Seed Mussel Survey Report for Blackwater Area – 20/07/2023 and 16/08/2023

Methodology:

Acoustic data collection using 400 kHz side scan sonar, data processing on SonarWiz 7 and ground-truthing of acoustic targets with an industry-standard seed fishing dredge (Van Lancker *et al.*, 2007; van Overmeeren *et al.*, 2009; BIM, 2016). The biomass estimation survey was carried out using 0.1m^{-2} Day grab to collect samples randomly within the predefined boundaries of 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). The data (dredge and grabs) was recorded using ESRI Field Maps with the Arrow 100 GNSS receiver for submeter accuracy.

Area surveyed:

The survey work concentrated on two areas where mussel beds historically occurred, along the shore north of Blackwater head, as far as Ballyvaldon, and going east toward the West Blackwater starboard buoy. Further, tows were carried out on the edge of the Blackwater Bank from the West Blackwater starboard buoy toward the southern end of the Rusk Channel (see maps attached).

Survey details:

- Along the Blackwater Bank: 11 tows were carried along the bank; no seed or old mussel was found in the area.

- Along the shore: 23 tows were done in the area, and mussels of different sizes were found in 12 tows. Quantities in each dredge were very variable, from a few clumps of seed mussels to half a bag of large mussels. The acoustic data collected with the side scan sonar made it possible to identify two areas. One small one (11 hectares) to the east, comprised of older mussels, and a larger area representing 54 hectares. However, the visual analysis of the sonar data for that particular area showed that the seed appeared to be very scattered on the seabed. Tows located further north along the shore showed limited quantities of large mussels.

Có-mhaoinithe ag an Aontas Eorpach
Co-funded by the European Union
Rialtas na hÉireann
Government of Ireland
Bord Iascaigh Mhara
Irish Sea Fisheries Board

Table 1: Areas coordinates (in Degrees, Decimal minutes and WGS84 projection)

Large mussel area (11 hectares):

latitude	longitude
52° 26.306' N	6° 17.141' W
52° 26.424' N	6° 17.001' W
52° 26.318' N	6° 16.748' W
52° 25.912' N	6° 16.869' W
52° 25.924' N	6° 17.107' W

Seed mussel (54 hectares):

latitude	longitude
52° 26.306' N	6° 17.141' W
52° 26.424' N	6° 17.001' W
52° 26.318' N	6° 16.748' W
52° 25.912' N	6° 16.869' W
52° 25.924' N	6° 17.107' W

NOTE: The seed bed displayed on the attached map has been established following verification by ground-truthing of the side-scan sonar data. These coordinates represent the corners of a simplified polygon of the area of the possible settlement identified (yellow boxes around the beds on the map).

Biomass survey (see attached map):

Because of the relatively small size of the large mussel patch, no biomass survey was carried out on this particular area.

For the seed area, 37 sampling points were randomly generated in ArcGIS, and all were investigated using the Day grab. However, the survey results revealed only 8 grabs containing seed mussels, insufficient to run the established method to estimate the area's biomass.

Biometrics:

The analysis of the large mussel samples (N=171) indicates that the average length is 57.55 mm (maximum: 72.91 mm, minimum: 20.76 mm), with 42% of the mussel sampled comprised between 56 and 62 mm. The large mussels show some colonisation from barnacles but to a lesser extent than the mussels from the shore in Cahore.

Fig.1: Example of large mussel from Blackwater

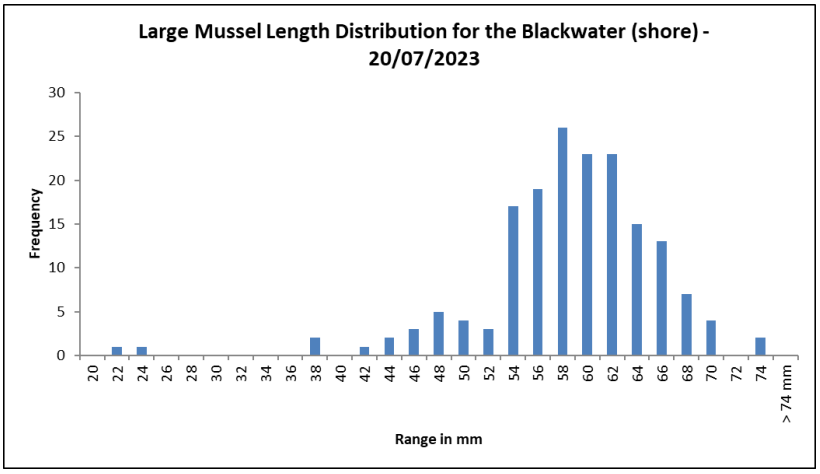


Fig.2: Large mussel length distribution for Blackwater

For the seed, the first samples were collected on Week 29 (20/07/2023). The average length of the sampled seed (N=200) on Week 29 was 24.12 mm (maximum: 34.58 mm, minimum: 4.22 mm), with 54% of the individuals sampled comprised between 24 and 30mm. The second samples were collected on Week 33 (16/08/2023). The average seed length on Week 33 was 29.83 mm (maximum: 40.44 mm, minimum: 12.69), with 49 % of the sampled individuals comprising between 26 and 32 mm. The seed appears to be in good condition with limited mortality.

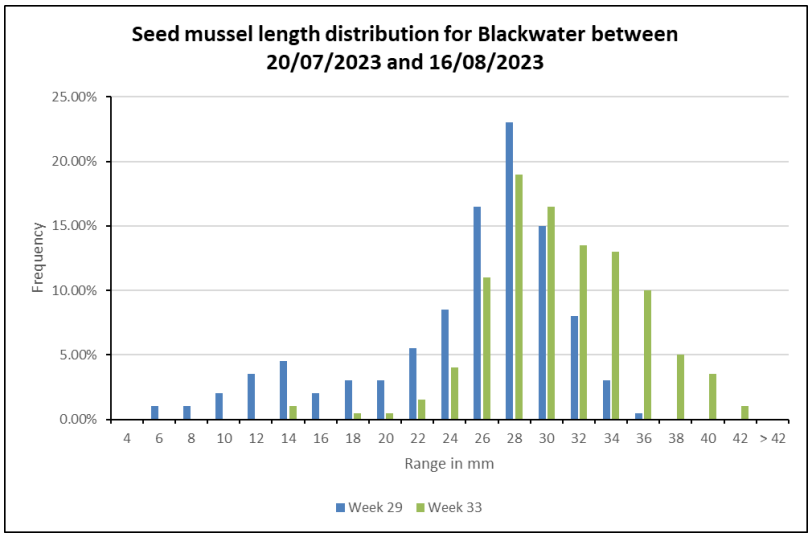


Fig.3: Seed Mussel Length Distribution for Blackwater from July and August 2023

Summary:

A mix of scattered older mussels and new seeds was found in the surveyed area. The **large mussels** (**average length= 57.55mm**) were found in multiple patches closer to the shore and presented various levels of barnacles coverage. The **new seed** (**average length = 29.83 mm**) appears scattered over **54 hectares**. However, the biomass survey correlated with the acoustic data observations, which indicated a very scattered seed distribution in the area. Therefore, **no biomass estimation could be generated**.

The presence of large mussels in this area adds to the other observations of significant overwintered mussels biomass between Cahore Point and Rosslare. So far in 2023, 1 to 2 years old mussels have been found in the South Shear in Rosslare, along the west side of the Long Bank, along the shore in Blackwater and along the shore south of Cahore Point. The regular presence of overwintered mussels seems to be trend since 2021, when remnant mussels were found in Rosslare following the 2020 fishery and dislodgement due to winter storms (Chopin and McCoy, 2020; BIM, 2021). However, following this year's surveys results, it appears that self-recruitment in those area is very limited, as no new seed was found throughout the samples. And , despite this level of broodstock, the overall level of recruitment of seed for 2023 in this part of the coast is very low.

Aquaculture Technical Section
Seafood Technology Services Business Unit
BIM

References

BIM. 2016. Side Scan Sonar Features Catalogue. https://www.researchgate.net/publication/358640202_Side_Scan_Sonar_Features_Catalogue_related_to_Aquaculture_and_Inshore_Fishing_Activities#fullTextFileContent.

BIM. 2021. 2021 Post Fishery Survey Report.

Chopin, N., and McCoy, G. 2020. Seed Mussel Bed Post Fishery Survey 2020 Seed Mussel Bed Post Fishery Survey 2020. 1–29 pp. https://bim.ie/publications/aquaculture/.

Hervas, A., Tully, O., Hickey, J., Keeffe, E. O., and Kelly, E. 2008. Assessment, Monitoring and Management of the Dundalk Bay and

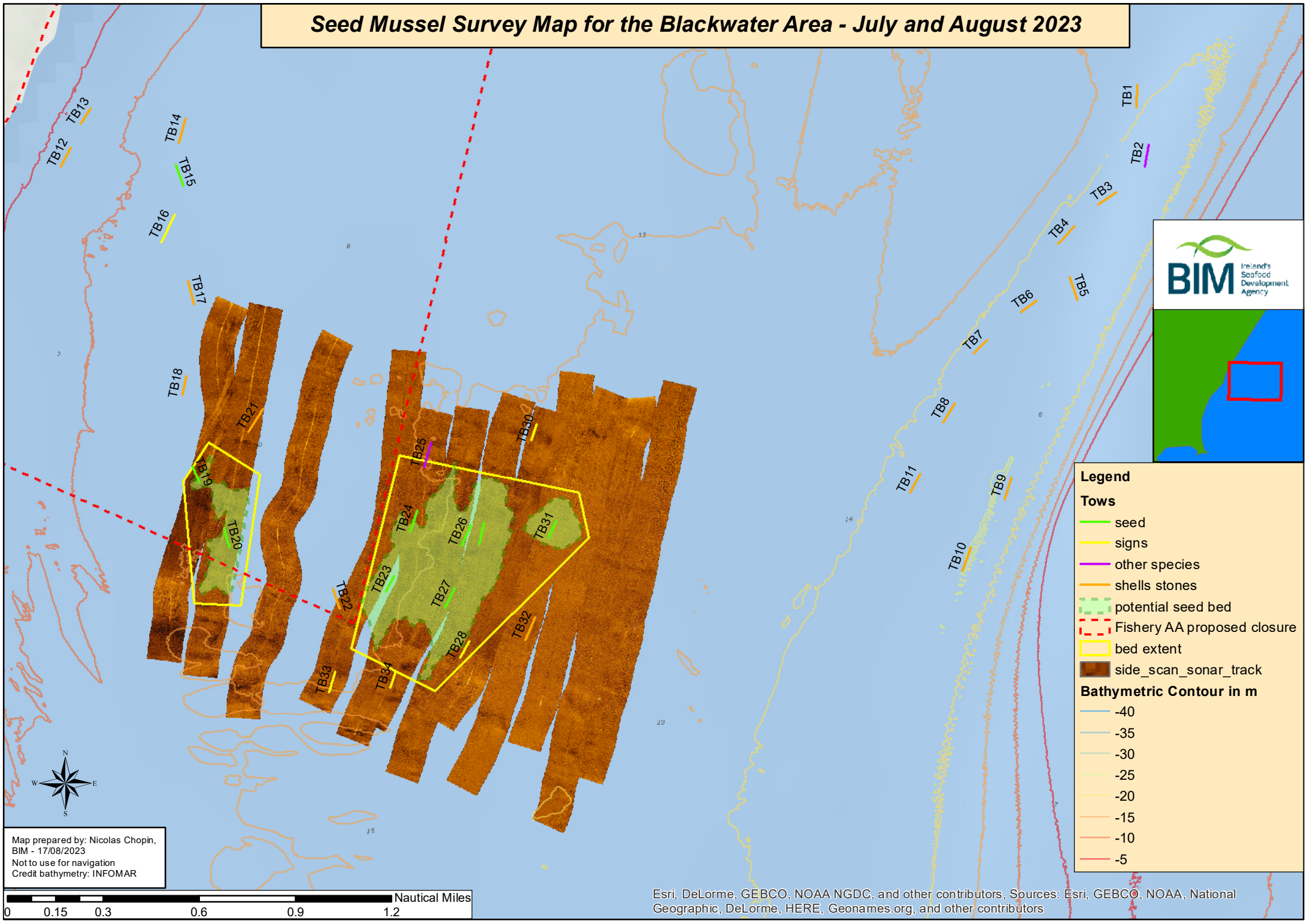
Waterford Estuary Cockle (*Cerastoderma edule*) Fisheries in 2007. 38 pp.

Van Lancker, V., Du Four, I., Papili, S., Verfaillie, E., Schelfout, K., Rabout, M., and Degraer, S. 2007. Habitat signature catalogue, Belgian Part of the North Sea.

van Overmeeren, R., Craeymeersch, J., van Dalfsen, J., Fey, F., van Heteren, S., and Meesters, E. 2009. Acoustic habitat and shellfish mapping and monitoring in shallow coastal water - Sidescan sonar experiences in The Netherlands. Estuarine, Coastal and Shelf Science, 85: 437–448. Elsevier Ltd. http://dx.doi.org/10.1016/j.ecss.2009.07.016.

Fig.4: Seed mussel from the Blackwater area

Seed Mussel Survey Map for the Blackwater Area - July and August 2023



Detail of Seed Mussel Biomass Map for the Blackwater Area - August 2023