

Seed Mussel Beds Biomass Estimation Report for Cahore and the Rusk Channel – July 2022

Methodology:

The biomass estimations have been calculated using 0.1m² Day grab samples collected randomly within each beds. 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 and 2021 (Chopin & McCoy, 2020).

Seed Mussel Beds surveyed:

Shore bed in Cahore and the Rusk Channel

Cahore bed (survey date 4/07/2022):

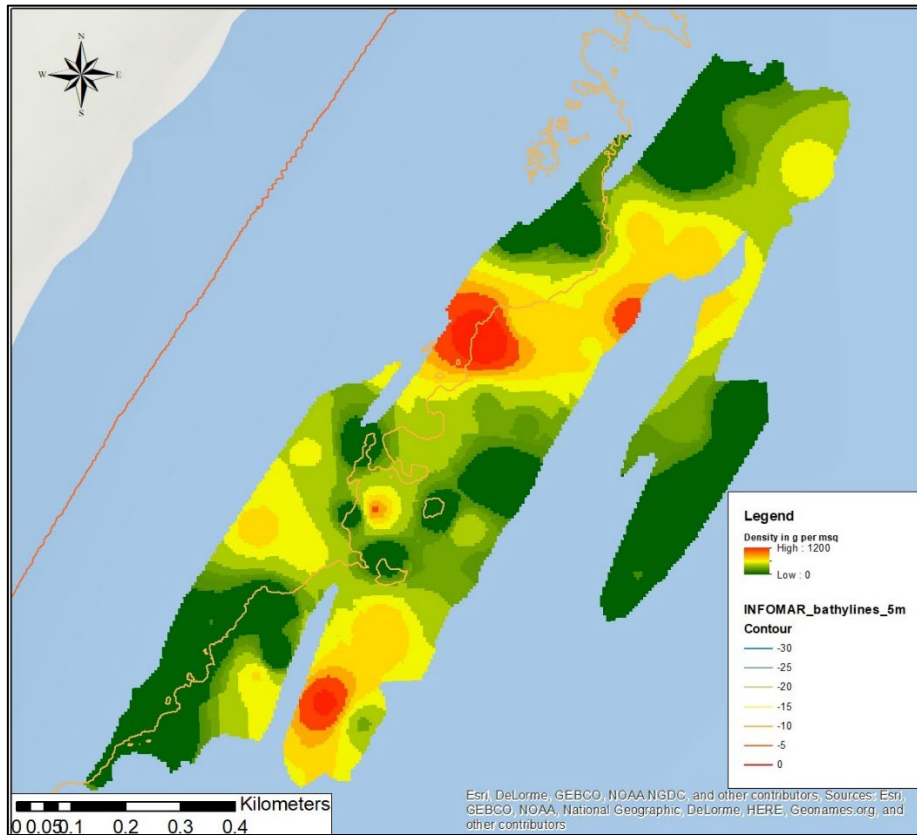
Random sampling points were generated in the largest area (south) of this settlement, the two smaller patches were not deemed relevant for this survey. A total of 44 grabs were collected including 10 that returned negative with seed. The average weight per grab 376 g (minimum: 120g, maximum 1,200g). 11 weight classes were used for the IDW interpolation, as shown in the table below.

| Density Classes | Areas in hectares | N samples | Mean Wt per 0.1 m ⁻² in Kg | Tonnes/Area |
|-------------------|-------------------|-----------|---------------------------------------|----------------|
| 0g to 100g | 17.63 | 17 | 0.00 | 0.00 |
| 100g to 120g | 0.15 | 2 | 1.20 | 1.79 |
| 120 g to 140g | 2.49 | 0 | 0.00 | 0.00 |
| 140 g to 160g | 3.00 | 3 | 1.47 | 44.16 |
| 160g to 200g | 6.59 | 5 | 1.84 | 121.26 |
| 200g to 300g | 11.47 | 2 | 3.00 | 344.04 |
| 300g to 400g | 9.39 | 4 | 3.60 | 338.05 |
| 400g to 500g | 7.37 | 7 | 4.40 | 324.39 |
| 500g to 600g | 1.47 | 0 | 0.00 | 0.00 |
| 600g to 800g | 1.57 | 2 | 6.70 | 105.09 |
| 800g to 1200g | 0.92 | 2 | 10.50 | 96.15 |
| Total area | 62.05 | | Total tonnage | 1374.94 |

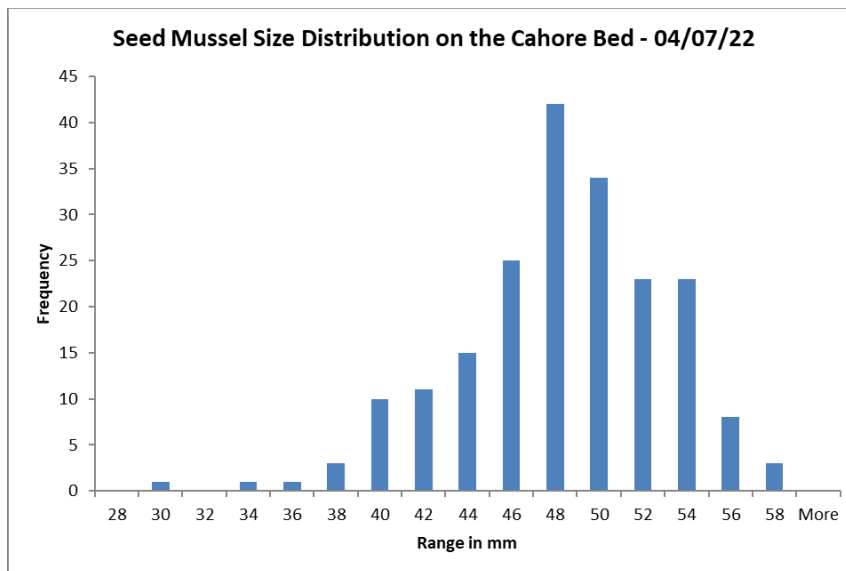
The estimate tonnage at the time of the survey for the main patch was **1,374.94 tonnes**. As indicated in the preliminary report, these mussels are overwintered. The average size is **47.3 mm (minimum: 29.2 mm, maximum: 57.6 mm)**, the 44 to 50 mm size range represented over 50% of the measured individuals (200 units).

From the data gathered with the grab and the side scan sonar, it appears that these mussels are scattered over the area forming dense patches in some places (in red on the distribution map).





Map1: Density distribution from IDW interpolation in Cahore



Graph1: Mussel size distribution for Cahore

Rusk Channel (survey date 06/07/2022):

Random sampling points were generated between the two areas of this settlement. A total of 38 grabs were collected including 10 that returned negative with seed. The average weight per grab 306 g (minimum: 40g, maximum 740g). 10 weight classes were used for the IDW interpolation, as shown in the table below.

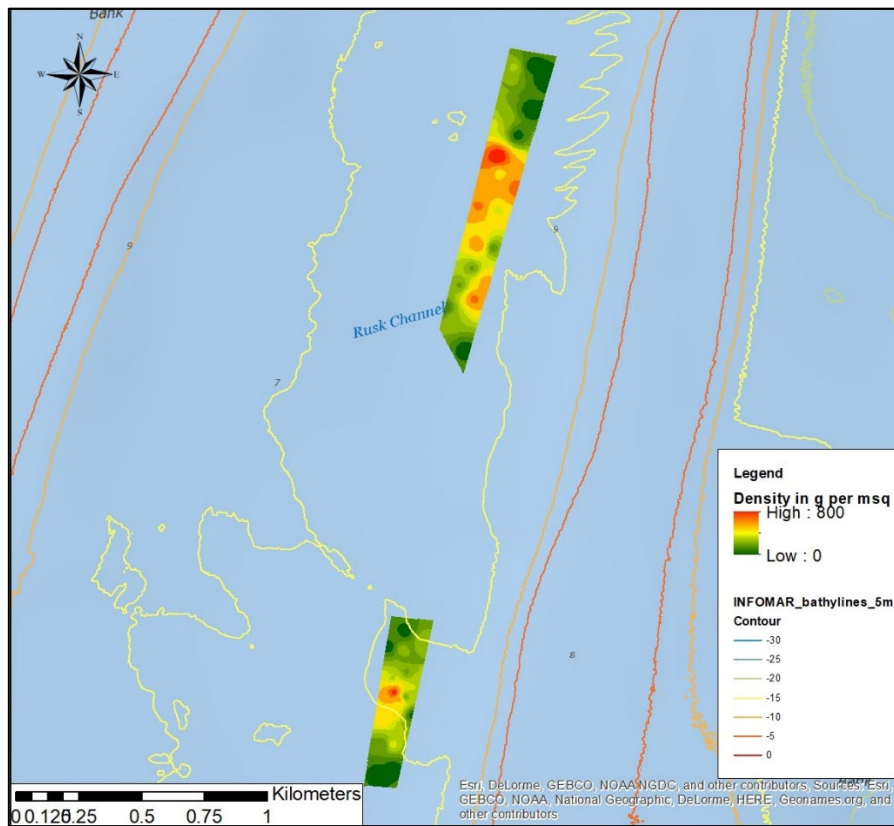
| Density Classes | Areas in hectares | N samples | Mean Wt per 0.1 m ⁻² in Kg | Tonnes/Area |
|-------------------|-------------------|-----------|---------------------------------------|---------------|
| 0 to 30g | 3.56 | 10 | 0.00 | 0.00 |
| 30g to 100g | 3.82 | 1 | 0.04 | 15.26 |
| 100g to 150g | 3.47 | 6 | 0.13 | 45.05 |
| 150g to 200g | 4.80 | 5 | 0.18 | 88.40 |
| 200g to 250g | 2.95 | 2 | 0.23 | 67.95 |
| 250g to 300g | 2.00 | 3 | 0.27 | 54.79 |
| 300g to 400g | 4.17 | 2 | 0.38 | 158.44 |
| 400g to 500g | 4.24 | 4 | 0.46 | 192.91 |
| 500g to 600g | 0.99 | 3 | 0.53 | 52.74 |
| 600g to 800g | 0.34 | 2 | 0.69 | 23.43 |
| Total area | 30.34 | | Total tonnage | 698.99 |

The estimate tonnage at the time of the survey for the main patch was **689.99 tonnes**. As indicated in the preliminary report, these are newly settled mussels, and they are expected to gain at least 14 mm in the next two months (Pérez-Camacho et al., 1995; Rodhouse et al., 1984). The average size is **19.58 mm (minimum: 3.63 mm, maximum: 34.06 mm)**, the 20 to 26 mm size range represented over 50% of the measured individuals (300 units). There is also an indication of a second settlement as the sample size distribution is showing two distinct peaks.

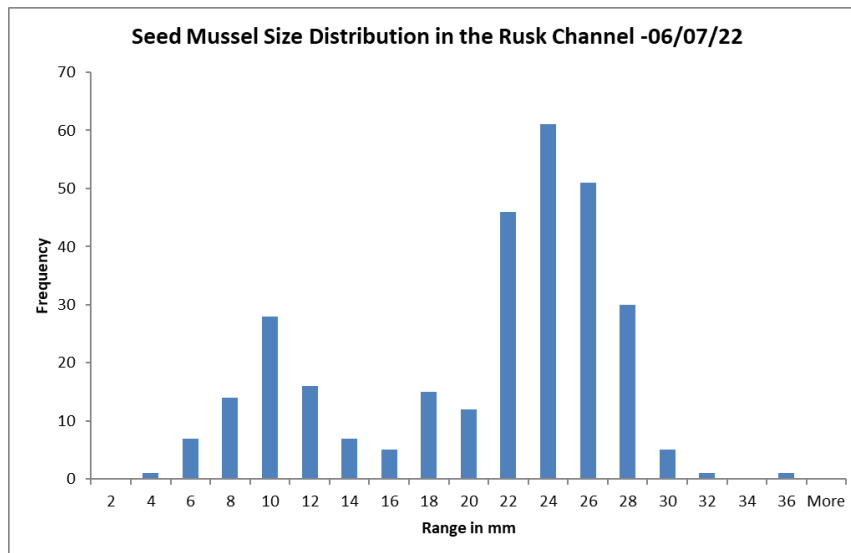
From the data gathered with the grab and the side scan sonar, it appears that these mussels are mainly concentrated in the northern bed, however the centre of the southern patch showed also good densities (in red/orange on the distribution map).

It is worth mentioning that the borders of this particular settlement could not be established at the time of the survey, as the seed mussel size was too small for distinguishing clear limits on the side scan sonar data.





Map 2: Density distribution from IDW interpolation in the Rusk Channel



Graph 2: Mussel size distribution for the Rusk Channel

Summary:

Although, these surveys took place at an early stage in the season, they already show significant amount of seed mussel. The cumulated amount between the two locations, at the start of July, was estimated to be **2,073.93 tonnes**. No biomass survey could be carried out on the bed in Wicklow due to weather conditions and seabed nature not being suitable for grab deployment. However, comparing results with a similar settlement in Cahore, it is expected that the Wicklow settlement could yield a further 500 tonnes (following the tows collected for the invasive species survey). Because of the limited time and reports of a large settlement in Wexford, the settlement south of the Glassgorman Bank was not surveyed for biomass, but it will likely be at a later stage in the season.

As mentioned further above, it is expected that the settlement in the Rusk Channel will significantly increase before the possible opening of the fishery, and it did not show any pressure from predation.

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Chopin, N., & McCoy, G. (2020). *Seed Mussel Bed Post Fishery Survey 2020*. Retrieved from <https://bim.ie/publications/aquaculture/>

Hervas, A., Tully, O., Hickey, J., Keeffe, E. O., & Kelly, E. (2008). *Assessment, Monitoring and Management of the Dundalk Bay and Waterford Estuary Cockle (Cerastoderma edule) Fisheries in 2007. Fisheries Resource Series (Vol. 7)*.

Pérez-Camacho, A., Labarta, U., & Beiras, R. (1995). Growth of mussels (*Mytilus edulis galloprovincialis*) on cultivation rafts: influence of seed source. *Aquaculture*, *138*(1–4), 349–362. Retrieved from <http://www.sciencedirect.com/science/article/pii/0044848695011390>

Rodhouse, P. G., Roden, C. M., Burnell, G. M., Hensey, M. P., McMahon, T., Ottway, B., & Ryan, T. H. (1984). Food Resource, Gametogenesis And Growth Of *Mytilus Edulis* On The Shore And In Suspended Culture: Killary Harbour, Ireland. *Journal of the Marine Biological Association of the United Kingdom*, *64*(3), 513–529. <https://doi.org/10.1017/S0025315400030204>

