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MULTIDISCIPLINARY CONSULTING ENGINEERS

D866: NATIONAL WATERSPORTS CAMPUS DÚN LAOGHAIRE

ANNEX IV SPECIES RISK ASSESSMENT

For

Dún Laoghaire-Rathdown County Council

20 January 2026

NOTICE

DOCUMENT CONTROL & HISTORY

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

1.1 PROJECT CONTRACTUAL BASIS & PARTIES INVOLVED

O'Connor Sutton Cronin & Associates Ltd. (OCSC) was contracted to carry out an Annex IV Species Risk Assessment for the proposed temporary marine and coastal site investigation works associated with the Maritime Usage Licence (MUL) application in relation to the proposed National Watersports Campus in Dún Laoghaire. The results of the SI works will be used to inform the construction stage, the engineering design for the proposed National Watersports Campus and will also provide baseline data for preconstruction and monitoring assessments.

This Risk Assessment for Annex IV Species report supports MARA in their role of completing a risk assessment of the effects of the SI works on Annex IV species. This report provides a brief description of the SI works, consisting of borehole drilling, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying within Dún Laoghaire Harbour. Annex IV species include all bat species, otters, cetaceans and marine turtles. Although not listed on Annex IV, we have included pinnipeds (seals) in this assessment as they frequently occur in waters at Dún Laoghaire.

The report was completed by Eadaoin Butler BSc, Ecologist, reviewed by Rebecca Duane BSc, MCIEEM and authorised by Eleanor Burke, BSc, MSc, DAS, MIEnvSc, CSci, and OCSC Director (Environmental).

1.2 SITE INVESTIGATION WORKS

Dún Laoghaire Harbour is a highly active marine environment, characterised by regular and frequent vessel movements, recreational watersports, commercial activity and public use throughout the year. The qualifying species associated with the adjacent European sites are therefore subject to, and considered habituated to, an existing high baseline level of anthropogenic activity and disturbance.

The proposed site investigation (SI) works will be temporary, localised and intermittent, will not involve dredging, land take, permanent structures or changes to coastal processes and will not result in habitat loss or long-term degradation. Any potential disturbance or water quality effects will be minor, short-term, and confined to the immediate vicinity of the works.

Five (5No.) MUL areas are involved in this application (Figure 1.1). MUL Area 4, (See Figure 1.2) is within an area designated as the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) as well as being in close proximity of South Dublin Bay SAC (0.2km).

This report considers the risk to Annex IV species from the proposed site investigations with the addition of seals which are protected under the Wildlife Act and listed on Annex II of the EU Habitats Directive.

The proposed SI works include a range of geotechnical and bathymetric survey methods including boreholes (sonic drilling or cable percussion boring followed by rotary core drilling), Vibrocore and Cone Penetration Testing (CPT) with a Multibeam survey of MUL Area 5.

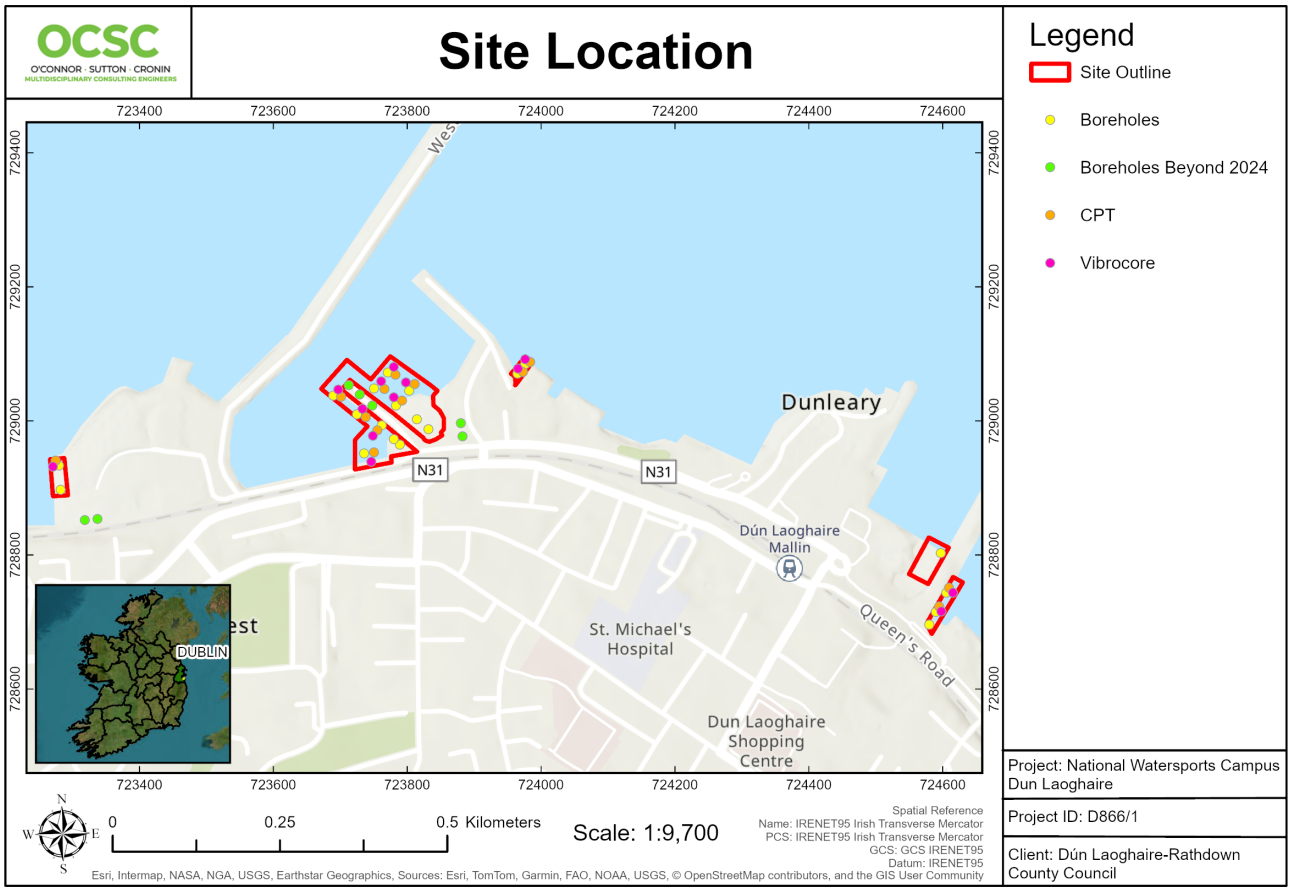


Figure 1.1; Location of proposed SI activities.

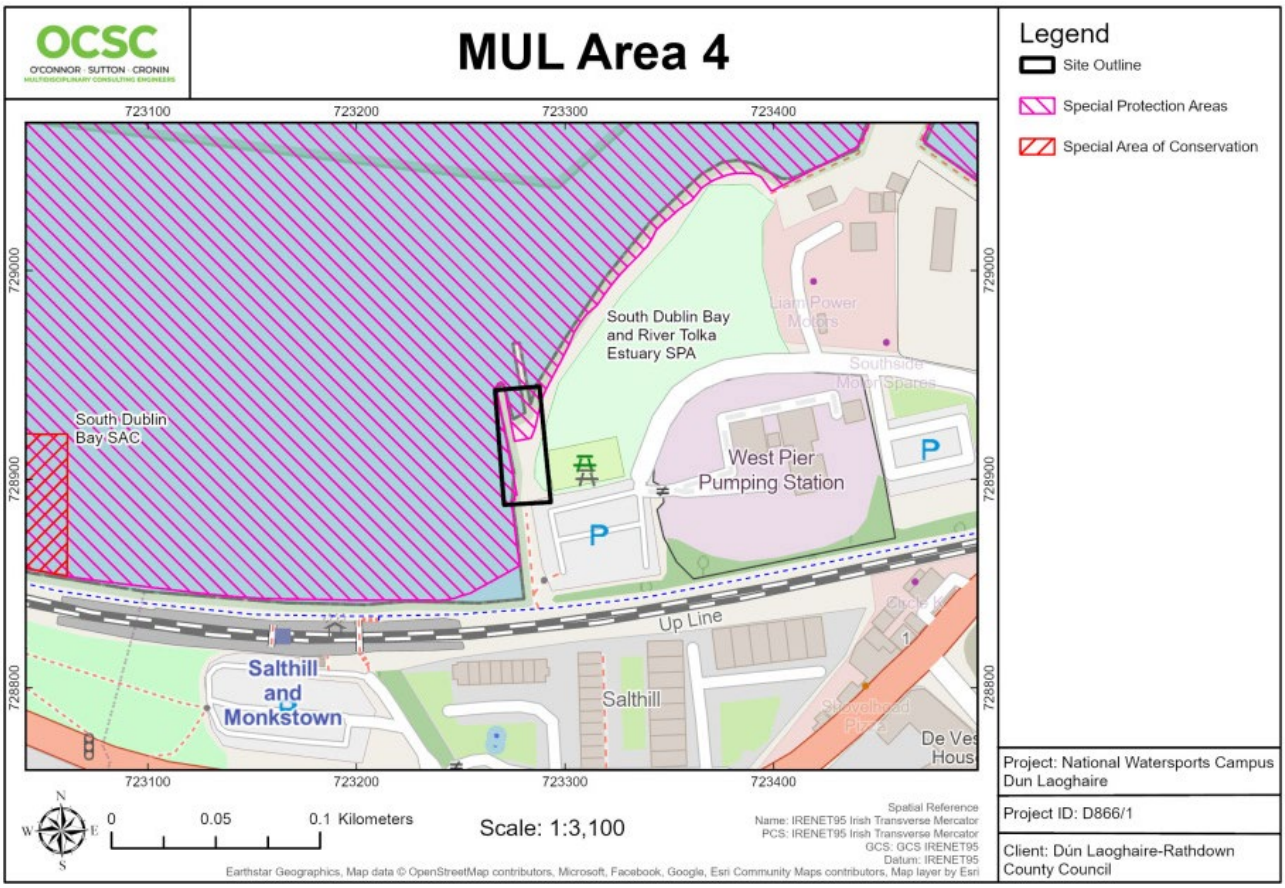


Figure 1.2; Overlap with MUL Area 4 and Natura 2000 sites.

1.3 EVIDENCE OF EXPERTISE

The technical competence of the authors is outlined below. Eadaoin Butler is a Project Ecologist with OCSC. She has over 4 years experience in the environmental science and ecology fields. Eadaoin holds an honours degree in Wildlife Biology (Ecology) from Institute of Technology Tralee. She has delivered the environmental assessments for a wide range of marine and coastal projects, including environmental impact assessment, appropriate assessment and Annex IV species reports.

Rebecca Duane MCIEEM is a professional ecologist and full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) with extensive experience in ecological science and consultancy. She holds an honours degree in Ecology/Environmental Biology (BSc) and has developed strong technical expertise through several years of professional practice in environmental assessment, ecological survey, and biodiversity reporting. Rebecca has direct experience delivering ecological assessments for a wide range of development types, including terrestrial, coastal and marine-influenced projects. Her experience includes Preliminary Ecological Appraisals (PEAs), habitat and species surveys, Ecological Impact Assessments (EcIA), Appropriate Assessment (AA) screenings and Natura Impact Statements (NIS), and the preparation of biodiversity action/management sections for both planning and licence applications.

1.4 LEGISLATIVE CONTEXT

Under Article 12 and 13 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended (the Habitats Directive). Member States must establish systems of strict protection for animal and plant species which are listed on Annex IV of the Habitats Directive. Article 16 provides for derogations from these legal protections under certain, specific, circumstances. Article 12, 13 and 16 of the Habitats Directive are transposed into Irish law by Regulations

51 - 52 and 54 - 55 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (the Regulations). Annex IV species are afforded strict protection throughout their range, both inside and outside of designated protected areas which apply to all life stages of the animals to which this Article applies. It is an offence to:

- Deliberately capture or kill any specimen of these species in the wild
- Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration
- Deliberately take or destroy eggs of these species in the wild
- Damage or destroy a breeding or resting place of such an animal
- Deliberately pick, collect, cut, uproot, or destroy any specimen of [plant] species in the wild
- Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of (animal or plant) species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Directive.

1.5 LIMITATIONS

This Annex IV Species Risk Assessment has been prepared for the sole use of Dún Laoghaire-Rathdown County Council ("the Client"). No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by OCSC.

This assessment is based on a review of available historical information, environmental records, consultations, relevant guidance information, and reports from third parties. All information received has been taken in good faith as being true and representative.

This report has been prepared in line with the best industry standards. The methodology adopted and the sources of information used by OCSC in providing its services are outlined in this Report. The assessment undertaken by OCSC and described was undertaken in January 2026 and is based on the information available during that period. The scope of this report and the services are accordingly factually limited by these circumstances.

OCSC disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report which may come or be brought to OCSC's attention after the date of the Report. The conclusions presented in this report represent OCSC's best professional judgement based on a review of the relevant

information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.

2 PROJECT DESCRIPTION

Dún Laoghaire Harbour has long been a focal point for marine activity on Ireland's east coast. Over time it has developed from a traditional ferry port into a vibrant centre for yachting and watersports, hosting high-profile international sailing championships and supporting a diverse range of marine organisations including state bodies, clubs, commercial operators, and volunteers. The harbour's role as a watersports hub has grown in response to increasing demand from a population of approximately 1.5 million people within a 10-mile radius.

Despite significant investment by private and club stakeholders, there is currently a notable lack of publicly accessible watersports facilities. At present, there are no slipways or public access points that offer tidal-independent access to the water. This project seeks to address this gap by establishing a National Watersports Campus that builds on the harbour's existing infrastructure and activity base.

This application seeks a Maritime Usage Licence (MUL) from the Maritime Area Regulatory Authority (MARA) to undertake a programme of site investigation (SI) works within the MUL application area (Figure 2.1). The SI work is designed to gather the bathymetric, geotechnical, and environmental data required to inform project design, environmental assessment and future consenting.

The MUL Area comprises 5No. areas, with Area 4 falling within the South Dublin Bay and River Tolka Estuary SPA. The remaining 4No. areas all fall within Dún Laoghaire harbour and the Irish Sea. The activities proposed to be carried out within the MUL Area are shown on Figure 2.1.

The total combined MUL Area encompasses an area of 21,422m^2.

- Area 1 is Carlisle Event Slipway and encompasses an area of 1,506m^2.
- Area 2 is High Performance Pontoon and encompasses 674m^2.
- Area 3 is Coal Harbour Watersports and encompasses 13,956m^2.
- Area 4 is the Gut Slipway and encompasses 2,959m^2.
- Area 5 is the Events Building-Pier and encompasses 2,327m^2.

The proposed locations shown in the figures and drawings are subject to minor change based on the results of the geotechnical, bathymetric and environmental surveys. Locations may be required to be moved due to the presence of obstructions/difficulties at individual locations. In such instances, the borehole location is moved to another nearby location away from the obstruction and drilled again to the target depth.

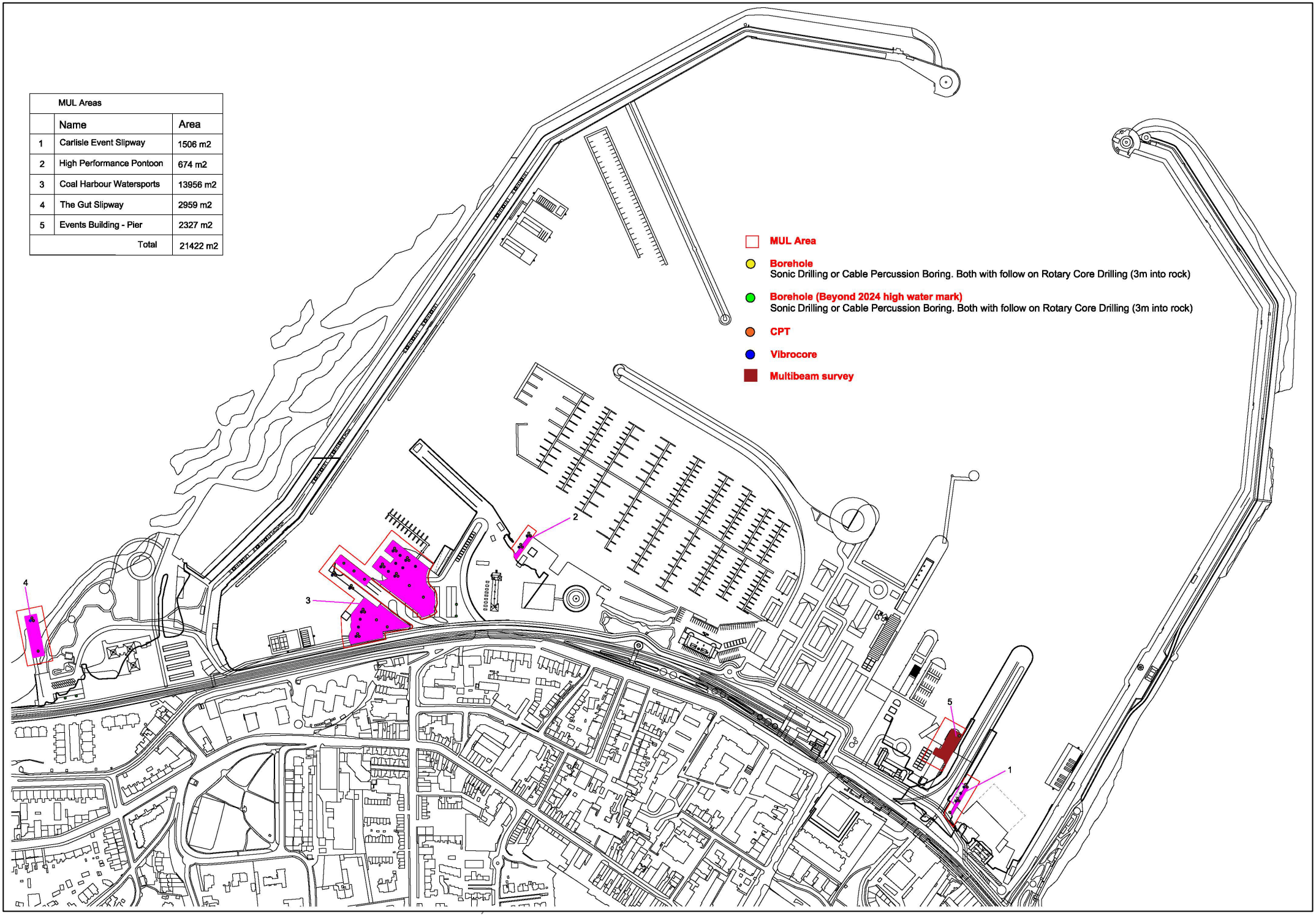


Figure 2.1; MUL areas in Dún Laoghaire Harbour.

3 RECEIVING ENVIRONMENT

3.1 RELEVANT ANNEX IV SPECIES

The SI works will be taking place across the MUL Areas as shown in Figure 2.1. The Habitats Directive lists species of community interest 'in need of strict protection' within Annex IV. This list was reviewed and all species/species groups with the potential to occur within the MUL Area were considered further. Of the animal and plant species on Annex IV known to occur in Ireland, the following species were identified as having the potential to occur within the MUL Area of the proposed SI works:

- All bat species
- Otter
- Dolphins, Whales and Porpoises
- Marine Turtles

Other Annex IV species found in Ireland, namely the natterjack toad (*Epidalea calamita*) and the Kerry slug (*Geomalacus maculosus*), do not occur in marine environments, have no suitable habitats present and have no previous recordings along the coast of the SI works MUL Area by the National Biodiversity Data Centre (NBDC). Therefore, these Annex IV species are not considered in this assessment.

3.1.1 CETACEANS

Under Article 12 of the Directive, all cetaceans should receive strict protection within the Exclusive Economic Zone (EEZ). In the case of the proposed project, the MUL area is located within Irelands EEZ. A total of 26 cetacean species have been recorded as using sea areas within the Irish EEZ. A marine Mammal Database compiled and managed by the National Biodiversity Data Centre has collated data from numerous sources (e.g. Irish Whale and Dolphin Group, ObSERVE project) on the distribution of cetaceans off the coast of Ireland.

Available data include sightings records for Bottle-nosed Dolphin (*Tursiops truncatus*), Common Dolphin (*Delphinus delphis*) and Common Porpoise (*Phocoena phocoena*) within a 5km buffer zone of the MUL area.

3.1.2 OTTER

Coastal otters are known to utilise the marine habitat for foraging, feeding on a variety of fish and shellfish species depending on the time of year. The proposed project areas are within land with potential otter habitat. Therefore, there is potential for impacting otters and further consideration is given to this species in the Annex IV risk assessment.

3.1.3 BATS

All bat species in Ireland are listed in Annex IV of the EU Habitats Directive. While bats are classed as terrestrial mammals, available evidence suggests they may follow prey insects into coastal waters, depending on the prevailing weather conditions. Recent evidence also notes that bats can migrate considerable distances over open marine waters (Bach *et al,* 2022). It is considered that bats may make use of the proposed MUL area for foraging due to presence of suitable foraging areas close by. As such, further consideration is given to this group of species in the Annex IV risk assessment.

3.1.4 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 the occurrence of this species within the MUL areas (NBDC, 2026). Due to the scale and scope of the project, it is considered highly unlikely that the surveys proposed would have the capacity to impact this species.

4 RISK ASSESSMENT FOR ANNEX IV SPECIES

4.1 METHODOLGY

This risk assessment for Annex IV species has been carried out in accordance with the following guidance:

- European Commission (2021) Guidance document on the strict protection of species of community interest under the Habitats Directive. C. (2021) 7301 final. Brussels.
- Mullen, E., Marnell, F. & Nelson, B. (2021) Strict Protection of Animal Species. National Parks and Wildlife Service Guidance Series, No. 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- NPWS (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. National Parks and Wildlife Service Guidance Series, No. 2. Department of Housing, Local Government and Heritage.
- NPWS (2025) Applications for Regulation 54 Derogations for Annex IV species. National Parks and Wildlife Service Guidance Series, Version 1.0, Department of Housing, Local Government and Heritage.
- This risk assessment for Annex IV species follows the methodology structure outlined in NPWS (2021), as follows:
    - Use existing information to determine the probability of the protected species being present in the area affected by the works.
    - Ecological survey, if required.
    - Examination of impacts and mitigation measures and satisfactory alternatives (if required).

For each of the relevant species discussed in Section 3.1, an assessment was made against each of the strict protections taking into account project details and the available evidence base for each species. If the examination of impacts concludes that the SI works will not conform with the strict protections afforded to Annex IV species, then an application will be made for a derogation licence under Regulation 54 of the Regulations.

4.2 DESK STUDY

In order to assess the probability of the above species/species groups being present in the zone of influence of the SI works, a desk study was undertaken, in addition to application of professional judgement and knowledge of the geographical area.

The following sources were consulted during the desk study in July 2025:

- *Irish Whale and Dolphin Group Sightings Log https://iwdg.ie/browsers/sightings.php/;*
- *Distribution records for Annex IV species held online by the NBDC https://biodiversityireland.ie/;*
- *NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species*
- *Assessments. Unpublished Report, National Parks and Wildlife Service. Department of Culture, Heritage*
- *and the Gaeltacht, Dublin;*
- *Giralt Paradell, O., Cañadas, A., Bennison, A., Todd, N., Jessopp, M., Rogan, E. (2024). Aerial surveys*
- *of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2021-2023.*
- *Department of the Environment, Climate & Communications and Department of Housing, Local*
- *Government & Heritage, Ireland. 260pp;*
- *Bat Conservation Ireland (BCI) bat distributions; and*
- *Ocean Research and Conservation Association (ORCA) wildlife reports.*

4.2.1 ZONE OF INFLUENCE

For this project at Dún Laoghaire Harbour, the zone of influence of the site investigation works differs between species. The following zones of influence have been considered in this risk assessment:

BATS

Bats will travel into coastal waters when following pray once conditions are favourable, however they tend not to use coastal waters for initial foraging (Limpens et al., 2017). It is considered highly unlikely they would make use of the proposed MUL Area for foraging due to its highly exposed nature. The zone of influence is considered to be confined to the area within the MUL boundaries.

OTTERS

Otter (*Lutra lutra*) is a mobile species with the ability of having large territories. In lowland rivers systems and lakes with large fish populations, otters only need to maintain small territories (up to 6 km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Therefore, it is possible that otters may be present within the MUL Area. Otters have been observed to forage out to a maximum of 80m from the coast (NPWS, 2009), therefore a zone of influence for otters is considered to be the MUL Areas and extending out to 80 m from the High Water Mark (HWM).

CETACEAN SPECIES

For harbour porpoise, JNCC (2020) advises that fixed distances should be applied to assess behavioural disturbance, based on empirical evidence. For bathymetric surveys, the JNCC's 'effective deterrence range' is 3 km. While the JNCC document focuses on harbour porpoise, this is precautionary for all other cetacean hearing groups, as harbour porpoise is considered to be the most sensitive. Therefore, a zone of influence of the MUL Areas plus a 3 km buffer from the MUL Area boundaries has been considered as appropriate for this risk assessment.

TURTLE SPECIES

Although sightings are extremely rare, turtle species have the potential to occur anywhere in the MUL Areas and therefore a zone of influence of the MUL Areas has been considered in this risk assessment.

4.2.2 BAT SPECIES

All native bat species in Ireland are listed on Annex IV of the EU Habitats Directive (92/43/EEC) and are strictly protected wherever they occur, irrespective of their proximity to designated sites. Under Irish legislation, it is an offence to intentionally capture, injure, disturb, or destroy bats or their roots without an appropriate licence from the National Parks and Wildlife Service (NPWS).

Bats are primarily terrestrial mammals that roost in buildings, trees, and other structures and forage for insects across a variety of terrestrial habitats including waterways and coastal margins. While bats are known to forage over water and along coastlines where insect prey occurs, any direct interaction with underwater works (E.g., proposed SI works) is essentially limited given the absence of suitable roosting habitat or structural features within the marine environment itself. There is potential for bat species to forage and commute within coastal areas, and bats are known to travel over water and along coastlines under suitable conditions.

Data obtained from the NBDC (Figure 4.1) indicate that two bat species have been recorded within the general vicinity of the site investigation (SI) works in and around the Dublin Bay coastal area, including the Dún Laoghaire Harbour:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Leisler's bat (*Nyctalus leisleri)*

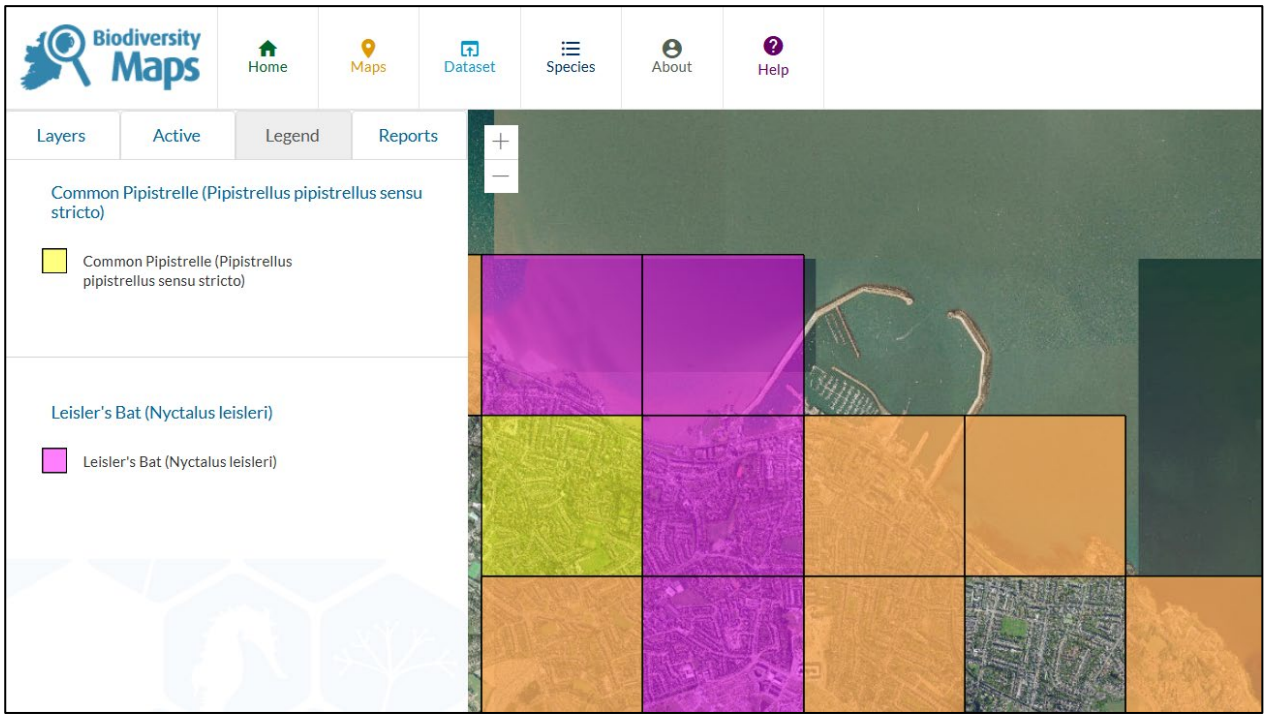


Figure 4.1: Bat species previously recorded within Dún Laoghaire and surrounds (NBDC, 2026).

These bats species are among the more commonly recorded bats in eastern Ireland and have been documented in nearby terrestrial habitats, rather than from within the marine work area. A review of ecological documents (https://www.maritimeregulator.ie/wp-content/uploads/2025/06/Annex-IV-Risk-Assessment.pdf) also note that no confirmed bat roosts have been identified within the harbour or on the pier structures themselves during previous survey, although Leisler's bats have been observed foraging near the former ferry berth area of the harbour. Importantly no structures used as roosts were confirmed in the area.

Therefore, there is no reasonable pathway by which the SI works could adversely affect bat roosts or key commuting/foraging habitats, and no known bat roosts have been identified on the harbour's piers or within the licence footprint itself. Accordingly, despite the presence of these species in the border area, it is considered unlikely that the proposed works would results in disturbance to bats, and no significant effects on bats are anticipated.

4.2.3 OTTER

Otter occurs throughout Ireland, with populations found along rivers, lakes, riverine (streams up to major river systems), marshland, estuaries and along the coastline (NPWS, 2019) where fish and other prey are abundant, and where the bank-side habitat offers plenty of cover. Otter is an opportunistic predator with a broad and varied diet and has diverse habitat preferences. Otter maintains small territories (up to 6 km) in lowland rivers and fish-rich lakes, but along smaller river systems and in upland areas otter territories can stretch to 20 km (Mullen et al., 2021). Coastal territories tend to be between 3 km to 4 km along the coastline where freshwater

is available to clean their fur after exposure to saltwater (Chanin, 2003). Otter have been observed to forage out to a maximum of 80m from the coast (NPWS, 2009).

Records from NBDC (2026) show that otters have been sighted in the areas adjacent to the MUL Area within the last 10 years. These records show that otter sightings (three sightings of a live animal) have been recorded in 2018 to the east, west and within Dún Laoghaire Harbour. It is therefore reasonable to conclude that otters, may be present within the adjacent areas of the MUL Area. No otter holts or couches were identified within or close to the MUL Areas by the desk study.

Impacts to otters can occur as a result of permanent loss of breeding or resting sites, habitat loss, disturbance/displacement and injury or mortality. The main threats to otter include pollution, particularly organic pollution resulting in fish kills; and accidental deaths, e.g., road traffic and fishing gear (NPWS, 2019). The most recent Article 17 conservation assessment for otters in Ireland deemed the species as being in favourable conservation status (NPWS, 2025) which is concurrent with its favourable conservation status in 2019 (NPWS, 2019), highlighting a stable overall trend in its conservation status.

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with otter are unlikely. However, the proposed underwater SI works has the potential to cause adverse effects on otter or their conservation status under the Habitats Directive. Therefore, otter are given further consideration within this report.

4.2.4 CETACEAN SPECIES

Twenty-five species of cetacean have been recorded in the waters around Ireland. The Irish Whale and Dolphin Group (IWDG) holds 24No. records of cetacean sightings within the 5km buffer zone of the MUL area for the period of January 2025 to 2026. IWDG data show that the waters around the MUL Area were used by three cetacean species in the last year.

Species recorded were:

- Harbour porpoise (*Phocoena phocoena*)
- Common dolphin (*Delphinus delphis*)
- Bottlenose dolphin (*Tursiops truncates*)

No other cetacean species were recorded within the 5km buffer zone of the MUL area by IWDG between January 2025 and January 2026. Phase II of the Irish ObSERVE programme (2021-2023) was conducted to investigate the occurrence, distribution and abundance of key marine species in Ireland's offshore and coastal regions. The Dún Laoghaire MUL Areas are within the coastal survey area named 'Stratum 5' (Irish Sea).

The Harbour porpoise (*Phocoena phocoena*) was the second most sighted cetacean species during the ObSERVE Phase II surveys with 212 individuals recorded. The species occurred across all strata but most commonly in stratum 5 (Irish Sea).

The Bottlenose dolphin (*Tursiops truncates*) was the third most sighted cetacean species during the ObSERVE Phase II surveys with 472 individuals recorded. The species occurred most commonly in continental shelf waters to the south and west of Ireland with some sporadic occurrences in stratum 5 (Irish Sea).

The Common Dolphin (*Delphinus delphis*) was the most sighted cetacean species during the during the ObSERVE Phase II surveys with 5,725 individuals recorded. The species occurred across all strata but were least frequently recorded in strata 5 (Irish Sea).

The sections below provide further detail on the cetacean species most frequently recorded within and around the MUL Area.

4.2.4.1 HARBOUR PORPOISE

Harbour porpoise was the second most sighted cetacean species throughout Phase II of the Irish ObSERVE programme, with 128 sightings totalling 212 individuals. Stratum 5 (Irish Sea) was the strata with the highest abundance of Harbour porpoise across all three survey periods with an abundance of 10,665, 2,350 and 4,547 respectively highlighting the importance of this area for the species. Similarly, stratum 5 (Irish Sea) also had the highest density of Harbour porpoise across all three survey periods with a density of 0.968 per km2 in the summer of 2021, 0.15 per km2 in the summer of 2022 and 0.413 per km2 in the winter of 2022. During the Phase II surveys a number of calves were recorded, the majority of which were sighted in the Irish Sea (4 out of 7) further highlighting this regions importance to the species.

According to the IWDG there were 4 recorded sightings of harbour porpoise within the 5km buffer zone of the MUL area for the period of January 2025 to January 2026. The Harbour porpoise is a species that is vulnerable to a number of anthropogenic threats including entanglement in static fishing gear, underwater noise and coastal development, while measures have been put in place to mitigate these threats. Phase II of the Irish ObSERVE programme found that the estimated densities and abundance indicate a continuing decline of this species within the region. The most recent Article 17 conservation assessment for harbour porpoise in Ireland deemed the species as being in inadequate conservation status (NPWS, 2025), which is a downgrade from its favourable conservation status in 2019 (NPWS, 2019).

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with harbour porpoise are unlikely. However, the proposed underwater SI works has the potential to cause adverse effects on harbour porpoise or their conservation status under the Habitats Directive. Therefore, harbour porpoise are given further consideration within this report.

4.2.4.2 COMMON DOLPHIN

The Common dolphin was the most commonly sighted cetacean species throughout Phase II of the Irish ObSERVE programme, with 812 sighting totalling 5,725 individuals. Stratum 5 (Irish Sea) was the strata with the lowest abundance of Common dolphins, 216 from the summer of 2022 and 725 from the winter of 2022, there were 0 recordings from the summer of 2021 and as such there is no estimated abundance or density. Similarly, stratum 5 (Irish Sea) also had the lowest density of Common dolphins with a density of 0.02 per km^2 in the summer of 2022 and 0.066 per km^2 in the winter of 2022. Strong seasonal differences were observed with more common dolphins occurring in summer than in winter, similarly there were strong interannual variability with more sightings during summer 2021 than summer 2022. Seasonal differences in mean group size was also observed with larger groups in the summer (7.2) than in the winter (6.7). Highest densities of Common dolphins were found in the south of Ireland, particularly in the Celtic Sea and in coastal waters off the south and west coasts.

According to the IWDG there was no recorded sightings of Common dolphin within the 5km buffer zone of the MUL area for the period of January 2025 to January 2026. Potential threats to Common dolphins include underwater noise, interactions with fisheries through bycatch, ship strikes, chemical and plastic pollution. The most recent Article 17 conservation assessment for Common dolphin in Ireland deemed the species as being in favourable conservation status (NPWS, 2025), which is concurrent with its favourable conservation status in 2019 (NPWS, 2019), highlighting a stable overall trend in its conservation status.

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with common dolphin are unlikely. However, the proposed underwater SI works has the potential to cause adverse effects on common dolphin or their conservation status under the Habitats Directive. Therefore, common dolphin are given further consideration within this report.

4.2.4.3 BOTTLENOSE DOLPHIN

The Bottlenose dolphin was the third most commonly sighted cetacean species throughout Phase II of the Irish ObSERVE programme, with 112 sighting totalling 472 individuals. Bottlenose dolphins were only sporadically observed in Stratum 5 (Irish Sea), sightings only occurred in summer 2022 with an estimated abundance of 1,223 and estimated density of 0.111 per km^2. A slight seasonal difference in mean group size was recorded with larger groups in the winter (4.4) than in the summer (3.9-4.2).

According to the IWDG there were 5 recorded sightings of Bottlenose dolphin within the 5km buffer zone of the MUL area for the period of January 2025 to January 2026. Potential threats to Bottlenose dolphins include underwater noise, interactions with fishing gear, habitat destruction and degradation. The most recent Article 17 conservation assessment for Bottlenose dolphin in Ireland deemed the species as being in favourable

conservation status (NPWS, 2025), which is concurrent with its favourable conservation status in 2019 (NPWS, 2019), highlighting a stable overall trend in its conservation status.

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with Bottlenose dolphin are unlikely. However, the proposed underwater SI works has the potential to cause adverse effects on bottlenose dolphin or their conservation status under the Habitats Directive. Therefore, bottlenose dolphin are given further consideration within this report.

4.2.4.4 MINKE WHALE

Minke whale were the most frequently sighted baleen whale during Phase II of the Irish ObSERVE programme. They occur both seasonally and sporadically around the entire coastline, although most sighting and higher densities have historically been reported along the south and west coasts during the spring and summer months. Minke whales are typically encountered in shallow continental shelf waters (<200m depth), where prey such as sprat, herring and sand eels are abundance (Irish Whale & Dolphin Group, 2010; NPWS, 2019).

Within the Irish Sea, including waters adjacent to Dublin Bay and Dún Laoghaire, Minke whales have occurred at low but measurable densities. Site-specific data from the Irish Sea indicate that the local average diversity of approximately 0.016 individuals per km^2 was estimated from spring/summer site surveys (Dublin Array EIAR Volume 3, 2025). ObSERVE and SCANS survey estimate suggest that within 'Stratum 5' (the Irish Sea), relative densities of Minke whale are patchy and seasonally variable, with high summer occurrence and minimal or no detection during winter surveys.

According to the IWDG there were no recorded sightings of Minke whales within the 5km buffer zone of the MUL area for the period of January 2025 to January 2026.

The most recent Article 17 conservation assessment for minke whale in Ireland deemed the species as being in favourable conservation status (NPWS, 2015) which is concurrent with its favourable conservation status in 2019 (NPWS, 2019), highlighting a stable overall trend in its conservation status.

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with Minke whales are highly unlikely. Therefore, the proposed underwater SI works are not expected to result in adverse effects on Minke whales or their conservation status under the Habitats Directive.

4.2.5 TURTLE SPECIES

Four Annex IV turtle species have been recorded in Ireland: Leatherback turtle (*Dermochelys coriacea*), Kemp's Ridley turtle (*Lepidochelys kempii*), loggerhead turtle (*Caretta caretta*) and hawksbill turtle (*Eretmochelys imbricata*). Of these species, only leatherback and loggerhead turtles have been documented

along Ireland's east coast. There are no records of any turtle species previously recorded within the MUL areas.

Leatherback turtles exhibit what is considered an 'atypical migration pattern'. Although they must return to tropical waters to breed, they frequently spend summer months in productive temperate waters such as those around Ireland, where they feed primarily on jellyfish and sea squirts (Doyle, 2007). The most recent loggerhead turtle record from the east coast was in 2021, when an individual was found stranded at Rush Beach, Co. Dublin. A single hawksbill turtle has ever been recorded in Irish waters, in Cork Harbour in 1983. The most recent Kemp's Ridley turtle record was in 2016, when an animal stranded on Tramore Beach, Co. Waterford.

The latest Article 17 conservation assessment for turtle species in Ireland assessed only leatherback turtles, concluding that their conservation status is unknown; no other turtle species were assessed (NPWS, 2025). On this basis, turtle occurrence within the MUL Area is considered possible but extremely rare, with leatherback and loggerhead turtles being the species most likely to be encountered.

The nature, duration, and location of the SI works, combined with the species' ecology, suggest that direct interactions with turtle species are highly unlikely. Therefore, the proposed underwater SI works are not expected to result in adverse effects on turtle species or their conservation status under the Habitats Directive.

5 EXAMINATION OF IMPACTS TO STRICT PROTECTIONS

5.1 BAT SPECIES

Based on the results of the desk study and available evidence, the proposed SI works will not result in any direct or indirect impacts on any structure or feature which could be used by roosting bats. Therefore, there is no likelihood of the SI works resulting in any bats being captured or killed and disturbed during periods of breeding, rearing or hibernation. No breeding site or resting place of such animals will be damaged or destroyed during the SI works.

Works within Dún Laoghaire Harbour will be carried out during daylight hours only and will be subject to tidal conditions. Any artificial lighting, if used, will be localised to the vessel at the borehole location within Dún Laoghaire Harbour. Therefore, there is no likelihood of any significant disturbance or displacement of foraging, commuting, or migrating bats. The proposed SI works conform with the strict protection afforded to bats under Article 12 of the Habitats Directive, and therefore, it is considered that no derogation is required.

5.2 OTTER

Based on the available evidence gathered in the desk study, it is possible that otters may be present within Dún Laoghaire Harbour and the nearshore (<80 m) in the Irish Sea during the SI works. The boat based bathymetric surveys will involve a small nearshore vessel within Dún Laoghaire Harbour utilising nonintrusive techniques within Area 5 only. For most survey types, no above-water noise, vibration or light will be emitted beyond baseline levels. SI works with the potential to emit above-water noise and vibration beyond baseline levels are geotechnical sampling (boreholes). Otters are typically most active at night. It is predicted that intrusive sampling works have the potential to interact with otter holts or couches as these are likely to be in the intertidal zone/on beaches where intrusive sampling will take place.

It is assumed that the survey vessel and multibeam echosounder (MBES) will be utilised in a very limited area surrounding Area 5. In the absence of mitigation, bathymetric sound sources have the potential to cause Permanent Threshold Shift to otters within 10m of the source and temporary threshold shift (TTS) within 100m.

To assess the potential impacts of the geotechnical surveys within Dún Laoghaire Harbour, the scenario assumed the use of a rotary and/or sonic drilling rig and a support vessel of up to 25 m in length. In the absence of mitigation, geotechnical sound sources have the potential to cause Permanent Threshold Shift to otters within 10m of the source and TTS within 40m.

In summary, the proposed site investigation works within Dún Laoghaire Harbour will be undertaken during daylight hours, when otters are not typically active. Furthermore, given the number of recent otter sightings (3), the limited spatial extent of the predicted Permanent Threshold Shift (10m) and TTS (100m) zones

combined with the likelihood that vessel itself will act as a visual deterrent, it is considered unlikely that the proposed site investigation works would result in the killing, injury, or disturbance of breeding, resting or commuting otters within Dún Laoghaire Harbour.

5.3 CETACEAN SPECIES

For cetaceans, the following potential pathways to effects on Strict Protection arise from the site investigation works:

- Underwater noise generated during the site investigation surveys
- Collision risk with survey boats

5.3.1 UNDERWATER NOISE

Cetacean sensory systems are highly adapted to the aquatic environment, with sound playing a central role in navigation, communication and the perception of their surroundings. The behavioural responses of marine mammals, including cetaceans, to sound are strongly influenced by contextual and individual factors such as prior experience, motivation, conditioning and current activity. These sources of variability require consideration in any case-specific assessment of the potential impacts of introduced underwater sound (NPWS, 2014). Sound waves attenuate with increasing distance from the source, although local oceanographic and propagation conditions influence the path and transmission characteristics of the sound.

Depending on the exposure levels of underwater noise, marine mammals may experience Permanent Threshold Shift. Acoustic effects in cetaceans may show as permanent, non-reversible Permanent Threshold Shift (PTS) or as a temporary threshold shift (TTS) in hearing sensitivity. TTS may limit an individual's ability to use natural sounds, such as those used for communication, navigation and prey detection, for periods ranging from minutes to days. The magnitude of impact on an individual is determined by the cumulative Sound Exposure Level (SEL) received as a result of underwater noise. With increasing distance from the sound source, and where the sound remains audible, the severity of effects is expected to decrease through a series of identifiable responses, from Permanent Threshold Shift or TTS, to behavioural responses such as avoidance, masking or reduced vocalisation, ultimately reaching a distance at which no significant response occurs. Factors such as local propagation and individual hearing ability can influence the actual effect (DAHG, 2014).

Marine mammal species can be categorised into functional hearing groups based on their frequency-specific hearing sensitivity (Southall et al., 2019). Minke, fin and humpback whales are classified as low-frequency (LF) cetaceans; common dolphin, bottlenose dolphin and Risso's dolphin as high-frequency (HF) cetaceans; and harbour porpoise as a very high-frequency (VHF) cetacean. Otters are classified separately as Other Marine Carnivores in Water (OCW). See Table 5.1 below for a list of species contained within each functional hearing group.

Lpk (Peak Sound Level) is the unweighted true maximum change in sound pressure at any given instant. It captures the sudden shock of a single event and is typically used to assess immediate physical injury or startle responses. SEL (Sound Exposure Level) is the cumulative sound energy over a specific duration (e.g., a single pulse or a 24-hour period) and is typically frequency-weighted. It is used to assess potential for Permanent Threshold Shift (such as permanent or temporary threshold shifts) by considering the total energy the listener is exposed to over time.

Impulsive sounds are short-duration, high-energy bursts that are perceived as more annoying and are associated with a greater risk of hearing loss than continuous sounds of the same average energy level. Non-impulsive or continuous sounds lack the sharp, sudden peak of impulsive sounds and have a lower risk of resulting in hearing loss. When considering auditory effects, sonars, other coherent active sources, and vibratory pile driving are considered to be non-impulsive sources, while explosives, impact pile driving, and air guns are treated as impulsive sources.

A summary of the survey methodologies to be used in the SI Works is presented in Table 5.3. Should the underwater noise generated during the geotechnical and bathymetric surveys exceed the Cetacean thresholds (Table 5.2), there is the potential for surveys to result in injury and/or disturbance to Annex IV marine mammal species in the vicinity of the SI works.

Table 5.1; Functional Marine Mammal Hearing Groups for Marine Mammal Species (Southall et al. (2019)).

Hearing Group Name	Species Included in Group	Generalised Hearing Range
Low-frequency cetaceans (LF)	Baleen whales (minke, fin and humpback whale).	7 Hz to 36+ kHz
High-frequency cetaceans (HF)	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer, and pilot whales).	150 Hz to 160 kHz
Very high-frequency cetaceans (VHF)	Certain toothed whales and porpoises (harbour porpoise).	200 Hz to 165 kHz
Other marine carnivores in water (OCW)	Includes sea lions, walrus, otters.	200 Hz to 32 kHz
Phocid carnivores in water (PCW)	Earless seals (including harbour and grey seal).	40 Hz to 90 kHz

Table 5.2; Cetacean PTS and TTS thresholds (NMFS, 2024).

Hearing Group	Parameter	Impulsive [dB]		Non-impulsive [dB]	
		PTS	TTS	PTS	TTS
Low frequency (LF) cetaceans	Lpk, (unweighted)	222	216	-	-
	SEL, (weighted)	183	168	197	177
High frequency (HF) cetaceans	Lpk, (unweighted)	230	224	-	-
	SEL, (weighted)	193	178	201	181
Very high frequency (VHF) cetaceans	Lpk, (unweighted)	202	196	-	-
	SEL, (weighted)	159	144	181	161
Phocid carnivores in water (PCW)	Lpk, (unweighted)	223	217	-	-
	SEL, (weighted)	13	168	195	175
Other marine carnivores in water (OCW)	Lpk, (unweighted)	230	224	-	-
	SEL, (weighted)	185	170	199	179
Sirenians (SI)	Lpk, (unweighted)	225	219	-	-
	SEL, (weighted)	186	171	186	180

Table 5.3; Typical frequencies and sound pressure levels

Activity	Typical frequency	Audible	Potential for PTS onset	Potential for TTS onset
Multibeam echo sounder (MBES)	400 – 700 kHz	No	No	No
Cone Penetration Testing (CPT)	20-200 Hz	Yes (LF)	No	No
Boreholes	Maximum 600 Hz (low frequency)	Yes (LF, HF, VHF)	VHF	LF HF VHF
Vibrocore	50 Hz (low frequency)	Yes (LF)	No	LF

Possible impacts of the geotechnical surveys with no mitigation measures:

- Auditory risk from Survey Equipment: None.
- Auditory risk from Survey Activities:
    - Boreholes: Risk of Permanent, non-reversible Permanent Threshold Shift (PTS) for Very high frequency (VHF) cetaceans. Risk of temporary threshold shift (TTS) in hearing sensitivity for Low frequency (LF), High frequency (HF) and Very high frequency (VHF) cetaceans.
    - Vibrocore Grabs: Risk of temporary threshold shift (TTS) in hearing sensitivity for Low frequency (LF) cetaceans.

The following presents the results of an underwater noise assessment of the proposed SI works within Dún Laoghaire Harbour. It is unlikely that cetacean species will be present within the MUL areas of Dún Laoghaire

Harbour due to geographical constraints (shallow water, tidal environment and the high base line of anthropomorphic activity from motorised vessels and water sports), with the exception of seals. The following therefore represents a highly precautionary assessment.

To assess the impacts of the geotechnical surveys within the MUL Area, the scenario assumed the use of a small vessel up to 25m in length. The results have been summarised below to present the 'worst-case scenario', and it should be noted that no mitigation (i.e. soft-start measures, or marine mammal observers) has been applied at this stage.

Table 5.4; Nature of proposed SI Works.

Activity	Geotechnical	Bathymetric
Sonic / Rotary Boreholes	Yes	No
Vibrocore	Yes	No
CPT	Yes	No
Multibeam Echosounder	No	Yes

Geotechnical Surveys (Boreholes, CPT and Vibrocore):

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 160 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 24 m.
- VHF group (harbour porpoise), auditory injury could occur less than 10 m of the sound source, while TTS could occur within 600 m.
- For all marine mammals, behavioural disturbance could occur out to 1.2 km when applying the criterion strictly (unweighted for hearing groups).

Bathymetric Surveys (Multibeam Echosounder):

- LF group (minke, fin and humpback whale), auditory injury could occur within <10 m of the sound source, and TTS could occur within 40 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within <10 m of the sound source, and TTS could occur within 60 m.
- VHF group (harbour porpoise), auditory injury could occur within 50 m of the sound source, while TTS could occur within 1.1 km.
- For all cetaceans, behavioural disturbance could occur out to 1.2 km when applying the criterion strictly (unweighted for hearing groups).

This is based on the assumption that activities will continue for up to 24 hours (long duration of sound exposure accumulation. In reality, SI works will not be undertaken for this long within the MUL areas. This also assumes that noise generated by the proposed works represents the dominant source of sound exposure for marine

mammals. In reality, any other larger vessel operating in closer proximity to an animal will be the primary contributor to its sound exposure rather than by the site investigation works themselves.

This assessment concludes that there is risk of inducing hearing injury (PTS) and TTS following noise from the SI works, but with the implementation of suitable mitigation as outlined below, these can be mitigated effectively to make the risks of Permanent Threshold Shift and TTS low for all hearing groups assessed.

5.3.1.1 MITIGATION

The risk of injury to all cetacean hearing groups is limited to a range of 10m from the source, with the exception of harbour porpoise during the bathymetric surveys, where the risk of injury was estimated to be 270m from the noise source. In the event that a cetacean is present within Dún Laoghaire Harbour, it is considered that the presence of the vessel and noise associated with the vessel in the area for 20 minutes prior to survey will act as a soft start to deter cetaceans.

- As a precautionary measure for the boat-based surveys taking place, a qualified and experienced marine mammal observer (MMO) should be appointed to monitor for marine mammals prior to the soft-start.
- A pre-start-up survey within the MUL zone (i.e. 500m radius of the sound source) will be conducted at least 30 minutes before the activity commences.
- Sound producing activity shall not begin until at least 30 minutes have passed with no marine mammals detected within the monitored zone (500m) by the MMO.
- Once sound producing activities begin, a "Ramp Up" procedure (20/30 minute soft-start) must be used.
- 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 Ramp-up Procedures must be carried out again (DAHG Guidance, 2014).

These measures will ensure that impacts on marine mammals will be reduced to the lowest possible risk to ensure there is no significant risk to marine mammals from noise.

5.3.1.2 CONCLUSION

Based on the current evidence base, it is concluded that, with the implementation of the appropriate precautionary mitigation measures outlined above, the proposed site investigation works will comply with the system of strict protection afforded to cetaceans under Article 12 of the Habitats Directive.

5.3.2 RISK OF COLLISION

Collision with vessel are a known cause of mortality and injury in marine mammals. Injuries from such collisions can be divided into two categories:

- Blunt trauma from impact
- Lacerations from propellers.

Injuries may leave individuals susceptible to infections or at risk of predation. It has been calculated that a maximum of one vessel and one jack-up barge could be operating at any one time within any of the MUL Area. It is likely that the survey vessels (i.e. geotechnical survey vessel) will be stationary for extended periods throughout their operations which will reduce the potential for collision with these vessels. The area currently has reasonably high levels of baseline marine traffic, with fishing boats and recreational vessels using the MUL Area regularly. It is, therefore, reasonable to assume that marine mammals in the area are exposed to vessel traffic on a regular basis and are habituated. Therefore, it is considered the proposed SI works do not present a collision risk and consequently correspond with the system of strict protection of cetaceans under Article 12 of the Habitats Directive in this regard.

5.4 TURTLE SPECIES

Due to the rarity of turtles within the MUL Areas, the limited scale, duration and nature of the site investigation and survey activities, it is concluded that there will be no significant disturbance, injury, or death of turtle species as a result of the SI works. There will be no deterioration or destruction of breeding sites or resting places. Therefore, it is considered that no derogation is required, and the proposed SI works will conform with the system of strict protection of turtles under Article 12 of the Habitats Directive.

6 CONCLUSION

The proposed site investigation (SI) works will not deliberately capture or kill any species listed under Annex IV of the Habitats Directive, and the breeding or resting places of Annex IV species will not be damaged or destroyed. Limited disturbance of Annex IV cetacean species may occur due to the introduction of underwater noise.

Although the range of potential impact is relatively small, it is considered, based on the precautionary principle, the mitigation outlined in this report should be implemented to avoid disturbance to Annex IV species. A suitably qualified marine mammal observer (MMO) will confirm the absence of protected species within the monitored zone prior to the commencement of bathymetric geotechnical surveys.

The implementation of these measures will ensure that the activities pose no significant risk to cetaceans or marine turtles. This approach aligns with Stage 3 of *Strict Protection of Animal Species – Guidance for Public Authorities* (NPWS, 2021), which states that:

"If mitigation is capable of reducing those impacts to the point where there will be no harmful effect, then a derogation will not be necessary."

It is therefore concluded that, with the implementation of the appropriate precautionary mitigation measures outlined above, the proposed SI works will comply with the strict protection provisions of Article 12 of the Habitats Directive and Regulations 51 and 52 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. This applies to the following Annex IV species:

- All bat species
- Otter
- All cetacean species
- All marine turtle species

7 REFERENCES

Chanin, P (2003): Ecology of the European Otter, Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature

Department of Arts, Heritage and the Gaeltacht (DAHG) (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Dublin, Ireland, Department of Arts, Heritage and the Gaeltacht, 58pp.

Giralt Paradell, O., Cañadas, A., Bennison, A., Todd, N., Jessopp, M. & Rogan, E. (2024). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2021-2023. Department of the Environment, Climate & Communications and Department of Housing, Local Government & Heritage, Ireland. 260pp

IAMMWG. (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough, ISSN 0963-8091. **https://hub.jncc.gov.uk/assets/f07fe770-e9a3-418d-af2c-44002a3f2872**

IAMMWG. (2022). Updated abundance estimates for cetacean Management Units in UK waters (Revised 2022). JNCC Report No. 680, JNCC Peterborough, ISSN 0963-8091.

IAMMWG. (2023). Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091. **https://hub.jncc.gov.uk/assets/b48b8332-349f-4358-b080-b4506384f4f7**

Irish Whale and Dolphin Group (IWDG) (2025). Common Dolphin available: Common Dolphin | Irish Whale and Dolphin Group accessed July 2025.

JNCC (2020). Joint Cetacean Data Programme (Phase one – final report), Department for Environment Food and Rural Affairs.

Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. & Podesta, M. (2001). Collisions between ships and whales. Marine Mammal Science 17: 35-75.

Limpens, H.J.G.A., Lagerveld, S., Schillemans, M. & Scholl, M. (2017) Bat 1: Estimate of bat populations at the southern North Sea. Supporting note to ZDV report no.2016.031 Migrating bats at the southern North Sea. Wageningen, Wageningen Marine Research (University & Research Centre), Wageningen Marine Research Report no. C014.17/Dutch Mammal Society Report no. 2017.08.14 pp.

MacGillivray, A.O., Racca, R. and Li, Z. (2014) Marine mammal audibility of selected shallow-water survey sources Journal of the Acoustical Society of America 135. doi: 10.1121/1.4838296.

Mullen, E., Marnell, F. & Nelson, B. (2021) Strict Protection of Animal Species. National Parks and Wildlife Service Guidance, No. 2. National Parks and Wildlife Service, Department of Housing. Local Government and Heritage.

National Biodiversity Data Centre (NBDC) (2025a). Common Dolphin (*Delphinus delphis*); Ireland; Available: **https://species.biodiversityireland.ie/134667.** Accessed January 2026

National Biodiversity Data Centre (NBDC) (2024b). Bottlenose Dolphin (*Tursiops truncates*) ; Ireland; Available: **https://species.biodiversityireland.ie/134666.** Accessed January 2026

National Marine Fisheries Service (NMFS) (2024). Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) [Report]. - Silver Spring : National Marine Fisheries Service, 2024.

National Marine Fisheries Service. 2024. Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0): Underwater and In-Air Criteria for Onset of Permanent Threshold Shift and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-71, 182 p.

NOAA (National Oceanic and Atmospheric Administration) (2024). Finneran James J. Marine mammal auditory weighting functions and exposure functions for US Navy Phase 4 acoustic effects analyses [Report]

NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report.

O'Brien, J. and Berrow, S. (2016). Harbour Porpoise Surveys in Rockabill to Dalkey Island SAC. Available at: npws.ie

Ocean Research and Conservation Association (ORCA) (2025a). Harbour Porpoise https://www.orcaireland.org/harbour-porpoise. Accessed January 2026.

Ocean Research and Conservation Association (ORCA) (2025b). Common dolphin https://www.orcaireland.org/common-dolphin Accessed January 2026

Ocean Research and Conservation Association (ORCA) (2025c). Bottlenose dolphin Ocean Research & Conservation Association of Ireland Accessed January 2026

Popper, A., Hawkins, A., Fay, R., Mann, D., Bartol, S., Carlson, T., Coombs, S., Ellison, W., Gentry, R., Halvorsen, M., Løkkeborg, S., Rogers, P., Southall, B., Zeddies, D. & Tavolga, W. (2014). Sound Exposure Guidelines. 10.1007/978-3-319-06659-2_7.

Ruppel, C.D.; Weber, T.C.; Staaterman, E.R.; Labak, S.J.; Hart, P.E. Categorizing Active Marine Acoustic Sources Based on Their Potential to Affect Marine Animals. J. Mar. Sci. Eng. 2022, 10, 1278. https://doi.org/10.3390/ jmse10091278

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., & Tyack, P. L. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4): 411- 521.

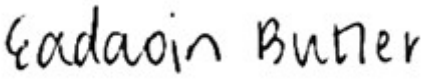
Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L, (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125.

Van Waerebeek, K., Baker, A., Félix, F., Gedamke, J., Iñiguez, M., Sanino, G., Secchi, E., Sutaria, D., van Helden, A. & Wang, Y. (2007). Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Latin American Journal of Aquatic Mammals. 6. 43-69. 10.5597/lajam00109.

Wall, D. (Marine Institute, 2013). Marine Mammals and Megafauna in Irish Waters - Behaviour, Distribution and Habitat Use- WP1 Monitoring Spatial and Temporal Habitat Use and Abundance of Cetaceans.Marine Research Sub-Programme (NDP 2007-'13), PBA/ME/07/005(02)

8 VERIFICATION

This report was compiled by Eadaoin Butler BSc; reviewed by Rebecca Duane, BSc, MCIEEM, Ecologist, and approved by Eleanor Burke, BSc, MSc, DAS, MIEnvSc, CSci, and OCSC Director (Environmental).



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