REPORT

# European Protected Species (EPS) Risk Assessment

| | |
|---|---|
| Client: | Bellrock Offshore Wind Farm Ltd |
| Reference: | PC3637-RHD-OF-XX-RP-MM-0001 |
| Status: | Final/1 |
| Date: | 26 June 2026 |

Haskoning
Enhancing Society Together

**HASKONING UK LTD.**

74/2 Commercial Quay
Leith
Commercial Street
Edinburgh
EH6 6LX
United Kingdom
Water & Maritime
VAT registration number: 792428892

Phone: +44 131 5550506
Email: info@uk.haskoning.com
Website: haskoning.com

| | |
|---|---|
| Document title: | European Protected Species (EPS) Risk Assessment |
| Subtitle: | |
| Reference: | PC3637-RHD-OF-XX-RP-MM-0001 |
| Your reference | Click or tap here to enter text. |
| Status: | Final/1 |
| Date: | 26 June 2026 |
| Project name: | Bellrock Offshore Transmission Development Area |
| Project number: | PC2483 |
| Author(s): | |
| Drafted by: | [Redacted] |
| Checked by: | [Redacted] |
| Date: | 25/06/2026 |
| Approved by: | [Redacted] |
| Date: | 25/06/2026 |
| Classification: | Project related |

# Table of Contents

## Table of Tables

## Table of Figures



### Glossary of Abbreviations

| Abbreviation | Definition |
|---|---|
| AUD INJ | Auditory Injury |
| BEIS | Business, Energy and Industrial Strategy |
| BNNC | Berwickshire and North Northumberland Coast |
| CES | Coastal East Scotland |
| CGNS | Celtic and Greater North Sea |
| CSP | Coastal Sub-Population |
| EDR | Effective Deterrence Range |
| EIA | Environmental Impact Assessment |
| EPS | European Protected Species |
| FCS | Favourable Conservation Status |
| GNS | Greater North Sea |
| HF | High Frequency |
| IAMMWG | Inter-Agency Marine Mammal Working Group |
| JNCC | Joint Nature Conservation Committee |

| Abbreviation | Definition |
|---|---|
| LF | Low Frequency |
| MBES | Multibeam Echo Sounder |
| MD-LOT | Marine Directorate - Licensing Operations Team |
| MMO | Marine Mammal Observer |
| MU | Management Unit |
| ncMPA | Nature Conservation Marine Protected Area |
| nm | Nautical mile |
| NMFS | National Marine fisheries Service |
| NS | North Sea |
| OfTDA | Offshore Transmission Development Area |
| OWF | Offshore Wind Farm |
| PAM | Passive Acoustic Monitoring |
| PTS | Permanent Threshold Shift |
| RA | Risk Assessment |
| SAC | Special Area of Conservation |
| SBES | Single Beam Echo Sounder |
| SBP | Sub-bottom Profiler |
| SCANS | Small Cetaceans in the European Atlantic and North Sea |
| SCOS | Special Committee on Seal |
| SNH | Scottish Natural Heritage |
| SNS | Southern North Sea |
| SSS | Side Scan Sonar |
| TTS | Temporary Threshold Shift |
| UK | United Kingdom |
| USBL | Ultra-Short Baseline |
| VHF | Very High Frequency |

| Abbreviation | Definition |
|---|---|
| WCA | Wildlife and Countryside Act |

## Executive Summary

Bellrock Offshore Wind Farm Limited are planning to undertake site investigation surveys (geophysical and environmental) for the Bellrock Offshore Transmission Development Area during the period of June to December 2026. Through assessment of the noise profiles of equipment to be used during each of the surveys, it has been determined that the Sub-bottom Profiler is considered worst case for the geophysical survey, and noise from the vessel considered worst case for the environmental surveys.

- Taking into account the proposed mitigation and assessments based on Sub-bottom Profiler as a worst-case, there is no risk of auditory injury to cetaceans.
- Taking into account the potential for temporary disturbance due to the intermittent use of the survey equipment for the geophysical survey, and assessments based on Sub-bottom Profiler as a worst-case, including cumulative effects on cetaceans, there is no risk of significant disturbance that could affect the cetacean populations or their Favourable Conservation Status.
- There are also no predicted significant effects on designated sites where harbour porpoise or bottlenose dolphin are qualifying features.
- Due to the slow vessel speeds associated with these site investigation surveys, there is no potential for significant risk of injury to marine mammals. Mitigation will be in place to reduce the potential for collision risk.

**Therefore, it is considered that a Marine European Protected Species Licence to disturb is required and the criteria are met. There is no requirement for a Marine European Protected Species Licence for injury.**

# 1 Introduction

This European Protected Species (EPS) Stage 1 Risk Assessment (RA) has been undertaken to support the Marine EPS Licence application submitted to the Marine Directorate - Licensing Operations Team (MD-LOT) regarding site investigation surveys (geophysical and environmental surveys) being undertaken for the Bellrock Offshore Transmission Development Area (OfTDA).

The purpose of this RA is to determine whether there is potential for the proposed site investigation surveys to cause deliberate harm or inadvertently cause disturbance to cetaceans or other protected species and if mitigation would be required for survey activities. The need for a Marine EPS Licence will be determined by MD-LOT, with advice from MD-Science, Evidence, Digital, Data and NatureScot, based on findings from this EPS RA. MD-LOT's consideration of whether an EPS Licence is required will comprise of three tests:

1. To ascertain whether the licence is to be granted for one of the purposes specified in Regulation 44 of the Conservation (Natural Habitats, &c.) Regulations 1994 (inshore waters), and the equivalent provisions under Part 3 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 (offshore waters);
2. To ascertain whether there are no satisfactory alternatives to the activity proposed (that would avoid the risk of offence); and
3. That the licencing of the activity will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status (FCS)[1].

## 1.1 EPS Protection

All species of cetacean (whale, dolphin, and porpoise) and otters occurring in United Kingdom (UK) waters are listed in Annex IV of the Habitats Directive as EPS. This means that they are species of community interest in need of strict protection, as directed by Article 12 of the Habitats Directive.

This protection is afforded in Scottish territorial waters (out to 12 nautical miles (nm)) under the Conservation(Natural Habitats, &c.) Regulations 1994 (as amended), Regulation 39(1); equivalent protection is afforded in offshore waters (beyond 12 nm) under the Conservation of Offshore Marine Habitats and Species Regulations 2017. Both make it an offence to:

- Deliberately or recklessly capture, injure or kill a wild animal of an EPS;
- Deliberately or recklessly:
    - Harass a wild animal or group of wild animals of an EPS;

[1] The Habitats Directive defined the conservation status of a species to be taken as 'favourable' when population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, when the natural range of the species is not being reduced for the foreseeable future, and there is a sufficiently large habitat to maintain its populations on a long-term basis.

- Disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;
- Disturb such an animal while it is rearing or otherwise caring for its young;
- Obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;
- Disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- Disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed, or reproduce, or rear or otherwise care for its young; or
- Disturb such an animal while it is migrating or hibernating.

Further protection is afforded through an additional disturbance offence given under Regulation 39(2) which states that "it is an offence to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean)".

Outside of 12 nm, the extent of legislative protection against injury is the same as within 12 nm. However, the definition of disturbance outside of 12 nm does not extend to individual animals. Therefore, whilst disturbance of a single animal within 12 nm may be considered an offence and thus requires an EPS licence, this is not required outside of 12 nm where there must be disturbance of a significant group of animals.

### 1.1.1 What constitutes disturbance?

#### 1.1.1.1 Within 12 nautical miles

Whether or not a specific activity could cause 'disturbance' depends on the nature of the particular activity and the impact on the particular species. Whilst 'disturbance' is not defined in the Conservation (Natural Habitats, &c.) Regulations 1994, Marine Scotland (2020) advise that the following matters should be taken into account when considering what constitutes disturbance:

- 'Disturbance' in Article 12(1)(b) should be interpreted in light of the purpose of the Habitats Directive to which this Article contributes. In particular, Article 2(2) of the Habitat Directive provides that measures taken pursuant to the Habitats Directive must be designed to maintain or restore protected species at FCS;
- Article 12(1)(b) affords protection specifically to species and not to habitats;
- The prohibition relates to the protection of 'species' not 'specimens of species';
- Although the word 'significant' is omitted from Article 12(1)(b) in relation to the nature of thedisturbance, that cannot preclude an assessment of the nature and extent of the negative impact and ultimately a judgement as to whether there is sufficient evidence to constitute prohibited 'disturbance' of the species;

- It is implicit that activity during the period of breeding, rearing, hibernation and migration is more likely to have a sufficient negative impact on the species and constitute prohibited 'disturbance' than activity at other times of the year;
- Article 12(1)(b) is transposed into domestic legislation by Regulation 39(1) and (2) of the Conservation(Natural Habitats, &c.) Regulations 1994. Therefore, when considering what constitutes 'disturbance', thought should be given to Regulation 39(1)(b) which provides a number of specific circumstances where an EPS could be disturbed, and which can potentially have an impact on the status of the species; and
- Disturbance that could be considered an offence may occur in other circumstances and therefore be covered under Regulation 39(2) of the Conservation(Natural Habitats, &c.) Regulations 1994 which state that it is an offence to 'deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean)'.

Marine Scotland (2020) advise that while the likelihood of acute injury can be relatively easy to determine, auditory injury accumulated over a period of time and disturbance are not so straightforward so assessments will need to be based on a number of factors including:

- The spatial and temporal distribution of the animal in relation to the activity;
- The duration of the activity;
- Any behaviour learned from prior experience with the activity;
- Similarity of the activity to biologically important signals (particularly important in relation to activities creating sound); and
- The motivation for the animal to remain within the areas (e.g., food availability).

As noise can cause disturbance to cetaceans, any application for an EPS licence will require detailed information on the source level of the sound and its frequency. Where there is the possibility for disturbance to any individual EPS occur, an EPS RA must be carried out and the need for a Marine EPS Licence determined.

#### 1.1.1.2 Outside of 12 nautical miles

As Regulation 39(2) is not applicable to offshore waters, disturbance of an individual animal would not necessarily qualify as significant disturbance requiring a Marine EPS Licence. Instead, under the Conservation of Offshore Marine Habitats and Species Regulations 2017, disturbance must occur to a sufficiently large or important group of animals that the ability of that group of animals to survive, breed or rear or nurture their young would be compromised. Alternatively, disturbance could be also considered to occur if the local distribution or abundance of the species was significantly changed.

## 1.2 Site Investigation Survey Works

Site investigation surveys in the Bellrock OfTDA are required to be undertaken to inform early project design work, to enable the development team to make responsible project design decisions

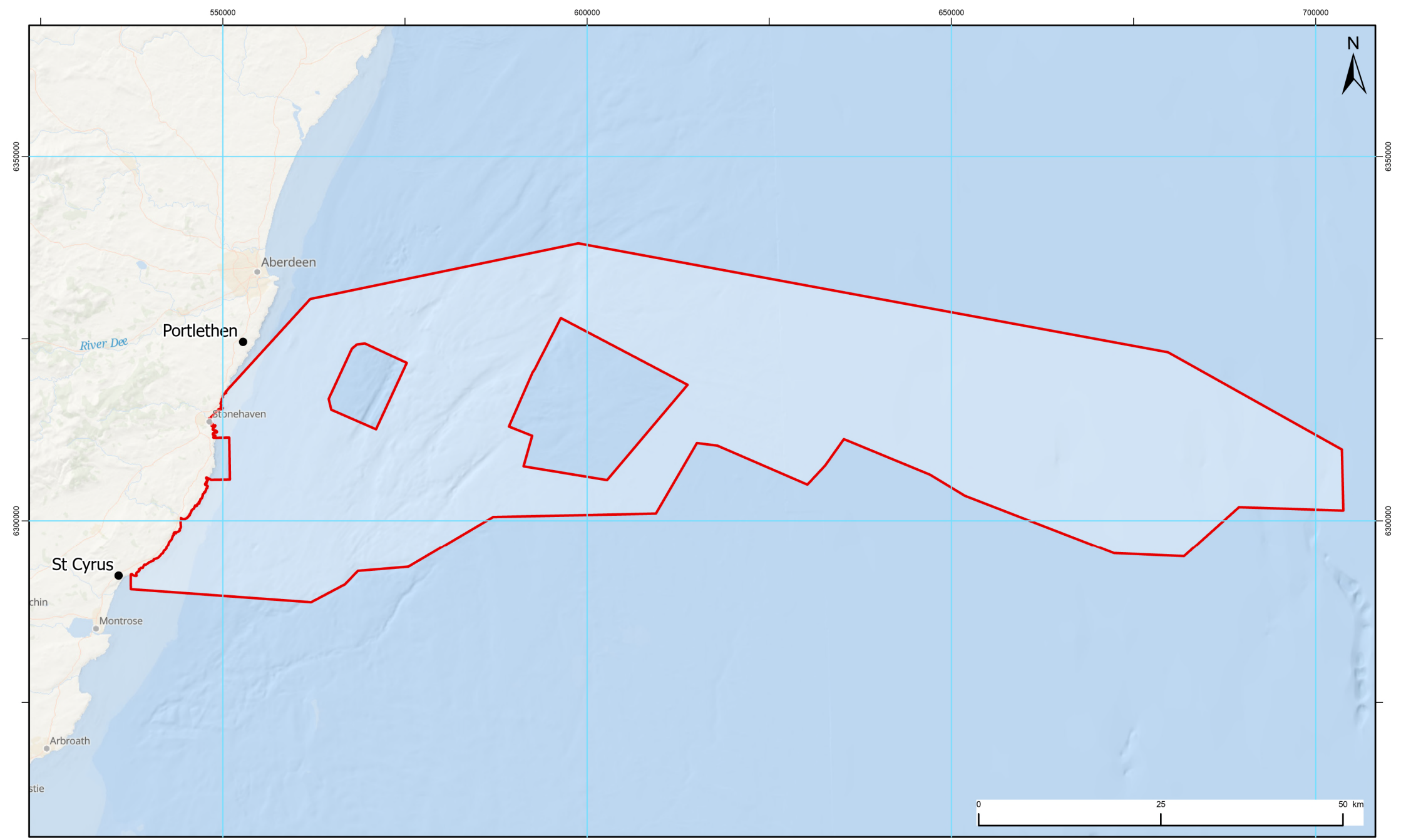
to inform the ongoing technical design and delivery plans and to feed into the baseline information requirements of the Bellrock OfTDA Environmental Impact Assessment (EIA).

To allow the submission of the EPS Licence application in sufficient time to allow determination prior to the programmed start of the surveys, a wide OfTDA Area of Search (the Bellrock OfTDA Area of Search) has been identified. However, the surveys will only take place within a 150 km by 3.0 km survey area within the Bellrock OfTDA Area of Search (maximum 450 $km^2$).

The proposed surveys will be undertaken within the Bellrock OfTDA Area of Search (**Figure 1-1** and **Table 1-1**).

*Table 1-1 Proposed Survey Area*

| Propose Survey Area | Area ($km^2$) |
|---|---|
| Bellrock OfTDA Area of Search | 4,132 |
| Maximum actual survey area within the Bellrock OfTDA Area of Search | 450 |




Haskoning
Enhancing Society Together
Bellrock


Legend:
Bellrock OfTDA Area of Search

| REV | DATE | STATUS | DRW | CHK | APR |
|---|---|---|---|---|---|
| 1 | 24/04/2026 | Final | [R | [ | [ |

Coordinate System: WGS 1984 UTM Zone 30N

Source:
Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, OceanWise, Esri, GEBCO, Garmin, NaturalVue, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, © Haskoning UK Ltd, 2026.

Scale @ A4
1:650,000

Figure Title:
**Bellrock Offshore Transmission Development Area (OfTDA) Area of Search**

Project:
Bellrock Offshore Transmission Development Area (OfTDA)

Report:
European Protected Species Risk Assessment

Drawing No.: PC3637-RHD-OF-ZZ-DR-GS-0070

**Figure 1-1**

### 1.2.1 Survey vessels

The proposed site investigations at Bellrock OfTDA Area of Search will require multiple vessels over the survey area:

- One geophysical survey vessel:
- Up to four unmanned surface vessels (USV) carrying geophysical survey equipment;
- One support vessel; and
- Up to two vessels carrying out environmental surveying.

In total there will be a maximum of one vessel and four USVs that could be operating geophysical equipment at the same time. The support vessel and two environmental survey vessels will operate ultra-short baseline (USBL) positioning systems during survey activities. In total there will be up to four vessels (excluding USVs (see **Section 3.3**)) on site at any one time.

As a worst-case scenario, eight vessels/USVs will be assessed operating geophysical equipment, three vessels/USVs will be assessed for the nearshore coastal area (up to 5 km from the coast). For disturbance associated with vessel activity, up to four vessels will be assessed, with a maximum of three vessels applied to the nearshore coastal area.

### 1.2.2 Schedule and duration

The proposed surveys are estimated to take 85 days in total with approximately 60 days for the geophysical survey and 25 days for the environmental survey; this is scheduled to be conducted in a window between 15 June 2026 to 31 December 2026.

## 1.3 Types of Survey Equipment

The site investigation surveys will involve different types of survey equipment, summarised in **Table 1-2**.

*Table 1-2 Types of Survey Equipment*

| Type of survey equipment | Description |
|---|---|
| Sub-Bottom Profilers (SBP) (sparkers and boomers) | SBP systems are used to identify and characterise layers of sediment or rock under the seafloor. A transducer emits a sound pulse vertically downwards towards the seafloor, and a receiver records the return of the pulse once it has been reflected off the seafloor. |
| Multibeam Echo Sounder (MBES) | MBES are used to obtain detailed maps of the seafloor which show water depths. They measure water depth by recording the two-way travel time of a high frequency pulse emitted by a transducer. The beams produce a fanned arc composed of individual beams (also known as a swathe). MBES can, typically, carry out 200 or more simultaneous measurements. |
| Single Beam Echo Sounder (SBES) | Like MBES, SBES determine water depth by measuring the travel time of a short sonar pulse. Unlike the MBES, which produces a fanned arc of a number of individual beams, the SBES emits a single wide beam. |

| Type of survey equipment | Description |
|---|---|
| Ultra-Short Baseline (USBL) system | USBL systems are used to determine the position of subsea survey items, including Remotely Operated Vehicles, towed sensors, etc. This involves the emission of sound from a hull-mounted transducer to a subsea transponder, thereby introducing sound into the marine environment. A complete USBL system consists of a small transducer array, which is mounted under a ship, and a transponder attached to the subsea unit. An acoustic pulse is transmitted by the transducer, travels through the water and is detected by the shipboard transducer on an onboard computer calculates the time from the transmission of the initial acoustic pulse until the reply is detected and is measures by the USBL system. This is converted into a range and bearing, and thus the position of the subsea unit / sampling equipment is determined. These systems can either be used continuously or intermittently through the operation they are supporting. |
| Side Scan Sonar (SSS) | SSS is used to generate an accurate image of the seabed. An acoustic beam is used to obtain an accurate image of a narrow area of seabed to either side of the instrument by measuring the amplitude of back- scattered return signals. The instrument can either be towed behind a ship at a specified depth or mounted to a Remotely Operated Vehicle. The higher frequency systems provide higher resolution, but shorter-range measurements. |
| Magnetometer | A magnetometer is used to measure variations in the Earth's magnetic field. In marine surveys, magnetometers are typically deployed to detect and map ferrous objects on or beneath the seabed and to support site characterisation and engineering design. Magnetometers are passive instruments and do not emit sound or electromagnetic energy during operation. |

**Table 1-3** outlines the frequency ranges and sound levels for the survey equipment required for the surveys. It can be concluded from the sound levels provided in **Table 1-3**, equipment used during the geophysical surveys are sufficient to cause injury and disturbance to EPS that have the potential to be present in the Bellrock OfTDA survey area during the survey period. SBP has been used as a worst-case for this EPS RA, based on the frequency range and sound levels (**Table 1-3**). The frequency range for the SBP (sparker) and USBL are within cetacean hearing range (of less than 100kHz, as noted in the Joint Nature Conservation Committee (JNCC) 2017; *Guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys*[2]).

There is also the requirement for MBES and SSS to be used for the geophysical survey. However, with frequencies of above 100 kHz (**Table 1-3**), the frequencies are out of audible range for cetaceans.

[2] https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/jncc-guidelines-seismicsurvey-aug2017-web.pdf

*Table 1-3 Survey Equipment Frequency Ranges and Sound Levels*

| Equipment | Frequency range | Sound Level | Reference |
|---|---|---|---|
| SBP / parametric pinger | Primary = 85 – 115 kHz | RMS source level: 232 dB re 1uPa@1m | Hartley Anderson Ltd. (2020) |
| SBP (Single Channel Sparker) | 1,250 Hz – 4 kHz | SPL: 226dB re 1µPa at 1m | AAE Duraspark 400 (2026) |
| SBP (Single Channel Boomer) | 100 Hz – 5 kHz | RMS source level 205 dB re 1 µPa m<br>Peak 211 dB re 1 µPa m | Hartley Anderson Ltd. (2020) |
| SBES | 200 kHz | SPL: 221.6dB re 1µPa at 1 m | Kongsberg (2022) |
| MBES | 100 to 800 kHz | SPL: 198dB re 1µPa at 1 m | |
| SSS | 230 – 850 kHz (low)<br>300 – 900 kHz (high) | SPL: 220 – 230dB re 1uPa @ 1m (Peak) | Hartley Anderson Ltd (2020); Irish Whale and Dolphin Group (2007) |
| USBL system | 19 – 34 kHz | SPL: 192dB re 1µPa @ 1m | Applied Acoustics (2020) |
| Magnetometer | N/A | N/A - do not emit noise | N/A |

## 1.4 Vessel Noise

In addition to the above survey equipment, the sound level and frequency for vessel noise is given in **Table 1-4**.

*Table 1-4 Vessel Noise*

| Type | Frequency range | Sound Level |
|---|---|---|
| Vessel noise | 0.05 - 0.30 kHz | 160 – 175 dB re 1µPa @ 1m |

# 2 Protected Species

## 2.1 Cetacean Species (EPS)

A review of the Small Cetaceans in the European Atlantic and North Sea (SCANS)-IV survey block NS-D (Gilles *et al.*, 2023) and the data review by Waggitt *et al.* (2019) indicates that cetacean species that could be present in or around the survey area are:

- Harbour porpoise (*Phocoena phocoena*);
- Bottlenose dolphin (*Tursiops truncatus*);
- White-beaked dolphin (*Lagenorhynchus albirostris*);
- Common dolphin (*Delphinus delphis*);
- Minke whale (*Balaenoptera acutorostrata*) and

- Fin Whale (*Balaenoptera physalus*).

Atlantic white-sided dolphin (*Lagenorhynchus acutus)*, Risso's dolphin (*Grampus griseus*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*) and long-finned pilot whale (*Globicephala melas*) have the potential to be present within the area as occasional visitors but have been not been considered for further quantitative assessment as they are likely to be in lower numbers and considered to be rare or infrequent visitors than the key species listed above.

Both bottlenose dolphin and harbour porpoise are listed on Annex II of the Habitats Directive which lists species whose conservation requires the designation of Special Areas of Conservation (SACs).

Management Units (MUs) provide an indication of the spatial scales at which any impact should be assessed for cetacean species (Inter-Agency Marine Mammal Working Group (IAMMWG), 2023). MUs, and the latest population estimate for each marine mammal species, have been determined based on the most relevant information, and scale at which potential impacts could occur.

For harbour porpoise, the relevant MU is the North Sea (NS) MU (**Figure 2-1**; IAMMWG, 2023). For white-beaked dolphin, common dolphin, and minke whale, there is just one MU that covers the Celtic and Greater North Seas (CGNS) MU (**Figure 2-1**; IAMMWG, 2023). There are no defined MUs in IAMMWG (2023) for fin whale, therefore, the MU is based on the North Atlantic MU (North Atlantic Marine Mammal Commission, 2022).

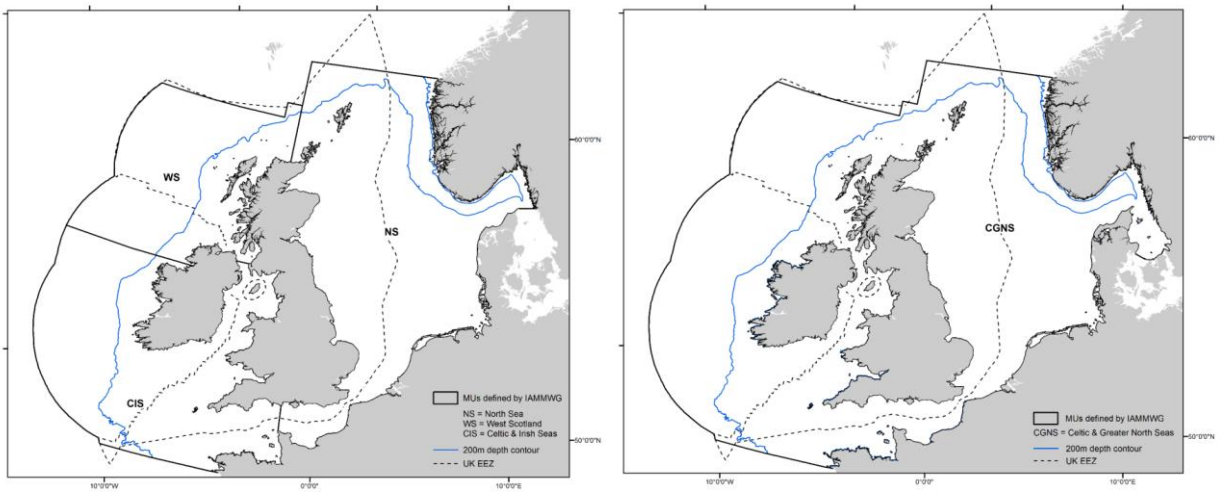



*Figure 2-1 The MUs for harbour porpoise (left) and white-beaked dolphin, common dolphin and minke whale (right) (IAMMWG, 2023)*

For bottlenose dolphin, there are seven MUs within the north-east Atlantic (**Figure 2-2**; IAMMWG, 2023). The MUs relevant to this assessment are the Greater North Sea (GNS) MU and the Coastal East Scotland (CES) MU. Within the Bellrock OfTDA survey area, any bottlenose dolphin recorded could plausibly originate from the GNS MU, reflecting the offshore extent of the survey area (extending up to approximately 150 km from the coast at its furthest point), or from the CES MU,

given that parts of the survey area overlap coastal waters. On this basis, both reference populations have been considered within the EPS RA.

In addition, to better reflect the spatial distribution and habitat use of the CES MU, the assessment also considers a coastal sub-population (CSP), representing individuals most likely to occur in nearshore waters potentially affected by the proposed activities. Based on Cheney *et al.* (2024), of the estimated maximum of 245 individuals within the CES MU, 127 individuals (approximately 52%) are considered to occur south of the Moray Firth SAC. Inclusion of this CSP provides a precautionary and spatially realistic assessment of potential injury risk, while retaining consideration of the CES MU as a whole in the assessment of FCS (**Section 3**).

.

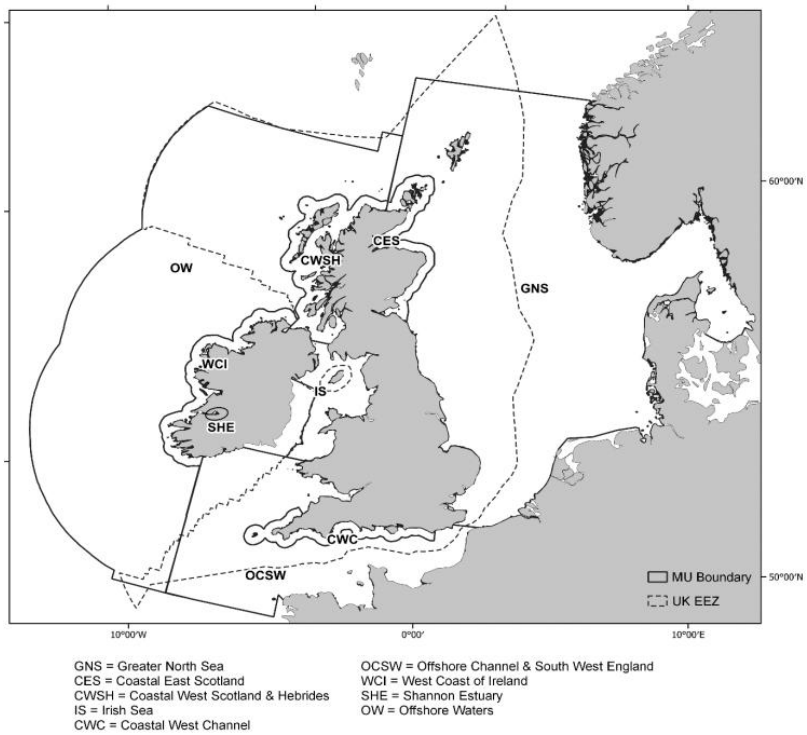



*Figure 2-2 The MUs for bottlenose dolphin (IAMMWG, 2023)*

### 2.1.1 Summary of Cetacean Species

**Table 2-1** summarises the cetacean species, density estimates, and reference populations used in this EPS RA. Density estimates are based on the highest for the area, from either SCANS-IV survey block NS-D (Gilles *et al*., 2023), SCANS-III survey block R (Hammond *et al.,* 2021) or the highest density across Bellrock OfTDA survey area, based on Waggitt *et al*. (2019). For bottlenose dolphins, a density of 0.2 animals km² has been applied for a maximum of three vessels operating within 5 km of the coast, as requested by NatureScot (2026). This density is derived by dividing the estimated 118 individuals (representing 52.5% of the 226 animals within the CES MU) by the area

between Peterhead and the Farne Islands, assuming a uniform distribution within the 2 to 20 m depth contour (Quick *et al*., 2014).

Assessments have not been undertaken for other cetacean species that are considered to be rare or infrequent in the area, as the potential for these cetacean species to be impacted is considered unlikely. However, if other cetacean species (EPS) were present in the area, such as killer whale or humpback whale, then the mitigation measures for the species in **Section 5** will be suitable, as the assessments are based on the representative functional hearing groups for all cetaceans.

*Table 2-1 Cetacean Species, Density Estimates and Reference Populations, with the Worst-Case Density in Bold*

| Species | Density Estimate | Reference Population |
|---|---|---|
| Harbour porpoise | **0.599/km$^2$ (SCANS-IV survey block NS-D; Gilles *et al.*, 2023)**<br>0.328/km$^2$ (Waggitt *et al*., 2019) | NS MU = 346,601<br>**NS MU UK portion = 159,632**<br>(IAMMWG, 2023) |
| Bottlenose dolphin** | **0.0298km$^2$ (SCANS-III survey block R; Hammond *et al*., 2021)**<br>**0.2/km$^2$ (Quick *et al*., 2014, NatureScot, 2026)**<br>0.002/km$^2$ (Waggitt *et al*., 2019) | GNS MU = 2,022<br>**GNS MU UK portion = 1,885**<br>(IAMMWG, 2023)<br>**CES MU = 226** (Cheney *et al*., 2024)<br>**CSP 172** (Cheney *et al*., 2024) |
| White-beaked dolphin | **0.243/km$^2$ (SCANS-III survey block R; Hammond *et al*., 2021)** | CGNS MU = 43,951<br>**CGNS MU UK portion = 34,025**<br>(IAMMWG, 2023) |
| Common dolphin*** | **0.026/km$^2$ (annual density across survey Block NS-D; Waggitt et al., 2019)** | CGNS MU = 102,656<br>**CGNS MU UK portion = 57,417**<br>(IAMMWG, 2023) |
| Fin whale | **0.0009 (SCANS-IV survey block NS-D; Gilles *et al.*, 2023)**<br>0.00002/km$^2$ (Waggitt *et al*., 2019) | **Combined region (North Sea, Barents Sea, Greenland Sea, Ireland, European Atlantic water = 24,932** (Leonard and Oien, 2020; Rogan *et al.*, 2018; Gilles *et al.*, 2023) |
| Minke whale | **0.0419/km$^2$ (SCANS-IV survey block NS-D; Gilles *et al.*, 2023)**<br>0.0074/km$^2$ (Waggitt *et al*., 2019) | CGNS MU = 20,118<br>**CGNS MU UK portion = 10,288**<br>(IAMMWG, 2023) |

***No animals recorded within the SCANS-IV survey, therefore, SCANS-III used*

****No animals recorded within any SCANS surveys, therefore, Waggitt et al., (2019) data used*

## 2.2 Otter (EPS)

Coastal populations of European otter (*Lutra lutra*) use shallow near-shore waters for feeding but are still dependent on freshwater for bathing and resting. When in coastal waters, otters can be seen foraging within very close proximity of the shoreline (less than 100 m).

Within north-east Scotland, most coastal records of otter are concentrated at the mouths of rivers (e.g. Dee, Don, Ythan and Spey), with areas of coast with no rivers or adjacent lochs being unsuitable (NESBReC, 2017). The Mammal Atlas of Scotland (NESBReC, 2017) indicates limited presence of otter along the coastline included within the Bellrock OfTDA Area of Search (as shown on **Figure 1-1**).

There are no designated sites for otter in the vicinity of the Bellrock OfTDA Area of Search.

Based on the limited range of otter within marine environments in Scotland (i.e. 100 m of the coastline), and the lack of suitable waterways close to the survey area, it is expected that there would be limited otter presence with the OfTDA Area of Search, and therefore otter are not considered further. It should also be noted that the presence of survey vessels within 100 m of the coastline would also be limited.

## 2.3 Other Protected Species

### 2.3.1 Basking Shark

Basking shark (*Cetorhinus maximus*) are listed on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981. The WCA was enacted in the UK to implement the Birds Directive and Bern Convention and applies to the terrestrial environment and inshore waters (up to 12 nm from land). Basking sharks are protected under Schedule 5 of the WCA which means it is an offence to: intentionally or recklessly kill, injure, take, or intentionally or recklessly disturb or harass basking sharks.

This protection was enhanced further by the Nature Conservation (Scotland) Act 2004. Under Schedule 6 of this legislation; it is an offence to deliberately or recklessly capture, kill, or disturb basking sharks. Furthermore, the Wildlife and Natural Environment (Scotland) Act 2011 added a new licensing purpose to the 1981 Act, at section 16(3) (i): 'for any other social, economic or environmental purpose' for certain protected species including basking shark.

Therefore, if an activity proposed to be undertaken within Scottish inshore waters (12 nm) is judged likely to cause to disturbance or injury to basking sharks a licence must be obtained from the Marine Directorate to undertake the activity legally subject to licence conditions being complied with.

The Bellrock OfTDA survey area is located in inshore and offshore waters. Taking into account the hearing range of elasmobranchs, the frequency and sound levels of the survey equipment and that the activities will be intermittent and localised, noise disturbance is not expected to impact basking sharks. On this basis, the potential for noise during the surveys to injure or disturb basking shark is unlikely and has not been further assessed.

Vessel collision can pose a threat to slow-moving species such as basking sharks, with collision risk increasing with increased vessel speed. However, as the survey vessels will be moving slowly, collision risk will be low. Any collision risk would be reduced by the proposed best practice measures to reduce vessel collision risk and the Scottish Marine Wildlife Watching Code (Scottish Natural Heritage (SNH), 2017), as outlined in **Section 5**. Therefore, the potential impacts on basking shark have not been assessed further.

### 2.3.2 Pinnipeds

Harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) are common throughout UK waters. Although both species are Annex II species, they are not listed on Annex IV of the Habitats Directive, and as such are not classified as EPS. Seals are protected in the UK under the Conservation of Seals Act 1970. Both species are listed under Annex II of the Habitats Directive and are considered Scottish Priority Marine Features. The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 introduced additional protection for seals at 194 designated haul-out sites, where harbour seal and grey seal come ashore to rest, moult or breed.

As harbour and grey seal are not classified as EPS they have not been assessed in this EPS Stage 1 RA (**Section 3**). However, potential effects on designated and protected sites where harbour and/or grey seal are a qualifying feature are assessed in **Section 4**.

## 2.4 Protected Sites

Potential effects of the proposed surveys on designated sites are assessed in **Section 4**.

### 2.4.1 Special Areas of Conservation (SACs)

#### 2.4.1.1 Southern North Sea SAC

The Southern North Sea (SNS) SAC is specifically designated for harbour porpoise. The SNS SAC is split into areas that have been modelled to have high densities of harbour porpoise within either summer or winter periods (Heinanen and Skov, 2015).

The Bellrock OfTDA is located approximately 150 km at the closest point to the SNS SAC summer area and approximately 300 km from the SNS SAC winter area. The SNS SAC is beyond that of potential for direct, alone or in-combination effects, and mitigation would be in place to reduce any risk of potential injury (permanent threshold shift (PTS)). Therefore, the SNS SAC has been screened out of further consideration.

#### 2.4.1.2 Berwickshire and North Northumberland Coast SAC

The Berwickshire and North Northumberland Coast (BNNC) SAC is designated for grey seal, supporting around 2.5% of the UK's annual grey seal pup production (JNCC, 2015a, Natural England 2018).

The BNNC SAC is located in the Northeast England MU and East Scotland MU. The Northeast England and East Scotland MU have grey seal counts of 21,396 and 6,298 respectively, based on the most recent August counts for 2025 (Special Committee on Seals (SCOS), 2025). The BNNC population estimate for grey seal was 16,903 in August 2020 (SCOS, 2025).

The BNNC SAC is approximately 90 km south of Bellrock OfTDA survey area, which is beyond the distance predicted for direct, alone or in-combination effects from the proposed surveys, and mitigation would be in place to reduce any risk of potential injury (PTS). Therefore, the BNNC SAC has been screened out of further consideration.

#### 2.4.1.3 Isle of May SAC

The Isle of May SAC is designated for grey seal. The site supports the largest grey seal breeding colony on the east coast of Scotland and the fourth-largest in the UK, contributing approximately 4.5% of annual UK pup production (JNCC, 2015b; NatureScot, 2024).

The Isle of May SAC is located at the entrance to the Firth of Forth on the east coast of Scotland. The East Scotland MU have grey seal counts of 6,298 based on the most recent August counts for 2025 (SCOS, 2025). The Isle of May SAC population estimate for grey seal was 386 in August 2020 (SCOS, 2025).

The Isle of May SAC is approximately 65 km south of Bellrock OfTDA survey area, which is beyond that of potential for direct, alone or in-combination effects, and mitigation would be in place to reduce any risk of potential injury (PTS). Therefore, the Isle of May SAC has been screened out of further consideration.

#### 2.4.1.4 The Moray Firth SAC

The Moray Firth SAC in north-east Scotland supports the only known resident population of bottlenose dolphin in the North Sea (NatureScot, 2021). The Moray Firth is approximately 150 km (at-sea distance, as straight-line distance crosses land) northwest from the Bellrock OfTDA survey area at its closest point. Individuals are present all year round within the Moray Firth SAC, with over 50% of the east coast population utilising the area (Arso Civil *et al*., 2019). The population generally maintain a coastal distribution which extends south to the Firth of Forth (Hague *et al*., 2020).

The Moray Firth SAC Conservation Objectives for bottlenose dolphin (NatureScot, 2021) are:

- To ensure that the qualifying features of Moray Firth SAC are in favourable condition and make an appropriate contribution to achieving FCS; and
- To ensure that the integrity of Moray Firth SAC is maintained or restored in the context of environmental changes by meeting the following objectives for each qualifying feature:
    - The population of bottlenose dolphin is a viable component of the site;
    - The distribution of bottlenose dolphin throughout the site is maintained by avoiding significant disturbance; and
    - The supporting habitats and processes relevant to bottlenose dolphin and the availability of prey for bottlenose dolphin are maintained.

Bottlenose dolphin within the Moray Firth SAC are in favourable (maintained) condition (NatureScot, 2021). The earlier Habitats Directive assessment classified the conservation status of bottlenose dolphins in UK waters as ‘unknown’ (JNCC, 2019). However, the most recent Habitats Regulations reporting cycle (2019–2024), published in 2026, assesses the species at a management-unit level rather than providing a single UK-wide status, with conservation status varying by region and some parameters remaining uncertain despite improved evidence (JNCC *et al.,* 2026)

The population estimate for the Moray Firth SAC is CES MU of 226 individuals (Coefficient of Variation (CV) = 0.02; 95% Confidence Interval (CI) = 214-239) (Cheney *et al.*, 2024).

#### 2.4.1.5 Firth of Tay and Eden Estuary SAC

The Firth of Tay and Eden Estuary SAC supports a nationally important breeding colony of harbour seal, which form part of Scotland's east coast population of seals that typically utilise sandbanks (JNCC, 2023). The site is approximately 42 km (at-sea distance, as straight-line distance crosses land) from Bellrock OfTDA survey area and is a protected seal haul-out site.

Tagging studies of harbour seal within UK waters have been undertaken since 2001, with a total of 420 individuals tracked within Scottish waters. These studies indicate there is potential connectivity with the Bellrock OfTDA survey area and the Firth of Tay and Eden Estuary SAC, with individuals travelling from the SAC to the Firth of Forth (Hague *et al*., 2020). Therefore, as a precautionary approach the potential effects on harbour seal from the Firth of Tay and Eden Estuary SAC have been assessed in **Section 4**.

The Firth of Tay and Eden Estuary SAC Conservation Objectives for harbour seal (NatureScot, 2023a) are:

- To avoid deterioration of the habitats of harbour seal or significant disturbance to harbour seal, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to achieving FCS for harbour seal; and
- To ensure for the harbour seal that the following are maintained in the long term:
    - Population of harbour seal as a viable component of the site;
    - Distribution of harbour seal within site;
    - Distribution and extent of habitats supporting harbour seal;
    - Structure, function and supporting processes of habitats supporting harbour seal; and
    - No significant disturbance of harbour seal.

The Firth of Tay and Eden Estuary SAC is located in the East Scotland MU, which based on the latest count (2023) consists of 55 harbour seal (SCOS, 2025). In 2021, the Firth of Tay and Eden estuary count was 57 harbour seal, although similar to the count of 37 harbour seal in 2020, the population in the Tay and Eden SAC has levelled off in recent years after a decline from 2004-2017 (SCOS, 2025).

The 2013–2018 Habitats Directive assessment classified harbour seal in UK waters as unfavourable-inadequate (JNCC, 2019). More recent Habitats Regulations reporting for the 2019–2024 period assesses conservation status at a regional (MU) level rather than a single UK-wide status, identifying marked spatial variability, with several populations remaining depleted or in decline despite localised stability or recovery (JNCC *et al.,* 2026; SCOS, 2024).

### 2.4.2 Marine Protected Areas

#### 2.4.2.1 Southern Trench Nature Conservation Marine Protected Area

The Southern Trench Nature Conservation Marine Protected Area (ncMPA) is located on the east coast of Scotland in the outer Moray Firth and along the Aberdeenshire coast, stretching from Buckie in the west to Peterhead in the east, approximately 23 km from Bellrock OfTDA survey area. It is designated to protect minke whale, burrowed mud, fronts and shelf deeps. Fronts in the Southern Trench are created by mixing of warm and cold waters, which creates an area of high productivity, attracting a number of predators to the area. Minke whale are attracted by the fish species brought to the area by the fronts, as well as the abundance of sandeels in the soft sands (NatureScot, 2020).

Minke whale are present in the highest numbers from June to October, although are present year-round. Within the Southern Trench ncMPA, minke whale are present in the northern part in higher numbers than in comparison to the southern part of the ncMPA. Adjusted densities of minke whale within the Southern Trench ncMPA (based on survey data from 2000 to 2012) range from 0 to 10 individuals per $km^2$, with adjusted densities of up to 0.1/$km^2$ in the southern area of the site (NatureScot, 2020). Robinson *et al.* (2009) carried out surveys between May to October 2001 to 2006 which resulted in a total density estimate of 0.026 whales per km.

The Southern Trench ncMPA is located in the CGNS MU for minke whale (**Figure 2-1**), which has a population estimate of 20,118 (**Table 2-1**; IAMMWG, 2023).

The Conservation Objectives (NatureScot, 2020) are to conserve the features, specifically to ensure “minke whale in the Southern Trench MPA are not at significant risk from injury or killing, conserve the access to resources (e.g. for feeding) provided by the MPA for various stages of the minke whale life cycle, and conserve the distribution of minke whale within the site by avoiding significant disturbance”. The supporting features of the minke whale (including their prey species and the habitats that support these prey species, and the presence of fronts) are also protected under these Conservation Objectives.

Minke whale are sensitive to collision with vessels and underwater noise; there is a potential for auditory injury, disturbance, and displacement (NatureScot, 2020). The management advice to reduce these pressures include:

- Use of best practice to reduce risk of boat collision; and
- Reduce disturbance from noisy activities through best practice mitigation.

In summary the conservation benefits of this designation are:

- Protection for an area containing persistently above average densities of minke whale where both juvenile and adult whales are regularly observed feeding; and
- Conservation of the persistent front within the Southern Trench NCMPA ensures that productivity and feeding conditions utilised by local mobile species are maintained.

### 2.4.3 Protected Seal Haul-Out Sites

Seal haul-out sites are coastal locations that seals use to breed, moult and rest. Almost 200 seal haul-out sites have been protected through the Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 which was amended with additional sites in 2017. These haul-out sites are protected under Section 117 of the Marine (Scotland) Act 2010. The Act is designed to assist in protecting seals when they are at their most vulnerable, such as providing protection from intentional or reckless harassment at significant haul-out sites (NatureScot, 2023b; Marine Directorate, 2023).

The nearest protected seal haul-out site is the Ythan River Mouth grey seal haul out at approximately 42 km at closet distance to the Bellrock OfTDA Area of Search (**Table 2-2**).

Taking into account the distances from the coast and nearest protected seal haul-out sites, there will be no direct effects from the proposed surveys. However, depending on location of the port to be used and vessel route to and from the survey area there is the potential for vessels to transit past protected seal haul-out sites. Therefore, as a precautionary approach the potential effects of vessels passing seal haul-out sites has been assessed in **Section 4**.

*Table 2-2 Protected Seal Haul-out Sites Within Proximity to the OfTDA Area of Search*

| Site Name | Distance (km) | Seal Species |
|---|---|---|
| Ythan River Mouth | 21.5 | Grey seals |

# 3 European Protected Species Stage 1 Risk Assessment

## 3.1 Potential Impacts

Potential impacts to cetaceans during the site investigation surveys are:

- Permanent change in hearing sensitivity / auditory injury (PTS) from underwater noise;
- Disturbance from underwater noise;
- Disturbance from presence of vessels; and
- Increased collision risk with vessels.

Underwater noise has the potential to impact cetaceans if the frequency is within their hearing range (**Table 3-1**) and / or the sound levels are greater than thresholds for the species (**Table 3-2**) (National Marine fisheries Service (NMFS), 2024).

*Table 3-1 Cetacean Hearing Ranges (from NMFS et al., 2024)*

| Species Hearing Group | Generalised Hearing Range |
|---|---|
| Very high-frequency cetaceans (VHF):<br>Harbour porpoise | 200 Hz to 165 kHz |
| High-frequency cetaceans (HF):<br>Bottlenose dolphin, white-beaked dolphin, and common dolphin (or any other dolphin/blackfish species) | 150 Hz to 160 kHz |
| Low-frequency cetaceans (LF):<br>Minke whale and fin whale (or any other whale species) | 7 Hz to 36 kHz |

The potential for auditory injury (AUD INJ) is not just related to the level of the underwater sound and its frequency relative to the hearing bandwidth of the animal but is also influenced by the duration of exposure. Southall *et al.* (2019) and NMFS *et al.* (2024) gives individual criteria based on whether the noise source is considered impulsive or non-impulsive. Southall *et al*. (2019) and NMFS *et al.* (2024) categorises impulsive noises as having high peak sound pressure, short duration, fast rise-time and broad frequency content at source, and non-impulsive sources as steady-state noise. Seismic airguns are considered impulsive noise sources. Sonars, vessels and other low-level continuous noises are considered non-impulsive. A non-impulsive noise does not necessarily have to have a long duration.

NMFS et al. (2024) presents unweighted peak criteria for Sound Pressure Level ($L_p$) ($L_{p\ -pk}$) and cumulative (i.e. more than a single sound impulse) weighted Sound Exposure Level ($L_{E,p}$) criteria ($L_{E,p,t}$) for AUD INJ, where unrecoverable hearing damage may occur, and temporary threshold shift (TTS), where a temporary reduction in hearing sensitivity may occur in individual receptors (**Table 3-2**).

*Table 3-2 Cetacean AUD INJ and TTS Threshold and onset Criteria for Underwater Noise (from NMFS, 2024)*

| Species Hearing Group | Unweighted $L_{p,-pk}$ (dB re 1 µPa) | | Weighted $L_{E,p,t}$ (dB re 1 µPa$^2$s) | | | |
|---|---|---|---|---|---|---|
| | Impulsive | | Impulsive | | Non-impulsive | |
| | AUD INJ | TTS | AUD INJ | TTS | AUD INJ | TTS |
| Harbour porpoise (VHF cetacean) | 202 | 196 | 159 | 144 | 181 | 161 |
| Dolphin species (HF cetacean) | 230 | 224 | 193 | 178 | 201 | 181 |
| Minke and fin whale (LF cetacean) | 222 | 216 | 183 | 168 | 197 | 177 |

**Table 3-3** summarises the potential impact to marine mammals from the different types of survey equipment, taking into account frequency range and sound levels in **Table 1-3**.

JNCC et al. (2010) assessed MBES system to have the potential to emit sound sources of up to 248 dB re 1µPa @1m, with frequencies of between 10 kHz and 200 kHz; the proposed equipment for the survey will be operating at 211 kHz (**Table 1-3**). Due to the high amplitude of MBES, there is the potential for auditory injury to marine mammal species, however this is highly unlikely as an animal would need to be within very close proximity of the source.

It is also unlikely that the MBES could cause disturbance when active for a short period due to the operating frequencies being outside the audible range of all marine mammals (JNCC et al., 2010). MBES surveys that are carried out in waters of less than 200 m in depth while operating above 100kHz are not considered to be a risk to marine mammals, as it is thought that the higher frequencies typically used fall outside of their hearing ranges, and the sounds are likely to attenuate quickly in the shallower waters. JNCC therefore advise that mitigation is unlikely to be required for MBES surveys in shallow (less than 200 m water depth) surveys (JNCC, 2017).

Similarly, the high frequency of the SSS, 300-900 kHz (**Table 1-3**), falls outside of the hearing ranges for marine mammals and the sounds are likely to attenuate quickly due to the high frequencies used. Therefore, as for the MBES, mitigation in shallow waters (less than 200 m) is not required.

Frequency ranges of the SBP, and sparker to be used in the survey is likely to be within the range from 400 Hz to 22 kHz (**Table 1-3**). This will be within cetacean hearing range and will therefore be audible to cetacean species that could be present in the area. There is therefore the potential for disturbance impacts to occur. Most of the sound energy generated by the SBP equipment will be directed towards the seabed and the pulse duration is extremely short, with the continuous movement of the survey. Auditory injury effects are not predicted, as an animal would need to remain in the very small zone of ensonification for a prolonged period, which is highly unlikely (JNCC et al., 2010).

The USBL used for positioning would have frequencies in the hearing range for cetaceans (19-34 kHz; **Table 1-3**), although the sound levels are predicted to be less than those of the SBP. Therefore, the SBP has been assessed as worst-case for the site investigation survey equipment.

None of the equipment used will involve seismic airguns.

*Table 3-3 Summary of Potential Impacts to Cetacean Species from Site Investigation Survey Equipment*

| Equipment | Potential Impacts to Cetacean Species | Assessed Further |
|---|---|---|
| SBP | The SBP frequency ranges are within cetacean hearing range and will therefore be audible to the marine mammal species that could be present in the area. | **Yes**<br>Potential risk of PTS assessed further.<br>Potential disturbance assessed further. |
| USBL | For the proposed surveys the USBL operating frequency would be typically 18-32 kHz, with SPL of 192 dB re 1µPa @ 1m.<br>The USBL has operating frequencies within marine mammal hearing range. | **Yes**<br>There is the potential for disturbance impact, however SBP assessed as worst-case. |
| SBES | The frequencies used by SBES are generally very high and outside of the main hearing range of cetacean species. | No<br>As the equipment is outside main hearing range of cetaceans, no further assessment required. |
| MBES | The frequencies used by MBES are generally very high and outside of the main hearing range of cetacean species. | No<br>As the equipment is outside main hearing range of cetaceans, no further assessment required. |
| SSS | The frequencies used by SSS are generally very high and outside of the main hearing range of cetacean species. | No<br>As the equipment is outside main hearing range of cetaceans no further assessment required. |
| Survey vessels | Source levels are likely to be too low to result in PTS or TTS, however, they will be audible to most species and thus have the potential to result in disturbance.<br>Increase in number of vessels on site and transits to and from survey area could increase collision risk. | **Yes**<br>Potential for disturbance from underwater noise and presence of vessels.<br>Potential for increased collision risk. |

## 3.2 Assessment of potential effects of survey equipment on EPS

The Review of Consents Habitats Regulations Assessment for the SNS SAC (Department for Business, Energy and Industrial Strategy (BEIS), 2020) undertook underwater noise modelling to determine the potential impact ranges of site investigation surveys for harbour porpoise.

For the BEIS (2020) assessment used the maximum source levels that could be expected from geophysical equipment: SBP with a maximum source noise level of 267 dB re 1 µPa-m. The noise modelling indicates that the permanent loss of hearing sensitivity (permanent threshold shift (PTS)) in harbour porpoise could occur within a maximum of 23 m (an area of 0.0017 km$^2$) from the source

location (**Table 3-4**; BEIS, 2020). This is based on the PTS cumulative threshold of 155 dB SEL weighted (**Table 3-2**; Southall et al., 2019).

Scottish and Southern Energy (2020) undertook noise modelling of impulsive noise sources including SBP and the Innomar SES 2000. The worst-case operating $SPL_{peak}$ was modelled as 445 m for PTS in harbour porpoise (VHF cetaceans) when operating at 4 kHz. The maximum predicted PTS range for dolphin species (HF cetaceans) was 98 m and 178 m for whale species (LF cetaceans) (**Table 3-4**). The maximum predicted impact ranges for PTS and disturbance from Scottish and Southern Energy (2020), as presented in **Table 3-4,** have been used in the assessments.

The current guidance for assessing the significance of underwater noise disturbance in relation to SACs designated for harbour porpoise (JNCC *et al*., 2020), recommends the use of an Effective Deterrence Range (EDR) of 3 km for geophysical surveys (JNCC, 2025). As a highly conservative worst-case approach, a disturbance range of 3 km (an area of 28.3 $km^2$) has been used to determine the maximum potential disturbance area (**Table 3-4**).

For surveys with SBP, it is realistic and appropriate to base the assessments on the potential impact area around the vessel, as the potential risk of PTS and disturbance would be around the vessel at any one time. Marine mammals would not be at risk throughout the entire area surveyed in a day, as animals would return once the vessel had passed, and the disturbance had ceased.

There is the potential for disturbance arising from the use of the equipment for the geophysical survey across the Bellrock OfTDA for a limited duration during the seven-month period.

**Table 3-4** presents a summary of the desk-based review of potential impact ranges for SBP, as potential worst-case for proposed geophysical surveys.

*Table 3-4 Summary of The Desk-Based Review of Potential PTS Impact Ranges for SBP (Ranges in Bold Taken Forward for Assessment)*

| Equipment | Species | Potential effect | Threshold (and source) | Reported range of effect | Reference |
|---|---|---|---|---|---|
| SBP | Harbour porpoise | PTS onset | 155 $SEL_{cum}$ dB re 1 µPa (NMFS, 2018) | 23 m | BEIS (2020) |
| SBP (4 kHz) (235 $SPL_{peak}$ dB 1µPa) | **Harbour porpoise** | **PTS** | **230dB$_{peak}$ / 185dB $SEL_{cum}$ (Southall *et al.*, 2019)** | **445 m** | Scottish and Southern Energy (2020) |
| | **Dolphin species** | **PTS** | **219dB$_{peak}$, 183dB $SEL_{cum}$ (Southall *et al.*, 2019)** | **98 m** | |
| | **Whale species** | **PTS** | **202dB$_{peak}$ / 155dB $SEL_{cum}$ (Southall *et al.*, 2019)** | **178 m** | |
| SBP and USBL | **Harbour porpoise** | **Disturbance** | **A statistical representation of typical disturbance distances** | **3 km** | **JNCC (2025)** |

### 3.2.1 Permanent Threshold Shift

**Table 3-5** presents the PTS impact range and areas used in the assessments, based on the worst-case for SBP (**Table 3-4**).

*Table 3-5 PTS Impact Ranges for SBP Used in Assessments*

| Species | Predicted maximum impact range (m) | Maximum predicted area of potential impact – one vessel ($km^2$) | Maximum predicted area of potential impact – five vessels ($km^2$) | Maximum predicted area of potential impact – eight vessels ($km^2$) |
|---|---|---|---|---|
| Harbour porpoise | 445 | 0.62 | 3.1 | 4.96 |
| Dolphin species | 98 | 0.03 | 0.15 | 0.24 |
| Minke and fin whale | 178 | 0.10 | 0.5 | 0.8 |

**Table 3-6** summarises the PTS assessment for cetaceans, based on worst-case scenario for SBP operations. This assumes up to five vessels operating concurrently using SBP, with a maximum of eight vessels operating overall, three of which will also utilise USBL systems. In the absence of auditory injury thresholds for USBLs, PTS ranges derived for SBP have been applied, which is considered to be highly conservative. For all cetacean species assessed, the predicted number of

individuals potentially at risk of PTS is less than one individual, irrespective of whether a single vessel, two vessels, or up to five vessels are operating simultaneously. Consequently, population level effects have conservatively been assessed on the basis of one individual.

The sole exception is harbour porpoise, for which up to three individuals could theoretically be at risk of PTS under a highly precautionary worst-case scenario involving one crewed survey vessel operating concurrently with up to four USVs, plus three vessels operating USBLs.

*Table 3-6 PTS Assessment for Cetaceans*

| Species | Maximum number of individuals (% of ref UK pop) for one vessel | Maximum number of individuals (% of ref UK pop) for five vessels | Maximum number of individuals (% of ref UK pop) for eight vessels |
|---|---|---|---|
| Harbour porpoise | <1 [0.4] (0.0006% NS MU) | <2 [1.9] (0.001% NS MU) | 3 (0.002% NS MU) |
| Bottlenose dolphin *(based on SCANS-III density)* | <1 [0.0009] (0.05% GNS MU; 0.44% CES MU) | <1 [0.004] (0.05% GNS MU; 0.44% CES MU) | <1 [0.007] (0.05% GNS MU; 0.44% CES MU;) |
| White-beaked dolphin | <1 [0.007] (0.003% CGNS MU) | <1 [0.03] (0.003% CGNS MU) | <1 [0.05] (0.003% CGNS MU) |
| Common dolphin | <1 [0.0008] (0.002% CGNS MU) | <1 [0.004] (0.002% CGNS MU) | <1 [0.006] (0.002% CGNS MU) |
| Minke whale | <1 [0.004] (0.01% CGNS MU) | <1 [0.02] (0.01% CGNS MU) | <1 [0.03] (0.01% CGNS MU) |
| Fin whale | <1 [0.0009] (0.004% North Atlantic) | <1 [0.0004] (0.004% North Atlantic) | <1 [0.0007] (0.004% North Atlantic) |

For the nearshore coastal area, a maximum of three vessels has been assessed. A precautionary approach has been adopted whereby up to three vessels are assumed to operate SBP concurrently. On this basis, a maximum of 0.009% of the CSP could be at risk of PTS (**Table 3-7**).

*Table 3-7 PTS Assessment for coastal bottlenose dolphin*

| Species | Maximum number of individuals (% of ref UK pop) for one vessel | Maximum number of individuals (% of ref UK pop) for three vessels |
|---|---|---|
| Bottlenose dolphin *(based on density of 0.2 / km$^2$)* | <1 [0.006] (0.002% CES MU; 0.003% CSP) | <1 [0.018] (0.006% CES MU; 0.009% CSP) |

The implementation of the mitigation measures outlined in **Section 5** will reduce the risk of PTS as a result of the surveys (with SBP assessed as the worst-case for all survey equipment). Taking into

account the mitigation (**Section 5**) there will be no potential to commit an offence with regards to injury or to affect the FCS of any cetacean species and, **therefore, there is no requirement for a Marine EPS licence for injury.**

### 3.2.2 Disturbance from underwater noise from the site investigation surveys

**Table 3-8** presents the predicted disturbance impact range and area, based the updated EDR (JNCC, 2025) for a single vessel operating. An area of 28.3 km$^2$ will be applied to each survey vessel. This is highly conservative, as the applying 28.3 km$^2$ to each vessel/USV does not account for any spatial overlap over the Bellrock OfTDA survey area.

Table 3-8 Predicted Disturbance Impact Ranges for SBP for All EPS

| Potential Impact | Predicted maximum impact range (km) | Maximum predicted area of potential impact for one survey vessel (km$^2$) | Maximum predicted area of potential impact for five survey vessels (km$^2$) | Maximum predicted area of potential impact for eight survey vessels (km$^2$) |
|---|---|---|---|---|
| Disturbance | 3 | 28.3 | 141.5 | 226.4 |

**Table 3-9** summarises the disturbance assessment for cetaceans, based on worst case scenario assuming five vessels/USV operating SBP and up to three additional vessels operating USBL systems, applying a 3 km EDR around each vessel/USV.

Table 3-9 Disturbance Assessment for Cetaceans

| Species | Maximum number of individuals (% of ref UK pop) for a single survey vessel* | Maximum number of individuals (% of ref UK pop) for five survey vessels* | Maximum number of individuals (% of ref UK pop) for eight survey vessels* |
|---|---|---|---|
| Harbour porpoise | 17 (0.01% NS MU) | 85 (0.05% NS MU) | 136 (0.09% NS MU) |
| Bottlenose dolphin *(based on SCANS-III density)* | <1 [0.8] (0.05% GNS MU;0.44% CES MU ) | 4 (0.2% GNS MU; 1.86% CES MU) | 7 (0.4% GNS MU; 3.1% CES MU) |
| White-beaked dolphin | 7 (0.02% CGNS MU) | 34 (0.1% CGNS MU) | 55 (0.2% CGNS MU) |
| Common dolphin | <1 [0.7] (0.002% CGNS MU) | 4 (0.006% CGNS MU) | 6 (0.01% CGNS MU) |
| Minke whale | 2 (0.02% CGNS MU) | 6 (0.058% CGNS MU) | 10 (0.09% CGNS MU) |
| Fin whale | <1 [0.03] (0.004% North Atlantic) | <1 [0.1] (0.004% North Atlantic) | <1 [0.2] (0.004% North Atlantic) |

* *The estimated number of individuals has been rounded up to the nearest whole number.*

For bottlenose dolphin, within the CES MU and the CSP, the assessment of disturbance arising from five or eight vessels operating concurrently is considered to be highly precautionary and

unrealistic, as not all vessels would operate simultaneously within inshore waters. As described in **Section 3.2.1**, the worst-case scenario assumes up to three vessels operating SBP and/or USBL systems within 5 km of the coast. The assessment does not account for potential spatial overlap between vessels; however, if all three were to operate simultaneously, it is predicted that less than 10% of the CSP could experience temporary disturbed (

**Table** 3-10).

Disturbance to bottlenose dolphins is expected to be short-term in nature. The use of multiple vessels (up to three) would increase survey efficiency and reduce overall survey duration, thereby minimising the potential for prolonged exposure.

*Table 3-10 Disturbance Assessment for coastal bottlenose dolphin population*

| Species | Maximum number of individuals (% of ref UK pop) for a single survey vessel* | Maximum number of individuals (% of ref UK pop) for three survey vessels* |
|---|---|---|
| Bottlenose dolphin *(based on density of 0.2/km$^2$)* | 6 (2.65% CES MU and 3.48% CSP) | 17 (7.5% CES MU and 9.8% CSP) |

* *The estimated number of individuals has been rounded up to the nearest whole number*

Any disturbance would be temporary, and any cetacean would be expected to return to the area once the vessel(s) had passed and the noise source ceased. It is possible that a small number of individual animals (relatively small percentage (<10%) of the relevant species population/MU) may experience some level of disturbance. As such, a Marine EPS Licence for disturbance is required.

## 3.3 Disturbance from underwater noise and presence of vessels

Any disturbance from underwater noise and the presence of vessels would be less than the potential disturbance areas assessed for the site investigation surveys. Although noise levels from vessels are highly unlikely to cause physical or auditory injury, they could be sufficient to cause local disturbance to sensitive marine mammals in the immediate vicinity of the vessels, depending on ambient noise levels.

Thomsen *et al*. (2006) used species hearing detection thresholds to conclude that noise from larger vessels around 0.25 kHz will be detected by harbour porpoise at distances of approximately 1 km, and noise from smaller vessels around 2 kHz will be detected at around 3 km.

The distance at which animals may react to vessels is difficult to predict. Behavioural responses can vary a great deal depending on context and data specific to harbour porpoise are limited. According to Thomsen *et al.* (2006), harbour porpoise might be expected to respond to vessels of this type at approximately 400 m.

As a precautionary approach, based on the studies by Brandt *et al.* (2018) and Benhemma-Le Gall *et al.* (2021), harbour porpoise could be disturbed up to 2 km from construction vessels.

Assessments for all species has been based on a disturbance impact range of 2 km and an area of 12.57 km$^2$ per vessel.

**Table 3-11** presents the disturbance impact areas, based on a 2 km disturbance impact range applied to one survey vessel, one support vessel, and two vessels undertaking environmental surveys. This represents a worst-case scenario of up to four vessels operating simultaneously within the survey area, equating to a maximum disturbance area of 50.3 km² (i.e. four discrete circular areas with no spatial overlap assumed).

This approach is highly conservative, as the application of a 2 km disturbance range to each vessel does not account for spatial overlap between vessels operating at the same time. USVs have not been included in this assessment, as they are generally considered to generate lower underwater radiated noise levels than conventional crewed vessels (Handegard *et al.,* 2024).

*Table 3-11 Vessel Disturbance Assessment for Cetacean Species Based on 2 km Disturbance Impact Range*

| Species | Maximum number of individuals (% of ref UK pop) for a single vessel | Maximum number of individuals (% of ref UK pop) for two vessels | Maximum number of individuals (% of ref UK pop) for four vessels |
|---|---|---|---|
| Harbour porpoise | 8 (0.005% NS MU) | 16 (0.01% NS MU) | 30 (0.02% NS MU) |
| Bottlenose dolphin *(based on SCANS-III density)* | <1 [0.4] (0.05% GNS MU; 0.44% of CES MU) | <1 [0.7] (0.05% GNS MU; 0.44% of CES MU) | 2 (0.1% GNS MU; 0.8% of CES MU) |
| White-beaked dolphin | 4 (0.01% CGNS MU) | 7 (0.02% CGNS MU) | 12 (0.03% CGNS MU) |
| Common dolphin | <1 [0.3] (0.002% CGNS MU) | <1 [0.7] (0.002% CGNS MU) | 1 (0.001% CGNS MU) |
| Minke whale | <1 [0.5] (0.01% CGNS MU) | 2 (0.02% CGNS MU) | 2 (0.02% CGNS MU) |
| Fin whale | <1 [0.01] (0.004% North Atlantic) | <1 [0.02] (0.004% North Atlantic) | <1 [0.04] (0.004% North Atlantic) |

* *The estimated number of individuals has been rounded up to the nearest whole number.*

To assess potential disturbance to the CSP of bottlenose dolphin, a maximum of three vessels has been considered. It should be noted that these may comprise either three USVs, or a combination of crewed vessels and USVs. It is unlikely that three vessels would operate concurrently within 5 km of the coast; however, a precautionary approach has been adopted whereby a maximum of three vessels is assessed. Less than 5% of the CSP of bottlenose dolphin could be temporarily disturbed (

**Table** 3-12). The use of multiple vessels enables the survey to be completed more efficiently, thereby reducing the overall duration of potential disturbance.

*Table 3-12 Vessel Disturbance Assessment for coastal bottlenose dolphin*

| Species | Maximum number of individuals (% of ref UK pop) for a single survey vessel* | Maximum number of individuals (% of ref UK pop) for three survey vessels* |
|---|---|---|
| Bottlenose dolphin *(based on density of 0.2/km$^2$)* | 3 (1.3% of CES MU; 1.7% CSP) | 8 (3.5% CES MU and 4.6% CSP) |

* *The estimated number of individuals has been rounded up to the nearest whole number* While the predicted source levels associated with the survey vessels have the potential to elicit a behavioural response in cetacean species, the vessel noise would need to be emitted over an extended period to cause a significant disturbance offence as defined under the Regulations 39(1) or 39(2). As the survey vessels will not be stationary, animals within a particular area will not be exposed to extended periods of noise from the vessels, there would be no risk of PTS and as such a Marine EPS Licence for injury is not required.

The level of disturbance for vessels in isolation will be lower than the predicted disturbance impact range and areas, based on the worst-case for SBP. Any disturbance would be temporary, and marine mammals would be expected to return to the area once the vessel(s) had passed and the noise source ceased. As such, vessel noise is not anticipated to negatively impact the FCS of any EPS, a Marine EPS Licence for disturbance is not required.

## 3.4 Increased collision risk with vessels

Any increased collision risk with vessels is unlikely, as vessels would be relatively slow moving and maintaining a fixed route during the surveys, giving any marine mammals ample opportunity to detect and avoid the vessels. With regard to collision risk, Laist et al. (2001) predicted that the most severe injuries from collision with vessels travelling at over 14 knots, and Vanderlaan and Taggart (2007) predicted that the probability of lethal injury of a large whale species (North Atlantic right whale) decreases from 0.79 at speeds of 15 knots to 0.21 at 8.6 knots. Given that the vessels involved in the site investigation surveys will be moving along defined survey routes at a very slow speed of 4 knots (indicative), the potential for collisions to occur is negligible.

Vessels movements to and from the port would be on established shipping routes, where possible. The vessels required for the surveys would be a very small proportion of current vessel activity in and around the survey areas and routes to and from port.

To reduce the risk of increased collision risk with vessels, vessel movements, where possible, will be incorporated into recognised vessel routes, and therefore to areas where marine mammals are accustomed to vessels, in order to reduce any increased collision risk. All vessel movements will be kept to the minimum number that is required to reduce any potential for collision risk. Additionally, all vessel operators will use good practice to reduce any risk of collisions with marine mammals, this includes following the Scottish Marine Wildlife Watching Code (SNH, 2017).

Given that there is predicted to be no risk of injury to any species of cetacean as a result of collision risk, there is no potential to commit an offence with regards to injury. Therefore, no impact on the

FCS of any species is expected. As such, there will be no risk of an offence and therefore no requirement for a Marine EPS licence for injury.

## 3.5 Cumulative Effect Assessment (CEA)

For wide ranging species such as cetaceans, it is important to consider other projects and activities over a wider area. Taking into account the potential impacts associated with the proposed site investigation surveys (**Section 3.2**), this has been based on the Scottish east coast area.

The proposed site investigation surveys at the Bellrock OfTDA are not anticipated to result in significant cumulative effects. Underwater noise attenuates more rapidly at higher frequencies, such that noise generated by the survey equipment is expected to be spatially limited and localised. Consequently, the potential for auditory injury is very limited, as an EPS would need to be in close proximity to the active noise source to experience biologically relevant exposure. The implementation of standard mitigation measures (**Section 5**) further reduces this already low likelihood, supporting the conclusion that no significant cumulative effects are predicted.

PTS / AUD INJ effects associated with cumulative exposure to underwater noise are expected to remain highly localised in the vicinity of individual activities, as indicated by modelled impact ranges. Accordingly, the potential for cumulative PTS injury to cetacean receptors arising from multiple noise sources; including geophysical surveys, piling, and offshore windfarm (OWF) operation and maintenance activities is considered negligible. Nevertheless, where multiple noise emitting activities occur within a similar timeframe or area, there is potential for temporary behavioural disturbance as a result of cumulative underwater noise exposure. On this basis, a qualitative cumulative disturbance assessment has been undertaken.

Using the Marine Directorate Licence Application website, several plans and projects on the east coast of Scotland have been identified to have potential overlap with the planned site investigation surveys within the Bellrock OfTDA Area of Search (see **Section 1.2**). For most of the listed projects and activities the exact times when work would commence are unknown or the relevant Marine Licences are valid for one year. It is, therefore, unlikely that all noisy activities outlined below would take place on the same day and the same time.

Operation and maintenance activities are ongoing at Moray West OWF and Seagreen OWF. To assess the potential for cumulative disturbance arising from these activities, a 4 km disturbance impact range, corresponding to an area of 50.27 km² has been applied to the relevant cetacean density estimates within the SCANS survey block in which the OfTDA Area of Search is located. Moray West OWF and Seagreen OWF have not been included in the cumulative assessment for the CES bottlenose dolphin MU or the associated CSP as these projects are not considered relevant to cetaceans within these predominantly nearshore receptors.

This assessment also considers up to five other geophysical survey activities may be undertaken concurrently with the proposed Bellrock OfTDA surveys. These include operational surveys at Green Volt, Beatrice OWF and Hywind Scotland Pilot Park, together with site investigation surveys associated with Bowdun OWF and offshore grid projects (Bowdun Offshore Wind Farm, 2025). EPS licence applications for these activities have been submitted with proposed survey periods that overlap with the Bellrock OfTDA programme. Estimates of the number of animals potentially

subject to disturbance from these surveys have been taken from the relevant EPS RA published on the Marine Directorate Licensing Application website and have been incorporated into the cumulative assessment (**Table 3-13**).

It is also anticipated that piling activities at Inch Cape OWF could take place concurrently with the proposed Bellrock OfTDA surveys. Accordingly, predicted impact ranges and estimates of population exposure presented within the Inch Cape piling strategy (Inch Cape Offshore Limited, 2025) have been incorporated into the cumulative assessment. In addition, piling activities may occur at Peterhead Smith Quay during a similar period. Although potential effects on cetaceans were not assessed directly within the associated EIA (Peterhead Port Authority, 2025), the predicted impact ranges and density estimates reported in that assessment have been used to derive indicative exposure estimates, which have been included within the cumulative assessment on a precautionary basis (**Table 3-13**).

The overall impact of disturbance (a temporary impact) to the overall cetacean population is considered to be negligible, or no potential for a significant effect on the overall population, if less than 1% of the reference population is anticipated to be exposed to effect. If between 1% to 10% of the reference population is potentially temporarily disturbed, it is considered to be low or no potential for a significant effect on the overall population.

Taking into account that cetacean species are not as sensitive to disturbance impacts as they are to the potential for injury, they would not be permanently disturbed from any area (as the impact is temporary and individuals will return to the area once the relevant activity has ceased), and less than 1% of the populations may be impacted (except bottlenose dolphin), as assessed in **Table 3-13**. The overall conclusion is that there would be no potential for a population level effect on harbour porpoise, white-beaked dolphin, common dolphin, minke whale or fin whale.

For bottlenose dolphin there would be a potential for a population level effect as 6.6% of the CES MU could be disturbed and up to 8.7% of the CSP could be temporarily disturbed based on the SCANS-III density. Less than 15% of the MU and up to 19.7% of the CSP could be temporarily affected when applying the inshore density of 0.2 animals km². This represents a precautionary assessment, as it assumes a uniform distribution and that all individuals within the predicted impact area are affected. In reality, not all projects included within the assessment for the inshore population will influence the inshore population, and therefore the number of individuals affected is likely to be lower (**Table 3-13**). However, it should be noted that the cumulative assessment undertaken is highly precautionary and represents an upper-bound scenario. In practice, it is unlikely that all identified noise-generating activities would occur concurrently due to constraints related to vessel availability, project scheduling, and weather conditions. Furthermore, the separation distances between Bellrock OfTDA and other developments, including Beatrice OWF and Moray West OWF are such that spatial overlap of disturbance zones for cetaceans is unlikely when the recommended EDRs are applied.

As noted above, the cumulative assessment indicates no significant disturbance of cetaceans at a population level, apart from bottlenose dolphin. It is possible that a small number of individual animals may experience some level of disturbance. The characterisation of effects as presented in this report has identified that the potential for impact will be highly localised and short term in nature and not result in significant effects. The potential for the proposed site investigation survey works

contributing to cumulative effects is highly unlikely. Therefore, relatively localised areas of disturbance and the short period of time for cumulative impacts to arise, are such that they will not cause an impact that will affect the FCS of any EPS. However, as a precautionary approach, **a Marine EPS Licence is required for disturbance**.

Based on the assumption that all the planned projects and activities with the potential for injury will have mitigation in place, which is similar to or more extensive than the measures being undertaken for the proposed site investigation surveys, no EPS will be at risk of injury from these activities.

*Table 3-13 Potential for Cumulative Effects (Numbers Have Been Rounded to Nearest Value)*

| Cumulative effect | Potential area of impact ($km^2$) | Number of harbour porpoise | Number of bottlenose dolphin | Number of white-beaked dolphin | Number of common dolphin | Number of minke whale | Number of fin whale |
|---|---|---|---|---|---|---|---|
| *Bellrock OfTDA proposed surveys (worst case scenario for disturbance)* | *226.4* | *136* | *7 (SCANS-III density)*<br><br>*17 (based on inshore density of 0.2/$km^2$)#* | *55* | *6* | *10* | *1* |
| Green Volt 2026 proposed nearshore geophysical survey (geophysical survey (3 km EDR)) | 28.3 | 22 | *2 (SCANS-III density)*<br><br>12 *(based on inshore density of 0.2/$km^2$)* | 1 | Not assessed | 1 | <1 |
| Inch Cape piling * | 706 | 422 | 0 | 56 | | 30 | Not assessed |
| Operational work at Moray West OWF | 50.27 | 38 | 1^^ | 4 | | 2 | <1 |
| Operational work at Seagreen OWF | 50.27 | 30 | 2^^ | 4 | | 2 | <1 |
| Geophysical survey at Beatrice OWF ** | 56 | 16 | 0.22^^ | 8 | | 1 | *Not assessed in the RA.* |
| Geophysical survey at Bowdun OWF*** | 78.5 | 47 | Not assessed | 6 | | 3 | |
| Geophysical survey at Offshore Grids – Netherton Corridor**** | 78.5 | 47 | 2.3 | 6 | | 30.3 | |
| Geophysical survey at Hywind | 113.2 | 68 | 3 | 9 | | 5 | |

| Cumulative effect | Potential area of impact (km²) | Number of harbour porpoise | Number of bottlenose dolphin | Number of white-beaked dolphin | Number of common dolphin | Number of minke whale | Number of fin whale |
|---|---|---|---|---|---|---|---|
| Piling at Peterhead Smith Quay*^ | 10.02 | 6 | Not assessed | 1 | | 1 | |
| **Total (% of reference population) ^*^*** | | **832 (0.5% NS MU)** | **18 (0.95% GNS MU)**<br><br>**15 (6.6% CES MU & 8.7% CSP)** *(SCANS-III density)*<br><br>**34 (15.0% CES MU & 19.7% CSP)** *(based on inshore density of 0.2/km²)* | **150 (0.4% CGNS MU)** | **6 (0.01% CGNS MU)** | **85 (0.8% CGNS MU)** | **<2 (0.008% North Atlantic)** |

# Based on one vessel within 5km of the coast * Numbers taken from Inch Cape piling strategy using 15 km disturbance EDR (Inch Cape Offshore Limited, 2025) ** Numbers taken from Beatrice OWF EPS RA for geophysical surveys and are based on a potential disturbance area of 56 km². *** Numbers taken from Bowdun OWF EPS RA and are based on a 5 km EDR for harbour porpoise (Bowdun Offshore Wind Farm, 2025). **** Numbers taken from Offshore Grids – Netherton Corridor EPS RA based on a 5 km EDR for harbour porpoise. *^ Numbers calculated from EPS RA, using the projects density and impact range of 10.02 km². ^^ Only assessed for bottlenose dolphin GNS MU ^*^* Total number of individuals has been rounded up to the nearest whole number.

# 4 Potential Effects on Protected Sites

As outlined in **Section 1.2.2**, the proposed surveys are scheduled to be conducted during the period from the 15th June to the 31st December 2026 and are expected to take place over 85 survey days (60 days for the geophysical survey and 25 days for the environmental survey).

### 4.1.1 Moray Firth SAC

As outlined in **Section 2.4**, the Moray Firth SAC is an important site for bottlenose dolphin. The Bellrock OfTDA Area of Search is located approximately 150 km from the Moray Firth SAC. However, as the proposed surveys will be undertaken within inshore waters, a precautionary assessment has been undertaken for a single survey vessel to consider any potential effects on bottlenose dolphins associated with the Moray Firth SAC (**Table 4-1**). The results of this assessment are presented in the context of the most recent population estimate for the CES MU, comprising 226 individuals (95% CI = 214–239; Cheney *et al.,* 2024) and using a precautionary density of 0.2 dolphins per km$^2$ (Quick *et al.,* 2014, NatureScot, 2026).

*Table 4-1 Assessment for Bottlenose Dolphin from The Moray Firth SAC*

| Potential Impact | Maximum number of individuals (% of ref pop) |
|---|---|
| PTS | <1<br>(0.44% CES MU) |
| Disturbance* | 17<br>(7.5% CES MU) |
| Disturbance from vessels** | 8<br>(3.5% CES MU) |

** Disturbance has been assessed based on a highly precautionary worst-case scenario, assuming concurrent operation of up to three vessels within the nearshore area.*
*** Disturbance from vessels has been assessed on a maximum of two vessels*

The proposed survey requiring a single vessel operating inshore, including any cumulative effects, are unlikely to have the potential for any effects that would result in adverse effect on the integrity of the Moray Firth SAC in relation to the Conservation Objectives (as outlined in **Section 2.4.1**) for bottlenose dolphin.

There are no anticipated potential effects on other designated sites where bottlenose dolphin are a qualifying feature, taking into account the distances to the sites and the potential impacts associated with the proposed site investigation surveys (**Section 3.2**). Therefore, there is no potential for significant disturbance, or adverse effect, to the bottlenose dolphins associated with the Moray Firth SAC.

### 4.1.2 Firth of Tay and Eden Estuary SAC

Although harbour seal are not EPS, an assessment in relation the Firth of Tay and Eden Estuary SAC has been conducted.

There will be no direct impact on the Firth of Tay and Eden Estuary SAC from the site investigation surveys due to the distance from the Bellrock OfTDA Area of Search. However, it is assumed that any harbour seal present in the survey area could have potential connectivity with the SAC.

Based on the site investigation survey scenario involving eight vessels operating SBP/USBL and applying a maximum spatial impact area of 226.4 km², the number of harbour seals potentially disturbed is estimated using a density of 0.00004 individuals per km², derived from Carter *et al.* (2025) and SCOS (2025). On this basis, the predicted number of harbour seals potentially exposed to disturbance is less than one individual, equating to 0.01% of the Firth of Tay and Eden Estuary SAC population of 55 (SCOS, 2025).

Given the low number of harbour seals at risk of disturbance, and the low level of overall population effect, and the temporary nature of the disturbance, it is considered that there is no potential for any effects on the site integrity of the Firth of Tay and Eden Estuary SAC in relation to the conservation objective for harbour seal.

### 4.1.3 Southern Trench Nature Conservation Marine Protected Area

With the application of mitigation, as outlined in **Section 5,** there is no potential adverse effect on site integrity of the Southern Trench ncMPA in relation to the Conservation Objectives for minke whale as a result of any injury. There is also no potential for the significant disturbance of minke whale in the Southern Trench ncMPA, taking into account distance from the survey area, therefore there is no potential adverse effect on site integrity of the Southern Trench ncMPA in relation to the Conservation Objectives for minke whale.

There could be the potential for the proposed site investigation surveys in the Bellrock OfTDA Area of Search to disturb minke whale associated with the Southern Trench ncMPA. As a precautionary approach it has been assumed that any minke whale in the survey area could be associated with the Southern Trench ncMPA. Therefore, the assessments have been presented in the context of the latest estimate for the Moray Firth, based on SCANS-IV abundance for survey block NS-D of 2,702 animals (95% CI = 547-7,357; Gilles *et al.,* 2023).

The number of minke whale that could potentially be disturbed due to the site investigation surveys, based on disturbance range for a single, five vessels with SBP and eight vessels with SBP/USBL is presented in **Table 4-2**. Additionally, disturbance from a maximum of four operating vessels is presented in **Table 4-2**.

*Table 4-2 Assessment for Minke Whale from the Southern Trench ncMPA*

| Potential Impact | Maximum number of individuals (% of ref pop) for one survey vessel | Maximum number of individuals (% of ref pop) for five survey vessels (for geophysical) | Maximum number of individuals (% of ref pop) for eight vessels operating SBP/USBL |
|---|---|---|---|
| PTS | <1<br><br>(<0.001% SCANS NS-D block) | <1<br><br>(<0.001% SCANS NS-D block) | <1<br><br>(<0.001% SCANS NS-D block) |

| Potential Impact | Maximum number of individuals (% of ref pop) for one survey vessel | Maximum number of individuals (% of ref pop) for five survey vessels (for geophysical) | Maximum number of individuals (% of ref pop) for eight vessels operating SBP/USBL |
|---|---|---|---|
| Disturbance | 1<br>(0.04% SCANS NS-D block) | 6<br>(0.2% SCANS NS-D block) | 10 (0.4% SCANS NS-D block) |
| | | | |
| Disturbance from four vessels | 2<br>(0.07% SCANS NS-D block) | | |

Taking into account the relatively small number of minke whale associated with the Southern Trench ncMPA that could be temporarily disturbed during the Bellrock OfTDA survey, there would be no population effects in relation to the Southern Trench ncMPA and no potential adverse effect on site integrity of the Southern Trench ncMPA in relation to the Conservation Objectives for minke whale.

### 4.1.4 Protected Seal Haul-Out Sites

The closest protected grey and harbour seal haul-out sites to the Bellrock OfTDA are approximately 21.5 km from the survey area (**Table 2-2**). Given the distance between the Bellrock OfTDA Area of Search and the protected haul-out sites, there is no potential for direct impact due to the surveys. However, there is the potential for transiting vessels to disturb seals at haul-out sites, depending on the port used and vessel route.

The response of seals to disturbance at haul-out sites can range from increased alertness to moving (stampeding) into the water (Wilson, 2014). The potential impact on pupping groups can include temporary or permanent pup separation, disruption of suckling, energetic costs and energetic deficit to pups, physiological stress and, sometimes, enforced move to distant or suboptimal habitat. Potential impacts on moulting groups can include energy loss and stress, while impacts on other haul-out groups can cause loss of resting and digestion time and stress (Wilson, 2014). The potential effects will be determined by the response of the seals, the duration and proximity of the disturbance to the seals.

For grey seal, mothers responded by moving into the water more due to boat speed than because of the distance, although movement into the water was generally observed to occur at distances of between 20 and 70 m, with no detectable disturbance at 150 m (Wilson, 2014; Strong and Morris, 2010). However, grey and harbour seals have also been reported to move into the water when vessels are at approximately 200 m to 300 m (Wilson, 2014).

In a study of the reaction of harbour seal to cruise ships, harbour seal were 25 times more likely to flee into the water when cruise ships passed 100 m from haul-out sites than when ships passed within 500 m, beyond 600 m there was no discernible effect on the behaviour of harbour seal (Jansen et al., 2010). Similarly, disturbance of harbour seals from vessel noise and presence has been demonstrated at up to 500 m from UK haul-out sites (Cates and Acevedo-Gutierrez, 2017).

To reduce potential disturbance at seal haul-out sites along vessel routes, all vessels transiting to the Bellrock OfTDA survey area will remain at a distance of at least 500 m from the protected seal haul-out sites and use existing shipping lanes and transit routes, wherever possible.

In addition, all vessel operators will use good practice to reduce any risk of collisions with marine mammals or significant disturbance at seal haul-out sites, this includes following the Scottish Marine Wildlife Watching Code (SNH, 2017).

With these proposed measures, there would be no potential for significant disturbance to protected seal haul-out sites.

# 5 Mitigation Strategy

The following mitigation measures, as outlined within the JNCC (2017) 'Guidelines for Minimising the Risk of Injury to Marine Mammals from Geophysical Surveys' would apply for geophysical surveys, especially when using either SBP or USBL equipment[3]*:

- As the geophysical surveys are short in nature and are using low energy sources (such as SBP), a non-dedicated Marine Mammal Observer (MMO) can be used. A non-dedicated MMO refers to a trained MMO who may undertake other roles on the vessel when not conducting their mitigation role. This person can be a member of the vessel's crew provided that during the mitigation period, they do not undertake any other roles on the vessel.
    - Note that the pre-survey watch can only be undertaken in periods of daylight and good visibility.
    - For USV operations, the pre-survey watch will be undertaken from the support vessel.
- Passive Acoustic Monitoring (PAM) to be undertaken during hours of darkness and in poor visibility).
- Prior to any survey commencement, a 30-minute pre-survey search of a 500 m mitigation zone around the moving source / vessel / USV is required. If a marine mammal is sighted or detected within the mitigation zone during the pre-survey search, the survey cannot commence until:
    1. Until the 30-minute pre-survey search is complete; and
    2. The mitigation zone has been clear of marine mammals for a period of 20 minutes prior to start of survey.

A soft-start must be undertaken (wherever practical) once the pre-survey search of 30 minutes has been completed and there have been no marine mammal sightings for at least 20 minutes. The soft-start will consist of a gradual and consistent ramp-up of power over a minimum of a 15-minute

[3] **At times when the USBL will be operated below 202 dB re 1 µPa @ 1 m (the lowest level which has the potential to induce the onset of auditory injury) mitigation will not be undertaken*

period[4], and the line must be commenced within 25 minutes of the start of the soft-start procedure. Once soft-start has commenced, there is no requirement to stop or delay the acoustic survey due to marine mammal presence within the 500 m mitigation zone.

- If a line change is expected to take more than 40 minutes, the survey should be halted at the end of the survey line, and a full pre-survey search and soft-start procedure should begin prior to the next line.
    - The pre-survey search of the 500 m mitigation zone can commence while on the line turn, so that survey equipment can be switched on ready for the next line. Note that the same delay and soft-start procedures apply for line changes as outlined above.
- If a line change is expected to take less than 40 minutes, surveys can continue if the shot point interval[5] is increased to a maximum of 5 minutes and is decreased gradually in the final 10 minutes of the line change.
    - The survey equipment can alternatively be switched off during line changes of less than 40 minutes, and the mitigation procedures undertaken as per the line changes of more than 40 minutes as outlined above.
- If several types of survey equipment are started sequentially, or interchanged during the operation, only one pre-survey search is required prior to commencement of the first acoustic output, and only if there are no gaps in data acquisition of more than 10 minutes.

Whilst not considered specifically in this assessment due to their low likelihood of occurrence, any assessment of, or mitigation measures put in place for the species assessed, are considered to be appropriate/relevant for other less commonly occurring species of cetacean that may be present in the survey area. These mitigation measures for cetacean EPS (JNCC, 2017) are also deemed to be appropriate for seals, turtles, and basking sharks, and would reduce the potential for impact to all species.

Best practice to reduce vessel collision risk and disturbance at protected seal haul-out sites:

- Vessel movements, where possible, will follow set vessel routes and hence areas where marine mammals are accustomed to vessels, in order to reduce any increased collision risk. All vessel movements will be kept to the minimum number that is required to reduce any potential collision risk. Additionally, vessel operators will use good practice to reduce any risk of collisions with marine mammals.
- The Scottish Marine Wildlife Watching Code (SNH, 2017) will be followed, to reduce the potential for a vessel collision, by reducing vessel transit speeds and by maintaining speed and course when in the presence of marine mammal species. This code will be followed for all vessels transiting to and from the Bellrock OfTDA survey area. In the

[4] *Based on the guidelines for mitigations for a mini air gun, as stated within the JNCC 2017 guidelines for minimising the risk of injury to marine mammals from geophysical surveys. https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/jncc-guidelines-seismicsurvey-aug2017-web.pdf*

[5] *A shot point interval refers to the distance between source points (shot points) or between the centres of source-point patterns.*

unlikely event that a collision event occurs, this will be reported on, and full information of the incident, including the marine mammal species, will be recorded.

Should the SBP (sparker) or USBL be able to operate (and be operated) below 202 dB re 1 µPa @ 1 m (the lowest level which has the potential to induce the onset of auditory injury) then mitigation will only be required for the SBP. The USBL equipment will be assessed under the geophysical survey, but any conclusions and mitigation will be applied during both surveys.

# 6 Assessment of Potential Offence

The Bellrock OfTDA Area of Search extends to the coast to the anticipated landfall locations. In the context of Regulations 39(1)(b) and 39(2) of the Conservation (Natural Habitats, &c.) Regulations, the proportion of the relevant reference population of each species that has the potential to be disturbed by the use of survey equipment is negligible, representing less than 1% of the reference population for all cetacean species occurring within the area. On this basis, any disturbance is not considered detrimental to the maintenance of the populations at FCS.

The sole exception relates to the CSP of bottlenose dolphin, represented by a precautionary consideration of 50% of the CES MU. Under a highly conservative worst-case scenario, two geophysical surveys (one inshore and one offshore) are assumed to be occurring concurrently within the Bellrock OfTDA Area of Search, more than 1% of this CSP could theoretically be subject to temporary disturbance. Each survey vessel is assumed to give rise to a maximum disturbance footprint of up to 28.3 km². On this basis, the maximum theoretical worst-case spatial extent that could be subject to disturbance at any one time would be 56.6 km², assuming complete overlap of the two disturbance areas. However, although two survey vessels may be present concurrently, one would operate in nearshore waters and the other further offshore. As a result, substantive spatial overlap between survey activities is considered unlikely, and any overlap in disturbance footprints would be minimal.

Furthermore, even in the unlikely event that disturbance of over 1% of the CSP were to occur, the disturbance would be temporary, localised and reversible, and would not be sufficient to result in population-level effects or compromise the maintenance of the CES bottlenose dolphin population at FCS. Therefore, it is concluded that the relevant tests under Regulation 39 of the Conservation (Natural Habitats, &c.) Regulations 1994 are met, and that an EPS licence (for disturbance) may be issued.

## 6.1 EPS Licencing Tests

The purpose of the EPS RA presented in this report is to determine whether, when considering appropriate mitigation as presented in **Section 5**. There is still potential for the survey activities to cause deliberate harm or inadvertently cause disturbance to cetaceans or other protected species. The need for a Marine EPS Licence will be determined by MD-LOT, with advice from NatureScot, based on findings from this EPS RA.

MD-LOT's consideration of whether an EPS Licence will be required will comprise of the following three tests as set out in **Sections 6.1.1** to **6.1.3**.

### 6.1.1 Test 1: The licence must relate to one of the purposes referred to in Regulation 44

The Scottish Government can only issue licenses under Regulation 44(2) of the Conservation (Natural Habitats, &c.) Regulations 1994 for specific purposes. These purposes include:

- 44(2)(e) preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

The development of the proposed Bellrock OfTDA meets the requirements of Regulation 44(2)(e) by demonstrating a direct environmental benefit on a national and international scale and complies with international and national environmental policies. There is an overarching European, UK and Scottish policy requirement for sustainable energy supply from renewables. This need is the subject of national planning and energy policy.

While the site investigation surveys will result disturbance to cetacean species, it will only be temporary in nature, be a risk to a small number of individuals and, with the mitigation that will be put in place, there is no potential for injury. The benefit of undertaking this survey and allowing for the development to progress has the potential for long-term benefit to Scotland and the renewables industry and helping Scotland to reach the overall target for greenhouse gas emissions.

### 6.1.2 Test 2: There must be no satisfactory alternative (Regulation 44, 3a)

Alternative options were considered prior to the inclusion of a site investigation surveys with regards to the scope and extent of the surveys within the Bellrock OfTDA. Alternative options considered include the use of autonomous underwater vehicles and unmanned vessels to inform the characteristics of the seabed. However, these were deemed to be unsuitable methods due to location and high levels of cost.

Alternative sample sizes, or smaller survey areas, is also not a feasible option as full coverage of the offshore export cable corridor (within the Bellrock OfTDA Area of Search) is required to determine the most suitable potential locations for the Offshore Transmission Infrastructure and to inform the EIA. These surveys are considered essential due to the need to accurately assess the Bellrock OfTDA for development, the proposed survey methods outlined in this document are the only viable way to ensure the accurate planning and assessment of the Bellrock Offshore Transmission Infrastructure.

As outlined above, there are no satisfactory alternatives to the use of survey equipment required during the site investigation works. Although there might be different types of survey equipment that could be used, this is often constrained by the specific purpose of the site investigation survey and the alternative equipment may not be effective. Site investigation works are required in order to detail the seabed and sub-surface characteristics within the Bellrock OfTDA Area of Search. These works are required to provide sufficient detail for the design phase of the Offshore Transmission Infrastructure. However, it is important to note:

- **Survey Location, Duration and Extent**: the smallest survey area possible (450 km$^2$) has been proposed. The smallest number of survey lines within this area and the minimum survey duration possible has been determined. Reducing the size of the survey area and/ or the number of survey lines any further would reduce data coverage quality to the point at which the project would become unviable.
- **Survey Equipment/Methodology**: The design of the survey considers the provision of the required data for the preliminary phase but without survey techniques which may be superfluous for the current objectives. The results of the survey will allow the most effective development and design decisions to be made. For future site investigation, it will provide data to allow the design of the most effective surveys. Overall, the proposed works meet the objectives of the preliminary survey with the minimal practicable impact to marine mammals.

Thus, the Applicant considers that the 'no satisfactory alternative test' has been reached.

### 6.1.3 Test 3: The action authorised must not be detrimental to the maintenance of the population of the species concerned at an FCS in their natural range (Regulation 44, 3b)

The percentage of the reference population of each species, which has the potential to be temporarily disturbed, over a relatively small area for a short period of time, based on the maximum predicted impact ranges for SBP during investigation survey, is considered to be negligible for all cetaceans (less than 1% of the reference population impacted, except for bottlenose dolphin), based on worst-case for the daily survey area. However, any disturbance during the surveys is not considered detrimental to the maintenance of the populations or their FCS.

## 7 Conclusions

While the Bellrock OfTDA site investigation surveys present a temporary disturbance to a localised area of the marine environment, this work is an important addition to Scotland's growing contributions to the UK's renewable energy sector. It will provide additional support to the UK Government's national and international commitments to reduce greenhouse gasses.

The assessment above demonstrates that, with the implementation of the mitigation measures detailed in **Section 5**, there will be no injury resulting from the proposed activities due to underwater noise or vessel collision risk and, thus, no offence related to injury of any cetacean species under either the inshore or offshore regulations. In this context, a Marine EPS Licence would not be required for injury.

It is possible that a small number of animals may experience some level of disturbance for the short period they may encounter noise during the survey operations. Given the short term and temporary impacts of the survey to cetaceans, it is considered that there is no potential for a significant impact on the wider populations of harbour porpoise, bottlenose dolphin, white-beaked dolphin, Atlantic common dolphin, fin whale or minke whale.

There is potential for cumulative effects from the proposed survey and other activities that could be undertaken at the same time in the East Coast of Scotland area. However, the level of cumulative disturbance is predicted to be relatively small in the area, as shown in **Section 3.5**. Any cumulative disturbance effects will be temporary and there will be no impact on the FCS of any EPS.

Therefore, a Marine EPS Licence is required for activities where there is potential for disturbance to cetaceans as per Regulation 39(2); this disturbance will not be sufficient to cause any population level effects, and it is concluded that an EPS licence to disturb can be issued.

# 8 References

Applied Acoustics (2020). Easytrak Nexus 2 USBL System, Model EZT-2691 [online]. Available at: https://www.aaetechnologiesgroup.com/wp-content/uploads/2023/11/Easytrak-Nexus-2-USBL-2691-%E2%80%93-Technical-Specification.pdf

Arso Civil, M., Quick, N.J., Cheney, B., Pirotta, E., Thompson, P.M., and Hammond, P.S. (2019). Changing distribution of the east coast of Scotland bottlenose dolphin population and the challenges of area‐based management. Aquatic Conservation: Marine and Freshwater Ecosystems, 29, 178-196

BEIS (2020). Record of the Habitats Regulations Assessment undertaken under Regulation 65 of the Conservation of Habitats and Species 2017, and Regulation 33 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. Review of Consented Offshore Wind Farms in the Southern North Sea Harbour Porpoise SAC. September 2020. Department for Business, Energy and Industrial Strategy.

BEIS (2022) UK Offshore Energy Strategic Environmental Assessment Future Leasing/Licensing for Offshore Renewable Energy, Offshore Oil & Gas and Gas Storage and Associated Infrastructure OESEA4 Environmental Report.

Benhemma-Le Gall, A., Graham, I.M., Merchant, N.D. and Thompson, P.M. (2021). Broad-Scale Responses of Harbor Porpoises to Pile-Driving and Vessel Activities During Offshore Windfarm Construction. Front. Mar. Sci. 8:664724. doi: 10.3389/fmars.2021.664724

Bowdun Offshore Wind Farm (2025). EPS Risk Assessment: https://marine.gov.scot/sites/default/files/eps_and_bs_risk_assessment_and_supporting_information_redacted.pdf

Brandt, M.J., Dragon, C.A., Diederichs, A., Bellmann, M.A., Wahl, V., Piper, W., Nabe- Nielsen, J. and Nehls G. (2018). Disturbance of harbour porpoises during construction of the first seven offshore wind farms in Germany. Marine Ecology Progress Series, 596: 213-232.

Carter, M.I., Aarts, G., Van Beest, F.M., Bivins, M., Brasseur, S.M., Dietz, R., Duck, C.D., Galatius, A., Gilles, A., Haelters, J. and Hastie, G.D., (2025). At‐sea distribution of seals on the Northwest European Shelf: Towards transboundary conservation and management. Journal of Applied Ecology, 63(1), p.e70236.

Cheney, B.J., Arso Civil, M., Hammond, P.S. and Thompson, P.M. (2024). Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation 2017-2022. NatureScot Research Report 1360.

Gilles, A, Authier, M, Ramirez-Martinez, NC, Araujo, H, Blanchard, A, Carlstrom, J, Eira, C, Doremus, G, FernandezMaldonado, C, Geelhoed, SCV, Kyhn, L, Laran, S, Nachtsheim, D, Panigada, S, Pigeault, R, Sequeira, M, Sveegaard, S,Taylor, NL, Owen, K, Saavedra, C, Vazquez-Banales, JA, Unger, B, Hammond, PS (2023). Estimates of cetacean abundance in

European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys. Final report published 29 September 2023. 64 pp.

Hague, E.L., Sinclair, R.R. and Sparling, C.E. (2020). Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters. Scottish Marine and Freshwater Science Vol 11 No 12.

Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Boerjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M. and Teilmann, J. (2021). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Wageningen Marine Research.

Handegard, N. O., De Robertis, A., Holmin, A. J., Johnsen, E., Lawrence, J., Le Bouffant, N., O'Driscoll, R., Peddie, D., Pedersen, G., Priou, P., Rogge, R., Samuelsen, M. and Demer, D. A. (2024). Uncrewed surface vehicles (USVs) as platforms for fisheries and plankton acoustics. ICES Journal of Marine Science, 81(9), pp. 1712–1723. https://doi.org/10.1093/icesjms/fsae130

Hartley Anderson Ltd. (2020). Underwater acoustic surveys: review of source characteristics, impacts on marine species, current regulatory framework and recommendations for potential management options. NRW Evidence Report No: 448, 119pp, NRW, Bangor, UK.

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.

Inch Cape Offshore Limited (2025). Piling Strategy https://marine.gov.scot/sites/default/files/ic02-int-ec-ofc-005-inc-str-001_inch_cape_osp_-_piling_strategy_ps_rev_00.pdf

Irish Whale and Dolphin Group (2007). Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters [online]. Available at: https://www.iwdg.ie/downloads/AcousticSurveys.pdf (Accessed: June 2024).

Jansen, J.K., Boveng, P.L., Dahle, S.P. and Bengston, J.L. (2010). Reaction of harbor seals to cruise ships. Journal of Wildlife Management,74,1186–1194. https://doi.org/10.1111/j.1937-2817.2010.tb01239.x

JNCC (2015a). Berwickshire and North Northumberland Coast SAC Standard Data Form. Available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0017072.pdf. (Accessed 18 June 2024).

JNCC. (2015b). Natura 2000 - Standard Data Form; Isle of May Special Area of Conservation (SAC). Available at: https://sac.jncc.gov.uk/site/UK0030172. (Accessed 18 June 2024).

JNCC (2017). JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys. Available at: https://jncc.gov.uk/resources/e2a46de5-43d4-43f0-b296-c62134397ce4

JNCC (2019). Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019. Available at: https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-marine

JNCC (2023). Marine Noise Registry Help and Guidance. MNR Help and Guidance, Version 1.1. Last Updated: 23 November 2023.

JNCC (2025). Updated Effective Deterrent Ranges (EDRs) for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise Special Areas of Conservation (England, Wales & Northern Ireland). JNCC Report 803. [jncc.gov.uk]

JNCC, Natural England and Countryside Council Wales (CCW) (2010). Draft EPS Guidance - The protection of marine European Protected Species from injury and disturbance. Guidance for the marine area in England and Wales and the UK offshore marine area. Joint Nature Conservation Committee, Natural England and Countryside Council for Wales. October 2010.

JNCC, Department of Agriculture, Environment and Rural Affairs (DAERA) and Natural England (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland). June 2020.

Kongsberg (2022). Subject: Sound Levels from Kongsberg Multibeam' s and Single beams [online]. Available at: https://www.kongsberg.com/contentassets/b2b6dedbb90f4ebba97bbca5618ac8dc/multibeam-intensity-v2022.pdf (Accessed: June 2024).

Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M. (2001). Collisions between ships and whale'. Marine Mammal Science 17 (1) 30-75.

Leonard, D.M. and Oien, N.I. (2020). Abundance of cetaceans in the Northeast Atlantic estimated from Norwegian shipboard surveys conducted in 2014-2018. NAMMCO Scientific Publications, 11 https://doi.org/10. 7557 /3.4695.

Marine Scotland. (2020). The protection of Marine European Protected Species from injury and Disturbance. Guidance for Scottish Inshore Waters (July 2020 Version).

Marine Directorate (2023). Seal-haul-out sites: https://www.gov.scot/policies/marine-environment/seal-haul-out-sites/ (Accessed: 22 April 2026).

North East Scotland Biological Records Centre (NESBReC) (2017) MAMMAL ATLAS OF NORTH-EAST SCOTLAND AND THE CAIRNGORMS. Available from: https://nesbrec.org.uk/Mammal%20Atlas%20of%20NE%20Scotland%20and%20the%20Cairngorms%202001-2015.pdf

North Atlantic Marine Mammal Commission (2022) Killer whale available at: Killer whale - NAMMCO

NatureScot (2020). Conservation and Management document for the Southern Trench MPA https://apps.snh.gov.uk/sitelink-api/v1/sites/10477/documents/59

NatureScot (2021). Moray Firth SAC Conservation and Management Advice. March 2021.

NatureScot (2023a). Firth of Tay and Eden Estuary SAC: https://sitelink.nature.scot/site/8257

NatureScot (2023b). Protected species: seals: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/protected-species-z-guide/protected-species-seals

NatureScot (2026). NatureScot comments on the Bellrock OfTDA Scoping Information Package (CNS REN OSWF E1- Bellrock Pre Application).

Natural England (2018). European Site Conservation Objectives for Berwickshire and North Northumberland Coast Special Area of Conservation Site Code: UK0017072. http://publications.naturalengland.org.uk/publication/5920077534724096

NMFS (National Marine Fisheries Service). (2024). Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0): Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts. U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NOAA Technical Memorandum NMFS-OPR-71, Office of Protected Resources, Silver Spring, MD. Available at: https://doi.org/10.25923/z6h7-5p93

Peterhead Port Authority. (2025). Peterhead Smith Quay Extension Environmental Impact Assessment. https://marine.gov.scot/sites/default/files/appendix_2_environmental_appraisal_rev1.pdf

Quick, N.J., Arso Civil, M., Cheney, B., Islas-Villanueva, V., Janik, V.M., Thompson, P.M. & Hammond, P.S. (2014). *The east coast of Scotland bottlenose dolphin population: improving understanding of ecology outside the Moray Firth SAC*. OESEA2 Supporting Document No. 14D/086. Department of Energy and Climate Change (DECC), UK

Robinson, K.P., Tetley, M.J., Gay Mitchelson-Jacob, E. (2009) The distribution and habitat preference of coastally occurring minke whales (*Balaenoptera acutorostrata*) in the outer southern Moray Firth, northeast Scotland. J Coast Conserv 13:39–48 DOI 10.1007/s11852-009-0050-2

Rogan, E, Breen, P, Mackey, M, Cafiadas, A, Scheidat, M, Geelhoed, S & Jessopp, M (2018). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017. Department of Communications, Climate Action & Environment and National Parks and Wildlife Service (NPWS), Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland. 297pp. https://secure.dccae.gov.ie/downloads/SDCU DOWNLOAD/ObSERVE Aerial Report.pdf.

Special Committee on Seals (2025). Scientific advice on matters related to the management of seal populations: 2025. Natural Environment Research Council (NERC), Special Committee on Seals, Sea Mammal Research Unit (SMRU), University of St Andrews.

Scottish and Southern Energy (2020). EPS and Protected Sites and Species Risk Assessment. EPS and Protected Sites and Species Risk Assessment – North Coast and Orkney Islands. Document number A-302244-S02-REPT-001. Prepared by Xodus Group. https://marine.gov.scot/sites/default/files/risk_assessment_4.pdf

Scottish Natural Heritage (2017) The Scottish Marine Wildlife Watching Code: https://www.nature.scot/sites/default/files/2017-06/Publication%202017%20-%20The%20Scottish%20Marine%20Wildlife%20Watching%20Code%20SMWWC%20-%20Part%201%20-%20April%202017%20%28A2263518%29.pdf

Strong, P. and Morris, S.R. (2010). Grey seal (*Halichoerus grypus*) disturbance, ecotourism and the Pembrokeshire Marine Code around Ramsey Island. J. Ecotourism 9(2): 117–132.

Thomsen, F., Lüdemann, K., Kafemann, R. and Piper, W. (2006). Effects of offshore windfarm noise on marine mammals and fish, on behalf of COWRIE Ltd.

Vanderlaan, A. S., and C. T. Taggart. 2007. Vessel collisions with whales: the probability of lethal injury based on vessel speed. Marine Mammal Science 23:144-156.

Waggitt, J.J., Evans, P.G., Andrade, J., Banks, A.N., Boisseau, O., Bolton, M., Bradbury, G., Brereton, T., Camphuysen, C.J., Durinck, J. and Felce, T. (2019). Distribution maps of cetacean and seabird populations in the North-East Atlantic. Journal of Applied Ecology, 57(2), pp.253-269.

Wilson, S. (2014). The impact of human disturbance at seal haul-outs. A literature review for the Seal Conservation Society. Available at: http://www.pinnipeds.org/attachments/article/199/Disturbance%20for%20SCS%20-%20text.pdf