

Solent Forum Biosecurity Workshop

*Developing an understanding of biosecurity measures
to protect The Eastern Harbours from marine invasive
species*

Welcome

apemltd.com



Agenda

Developing an understanding of biosecurity measures to protect the Eastern Harbours from marine invasive species

- 🕒 **Welcome and aims of workshop** – Karen McHugh (Solent Forum)
- 🕒 **Why we are doing this work** – Jess Taylor (Natural England)
- 🕒 **Introduction to marine invasive species** – Katie O'Shaughnessy (APEM, Ltd)
- 🕒 **Invasive species display** – Chris Wood (Marine Biological Association)
- 🕒 **Introduction to biosecurity** – Katie O'Shaughnessy (APEM, Ltd)
- 🕒 **Discussion breakout session** – all
- 🕒 **Summary of major discussion points** – Katie O'Shaughnessy (APEM, Ltd)
- 🕒 **Closing statements** – Karen McHugh (Solent Forum)

Welcome

Who is who?

- **The Solent Forum** – Kate Ansell & Karen McHugh
 - Helping produce 3 Biosecurity Plans/Resources over the year working with you
- **Natural England** – Jess Taylor, supported by Connor Reid, Marina Rees & Jack Bush
 - Helping guide the biosecurity planning process
- **APEM, Ltd** – Katie O’Shaughnessy & Lucy Lintott
 - Leading workshop / Have produced review report on marine invasive species biosecurity planning in England
- **Marine Biological Association** – Chris Wood
 - Display table of marine invasive species with specimens, images and notes



Aims of the workshop

Workshop 1 Aims:

- Introduce marine invasive species to you
- Introduce biosecurity planning
- Work with you to develop and share information on how to manage marine invasive species in your area

Biosecurity Planning

...is developing a set of measures that aim to prevent the introduction and spread of marine invasive species (to be covered in detail later)

- We will be developing a range of resources for people to use
- You are part of a biosecurity planning network of interested organisations and groups in each plan area
- Focus on three areas in the Solent - site information, a biosecurity plan and a range of sector specific resources.
- A second set of online workshops to be held in your area:
 - The Eastern Harbours – Portsmouth , Chichester, Langstone (8nd June)
 - Southampton Water and the Solent (14th June)
 - Isle of Wight (15th June)

Solent Forum Biosecurity Workshop

*Developing an understanding of biosecurity measures
to protect The Eastern Harbours from marine invasive
species*

Introduction to Marine Invasive Species

apemltd.com



Native vs Non-Native vs Invasive

Native species

- A species that originated and developed in its current surrounding habitat
- It “belongs” here
- Usually causes no harm but *can* be a nuisance under certain conditions

Non-Native species

- A species that originated somewhere other than its current location and has been introduced to the area where it now lives
- Introduction usually human-mediated
- No noticeable negative ecological and/or socio-economic effects on receiving ecosystem
- It does not “belong” here but does not cause a problem

Invasive species

- Approx. 10-15% of non-natives are harmful
- A non-native species that causes ecological and/or socio-economic harm
- By the above definition, it can be a nuisance
- It does not “belong” here and causes a problem
- For example, outcompeting or predated on native species, reducing biodiversity
- For example, fouling harbour/marina equipment and infrastructure, shellfishery gear, vessel hulls, resulting in extra costs for cleaning/removal



Impacts of invasive species

Ecological & environmental

- Biodiversity
 - Predation on and competition with natives
 - Alter gene pool through hybridisation
- Habitat alteration
 - Ecosystem engineers
- Effects on habitat restoration efforts
 - e.g. seagrass and oyster bed restoration
- Introduction of new diseases and parasites



Economic & social

- Public utilities & waterside infrastructure (e.g. FCERM)
- Tourism & recreation
- Fisheries & agriculture
- Estimated €117 billion between 1960-2020 in EU alone*
 - Management, control



Concerns for The Eastern Estuaries

- Effects on habitat restoration and conservation efforts (e.g. seagrass and oyster bed restoration)
- Shellfisheries and aquaculture
- Harvesting (in regards to oysters)
- Port and harbour infrastructure, incl. navigational aids
- Flood and coastal erosion risk management (FCERM)
- Passenger ferries
- Recreational activities & marinas
- Legislation for shipping movements/ship inspections

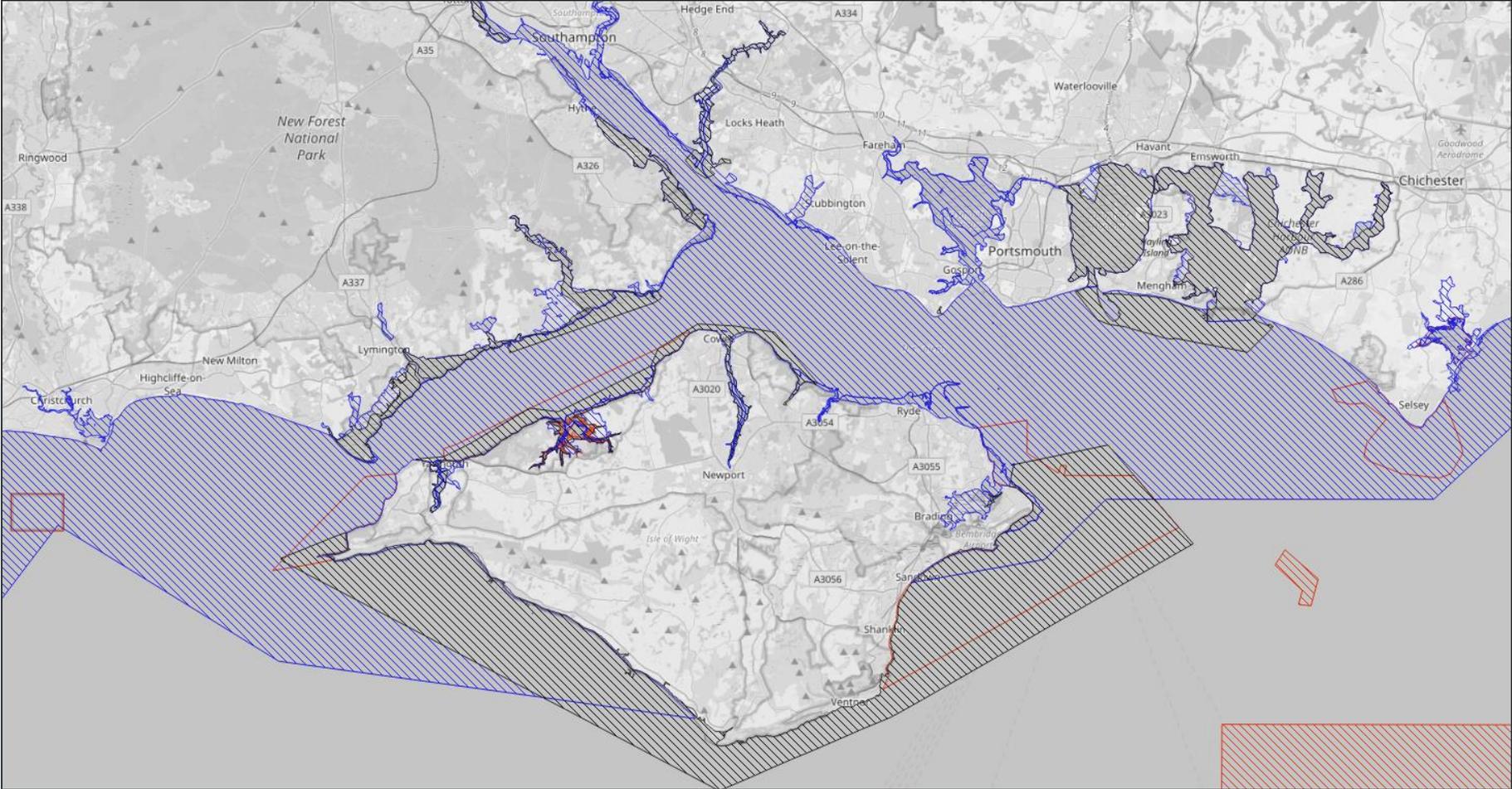


Carpet sea squirt on aquaculture equipment © USGS

Concerns for the entire Solent

Natural surrounding areas / Protected areas / Designated sites

- MCZs
- SACs
- SPAs
- Offshore MPAs



How are invasive species spread in the marine environment?

Via **pathways/vectors**...

- Transfer mechanisms responsible for the introduction and spread of species
- Physical means or agents
- Typically mobile
- Movement from one geographic location to another



How are invasive species spread in the marine environment?

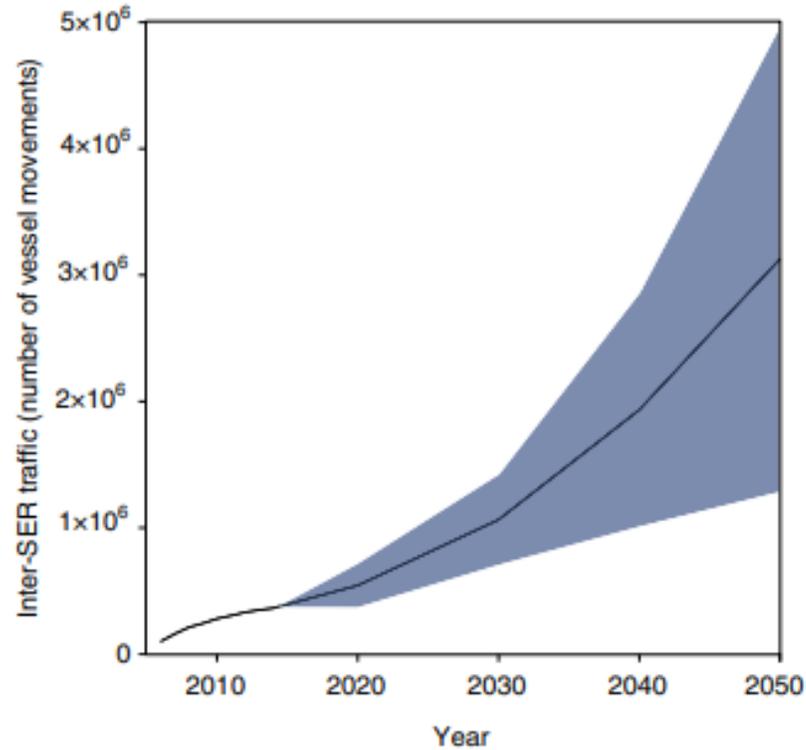
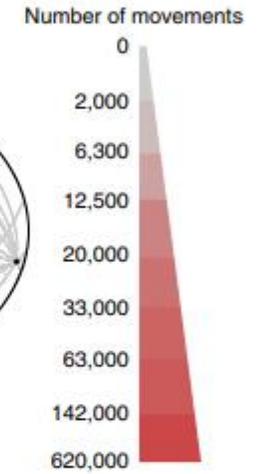
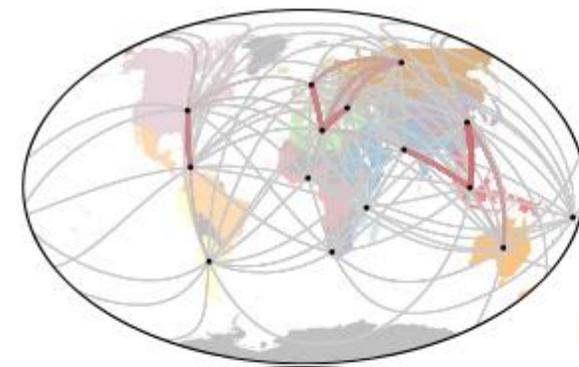


Fig. 1 | Decadal projections of total inter-SER traffic. The error envelope represents the combined error due to scenario uncertainty (SSP), as well as parameter estimation for the gravity model (PI_{gm}) and residual adjustment (PI_{ra}).

2014



2050

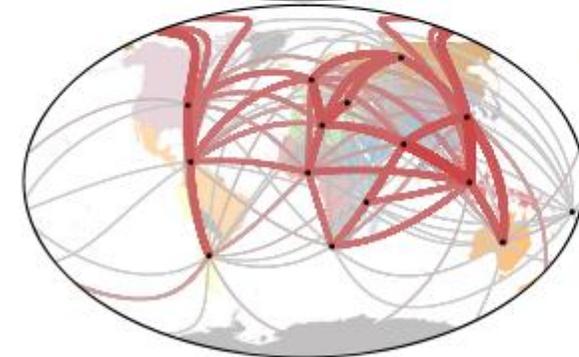


Fig. 2 | Shipping vessel movements. Number of shipping vessel movements between SERs in 2014 (top), and 2050 under lowest-case traffic growth and lowest $PI_{gm} + PI_{ra}$ error bound (middle; SSP3: 'regional rivalry') and highest-case traffic growth and highest $PI_{gm} + PI_{ra}$ error bound (bottom; SSP5: 'fossil-fuelled development').

How are invasive species spread in the marine environment?

- Movement of vessels - Commercial Shipping and Military Vessels
 - Biofouling (hull, sea chest, niches)
 - Ballast water (for cargo ships, tankers and bulkers)

How are invasive species spread in the marine environment?

○ Passenger Ferries

- Biofouling

○ Shellfisheries

- Escape (of cultured species)
- Hitchhiker

○ Recreational Activities

- Sailing, boating, paddling
- Events and competitions



○ Commercial Fishing

- Release / overboarding of live organisms
- Hull fouling

○ Recreational Fishing

- Angling equipment
- Live Bait

○ Construction/Maintenance

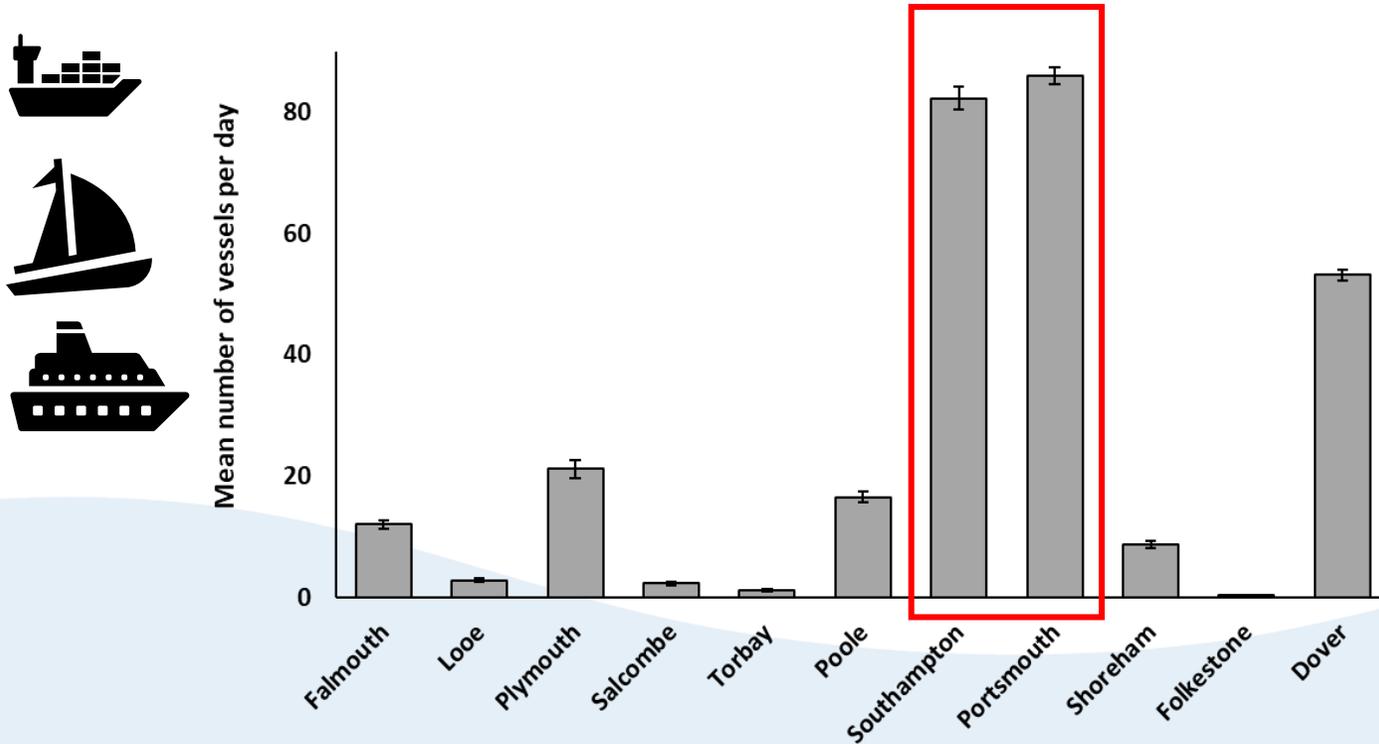
- Coastal infrastructure, e.g. seawalls
- Marina development/ pontoon reconfiguration
- Dredging
- Beach renourishment

○ Natural Spread / Climate Change

- Range expansions

Major pathway of spread for The Solent

Frequency of activity (pathway of spread)



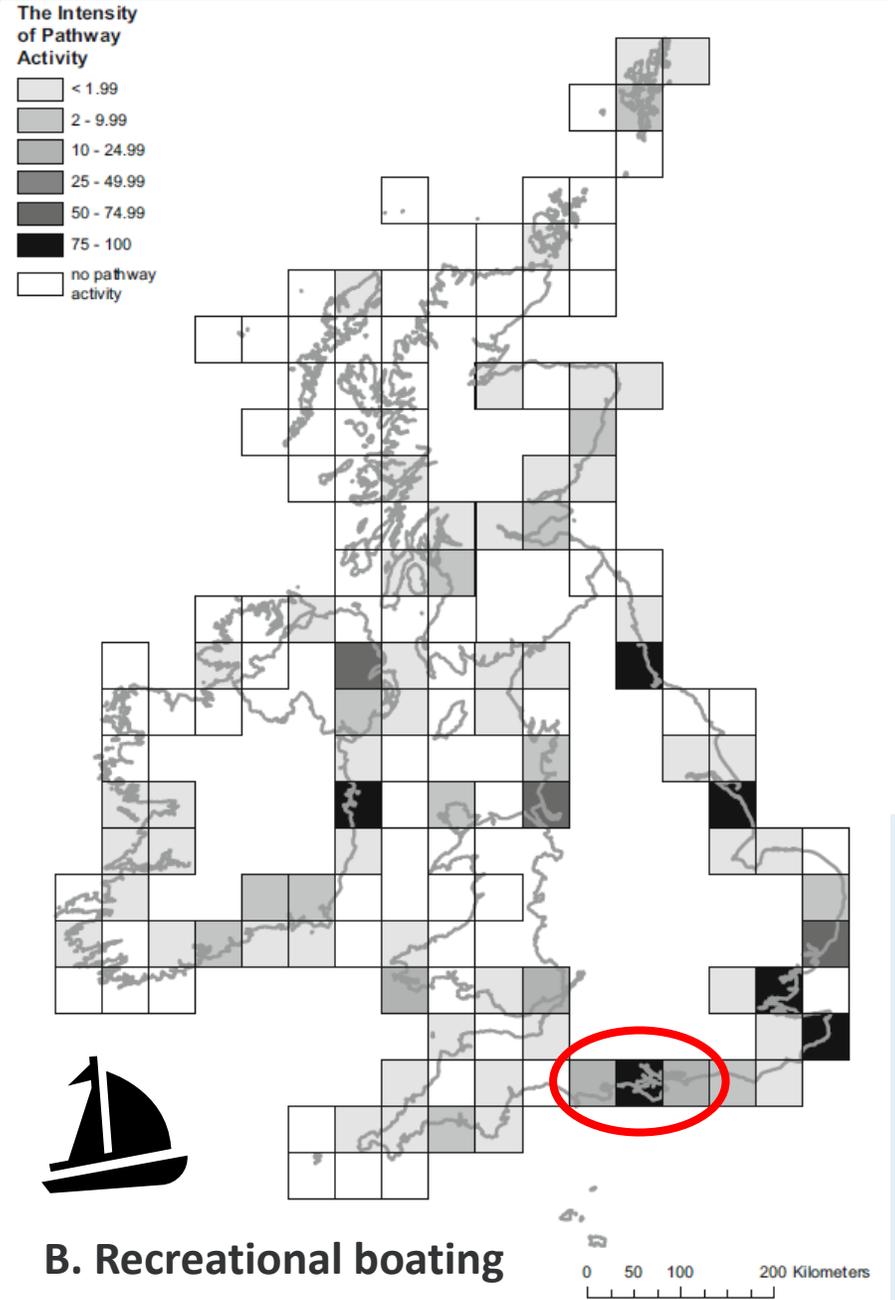
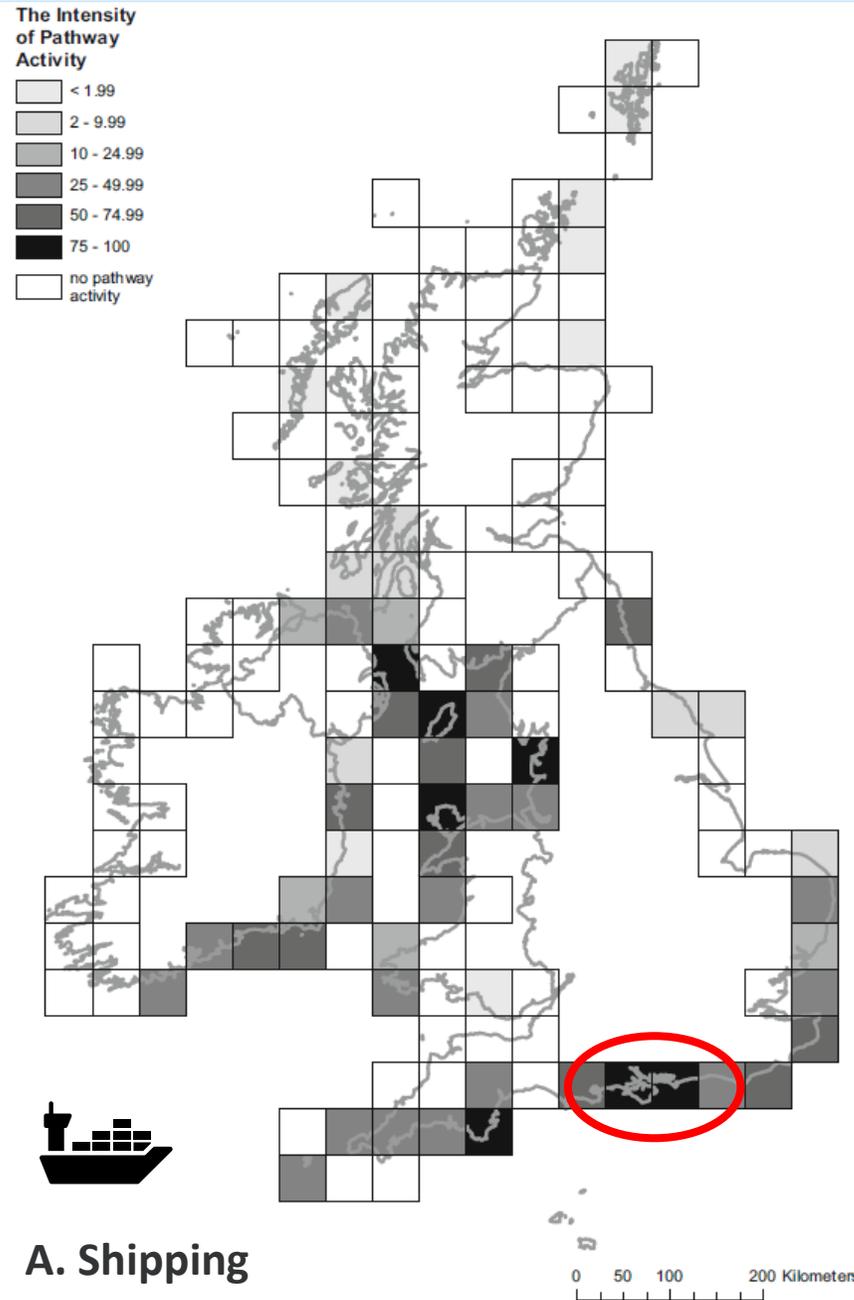
O'Shaughnessy et al. (2020) Occurrence and assemblage composition of intertidal non-native species may be influenced by shipping patterns and artificial structures. *MPB*. 1;154:111082.

www.marinetraffic.com



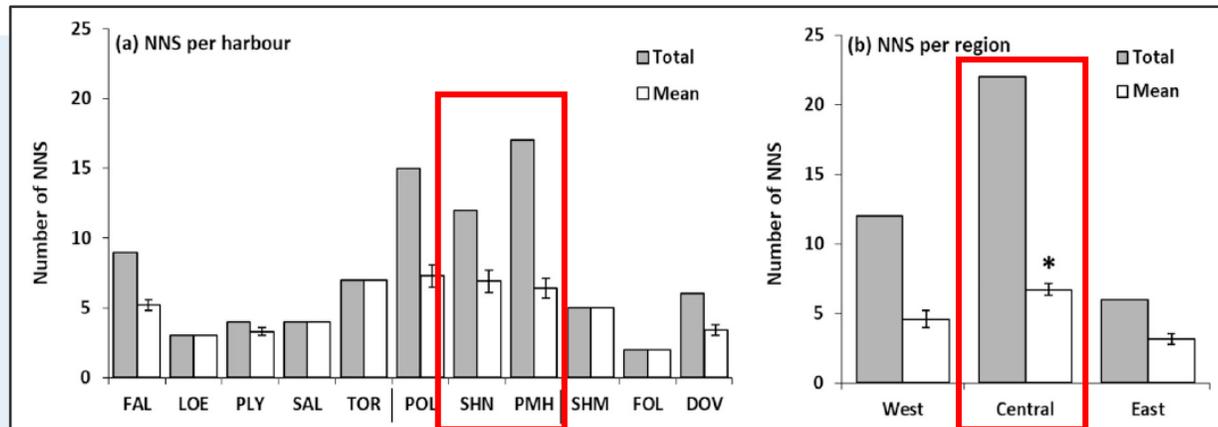
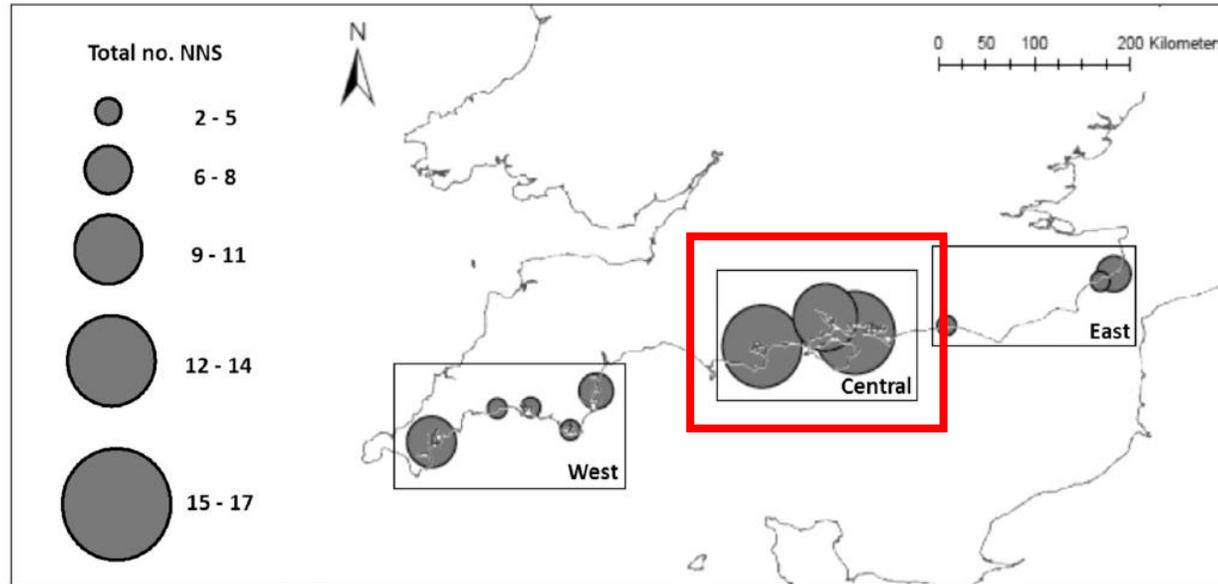
Major pathway of spread for The Solent

Frequency of activity (pathway of spread)



Tidbury et al. (2016) Predicting and mapping the risk of introduction of marine non-indigenous species into Great Britain and Ireland. *Biol Inv*, 18(11), pp.3277-3292.

High frequency of pathway = many invasive species



O'Shaughnessy et al. (2020) Occurrence and assemblage composition of intertidal non-native species may be influenced by shipping patterns and artificial structures. *MPB*. 1;154:111082.

Species of concern for The Solent

Crepidula fornicata (Slipper limpet)

- Native to North America
- First recorded in UK in 1872
- Forms 'chains' with female on bottom
- Competes for space and food with natives
- Shells can alter substrate such as soft sediment beaches
- On list of The 100 Most Invasive Alien Species in Europe*



Species of concern for The Solent

Carpet sea squirt (*Didemnum vexillum*)

- Native to Japan
- Smothers native flora and fauna
- Can grow over protected species such as seagrass*
- Biofouls infrastructure, fishing, shellfishery and aquaculture equipment, vessel hulls



Carpet sea squirt growing over native anemone. © K O'Shaughnessy.



Carpet sea squirt growing over eelgrass in New England. © Carmen and Gruden (2010)



Carpet sea squirt on aquaculture equipment © USGS

*Carman and Gruden, 2010

Species of concern for The Solent

Pacific oyster (*Magallana gigas*)

- Native to Japan and NE Asia
- Introduced from Canada in 1960s for aquaculture. First wild record 1965
- Can form dense aggregations in intertidal and shallow subtidal, altering substrate
 - Human health hazard
- Can alter rocky shore community composition
- Can negatively impact native oysters



© Marine Biological Association

©MBA – *M. gigas* bed in Yelm Estuary



© MBA

Species of concern for The Solent

Trumpet tube worm (*Ficopomatus enigmaticus*)

- Native to Indo-Pacific
- Biofouling of boat hulls, marina equipment, infrastructure
- Nuisance in ports and marinas
- Clogs pipes and blocks tide-gates



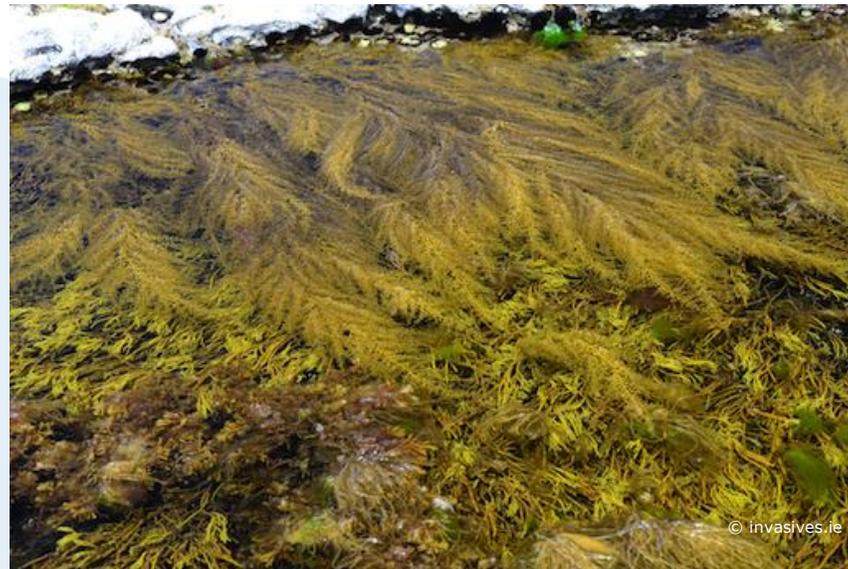
Fouled yacht. © Image Rob Holland



Species of concern for The Solent

Wireweed (*Sargassum muticum*)

- Native to Japan
- Outcompetes native seaweeds, particularly in rock pools
- Fouls fishing gear
- Blocks intake pipes



Species of concern for The Solent

American lobster

(Homarus americanus)

- Horizon species for The Solent
- Deliberate release of 361 individuals in Brighton
- Currently uncommon in GB waters
- Very difficult to identify
- Impact on native lobster through competition, interbreeding and by spreading disease



© GB NNSS



© GB NNSS

Distribution

Few isolated records. Not common.



Source: Stebbing *et al* 2012

Legislative drivers

- Convention on Biological Diversity
- GB Non-Native Species Strategy
- UK Marine Strategy
- Water Framework Directive (WFD)
- Habitats Directive & Marine and Coastal Access Act
- Invasive Alien Species Regulation
- Wildlife and Countryside Act

The Great Britain Invasive Non-Native Species Strategy

2023 to 2030

Date: February 2023



Legislative drivers

South Inshore and South Offshore Marine Plan

- Policy S-NIS-1 Non-indigenous species
- Proposals must put in place appropriate measures to avoid or minimise significant adverse impacts on the marine area that would arise through the introduction and transport of non-indigenous species, particularly when:
 - Moving equipment, boats or livestock (for example fish and shellfish) from one water body to another
 - Introducing structures suitable for settlement of non-indigenous species, or the spread of invasive non-indigenous species known to exist in the area



HM Government

South Inshore and South Offshore Marine Plan

Technical Annex

July 2018



Solent Forum Biosecurity Workshop

Developing an understanding of biosecurity measures to protect The Eastern Harbours from marine invasive species

Introduction to Biosecurity

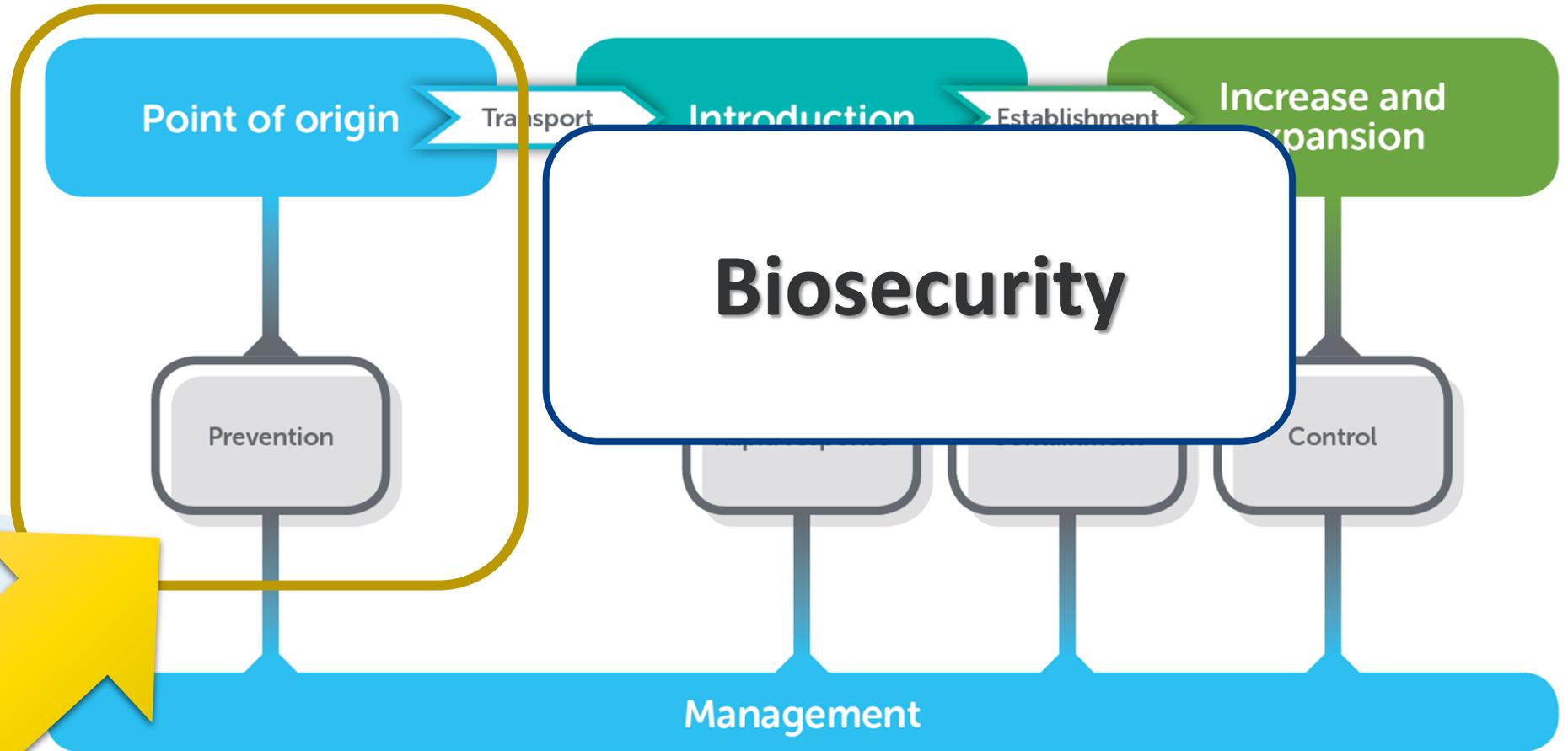
apemltd.com



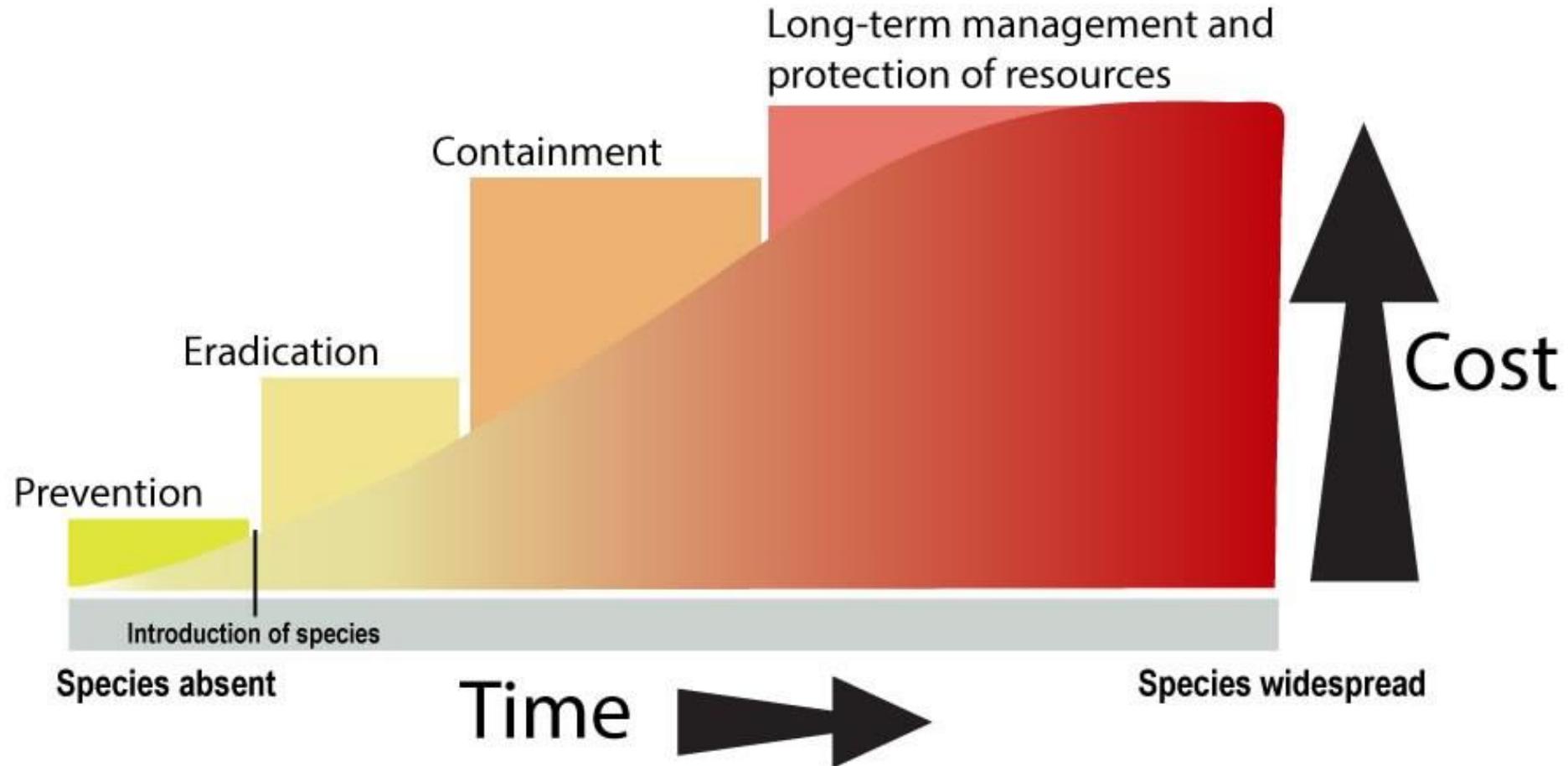
How do we minimise introduction and spread?

Hierarchy of management

- Prevention
- Rapid response & eradication
- Containment & long term control



Why is biosecurity planning so important?



©US National Park Service

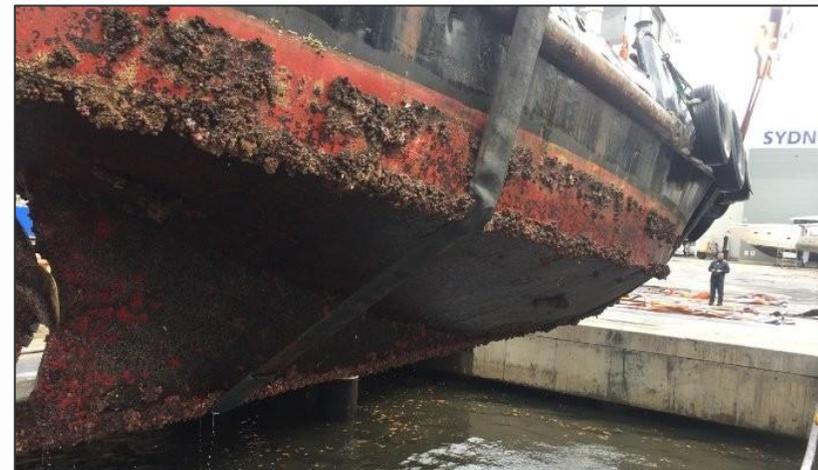
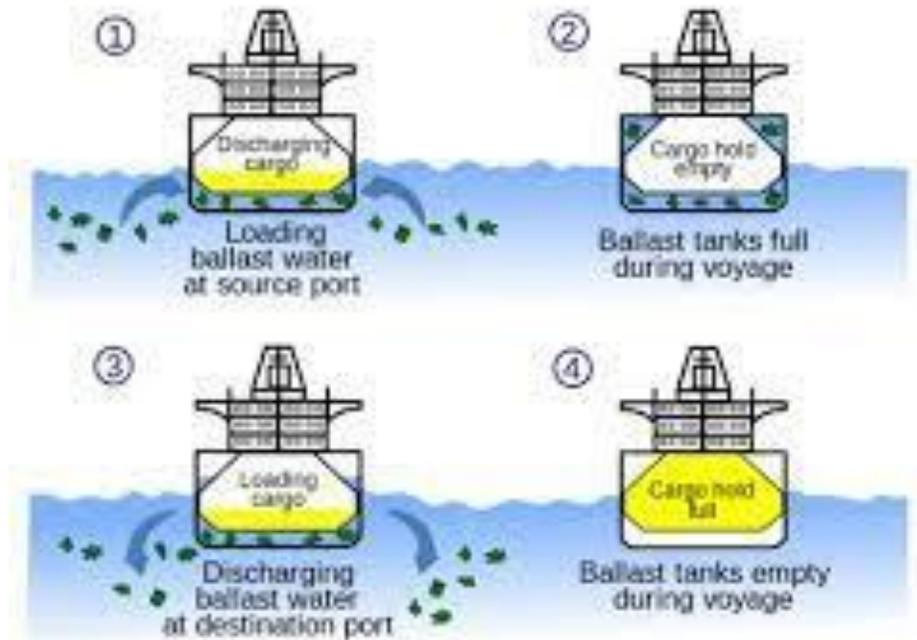
Biosecurity Planning

- “An ounce of **prevention** is worth a pound of cure”
- Identifies **realistic, pragmatic and cost-effective procedures** and behaviours that reduce the risk of invasive species introduction and establishment
- Highly specific to the characteristics and **pathways/** activities at the site, but there are general measures that will likely apply across all sites

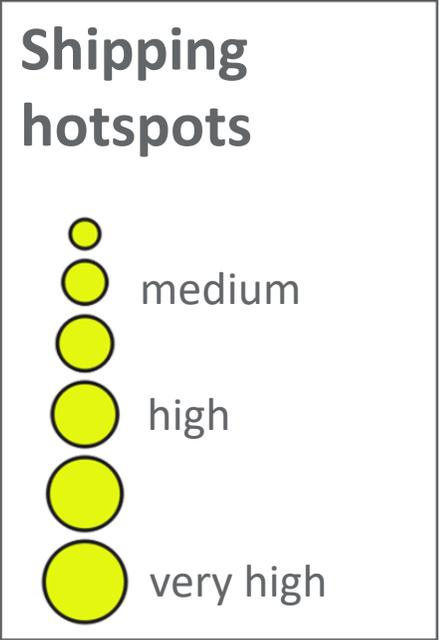
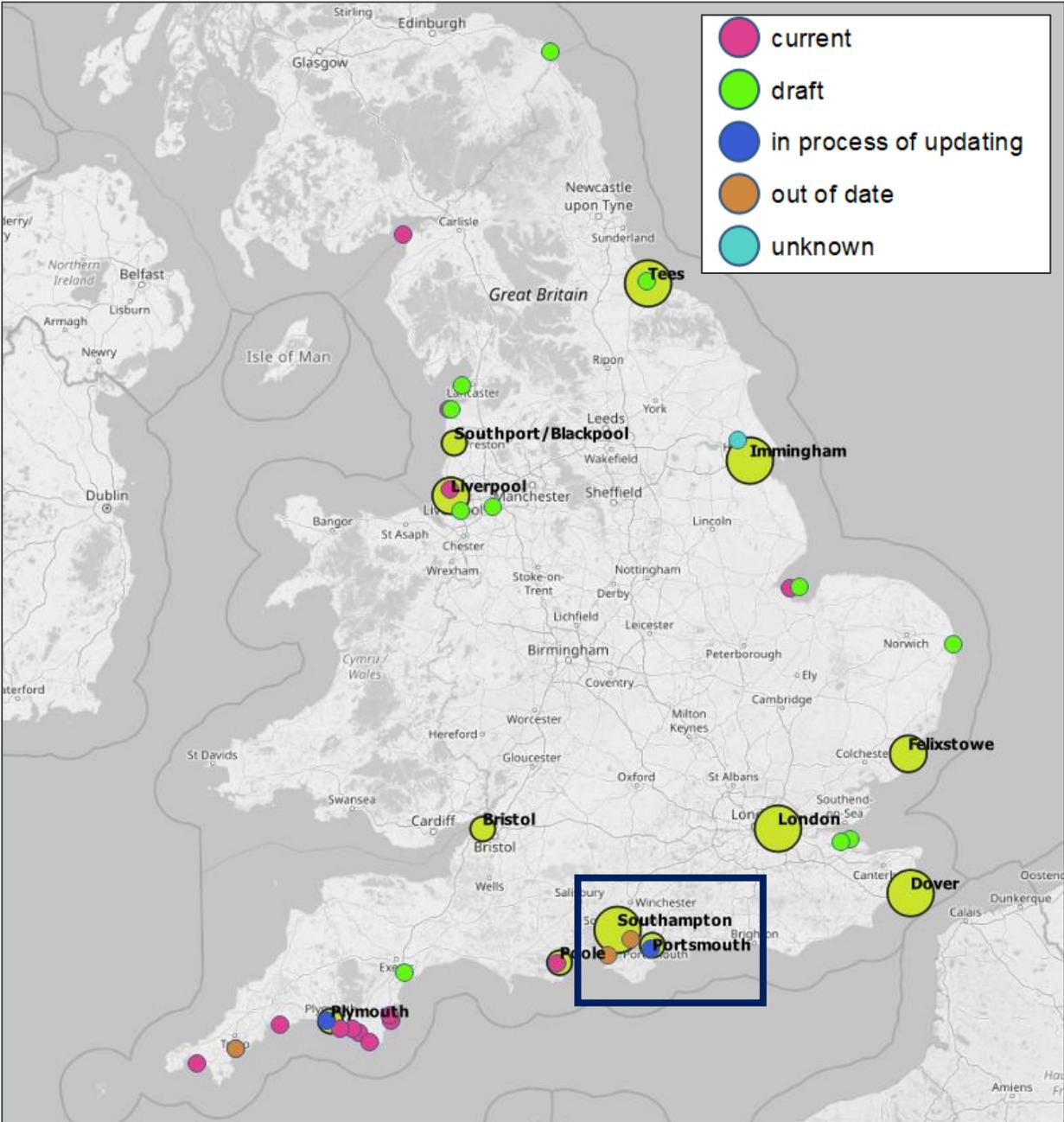


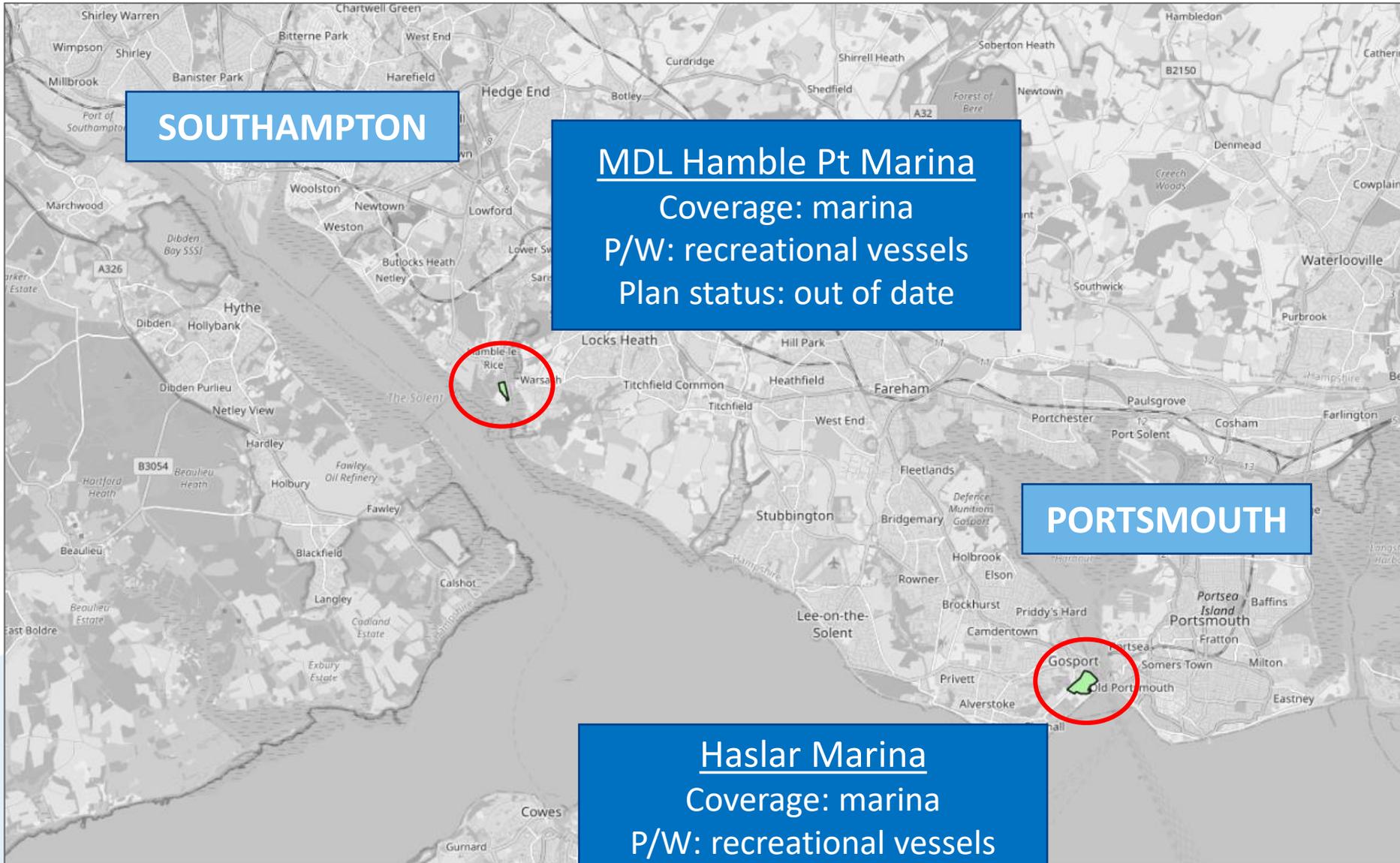
Biosecurity Planning

Address the pathway and can address the species that move with that pathway!



Audit and review of marine invasive non-native species biosecurity planning in England





SOUTHAMPTON

MDL Hamble Pt Marina
Coverage: marina
P/W: recreational vessels
Plan status: out of date

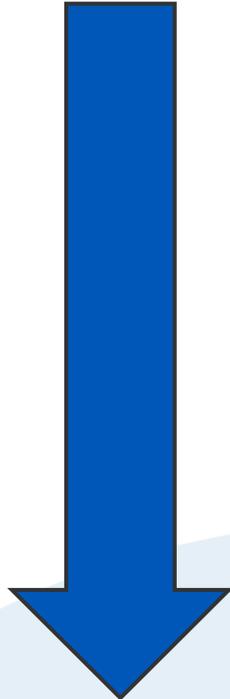
PORTSMOUTH

Haslar Marina
Coverage: marina
P/W: recreational vessels
Plan status: updating

*Ports of SH & Ports'm:
“No port-wide biosecurity plans”*

Biosecurity Measures

£

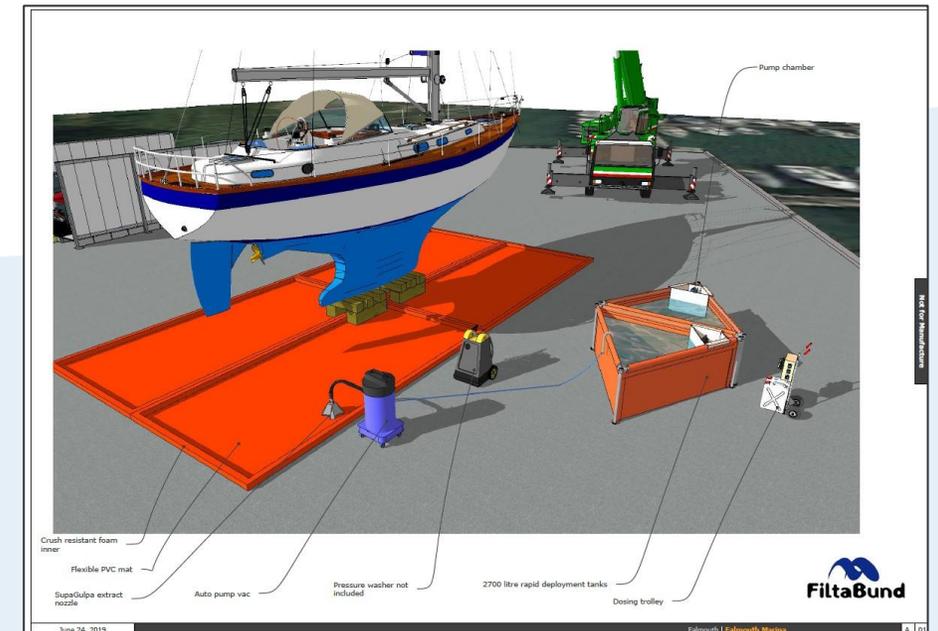


£££

- Raise public awareness and encourage 'good practice' measures, *e.g. Check Clean Dry campaign*
- Species ID and monitoring training
- Biosecurity measures during events, *e.g. participants of events to arrive with clean equipment*
- Biosecurity Manager
- Washdown and waste capture facilities
- New and developing technologies for continual biosecurity



© British Canoeing



Raising Awareness

Whenever you leave the water, remember to Check Clean Dry



Check

Check your equipment, boat, and clothing after leaving the water for mud, algae, and plant material. Remove anything you find and leave it at the site.



Clean

Clean everything thoroughly as soon as you can, paying attention to areas that are hard to access. Use hot water if possible.



Dry

Dry everything for as long as you can before using elsewhere as some invasive animals can survive for over two weeks in damp conditions.



STOP THE SPREAD

Invasive plants and animals block waterways, harm the environment and wildlife, and can damage your boat's engine and prop. They can be small and hard to spot so are easily spread on damp equipment and clothing.

Protect the environment and sport you enjoy by keeping your kit free of invasive plants and animals.



Remember to check these places



CHECK

Check boats, equipment and clothing after leaving the water for mud, aquatic animals or plant material. Remove anything you find and leave it at the site. Reapply anti-fouling annually.

CLEAN

Clean everything thoroughly as soon as you can paying attention to ropes, bilges, trailers and areas that are damp and hard to access. Use hot water if you can.

DRY

Dry - drain water from every part of your boat and trailer before leaving the site. Dry everything for as long as possible before using elsewhere as some invasive plants and animals can survive for two weeks in damp conditions.

Watch out for



For more information, contact your local authority or visit nonnativespecies.org/checkcleandry





Identification guide for selected marine non-native species

The 38 species in this guide are non-native seaweeds and marine animals that may be found:

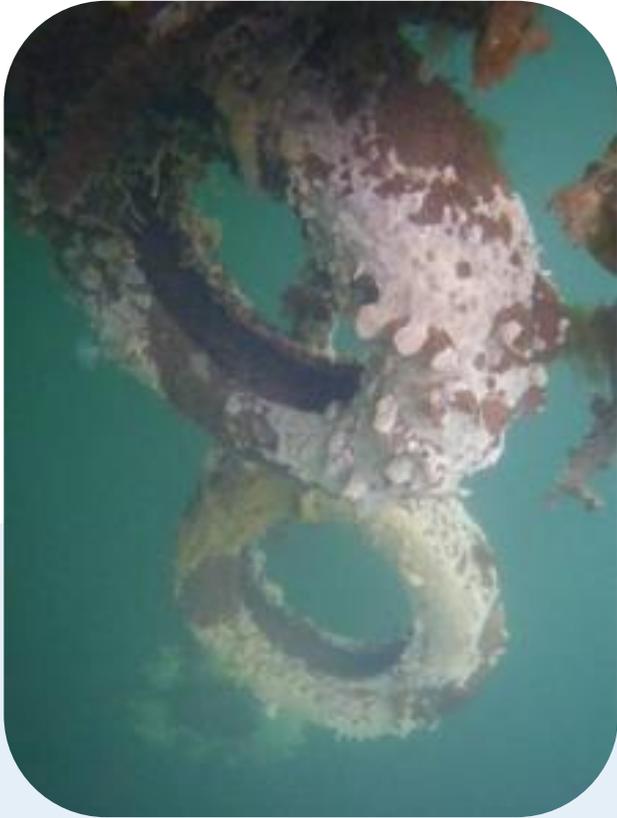
- in ports and marinas
- on boat hulls
- on fishing gear or aquaculture equipment
- on natural shores

The guide is aimed at marina and aquaculture operators, inshore fishers, recreational boat owners, watersports enthusiasts and all those who have an interest in maintaining healthy and productive seas.



Simple 'good practice' biosecurity measures

e.g. remove unused equipment from water



Carpet sea squirt Didemnum vexillum on unused tyre fenders.

© Fiona Manson, SNH



Invasive species on unused mooring buoy

© <http://www.biofoulingolutions.com.au/about2-c1eea?lightbox=c1980>

Simple 'good practice' biosecurity measures

e.g. dry as much as you can



© Kindel Media

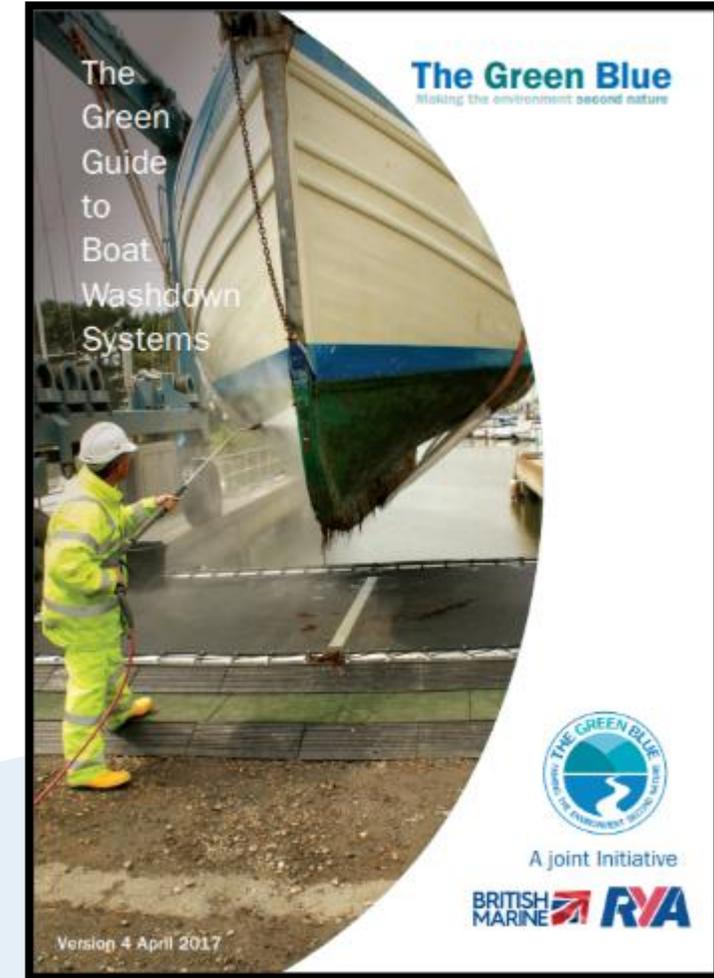
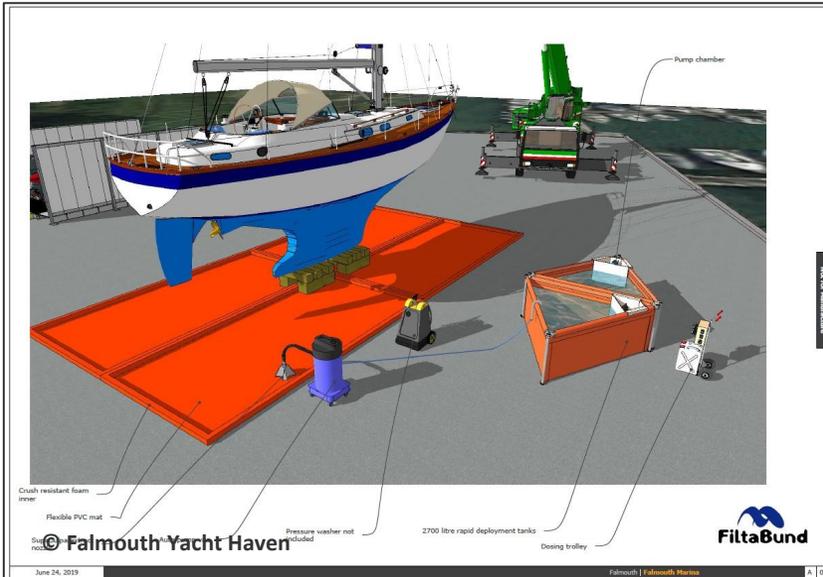


Species ID and Monitoring

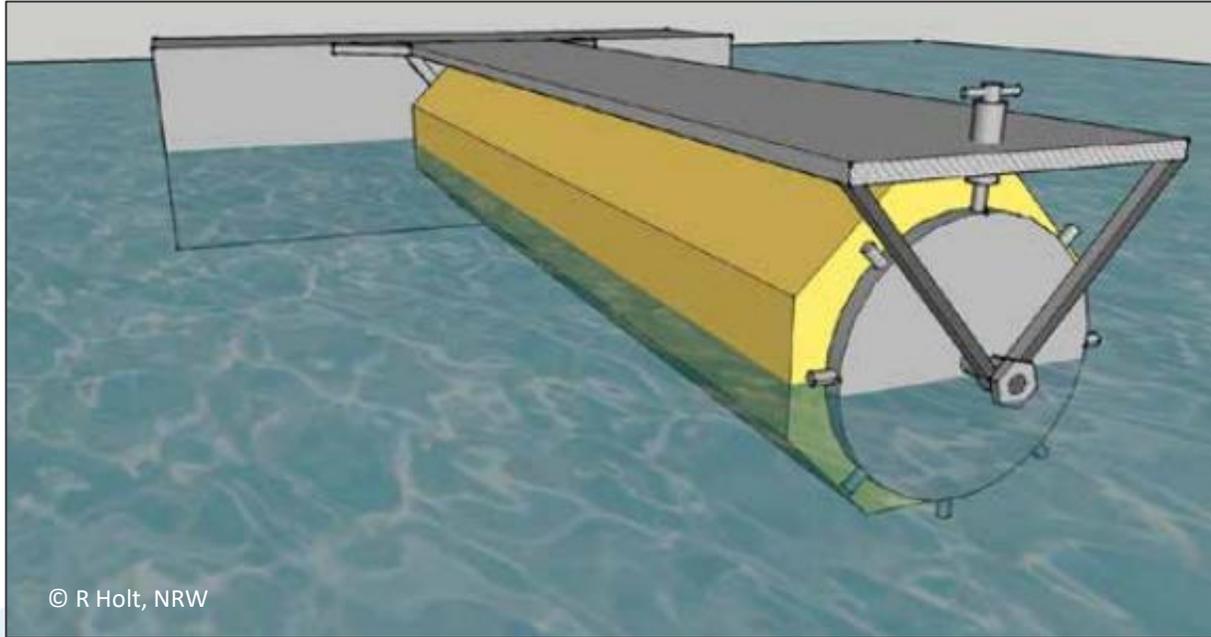
- Species data – what have you got on site?
- Baseline surveys and continual monitoring
- Settlement panels, passive monitoring
- Integrate into routine inspections of infrastructure / vessels
- Train staff to ID species of concern and alert species



Washdown facilities



New and developing technologies



Examples of pathway-based approaches to biosecurity

Recreational Boating

GB Non-Native Species Pathway Action Plan: Recreational Boating

BIOSECURITY ACTIONS

GBNNS Pathway Action Plan: Recreational Boating

- Promoting Code of Conduct
- Biosecurity clauses in by-laws
- Raise awareness
- Ban entry to heavily-fouled boats
- Provide hull cleaning areas

Recreational Angling

Drafted and supported by (among others):

GBNNS Pathway Action Plan: Recreational Angling

- CCD campaigns at high risk routes of entry
- Fishery managers to reference biosecurity in agreements
- Promote Code of Conduct



Biosecurity Plans

Minimum requirements:

- an **introduction** setting out purpose aims and objectives
- a section identifying the **risks** that the biosecurity plan will cover
- the **measures** by which the risks will be addressed
- how the plan will be **implemented**
- a **review** process

Concise and instructive!

Useful and useable!

Biosecurity Plans

Fal and Helford SAC Biosecurity Plan: Recreational Boating

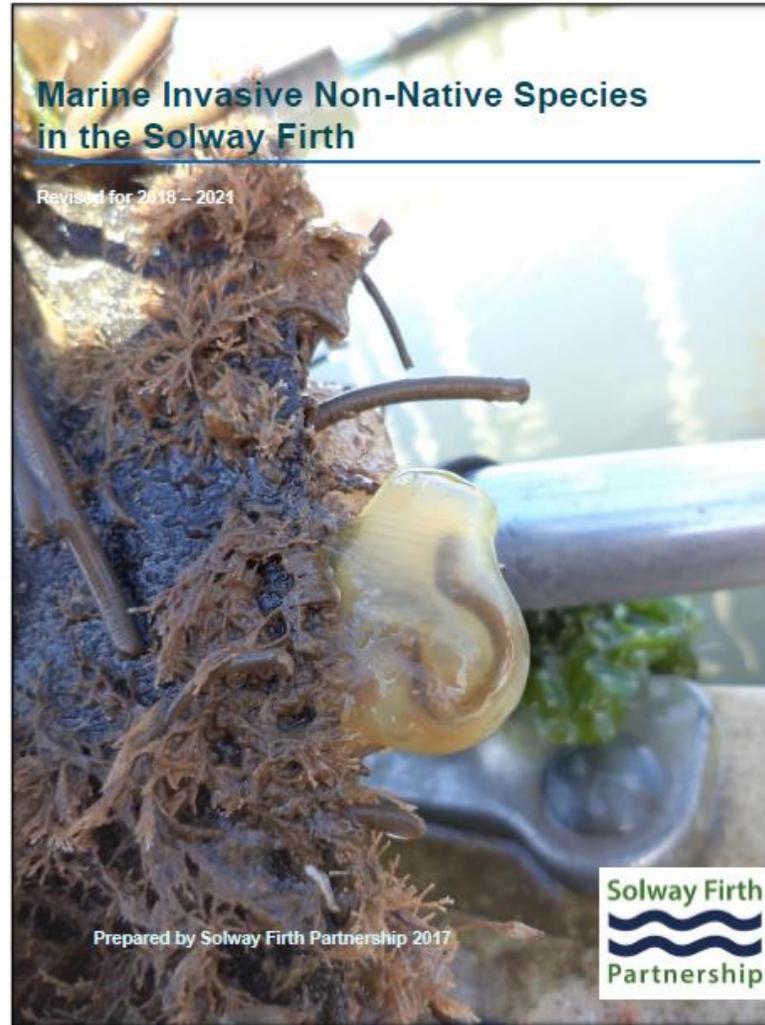


September 2022



Marine Invasive Non-Native Species in the Solway Firth

Revised for 2018 – 2021



Prepared by Solway Firth Partnership 2017



MARINE BIOSECURITY PLAN

Tamar Estuaries

2018 - 2020



Christine A. Wood, Anna L.E. Yunnice, Tom Vance, Sarah Brown

April 2018



PML Applications Ltd



Solent Forum Biosecurity Workshop

*Developing an understanding of biosecurity measures
to protect The Eastern Harbours from marine invasive
species*

Breakout session

apemltd.com



Breakout discussion session

Aim

To collate and share information regarding relevant and feasible options for managing marine invasive species in order to inform practical biosecurity planning for the Eastern Harbours

- Relevant pathways?
- Species of concern?
- What are practical biosecurity actions that can be taken?
- What support do you need to implement biosecurity actions?
- What should be the next steps in agreeing a biosecurity plan?

Next Steps

- Please scan QR code to access a short survey about today
- Workshop reports to be prepared by Solent Forum
- Solent Forum to begin drafting each plan and sector resources
- Invites to on-line workshops to be sent in April
- Second set of on-line workshops in June to deliver workshop findings and resources prepared

Feedback Form for Biosecurity Workshops



Thank you

Any questions?

