



MERC Consultants
environmental and conservation services

EU Habitats Directive: Annex IV Risk Assessment

Survey and salvage work on RMS Laconia

Document control			
Document reference: ANNEX_IVRA_ RMS LACONIA			
Version	Date	Author/s	Approved by
0.2	1/9/2026	Nick Pfeiffer Dr. Ronan Browne	Dr. Louise Scally

Contents

1. Introduction	1
2. Legislation	3
3. Proposed survey and salvage work.....	4
3.1 Overview	4
3.2 Survey/ Salvage Vessel.....	9
3.3 Survey and Salvage Campaign	9
<i>Multibeam echosounder</i>	10
<i>Sub-bottom profiler (SBP)</i>	10
<i>Additional acoustic transponders</i>	10
<i>ROV mounted Teledyne RESON SeaBat® 7125 MBES system</i>	10
<i>General visual inspection of the wreck</i>	10
<i>Digital video acquisition</i>	10
<i>Hydrocarbon Leak Detection Survey</i>	10
<i>Photogrammetry survey</i>	10
<i>Vessel presence and dynamic positioning</i>	10
<i>Controlled access works</i>	10
<i>Sediment removal and clearance</i>	11
<i>Recovery of cargoes and artefacts</i>	11
<i>Containers and subsea collection workflow</i>	11
<i>UXO avoidance and in-situ protection</i>	11
<i>Deck operations and recovery of seabed equipment</i>	11
<i>Underwater noise source levels</i>	11
4. Receiving environment: Annex IV Species	12
4.1 Cetaceans.....	12
4.2 Reptiles (marine turtles)	13
4.3 Additional Annex IV species.....	13
5. Risk assessment	13
5.1 Direct and Indirect impacts.....	13
5.2 Cetaceans.....	13
5.3 Reptiles (marine turtles)	15
6. Risk Assessment Conclusion	15
7. Proposed mitigation.....	15
8. Assessment of residual risk.....	18

9. Conclusion.....	18
10. Bibliography	20

List of Figures

FIGURE 1: OVERVIEW OF PROPOSED SURVEY/SALVAGE LOCATION AND SELECTED SACS	2
--	---

List of Tables

TABLE 1: RMS LACONIA DETAILS	6
TABLE 2: SURVEY AND SALVAGE EQUIPMENT PROPOSED FOR THE RMS LACONIA WORKS	7
TABLE 3. GROUPED MECHANICAL-NOISE ASSESSMENT FOR WROV TOOLING.....	8
TABLE 4: AN EXAMPLE OF A SURVEY/SALVAGE VESSEL	9
TABLE 5. CETACEAN FUNCTIONAL GROUPS RELATIVE TO HEARING AT DIFFERENT SOUND FREQUENCIES.	14
TABLE 6. SOUND PRESSURE LEVELS ASSOCIATED WITH TEMPORARY THRESHOLD SHIFT (TTS) AND PERMANENT THRESHOLD SHIFT (PTS)	14

1. Introduction

Salvocean proposes to undertake a subsea survey and controlled salvage operation at the wreck of Royal Mail Ship (RMS) *Laconia*, hereafter referred to as the “proposed project”. The RMS *Laconia* wreck is located within Ireland’s Exclusive Economic Zone (EEZ) and over the State’s continental shelf area known as the Porcupine Bank, approximately 150 miles (242 km) from the nearest point of land (Figure 1). Average water depths in the area are approximately 370–375m.

This Annex IV Risk Assessment has been prepared in support of an application for a Marine Usage Licence (MUL) to the Maritime Area Regulatory Authority (MARA) for the proposed survey and controlled salvage operations.

Salvocean Ltd is a limited liability company established in the United Kingdom, with a subsidiary in the United States, specialising in marine survey and salvage operations, recovery from shipwrecks, the handling and disposal of submerged ordnance, environmental impact surveys, and marine operations supporting the oil and gas and renewable energy sectors. Salvocean also works in collaboration with academic and research institutions, providing vessel-based facilities and operational support for scientific investigations into marine biology, ocean health, and the environmental risks associated with potentially polluting shipwrecks.

RMS *Laconia* was lost during the First World War (WWI), following an attack by a submarine. The vessel, originally designated SS *Laconia*, was a steel ocean liner operated by the Cunard Steamship Co. Ltd. It was built and launched by Swan, Hunter & Wigham Richardson Ltd. at Wallsend in January 1912. The vessel was constructed as Yard No. 877 and was assigned Official/IMO No. 131412.

A number of species listed under Annex IV of Council Directive 92/43/EEC (the Habitats Directive) are known to occur within the wider offshore area. However, for the purposes of this assessment, only those species and taxa for which a credible pathway for exposure to impacts associated with the proposed project activities has been identified are considered further in the risk assessment.

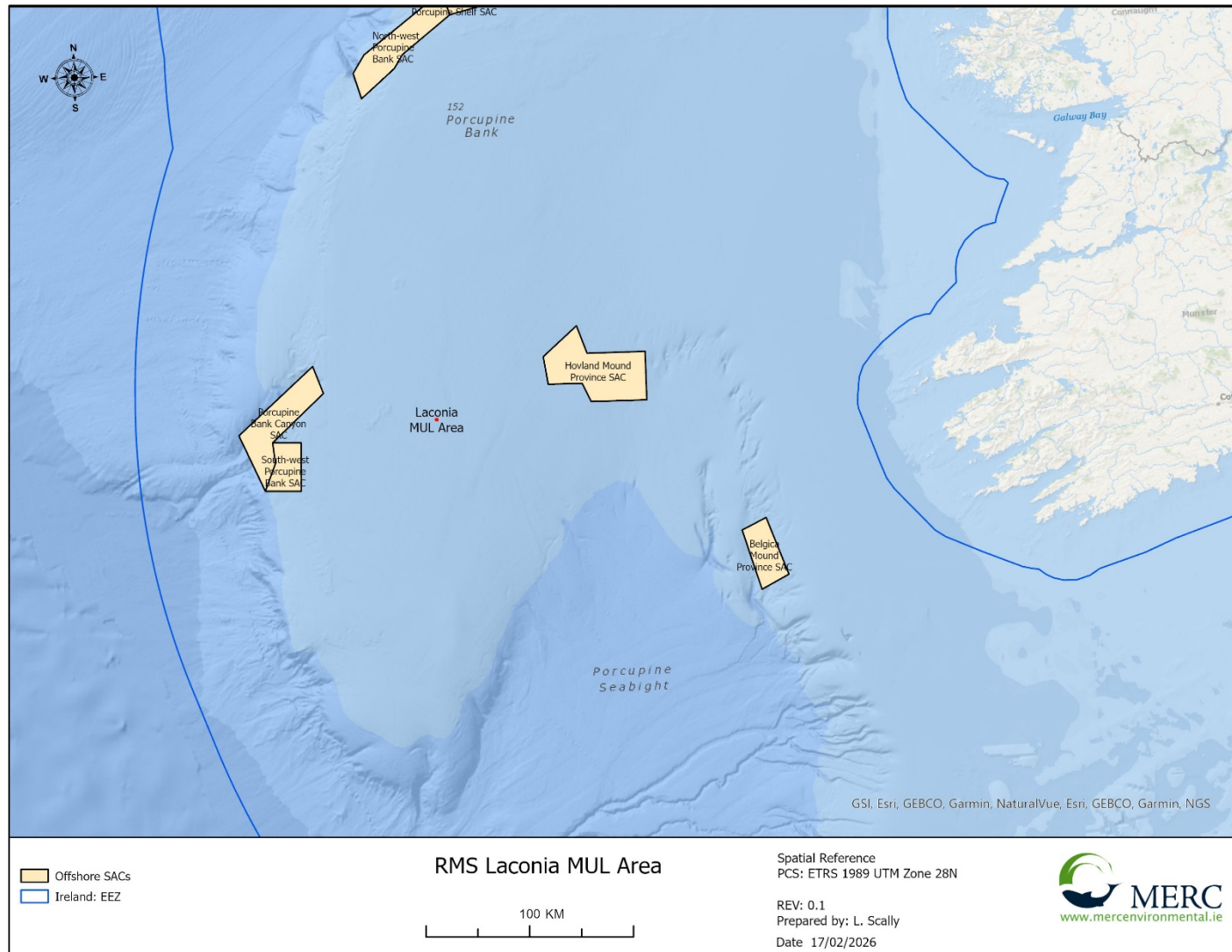


Figure 1: Overview of proposed survey/salvage location and selected SACs

2. Legislation

Article 12 of the EU Habitats Directive states:

Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:

- (a) all forms of deliberate capture or killing of specimens of these species in the wild;*
- (b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;*
- (c) deliberate destruction or taking of eggs from the wild;*
- (d) deterioration or destruction of breeding sites or resting places.*

2. For these species, Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.

3. The prohibition referred to in paragraph 1(a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.

4. Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.

This Annex IV assessment examines whether the proposed works could give rise to: (i) deliberate killing; (ii) deliberate disturbance, particularly during breeding, rearing or migration; or (iii) deterioration or destruction of breeding or resting sites.

In accordance with Irish and CJEU¹ law, 'deliberate disturbance' requires knowledge of the presence of the species and the intention to carry out the action giving rise to the disturbance. The proposed survey and salvage project is not directed toward Annex IV species and does not target habitats used for breeding or resting.

¹ Court of Justice of the European Union - the body of case law and legal interpretations established by the Court.

3. Proposed survey and salvage work

The scope of work includes geophysical and visual survey (MBES, ROV-based imagery/video, photogrammetry outputs and hydrocarbon leak detection), USBL/HiPAP positioning, work-class and Vector fly-out ROV operations, DP2 station-keeping, heavy-lift crane operations (200 t SWL), localised sediment removal using the Excav8 Subsea 6" Dredge Pump and/or Controlled Flow Excavator where required, cutting/grinding and subsea recovery using half-height recovery baskets/containers. Historic SBP data will form part of the existing wreck survey record.

While the MUL area applied for is 1 km², all survey/salvage activities are confined to the immediate wreck footprint (~155 m x 25 m). The vessel will remain largely stationary under DP with minimal lateral seabed movement.

3.1 Overview

Salvocean proposes to conduct a subsea survey and salvage operation at the shipwreck Royal Mail Ship (RMS) Laconia (the “proposed project”). The wreck lies offshore within Ireland’s Exclusive Economic Zone (EEZ) and over the State’s continental shelf (Figure 1). RMS Laconia was lost during World War I (WWI), sunk following submarine action; the steel ocean liner Steam Ship (SS) Laconia was built by Swan, Hunter & Wigham Richardson Ltd. at Wallsend and launched in January 1912 (yard no. 877; official no. 131412) (

Table 1).

Salvocean will undertake the proposed survey, and salvage works in accordance with a controlled suite of HSE and operational procedures and applicable regulatory requirements. Core procedures (SAL-PRO-HSE-002 to -028) address, inter alia, permit-to-work, toolbox talks, PPE, job safety analysis and risk assessment, lifting/rigging and crane operations, ROV and survey operations, hazardous substances, work over the sea and at height, waste and pollution control, incident/event reporting, and cultural heritage assessment reporting, supported by an Oil Spill Contingency Plan (SAL-PRO-HSE-030). These arrangements operate within a risk assessment-based Safety Management System aligned with ISO 9001, ISO 14001 and ISO 45001, and are intended to ensure that survey and salvage activities are delivered safely and in compliance with relevant maritime and statutory instruments (including, as applicable, the ISM Code, SOLAS, MARPOL, SOPEP, and relevant merchant shipping and pollution legislation, alongside LOLER and PUWER).

As per standard operations for survey and salvage operations, Salvocean will undertake a project-specific HIRA before mobilisation; Permit-to-Work, Job Safety Analysis, lift-plan and recorded toolbox-talk controls; twice-daily/12-hour weather forecasts with suspension of operations when operating limits are exceeded; spill kits at suitable locations; use of synthetic biodegradable hydraulic oils where oil-powered subsea tooling is required; segregation and compliant disposal of used spill materials; return of non-incinerator waste to port for compliant disposal; and defined notification/response arrangements for environmental incidents.

Table 1: RMS Laconia details

Date of loss	25 February 1917
National Monuments Service: Wreck Viewer I.D.	W05759
Position (GPS/PA)	5203711N 1331179W 52° 00.3079'N. 013° 58.2161'W
Water depth	~375 meters
Wreck footprint (approximate)	There have been several previous salvage attempts on the wreck, which have greatly reduced the wreck structure to approximately 155m x 25m (the wreck is in three sections)
Project description	The location of the wreck has been known since early salvage attempts (over four salvage efforts) in the mid to late 20th century. The wreck's 1st- and 2nd-class accommodation levels have been removed, down to the 3rd-class accommodation level. The contents of the grab tools have been dumped from the port and starboard sides of the wreck, while significant areas of the stern and aft have been excavated by a mass flow excavator to a depth of a few meters. The wreck comprises three sections: Forward section (bow to forward funnel hatch): decks have collapsed, and both port and starboard hull plates are separating. Midship section (forward funnel hatch to aft end of engine room hatch): the central hull remains intact and upright on the seabed; the aft section continues at an angle of ~10–20° towards the stern. Stern section (aft end of engine room hatch to stern): largely indistinguishable, heavily damaged by two torpedo strikes and subsequent salvage attempts (including grabs, explosives, mass-flow excavator, and other tools).
SS Laconia particulars at the time of build in 1912	Tonnage of 18,099 grt, her dimensions were: 183.3m x 22.5m x 12.4m. Fitted with 2 x quadruple expansion engines, 6 boilers fuelled by coal, dual shaft, and 2 screws.
Cargo	Cargo on the final voyage included silver (bars/coins), mail and substantial shell and munitions cargo, alongside other bulk goods (Chronicle 2017). Salvocean's August 2026 UXO review records 11,628 cases of rifles and large-calibre shells with a gross weight of 4,831,028 lb; apart from identified proof-shell consignments, the shipping declaration does not establish whether the shells were primed or awaiting filling. 368 tons of lard – (140 tons of lard in crates, and 128 tons of lard in tierces (barrels or casks), 100 tons of block lard in crates). 1,201 barrels of mineral lubricating oil, 161 tons. 2,024.5 tons of brass shells (made up of 6-, 8-, 9.2- and 12-inch shells). Fuses, explosives, propellants and small arms ammunition. The munitions shipped on the <i>Laconia</i>, consisted of: • Guns: \$5,200,000 • Rifles: \$3,000,000 • Shells 6" and over: \$71,000,000 • Shells under 6": \$47,000,000 • Fuses: \$12,500,000 • Forgings: \$25,000,000 • Explosives and Propellants: \$27,500,000

	Small Arms and Ammunition: \$14,800,000
Estimated time for the proposed survey and salvage works	Salvocean estimates an overall campaign duration of 1,258 hours (53 days), including mobilisation, transit, demobilisation, a mid-project crew change and 20% weather downtime. The four offshore operational phases at the wreck site total approximately 32.4 days (Phase I 1 day; Phase II 1 day; Phase III 30 days; Phase IV 0.4 day). A two-year MUL is still sought to provide for weather, vessel availability, seasonality and operational contingencies.

A suite of survey technologies will be used to characterise the wreck site and support salvage operations, including ROV-mounted MBES, ROV-based digital imagery/video, hydrocarbon leak detection, and USBL/HiPAP positioning with seabed reference beacon(s), supported by SVP. Historic SBP data remain part of the existing wreck survey record. Salvage works will use work-class ROVs and the Vector fly-out ROV, a 200 t SWL crane with secondary crane support, the specified cutting/removal tooling, and localised sediment removal with the Excav8 Subsea 6" Dredge Pump and/or Controlled Flow Excavator. Approved non-UXO cargoes/artefacts will be recovered using grabs and open-top half-height recovery baskets/containers.

See Table 2 and Table 3 and for the proposed survey/ salvage equipment and indicative sound levels.

Table 2: Survey and salvage equipment proposed for the RMS Laconia works

Equipment	Model	Deployment	Company	Sound Pressure Level / Source Level (dB re 1 μ Pa)
Survey/salvage vessel	Type 639 Multipurpose Offshore Vessel (or similar)	Ocean surface	Aker Yards, Norway	165–175
Vessel DP	DP2 Kongsberg K-Pos 21	Hull mounted	Kongsberg	178
Acoustic transponders	EdgeTech CAT Coastal Acoustic Transponder	Equipment mounted	EdgeTech	192
Underwater navigational signals (USBL)	Sonardyne Compatt 6 8300-3111	Equipment mounted	Sonardyne	187–196
Work class ROV (WROV)	Millennium® Plus Work Class ROV	Launched from vessel	Oceaneering	130–160
Work class ROV (WROV)	Schilling Robotics HD Work Class ROV	Launched from vessel	Schilling	130–160
MBES ROV	Teledyne RESON SeaBat® 7125	ROV mounted	Teledyne	196–224
Fly-out ROV	Vector	ROV mounted	Snaeco, France	Estimated 130 - 160

Table 3. Grouped mechanical-noise assessment for WROV tooling.

Group	Items included	Mechanical sound type	Typical duration/duty cycle	Annex IV pathway	Impact
ROV manipulators	T4 + Atlas Manipulators; Flange Splitter; PHINS; DVL	Mostly low-level hydraulic/electric actuation, short “servo” sounds; minor structure-borne vibration	Intermittent	Would require Annex IV species to be at/near the seabed worksite	Negligible: localised, low energy, no realistic receptor proximity at 370 m
Cutting/grinding / sawing tools	Grinders / Chop Saw; Track Saw (17" rotary saw); Diamond Wire Cutter (MMDWS); Hydraulic Shears (Tiny); Deck Removal Tool (Deep Tek)	Intermittent high-frequency tonal/rasping cutting noise; vibration transferred into the wreck structure; occasional impact sounds	Short bursts	Only credible if the species is very close to the tool/wreck at depth	Negligible: brief + localised; no plausible injury; disturbance highly unlikely to be ecologically meaningful
Line cutters & small cutters	Soft Line Cutter; Hard Line Cutter	Very brief mechanical snap/cut, possibly a short motor whine; minimal energy	Infrequent	Requires immediate proximity	Negligible
Pump/jet / hydraulic flow tools	Dynajet Pump; HP Water Jet; Excav8 Subsea 6" Dredge Pump; Controlled Flow Excavator	Broadband “hiss/jet” with pump whine; some low-frequency components; largely confined to a few metres	Intermittent	Would require animals at depth and close range	Negligible: localised source; low encounter probability at seabed
Grabs and baskets: contact/impact handling	Large Tine Grab (DWT OPG 2.2); Small Tine Grab (MEGA CLAW 3); Clam Shell Grab (DWT BAG10 Grab); Half Height Baskets	Intermittent low-frequency clunks/impacts, scraping/dragging depending on substrate	Intermittent	Requires close proximity at seabed	Negligible: localised contact noise; no plausible pathway to Annex IV effect at 370 m

Further details regarding the survey/salvage vessel, the equipment to be deployed, and the survey/salvage techniques are provided in sections 3.2 to 3.3 and the subsections below.

No intentional detonation or explosive ordnance disposal activities form part of the proposed works under this MUL application.

3.2 Survey/ Salvage Vessel

The specific survey/salvage vessel will be confirmed prior to mobilisation. For assessment purposes, this Annex IV assessment uses a type 639 Multipurpose Offshore Vessel (or similar). Aker Yards, Norway, as an indicative vessel with sound pressure levels of 165-175 dB re 1 μ Pa at 1 m, and a DP2 Kongsberg Kpos 21 system at the ship's hull with an indicative level of 178 dB re 1 μ Pa at 1 m. The Olympic Challenger can also be used as another 'example' vessel for the survey/salvage operation (Table 4).

Table 4: An example of a survey/salvage vessel

Olympic Challenger Type: Multipurpose Offshore Vessel MMSI: 257089810 Call sign: LAZQ7 IMO Number: 9398292 Flag: Norway	
Length OA	105.9m
Beam	21.0m
Draft Max (Loaded)	5.7m
Classification (RINA)	DNV, 1A1 ICE-C SF COMF-V(3), HELD K(E) DYMPOS AUTR, CLEAN DESIGN DK (+)
DP Type	DP2 – Kongsberg Kpos 2

3.3 Survey and Salvage Campaign

On arrival on site, the vessel will establish DP and complete survey calibrations, followed by a baseline survey across the wreck and surrounding seabed (GVI, hydrocarbon leak detection and MBES). ROVs will inspect internal compartments, after which controlled works will begin. Cargoes and artefacts will be recovered using dedicated secure baskets. Recovery baskets and subsea containers will be used for approved non-UXO cargoes and artefacts. Salvage will target on the bow and forward holds. The identified shell-cargo stack at the stern lies more than 85 m from the intended work area and will not be disturbed. The works will finish with "as left" surveys (MBES, video and hydrocarbon leak detection), after which the vessel will depart the site. Salvocean will undertake the works in accordance with MARA (2024) guidance on the identification of unexploded ordnance (UXO).

Salvocean plan to undertake the operational sequence in four phases: Phase I - as-found survey, hydrocarbon leak detection, MBES and detailed bow/holds 1-3 inspection; Phase II - survey point-fixing and installation of frond matting over the exposed UXO/lard area; Phase III - controlled bow access, systematic deck/overburden removal and recovery of selected cargoes/artefacts; and Phase IV - as-left video, MBES and hydrocarbon leak detection followed by recovery of seabed equipment.

Multibeam echosounder

Salvocean Rev. 4.0 specifies a Teledyne RESON SeaBat 7125 ultra-high-resolution MBES, ROV-mounted, with an indicative sound pressure level of 196-224 dB re 1 μ Pa at 1 m. The MBES is to be used for the as-found survey and the as-left survey of the wreck and surrounding seabed.

Sub-bottom profiler (SBP)

A sub-bottom profiler survey was previously undertaken over the wreck as part of the existing survey record.

Additional acoustic transponders

A number of additional transponders, as given in Table 2 will be required to aid in the positioning of the deployed equipment. All transponders operate by emitting and receiving acoustic signals and measuring time to calculate distance and direction by analysing the returning signal.

ROV mounted Teledyne RESON SeaBat® 7125 MBES system

A ROV-mounted (MBES) system to obtain high-resolution seabed and target imagery, supported where required by ROV-based visual inspection to confirm wreck identity and local seabed conditions.

General visual inspection of the wreck

A video survey will be conducted at the shipwreck and its immediate vicinity. The adjacent areas will be surveyed to confirm the locations of debris, fishing nets, and similar items.

Digital video acquisition

One or more cameras mounted on a ROV will be used to record visual monitoring of the wreck and adjacent areas during the surveys, salvage and at the completion of works.

Hydrocarbon Leak Detection Survey

Hydrocarbon/HNS monitoring will be undertaken during the works. Although RMS Laconia was coal-fired, the cargo included mineral lubricating oil; therefore, the assessment distinguishes between bunker-fuel risk and cargo/HNS risk. If hydrocarbon leakage, sheen formation, or evidence of release from mineral oil containers or associated sediments is identified, work will pause where necessary to allow assessment and implementation of containment, recovery or mitigation measures in accordance with pollution response procedures and the vessel SOPEP.

Photogrammetry survey

Photogrammetry files to be collected with a fly-out ROV as the Vector system (Snaeco, France), ROV-mounted, for close visual inspection of the bow compartments.

Vessel presence and dynamic positioning

The survey/salvage vessel will mobilise to the site and maintain station using DP while surveys and subsea works are undertaken. Vessel presence, thruster use and general operations contribute to the overall underwater noise environment.

Controlled access works

Controlled access works at the bow will use WROV cutting tools together with the crane-deployed Hydraulic Shears (Tiny) and Deck Removal Tool (Deep Tek). The deck removal tool will lift and shift cut deck sections clear of the bow to a dedicated laydown zone, under the project lifting, rigging and HSE controls.

Sediment removal and clearance

Sediment removal will be undertaken where required using the ROV-mounted Excav8 Subsea 6" Dredge Pump (Centurion Subsea Services, UK) and/or the vessel-crane-deployed Controlled Flow Excavator (Coretti, France), depending on local conditions and access requirements.

The Controlled Flow Excavator and ROV-mounted 6" dredge pump will be used where required to move or remove localised overburden.

Recovery of cargoes and artefacts

Cargoes and artefacts will be recovered using dedicated secure baskets. Baskets will be positioned adjacent to the work area and recovered to the surface as required, with handling managed via ROV/vessel cranes and deck operations.

Containers and subsea collection workflow

Open-top half-height recovery baskets/containers will be positioned adjacent to the bow worksite for recovered cargoes/artefacts and material of interest. Containers will be cycled to the surface for emptying and redeployed as necessary.

UXO avoidance and in-situ protection

Salvage efforts will target the bow and forward holds, more than 85 m away from the identified shell-cargo stack in the stern/No. 4-5 hold area. Frond matting will be placed over the exposed UXO/lard-crate area to secure it, promote sediment accumulation and provide *in-situ* protection without disturbing the ordnance.

Frond mats will be deployed individually by vessel crane using a purpose-built lifting frame and positioned by the WROV. The mats are soft and reversible *in-situ* preservation measures intended to reduce scour and promote sediment accumulation over the exposed UXO/lard area.

Deck operations and recovery of seabed equipment

Deck operations will support crane rigging, deployment and recovery of tooling, container emptying, and general handling. At completion, seabed equipment (including positioning beacons and any temporary subsea infrastructure) will be recovered.

Underwater noise source levels

Indicative source levels for key acoustic systems are provided in the associated equipment (dB re 1 μ Pa).

The work-class ROV equipment includes T4 + Atlas Manipulators, RTIS, Grinders / Chop Saw, Dynajet Pump, Flange Splitter, Soft and Hard Line Cutters, Track Saw (Aleron), HP Water Jet, MBES, PHINS, DVL, SVP, USBL Beacons and a Diamond Wire Cutter. Remote-intervention equipment includes the DWT OPG 2.2 Large Tine Grab, MEGA CLAW 3 Small Tine Grab, DWT BAG10 Clam Shell Grab, Tiny Hydraulic Shears, Deep Tek Deck Removal Tool, Half Height Baskets and a Controlled Flow Excavator.

The USBL beacons are active acoustic sources for which indicative source levels are provided where available, while other navigation aids are not expected to generate material underwater noise unless they include active acoustic transmissions (to be confirmed).

4. Receiving environment: Annex IV Species

The proposed survey and salvage area covers ~1 km². There is no spatial overlap between the proposed MUL area for the wreck site and any European site/s. The wreck lies in Ireland's EEZ on the Porcupine Bank, approximately 150 miles NW by W of Fastnet, at a water depth of roughly 370 m. The site is characterised as low energy, with the wreck sitting relatively upright on a gentle slope.

Given the offshore location, terrestrial Annex IV species such as otter and bats are not ecologically connected to the site and are screened out with justification. The assessment, therefore, focuses on cetaceans and, on a low-probability precautionary basis, marine turtles.

Seabed conditions are soft, silty sediment with a surface layer dominated by foraminifera-rich glauconitic quartz sand (in the regional geological context of the Porcupine Bank). The wider Porcupine Bank setting is noted as being free of terrigenous sedimentation, with carbonate accumulation and mixing with relict quartz sands/glacial material, and with benthic foraminifera and possible coral patch association in 200–500 m water depths.

The seabed around the wreck has been disturbed by up to four previous salvage attempts, including mass-flow excavator activity, and there are excavation features and the dumping of grab contents along the sides of the wreck. The receiving environment is not “pristine” and already contains disturbed sediments and redistributed material.

4.1 Cetaceans

National collation platforms (e.g. the National Biodiversity Data Centre's Biodiversity Maps) provide regional context on cetacean records in Irish waters, and the State ObSERVE programme has collected aerial and acoustic survey data on cetaceans across large portions of Ireland's EEZ. Consistent with this wider offshore setting, the receiving environment may support transient and/or foraging use by Annex IV cetaceans such as bottlenose dolphin (*Tursiops truncatus*), harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*) and minke whale (*Balaenoptera acutorostrata*), noting that occurrence offshore is expected to be patchy and temporally variable in response to oceanographic and prey processes.

4.2 Reptiles (marine turtles)

Both Loggerhead turtle (*Caretta caretta*) and Leatherback turtle (*Dermochelys coriacea*) are recorded occasionally around the entire coast of Ireland. However, no records were available for this species within the proposed MUL areas (NBDC, 2025). Given the scale and scope of the project, it is highly unlikely that the proposed surveys would have the capacity to affect this species.

4.3 Additional Annex IV species

Given the deep-offshore setting, no credible impact pathway exists for any additional Annex IV species (e.g. Otters and bats), and they are not considered further.

5. Risk assessment

5.1 Direct and Indirect impacts

Direct impacts may include underwater noise from DP thrusters, USBL/acoustic positioning systems, MBES/SBP (where used), and vessel presence/collision risk. Physical seabed disturbance, sediment plumes and cargo recovery are confined to the immediate wreck footprint.

Salvage will concentrate on the bow and forward holds, more than 85 m away from the identified shell-cargo stack in the stern/No. 4-5 hold area. Frond matting will be placed over the exposed UXO/lard-crate area to secure it, promote sediment accumulation and provide *in-situ* protection without disturbing the ordnance.

Indirect impacts may result from the subsequent redistribution of sediments during specified salvage operations at the site.

5.2 Cetaceans

The JNCC/IAMMWG (2023) Management Units (MU) layers show that the RMS Laconia MUL Area falls within the broad management units for offshore cetacean species (including harbour porpoise, bottlenose dolphin, common dolphin, white-sided and white-beaked dolphins, Risso's dolphin and minke whale). These MUs are large-scale population assessment areas, and MU overlap does not indicate regular presence, aggregation, or critical habitat at the wreck. The MU context is used to identify relevant Annex IV receptors for screening.

No plausible mechanism exists for deliberate killing or destruction of breeding/resting sites, given the depth, offshore location and confined operational footprint.

Underwater noise can lead to disturbance and/or injury to marine mammals, depending on the type and frequency of the noise as well as the distance of the receptor from the source.

Cetacean sensory systems are adapted to life in the water. They rely on sound to navigate, to communicate with one another and to sense and interpret their surroundings. Behavioural responses

of marine mammals, including cetaceans, to a sound are known to be strongly influenced by the context of the event and individual factors such as the animal's experience, motivation, conditioning and activity (Southall *et al*, 2007). Such features and variability may also require consideration in the case-specific assessment of impact on marine mammals from introduced sound sources (NPWS 2014). Sound waves dissipate through the water with distance from the source. While local oceanographic conditions affect the path of the sound and its transmission.

Depending on the exposure levels from underwater noise, auditory injury to marine mammals can occur. This may result in temporary loss in hearing sensitivity, known as **Temporary Threshold Shift (TTS)** or more permanent damage, known as **Permanent Threshold Shift (PTS)**. The potential for auditory injury is related to the noise frequency relative to the hearing bandwidth of the marine mammal and is also influenced by the duration of exposure. The level of impact on an individual is a function of the **Sound Exposure Level (SEL)** that an individual receives as a result of underwater noise.

Table 5 details the various functional groups relative to hearing for the majority of cetaceans encountered in Irish waters.

Table 5. Cetacean functional groups relative to hearing at different sound frequencies.

Low frequency 7 Hz-22 kHz	Mid-frequency 150 Hz-160 kHz	High frequency 200 Hz-180 kHz
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoise
Species- Ireland Humpback whale Blue whale Fin whale Sei whale Minke whale	Species- Ireland Sperm whale Killer whale Long-finned pilot whale Beaked whale species Dolphin species	Species- Ireland Pygmy sperm whale Harbour porpoise

After: NPWS (2014). *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*.

Southall *et al* (2007) describes the sound pressure levels associated with the various functional groups as detailed in Table 6. This has been revised (Southall *et al*, 2019) to further refine functional hearing groups but similar injury criteria as relevant to the proposed project apply.

Table 6. Sound pressure levels associated with Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS)

Functional group	Injury Criteria (based on single pulse)	
	TTS	PTS
Low frequency cetaceans	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
Mid frequency cetaceans	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
High frequency cetaceans	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
Pinnipeds (in water)	212dB re: 1µPa (peak)	218 dB re: 1µPa (peak)

Given operational source levels and rapid sound attenuation at 375 m depth, the probability of PTS is considered highly unlikely. Behavioural disturbance (temporary avoidance) due to vessel presence is the principal potential effect.

Salvage-phase impacts include localised seabed disturbance from grabs, the Controlled Flow Excavator and the ROV-mounted Excav8 Subsea 6" Dredge Pump. These activities are confined to the

wreck footprint and do not affect breeding or resting sites of Annex IV species. Sediment plume effects are short-range and rapidly dispersive in offshore conditions.

DP2 thruster noise is continuous but low frequency; mitigation includes power optimisation and operational limits to reduce the acoustic footprint.

NPWS (2014) guidance, drawing on international criteria, identifies indicative injury thresholds for impulsive sources of approximately 230 dB re 1 μ Pa (peak) for low-frequency cetaceans (PTS) and approximately 224 dB re 1 μ Pa (peak) for TTS onset. For non-impulsive sources, cumulative sound exposure level (SELcum) injury thresholds are typically in the range of 198 dB re 1 μ Pa²s (low-frequency cetaceans).

The proposed works include the MBES, USBL/acoustic transponders and stationary DP/vessel noise. Given geometric spreading, water depth (~370 m), the confined operational footprint and the source levels stated, exposure at biologically relevant distances is considered highly unlikely to approach PTS thresholds and highly unlikely to exceed TTS thresholds.

Accordingly, the risk of injury (PTS) is considered negligible. Any behavioural disturbance, should it occur, is predicted to be temporary, localised and non-significant.

5.3 Reptiles (marine turtles)

Given the offshore location, the localised nature of the works, the deep-water seabed focus of operations, and the very low likelihood of turtle presence within the immediate works area, significant effects on marine turtles are not anticipated. Any potential interaction would be temporary, localised and of negligible ecological significance.

6. Risk Assessment Conclusion

Risk Assessment Conclusion (Article 12): Having regard to the pathway-led ZOI defined in the Supporting Information for Screening for Appropriate Assessment (MERC, 2026), the confinement of seabed interaction to the immediate wreck footprint (~155 m x 25 m); the offshore location (~240 km from shore; ~370 m depth); the localised nature of survey and salvage noise sources; and the patchy, transient occurrence of cetaceans within large-scale Management Units, it is concluded that the proposed works will not give rise to deliberate killing, deliberate disturbance in the Article 12 sense, or deterioration/destruction of breeding or resting sites. Any behavioural responses, should they occur, would be temporary and localised and would not translate to biologically significant disturbance or an adverse effect on any cetacean species. No derogation under Article 16 is required.

7. Proposed mitigation

NPWS (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 by the National Parks and

Wildlife Service. Specifically, in relation to Geophysical acoustic surveys, such as proposed in this project, the guidance set out in NPWS (2014), 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

1. 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.
2. 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.
3. 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.
4. 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

5. 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.

6. 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.
7. 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 state² 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).

UXO mitigation

Salvocean will adhere to MARA (2024) Guidance Note Identification of Unexploded Ordinance (UXO) in the Maritime Area Guidance for Consent Holders.

² 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.

Further archival research will be undertaken to clarify, where possible, whether the shell consignments were shipped live or unfilled.

A third-party qualified and regulated UXO technician will be on-board the survey vessel and will direct any decisions relative to the determination and actions to be taken in the event of UXO being identified during salvage operations.

Salvocean will place frond matting over the exposed UXO and adjacent lard-crate area to secure the material and promote in-situ preservation by sediment accumulation.

Salvage will target the bow and forward holds only. The intended work area is more than 85 m away from the identified shell-cargo stack, providing separation so that the stack is not disturbed.

No intentional detonation or disturbance of the identified ordnance forms part of the current MUL scope.

If an unexpected suspect munition is encountered outside the identified shell-cargo area, work will stop, and the item will remain *in situ* pending assessment by the qualified UXO technician and under direction of the applicable authority.

8. Assessment of residual risk

Following incorporation of the above mitigation, the proposed survey and salvage works are not predicted to result in deliberate killing or disturbance, or destruction of breeding/resting sites of Annex IV species within Irish waters.

Annex IV risk is considered negligible following implementation of the mitigation and project controls set out in Section 7.

9. Conclusion

The RMS Laconia wreck footprint represents a small, discrete area within an extensive offshore receiving environment. Annex IV receptors recorded in the wider Porcupine Bank/slope province are wide-ranging, transient and influenced by oceanographic processes, rather than fixed to small, static seabed features. Available data indicate broad-scale habitat use associated with shelf-edge and offshore systems, with spatially and temporally variable occurrence. There is no evidence that the wreck site itself constitutes a known aggregation, breeding, resting or critical foraging area for Annex IV species.

The wreck site lies within deep offshore waters of the Porcupine Bank and does not correspond with any known critical habitat area. Accordingly, while the transient passage of Annex IV species cannot be excluded, there is no evidence of site-specific ecological sensitivity that would elevate risk beyond negligible levels.

Having regard to the scale, duration, depth and offshore location of the works, no adverse effect on the conservation status of any Annex IV species is predicted.

It is concluded that the proposed survey and salvage works will not result in deliberate killing, deliberate disturbance, or deterioration/destruction of breeding or resting places of Annex IV species.

No likely transboundary Annex IV effect is identified.

Residual Risk: Negligible.

Annex IV Derogation: Not required.

10. Bibliography

Bach, P., Voigt, C.C., Göttsche, M., Bach, L., Brust, V., Hill, R., Hüppop, O., Lagerveld, S., Schmaljohann, H., Seebens-Hoyer, A. and Göttsche, M. (2022). Offshore and coastline migration of radio-tagged Nathusius' pipistrelles (*Pipistrellus nathusii*) in the Baltic Sea region. *Conservation Science and Practice*, 4(10), e12783. <https://doi.org/10.1111/csp2.12783>.

Biodiversity Data Centre (2024) Maps. Available at: <https://maps.biodiversityireland.ie/Map>. Accessed 2.06.2025.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). *Official Journal of the European Communities*, L206, 22.7.1992. Available via EUR-Lex.

Department of the Environment, Climate and Communications (DECC) (n.d.). ObSERVE Programme. <https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/observe-programme>.

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive). *Official Journal of the European Union*, L20, 26.1.2010. Available via EUR-Lex.

European Commission (2021). *Commission Notice: Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC* (C/2021/7301). Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021XC1209\(02\)](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021XC1209(02))

European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). Available at: <https://www.irishstatutebook.ie/eli/2011/si/477>

European Marine Observation and Data Network (EMODnet). Available at: <https://emodnet.ec.europa.eu/en/seabed-habitats>. Accessed 11.06.2025.

Gilles, A., Authier, M., Ramirez-Martinez, N.C., Araújo, H., Blanchard, A., Carlström, J., Eira, C., Dorémus, G., Fernández-Maldonado, C., Geelhoed, S.C.V., Kynh, L., Laran, S., Nachtsheim, D., Panigada, S., Pigeault, R., Sequeira, M., Sveegaard, S., Taylor, N.L., Owen, K., Saavedra, C., Vázquez-Bonales, J.A., Unger, B. & Hammond, P.S. (2023). *Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys*. Final report published 29 September 2023. Available at: https://www.tihoannover.de/fileadmin/57_79_terr_aqua_Wildtierforschung/79_Buesum/downloads/Berichte/20230928_SCANS-IV_Report_FINAL.pdf

INFOMAR Seabed and sediment data. Available at: <https://www.infomar.ie/maps/interactive-maps/seabed-and-sediment>. Accessed 24/06/2025.

Irish Whale and Dolphin Group (2009). *Cetaceans on the Frontier: A report on cetacean distribution and habitat features from dedicated surveys of deep-water canyons and continental margin off western Ireland (August 2009)*. Irish Whale and Dolphin Group, Kilrush, Ireland. https://www.iwdg.ie/downloads/2009_Cetaceans_on_the_Frontier_Survey.pdf.

MARA 2024. Guidance Note Identification of Unexploded Ordnance (UXO) in the Maritime Area Guidance for Consent Holders on the identification of Unexploded Ordnance (UXO) in the Maritime Area. Guidance Note 001 October 2024. <https://www.maritimeregulator.ie/wp-content/uploads/2025/10/CER-Guidance-001-UXO-Unexploded-Ordnance.pdf>.

MERC (2026). Supporting Information for Screening for Appropriate Assessment: Proposed salvage of the RMS Laconia.

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. Available at: https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf

National Biodiversity Data Centre (NBDC) (n.d.). *Biodiversity Maps*.

National Parks and Wildlife Service (NPWS) (2011). *Tracking grey seals to identify offshore foraging areas*. NPWS, Dublin.

ObSERVE Aerial Surveys for Seabirds and Cetaceans in the Irish Atlantic Margin. Department of the Environment, Climate and Communications (DECC) (n.d.). *ObSERVE Programme*. Available at: <https://maps.biodiversityireland.ie/Dataset/322>. Accessed 26.06.2025

Southall, B., Finneran, J., Reichmuth, C., Nachtigall, P., Ketten, D., Bowles, A., Ellison, W., Nowacek, D., Tyack, P. (2019). Marine Mammal Noise Exposure Criteria. Updated Scientific Recommendations for Residual Hearing Effects. *Aquatic Mammals*. 45. 125-232. 10.1578/AM.45.2.2019.125.

Southall, B. L., Bowles, A. E., Ellison, W. T., Finneran, J. J., Gentry, R. L., Greene, C. R. Jr., Kastak, D., Ketten, D. R., Miller, J. H., Nachtigall, P. E., Richardson, W. J., Thomas, J. A., and Tyack, P. L. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. *Aquatic Mammals* 33(4): 411-521.

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>

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.

ICES. 2024. Working Group on Marine Mammal Ecology (WGMME). ICES Scientific Reports. 6:82. 239 pp. <https://doi.org/10.17895/ices.pub.26997367>

Some acronyms and abbreviations

AA — Appropriate Assessment

AFS — Anti-Fouling Systems (Convention)

ARC / ARCs — Activities Requiring Consent

ASC — Aquaculture Stewardship Council

AUT-UMS — *Classification notation* “Automated – Unattended Machinery Space” (RINA/flag/class usage)

BIM — Bord Iascaigh Mhara (Irish Sea Fisheries Board)

BTO — British Trust for Ornithology

BWM — Ballast Water Management (Convention)

C70 — Garda form used to request Defence Forces assistance (Aid to the Civil Power)

CESS — Cumulative Effects Spatial Scope

CETS — Cumulative Effects Temporal Scope

CIEEM — Chartered Institute of Ecology and Environmental Management

CLS — Complete Laboratory Solutions (as used in your context)

COSHH — Control of Substances Hazardous to Health

CSMB — Continental Shelf Maritime Boundary

dB — decibel

DP — Dynamic Positioning

DP2 — Dynamic Positioning Class 2

DTM — Digital Terrain Model

DVL — Doppler Velocity Log

EEZ — Exclusive Economic Zone

EIA — Environmental Impact Assessment (appears in the transboundary section)

EIAR — Environmental Impact Assessment Report (*not used in the excerpt; included only if you treat it as implied—otherwise ignore*)

EMODnet — European Marine Observation and Data Network

EU — European Union

EUSEaMap — EUSEaMap (EMODnet seabed habitat mapping product)

GIS — Geographic Information System

GPS — Global Positioning System

GRT / grt — Gross Registered Tonnage

GVI — General Visual Inspection

HD — Heavy Duty (e.g., “HD grab / shear”)

HiPAP — High Precision Acoustic Positioning (Kongsberg positioning system)

HNS — Hazardous and Noxious Substances

HRA — Habitats Regulations Assessment (used in “HRA screening”)

HSE — Health, Safety and Environment (procedures/system context)

IAS — Invasive Alien Species

IMR — *UNSURE* (used as “onboard the IMR, Survey and Light Construction vessel”; could be a vessel class/term or company acronym—needs confirmation)

IMO — International Maritime Organization (*also used as “IMO Number” for the vessel*)

INTERREG — EU Interreg programme (cross-border cooperation funding/programme)

IROPI — Imperative Reasons of Overriding Public Interest

IRCG — Irish Coast Guard

ISO — International Organization for Standardization (e.g., ISO 9001/14001/45001)

ISM — International Safety Management (ISM Code)

JNCC — Joint Nature Conservation Committee

km — kilometre(s)

LOLER — Lifting Operations and Lifting Equipment Regulations

LS — Likely Significant (as used in LSEs) (*strictly, LS isn't written alone here; including for completeness*)

LSE / LSEs — Likely Significant Effect(s)

M/V — Motor Vessel

MAC — Maritime Area Consent

MAPA — Marine Area Planning Act 2021

MARA — Maritime Area Regulatory Authority

MARPOL — International Convention for the Prevention of Pollution from Ships

MBES — Multibeam Echosounder

MCIEEM — Member of CIEEM

MMSI — Maritime Mobile Service Identity

MoD — Ministry of Defence (UK)

MSC — Marine Stewardship Council

MSc / M.Sc. — Master of Science

MU — Management Unit

MUL — Maritime Usage Licence

NA/C1-E; NA/C7-D; etc. — *UNSURE* (project/wreck identifiers/codes; not expanded in text)

N/A — Not Applicable

NPWS — National Parks and Wildlife Service

OA — Overall (as in “Length OA”)

OPR — Office of the Planning Regulator

PA — Position Approximate

PHINS — a fibre-optic gyro inertial navigation system (brand/model family)

PPE — Personal Protective Equipment

POWER — Provision and Use of Work Equipment Regulations

QI / QIs — Qualifying Interest(s)

RINA — Registro Italiano Navale (Italian classification society)

RMS — Royal Mail Ship

ROV — Remotely Operated Vehicle

ROI — Republic of Ireland

SAC / SACs — Special Area(s) of Conservation

SAL — Salvocean Ltd

SBP — Sub-Bottom Profiler (historic data only)

SCI / SCIs — Special Conservation Interest(s) (SPA context)

SI / S.I. — Statutory Instrument

SISAA — Supporting Information for Screening for Appropriate Assessment

SOLAS — International Convention for the Safety of Life at Sea

SOPEP — Shipboard Oil Pollution Emergency Plan

SPA / SPAs — Special Protection Area(s)

SPR — Source–Pathway–Receptor

SS — Steam Ship (*also used generally as ship prefix*)
SSS — Side-Scan Sonar
SVP — Sound Velocity Profiling / Sound Velocity Profile (context implies profiling)
SWL — Safe Working Load
TBC — To Be Confirmed
TBD — To Be Determined
UCH — Underwater Cultural Heritage
UK — United Kingdom
UNECE — United Nations Economic Commission for Europe
UNESCO — United Nations Educational, Scientific and Cultural Organisation
US / USA — United States / United States of America
USBL — Ultra-Short Baseline (acoustic positioning)
WFD — Water Framework Directive
WW1 — First World War
WROV — Work-class Remotely Operated Vehicle
ZoI — Zone of Influence