

Monitoring of Marine INNS using Submerged Settlement Panels

Whitehaven Marina - May to September 2021

Solway Firth Partnership October 2021



Whitehaven 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. 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 to.

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

Four settlement panels (Photo 1) were attached to pontoons within Whitehaven Marina on 10 May 2021 by SFP staff, location shown at 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).

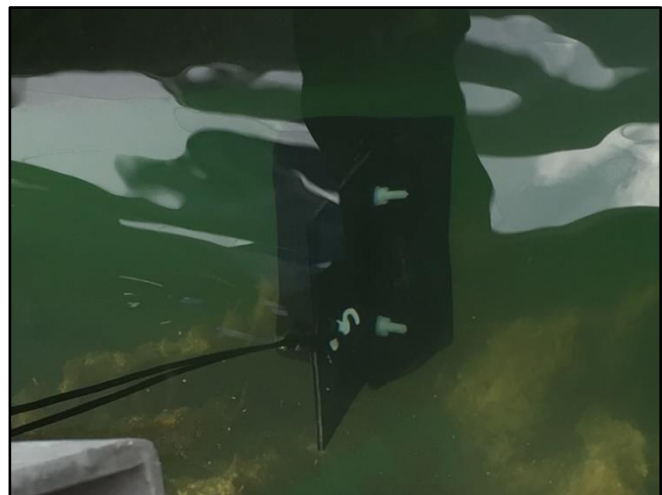


Photo 1 - Complex Correx panel structure Photo 2 - Submerged complex Correx panel

Whitehaven was chosen as a relatively large and active but protected marina. This was the first time that SFP had monitored the marina although Cumbria Wildlife Trust (CWT) carried out monitoring using settlement panels in 2015 as part of a national monitoring project.

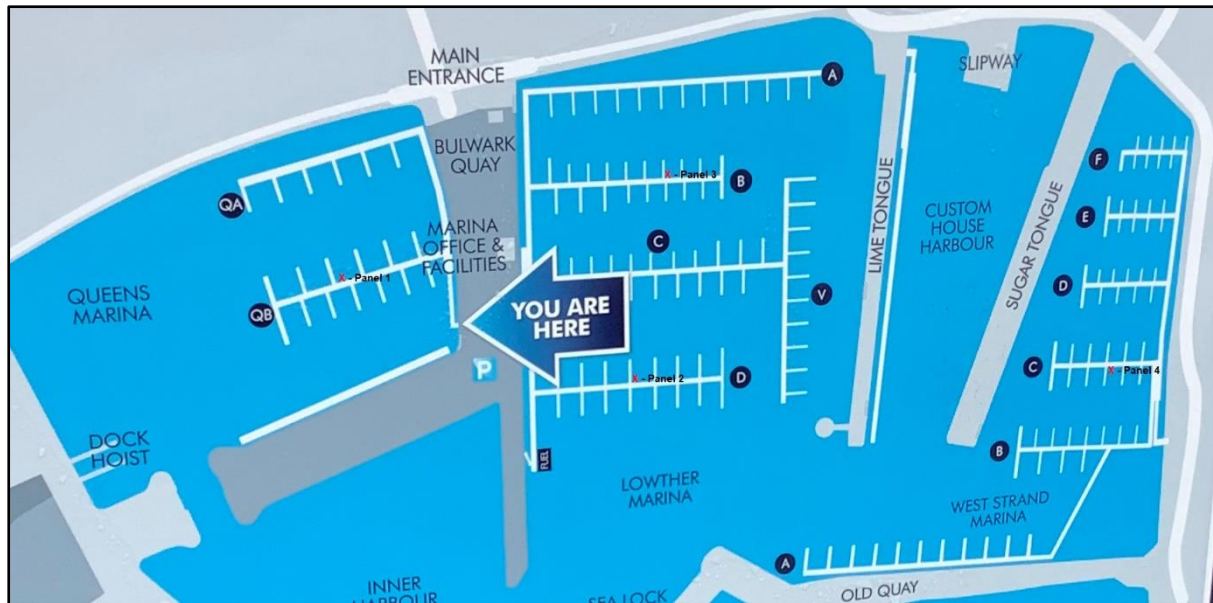


Figure 1: Whitehaven Marina. Location of panels

At the end of the summer (4 October 2021), the panels at Whitehaven were collected, photographed (Photos 3, 4), 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. Staff from CWT joined SFP staff and helped with the identification of species and scoring.



Photo 3 – Collecting panels



Photo 4 – Identifying species

3. Results

All four panels installed at Whitehaven were successfully recovered and assessed.

This was the first year that SFP had monitored Whitehaven marina but the survey from 2015 by CWT was consulted for comparison.

The most commonly occurring species across all panel locations was the trumpet tubeworm, *Fipimactus enigmaticus* (Photo 5) which had been found to be a dominant species in the CWT 2015 survey. Also occurring on all panels was the sea squirt *Ascidiella aspersa* (Photo 6). Other species noted included the red seaweed, *Ceramium virgatum* (Photo 7); the green algae, *Cladophora rupestris* (Photo 8); star ascidian, *Botryllus shlosseri* and Darwin's barnacles, *Elminius Modestus* (both on Photo 9). A second species of barnacle was also found on the interior of several panels but it was not possible to positively identify it (Photo 10) The bryozoan, *Conopeum reticulum* was also noted (Photo 11).

The common shore crab, *Carcinus maenas* (Photo 12) was present in the marina along with numerous small mussels (possibly blue mussels) shown in the hand (Photo 13).

Local evidence suggests that the trumpet tube worm, *Fipimactus enigmaticus* (Photos 14 and 15) is common across the marina and is an issue to boat owners who must pay to have it scraped off the bottom of their boats. Another species found commonly on marina structures was Darwin's barnacle, *Elminius Modestus* (Photo 16) which was also noted in the CWT 2015 survey. However, it doesn't appear to have become a species of concern on site.

A full species list is found at Appendix 1.



Photo 5 – Trumpet tubeworm



Photo 6 – Sea squirts



Photo 7 – Red seaweed



Photo 8 – Green algae



Photo 9 – Star ascidian / barnacles



Photo 10 – Unidentified barnacle



Photo 11 - Bryozoan



Photo 12 – Crab



Photo 13 - Small mussels



Photo 14 – Trumpet tubeworm dominates



Photo 15 – Trumpet tubeworm



Photo 16 - Darwin barnacles on structures

4. Conclusion

The most commonly occurring species across all panel locations was the trumpet tubeworm, *Fipimactus enigmaticus*. Local evidence suggests that this species is common across the marina and is an issue to boat owners who must pay to have it scraped off the bottom of their boats. Darwin's barnacle, *Elminius Modestus* was also present on site but does not appear to be causing problems on site.

Continued awareness of INNS gained from the use of the panels and including future 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

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Appendix 1: Whitehaven settlement panel results

WHITEHAVEN MARINA								
Panel No	Grid Ref	Species - Common Name	Species - Latin Name	Abundance	Invasive sp	Abbrev	Scale	%
1	NX9727718436	Green seaweed	<i>Cladophora rupestris</i>	A	N	S	Super Abundant	80 - 100
	NX9727718436	Darwins Barnacle	<i>Elminius modestus</i>	F	Y	A	Abundant	40 - 80
	NX9727718436	Trumpet Tube worm	<i>Fipimactus enigmaticus</i>	C	Y	C	Common	20 - 40
	NX9727718436	Bryozoan	<i>Conopeum reticulum</i>	C	N	F	Frequent	10 - 20
	NX9727718436	Sea squirt	<i>Ascidella aspersa</i>	C	N	O	Occasional	5 - 10
	NX9727718436	Barnacle sp	<i>Unsure of species</i>	R	N	R	Rare	<5%
	NX9727718436	Mussel sp	<i>Unsure of species</i>	R	N			
	NX9727718436	Shrimp	<i>Gammarus sp</i>	R	N			
2	NX9716018400	Green seaweed	<i>Cladophora rupestris</i>	C	N			
	NX9716018400	Darwins Barnacle	<i>Elminius modestus</i>	A	Y			
	NX9716018400	Trumpet Tube worm	<i>Fipimactus enigmaticus</i>	C	Y			
	NX9716018400	Common Shore Crab	<i>Carcinus maenas</i>	R	N			
	NX9716018400	Sea squirt	<i>Ascidella aspersa</i>	F	N			
	NX9716018400	Barnacle sp	<i>Unsure of species</i>	R	N			
	NX9716018400	Star ascidian	<i>Botryllus shlosseri</i>	C	N			
	NX9716018400	Red seaweed	<i>Ceramium virgatum</i>	O	N			
	NX9716018400	Shrimp sp	<i>Gammarus sp</i>	R	N			
	NX9716018400	Broad-clawed porcelain crab	<i>Porcellana platycheles</i>	R	N			
	NX9716018400	Mussel sp	<i>Unsure of species</i>	O	N			
	NX9716018400	Encrusting bryozoan	<i>Conopeum reticulum</i>	A	N			

3	NX9720018328	Green seaweed	<i>Cladophora rupestris</i>	O	N
	NX9720018328	Darwins Barnacle	<i>Elminius modestus</i>	A	Y
	NX9720018328	Trumpet Tube worm	<i>Fipimactus enigmaticus</i>	F	Y
	NX9720018328	Common Shore Crab	<i>Carcinus maenas</i>	R	N
	NX9720018328	Sea squirt	<i>Ascidella aspersa</i>	C	N
	NX9720018328	Barnacle sp	<i>Unsure of species</i>	R	N
	NX9720018328	Star ascidian	<i>Botryllus shlosseri</i>	R	N
	NX9720018328	Red seaweed	<i>Ceramium virgatum</i>	F	N
	NX9720018328	Shrimp sp	<i>Gammarus sp</i>	R	N
	NX9720018328	Encrusting bryozoan	<i>Conopeum reticulum</i>	C	N
	NX9720018328	Mussel sp	<i>Unsure of species</i>	O	N
4	NX9698118259	Green seaweed	<i>Cladophora rupestris</i>	O	N
	NX9698118259	Darwins Barnacle	<i>Elminius modestus</i>	O	Y
	NX9698118259	Trumpet Tube worm	<i>Fipimactus enigmaticus</i>	F	Y
	NX9698118259	Common Shore Crab	<i>Carcinus maenas</i>	R	N
	NX9698118259	Sea squirt	<i>Ascidella aspersa</i>	C	N
	NX9698118259	Barnacle sp	<i>Unsure of species</i>	R	N
	NX9698118259	Star ascidian	<i>Botryllus shlosseri</i>	R	N
	NX9698118259	Red seaweed	<i>Ceramium virgatum</i>	F	N
	NX9698118259	Shrimp sp	<i>Gammarus sp</i>	O	N
	NX9698118259	Mussel sp	<i>Unsure of species</i>	O	N
	NX9698118259	Encrusting bryozoan	<i>Conopeum reticulum</i>	A	N