

Restoring a seagrass ecosystem

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Posidonia australis meadows exposed during a super low tide at Useless Loop in October 2022, with the salt stockpile on the loading wharf in the background. Photo: William Jones

We are nearing the end of the second year of the UN Decade on Ecosystem Restoration, a global initiative to restore natural ecosystems. There are many great initiatives underway and here's a little about what we have been up to.

The seagrass (wirriya jalyanu) research and restoration team completed a 1 ha restoration site at Useless Loop, Shark Bay (Gathaagudu, on Malgana Land and Sea Country).

The balance sheet is in the red for marine ecosystems globally, like most terrestrial ecosystems, losing ~7% pa. Our goal was to establish a one hectare seagrass restoration site.

This does not seem like a large area compared to land-based restoration, however, the challenges are very different when restoring underwater ecosystems.

The sandy bottom turns to 'liquid' when you start to dig, the water continually moves transplants and equipment, curious and hungry animals dig up or eat the new transplants, visibility can be reduced to several metres and people need air!

Low visibility is common in disturbed or modified aquatic environments, where the loss of vegetation and shellfish (oysters, scallops, and mussels) leads to resuspension of fine silty particles.

Below, from left: Welcome to Country at Whiting Bay; morning briefing on wharf with Tidal Moon crew; *Posidonia australis* cuttings; a SCUBA diver monitors transplant survival.

Photos: Elizabeth Sinclair, Alex Dodd, Giulia Ferretto



Useless Loop Primary School visit to fill wieners. Photos: Elizabeth Sinclair



Seagrass restorers with a stockpile of snaggers and wieners on the town wharf.





Visual record of the restoration plots drawn and coloured by MAC rangers Malcolm Cross and Kiefer Cross.

Kiefer Cross prepares a ribbon weed cutting for planting. Photos: Elizabeth Sinclair



Working together means a shared effort and this assists in overcoming some of the challenges in working underwater.

A new partnership between University of WA researchers and Shark Bay Resources provided local employment for an indigenous-owned and operated business, Tidal Moon Sea Cucumbers, training opportunities in seagrass restoration for Malgana Aboriginal Corporation rangers, as well as opportunities for the local community to learn about their environment and get involved.

Our restoration site (~500 x 20 m) now connects two remnant seagrass meadows. Twenty-five different plots use a combination of traditional cuttings from large temperate seagrasses, ribbon weed (*Posidonia australis*) and wire weed (*Amphibolis antarctica*) and new methods to assist natural recovery.

Restoration sites provide great opportunities to embed scientific experiments within them. We asked whether the source of cuttings of the giant ribbon weed clone mattered (*For People & Plants* issue 119). Do cuttings from a local meadow grow better than those from another more distant meadow? How much seagrass is needed to slow the tidal flow across the sea floor? And can we help seagrass to recover naturally so fewer SCUBA divers are required to harvest and plant?

Several of the plots contained ribbon weed cuttings collected from different meadows in Shark Bay, as well as cuttings planted at different distances from each other.

Sand-filled hessian structures, seagrass snaggers, wieners and coffee bags, were placed in different plots on the sea floor to slow water and sand movement enough to encourage natural recolonisation, as well as providing a fibrous substrate to snag wire weed seedlings.

A visual record of the underwater restoration site was created by Malgana Aboriginal Corporation rangers. This visual record was used by researchers and rangers to share seagrass restoration knowledge with the Useless Loop Pre-Primary and Years 3 – 6 students during their visit to our field camp at Whiting Bay. The school students and local community filled many snaggers and wieners.

Regular monitoring is an important part of restoration to see whether sites are on the path to recovery, such as providing food and shelter for biodiversity, storing carbon and slowing water movement to reduce erosion and improve water quality.

SCUBA divers checked to see how our previous efforts had fared (now five months old). The transplants could be seen as soon as the divers jumped into the water.

They were looking healthy, with more than 85% surviving and even a few with new shoots. How exciting!

Snaggers and wieners were partly buried with small tropical seagrasses (*Halodule*, *Halophila* and *Cymodocea*) seaweeds, heart urchins and mushroom corals already growing in amongst them. Phew! They are on their way, but it will take at least five years for the new meadow to mature.

Plant it, sew it, deploy it and they will come? The old saying 'curiosity killed the cat'.... but curiosity increases biodiversity as critters explore the restoration site.

High density plantings were especially popular, as they formed an almost instant meadow. The divers spotted many sea critters - schools of butterfish, hermit crabs, cone snails, sea snakes and many different fish species. A white and purple striped squid tested its camouflage strategy next to newly planted wire weed, much to the distraction of our experienced dive team.

Biodiversity is returning to an open sandy environment. We hope some will stay and make a permanent home amongst the transplants and snaggers. ■

For more information contact Dr Elizabeth Sinclair or visit www.seagrassresearch.net

We are grateful for the interest, enthusiasm and support from the Shark Bay community.

It takes a tremendous, coordinated effort to make this all happen in such a remote location:

- 10 000m² site (=1 ha)
- 5 000 seagrass cuttings harvested and transplanted
- 443 seagrass snaggers
- 1 125 wieners
- 50 coffee bags
- > 200 SCUBA diving hours

Participants included volunteers and staff from UWA, Murdoch University, Tidal Moon Sea Cucumbers, Useless Loop Primary School and local community and Malgana Aboriginal Corporation rangers

This seagrass restoration site is dedicated to the memory of our dear friend and Malgana Aboriginal Corporation ranger, Nicholas Pedrocchi, *tread lightly as you continue your journey in peace.*

The project was funded by



What can you do as an individual, community group or large corporation?

Keep an eye out for ways to get involved as we seek to restore a further four hectares of seagrass. During your next restoration project, why not consider a 'Plus One'? Restore just one extra hectare of habitat. Globally, this will make a huge contribution to restoring the planet's ecosystems including the associated biodiversity

