



 **Manx Wildlife Trust**
Treisht Bea-Feie Vannin 

Ramsey Harbour Invasive Species Survey 2018

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



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Introduction

The survey was conducted on 9th September 2018 to coincide with low water at 11:49am. No members of the public were able to attend so it was carried out by our Marine Officer, Lara Howe, 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

2018 results

Species	Site 1		Site 2			Site 3			Site 4			
	VH	H	VH	H	M	VH	H	M	VH	H	M	L
<i>A. modestus</i>	F	F	C/F	C/F	F	C	F	F	F/C	F/C	F	R
<i>S. balanoides</i>	S	S	S	A	A	S	S	S	S	S	S	C/A
<i>C. gigas</i>	BEEN REMOVED ENTIRELY											
<i>M. edulis</i>	O	O	N	N	N	N	N	R	N	N	N	R

Table 1. Results of the invasive species 2018.

2017 Results

Species	Site 1		Site 2			Site 3			Site 4			
	VH	H	VH	H	M	VH	H	M	VH	H	M	L
<i>A. modestus</i>	F	O	C	A	C	F	O	O	F	F	O	R
<i>S. balanoides</i>	A	S	C	A	A	A	A	A	C/A	C	A	A
<i>C. gigas</i>	N	N	N	N	N	N	N	$\frac{1}{2}$ Shell	N	N	N	R
<i>M. edulis</i>	N	N	N	N	N	N	N	N	N	N	R	N

Table 2. Results of invasive species survey 2017.

2016 Results

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

Table 3. Results of invasive species survey 2016.

2015 Results

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

Table 4. Results of invasive species survey 2015.

2014 Results

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

Table 5. Results of invasive species survey 2014.

2013 Results

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

Table 6. Results of invasive species survey 2013.

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

Table 7. Key to tables 1-4 (see Appendix for detailed SACFOR scale).

In July and August 2018 all pacific oysters were removed from both harbour arms. A total of 163 were removed, 16 from the south facing south harbour arm.

Discussion

As done in previous years, the invasive species abundance survey was undertaken at low water and along the southern harbour arm in Ramsey. The SACFOR scale was used to determine the abundance of each of the species.

The abundance of two species of barnacles was measured; the invasive Australian species of barnacle, *Austrominius modestus* and the native *Semibalanus balanoides*. The non-native, invasive *A. modestus* has increased in abundance over the past years resulting in all sites (besides one) now showing abundance as frequent or common. This is a noticeable increase from last year as half of the sites have now stepped up a level on the SACFOR scale. The least abundant site remains the lowest site at the end of the pier (site 4). Although this is a little concerning, fortunately the abundance of the native *S. balanoides* has also increased and do not appear to be affected by their increasing invasive counterparts. The abundance of our native barnacle has remained consistently high over the past years and for 2018, 9 out of the 12 sites the abundance of *S. balanoides* were deemed superabundant with the remaining locations as abundant or common. This is a record high compared with previous results since surveys began back in 2013. Until 2018, they had not been reported as being superabundant in more than 3 sites since 2016 and never before then. This is positive as it shows that although the invasive species abundance is increasing, so is the native barnacle.

M. edulis, our native mussel, this year has shown a slight increase in site 1 to occasional, having never been recorded here before. Sites 2, 3 and 4 remain rare or not found which the same as previous surveys results. With the removal of pacific oysters it will be interesting to see if numbers of mussels increase in future surveys. However, environmental factors such as wave action and



exposure to tidal range on the southern side are much greater than other locations. So it may be that this location is unsuitable for habitation by *M. edulis*.

To conclude, the native species have both seen an improvement in abundance from the previous year's studies. Next year's survey will identify whether the eradication of the Pacific oyster, *C. gigas*, was successful and whether or not the native species' abundance will increase. However, recorder bias should be taken into consideration as the SOCFAR scale is a subjective view of the rough guidelines.

References

Crisp, J. 1985. The spread of *Elminius modestus* Darwin in North-West Europe. 37: 483-520.

Crisp, J. & Southward, J. 1959. The further spread of *Elminius modestus* in the British Isles to 1959. Marine 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.