MERC Consultants
environmental and conservation services

Assessments of Impacts of the Maritime Usage (AIMU) Report

Saoirse Wave Energy Project

Document control			
Document reference: AIMU_11042025			
Version	Date	Issue	Author
Final	11/04/2025	0.4	[redacted]

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1. Introduction

Saoirse Wave Energy Limited is seeking a Marine Usage Licence (MUL) to undertake marine site investigations off the Clare coast to progress the Saoirse Wave Energy project. The site investigation works, which constitute the proposed project, include geophysical, geotechnical, metocean, archaeological and environmental surveys which are required to facilitate the future design of the wave energy site, define the location of the array site, export cable corridor and landfall location options; and support the project planning application.

1.1 Background

Located at the edge of the Atlantic Ocean, where waves have been created by high winds travelling over long distances, the Irish west coast has an exceptionally high wave resource making it an ideal place to demonstrate and develop wave energy in Europe. It is estimated that Ireland has up to 18GW of wave resource off its west coast.

The benefits of wave energy lie in its power profile which complements other renewables such as wind and solar, thus supporting grid balancing. Additionally, in colocation with wind farms wave arrays can improve the power density of offshore energy parks in line with evolving national policy positions.

Saoirse Wave Energy Limited is a 100% ESB owned company whose objective is to develop, build, and operate a pre-commercial offshore wave farm. ESB has been involved in promoting and developing wave energy for many years. ESB developed the initial wave energy atlas for Ireland in 2005 and in 2008, ESB initiated the WestWave project, a now terminated 5MW pre-commercial wave energy project. The Saoirse Wave Energy Project which ESB is now progressing, benefits from this heritage.

The Saoirse project is a pioneering 4.9MW wave farm array, located adjacent to the Co Clare coast. It is an innovation project which is seeking to demonstrate the feasibility, benefits and viability of harnessing wave energy in Irish seas as well as the potential of deploying this solution at scale. The project was awarded €39.5m by the EU Innovation Fund in 2023. Subject to the necessary consents and a grid connection, the project is scheduled to be completed by early 2030.

Saoirse Wave Energy Limited is seeking a MUL to undertake the marine site investigations described in this application to progress the project design and support the project planning application.to progress the project design and support the project planning application.

1.2 Technology overview:

The chosen technology for deployment is developed by Swedish based CorPower Ocean. The first full-scale demonstration of the CorPower Ocean technology is currently taking place in Portugal. The wave farm will be in operation for a minimum of fifteen years and will provide key data and learnings related to the reliability, efficiency, energy production and environmental impact of wave farms over the long term to best inform potential future development and ocean energy strategy in Ireland and Europe.

As the project is supported by the EU Innovation Fund, the non-commercial sensitive environmental and technical knowledge gained throughout the development and operation of the project will be shared with scientific, technical, educational, and governmental institutions to ensure ongoing learnings from the work undertaken.

1.3 Project Criticality & Alignment with National and EU Policy

In line with MARA's Application Prioritisation Scoring System for the prioritisation of licence applications aimed at ensuring that applications of national strategic importance are prioritised and delivered in a timely manner, the proposed project aligns with the following Application Prioritisation Criteria, including:

National & European Priorities

Offshore Renewable Energy & ORE Non DMAP

- The project has been awarded EU Innovation Funding which funds programmes for the deployment of innovative net-zero and low-carbon technologies and constitutes one of the key tools of the European Green Deal Industrial Plan.

- The EU Offshore Renewable Energy Strategy sets a target of 1GW by 2030 of ocean energy (wave and tidal) installed capacity (EC, 2020)

- The EU Renewable Energy Directive revision (RED III) has set an indicative target for innovative renewable energy technology to count for at least 5% of newly installed renewable energy capacity by 2030 (Directive (EU) 2023/2413)

- The project will apply to become a Strategic Project under the Article 13 of the Net Zero Industry Act Regulation (EU) 2024/1735

- More generally, the project aligns with the following EU policies aimed at delivering secure, sustainable, and affordable energy for Europe including the Energy Union Strategy, EU Climate Law, the RePowerEU Plan, the Fit for 55 Legislative Package and the Energy Efficiency Directive (EED).

Policy and Regulation

National Policies linked with the Marine Strategy Framework Directive & Climate Action Plan (CAP)

- The national Climate Action Plan (CAP) underlines that addressing the climate challenge requires the deployment of existing innovative technologies and solutions at scale, and the development and deployment of innovative technologies and solutions (including ocean energy technologies). This Plan also includes renewable electricity targets (80% share of electricity generation capacity coming from renewable sources by 2030) which this project will contribute to deliver and will provide insights into an alternative renewable energy source which has the potential to significantly support the decarbonisation of the electricity grid beyond 2030.

- The project fully aligns with the National Marine Planning Framework 2021 (NMPF) which plays a key role in Ireland's response to the requirements of the EU Marine Strategy Framework Directive (MSFD). In this regard, key aspects of the MSFD have been incorporated into the NMPF to ensure coherence between marine environmental requirements and marine planning. The proposed project adheres fully with a number of key policy objectives including supporting Ireland's decarbonisation journey through increased use of ORE and accelerating the move to cleaner energy in line with national and EU policy etc (as fully detailed in section 8 of this Report below).

- In addition, offshore renewable energy is firmly supported in the Future Framework Policy Statement 2024 which expressly references the State's binding renewable energy and ghg emission reduction targets and legal requirement to reach net zero no later than 2050. This Statement expressly notes that all ORE technologies will play a vital role as Ireland aims for 20 GW of ORE generation by 2040 and 37GW by 2050. This includes both fixed bottom and floating offshore wind turbines as well as other ocean energy generation including wave and tidal devices.

- Ireland's Powering Prosperity: Ireland's Offshore Wind Industrial Strategy notes that the EU Net Zero Industry Act will inform future measures, and which will provide opportunities for green industrial development and in particular via the use of regulatory sandboxes in relation to renewable energy technologies in order to foster innovation.

Additionally, and whilst not a policy document, the proposed project also aligns with the SEAI ORE Technology Roadmap which shows deployment opportunities for wave energy projects off Ireland ranging from 150MW to 4GW by 2050 (SEAI, 2024). This Roadmap will support policy development in the coming years in line with the development and deployment of innovative technologies.

In light of the foregoing clear national and EU policy alignment, the delivery of the Saoirse project has a critical role to play in contributing to the achievement of binding national and European renewable energy and decarbonisation targets. The proposed project would also assist with national and EU efforts to decarbonise our energy systems whilst simultaneously providing energy security, diversity of supply and reducing the impacts of climate change in real terms.

As such, adherence to the prioritisation criteria described above, is of the utmost importance such that this proposed project is prioritised in line with this framework in order that the largest EU Innovation Fund award ever awarded to an Irish project (and the largest award for a wave project) can be advanced in line with funding timelines laid down by the European Commission and which are binding in nature.

As this project essentially constitutes a First Of A Kind (FOAK) project in many respects, it is critical to the development of the wave sector in Ireland as it will be the largest wave array demonstrated

anywhere in the world and moreover, will be a key enabler for future development of wave energy in Ireland and indeed Europe.

Given that the project is being progressed with the support of an EU Innovation Fund award, the project must adhere to the timelines set out in the Grant Agreement in order to be successful and prioritisation in line with MARA's Application Prioritisation Scoring System would assist in a tangible manner and assist with adherence to the aforementioned binding timelines.

2. Objectives of this report

The objectives of this report are to provide the information to allow the Competent Authority (MARA) to fully assess all potential impacts of the proposed maritime usage. This Assessment of Impact on the Maritime Usage (AIMU) report has examined the potential for project related impacts on the environment including the following elements:

- Assessment of impact on the environment with respect to the EIA Directive
- Assessment of conformity relative to the key objectives of the Water Framework Directive (WFD)
- Assessment of conformity relative to the key objectives of the Marine Strategy Framework Directive (MSFD)
- Assessment of consistency with the National Marine Planning Framework (NMPF)

3. Statement of Authority

This report was prepared by [redacted] and [redacted] of MERC Consultants. MERC are a specialist marine ecological survey and consultancy firm. Core staff have more than 60 years of combined experience and specialist knowledge in relation to Irish marine habitats and species in addition to the assessment and management of conservation interests. MERC have been responsible for conducting national surveillance monitoring of EU Annex I marine habitats for compliance under Article 17 of the EU Habitats Directive since 2015.

In this context MERC have also been responsible for the assessment and reporting of marine Annex I habitats and the preparation of Article 17 and overarching site monitoring reports. MERC are currently engaged in conducting surveys and preparing the relevant reports for the current (2022-2025) monitoring cycle. Between 2005 and 2010 MERC conducted the survey, monitoring, and assessment of sensitive subtidal habitats in Ireland to inform the conservation objective setting for Irish marine SACs.

[redacted]**MCIEEM** is a professional marine ecologist with a wide range of experience in the field of conservation biology, marine habitat mapping and ecology. She completed a M.Sc. in ecology and taxonomy at Trinity College Dublin in 1989 and a Ph.D. in taxonomy also at Trinity College Dublin in 2001. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). For the last 20 years she has specialised in the ecology of marine ecosystems. She has specialised in the assessment of benthic habitats with a focus on intertidal and subtidal reef habitats

and sensitive seabed species and habitats. Over the last 20 years she has conducted extensive marine monitoring surveys and assessments of EU Habitats Directive marine Annex I habitats and their associated species within European sites in Ireland to assist Ireland in complying with monitoring obligations under the EU Habitats Directive.

[redacted]**MCIEEM** is a professional marine ecologist with a wide range of experience in the ecology, survey, and monitoring of marine habitats and species in Ireland. He completed a Diploma in Science at Galway Regional Technical College in 1987 and a B.Sc. in Biological Sciences at Plymouth University in 1989. He has extensive experience in the monitoring of benthic habitats and species in Ireland and was lead scientist for the mapping of sensitive subtidal species across a range of European sites in Ireland from 2005 to 2010.

Over the last 30 years he has also specialised in the ecology of marine fish, and in this regard, provides expertise and review services with respect to assessment of anthropogenic impacts on shellfish, pelagic and demersal species. In this regard he has acted as a lead auditor for the Aquaculture Stewardship Council (ASC) and Marine Stewardship Council (MSC).

4. Details of the proposed project

4.1 Project location

The proposed broad geophysical target survey area is 114.57 km^2 It encompasses an area extending from Freagh point County Clare, south to Ballard Bay and out to a maximum distance of 10km from shore (Figure 1).

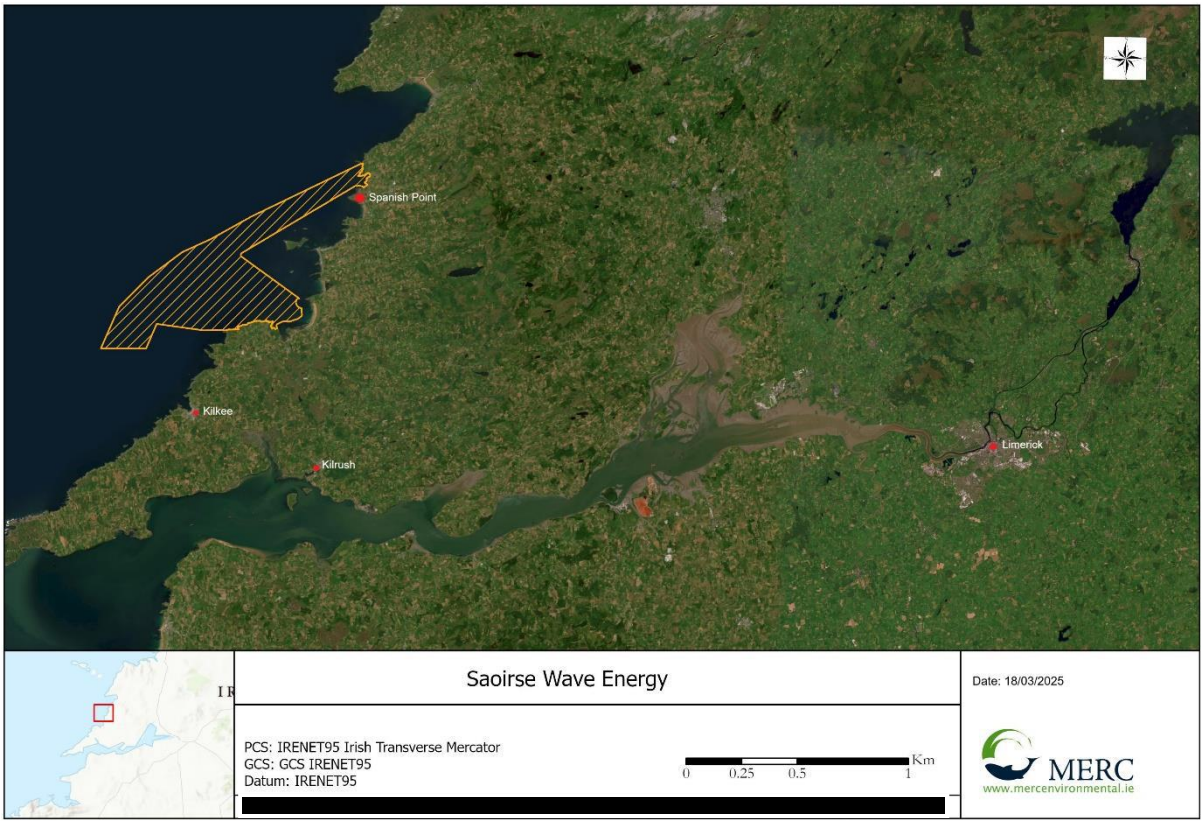

Figure 1. MUL application area.

4.2 Proposed survey Activities

Saoirse Wave Energy Limited is planning geophysical, archaeological, geotechnical, metocean and environmental surveys to provide the required information to establish the future design and operation of the wave energy demonstration site. The results from the proposed surveys will also define locations of the array site and landfall options. The proposed survey area which corresponds to the MUL application area, is 114.57 km^2. It encompasses an area extending from Freagh point County Clare, south to Ballard Bay and out to a maximum distance of 10km from shore.

It is intended that surveys will commence in the summer of 2025 with a staged programme of investigations over the subsequent four years (2026, 2027, 2028, 2029), capitalising on suitable weather windows over the total period of five years. A high-level programme, including indicative numbers of samples, durations and timings is outlined in and described below.

Table 1. Proposed Survey activity and estimated time and duration

Activity	Equipment	Timing and duration
Geophysical surveys	Multibeam echosounder (MBES) with acoustic backscatter; Side scan sonar (SSS). Magnetometer. Gradiometer. Sub-bottom profiler (SBP);	Initial reconnaissance geophysical surveys in spring - summer 2025 (with support from the National Marine Survey Programme). Subject to grant of MUL licence. Detailed surveys in summer of 2026. Total duration of up to 6 months (weather permitting).

Activity	Equipment	Timing and duration
	Ultra-high resolution Seismic (UHRS). Potentially a sparker (single and multi-channel) and mini-air gun. USBL system.	
Geotechnical surveys	Up to 30nr. boreholes to depths of up to 50m below seabed (BSB) in subtidal areas; Up to 40nr. cone penetration tests (CPTs) in subtidal areas; and Up to 40nr. vibrocores in subtidal areas. Up to 5nr. trial pits at proposed landfall locations	Reconnaissance geotechnical campaign in summer 2026. Potentially a refined detailed survey in summer of 2027. 15 - 25 hours of drilling time in any one location. CPT - 30min – 2 hours in any one location. Vibrocores 30mins-2 hours in any one location. Trial pits – 30mins-2 hours in any one location. Total duration of up to 6 months (weather permitting). The exact locations of boreholes, vibrocores and CPTs will be informed by the data derived from the geophysical surveys and cannot be confirmed at this stage. However, it is considered likely that they will be spread across the entire area of the MUL where suitable bathymetry is present.
Benthic ecology survey	Benthic grab sampling (up to 50 sampling locations). Camera and video sampling (up to 50 sampling locations). Video transects over potential Annex I habitats and protected features e.g. reef habitats (If required; number of locations to be confirmed by geophysical survey results). Diving activities may be applied for inspection and sampling in areas with restricted access. Intertidal walkover surveys to record biotopes and species present.	Subject to availability of geophysical survey results. A part of summer survey 2026 campaign. Up to 3 hours at any one location. Total duration of up to 3 weeks (weather permitting). The exact locations of grab stations will be informed by the data derived from the geophysical surveys and cannot be confirmed at this stage. However, it is considered likely that they will be spread evenly across the entire area of the MUL where suitable soft sediments are present.
Metocean	Up to 2 Acoustic Doppler Current Profilers (ADCPs) are likely to be deployed on the seafloor in a trawl resistant mooring frame.	Maximum 36 months.

Activity	Equipment	Timing and duration
	Up to 2 waverider buoys are likely to be deployed with a mooring system. Up to 2 LiDAR buoys with a mooring system may be also deployed.	
Marine mammal acoustic monitoring	Up to 4 acoustic monitoring devices (i.e. CPoDs and/or AMAR) are likely to be deployed across the site at any one time. Assume deployment of up to six deployments of CPoDs/AMAR devices, as contingency for lost equipment, at the same locations as the original deployments.	Up to 2 years of monitoring.
Intertidal ecology surveys	Walkover surveys to map intertidal habitats and species. Likely to include transects, quadrats and core sampling (e.g. hand coring). Up to 12 sampling locations per landfall considered.	1-2 days per landfall. Summer 2025 (weather and tide permitting).
Offshore bat surveys	Offshore bat surveys may be considered for the project.	To be confirmed.
Water Quality	Sample collection may be undertaken with a rosette of water bottles and *in situ* sampling (i.e. with CTD probe)	There may be maximum of 20 nr. water quality sampling locations within the MUL Licence Area. As a part of summer survey 2026 campaign.
Archaeological Survey	Underwater Archaeology Intertidal archaeology	Identification and assessment of metallic and other targets recorded during the magnetometer survey (as part of the geophysical survey specification above). This will be conducted in advance of geotechnical survey to inform the UXO and archaeological risk assessment. Undertaken as part of geophysical survey (2025/2026). Intertidal archaeological survey is also considered to be carried out during summer 2025.

4.3 Survey vessel

For the geophysical, environmental, and possibly geotechnical (CPTs and vibrocore) surveys it is proposed to use the Irish multi-purpose marine research vessel, the *RV Tom Crean,* () or similar vessels available at time of survey mobilisation. For follow-on geotechnical surveys, it is proposed to use vessels similar to Fugro Voyager and Fugro Aran 120 and a Jack Up Barge as shown in to Figure 5.

Fugro Voyager is an example of typical, purpose built offshore geotechnical vessel. The vessel has been specifically designed for operating in water depths up to 3,000m metres for both drilling and seabed sampling and in situ testing. The vessel has a twin tower type drilling derrick over a central moonpool.

Fugro Aran 120 is an example of Jack Up Barge, designated for acquisition of sub-seabed data using borehole, vibrocore and cone penetration techniques in the nearshore area.

For follow-on nearshore geophysical, geotechnical, and environmental surveys smaller vessels are likely to be employed.

Uncrewed surface vehicle (USV) and/or autonomous surface vehicle (ASV) may also be used for the provision of geophysical survey.

The RV Tom Crean was commissioned in 2022 and was designed as a silent research vessel, in order to meet the stringent criteria of the ICES 209 noise standard for fisheries research. The vessel technical specification is outlined in Table 2.

A suitable support vessel will be contracted to enable to deployment and recovery of any metocean survey equipment throughout the project duration. A suitable small to medium sized multicat support vessel with an appropriately rated crane or A-frame system would be required for the tow-out, deployment and mooring, and recovery operations. A vessel such as the AMS Retriever (as shown in Figure 5) or similar would be required for these operations.

Other vessels supporting project works, have yet to be identified, as their availability will be subject to grant of MUL licence.

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended, including the requirements of MARPOL. In addition, all vessels will adhere to published guidelines and best working practices such as: the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations. Vessels shall have a Health, Safety and Environmental Managements system which should conform to the requirements of the latest International Maritime Organization (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in.

The vessels to be considered for the provision of survey works will be represented by small and medium size vessels. Acoustic broadband source pressure levels with smaller vessels (<50 m) having source pressure levels 160-175 dB (re 1µPa at 1m) and medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) (DECC, 2011). The survey works will be undertaken from vessels in accordance with the relevant guidelines required to manage the risk to marine mammals from man-made sound sources in Irish waters.

Figure 2. RV Tom Crean

Figure 3. Typical Offshore geotechnical drill survey vessel - Fugro Voyager

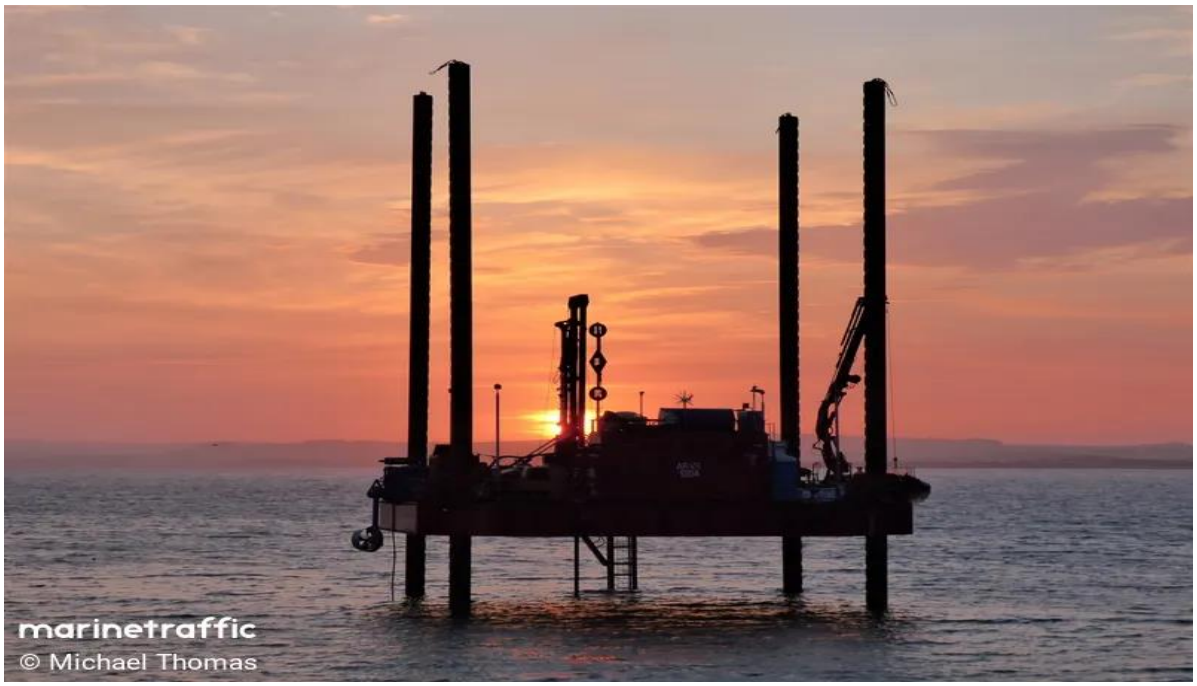

Figure 4.Typical Jack Up Barge – Fugro Aran 120

Figure 5. Typical vessel for metocean deployment and recovery – AMS Retriever

Table 2. RV Tom Crean: Vessel specifications

Vessel size	
Vessel length	52.8m
Beam	14m
Draught	5.2m (maximum)
Tonnage (GRT)	1935 Tonnes
Main diesel generators	
Make	Mitsubishi
Type	S16R-(Z3) MPTAW
Number and power	2 x ~1437kW
Speed	1500 rpm
Mounting	Double resilient
Exhaust silencers	SCR system with 45dB(A) attenuation
Auxiliary diesel generators	
Make	Scania
Type	DI 13-91 M
Power	426 kWm
Speed	1500 rpm
Mounting	Resilient
Exhaust silencers	At least 25 dB(A)
Propulsion motor	
Make	Indar
Type	Squirrel cage – Induction motor IMU-710-X/8
Power	2000 kW at 179rpm
Rated frequency	12.6 Hz

4.4 Equipment description and specifications

A suite of instruments will be used for the site investigation survey as detailed in .

Geophysical survey equipment will include a multibeam echosounder, sub bottom profiler and side scan sonar. A sparker system and, if further penetration is required, an air gun source may also be required. The type of geophysical survey equipment to be used will be determined by a number of factors including:

- Depth of interest below seafloor.
- Nature of shallow rock that is likely to be encountered.
- Desired resolution of the data that are to be used for mapping the shallow materials.

Geotechnical survey equipment to test the nature of, and/or retrieve samples on or below the seafloor will also be required. This to include vibrocore, borehole or cone penetration testing (CPT). Trial pits possibly to be collected in the intertidal zone as well.

A number of other instruments, such as a magnetometer, ADCPs, wave rider buoys, LiDAR and a maximum of 4 no. CPoDs, which are considered passive devices in terms of noise generation, will also be deployed.

Deployment of a Day or Hammon grab will be required to collect sediment samples to inform the benthic ecology of the MUL application area.

The indicative specifications of proposed equipment required to undertake the geophysical, geotechnical, metocean and environmental surveys is listed in Table 3 and described below.

Table 3. Indicative specifications of proposed survey equipment

Equipment	Example Model	Deployment	Company	Sound Pressure Level re 1 µPA in water @ 1m from source
Geophysical equipment				
Multibeam Echo sounder	EM2040 (200,300 & 400kHz)	Retractable hull mount	Konsberg Maritime	210dB
Side scan Sonar	4205 sidescan (300 to 900 kHz)	Towed system	Edgetech	228dB
Sub-bottom Profiler	Knudsen 3250 CHIRP (3.5-12kHz)	Vessel mount	Knudsen	223dB
Sparker	Dura-speak seismic sound source (300Hz to 1.2kHz)	Towed system	Subsea Technologies	226dB
Mini air-gun	Mini G Gun (10 and 500 Hz)	Vessel mount	Sercel	230dB
ultra-short baseline (USBL) system	e.g. Kongsberg HiPAP (Typically 20 to 50 kH)z	Equipment mounted	Konsberg	207dB
Geotechnical equipment				
Vibrocorer	HPC (high performance corer), or similar	From vessel	Fugro or similar	145-190dB
Cone penetration testing	Fugro Seascalf, G-Tec GT25 or similar	From vessel	Fugro or similar	118-145dB
Borehole testing	Geobor S or similar	From vessel	Fugro or similar	145-190dB
Trial Pitting	Tracked excavator	Tracked within foreshore area where access is possible	Fugro or similar	N/A
Passive recording equipment				
Magnetometer/ gradiometer	TBC	Towed	TBC	N/A
Wave rider	DWR-MkIII	Anchored	Datawell	N/A
CPoDs/Autonomous Marine Acoustic Recorder (AMAR)	AMAR G4	Anchored	Jasco	N/A
Acoustic Doppler Current Profiler (ADCP)	Sentinel V (300 – 1000Hz)	Static on seabed	Teledyne marine	N/A
Floating LiDAR buoy	EOLOS FLS200	Anchored	EOLOS	N/A
Benthic sampling and survey equipment				
Day Grab	N/A	Overboard	N/A	N/A
Hammon Grab	N/A	Overboard	N/A	N/A
Drop down camera	N/A	Overboard	N/A	N/A
Diver surveys	N/A	Overboard	N/A	N/A

*Note: Where the exact model to be used is yet To Be Confirmed (TBC) a worst-case scenario has been used to determine the upper-level sound pressure possible. The equipment type and model are indicative only, exact equipment to be specified by the contractor but the examples provided are consisted standard and any variations will be minor.

4.4.1 Geophysical surveys

Multibeam echosounder

A multibeam echosounder (MBES) is a type of sonar frequently used to map bathymetry. It operates by emitting an acoustic wave in a fan shape beneath the point of its transceiver attached to the hull of the vessel. The time it takes for the sound waves to bounce off the seabed and return to the transceiver is used to calculate the water depth within the arc of the fan. The proposed MBES operates at a sound pressure level of 210 dB re 1µPa at 1m with a peak frequency between 200-400 kHz.

Side scan sonar

Side scan Sonar (SSS) is another device that transmits sound pulses that provide the information required to map the seabed. It differs from MBES in that SSS has a finer beam width and smaller footprint to MBES and therefore higher resolution. It is towed behind the vessel very close to the seabed and emits fan-shaped acoustic pulses directed down toward the seafloor which are recorded as a series of cross-tracks. The sound frequencies used by side-scan sonar range from 100 to 1000kHz; higher frequencies yielding better resolution but less range.

Sub-bottom profiler

A Sub-bottom profiler employs an acoustic signal, to provide the information required to identify and measure marine sediment layers that exist below the sediment/water interface. The proposed equipment comprises a Knudsen Chirp system which transmit a sweep of frequencies (e.g. 2-10 kHz) in a single pulse. Depending on the profile of the seabed (rock, sand, mud etc.) and level of compaction, the energy reflected back can be related to the sub-bottom composition.

Sparker system and hydrophone array

A sparker is a device used for sub-seabed investigations where deeper acoustic penetration is required. It is generally more powerful than a Sub-bottom profiler and used to explore very coarse/compacted sea beds. The sound source is generated by an electrical arc that creates a bubble. As it collapses the bubble produces a broad band (500 Hz – 4 kHz) omnidirectional pulse which penetrates a few hundred meters into the subsurface. Hydrophone arrays towed near the acoustic source receive the returning signals.

Mini airgun

A mini airgun emits a blast of compressed air resulting in an acoustic signal consisting of an initial high-amplitude pressure pulse followed by a decaying series of “bubble pulses” formed by oscillations of the resulting air bubble.

USBL system

A USBL system provide a method of positional fixing underwater. It consists of a transceiver, which is mounted on a pole under the survey vessel, and a transponder deployed on the seafloor or on the subsea instrument being used. An acoustic pulse is transmitted by the transceiver, and the pulse detected by the transponder is retuned. The time between the initial acoustic pulse and the reply is then measured by the USBL system and is analysed to allow the position to be calculated.

4.4.2 Metocean and other passive equipment

ADCP

An ADCP is a hydroacoustic current meter used to measure water current velocities over a depth range using the doppler effect of sound waves scattered back from particles within the water column. In the present case ADCPs potentially operating in the range of 300 – 1000Hz will be used. The instrument emits "pings" of sound at a sampling rate of 1-minute average every 10 minutes.

The ADCP is contained within a trawl resistant bottom mount frame *circa* 1.8m x 1.3m x 0.6m with a weight of approximately 300kg. The frame is attached to a ground line, a clump weight and to an acoustic release system carrying a rope retrieval system. The frame also houses a recovery line attached to a small rigid buoy which is held in place by an acoustic release, which releases the buoy on command from a deck unit.

Also housed within the frame is lead ballast to secure the frame to the seabed. Additional instrumentation to collect salinity and temperature data may also be contained within the frame. An acoustic pinger is also mounted on the frame to aid in the recovery of the frame in the event of the acoustic release not firing. The frame is deployed with a grapple hook and floating nylon line to serve as a backup means of recovery.

The specifications of the ADCP and installation vessel will be confirmed by award of the tender contract. A vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Floating LiDAR buoy

Floating LiDAR buoys may be deployed to measure the wind resource and wind speeds, understand the wave hight, heave and direction, measure current profiles to understand met conditions within MUL licence area. Deployment of buoy will include anchoring. Up to 2 LiDAR buoys may be deployed for a period of between 12 to 24 months.

The specifications of the floating LiDAR buoy, the associated mooring type, and an installation vessel will be confirmed by award of the tender contract. An installation vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Waverider buoy

Waverider buoys may be deployed to measure wave hights and direction to support a detailed design of the project within MUL Licence area. They will be attached to a seabed with suitable mooring. Up to 2 waverider buoys may be deployed to gather wave data. The specifications of the waverider buoy, the associated mooring type, and an installation vessel will be confirmed by award of the tender contract. An installation vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Magnetometer/ Gradiometer

A magnetometer is a passive instrument that measures the Earth's magnetic field allowing magnetic anomalies to be measured. It is towed behind the survey vessel where it samples background magnetism. When the magnetometer detects an anomaly, such as ferrous objects such as fragments of a ship hull or a geological formation of basalt. This is detected as a change to the background magnetic field. This tool can detect artifacts above or below the seabed.

Gradiometer surveys are carried out using a similar methodology but with the use of two separate magnetometer sensors towed in a paired configuration. Gradiometer surveys measure the gradient of the magnetic field, allowing for a more precise measurements of magnetic variations. The use of magnetometer or gradiometer survey arrays will be determined following further site-specific assessments to ensure the most appropriate methodology.

4.4.2 Benthic survey

Seabed imagery

Underwater camera systems or Remotely Operated Vehicles (ROVs) may be used for visual inspection of the existing environmental conditions within MUL area. Dropdown video surveys using a overboard camera may be conducted to record the subtidal habitat especially in areas where hard strata (subtidal reef) are indicated (based on bathymetry) to be present. High quality video recordings and stills will be collected for further analysis and confirmation of suitable conditions for further intrusive activities e.g. benthic sampling or geotechnical works.

Day or Hammon grab

A Day grab is an instrument used for sampling soft seabed sediments. When deployed overboard it is lowered on a winch to the seabed where the jaws open to take a small (approx. 15L) sample of the surface sediment (top 20cm). A Hammon grab is a very similar type of sampler, but the jaw mechanism is slightly different which allows it to sample coarser sediments (e.g. gravel and shelly sediments). The samples retained can then be analysed to obtain an overview of the sediment fauna, and particle size. Both samplers are routinely used for surveillance monitoring to support a number of EU Directives such as the Habitats Directive and Water Framework Directive. Day or Hammon grabs do not introduce noise into the underwater environment other than that produced from a slight impact with the grab making contact with the seabed.

Intertidal coring and walkover surveys

For intertidal sediment assessment a 0.01m^2 hand core taken to a depth of 20cm for benthic faunal analysis will be used. Additional surveys of intertidal hard strata may also be carried out by conducting walk over surveys of the relevant hard strata to record biotopes and species present.

Diver surveys

Diver surveys, using SCUBA, may also be conducted in areas of hard strata. Both surveys are considered to be non-intrusive as they do not make contact with the seabed.

4.4.2 Geotechnical surveys

The aim of the geotechnical survey is to provide sufficient geotechnical data to allow the characterisation of the sub-seabed strata. As such vibrocoring, seabed CPT and borehole testing will be conducted at the number of locations spread throughout the MUL application area. The geotechnical survey will be undertaken from a dedicated geotechnical vessel as described in section 4.2. Drilling, resulting from geotechnical surveys, is acknowledged to produce moderate levels of continuous omnidirectional sound at low frequency (several tens of Hz to several thousand Hz and up to c.10 kHz). Source sound pressure levels have generally been reported to lie within the 145-190 dB re: 1 µPa range (NPWS, 2014).

Boreholes

Up to 30 boreholes with a diameter of up to 102mm and a depth of up to 50m below the seabed will be carried out. To facilitate this, a drill head is lowered to the seabed from the vessel via a drill string and stabilised using a seabed frame. The drill head penetrates the seabed via rotation of the drill string and the application of a downward pressure. Soils and rock samples are then retrieved for laboratory testing via the drill string. Borehole drilling may be combined with *in-situ* testing such as cone penetration testing or down the hole testing at some investigative locations.

Indicative Equipment: Drilling equipment used will follow the ISO and API technical specifications for drilling equipment. Indicative equipment to be used would be traditional API drill string or a triple core barrel system (e.g., Geobor 'S') or similar.

Cone penetration testing

Up to 40 CPT with a Diameter: 50-62mm and a depth of up to 30m below the seabed will be carried out. This will be carried out *in situ* on the seabed via a frame or by deck-push CPT from the vessel via a moon pool.

Indicative Equipment: Fugro Seascalf, G-Tec GT25 or similar. For landfall investigation within the intertidal zone, a tracked borehole / CPT rig and ancillary equipment would be used.

Vibrocoring

Up to 40 Vibrocore samples will be taken to a depth of 6m. A gravity or piston core will be used to collect the samples. These devices are typically deployed from a crane on the vessel.
Indicative Equipment: Fugro HPC (high performance corer) & OSIL Vibro-Corer or similar.

Trial pitting

Up to 5 trial pit excavation locations will be carried within the intertidal or foreshore areas where access is possible. These excavations will be carried out using a tracked excavator to excavate a pit approximately 1m wide, 3m long and up to 4m deep depending on the ground conditions. Trial pit excavations will be used to visually inspect the ground conditions, collect samples and carry out insitu testing such as shear vane testing and plate bearing testing. Completion of a trial pit excavation will take up to two hours each and all excavations will be back filled with the excavated materials in the

order in which they were excavated. Trial pit excavation is not carried out within the water body, with all works carried out above the water line or within tidal windows.

5. Methods

The following reports were carried out in support of this MUL application and were consulted during the preparation of this AIMU report:

- Supporting Information for Screening for Appropriate Assessment (MERC, 2025a)
- Natura Impact Statement (MERC, 2025b)
- Annex IV Risk Assessment (MERC, 2025c)

This report has been prepared with reference to the following European Directives, national legislation, and guidance on the provisions of, inter alia, the Environmental Impact Assessment Directive.

- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (EIA Directive) (Codified Directive).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Technical Guidance note: Obtaining a licence to carry out specified maritime usages in the Maritime Area under the Maritime Area Planning Act 2021. MARA, 2024 Ver 7.
- European Communities (Birds and Natural Habitats) Regulations 2011. SI No. 477 of 2011.
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014.

A review of the baseline data was carried out by referring to the following reports and datasets:

- Department of Housing, Local Government and Heritage. National monuments service; wreck viewer.
- Integrated Mapping for the Sustainable Development of Ireland's Marine Resource (INFOMAR) 2024. Bathymetry, backscatter, sediment samples and sediment classification layers.
- Marine Institute (2022). Ireland’s Marine Atlas: Fishing activity and Fish Species Distribution Layers
- Irish Ramsar Wetlands Committee. Ramsar sites Ireland.
- NPWS Designations viewer (SACs, SPAs, NHAs and pNHAs)
- Biodiversity Data Centre Maps: Habitats and Species.
- MERC (2025a). Supporting Information for Screening for Appropriate Assessment: Saoirse wave energy project.
- MERC (2025b). Natura Impact Statement: Saoirse wave energy project.
- MERC (2025c). EU Habitats Directive Annex IV Risk Assessment: Saoirse wave energy project.

6. Environmental Report (EIA Directive: not of a class)

6.1 Background

The objective of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the Environmental Impact Assessment, or EIA, Directive) is to ensure that projects that are likely to have a significant effect on the environment are adequately assessed before they are approved. An EIA is required for all projects listed on Annex I of the EIA Directive and for all projects listed on Annex II, where the proposed project is likely to have significant effects on the environment. The proposed project does not fall within the classes defined under Annex I or Annex II of the EIA Directive. Therefore, it is not subject to the provisions of the EIA Directive.

Notwithstanding the fact that the proposed project is not subject to mandatory EIA, this AIMU has assessed the project relative to its potential to impact the receiving environment by virtue, *inter alia*, of its nature, size, and location.

As such the following elements have been assessed and an analysis of the assessment is given in Table 3 of this report:

- Land & Soils
- Water
- Biodiversity
- Fisheries and Aquaculture
- Air Quality
- Noise & Vibration
- Landscape/Seascape
- Traffic & Transport (including navigation)
- Cultural Heritage (including underwater archaeology
- Population & Human Health
- Major Accidents & Disasters
- Climate
- Waste
- Material Assets
- Interactions

6.2 Assessment of Impact

The Zone of Influence (ZoI) of the proposed project was established in the preparation of the SISAA (MERC, 2025a).

No direct or indirect pathway to freshwater, coastal or terrestrial habitats was established. For this reason, the baseline of the receiving environment is focused solely on marine habitats, and species including marine mammals and avifauna that utilise the marine environment.

The bathymetry and predominant habitat types in the area is known from INFOMAR data. A description of the ecology of the receiving environment is provided in the SISAA (MERC, 2025a). Table 4 below provides a summary of the environmental baseline and an assessment of the potential for impact on the environment.

Table 4. Environmental baseline and assessment of impact.

Protected sites
European sites (SAC's and SPA's)
There is no spatial overlap between the MUL area and any SAC. There is a spatial overlap between the MUL area and Carrowmore Point to Spanish Point and Islands SPA. A number of additional European sites (SACs and SPAs) are present within the ZoI of the proposed project. A SISAA report (MERC, 2025a) has been provided as part of this application. The SISAA concluded that "*the proposed project may give rise to significant effects on the conservation objectives a number of European sites without mitigation*." Accordingly, it concluded that Appropriate Assessment of the proposed project was required. A NIS for the proposed project was subsequently prepared and detailed measures designed to mitigate the identified potential for effects on the conservation objectives of the European sites within the ZoI of the proposed project (MERC, 2025b). The NIS concluded that "*provided the mitigation measures described in this [NIS] document are fully implemented, no adverse effect on the integrity of any European site will occur*." The mitigation proposed is provided in Appendix 1 of this report. Appendix 2 of this report lists all European sites that were brought forward for Appropriate Assessment (AA). Appendix 2 also gives details of UK sites outside of the network of European sites, that are within a Management Unit for Bottlenose Dolphin and/or Harbour porpoise and also brought forward for AA.
Additional designations (NHAs, pNHAs, Ramsar sites)
The proposed project is entirely marine and the SISAA did not identify any Source Path Receptor (SPR) link to any terrestrial, coastal, or freshwater habitats or species. There are no NHAs within the ZoI of the proposed project, as defined in the SISAA (MERC, 2025a). The nearest NHA to the MUL area is Illaunonearaun NHA [site code: 001014]. The boundaries of this site are coincident with those of Illaunonearaun SPA which is designated for Barnacle Goose (*Branta leucopsis*). The SISAA did not record any potential for interaction between the proposed project and this SPA and therefore no potential for impact is considered possible. Carrowmore Point to Spanish Point and Islands pNHA is located immediately adjacent to the MUL area. This site overlaps with the majority of Carrowmore Point to Spanish Point and Islands SPA. This SPA was screened in for AA. A Natura Impact Statement (NIS) for the proposed project was subsequently prepared and detailed measures designed to mitigate the identified potential for effects on the conservation objectives of this and other European sites. It is considered that provided the mitigation

recommended in Appendix 1 is implemented, there will be no adverse effects on Carrowmore Point to Spanish Point and Islands pNHA.
Additional pNHAs are located within the ZoI of the proposed project, as defined in the SISAA. However, no SPR link between these sites and the MUL area has been identified. Therefore, no potential for adverse effects is possible.

A review of the Ramsar database (https://www.ramsar.org/country-profile/ireland) indicates that no Ramsar sites overlap with the MUL area or are considered to be within the ZoI of the proposed project. The nearest coastal Ramsar sites are Inner Galway Bay Ramsar site, (circa 40km to the north) and Tralee Bay Ramsar site (circa 50km to the south). The boundaries of which, are largely coincident with the boundaries of the SPAs associated with these two sites. The SISAA (MERC 2025a) found no potential for impact on these SPAs, which are designated for waterbirds, and therefore no project related impacts or associated effects are considered possible.

Non-statutory Environmental Assessment

Population and Human Health

All acoustic surveys will be fully marine. Minor inconvenience may be encountered by fishing vessel operators during survey activities, but this will be temporary and for a short period of time.

While the potential for the accidental spillage of hydrocarbons from small, non-MARPOL compliant vessels, was identified as a small project related risk in the SISAA, mitigation to avoid this risk was proposed and is detailed in Appendix 1 of this report. Even in the absence of measures designed to mitigate the spillage of hydrocarbons, the identified risk is considered too low to impact population and human health due to the exposed location of the proposed project and low volumes of hydrocarbons carried on-board small working vessels.

Biodiversity

Benthic habitats

A mosaic of different sediment types is recorded for this area. The habitat being described on the basis of Shipek grab samples taken as part of the INFOMAR programme over recent years. The area is characterised by circalittoral fine sand or circalittoral muddy sand, circalittoral rock and other hard substrata, deep circalittoral coarse sediment, deep circalittoral mixed sediments, deep circalittoral sand and unspecified infralittoral sediments. There are no records of any sensitive habitats for this area. The intrusive equipment being used, for benthic and geotechnical sampling, includes a Day or Hammon grab, a vibrocorer, a drill and a cone penetrometer. The SISAA (MERC, 2025a) has indicated that no potential for impact from the use of these equipment types is possible due to the small diameter of the holes that will be created and low volume of samples collected, combined with the nature of the sediment and exposure of the site.

Coastal and terrestrial habitats

Not relevant. The proposed project is entirely within the subtidal and intertidal marine environment and no direct or indirect links to coastal, freshwater, or terrestrial habitats are possible.

Avifauna

The MUL area provides foraging habitat for seabirds. Following a full review of the available data and the potential for impact on bird species, the SISAA (MERC, 2025a) identified the potential for adverse effects on the SCIs for a range of seabirds within the ZoI of the MUL. Based on further assessment, the NIS concluded there was a low likelihood of interaction between the sound sources and diving birds due to the relatively short exposure time, temporary nature of the survey work, mobile nature of the birds and the resultant temporary displacement of most diving species due to vessel presence. However, mitigation to avoid effects on seabirds were recommended in the NIS (MERC, 2025b). It is considered that provided the mitigation measures recommended are implemented no impacts on seabirds will occur.

Marine Mammals

Data derived from the IWDG live sightings database and the ObSERVE aerial survey programme and site-specific surveys conducted to support the MUL indicated a range of marine mammals utilise the MUL area. The site-specific surveys indicated high numbers of Common dolphin (*Delphinus delphis*) within the MUL area. These surveys also indicated that Harbour Porpoise (*Phocoena phocoena*), Bottlenose Dolphin (*Tursiops truncates*) and Minke Whale (*Balaenoptera acutorostrata*) make regular use of the MUL area. While occasional use of the area is made by Humpback Whale (*Megaptera novaeangliae*).

An Annex IV Risk Assessment was prepared for the proposed project (MERC 2025c). This assessment indicated the potential for impacts on a number of cetacean species should they be present in the MUL area during selected elements of the acoustic survey. As such mitigation was proposed and this has been included in mitigation given in Appendix 1.

In a similar manner to that identified for cetaceans in the Annex IV Risk assessment, it is considered that impacts on pinnipeds, including grey seal and harbour seal, may occur, without mitigation. However, provided the mitigation detailed in Appendix 1 of this AIMU report is implemented no potential for impact on pinnipeds is considered likely.

While there are records for otter (*Lutra lutra*) within the intertidal areas of the site, and a likelihood they use the nearshore (< 100m from shore) it is considered unlikely that otter would be impacted due to the largely offshore nature of the proposed work and minimal interaction within the intertidal areas.

Fish

Commercial fisheries

The MUL area is a nursery area for the Cod, Mackerel, Horse mackerel, Whiting, and White bellied monkfish (See Figure 6 to Figure 8). There are no recorded spawning areas within the MUL.

Bottom trawling (Otter Trawls), which target demersal species, is carried out within the MUL area. Gill netting is also carried out within the MUL area, but closer to the outer margins of the area. While Long lines and pelagic trawls are not generally used within the MUL area (Figure 9 and Figure 10).

Pot fishing occurs towards the northern section of the MUL area, north of Doonbeg (Figure 11), where Brown crab and Lobster are the main target species. Tangle netting for Cray fish also occurs along the Clare coast, but there is minimal interaction with this fishery and the MUL area. Bait fishing is a feature of the inshore waters and occurs within the MUL area. (Figure 12).

Vessel noise would not be above background levels for the MUL area and does not have the potential to lead to any noise related, or other, impacts on commercial fisheries.

A noise modelling and environmental risk assessment (Thomsen *et al*, 2023) was carried out for the use of the same, or similar, geophysical equipment to that proposed for this project. This modelling report assessed the potential for impact as a result of the use of the proposed acoustic equipment on Atlantic Herring. Atlantic Herring was used as a proxy for fish containing a swim bladder, such as the other commercial fish species detailed above.

The results of the noise modelling indicated that the effects of Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) from a single pulse, as well as of the cumulative PTS, would be of equally short range for the airgun and the sparker. When multiple pulses were considered, TTS ranges were higher for the airgun, but also within a relatively small distance from the sound source and a resulting impact area up to 1.1 km^2. In contrast, the effect in form of behavioural reaction predicted for the use of airgun was much higher, reaching 13.6 km and an impact area of 460.5 km^2. In case of the sparker, behavioural changes are predicted within area up to 2.2 km^2.

While a behavioural response is predicted, it is considered that this would only have the potential to lead to temporary disturbance, over a short duration (days) and would therefore, not have the potential to lead to impacts on the fishery especially given the magnitude of the minor impact relative to the large nursery and spawning area available to these species.

Only minimal impact related to disturbance of fishing activities is possible. However, it will be localised and short term. All survey activities will be adequately planned to minimise the impact on fishing activities. Early engagement will be undertaken with local fishing representative associations prior to, and during survey periods. All required notices such as Marine Notices will also be published in advance of any survey activity undertaken as required.

A Fisheries Liaison Officer (FLO) has been appointed for the project. Early engagement by FLO with the local fishing community is being carried out in order to determine the full extent of fishing activity in the MUL area, and to minimise disruption to the fishing activity. In addition, an Offshore Fisheries Liaison Officer will be appointed to assist during survey activities as required.

No potential impacts are expected for aquaculture operations or shellfish as a result of the proposed site investigation (SI) activities.

Annex II fish species

The SISAA (MERC, 2025a) demonstrated that proposed project did not have the potential for impact on any Annex II fish species.

Aquaculture There are no licensed aquaculture sites within the MUL area. The nearest licenced aquaculture sites are shellfish licenced sites with the River Shannon Estuary (Figure 13).
Water, Air and Climate
While some sediment mobilisation as a result of benthic grab sampling will occur, this will be temporary and short lived and does not have the potential to impact overall water quality. While emissions to air as a result of vessel exhausts is unavoidable the level of such emissions would not be significantly above background levels in this area and would not have the potential to lead to Air Quality standards being exceeded. Therefore, no likely significant effects to air quality are anticipated. The project does not have the potential to impact climate change trends. The proposed survey is intended to support offshore Renewable Energy projects which in the long term will have a positive effect on climate change and hence air and water quality.
Waste
There are no elements of the proposed project that could contribute to marine waste or littering. Only "domestic waste" will be generated on-board survey vessels, and all waste will be returned to shore and disposed of at appropriate licenced facilities. The main survey vessels are MARPOL compliant and as such will not discharge to sea.
Noise and vibration
Underwater noise generation from the use of acoustic survey equipment is discussed, relative to its impacts on sensitive receptors, under the biodiversity section of this report. Mitigation to avoid the identified underwater noise related impacts are proposed in Appendix 1. Provided the mitigation proposed is implemented no potential for noise related impacts are considered possible.
Cultural heritage
A review of the National Monuments Service Wreck viewer has been carried out. The review indicates that there are no wrecks located within the MUL area (Figure 14). Therefore, there is no potential for interaction with any wreck sites and no impact on cultural heritage is possible.
Landscape and Seascape
No potential for impact. No infrastructure is being installed above the surface of the water.
Marine traffic and Navigation
Shipping traffic at and surrounding the MUL area is shown in Figure 15. The MUL area is outside of main shipping lanes and will not lead to the obstruction of access to any commercial ports or fishing harbours. As such no impacts are possible.
Material Assets
No potential for any interaction with material assets has been identified. No infrastructure (e.g. subsea electrical or telecoms cables) or other marine based infrastructure is located within the proposed project area (Figure 16). The project, with the exception of limited sediment sampling, will have no physical interaction with the seabed that could affect material assets.

Major Accidents and Disasters
The project is of too small a scale and at a largely offshore location to present a risk of leading to a major accident and disaster.
Cumulative impacts
Cumulative impacts were assessed as part of the preparation of the SISAA (MERC, 2025a). This report concluded that following a review of current sources of information for marine based projects or plans, two projects were identified with the potential for cumulative impacts with the proposed project. Mitigation has been proposed to avoid cumulative impacts with these two projects, and this has been included in mitigation given in Appendix 1. It is considered that provided this mitigation is implemented, no cumulative impacts will arise.

6.3. Conclusion. EIA Directive (not of a class)

The proposed project is not of a class whereby mandatory Environmental Impact Assessment (EIA) is required. Projects which do not meet the threshold may still require an EIA if the project is likely to have significant effects on the environment. This AIMU report has assessed the implications of the project, alone and in-combination with other projects on the receiving environment. It concludes that, based on the scale and scope of the proposed project and mitigation measures proposed, no impact on the receiving environment is likely. Therefore, EIA is not required.

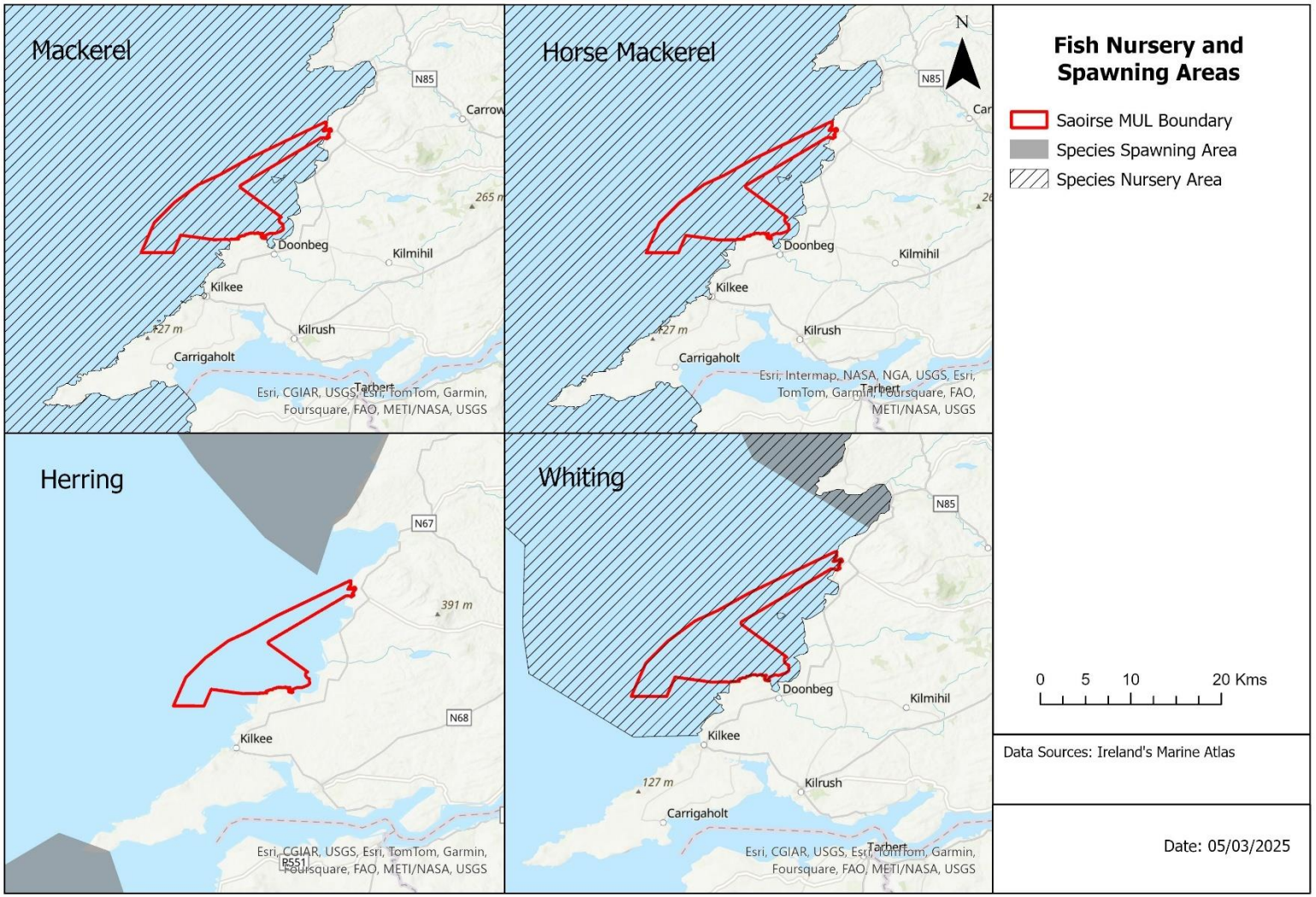

Figure 6. Nursery and Spawning areas.

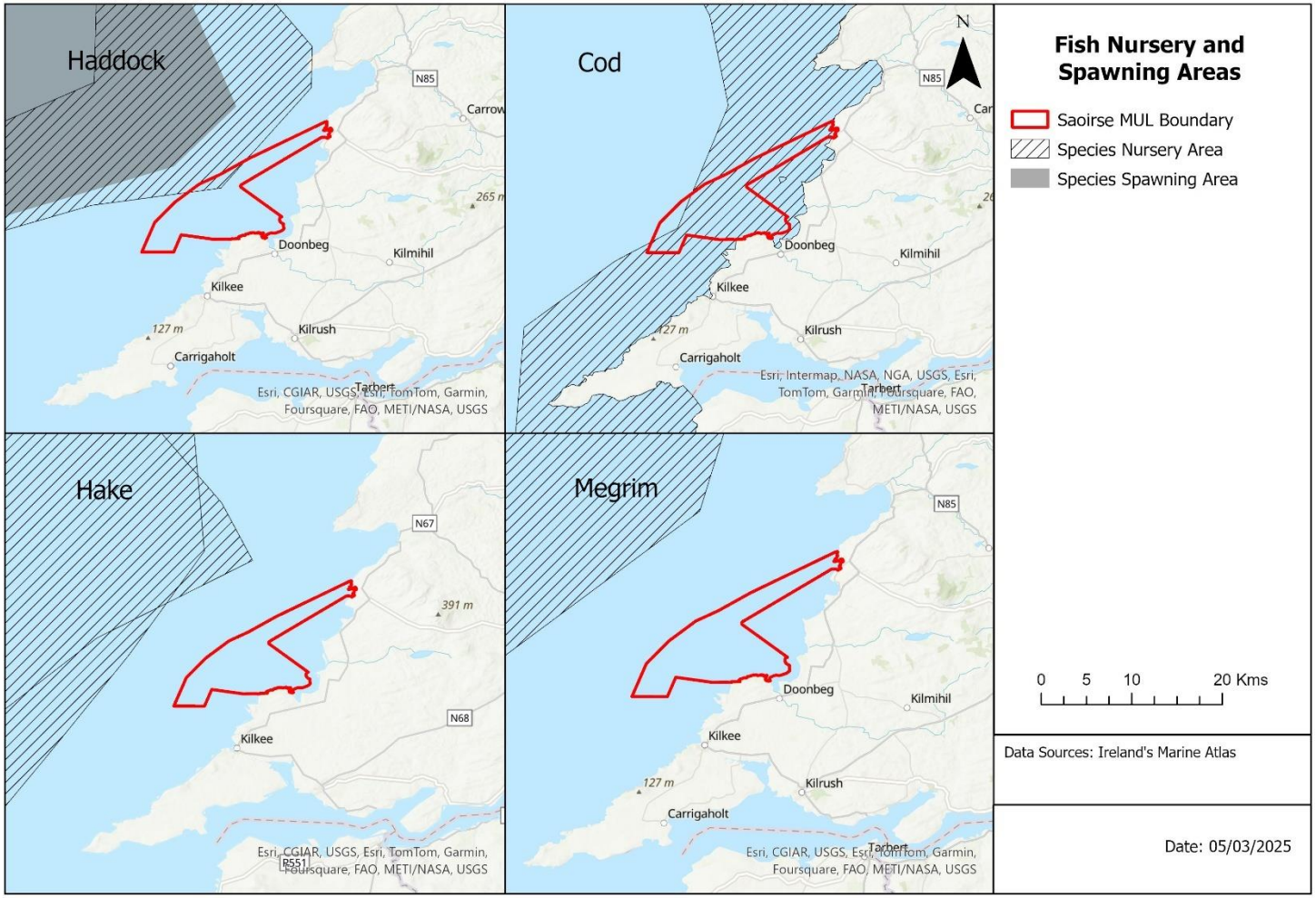

Figure 7. Nursery and spawning areas

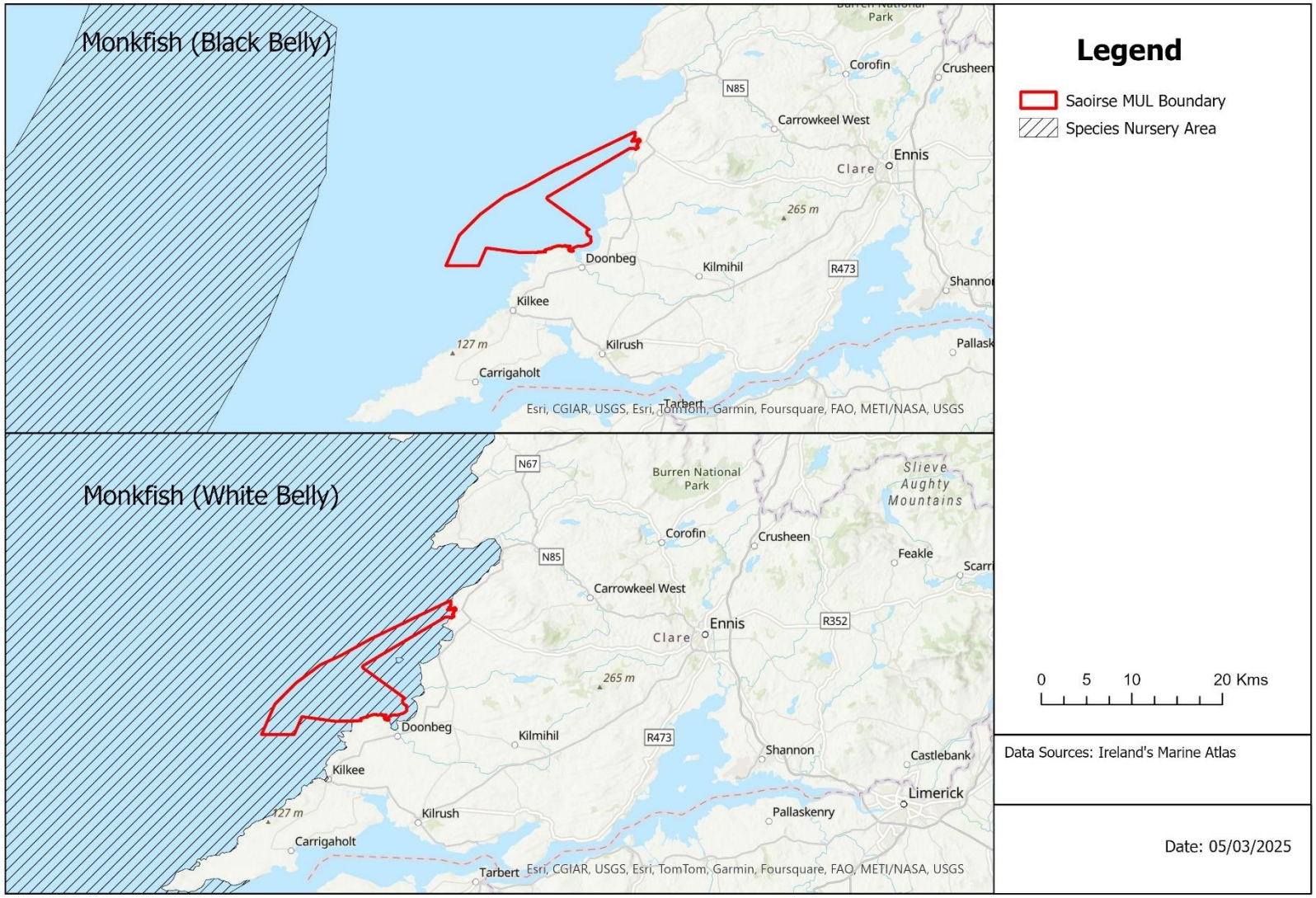

Figure 8. Nursery areas (Monkfish).

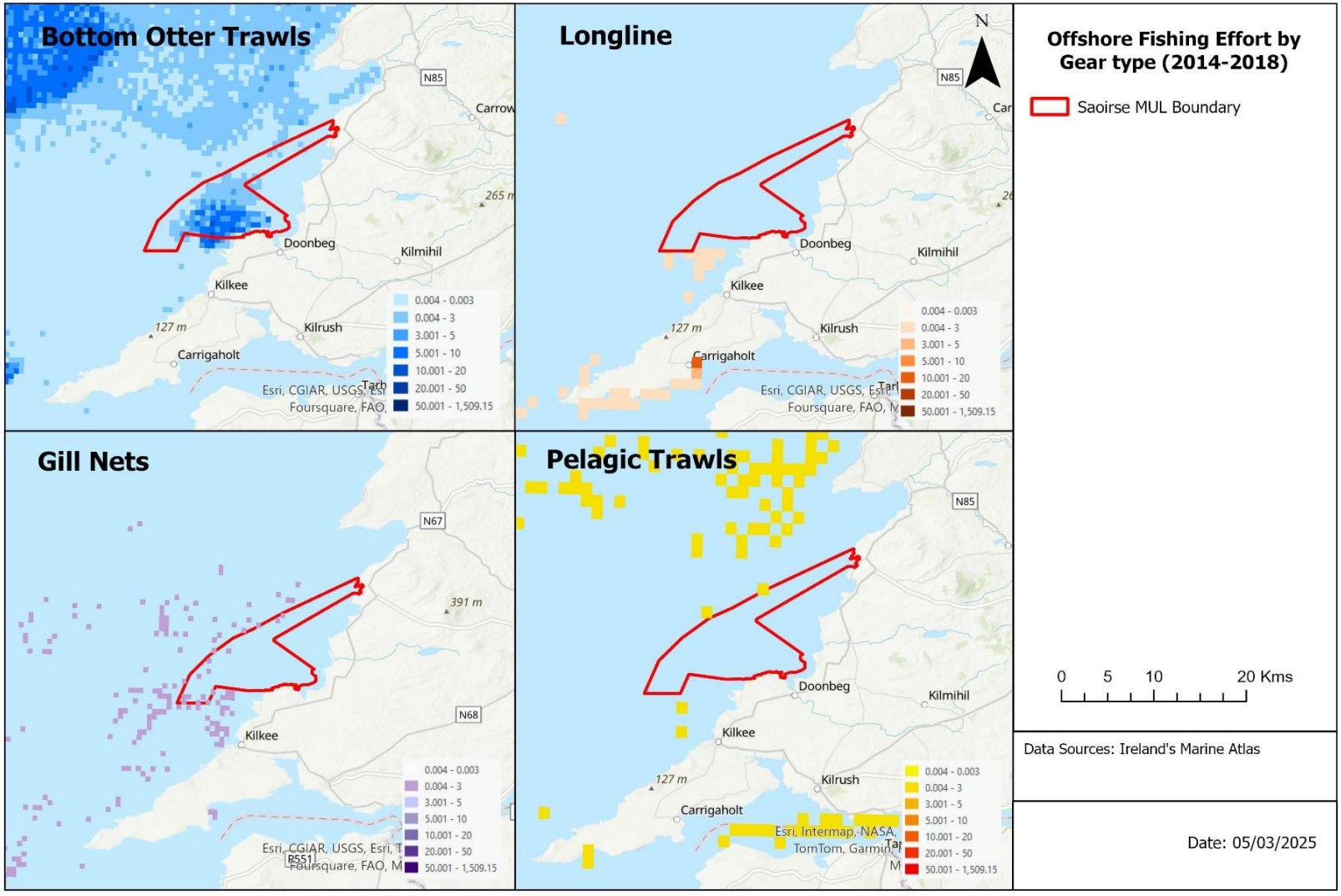

Figure 9. Fishing gear effort by type.

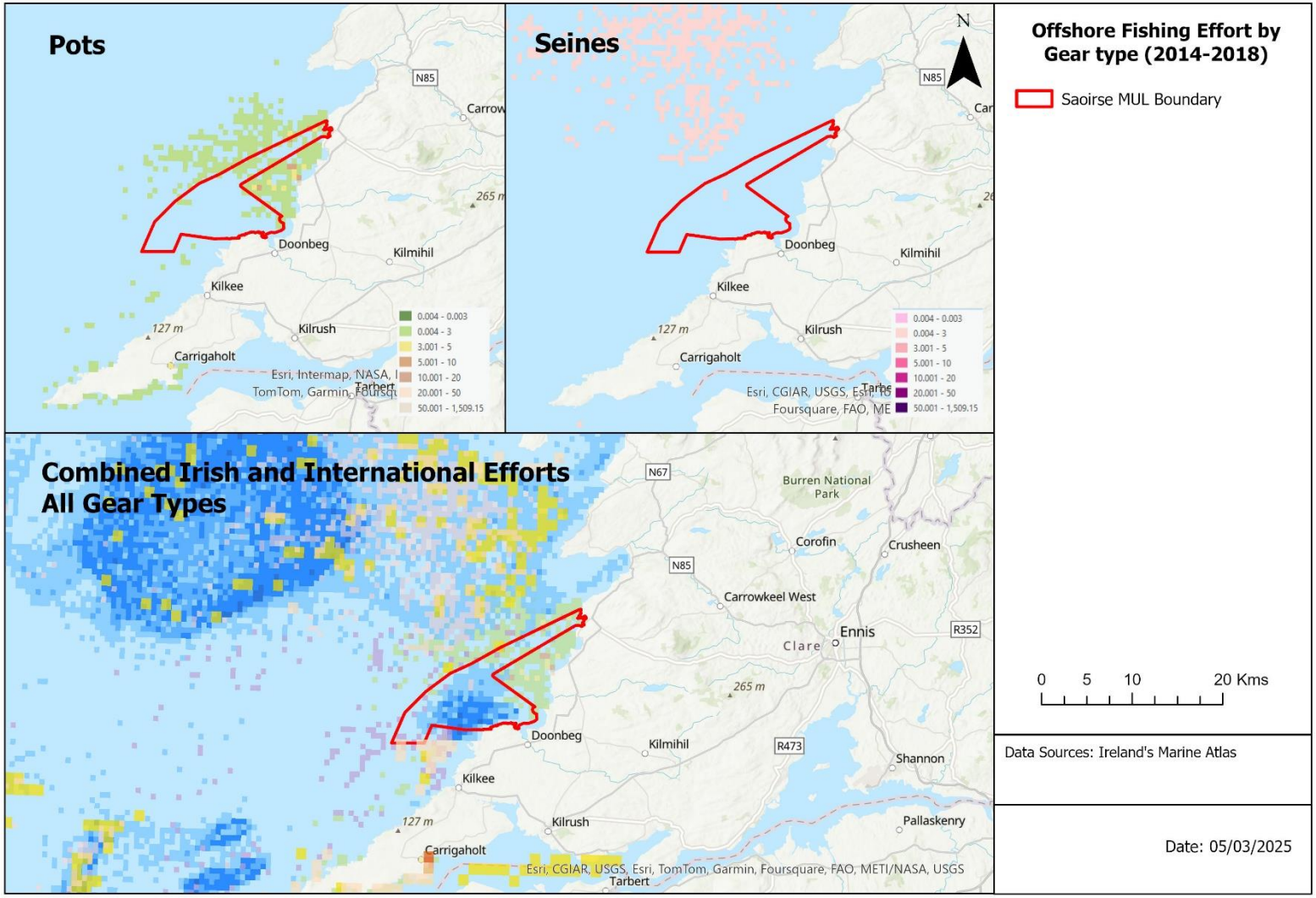

Figure 10. Fish gear effort by type.

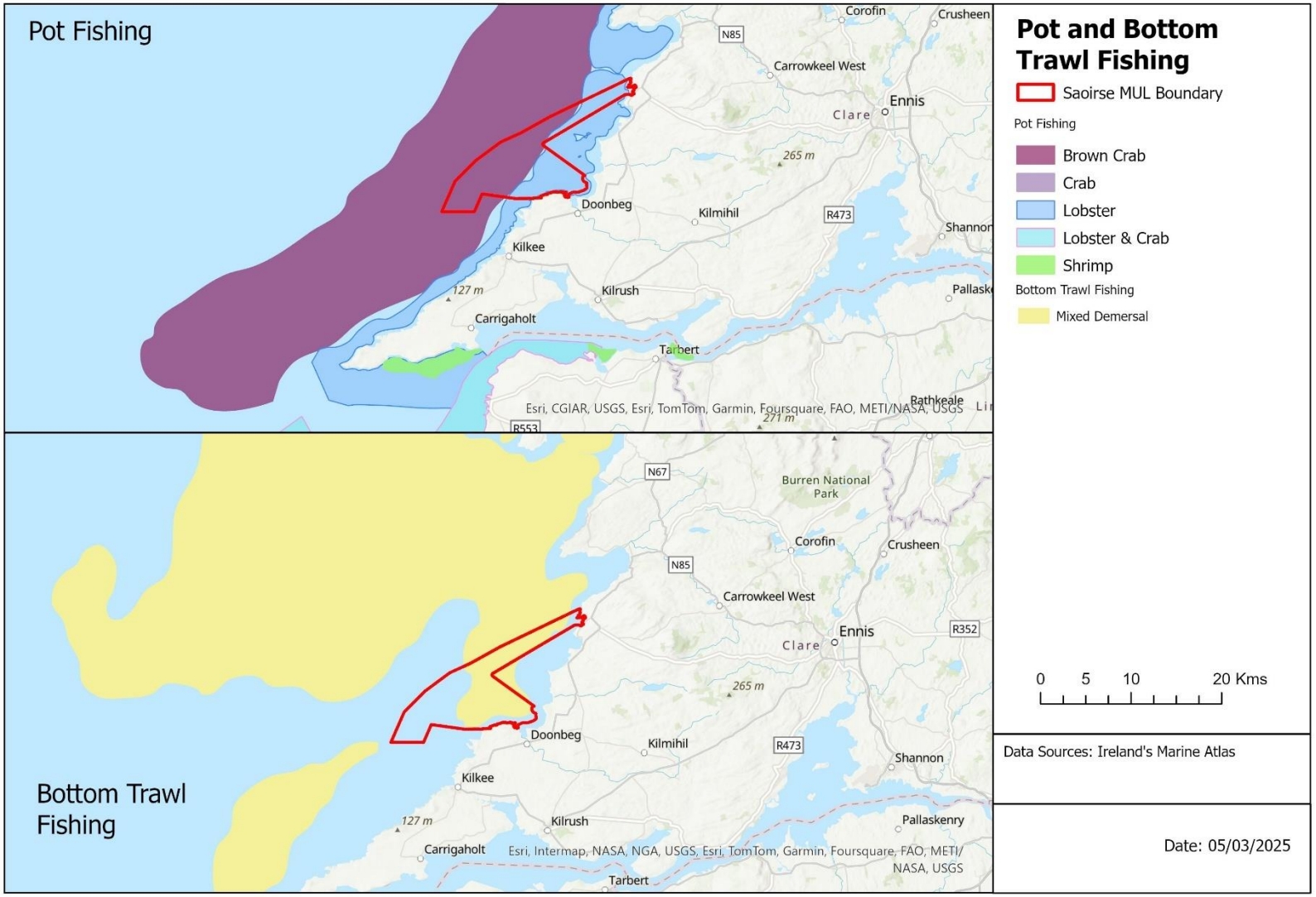

Figure 11. Pot and bottom trawl fishing.

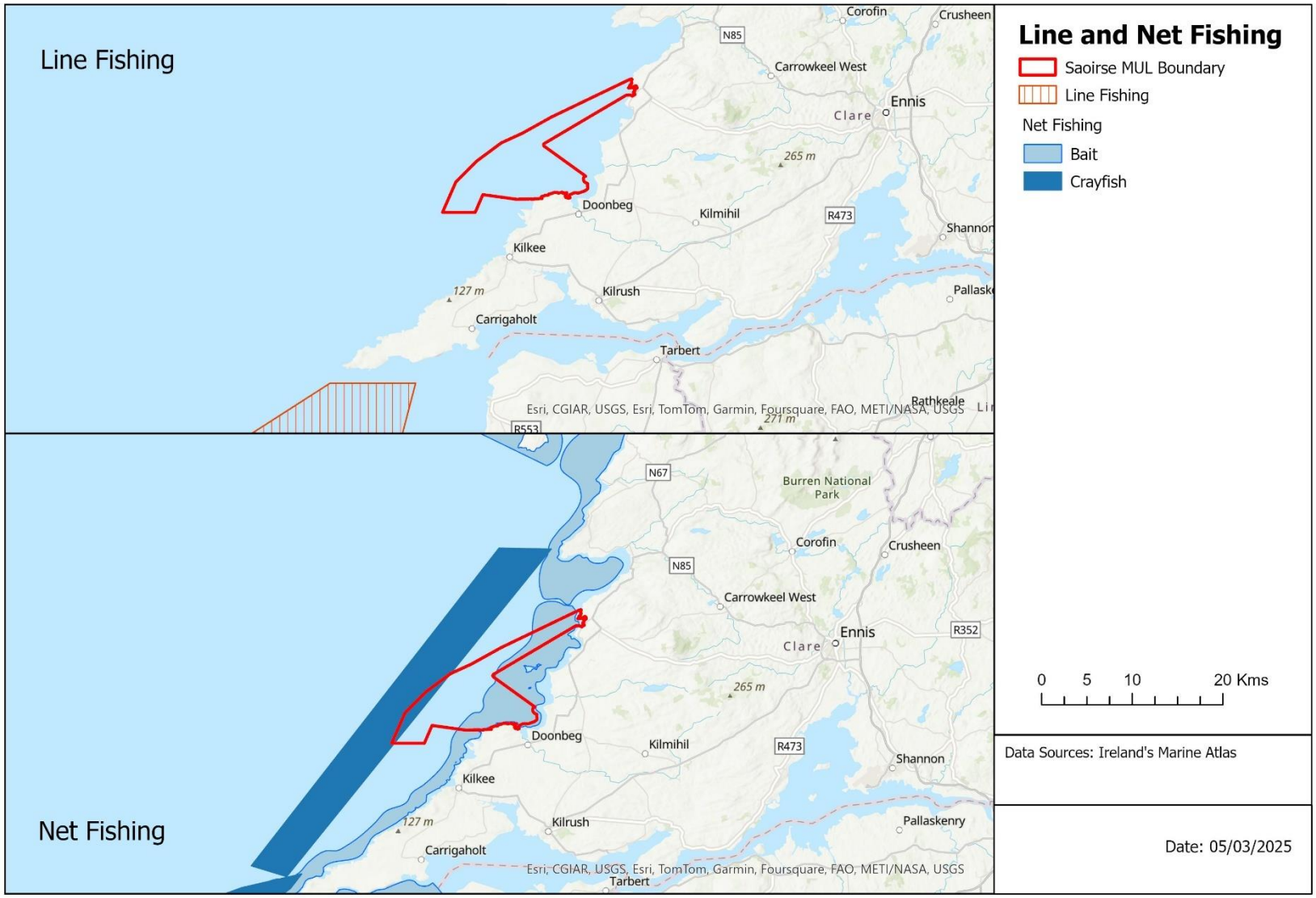

Figure 12. Net fishing: Cray fish and Bait.

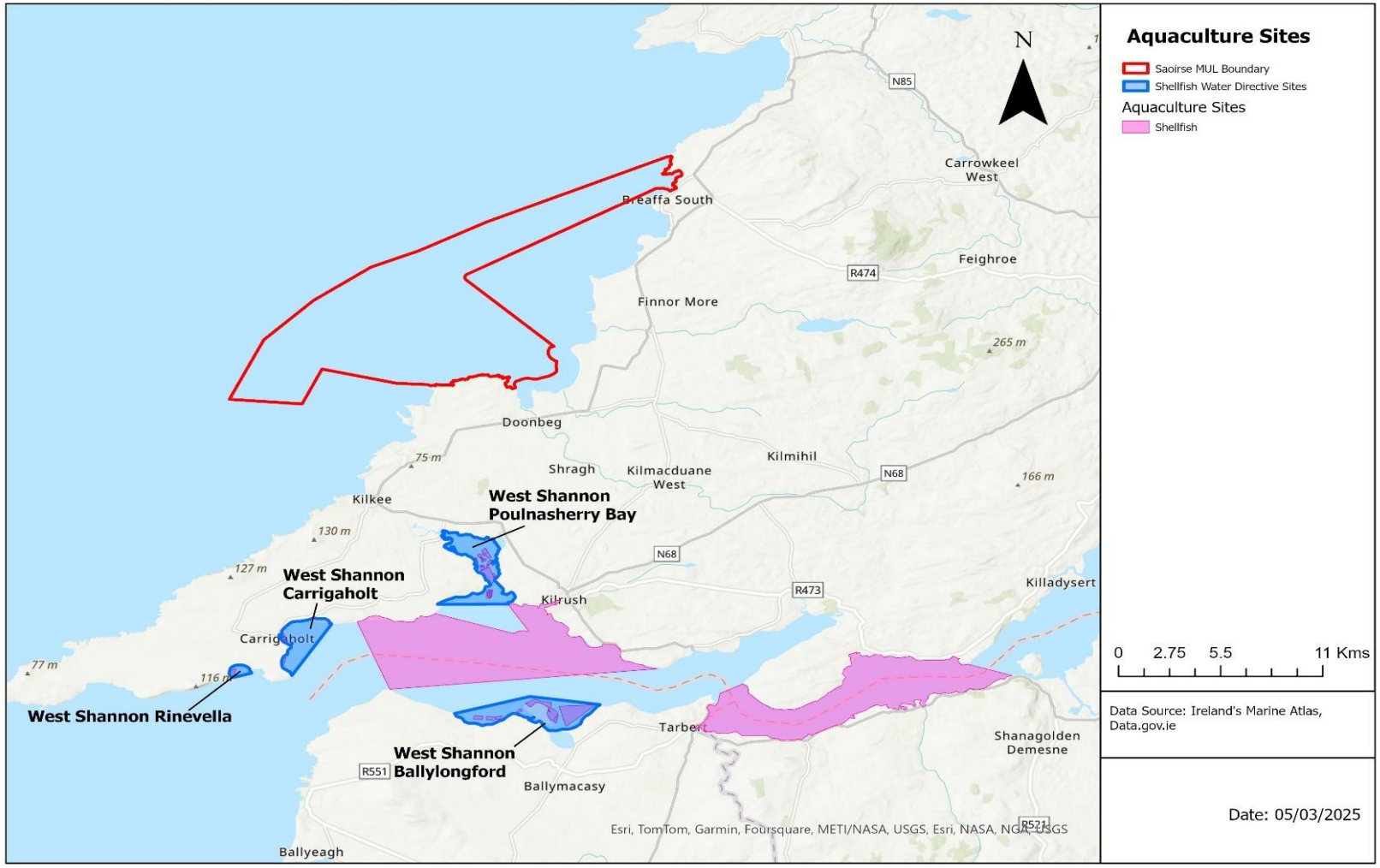

Figure 13. Aquaculture licenced areas

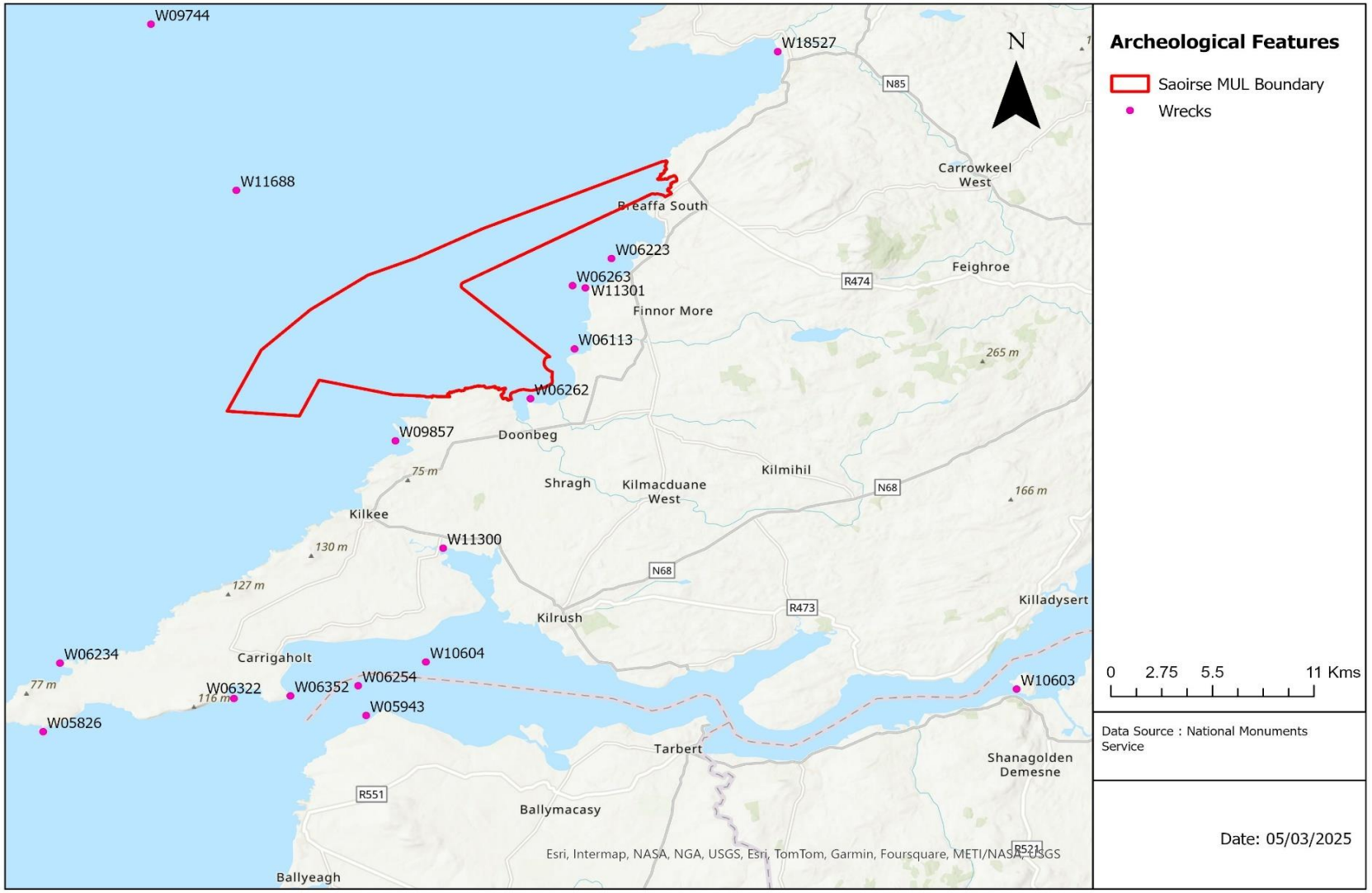

Figure 14. Known Wreck locations

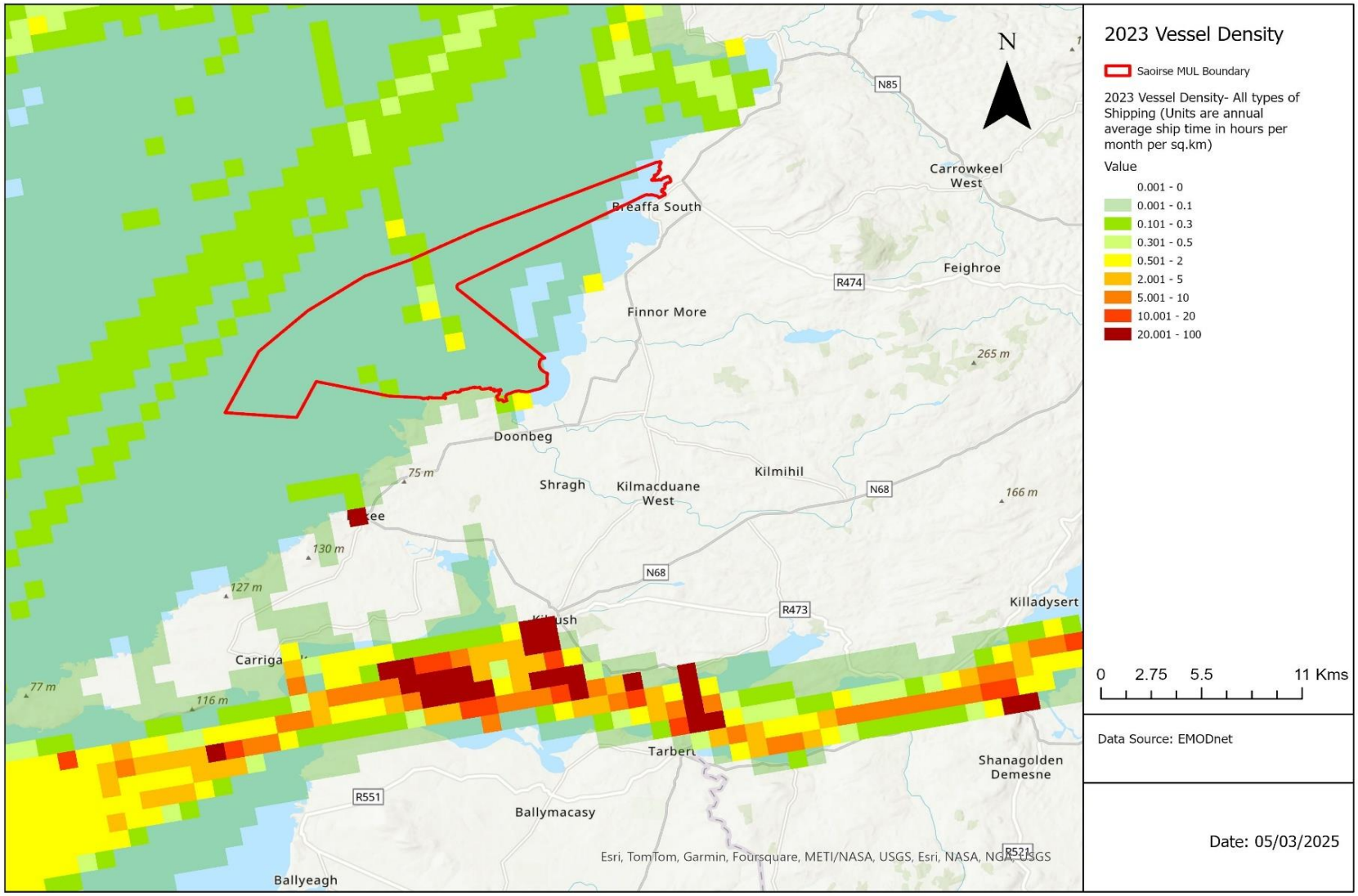

Figure 15. Shipping Vessel density.

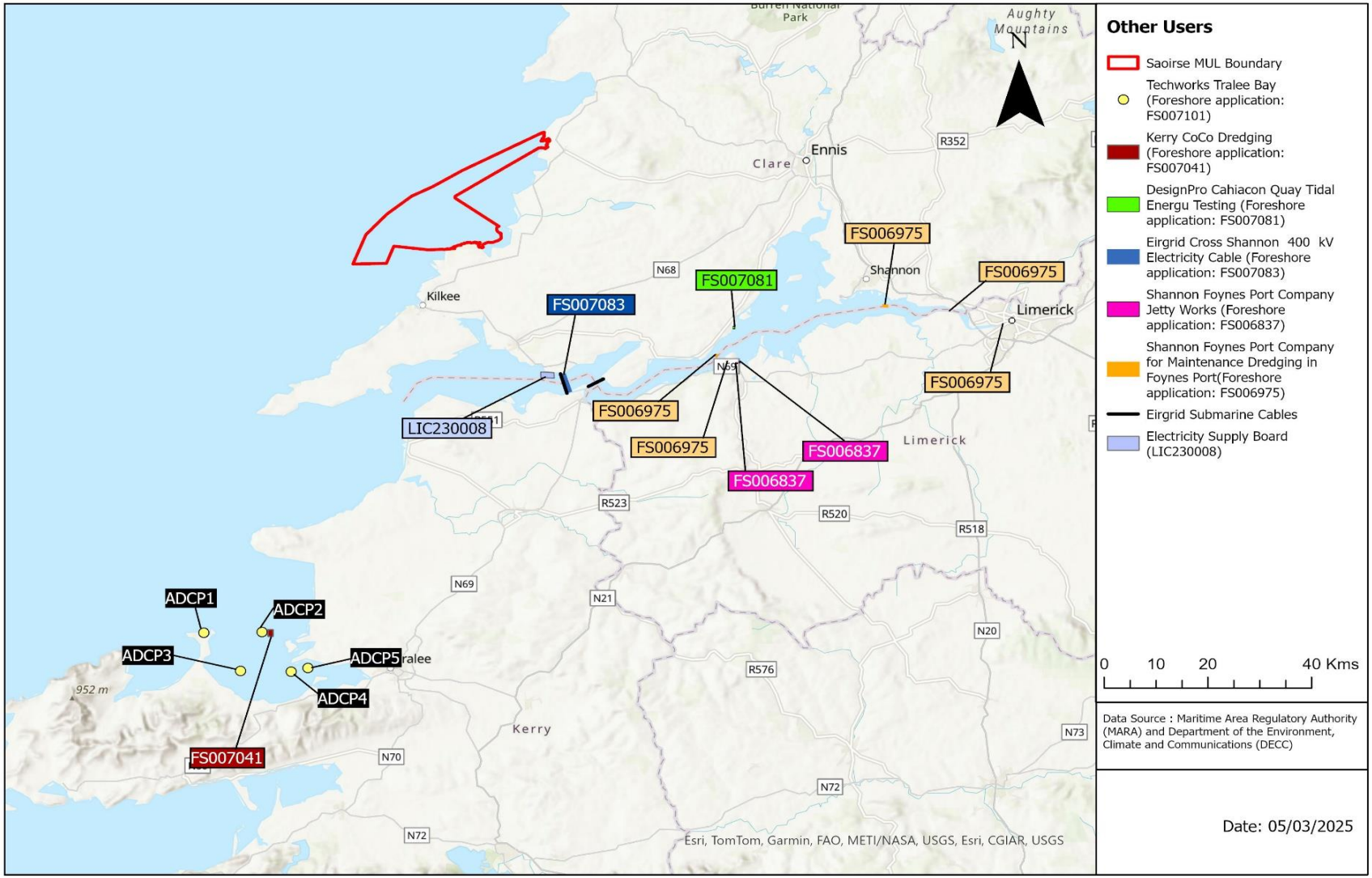

Figure 16. Existing infrastructure

7. Water Framework Directive

The key objectives of the Water Framework Directive (WFD) are set out in Article 4 of the Directive. It requires Member States to use their River Basin Management Plans and Programmes of Measures to protect and, where necessary, restore water bodies in order to reach good status, and to prevent deterioration. Thereby ensuring good qualitative and quantitative health, i.e. on reducing and removing pollution and ensuring that there is enough water to support wildlife at the same time as human needs.

This AIMU report has assessed the implications of the project on the receiving environment. It concludes that, based on the scale, scope, and location of the proposed project no impact on the any receiving waterbody will occur. No project related activity has been identified that could lead to a deterioration in water quality.

8. Marine Strategy Framework Directive

The key objective of the Marine Strategy Framework Directive (MSFD) is to protect the marine ecosystem and biodiversity upon which our health and marine-related economic and social activities depend. Its aim is to achieve good environmental status (GES) of the EU's marine waters and sustainably protect the resource base upon which marine-related economic and social activities depend. A review cycle is undertaken every six years.

To help EU countries achieve a good environmental status (GES), the Directive sets out 11 illustrative qualitative descriptors. To achieve this goal of GES, the MSFD has set out a programme of measures to address identified stressors to achieving GES. A total of 28 separate measures have been set out. These measures are mostly focused on reducing pressures by improving water quality and preventing environmental damage. Negative impacts stated in the MSFD include, for example, pollution, biodiversity loss, seabed damage, overexploitation, spread of non-indigenous species, marine litter, underwater noise, and ocean warming and acidification.

This AIMU report has assessed the implications of the project on the receiving environment (Table 5. MSFD Analysis). It concludes that, based on the scale and scope of the proposed project, and temporary nature of the proposed survey works, no impact on the marine environment is possible.

Table 5. MSFD Analysis

Descriptor	Analysis	Assessment
Descriptor 1: Biodiversity is maintained	Table 4 of this AIMU provides a description of the biodiversity baseline of the proposed project location and its environs. In addition, a separate SISAA, NIS and Annex IV Risk Assessment were prepared for this project. All of which examined the potential for impact on various elements of the biodiversity of the MUL area and any habitats or species within its ZoI. With the exception of potential impacts on selected marine mammals and bird species, no potential for impact on biodiversity was recorded. Mitigation to ensure no impact on marine mammals occurred was proposed in this AIMU and the Annex IV Risk Assessment (MERC, 2025c).	Provided the mitigation outlined in Appendix 1 of this AIMU is adhered to no potential for impact on this descriptor is considered possible.
Descriptor 2: Non-indigenous species do not adversely alter ecosystems	The survey vessel will be MARPOL compliant and adheres to MARPOL regulations with respect to the introduction and spread of non-indigenous species. No other element of the proposed project has been identified that has the potential to introduce or spread non-indigenous species.	No potential for impact.
Descriptor 3: Populations of commercial fish and shellfish species are healthy	Commercial fishing occurs within the MUL area. This AIMU (Table 4) has considered impacts on commercial fisheries and has not identified any potential for impact.	No potential for impact.
Descriptor 4: Food webs ensure long-term abundance and reproduction of species	No project related impacts with the potential to impact food webs or affect long-term abundance and/or reproduction of species is considered possible.	No potential for impact.
Descriptor 5: Eutrophication is reduced	No impacts relative to eutrophication are possible.	No potential for impact.
Descriptor 6: Sea floor integrity ensures the proper functioning of ecosystems	Minor disturbance to the seafloor will occur during geotechnical and benthic sampling as proposed for this project. Both of these sampling types will lead to small localised (< 10 meters) temporary impacts that will be highly unlikely to be detectable within weeks of taking place. They do not have the potential to lead to any impacts on the proper functioning of the ecosystem.	No potential for impact.

Descriptor 7: Permanent alteration of hydrographical conditions does not adversely affect ecosystems	The proposed project does not have the potential to cause any hydrographical changes.	No potential for impact.
Descriptor 8: Concentrations of contaminants give no pollution effects	The proposed project does not have the potential to lead to the introduction of any contaminants. The vessel is compliant with MARPOL regulations in this regard.	No potential for impact.
Descriptor 9: Contaminants in seafood are at safe levels	The proposed project does not have the potential to add to or alter contaminants in the seafloor.	No potential for impact.
Descriptor 10: Marine litter does not cause harm	The proposed project does not have the potential to lead to the littering. The vessel will be compliant with MARPOL regulations in this regard.	No potential for impact.
Descriptor 11: Introduction of energy (including underwater noise) does not adversely affect the ecosystem	A noise assessment carried out for the use of the same, or very similar geophysical survey equipment (Thomsen *et al*, 2023), identified a narrow range (<3km) relative to the potential for TTS in selected marine mammals. As a result, mitigation to ensure no impact on marine mammals occurred was proposed in this AIMU and the Annex IV Risk Assessment.	Provided the mitigation outlined in Appendix 1 of this AIMU is adhered to no potential for impact on this descriptor is considered possible.

9. National Marine Planning Framework (NMPF)

The proposed project is considered to have limited potential to impact on the overarching marine planning policies of the NMPF. Nonetheless, a review of these policies relative to the proposed project has been carried out and is documented in Table 6 which indicates how the proposed project will be in compliance with the objectives of the NMPF.

The NMPF sets out Overarching Marine Planning Policies (OMPPs) that will apply to all marine activities or development. These include policies in relation to, *inter alia*, co-existence with biodiversity, coastal and island communities, and infrastructure.

Table 6. Assessment of compliance with the National Marine Planning Framework (NMPF)

Environmental-Ocean Health	
Biodiversity & Protected Marine Sites	
Biodiversity	The project is supported by the following documents: • Supporting Information for Screening for Appropriate Assessment (SISAA) • Natura Impact Statement (NIS) • Annex IV Risk Assessment • Assessment of Impact on Maritime Usage Report (AIMU) The conclusion of the SISAA was that, without mitigation, the project as proposed had the potential to lead to adverse effects on European sites within its ZoI. Mitigation proposed in the NIS was designed to avoid the identified impacts. As such, it is considered that provided the proposed mitigation is implemented no project related impacts on biodiversity are possible. The conclusion of the Annex IV Risk Assessment and AIMU was that, with mitigation, no impact on any marine mammal will occur. Furthermore, the scale and scope of the project is considered too small to lead to any adverse effects on either the local or wider biodiversity of the marine environment.
Protected Marine Sites	As detailed above, the SISAA concluded that, without mitigation, the project as proposed had the potential to lead to adverse effects on European sites within its ZoI. Mitigation proposed in the NIS was designed to avoid the identified impacts. As such, it is considered that provided the proposed mitigation is implemented no project related impacts on any protected sites are possible. The AIMU did not identify the potential for impact on additional protected marine sites (e.g., Ramsar Sites).
Non-indigenous Species	The SISAA and AIMU did not identify any potential for the introduction of non-indigenous species.
Water Quality	The AIMU did not identify potential for impacts on water quality.
Sea-floor and Water Column Integrity	The scale and scope of the project does not have the potential to impact Sea-floor and Water Column Integrity as documented in the AIMU.
Marine Litter	The scale and scope of the project does not have the potential to intentionally or accidentally contribute to the impacts on marine litter policy as documented in the AIMU.

Underwater Noise	Underwater noise was fully considered in the SISAA and Annex IV Risk Assessment. The NIS and Annex IV Risk assessment concluded that, with mitigation, there was no potential for impact on any Annex IV species as a result of underwater noise. The AIMU concluded that, with mitigation, there was no potential for impact on any marine mammal.
Air quality	Not relevant: The project does not have the potential to impact air quality.
Climate Change	The proposed project will support future ORE development, which will, in turn, contribute to Climate resilience through reducing CO2 emissions and contribute to the achievement of binding EU and national renewable energy and ghg emission reduction targets.
Economic – Thriving Maritime Economy	
Co-existence	No potential for significant impact. The proposed works are temporary in nature (days). While disturbance to commercial fisheries activity may occur, this disturbance will be of a temporary nature (days) and will not have a significant impact on commercial fishery activity in the area. No other significant activities have been identified.
Infrastructure	No potential for impact on the infrastructure policy. No permanent infrastructure is proposed.
Social – Engagement with the sea	
Access	No access issues have been identified.
Employment	Not applicable. It is considered the Employment Policy 1 is not relevant to the proposed project.
Heritage assets	A review of the National monument service wreck viewer (Accessed March 2025) did not indicate any heritage assets within the MUL application area.
Rural cost and Islands communities	This policy is not considered relevant to the proposed project.
Seascape and Landscape	No impact possible. All survey instrumentation to be deployed in the subtidal.
Social Benefits	The proposed project in itself will not provide any social benefits. However, it is being carried out to support ORE, which in the medium to long term will provide social benefits include job creation, Energy access & affordability, Climate resilience through reducing CO2 emissions with future opportunities for local supply chain at all stages of project development.
Transboundary	No transboundary effects are possible.

The Sectoral Marine Planning Policies for each individual marine sector or activity are detailed in the NMPF. No element of the proposed project is considered contrary to these policies.

10. Conclusion

A review of the application has been undertaken to conduct marine site investigations (SI) which will include geophysical, environmental, metocean and geotechnical surveys, against the requirements of the National Marine Planning Framework (NMPF). The conclusion of which, is that the proposed project is fully compliant with the overall objectives and policies of the NMPF. In addition, the proposed project

adheres fully with several key policy objectives including supporting Ireland's decarbonisation journey through increased use of ORE and accelerating the move to cleaner energy in line with national and EU policy frameworks.

11. References

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NPWS Designations viewer (SACs, SPAs, NHAs and pNHAs):
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Accessed 6.03.2025.

NPWS (2014). Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of arts, Heritage, and the Gaeltacht.

Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724 (Text with EEA relevance)

SEAI, 2024. Offshore Renewable Energy Technology Roadmap.

Thomsen, F., Ram, M., Chreptowicz, M., Nocoń, M., & Balicka, I. (2023) Noise modelling and environmental risk assessment of a geophysical survey and its impact on herring and minke whales in Irish coastal waters. Marine Institute, Galway. http://hdl.handle.net/10793/1872

Appendix 1 Proposed mitigation

Mitigation Cetaceans

DAHG (2014) provides guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. This document provides guidance and mitigation measures to address key potential sources of anthropogenic sound that may impact negatively on marine mammals in Irish waters. The mitigation methods should follow the guidance prescribed in this document. In relation to geophysical and geotechnical surveys, which have the potential to introduce noise into the marine environment, such as proposed in this project, the guidance set out, as stated below, should be fully implemented.

1. A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms (Appendix 6, NPWS, 2014).
2. Unless information specific to the location and/or plan/project is otherwise available to inform the mitigation process (e.g., specific sound propagation and/or attenuation data) and a distance modification has been agreed with the Regulatory Authority, acoustic surveying using the above equipment shall not commence if marine mammals are detected within a 500m radial distance of the sound source intended for use, i.e., within the Monitored Zone.

Pre-Start Monitoring

3. Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
4. An agreed and clear on-site communication signal must be used between the MMO and the Works Superintendent as to whether the relevant activity may or may not proceed, or resume following a break (see below). It shall only proceed on positive confirmation with the MMO.
5. In waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO.
6. This prescribed Pre-Start Monitoring shall subsequently be followed by a Ramp-Up Procedure which should include continued monitoring by the MMO.

Ramp-up Procedure

7. In commencing an acoustic survey operation using the proposed acoustic equipment, the following Ramp-up Procedure (i.e., “soft-start”) must be used, including during any testing of acoustic sources, where the output peak sound pressure level from any source exceeds 170 dB re: 1µPa @1m:
   (a) Where it is possible according to the operational parameters of the equipment concerned, the device’s acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20 minutes.

(b) This controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period.

(c) Where the acoustic output measures outlined in steps (a) and (b) are not possible according to the operational parameters of any such equipment, the device shall be switched "on" and "off" in a consistent sequential manner over a period of 20 minutes prior to commencement of the full necessary output.

8. In all cases where a Ramp-Up Procedure is employed the delay between the end of ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment.

9. Once the Ramp-Up Procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500m radial distance of the sound source, i.e., within the Monitored Zone.

Line Changes

10. Where the duration of a survey line or station change will be greater than 40 minutes the activity shall, on completion of the line/station being surveyed, either

(a) shut down and undertake full Pre-Start Monitoring, followed by a Ramp-Up Procedure for recommencement, or

(b) undergo a major reduction in seismic energy output to a lower energy state[1] where the output peak sound pressure level from any operating source is 165-170 dB re: 1µPa @1m, and then undertake a full Ramp-Up Procedure for recommencement.

11. Where the duration of a survey line or station change will be less than 40 minutes the activity may continue as normal (i.e., under full seismic output)

Breaks in sound output

12. If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down, survey line or station change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken.

13. For higher output survey operations which have the potential to produce injurious levels of underwater sound (see sections 2.4, 3.2) as informed by the associated risk assessment, there is likely to be a regulatory requirement to adopt a shorter 5–10-minute break limit after which period all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) shall recommence as for start-up.

Reporting

14. Full reporting on MMO operations and mitigation undertaken must be provided to the Regulatory Authority as outlined in Appendix 6 of NPWS (2014).

[1] *It is important that this significant reduction in sound output is to a minimum point (i.e., minimum peak sound pressure level) that in theory remains audible above most ambient sound and shipping noise and yet is also consistent with the Ramp-up Procedure.*

Mitigation measure: Grey seal and Harbour seal

In line with the guidance to manage the risk to marine mammals (NPWS, 2014), the mitigation proposed for Cetacean species are also proposed for grey and harbour seal.

Mitigation measure: Seabirds

To minimise the potential for in-combination effects related to underwater noise related disturbance on the breeding seabirds associated with SPAs, the mitigation detailed below is proposed.

- Survey operations will be scheduled to avoid overlap, within a radius of 5km, with the additional two projects identified as having the potential to introduce similar noise inducing effects.

Mitigation measures: Wintering waterbirds

Intertidal surveys in sediment habitats should be avoided during the wintering season (October to March) if wintering waterbirds are using the intertidal area for foraging.

Mitigation: Accidental spillage of hydrocarbons

To minimise the potential for adverse impacts resulting from the accidental spillage of hydrocarbons it is recommended that vessels operating have an oil pollution emergency plan.
This plan should specify:

- Information on the location and detail of spill response resources on-board;
- Information on crew training in relation to oil pollution response;
- How crew will interface with other site investigation operators, where applicable.

Appendix 2: Sites screened in for Appropriate Assessment

Site code	Site name
1021	Carrowmore Point to Spanish Island SAC
2264	Kilkee Reef SAC
90	Glengarriff Harbour and Woodland SAC
101	Roaringwater Bay and Islands SAC
133	Donegal Bay (Murvagh) SAC
147	Horn Head and Rinclevan SAC
190	Slieve Tooey/Tormore Island/Loughros Beg Bay SAC
191	St. John's Point SAC
197	West of Ardara/Maas Road SAC
204	Lambay Island SAC
241	Lough Swilly SAC
268	Galway Bay Complex SAC
278	Inishbofin and Inishshark SAC
328	Slyne Head Islands SAC
343	Castlemaine Harbour SAC
428	Lough Melvin SAC
458	Killala Bay/Moy Estuary SAC
495	Duvillaun Islands SAC
507	Inishkea Islands SAC
622	Ballysadare Bay SAC
627	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
707	Saltee Islands SAC
764	Hook Head SAC
781	Slaney River Valley SAC
1141	Gweedore Bay and Islands SAC
1482	Clew Bay Complex SAC
2034	Connemara Bog Complex SAC
2074	Slyne Head Peninsula SAC
2111	Kilkieran Bay and Islands SAC
2158	Kenmare River SAC
2165	Lower River Shannon SAC
2172	Blasket Islands SAC
2269	Carnsore Point SAC
2283	Rutland Island and Sound SAC
2953	Blackwater Bank SAC
2998	West Connaught coast SAC
3000	Rockabill to Dalkey Island SAC
3015	Codling Fault Zone SAC

2500077	Baie du Mont Saint-Michel SAC
2500079	Chausey SAC
2500084	Récifs et landes de la Hague SAC
2502018	Banc et récifs de Surtainville SAC
2502019	Anse de Vauville SAC
5300008	Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay SAC
5300009	Côte de Granit rose-Sept-Iles SAC
5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SAC
5300015	Baie de Morlaix SAC
5300017	Abers - Côte des légendes SAC
5300018	Ouessant-Molène SAC
5300061	Estuaire de la Rance SAC
5300066	Baie de Saint- Brieuc SAC
5302006	Côtes de Crozon SAC
5302007	Chaussée de Sein SAC
5302015	Mers Celtiques - Talus du golfe de Gascogne SAC
5302016	Récifs du talus du golfe de Gascogne SAC
2502022	Nord Bretagne DH SAC
004182	Mid-Clare Coast SPA
004005	Cliffs of Moher SPA
004119	Loop Head SPA
004152	Inishmore SPA
004154	Iveragh Peninsula SPA
004008	Blasket Islands SPA
004136	Clare Island SPA
004007	Skelligs SPA
004021	Old Head of Kinsale SPA
004192	Helvick Head to Ballyquin SPA
004066	The Bull And The Cow Rocks SPA
004002	Saltees Islands SPA
004189	Kerry Head SPA
004153	Dingle Peninsula SPA
004144	High Island, Inishshark and Davillaun SPA
004003	Puffin Island SPA
004175	Deenish Island and Scariff Island SPA
004155	Beara Peninsula SPA
004111	Duvillaun Islands SPA
004150	West Donegal Coast SPA
004069	Lambay Island SPA
004194	Horn Head to Fanad Head SPA
004073	Tory Island SPA

004077	River Shannon and River Fergus Estuaries SPA
004177	Bills Rocks SPA
004237	Seas of Wexford SPA
004236	North-West Irish Sea SPA

Site code	Site name
UK0030399	North Channel SAC
UK0016618	Strangford Lough
UK0016612	Murlough
UK0030398	North Anglesey Marine/Gogledd Môn Forol Side Code
UK0030397	West Wales Marine/Gorllewin Cymru Forol U
UK0030396	Bristol Channel Approaches/Dynesfeydd Môr Hafren