

CASTLE COVE SAILING CLUB

Seagrass – what's the fuss?

Jean-Luc Solandt, Frith Dunkley



MARINE
CONSERVATION
SOCIETY



What is seagrass

- Flowering plant
- Is NOT algae
- Shallow waters
- Root system
- Sexual reproduction or cloning
- Very old
- Very large



SCIENCE NEWS

Seagrass ranks among Earth's oldest life forms

Seagrass meadows can be composed of ancient giant clones, organisms stretching up to nearly 10 miles wide that may be up to tens of thousands of years old, scientists find.



Clones of the seagrass *Posidonia oceanica* may be the oldest and largest organisms on Earth, spanning nearly 10 miles (15 km) wide, with ages that date back to 100,000 years. M. San Felix

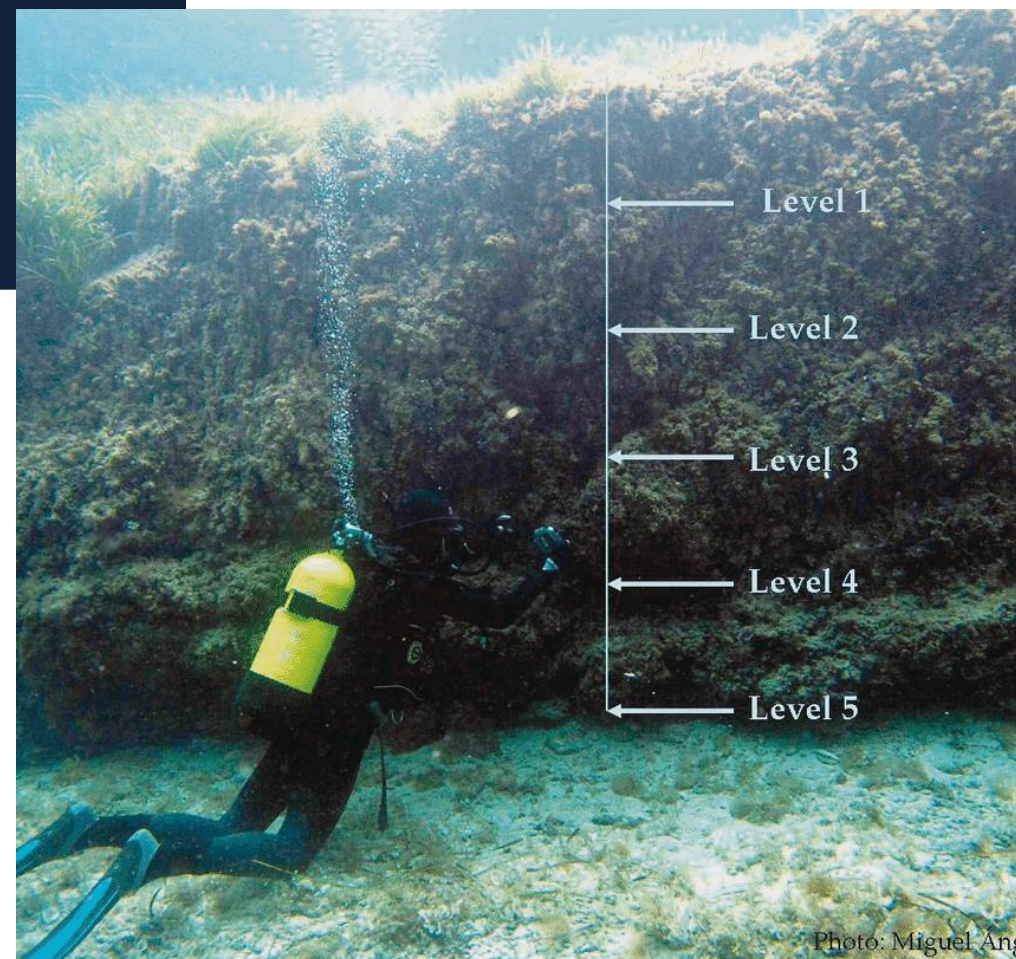
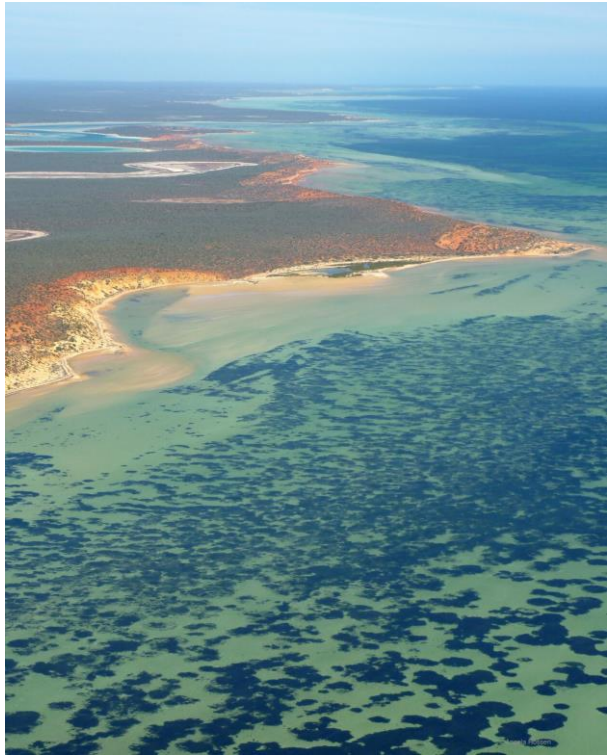
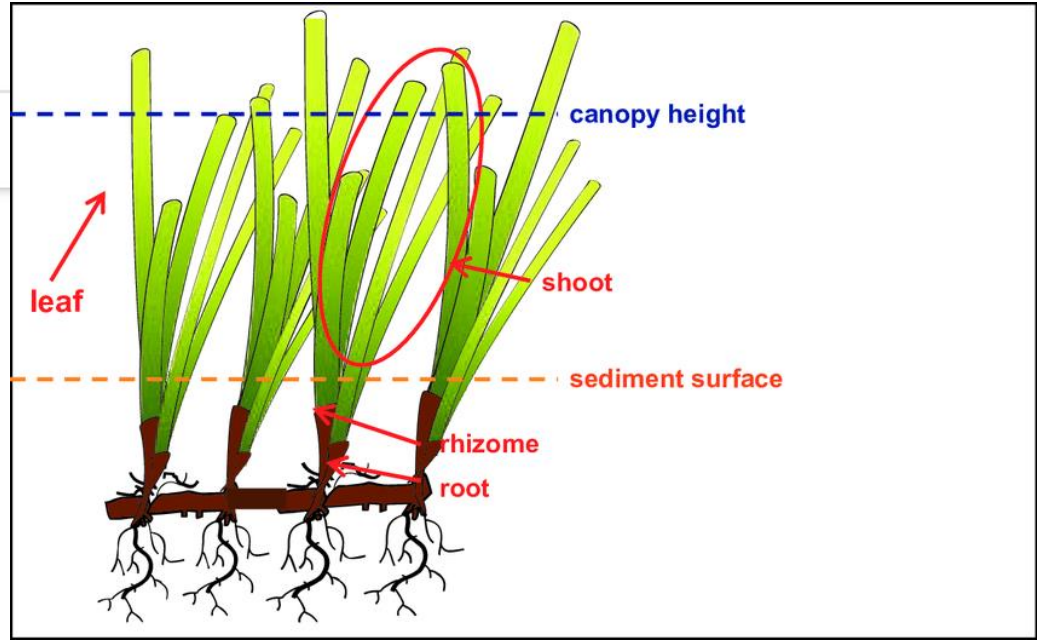
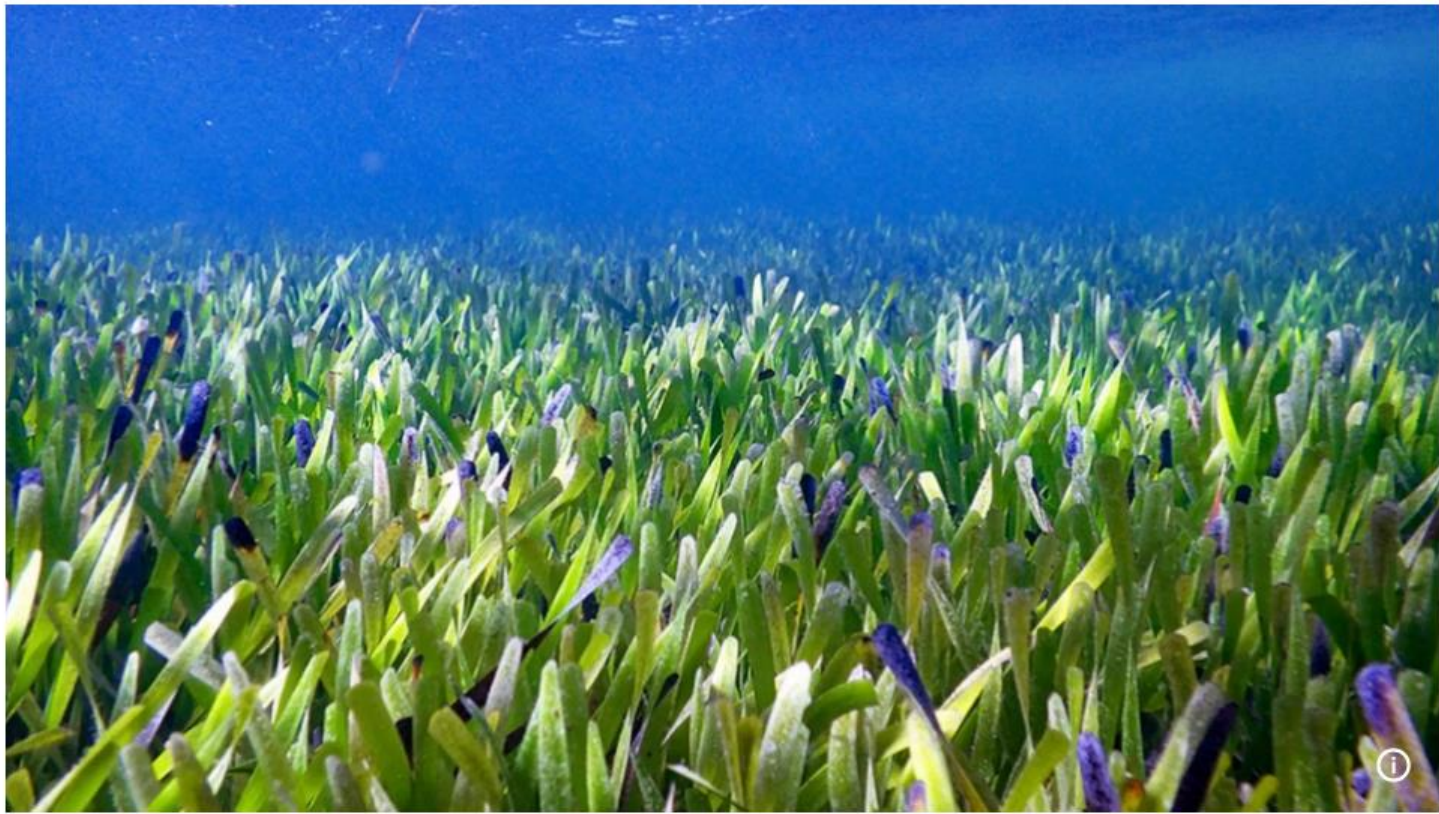


Photo: Miguel Ángel

Mediterranean seagrass at over 10,000 years old. Australian seagrass bed (west coast) at 4,500 years old. By *Cloning* (cloning is where an individual genetically replicates itself)... Over time and space.

World's largest plant: Scientists 'blown away' by 180km long seagrass discovered off Australia



Seagrass vital carbon sink in solution to climate change

According to a study in Nature Geoscience, seagrass meadows store as much as twice the carbon as the worlds forests per unit area.

24 May 2012

According to a study in Nature Geoscience, seagrass meadows store as much as twice the carbon as the worlds forests per unit area. The coastal seagrass beds can store as much as 83,000 tons of carbon per square kilometre, whilst forests are around 30,000. The meadows are not particularly common in the oceans but still are responsible to 10 per cent of all carbon sequestered in the ocean annually.



Variable carbon storage & sequestration values.
 UK has lower end of values compared to Med/tropics, but still high relative to surrounding bare sand.
 Although a relatively scarce habitat, it has relatively high storage potential.

SCOTTISH BLUE CARBON SEQUESTRATION

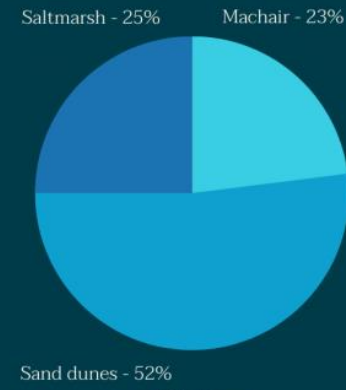
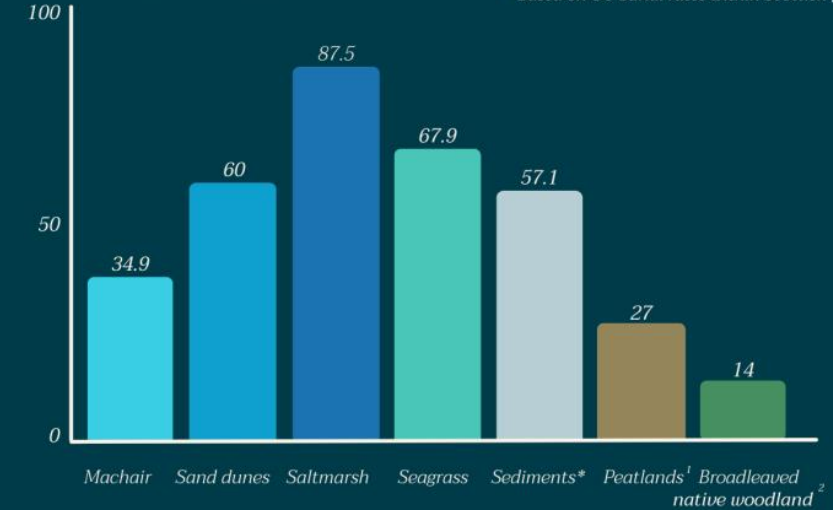
Naturescot

Sequestration Rates (per unit area) g OC /m² /yr

¹ Average for peatlands in Scotland, Aitkenhead & Coull (2019)

² Broadleaved native woodland UK Gregg et al. (2021)

*Based on OC burial rates within Scottish fjords



Sequestration Capacity ~0.02 Mt OC /yr

Carbon captured annually in living material and the subsequent burial in sediments, which is stored over long timescales.

Coastal Habitats
17,474 t OC /yr

Seagrass
1,021 t OC /yr



Kelp is considered a donor habitat as it does not sequester carbon locally, so productivity values are provided instead:

Production Capacity - 1.4 Mt OC /yr

Production Rate - 378 g OC /m² /yr

Water quality?

NewScientist

Sign in

Enter search keywords

Life

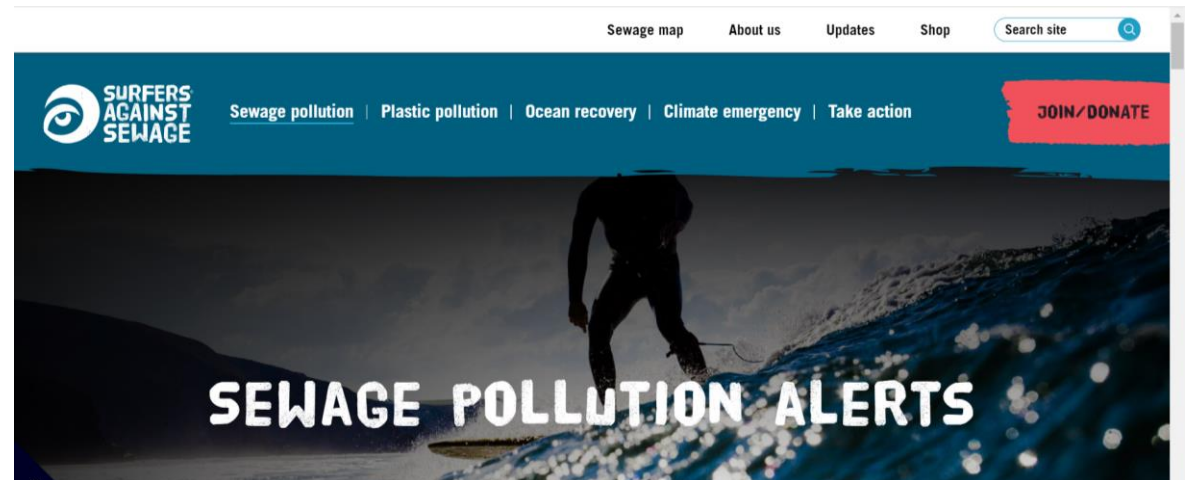
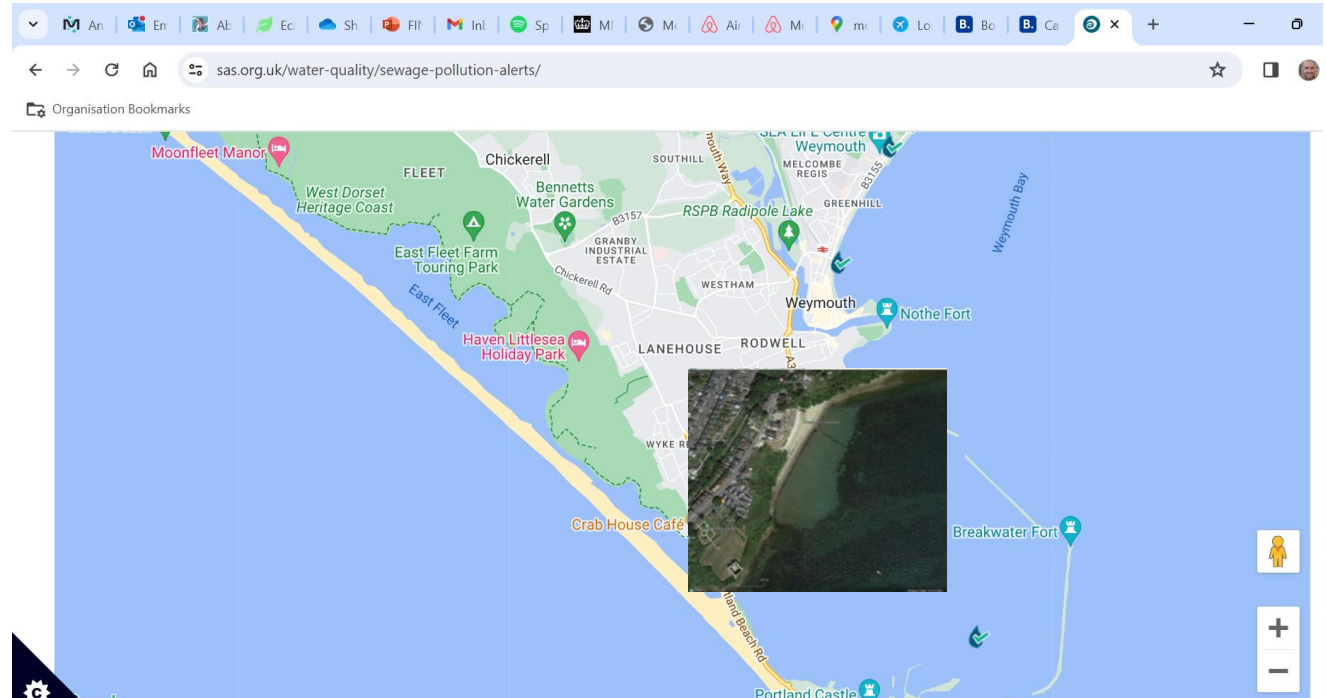
Seagrass meadows help remove dangerous bacteria from ocean water

By Chelsea Whyte

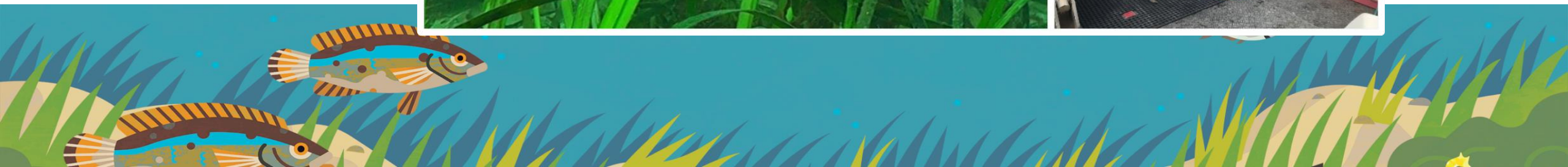
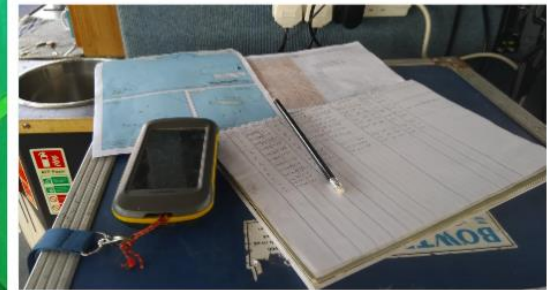
16 February 2017

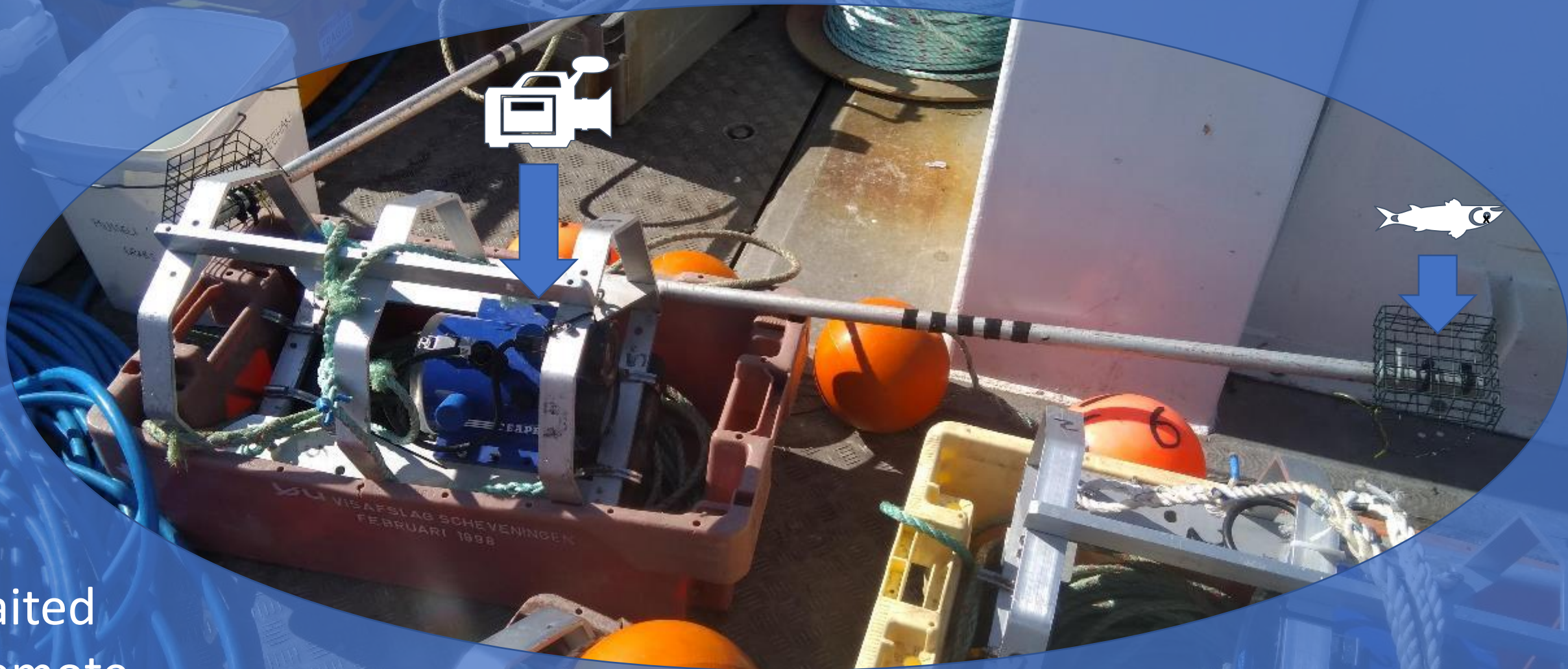


Reduction of 50% Enterococcus in seagrass sites in Indonesia.

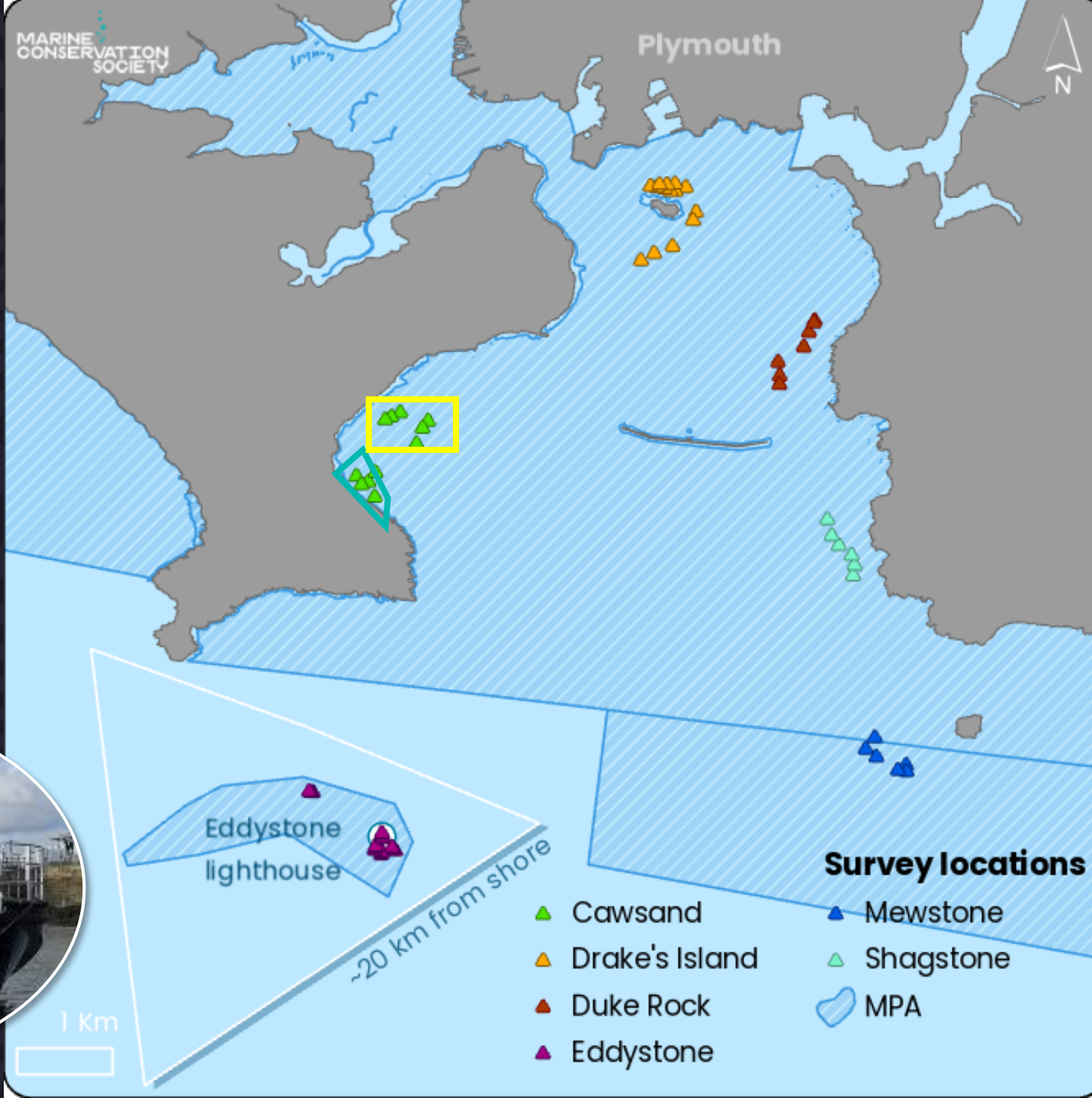


Biological surveys (BRUVs) 22-24

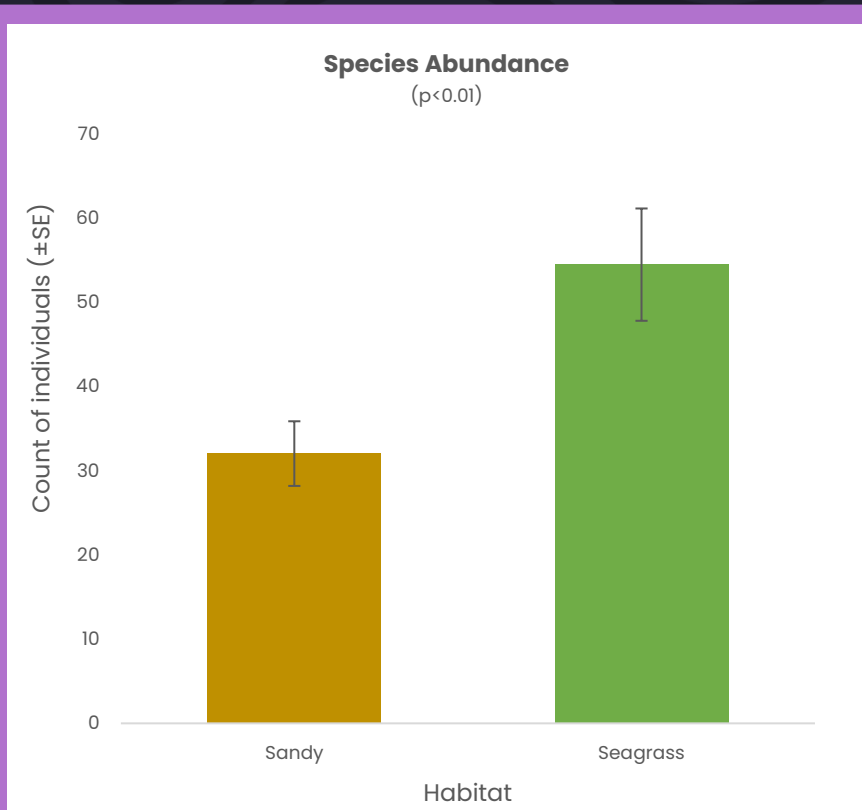




Baited
Remote
Underwater
Video

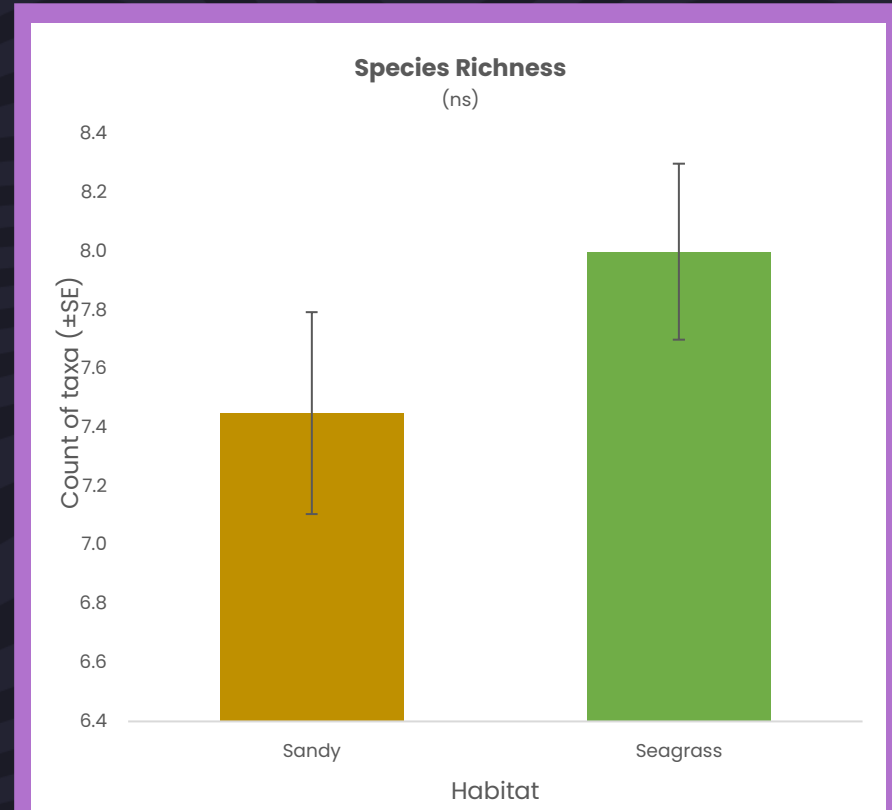


September
2020
2021
2022
(+ 2023)



Total number of individual animals

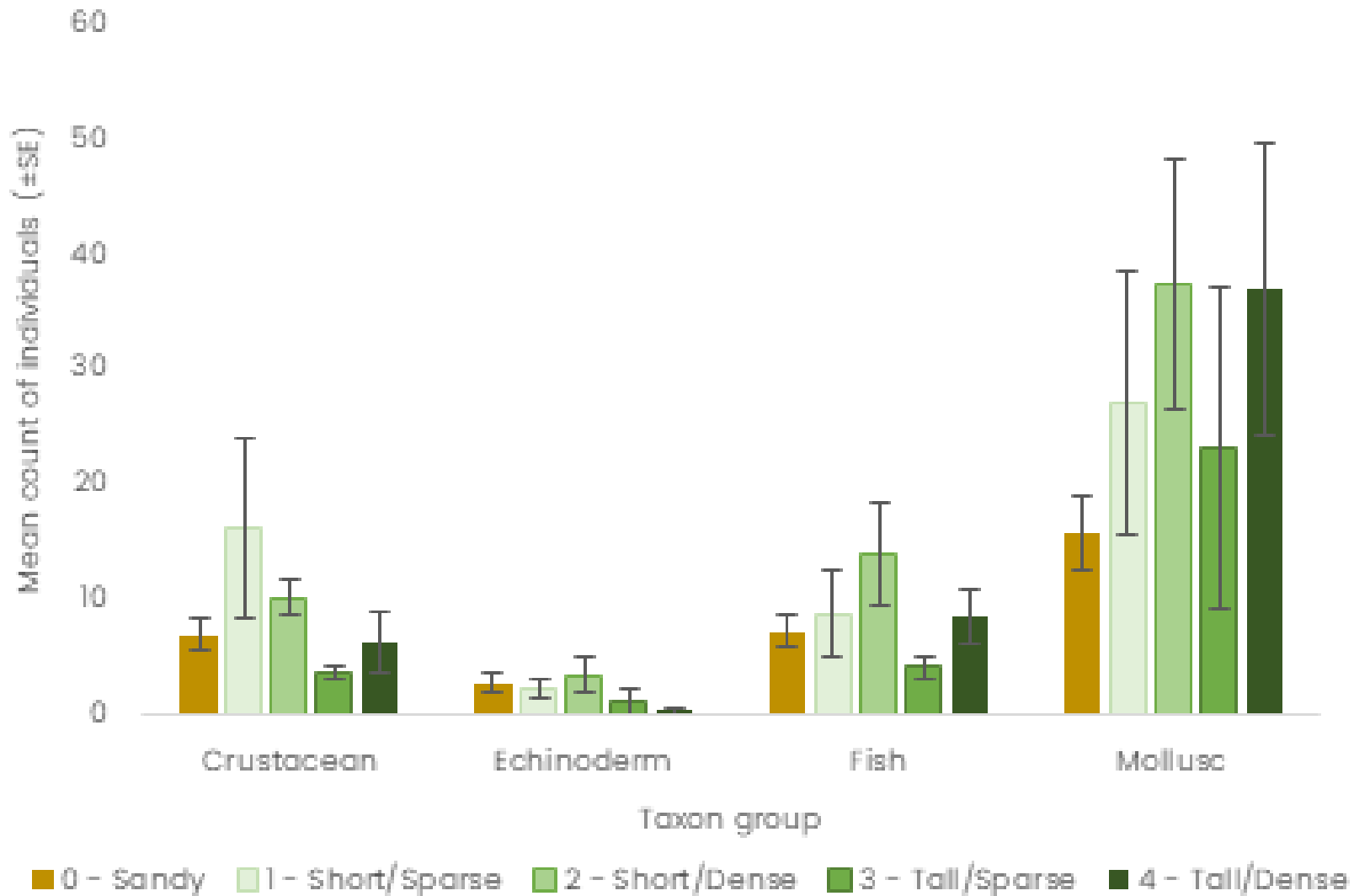
Significantly higher in seagrass meadows

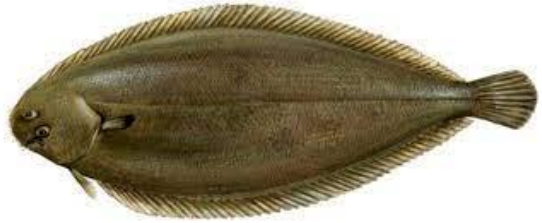


Total number different species

Higher in seagrass meadows

F. Abundance (by group and seagrass density)



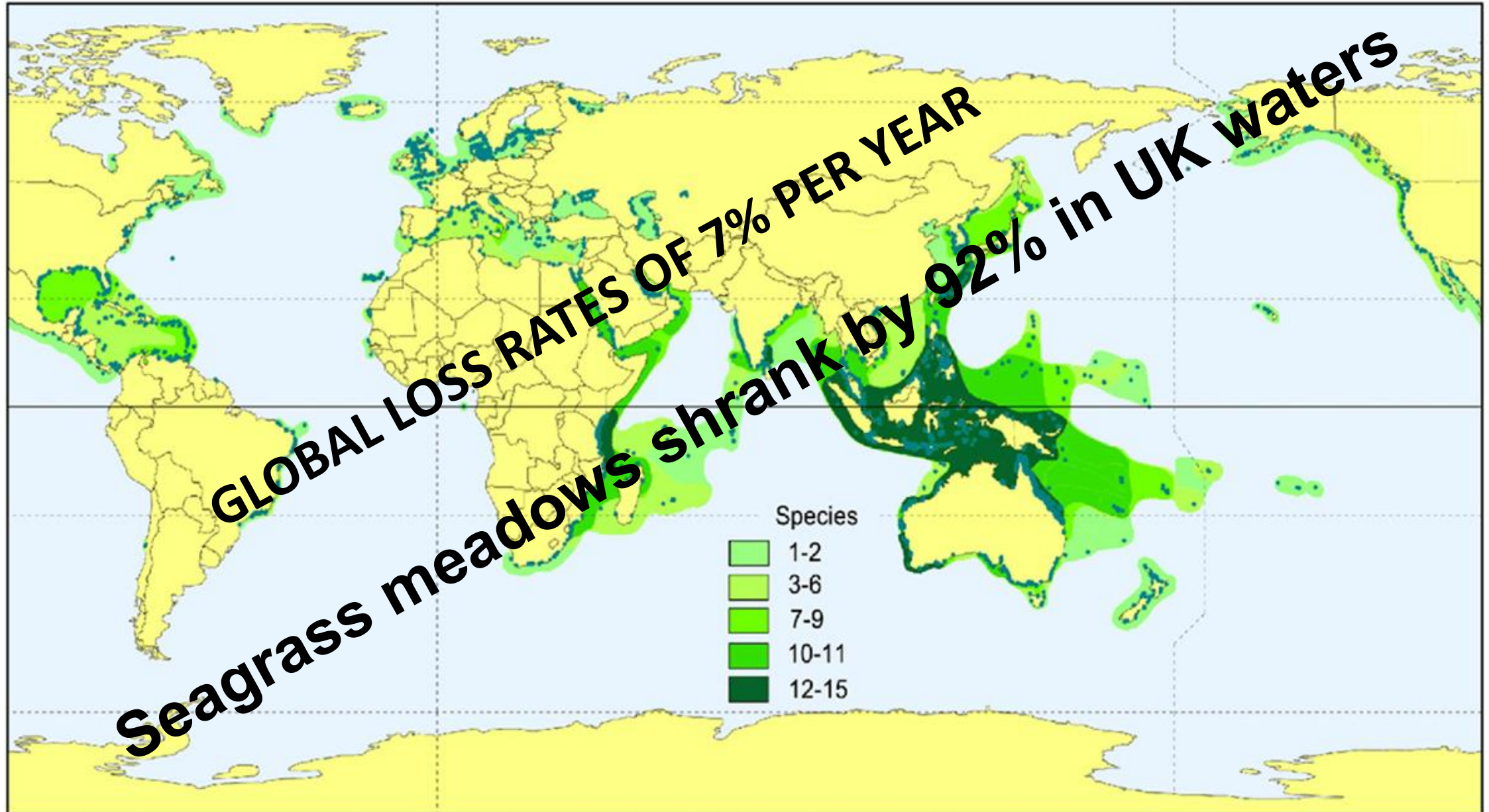


IPLYMFISHI
MARINE
CONSERVATION
SOCIETY

In partnership with the
University of Plymouth and
support from Princess Yachts

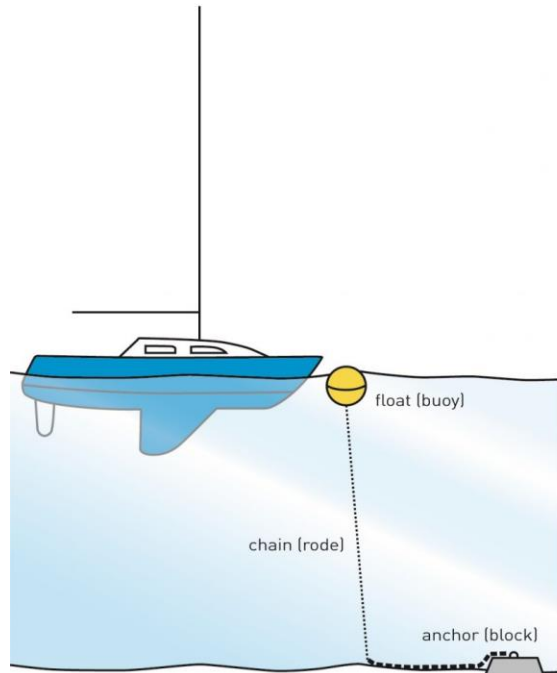


Seagrass is a globally threatened habitat





A: Traditional mooring



Club/Area with...

- ...moorings overlapping potential seagrass extent
- ...moorings overlapping current and potential seagrass extent
- Current seagrass extent (EA)
- Potential seagrass extent (EA)



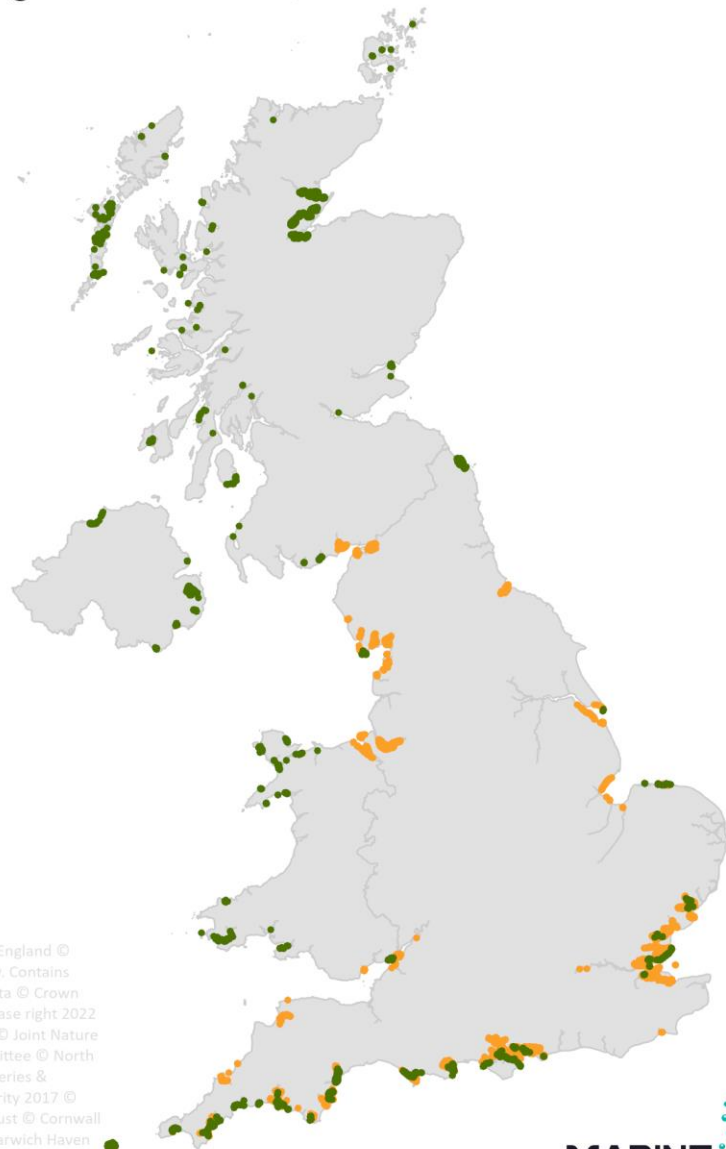


Current Seagrass extent



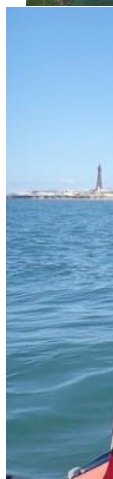
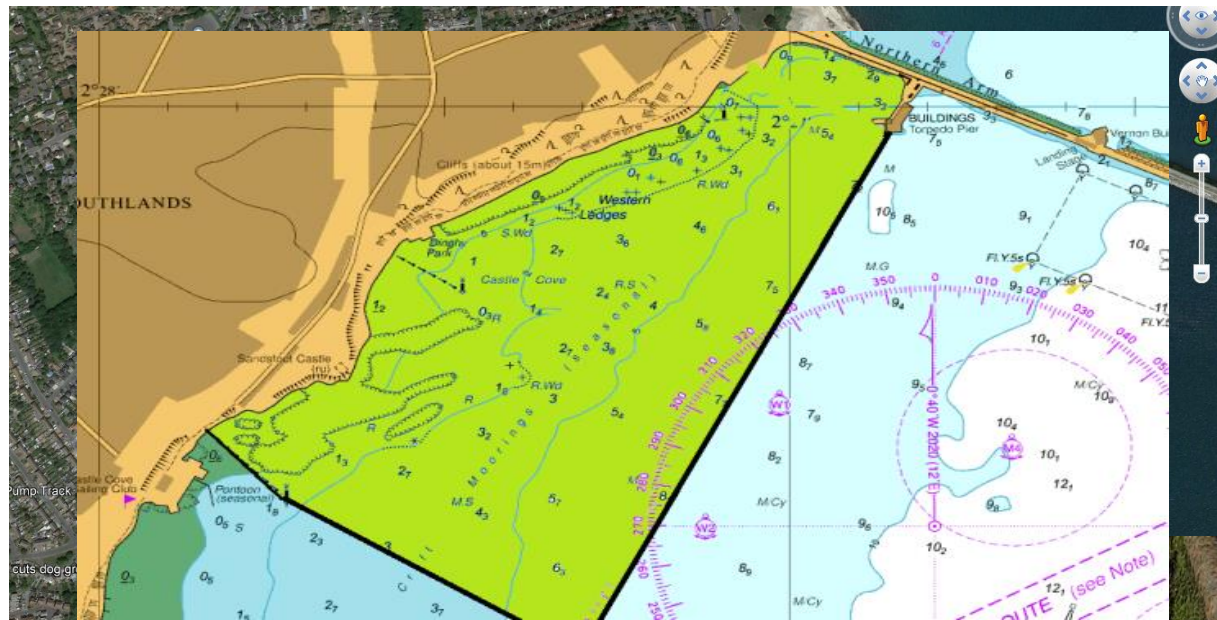
Potential Seagrass extent
(England & Wales)

50 KM



Contains © Natural England © Environment Agency. Contains Ordnance Survey data © Crown copyright and database right 2022. Contains data from © Joint Nature Conservation Committee © North Eastern Inshore Fisheries & Conservation Authority 2017 © Yorkshire Wildlife Trust © Cornwall County Council © Harwich Haven Authority. Contains Ordnance Survey data © copyright and database right [2020]. Contains EMODnet data (2019).

MARINE CONSERVATION SOCIETY



Aim of Collaboration

- Move (non CCSC vessel) anchoring **away from seagrass beds** (vNAZ)
- Monitor and fine-tune seagrass **habitat location (ROV) & EA surveys**
- Identify **damage** from individual moorings (divers and ROV)
- Understand **social value** of seagrass conservation
- Introduce concept of **seagrass-friendly moorings** (AMS)
- Discuss **new mooring trial design** with individuals, club & Harbour Master

Reports: <https://saveourseabed.co.uk/boating-community-surveys/>



Seagrass

Seagrass is a flowering plant that grows in the sea. It is more closely related to plants on land than to seaweed. It creates a unique habitat that provides many benefits to other wildlife and people.



Seagrass has horizontal roots that connect plants to form a dense mat on the sea floor.

what does seagrass provide?

what does seagrass do for us?



Seagrass takes up carbon for growth and stores large quantities in its roots. It is globally important for its potential to mitigate climate change.



Each year seagrass in England stores the amount of carbon produced by return flights for 3,500 passengers from London to New York.



Seagrass meadows act as filters, trapping sediment, nutrients, and pollutants in their root structure and dramatically improving water quality.

Seagrass beds in England remove 17 Olympic swimming pools worth of sediment and excess nutrients from the water each year.

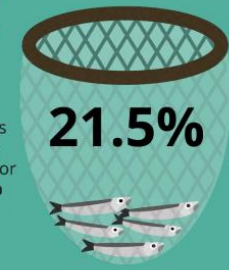


Seagrass provides a home, place to reproduce and a safe nursery for many species, including some rare and endangered ones.



Healthy seagrass supports many commercial species, ensuring a continuing supply of the fish we eat.

Seagrass habitats provide valuable nursery habitat for 21.5% of the top 25 wild caught fish species globally.



Clear, clean seas rich in biodiversity provide greater opportunities for recreational activities and other benefits for people's happiness and wellbeing.



threats and pressures

Declining water quality



Recreational impacts



how can we help seagrass?



Reducing and Mitigating Erosion and Disturbance Impacts affecting the Seabed. The LIFE Recreation ReMEDIES project (LIFE18 NAT/UK/000039) is financially supported by LIFE, a financial instrument of the European Commission. The contents of this publication are the sole responsibility of Natural England and do not necessarily reflect the opinion of the European Union.

www.saveourseabed.co.uk



Scan or click on this QR code for an accessible version of this infographic

This infographic has been created from the Seagrass Natural Capital Assessments, please refer to these reports on the project website for sources.

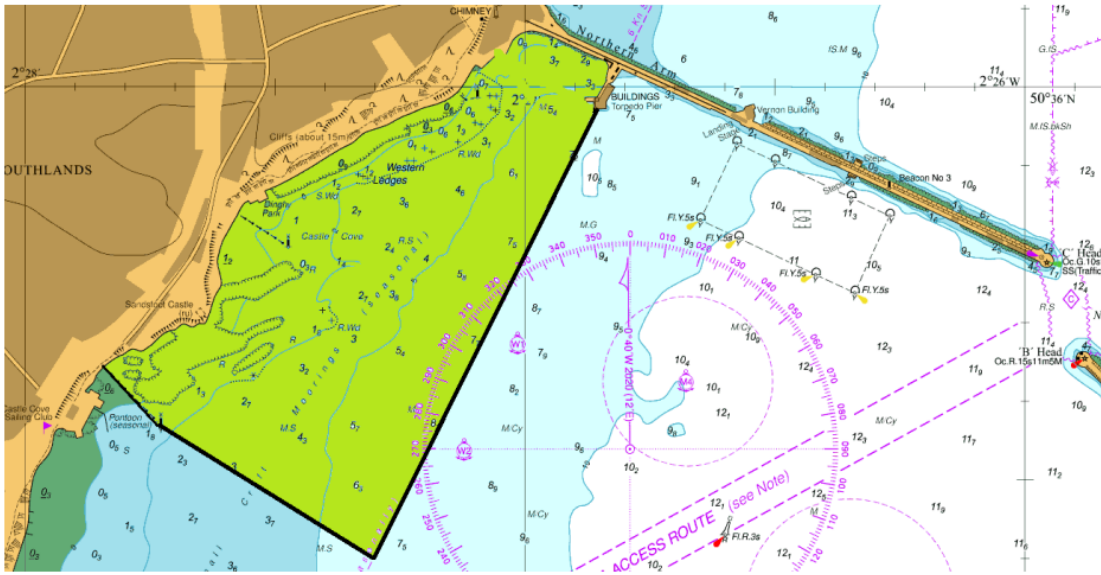
**Concerns from
Environment
Agency, Natural
England, CCSC,
MCS and Sandie
Wilson (Portland
Port) in 2018**



1. Move anchoring away from seagrass bed (June 2022)

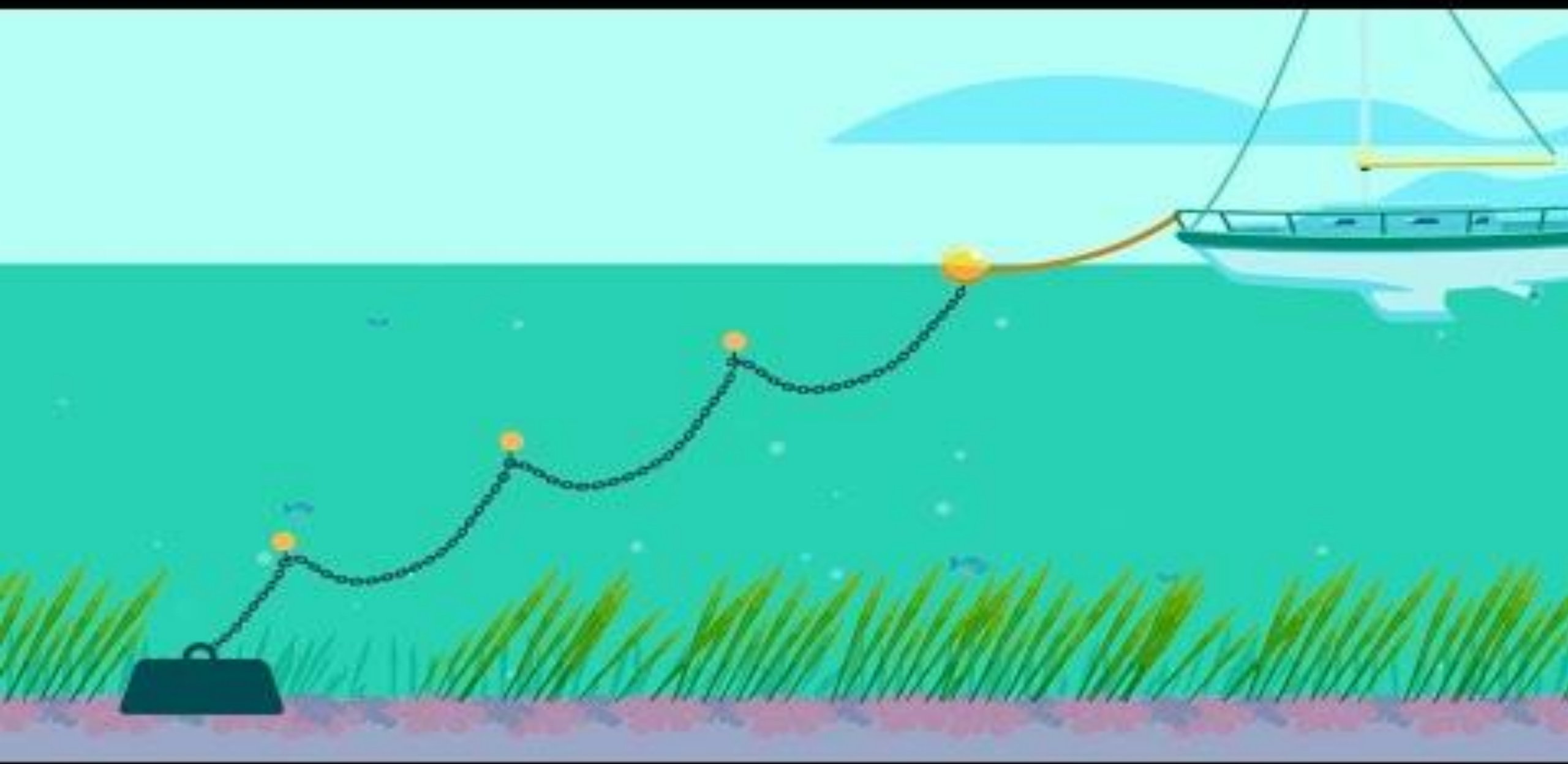
From the shore at
to a position
and thence to position
and to shore at

$50^{\circ} 35.70\text{N } 002^{\circ} 27.64\text{W}$
 $50^{\circ} 35.56\text{N } 002^{\circ} 27.74\text{W}$
 $50^{\circ} 35.40\text{N } 002^{\circ} 27.30\text{W}$
Torpedo Pier



All mariners are advised not anchor within the high-lighted area above.



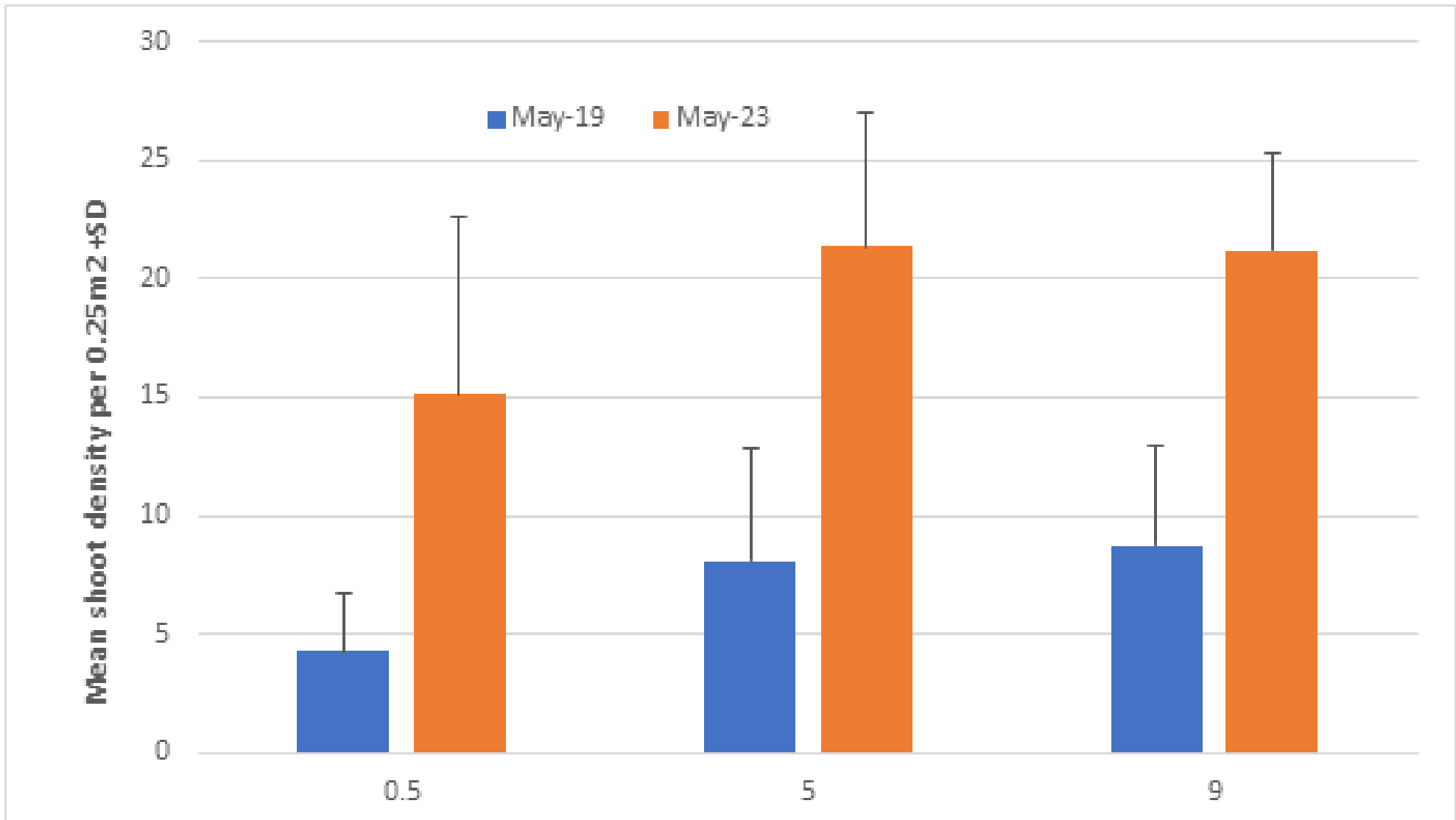




 **THE**
WORLD'S
GREAT
We take a starting, advanced

Recovery at Cawsand

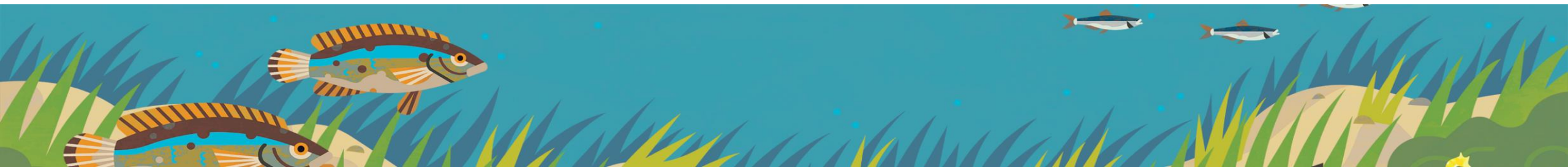




2. Identify damage from individual moorings



2. Identify damage from individual moorings



2. Identify damage from moorings

ROV surveys. May, June, July, August.

- No seagrass
- Seagrass

103 Thirisia

- Little seagrass
- 6.6m

93 No boat

- Significant seagrass coverage
- 3.8m

94 Jenorah

- Mud
- 6.7m

141 Fortune

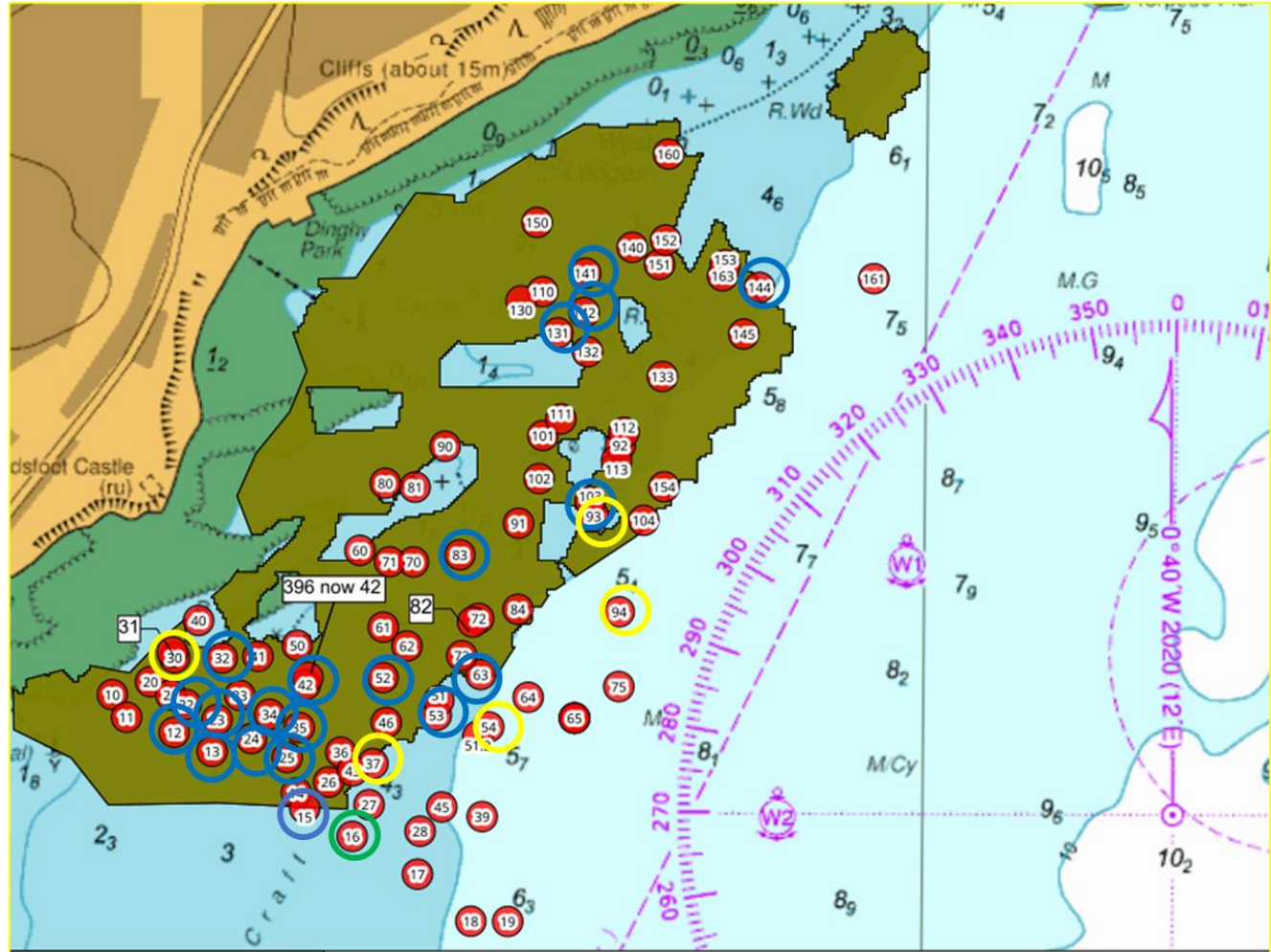
- Seagrass
- 5.3m

15 Blue Moon

- Seagrass and filamentous algae
- 4.5m

30 Jonquil

- Reef and filamentous algae
- 1.5m



Mooring #93 extensive seagrass (ROV survey, May 2023)



Bare patches - between #12, 13, 14, #22, 23 (Snorkel Survey, June 2023 & ROV survey, July 2023)

- Bare patches likely to be moving moorings over time...
- Distinct 2 x 2m - 4 x 4m bare sand patches surrounded by seagrass.
- Ground chains eroding seagrass in 1-2m wide strip.
- Riser chain 'compressing' live seagrass.
- Dense seagrass to the SWW, away from line of moorings.

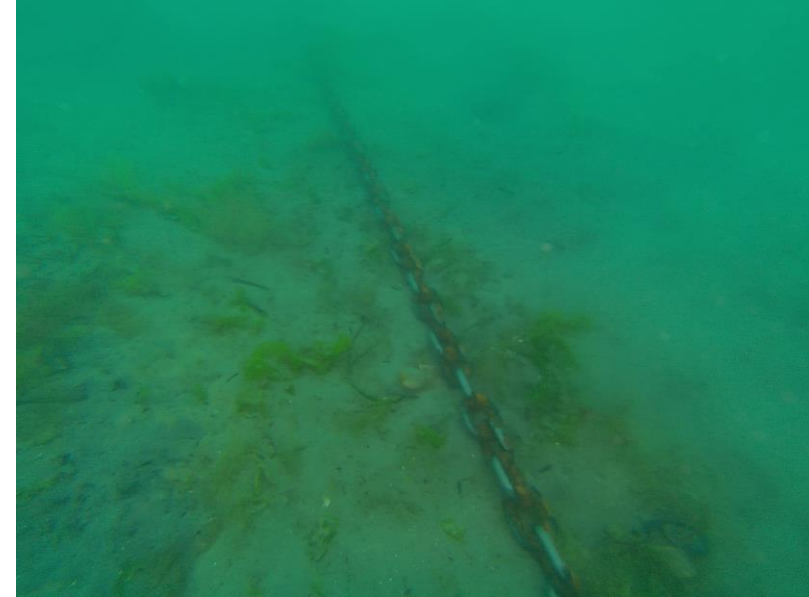




- Mooring 12
Mooring 13

Mooring 14





#63 flying colours: chain abrasion



#24 Nexus: Abrasion



#23 blues breaker: cropping



#13 Pimpernel: angelwings



#32 zigzag: lines



#32 zigzag: crushing

#13 Pimpernel



What we learned from Studland in 2012....

“Studland Bay is the only location along a relatively flat coastline that provides good shelter for small craft during strong westerly winds. The seahorse community appears to have thrived for centuries despite Studland Bay’s use as an anchorage and safe haven during the UK’s sparse summer months.

Clearly, a more reasonable compromise would be a request for allocation of a small no anchoring zone within a small portion of Studland Bay rather than total denial of the entire anchorage.

Moreover, Eco Moorings are known to protect the fragile marine environment from harmful bottom chain scouring.

The Marine Conservation Society should be encouraged to provide Eco Moorings to local boat owners and provide ecofriendly visitors moorings rather than impose a ban that will damage the local economy.”



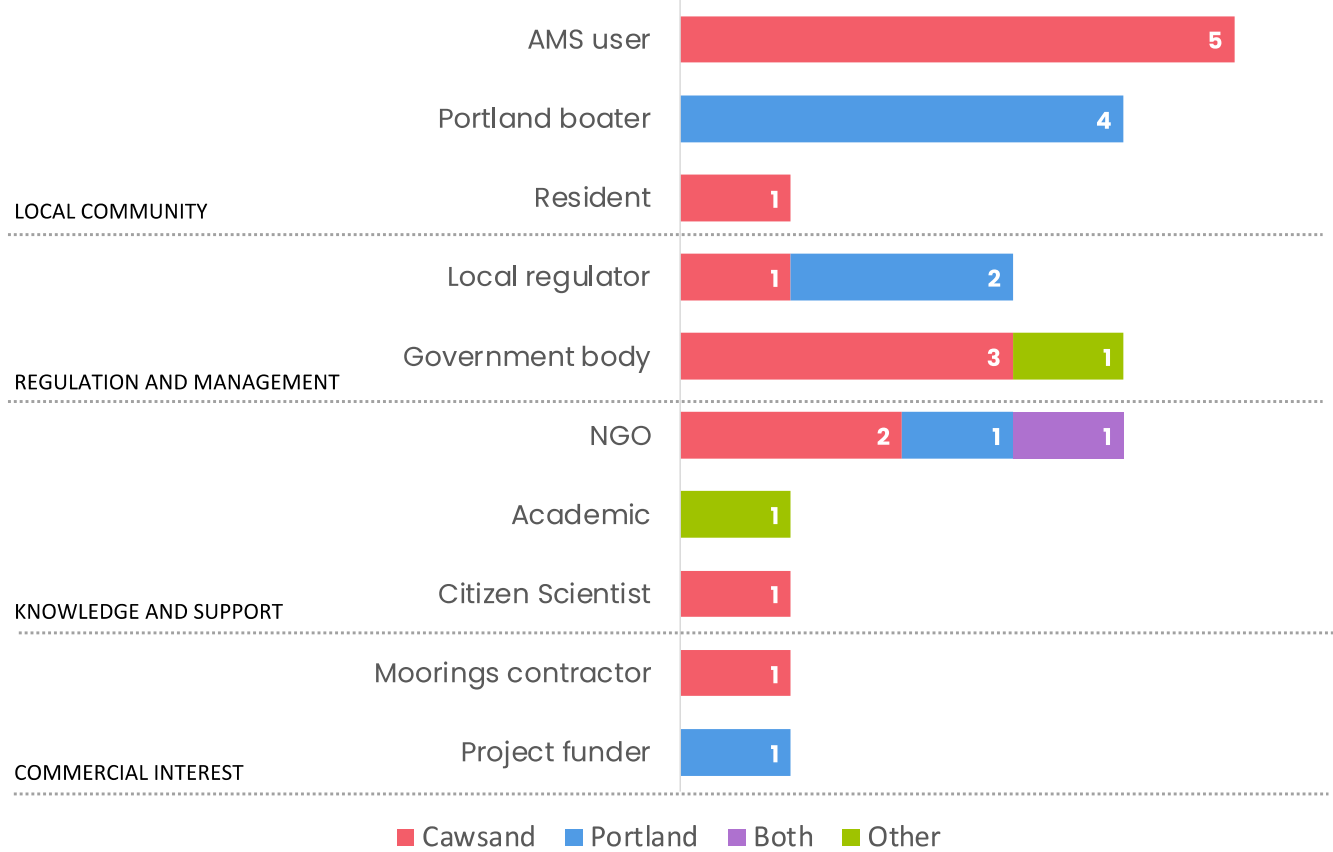
MOORING MATTERS


A report on the perspectives of key stakeholders on seagrass friendly mooring initiatives in two sites in Southwest England

Emily Bunce (Social Science Officer)




INTERVIEWS







Initial thoughts about Seagrass



Thoughts about AMS and vNAZ



Comparison of sites and wider applicability



Vision for future



WHAT DO YOU THINK WHEN YOU HEAR THE WORD SEAGRASS?

Environment and conservation



Provisioning services



Aesthetic appreciation



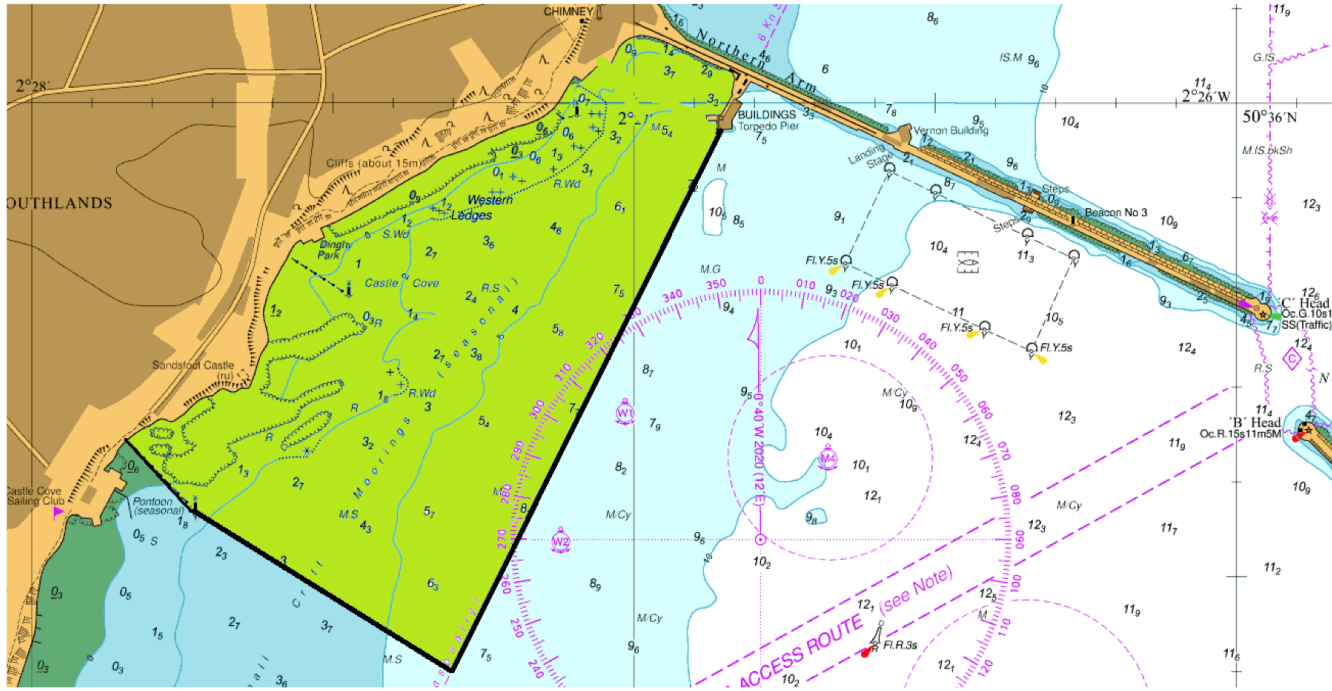
Limited awareness



Broad grouping category	Subgroups	Environment and conservation	Provisioning services	Aesthetic	Limited connection
LOCAL COMMUNITY	AMS user (n=5)	High	Low	Low	High
	Portland boater (n=4)	High	Medium	Low	Medium
	Resident (n=1)	Medium	Medium	Low	Low
REGULATION AND MANAGEMENT	Local regulator (n=3)	High	Medium	Low	Low
	Government body (n=4)	Medium	High	High	Low
KNOWLEDGE AND SUPPORT	NGO (n=4)	High	High	High	Low
	Academic (n=1)	Low	High	High	Low
	Citizen Scientist (n=1)	Medium	Low	Low	Low
COMMERCIAL INTEREST	Moorings contractor (n=1)	Medium	High	High	Low
	Project Funder (n=1)	Medium	Low	High	Low



Portland Voluntary No Anchor Zone (vNAZ)



Map – Portland Port vNAZ Notice to Mariners June 2022

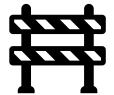


Buoy image – Emily Bunce
Spring, Summer and Autumn



vNAZ: ISSUES

SOCIETAL BARRIERS



Limiting freedom



Limiting safety



Limiting affordability

MONITORING AND ENFORCEMENT



Difficult to enforce



Compliance less likely in honeypot sites

RELOCATING PRESSURE



Anchoring on adjacent sites increases



vNAZ: SOLUTIONS AND REQUIREMENTS

**WELL CONSIDERED
AREA DESIGNATION**



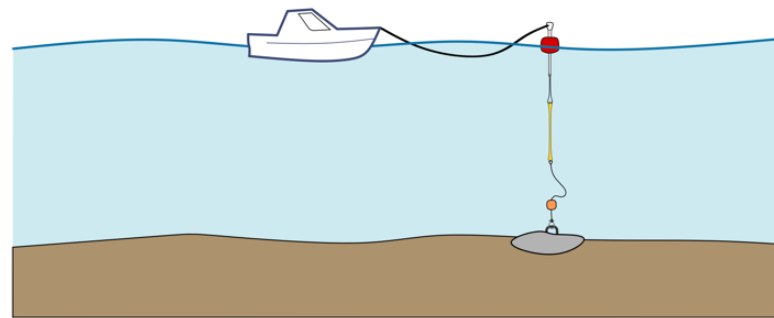
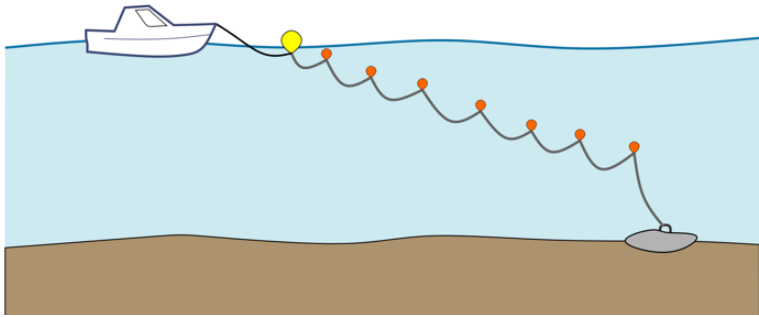
**GOOD
COMMUNICATION**



**COMMUNITY LED WITH
CROSS-ORGANISATIONAL
EFFORT**



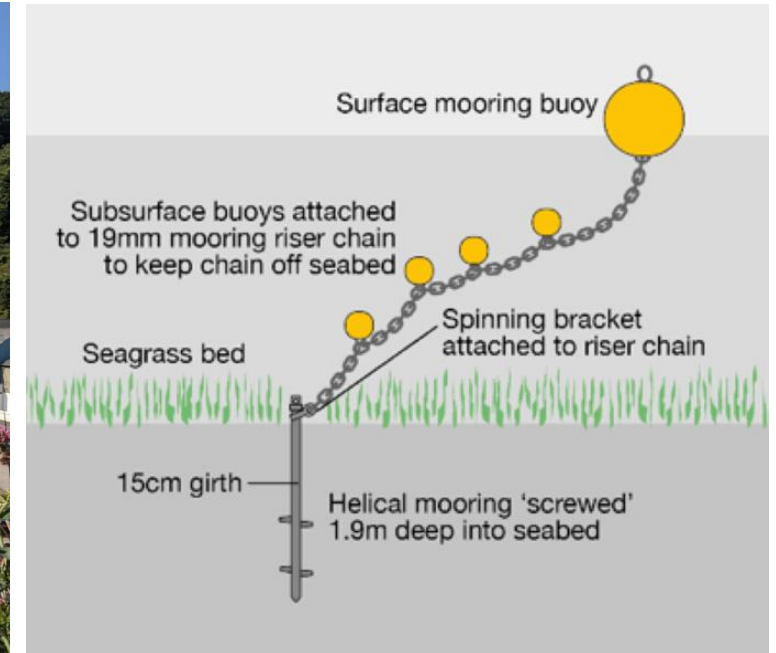
Cawsand Advanced Mooring Systems (AMS)



Sterling system diagram (top)- ReMEDIES
Seaflex system (bottom)- ReMEDIES



Cawsand Bay – Emily Bunce



Helical Screw diagram – ReMEDIES



AMS: ISSUES

PHYSICAL ENVIRONMENT LIMITING AMS FEASIBILITY



Tidal variance



Seabed substrate

IMPACT ON MOORING OWNERS



Higher cost



Maintenance



Concern about effectiveness

PROJECT TIMELINE



Slow process



Requirements for installation

SOCIETAL BARRIERS



Resistance to new ideas



Negative stories damaging trust



Perceived lack of evidence



AMS: SOLUTIONS AND REQUIREMENTS

**GOOD
COMMUNICATION**



**COMMUNITY LED
INITIATIVES**



**PROACTIVE AND
TRANSPARENT
ENGAGEMENT**



**EVIDENCE AND
EDUCATION**



LOCAL TRIALS



3. Discuss mooring design adaptations?

COMPARISON TABLE: MOORING DESIGNS			
	Hazelett	Seaflex	Stirling
Water depth/tides	Tidal range cannot be greater than low water depth – min depth 1.5m	Up to 8m. No limit on water depth – designed accordingly. Increased depth = increased cost.	Similar to traditional mooring.
Life span	30 year design life, 10 year recommended replacement cycle	20 years expected.	Component life expectancy 3 years.
Cost	<5 tonnes single elastic £223-£520 Full System £669-£1487 6-15 tonnes elastic only £669 Full System £929-£1375 16-25 tonnes elastic only £1115 Full System £1561-£2453 26-35 tonnes elastic only £1561 Full System £1933-2602 * see note below (price is dependent on a range of factors)	Up to 12 meters: £1062 full system 12 to 18 meters: £1487 full system 18 to 20 meters: £2321 full system 20 to 25 meters: £2866 full system	Including helical screw and installation by divers: <3.5 tonnes (16mm chain) £1545 + VAT >9.5 tonnes (20mm chain) £1710 + VAT Modify existing moorings on request
Experience	Over 4000 installations worldwide. 10 installed in Studland July 2021. Have been selling design for over 30 years. 1000s have been in situ for more than 10years. Isle of Man example 5+years.	1500+ installations worldwide. First mooring 1970.	Trials in Salcombe (since 2014), Torbay (2017) and Cawsands (2018). Total 17.
Maintenance	Recommend annual inspection by divers. Could potentially use camera but only if very clear conditions.	Recommend annual inspection (divers or pull mooring up by boat)– likely can decrease after years 2/3	Same as traditional mooring – annual checks to monitor chain and additional buoy floats to maintain.

QUESTIONS FOR DISCUSSION

HOW DO WE GET SAILORS TO CARE MORE ABOUT REDUCING DAMAGE TO SEAGRASS MEADOWS?

WHAT ARE THE PROS AND CONS OF THE MOORING OPTIONS AVAILABLE?

WHAT CAN WE AFFORD?

HOW DO WE MONITOR IMPACT ON SEAGRASS AND SAILORS?

WHAT ARE THE CHALLENGES WE WOULD HAVE TO OVERCOME (E.G. INDEMNITY AND INSURANCE)?

WHAT IS THE RIGHT THING TO DO FOR CASTLE COVE SAILING CLUB AND ITS SEAGRASS?

Work for 2024

- Circulate reports (Cawsand, CCSC, community perspectives and workshop reports) by December
- Update MCS seagrass webages by March
- Raise awareness of seagrass value @CCSC (presentation and evening event) February
- Work with CCSC to develop AMS trial location/cost (from April)
- Monitor (ROV) location for AMS trial with CCSC
- Salcombe AMS and speed access area research (Feb/March/April)
- Osborne Bay vNAZ supporting research (April, May, June, July)
- Write up wider ReMEDIES reports (October 2024)