

Restoring the threatened seagrass *Posidonia australis* in old boat mooring scars

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Endemic to Australia
Occurs in shallow and sheltered waters

Highly productive ecosystem
Dense and structurally complex meadows

<p>Water quality</p> 	<p>Protection from erosion</p> 	<p>Blue carbon</p> <p>SEAGRASS HABITATS ARE UP TO 35X MORE EFFECTIVE THAN AMAZONIAN RAINFORESTS IN THEIR CARBON UPTAKE ABILITY.</p> 
<p>Habitat</p>  <p><small>Photo: David Pearson</small></p>	<p>Food</p> 	<p>Nursery area</p>  <p><small>Photo: Adriano Vergés</small></p>

The problem

We're losing a soccer field of seagrass every 30 minutes.



Posidonia: Endangered in 6 NSW Estuaries



Posidonia australis distribution

- Listed as endangered ecological communities by the NSW government in 2011
- Australian Commonwealth Government (EPBC Act) in 2015
- Risk that *Posidonia* may become locally extinct from some of the NSW estuaries within the next 15 years

Conna et al. 2009, Gladby and West 2015, Evans et al. 2018



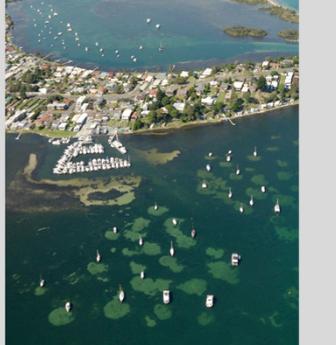
Pollution
Physical disturbance (boats, dredging)
Shading (sedimentation, nutrients, structures)

EPBC Act, 2015

Mooring impacts

Losses of *Posidonia* due to moorings in NSW:

130,000 m²
 =
26 soccer fields



Gladby and West, 2018 Marks Point, Lake Macquarie. Photo: Tim Gladby



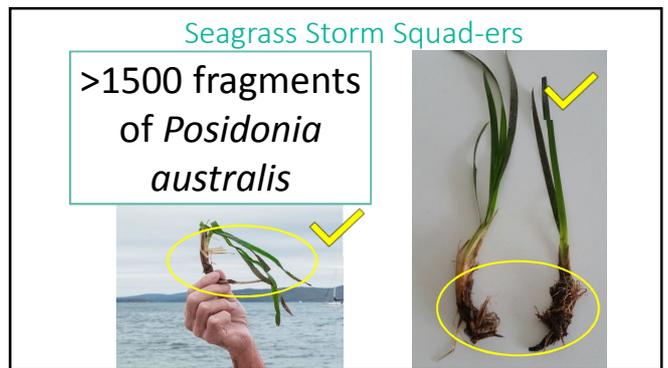
Traditional Swing Mooring
SEA BED DAMAGED BY CHAIN DRAG, LIMITED SEAGRASS GROWTH

Environmentally Friendly Mooring
NO CHAIN DRAG AND SEAGRASS HABITAT REMAINS UNDISTURBED

Diagram: EFM vs Traditional swing mooring

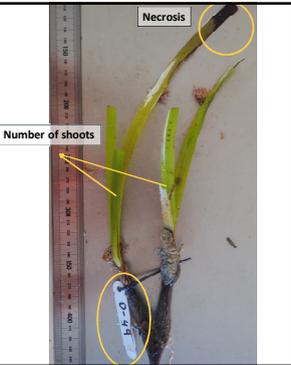
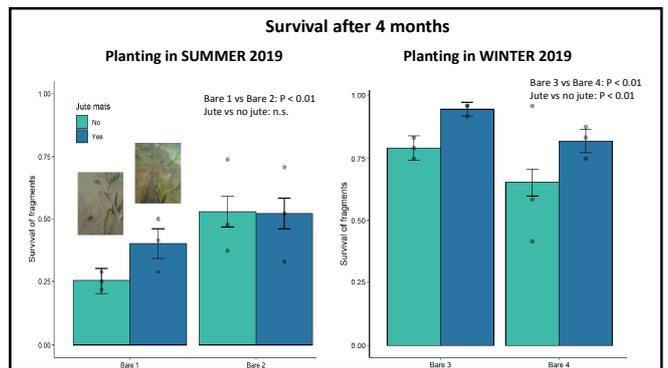
Mooring damage happens quickly
Posidonia grows very slowly
 Risk that *Posidonia* may become locally extinct from some of the NSW estuaries soon

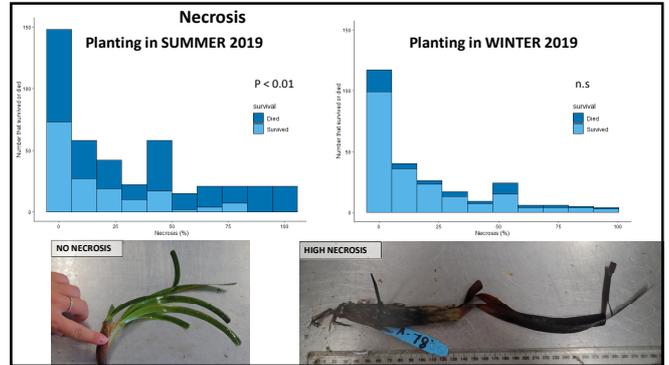
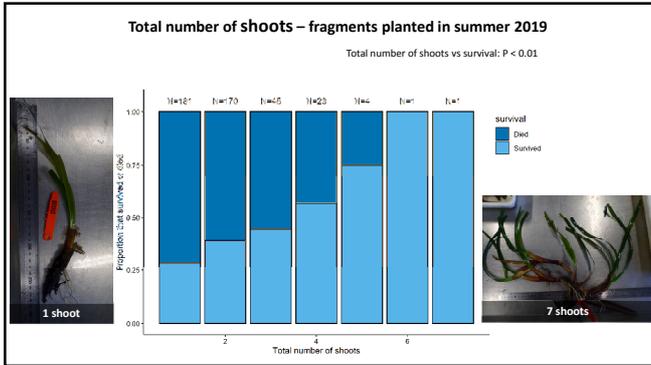
Meenan and West, 2009, NSW FSC, 2010



How can we optimize seagrass restoration?

- What **abiotic factors** influence seagrass survival most during restoration?
Season, sedimentation, distance from natural seagrass, depth
- What **morphological traits** influence fragment survival most?



Higher survival of fragments planted in winter:

- Seasonal effect? Better to plant in winter?
- Restoration technique is improving?
 - volunteers are collecting 'healthier' fragments?
 - planting method is getting better?

In conclusion

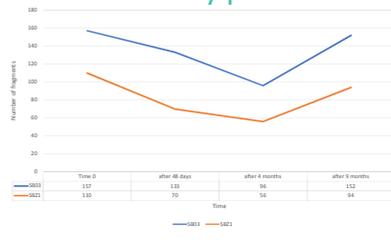
- P. australis* beach-collected fragments can establish within old boat mooring scars and grow
- Season of planting seems to be a critical factor for survival
- Presence of jute mats can enhance survivorship
- Some morphological traits can influence fragments survival (e.g., necrosis and number of shoots)

THANK YOU!

And then planted underwater!



Preliminary pilot trials



our restored shoots are growing and spreading!!!