

Assessing the impact of marine debris in the spread of INNS in The Solent



UNIVERSITY OF
PLYMOUTH



Solent Forum Biosecurity Plan

- **Biosecurity action plans:**
Southampton Water
Eastern Harbours: Portsmouth, Langstone, Chichester
Isle of Wight

Local Generic Actions

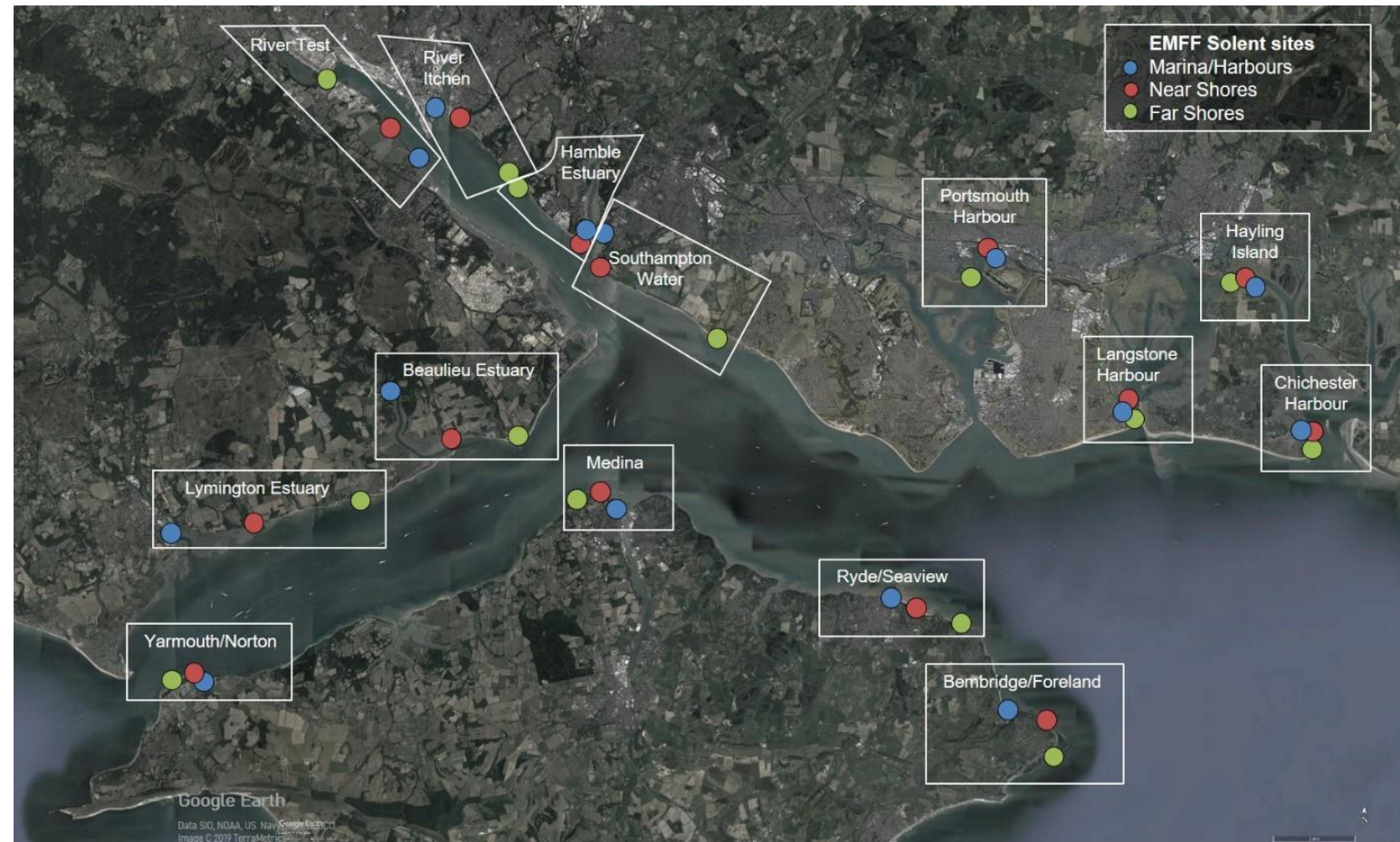
Short Term Actions (by October 2024)		
1.	Support and endorse this plan and utilise its resources to help improve biosecurity throughout your organisation.	
2.	Nominate a biosecurity lead in your organisation. Encourage them to educate staff and customers about marine invasives using the resources available on these biosecurity pages.	
3.	Establish a system such as a hard copy or digital log book to record any marine invasive species found at your location. Ask the biosecurity lead to report species on iRecord and/or email finding details to: marineinvasivespecies@naturalengland.org.uk .	
4.	Obtain a copy (free from the Solent Forum office) of the 'Identification guide for selected marine non-native species' and leave in a public place for staff/customers to browse. Show and encourage any site contractors to browse through it too. An online copy is available on these pages.	
Long Term Actions (implement as part of ongoing work programmes/business planning)		
5.	Educate your staff, customers and contractors by including information on marine invasives and biosecurity in your existing print and online media such as harbour guides and websites. Please use our media pack for copy and images. This pack contains a QR code for where there is limited space.	
6.	Support invasive non native species week (every May) with an annual refresh of communications on this issue.	
7.	Consider writing a biosecurity plan for your organisation using the resources on this site. This will help you be prepared if it is asked for as part of a Marine Licence application or other consent. See: Marine Biosecurity Plan Estuary Wide template and Specific Operation/Construction Related Activities template .	
8.	Consider establishing a small working group for the locality, for example to include local estuaries officer, government agencies and local catchment partnership officer, to explore further awareness raising on this topic and partnership action.	

Pathway Actions: Habitat and Species Restoration

Habitat and Species Restoration			
	Action	Owner	Timescale
1	View the Blue Marine Foundation's biosecurity decision cycle for an example of the factors that need to be considered when carrying out species restoration.	Habitat restoration practitioners	As required.
2	A biosecurity plan will be requested as part of a marine licence application. See the resources section in our pathway page for a link to an example.	Marine licence applicants	As required.
3	When undertaking beneficial use of dredgings for habitat creation, be prepared that grab samples could be requested to undergo eDNA testing to check for marine invasive species (this type of monitoring is still in its infancy but will become more readily used over time).	Beneficial use of dredgings project managers	As required.

- **GB Non-Native Species Strategy**

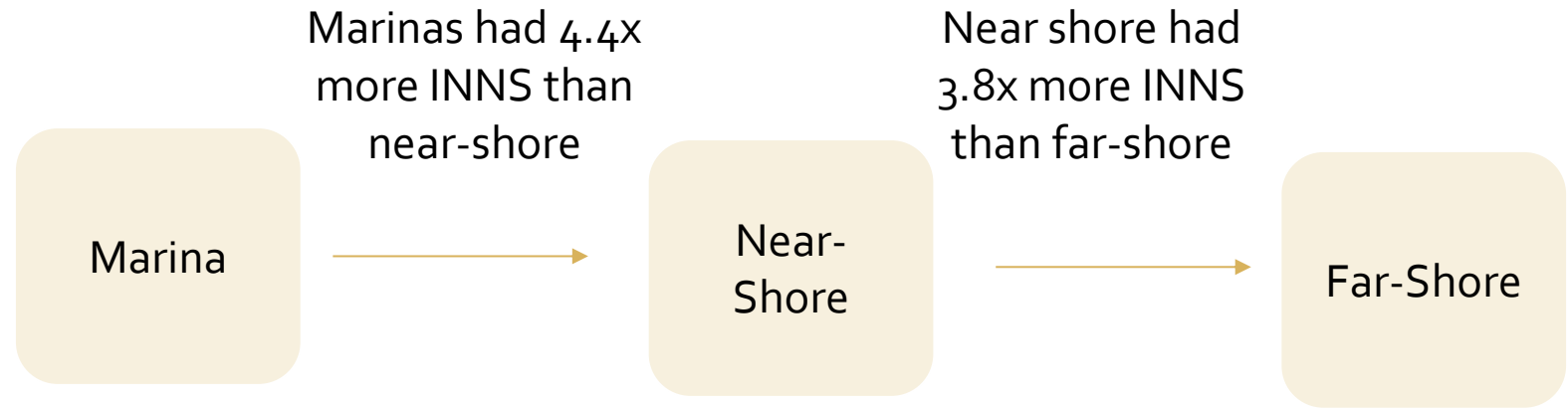
2018 Natural England Study



Cluster sites visited in the initial mapping surveys in 2018 .
Taylor et al., 2018.

Findings

50 INNS species identified



Evidence of spill-over from marina into natural habitats

2022 Natural England Study



Cluster sites revisited in the follow up monitoring surveys in 2022. Taylor *et al.*, 2022.

Findings

- Target list increased to 52 species
- Noticeable increase in abundance of INNS
- Significant impact of foreign substrata on 'presence and prevalence of INNS'

A growing problem...



Oyster spats at Hook Spit in 2019. Image by Jess Taylor



Oyster spats at Hook Spit in 2022. Image by Jess Taylor

What is marine debris?

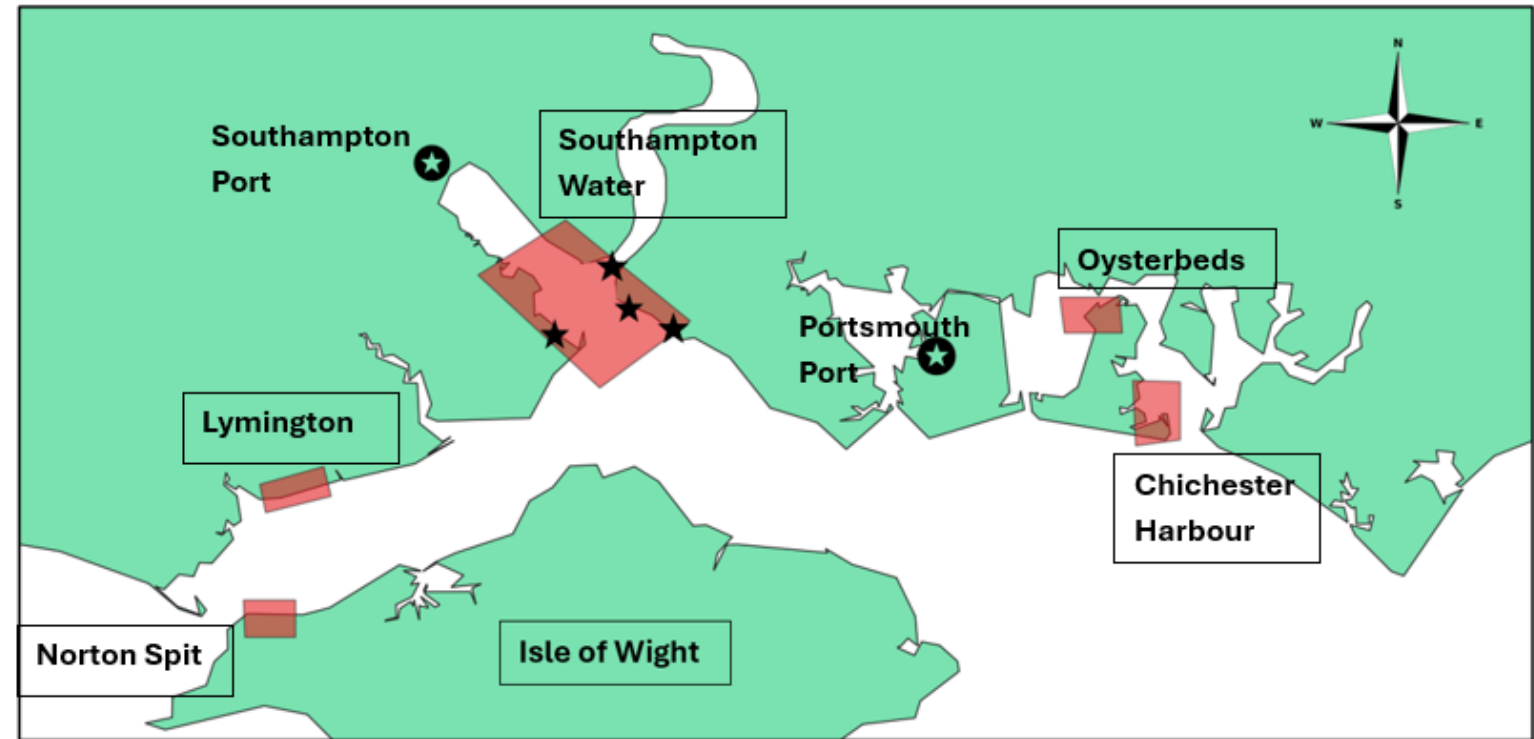
- Foreign substrata
- Removable
- Minimum Size
- Not have another intended purpose

Marine debris



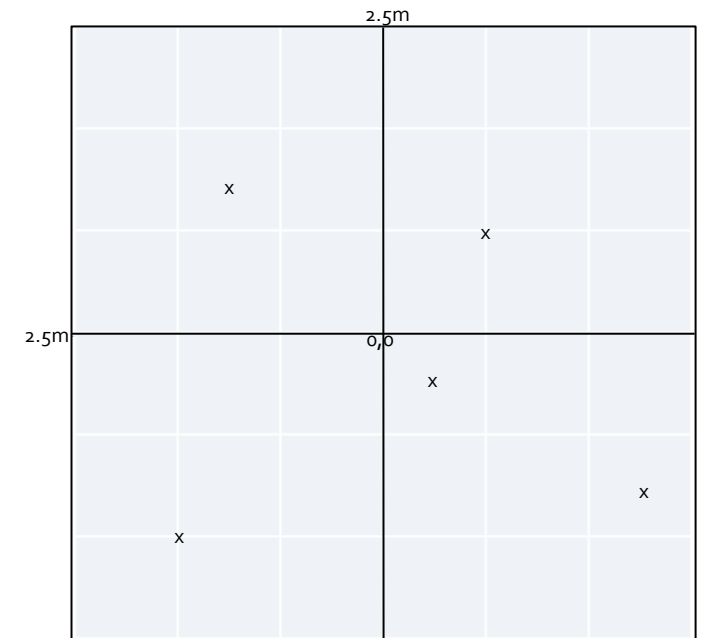
Marine debris encountered in
2024 surveys. Images: Luke Perry

Survey sites

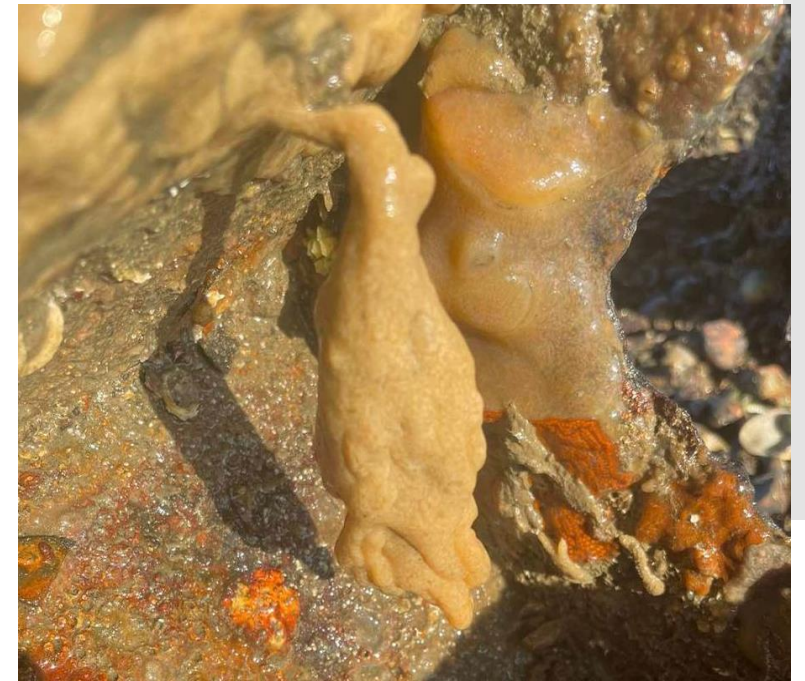


Methodology

- Quantified in a SACFOR classification:
Superabundant, Abundant, Common, Frequent, Occasional, Rare
- 5 quadrats in increasing distances from item of debris
- Pre-mapped debris identified through satellite imagery

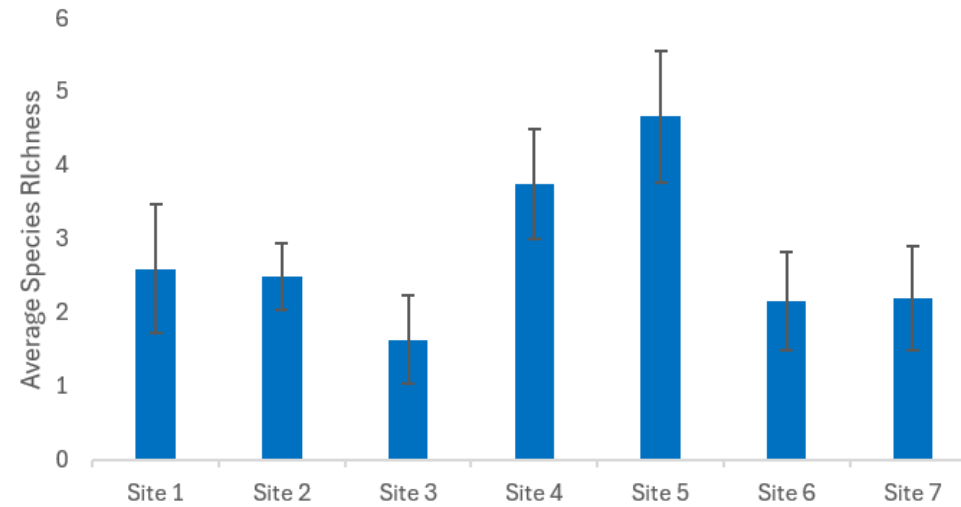


What did we
find?



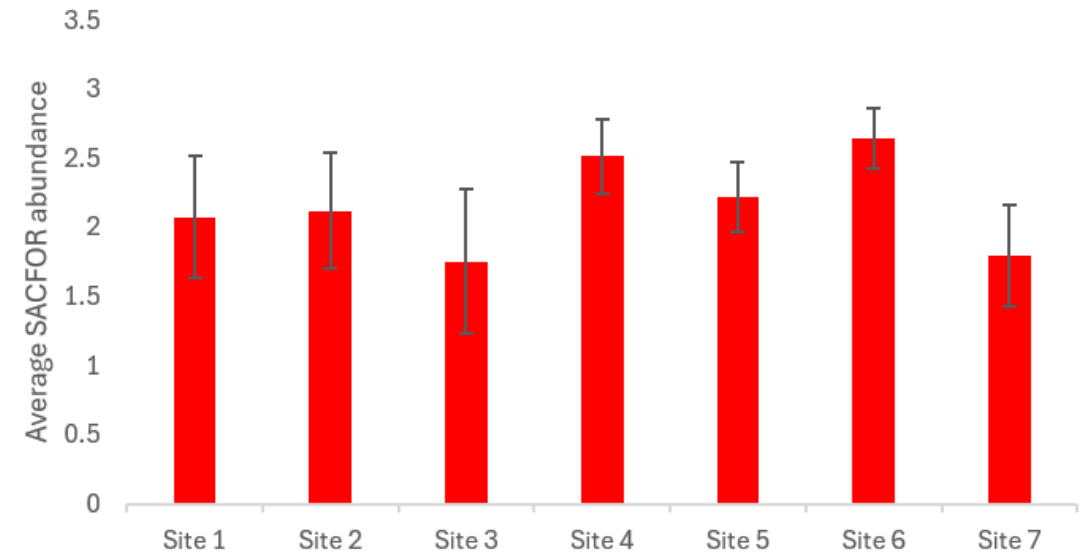
Watersipora subatra, *Botrylloides diegensis*, *Botrylloides violaceus*, *Didemnum* spp, 2024. Images: Luke Perry

Results

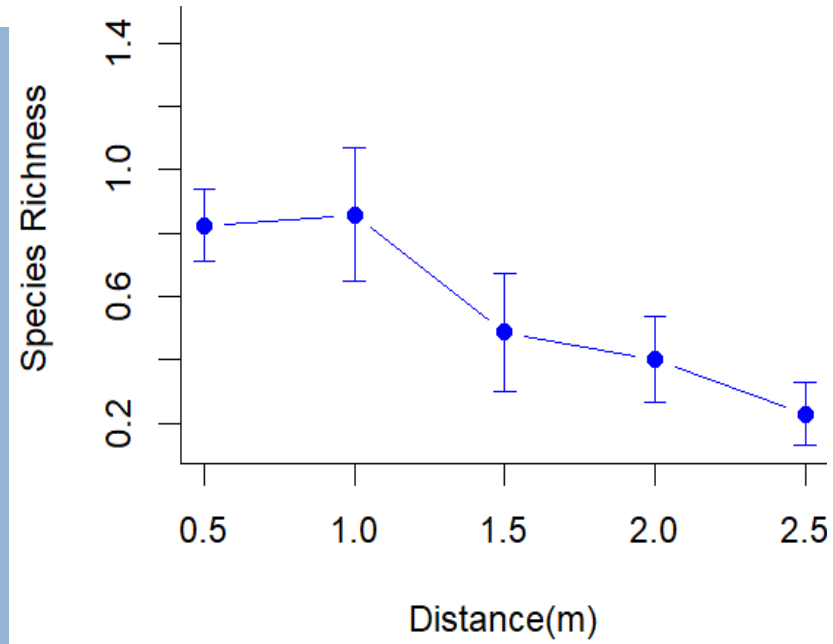


Average species richness of INNS on marine debris at each site.

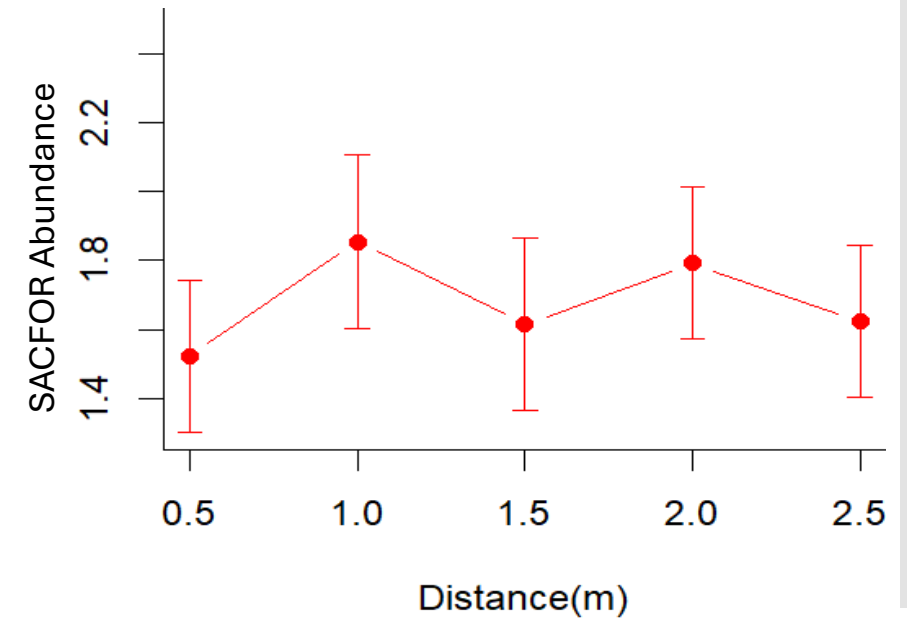
Average SACFOR abundance of INNS on marine debris at each site.



Quadrat Distance

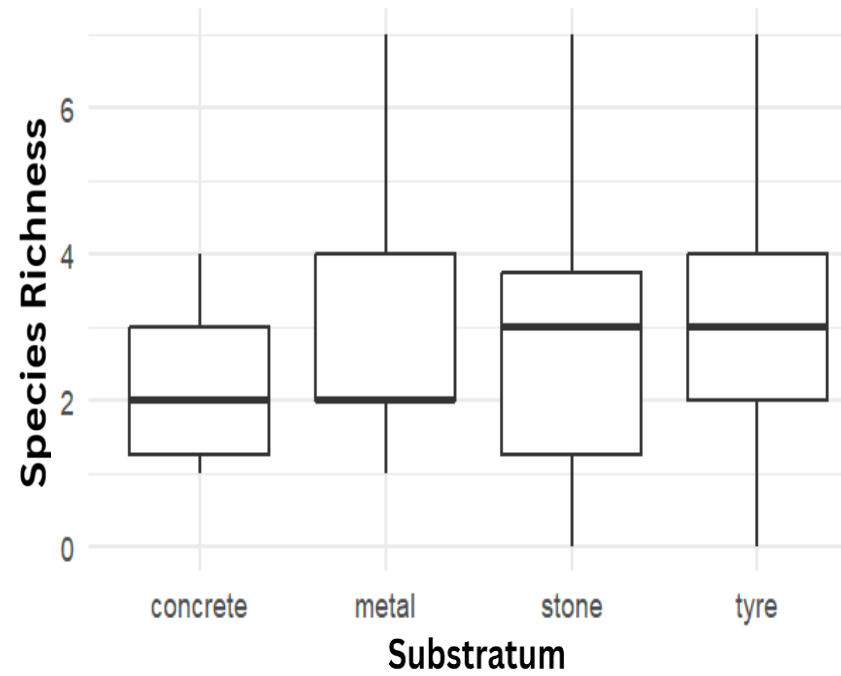


Average SACFOR abundance of INNS on natural substrata at increasing distances from marine debris.



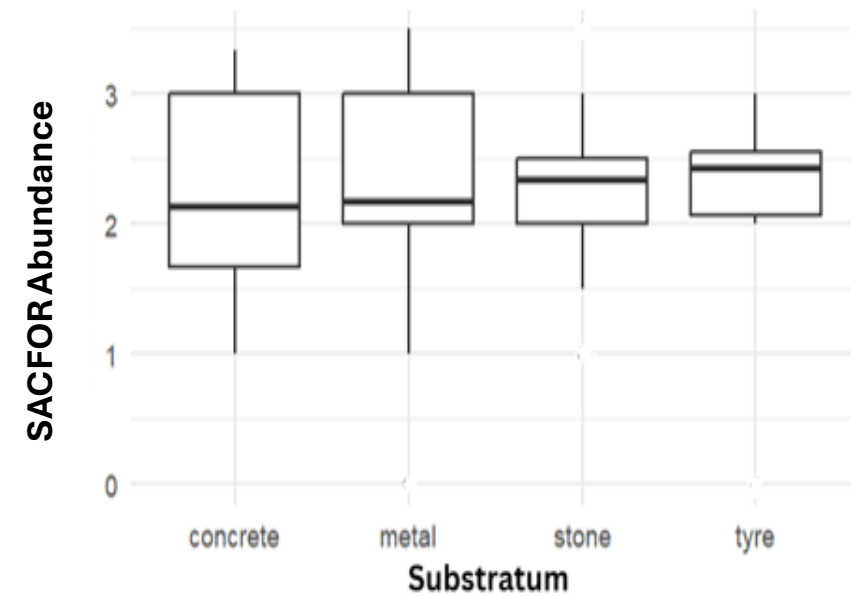
Average species richness of INNS on natural substrata at increasing distances from marine debris.

Substrata

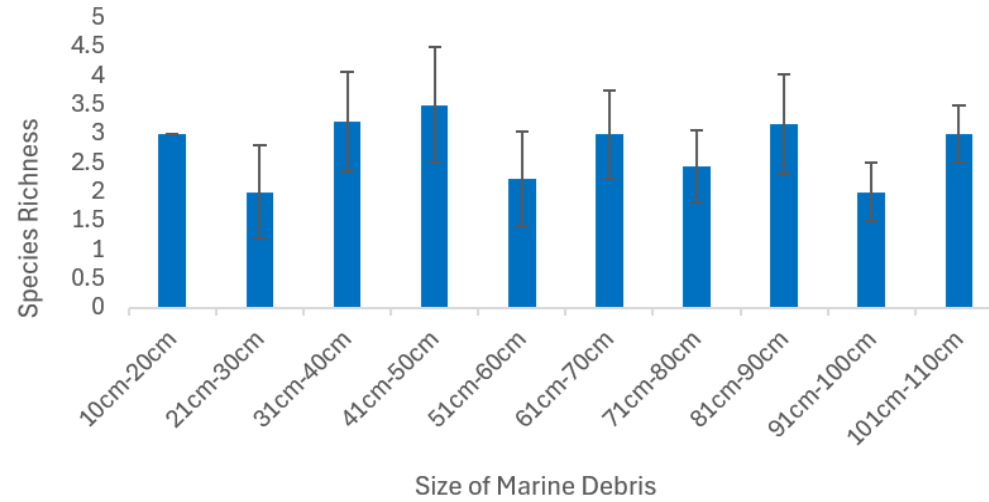


Average species richness of INNS on marine debris at each site.

Average SACFOR abundance of INNS on marine debris at each site.

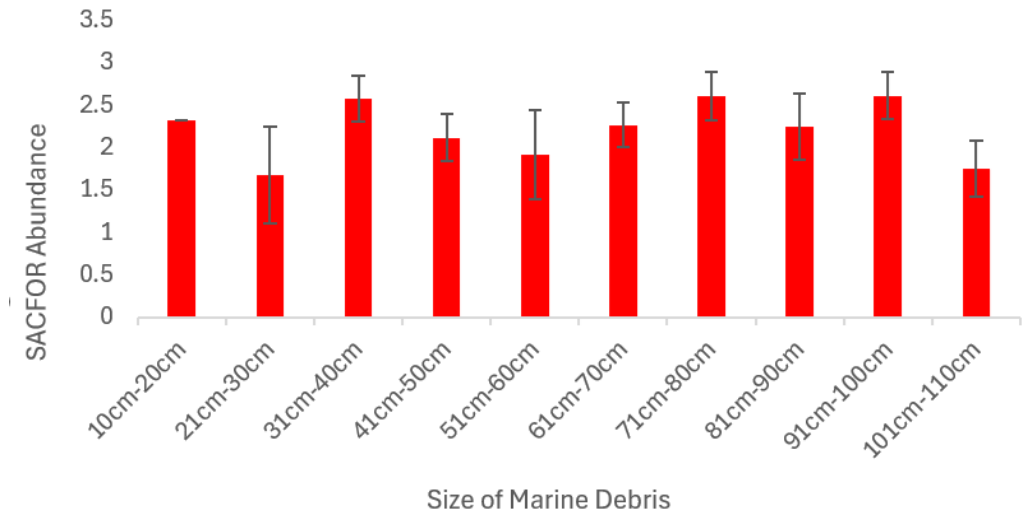


Size



Average species richness of INNS on marine debris of different sizes.

Average SACFOR abundance of INNS on marine debris of different sizes.



Observations

- Intertidal ranges and at risk shorelines.
- (Semi) Naturalised Species.
- Importance of debris characteristics.



Limitations of the study

- Species identification
- Sequence of events
- Only investigated emerged areas of intertidal zone



Removal of debris

- All but one piece of debris were readily 'removable'.
- First time physical attributes of debris have been recorded.
- Removal attempts can target high risk shorelines proactively and be site-specific to ensure efficacy.

Recommendations

- Removal of debris would significantly reduce INNS, but not eradicate.
- Management frameworks need to have multiple parallel strategies
 - Prioritising high risk shorelines etc.
- Continued monitoring is essential.
 - Public hotline

References:

- BISHOP, J.D.D, WOOD, C.A.,TAYLOR, J.G., 2023. Mapping Invasive Non-Native Species in the Solent: An Update. NECRXXX. Natural England. (UNPUBLISHED)
- LAING I., BUSSELL J., SOMERWILL K., 2010. Assessment of the impacts of *Didemnum vexillum* and options for the management of the species in England. Project report for Defra
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