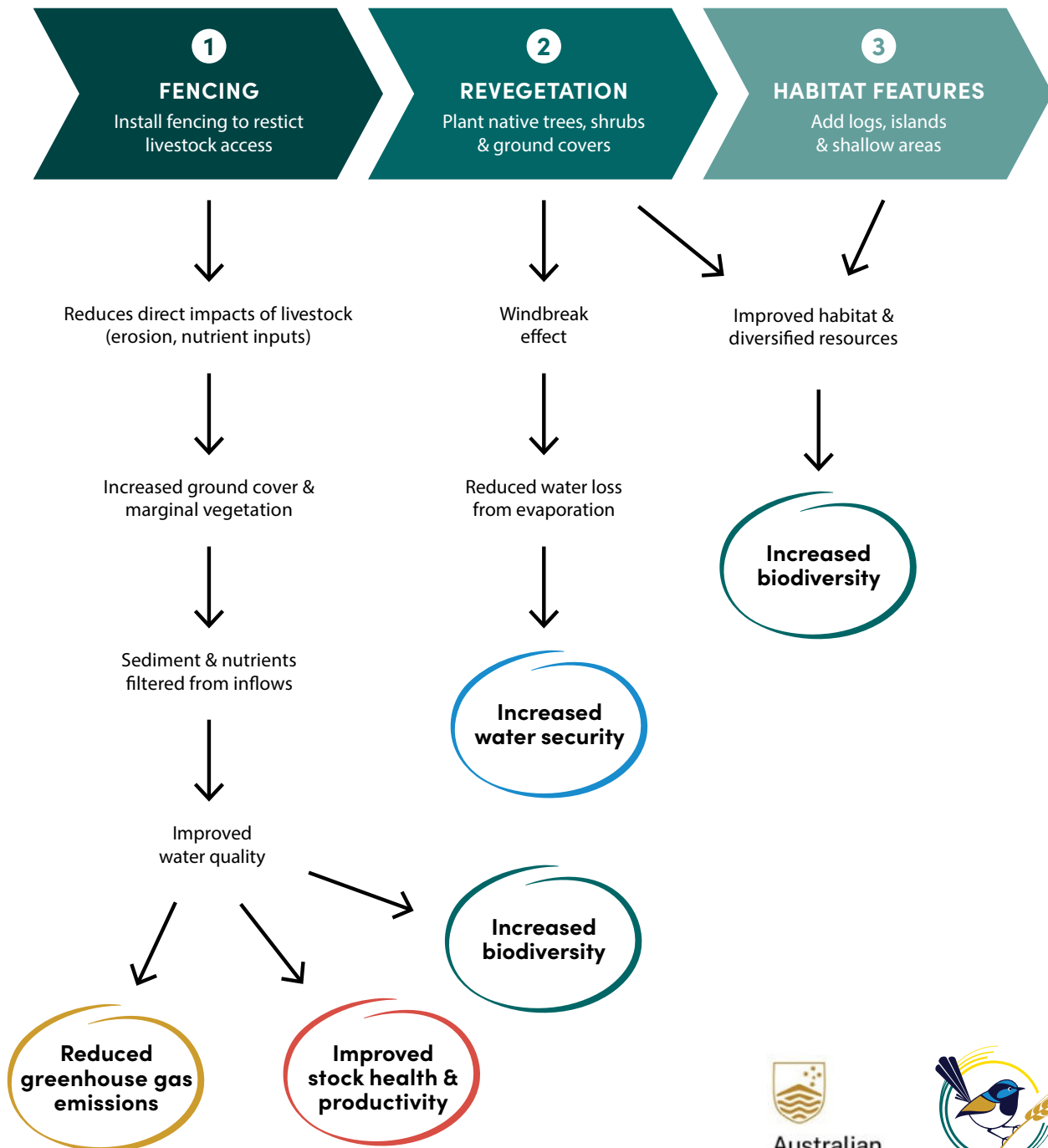


Figure 1. Key benefits of enhancing a dam. Image provided by Sustainable Farms, Australian National University.



CHALLENGES OF UNFENCED DAMS IN THE SOUTH COAST

Traditional unfenced dams give livestock unrestricted access to water. While this may seem beneficial to livestock hydration, there are hidden costs and long-term detrimental impacts on dam health and farm productivity.

KEY IMPACT 1: LIVESTOCK HEALTH

Livestock often walk into dams to drink and cool off, introducing faecal matter, bacteria and sediment into the water. Contaminated water reduces how much animals drink, which can lower feed intake, cause weight loss, and increase susceptibility to disease, all of which can have significant economic consequences.

KEY IMPACT 2: DAM STRUCTURAL INTEGRITY

When livestock congregate around a dam, their hooves 'pug' the banks, weakening the structure and increasing erosion. This disturbance leads to siltation as loose soil washes into the dam, especially during heavy rain. Dams without surrounding vegetation are even more vulnerable, as sediment from nearby paddocks and inflow areas are easily washed in. The removal of silt from dams is a costly and time intensive process.

KEY IMPACT 3: REDUCED WATER RETENTION

Exposed dams that have limited surrounding vegetation lose water more quickly. Direct sun and wind increase evaporation and create conditions that favour algal blooms, both of which reduce dam reliability and health.



EXAMPLE PLAN OF AN ENHANCED FARM DAM

There are many ways to enhance a dam. We have listed a few of the key aspects of a healthy dam which all work to improve the health of the dam and property.

Make sure you comply with relevant regulations before beginning any work!

LIVESTOCK EXCLUSION FENCING

Livestock exclusion fencing will involve fencing around the perimeter of the dam. Fencing at least 20m away from the dam's edge allows a buffer zone for vegetation to grow.

If possible, avoid using barbed wire as small birds and bats can easily become entangled while approaching water.

BENEFIT Limiting livestock access to the dam will reduce contaminants entering the water and prevent structural damage to the dam's banks.

NATIVE VEGETATION ZONES

Plant local native vegetation around the dam, and consider introducing native aquatic plants as well.

Ensure that trees are at least 15m away from the edge of the dam so that they have room to grow and to ensure their roots don't cause structural damage to the dam bank. Avoid planting near the hardened access point.

BENEFIT Native plants are adapted to the local conditions, meaning that once they are established, they will require very little maintenance.

Vegetation both in and around the dam will provide shade, reduce evaporation, and improve soil structure. Plants also filter excess nutrients and improve water quality.

HARDENED ACCESS POINT

A fenced hardened access point allows livestock to access a section of the dam without trampling vegetation and eroding dam banks.

The access point should have a compacted surface that resists pugging and erosion (e.g. limestone rubble or gravel) and lead to the deepest part of the dam. Limestone rubble can be particularly useful in the hardened access as it can reduce acidity in dams in peat or acid sulphate systems.

BENEFIT Allows livestock direct access to the dam if troughs can't be checked or maintenance is required on the troughs. Having a gate across the access point ensures it can be used only when it's needed for occasional access.

PUMPS AND ASSOCIATED WATERING POINTS

To utilise the water from a fenced dam, a pump and related infrastructure such as troughs will be required. Make sure you choose the right pump/trough system that suits the needs of the farm.

BENEFIT Providing off-dam watering points ensures that livestock have access to fresh drinking water without damaging the structural integrity of the dam or polluting the dam.



Image by: Renae van Noort

VARIED WATER DEPTHS

Ensure that the dam has different water depths, with some areas of deep water for long-lasting water retention, and others with shallow banks.

BENEFIT Creating different water depths allows for a diverse ecosystem within the dam. Deep areas are less prone to evaporation and provide native wildlife such as fish and frogs safe places to hide away from predators, while shallow zones help riparian vegetation establish.

SILT TRAP

Creating shallow ponds in the inflow area can capture and filter water prior to it entering the dam. This can assist in removing silt, debris and animal manures in heavy rain. Plant vegetation suited to the varied depth and be mindful that silt traps may need to be cleaned out occasionally.

BENEFIT These pond/s act as a pre-filter, capturing silt and nutrients. They can help to limit the amount of nutrients entering the dam and therefore aid in algal management. These ponds provide an exceptional habitat zone in addition to the main dam.

ISLANDS

Creating an island can be as easy as having some floating or partially submerged logs or can be small physical islands.

BENEFIT Islands or floating objects create a varied ecosystem and provide wildlife with places to rest out of reach from many predators.

DIAGRAM OF A HEALTHY DAM

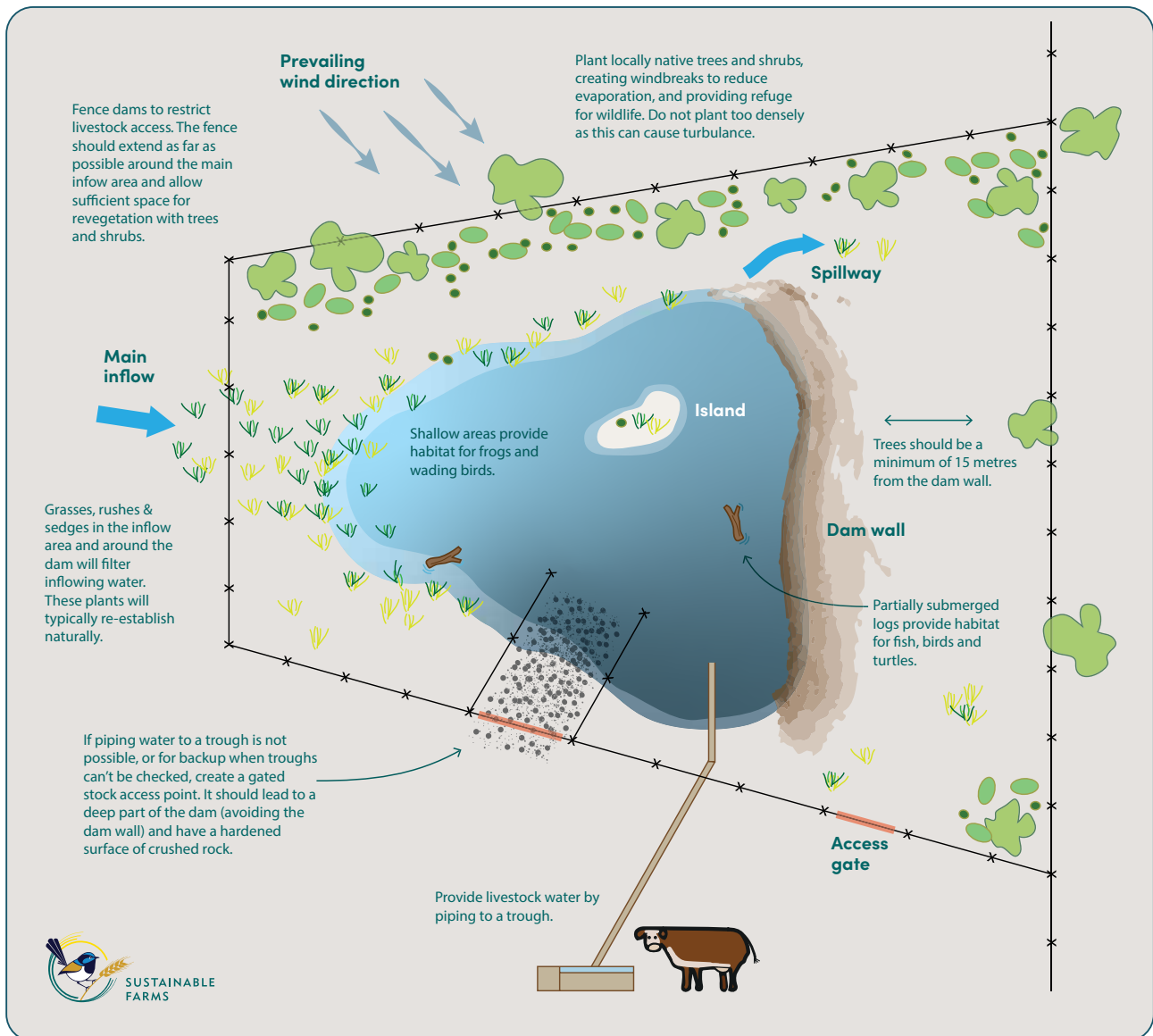


Figure 2. Example of a sustainable enhanced dam. Image provided by Sustainable Farms, Australian National University.

DESIGN CONSIDERATIONS

WHICH DAM SHOULD I IMPROVE?

If you have multiple dams on the property and want to start by enhancing just one, consider choosing a dam that:

- Is located close to where the water will be used, meaning it will be easier and cheaper to pump the water around the property.
- Is already set up for pumping.
- Provides a secure water supply. It is a good idea to invest in farm water planning before commencing work to ensure the chosen dam has sufficient water for the farms needs and to gain a better understanding of the level of water security on the property. It is often best to pick a deep dam with a smaller relative surface area, as this will reduce the surface area for evaporation to occur.
- Is close to existing native vegetation. This provides the opportunity for habitat connectivity for native wildlife and vegetation.

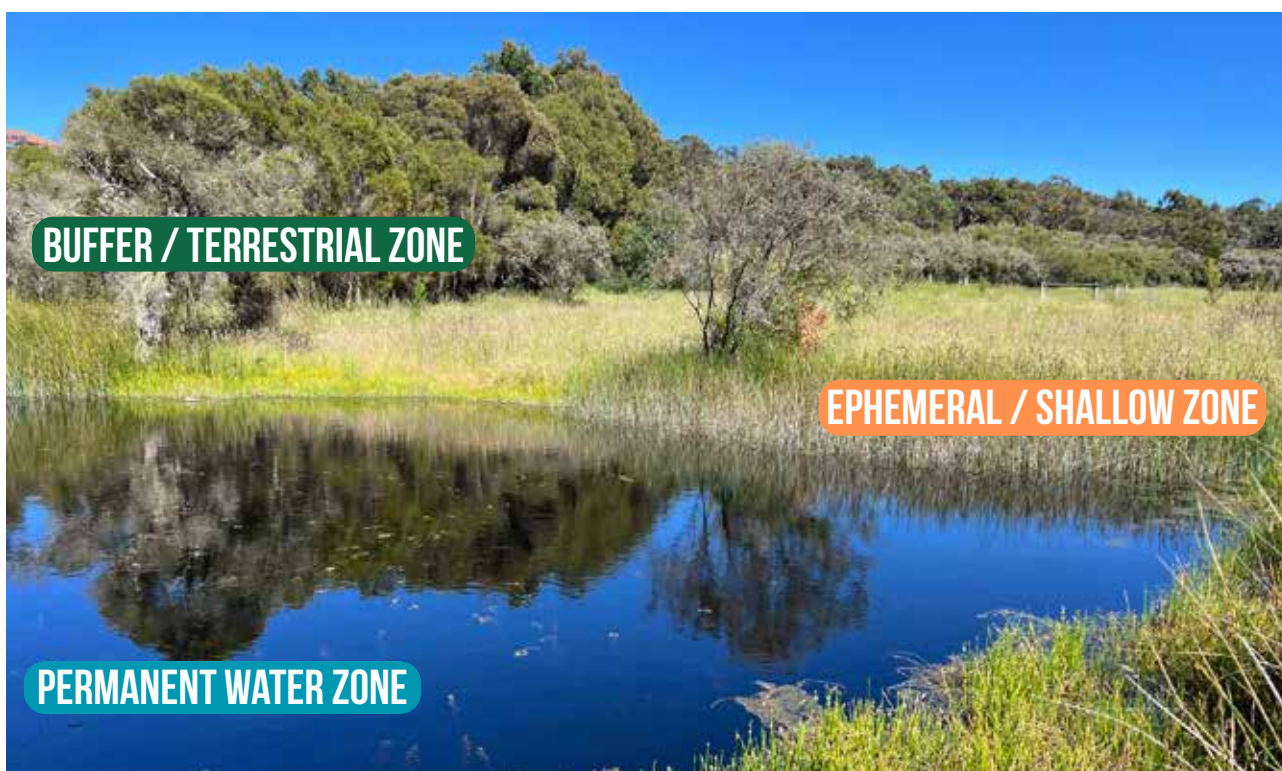
PREPARING YOUR DAM

Take time to adequately prepare the dam before planting. This includes ordering plants, removing excess silt from the dam, installing fencing, and removing weeds. Consider the soil type and pH of any materials excavated from a dam and select plants accordingly e.g. species to suit clay. Alternatively repurposing topsoil to provide a layer over any excavated material can create a better soil profile that suits a wider range of species.

As a general rule, plant trees at least 3m apart, shrubs 1m apart and sedges/grasses at least 30cm apart. Aim for high density vegetation on the side of the dam which receives the most wind, creating a wind break and decreasing the rate of evaporation. Avoid planting tall trees near the hardened access point as it can encourage livestock to linger if given access to the dam. Aim to plant as early as possible in winter and use tree guards if kangaroos or rabbits are numerous in the area.

Example of zones in an enhanced dam:

Suggested native plants for each zone are listed on the next page.



PLANT LIST

Below we have suggested some plants native to the southwest of Western Australia, with a particular focus on the Albany region. The Great Southern Coastal region refers to Albany and surrounds (south of the Muir Highway and Stirling Ranges) while the Great Southern Inland region is the area north of the Muir Highway and Stirling Ranges.

This list can be used as a guide for revegetating around a dam. Where possible, seek professional advice to refine your species selection. It is best to plant species which are local to the area and were on the property before it was cleared.

Table 1. Native plants of the southwest of Western Australia that are suitable for dams. Note: * represents plants that can tolerate salt and † represents plants that have the potential to become weedy, especially in small dams.

Common Name	Species Name	Zone					Height	Type	Suitable for	
		Buffer / terrestrial (outside the dam body)	Dam wall	Ephemeral / shallow (periodic inundation)	Permanent water	Spillway (periodic inundation)			Great Southern Coastal	Great Southern Inland
Swamp Banksia	<i>Banksia littoralis</i>						8-12m	Tree	✓	✓
Flooded Gum	<i>Eucalyptus rudis</i> *						10-20m	Tree	✓	✓
Bullich	<i>Eucalyptus megacarpa</i>						2-35m	Tree	✓	
Swan River Blackbutt	<i>Eucalyptus patens</i>						3-25m	Tree	✓	
River Banksia	<i>Banksia seminuda</i>						5- 25m	Tree	✓	
Robin Red-Breast Bush	<i>Melaleuca lateritia</i>						1.5-2m	Shrub	✓	✓
Modong	<i>Melaleuca preissiana</i>						5-12m	Medium Tree	✓	
Swamp Paperbark	<i>Melaleuca raphiophylla</i> *						5-10m	Medium Tree	✓	✓
	<i>Melaleuca microphylla</i>						1.5-5m	Medium Tree	✓	
Mohan	<i>Melaleuca viminea</i> *						0.5-15m	Tall Shrub	✓	✓
	<i>Melaleuca spathulata</i> *						1-2.5m	Shrub	✓	✓
Common Astartea	<i>Astartea scoparia</i> *						1.8m	Shrub	✓	✓
River-bank Astartea	<i>Astartea leptophylla</i>						2-8m	Shrub	✓	
Horned Astartea	<i>Astartea corniculata</i>						1-3m	Shrub	✓	✓
Swamp Bottlebrush	<i>Beaufortia sparsa</i>						1-3m	Shrub	✓	
Red Swamp Banksia	<i>Banksia occidentalis</i>						1-7m	Shrub	✓	
	<i>Kunzea recurva</i> *						0.3-2m	Shrub	✓	✓
Albany Bottlebrush	<i>Callistemon glauca</i>						2m	Shrub	✓	
Tall Kangaroo Paw	<i>Anigozanthos flavidus</i>						1-2m	Shrub	✓	
	<i>Melaleuca violacea</i> *						0.1-1.5m	Low Shrub	✓	✓
Whitemyrtle	<i>Hypocalymma angustifolium</i> *						1-3m	Low Shrub	✓	✓
Fragrant Tea Tree	<i>Taxandria fragrans</i>						1-3m	Shrub	✓	
Coarse Tea Tree	<i>Taxandria linearifolia</i>						2-5m	Small Tree/ Shrub	✓	✓
Fine Tea Tree	<i>Taxandria parviceps</i>						2-4m	Shrub	✓	✓

Common Name	Species Name	Zone					Height	Type	Suitable for	
		Buffer / terrestrial (outside the dam body)	Dam wall	Ephemeral / shallow (periodic inundation)	Permanent water	Spillway (periodic inundation)			Great Southern Coastal	Great Southern Inland
Variable-Leaved Hakea	<i>Hakea varia</i> *						1-4m	Shrub	✓	✓
Cauliflower Hakea	<i>Hakea corymbosa</i>						1-2m	Shrub	✓	✓
Olive Leaf Hakea	<i>Hakea oleifolia</i>						2-10m	Shrub to Small tree	✓	
Marsh Club-Rush	<i>Bolboschoenus caldwellii</i>						0.3-1.2m	Perennial Grass Sedge	✓	✓
Tall Sedge	<i>Carex appressa</i>						0.5-2m	Sedge	✓	
Knotted Club-Rush	<i>Ficinia nodosa</i> *						1m	Perennial Sedge	✓	✓
Lake Club Rush	<i>Schoenoplectus validus</i>						2.5m	Sedge	✓	✓
Four Angle Sword-Sedge	<i>Lepidosperma tetraquetrum</i>						2-3m	Perennial Sedge	✓	
Spreading Sword-Sedge	<i>Lepidosperma effusum</i>						2.5m	Perennial Sedge	✓	
Bare Twig-Rush	<i>Machaerina juncea</i>						0.2-1.2m	Perennial Sedge	✓	✓
Sheath Twig-Rush	<i>Machaerina vaginalis</i>						0.6-1.2m	Perennial Sedge	✓	✓
Jointed Twig-Rush	<i>Machaerina articulata</i>						2-3m	Perennial Rush	✓	✓
	<i>Machaerina rubiginosa</i>						0.3-1.2m	Perennial Sedge	✓	✓
Sea Rush	<i>Juncus kraussii</i> *						0.3-1.2m	Perennial Rush	✓	✓
Pale Rush	<i>Juncus pallidus</i> ¹						1-2m	Perennial Rush	✓	✓
Finger Rush	<i>Juncus subsecundus</i> *						0.3-1m	Perennial Rush	✓	✓
Velvet Rush	<i>Leptocarpus scariosus</i>						1-1.5m	Perennial Rush	✓	
Weeping Grass	<i>Microlaena stipoides</i>						75cm	Perennial Grass	✓	✓
Mat grass	<i>Hemarthria uncinata</i> *						20-80cm	Grass	✓	
Kangaroo Grass	<i>Themeda triandra</i>						1.5m	Perennial Grass	✓	✓
Wallaby Grass	<i>Rytidosperma caespitosa</i>						10-50cm	Perennial Grass	✓	✓
Swamp Wallaby Grass	<i>Amphibromus nervosus</i>						0.25-1m	Perennial Grass	✓	✓
	<i>Centella asiatica</i>						5-40cm	Perennial Herb	✓	✓
Streaked Arrowgrass	<i>Triglochin striata</i>						20-50cm	Aquatic Herb	✓	✓
Common Spike Rush	<i>Eleocharis acuta</i>						70cm	Aquatic Perennial	✓	✓
Swamp Lily	<i>Ottelia ovalifolia</i> ¹						16cm	Aquatic Perennial	✓	✓
Round-leaved Pigface	<i>Disphyma crassifolium</i> *						10-30cm	Succulent		✓

This booklet was written by Renae van Noort and Suzannah Macbeth (South Coast NRM) in consultation with Keith Smith (Formosa Flora) and Kylie Cook (Wilson Inlet Catchment Committee).

South Coast Natural Resource Management acknowledges the Noongar / Nyungar peoples of the south coast region as the traditional custodians of this land, and we pay our respect to their Elders, past, present and emerging and extend this respect to all First Nations peoples.

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References and further information

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