

Transport for NSW

Kamay Ferry Wharves

Community forum:

Deep dive on environmental management of *Posidonia australis* seagrass

Welcome. The session will start soon.

Contact us

1800 718 556

kamayferrywharves@transport.nsw.gov.au

La Perouse Wharf (artist impression)



Kurnell Wharf (artist impression)



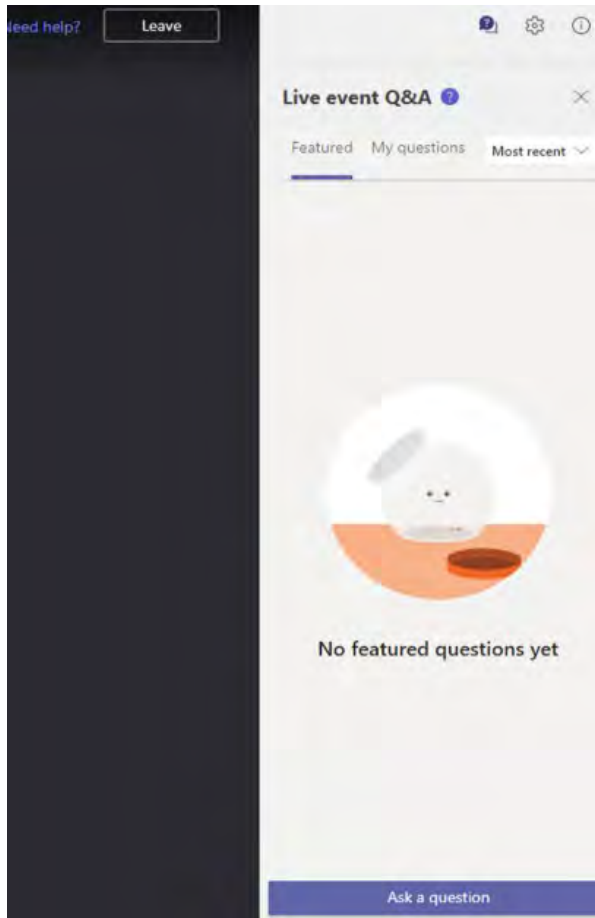


We acknowledge the Bidjigal and Gweagal clans who traditionally occupied Kamay (Botany Bay) and pay respect to Elders past and present.

We recognise and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of NSW.

New to Microsoft Teams?

Learn how to use Q&A



Q&A is enabled on the right panel of your desktop, or by tapping the  icon on your mobile device.

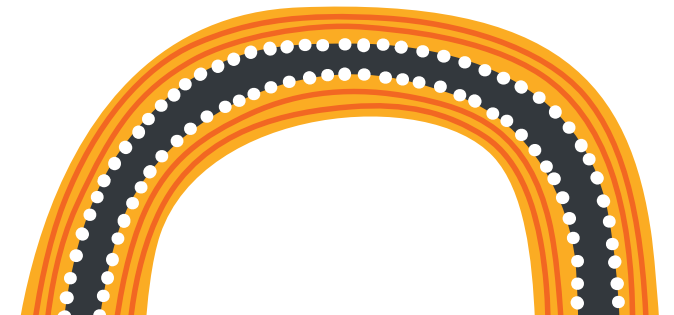
Featured comments will begin to populate as our team moderates and publishes questions posted by attendees to the livestream.

You can sort comments by most recent or by most liked.

My questions allows you to submit your question or comment (either using your name or anonymously).



This information session is being recorded



Introductions



Kate Lewis
Transport Engagement Manager



Estelle Ouari
Transport Assistant Project Manager



Erin McCosker
UNSW Marine Scientist
and Project Coordinator



Adriana Vergés
UNSW Professor in
Marine Ecology



Robert Cooley
Gamay Ranger

Key topics from registration

Check website, Frequently Asked Questions or contact our team

Seagrass-related

- Update on Posidonia seagrass work
- Restoration methods and timing
- How is seagrass being protected, will boat propellers impact seagrass beds?
- Plans for Halophila seagrass?
- Can community help plant seagrass?
- What happens if expected outcomes aren't realised?

Environment

- Is there dredging?
- Will construction impact sand disturbance?
- Marine sustainability, waste management and environmental management plans
- Will there be any artificial reefs or exclusion zones?
- Consider no fishing zones at Bare Island

Wharf access

- Recreational boating
- Fishing
- Impact to divers

Ferry and transport

- Ferry service questions
- Public transport questions
- Connection to other areas

Local Engagement

- Engagement with Traditional Custodians of the area
- Job opportunities for local youth
- Cultural or art/science workshops or event

Parking and traffic

Project consultation and approval

Kamay Ferry Wharves

Reinstating a water connection

The NSW Government is replacing the previous ferry wharves at La Perouse and Kurnell as part of the Kamay Botany Bay National Park, Kurnell Master Plan.

\$78m has been funded by NSW Government.

Both wharves are being built at the same time.

Site establishment work started in late June 2023 and construction is underway.

Construction is expected to be completed by late-2024



Features and benefits

Wharves everyone can use

La Perouse Wharf

- 13 new parking spaces on Anzac Parade
- 2 additional accessible spaces (3 in total)
- 10 new bike racks
- 2 recycling and general waste bins

Kurnell Wharf

- Existing accessible spaces on Prince Charles Parade
- 2 recycling and general waste bins

National Parks and Wildlife Service will provide:

- 34 additional parking spaces in the Cricket Pitch Carpark (inside the national park)
- Bike racks (number and location to be confirmed)

No dredging as part of this project.



Connecting both sides of the National Park



Recognising Aboriginal connections to the area



Gathering and meeting places



Native plants and trees



Berthing for small vessels up to 20 metres in length and ferries up to 40 metres



Safe fishing



Protection from the weather



Additional car and bike parking



Accessible to all

ENVIRONMENTAL MANAGEMENT OF *POSIDONIA AUSTRALIS* SEAGRASS

Environmental offsetting

- Under NSW and Australian law, when a project can't avoid environmental impact, it needs to try and reduce it. When it can't do this, it must offset any remaining impacts
- While the wharves have been designed to avoid as many impacts as possible, construction activities and shading from the wharf will have some impact on seagrass, including threatened species *Posidonia australis* seagrass at Kurnell
- Our Marine Biodiversity Offset Strategy (MBOS) sets out how we will manage and mitigate the residual impacts of the project on marine ecology and biodiversity, to ensure no net marine biodiversity loss in Botany Bay as a result of the construction of the wharves



Aerial image of the Kurnell site

Marine Biodiversity Offset Strategy (MBOS)

- Our MBOS activities include:
 1. The restoration of *Posidonia australis* seagrass to create a greater area of Posidonia habitat than is expected to be directly impacted by the project
 2. The provision of artificial habitat for White's Seahorse
 3. Improvements to existing moorings to offset impacts to *Zostera* and *Halophila* seagrass and macroalgae
 4. Supporting research into seagrass rehabilitation.
- An MBOS Implementation Reference Panel is overseeing the implementation of the MBOS
- We are partnering with experts from the University of NSW and Gamay Rangers to deliver the MBOS
- Tonight's session focusses on the work to restore *Posidonia* seagrass



Two White's Seahorses using a seahorse hotel. Image by Department of Primary Industries and Fisheries.

Restoring seagrass meadows in Gamay (Botany Bay)



UNSW
SYDNEY



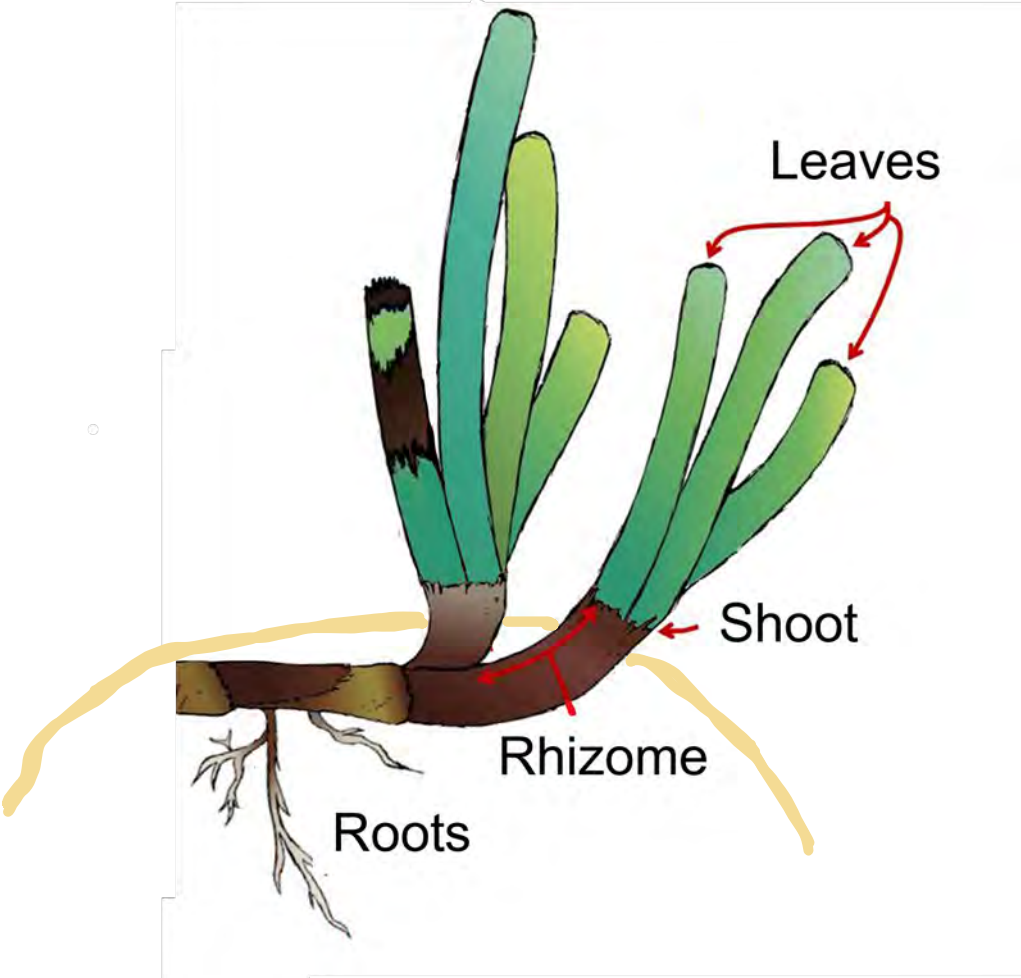
What are seagrasses?



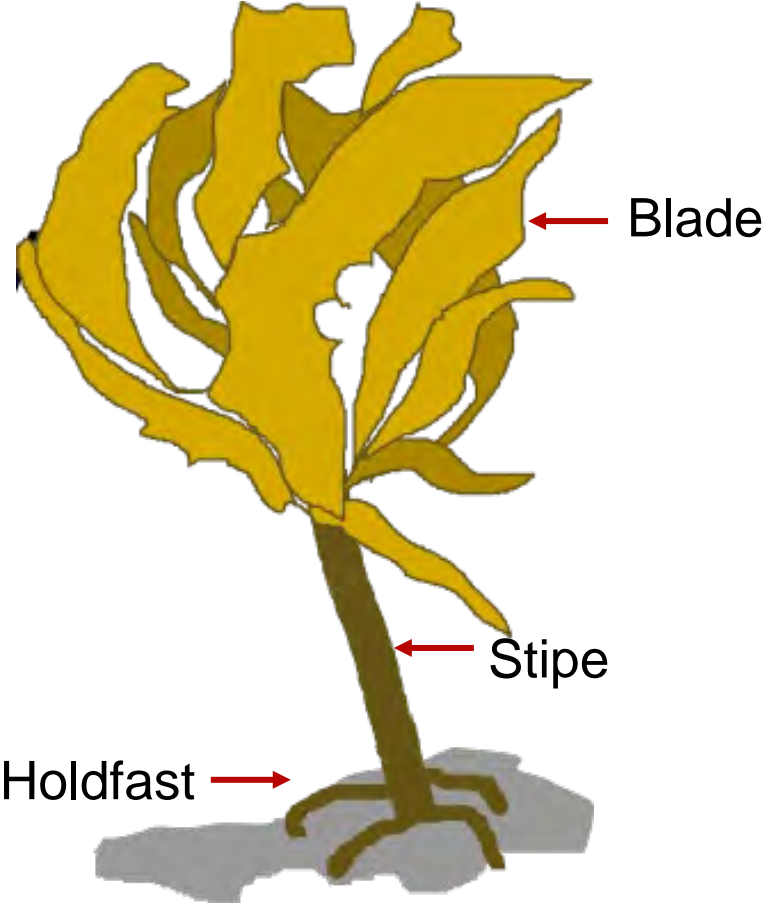
Photo: Harriet Spark

What are seagrasses?

Seagrass



Seaweed (kelp)



Adapted from Ferretto et al.(2023)

Water quality



Protection from erosion



Blue carbon



Habitat



Food



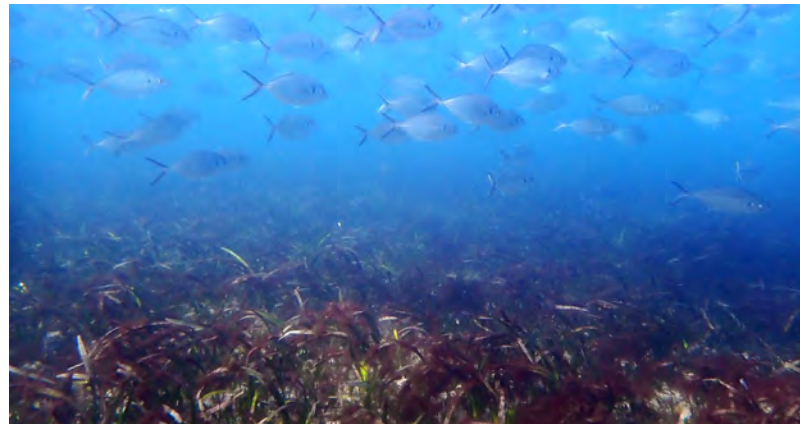
Nursery area





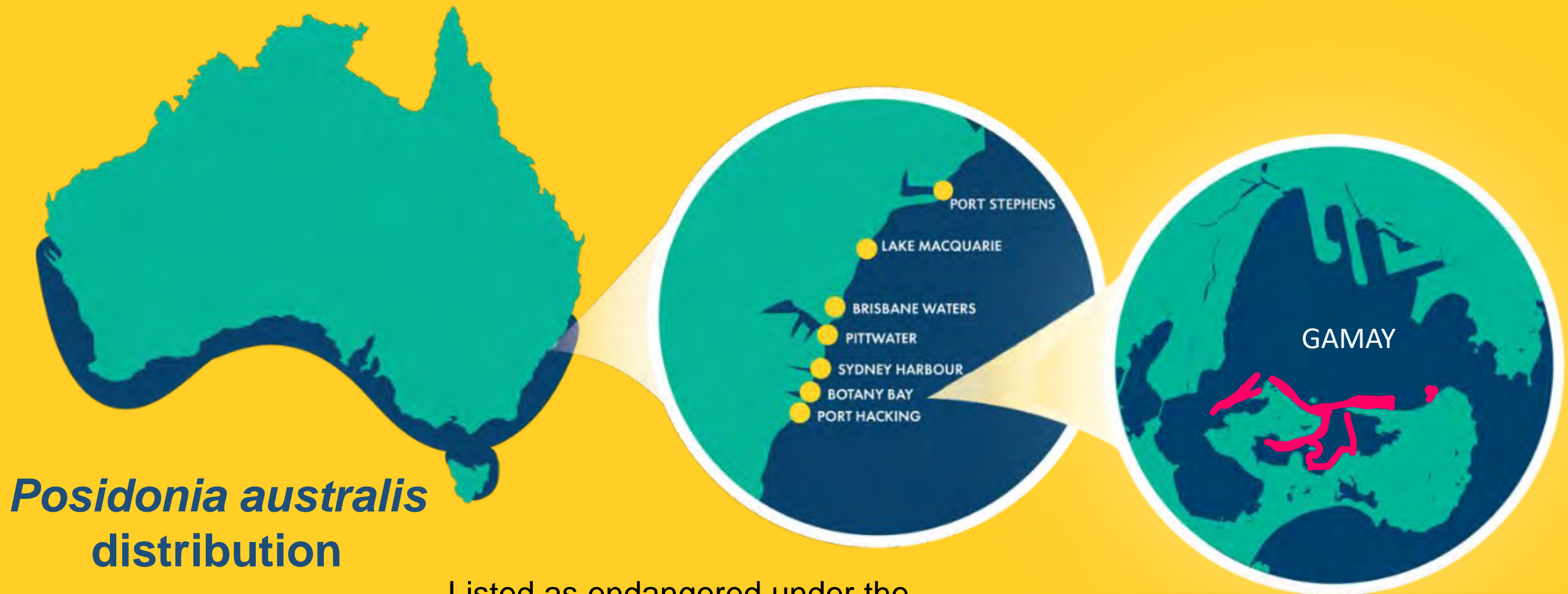
Posidonia australis

- Largest seagrass in Australia
- Grows in shallow areas, less than 10m deep
- Leaves up to 80cm long
- Shoots grow up through the sediment from a buried rhizome
- Produces flowers, fruits and seeds, but rarely in NSW
- Seedlings take decades to develop into mature plants



Life in
Posidonia
meadows

Posidonia: Endangered in 6 NSW estuaries



Posidonia australis
distribution

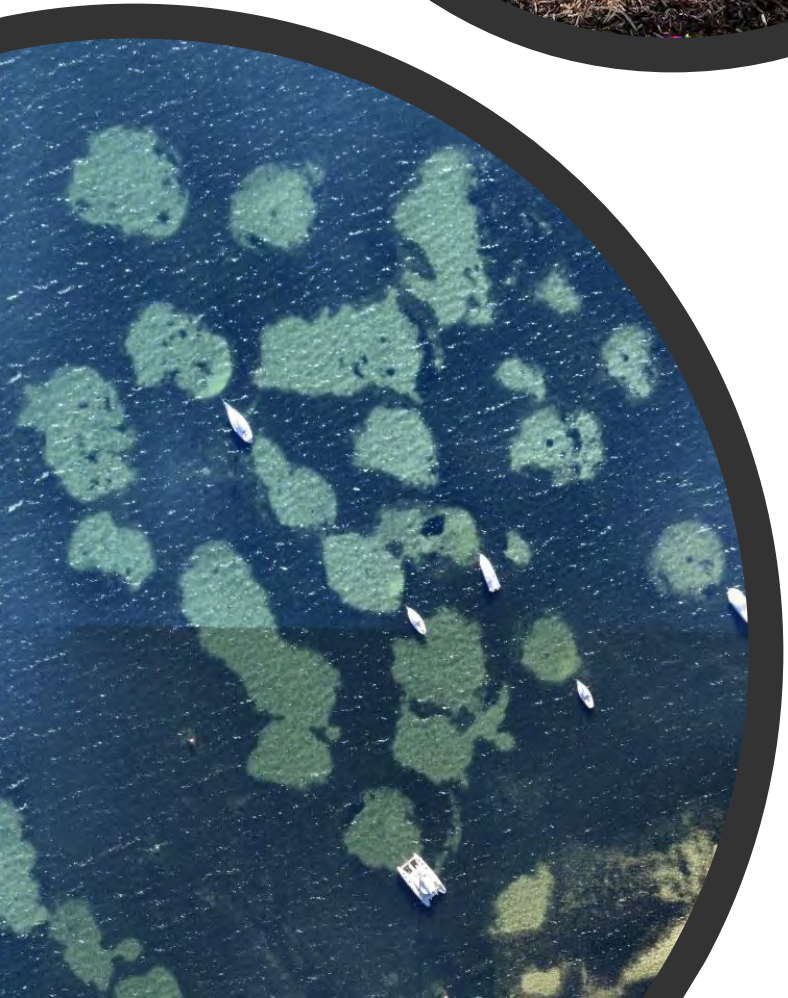
Listed as endangered under the.....

- Fisheries Management Act (NSW) in 2010
- Environment Protection and Biodiversity Conservation Act in 2015

Storms



Development



Boat moorings
and anchor
damage

Pollution

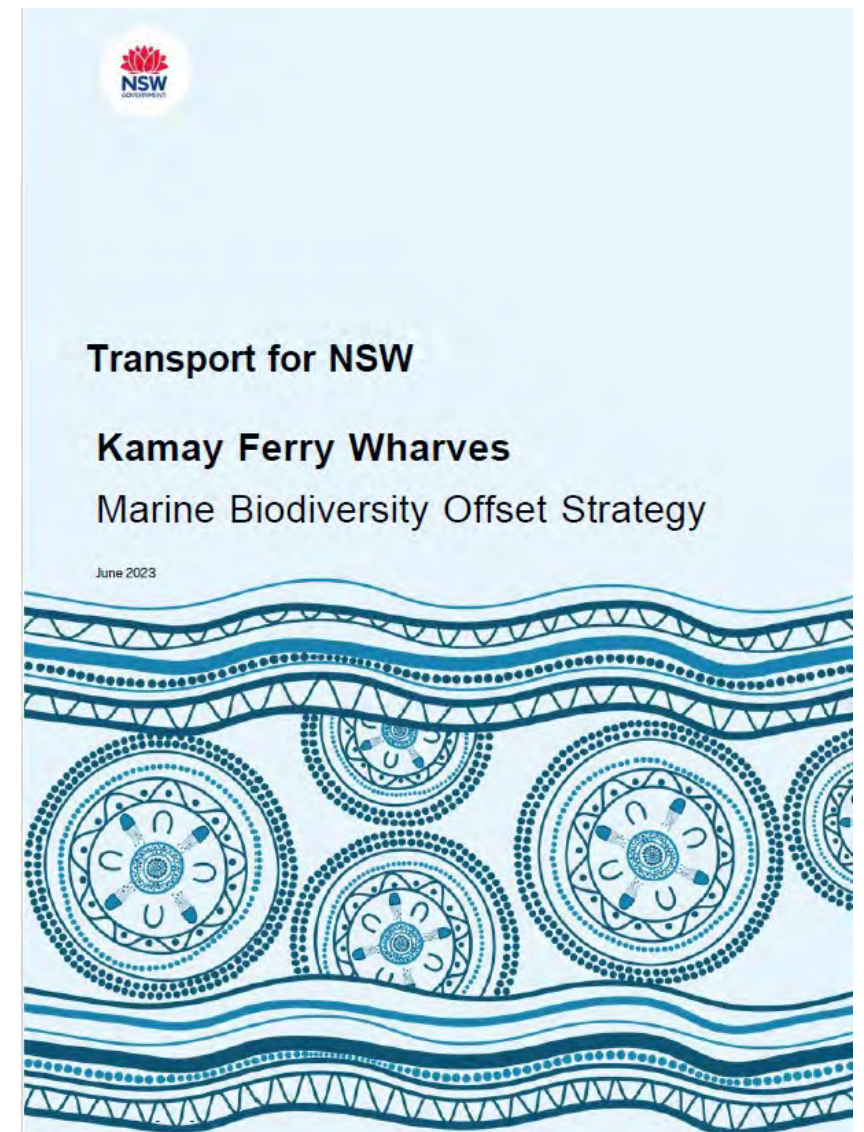
Dredging



What are the ongoing
threats to *Posidonia*?

Marine Biodiversity Offset Strategy (MBOS)

- No net marine biodiversity loss in Botany Bay through...
 - ✓ Direct offset actions – creating and improving habitat
 - ✓ Indirect offset actions – research, education
- *Posidonia australis* offset area: 770 m²
 - ✓ Translocation, rehabilitation and monitoring
 - ✓ Environmentally friendly moorings



UNSW project team and partners



Gamay
RANGERS



 hullbot





Gamay Rangers and UNSW partnership



Implementing the Marine Biodiversity Offset Strategy

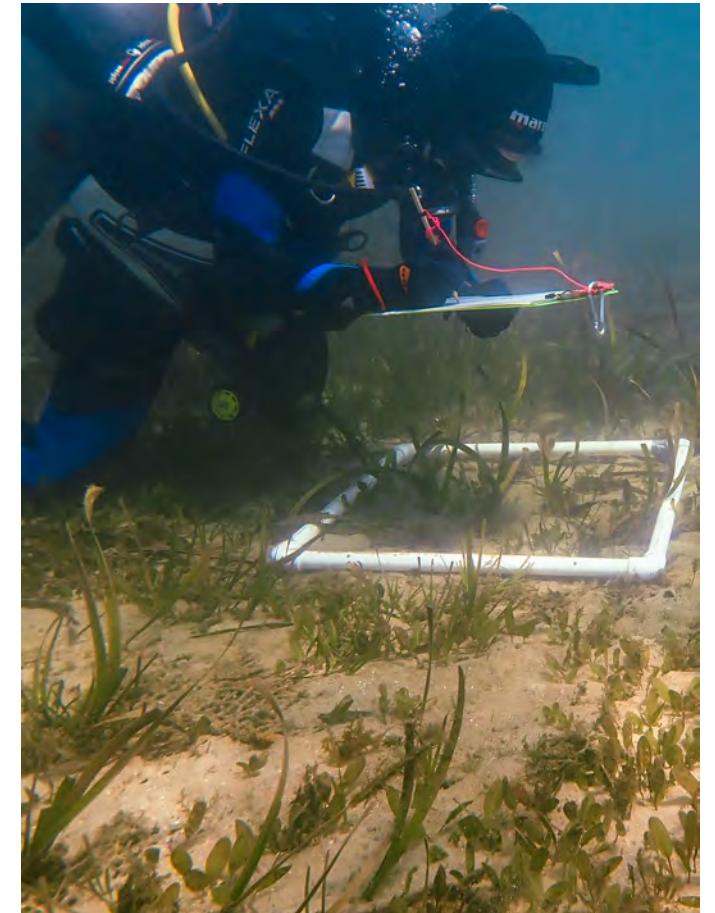
1 Translocating *Posidonia* from Kurnell impact area to restoration sites



2 Transplanting beach-cast *Posidonia* fragments collected from Botany Bay



3 Monitoring offset success over 10 years



What does long term success look like?



Create *Posidonia* habitat 2x the
area removed from impact area
at Kurnell

with

qualities and ecosystem
functions equivalent to natural
meadows

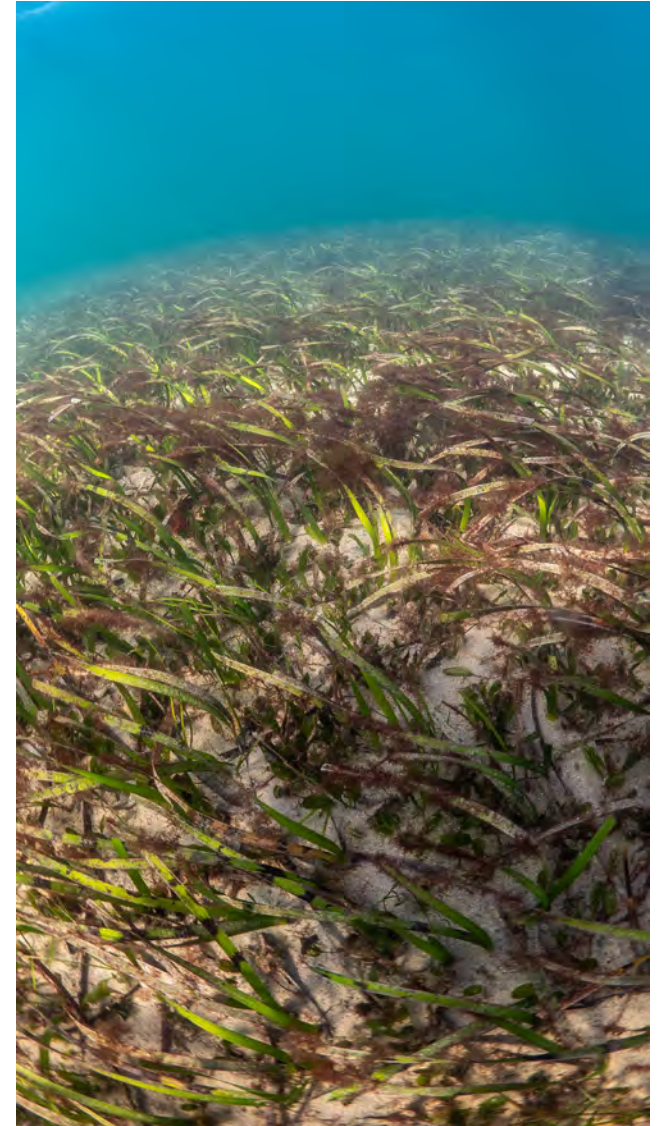




photo: John Turnbull

Planning stage

Identifying donor *Posidonia* patches and restoration sites

- Surveys identified *Posidonia* within the Kurnell wharf construction footprint, but not La Perouse
- Surveys and mapping of patches to be harvested from Kurnell impact area
- Surveys and mapping of potential restoration sites around Botany Bay
- Identified reference monitoring sites in main *Posidonia* meadow at Kurnell



Identifying donor *Posidonia* patches and restoration sites



3

5

6

4

2

1

6 high & medium priority restoration sites, total area ~619m²

8200-13400 *Posidonia* shoots to harvest and replant

10 *Posidonia* patches ranging ~1.5-66m²

Kurnell wharf impact area



photo: John Turnbull

Stage 1 – *Posidonia* translocation

Underwater gardening brings life to bare, degraded areas





Harvesting *Posidonia* from the impact area

- Daily Syngnathid survey
- Harvest from 10 known patches in the impact area at Kurnell, later sweep the entire impact area
- Dig out rhizomes from sediment by hand and place in catch bags
- Record number of shoots per fragment harvested
- All shoots transplanted on the same day as harvested

Harvesting *Posidonia* from the impact area





Planting *Posidonia* into jute mats

- Jute mats stabilise the sediment and anchor *Posidonia*
- Biodegradable and naturally corroding materials
- Planted at the mean overall impact area patches' density of 42 shoots/m²
- Threaded through jute mesh and secured with pins
- Mats anchored with pins and become naturally covered over with sediment in weeks

Planting *Posidonia* into jute mats

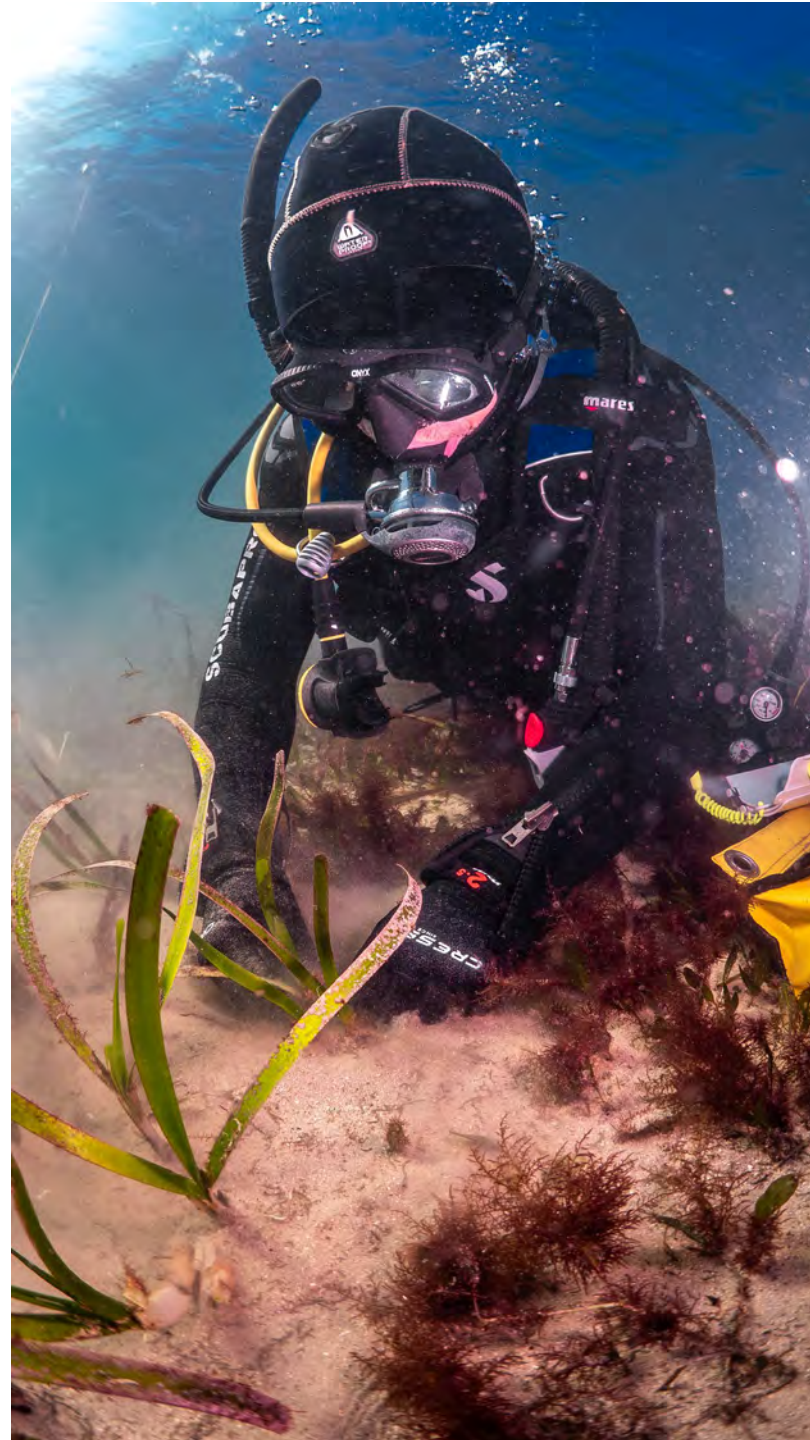


Planting *Posidonia* into jute mats



Planting *Posidonia* into jute mats





Planting *Posidonia* directly into sediment

- Plots same size and shoot density as jute mats
- Shoots secured with metal pins
- Interspersed with jute mats

Outcomes of *Posidonia* translocation

Long-term goal: 536m²

Posidonia shoots relocated: 12,946

Area restored: 304m²



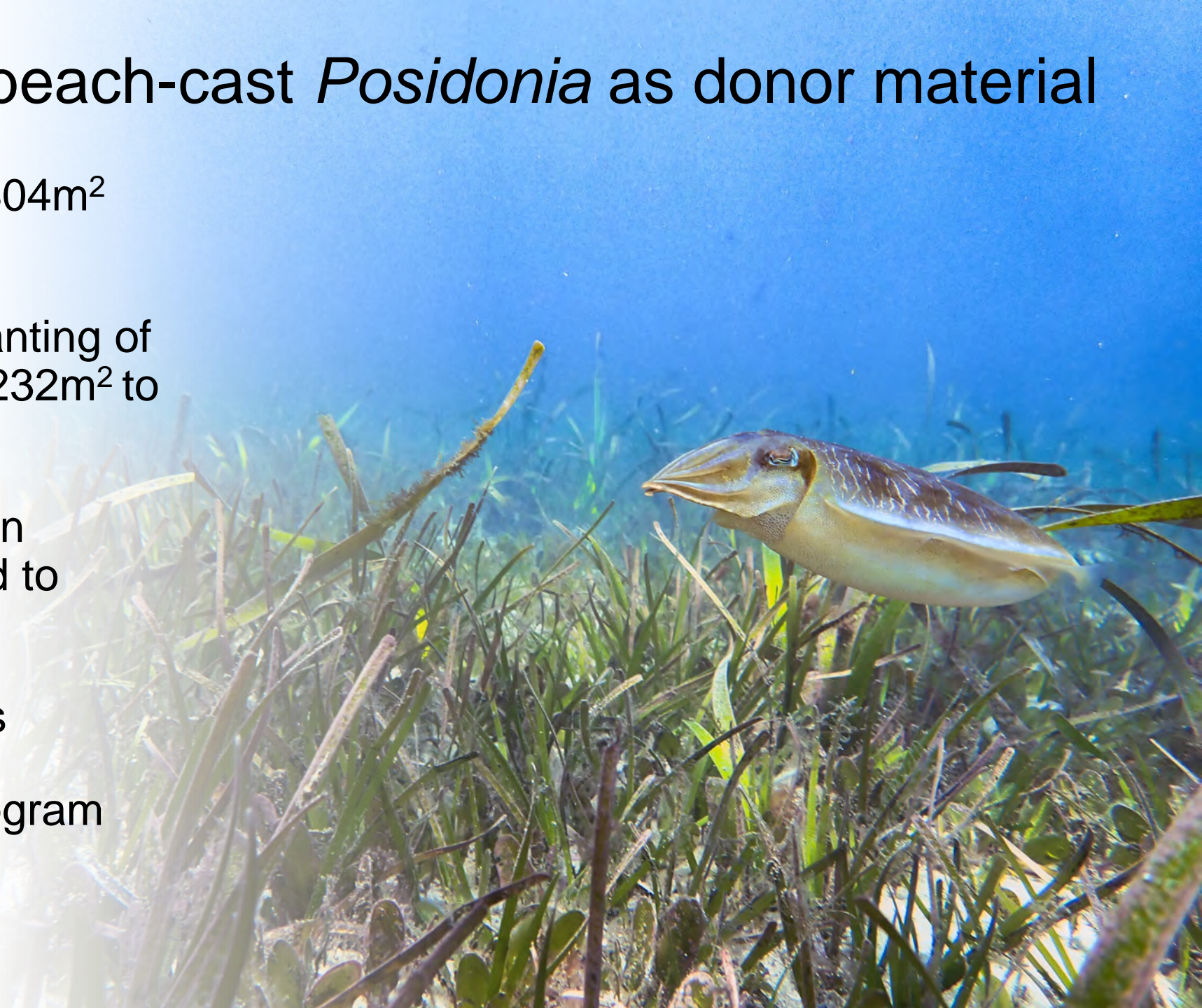


photo: John Turnbull

Stage 2 –
Transplanting beach-cast
Posidonia fragments

Restoration using beach-cast *Posidonia* as donor material

- Stage 1 translocation – 304m² restored
- Stage 2 ongoing transplanting of beach-cast *Posidonia* – 232m² to restore
- Supplementary planting in response to mortality and to increase density
- Create new habitat areas
- Long-term, 8-10 year program



Restoration using beach-cast *Posidonia* fragments as donor material

- Finding donor shoots for restoration is a major challenge!
- Operation Posidonia (est. 2018) – beach-cast fragments are a viable source of donor material



Collecting and transplanting beach-cast *Posidonia* fragments

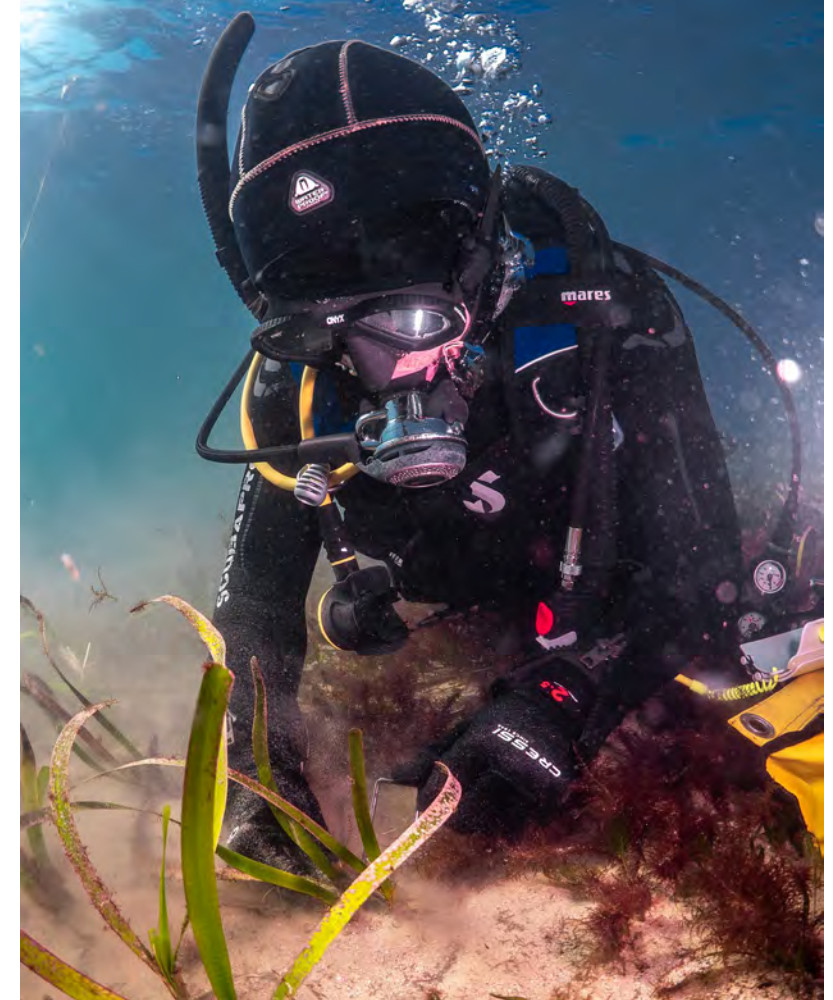
Collect fragments from beaches in Botany Bay



Store at Sydney Desalination Plant at Kurnell



Transplant in restoration sites



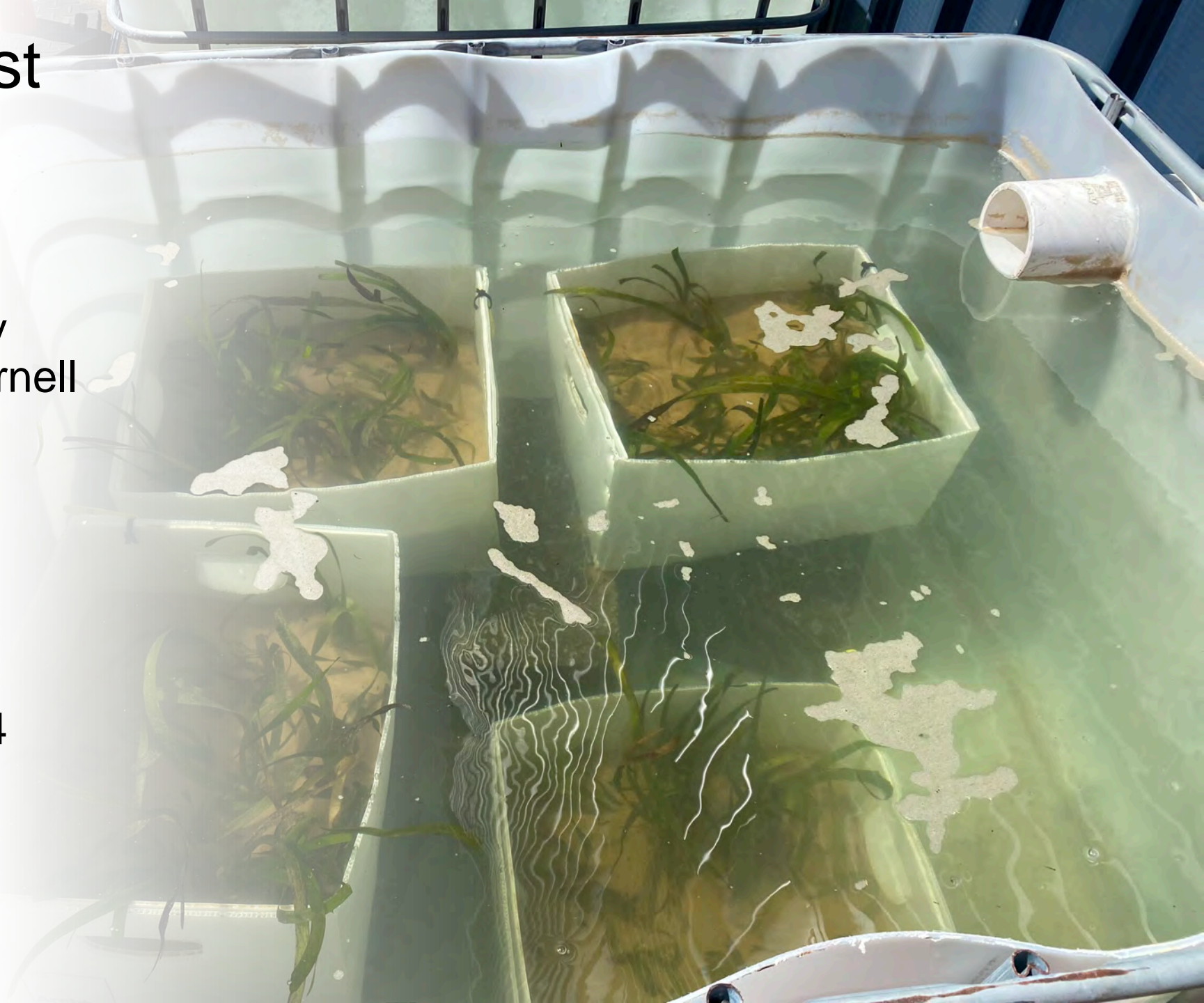
Giving viable *Posidonia* fragments a second chance

- Weekly surveys of Botany Bay shorelines by Gamay Rangers and UNSW began in May
- Monitoring recent weather patterns to inform the beach collections
- Healthy fragments have bright green leaves attached to a rhizome



Storing beach-cast *Posidonia* fragments

- Outdoor tanks at Sydney Desalination Plant at Kurnell
- Planted in sand
- Natural seawater enters Desalination Plant from offshore
- Fragments stored for 3-4 weeks



Transplanting beach-cast fragments in restoration sites

- Transplanting every 3-4 weeks
- Fragments transplanted directly into sediment and secured with pins
- Planting density of 42 shoots per m²
- Infill existing restoration sites, then expand into new sites



Outcomes of transplanting beach-cast *Posidonia*

May-September 2023...

Posidonia fragments collected: >400

Posidonia fragments transplanted: >230



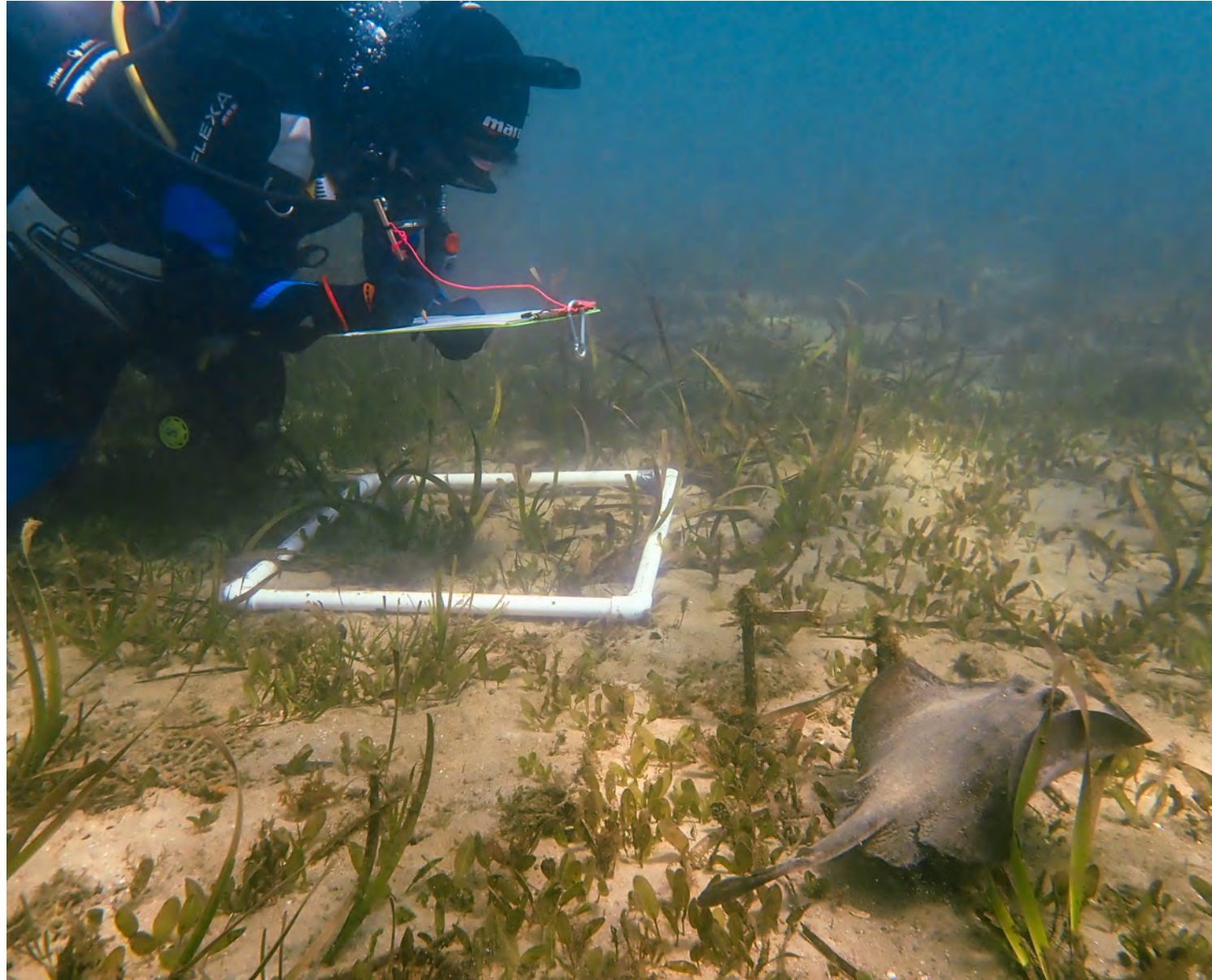


photo: John Turnbull

Stage 3 – Monitoring

Monitoring the success of the offset strategy

- Long-term, 10 year program
- Track and report progress towards success criteria
- Identify factors (e.g. environmental, plant traits, methods) that influence restoration success
- Adaptive management tool - identify issues or need for remedial action



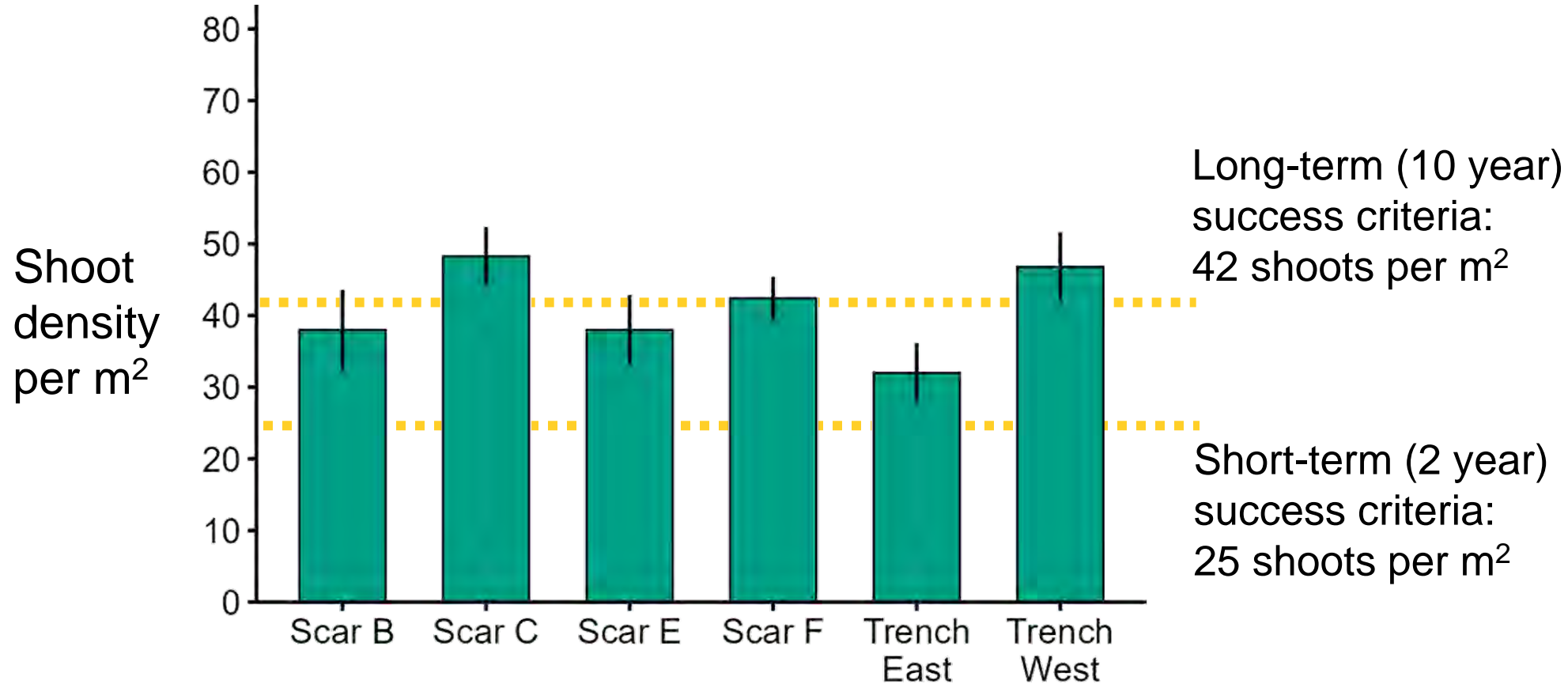
Monitoring program

- Mapping restored areas
- Underwater surveys to quantify:
 - ✓ Shoot density
 - ✓ Leaf length
 - ✓ Shoot condition
 - ✓ Seagrass cover and species composition
 - ✓ *Posidonia* flowers
- Temperature and light data loggers
- Natural meadows as reference sites (Kurnell)



Initial data from October restoration sites monitoring

Shoot density



Monitoring restoration using underwater drones

- Hullbot underwater drone system uses computer vision, sensors, AI and machine learning
- Photogrammetry for 4D surveys (3D model + time) to monitor restored areas



 **hullbot**



Monitoring recovery of ecosystem functions of restored *Posidonia*

- Habitat provision and biodiversity of:
 - ✓ Fish
 - ✓ Invertebrates
 - ✓ Epifauna
 - ✓ Microbes
- Productivity (photosynthesis)





photo: John Turnbull

Research to advance
Posidonia restoration

Posidonia restoration research

Monitoring restoration and reference sites to quantify through time...

- Survival, growth and condition of translocated vs beach-cast fragments
- Performance of larger vs smaller fragments
- Density and condition of translocated *Posidonia* shoots in jute mats vs other plots
- Response to environmental events (e.g. marine heatwaves)



PROTECTING THE SEAGRASS RESTORATION AREA

No anchor zone in Botany Bay, Kurnell



KEY	
	Construction work area
	Temporary access road
	Site buildings and laydown
	Temporary closure Monument Track
	Pedestrian detour to National Park
	Seagrass restoration
	Utilities work zone
	Temporary access structure
	No anchor zone
	Kurnell Wharf
	Exclusion zone



Signs at local boat ramps

QUESTIONS

THANK YOU
UNSW AND GAMAY RANGERS

Share your feedback on tonight's session



Connect with us



kamayferrywharves@mcdgroup.com

kamayferrywharves@transport.nsw.gov.au



1800 718 556



nswroads.work/kamayferrywharves

