

## Seed Mussel Survey Tonnage Estimation Report for Cahore/Rusk Channel Area – July and August 2021

**Equipment:** 0.1 m<sup>2</sup> Day Grab, 1 meter dredge, 400 kHz side scan sonar

**Area surveyed:** Along the shore south of Cahore Point and in the Rusk Channel

### Survey summary:

Following the survey carried out in May on the 2020 remnants in the Rusk Channel, the search was extended in July to other locations in the Cahore/ Rusk Channel area. Two potential settlements were found at the time, one along the shore and a second, much smaller on the south end of the Rusk Channel (Fig.1).

Table 1: Area coordinates (in Degrees, decimal minutes WGS84)

- Area along the shore (34 hectares):

latitude	longitude
52° 28.686' N	6° 15.810' W
52° 29.087' N	6° 15.332' W
52° 29.218' N	6° 14.954' W
52° 28.958' N	6° 14.919' W
52° 28.762' N	6° 15.144' W
52° 28.616' N	6° 15.646' W

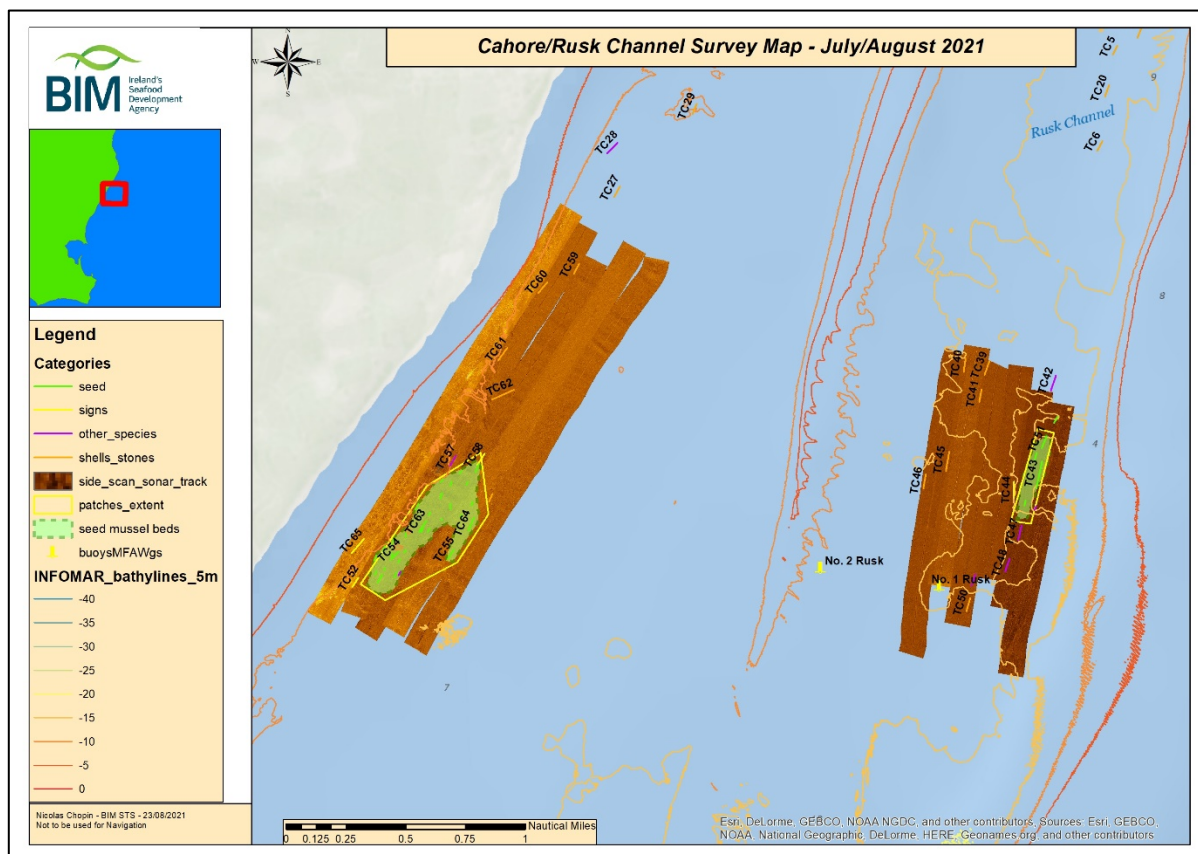
- Area in the Rusk Channel (8 hectares):

latitude	longitude
52° 29.207' N	6° 11.026' W
52° 28.833' N	6° 11.209' W
52° 28.847' N	6° 11.346' W
52° 29.227' N	6° 11.139' W

NOTE: Those coordinates only indicate corners of a simplified polygon (yellow borders on Fig.1) in which the seed mussel settlement is located.

The area along the shore presented scattered amount of seed ranging mainly, at the time, from 6 to 10 mm, while the settlement in the Rusk presented a nearly uniform size distribution ranging from 8 to 20 mm. No clear seed

mussel patterns were observed on the acoustic data on the shore settlement, however clear features were seen in the Rusk. Further sampling survey was carried out, later in July, on the largest settlement along the shore to assess potential alien invasive species. Dredges presented various amount of seed mainly characterised by significant level of waste material composed of shells and stones/gravel and other coarse sediment.



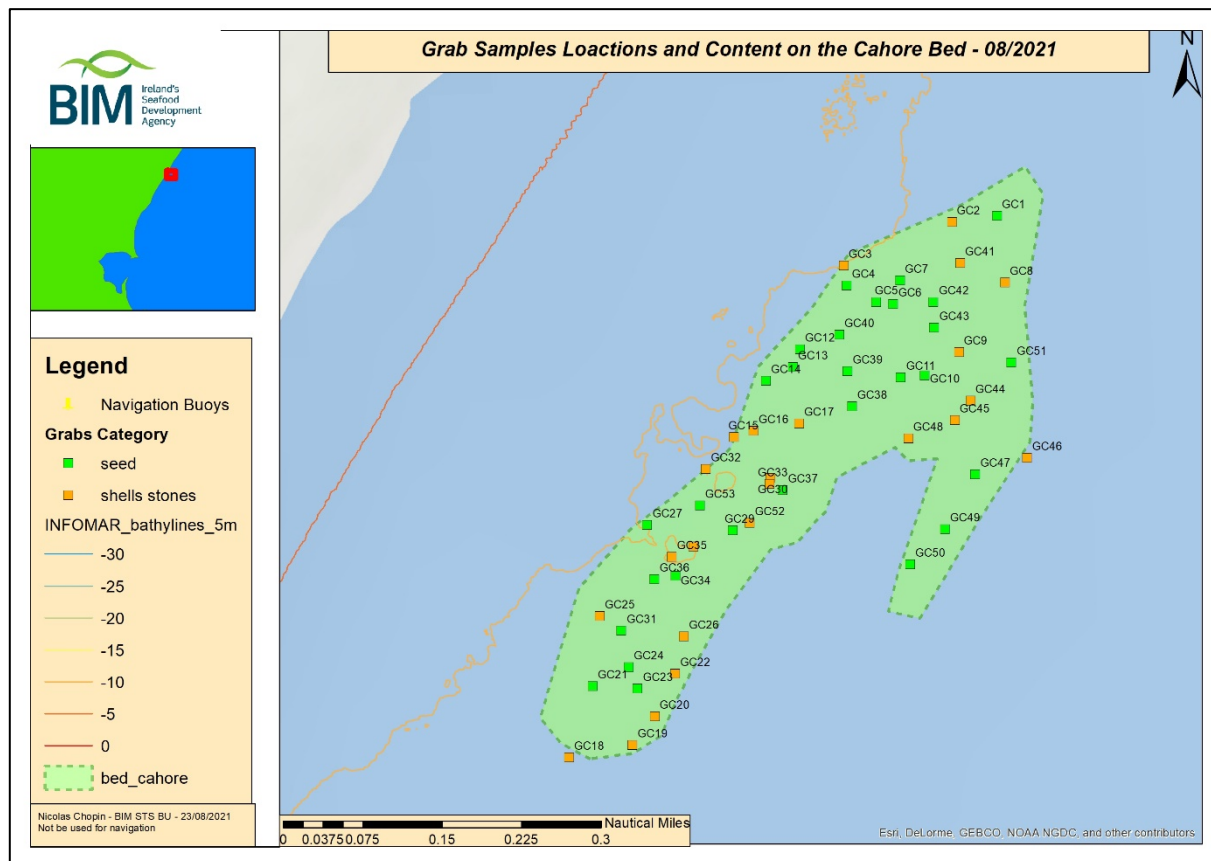
**Fig.1: Seed Mussel Survey Map for South Cahore**

Those observations indicate that the seed distribution on the seabed is scattered rather than forming a near uniform layer. Some starfish also have been found on the north side of the small patch in the Rusk Channel.

#### Biomass estimation:

Using the methodology designed in 2020, 53 sampling points were randomly generated within the shore area, but due to weather and tide conditions and their proximity to the border of the possible bed, 4 samples were taking outside the relevant area, therefore they were not included in the estimation calculation. From the remaining 49

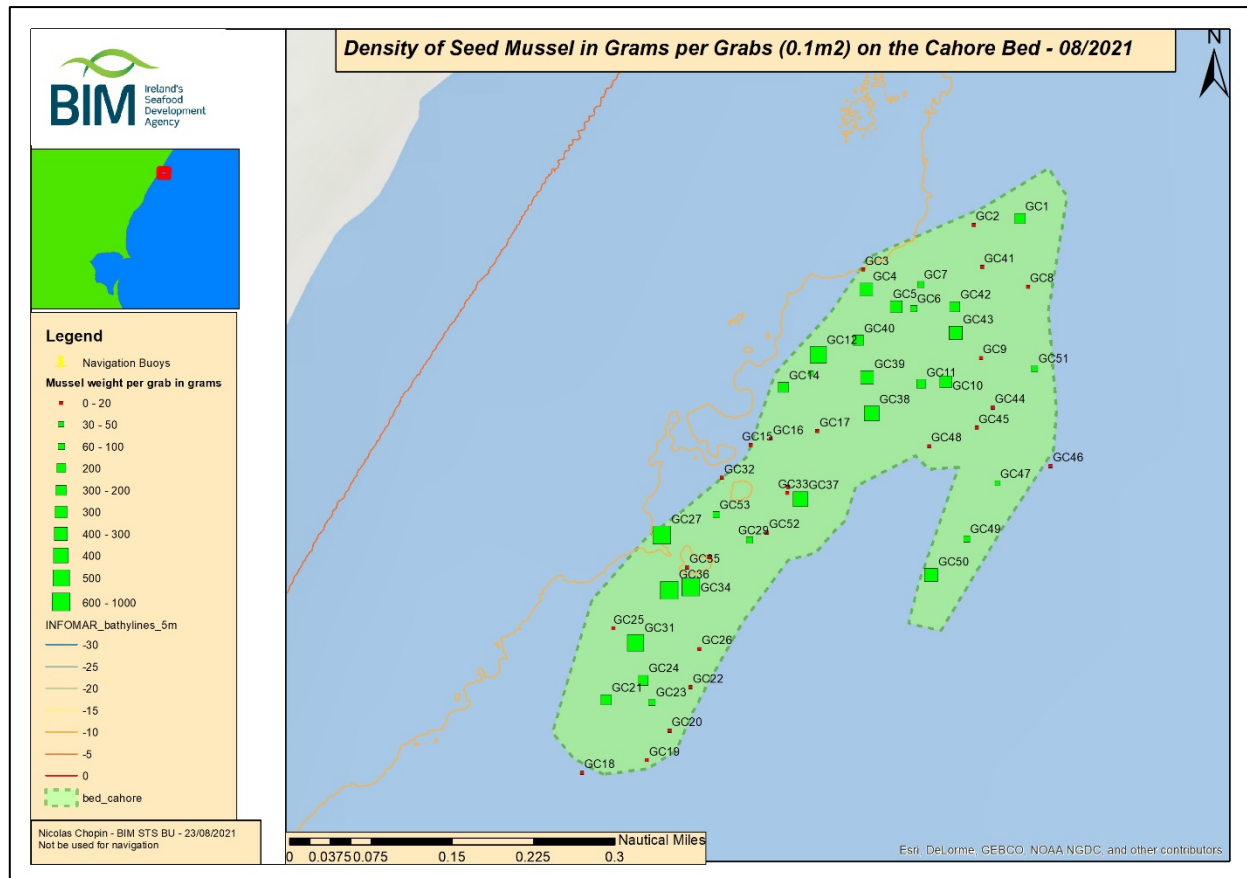
samples, 20 showed no seed mussel. Because of its size, no biomass survey was carried out on the patch in the Rusk Channel.



**Fig.2: Grabs distribution and content**

As expected, the samples showed a wide range of seed mussel density per grabs, from 20 grams per  $0.1 \text{ m}^2$  to 1,000 grams per  $0.1 \text{ m}^2$ , averaging just above **260 grams per  $0.1 \text{ m}^2$  overall** (Fig.3).

The waste amount per grab is as usual rather high, averaging 47% of the samples weight (higher: 95%, lower:16%), and mainly composed of stones, gravel and coarse sand. Although, high level of waste was observed in the 26 tows carried out for the alien invasive species survey, they were nowhere close to the ones from the grab samples (substrate is also collected by the grab which explains to high level of waste).

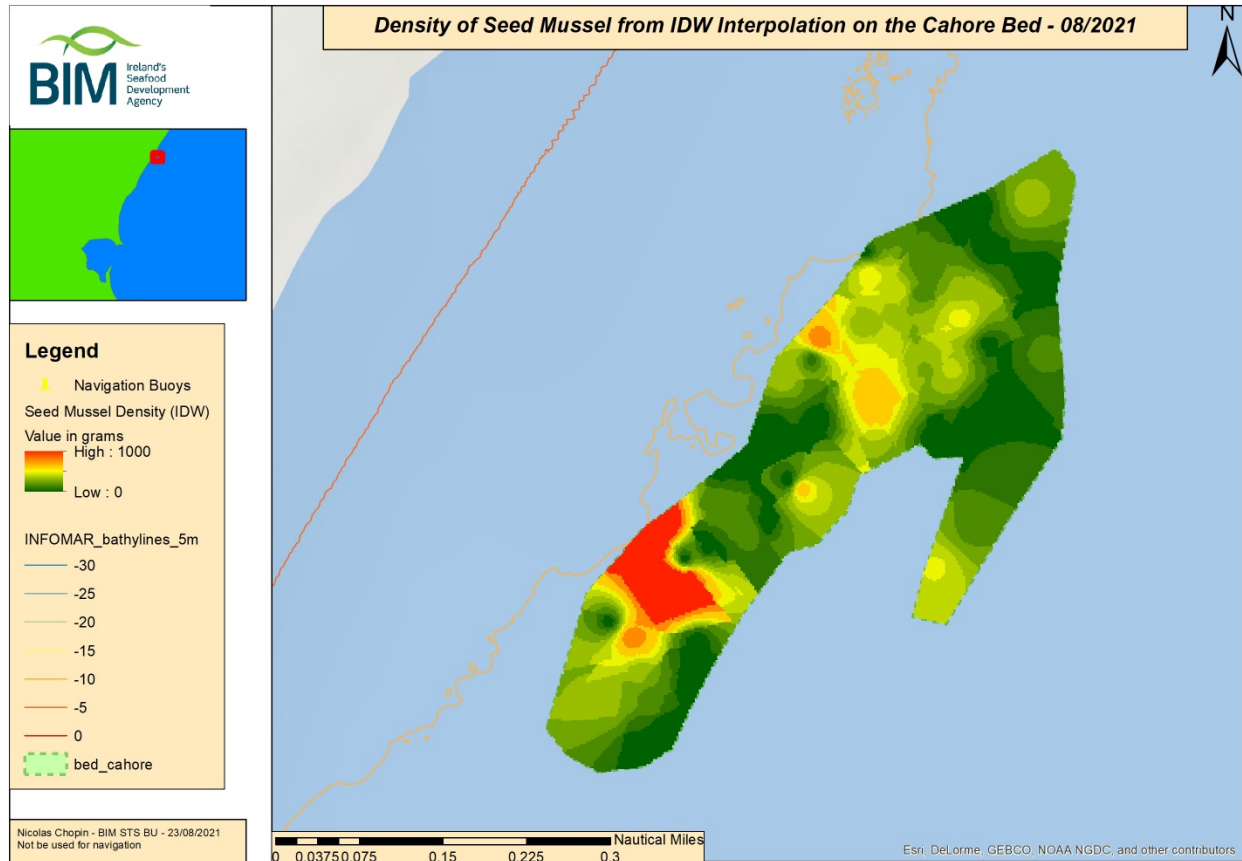


**Fig.3: Seed mussel densities per grabs**

The data collected was interpolated using the IDW (Inverse Distance Weighting) tool in ArcGIS, which was previously used to assess biomass on cockle beds (Hervas et al. 2008) as well as seed mussel beds in 2020 (BIM, Chopin, and McCoy 2020).

Based on the weight of seed collected in each grab, 11 density classes were defined and used to classify the interpolated grid within the bed boundaries. The extent of each class was then calculated in hectares and the biomass was generated by multiplying the mean weight by the area for each class (table 2).

In the IDW interpolation map, two distinctive area show higher densities than the rest of the bed, however, because of the scattered distribution of the seed on the seabed, it is difficult to get a fully accurate estimation.



**Fig.4: IDW generated density map**

Density Classes	Areas in hectares	N samples	Mean Wt per 0.1 m <sup>-2</sup> in Kg	Tonnes/Area
0 to 20g	6.52	20	0.00	0.00
20g to 50g	4.98	2	0.03	14.94
50g to 100g	5.21	7	0.07	38.70
100 g to 150g	4.02	1	0.14	56.25
150g to 200g	4.89	6	0.18	86.43
200g to 250g	3.31	2	0.23	76.08
250g to 300g	1.67	4	0.29	47.56
300g to 400g	1.50	2	0.38	56.90
400g to 500g	0.58	2	0.49	376.86
500g to 750g	1.07	1	0.62	753.72
750g to 1000g	0.53	2	0.95	1492.49
<b>Total area</b>	<b>34.27</b>		<b>Total tonnage</b>	<b>2999.93</b>

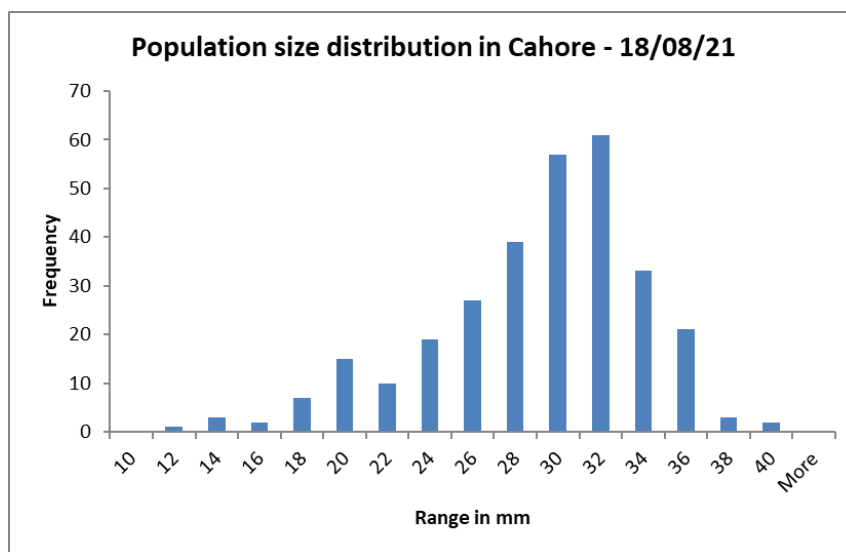
**Table 2: IDW biomass interpolations**

At the time of this survey, the potential seed mussel biomass in Cahore was estimated to be **2,999.93 metric tonnes**.

#### Biometrics:

Three samples were kept for shell length measurement. For each sample, 100 individuals were measured as well as another 100 mussels taken from pooling all the other samples. **GC10** appeared to be a very clean sample with uniform size distribution, the average size was **28.6 mm** (range: 12.46 mm minimum, 38.15 mm maximum). **Two pool samples** were gathered by pooling all the mussel sample together but GC10. **Pool sample 1** had average size of **26.65 mm** (range: 10.36 mm minimum, 36.16 mm maximum) and **Pool sample 2** had an average size of **28.8 mm** (range: 15.6 mm minimum, 38.7 mm maximum).

When looking across the population size distribution, the majority of mussels measured (52% of 300 individuals) are comprised between 26 and 32 mm (fig.5), likely composed of seed mussel probably settled earlier in the year or late in 2020.



**Fig.5: Population distribution histogram**

The current population does not seem to be under predation pressure as only a limited amount of starfish was observed during the alien invasive species survey carried out the previous week.



### Summary/recommendations:

The 2021 Cahore settlement is mainly **composed of new seed mussel averaging 28 mm** in length. The bed is stretching over **34 hectares** and following biomass estimation calculations, could yield around **2,999 metric tonnes**. The size range at the time of the survey corresponds to one main larvae settlement with limited recruitment of new spat (**minimum: 10.36 mm, maximum: 38.7 mm**). There is no apparent predation pressure on the settlement. Because of the distribution of the seed mussel on the seabed, fishing efficiency may be limited.

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### References

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- Hervas, Antonio, Oliver Tully, John Hickey, Eimear O Keeffe, and Eoghan Kelly. 2008. *Assessment, Monitoring and Management of the Dundalk Bay and Waterford Estuary Cockle (Cerastoderma Edule) Fisheries in 2007. Fisheries Resource Series*. Vol. 7.