Monitoring of Marine INNS using Submerged Settlement Panels

Maryport Marina - May to September 2021

Solway Firth Partnership October 2021

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Solway Firth Partnership

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1. Introduction

The GB non-native species secretariat (2015a) defines an invasive non-native species (INNS) as “any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live.” Globally, 84% of marine ecoregions have reported marine invasion (Molnar *et al*., 2008). In the UK marine environment INNS have the potential to pose a significant threat to native marine biodiversity and commercial interests. DEFRA (Department for Environment, Food and Rural Affairs) is the overarching coordinator for INNS in England with the GB NNSS (GB Non-Native Species Secretariat) being the organisation for reporting INNS.

Known impacts of INNS on native biodiversity are the spread of disease, competition for habitat and food and direct predation (GB NNSS, 2015b). Direct impacts include where biological indices display lower scores where INNS are present. Indirect impacts include where INNS densities are so high that a reduction in abundance of other taxa is observed (SEPA, 2013). The major pathways by which marine INNS are introduced include shipping, recreational boating, aquaculture stock movements and natural dispersal (GB NNSS, 2015c). Once INNS have established in a marine ecoregion, they are very difficult or even impossible to eradicate as many filter-feeding marine invertebrate animals live attached to solid surfaces and, along with algae, may be spread along coastlines marina-to-marina as fouling growth on the hulls of leisure craft. For this reason, early detection and monitoring of marine INNS is crucial.

2. Method

Two settlement panels (Photo 1) were attached to pontoons within Maryport Marina on 10 May 2021 by SFP staff in locations highlighted in Figure 1. The panels were attached to the underside of the pontoons and submerged to around one metre depth using strong paracord and weighed down with 6 oz fishing weights (Photo 2).

Photo 1 - Complex Correx panel structure

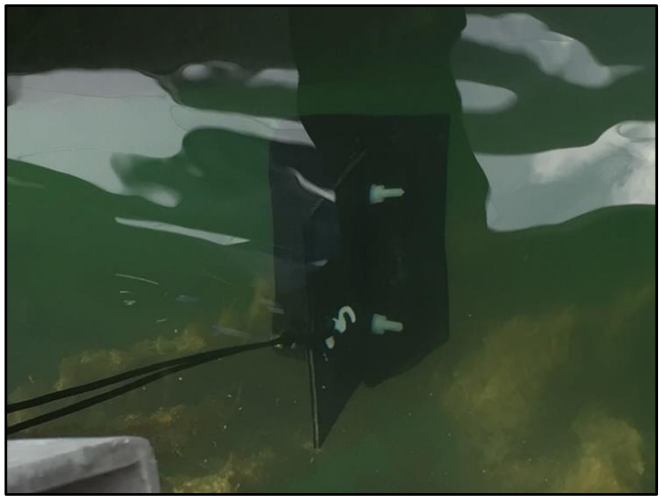

Photo 2 - Submerged complex Correx panel

Maryport was chosen as a relatively large and active but protected marina.

Figure 1 - Maryport Marina. Location of panels 1 & 2

At the end of the summer (4 October 2021), the panels at Maryport were collected, photographed (Photos 4, 5), scored for percentage cover of surface species and then appropriately discarded. Mobile organisms, including barnacle cyprids and crabs were counted individually if numbers were low.

Photos 4 /5 – Panels with growth of sea squirts

3. Results

Due to the covid pandemic the settlement panels were not installed over summer 2020 and so it was not possible to make a comparison to growth in the previous year. The species diversity was similar to that recorded in the 2019 survey but with higher levels of coverage of some species such as the sea squirt, *Ascidiella aspersa*.

The marina was more sheltered than Scottish marinas on the north side of the Solway and had a much higher volume of mud and silt on the panels and lower amounts of growth although the species assemblage was similar.

Species noted from the panels included Darwin's barnacles, *Elminius modestus,* and another unidentified species of barnacle (Photo 6); tubeworm, *Spirobranchus triqueter* (Photo 7); common shore crab, *Carcinus maenas* (Photo 8); the red seaweed, *Ceramium virgatum* (Photo 9); and different coloured star ascidians, *Botryllus shlosseri* (Photos 10 and 11).

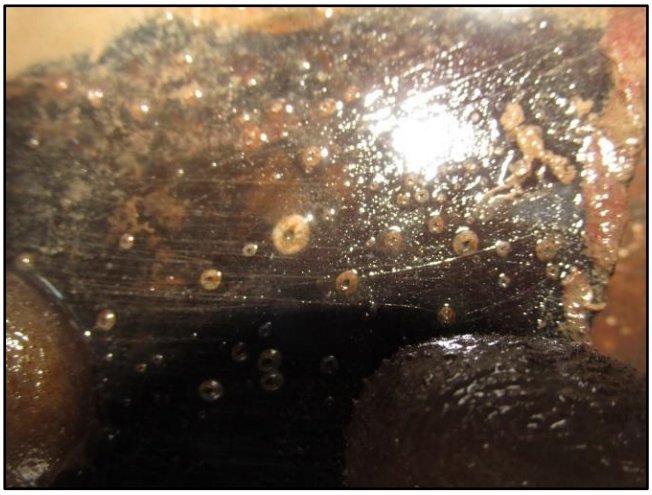

Photo 6 – Barnacles

Photo 7 - Tubeworm

Photo 8 – Common shore crab

Photo 9 – Red seaweed

Photo 10 – Star ascidian

Photo 11 – Star ascidian

4. Conclusion

Although there were no marine INNS of concern found at Maryport and the marina looked very clean and well maintained, it is intended to continue deploying panels there in 2022 to maintain monitoring.

Continued awareness of INNS gained from the use of the panels and the rapid site assessments will allow for improved biosecurity control of invasives species. It is recommended the use of the current 3D scratched surface panel design is continued, as this seems to encourage a representative level of growth.

It is suggested that panels should also aim to be removed prior to any major storms, as even though this may result in a reduced soak time, it could prevent the loss of panels to the environment.

5. References

Finlay, J.A., Callow, M.E., Schultz, M.P., Swain, G.W. and Callow, J.A., (2002). Adhesion strength of settled spores of the green alga *Enteromorpha.*

Molnar JL, Gamboa RL, Revenga C & Spalding MD (2008). Assessing the global threat of invasive species to marine biodiversity. *Frontiers in Ecology and the Environment*, 6. 485-492.

GB NNSS (2015a). *Definition of Terms*. Online at http://www.nonnativespecies.org/index.cfm?pageid=64 [accessed 01.10.18].

GB NNSS (2015b). *Check, Clean, Dry*. Online at http://www.nonnativespecies.org/checkcleandry/index.cfm [accessed 18/03/15].

GB NNSS (2015c). *Monitoring for NNS*. Online at http://www.nonnativespecies.org/index.cfm?pageid=477 [accessed 01.10.18].

SEPA (2013). Natural Scotland Managing Invasive Non-Native Species in Scotland's Water Environment. A supplementary Plan to the River Basin Management Plans. SEPA on behalf of the Scottish Government. December 2013. Available at: https://www.sepa.org.uk/media/37362/managing-invasive-non-native-species_plan.pdf [accessed 01.10.18].

Solway Firth Partnership (2012). Marine Invasive Non-Native Species in the Solway. A report prepared by the Solway Firth Partnership. Available at: http://www.solwayfirthpartnership.co.uk/uploads/Marine%20Invasive%20Non-native%20Species/Marine%20INNS%20in%20Solway%202013.pdf [accessed 01.10.18].

Solway Firth Partnership (2015). Marine Invasive Non-Native Species in the Solway, Revised for 2015-18.

A report prepared by the Solway Firth Partnership. Available at: http://www.solwayfirthpartnership.co.uk/uploads/Marine%20Invasive%20Non-native%20Species/Marine%20INNS%20in%20Solway%202013.pdf [accessed 01.10.18].

Appendix 1: Maryport settlement panel results

MARYPORT MARINA

Panel No	Grid Ref	Species - Common Name	Species - Latin Name	Abundance	Invasive sp	Abbrev	Scale	%
1	NY0304736597	Green seaweed	*Cladophora rupestris*	R	N	S	Super Abundant	80 - 100
	NY0304736597	Darwins Barnacle	*Elminius modestus*	F	Y	A	Abundant	40 - 80
	NY0304736597	Tube worm	*Spirobranchus triqueter*	R	Y	C	Common	20 - 40
	NY0304736597	Common Shore Crab	*Carcinus maenas*	R	N	F	Frequent	10 - 20
	NY0304736597	Sea squirt	*Ascidiella aspersa*	C	N	O	Occasional	5 - 10
	NY0304736597	Barnacle sp	*Unsure of species*	R	N	R	Rare	<5%
2	NY0298936515	Green seaweed	*Cladophora rupestris*	A	N			
	NY0298936515	Darwins Barnacle	*Elminius modestus*	R	Y			
	NY0298936515	Tube worm	*Spirobranchus triqueter*	R	Y			
	NY0298936515	Common Shore Crab	*Carcinus maenas*	R	N			
	NY0298936515	Sea squirt	*Ascidiella aspersa*	A	N			
	NY0298936515	Barnacle sp	*Unsure of species*	R	N			
	NY0298936515	Star ascidian	*Botryllus shlosseri*	R	N			
	NY0298936515	Red seaweed	*Ceramium virgatum*	F	N			
	NY0298936515	Shrimp sp	*Gammarus sp*	R	N			