Farm dam
aquatic plants

David Carew

CAREW ENVIRONMENTAL

Why have plants in and around dams?

- Improve water quality
- Stabilise dam banks and spillways
- Reduces sediment in water
- Reduced evaporation
- Shelter for livestock
- Increased biodiversity
  - Plants
  - Birds
  - Insects
  - Reptiles and mammals
- Looks good
- Increase property value. Does it?
- Makes us feel good

Why have plants in and around dams?

- Improve water quality
- Stabilise dam banks and spillways
- Reduces sediment in water
- Reduced evaporation
- Shelter for livestock
- Increased biodiversity
  - Plants
  - Birds
  - Insects
  - Reptiles and mammals
- Looks good
- Increase property value. Does it?
- Makes us feel good

What about?

- Blocks irrigation infrastructure
- Restricts access
- Requires maintenance
- Harbours vermin

What is a wetland?

Seaford Wetlands - 2003

Ramsar convention on wetlands (1971)

Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life.
They occur where the water table is at or near the surface of the land, or where the land is covered by water.

CAREW ENVIRONMENTAL

Wetlands in Victoria

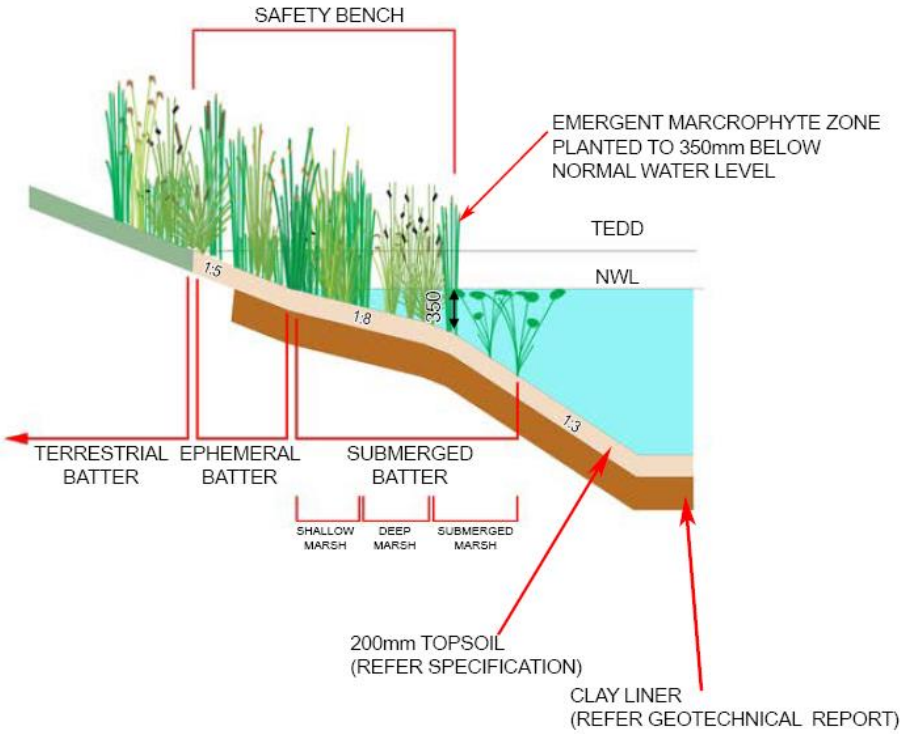
Most of the wetlands in Victoria are shallow temporary marshes.

Gradients into natural wetlands are often very flat (1:100)

Constructed wetlands often have gradients of 1:5.

CAREW ENVIRONMENTAL

Dam bank form



CAREW ENVIRONMENTAL

Aquatic plant characteristics

Plants have evolved many different physical and physiological adaptations to survive wetland conditions. These include;

- Development of specialized tissue for gas transport (parenchyma)
- Ability to oxidize anaerobic substrate around root zone
- Ability to ferment starches anaerobically to produce energy
- Asexual reproduction, production of rhizomes and/or stolons
- Flexible leaves, stems and other structures
- Foliage differentiation
- Use of photosynthetic pigments other than chlorophyll to maximize adsorption of high wave-length light
- Opportunistic annual life cycles that take advantage of optimal growing conditions which may occur very irregularly
- Production of significant underground biomass in the form of rhizomes, tubers etc. as energy storage for surviving drought
- Ingenious pollination and recruitment strategies

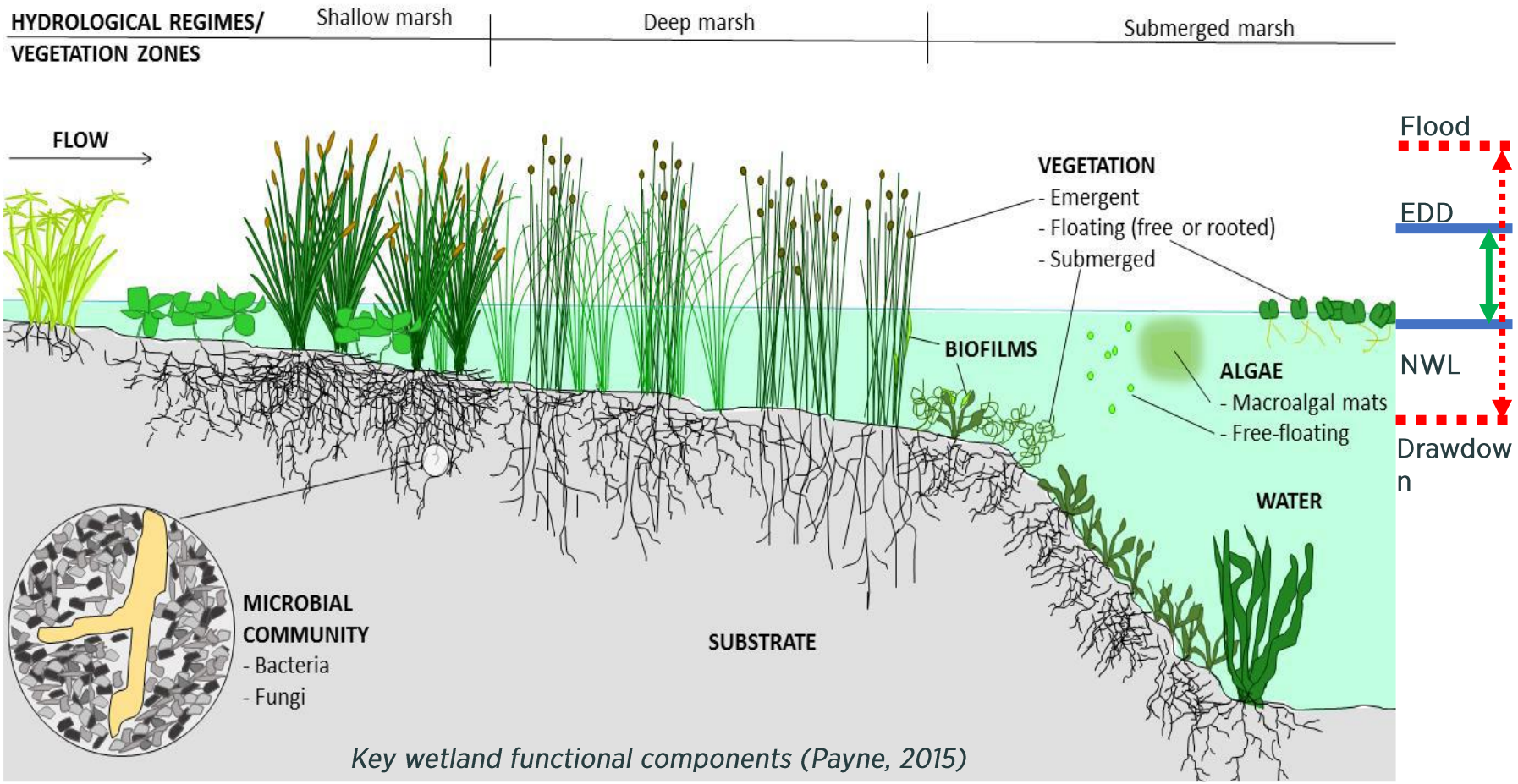
CAREW ENVIRONMENTAL

Tussock vs Sward habit

Tussock vs Sward

CAREW ENVIRONMENTAL

Role of plants in water treatment



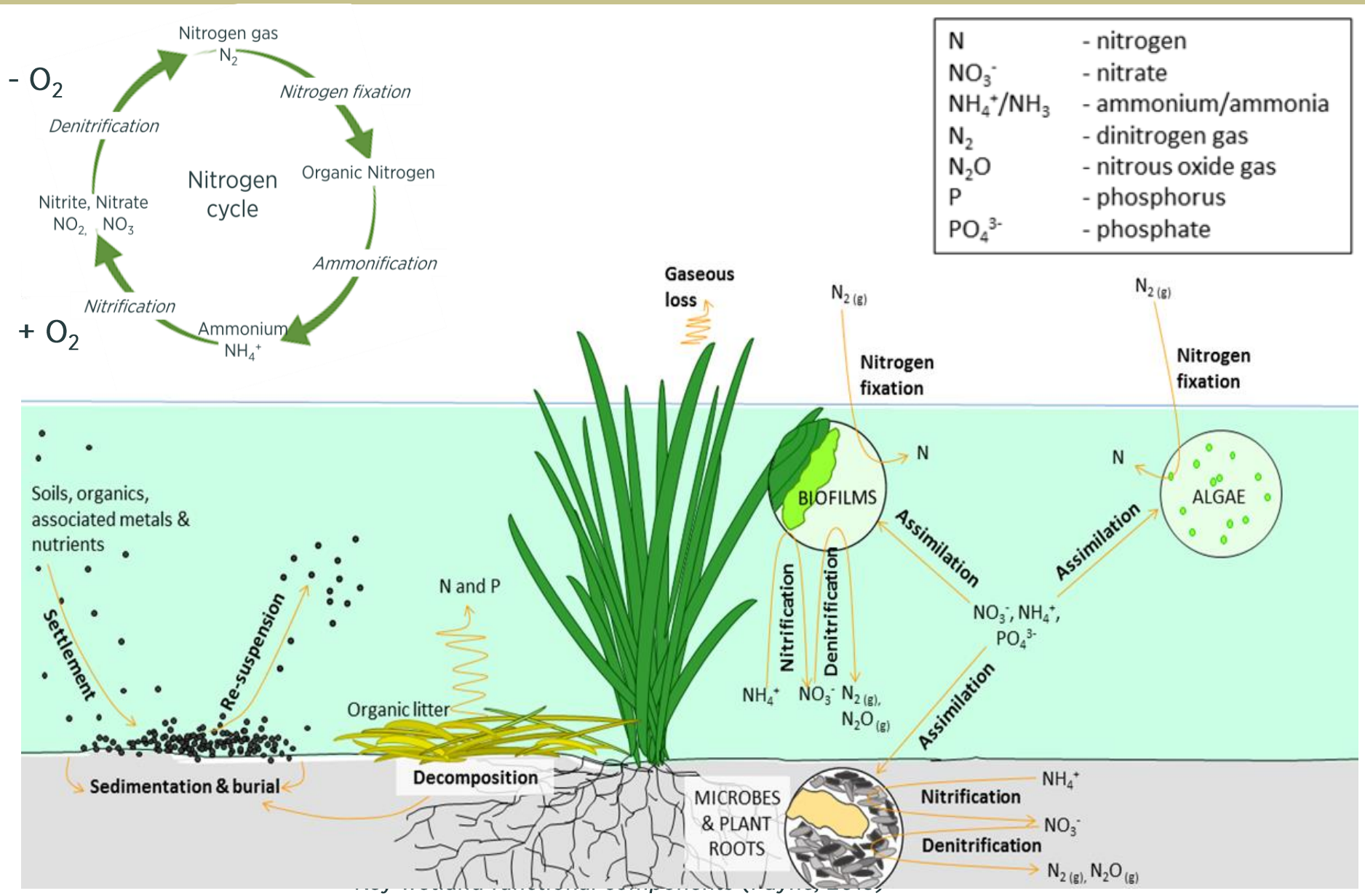
Key wetland functional components (Payne, 2015)

Water treatment processes:

- Physical (sedimentation and filtration)
- Biological uptake
- Chemical (adsorption and reaction)

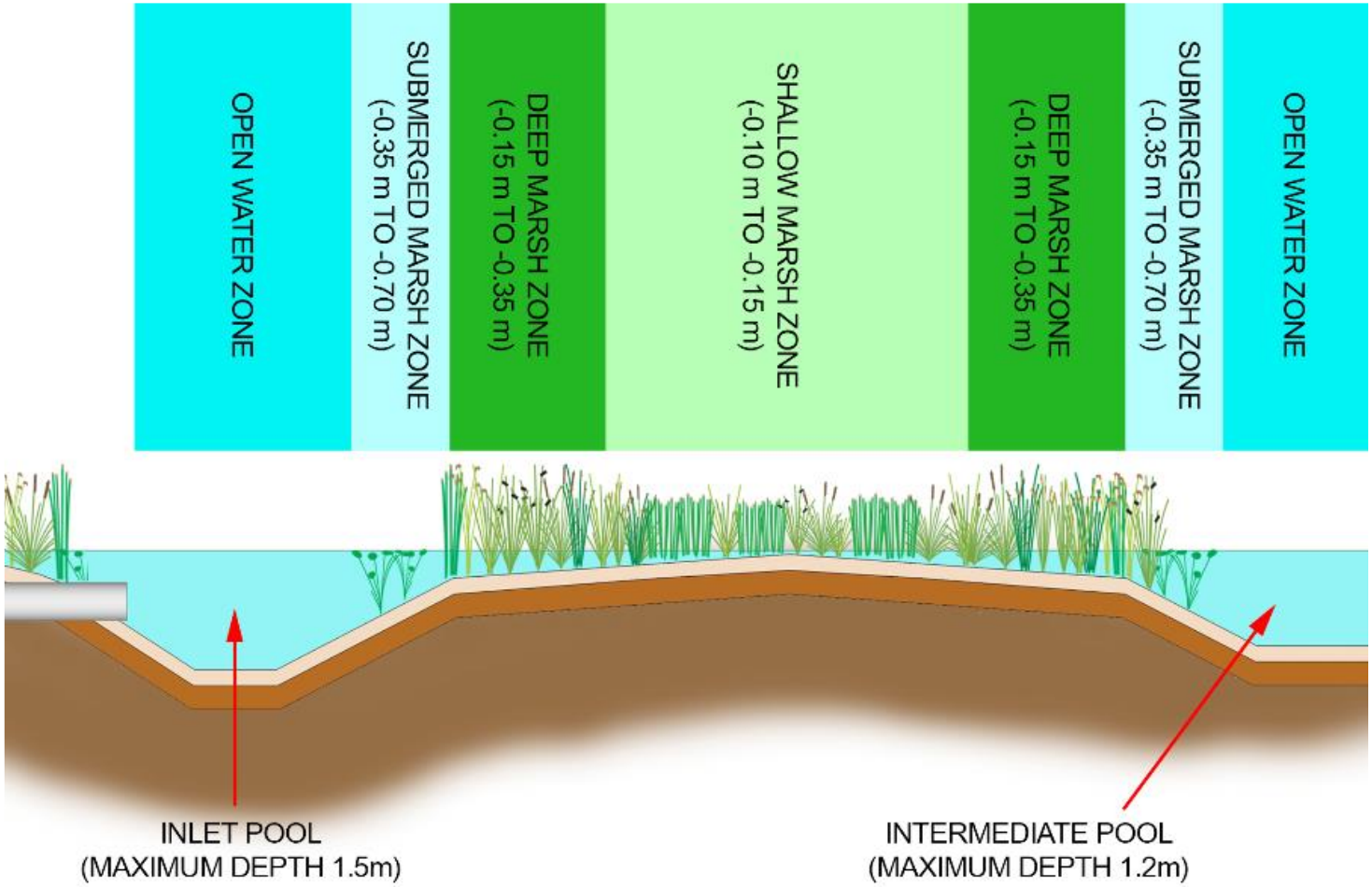
CAREW ENVIRONMENTAL

Denitrification



Processes acting on nutrients and sediment in a constructed treatment wetland (Payne, 2015)

Plant species & wetland zones



CAREW ENVIRONMENTAL

Dam banks and margins

Dam banks and margin plant list (-100mm to 350mm above NWL)

Scientific name	Common name	Ephemeral zone	Shallow marsh	Deep marsh	Submerged marsh	Form
Carex appressa	Tall Sedge					Tussock
Carex tereticaulis	Basket Sedge					Tussock
Crassula helmsii	Swamp Crassula					Matted herb
Cyperus lucidus	Leafy Flat-sedge					Tussock
Juncus amabilis	Hollow Rush					Tussock
Juncus flavidus	Yellow Rush					Tussock
Juncus krausii	Sea Rush					Tussock
Juncus pallidus	Pale Rush					Tussock
Lomandra longifolia	Spiny-headed Matt-rush					Tussock
Machaerina rubiginosa (syn. Baumea rubiginosa)	Soft Twig-rush					Sward
Persicaria decipiens	Slender Knot weed					Herb
Poa labillardierei	Common Tussock					Tussock
Native and exotic grasses						

Carex appressa

Crassula helmsii

Shallow marsh plants

CAREW ENVIRONMENTAL

Shallow marsh plant list (NWL to 150mm below NWL) – Dam margin

Scientific name	Common name	Ephemeral zone	Shallow marsh	Deep marsh	Submerged marsh	Form
Bolboschoenus caldwellii	Sea Club-rush					Sward
Bolboschoenus fluviatilis	Tall Club-rush					Sward
Bolboschoenus medianus	Marsh Club-rush					Sward
Cladium procerum	Leafy Twig-rush					Tussock
Cycnogeton procerum (syn. Triglochin procerum)	Water Ribbons					Sward
Eleocharis acuta	Common Spike-rush					Sward
Machaerina articulata (syn. Baumea articulata)	Jointed Club-rush					Tussock
Myriophyllum crispatum	Upright Water-milfoil					Herb
Phragmites australis	Common Reed					Sward
Schoenoplectus tabernaemontani	River Club-rush					Sward

Cycnogenton procerum

Bolboschoenus caldwellii

Myriophyllum crispatum

Deep marsh plants

CAREW ENVIRONMENTAL

Deep marsh plant list (150 to 350mm below NWL) – Dam margin and deeper water

Scientific name	Common name	Ephemeral zone	Shallow marsh	Deep marsh	Submerged marsh	Form
Bolboschoenus caldwellii	Sea Club-rush					Sward
Bolboschoenus fluviatilis	Tall Club-rush					Sward
Bolboschoenus medianus	Marsh Club-rush					Sward
Cladium procerum	Leafy Twig-rush					Tussock
Cycnogeton procerum (syn. Triglochin procerum)	Water Ribbons					Sward
Eleocharis sphacelata	Tall Spike Rush					Sward
Machaerina articulata (syn. Baumea articulata)	Jointed Club-rush					Tussock
Phragmites australis	Common Reed					Sward
Schoenoplectus tabernaemontani	River Club-rush					Sward

Schoenoplectus tabernaemontani

Eleocharis sphacelata

Floating and Submerged aquatics

Submerged marsh plant list (350 to 1000mm below NWL)

Scientific name	Common name	Ephemeral zone	Shallow marsh	Deep marsh	Submerged marsh	Floating	Form
Azolla and Lemna sp	Azolla and Duck-weed						Herb
Myriophyllum salsugineum	Lake Water-milfoil						Herb
Myriophyllum verrucosum	Red Water-milfoil						Herb
Potamogeton ochreatus	Blunt Pondweed						Herb
Potamogeton crispus	Curly Pondweed						Herb
Vallisneria australis	Eel-grass						Sward
Chara and Nitella sp	Charophyte macro-algae						Macro-algae

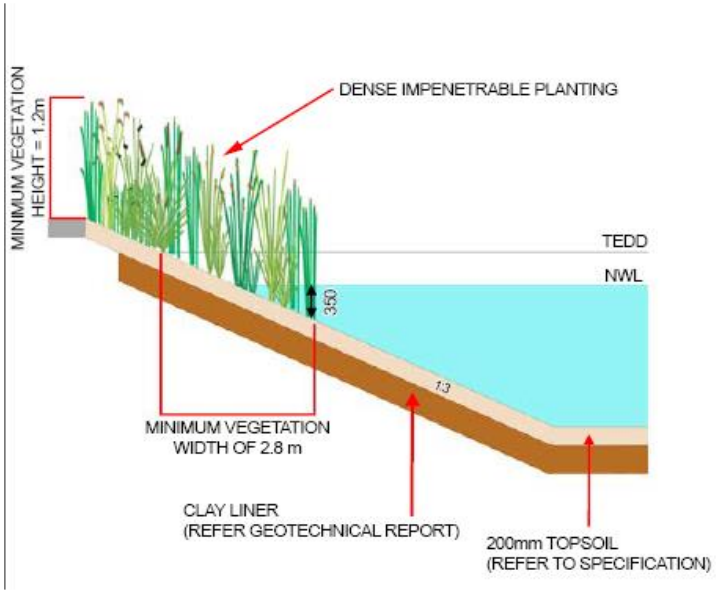
Vallisneria australis

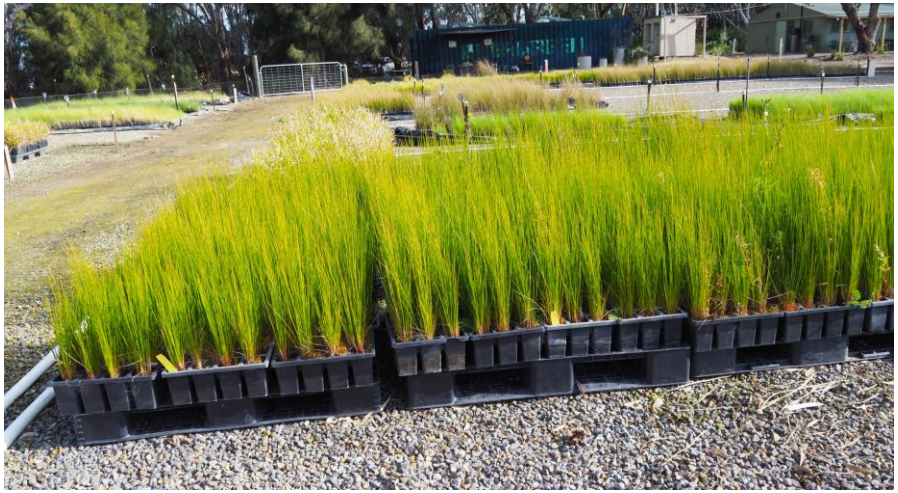
CAREW ENVIRONMENTAL

Topsoil

Good quality topsoil is required to ensure that site or imported soils provide a medium for plant growth for the specified landscape use.
There are separate specifications for aquatic and terrestrial plantings.

Topsoil should be placed to a minimum depth of 200mm.





Plant establishment

- Timing of planting
- Variation between species
- Natural regeneration

Plant establishment netting

Planting failure without netting

Dividing and propagating

Azolla

Azolla rubra (syn A. filiculoides) and Azolla pinnata are both native aquatic ferns.

Grows in slow-moving water as well as still backwaters, dams and billabongs.
Fresh water salinity up to 3000mg/L

Not harmful to stock that consume plants or drink water it is growing in.

Azolla is responsive to increased nutrients in the water.
It will colonise protected waterbodies where physical disturbance is low.

Is Azolla a problem?

Heavy growth of the plant can cause the following problems:
•blocked pump inlets and filters
•restricted stock access to drinking water if plant density is sufficient
•reduced sunlight penetration of dam waters
•when azolla dies off it can reduce oxygen levels in the dam.
Agriculture Vic 2021

Phragmites and Typha sp

Phragmites australis and *Typha* sp (x3) are strong dominant species which form monoculture swards.
They provide habitat for many birds, insects and frogs.
There is often an understorey vegetation layer.

Both will respond to permanent summer water and high nutrient levels.
Phragmites is tolerant of saline conditions.
Both species are depth limited to <1m.
Typha is a more aquatic species with Phragmites spreading into damp soil and seasonally inundated areas.

Typha will often colonise where sedimentation is occurring.








Questions.
CAREW ENVIRONMENTAL