# Seed Mussel Survey Tonnage Estimation Report for the Rusk Channel Area – 18/08/2020

**Equipment:** 0.1 m2 Day Grab

**Area surveyed:** Seed mussel settlement previously found in the Rusk Channel (see Preliminary Seed Mussel Survey Report for Blackwater/Cahore Point and Rusk Channel Area – 21/07/2020 to 07/08/2020 at www.bim.ie)

**Survey summary:**

Following the identification of three seed mussel settlements in the Rusk Channel, further sampling was required to facilitate biomass estimation and invasive alien species screening. Using ArcGIS, 32 random sampling points were generated. A total of 36 grabs were then collected within the possible settlement borders highlighted in the previous report. Due to weather and tide conditions, 5 sampling stations were outside the boundaries of the identified beds (Fig 1).

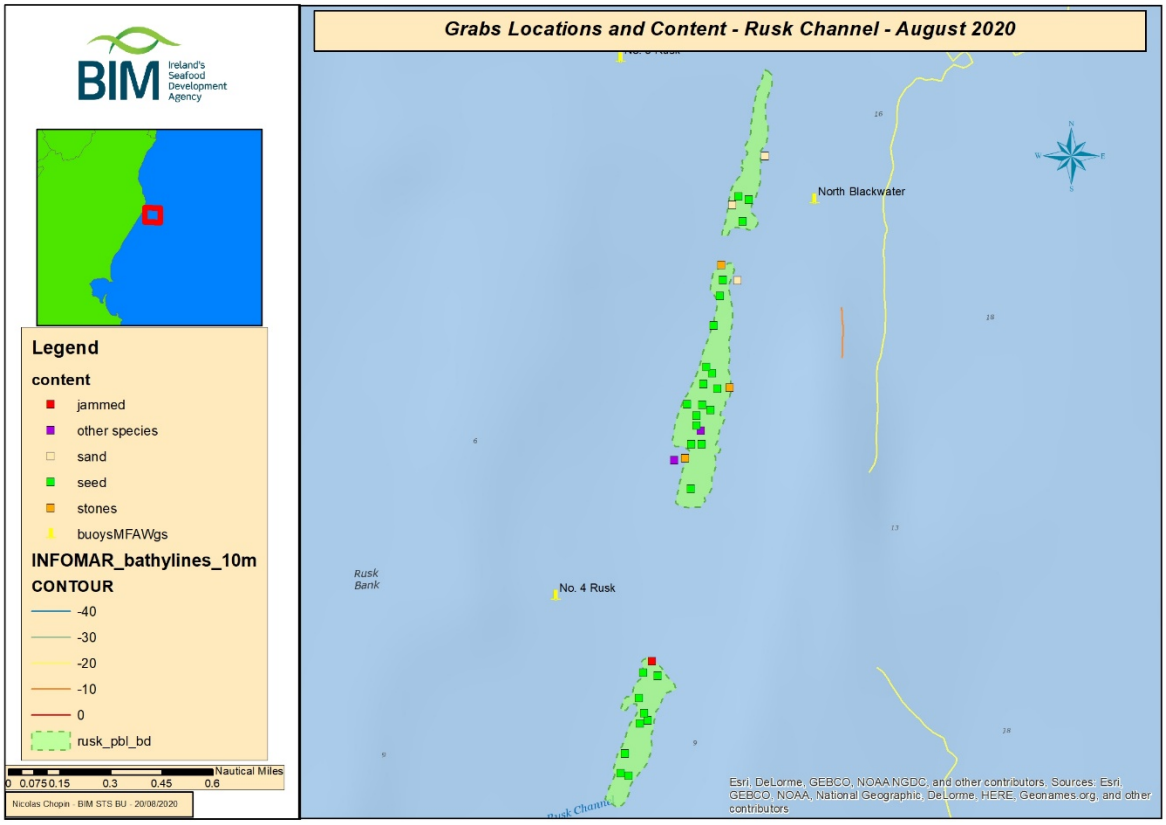


**Fig.1: Grabs location and content map.**

Of the 36 grabs, one was discarded (jammed with a stone), 8 did not contain seed mussel (sand, stones/gravel, other species) and 27 were successful. The density throughout the three areas is variable; the southern location appears to be the more dense with high quantities of mussel in the majority of grabs which correlates to observations made in the previous report (Fig 2). This is typical of high density mussel beds which commonly exhibit low bycatch, dense byssus, loose seed and soft black silt (Liu *et al.*, 2012).

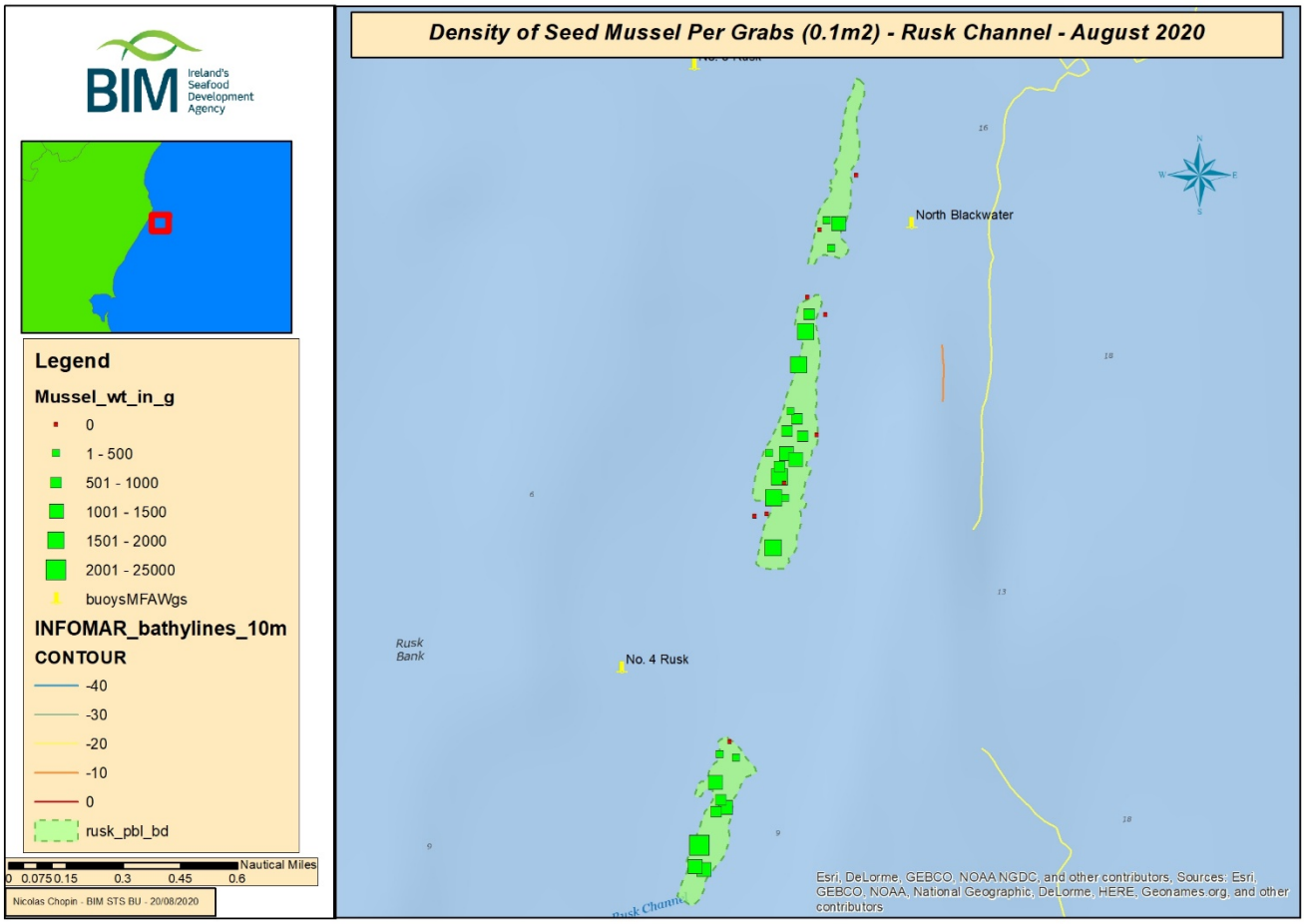


**Fig.2: Grabs density map**

Grabs collected in the central bed are indicating a variation in density with what appears to be possible uniform density in the middle of the settlement. On the north patch, the grab sampling confirmed observations made previously using the dredge: low density and scattered patches. The average weight of seed collected throughout the grabs was 947 grams per 0.1 $m^{-2}$ (maximum: 2,280g, minimum: 100 g). The average amount of waste (including stones and other shells) was 42% across the three locations, with the highest level at 94% (on the north patch which

mainly contained stones) and the lowest level at 2% (on the southern patch). However, grab sampling also collects the substrate on which the seed has settled, this explains these high levels. Starfish were observed, which occurred mainly on the central settlement.

**Biomass estimation**:

The data collected was interpolated using the IDW (Inverse Distance Weighting) tool in ArcGIS, which was previously used to assess biomass on cockle beds (Fig 3; Hervas *et al.*, 2008).

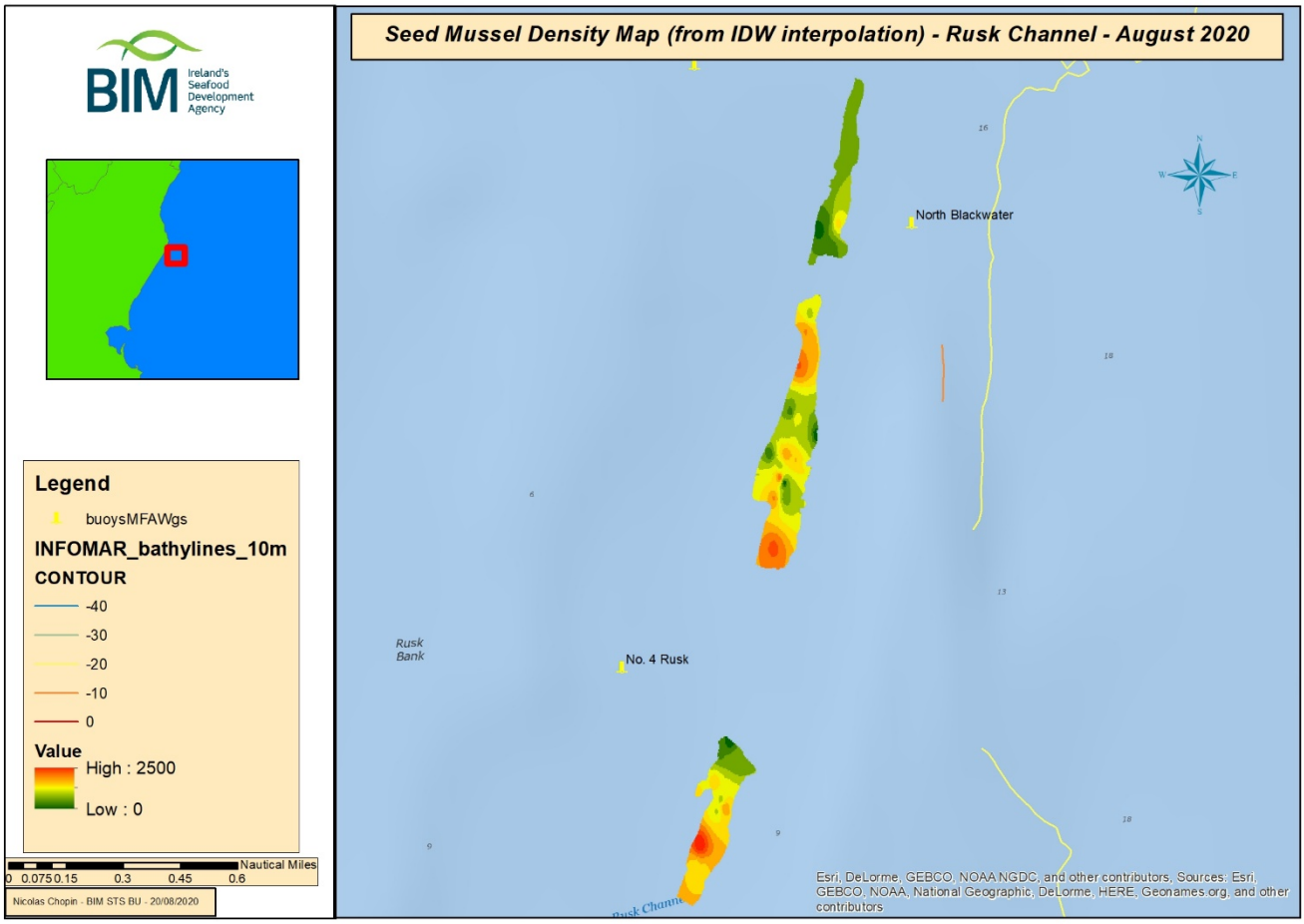


**Fig.3: Seed mussel density map (IDW)**

Based on the weight of seed collected in each grab, 10 density classes were defined and used to classify the interpolated grid within the bed boundaries. The extent of each class (Hectares) was then calculated (see table 1) and biomass generated by multiplying the mean weight by the area for each class.

| Density Classes in g | Areas in hectares | N samples | Mean Wt. per 0.1 $m^{-2}$ in Kg | Tonnes/Area |
|---|---|---|---|---|
| 0 | 0.58 | 4 | 0.00 | 0.00 |
| 0 to 250 | 2.53 | 5 | 0.13 | 33.33 |
| 250 to 500 | 8.26 | 2 | 0.33 | 272.50 |
| 500 to 750 | 6.88 | 6 | 0.64 | 442.90 |
| 750 to 1000 | 7.27 | 1 | 0.92 | 668.92 |
| 1000 to 1250 | 6.79 | 4 | 1.13 | 763.97 |
| 1250 to 1500 | 5.46 | 3 | 1.41 | 768.19 |
| 1500 to 1750 | 2.79 | 3 | 1.59 | 442.18 |
| 1750 to 2000 | 0.70 | 2 | 1.80 | 126.09 |
| 2000 to 2500 | 0.31 | 1 | 2.28 | 70.39 |
| ***Total area*** | ***41.57*** | | ***Total tonnage*** | ***3588.49*** |

**Table 1: Detailed estimations per areas**

The total area was estimated to be **41.6 hectares** for a possible biomass of **3,588.49 tonnes** (CI 95% [142.72;574.96]).

**Recommendations:**

The current settlement in the Rusk Channel has a biomass exceeding the 1,500 tonnes the minimum threshold for the possible opening of the fishery. It is estimated that throughout the three patches, there could potentially yield over **3,500 tonnes** of seed (see previous report for biometrics). Considering weather deterioration and the possible predation threat highlighted in the previous report, the opening of the fishery should be prioritised in the coming weeks.

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***References:***

Hervas, A. *et al.* (2008) *Assessment, Monitoring and Management of the Dundalk Bay and Waterford Estuary Cockle (*Cerastoderma edule*) Fisheries in 2007*, *Fisheries Resource Series*.

Liu, Q. X. *et al.* (2012) 'Alternative mechanisms alter the emergent properties of self-organization in mussel beds', *Proceedings of the Royal Society B: Biological Sciences*, 279(1739), pp. 2744–2753. doi: 10.1098/rspb.2012.0157.

http://www.bim.ie/media/bim/content/publications/aquaculture/BIM-preliminary-smsp-blk-cahore-July-2020.pdf