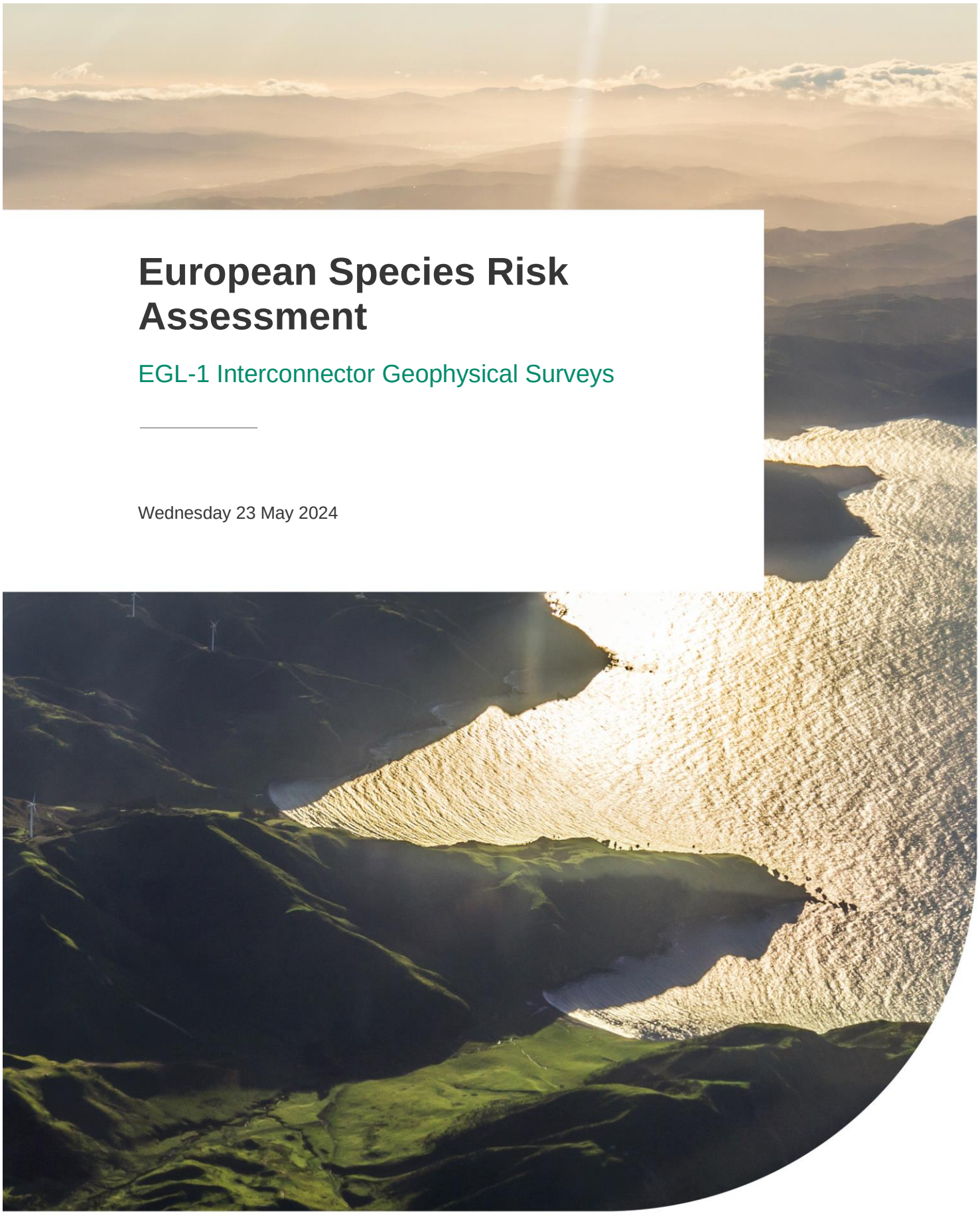


European Species Risk Assessment

EGL-1 Interconnector Geophysical Surveys

Wednesday 23 May 2024

OUR VISION

Working to create a world powered by renewable energy

natural power

Document history

Author	<Redacted> Environmental Consultant <Redacted> Environmental Consultant <Redacted> Environmental Consultant		22/04/2024
Checked	<Redacted> Diector	Technical	30/04/2024
Approved	<Redacted> Environmental	, Senior Consultant	14/06/2024

Client Details	
Contact	<Redacted>
Client Name	Prysmian Powerlink
Address	Via Chiese, 6 20126 – Milano (Italy)

Issue	Date	Revision Details
A	22/04/2024	First Draft
B	07/05/2024	Issued for client review
C	16/05/2024	Final

Local Office:

First Floor
Suite 6, The Mall
Beacon Court
Sandyford
Dublin 18
Tel: +353 (0) 169 713 44

Registered Co Number 522742

Registered Office:

Suite 6, First Floor
The Mall Beacon Court, Sandyford
Dublin 18

VAT No IE 319 4275 IH

Contents

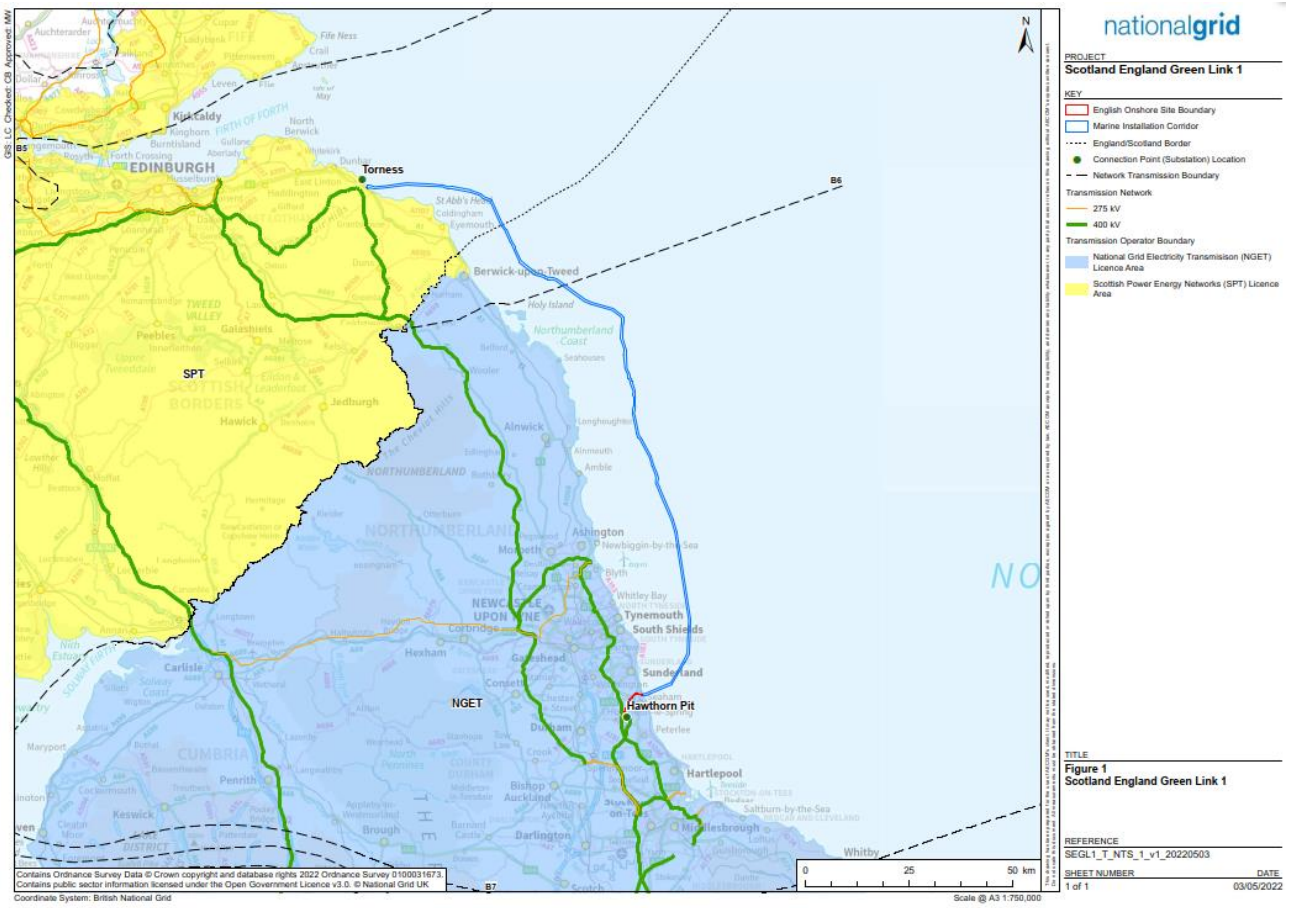
1. Introduction

The Scotland to England Green Link 1, or EGL-1 for short, is a proposed new offshore interconnector from Scotland to England. The project includes the development of a 525kV high voltage direct current (HVDC) electricity transmission interconnector running under the North Sea from the Torness area in East Lothian, Scotland, to Hawthorn Pit in County Durham, England. The submarine cable length is approximately 196 km between the 2 landings.

At the landfall locations the subsea cable will connect to onshore cables at a buried transition joint pit (TJP), which is an underground chamber constructed of reinforced concrete. To minimise impacts at the landfall the cables will be installed using an underground drilling technique referred to as Horizontal Directional Drilling (HDD). Prior to the detailed design of the HDD works, a geophysical survey is required to provide pre-construction survey data to inform clearance activities, refine cable routing, structure and cable installation.

This document assesses the potential risk to marine European Protected Species (EPS), basking sharks and seals from the proposed geophysical surveys in order to ascertain whether EPS and basking shark licences are required and can be awarded. This EPS Risk Assessment covers the portion of the cable route and geophysical surveys that are to take place in Scottish waters only.

Figure 1.1: Scotland - England Green Link 1 site location



2. Planned Geophysical Survey Work

2.1. Survey Methods

The survey will be conducted using electromagnetic or acoustic tools (Table 2.1) along the proposed HDD section of the cable route corridor. All equipment listed may not be required but has been included within this risk assessment to cover the full possible scenario. Where exact equipment specifications are currently unknown indicative ranges are provided in *italics*.

Table 2.1: Equipment proposed for the geophsyical survey

Equipment type	Equipment model	Frequency range (kHz)	Maximum Source Pressure Level (dB re 1 µPa @ 1 m)
Ultra-Short Baseline (USBL)	AAE Pyxis Omni INS+	18 - 32	194
Single Beam Echo Sounder (SBES)	*Teledyne Echotrac MKIII*	Low band: 3.5 - 50	210
Multi Beam Echo Sounder (MBES)	*Norbit iWBMS MBES*	200 - 700	*216*
Side Scan Sonar (SSS)	Klein 4900	455 - 900	*210 – 224*
Sub-Botto Profiler (SBP)	EdgeTech 3400-OTS	4 - 24	*240 – 250*

2.2. Proposed Vessels

The vessels to be used for the proposed geophysical surveys are the MV Validus Boat Catamaran, the MV Fortis Boat Landing Craft and the MV Virtus boat Landing Craft.

2.3. Timing and Duration

The earliest estimated date of mobilisation for the geophysical survey will be 1 July 2024. The aim is to have completed the surveys by the 17th July 2024. A more specific work timetable will be provided by Prysmian closer to the start of the works. Survey operations will be undertaken on a 24-hour basis where conditions allow.

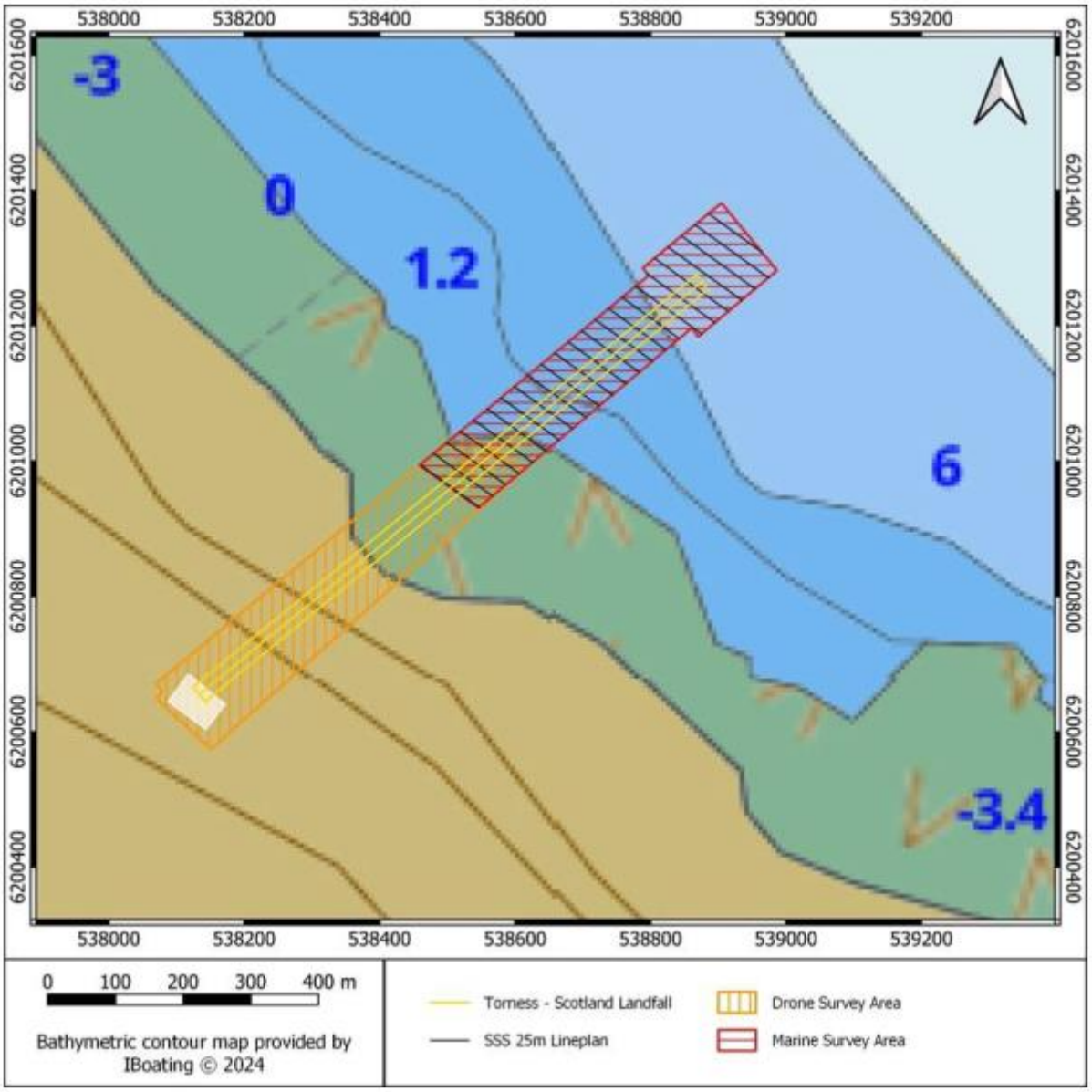
2.4. Survey Area

The geophysical survey area is in the nearshore waters south-east of Torness, Scotland. The coordinates of the survey area are listed in the Table 2.2 and a chart of the survey area is shown in Figure 2.1.

Table 2.2: Survey coordinates of survey within Scottish waters

Coordinate reference number	Longitude	WGS84 UTM Latitude
1	55°56.982'N	2°23.422'W
2	55°56.987'N	2°23.413'W
3	55°56.994'N	2°23.423'W
4	55°57.315'N	2°22.719'W
5	55°57.321'N	2°22.727'W
6	55°57.372'N	2°22.615'W
7	55°57.318'N	2°22.536'W
8	55°57.267'N	2°22.648'W
9	55°57.274'N	2°22.658'W
10	55°56.978'N	2°23.303'W
11	55°56.973'N	2°23.293'W
12	55°56.941'N	2°23.345'W

Figure 2.1 Proposed survey area at Torness, Scotland



3. Legal Requirement

All species of cetacean in waters around the UK are considered EPS under Annex IV of the Habitats Directive (Council Directive 92/43/EEC) which covers animal and plant species of community interest in need of strict protection.

The need to consider EPS in waters off Scotland comes from two articles of legislation, these are:

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland) which transposes the Conservation of Natural Habitats and Wild Fauna and Flora Directive (Council Directive 92/43/EEC; referred to as the Habitats Directive) into Scottish law. This legislation covers Scottish Territorial Waters; and
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (known as the Offshore Regulations) which transpose the Habitats Directive into UK law for all offshore activities. This legislation covers UK waters beyond the 12 nm limit.

Both of these regulations (collectively known as the 'Habitat and Offshore Marine Regulations') provide for the designation of protected European sites (Special Areas of Conservation (SACs)) and the protection of EPS as designated under the Habitats Directive.

The Offshore Regulations state in section 45, that it is an offence to:

- Deliberately capture, kill or injure any wild animal of a EPS, as listed under Annex IV of the Habitats Directive;
- Damage or destroy, or cause deterioration of the breeding sites or resting places of a EPS; and
- Deliberately disturb EPS (in particular disturbance which is likely to impair the ability of a significant group of animals of that species to survive, breed, rear, or nurture their young, or which might affect significantly their local distribution or abundance).

The Conservation of Habitats and Species Regulations 1994 (as amended in Scotland) state, under section 39, that it is an offence to:

- Deliberately or **recklessly** capture, kill or injure a wild animal of a EPS, as listed under Annex IV of the Habitats Directive;
- Damage or **recklessly** destroy, or cause deterioration of the breeding sites or resting places of an EPS; and
- Deliberately or **recklessly** disturb EPS (in particular disturbance which is likely to impair their ability to survive, breed, reproduce, nurture their young, migrate or hibernate, or which might affect significantly their local distribution or abundance).
- Disturb **any** EPS in a matter that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which is belongs;
- **Deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean) through Regulation 39 (2).**

The additional protection afforded by the Conservation of Habitats and Species Regulations 1994 (as amended in Scotland) has been shown in **bold** in the list above. It is therefore an offence to deliberately or recklessly disturb a single cetacean in Scottish Territorial Waters.

In addition, any means of capturing or killing which is indiscriminate and capable of causing the local disappearance of - or serious disturbance to - any population of EPS is an offence.

Licences may be granted by the Marine Directorate (on behalf of the Scottish Ministers) which would allow otherwise illegal activities to go ahead.

Three tests must be passed before a license can be granted:

1. The license must relate to one of the purposes referred to in Regulation 44;
2. There must be no satisfactory alternative (Regulation 44, 3a); and
3. The action authorised must not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status (FCS) in their natural range (Regulation 44, 3b).

FCS is defined in the Habitats Directive as the following:

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

The proposed Cable Route and Development Area are both within the 12 nm limit of Scotland's Territorial Waters. However, sound from the proposed works has the potential to affect animals within both Scottish Territorial and offshore waters. Both the Habitats and Offshore Regulations therefore apply.

3.1. Guidance

The Marine Directorate and Scottish Natural Heritage (SNH) (now Nature Scot) produced guidance for Scottish inshore waters 'The protection of Marine European Protected Species from injury and disturbance' in March 2014 (Marine Scotland and SNH, 2014). This guidance was updated in July 2020 (Marine Scotland and SNH, 2020). The Marine Directorate recognise that the guidance '…reflects a precautionary approach…' to the interpretation of the Habitats Directive with regards to EPS and requires the careful examination of the potential impact of proposed offshore activities, and the resultant noise produced, on individual animals likely to be present at the location.

The guidance states that the two main potential causes of death or injury are physical contact (with a vessel) and anthropogenic noise. Likelihood of disturbance for individuals includes factors such as:

- Spatial and temporal distribution of the animal in relation to 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 of the animal to remain within the areas (e.g. food availability).

Likelihood of potential impacts should include the following considerations:

- Type of activity;
- Duration and frequency of the activity;
- Extent of the activity;
- Timing and location of the activity; and
- Other known activities in the area at the same time.

4. EPS in Region of the EGL-1 Interconnector

4.1. Cetaceans

Four cetacean species are considered to occur on a relatively common basis in the vicinity of the Scottish portion of the EGL-1 Interconnector: Harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus),* white beaked dolphin (*Lagenorhynchus albirostris*) and minke whale (*Balaenoptera acutorostrata*) (Arso Civil *et al*. 2021, Gilles *et al.* 2023, IAMMWG, 2023).

Occasional visitors to the region include common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), white-sided dolphin (*Lagenorhynchus acutus*), killer whale (*Orcinus orca*), long-finned pilot whale (*Globicephala melas*) and fin whale (*Balaenoptera physalus)*. Sightings of humpback whale (*Megaptera novaeangliae*) and sei whale (*Balaenoptera borealis*) have also been recorded in recent years[1].

4.1.1. Harbour Porpoise

The harbour porpoise is widespread around the UK, including the North Sea, Irish Sea, the seas west of Ireland and Scotland, and northwards to Orkney and Shetland. Since the 1990s it has become much less common around the Northern Isles, but it appears to be returning to the English Channel and southern North Sea, where it was infrequent in the late 1980s. The recent SCANS-IV survey results, the latest in a series of large-scale surveys for cetaceans in European Atlantic waters, show that the harbour porpoise population in the North Sea is stable and there is very little difference in the estimated abundance from 2016 – 2022 (Gilles *et al.,* 2023).

Harbour porpoise density in the vicinity of the Scottish portion of the EGL-1 Interconnector, from SCANS-IV, is provided in **Error! Reference source not found.**. The relevant Inter Agency Marine Mammal Working Group (IAMMWG) Management Unit (MU) abundance estimate is also provided and can be considered as the reference population.

The closest designated site for harbour porpoise (Southern North Sea SAC) is approximately 198 km from the Scottish portion of the EGL-1 Interconnector.

Table 4.1: Harbour porpoise density and reference population abundance

Density (animals per km2)	Management Unit	Abundance	95% confidence interval (CI)
0.5985	North Sea	346,601	289,498 - 419,967

Source: Gilles et al. (2023) – SCANS-IV Block NS-D; IAMMWG (2023)

4.1.2. Bottlenose Dolphin

Both inshore and offshore bottlenose dolphin ecotypes are recognised in UK waters. In the absence of a density provided for bottlenose dolphins in the recent SCANS-IV survey (Gilles *et al*., 2023), the density of bottlenose dolphins in the vicinity of the of the Scottish portion of the EGL-1 Interconnector, from SCANS-III, is provided in Table 5.2 (Hammond *et al.* 2021). The relevant IAMMWG MU abundance estimate is also provided and can be considered as the reference population.

The closest designated site for bottlenose dolphins (Moray Firth SAC) is approximately 280 km from the Scottish portion of the EGL-1 Interconnector, however, with the southerly expansion of the east Scotland bottlenose dolphin population there is likely high connectivity between the EGL-1 Interconnector and animals from the population which uses this SAC.

[1] https://www.seawatchfoundation.org.uk/recentsightings/

Table 4.2: Bottlenose dolphin reference population abundance estimates

Density (animals per km^2)	Management Unit	Abundance	95% confidence interval (CI)
0.0298	Greater North Sea	2,022	548 - 7453

Source: Hammond et al. (2021) – SCANS-III Block R; IAMMWG (2023)

4.1.3. White-beaked Dolphin

White-beaked dolphins are detected predominantly offshore in UK waters and their highest densities have been estimated around the Shetland Islands, northern North Sea and northwest Scotland (Gilles *et al*., 2023). The density of white-beaked dolphins in the vicinity of the Scottish portion of the EGL-1 Interconnector, from SCANS-IV, is provided in Table 4.3. The relevant IAMMWG MU abundance estimate is also provided and can be considered as the reference population.

There are no designated sites (SACs) for white-beaked dolphins (the species is not listed on Annex II of the Habitats Directive).

Table 4.3: White-beaked dolphin density and reference population abundance

Density (animals per km2)	Management Unit	Abundance	95% confidence interval (CI)
0.0799	Celtic and Greater North Seas	43,951	28,439 - 67,924

Source: Gilles et al. (2023) – SCANS-IV Block NS-D; IAMMWG (2023).

4.1.4. Minke Whale

Minke whales are the smallest of the baleen whales and are widespread around the UK. There was some evidence that minke whale distribution in the North Sea was shifting south between 1994 and 2005 (Hammond *et al.* 2013). In sequential surveys the distribution seemed to stay the same until the observed distribution from the recent SCANS-IV survey showed many sightings further south in the North Sea than previously seen. There is no evidence of a change in abundance for minke whales in the North Sea from 1989-2022 (Gilles *et al*., 2023).

Minke whale density in the vicinity of the Scottish portion of the EGL-1 Interconnector, from SCANS-IV, is provided in Table 4.4. Block NS-D is the highest density block for minke whales from the SCANS-IV survey. The relevant IAMMWG MU abundance estimate is also provided and can be considered as the reference population.

The closest protected area for minke whale (Southern Trench MPA) is approximately 168 km from the Scottish portion of the EGL-1 Interconnector at its closest point. There are no designated sites (SACs) for minke whales (the species is not listed on Annex II of the Habitats Directive).

Table 4.4: Minke whale density and reference population abundance

Density (animals per km2)	Management Unit	Abundance	95% confidence interval (CI)
0.0419	Celtic and Greater North Seas	20,118	14,061 - 28,786

Source: Gilles et al. (2023) – SCANS-IV Block NS-D; IAMMWG (2023).

4.2.

4.2. Marine Turtles

In addition to marine mammals, there are up to five species of marine turtle which have been sighted in British waters. The leatherback turtle (*Dermochelys coriacea*) is the most commonly recorded species in UK waters however the species is thought to be at the most extreme northern limit of its natural range in UK waters (BEIS, 2016). Sightings in the North Sea are uncommon with most UK sightings occurring in the Irish Sea (BEIS, 2016). Due to the low likelihood of occurrence of marine turtles in the vicinity of the Scottish portion of the EGL-1 Interconnector, they have not been considered further. However, any mitigation proposed for cetacean EPS will also be applied to marine turtles.

4.3. Other (non-EPS) Species

4.3.1. Basking Shark

Basking sharks are protected under Schedule 5 of the Wildlife and Countryside Act 1981. There have been few sightings of this species in the North Sea (Drewery, 2012; Wilson *et al*., 2020) which indicates a low abundance in the vicinity of the Scottish portion of the EGL-1 Interconnector. Due to their habit of feeding at slow speed very close to the surface, basking sharks are potentially at risk from collision with boat traffic (Wilson *et al*., 2020). In contrast, although there is little information on sound detection in basking sharks, there is no direct evidence of sound causing basking shark mortality or stress (Wilson *et al*., 2020). Although the potential effects of noise on basking sharks have not therefore been assessed, any mitigation measures proposed for EPS will also be applied to basking sharks.

4.3.2. Seals

Two seal species occur on a relatively common basis in the North Sea: Grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) (Carter *et al*., 2022).

Grey seals

Grey seals are among the rarest seals in the world; the UK population represents about 40% of the world population and 95% of the EU population. Grey seals spend most of the year at sea and may range widely in search of prey. They come ashore in autumn to form breeding colonies on rocky shores, beaches, in caves, occasionally on sandbanks, and on small largely uninhabited islands.

In the east of Scotland the most recent estimate of grey seal pup production is 7,261 pups (2019) and the most recent August count of adult grey seals is 2,707 (2021) (SCOS, 2022).

The closest SAC which lists grey seal as a qualifying interest feature (Berwickshire and North Northumberland Coast SAC) is 9.4 km from the Scottish portion of the EGL-1 Interconnector at its closest point. The Isle of May SAC is approximately 26 km from the Scottish portion of the EGL-1 Interconnector at its closest point.

Harbour seals

Harbour seals have a near-circumpolar distribution, with at least four subspecies recognised. Only the eastern Atlantic subspecies occurs in Europe. The UK population represents about 5% of the world population and approximately 50% of the EU population. Harbour seals are the characteristic seal of sandflats and estuaries but are also found on rocky shores in Scotland. As pups swim almost immediately after birth, seals can breed on sheltered tidal areas where banks allow access to deep water. Seals may range widely in search of prey, but individuals often return to favoured haul-out sites.

The closest SAC which lists harbour seal as a qualifying interest feature (Firth of Tay and Eden Estuary) is approximately 53 km from the Scottish portion of the EGL-1 Interconnector at its closest point.

The absolute density of both grey and harbour seals in the vicinity of the Scottish portion of the EGL-1 Interconnector, calculated using the relative density of at-sea distribution estimates from Carter *et al.* (2022), is provided in Table 4.5. SCOS (2022) provides minimum abundance estimates for the East Scotland Seal Management Area (where the Scottish portion of the EGL-1 Interconnector is located) for both seal species and can be considered as the reference population (Table 4.5).

Table 4.5: Seal density and reference population abundance

Species	Density (animals per km^2)	Management Unit	Abundance
Grey seal	0.3016	East Scotland	10,106
Harbour seal	0.0051	East Scotland	262

Source: Carter et al. (2022), SCOS 2022.

5. Risk Assessment

During the proposed geophysical survey, there is potential for marine EPS and seals to be impacted. The main activities associated with the work which may impact these species are:

- Increased anthropogenic noise from geophysical survey and positioning equipment; and
- Collision risk (with the survey vessel(s)).

Increased anthropogenic noise from the survey vessels themselves has been considered as a potential impact but has not been assessed individually. This is because noise from the survey vessel(s) is unlikely to significantly increase vessel noise in this area and any displacement due to noise from the survey vessels alone is likely to be small-scale and temporary. The vessels will be on survey, and therefore emitting other sounds, for the majority of the time they are at sea. This potential impact (increased anthropogenic noise from geophysical survey and positioning equipment) has been assessed.

5.1. Overview of the Potential Effects of Anthropogenic Noise on Marine Mammals

It is widely documented that marine mammals are sensitive to underwater noise with the level of sensitivity depending on the hearing ability of the species (Table 5.1).

Potential effects of underwater noise on marine mammals can be summarised as:

- Auditory injury; and
- Behavioural responses.

Table 5.1: Marine mammal hearing ranges

Functional hearing group	Example species	Estimated auditory bandwidth (kHz)
Low frequency cetacean	Minke whale	0.007 - 35
High frequency cetacean	Bottlenose dolphin, white-beaked dolphin	0.15 - 160
Very high frequency cetacean	Harbour porpoise	0.2 - 180
Phocid carnivores in water	Harbour seal, grey seal	0.05 - 86

Source: NOAA (2018); Southall et al. (2019).

5.1.1. Auditory Injury (PTS)

Southall *et al.* (2019) provide thresholds for received sound levels that have the potential to induce the onset of auditory injury (Permanent Threshold Shift – PTS) in marine mammals (Table 5.2). Sound from geophysical survey and positioning equipment is generally impulsive (whereas sound from other sources e.g., vessels, is non-impulsive i.e., continuous). It is worth noting that the criteria refer only to the 'onset' of injury risk rather than a confident assessment of an occurrence of the effect.

JNCC *et al*. (2010) proposes that a permanent shift in the hearing thresholds (PTS) of an EPS would constitute an injury offence. The Southall *et al*. criteria for injury are based on quantitative sound level and exposure thresholds over which PTS onset could occur (Table 5.2). If it is likely that an EPS could become exposed to sound at or above the levels proposed, then there is a risk that an injury offence could occur.

Table 5.2: Permanent threshold shift (PTS) thresholds

Functional hearing group	Example species	Impulsive		Non-impulsive
		SPLpeak (dB re 1 µPa)	SEL (dB re 1 µPa^{2}s)	SEL (dB re 1 µPa^{2}s)
Low frequency cetacean	Minke whale	219	183	199
High frequency cetacean	Bottlenose dolphin White-beaked dolphin	230	185	198
Very high frequency cetacean	Harbour porpoise	202	155	173
Phocid carnivores in water	Harbour seal Grey seal	218	185	201

Source: Southall et al. (2019).

5.1.2. Behavioural Responses

Behavioural responses may arise where an activity is audible (see Table 5.1) and at a level above ambient noise. However, the most likely response will be temporary, for example, there is evidence that short-term disturbance caused by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises (Thompson *et al.*, 2013). For harbour porpoises, it is recommended that a 5 km effective deterrence range (EDR) is used for the type of equipment to be used in the proposed geophysical works (e.g. SBP, MBES) (JNCC, 2020). Without suitable alternative data being available it is assumed the same deterrence ranges applies to the other marine mammals assessed here. This assumption is likely conservative.

5.2. Increased Anthropogenic Noise from Geophysical Survey and Positioning Equipment

The geophysical survey and positioning equipment used during the survey will increase levels of anthropogenic noise in the marine environment as it operates by producing and receiving sound. A summary of the equipment types proposed for use is provided in Table 2.1.

5.2.1. Prediction of Potential Impact of MBES and SSS

The high frequency sounds produced by the Multi Beam Echo Sounder (MBES) and Side Scan Sonar (SSS) all fall outside the hearing range of the marine mammals assessed (Table 2.1, Table 5.1). There is therefore no risk of auditory injury or behavioural responses from the use of this equipment and no mitigation is required. This is supported by the advice from the JNCC, who do not advise the use of mitigation for the use of MBES in shallow waters (<200 m) (JNCC, 2017). This is because it is thought that the high frequency sounds produced by MBES attenuate more quickly than the lower frequencies used in deeper waters.

5.2.2. Prediction of Potential Impact of USBL, SBES and SBP

5.2.2.1. Auditory Injury

USBL

The sounds produced by the USBL equipment do fall within the hearing range of the marine mammals assessed (Table 2.1, Table 5.1). However, these sounds will not reach the SPL thresholds (Table 5.2) therefore there is no risk of auditory injury onset from the use of this equipment and no mitigation is required.

SBES and SBP

The sounds produced by the SBES and SBP do fall within the hearing range of the marine mammals assessed (Table 2.1, Table 5.1). The estimated maximum source level of the SBES (210 dB re. 1 µPa) and SBP (maximum SPL 250 dB re. 1 µPa) has the potential to induce the onset of instantaneous PTS at very close-range (Southall *et al*., 2019). However, it is likely that the presence of the survey vessel(s) will lead to small-scale temporary displacement of marine mammals, resulting in them being at sufficient distance from the survey equipment so as not to be susceptible to instantaneous auditory injury. Nonetheless, to remove the risk of auditory injury from the use of the SBES and SBP, mitigation will be required (see Section 6).

5.2.2.2. Behavioural Responses

The sound emitted by the USBL, SBES and SBP falls within the hearing range of the marine mammals assessed and therefore has the potential to cause animals to respond behaviourally (Table 5.1). However, these pieces of equipment will likely be used as the survey vessel(s) is moving, and not stationary for a prolonged period, any behavioural avoidance in a location will likely be temporary and will not result in long-term displacement (Thompson *et al*., 2013).

Using the EDR of 5 km recommended for geophysical surveys for harbour porpoise (JNCC, 2020), the number of individuals for each marine mammal species assessed which have the potential to be affected has been estimated (Table 5.3). The area of potential effect was estimated using the formula: area = πr^2 = 78.54 km^2 (where r = 5 km). For all species, the number of animals and the percentage of the reference population estimated to be disturbed was estimated using the density estimates and reference population abundance estimates presented in Section 4.

Considering the estimates provided in Table 5.3 there is potential for temporary behavioural avoidance from all marine mammal species assessed quantitatively as a result of the use of USBL, SBES and SBP during the geophysical surveys. However, any such avoidance is very unlikely to significantly affect the local distribution or abundance of any species (the largest percentage of a reference population which has the potential to be affected is 0.234% for grey seals, which is deemed negligible).

Table 5.3: The number of individuals estimated to have the potential to be disturbed by sound emitted by the USBL, SBES and SBP systems

Species	Number of individuals within the area of potential effect	Percentage of reference population which has the potential to be affected
Harbour porpoise	47	0.014
Bottlenose dolphin	2	0.099
White-beaked dolphin	6	0.014
Minke whale	3	0.016
Grey seal	24	0.234

Species	Number of individuals within the area of potential effect	Percentage of reference population which has the potential to be affected
Harbour seal	<1	0.153

5.3. Collision Risk

Vessel strikes are a known cause of mortality in marine mammals and basking sharks (Laist *et al*., 2001). Non-lethal collisions have also been documented (Laist *et al*., 2001; Van Waerebeek *et al*., 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections or predation.

Avoidance behaviour by marine mammals (e.g., bottlenose dolphins), is often associated with fast, unpredictable boats such as speedboats and jet-skis (Bristow and Reeves, 2001; Gregory and Rowden, 2001; Buckstaff, 2004), while neutral or positive reactions for other species have been observed with larger, slower moving vessels such as cargo ships (Sini *et al*., 2005).

5.3.1. Prediction of Potential Impact

The proposed survey work will require a maximum of two vessels following predetermined survey lines. The consistent speed and direction of travel employed will mean that animals can predict the path of the vessels and potentially alter their direction of travel, thus reducing the risk of collision. Additionally, the presence of up to two survey vessels is unlikely to significantly increase the vessel traffic in the area. Therefore, the increase in potential collision risk for marine mammals and basking sharks is considered to be negligible. During transits, when vessel speed may be greater, transit watches (section 6.2) will be conducted.

6. Mitigation Measures

6.1. Use of SBES and SBP

In order to ensure the absence of animals in the vicinity of the geophysical survey works, and to reduce the risk of auditory injury, mitigation measures will be enforced prior to use of the SBES and SBP (and any other equipment assessed to have the potential to induce the onset of auditory injury). The mitigation will follow the JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017) and the JNCC guidance for the use of Passive Acoustic Monitoring in UK waters for minimising the risk of injury to marine mammals from offshore activities (JNCC, 2023).

The mitigation measures are as follows:

- A non-dedicated but fully briefed Marine Mammal Observer (MMO) will undertake a pre-work search of a 500 m mitigation zone for 30 minutes prior to use of the equipment. If a marine mammal is detected within the mitigation zone then there will be a minimum 20-minute delay in starting the equipment from the time of the last detection of the animal within the mitigation zone. If marine mammals are detected during operation of the equipment there is no requirement to stop use of the equipment.
- A passive acoustic monitoring (PAM) operator[2] will undertake a pre-work acoustic search prior to the use of the equipment when a visual search by the MMO is not possible (e.g. high sea state conditions, low visibility or low light levels). Either a towed PAM system (with multiple hydrophones to allow distance determination to adequately monitor the 500 m mitigation zone) or a dipping hydrophone (any detections will be assumed to have occurred within the mitigation zone) will be used. If a marine mammal is detected the same delay protocol will be applied as for a visual search.
- Soft starts will be employed where equipment has the capability.
- If there are unplanned breaks in the operation of the equipment of greater than 10 minutes, then a full pre-work search will be carried out by either the MMO or PAM operator, where appropriate, before the equipment is turned back on. If the MMO or PAM operator continues monitoring for marine mammals during the breakdown period this time can contribute to the 30 minute pre-work search.
- Post-survey reports will be provided by the MMO and PAM operator following the JNCC guidelines for reporting (JNCC, 2017, JNCC, 2023).

6.2. Transit Watches

An observer on the bridge of all vessels will keep watch for EPS, basking sharks and seals during all transits to and from the work sites. Any sightings will be communicated to the Officer on watch as soon as is practicable and the following actions implemented:

- The Officer on watch will ensure that EPS, basking sharks and seals are avoided where safe to do so; and
- The Officer on watch will minimise high powered manoeuvres or rapid changes of course where this does not impair safety.

The observer may be the Master of the vessel, a member of the bridge crew, another member of the ship's crew or an MMO as appropriate. Observers will be briefed on the Scottish Marine Wildlife Watching Code[4] and Basking Shark Code of Conduct[5].

---

[2] PAM operators will be suitably trained and have an appropriate level of experience of conducting PAM for mitigation.

[4] Scottish Marine Wildlife Watching Code | NatureScot

[5] Download.ashx (sharktrust.org)

7. Assessment of Potential Offence

7.1. Increased Anthropogenic Noise from Geophysical Surveys

MBES and SSS

The conclusions of the assessment for effects as a result of increased anthropogenic noise from the use of MBES and SSS geophysical survey equipment are that:

- There is no potential for auditory injury to EPS; and
- There is no potential for behavioural responses from EPS (see section 5.2.1).

USBL, SBES and SBP

The conclusions of the assessment for effects as a result of increased anthropogenic noise from the use of USBL, SBES and SBP geophysical survey and positioning equipment is that:

- There is no potential for auditory injury to EPS from the use of a USBL;
- With mitigation for the SBES and SBP (see section 6.1) there is no potential for auditory injury to EPS (see section 5.2.2.1); and
- There is the potential for EPS to respond behaviourally (see , section 5.2.2.2). However, any disturbance is deemed short-term, sporadic, reversible, and without any likely negative effect on the species.

Considering the conclusion from this work, an **EPS licence (to disturb) will be required and can be granted** as advised from the guidance provided in the Conservation of Habitats and Species Regulations 1994 (as amended in Scotland).

7.2. Collision Risk

The risk of collision with vessels involved in the proposed geophysical survey work is negligible for the species likely to be present in this area. Nonetheless, watches will be undertaken during transits whilst vessels will be moving more quickly.

Considering that the presence of up to two survey vessels is unlikely to significantly increase the vessel traffic in the area then it is concluded that an EPS licence will not be required for this aspect of the proposed work.

8. References

Arso Civil, M., Quick, N. J., Mews, S., Hague, E., Cheney, B., Thompson, P. M., & Hammond, P. S. (2021). Improving understanding of bottlenose dolphin movements along the east coast of Scotland. Final report.: Report number SMRUC-VAT-2020-10 provided to European Offshore Wind Deployment Centre (EOWDC). March 2021 (unpublished).

BEIS (2016) Guidance. Oil and gas: environmental data. June 2016 [Online]. Available from: https://www.gov.uk/guidance/oil-and-gas-environmental-data

Bristow, T. and Reeves, E.I.S. (2001). Site fidelity and behaviour of bottlenose dolphins (Tursiops truncatus) in Cardigan Bay, Wales. Aquatic Mammals 27: 1-10.

Buckstaff, K.C. (2004). Effects of watercraft noise on the acoustic behaviour of bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, Florida. Marine Mammal Science 20: 709-725.

Carter, M.I.D., Boehme, L., Cronin, M.A., Duck, C.D., Grecian, W.J., Hastie, G.D., Jessopp, M., Matthiopoulos, J., McConnell, B.J., Miller, D.L., Morris, C.D., Moss, S.E.W., Thompson, D., Thompson, P.M. & Russell, D.J.F. (2022). Sympatric seals, satellite tracking and protected areas: Habitat-based distribution estimates for conservation and management. *Front. Mar. Sci*. **9.** Available online at: https://doi.org/10.3389/fmars.2022.875869

Drewery, H.M. (2012). Basking shark (*Cetorhinus maximus*) literature review, current research and new research ideas. Marine Scotland Science Report 24/12.

Hammond, PS, Lacey, C, Gilles, A, Viquerat, S, Börjesson, P, Herr, H, Macleod, K, Ridoux, V, Santos, MB, Scheidat, M, Teilmann, J, Vingada, J & Øien, N (2021). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. SCANS-III project report 1, 39 pp.

Hammond, PS, Macleod, K, Berggren, P, Borchers, DL, Burt, ML, Cañadas, A, Desportes, G, Donovan, GP, Gilles,A, EastermGillespie, D, Gordon, J, Hedley, S, Hiby, L, Kuklik, I, Leaper, R, Lehnert, K, Leopold, M, Lovell, P, Øien, N, Paxton, C, Ridoux, V, Rogan, E, Samarra, F, Scheidat, M, Sequeira, M, Siebert, U, Skov, H, Swift, R, Tasker, ML, Teilmann, J, Van Canneyt, O & Vázquez, JA. (2013). Cetacean abundance and distribution in European Atlantic shelf waters to inform conservation and management. Biological Conservation 164: 107-122.

Gilles, A., Authier, M., Ramirez-Martinez, N.C., Araújo, H., Blanchard, A., Carlström, J., Eira, C., Dorémus, G., Fernández-Maldonado, C., Geelhoed, S.G.V., Kyhn, L., Laran, S., Nachtsheim, D., Panigada, S., Pigeault, R., Sequeira, M., Sveegaard, S., Taylor, N.L., Owen, K., Saavedra, C., Vázquez-Bonales, J.A., Unger, B. and Hammond, P.S. (2023). Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys. Final report published 29 September 2023. 64 pp. Available from: https://tinyurl.com/3ynt6swa

Gregory, P.R. and Rowden, A.A. (2001). Behaviour patterns of bottlenose dolphins (*Tursiops truncatus*) relative to tidal state, time of day and boat traffic in Cardigan Bay, West Wales. Aquatic Mammals 27: 105-113.

IAMMWG. (2023). Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091.

JNCC (2023) JNCC guidance for the use of Passive Acoustic Monitoring in UK waters for minimising the risk of injury to marine mammals from offshore activities. JNCC, Peterborough. https://hub.jncc.gov.uk/assets/fb7d345b-ec24-4c60-aba2-894e50375e33

JNCC (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland). JNCC Report No. 654, JNCC, Peterborough, ISSN 0963- 8091.

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

JNCC, Natural England and Countryside Council for Wales. (2010). 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.

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

Marine Scotland and SNH. (2014). The protection of Marine European Protected Species from injury and disturbance. Guidance for Scottish Inshore Waters. March 2014.

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

NOAA. (2018). 2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. Available from: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustictechnical-guidance

SCOS (2022). Scientific Advice on Matters Related to the Management of Seal Populations: 2022. Natural Environment Research Council Special Committee on Seals. Available from: https://www.smru.st-andrews.ac.uk/scos/scos-reports/

Sini, M.I., Canning, S.J., Stockin, K.A. and Pierce, G.J. (2005). Bottlenose dolphins around Aberdeen harbour, northeast Scotland: a short study of habitat utilization and the potential effects of boat traffic. Journal of the Marine Biological Association of the UK 85: 1547-1544.

Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P. and Tyack, P.L. (2019). Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals 45(2): 125-232.

Thompson, P.M., Brookes, K.L., Graham, I.M., Barton, T.R., Needham, K., Bradbury, G. and Merchant, N.D. (2013). Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proceedings of the Royal Society B 280: 20132001.

Van Waerebeek, K., Baker, A.N., Félix, F., Gedamke, J., Iñiguez, M., Sanino, G.P., Secchi, E., Sutaria, D., van Helden, A. and Wang, Y. (2007). Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Latin American Journal of Aquatic Mammals 6(1): 43-69.

Wilson, C.M., Wilding, C.M. and Tyler-Walters, H. (2020). *Cetorhinus maximus* Basking shark. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews.

natural power

Creating a better environment

naturalpower.com
sayhello@naturalpower.com

25 years

For full details on our ISO and other certifications, please visit our website.