Seed Mussel Beds Survey and Biomass Estimation for Cromane – 29/08 to 02/09/2022

Methodology:

A 400kHz side scan sonar was used to assess the presence/absence of seed mussel features on the seabed as well as delineate the extent of the possible settlement (van Overmeeren et al., 2009). Georeferenced recorded side scan sonar targets were investigated using a 1 metre dredge deployed for a short tow (usually < 100 m long). The data (dredge and grabs) was recorded using ESRI Field Maps with the Arrow 100 GNSS receiver provide submeter accuracy.

The biomass estimation has been calculated using $0.1m^{-2}$ Day grab samples collected randomly within each bed. 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).

Survey summary:

Following reports from the local industry in Castlemaine Harbour, the channel between Rossbeigh and Inch was surveyed using the side scan sonar. A number of relevant feature were observed on the side scan sonar data. A total of 22 tows were completed within the survey area, 13 of those showed various quantities of seed mussel. Using this data and the side scan sonar imagery, two areas were delineated. At the time of the survey, the beds represent approximately **35 hectares**, divided in 18.5 hectares for the west bed and 17 hectares for the east bed bordering bur wholly outside the closed zone designated in the fishery plan (in red on the attached map).

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

West bed (18.5 ha)

Latitude	Longitude
52° 5.440' N	9° 57.255' W
52° 5.540' N	9° 58.446' W
52° 5.606' N	9° 58.195' W
52° 5.570' N	9° 57.358' W

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East bed (17 ha)

Latitude	Longitude
52° 5.750' N	9° 56.157' W
52° 6.092' N	9° 55.801' W
52° 6.130' N	9° 55.720' W
52° 6.110' N	9° 55.578' W
52° 6.020' N	9° 55.568' W
52° 5.688' N	9° 56.054' 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 (green boxes around the beds on the map).

Biomass estimation:

Random sampling points were generated within both beds. A total of 30 grabs were collected including 3 that returned no seed. The average weight per grab was 650g (minimum: 180g, maximum 1,460g). 10 weight classes were used for the IDW interpolation, as shown in the table below.

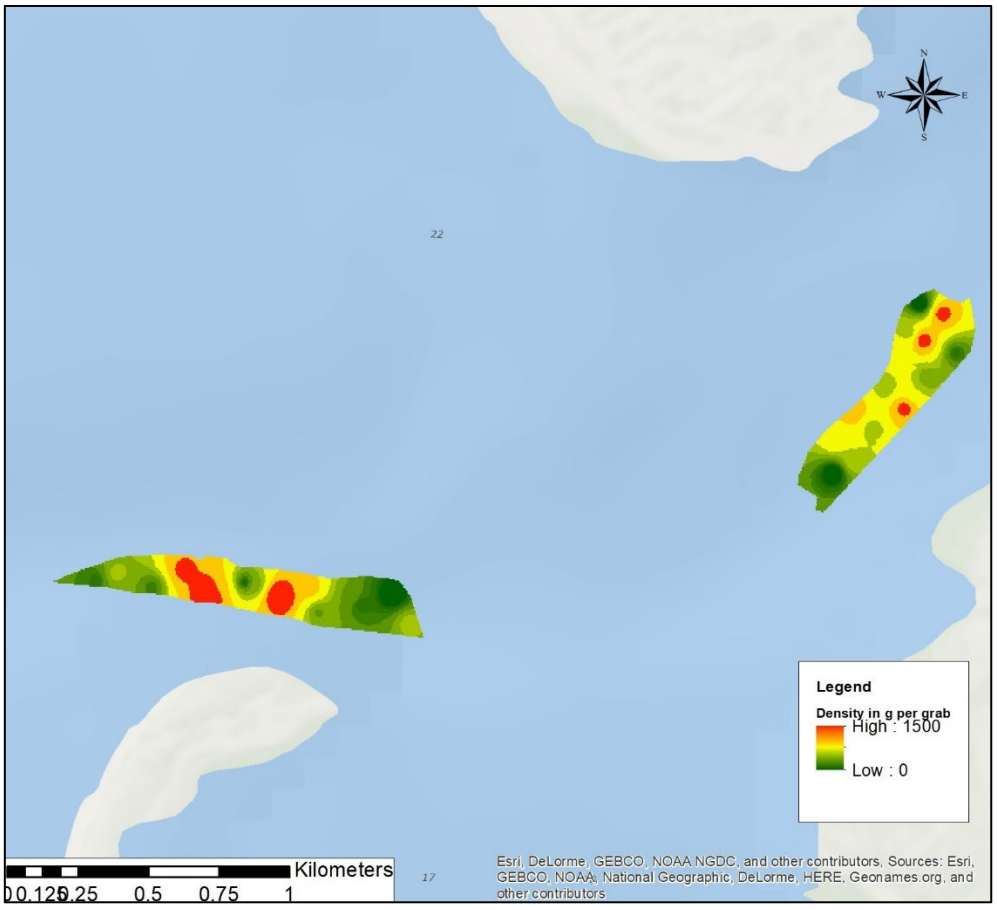
Table 2: Biomass estimation details

Density Classes	Areas in hectares	N samples	Mean Wt per 0.1 m^{-2} in Kg	Tonnes/Area
0 to 180g	1.32	3	0.00	0.00
180g to 200g	0.56	1	0.18	10.02
200g to 250g	1.31	3	0.21	27.10
250g to 300g	2.05	2	0.28	57.48
300g to 400g	4.02	2	0.38	152.71
400g to 500g	4.70	2	0.41	192.63
500g to 600g	5.16	6	0.54	280.19
600g to 800g	8.21	2	0.66	542.01
800g to 1000g	5.50	3	0.91	498.83
1000g to 1500g	2.96	6	1.22	360.78
Total area	***35.79***		***Total tonnage***	***2121.75***

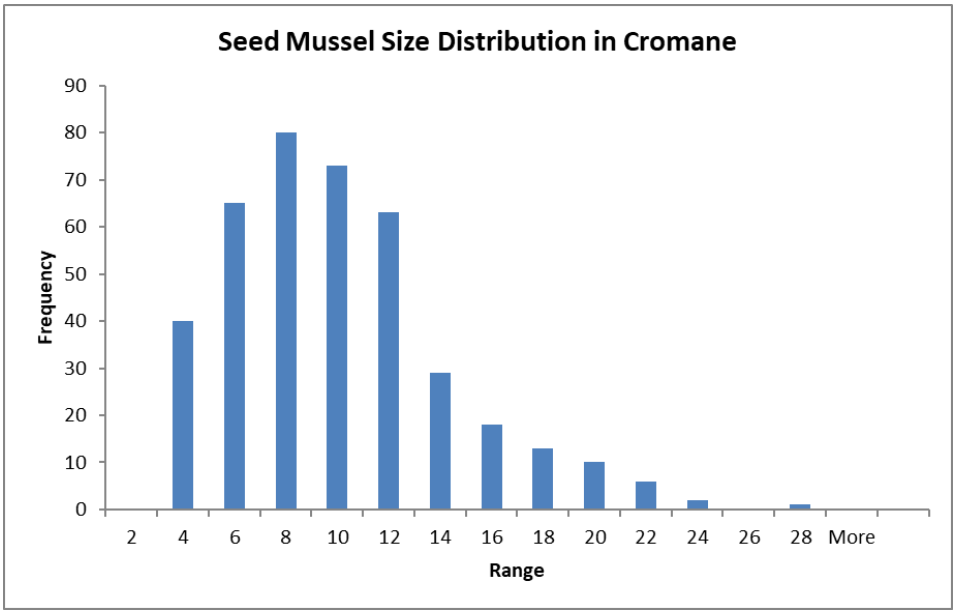
The estimate tonnage at the time of the survey across both beds was **2,121.75 tonnes**. The seed mussel from these beds appears to be a mix of newly settled mussels from various size including newly settled spat (< 2mm in length). The average size is **9.04 mm** (minimum: 2.2 mm, maximum: 26.03 mm), the 4 to 10 mm size range represented over 50% of the measured individuals (400 units).

From the data gathered with the grab and the side scan sonar, it appears that these mussels are scattered over the area, forming very dense patches in some places (in red on the distribution map); this has been regularly observed in previous surveys of the area.

Also, as previously observed in this area, small starfish were found in the various samples, mainly on the eastern border of the channel bed (West), possibly correlating with lower mussel density on the map below.



Map2: Density distribution from IDW interpolation for Cromane



Graph2: Mussel size distribution for Cromane

Summary:

As in previous years, the settlement in Cromane appears to be relatively late; the seed mussel sizes are much smaller than the ones found in the east coast settlements for the same time of year. The current settlement is similar to the one found in 2020, showing typical high density patches throughout the various beds: 6 grabs over 1,000 g representing 100 tonnes/hectare density. At the time of the survey, the estimated tonnage between the two beds was 2,121.75 tonnes tonnes. Although the current size of the seed is small, it is worth considering historical data from the location for transplantation. Indeed, records show that similar beds were either lost or affected by weather events in this particular area (bed lost in 2013, no fishing in 2016 and 2021, late settlement in 2019 and 2020).

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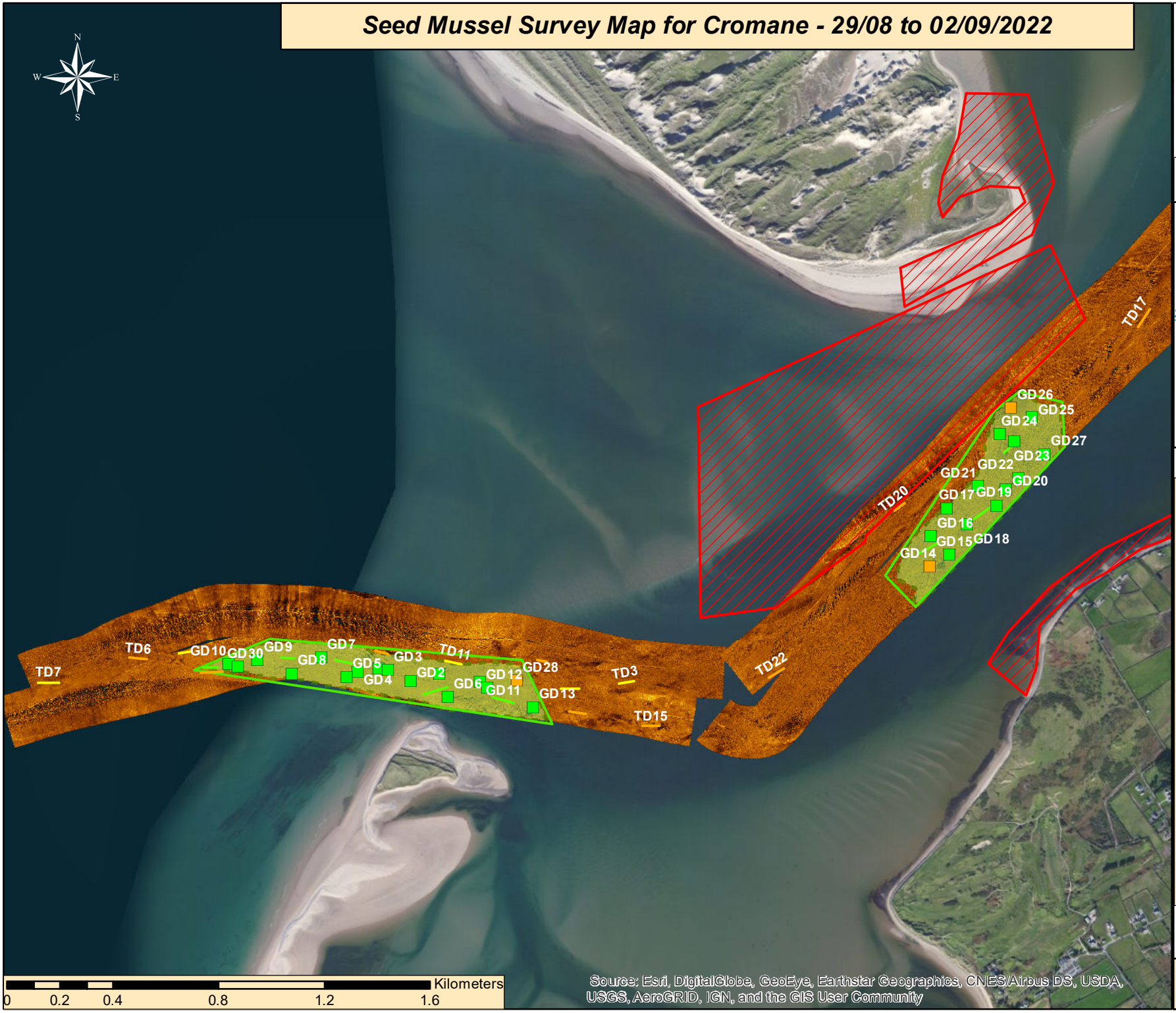

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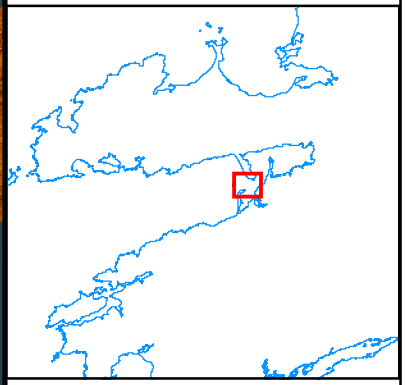

Legend

Tows category

- seed
- signs
- shells_st

Grab category

- seed
- shells stones
- bed_extent
- cromane_22
- amended_no fishing

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