# Risk Assessment for Annex IV Species

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**Iarnród Éireann**

**East Coast Railway Infrastructure Protection Project**

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# 1. Introduction

The East Coast Railway Infrastructure Protection Projects (ECRIPP) is a coastal protection scheme that is proposed to protect the existing railway infrastructure on the Dublin to Wexford rail line. Following a study, five Coastal Cell Area's (CCA's) were identified as "at risk" between Dublin and Wicklow. The railway line within these CCA's are vulnerable to coastal erosion, coastal flooding, wave overtopping and cliff instability that is expected to increase both in frequency and severity in future years due to climate change effects. The ECRIPP (hereafter referred to as the Proposed Project) will deliver long term engineering solutions to proactively manage climate change effects in the form of wave overtopping, coastal flooding, erosion and cliff instability to this important rail infrastructure corridor.

As part of the Proposed Project, Iarnród Eireann are applying for a licence to undertake geotechnical and geophysical site investigation surveys (hereafter referred to as the Proposed Survey Works) within the foreshore area throughout the five CCA's along Ireland's East Coast. The purpose of the Proposed Survey Works are to inform the optioneering and design development for the Proposed Project. For the purposes of the licence application, the CCA's are termed Licence Areas which can be seen in Table 1.1 below.

**Table 1.1: Licence Areas**

| CCA | Description | Licence Area |
|---|---|---|
| 1 | Merrion Gates to Dun Laoghaire | A |
| 2/3 | Dalkey Tunnel to Killiney South | B |
| 5 | Bray Head to Greystones North Beach | C |
| 6.1 | Greystones South to Newcastle | D |
| 6.2 | Newcastle to Wicklow | D |


**Figure 1.1: Overview of the Proposed Project CCA's**

The Proposed Survey Works are subject to the European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (Statutory Instrument (S.I) No. 477 of 2011) (as amended) (hereafter referred to as 'the Habitats Regulations'). As per the Habitats Regulations, it is deemed an offence to deliberately disturb Annex IV Species. This includes disturbance at any time, particularly within breeding, rearing, hibernation or migration seasons. The purpose of this Risk Assessment for Annex IV Species Report is to provide the Competent Authority with the necessary information to establish whether there is a potential risk to Annex IV species as a result of the Proposed Survey Works.

# 2. Legislation and Guidance

## 2.1 International Legislation

### 2.1.1 Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) (The Habitats Directive)

The main aim of the Directive is to ensure species and habitat types listed within the Annexes of the Directive are protected. The overall objective is to maintain or restore species and habitat types to a favourable conservation status within the EU whilst taking account of economic, social, cultural requirements and regional and local characteristics. The Directive, in addition to halting the further decline or disappearance of species and habitats, aims to allow them to recover and thrive over the long-term.

The Directive requires all Member States to establish a strict protection regime for species listed in Annex IV, both inside and outside Natura 2000 sites. In particular, Member States must prohibit:

- All forms of deliberate capture or killing in the wild
- Deliberate disturbance, e.g. During breeding, rearing, hibernation and migration.
- Deterioration or destruction of breeding sites or resting places.
- Deliberate destruction of nests or eggs, or the picking, collecting, cutting, uprooting or destruction of protected plants in the wild
- The use of all indiscriminate means of capture or killing capable of causing local disappearance and serious disturbance to populations of such species, and
- The keeping, transport and sale of specimens taken from the wild

Member States must also take measures, where necessary, to ensure that the taking or exploitation of specimens of species listed in Annex V is compatible with their being maintained at a favourable conservation status.

Member States must designate, protect and manage core areas for habitat types listed in Annex I and species listed in annex II of the Habitats Directive. Sites are selected on scientific grounds using the criteria laid down in the Directive (Annex III)."

All cetacean species are listed on Annex IV (Animal and Plant Species of Community Interest in Need of Strict Protection) of the European Commission's Habitats Directive. Under Annex IV, *the keeping, sale or exchange of such species is banned as well as deliberate capture, killing or disturbance*. The grey and harbour seal are listed in Annex II of the Habitats Directive under which member countries of the EU are required to *consider the establishment of Special Areas of Conservation (SACs)*. All seal species are listed on Annex A of EU Council Regulation 338/97 and are therefore treated by the EU as *if they were on CITES Appendix I, thus prohibiting commercial trade*.

The Directive also requires appropriate assessment of any plan or project not directly connected with or necessary to the management of a European Site, but likely to have significant effects upon a European site, either individually or in combination with other plans or projects.

## 2.2 Irish Legislation

S.I. No. 355 of 2015 provides that the following shall be construed together as one:

- Wildlife Act 1976;
- Wildlife (Amendment) Acts of 2000, 2010 and 2012;

- European Communities (Birds and Natural Habitats) (Restrictions of the Use of Poison Bait) Regulations 2010;
- European Communities (Birds and Natural Habitats) Regulations 2011;
- European Communities (Birds and Natural Habitats) (Amendment) Regulations of 2013, 2015; and
- Wildlife Amendment Bill 2016.

### 2.2.1 Annex IV and Annex II Species

Bats are protected by law in the Republic of Ireland under the Wildlife Act (1976) and its amendments (2000, 2005, 2010 and 2012). In addition to domestic legislation, bats are also protected under the EC Habitats Directive (92/43/EEC). The lesser horseshoe bat (*Rhinolophus hipposideros*) is listed in Annex II of the EC Habitats Directive. The other eight species of bat native to Ireland (common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), whiskered bat (*Myotis mystacinus*), natterer's bat (*Myotis nattereri*) and Daubenton's bat (*Myotis daubentonii*)) are listed in Annex IV and are strictly protected under EU legislation to 'maintain the favourable conservation status'. For all bat species it is an offence to disturb, injure or kill bats or disturb or destroy their roosts.

Cetaceans (whales, dolphins and porpoises), pinnipeds (seals) are all protected under national legislation as well as under a number of international directives and agreements. All cetaceans, as well as the pinnipeds, grey and harbour, are protected under the Wildlife Act (1976) and its amendments (2000, 2005, 2010 and 2012). Under this, it is an offence to hunt, injure or wilfully interfere with, disturb or destroy the resting or breeding place of a protected species (except under license or permit). The act applies out to the 12 nautical mile limit of Irish territorial waters.

All cetaceans are protected under Annex IV of the EC Habitats Directive (92/43/EEC). The Directive lists Annex IV species of community interest 'in need of strict protection'.

Pinnipeds are not listed on Annex IV but are listed on Annex II, which are of community interest and whose conservation requires the designation of special areas of conservation.

The following document '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' (NPWS 2014) recommends that listed coastal and marine activities be subject to a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process.

# 3. Project Description and Methodologies

## 3.1 Proposed Survey Works

### 3.1.1 Geotechnical Survey

#### *3.1.1.1 Borehole Works*

Borehole site investigation works will be used to investigate the characteristics such as stability, sediments and ground conditions within Licence Area A. This information will be used to determine appropriate design options for coastal protection measures as part of the Proposed Project.

Cable percussion boreholes involves a variety of tools, which are raised and lowered through either a cable and winch or a set of steel rods to conduct drilling, sample collection, and testing within the borehole. The rig is generally positioned for a duration ranging from 0.5 to two days, which is varies based on the sampling depth and soil thickness. Once completed, the borehole is backfilled with materials excavated earlier, or alternatively, instrumentation may be installed, such as equipment for monitoring water levels. In cases where an installation remains in situ, the only visible element is a small cover, level with the ground surface.

The rotary core drilling method encompasses a drill which is mounted on the back of a truck or tracked rotary rig alongside a variety of steel bits can be used to drill the hole. These either form an open hole with no sample recovered or they recover a core of rock or soil for examination and laboratory testing. The rig may be in place for 3-5 days, depending on the thickness of the ground being examined. Upon completion, the borehole is filled in with previously excavated materials or instrumentation is installed – for example, to monitor water levels. Where an installation remains in place, the only thing visible is a small cover, level with the ground. Coring is carried out in run lengths of 1m to 3m. The extracted core will be removed from the core barrel and deposited on clean polythene within a standard core box. Samples are then labelled and stored.

Window sampling (also known as windowless sampling) is a technique used to bore through shallow soft soils to investigate substrate. It is carried out by a small lightweight rig on rubber tracks and extends no deeper than 5mBGL. Due to its small size, it is particularly useful in areas with limited access or on embankments/ steep terrain. It uses one-metre-long extension rods and is driven into the ground by a percussion method using a drop hammer. Window samples, in diameters typically ranging from 35mm-80mm, are retrieved for geotechnical analysis.

#### *3.1.1.2 Sediment Sampling*

Sediment sampling will be undertaken with the use of hand tools. A small bag of sediment will be collected for subsequent analysis.

#### *3.1.1.3 Trial Pit Works*

Trial pits are dug by mechanical means by a JCB. These are dug to investigate soil conditions and conduct tests. Typically, a 1x4m pit is dug to a depth of 2m-4m. This enables observation of the profile of the ground from the surface and samples to be retrieved for testing. The contractor is required to leave every site as they found it, and this will involve replacement of minor quantities of topsoil only.

#### *3.1.1.4 Slit Trench Works*

A slit trench is a long narrow trench commonly used in urban environments and on roadways to determine the position of existing services. These are usually excavated by a combination of hand excavation and excavation using a small mechanical excavator equipped with a toothless bucket.

## 3.1.2 Geophysical Survey

The geophysical surveys will employ two methods: Standard System and Dragged System and will be undertaken within Licence Area A.

### *3.1.2.1 Standard System*

This method involves an input signal (such as a weighted object, electrical current or radio waves) which is transmitted into the ground. These geophysical signals are received by a series of receivers (Geophones or metal pins 300m in length) which are laid out along in a transect line, with each receiver connected to a control box. The signals detected by these receivers help determine the velocity or electroconductivity/resistivity of these input signals and infer the depth of underlying objects from these readings. A transect line can be numbered at 0.5m, or 1m intervals, all the way along its length. This line will be laid across the study area. This method allows for 15m-70m length of geophysical transect per hour.

### *3.1.2.2 Dragged System*

The Dragged System approach involves deploying a land streamer, which is towed by a vehicle like a lightweight Argocat, which enables faster data collection compared to the Standard System. A land streamer in Multichannel Analysis of Surfaces Waves (MASW) is a platform on which geophones are attached without spikes so that all of them can be moved as one unit, facilitating the mobility of receiver array.

A data collection cable reel is linked to a Summit X One seismograph and is unwound along the length of the test profile by the Argocat. The seismic survey data will provide information of bedrock depth through seismic refraction processing. The surveys will primarily occur in the foreshore beach habitat, with some areas requiring work in the upper shore or existing public footpaths. Access is facilitated through existing access tracks.

As the proposed geophysical surveys will take place on land and not in the marine environment, there is no requirement for cetaceans to be considered further in this risk assessment. However, given that pinnipeds are known to haul-out on land to breed, moult and rest, the proposed geophysical survey could result in disturbance to nearby populations. The information presented in the following sections will be used to inform the overall risk to pinniped from the Proposed Survey Works.

## 3.1.3 Bathymetric Survey

Bathymetric surveys are required across all licence areas and will be used to inform the hydrographic baseline conditions. Whilst areas of the proposed Scheme have already been covered by bathymetric survey in the past, more up to date data is required to inform the proposed Scheme. These areas are illustrated in **Error! Reference source not found.**. Should the sounder be towed rather than integrated, it will be suspended below the surface of the water using weights and towed at a suitable distance to avoid snagging and fouling of the tow rope on obstructions within the river course. The survey will be undertaken at high tide to ensure as much of the intertidal area is captured within the scanning of the seabed. A qualified Hydrographic Surveyor will be responsible for the technical direction of the survey works, and an ecologist will work alongside the crew to oversee the operations onboard and ensure that everything is completed in line with the license requirements.

The details of the survey vessels that will be used to undertake the bathymetric surveys are not currently known until a contractor is appointed to carry out the works. It is envisaged that there will be two types of vessel depending on the depth of the waters at each location. If required, further details can be provided to MARA for agreement.

### *3.1.3.1 Echo Sounder*

A high-resolution multi-beam echo sounder (MBES) shall be used to collect bathymetric data. The MBES shall have the following minimum specifications:

1) Minimum depth resolution: ± 0.010m;

2) Ping footprint on seabed: ≤ 2.0°x 2.0° at 200 kHz;

3) Minimum ping density: 50 hits per $m^2$; and

4) Each image will need to overlap 80% in both front and side planes accept the extreme edge of the data. Sufficient overlap shall be provided to allow qualitative 3D modelling.

Three-dimensional survey data shall be automatically and digitally recorded.

#### *3.1.3.2 Sub-Bottom Profiler Survey*

In addition to MBES, Sub-Bottom Profiler (SBP) data is required to characterise the shallow stratigraphy. A single SBP line is to be taken in each of the six areas of MBES data capture at 300 ±50 m offshore of mean high water. It is anticipated that collection of SBP and MBES data can be synchronous. The approximate survey line lengths are as follows:

- Licence Area A: 5.5km
- Licence Area B: 4km
- Licence Area C: 5km
- Licence Area D: 19km

A SBP technique shall be used to achieve a minimum resolution of 0.2 m to a depth below seabed of at least 20m. The critical information required are depth to rockhead, thickness and stratigraphy of Pleistocene glacial sediments, and thickness and stratigraphy of Holocene sediments.

It is recommended that a parametric echosounder, or single channel chirp SBP system be used, such as the INNOMAR parametric system (SES 2000 system). The sub-bottom profiler proposed to be used is an INNOMAR SES 2000 Compact Parametric SBP which operates at approximately 247 dB with primary frequencies of 100 kHz (frequency band 85 - 115 kHz), and secondary selectable low frequencies of 4, 5, 6, 8, 10, 12 and 15 kHz.

### 3.1.4 Ecology Surveys

The proposed ecology surveys will comprise: -

- Breeding bird surveys by boat or drone to establish the locations of breeding sites for breeding birds on the cliff face in Licence Area C.

The sea cliffs and waters in Licence Area C between Bray and Greystones have a high ecological value for coastal birds and their prey. These cliffs are a key breeding site for coastal bird species including herring gull, common gull, black-headed gull, greater black-backed gull, lesser black-backed gull, kittiwake, fulmar, guillemot, black guillemot, razorbill, shag and cormorant. Additionally, the coastal waters at the base of the cliffs are a key foraging site for these bird species and additional species which breed in the vicinity which may include arctic tern, common tern, little tern and roseate tern.

These breeding birds (aside from black guillemot) are protected by European sites Special Protection Areas (SPAs) in the vicinity of ECRIPP and therefore the Bray Head cliffs may be considered functionally linked habitat to these SPAs. As the ECRIPP works have the potential to affect the conservation objectives of these SPAs, the location of bird breeding sites is therefore needed to inform the design of ECRIPP to avoid or minimise potential impacts on these qualifying features of the European sites.

- Drop down camera work from a boat in Licence Area C to establish the substrate to check for suitable sand eel habitat, and thus feeding areas for coastal birds.

- Tern species and other coastal birds typically feed on sand eel. Sand eel burrow into fine sandy habitats at night and come up to the surface waters to feed on plankton blooms during the day. There are five species of sand eel found in Irish waters. These species use sandy substrate at a range of depths with some using intertidal areas down to 20m and other species using waters deeper than 20m. While the aforementioned breeding birds consume a range of fish species, sand eel are the most important source of food in the breeding period as they are small, fatty and abundant and are the ideal size and shape to feed the bird's offspring.
- Sand eel exhibit high site fidelity which means they do not stray from their natural range. It is imperative to know if suitable habitat exists within Licence Area C as if this habitat is present and removed then it is highly likely that sand eel will not be able to travel to suitable habitat areas elsewhere and this source of food will be lost for bird species in this location.
- Mapping and photographing of sea caves from a boat in Licence Area C to identify any caves in the cliff face, which could provide high quality roosting habitats for bats. These findings will enable a bat structure assessment to help determine if the future ECRIPP works have potential to block bats from accessing any roosts, as bats are known to forage and migrate over the sea.
- Intertidal and subtidal ecology surveys in Licence Areas A to D to understand the potential changes in habitat that may result from future ECRIPP works; both direct impacts on intertidal and subtidal habitat in the footprint of new coastal defence structures and indirect impacts on habitats, as well as associated qualifying interest species that may be using the Licence Areas for feeding and nesting. The surveys are proposed to be undertaken between May and September.

#### *3.1.4.1 Proposed Methodology*

**Breeding Bird Surveys by Boat**

When determining the breeding activity on the cliff face, at least three surveys will be completed between the months of April and August, however the ideal period is between May and June. The survey will be conducted in daylight hours between 07:00 and 18:00. The entire length of the cliff face from grid reference: O 27668 17934 to grid reference O 28717 15209 will be surveyed, which is approximately 3.3km long.

Surveyors will be equipped with:

- Binoculars (one per team member)
- A scope with a tripod
- A high-quality camera e.g. Nikon D800E digital camera using a 70mm lens
- PPE
- Weather writer (one per team member)
- Printed maps (one per team member)
- iPad

The boat will be driven 100-200m from the cliff face, with surveyors keeping an eye for bird disturbance, which would not allow for an accurate assessment of breeding activity. If the boat is causing disturbance, the boat will move out to a maximum of 400m from the cliff face within the application area.

Surveyors will stop approximately every 300m and will spend up to one hour surveying the stretch of cliff face at each point. These distances may be adjusted on site if the aspect of the cliff face blocks the field of view for surveyors. Indicative boat survey locations within Licence Area C are shown on Figures 2.3 to 2.5. Surveyors will first survey for breeding activity on the cliff face, looking for nesting sites and resting birds. If time allows then a count of birds foraging in the waters at the base of the cliff will be conducted.

Species, breeding activity and number of birds will be drawn onto the printed maps/ iPad mapping app. The entire length of the cliff face will be photographed using a high-quality camera.

Surveyors will aim to carry out in situ counts of breeding bird activity. However, photographs taken on the day may be used for counts (if needed) if the surveyors check the accuracy of the photography (which tends to be low). This can be done by taking a sample count of 200 birds then photographing the area immediately and repeating this five times. Subsequently, at the desk the photographs can be analysed for accuracy and all other photographs can be used for completing counts with this error reported alongside the count data.

**Breeding Bird Survey by Drone**

Alternatively, bird surveys may be conducted using a drone, mounted with a high-resolution camera, should the boat survey work not be feasible. The drone must provide real-time information to surveyors as it is flying so that ecologists can assess if breeding birds are disturbed by the drone.

Should this methodology be used, surveyors will be located at a safe location on land and will launch the drone. Using an ipad/relevant device which provides real-time footage from the drone, surveyors will conduct counts of breeding colonies. The drone will be flown at a slow even pace at a safe distance from the cliff, stopping every 100m to allow the surveyors to conduct counts. Footage will be analysed during a desk base review to recheck counts and map the locations of nests.

Three surveys between the months of April to August are required with May – July being the preferred period.

**Drop Down Camera Work to Determine Substrate**

During one of the boat survey trips, the drop-down camera work will be conducted. These surveys will be conducted on a day with calm weather conditions to reduce turbidity in the water and allow for maximum camera clarity. A waterproof camera will be lowered to the sea floor and images gathered to check for the presence or absence of sandy substrate. The camera will be dropped and dragged along the entire length of Licence Area C as close to the cliff face as is safe following the boat crew's advice. The camera work will be conducted after the breeding bird surveys are complete to prevent any potential disturbance from effecting those surveys.

Footage will be assessed off site during a desk-based assessment.

**Bat Roosting Assessment**

During one of the boat survey trips, a bat roosting assessment will be undertaken to examine the cliffs for cliffs and cracks above the sea level and assess these structures for bat roost potential.

Surveyors will be equipped with:

- Binoculars (one per team member)
- A scope with a tripod
- PPE
- Weather writer (one per team member)
- iPad

Upon completion of the breeding bird surveys, on the return trip the bat roosting assessment will take place. The boat will drive at a pace guided by ecologists so that all features can be recorded and photographed. Ecologists will instruct the boat crew to stop if required. Potential roosts will be mapped on the iPad and photographs will be taken.

**Benthic Ecology Surveys**

The benthic ecology surveys will comprise the following works: -

**Intertidal Cores**

In Licence Area A, six replicates will be taken at 15 intertidal core sites, with 75 replicates in total for infaunal analysis and 15 replicates for sediment particle size and chemistry. Each intertidal core will cover an area of approximately 0.01m$^2$, and the core will be taken to a depth of 20cm, sieved and infaunal preserved for laboratory identification.

The cores are proposed to be undertaken in September to replicate the overwintering bird period.

**Intertidal Transects**

In Licence Area A, up to ten intertidal transects are proposed from the high water mark to the low water mark with quadrats undertaken to allow for accurate biotope mapping to be established.

In Licence Area B, up to13 intertidal transects are proposed from the high water mark to the low water mark with quadrats undertaken to allow for accurate biotope mapping to be established. Between two and four transects are proposed per 1km of frontage, with up to eight transects completed in one day per team. Where intertidal areas are homogenous then a lower number of transects may be required (>500m apart).

In Licence Area C, up to three (3 no.) transects are proposed from the high water mark to the low water mark with quadrats undertaken to allow for accurate biotope mapping to be established.

In Licence Area D, up to 88 intertidal transects are proposed from the high water mark to the low water mark with quadrats undertaken to allow for accurate biotope mapping to be established. Between two and four transects are proposed per 1km of frontage (which extends approximately 22km), with up to eight transects completed in one day per team. Where intertidal areas are homogenous then a lower number of transects may be required (>500m apart).

The intertidal transects would be undertaken between May and August in Licence Areas B, C and D, subject to consenting.

**Subtidal Day Grabs (Or Equivalent)**

In Licence Area B, up to six (6 no.) 0.1m subtidal day grabs (or equivalent) are proposed to allow the collection of benthic fauna and to allow habitat categorisation, with three replicates for each sample (and up to 18 replicates in total).

In Licence Area C, up to three (3 no.) 0.1m subtidal day grabs (or equivalent) are proposed to allow the collection of benthic fauna and to allow habitat categorisation, with three replicates for each sample (and up to nine (9 no.) replicates in total).

The subtidal day grabs would be undertaken between May and August, subject to consenting.

## 3.1.5 Archaeology Surveys

The archaeology surveys are proposed to be carried out within all four licence areas, as shown on the supporting maps. Subject to approval of the MARA licence, these surveys are scheduled to commence from August 2024.

The purpose of these surveys is to better understand the archaeological resource of the licence areas to ensure future ECRIPP works avoid adversely impacting known or potential marine and intertidal archaeology and cultural heritage.

### *3.1.5.1 Proposed Methodology*

The archaeology surveys will comprise the following works in all Licence Areas: -

**Licenced Metal Detection Surveys**

These will involve a two person intertidal (foreshore) walkover survey in all Licence Areas using a metal detector, as and where appropriate in the footprint of future ECRIPP works and areas affected by the proposed ground investigations.

**Other Archaeological Considerations**

Archaeological considerations will be integrated with the planning and execution of the proposed geotechnical and geophysical site investigations and the resultant data will be assessed for archaeological purposes, as appropriate. Any additional survey requirements agreed in consultation with the Underwater Unit of the National Monuments Service would be subject to a separate MARA licence application.

# 4. Baseline Information

## 4.1 Summary of Noise Levels in Marine Environment

The exact manufacturer for the equipment to be used for the proposed works have yet to be determined and therefore proxy values have been provided for the equipment type (Table 4.1). Table 4.1 lists the operating frequency and typical source level (in dB re 1µPa (rms)@1 m for the proposed methodologies used in bathymetric surveys for the Scheme.

**Table 4.1. Generic information on underwater noise levels for at-sea techniques.**

| Method | Operating frequency | Typical source level (dB re 1µPa (rms)@1 m) |
|---|---|---|
| Sub-Bottom Profiler – Chirp/Pinger (Seismic) | 4 kHz/100 kHz | 210-214 |
| Magnetometer | Magnetometer surveys are not considered to be a significant noise source and have therefore not been included. | |
| Side-scan sonar | 100 kHz and 900 kHz | 210 |
| Notes: these are generic typical values and may vary depending on the make, model and engine size of the rig actually used. | | |

## 4.2 Cetaceans

As described in Section 2.2.1, all cetaceans are Annex IV species and as such require consideration here for the bathymetric surveys that are proposed for the Scheme. According to the Irish Whale and Dolphin Group (IWDG), the harbour porpoise (*Phocoena phocoena*) species is particularly abundant between Howth Head and Dalkey off Co. Dublin. In this region, boat surveys produced the highest counts anywhere in Ireland. The harbour porpoise is also a qualifying feature of the Rockabill to Dalkey Island Special Area of Conservation (SAC) which is within the proposed works of the Scheme. In addition to this, the common dolphin (*Delphinus delphis*) is present all year round in Irish waters. Densities of the common dolphin appear to be greatest off the south and south west coasts in summer and autumn. Other species that frequent the Celtic and Irish Sea within the vicinity of the Scheme include: bottlenose dolphin (*Tursiops truncatus*), orca (*Orcinus orca*) and the Risso's dolphin (*Grampus griseus*).

Limited information is available on abundances of cetaceans within the vicinity of the scheme. However, the IWDG have produced the following maps that illustrate the key cetacean species of interest.

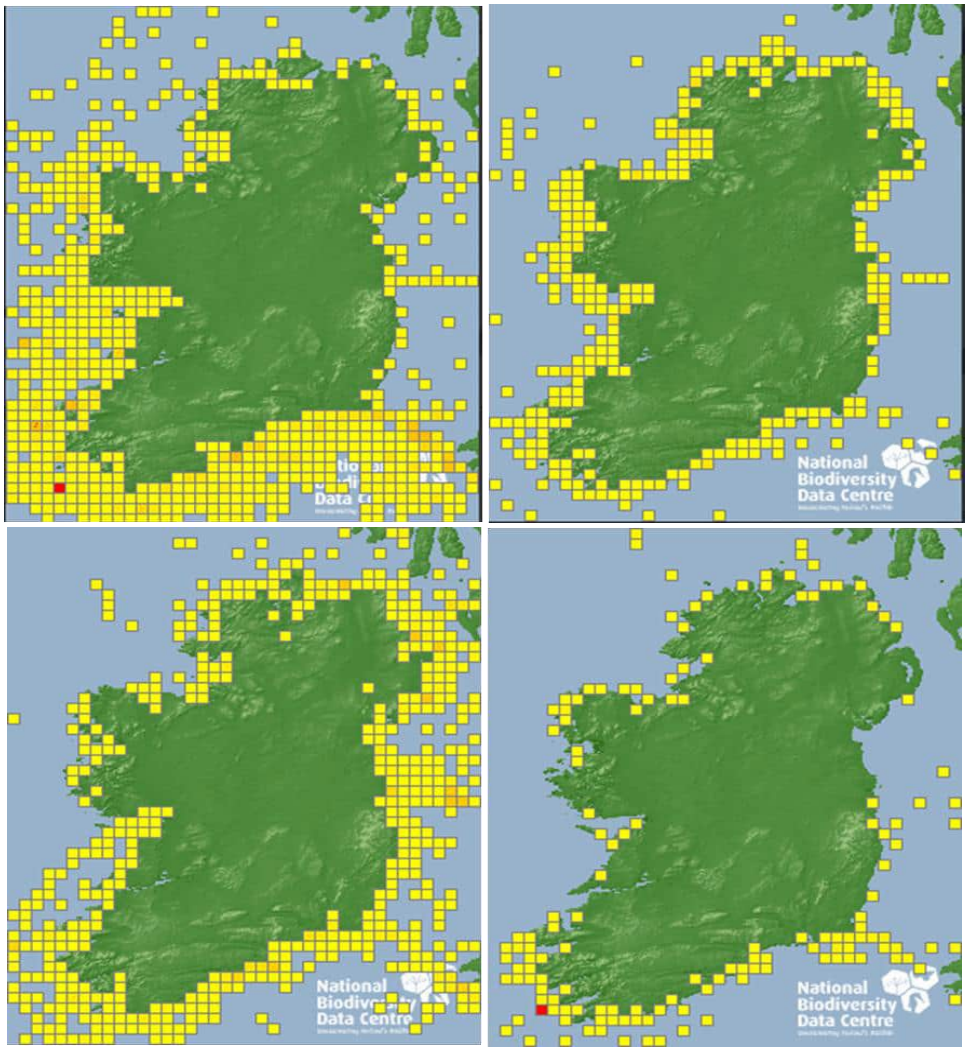


**Figure 4.1. Inshore map of the common dolphin (top left), bottlenose dolphin (top right), harbour porpoise (bottom left) and Risso's dolphin (bottom right). Taken from the IWDG website (Accessed 2024).**

Additional baseline information has been gathered from available sightings database (Sea Watch Foundation) where the most recent sightings are uploaded. The most recent sighting was of a pod of12 bottlenose dolphin off the coast of Dublin in Augus 2021 and four individuals sighted Arklow, Wicklow in May 2019.

## 4.3 Pinnipeds

There are two Annex II pinniped species whose home ranges are close to the proposed geophysical survey area. This means that they are likely to frequent various haul out locations on the east coast of Ireland between Dublin and Wicklow. The two species considered here are grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*). In terms of available literature, the Sea Mammal Research Unit (SMRU) have undertaken a comprehensive aerial survey of both the harbour and grey seals, together comprising the entire coastline of Ireland. The area of interest was surveyed during August 2017.

## 4.4 Harbour Seal

Looking at the east coast of Ireland only, the 2017/18 survey illustrates that harbour seals tend to aggregate at Lambay Island Special Area of Conservation (SAC), with only low numbers (single individuals) reported in two other locations on the east coast of Ireland (Figure 4.2); one to the west of Lambay Island SAC and one on North Bull Island. The counts at the 13 SAC sites remained relatively stable with approximately 50 individuals sighted at Lambay Island SAC.

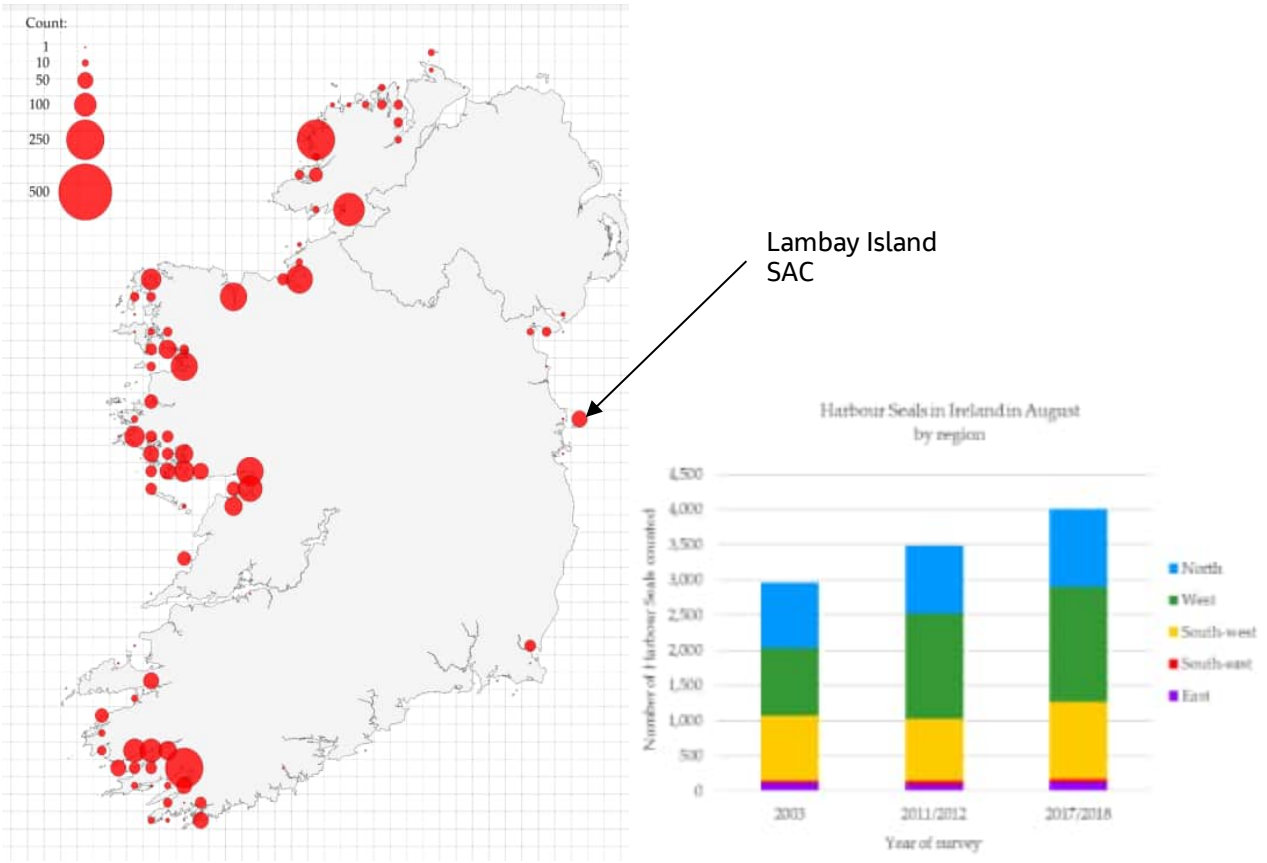


**Figure 4.2. Left: Distribution of harbour seal from aerial survey 2017/18 aggregated by 10 km grid squares. Right: Comparison of the counts for harbour seal from three surveys across the five regions of Ireland (Duck and Morris, 2019).**

The total harbour seal count in 2017/18 was nearly 15% higher than that of 2011/12, equating to an annual average increase of 2.3% over six years (Table 4.1).

**Table 4.2. Counts of harbour seal in east Ireland in 2003, 2011/12 and 2017/18. (Duck and Morris, 2019).**

| | | Harbour Seals | | |
|---|---|---|---|---|
| Region | Area | 2003 | 2011/12 | 2017/18 |
| East | 1 | 89 | 61 | 61 |
| | 2 | 34 | 29 | 70 |
| | 3 | 0 | 0 | 0 |

## 4.5 Grey Seal

Grey seal distribution differs from harbour seal in that large numbers of grey seal are often found on more exposed shorelines, rocky skerries and offshore islands. The distribution of grey seal has expanded across the survey years with 2017/18 indicating an expansion of grey seals around Dalkey Island.

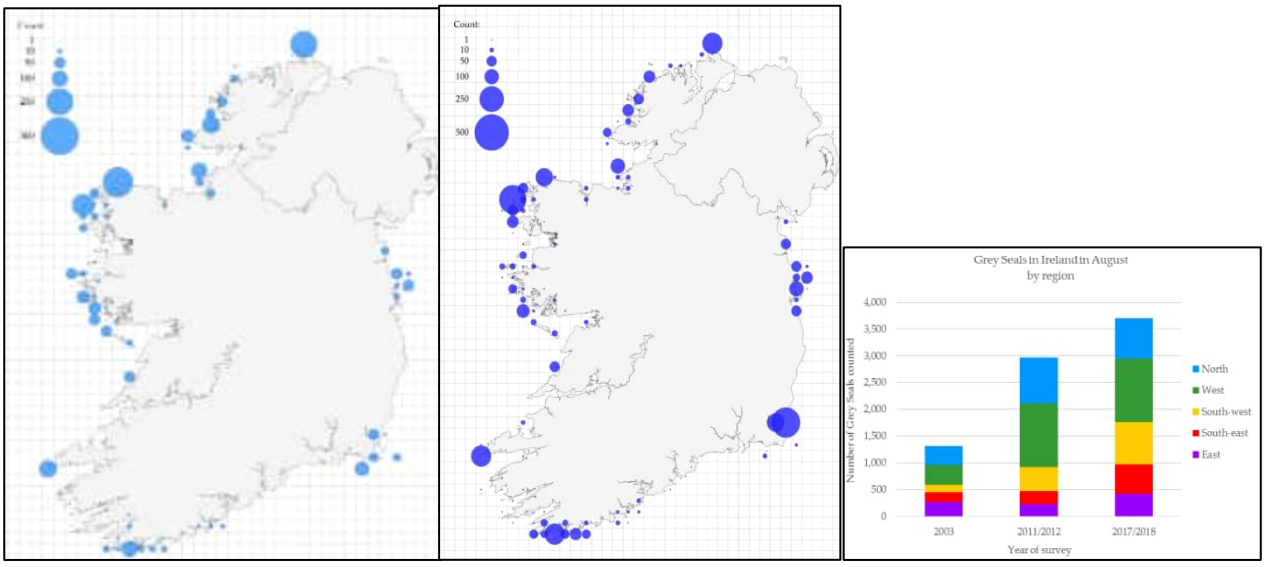


**Figure 4.3. Left: Distribution of grey seal from aerial survey 2011/12 aggregated by 10km squares. Centre: Distribution of grey seal from aerial survey 2017/18 aggregated by 10km grid squares. Right: Comparison of the counts for harbour seal from three surveys across the five regions of Ireland (Duck and Morris, 2019)**

The cumulative grey seal counts during the summer of 2017/18 reached the highest levels documented thus far, surpassing those of 2011/12 by 25%. This translates to an average annual increase of 3.8% over a span of six years, as indicated in Table 4.2. This surge was partially ascribed to elevated counts specifically in the eastern regions of Ireland, where higher numbers of grey seals were observed across all locations.

**Table 4.3. Counts of grey seals in east Ireland in 2003, 2011/12 and 2017/18 (Duck and Morris, 2019)**

| | | Grey Seals | | |
|---|---|---|---|---|
| Region | Area | 2003 | 2011/12 | 2017/18 |
| East | 1 | 39 | 48 | 83 |
| | 2 | 211 | 172 | 335 |
| | 3 | 12 | 3 | 0 |

## 4.6 Summary

In summary, numbers of harbour seal and grey seal have trended upwards across the three surveys that have occurred since 2003 (Duck and Morris, 2019). Whilst the SMRU state that harbour and grey seal frequent different locations in terms of preferred haul out sites, grey seal are the more frequently observed pinniped species along the main coast of eastern Ireland in the main area of concern between Dublin and Wicklow.

Four species of cetacean are likely to frequent the waters in the vicinity of the Scheme, these are: harbour porpoise, common dolphin, bottlenose dolphin and Risso's dolphin. Only the harbour porpoise is offered further protection through its designation under the Rockabill to Dalkey Island SAC.

# 5. Risk Assessment

## 5.1 Bats

There are no SACs designated for bats located within 30km of the Proposed Survey Works. In addition, the habitats present on site are considered to be sub-optimal for bat species due to the area being coastal and lacking in woodland and other vegetation features required for roosting, foraging and commuting. It should also be noted that no structures or trees will be impacted by the proposed works. In addition, none of the boat-based ecological surveys being undertaken as part of this Scheme are unlikely to impact any potential bat roosts that may be present in the vicinity of the proposed works. As such, bats are not considered further in this risk assessment.

## 5.2 Cetaceans

### 5.2.1 Assessment

#### *5.2.1.1 Noise and Vibration – at sea*

On this project, sonar/multibeam are likely to be the options chosen and these best-fit the definition of an impulsive noise type source. Impulsive noise types have been distinguished by Southall, *et al.* (2019) from other noise sources based on their characteristics at the source without taking into account the propagation effects that could later change the characterisation of the sound. Such characterised impulsive noise sources include pile driving and seismic air gun sounds.

Marine mammals are broadly split into three categories: low-frequency cetaceans; high-frequency cetaceans and very high-frequency cetaceans. The working group, Southall *et al.* (2019) reviewed previous criteria given by Southall *et al.* (2007) and NMFS (2018) providing more up to date criteria which should be used going forward.

Cetaceans that are reported from within the project area include those that fall into Group 3: very high frequency cetaceans (according to Southall *et al.* (2019) (**Error! Reference source not found.**) with a g eneralised hearing range of between 13 to 140 kHz (Kastelein *et al.,* 2015), and these are assessed in the risk assessment as the most sensitive and therefore worst case . The subsequent sound levels triggering Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) are defined in **Error! Reference source not found.** f or impulsive sounds. These are expressed both as Sound Exposure Level (SEL) and Sound Pressure Level (SPL) (i.e. Peak sound).

**Table 5.1. Proposed marine mammal hearing groups, applicable auditory weighting functions, genera or species within each group (taken from Southall *et al.* 2019)**

| Marine mammal hearing group | Auditory weighting function | Genera (or species) included | Group-specific appendix |
|---|---|---|---|
| Low-frequency cetaceans | LF | Balaenidae (*Balaena*, Eubalaenidae spp.); Balaenopteridae (*Balaenoptera physalus*, *B. musculus*) | 1 |
| | | Balaenopteridae (*Balaenoptera acutorostrata*, *B. bonaerensis*, *B. borealis*, *B. edeni*, *B. omurai*; *Megaptera novaeangliae*); Neobalenidae (*Caperea*); Eschrichtiidae (*Eschrichtius*) | |
| High-frequency cetaceans | HF | Physeteridae (*Physeter*); Ziphiidae (*Berardius* spp., *Hyperoodon* spp., *Indopacetus*, *Mesoplodon* spp., *Tasmacetus*, *Ziphius*); Delphinidae (*Orcinus*) | 2 |
| | | Delphinidae (*Delphinus*, *Feresa*, *Globicephala* spp., *Grampus*, *Lagenodelphis*, *Lagenorhynchus acutus*, *L. albirostris*, *L. obliquidens*, *L. obscurus*, *Lissodelphis* spp., *Orcaella* spp., *Peponocephala*, *Pseudorca*, *Sotalia* spp., *Sousa* spp., *Stenella* spp., *Steno*, *Tursiops* spp.); Montodontidae (*Delphinapterus*, *Monodon*); Plantanistidae (*Plantanista*) | |
| Very high-frequency cetaceans | VHF | Delphinidae (*Cephalorhynchus* spp.; *Lagenorhynchus cruciger*, *L. australis*); Phocoenidae (*Neophocaena* spp., *Phocoena* spp., *Phocoenoides*); Iniidae (*Inia*); Kogiidae (*Kogia*); Lipotidae (*Lipotes*); Pontoporiidae (*Pontoporia*) | 3 |

**Table 5.2. TTS- and PTS-onset thresholds for marine mammals exposed to impulsive noise: SEL thresholds in dB re 1 µPa$^2$s underwater; and peak SPL thresholds in dB re 1 µPa underwater. Taken from Southall *et al.* (2019).**

| Marine mammal hearing group | TTS onset: SEL (weighted) | TTS onset: Peak SPL (unweighted) | PTS onset: SEL (weighted) | PTS onset: Peak SPL (unweighted) |
|---|---|---|---|---|
| LF | 168 | 213 | 183 | 219 |
| HF | 170 | 224 | 185 | 230 |
| VHF | 140 | 196 | 155 | 202 |

Within the immediate vicinity of the marine bathymetric surveys, Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) could occur to very high and high frequency cetaceans although TTS for these species could occur at distances of up to approximately 250 m. Behavioural disturbance to marine mammals have a greater range, estimated to be around 1 km from the source of sound.

The proposed ecology surveys will be undertaken on a standard *Research Vessel* less than 15 m in length and operated either on a pre-determined transect route (such as those undertaken for the SCANS surveys) or at specific site locations (e.g. benthic grabbing surveys). None of the ecological survey methodologies proposed are considered by the NWPS (2014) to be a 'noisy' activity and therefore will not result in PTS or TTS and unlikely to result in significant avoidance.

#### 5.2.1.1.1 Vessel Strike

Vessel strikes can occur when there is an interference with a marine mammals ability to detect a source of sound. These are known as the Lloyd mirror effect (where the source of sound is duplicated out of phase of the direct soundwave due to the source of sound being reflected off the seabed and sea surface) (Allman *et al.*, 1993) and acoustic shadowing (usually caused by large shipping vessels) (Gerstein *et al.*, 2003). Previous studies have shown that the majority of vessel strikes are most likely to occur if the vessel is large (e.g. container/cargo vessels) (Jensen and Silber, 2003).

The likelihood of vessels colliding with marine mammals depends on the increase in number, the size and how far/fast the vessel/s is/are travelling. The increase in shipping traffic is likely to be small, sporadic in nature and confined to certain times of the year. The vessel type proposed on this Scheme is likely to be a standard *Research Vessel* less than 15 m in length and will operate in sections across the Scheme. It has therefore been assessed that vessel strike is unlikely to occur.

## 5.3 Pinnipeds

As noted in Section 4, both harbour seal and grey seal have been reported as using locations along the east coast of Ireland to haul out for moulting (Duck and Morris, 2019). However, grey seal are the more frequently occurring species within the Licence Areas. Therefore, it is likely that only grey seal will utilise various haul out locations along the east coast of Ireland where the proposed works are taking place however, none of these locations are known breeding sites for this species. The nearest breeding location is Lambay Island SAC which is located approximately 22 km from the most northern part of the Proposed Survey Works.

### 5.3.1 Assessment

#### *5.3.1.1 Noise and Vibration – on land*

The Proposed Survey Work relevant to airborne noise and vibration are boreholes and geophysical and it is known that seals do not hear particularly well in air having greatest sensitivity around 2-20 kHz and a hearing threshold of around 100 dB RMS (unweighted; N.B. note that this is not an official threshold but guideline only).

The ground investigation boreholes will be undertaken using either using an open hole/ auguring rotary percussive/ percussive drilling technique to establish the level of existing rock head. The rock will be cored to a depth sufficient to recover an acceptable quantity of solid core (generally 3 m or more). Usually, cable percussion boreholes are drilled until rock is encountered, and thereafter rotary core drilling is used. For the purpose of this project, sound levels from piling have been used as a proxy to percussive drilling and the sound level in air for piling and shows that unweighted impact piling ranges between 87 and 110 dB re 20 µPa.

Jacobs have undertaken an internal assessment on the worst case (piling) rig should it operate continuously in the day. The modelling shows that at 10m the sound level of a piling rig is 87 dB which drops to 73 dB at 50 m distance.

From reviewing the available literature and undertaking internal assessments by Jacobs acoustic team, likely noise levels at varying distances from the source of sound have been modelled. Assuming worst case (piling on land), it is anticipated that the sound level will dissipate rapidly over distance and the sound will be below the hearing threshold of seals at approximately 10m from the source of sound.

#### *5.3.1.2 Visual Disturbance*

Visual disturbance could result from the Proposed Survey Works. Seals that are hauled out can be sensitive to close approach by humans. Seals have good eyesight and will usually be aware of human presence. There is no defined distance over which a seal can tolerate visual disturbance as it depends on how much human presence they are used to. The sensitivity of seals on haul-out sites can also be site specific and seasonally dependent.

There is general guidance published by wildlife organisations in the United Kingdom such as ZSL (Zoological Society of London) which state it is advisable for the public to remain at least 50m away from hauled out seals so that both seals and members of the public remain protected.

# 6. Mitigation and Summary

## 6.1 On Land

From the data presented, it is anticipated that of the two pinniped species, only the grey seal is likely to haul-out at site locations within the vicinity of the proposed works. Whilst these works are highly unlikely to cause permanent or temporary hearing damage to grey seals, there is the potential to cause behavioural disturbance and temporarily displace grey seals. However, given there are numerous other locations nearby that can be used as alternative haul-out sites. As such no mitigation is proposed.

Whilst no mitigation is proposed for these works, it is advisable for the public to remain at least 50m away from hauled out seals so that both seals and members of the public remain protected.

## 6.2 At Sea

From the data presented, it is anticipated that of the cetaceans likely to be present within the vicinity of the proposed bathymetric works and ecological surveys. The harbour porpoise is not only the most sensitive of all the cetaceans in terms of hearing, but any sighting of this species is likely to also belong to the protected population of the Rockabill to Dalkey SAC.

It is considered that the proposed ecological surveys do not require any mitigation measures to be incorporated whilst the work is being undertaken. However, all boat based survey work would record incidental marine mammal sightings to gather baseline information.

Whilst the bathymetric surveys are highly unlikely to cause permanent or temporary hearing damage to harbour porpoise (and any other cetacean species), there is the potential to cause behavioural disturbance and temporarily displace individuals from the area.

It is proposed that for the bathymetric surveys, no additional mitigation will be required over and above that already stated within the NPWS (2014) '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' document as this requires the following mitigation which should be followed:

# 7. References

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## Legislation

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

European Communities (Birds and Natural Habitats) (Amendment) Regulations of 2013, 2015.

European Communities (Birds and Natural Habitats) (Restrictions of the Use of Poison Bait) Regulations 2010.

European Communities (Birds and Natural Habitats) Regulations 2011.

European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011), as amended.

Wildlife (Amendment) Acts of 2000, 2010 and 2012.

Wildlife Act 1976.

Wildlife Amendment Bill 2016.