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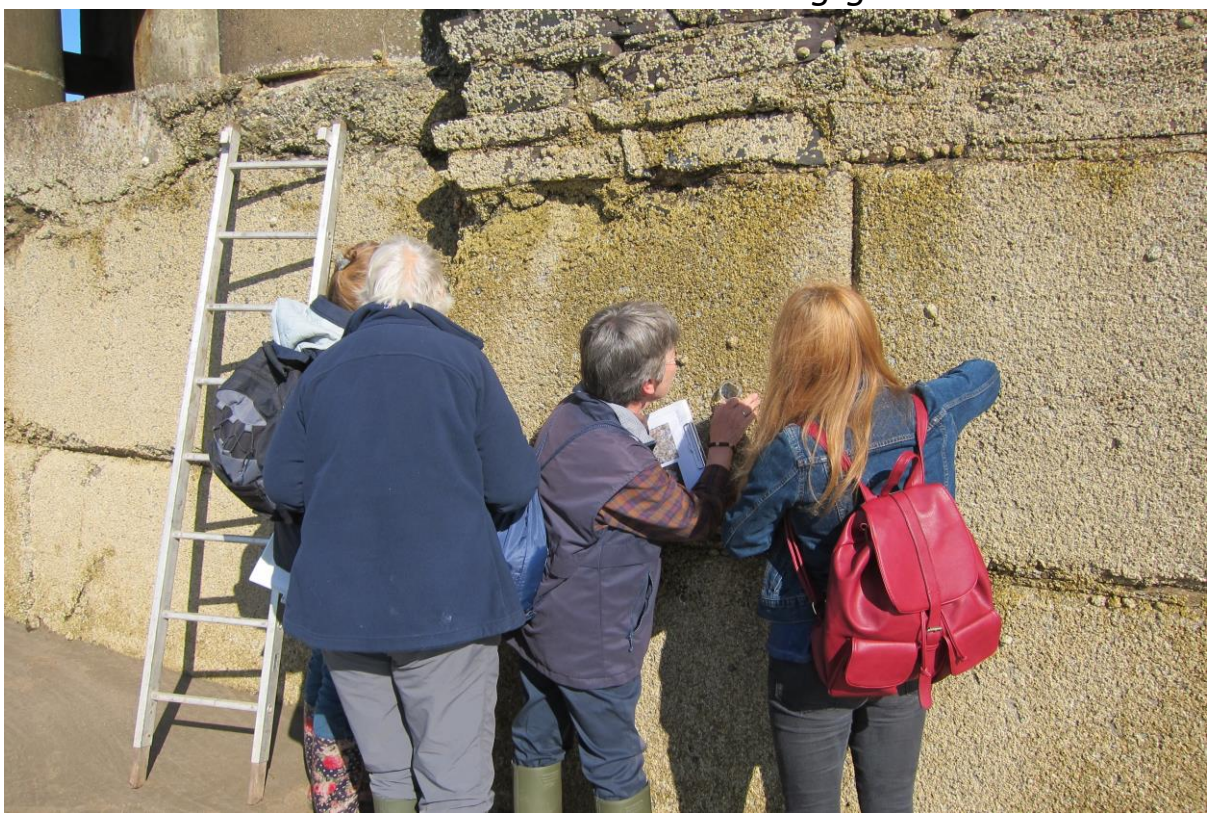
Manx Wildlife Trust
Treisht Bea-Feie Vannin

Ramsey Harbour
Invasive Species Survey 2017

Semi-quantitative estimate of abundance of Austrominius modestus and Crassostrea gigas



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Introduction

The survey was conducted on 10th September 2016 at 11:00am to coincide with low water at 12:00pm. Two volunteers and two members of MWT Staff helped conduct the survey. Due to the limited number of volunteers only the south side of the south wall was surveyed, as in the previous year.

Methods

All methods followed the previous year's survey methodologies (See Appendix).

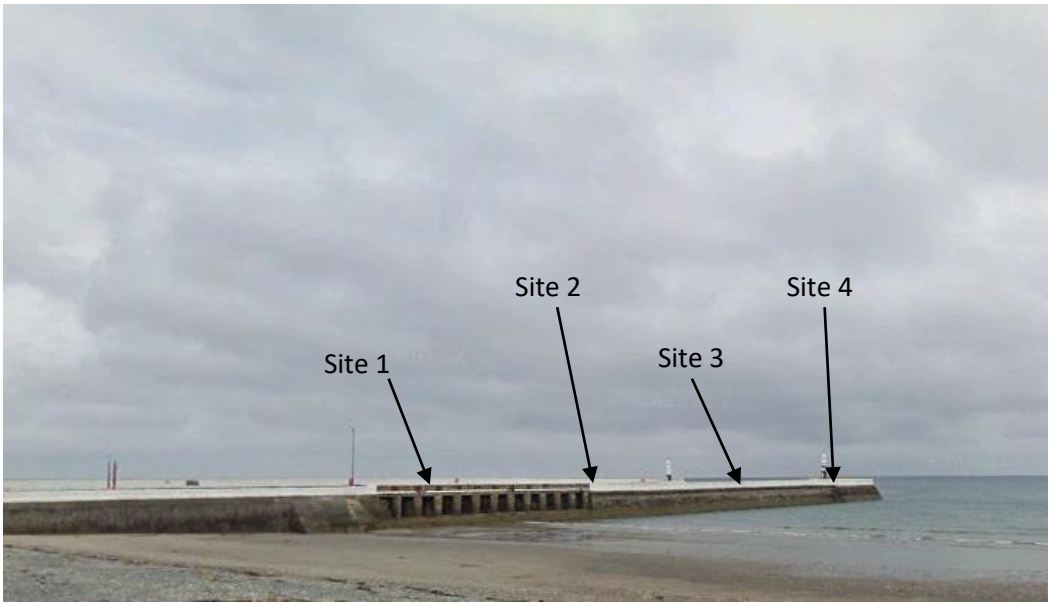

Figure 1. Positions of the four survey points along the southern wall.

Site 1: The top of the pier, at the 3rd pillar down.
Site 2: The promontory to the right of the last pillar.
Site 3: 20 rectangular blocks to the right of site 2.
Site 4: The end of the pier, immediately prior to the stepped section.

Results

2017 Results

	Site 1		Site 2			Site 3			Site 4			
Species	**VH**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	**VH**	**H**	**M**	**L**
A. Modestus	F	O	C	A	C	F	O	O	F	F	O	R
S. Balanoides	A	S	C	A	A	A	A	A	C/A	C	A	A
C. gigas	N	N	N	N	N	N	N	1/2 Shell	N	N	N	R
M. edulis	N	N	N	N	N	N	N	N	N	N	R	N

Table 1. Results of invasive species survey 2017

2016 Results

	Site 1		Site 2			Site 3			Site 4			
Species	**VH**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	**VH**	**H**	**M**	**L**
A. modestus	C	C	F	A	C	F	F	O	F	F	O	R
S. balanoides	A	S	A	S	S	C	A	A	C	A	A	A
C. gigas	N	N	N	N	N	N	N	N	N	N	N	R
M. edulis	N	N	N	R	N	N	N	O	N	N	N	R

Table 2. Results of invasive species survey 2016.

2015 Results

	Site 1		Site 2			Site 3			Site 4			
Species	**VH**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	**VH**	**H**	**M**	**L**
A. modestus	F	O/F	F	F	O	F	O	O	F	O	R	N
S. balanoides	C	A	C	A	A	C	A	A	C	A	A	A
C. gigas	N	N	N	N	N	N	N	O	N	N	N	R
M. edulis	N	N	N	R	R	N	R	R	R	N	N	R

Table 3. Results of invasive species survey 2015.

2014 Results

	Site 1		Site 2			Site 3			Site 4			
Species	**VH**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	**VH**	**H**	**M**	**L**
A. modestus	O	O	F	F	O	O	O	O	F	F	O	N
S. balanoides	F	A	C	A	A	C	A	A	C/F	A	A	C
C. gigas	N	N	N	N	N	N	N	O	N	N	N	O
M. edulis	N	R	N	R	R	N	R	O	N	R	R	O

Table 4. Results of invasive species survey 2014.

2013 Results

	Site 1		Site 2			Site 3			Site 4			
Species	**VH**	**H**	**VH**	**H**	**M**	**VH**	**H**	**M**	**VH**	**H**	**M**	**L**
A. modestus	O/F	F	O	F	O	F	C	F	F	F	O	R
S. balanoides	F	A	F	A	A	F	A	A	F	A	A	A
C. gigas	N		N			O			F			
M. edulis	N		N			O			N			

Table 5. Results of invasive species survey 2013.

Key:			S =	Superabundant
VH =	Very high		A =	Abundant
H =	High		C =	Common
M =	Mid		F =	Frequent
L =	Low		O =	Occasional
			R =	Rare
			N =	Not present

Table 6. Key to tables 1-4 (see Appendix for detailed SACFOR scale).

The number of *C. gigas* counted along the entire length of the south wall has shown a decline from 240 in 2013, to 115 in 2014, 98 in 2015 and 34 this year. Shell remnants on the wall equated to 57 and the 'holes' in the barnacle cover where the oysters are likely to have previously been attached was 13. Tallying these together brings the total to 104.

Discussion

The native *M. edulis* results have showed a similar pattern over the past few years. Their abundance has only decreased by one position on the SACFOR scale so the variation in numbers is not as dramatic and is likely a result of natural fluctuations in the population. Although it appears that the population of *M. edulis* are depleting from the results of surveys thus far, from a broad overview we can ascertain that their population is constant in the long term despite these natural fluctuations. Potential anomalies may have occurred due to differences in how the population have settled or human error may have also played a part in our survey results as well with the volunteers involved also varying every year.

Little has changed in *C. gigas* numbers recently as they have been declining for a while, with the most noticeable changes in the 2014 survey, when they decreased from 98 to 34. A possible reason for that decline in the numbers could be due to strong winds that have hit our coast in recent years. Another possible explanation could be the abundance of barnacles on the harbour walls, which makes a less stable anchoring platform for the oysters and may have led to their removal. Unlike the mussels, *C. gigas* are unable to wedge themselves into cracks in the wall and are thus more vulnerable to big waves and strong currents. This is hinted at in 2014 and 2015 with intact oysters seen on the sand at the base of the wall. The decline is most likely due to an aging population, which is slowly dying off as is made evident in the half shells found on the middle shore

in this year's survey. As stated in a previous report, *C. gigas* were first reported on Ramsey harbour in 2005 and are capable of living to an age of 30 but with the less than optimum conditions this could be reduced considerably.

The native *S. balanoides* population have remained fairly stable as of late, with them having maintained a consistently high population according to our surveys over the past few years – in particularly high abundance on the high ground. Even before, they had similar small fluctuations of high abundance in 2015, with a slight one point increase at Sites 1 and 2. These small fluctuations could be due to a multitude of natural factors, or variance in the volunteer's opinion of what is common and what is frequent. This perception of abundance will vary from person to person, which can also be said for all species assessed in this survey.

The invasive species, *A. modestus*, however shows an increase in abundance across all sites. Sites 1, 3 and 4 are only an increase of one point on the SACFOR scale, but Site 2 shows an increase of 2 points. This change could be a result of volunteer opinion as to which abundance scale to place *A. modestus* in at that location or it could be a reflection of an increase in abundance. This is clearly something to focus on next year.

Although *A. modestus* has increased in abundance since the last survey in 2016, their increase is still relatively small. Fortunately, our native species (*S. Balanoides*) are still doing well and do not seem to be impacted by the apparent abundance changes with *A. modestus*. *C. gigas* is still declining. This would suggest that the native populations are not being adversely affected by these invasive species. However, to ensure the situation remains manageable they will require further monitoring, particularly of *A. modestus*, in the coming year.

References

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Crisp, J. & Southward, J. 1959. The further spread of *Elminius modestus* in the British Isles to 1959. Marin Biological Association of the U.K. 38: 429-437.

Kobayashi, M., Hofman, E.E., Powell, E.N., Klinck, J.M. and Kusaka, K. 1997. A population dynamics model for the Japanese oyster, *Crassostrea gigas*. Aquaculture 149: 285-321.

Appendix

Scales:	Small Barnacles	Mussels
S = Superabundant	3-5cm^{-2}	50-79% cover
A = Abundant	> 1cm^{-2}	>20% cover
C = Common	0.1-1cm^{-2}	Large patches
F = Frequent	100-1000m^{-2}	Scattered individuals/small patches
O = Occasional	1-100m^{-2}	Scattered individuals, no patches
R = Rare	Few found	Few found
N = Not found	None found	None found

Survey Methods

All 4 species that were expected were found and quantified. These were the non-native species *Austrominius modestus* (Australian barnacle) and *Crassostrea gigas* (Pacific oyster) and two morphologically similar species which were selected as appropriate indicator proxies for assessment of the two non-native species: *Mytilus edulis* (edible mussel) and *Semibalanus balanoides* (barnacle). Survey methodology was based on the SACFOR scale, which uses several native species as representative size/morphology types for measuring abundance (Appendix 1). The scales for *Small Barnacles* and *Mussels* were used for the barnacle and oyster/mussel species respectively.

For barnacle abundance only, each survey station was divided vertically by eye according to tidal height marks on the wall associated with barnacle abundance. These 4 zones were classified as 'very high shore/intertidal', 'high shore', 'mid shore' and 'low shore'. Due to the beach gradient and reach of the tide up the pier wall, not all stations had all zones present. At each present zone of each station, a horizontal area of a few metres was examined by several teams of 2-3 individual surveyors and the abundance score determined. Subsequently, all survey teams agreed on a final abundance score for the zone, taking account of each team assessment. A tally of all *C. gigas* was kept independently by 2 different recorders and compared at the end. Data was recorded onto pre-designed recording sheets.