



Schedule of Works

University College Dublin: Seabed Survey and
Sampling in support of marine Blue Carbon Research

Schedule of Works

In support of the QUEST Project, Project Partners UCD and DCU are planning a Seabed Mapping and Sediment Sampling Survey to take place onboard the *RV Tom Crean* on the provisional dates of 26/11/2024 04/ 12/2024 and 10/12/2024 15/12/2024. The survey data collected by this initial and future survey works will provide information on the upper 5 m of subsurface geology and seafloor conditions, to characterise and assess marine areas for Blue Carbon potential, and help inform future policymaking with regards the same. A suite of mapping instruments will be used in this geophysical reconnaissance survey. This includes:

- Day grab and coring equipment for sediment sampling;
- Deployment of Unisense MiniChamber Lander System;
- Hull-mounted multibeam echosounder (MBES), sub-bottom profiler and acoustic Doppler current profiler acquisition;

A Primary Study Areas (high-priority) for characterising soft sediments, quantifying carbon stock levels, assessing anthropogenic impacts on sediments has been identified from existing data (Figure 1).

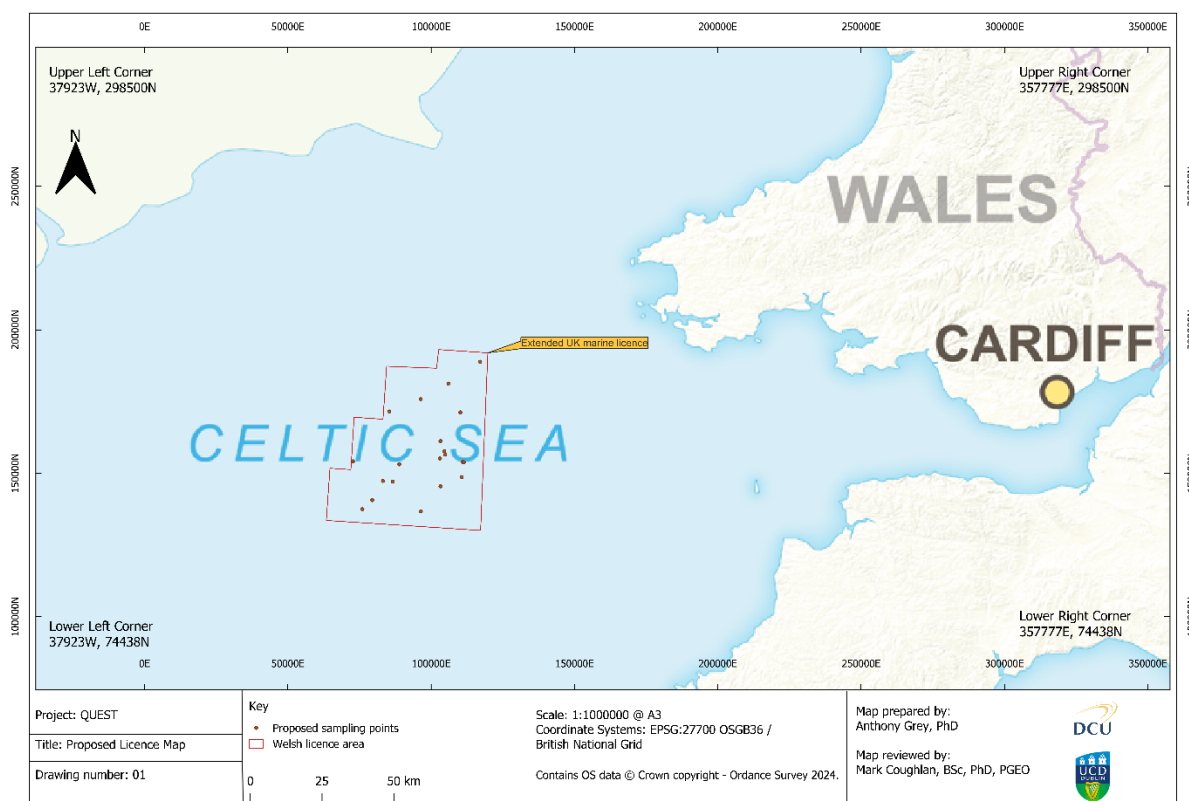


Figure 1 Proposed Survey Area

The proximity of this Study Area, and the sampling locations therein, to near or overlapping protected sites is presented in Figure 2. From Figure 2, the overall Study Area overlaps with the Skomer, Skokholm and the Seas off Pembrokeshire SPA, but there is no planned sampling or survey within this area. Joint Nature Conservation Committee (JNCC) provides guidance to manage the risk to marine mammals from manmade sound sources in UK waters. This document provides guidance and mitigation measures to address key potential sources of anthropogenic sound that may impact negatively on marine mammals in UK waters. A certified Marine Mammal Observer (MMO) will be on board during operations, and the guidance set out by JNCC will be fully implemented to minimise risk to the marine environment to mitigate any harm. During sampling, all appropriate protocols according to the sampling technique will be implemented to minimise risk to the marine environment. The equipment we are using is standard, certified sampling equipment. The nearest MPA is the South of Celtic Deep, which is located 5 km to the south.

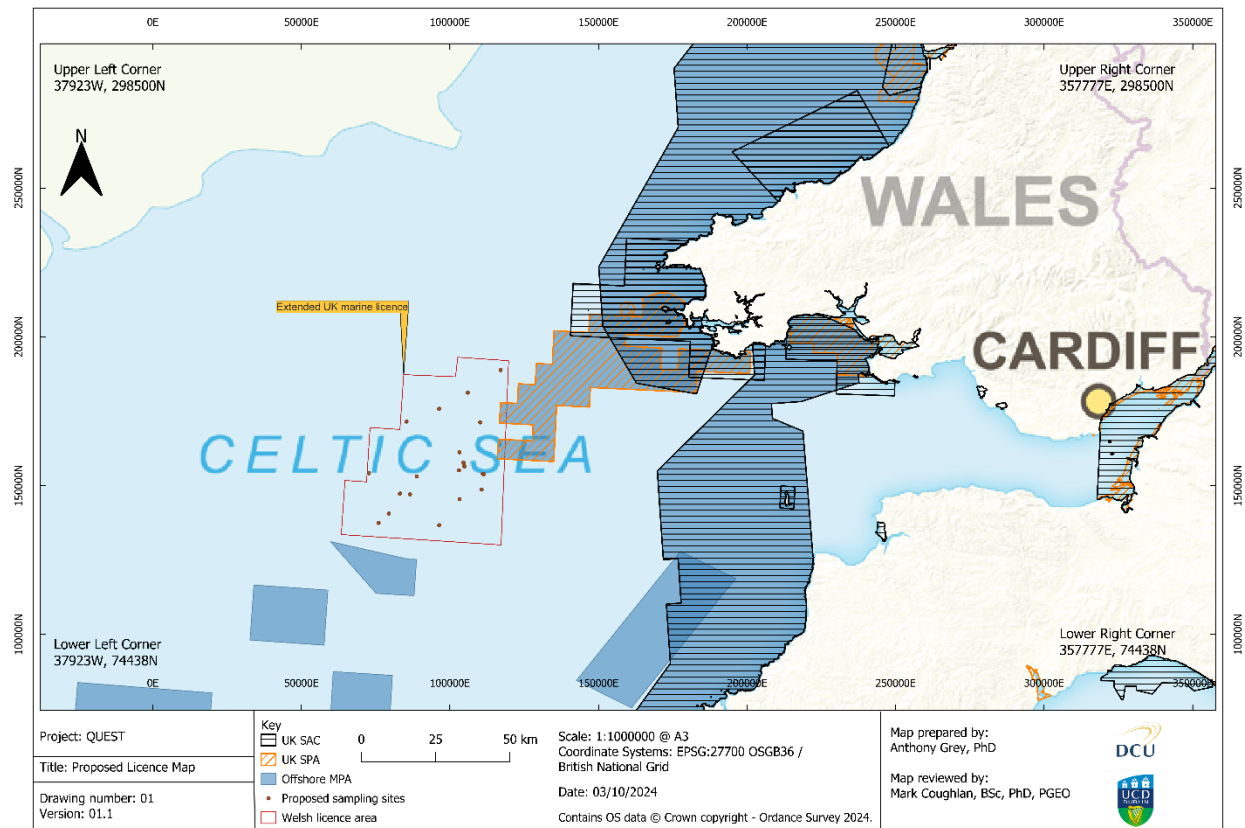


Figure 2 Proposed Survey Area and sample locations relative to UK Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Marine Protected Areas (MPA)

26/11/2024

- Mobilise in Cork

27/11/2024 – 03/12/2024

- Leave Port, to the first Primary Study Area south of Ireland.
- we propose a day schedule of deployment of the Unisense MiniChamber Lander System coupled with sediment sampling at targeted locations within the Primary Study Area. The deployment of the Unisense MiniLander System is expected to take approximately 4 hours at each site.
- We propose a night schedule of acquiring geophysical data at targeted locations where sampling is performed. Starting in the evening this would include;
 - Perform SVP dip at site and undertake MMO activity
 - Regional and detailed MBES and pinger survey across the site, as dictated by site conditions (8 hours approximately overnight).

04/12/2024

- Transit home to Cork
- De-mobilise in Cork.

10/12/2024

- Mobilise in Cork

11/12/2024 – 14/12/2024

- Leave Port, to the first Primary Study Area south of Ireland.
- we propose a day schedule of deployment of the Unisense MiniChamber Lander System coupled with sediment sampling at targeted locations within the Primary Study Area. The deployment of the Unisense MiniLander System is expected to take approximately 4 hours at each site.
- We propose a night schedule of acquiring geophysical data at targeted locations where sampling is performed. Starting in the evening this would include;
 - Perform SVP dip at site and undertake MMO activity
 - Regional and detailed MBES and pinger survey across the site, as dictated by site conditions (8 hours approximately overnight).

14/12/2024

- Transit home to Cork
- De-mobilise in Cork.

Equipment

MBES

We propose using the EM2040 Multi-beam echosounder onboard the RV Tom Crean as it offers high-quality MBES data.

Sub-bottom Profiler

We propose using the Knudsen 3260, with Coda acquisition, onboard the RV Tom Crean

Sampling

We propose using the existing box corer, multicorer vibrocorer, gravity corer and day grab sampling equipment available from the Marine Institute. Details of each are given in Table 1 below.

Unisense MiniChamber Lander System

We will utilise the Unisense MiniChamber Lander System available from the Agri-Food and Biosciences Institute. The Unisense shallow water instruments can be deployed to up to 300 meters depth and can stay deployed for up to a month, depending on the temporal resolution of measurements. The instruments are controlled online via cables from a PC on a ship or run by an autonomous program until retrieved. The MiniChamber Lander is a lightweight unit for shallow water benthic chamber measurement of multiple parameters, including shallow water sediment chamber studies and measurements for O₂, H₂, N₂O, NO, pH, H₂S and Redox.

Acoustic Doppler Current Profiler

We propose to use the RDI Teledyne 4 Pinnacle ADCP that is drop keel mounted. This unit measures the absolute speed of water currents with sound waves (Doppler effect) at multiple depths within the water column. It emits acoustic pings at 45 kHz and can profile up to 1000 m water depth.

Sample Locations & Details

A total of 22 sites (2 x vibrocore, 3 x multicore and 17 box core + grab samples) have been identified for seabed sediment sampling in the proposed study area as described by the coordinates below (Table 2 and see Figure 1 and attached document). The sampling strategy will primarily involve the use of a Boxcorer (see details below). Grabs will be taken at these locations should the boxcorer, multicorer or vibrocorer fail to return a sample.

SAMPLER	SEDIMENT TYPE	PENETRATION DEPTH	SURFACE AREA (m ²)	SAMPLE VOLUME (litres)
Grab Shipek	Soft/Fine grained	<10cm	0.04	<3
Box Corer	Soft to consolidated	30 - 40 cm	0.25	>3
Multicorer	Mud	~40cm	0.1 * # cores	>5
Vibrocorer	Sand, Gravel/Tills	5m	0.09	>5

*Table 1
Sample techniques to be used and calculated extracted volume for each*

Table 2 Survey sample locations and technique to be used at each location with approximate material removed

ID	Operation	Lat	Long	Volume removed (Approx L)
1	Box Core & Grab Sample	51.36626667	-6.16516667	6
2	Box Core & Grab Sample	51.2417	-6.23428333	6
3	Box Core & Grab Sample	51.21821667	-6.25385	6
4	Vibrocore & Grab Sample	51.5275609	-6.08048438	8
5	Vibrocore & Grab Sample	51.19299492	-6.68572137	8
6	Box Core & Grab Sample	51.19227644	-6.45462628	6
7	Box Core & Grab Sample	51.35556742	-6.52036112	6
8	Box Core & Grab Sample	51.45373779	-6.23309177	6
9	Box Core & Grab Sample	51.21147921	-6.13869181	6
10	Box Core & Grab Sample	51.2311302	-6.2287845	6
11	Box Core & Grab Sample	51.2726442	-6.2567265	6
12	Box Core & Grab Sample	51.0493088	-6.3333786	6
13	Box Core & Grab Sample	51.1374234	-6.5306184	6
14	Box Core & Grab Sample	51.075069	-6.5780385	6
15	Box Core & Grab Sample	51.40164941	-6.36824178	6
16	Box Core & Grab Sample	51.16450365	-6.13960658	6
17	Box Core & Grab Sample	51.13746727	-6.48195458	6
18	Box Core & Grab Sample	51.1335819	-6.22774599	6
19	Box Core & Grab Sample	51.05931019	-6.61826086	6
20	Multicorer & Grab Sample	51.13634761	-6.48506191	8
21	Multicorer & Grab Sample	51.16370856	-6.1427431	8
22	Multicorer & Grab Sample	51.40099528	-6.372013	8
TOTAL				142