Seed Mussel Biomass and Extended Survey of the Rusk Channel – 21 and 22/08/2025

Methodology: The acoustic data were collected using a 400 kHz side scan sonar, processed in SonarWiz 6 and ground truthed using a 1 metre seed mussel dredge, (BIM, 2016; Chopin, 2024). The biomass estimation survey was carried out using 0.1m^2 Day grab to collect samples at locations randomly generated within the predefined bed boundaries. The data collected were interpolated using the IDW (Inverse Distance Weighting) tool in ArcGIS Pro (Hervas *et al.*, 2008; Chopin, 2024). The spatial data (dredge and grabs) were recorded with ESRI Field Maps and the Arrow 100 GNSS receiver for submeter accuracy.

Area surveyed: The length of the Rusk Channel, focusing on the area where mussels were observed in May and June 2025 (see maps).

Survey details:

Returning to the area where seed and overwintered mussels were found in the Rusk Channel, further side scan sonar data were collected to help define the boundaries of the mussel bed. Mussels acoustic features were limited in parts of the data collected; therefore, precise boundaries were difficult to establish. However, mussels of various sizes were observed in an area of approximately **51 hectares.**

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

Latitude	Longitude
52° 28.576' N	006° 11.550' W
52° 29.831' N	006° 10.885' W
52° 29.778' N	006° 10.618' W
52° 28.521' N	006° 11.309' W

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NOTE: The seed bed shown on the attached map was confirmed 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 (green box around the beds on the survey map).

The bed stretches for 2.3 km from north to south and 190 m at its widest. In addition with the original tows carried out during the preliminary survey, a further 38 were taken in the area (including Invasive Species Survey) within the area. For the biomass estimation, 42 grabs were collected within the boundaries of the beds.

Biomass estimation:

On the 42 grabs collected , 11 did not indicate mussels (Fig. 1). The results indicated three distinct mussel populations in the settlement. The biomass estimation was calculated across those populations. The average weight per grab (over the 31 successful ones) was 485.81 grams (min: 160g, max: 880g), while the waste (non-mussel material) averaged 50.96% of the overall weight of each grab (min:24.14%, max: 83.33%). It was mainly composed of small stones, shells ash/debris, empty mussel shells, barnacles and a mixture of bryozoans and hydroids.

Results from the grab sampling indicate that mussels are concentrated in the centre and to the north side of the bed (Fig. 2). Following the analysis of the generated data, it is estimated that this bed could yield **1,691.05 metric tonnes** (see table 2).

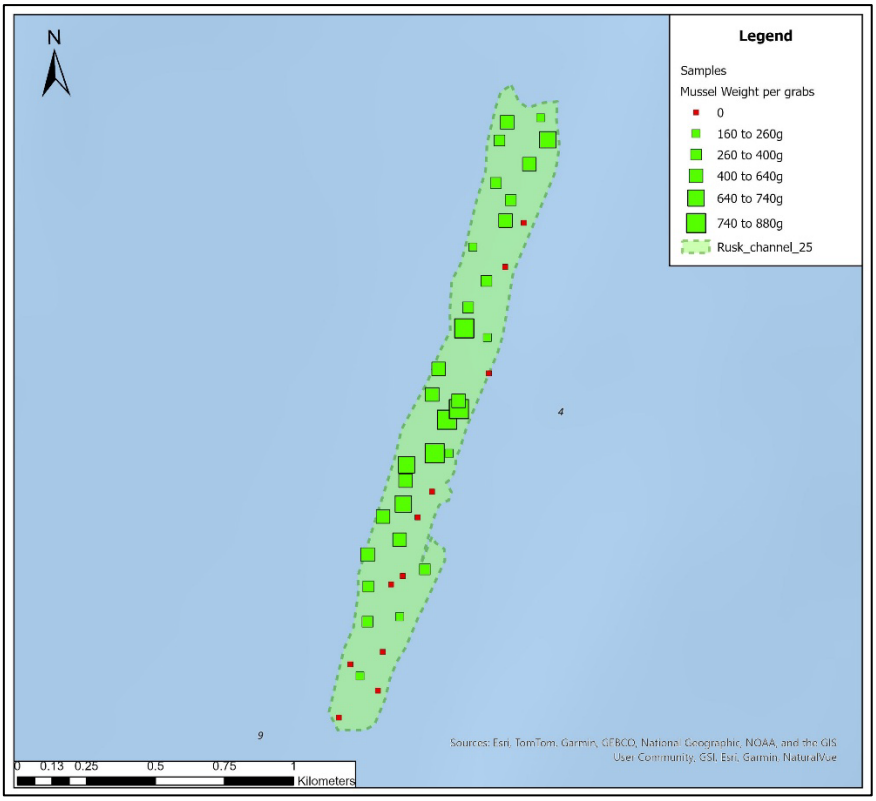

Fig. 1: Grabs distribution and weight classification

Table 2: Tonnage estimation

Density Classes	Areas in hectares	N samples	Mean Wt per 0.1 m^{-2} in Kg	Tonnes/Area
0g to 160g	10.54	11	0.00	0.00
160g to 200g	2.93	1	0.16	46.88
200g to 300g	8.04	6	0.23	187.33
300g to 400g	9.13	6	0.33	301.29
400g to 500g	5.09	2	0.43	218.87
500g to 600g	8.24	6	0.55	455.67
600g to 700g	5.55	4	0.64	355.20
700g to 800g	1.45	4	0.77	110.93
800g to 900g	0.24	2	0.86	20.88
Total area	***51.21***		***Total tonnage***	***1697.05***

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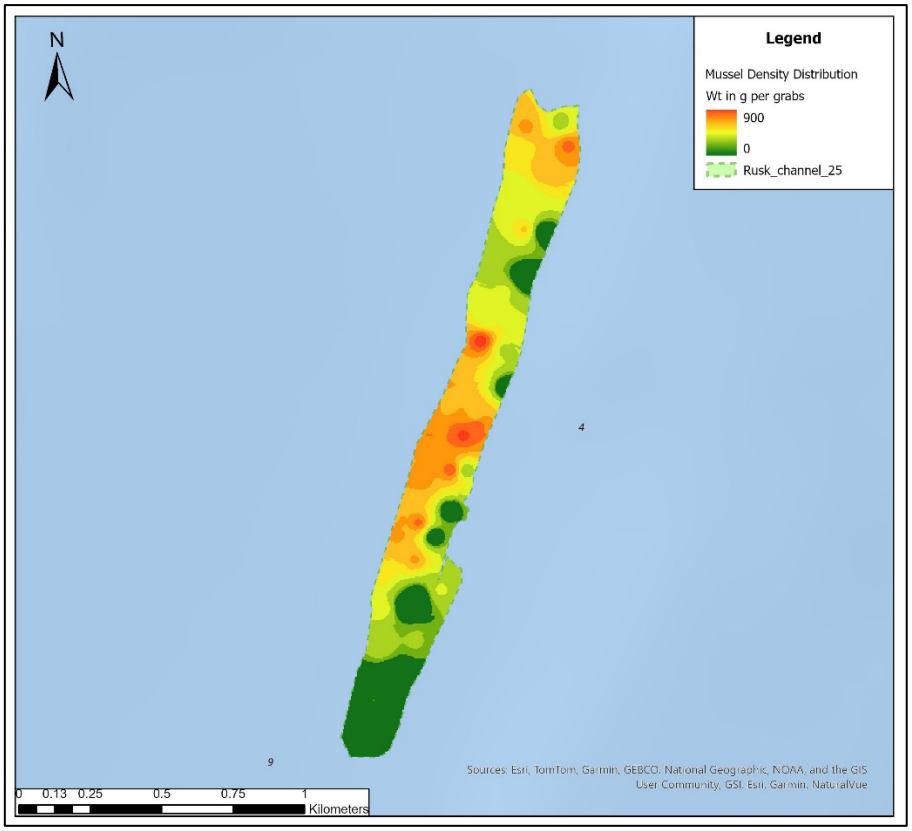

Fig. 2: Mussel Density Map based on IDW interpolation

Biometrics:

The mussels observed indicated multiple settlement events. The largest mussels are likely to be from to the small settlement found in 2024 at the same location. Another population, slightly smaller, may have settled late in 2024 or early in 2025 . Finally, a small quantity of recently settled seed (likely from a late spring settlement) was also present (see Fig. 3). To facilitate biometrics measurements, the mussels were classed into 3 categories: large (1 or 2 years old mussels), medium (late 2024 settlement or early 2025) and small (the most recent settlement).

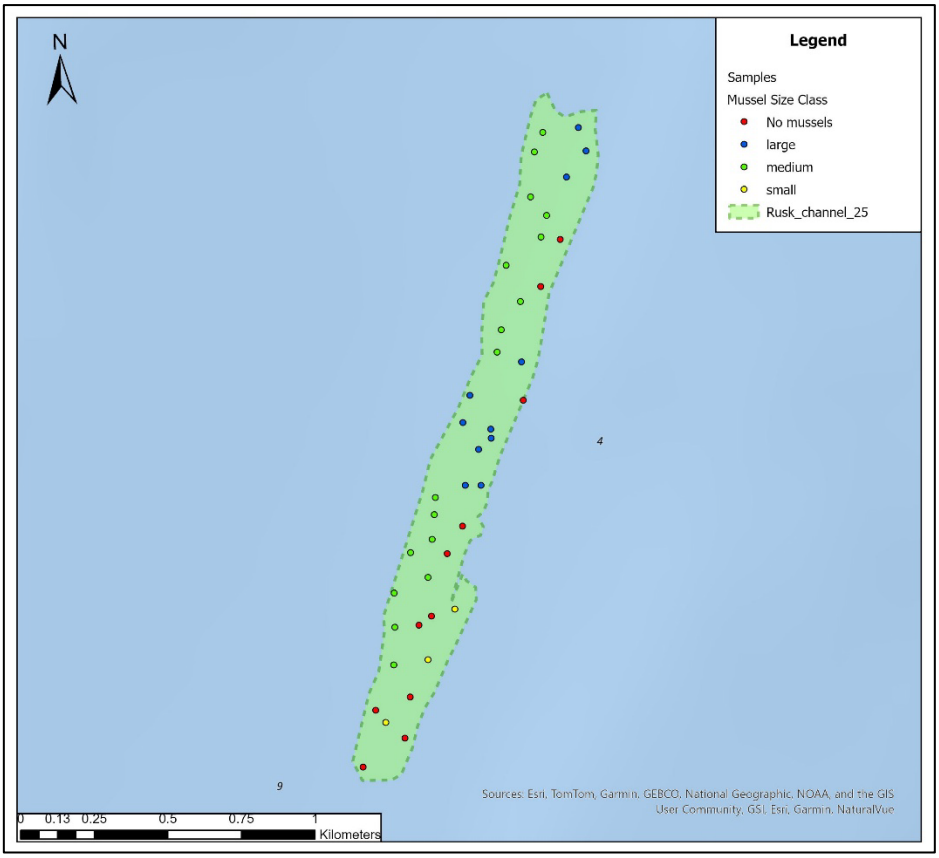

Fig. 3: Mussel size class distribution through the bed

Small mussels are located in the southside, the large mussels are located in the middle and north of the bed. The medium size mussels occupied the remaining areas. The south side of the settlement also contained some very scattered patches of small seed. For ease of analysis, the mussels of each sample were pooled according to those categories. The measurements summary is indicated in the table below (N=200 per category):

Mussel Length in mm			
	Average	**Max**	**Min**
Large	52.32	68.84	36.29
Medium	44.88	55.62	27.93
Small	28.28	42.63	10.07

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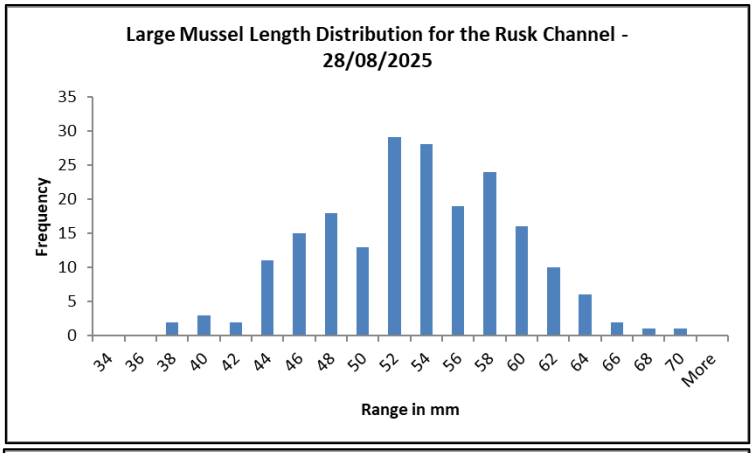

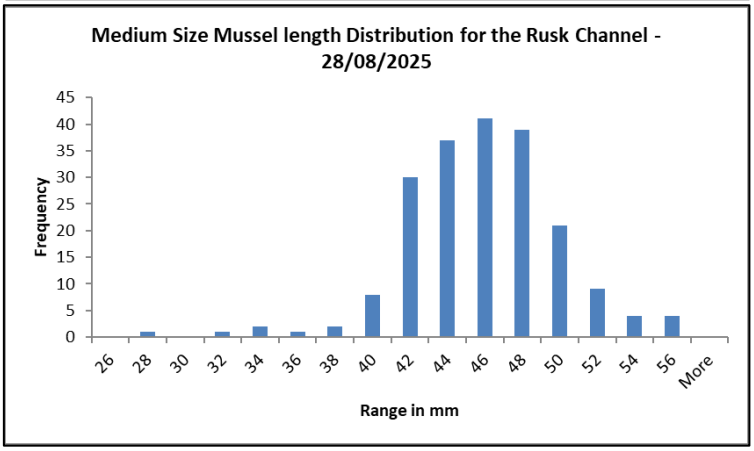

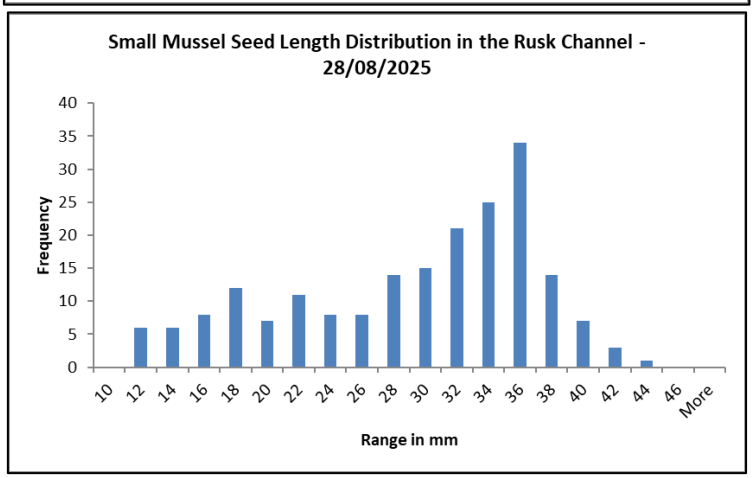

Fig. 4: Mussel size distribution throughout the three categories

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The large category (77 pieces/kg) is dominated by mussels measuring between 50 and 54 mm (29% of the mussels measured), the medium category (125 pieces/kg) is dominated by mussels measuring between 42 and 48 mm (60% of the mussels measured) and finally the small category (500 pieces/kg) is dominated by mussels measuring between 30 and 36 mm (41% of the mussels measured).

Summary:

The survey of the seed mussel bed in the Rusk Channel indicates that approximately **1,600 tonnes** of seed are spread over **51 hectares**. No mortality or signs of predation were observed, and the younger mussels were in good conditions. The older mussels carried heavy barnacle fouling. The mussels appeared to grow faster than reported in the literature (Pérez-Camacho *et al.*, 1995) ; from an average size of 14 mm (min: 4.49 mm, max: 27.97mm) in early July, they more than doubled in size within less than two months. Finally, an extended survey of the north part of the channel (10 further tows) did not indicate any seed or mussels.

Aquaculture Technical Section

Seafood Technology Services Business Unit

BIM

Reference:

BIM. 2016. Side Scan Sonar Features Catalogue.

Chopin, N. 2024. Temporal and Spatial Settlement of Subtidal Seed Mussels on the Southeast coast of Ireland. Bangor University. 127 pp. https://research.bangor.ac.uk/portal/en/theses/temporal-and-spatial-settlement-of-subtidal-seed-mussels-on-the-southeast-coast-of-ireland(63c5e187-82ac-4a73-a9fc-efbe7d34328c).html.

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.

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

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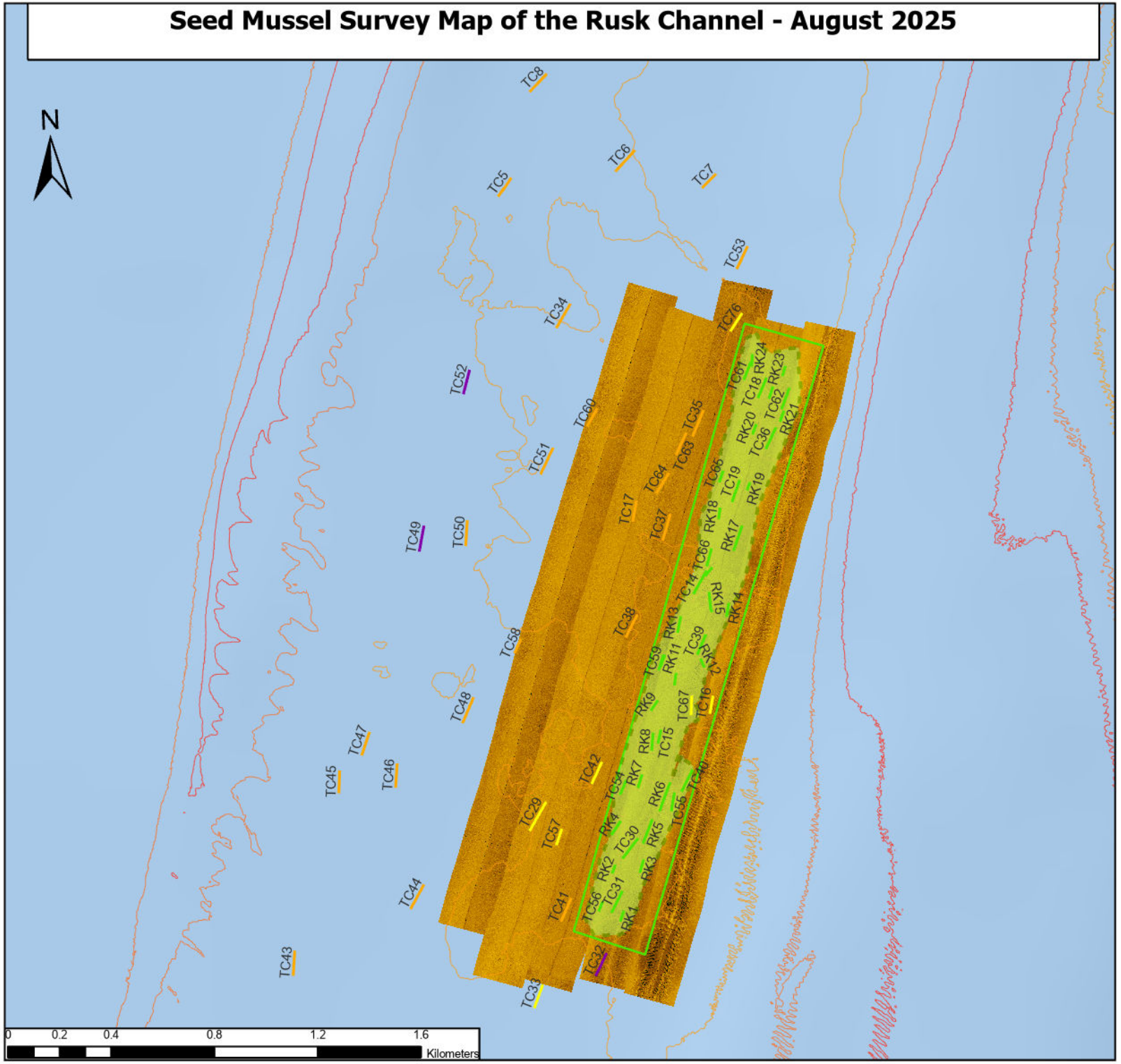
Seed Mussel Survey Map of the Rusk Channel - August 2025



Legend

Tows

- seed
- other species
- shells stones
- signs

bed_extent

Rusk_channel_25

Side scan sonar coverage

INFOMAR_bathylines_5m

Contour

-5

-75

Do not use for navigation
Map prepared by: Nicolas Chopin, BIM
27/08/2025
Credit bathymetry: INFOMAR 2022