

Developing tools and knowledge for intertidal seagrass restoration in Western Port



**Melbourne
Water**

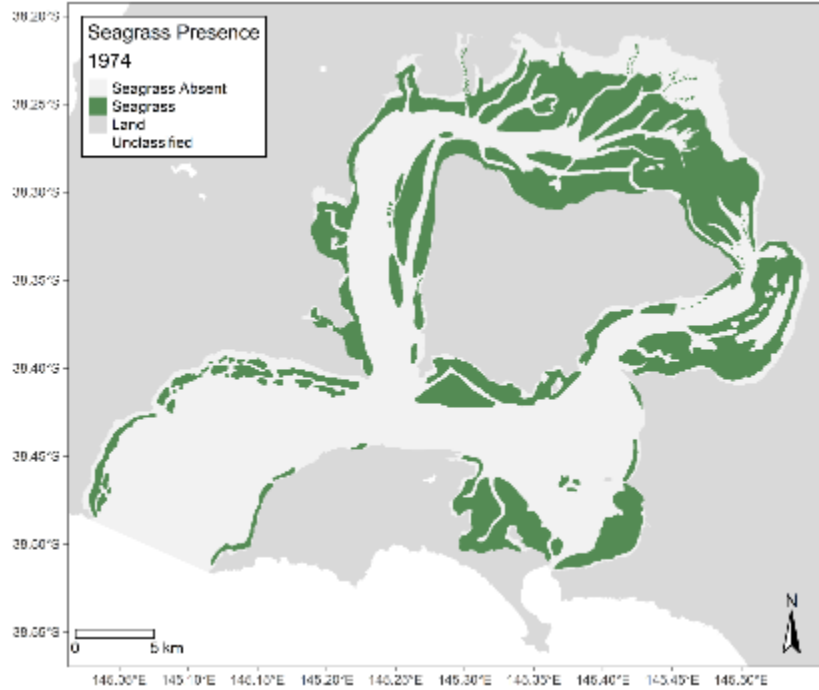
Seagrass - Why is it important?

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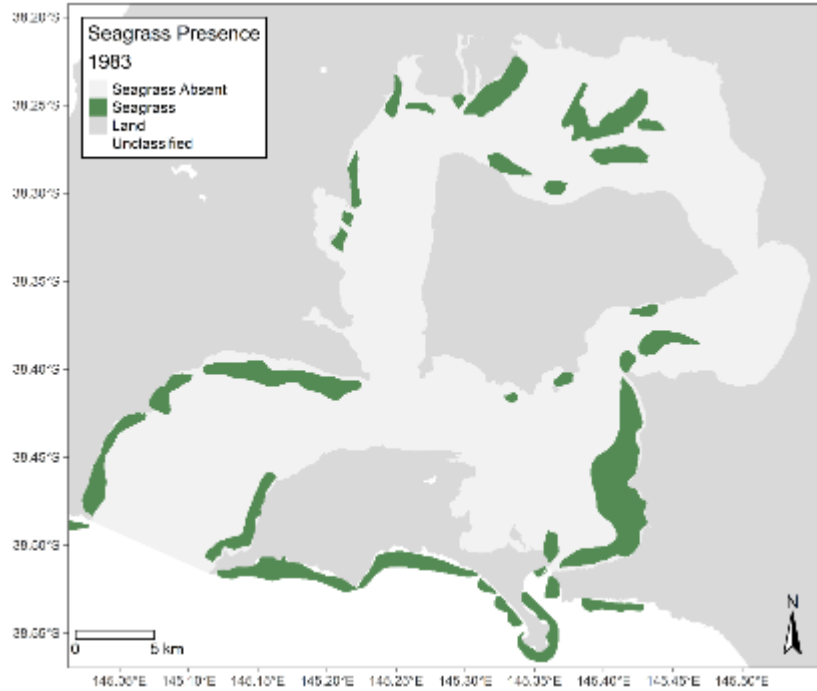
Seagrass in Western Port

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Seagrass in Western Port

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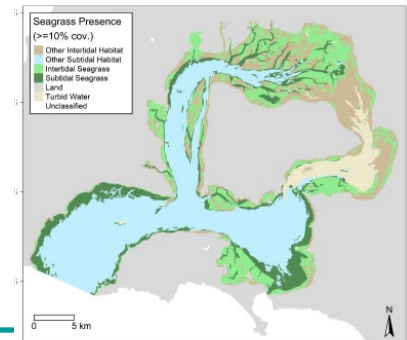




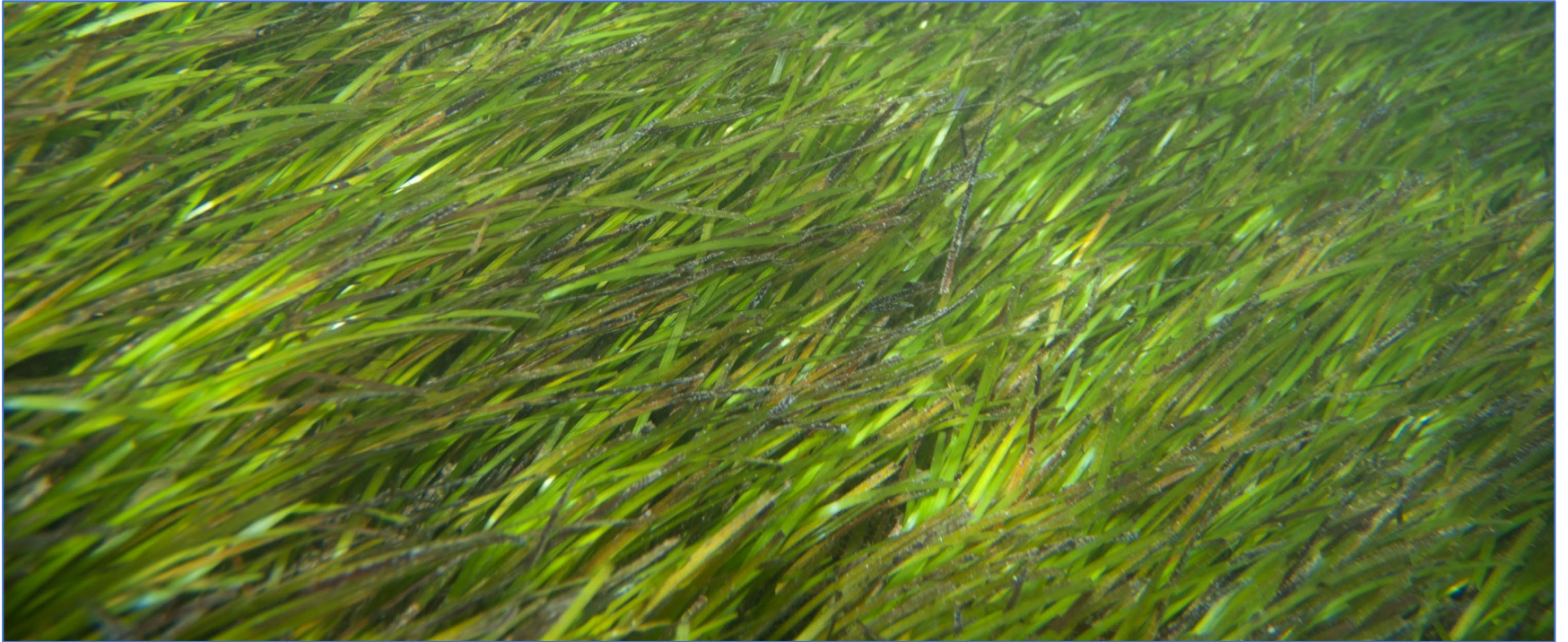
Western Port seagrass restoration program

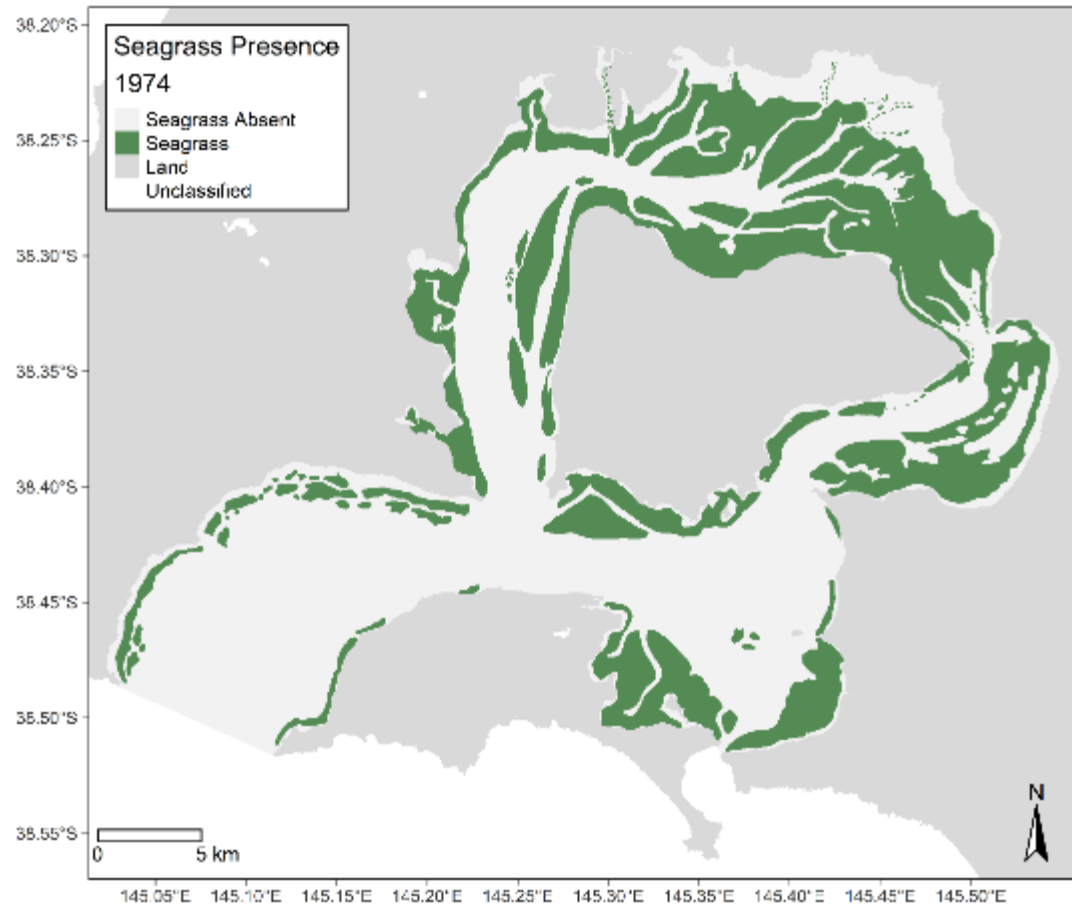
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- Commenced in 2018 by Deakin – Melbourne Water
- Building on previous work from Western Port Seagrass Partnership
- Learn from other seagrass projects – QLD, UK, Netherlands, Denmark
- Understand the current status of seagrass and identify areas suitable for restoration
- Develop the tools and knowledge to undertake seagrass restoration



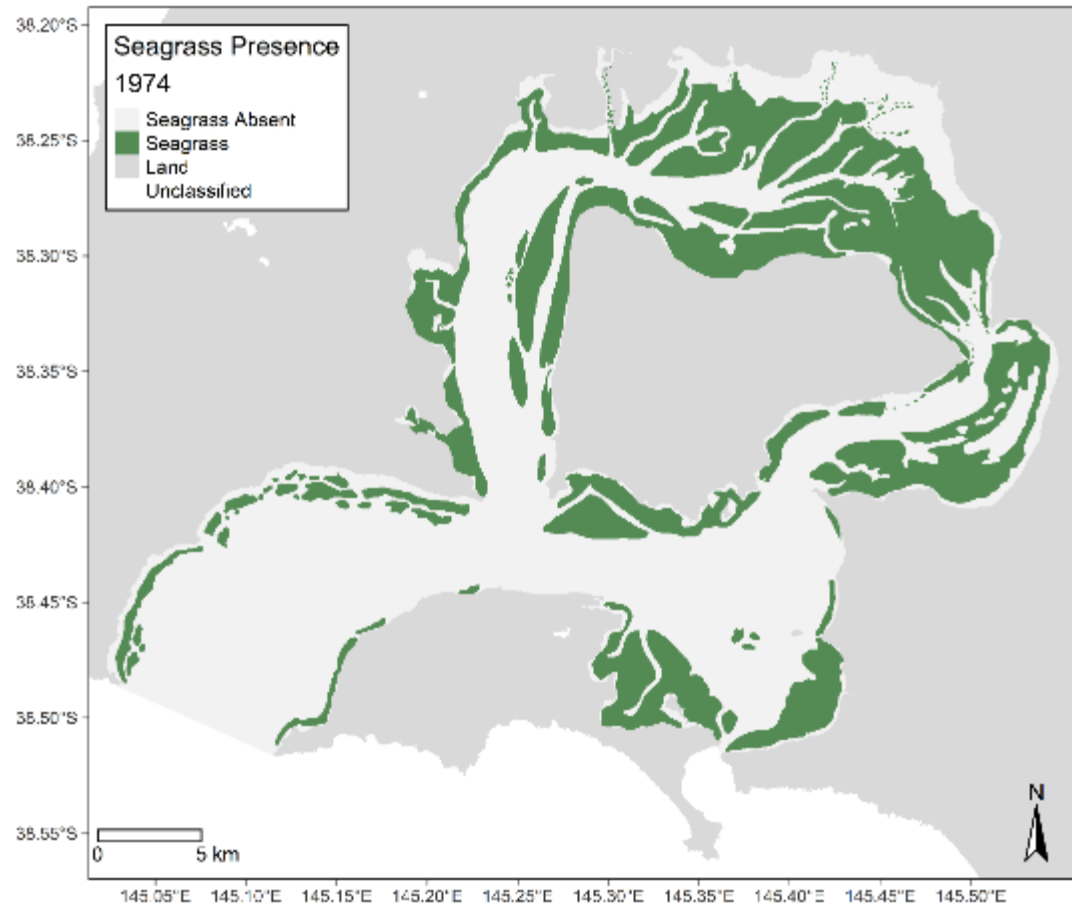
Historical trends in seagrass extent





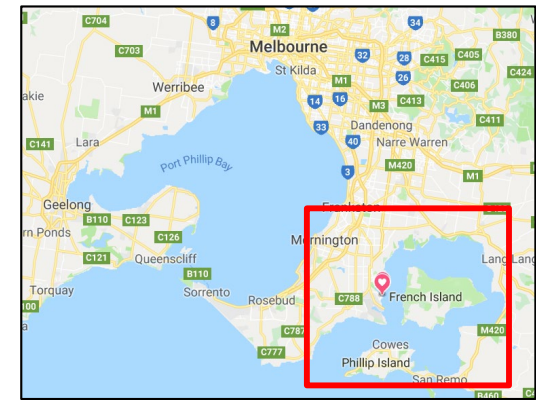
Oliver Dalby

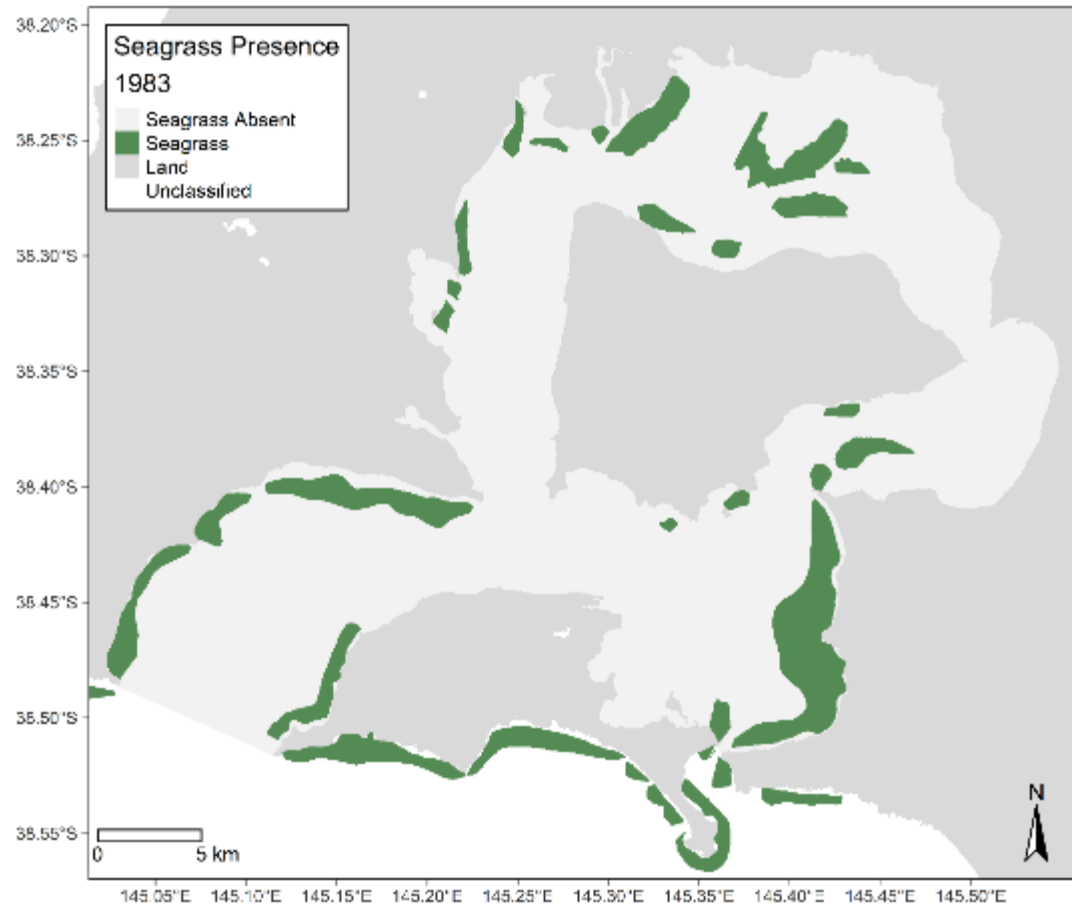




Total Seagrass Cover

251km² - Bulthuis et al (1980)

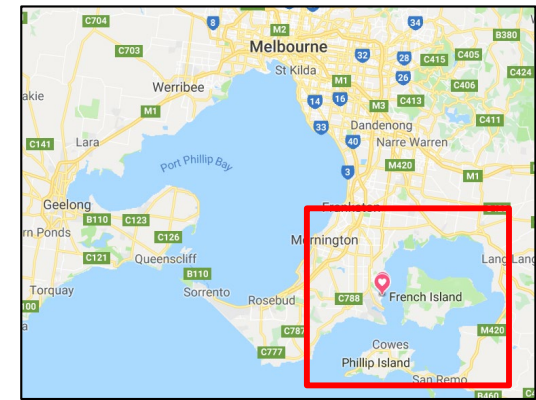


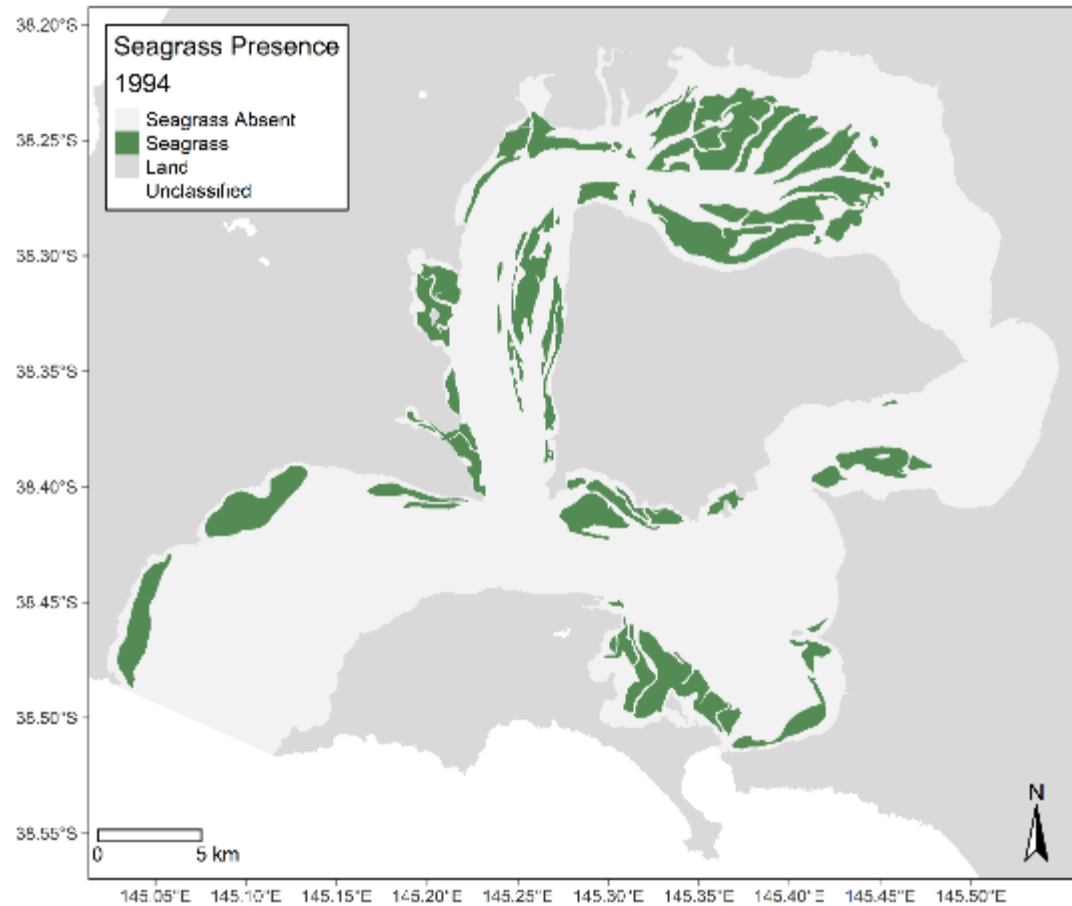


Total Seagrass Cover

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76km² – WPRPCC (1992)





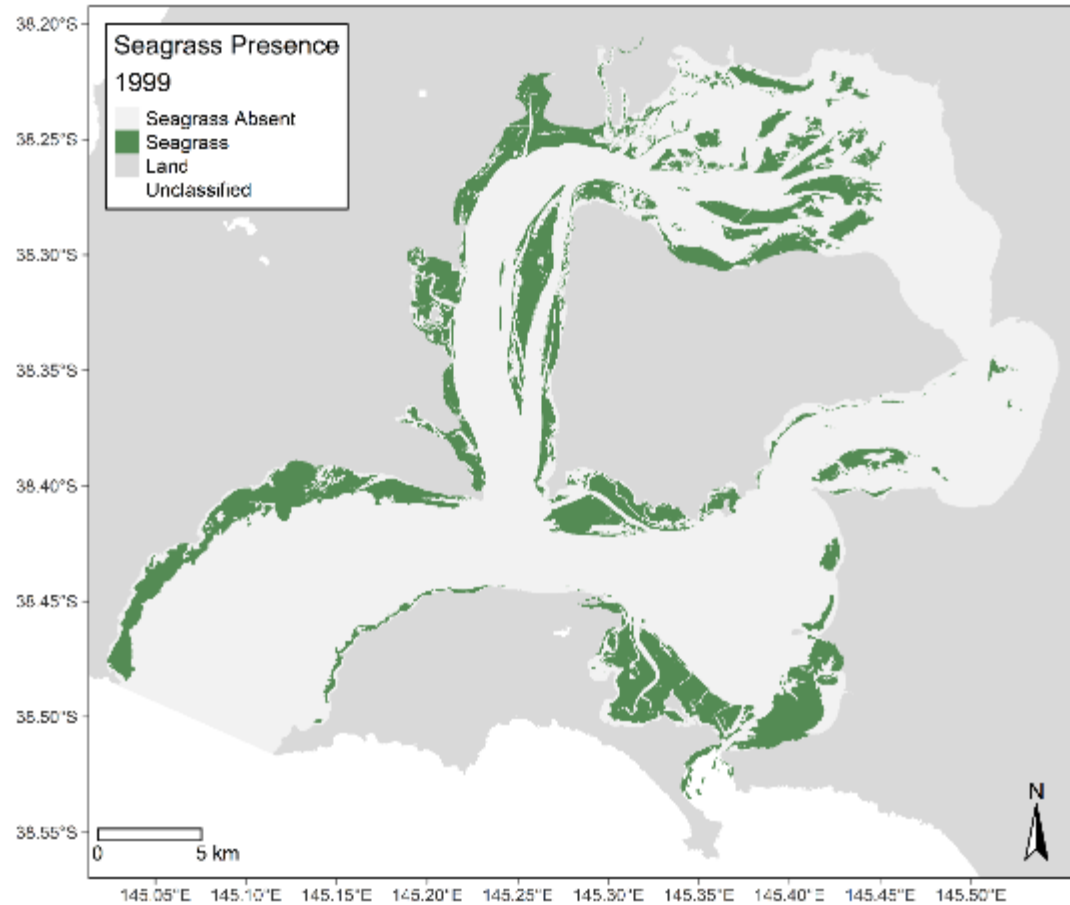
Total Seagrass Cover

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131km² – Stephens (1995)





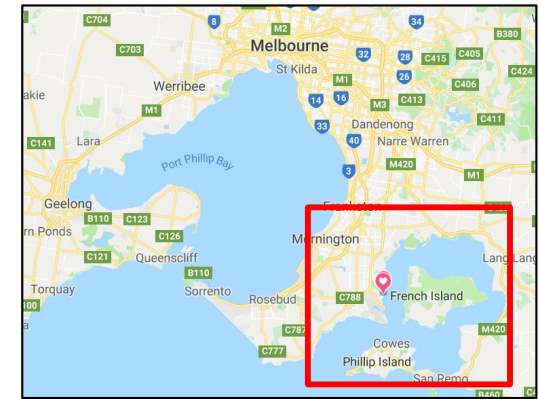
Total Seagrass Cover

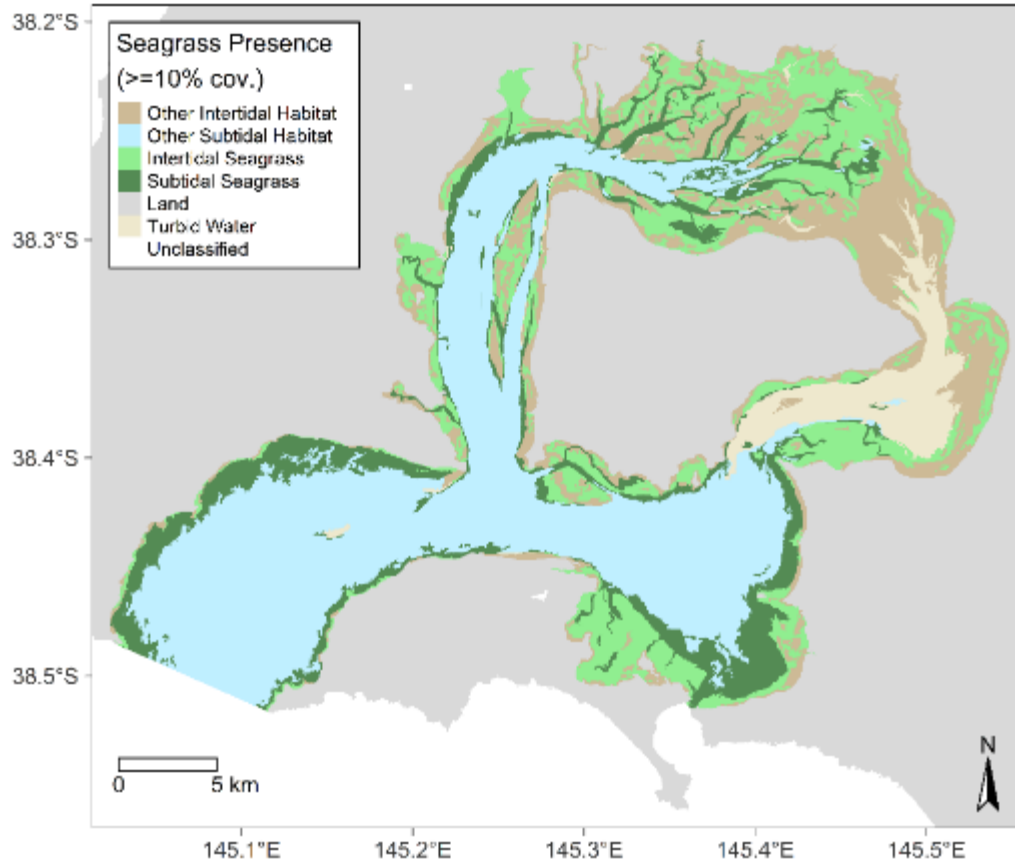
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Total Seagrass Cover

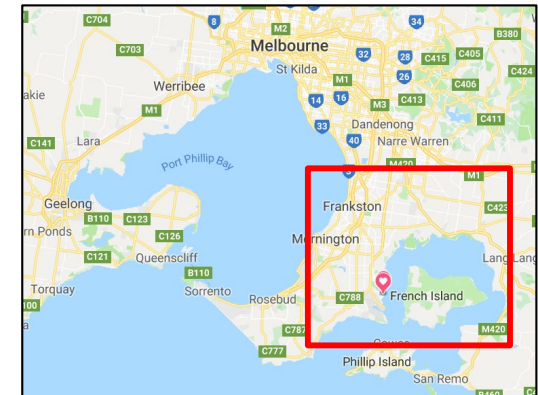
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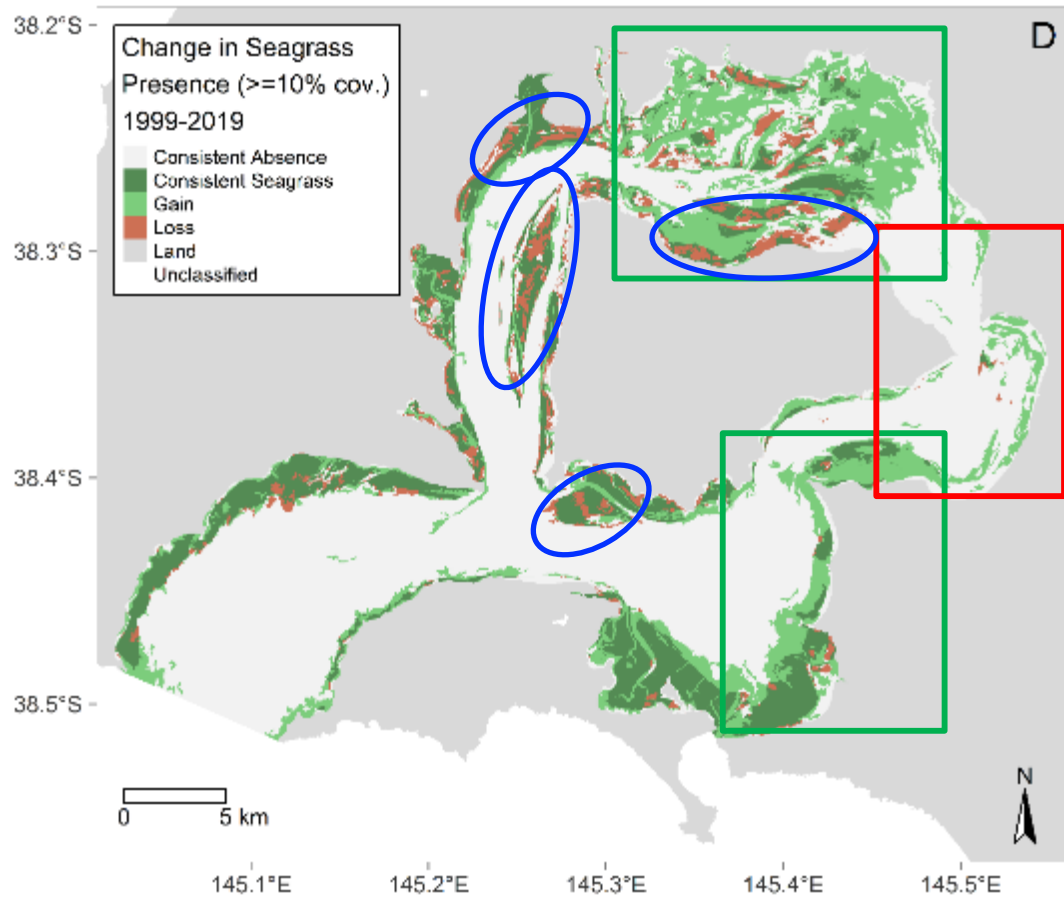
76km² – WPRPCC (1992)

131km² – Stephens (1995)

~130km² – Blake and Ball (2001)

222km² – Dalby et al (2023)





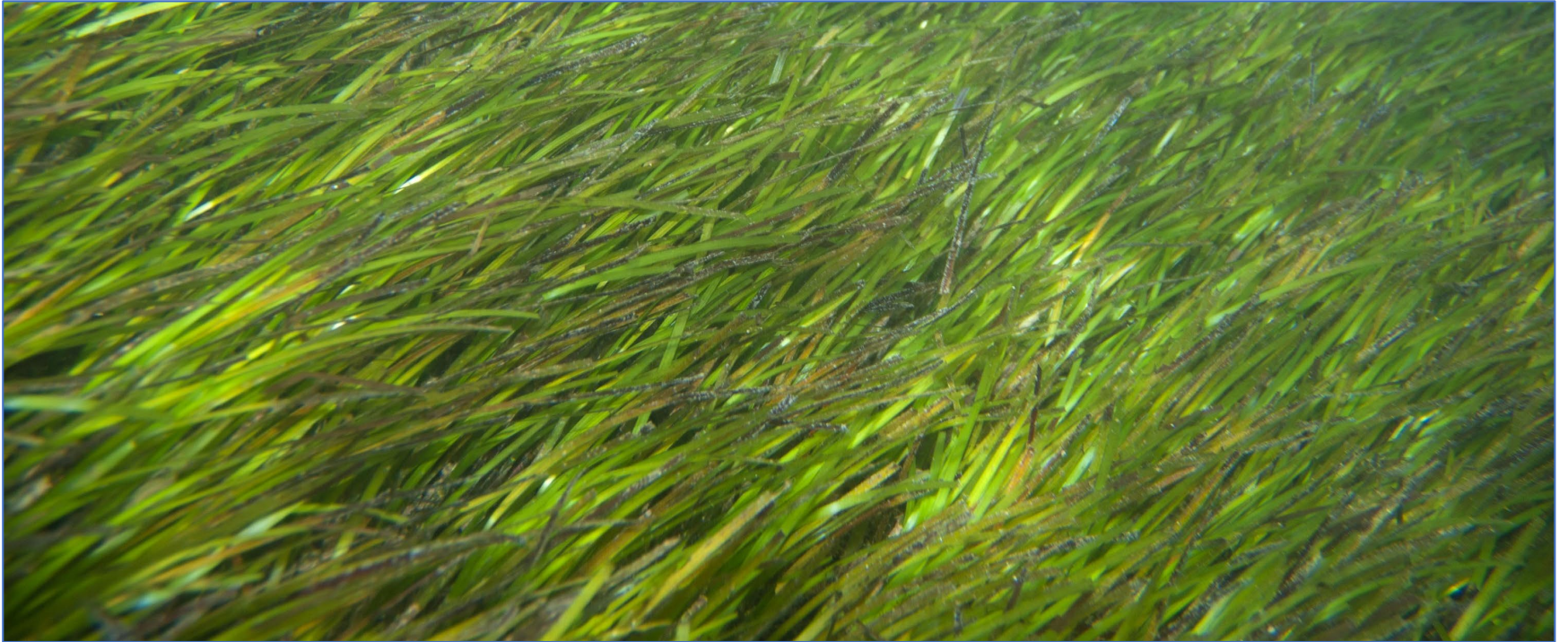
Mapping biodiversity values using eDNA

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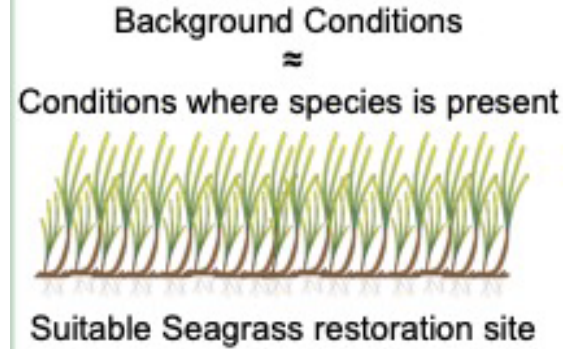
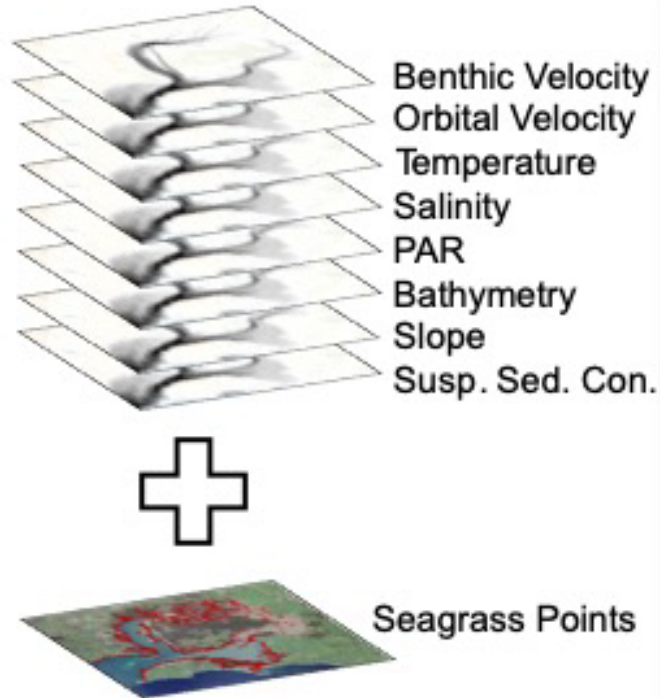
- 150 sediment samples from ground truthing campaign
- Using eDNA to map biodiversity values across Western Port
- Bacterial, invertebrate and vertebrate diversity



Where should we be planting?

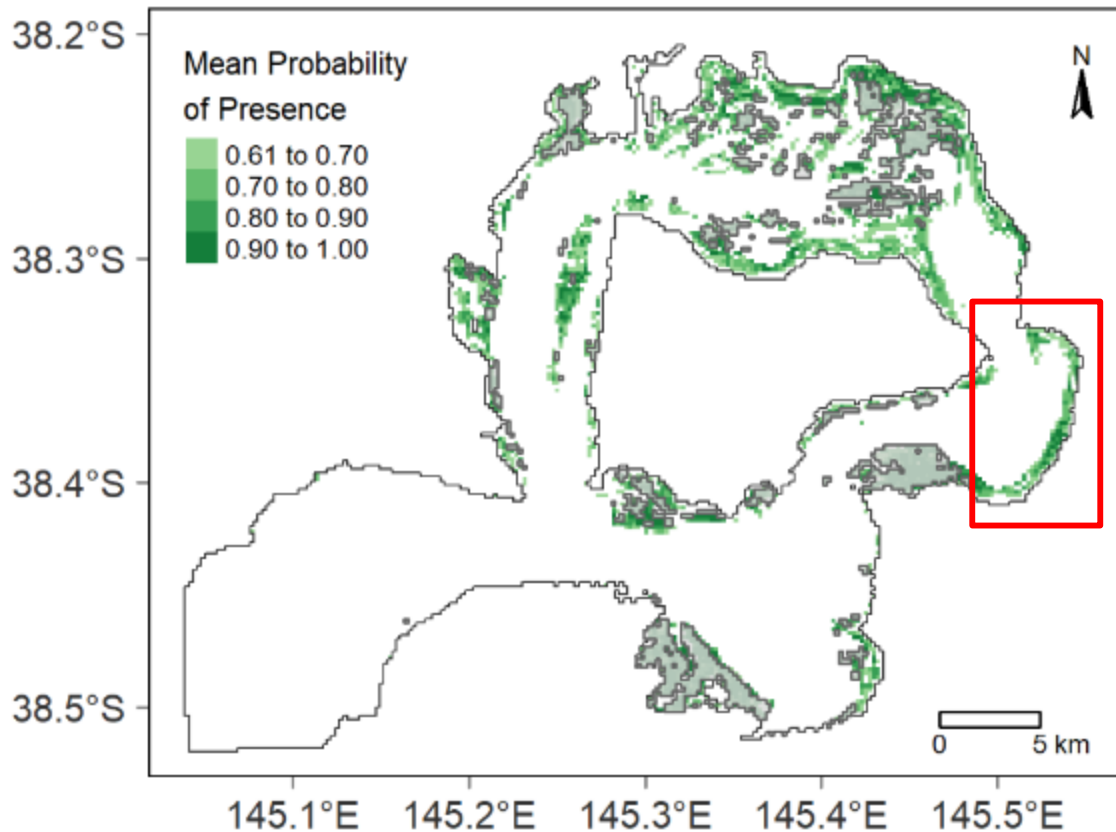


Habitat suitability model OFFICIAL

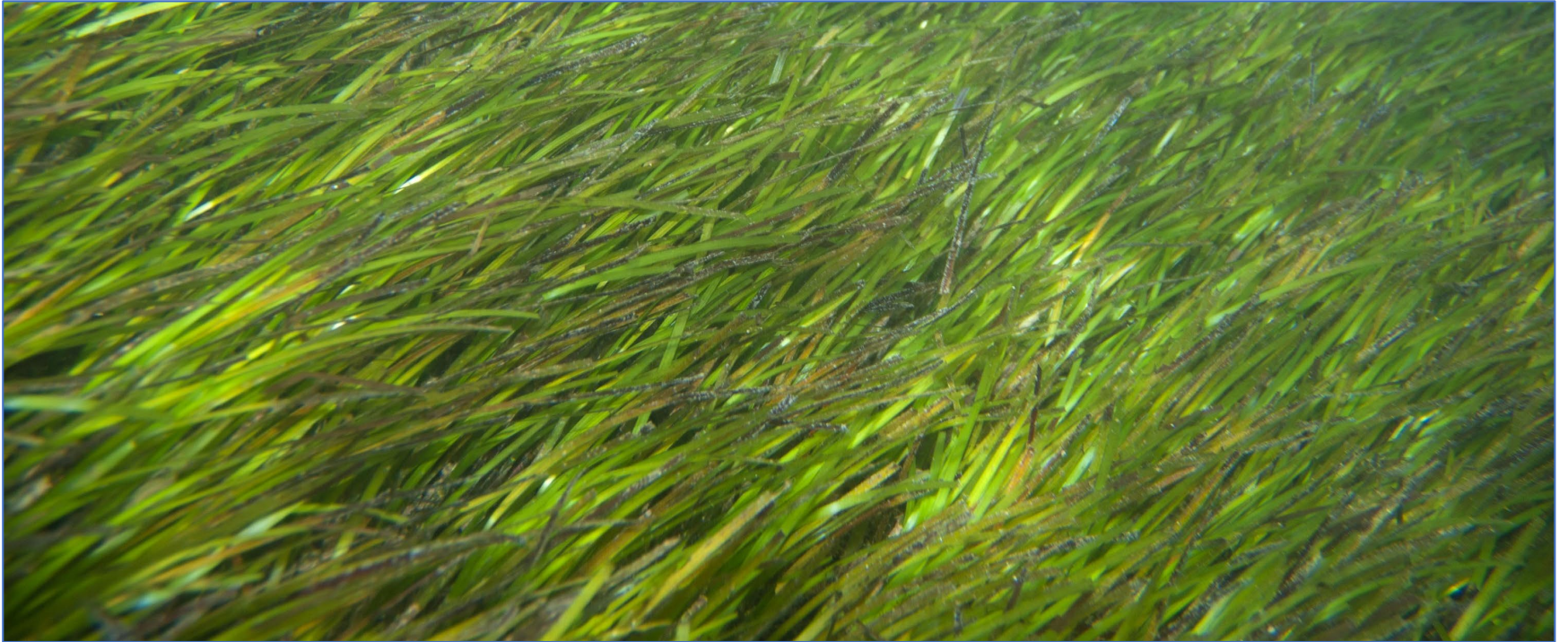


Restoration suitability model

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How do we plant seagrass?



Developing tools and knowledge to assist seagrass recovery

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1: Shoot-based restoration approaches

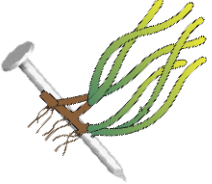
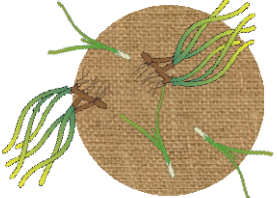
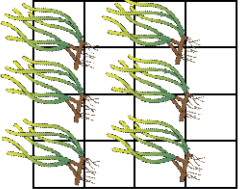

2: Seed-based restoration approaches

3: Investigate the feasibility of cultivating in a nursery setting



Shoot based trials

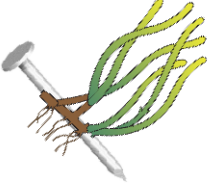

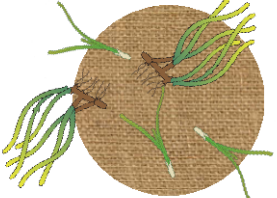

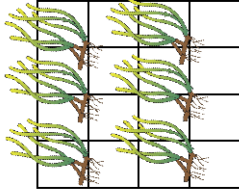



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<p>Nails</p> 	
<p>Hessian discs</p> 	
<p>Wire mess</p> 	
<p>Cores/plugs</p> 	



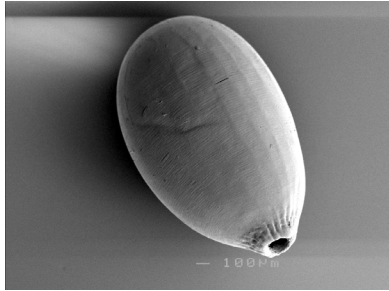
Shoot based trials

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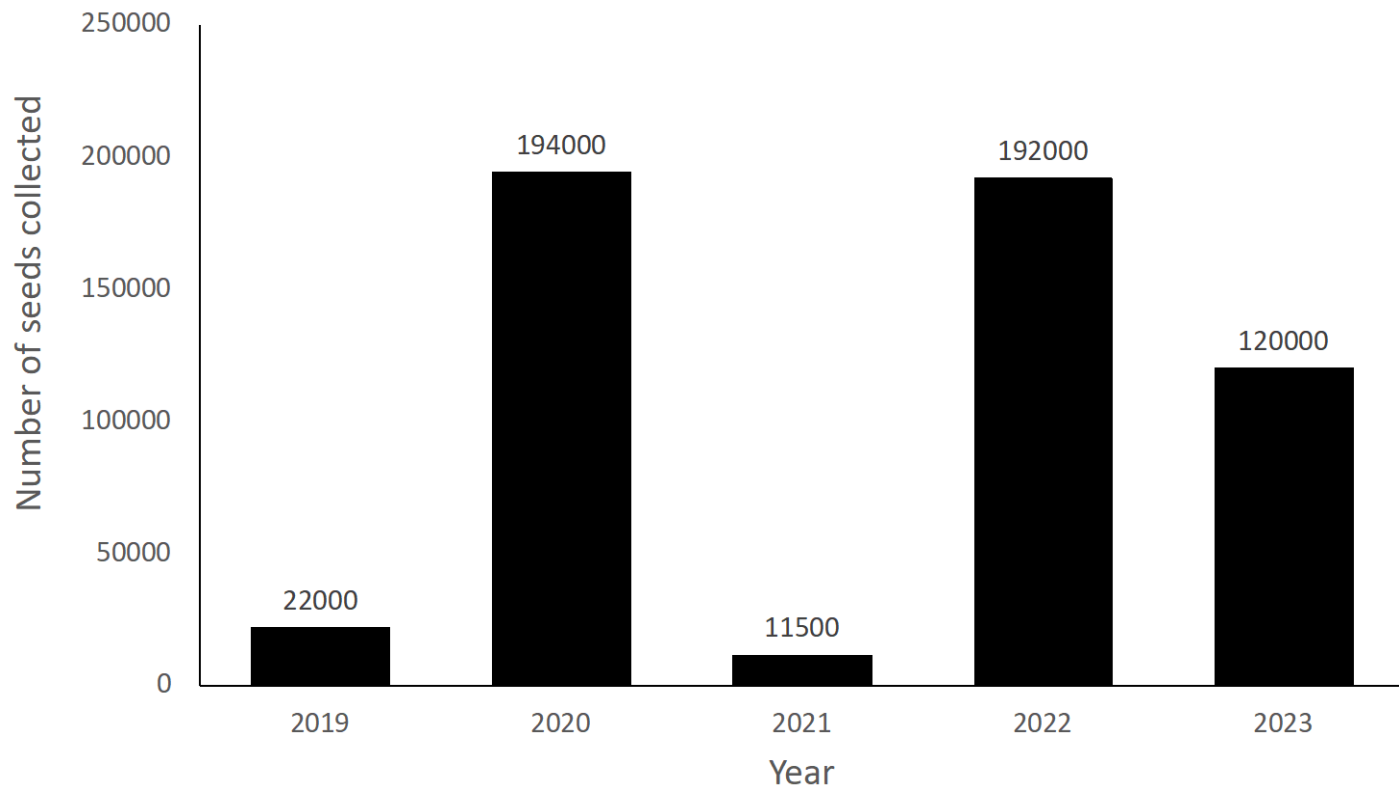
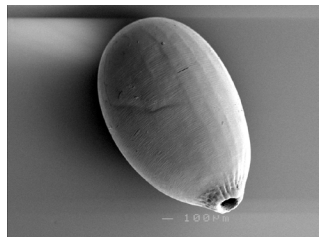


Seed-based restoration OFFICIAL



Seed collections

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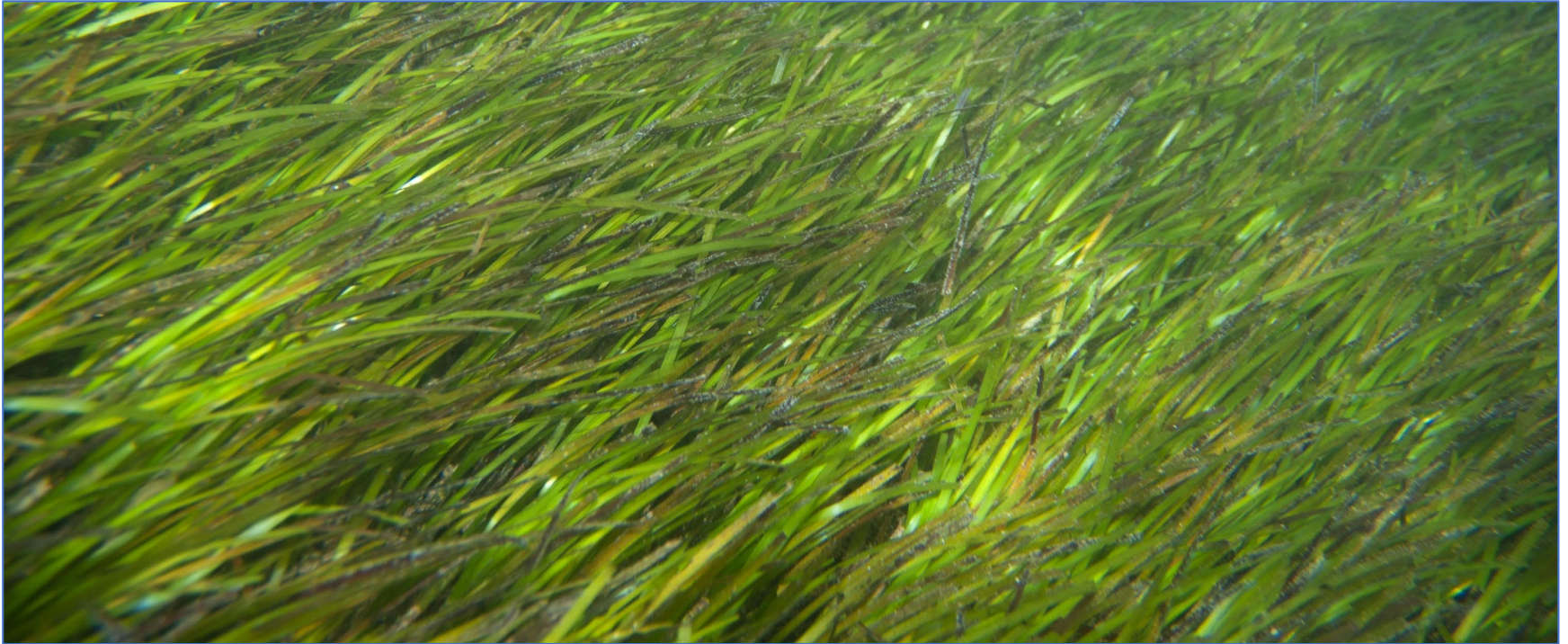


Seed-based restoration OFFICIAL

- Field germination trials
 - Seeds deployed in hessian bags
 - On average 12% germination
 - Shoot density doubled over 5 months
 - But seedlings didn't survive winter



Can we grow seagrass in a nursery for restoration?



Advance Community College - Mornington

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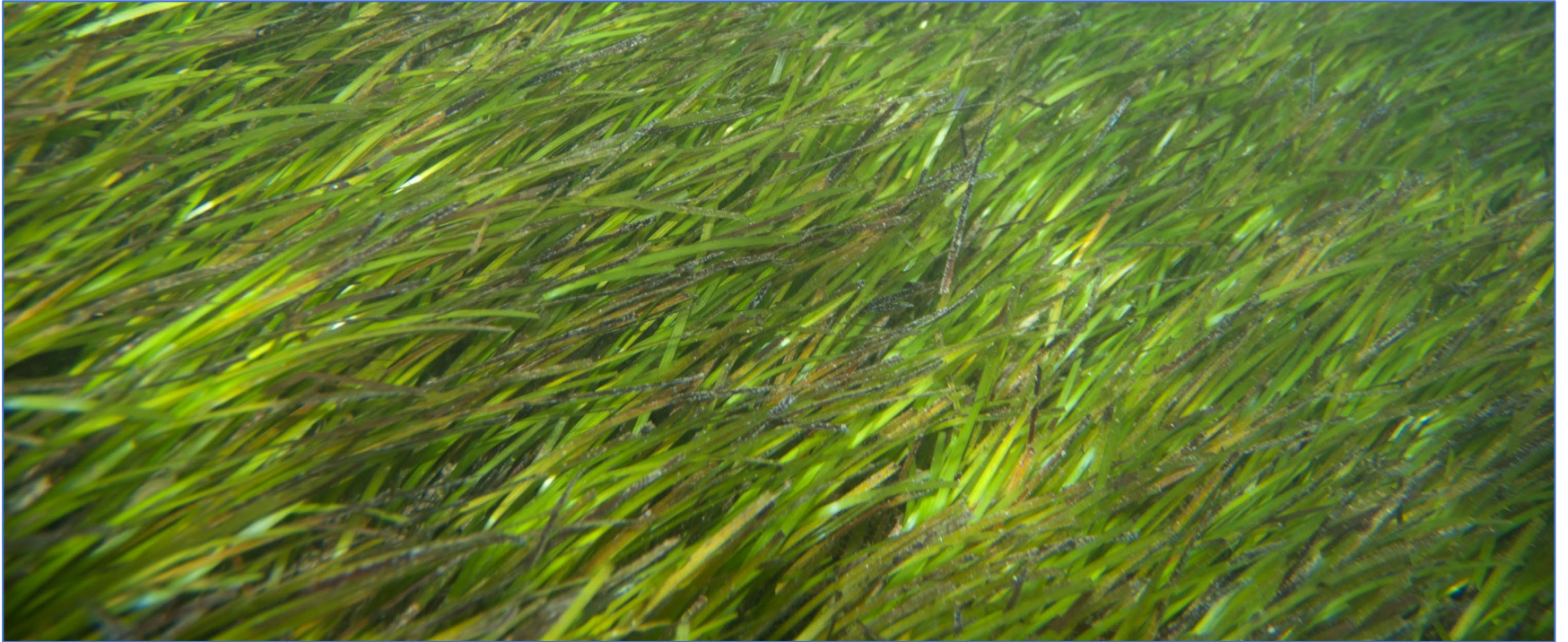


Seagrass nursery to field trials

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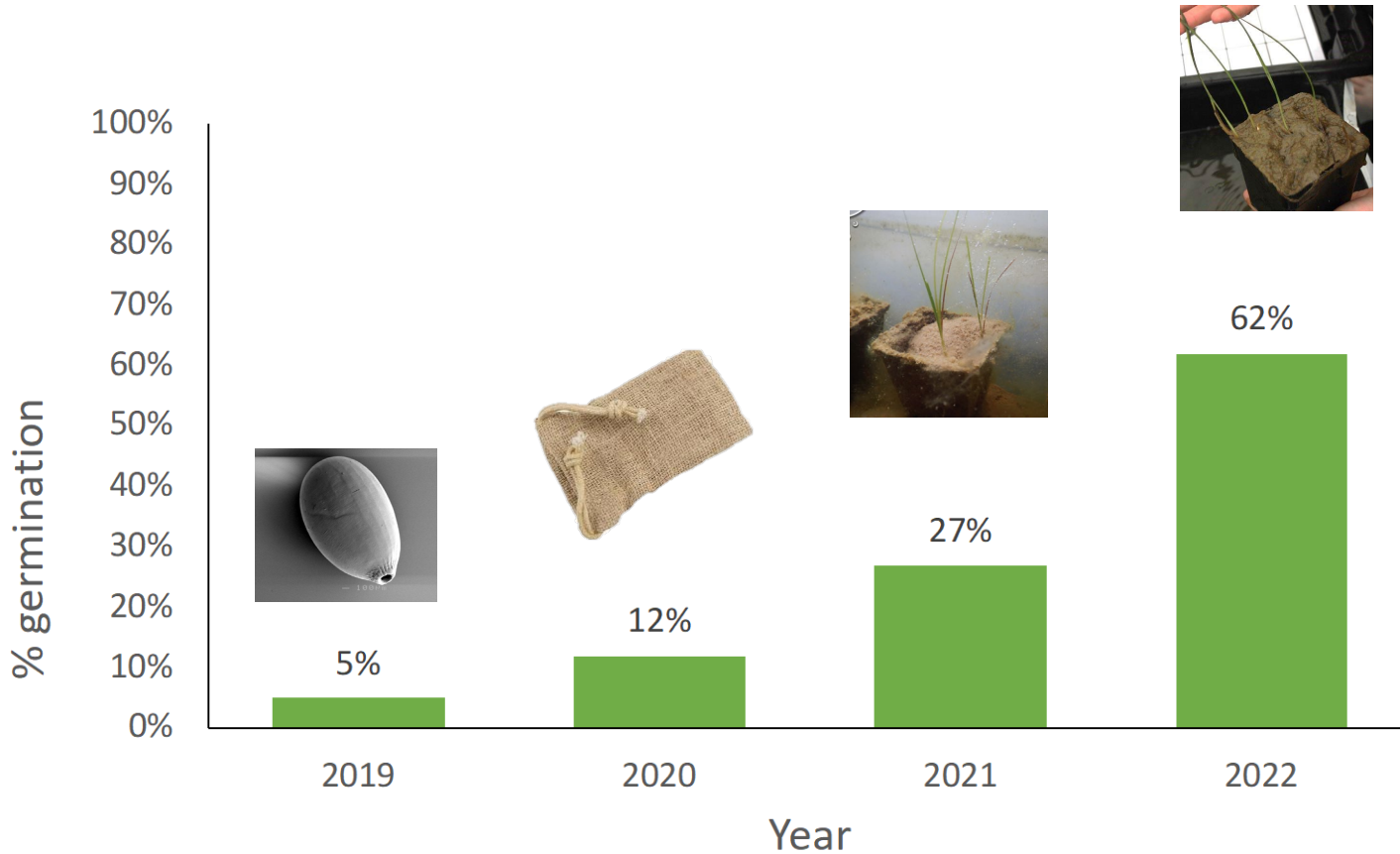


How hard is it to grow seagrass from seed?



Seed germination

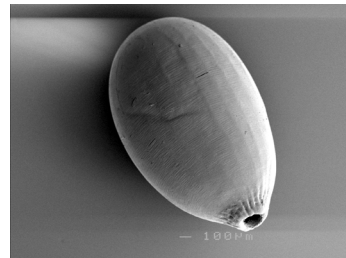
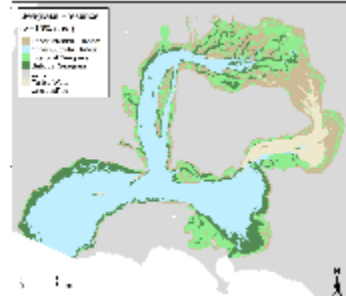
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What have we learnt so far?

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- Significant natural recovery has occurred, BUT some areas have lost seagrass or not recovered
- Shoot-based approaches seem limited to large cores
- Seed based restoration and nursery cultivation look most feasible

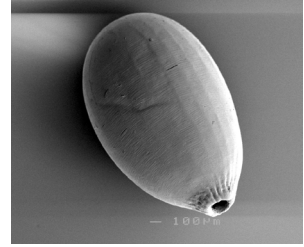


Where to from here? Phase two

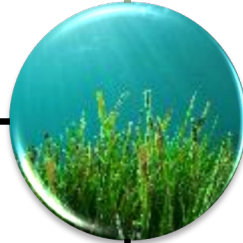
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Seagrass nursery – seed collection, storage and germination



Field restoration techniques



Seagrass nursery – Seedling conditions and out planting



Fine-scale site suitability assessments





Dr Craig Sherman
Deakin University



Dr Rhys Coleman
Melbourne Water



Dr Kathy Cinque
Melbourne Water



Dr Adam Miller
Deakin University



Dr Emma Jackson
CQU



Dr Perran Cook
Monash



Dr Luara Govers
University of
Groningen



Dr Daniel Ierodionou
Deakin



Dr Jannes
Heusinkveld
The fieldwork
company



Dr Richard Unsworth
Swansea University



Dr Peter Macreadie
Deakin



Dr Mogens Flindt
University of
Southern
Denmark



Oliver Dalby
PhD student



Yi Mei Tan
PhD student



Elizabeth Keehner
PhD student



Abigail Wookey
PhD student



Lucy Coals
PhD Student

The seagrass champions!!



Laney Callahan
PhD Student



Amélie Nithard
& Edel Lheureux
Masters students



Jack Dewhurst
Honours student



Shash Dodampahala
Honours student

Questions

Interested in getting involved in seed collections?
See me after this talk!



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