Monitoring of Marine INNS Using Submerged Settlement Panels

Stranraer Marina and Portpatrick Harbour

May to September 2018

Solway Firth Partnership September 2018

Stranraer Marina

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. Scottish Natural Heritage is the overarching coordinator for NNS in Scotland and lead for terrestrial habitats and wetlands, whilst Marine Scotland lead for marine habitats.

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 introduction is crucial.

2. Method

Six settlement panels (Photo 1), were attached to pontoons within Stranraer Marina on 21st May 2018 (Figure 1). A further two panels, at seperate locations were attached to the RNLI pontoon at Portpatrick Harbour (Figure 2) on the same day.

Photo 1– Complex Correx panel structure

Photo 2 - Attaching panels

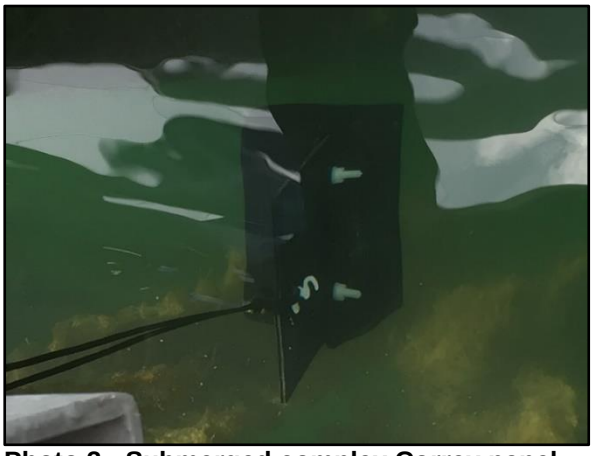

Photo 3 - Submerged complex Correx panel

The panels were attached to the underside of the pontoons (Photos 2) and submerged to around one metre depth using strong paracord and weighed down with 6 oz fishing weights (Photo 3).

Stranraer was chosen as a repeat site for monitoring due to the ease of installing the panels and because the site is active with both recreational and fishing boats using the port. Portpatrick was also chosen as an active harbour used by mostly small recreation, tourism and fishing boats.

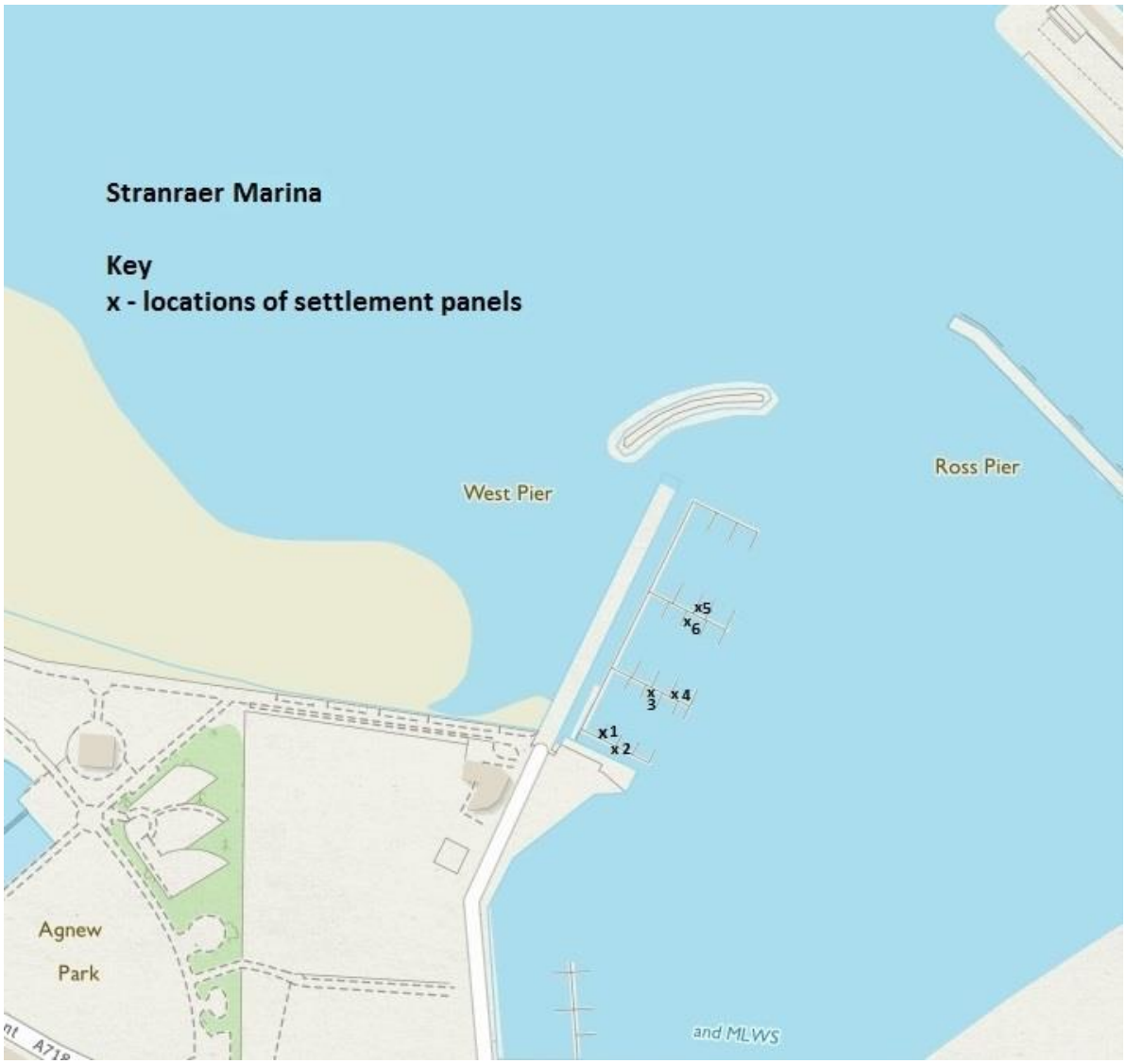

Figure 1 - Stranraer Marina, Location of Settlement Panels, 1 – 6

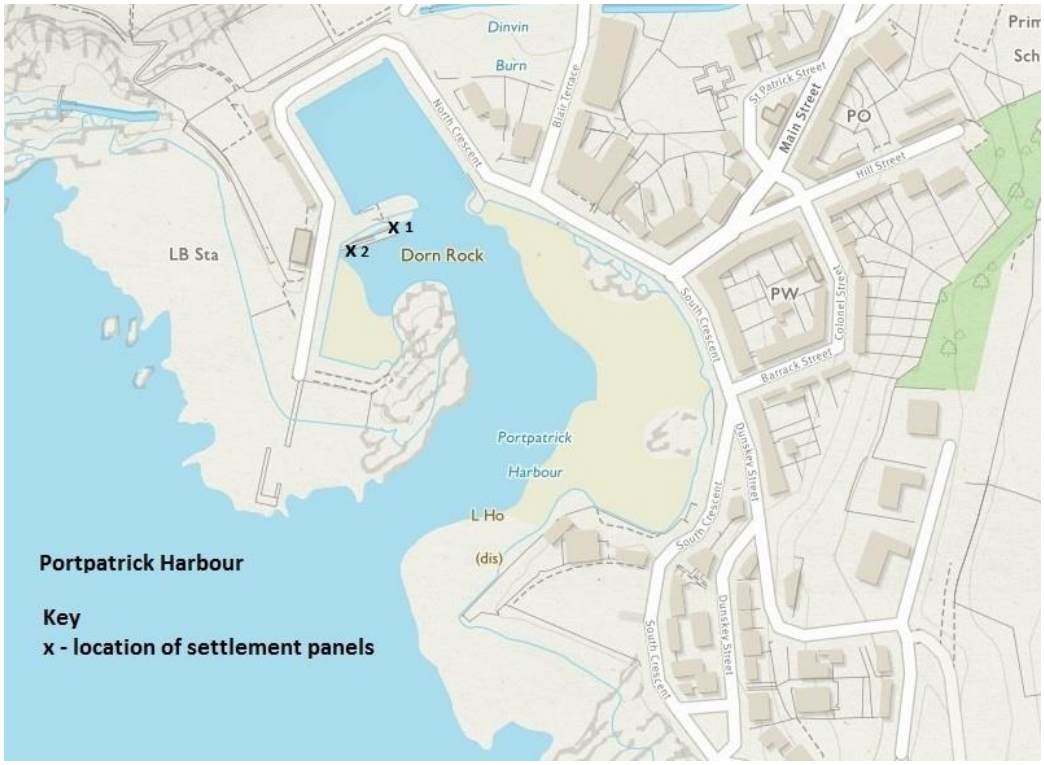

Figure 2 - Portpatrick Harbour, Location of Settlement Panels, 1 – 2

After seventeen weeks, at the end of summer (20 September 2018) the panels at Stranraer and Portpatrick were collected, photographed (Photos 4 and 5), scored for percentage cover of surface species and then discarded. Mobile organisms, including barnacle cyprids and crabs were counted individually. Each side of each panel was assessed individually for species present and percentage cover.

Photo 4 – Panel with growth

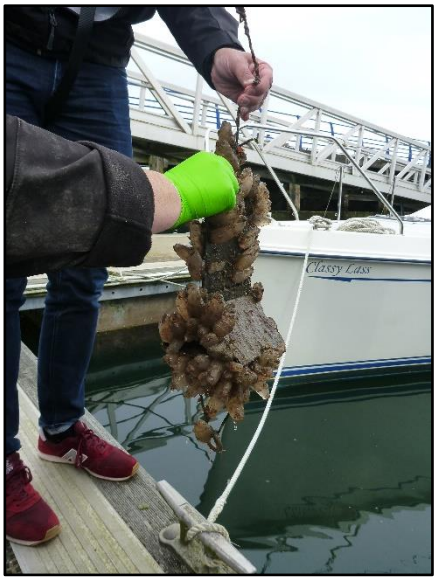

Photo 5 – Panel at Stranraer Marina

In addition, other species present on buoys and on the underside of the pontoon were recorded (Photos 6 and 7).

Photo 6 – Underside of a buoy

Photo 7 – Rope pulled up to inspect

3. Results

Three of the six panels installed at Stranraer were successfully recovered. Only one of the two panels installed in Portpatrick marina were recovered. The panels were recovered from both sites the day after Storm Ali hit Dumfries and Galloway, so it is possible panels were lost during this event, if not before. Several fishing weights had been lost from the panels that had been recovered across both sites.

A Rapid Assessment Survey (RAS) was also conducted at Stranraer, looking at the pontoons, buoys and vessels present. The invasive Japanese skeleton shrimp, *Caprella mutica* was recorded during the RAS. An assessment was not conducted at Portpatrick, as the floating pontoon where the panels were anchored was relatively small with no buoys available for inspection. A large mooring rope was lifted partway from the water but no invasive species were immediately visible (Photo 7).

Species diversity was similar to that recorded in the 2017 survey, which was the first time the complex 3D panels were used. The community was again representative of a west coast harbour environment, with many individuals at a mature stage of development. Both Stranraer and Portpatrick had similar levels of settlement, growth and species assemblage, though there was only one panel to observe at the latter.

The native tunicate, *Ascidiella aspersa as* well as the green algae, *Cladophora rupestris,* appeared to dominate the assemblage of most recovered panels. The peacock worm, *Sabella pavonina,* was less prevalent than in the previous year.

The native tunicates ranged in size from 1 cm to >10 cm across all recovered panels. Other commonly observed species included: the encrusting worm, *Pomatoceros triqueter*, blue mussel, *Mytilus edulis,* green shore crab *Carcinus maenas,* star ascidian*, Botryllus shloesseri,* ragwown*, Nereis virens,* sea lettuce*, Ulva lactuca,* barnacles*,* and the sponge *Sycon silicium.*

Stranraer panels also hosted species that although known to be present, had not been found in previous monitoring surveys. These species included: the saddle oyster, *Anomia ephippium* (Photo 8) the cockle, *Cerastoderma edule* and the long-clawed porcelain crab, *Pisidia longicornis* (Photo 9).

The only marine invasive species identified at both Stranraer and Portpatrick on the settlement panels was the orange-tipped sea squirt, *Corella eumyota.* However, it was unknown whether any of the barnacles found were the invasive Darwin's barnacle, *Elminius modestus* as the individuals were too small to identify.

In Stranraer, the Japanese skeleton shrimp, *Caprella mutica,* (Photo 10) which was recorded in multiple locations and also observed growing on the undersides of several buoys attached to recreational boats (Photo 11). The Harbour Master was notified of this.

Photo 6 - Saddle oyster

Photo 7 - Long clawed porcelain crab

Photo 8 - Japanese skeleton shrimp (centre)

Photo 9 - Buoy with skeleton shrimp

4. Conclusion

Both the invasive Japanese skeleton shrimp, *Caprella mutica*, and the orange-tipped sea squirt, *Corella eumyota* were found in the current study, as had been recorded in previous years.

The current study suggests re-visiting both marinas again in the growing season of 2019 to see if species assemblage or if the spread of INNS has changed. Both sites would also benefit from another rapid site assessment, to allow for a more thorough INNS assessment, beyond the area in which the panels had been deployed.

Continued awareness of INNS gained from the use of the panels and the rapid site assessments will allow for improved biosecurity control of invasives at the two locations. 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 different fishing weights are used, perhaps the ring-shaped fishing weights ‘sinkers’ to allow for more secure attachment to the panel. 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

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Appendix 1: Stranraer and Portpatrick settlement panel results

STRANRAER MARINA

Panel No	Grid Ref	Species - Common Name	Species - Latin Name	Abundance	Invasive sp	Comments
	NX0587861181	Sea squirt	Ascidiella aspersa	A	N	
	NX0587861181	Sponge	Sycon ciliatum	O	N	
	NX0587861181	Peacock worm	Sabella pavonina	R	N	
1	NX0587861181	Green shore crab	Carcinus maenas		1 N	
	NX0587861181	Tube worm	Pomatoceros triqueter		20 N	
	NX0587861181	Star ascidian	Botryllus shlosseri		1 N	
	NX0587861181	Bryozoan	Conopeum reticulum		1 N	
	NX0587861181	Green seaweed	Cladophora rupestris	A	N	
	NX0587861181	Ragworm	Nereis virens		1 N	
	NX0588561176	Orange tipped sea squirt	Corella eumyota		6 Y	
	NX0588561176	Long-clawed porcelain crab	Pisidia longicornis		3 N	
	NX0588561176	Sea squirt	Ascidiella aspersa	C	N	
	NX0588561176	Green seaweed	Cladophora rupestris	A	N	
2	NX0588561176	Tube worm	Pomatoceros triqueter		20 N	
	NX0588561176	Saddle oyster	Anomia ephippium		10 N	
	NX0588561176	Barnacle	Unclear		1 N	
	NX0588561176	Ragworm	Nereis virens		2 N	
	NX0588561176	Star ascidian	Botryllus shlosseri		1 N	
3	NX0590260201		PANEL LOST			
4	NX0591261198		PANEL LOST			
5	NX0592261234		PANEL LOST			
	NX0591961232	Japanese skeleton shrimp	Caprella mutica		3 Y	
	NX0591961232	Orange tipped sea squirt	Corella eumyota		6 Y	
	NX0591961232	Sea squirt	Ascidiella aspersa	A	N	
	NX0591961232	Green seaweed	Cladophora rupestris	C	N	
	NX0591961232	Tube worm	Pomatoceros triqueter		10 N	
	NX0591961232	Sponge	Sycon ciliatum	R	N	
6	NX0591961232	Sea lettuce	Ulva lactuca	R	N	
	NX0591961232	Cockle	Cerastoderma edule		1 N	
	NX0591961233	Green shore crab	Carcinus maenas		1 N	
	NX0591961234	Blue mussel	Mytilus edulis		1 N	
	NX0591961235	Star ascidian	Botryllus shlosseri		2 N	
	NX0591961236	Barnacle	Unclear		5 N	
	NX0591961237	Sponge	Sycon cilatum		10 N	

Panels retrieved from both sites after Storm Ali

Abbrev	Scale	%
S	Super Abudant	80 - 100
A	Abundant	40 - 80
C	Common	20 - 40
F	Frequent	10 - 20
O	Occasional	5 - 10
R	Rare	<5%

PORTPATRICK MARINA

Panel No	Grid Ref	Species - Common Name	Species - Latin Name	Abundance	Invasive sp	Comments
	NW9981354146	Orange tipped sea squirt	Corella eumyota		6 Y	
1	NW9981354146	Green shore crab	Carcinus maenas		2 N	
	NW9981354146	Sea squirt	Ascidiella aspersa	A	N	
	NW9981354146	Tube worm	Pomatoceros triqueter		2 N	
2	NW9979154137		PANEL LOST			