

19/062 - WO064 Marine Modelling Studies - Lot 1 Greater Dublin & Northeast Region

Risk Assessment for Annex I Species

Uisce Éireann

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Quality Information

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1. Risk Assessment for Annex IV Species

1.1 Introduction

This Attachment has been prepared in support of the Maritime Usage Licence (MUL) Application for marine surveys associated with the Marine Modelling Study (MMS) being undertaken by Uisce Éireann along the Irish coast, from Carlingford Lough to Kilcoole. The marine surveys comprise the deployment and recovery of Acoustic Doppler Current Profilers (ADCPs), bathymetric surveys, and passive water quality sampling (hereafter referred to as the Marine Surveys), within Proposed Licence Areas A–D (Figure 1). Further details of the marine surveys and Proposed Licence Areas A–D can be found in Part 3 of the MUL Application.

This attachment forms one of eleven attachments (the current attachment is highlighted in **bold**) submitted in support of included as part of the MUL Application:

- Attachment 3.1: Proposed Maritime Usage
- Attachment 3.4: MUL Map and GIS Shapefiles
- Attachment 3.5: Other Maps and Drawings
- Attachment 4.1: Compliance with Objectives of the National Marine Planning Framework (NMPF);
- Attachment 4.3.1: Supporting Information for Screening of Appropriate Assessment (SISAA);
- **Attachment 4.4: Risk Assessment for Annex IV Species;**
- Attachment 4.5: Compliance with Objectives of the Water Framework Directive;
- Attachment 4.6: Compliance with Marine Strategy Framework Directive;
- Attachment 4.7: Information for EIA Screening; and,
- Attachment 4.11: Compliance with National or European Strategic or Policy Objectives.

The purpose of this document is to consider the potential for impacts on Annex IV species from the Marine Surveys associated with the Lot 1 Project. Annex IV species are strictly protected under the EU Habitats Directive, requiring consideration of risks such as disturbance, injury, or killing. It evaluates effects arising from the proposed activities, alone and in-combination with other plans or projects, using best available scientific knowledge, to determine the risk of offences and identify any mitigation required to ensure compliance.

1.2 Quality Assurance and Statement of Authority

This Report and the assessment described within it has been completed in accordance with the AECOM Integrated Management System (IMS). AECOM's IMS places emphasis on professionalism, technical excellence, quality, as well as covering health, safety, environment and sustainability management. All AECOM staff members are committed to maintaining this accreditation to those parts of BS EN ISO 9001:2015 and 14001:2015, as well as BS OHSAS 18001:2007 that are relevant to a consultancy service.

1.3 Legislative Context

All cetaceans (dolphins, whales, porpoises) and marine turtles in the Republic of Ireland are listed under Annex IV of the European Union (EU) Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). Listing under Annex IV requires Member States of the EU to strictly protect these species wherever they occur within the member states Exclusive Economic Zone (EEZ). In addition, some marine species (shown in Table 1) are also listed under Annex II of the Habitats Directive, which effectively means that Member States are required to designate Special Areas of Conservation (SAC) for the further protection of these species.

The Habitats Directive is transposed into Irish law by the European Communities (Bird and Natural Habitats) Regulations 2011 – 2021 (the 'Habitats Regulations'), which provide national legislation for the protection of Annex IV species. Under the Habitats Regulations it is an offence to:

- Deliberately capture, injure, or kill any Annex IV species.

- Deliberately disturb any Annex IV species, particularly during the period of breeding, rearing, hibernation, and migration.
- Damage or destroy any Annex IV species breeding site or resting place.

Disturbance is defined as an activity which impairs the ability of the Annex IV species to survive, breed, rear/nurture their young, to migrate or an activity which significantly affects the local distribution or abundance of the species.

Furthermore, under the Wildlife Acts 1976 to 2021¹ (the 'Wildlife Act') all cetaceans, seals and basking shark are protected species listed on the 5th Schedule. Under the Wildlife Act, it is an offence to hunt (except in some instances under licence or Ministerial permit), injure (except when hunting under such licence) or wilfully interfere with or destroy the breeding place of a protected species.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

The protection afforded to relevant marine species in Ireland are summarised in Table 1.

Table 1. Relevant marine species and their protection legislation.

Species / Species group	Legislation
Annex IV species	
All Cetaceans	• Annex IV • Wildlife Act
Harbour porpoise (<i>Phocoena phocoena</i>);	• Annex IV and II • Wildlife Act • OSPAR
Bottlenose dolphin (<i>Tursiops truncatus</i>)	• Annex IV and II • Wildlife Acts
Loggerhead turtle (<i>Caretta caretta</i>)	• Annex IV • Wildlife Act
Leatherback turtle (<i>Dermochelys coriacea</i>)	• Annex IV • Wildlife Act
Hawksbill turtle (<i>Eretmochelys imbricata</i>)	• Annex IV • Wildlife Act
Kemp's ridley turtle (<i>Lepidochelys kempii</i>)	• Annex IV • Wildlife Act
Green turtle (<i>Chelonia mydas</i>)	• Annex IV • Wildlife Act
European otter (<i>Lutra lutra</i>)	• Annex IV and II • Wildlife Act
Other relevant Non-Annex IV species	
Harbour seal (<i>Phoca vitulina</i>)	• Annex II and V • Wildlife Act
Grey seal (<i>Halichoerus grypus</i>)	• Annex II and V • Wildlife Act
Basking shark (<i>Cetorhinus maximus</i>)	• Wildlife Act

If the risk of injury or significant disturbance cannot be reduced to negligible levels with mitigation, then a derogation licence is required. In Ireland, all derogation licence applications must be submitted to the NPWS and may be granted by the DHLGH which would allow an otherwise illegal activity to go ahead in a controlled manner provided that:

¹ The Wildlife Act

- There is no satisfactory alternative.
- The derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range.

Favourable conservation status is defined in the Habitats Directive as the following:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable element of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

1.4 Guidance

The DHLGH “*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*”² published in 2014, and “*Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland*”³ published in 2021 were provided as official guidelines and codes of practice under Regulation 71 of the Habitat Regulations. These guidelines have been used in this report to determine the content required for this Risk Assessment of Annex IV Species.

The new Maritime Area Regulatory Authority (MARA) guidance “*Obtaining a Licence to Carry Out Specified Maritime Usage in the Maritime Area under the Maritime Planning Act 2021. Applicant Technical Guidance Note*”⁴ published in 2023 (updated in 2024) has been used in this report.

In the absence of any additional relevant Irish guidance, the UK Joint Nature Conservation Committee (JNCC) 2010 guidance “*The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area*” is used in this report.

1.5 Project Description

The Lot 1 Project involves conducting Marine Surveys within certain areas of the Proposed Licence Areas (Figure 1). These Marine Surveys will include Acoustic Doppler Current Profiler (ADCP) surveys, bathymetric surveys and other passive water quality sampling. The Marine Surveys will involve deploying, operating, and recovering ADCPs and tidal gauges. Each bed-mounted ADCP and tidal gauge will include a Conductivity, Temperature, and Depth (CTD) sensor. CTD profiles will also be recorded upon completion of each ADCP deployment. Bathymetric surveys will use vessel-mounted single-beam or multibeam echo sounders (SBES/MBES) within certain areas of the Proposed Licence Areas (Figure 1).

Passive water quality monitoring will involve minimal-disturbance, non-intrusive methods such as handheld sondes, Niskin bottles (for collecting water samples from shore or vessel), and water level/tidal monitoring using gauges affixed to existing structures. These methods have no significant impact on protected marine species, and therefore they are not considered further in this assessment. However, their planned locations are shown on Figure 1 for completeness.

These surveys are scheduled to commence within a 60-month period from 01 September 2026 or the licence date. The survey duration will be a minimum of 35-days and a maximum of 60 days (survey period). Within that survey period there will be 13-hour surveys over a spring tide and a neap tide. The bathymetric surveys may be undertaken during the 35-day survey period or as separate surveys but not commencing before 01 September 2026 or the licence date. The data collected will be used for calibrating hydrodynamic and water quality models, which will support an assessment of water quality in the broader Lot 1 area.

1.5.1 ADCP Surveys

These surveys will be carried out in shallow waters only, less than 100 m in depth. There will be a total of eighteen ADCPs deployed throughout the Proposed Licence Areas with two ADCPs deployed in Area A, ten deployed in Area B, three deployed in Area C and three deployed in Area D. The ADCPs will be located within 100 m of the

² https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf

³ <https://www.npws.ie/sites/default/files/files/strict-protection-of-certain-animal-and-plant-species.pdf>

⁴ <https://www.maritimeregulator.ie/our-work/maritime-usage-licences/licensing-of-maritime-usages/>

centre point for each ADCP to allow for optimal placement. Details on these ADCPs are shown in Table 2 and the indicative location of deployment is shown on Figure 1.

For the purposes of this Annex IV report the construction phase represents the deployment of ADCPs on the seabed/vertically-mounted, the operational phase is the operation of the ADCPs, and the decommissioning phase is the recovery of the ADCPs from the seabed/vessel. These are described in further detail below.

1.5.1.1 Deployment of ADCP Instruments (Deployment Phase)

ADCPs will be deployed either directly onto the seabed or vertically mounted from a vessel or structure. All deployment locations are in waters shallower than 100 m and are shown in Figure 1. Seabed-mounted ADCPs will be lowered from the vessel using a crane or A-frame with a winch. They will remain fully submerged for approximately 35 days, with a maximum deployment of 60 days. The four vertically deployed ADCPs (VADCPs) will be mounted from vessels or bridges. These are not placed on the seabed but instead suspended in the water column, either manually or using a winch.

1.5.1.2 Operation of ADCP Instruments (Operation Phase)

During operation, the ADCPs will remain on the seabed/vessel for an approximate duration of the survey period to gather hydrodynamic data. To collect data during operation, the ADCP survey instruments will emit periodic "pings" of sound into the water column. For the Lot 1 Project, the pings emitted from the ADCPs will have operating frequencies between 200 kHz to 500 kHz. The instrument is contained within a trawl resistant housing and has a footprint of less than 1 m². A Conductivity Temperature Depth (CTD) sonde may be placed inside the housing.

1.5.1.3 Recovery of ADCP survey Instruments (Decommissioning)

To facilitate recovery, a hydrostatic release mechanism will be employed. When activated, it sends a ranging ping to the release mechanism. If successful, this mechanism releases a buoy connected to a recovery line. The vessel can then manoeuvre into position over the buoy and retrieve the ADCPs onto the boat using the crane. In cases where the hydrostatic release fails, the ADCPs are equipped with acoustic pingers that can be activated to assist in locating the ADCP instruments. Another attempt can then be made to activate the acoustic release. If this attempt also fails, the ADCP will be recovered using a grapple recovery method. This involves dragging a line with a grapple attached across the seabed in the deployment area to catch the grapple line between the ADCPs and the grapple anchor. To avoid unnecessary interaction with underwater archaeology prior review of the underwater cultural heritage (UCH) database will be carried out prior to the surveys.

Table 2. List of ADCPs within the Proposed Licence Areas

ADCP Reference	ADCP Name	Within Proposed Licence Area	Area of seabed
ADCP02	Dundalk Bay	A	Approximately 1 m ²
VADCP02	Dundalk Channel	A	Vessel mounted
ADCP03	Skerries Islands	B	Approximately 1 m ²
ADCP04	Rogerstown Estuary Offshore	B	Approximately 1 m ²
ADCP05	Howth Harbour Approach	B	Approximately 1 m ²
ADCP06	Malahide Marine	B	Approximately 1 m ²
ADCP12	Malahide 1	B	Approximately 1 m ²
ADCP13	Malahide 2	B	Approximately 1 m ²
ADCP14	Malahide 3	B	Approximately 1 m ²
VADCP03	Drogheda Entrance Channel	B	Vessel mounted
VADCP04	Rogerstown Channel	B	Vessel mounted
VADCP05	Malahide Harbour Entrance	B	Vessel mounted
ADCP07	Dublin Bay (Outer)	C	Approximately 1 m ²
ADCP08	Dun Laoghaire	C	Approximately 1 m ²
ADCP09	Dublin Bay (Inner)	C	Approximately 1 m ²
ADCP10	Shanganagh	D	Approximately 1 m ²
ADCP11	Bray SWO	D	Approximately 1 m ²
ADCP12	Greystones	D	Approximately 1 m ²

1.5.2 Bathymetric Surveys

The bathymetric surveys will include the use of SBES and/or MBES within areas B, C and D of the Proposed Licence Areas. These surveys will be carried out in shallow waters only, less than 100 m in depth, at the time of writing this report the exact number, make and models of the survey equipment are not known. However, industry standard operating frequencies will be used, which typically range from 200-700 kHz for MBES and 200 kHz for SBES. During the survey window the SBES/MBES will be vessel-mounted. The total area of bathymetric surveys is 3,747 ha. Details on the survey areas are shown in Table 3 and the location of these survey areas are shown on Figure 1.

Table 3. List of Bathymetric survey areas within the Proposed Licence Areas

Bathymetric Site Reference	Bathymetric Site Name	Within Proposed Licence Area	Area of seabed (ha)
Bathy01	Skerries	B	694
Bathy02	Broadmeadow Water	B	337
Bathy03	Malahide Harbour	B	246
Bathy04	Malahide Bay	B	377
Bathy05	Shanganagh	C & D	1514
Bathy06	Greystones	D	641

1.5.3 Tidal Gauges

There are a total of nine tidal gauges to be positioned within the Proposed Licence Areas, two in Area A and seven in Area B. These will all be passive tide gauges with an area less than 0.1 m² mounted on fixed structures, quaysides or navigation markers and will not be placed on the seabed. Further information can be found in Table 4 and their locations are shown in Figure 1.

Table 4. Proposed tide gauge locations

Gauge Reference	Site Name	Within Proposed Licence Area	Coordinates
TG01	Dundalk Road Bridge	A	704710, 808224
TG02	Blackrock	A	706375, 801754
TG03	Drogheda Port	B	709457, 775310
TG04	Skerries Harbour (MI)	B	725237, 761098
TG05	Malahide Marina	B	722609, 746840
TG06	Broadmeadow Water	B	722438, 746880
TG07	Swords Discharge	B	719219, 747802
TG08	Malahide 1	B	722649; 746565
TG09	Malahide 2	B	725287; 761137

1.5.4 Survey Vessels

Survey vessels will be selected by the survey contractor. The vessels will be selected based on suitability as a survey platform for the deployment and recovery of the different equipment. It is envisioned that two small vessels (up to 25 m in length) moving (*i.e.*, survey speeds of 4 knots and 10 – 15 knots whilst in transit) will be used at any

one time during the Marine Surveys, subject to final survey methodology and contractor arrangements. The vessels may maintain their position either using an anchor or dynamic positioning depending on the size and type of vessel. Note, that dynamic positioning will not be used in shallow areas or when a vessel is close to the shore except for berthing operations at suitable docking facilities.

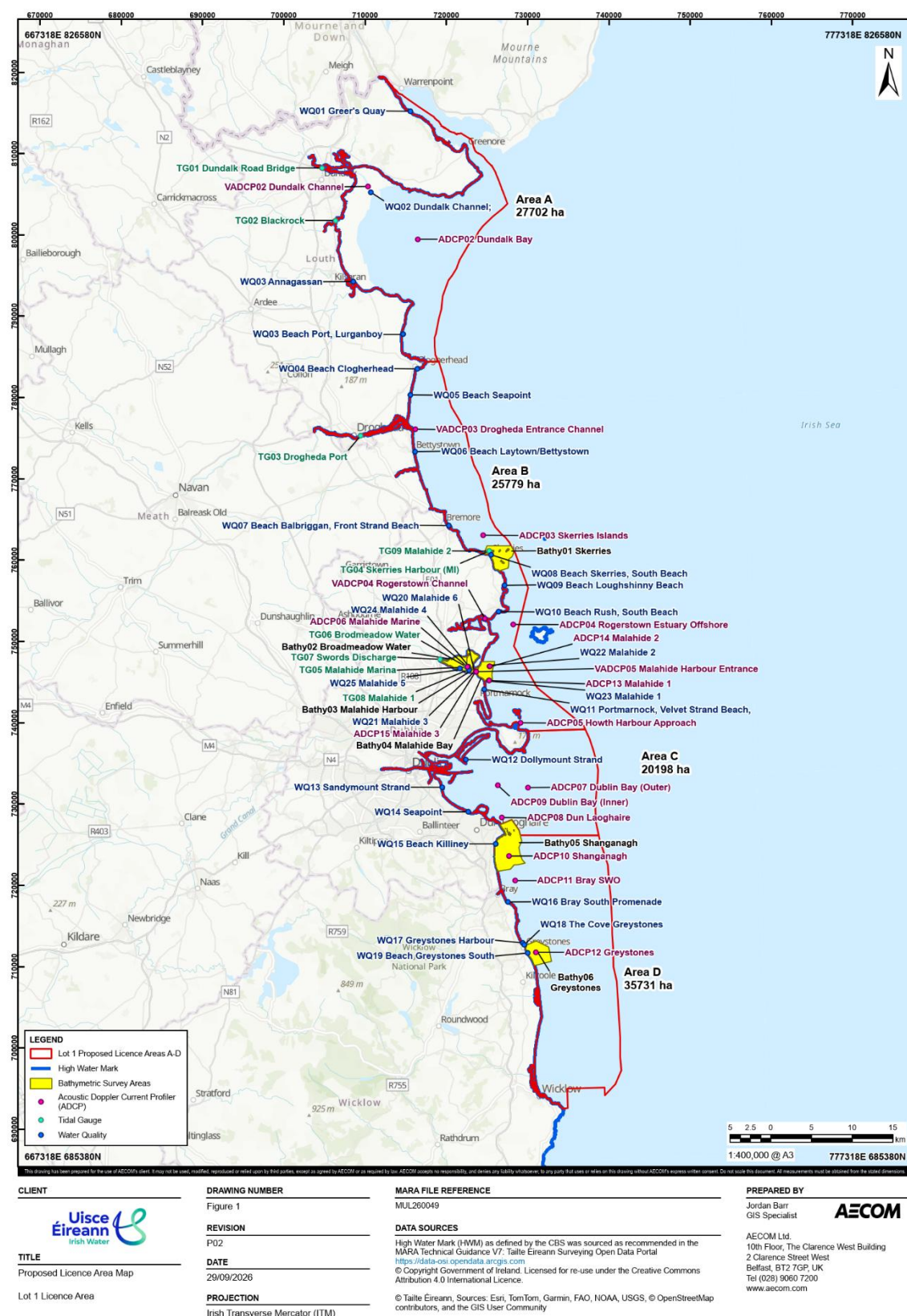


Figure 1. Proposed Survey Areas

2. Baseline Characterisation

2.1 Study Area

The Study Area has been determined at a scale that recognises the highly mobile and transient nature of marine Annex IV species and the potential implications of local impacts on wider populations. Given the wide-ranging nature of these species and their varying ecology, distribution and density, separate areas have been defined for each species or species groups.

For cetaceans, the Study Area has been delineated based on Management Units (MUs) in which the Proposed Licence Areas is located. These MUs have been defined separately for each species by the Inter Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2023). They have established separate geographical MUs for the seven most common species in UK and Irish waters, defined according to biological population structure, movement and habitat use, and relevant management boundaries. An MU typically refers to a geographical area in which the animals of a particular species are found, and to which management of human activities is applied. The relevant Study Areas (MU) for each cetacean's species in which the Proposed Licence Areas is located is shown in Table 5.

There are currently no management units for pinnipeds, turtles or basking shark in Ireland. Therefore, Dublin coast as a whole has been considered as the initial Study Area for these species.

2.2 Key Data Sources

Detailed baseline conditions were established by undertaking a desktop review of publicly available information. No marine mammal field surveys or consultations with relevant organisations were undertaken.

A number of different initiatives have been carried out over the last 10 years to quantify the distribution and abundance of Annex IV species off the coast of Ireland. These data sources were used to inform the understanding of the relative importance and functionality of the Study Area in the regional context of Annex IV species populations in the Atlantic Sea off the west coast of Ireland. The key data sources used include, but are not limited to:

- The National Biodiversity Data Centre (NBDC) mapping system www.biodiversity.ie;
- The National Parks and Wildlife Service www.npws.ie;
- County Biodiversity Plans and Biodiversity Maps;
- Small Cetacean Abundance in the European Atlantic and North Sea (SCANS) data;
- ObSERVE programme <https://www.gov.ie/en/publication/12374-observe-programme/>;
- Irish Whale and Dolphin Group (IWDG) sightings data <https://iwdg.ie/browsers/sightings.php>;
- Aerial Thermal-Imaging survey of seals in Ireland (Morris and Duck, 2019), and
- Publicly available academic journals and online reports.

Scans Data (I - IV)

The SCANS project is a large-scale ship and aerial based survey effort to quantify cetacean abundance and summer distribution in UK and European Atlantic Waters. It first began in 1994 (SCANS I) with boat-based line and aerial line transect surveys following methods of Hiby and Lovell 1998, initially in the North and Celtic seas. This programme has evolved and was repeated in 2005 (Hammond, *et al.*, 2013) (*i.e.*, SCANS-II) and 2016 (Hammond *et al.*, 2017), updated in 2021 (Hammond, *et al.*, 2021) (*i.e.*, SCANS-III) and again in summer 2022 (SCANS IV) (Gilles, *et al.*, 2023). Abundance estimates are divided into blocks. The SCANS-IV survey only covered part of the Celtic and Irish Sea. The remaining part of the Celtic, Irish Sea and Irelands Atlantic Margin was not covered by SCANS-IV but was covered by the ObSERVE programme. The Proposed Licence Areas and survey area is located within SCANS-IV Block CS-D.

It should be noted that SCANS surveys are conducted in the summer (predominantly July) and therefore data are representative of summer distributions only. It is understood that the densities of cetaceans around Ireland are likely greatest during this time period (Waggitt *et al.*, 2019). Therefore, the abundances presented in Table 5 are considered to represent the worst-case scenario and indicate the greatest abundances likely to be encountered within the Study Area.

ObSERVE 1 and 2 Programme

The ObSERVE aerial project is a major scientific programme based in the Irish Exclusive Economic Zone (EEZ) established in October 2014 (ObSERVE I programme) with most recent surveys being completed in summer of 2021 and 2022 and winter of 2021 – 2023 (ObSERVE 2 programme) (Giralt Paradell *et al.*, 2024; Rogan *et al.*, 2018). The objective of the ObSERVE aerial project was to assess the occurrence, distribution and abundance of cetaceans and seabirds within the Irish EEZ. The surveys were aerial survey track-lines, designed to be extensive and representative of a large study area and were split into 'strata'. Surveys took place during both the summer and winter seasons for a survey line coverage of 10,504 km in 2021, and 20,687 km in 2022. The ObSERVE aerial project represents the first time that the winter abundance and density of cetaceans and seabirds have been estimated in this region. The Proposed Licence Areas is located within ObSERVE 2 Stratum 5.

The summer 2022 ObSERVE surveys coincided with the SCANS-IV 2022 summer surveys, a period when cetacean populations typically peak in Irish waters (Waggitt *et al.*, 2019). However, because the SCANS-IV block area CS-D is larger than the ObSERVE I survey area, SCANS-IV data has been prioritised as a worst-case scenario assessment in this report. ObSERVE survey data is then used to compare and refine the findings if needed, to better understand species distribution shifts on a broader scale.

2.3 Annex IV Species

This section presents the Annex IV baseline within the Study Area.

2.3.1 Cetaceans

During the last 10 years several different initiatives to quantify the distribution and abundance of marine mammals have been carried out in the waters of the Irish EEZ (e.g. Berrow *et al.*, 2013; Wall *et al.*, 2013; Hammond *et al.*, 2021; Gilles, *et al.*, 2023, Rogan *et al.*, 2018 and Giralt Paradell *et al.*, 2024). More than 24 cetacean species are known to use the waters surrounding Ireland (Wall *et al.*, 2013; O'Brien *et al.*, 2009), with a few of these species only being identified through data from strandings (NPWS 2023).

Cetaceans commonly found off the east coast of Ireland are harbour porpoise, bottlenose dolphin, common dolphin, and minke whale. Minke whales are considered to be seasonal visitors with all other species thought to be present year-round (Berrow, 2001; Berrow *et al.*, 2010; Berrow *et al.*, 2013; Wall *et al.*, 2006). Other seasonal visitors include the humpback whale (*Megaptera novaeangliae*) which has been sighted more frequently in recent years (Ryan *et al.*, 2015; Berrow *et al.*, 2010; IWDG sightings). The estimated abundance and density information for each of the most common species within Stratum 5 are shown in Table 5. Overall Stratum 5 showed the highest abundance of harbour porpoise and lowest abundance of common dolphin (*Delphinus delphis*) and striped dolphin (*Stenella coeruleoalba*) compared to the other strata surveyed for the Observe II programme (Giralt Paradell *et al.*, 2024).

Deeper-diving marine mammal species are unlikely to be found in close proximity to the Proposed Licence Areas due to the relatively shallow water depths (< 100 m). Whilst the rare or less commonly occurring cetacean species (e.g., Risso's dolphin (*Grampus griseus*), white-beaked dolphin (*Lagenorhynchus albirostris*), striped dolphin, fin whale (*Balaenoptera physalus*), and killer whale (*Orcinus orca*)) may be present, it is considered that any assessment or mitigation measures put in place for the more common species is appropriate for all cetacean species.

Two European sites (Lambay Island SAC and Rockabill to Dalkey Island SAC) designated for cetaceans are located in the vicinity of the Proposed Licence Areas. Dalkey Islands SAC is located within the Proposed Licence Areas and Lambay Island SAC is located >1km from Proposed Licence Areas. Both of these sites are designated for harbour porpoise. These relevant European sites are shown in Figure 2 .

Table 5. Density and abundance estimate for the commonly occurring marine mammals within the SCANS-IV survey block 'CS-D'.

Common name	Relevant Management Unit (IAMMWG, 2023)	Abundance	95% Confidence Level	Highest density estimate (Animals per km ²) ⁵
Harbour porpoise	Celtic and Irish Seas (CIS) MU	9,773	4,764 – 18,125	0.280
Bottlenose dolphin	Irish Sea MU	8,199	3,595 – 15,158	0.235
Common dolphin	Celtic and Greater North Seas (CGNS) MU	949	32 – 2,990	0.0272
Minke whale	Celtic and Greater North Seas (CGNS) MU	477	85 – 1,425	0.0013
Risso's dolphin	Marine Atlantic (MATL) MU	75	2 – 1,259	0.0022
Beaked whales (all species)	Celtic and Greater North Seas (CGNS) MU	73	20 – 276	0.0021

⁵ On a pre-cautionary basis, the highest estimated density value recorded across the four seasons were used in this report

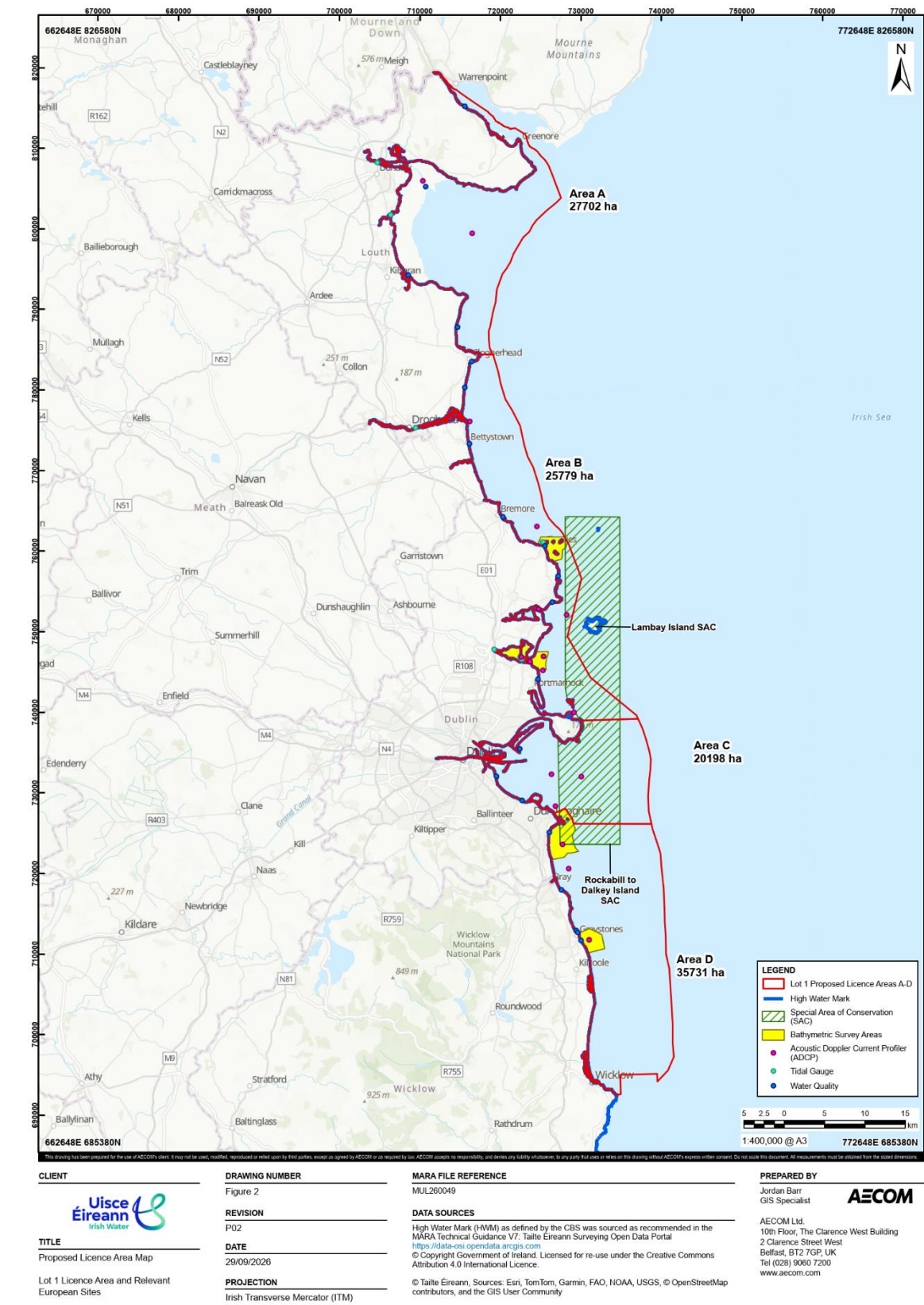


Figure 2. Proposed Surveys and Relevant European Sites.

2.3.2 Sea Turtles

Five Annex IV turtle species are known to occur off the coast of Ireland. These species are:

- Loggerhead turtle (*Caretta caretta*);
- Leatherback turtle (*Dermochelys coriacea*);
- Hawksbill turtle (*Eretmochelys imbricata*);
- Kemp's ridley turtle (*Lepidochelys kempii*); and
- Green turtle (*Chelonia mydas*).

The leatherback is the most frequently recorded species of turtle in Irish waters though overall, these species are rare visitors (Botterell *et al.*, 2020). While leatherback turtles typically migrate to tropical regions for breeding and their preferred nesting areas, they are known to migrate to the productive temperate waters of Ireland during the summer months to forage. During this time, they feed on jellyfish and pelagic tunicates (Doyle, 2007). This species has been recorded mainly off the western Irish coastline with sightings generally declining over the last decade (Botterell *et al.*, 2020). From 2000 to 2018, there were 198 documented sightings of leatherback turtles in Irish waters (NPWS, 2019). However, there have been very few verified sightings of this species off the Dublin coast. The most recent reported sighting was an individual in August 2020 (NBDC, 2023) off the coast of Dublin.

2.3.3 Otter

The European otter (*Lutra lutra*) is listed as an Annex IV species under the Habitats Directive. The European otter is largely a freshwater and terrestrial mammal. Individuals occupying coastal territories tend to remain within a 3 to 4 km area of coastline, where freshwater is also readily available for cleaning their fur after exposure to saltwater (Chanin, 2003). Therefore, due to the offshore nature of the ADCP surveys this terrestrial and coastal species is not considered to be relevant for the purposes of this report and consequently is not considered further.

2.3.4 Bats

All bat species in Ireland are listed under Annex IV of the Habitats Directive. While bats are typically classified as terrestrial mammals, some evidence suggests that they may follow prey insects over coastal waters depending on prevailing weather conditions. Additionally, studies indicate that certain bat species are capable of migrating considerable distances across open marine waters (Ahlén *et al.*, 2007). However, given the offshore nature of the ADCP surveys, the temporary and localised nature of the works, and the lack of any structures that could provide roosting or resting opportunities, the likelihood of bats being significantly impacted is negligible. As such, bats are not considered further in this assessment.

2.4 Other Non-Annex IV Species

Although basking sharks and pinnipeds are not Annex IV species, these species are Annex II listed and information has been provided below, as any proposed mitigation measures will also be appropriate/relevant to these protected species.

2.4.1 Pinnipeds

Two pinniped species are recorded in Ireland: the harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*). Both species are found throughout the Irish coastline, with several breeding haul-out sites for harbour seals located along the coast of Ireland, particularly along the Kerry, Galway, Mayo, Donegal and Dublin coasts (Morris and Duck, 2019).

A study of the number and distributions of these species around Ireland, split the Irish coast into regions and Study Area blocks (Morris and Duck, 2019). The Proposed Licence Areas falls within the East Region Areas 1, 2, and 3. The total combined count of harbour seals found in these areas in 2017/2018 was 1,008 individuals with a majority occurring in Area 3 (Inner Dublin coast). The total number of grey seals recorded in these Areas combined in 2017/2018 was 131 individuals with most individuals occurring in Area 1 (Louth coast) and 2 (Dublin coast) and no individuals recorded in Area 3 (Wicklow coast). This corresponds with the total grey seal and harbour seal usage as identified by Russell *et al.*, 2017 which shows these species to show a preferential use of the Louth and Dublin coast.

There are no SACs designated for seals within the Proposed Licence Areas. The closest SAC is Lambay Island SAC located >1 km from Proposed Licence Areas. This SAC is designated for grey seal and harbour seal. Both seals have breeding, moulting and resting haul-out sites located throughout the intertidal and terrestrial areas of the island. Grey seals breeding haul-out sites are primarily located on the southern side of the island while harbour seal breeding haul-out sites are primarily located on the western site of the island. This European site is shown on Figure 2.

2.4.2 Fish Species: Basking Shark

Sightings of basking shark in Irish waters have been recorded mainly between April and November (Berrow and Heardman, 1994). While sightings are generally rare, they are understood to migrate through Irish waters and peak basking shark abundance being associated with peak plankton density (Sims and Quayle, 1998).

Unlike other nearby regions (e.g. Isle of Man, southwest England and northwest Scotland), the east coast of Ireland is not known as a particular 'hotspot' for basking sharks. However, they are known to be present throughout the Irish and Celtic seas (Howe, 2018). Although total abundance numbers in the Study Area are not available, the NBDC map viewer indicates that individual basking sharks have been recorded off the Dublin coast with recent sightings around Rockabill Island in 2020-2023. The Irish Whale and Dolphin Group (IWDG) basking shark survey season in 2024, recorded increasing numbers of individuals across the Irish coast compared to the 2021-2023 seasons. While exact count numbers are not available within the Proposed Licence Areas, the records show highest counts have been recorded off the west coast of Ireland with lower numbers recorded off the east coast (Whooley, 2024). It is worth noting that while distribution patterns of basking sharks in Ireland and the UK have been relatively well studied, there are no estimates of population density or abundance for basking sharks worldwide (Sims, 2008).

2.5 Summary

Based on the information provided in Section 2.3 and 2.4 the protected species (Annex II and IV) that will be considered further in the risk assessment due to their relatively common presence and/or sensitivity to underwater sound disturbance within the Study Area are:

- cetaceans (particularly harbour porpoise, bottlenose dolphin, common dolphin, and minke whale); and
- pinnipeds (harbour seal and grey seal).

Those species that will not be considered further in the assessment due to their relative rarity on the east coast of Ireland, and/or having low sensitivity to underwater sound disturbance, are:

- sea turtles; and
- fish species, including basking shark.

3. Risk Assessment

3.1 Pathways Scoped out from Further Assessment

Based on the project description in Section 1.5, all three marine survey instrument types will operate in shallow waters (<100 m) and all will operate at high frequency (*i.e.* 200 kHz and above), outside the hearing ranges of all cetaceans and seals (see hearing range for marine mammal groups in Table 6 below). Consequently, there is no possibility of causing any hearing-related injury or behavioural disturbance to marine mammals due to the underwater sounds produced by these marine survey instruments.

Table 6. Functional marine mammal hearing groups and auditory bandwidth and potential species within the Study Area

Cetacean hearing group	Species groups	Estimated auditory bandwidth ⁶	Key species potentially present in survey area
Low frequency	Baleen whales	7 Hz to 35 kHz	Minke whales
High frequency	Dolphins, toothed and beaked whales	150 Hz to 160 kHz	Bottlenose dolphin White beaked dolphin
Very high frequency	True porpoise and some small whales	275 Hz to 160 kHz	Harbour porpoise
Pinnipeds in water	Seals	50 Hz to 86 kHz	Grey seal and harbour seal

Therefore, the pathway concerned with the effect of underwater sound from ADCP, SBES and MBES survey activities has been scoped out from further assessment.

3.2 Pathways Scoped in for Further Assessment

Based on the project description in Section 1.5, the following key pathways have been identified to have potential impacts on Annex IV species and/or pinnipeds in the Study Area:

- Increased underwater sound emitted by the vessels' engines causing behavioural disturbance; and
- Increased collision risk with vessels used during the Marine Surveys.

3.3 Impact Assessment – Increased Underwater Sound Emitted by the Vessels' Engines

Underwater sound from anthropogenic activities (including vessel engine noise) can negatively impact marine mammals. In cetaceans it can influence their ability to echolocate, communicate and in extreme cases, such as during underwater explosions or military sonar or seismic surveys, it can cause physical harm (including through disorientation leading to beaching and trauma to the auditory apparatus) (Southall, *et al.*, 2007). Sound can cause certain cetacean species to change their behaviour and may result in increased alertness, modification of vocalisations, interruption, or cessation of feeding or social interactions, alteration of movement or diving behaviour, and temporary or permanent habitat abandonment. Seals also produce a diversity of sounds, though generally over a lower and more restricted bandwidth (generally from 50 Hz to several tens of kHz) (Table 6). Their sounds are used primarily in social and reproductive interaction, both in water and air (Southall, *et al.*, 2007).

Cetaceans produce and receive sound over a wide range of frequencies for communication, orientation, predator avoidance and foraging (Tyack, 2008). For the determination of the impact of underwater sound on cetaceans they have been classified into three functional hearing groups (low, high and very high frequency) based on their peak hearing. Different species will be sensitive to different frequencies. There are six species of cetacean commonly occurring in the SCANS-IV block CS-D in which the Proposed Licence Areas is located. These species are at an abundance high enough for animal density estimates to have been determined (Table 5). These species are:

- Harbour porpoise - Very high frequency;
- Bottlenose dolphin – High frequency;

⁶ Source: Southall *et al.* (2007); NMFS (2018); and Southall *et al.* (2019).

- Common dolphin – High frequency;
- Minke whale – Low frequency;
- Risso's dolphin – High frequency;
- Beaked whales – High frequency.

Harbour porpoise are the most common cetacean species in the Study Area. These very high frequency hearing species are generally considered very sensitive to underwater sound. Bottlenose and common dolphin are also present along the east coast which are high frequency hearing species and minke whales, which are low frequency hearing species, are also present. Therefore, there is potential for animals in each of three functional hearing groups to be present in the vicinity of the Proposed Licence Areas during the Marine Surveys.

The impact of underwater sound in marine mammals can cause physical or auditory injury; however, due to the relatively low level intensity of the sound source, and the fact the sound is continuous in nature (rather than high intensity impulsive sounds) it is unlikely that underwater sound emitted by the vessel's engine during the Marine Surveys will cause any physical or auditory injury. This is also because both the survey vessels and animals will be mobile and animals are unlikely to remain close to the sound source for very long.

However, underwater sound from vessels can result in a range of behavioural responses in marine mammals, as well as avoidance, to chronic levels of underwater sound (Erbe *et al.*, 2019). Behavioural responses to increases in underwater sound are highly variable and context-specific, ranging from increased alertness, alteration of vocal behaviour, interruption to feeding or social interaction, alteration of movement or diving behaviour, or temporary or permanent habitat abandonment. Minor or temporary behavioural responses are often simply evidence that an animal has heard a sound. Anthropogenic underwater sound may also partially or entirely reduce the audibility of signals of interest such as those used for communication and prey detection.

As discussed in Section 1.5, it is envisioned that the Marine Surveys will involve the use of no more than two small vessels (up to 25 m in length) within the Proposed Licence Areas, subject to final survey methodology and contractor arrangements. The vessel engines will emit underwater sound during the Marine Surveys which have the potential to cause behavioural disturbance in Annex IV species in the vicinity of the vessels.

All Annex IV species that could be present in Irish waters are highly mobile. Thus, any risk to individuals from underwater sound is often considered to be small on the assumption that affected animals will leave the area. Nevertheless, the marine survey is of relatively short duration, particularly at the local scale because the vessel will be continuously moving. Therefore, any behavioural responses will be very short-term and temporary and not expected to have a significant impact for individuals or populations of Annex IV species. In addition, Annex IV species are likely to be habituated, to some extent, to vessel noise and movement in a busy sea area such as the waters off the east coast of Ireland (MMO, 2014).

Overall, the risk of the short-term presence of survey vessels causing underwater sounds levels significantly over and above that caused by the usual vessel activity within the area, is considered very low. Therefore, any impact from the noise of the survey vessel is expected to be **not significant**.

3.4 Impact Assessment – Increased Collision Risk with Vessels

Vessel movements during the Marine Surveys have the potential for collisions with marine mammals. This could result in physical injury, such as propeller injuries, and in the worst-case, mortality (Schoeman, *et al.*, 2020). The exact size and number of vessels deployed is subject to the appointment of the survey contractor, however, it is assumed that two vessels will be required: one to deploy and recover the ADCPs and one to vessel-mount and tow the SBES and/or MBES in the Proposed Licence Areas. The ADCP and bathymetric Marine Surveys are expected to be completed using vessels which are considered to be small (<25 m).

Marine mammals, particularly cetaceans, are fast swimming, agile species, with rapid reflexes and good sensory capabilities (Hoelzel, 2002). The most lethal and serious injuries to cetaceans are believed to be caused by large ships, typically 80 m and longer, as well as vessels travelling faster than 14 knots (Laist, *et al.*, 2001). It is anticipated that the vessels required for the Marine Surveys will be less than 25 m in length and slow moving (*i.e.*, survey speeds of 4 knots and 10 – 15 knots whilst in transit).

Marine mammals are reasonably resilient to minor strikes and collisions (Wilson, *et al.*, 2007). However, a direct strike from a sharp object such as rotating propeller blades has potential to cause lethal injury to marine mammals. Cases of seal injuries thought to be caused by propellers and thrusters (for dynamic positioning of vessels) have been recorded in the UK (Bexton, *et al.*, 2012). However, evidence suggests that a large proportion of these injuries

can be attributed to alternative, natural mechanism for injury such as grey seal infanticide and cannibalism, which may also cause 'spiral/corkscrew' lacerations comparable to those produced by ship propellers (Brownlow, *et al.*, 2016). Marine mammals possess a thick subdermal layer of blubber or fat deposits which provides a level of protection to their vital organs meaning they are reasonably resilient to minor strikes and collisions.

Overall, the likelihood of the survey vessel colliding with marine mammals is predicted to be low. The addition of the two small survey vessels within the Proposed Licence Areas will not result in a significant increase in vessel traffic. In addition, the vessels will be slow moving, meaning that individual marine mammals can easily avoid the vessel, greatly reducing the risk of collision. The density of most cetaceans and seals within the survey area is estimated to be low (Table 5), further reducing any remaining risk. In Irish waters, the issue of injury through collision is not currently thought to be of major concern and so there are no specific mitigation measures recommended by the DHLGH (2014) or JNCC (2010) guidance.

Therefore, effects to marine mammals from collisions with survey vessels are predicted to be **not significant**.

3.5 Assessment of Potential Offence

The assessment of potential effects for underwater sound from the survey vessel and the potential for any collisions risk strikes has concluded the following:

- The operating frequencies of the marine instruments are outside the hearing range of all Annex IV cetacean species and pinnipeds and therefore, and therefore there is no possibility of any lethal effect, physical injury, auditory injury and/or behavioural disturbance as a result of underwater sound emitted during the Marine Surveys.
- Vessel movement sounds will be within the hearing range of marine mammals likely to be present and may cause some disturbance, but this disturbance is likely to be negligible.
- The risk of collision with marine vessels associated with the marine survey work is very low and is therefore unlikely to result in the harassment, disturbance, injuring or killing of any Annex IV species.

The Marine Surveys are therefore, not considered to result in any significant effect and are unlikely to be detrimental to the maintenance of the range of Annex IV populations at a favourable conservation status in their natural range. Furthermore, any displacement of Annex IV species or potential for collision with vessels is considered to be extremely unlikely. **Therefore, a derogation licence will not be required.**

3.6 Consideration of Designated Sites

Three relevant European sites (*i.e.*, SACs designated for marine mammals) have been identified within the Study Area. These SACs have been assessed in the adjoining Supporting Information for Appropriate Assessment Screening Report (SISAA) (AECOM, 2025) which concluded that **no likely significant effects are predicted to occur on any European sites either alone or in-combination with any other plans or projects.**

4. Mitigation Measures

The Marine Survey sound sources are outside the hearing range of all marine mammals and are therefore not considered to have any potential to cause any lethal effect, physical injury, auditory injury and/or behavioural disturbance to Annex IV species. Nevertheless, as detailed by DAHLG (2014) mitigation measures concerned with minimising the risk of injury to marine mammals are required as standard for any single beam or multibeam echo sounding activities (SBES/MBES). Therefore, the following measures will be adopted, as described below.

While the Marine Surveys are not considered to have the potential to cause lethal effects, physical injuries, auditory harm, or behavioural disturbances to marine mammals as a result of underwater sound emissions during the Marine Survey, a set of industry-standard mitigation measures, as outlined by DHLGH (2014), are recommended to further minimise the risk of injury to marine mammals during Marine Surveys. Alongside these mitigation measures the Marine Surveys will use updated guidelines published by MARA (2025). These measures are applicable to all SBES, MBES, side scan sonar and sub-bottom profilers surveys within bays, inlets or estuaries and within 1,500 m of the entrance of enclosed bays/inlets/estuaries. Where applicable, these measures will be adopted and described below.

4.1 Pre-Start Monitoring

A minimum of two qualified and experienced marine mammal observer will be designated to monitor marine mammals and record all relevant events using standardised MMO recording forms available on the MARA website (<https://www.maritimeregulator.ie/knowledge-centre/guidance/>). To enable continuous monitoring, including during situations when visual observation is hindered by weather conditions or sea state, a proven Passive Acoustic Monitoring (PAM) system and skilled operator(s) will be employed for pre-start monitoring during such instances.

As the Marine Surveys will be carried out in shallow waters (<100 m), the marine mammal observer 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. If a marine mammal is sighted within 500 metres (monitored zone) of the sound source (*i.e.* the vessel) during the 30 minutes leading up to the scheduled start time, operations will be postponed until a consecutive 30-minute period without any marine mammal sightings has passed. If the marine mammals remain in the vicinity, the survey vessel may adjust its course to ensure that the animals are outside the monitored zone when the soft start/ramp-up procedure begins. The marine mammal observer will employ a distance measuring stick or reticule binoculars to determine distances to marine mammals, and all PAM detections will be presumed to originate from animals⁷ within the monitored zone.

4.2 Ramp-Up Procedure

A ramp-up (*i.e.*, soft start) is the gradual increase in power output over a predetermined duration. This method will be applied where possible, including during any testing of acoustic sources, where the output peak sound pressure level from any source exceeds 170 dB re: 1µPa @1m:

- If the equipment allows, begin with a lower energy start-up (peak sound pressure level not exceeding 170 dB re: 1µPa @1m), gradually increasing to the necessary maximum output over 20 minutes.
- This controlled energy increase should occur in consistent stages for a steady and gradual rise.
- If the equipment cannot follow steps (a) and (b), turn the device on and off in a consistent sequential pattern over 20 minutes before reaching the full necessary output.

In all situations, once the ramp-up process begins, there's no requirement to pause or cease the procedure even if conditions deteriorate or marine mammals enter the Monitored Zone (a radial distance of 500 metres from the sound source). Efforts will be made to minimise any delays between the ramp-up procedure and the commencement of the survey line or station to reduce unnecessary noise as much as possible.

⁷ This relates to cetaceans only.

4.3 Breaks in Sound Output

If there is a break in sound output from any of the marine instruments for a period of greater than 30 minutes (*e.g.* due to equipment failure, shut-down, survey line/station change), all pre-start monitoring measures (marine mammal observer check) and ramp-up (where this is possible) will recommence prior to re-starting.

4.4 Reporting

Full reporting from the marine mammal observer on the operations and mitigation undertaken must be provided to the DHLGH to facilitate reporting under Article 17 of the EC Habitats Directive and future improvements to guidance (DAHG, 2014).

5. Conclusion

This assessment of the potential impacts on marine Annex IV species from the Marine Surveys which form part of the Lot 1 Project concluded that:

- There is no potential for lethal effects, physical injury, auditory injury and/or behavioural disturbance to relevant Annex IV species as a result of underwater sound generated by the ADCP and bathymetric acoustic equipment used during the Marine Surveys.
- Increased underwater sound from movement of the survey vessels engines themselves during the Marine Surveys causing auditory injury or behavioural disturbance is considered to be not significant.
- The potential for collision risk is considered to be negligible.

Therefore, this risk assessment concludes that the Marine Surveys will not significantly affect the favourable conservation status of any Annex IV species as defined by the Habitats Directive and corresponding Habitats Regulations and a derogation licence will not be required for the Marine Surveys.

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