Out of sight
Take a look underwater

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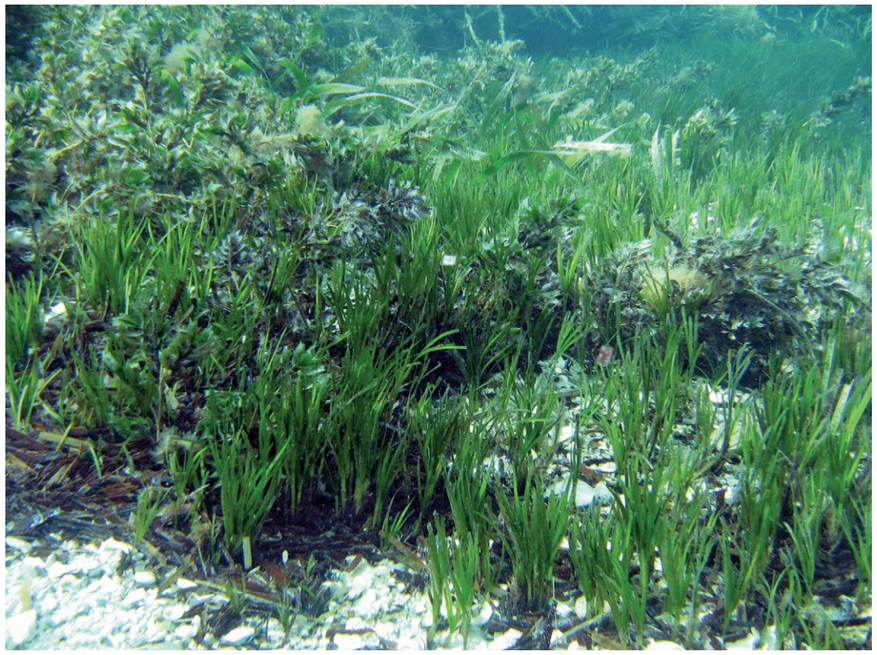


A cool water seascape from Two Peoples Bay near Albany contains five species of seagrass *(Amphibolis antarctica, A. griffithii, Posidonia australis, P. coriacea, Zostera nigricaulis)*. Photo: Renae Hovey

We are fortunate in Australia to have beautiful beaches with stunningly biodiverse near-shore marine life.

The swaying seagrass meadows make up an important part of this living ecosystem. It is lovely to snorkel just metres from the shore over the gently moving leaf canopy to watch the crabs, schools of juvenile fish and starfish quietly go about their business.

Seagrass meadows are structurally complex and play a critical role in supporting diverse biological communities.

From the tiniest transparent paddle weeds just a few centimetres tall to the two-metre-tall wire weed, seagrasses provide food and homes for many living creatures. Like land plants from which they evolved, seagrasses have strong roots deep in the sediment, protecting coastlines from storm surges and improving water quality.

In addition, the largest seagrasses (*Posidonia* species) capture carbon at up to 35 times faster than tropical rainforests.

The health of seagrasses is generally most threatened where there is a large human population. People modify estuaries and coastlines with in-water developments (harbours, groynes, marinas), activities (dredging, fishing, boating) and pollution (agricultural and sewerage run-off). Widespread seagrass losses have occurred globally and locally within Cockburn Sound (~80%) and WA's World Heritage Site at Shark Bay (~36%).

Declining health leads to a thinning of the shoot canopy and eventual loss often goes unnoticed – 'Out of sight, out of mind' for many who don't snorkel or dive.

Restoring these marine meadows is just as important as restoring terrestrial ecosystems, but it is not without its challenges, even after a stress has been removed. Changed water movement and polluted sediments can be long lasting. One of the biggest challenges is getting them to grow in a constantly moving liquid medium!

Multidisciplinary research and experimentation have led to the development of effective methods for restoring seagrass meadows. Our research has focused on the large temperate seagrass species where seeds, seedlings and adult plants can be grown. Researchers assessed genetic diversity and dispersal of Ribbon Weed fruit (*Posidonia australis*) to understand natural coastal processes.

Genetic markers showed just how much diversity there is within and among meadows. High diversity means pollen and seeds disperse widely via currents.

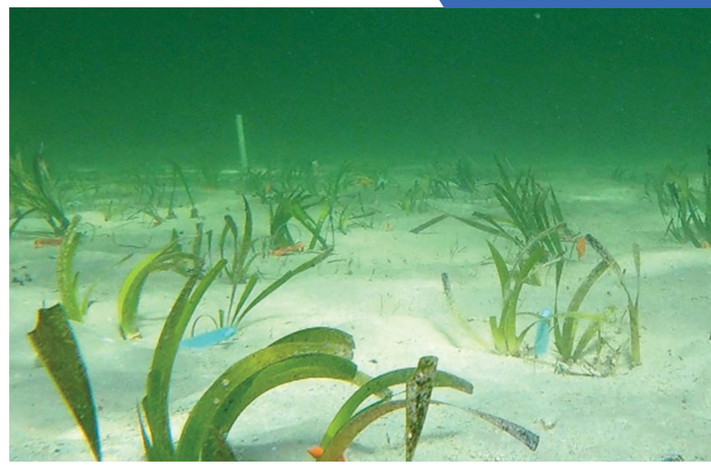
Seagrasses tend to grow best where they have previously grown – where the unseen carbon storage of accumulating rhizomes, leaf sheaths and roots (known as matte) is buried in the sand. Adult plants (rhizome with 3-4 shoots) can be replanted and secured using wire 'staples' to prevent them from moving while new roots are growing.

Restoration methods can assist wire weed (*Amphibolis* spp.) seedlings to establish by providing a biodegradable substrate for attachment. Malgana Land and Sea Rangers have been working with researchers, sharing Traditional Ecological Knowledge and adapting seagrass restoration methods.

Typically, one or two species are the focus in restoring seagrass ecosystems. Re-establishing the dominant species enables other smaller faster growing species to recolonise naturally. Seaweeds and algae start to grow on the transplants and fish and invertebrates begin to use the new habitat. However, it takes five to ten years before shoot density and biodiversity is similar to a natural undisturbed meadow.

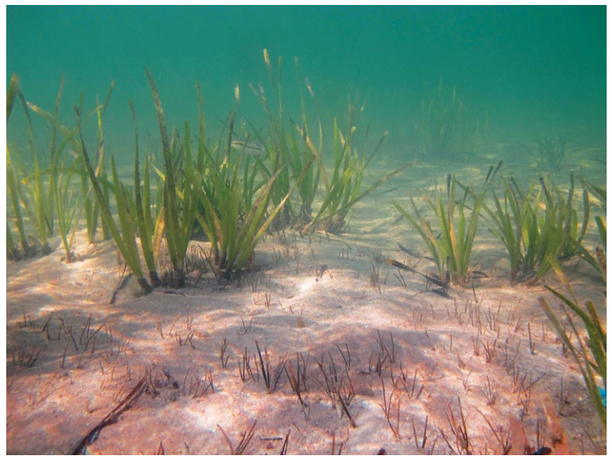
Restoration guidelines have been developed and consideration is given to selecting the most appropriate source of plant material for restoration – either through matching (similar genetic composition) or using climate projections to match for future conditions, for example selecting plants which may be more tolerant to warmer ocean temperatures. A seagrass restoration framework developed with Malgana Rangers can be applied to restoration activities in the next decade. ■

- 3000+ seagrass samples genotyped
- 200+ seagrass 'families' genotyped
- Restoration methods developed for 3 species
- 80%+ survival of adult transplants
- 5 years to form dense meadows
- 10 years to restore biodiversity and sequester carbon



A *Posidonia* transplant experiment in Gathaagudu (Shark Bay). Photo: Martin Breed

A new seagrass restoration method is trialled at Gathaagudu. Malgana Ranger Nick Pedrocchi and Dr John Statton deploy a 'seagrass snagger', a biodegradable, sand-filled hessian tube for assisting natural recruitment of dispersing *Amphibolis* seedlings. Photo: Gary Kendrick



Narrow leaf seagrass or needle grass *(Halodule uninervis)*, a fast-growing tropical seagrass, recolonises a two year old *Posidonia* restoration site. Photo: Gary Kendrick