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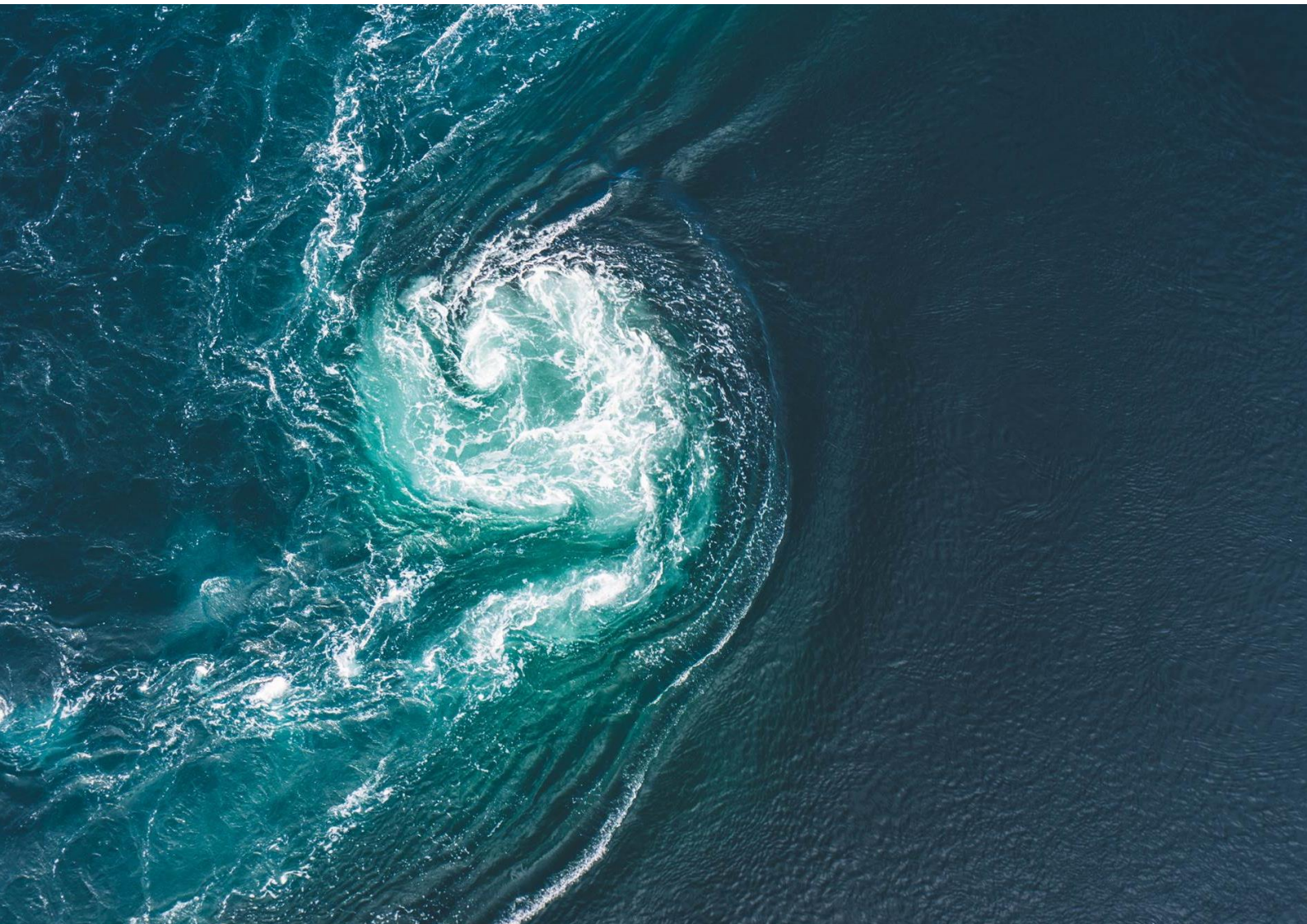
EGS Ltd

DATE
05 April 2024

EPS and Basking Shark Risk Assessment

Telecom Cable System



DOCUMENT DETAILS

DOCUMENT TITLE	EPS and Basking Shark Risk Assessment
DOCUMENT SUBTITLE	Telecom Cable System
PROJECT NUMBER	0731092
Date	08 April 2024
Version	1.1
Author	[Redacted]
Client name	EGS Ltd

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
0.1	000	[Redacted]				
0.2	000	[Redacted]	[Redacted]			
1.1	000	[Redacted]				

SIGNATURE PAGE

EPS and Basking Shark Risk Assessment

Telecom Cable System

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

Acronyms	Description	Definition
2DUHR	Two-dimensional Ultra High Resolution	A multichannel seismic system consisting of a sound source and detectors along a straight line
AEP	Auditory Evoked Potential	Reflects auditory ability to perceive a set frequency via brain stimulus
CES	Coastal East Scotland	Cetacean (bottlenose dolphin) management unit
CGNS	Celtic and Greater North Seas	Cetacean (bottlenose dolphin) management unit
CPT	Cone Penetration Test	Method for determining geotechnical engineering properties by pushing a steel cone vertically into the substrate
ESO	Electricity System Operator	Electricity utility company that owns and operates electricity transmission networks (e.g. National Grid plc in the UK)
EPS	European Protected Species	Species listed on Schedule 2 and Schedule 4 of the Habitats Regulations
GCR	Geological Conservation Review	Designated sites with geological or geomorphological features of national and international importance
GNS	Greater North Sea	Cetacean (bottlenose dolphin) management unit

Acronyms	Description	Definition
HF	High Frequency	Cetacean functional hearing group from
HVDC	High Voltage Direct Current	Power transmission system that uses direct current for electric power transmission, with voltages generally between >100kV
IUCN	International Union for Conservation of Nature	International organisation dedicated to the conservation and sustainable use of natural resources, including the protection and designation of endangered species
JNCC	Joint Nature Conservation Committee	A public body that advises the UK Government and devolved administrations on UK and international nature conservation
LF	Low Frequency	Cetacean functional hearing group
MBES	Multibeam Echosounder	A geophysical survey device used to map the seabed using multiple swathes of sonar
MMO	Marine Mammal Observer	A professional trained to identify and record the presence of marine mammals within an area of interest
MPA	Marine Protected Area	Areas of ocean established to protect habitats, species, and processes essential for healthy functioning of marine ecosystems
MU	Management Unit	Spatial zones based on the presence of known populations, with divisions based on ecological classifications and divisions relevant to human activities
NCMPA	Nature Conservation Marine Protected Area	Scottish Marine Protected Areas (MPAs)
NMPi	National Marine Plan Interactive	Online mapping tool provided by Marine Scotland
NS	North Sea	Cetacean (bottlenose dolphin) management unit
OWF	Offshore Wind Farm	An array of turbines located offshore (either floating or on the seabed) that generate electricity through wind energy
PAM	Passive Acoustic Monitoring	Monitoring technique that uses a hydrophone to detect marine mammal presence through vocalisations
PTS	Permanent Threshold Shift	Permanent change in the frequencies audible to an individual caused by exposure to excessive sound
SAC	Special Area of Conservation	Areas designated to protect Annex I habitats and/or Annex II species
SBES	Single Beam Echo Sounder	A geophysical survey device used to map the seabed using a single sonar beam

Acronyms	Description	Definition
SBP	Sub Bottom Profiler	Device used to characterise sub-seabed sedimentation and geology using pressure waves (acoustic or seismic), typically low frequency
SCANS	Small Cetacean Abundance in the North Sea	A series of large-scale surveys for cetaceans in European Atlantic waters
SEL	Sound Exposure Level	Measurement of the total acoustic energy (energy flux density) of the pressure wave over a measurement period
SPA	Special Protected Area	Protected areas in the UK designated for the protection of birds
SPL	Sound Pressure Level	Unit used to characterise continuous sound and vibration
SSS	Side Scan Sonar	Sonar device that emits high-frequency acoustic pulses between the source and the seabed across a wide-angle perpendicular to the direction of travel, to map seabed morphology and texture
SSSI	Site of Special Scientific Interest	Formal conservation designation for an area of interest to science due to rare species or geological or physical features
TTS	Temporary Threshold Shift	Temporary change in the frequencies audible to an individual caused by exposure to excessive sound, recoverable over a period of time
USBL	Ultra-Short Baseline	A method of underwater acoustic positioning consisting of a transponder mounted on a towed/tethered device that transmits a signal to a receiver on the underside of the vessel
USV	Uncrewed Surface Vessel	A small boat or ship that operates on the water surface without a crew
VHF	Very High Frequency	Cetacean functional hearing group

EXECUTIVE SUMMARY

The EGS Telecommunication Cable Route Survey is a planned geophysical and geotechnical survey between the Eastern boundary of the UK Exclusive Economic Zone (EEZ) and the Western limit of the UK EEZ, with a short section through Scottish inshore waters. The total route length in UK/Scottish Waters is just over 991km, of which 42km is within Scottish inshore waters. These surveys will gather information on the bathymetry, seabed substrate, and marine habitats characterising these areas.

This document contains a European Protected Species (EPS) and Basking Shark Risk Assessment, supporting the application for an inshore EPS licence and basking shark licence for the proposed inshore geophysical surveys. The Risk Assessment presents a biological baseline of the survey area and assesses likely significant impact (e.g. due to injury or disturbance) on EPS or basking shark. It also describes the proposed activities and impacts within the context of the EPS licence requirements and tests.

The proposed survey activities satisfy all three EPS licence assessment tests. The activity has a licensable purpose, has considered all alternatives, and will maintain a favourable conservation status for all potentially impacted EPS.

The assessment concludes that there will not be any predicted significant impacts from underwater sound generated by vessels/survey equipment or resulting from collisions with survey vessels for EPS or basking shark. Due to the short-term duration and low intensity of the proposed surveys, the highly mobile nature of the marine EPS present in the area, and mitigation protocol based on guidance produced by the Joint Nature Conservation Committee (JNCC), the predicted impacts from the proposed surveys on EPS are negligible.

However, as there is the potential for negligible risk of disturbance to some species due to underwater sound produced by geophysical survey equipment, an inshore EPS licence (to consider and document disturbance levels) and basking shark licence will be required for the Project, to undertake the proposed surveys.

1. INTRODUCTION

This European Protected Species (EPS) Risk Assessment has been prepared by ERM Ltd. on behalf of EGS International Ltd (referred to in this document as EGS). The document aims to assess the risk of potential impacts of planned geophysical and geotechnical surveys on EPS and basking sharks. EGS plans to undertake survey operations along the proposed Cable Route extending between the Eastern boundary of the UK Exclusive Economic Zone (EEZ) through the Scottish Territorial Sea (TS) out to the Western limit of the UK EEZ. The total route length is just over 991km, of which 42km are within the Scottish TS.

This EPS Risk Assessment considers the available Joint Nature Conservation Committee (JNCC) guidance on the protection of marine EPS from injury and disturbance (JNCC, 2010), and Marine Scotland guidance on the protection of marine EPS from injury and disturbance for Scottish inshore waters (Marine Scotland, 2020).

The proposed surveys will acquire, analyse, interpret and report on geophysical and geotechnical data to validate the proposed cable routing, confirming that it is clear of any obstructions or features that may threaten the integrity of the cable, and that the seabed conditions allow for the cable to buried to the design depth of 2m. The surveys will take place in Scottish inshore and offshore waters.

The proposed surveys will include the use of multibeam echo sounder (MBES), side scan sonar (SSS), ultra-short baseline (USBL) acoustic positioning system, and sub bottom profiler (SBP) devices, which could have the potential to impact EPS or basking sharks through underwater sound generation. A series of geotechnical surveys will also be undertaken, however these devices will be selected such that no impulsive sound will be generated during use. Two vessels will be used for survey data acquisition, within a total area of data acquisition of 447.616 km^2.

2. PROPOSED SCOPE OF WORKS

2.1 SURVEY DESIGN

The Proposed surveys will cover the planned Cable Route for the telecom cable between Eastern boundary of the UK Exclusive Economic Zone (EEZ) through the Scottish Territorial Sea (TS) out to the Western limit of the UK EEZ. The surveys are required to map the seabed, collect data on bathymetry, characterise layers of sediment or rock below the seabed, and assess marine habitats. These surveys are essential prior to installation of marine cables into the seabed, to ensure the route is mapped and characterised accordingly. Projects cannot be developed without geophysical/geotechnical work being undertaken to fully document the characteristics of this area and ensure safety of subsequent work.

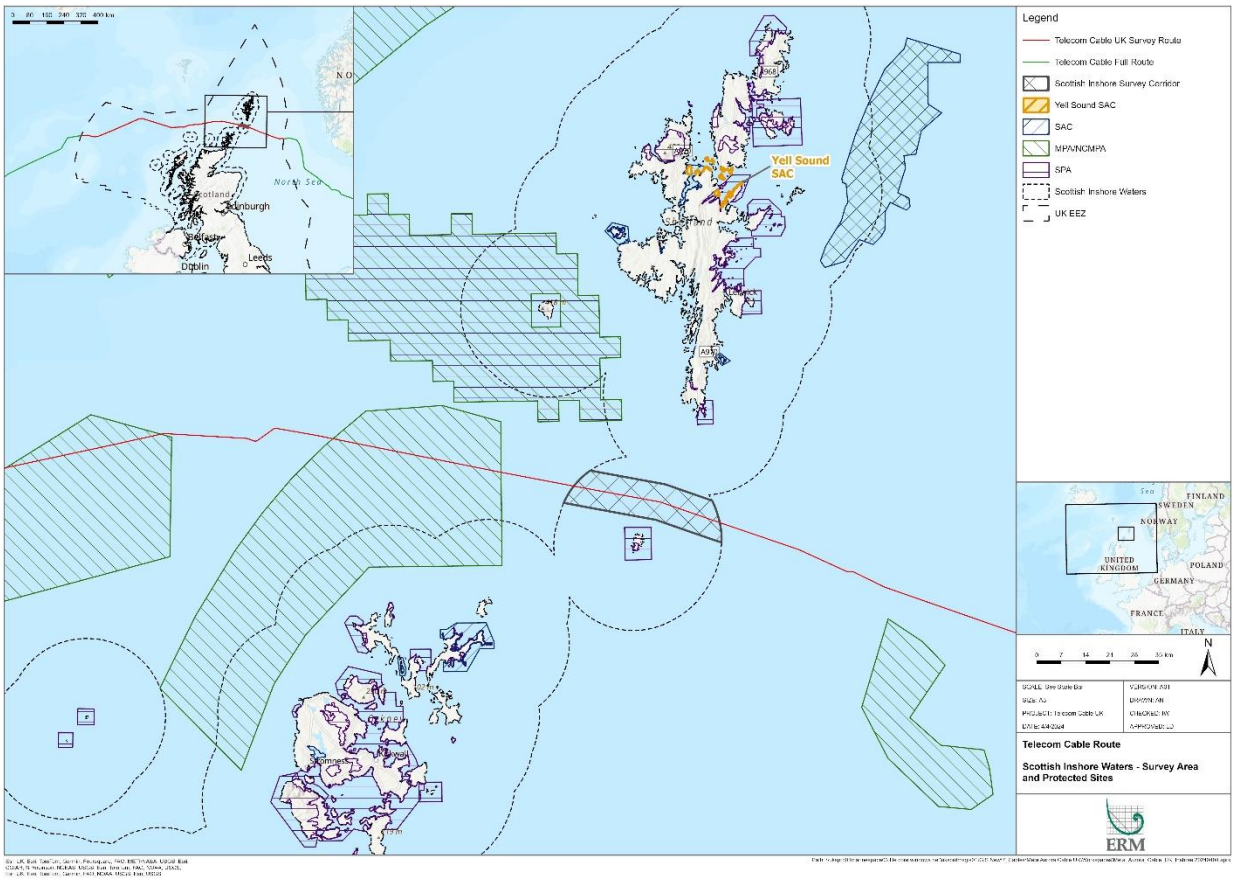
The 500m survey corridor will consist of 3 survey lines with 125-150m spacing between lines in water depth of 50-1,500m.

2.1.1 SURVEY LOCATION

The EPS and Basking Shark Risk Assessment covers the 500m survey corridor that falls within Scottish inshore waters, plus a 5km 'buffer' (the "Inshore Survey Study Area"; see **Error! Reference source not found.**), based on JNCC guidance (JNCC, 2020) on effective deterrence range (EDR) of harbour porpoise to high-frequency sources (SBP and MBES). The Inshore Survey Study Area makes the precautionary assumption that all 3 lines (maximum

150m spacing) of the 500m corridor and all 43.096km of the cable route in inshore waters will be completed within a single day (**Error! Reference source not found.**). The Inshore Survey Study Area therefore encompasses a total area of 447.62km^2.

FIGURE 2-1 INSHORE SURVEY STUDY AREA (INCLUDING 5KM BUFFER) WITH SURROUNDING PROTECTED AREAS, AND AREAS WITH EPS DESIGNATED FEATURES



2.1.2 SURVEY VESSELS

Only one EGS vessel will be utilised to complete the geophysical surveys for the inshore area: the EGS Ventus. The EGS Ventus is a 49.85m multipurpose vessel that will operate within and outside the 12nm Scottish TS boundary. It is certified under the Code of Safety for Special Purpose Ships. The EGS Ventus operates under the Marshall Islands Flag and has a maximum speed of 12kts and a cruising speed of 10kts. Average speed during nearshore surveys is 3.5kts and increases to 7kts offshore (in water depths >1,500m). The vessel is equipped with MBES, SSS, SBP, USBL, and magnetometer (see details in Section 2.2.1).

2.1.3 SURVEY DURATION

It is anticipated (including allowance for weather downtime estimated on available weather statistics) that the operational period will fall within an approximately 4-week period in June-August 2024 (geophysical and geotechnical), with ~3 days required to complete the surveys that fall within the Scottish TS. With weather conditions during this period, it is estimated that survey work will be able to progress for approximately 50% of the total time scheduled.

2.2 EQUIPMENT SPECIFICATIONS

2.2.1 GEOPHYSICAL SURVEYS

Geophysical surveys will be conducted along a narrow (500m) survey corridor, using a combination of instruments. Surveys will fulfil the following requirements:

- Obtain accurate water depths to aid site characterisation and cable installation works;
- Measure seabed topography and morphology and identify the nature of the seabed sediments, and in particular identify any areas of steep slopes greater than 6° (including the height and slope of any large mega ripples / sand waves);
- Identify the location, extent and nature of any cable installation impediments along the Cable Route such as wrecks, debris on seafloor, rock outcrops (or other hard ground), boulders, anthropogenic infrastructure (including cables and pipelines); and
- Identify any areas with thin sediment cover which would impact the design burial depth of the cable of 2m below seabed.

The proposed geophysical equipment to be deployed during the proposed surveys are summarised below:

- MBES: Geophysical survey devices used to map the seabed by measuring the reflected signal of a high frequency pulse (a swathe comprised of individual beams) emitted from a transducer;
- SSS: Sonar device that emits high-frequency acoustic pulses between the source and the seabed across a wide-angle perpendicular to the direction of travel, to map seabed morphology and texture;
- SBP: Device used to characterise sub-seabed sedimentation and geology using pressure waves (acoustic or seismic), typically low frequency;
- Magnetometer: Records spatial anomalies in the local magnetic field to identify items of ferromagnetic nature such as wrecks, existing infrastructure, and possible large UXO; and
- Ultra-short Baseline (USBL): A method of underwater acoustic positioning consisting of a transponder mounted on a towed/tethered device that transmits a signal to a receiver mounted on a pole on the underside of the vessel.

Specifications for the various geophysical survey equipment on the EGS Ventus and RV Geo Resolution are presented in (Table 2-1 and **Error! Reference source not found.**, respectively).

TABLE 2-1 GEOPHYSICAL SURVEY EQUIPMENT ON EGS VENTUS

Equipment	Make/Model	Frequency (kHz)	Source Level (dB re 1µPa @1m)
Multibeam Echosounder (MBES)	KONGSBERG EM2040 (Dual-Head)	200-400kHz	248dB
Side Scan Sonar (SSS)	EDGETECH 4205	230, 540 & 850kHz	230kHz: 220dB 600kHz: 219dB 900kHz: 221dB
Sub-bottom Profiler (SBP)	INNOMAR SES 2000 Medium-100	Primary: 85-115kHz Secondary: 2-22kHz	247-250dB

Equipment	Make/Model	Frequency (kHz)	Source Level (dB re 1µPa @1m)
Ultra-short Baseline (USBL)	SONARDYNE Ranger 2	20-34kHz	200dB

Magnetometers (Geometrics G-881) will be used by both vessels; however, this equipment is not sound-emitting, and therefore will not be considered further in this risk assessment.

3. LEGISLATION

3.1 EUROPEAN PROTECTED SPECIES

In Scottish Territorial waters, the European Habitats Directive (European Council Directive 92/43/EEC) is implemented by the Habitats Regulations 1994 (The Conservation (Natural Habitats &c.) Regulations 1994) and amendments. These are strengthened by the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007, which contain a revision of the disturbance offence for EPS specifically through Regulation 39.

Under Regulation 39.— (1) of the Habitats Regulations, it is an offence–

> *(a) Deliberately or recklessly to capture, injure or kill a wild animal of a European protected species;*
>
> *(b) Deliberately or recklessly–*
>
> > *(i) To harass a wild animal or group of wild animals of a European protected species;*
> >
> > *(ii) To disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;*
> >
> > *(iii) To disturb such an animal while it is rearing or otherwise caring for its young;*
> >
> > *(iv) To 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;*
> >
> > *(v) To 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;*
> >
> > *(vi) 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*
> >
> > *(vii) Do disturb such an animal while it is migrating or hibernating;*
>
> *(c) deliberately or recklessly to take or destroy the eggs of such an animal; or*
>
> *(d) to damage or destroy a breeding site or resting place of such an animal.*

Regulation 39.— (2) of the Habitats Regulations further states:

> *(2) Subject to the provisions of this Part, it is an offence to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean).*

In UK Offshore Waters (beyond the 12 nm limit of Scottish territorial waters), the Habitats Directive is transposed into law by the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended). The protection of wild animals listed in Annex IV(a) is addressed under Regulation 45, which states:

***45**.—(1) Subject to regulations 46 and 55, a person who—*

(a) deliberately captures, injures, or kills any wild animal of a European protected species,

(b) deliberately disturbs wild animals of any such species,

(c) deliberately takes or destroys the eggs of such an animal, or

(d) damages or destroys, or does anything to cause the deterioration of, a breeding site or resting place of such an animal,

is guilty of an offence.

(2) For the purposes of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely—

(a) to impair their ability—

(i) to survive, to breed or reproduce, or to rear or nurture their young; or

(ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

(b) to affect significantly the local distribution or abundance of the species to which they belong.

Any offshore activity that has the potential to disturb these species must therefore obtain an EPS licence prior to the commencement of the activity. There are certain strict criteria that must be met before licensing may be granted exempting the proposed activity:

- There is a licensable purpose;
- There are no satisfactory alternatives;
- The actions authorised will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range.

The proposed activity may only proceed if these criteria are fulfilled, and an EPS licence has been granted.

3.2 BASKING SHARK

Basking shark are not listed on either Annex II or Annex IV of the EU Habitats Directive but are given full protection (alongside cetaceans) under Schedule 5 of the Wildlife and Countryside Act 1981. This act implements the Bern Convention and applies to inshore waters up to 12 nm from land (and terrestrial environment), providing protection for various fish species including basking sharks.

Under Schedule 5, it is an offence to-

- *intentionally or recklessly kill, injure, or take fish;*
- *possess or sell fish; or*
- *intentionally or recklessly disturb or harass fish.*

The protection given by the Wildlife and Countryside Act 1981 is enhanced by the Nature Conservation (Scotland) Act 2004, under which it is an offence for any activity to deliberately or recklessly capture, kill, injure, or disturb any basking shark (or dolphin, whale, or porpoise).

Basking sharks are also considered a mobile Priority Marine Feature in Scottish territorial waters and the majority of Scottish offshore waters.

Activities in Scottish inshore waters that have the potential to disturb basking shark must therefore obtain a Basking Shark Licence to undertake the proposed works.

4. BIOLOGICAL BASELINE

4.1 PROTECTED AREAS

Protected areas in Scotland are divided into Nature Conservation MPAs (NCMPAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSIs), and Ramsar sites. These various categories of protected areas function in slightly different ways. SACs and SPAs were designated internationally under the EU Habitats Directive. SACs are areas designated for the protection of marine species and habitats determined through the Habitats Directive to contribute to conservation of Europe's biodiversity. There are currently 16 SACs for marine mammals (1 for harbour porpoise, 1 for common bottlenose dolphin, 8 for harbour seal, and 6 for grey seal) in Scottish waters. SPAs are selected for the protection of rare, threatened, or vulnerable bird species listed in Annex I of the Birds Directive. NCMPAs add additional protection and serve to fill in any gaps not protected by SACs or SPAs. In total, 230 of these various categories of sites make up the Scottish Marine Protected Area (MPA) Network.

The closest protected area to the proposed Inshore Survey Study Area that includes EPS designated features is the Yell Sound SAC (straight line distance 80.67km), which is designated for otter. Other protected areas that include EPS designated features within the wider region include Southern Trench NCMPA, designated for minke whale (distance 186.93km), and the Moray Firth SAC, designated for common bottlenose dolphin (distance 193.63km). There is evidence of common bottlenose dolphin travelling to Orkney from this SAC, however the population is more heavily distributed within the inner Moray Firth and Moray coast, with sightings highly skewed to that area. The North-west Orkney MPA (distance 17.88km) is not designated for EPS; though it is designated for sandeels (e.g. *Ammodytes marinus*), which is a prey species for marine mammals and is therefore of relevance to the proposed surveys. There are additional MPAs designated for EPS further south, however those are too far away to be of any concern for the geophysical surveys planned in the Inshore Survey Area. There are also numerous harbour and grey seal haul out sites in the wider area.

4.2 PROTECTED SPECIES

4.2.1 CETACEANS

All cetacean species in Scottish inshore and offshore waters are deemed EPS of Community Interest and in need of strict protection under Annex IV of the Habitats Directive. Additionally, harbour porpoise *Phocoena phocoena* and common bottlenose dolphin *Tursiops truncatus* are protected under Annex II as Species of Community Interest whose conservation requires the designation of SACs.

The most common cetacean species in Scottish waters are harbour porpoise, common dolphin *Delphinus delphis*, common bottlenose dolphin, white-beaked dolphin *Lagenorhynchus albirostris*, Risso's dolphin *Grampus griseus*, killer whale *Orcinus orca*, and minke whale *Balaenoptera acutorostrata*.

Abundance and density estimates for the Inshore Survey Study Area can be extracted from the Cetaceans in European Atlantic waters and the North Sea (SCANS) surveys (Hammond *et al.*, 2002). Surveys were performed in 2005 (SCANS-II; Hammond *et al.*, 2013), 2007 (CODA 2009), in 2016 (SCANS-III; Hammond *et al.*, 2021) and most recently in 2022 (SCANS-IV; Gilles *et al.*, 2023). The latter has been used to inform this EPS risk assessment. The aim of this survey programme is to provide abundance estimates of cetacean species in shelf and oceanic waters of the European Atlantic to enable effective and efficient future monitoring, and to enable management of cetacean populations at favourable conservation status (Hammond *et al.*, 2002).

The Inshore Survey Study Area falls within Block NS-E of the most recent SCANS surveys, and potentially overlaps with Block CS-K as well (SCANS-IV; Gilles *et al.*, 2023). Abundances and densities of these species within survey Block CS-K and NS-E are presented in Table 4-1. Species that have recorded sightings in the area but that were not sighted during SCANS surveys in this block are included in the table but have no displayed density or abundance. Abundances for cetacean Management Units (MUs) that overlap the Inshore Survey Study Area are also included (IAMMWG, 2023). MU abundances provide a reference for population-level impact assessments of proposed plans (and cumulative impacts with other projects).

TABLE 4-1 CETACEAN DISTRIBUTION FROM SCANS IV REPORT (GILLES *ET AL.*, 2023).

Species	Abundance (n) in SCANS Block		Species Density (animals/km^2) in SCANS Block		Abundance (n) by UK portion of Management Unit (MU)[a]
	CS-K	NS-E	CS-K	NS-E	
Harbour Porpoise	11,357	33,735	0.281	0.516	159,632 (NS)
Common Dolphin	None recorded	None recorded	None recorded	None recorded	57,417 (CGNS)
Atlantic White-sided Dolphin	None recorded	958	None recorded	0.015	12,293 (CGNS)
Common Bottlenose Dolphin	None recorded	None recorded	None recorded	None recorded	1,885 (GNS)
White-beaked Dolphin	5,460	11,611	0.135	0.178	34,025 (CGNS)

Species	Abundance (n) in SCANS Block		Species Density (animals/km²) in SCANS Block		Abundance (n) by UK portion of Management Unit (MU)[a]
	CS-K	NS-E	CS-K	NS-E	
Risso's Dolphin	1,519	4,589	0.038	0.070	8,687 (CGNS)
Killer Whale	None recorded	None recorded	None recorded	None recorded	No MU
Long-finned Pilot Whale	None recorded	None recorded	None recorded	None recorded	No MU
Beaked Whale spp.	None recorded	None recorded	None recorded	None recorded	No MU
Minke Whale	467	795	0.012	0.012	10,288 (CGNS)
Humpback Whale	None recorded	None recorded	None recorded	None recorded	No MU
Fin Whale	None recorded	None recorded	None recorded	None recorded	No MU

Source: Gilles *et al.*, 2023 (SCANS data); IAMMWG, 2023 (MU data)
[a] NS = North Sea; GNS = Greater North Sea; CGNS = Celtic & Greater North Sea; CES = Coastal East Scotland

4.2.1.1 HARBOUR PORPOISE

Harbour porpoise are present in Scottish inshore and offshore waters year-round, with peak sightings of small groups recorded in summer months (Evans *et al.*, 2011; Hague *et al.*, 2020). The highest densities and encounter rates of harbour porpoise (in Scottish waters) are located within eastern and southeastern waters, albeit at markedly lower density than populations within the central and southern North Sea (Baxter *et al.*, 2011; Lacey *et al.*, 2022). Harbour porpoise are frequently recorded by surveys undertaken within the vicinity of the Inshore Survey Study Area, and are considered resident within the area year-round (Sea Watch Foundation, 2024a).

The main diet of this species consists of small (<40 cm) fish, such as Gadidae (Atlantic cod *Gadus morhua*, whiting *Merlangius merlangus* and haddock *Melanogrammus aeglefinus*), Ammodytidae (sandeel spp.), and Atlantic herring *Clupea harengus*, amongst other species (Santos and Pierce, 2003).

4.2.1.2 COMMON DOLPHIN

Common dolphin are seasonal visitors to Scottish waters, with sightings primarily concentrated within the Celtic Sea and west of the Hebrides (Hammond *et al.*, 2021; Hague *et al.*, 2020). The greatest frequency of sightings in northwest Scotland are recorded in late spring-autumn months, mainly concentrated within The Minch, the Little Minch, and the Sea of the Hebrides (Waggitt *et al.*, 2019; HWDT, 2023). Sightings within the Moray Firth are occasional, and rarer off the southeast Scottish coastlines (Hague *et al.*, 2020).

4.2.1.3 ATLANTIC WHITE-SIDED DOLPHIN

Atlantic white-sided dolphin *Lagenorhynchus acutus* are primarily distributed in deep offshore waters where offshore groups sizes may approach 1,000 individuals (Reid *et al.*, 2003).

However, they are also regularly sighted off northeastern and eastern Scottish coastlines (Evans *et al.*, 2011; Hammond *et al.*, 2021). with greater likelihood of occurrence during late summer and autumn months (Hague *et al.*, 2020).

The main diet of Atlantic white-sided dolphin is similar to that of white-beaked dolphin and common bottlenose dolphin, consisting of fish and shellfish species such as Gadidae, Scombridae, Carangidae, Cephalopoda, and Crustacea (Evans and Smeenk, 2008b; Evans *et al.*, 2011).

4.2.1.4 COMMON BOTTLENOSE DOLPHIN

Common bottlenose dolphin are a common species within inshore and offshore waters of the north Atlantic Ocean (Reid *et al.*, 2003; Hague *et al.* 2020). Although no common bottlenose dolphin were detected in SCANS-IV surveys of block CS-K or NS-E (Gilles *et al.*, 2023), there is a known notable resident population within the Moray Firth (Wilson *et al.*, 1997), which is a 193.63km straight line distance to the survey site. Individuals from the Moray Firth population are suggested to occur around Orkney (Orcadian Wildlife, 2024), however the population distribution is heavily skewed to the inner mouth of the Moray Firth and the southern coast, with migrations made beyond the SAC south to Aberdeen Bay.

Most bottlenose dolphin sightings are related to individuals within inshore waters during summer months from May-September, but it is known that individuals move into offshore waters during winter months (Evans *et al.*, 2011). As sightings are regularly recorded within the Greater North Sea (GNS) Management Unit and the Coastal East Scotland (CES) Management Unit, these species are considered to be potentially present within the vicinity of the Inshore Survey Study Area (IAMMWG, 2023; Orcadian Wildlife, 2024; HWDT, 2023).

The main diet of this species is like that of harbour porpoise, consisting of fish (e.g. Gadidae, Ammodytidae and mixed small fish species) and shellfish (e.g. Cephalopoda and Crustacea), although noting prey size is likely to be larger than that of harbour porpoise, due to the greater body size of common bottlenose dolphin (Wilson, 2008).

4.2.1.5 WHITE-BEAKED DOLPHIN

While White-beaked dolphin prefer waters deeper than <200m, they are also a commonly sighted cetacean species within Scottish inshore waters (Barnes, 2008). The species typically forms large pods, although has been noted to form large schools with the Atlantic white-sided dolphin, as well as other cetacean species (Reid *et al.*, 2003). Their distribution is thought to vary by season, with a substantially higher abundance recorded within summer months (Waggitt *et al.*, 2019).

The main diet of white-beaked dolphin is like that of common bottlenose dolphin, consisting of fish and shellfish species such as Gadidae, Cephalopoda, and Crustacea (Canning *et al.*, 2008).

4.2.1.6 RISSO'S DOLPHIN

Risso's dolphin prefer deep waters along the continental shelf; however, they are resident year-round within western Scottish waters, with a seasonal distribution extending into the Celtic Sea and Irish Sea during winter months (IAMMWG, 2015; Waggitt *et al.*, 2019). Population densities within Scottish waters increase during summer months in line with the seasonal distribution of this species (Hague *et al.*, 2020).

4.2.1.7 KILLER WHALE

Killer whale generally prefer deep waters but do also occur in shallow bays or estuaries. Although no killer whale were detected in SCANS-IV surveys of block CS-K or NS-E (Gilles *et al.*, 2023), they are known to occur around Orkney and Shetland (Orcadian Wildlife, 2024) and Shetland (Shetland, 2024), where sightings are increasingly common (particularly between May and August).

Killer whale are at the top of the food chain and feed on a variety of prey, including fish, shark, octopus, and squid, but also birds, seals and other cetaceans (HWDT, 2024a).

4.2.1.8 LONG-FINNED PILOT WHALE

Long-finned pilot whale *Globicephala melas* are a pelagic species and generally prefer deep waters but can also occur inshore. The species is usually found along the continental shelf edge (Sea Watch Foundation, 2024b). Although no long-finned pilot whale were detected in SCANS-IV surveys of block CS-K or NS-E (Gilles *et al.*, 2023), they are common around Orkney (Orcadian Wildlife, 2024) and Shetland (Sea Watch Foundation, 2024b), where the species can be sighted between September and March. Long-finned pilot whale mainly feed on squid and fish but also small octopus and shrimp (HWDT, 2024b).

4.2.1.9 MINKE WHALE

Minke whale are the most common baleen whale in Scottish waters, and density is greatest within inshore waters off western Scottish coastlines (Hague *et al.*, 2020). The distribution of minke whale is seasonal in nature, with low densities during winter months and higher densities within summer months, particularly during the July-August period (Waggitt *et al.*, 2019). The species is common around Orkney (Orcadian Wildlife, 2024) and the most commonly sighted whale in Shetland (Sea Watch Foundation, 2024b). Minke whale are designated as a feature of conservation interest within the Southern Trench NCMPA, and are considered a mobile PMF in territorial and offshore waters. During summer months, when minke whale are most frequent in the Southern Trench NCMPA, densities of minke whale around the Survey Area remain low, at 0.012 animals/km^2 (Gilles *et al.*, 2023).

The main diet of Minke whale consists of fish species, including Ammodytidae, Clupeidae, Scombridae, and Carangidae (Robinson and Tetley, 2007; Anderwald and Evans, 2007).

4.2.1.10 HUMPBACK WHALE

Humpback whale *Megaptera novaeangliae* prefer inshore waters and continental shelf areas, but are also found in open waters during their migration. Humpback whale are occasionally encountered in the UK between breeding grounds off Africa to feeding grounds around Iceland and Norway (HWDT, 2024c). Although no humpback whale were detected in SCANS-IV surveys of block CS-K or NS-E (Gilles *et al.*, 2023), they are annually seen around Orkney (Orcadian Wildlife, 2024) and Shetland (Sea Watch Foundation, 2024b), where the species can be sighted between May and September. In British waters, humpback whale mainly feed on krill, herring, and cod (HWDT, 2024c).

4.2.1.11 OTHER CETACEAN SPECIES

Several other cetacean species have been recorded in relatively low numbers by surveys undertaken in the vicinity of the Survey Area, including fin whale *Balaenoptera physalus* and

sperm whale *Physeter macrocephalus* (Hague *et al.*, 2020; Evans *et al.*, 2011; Waggitt *et al.*, 2019; HWDT, 2023). Fin whale and sperm whale are not associated with any Management Units in UK waters as management is more appropriate at a larger scale due to their population sizes (IAMMWG, 2015).

4.2.2 BASKING SHARK

Basking shark *Cetorhinus maximus* are listed as Endangered on the IUCN Red List of Threatened Species (Rigby *et al.*, 2024), and are the largest fish species found in UK waters. Their distribution in the UK is seasonal: in the summer months, basking shark feed on plankton in the coastal surface waters near tidal fronts (Sims and Quayle, 1998; Doherty *et al.*, 2017). Summer sightings are concentrated around the southwest coast of England, throughout the Irish Sea, and off the west coast of Scotland (Witt *et al.*, 2016; Shark Trust, 2022). Modelling of areas of persistent use by basking sharks has indicates presence of basking sharks between Orkney and Shetland from July-September in 2001-2012 (Paxten *et al.*, 2014). Recent sightings have been confirmed off the northeast Scottish coast, but at a much-reduced density than off western coastlines (Sims, 2008; Evans *et al.*, 2011; HWDT, 2023). In winter, basking shark in the northeast Atlantic inhabit the waters of continental shelf and shelf edge, but do not hibernate or exhibit prolonged movements into open-ocean regions (Sims *et al.*, 2008).

4.2.3 EURASIAN OTTER

The only native UK species of otter is the Eurasian otter *Lutra lutra*, which is protected as an EPS under the Habitats Directive. Otter distribution in Scotland occurs primarily in the north and west (Findlay *et al.*, 2015). Otters have been documented using coastal areas within Scotland and the wider UK (McMahon and McCafferty, 2006; Liles, 2009). Marine areas can provide increased prey availability, however access to inland habitats must be maintained as freshwater is used for consumption and washing (Kruuk, 2006; Parry *et al.*, 2011).

5. RISK ASSESSMENT

An assessment of the possible risks from the proposed geophysical and geotechnical surveys, including identification of injury or disturbance pathways for EPS, will help to ensure safe operations with a favourable conservation outcome. The area discussed within this Risk Assessment is greater than that surveyed to ensure that a precautionary approach is undertaken. The primary potential impact pathways that have been identified in relation to the proposed surveys are:

- Collision with vessels;
- Underwater sound impacts from geophysical survey equipment;
- Underwater sound impacts from increased vessel traffic.

Collisions with survey or support vessels (‘ship strikes’) have the potential to injure or kill affected individual animals.

The overall length of the proposed survey vessel is 49.85m for the EGS Ventus. For vessels between 50-100m underwater sound typically falls between 165-180 dB re 1µPa (RMS) with most energy below 1kHz. The sound is continuous and non-impulsive (OSPAR, 2009). Sound emissions from vessels are unlikely to cause physical injury in terms of hearing impairment

(e.g., Permanent Threshold Shift) or mortality at most distances from the noise source, but may result in behavioural changes, such as displacement of some cetaceans from the affected area (Benhemma-Le Gall *et al.*, 2021), or reduction in foraging activity (Wisniewska *et al.*, 2018).

The risk of impacts associated with underwater sound from geophysical survey equipment occurring is likely to have the greatest potential impact of the three identified pathways, particularly for cetaceans, as there is the potential to cause Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS). TTS is a temporary change in the frequency threshold audible to an individual, caused by changes to the ear tissues, which recover over time. PTS, in contrast, is a permanent full or partial loss of hearing acuity, also caused by damage to the ear. For the purposes of this assessment, the PTS onset threshold defines the point at which an individual is considered to experience non-recoverable auditory injury. With adherence to best practice guidance produced by the JNCC (JNCC, 2010; JNCC, 2017), the risk of PTS in cetaceans may be reduced to negligible levels.

Whilst geotechnical surveys will also be undertaken, the only associated sound emitting equipment will be USBL (Sonardyne Ranger 2). The operating frequencies for the representative USBL equipment typically fall between 35 and 50kHz. Whilst this poses the possibility of auditory injury to occur, the peak sound power level of 200 / 188 (rms) dB re 1µPa is below the PTS threshold for all identified marine mammal species to be present, except harbour porpoise. The likelihood of injury or disturbance to all other identified marine mammal receptors (except harbour porpoise) as a result of USBL is therefore considered to be negligible.

Potential impacts are discussed in further detail below.

5.1 LIKELIHOOD OF IMPACT

Likelihood of impact is based upon the sensitivity and exposure of receptors to the potential impact, scored from Negligible to High informed by available published studies:

- Negligible: Impact would be immeasurable against background levels, having no effect on the project;
- Low: Impact may be slightly measurable against baseline levels or in the context of natural variation, however, will not be substantial enough to lead to regional or population-level effects or to require additional mitigation and receptors will recover within a reasonable period following the end of the project;
- Moderate: Impact will be measurable against the baseline conditions in such a way that regional or population-level effects may be recorded, such impacts are expected to require consideration by the project, but could be managed by design changes or implementation of appropriate mitigation measures;
- High: Impact will be measurable against background levels, and regional or population-level effects are expected to occur; impact will require serious consideration and alteration to the project design or implementation of strong mitigation, or compensatory measures to reduce the impact to an acceptable level.

5.1.1 VESSEL COLLISION

5.1.1.1 CETACEAN IMPACTS

Vessels moving through the marine environment have the potential to collide with local EPS, which may result in injury or mortality. Large, slow-moving cetaceans (e.g. minke whale) have a greater sensitivity compared to smaller species (e.g. harbour porpoise) that are more agile and have faster swim speeds (Schoeman *et al.*, 2020). This risk also varies with vessel size, speed and time needed to alter course should a marine mammal be identified; vessels that are >80m in length or travelling >14kn are the most likely to cause severe or lethal injuries (Laist *et al.*, 2001). Where speeds are reduced to <10kn, the probability of lethal injury may be lowered to below 50% (Vanderlaan and Taggart, 2007). The coastal waters between Orkney and Shetland are exposed to regular vessel traffic, and it is likely that marine mammals present will be accustomed to the presence and movements of vessels in the area.

Although marine mammals are able to detect and avoid vessels, collisions may still occur while animals are engaged in other activities such as foraging, breathing, interacting, or as a result of their inquisitive nature (Wilson *et al.*, 2007). Harbour porpoise are the most abundant species within the Survey Area and have been shown to exhibit an avoidance response to vessel sound (Benhemma-Le Gall *et al.*, 2023).

The proposed surveys would result in an increase in vessel movements; however, the increase will be limited and will not extend beyond the short temporal scale described. Whilst the licence would cover a route length of about 991km in UK Waters, only 42km are within the Scottish TS. Operational surveys will be limited in duration, being conducted over a day or two within a 4-week period in June-August 2024. As such, any increases in the number of transiting vessels will be temporary in nature. Vessels will travel along predefined transit routes and will follow a survey route that minimises unnecessary vessel movements.

Following Marine Scotland guidance for inshore waters (Marine Scotland, 2020), the potential for injury or disturbance to EPS, as defined in Regulations 39 (1) (a) and (b) and 39 (2) of the Habitats Regulations, from collision with vessels associated with the proposed work is negligible. The likelihood of an injury or disturbance offence (considering alternatives) for collisions with EPS has been assessed as a **negligible risk of offence**; therefore, an EPS licence will not be required for this potential impact (collision with vessels).

5.1.1.2 BASKING SHARK IMPACTS

Basking shark are thought to have a medium sensitivity to collision (NatureScot, 2020a); however, the impacts of anthropogenic activities are still poorly documented and understood (Kelly *et al.*, 2004). Basking sharks are thought to be unaware of surface vessels, with little or no reaction to approaching research vessels, even during tag attachment via spear gun or while being hunted (Speedie *et al.*, 2009). They are therefore unlikely to be disturbed by human activities but may also be more prone to collisions with vessels due to a lack of evasion behaviour (Pirotta *et al.*, 2018).

A recent global review of vessel collisions with marine animals found only three published reports of basking shark collisions, all off the west coast of Scotland (Schoeman *et al.*, 2020). This risk is ascertained to be significantly lower off the Orkney and Shetland coast, where basking shark sightings are rare. Additionally, as for cetaceans, vessels will follow routes that minimise unnecessary movements, and will travel at low speeds when surveying and

transiting. Finally, all proposed surveys will be short-term in duration. Therefore, the likelihood of an injury or disturbance offence (considering alternatives) for collision with basking shark has been assessed as a **negligible risk of offence**. However, as this risk cannot be ruled out completely, a Basking Shark licence will be sought for related to this pressure for proposed survey operations.

5.1.2 UNDERWATER SOUND FROM SURVEY EQUIPMENT

Geophysical survey equipment associated with the proposed surveys within the inshore area are predicted to result in an increase in anthropogenic underwater sound in the marine environment, particularly impulsive sound (from geophysical surveys).

5.1.2.1 CETACEAN IMPACTS

Cetacean species are particularly vulnerable to underwater sound at high levels, due to their reliance on vocalisations and hearing to communicate, navigate, and forage for prey. However, the auditory range and peak frequency sensitivity varies with species and has resulted in the categorisation of cetacean species into one of three functional hearing groups, summarised in Table 5-1.

TABLE 5-1 FUNCTIONAL MARINE MAMMAL HEARING GROUPS POTENTIALLY PRESENT IN THE INSHORE SURVEY STUDY AREA AND ASSOCIATED AUDITORY RANGES (FROM: NMFS, 2018; SOUTHALL *ET AL.*, 2019)

Functional Hearing Group	Species	Auditory Range
Very high-frequency cetaceans (VHF)	Harbour Porpoise	275Hz-160kHz
High-frequency cetaceans (HF)	Common Dolphin	150Hz-160kHz
	Atlantic White-sided Dolphin	
	Common Bottlenose Dolphin	
	White-beaked Dolphin	
	Risso's Dolphin	
	Killer Whale	
	Long-finned Pilot Whale	
Low-frequency cetaceans (LF)	Minke Whale	7Hz-35kHz
	Humpback Whale	

Underwater sound has the potential to cause non-recoverable auditory injury in marine animals, characterised as the onset of PTS, when it falls within a receptor's auditory range and exceeds a certain sound threshold level. This threshold differs across species and across different cetacean hearing groups, and is dependent on whether sound is impulsive or non-impulsive (Southall *et al.*, 2019). In cetaceans, the onset thresholds for PTS have been summarised by Southall *et al.* (2007) and subsequently updated in Southall *et al.* (2019). These thresholds are summarised in Table 5-2.

TABLE 5-2 PTS ONSET THRESHOLDS FOR CETACEAN FUNCTIONAL HEARING GROUPS FOR IMPULSIVE NOISE SOURCES (FROM: SOUTHALL *ET AL.*, 2019)

Functional Hearing Group	SEL_{cum} (weighted; dB re 1µPa²s)	SPL_{peak} (unweighted; dB re 1µPa)
Very high-frequency cetaceans (VHF)	155	202
High-frequency cetaceans (HF)	185	230
Low-frequency cetaceans (LF)	183	219

Note: Peak sound pressure level measured at distance R (SPLR) and the cumulative sound exposure level (SELcum), for a recommended accumulation period of 24 hrs.

Sub-Bottom Profiler (SBP)

The indicative SPL of the INNOMAR SES 2000 Medium-100 may reach 250dB re 1 µPa @1m at frequencies (85-115kHz) that overlap the hearing range of cetaceans in the area. This source level thus exceeds the injury threshold for all three cetacean functional hearing groups, and therefore there is potential for EPS injury (PTS) in LF, HF, and VHF cetaceans. Of all survey equipment used, the SBP is predicted to have the greatest impact on EPS through the generation of underwater sound.

Worst-case scenario sound modelling conducted for BEIS as part of a Review of Consents Habitats Regulations Appraisal (HRA), based on the maximum source levels and bandwidths obtained from a range of sub-bottom profilers, indicated that for harbour porpoise the onset of PTS could arise from 17-23m from source and potential behavioural impacts between 2.4-2.5km (BEIS, 2018). Another example of sound modelling of SBP (Neptune T335 pinger sub-bottom profiler) with a sound source of 220 dB re 1 µPa-m suggested that the onset of PTS in minke whale could occur within 5m of the sound source and in harbour porpoise within 32m. The thresholds at which the onset of PTS in dolphins could occur were not exceeded. These sound modelling results are based on equipment emitting a higher level of noise than the proposed survey equipment.

The SBP is likely to be active within the inshore area for a very limited period (3 days inclusive of weather delay), therefore potential impacts on inshore EPS are predicted to be short-term. Additionally, harbour porpoise (the EPS most common in the Inshore Survey Study Area) have been shown to demonstrate avoidance behaviours to underwater sound at thresholds lower than that of TTS/PTS onset (Lucke *et al.*, 2009; Palmer *et al.*, 2021).

JNCC guidance for protection of EPS during geophysical surveys (JNCC, 2010) concludes that SBPs could, in a few cases "cause localised short-term impacts on behaviour such as avoidance", but that this would not be sufficient to constitute disturbance under the terms of the Regulations. Similarly, a more recent JNCC report (2020) states that although some types of SBPs may have relatively loud sources, "on the whole, these are highly directional sources with expected low levels of horizontal sound propagation; many operating at high frequencies and therefore subject to high transmission loss (e.g. Crocker & Fratantonio 2016, Crocker *et al.* 2019)". The report subsequently recommends the use of a 5km EDR when assessing impacts on marine mammals.

This Risk Assessment considers a fixed EDR (5km), based on empirical evidence, when calculating the potential for disturbance or injury to EPS. This method avoids uncertainty in

noise modelling associated with choice of numerical models, behavioural context, and characteristics of the sound associated with physical environmental factors (JNCC, 2020). The 5km EDR for geophysical surveys is considered to be likely conservative but is informed by published ranges where the bulk of the disturbance effect was detected.

Due to overlap with EPS functional hearing groups, there is potential for injury or disturbance to occur from underwater sound from SBP equipment when operating above 202 dB re 1µPa SPL_{peak}. To exceed the cumulative injury threshold of 155 dB re 1µPa^{2}s SEL_{cum}, an individual would need to be extremely close to the sound source and remain within the zone of ensonification for multiple hours in order for injury to occur. Sound attenuation is predicted to be high for these sources and, due to the strong directionality of the equipment, only individuals directly within the beam of the device or very close to the source are predicted to have a risk of injury. Furthermore, the surveys within the inshore region are predicted to be extremely short-term (~3 days) and spatially limited (43km cable route length). Therefore, the likelihood of disturbance or injury as a result of SBP is considered to be **low**.

Ultra-short Baseline (USBL)

The operating frequencies for the representative USBL equipment fall between 20-34kHz. This frequency range overlaps the auditory range of all cetacean species likely to be present within the Inshore Survey Study Area (LF, HF, VHF). Therefore, there is the possibility of auditory injury to occur as a result of their likely presence. However, the peak sound power level is below the PTS threshold for EPS likely to be present, except harbour porpoise. The likelihood of injury or disturbance to all EPS (except harbour porpoise) as a result of USBL is therefore considered to be **negligible**.

For harbour porpoise, the estimated frequency range of greatest sensitivity falls between 12-140kHz, with peak sensitivity at 105kHz (Southall *et al.*, 2019). Therefore, the operating frequency of USBL is below the most sensitive hearing range for harbour porpoise. The likelihood of injury or disturbance to harbour porpoise as a result of USBL is therefore considered to be **low**.

Multi-beam Echo Sounder (MBES)

The MBES equipment that will be used during surveys (Kongsberg EM2040 Dual-Head) has an indicative SPL of up to 248dB re 1µPa @1 m, however the frequency range during operations will fall between 200-400kHz. Therefore, there is no overlap with the auditory range of any EPS, thus these receptors are unlikely to be impacted. As such, the likelihood of injury or disturbance as a result of MBES is considered to be **negligible**.

Side Scan Sonar (SSS)

The operating frequency for the SSS (Edgetech 4205) is 230-850kHz, however during all surveys the SSS will only operate at frequencies >230kHz. This frequency is above the auditory range of all cetacean functional groups (VHF, HF and LF). As a result, SSS is not expected to cause auditory injury or disturbance to EPS within the Inshore Survey Study Area. As such, the likelihood of injury or disturbance to EPS as a result of SSS is therefore considered to be **negligible**.

Magnetometer

The magnetometer is a passive system and does not emit sound. It has therefore not been assessed further.

5.1.2.2 BASKING SHARK IMPACTS

Little information on the hearing range of basking shark is available. However, it is thought that elasmobranch species may have a relatively narrow auditory range and poor sensitivity compared to teleost species (Hart and Collin, 2015). Sharks are thought to have an auditory range of approximately 20Hz-1.5kHz, with peak sensitivity between 200-600Hz (Chapuis *et al.*, 2019). Basking shark do not rely on hearing for communication or foraging (Booth *et al.*, 2013).

There is no direct evidence that basking shark experience mortality or stress from sound within the ranges produced by the proposed geophysical surveys (Wilding *et al.*, 2020), and the peak sensitivity range falls below the frequencies generated by the proposed survey equipment. Therefore, the likelihood of an injury or disturbance offence for impacts of geophysical survey equipment on basking shark has been assessed as a **negligible risk of offence**. However, as this risk cannot be ruled out completely, a Basking Shark licence will be sought for proposed survey operations.

5.1.3 UNDERWATER SOUND FROM VESSEL TRAFFIC

5.1.3.1 CETACEAN IMPACTS

Underwater sound generated by ship traffic is primarily low-frequency in nature (10-100Hz), leading to a rise in ambient sound in many areas of the global ocean (Erbe *et al.*, 2019; Sinclair *et al.*, 2021). Marine species whose hearing ranges overlap with frequencies of sound produced by vessel traffic have the potential to experience an impact, potentially resulting in negative behavioural responses, stress, masking of species vocalisations, and temporary or permanent shifts in hearing threshold (TTS and PTS) (Erbe *et al.*, 2019; Duarte *et al.*, 2021). However, recovery following displacement from a site due to anthropogenic activities may be as short as several hours and does not always equate to utilisation of lower-quality habitats (Thompson *et al.*, 2013). In some cases, vessel displacement may even reduce impacts of other, more damaging, anthropogenic underwater sound (Benhemma-Le Gall *et al.*, 2023). As both vessel presence and vessel sound will cease following survey operations, survey operations will be limited in duration (~4 weeks in July-August 2024), and as displacement or foraging disruption are predicted to be short-term and temporary (Thompson *et al.*, 2013; Pirotta *et al.*, 2015), this impact is considered as **negligible**.

The planned surveys are located in an area of moderate anthropogenic activity, close to the shore of Orkney and Shetland. Commercial and recreational vessel activity in these waters is expected to occur regularly and the presence of vessels within the Inshore Survey Study Area is not considered to be a novel impact pathway for EPS. The regular exposure of EPS to vessel activity in the Inshore Survey Study Area makes it additionally likely that species may be partially habituated to anthropogenic sound, as has been documented elsewhere (Duarte *et al.*, 2021).

Underwater sound generation from vessels is dependent on multiple factors including bathymetry, source frequency, vessel and propellor design, speed, and size, among others.

Smaller vessels (e.g., jet skis and rigid inflatable boats) are likely to produce source levels of 130-160dB re 1µPa (Erbe, 2013; Erbe *et al.*, 2016). Large vessels (e.g., container ships, ferries) may produce source levels of >200dB re 1µPa (Simard *et al.*, 2016; Gassmann *et al.*, 2017). The overall length of the proposed survey vessel is 49.85m, meaning that the underwater sound is expected to fall between 165-180 dB re 1µPa (RMS) with most energy below 1kHz. Therefore, a receptor is unlikely to experience auditory injury from these vessels due to continuous underwater sound. JNCC guidance on the protection of marine EPS from injury and disturbance states that it is unlikely that a passing vessel would cause more than trivial disturbance (JNCC, 2010). The presence of survey vessels will represent a proportionally small increase in total vessel numbers, and therefore will not result in a significant increase in vessel traffic in the area.

Harbour Porpoise

Harbour porpoise have a high frequency hearing range (275Hz-160kHz) and have been shown to have a quick recovery time to disturbance from increased vessel traffic (Wisnieska, 2013). As a result, the likelihood of injury or disturbance to harbour porpoise from underwater sound emitted by vessels associated with the proposed surveys is considered to be **low**.

Dolphin species

Since all dolphin species are grouped within the same auditory range (HF), common bottlenose dolphin are used as the representative species for this group. OWF-associated vessel traffic has previously been shown to have no negative impact on common bottlenose dolphins in the Moray Firth (Lusseau *et al.*, 2011). Further evidence suggests that habituation to vessel traffic may occur when vessel movements are predictable and do not disrupt foraging behaviours (Sini *et al.*, 2005). However, one study indicated that the presence of vessels transiting in the Moray Firth and associated vessel sound resulted in reduced recordings of common bottlenose dolphin prey capture buzzes (Pirotta *et al.*, 2015). Reduced foraging success and masking of biological sound may have chronic or long-term impacts on cetacean health, although these are more difficult to quantify compared with short-term behavioural responses (Bejder *et al.*, 2006; Weilgart, 2007).

The proposed survey activities will be spatially and temporally limited, therefore exposure to vessel sound output will be short-term. Furthermore, although there is some overlap, the majority of the auditory range of dolphin species falls above the likely vessel sound frequencies (Southall *et al.*, 2019). As such, the sound emissions form transiting vessels are unlikely to significantly overlap with the peak hearing sensitivities of these species. Therefore, the likelihood of injury or disturbance to dolphin species as a result of underwater sound from vessels associated with the proposed surveys is considered to be **low**.

Baleen Whales

Since all baleen whales are grouped under the low auditory range (LF), minke whale are used as the representative species for this group. Baleen whales are considered low-frequency cetaceans, with an auditory range of 7Hz-35kHz (NMFS, 2018; Southall *et al.*, 2019). Underwater sound generated by vessel traffic is therefore likely to overlap with their hearing range and has the potential to temporarily displace these species. Anderwald *et al.*, (2013) reported a slight negative correlation between minke whale presence and vessel presence in one study area, however the correlation strength was less than the effect of sea state or swell

height on minke whale presence , and the correlation was not detected at other locations. In Cape Cod (USA), 25 years of observations show a habituation of minke whale to ship traffic (Watkins, 1986). Minke whale and humpback whale are primarily present within the waters surrounding the Inshore Survey Study Area during the summer months (Orcadian Wildlife, 2024; Sea Watch Foundation, 2024b; Waggitt *et al.*, 2019).

The survey duration will be short-term, vessels will be relatively slow-moving and small (<70m), and will not be directly seeking interaction with the animals (as would a whale-watching or recreational vessel). Therefore, the likelihood of injury or disturbance to baleen whales as a result of underwater sound from vessels associated with the proposed surveys is considered to be **low**.

Considering the baseline sound levels from existing traffic, and expected habituation, the potential for underwater sound from vessel traffic to cause disturbance or injury to EPS is considered very low. Therefore, it is considered that there is a **negligible risk of offence** being committed as defined in Regulations 39 (1) (a), (b) and 39 (2) of the Habitats Regulations.

Basking Shark Impacts

Vessel presence and engine sound appear to have limited or no effect on basking shark (Wilson, 2000; Bloomfield and Solandt, 2006; Speedie *et al.*, 2009). There is no direct evidence of sound causing injury, mortality, or stress to basking shark, therefore basking shark have been assessed as having a 'high' resistance and 'high' resilience to underwater sound and are classified as 'not sensitive' in the Marine Life Information Network (MarLIN) sensitivity review (Wilding *et al.*, 2020).

Standard mitigation measures and best practice guidance (JNCC, 2017) will be followed for the proposed surveys to ensure any risk of injury to basking shark is minimised. Therefore, the likelihood of an injury or disturbance offence for impacts of underwater sound from vessel traffic on basking shark has been assessed as a **negligible risk of offence**. However, as this risk cannot be ruled out completely, a Basking Shark licence will be sought for proposed survey operations.

5.1.4 SUMMARY

The likelihood of impact on EPS (cetaceans) as a result of geophysical survey is presented in Table 5-3 below.

TABLE 5-3 LIKELIHOOD OF DISTURBANCE OR INJURY ON CETACEANS AS A RESULT OF GEOPHYSICAL AND GEOTECHNICAL SURVEYS

Impact Pathway	Receptor	Likelihood of Impact
Vessel Collision	EPS	Negligible
	Basking Shark	Negligible
MBES	EPS	Negligible
	Basking Shark	Negligible
SBP	EPS	Low

Impact Pathway	Receptor	Likelihood of Impact
	Basking Shark	Negligible
SSS	EPS	Negligible
	Basking Shark	Negligible
USBL	EPS	Low (Harbour porpoise) Negligible (All other EPS present)
	Basking Shark	Negligible
Underwater Sound from Vessel Traffic	EPS	Low
	Basking Shark	Negligible

5.2 MAGNITUDE OF IMPACT

5.2.1 CETACEAN IMPACTS

Magnitude is defined in terms of the level of the impact above background conditions and natural variability by whatever parameters are measurable. The assessment of magnitude of impact for underwater sound and vessel collision is based on available scientific literature (e.g. SCANS-III and SCANS-IV surveys, sightings data, academic journals), as well as on detailed sound modelling performed for similar surveys with comparable equipment (BEIS, 2018; Shell, 2017). The assessment follows a precautionary approach using worst-case assumptions (based on JNCC 2020 guidance) and is focused on impacts on EPS species most likely to be present within the Inshore Survey Study Area.

For this assessment, all survey activities are evaluated together, and magnitude is ranked from low to high based on the percentage of the reference population potentially disturbed:

- Low is <1% of the population potentially disturbed;
- Moderate is 1-5% of the population potentially disturbed;
- High is >5% of the population potentially disturbed.

Calculations of the realistic worst-case total number of individuals of each species present and likely to be impacted within the proposed Inshore Survey Study Area has been based on density estimates from the 2023 SCANS-IV report on estimates of cetacean abundance (Gilles *et al.*, 2023). Since the Inshore Survey Study Area may overlap two blocks of the SCANS IV surveys, calculations are precautionarily based on the block with higher density recorded. The species covered within this report and with the potential to be affected by the proposed works are harbour porpoise, white-beaked dolphin, Risso's dolphin, and minke whale.

The percentage of the reference population likely to be impacted by survey activities is calculated using the updated abundance estimates for cetacean Management Units (IAMMWG, 2023). These have been used for all species except killer whale, long-finned pilot whale, beaked whale spp., sperm whale, and humpback whale, which do not have a defined UK MU due to their widely distributed populations, and for which no SCANS-IV observations were recorded in the blocks encompassing the Survey Area. Common dolphin, Atlantic white-sided dolphin, and common bottlenose dolphin were not detected in SCANS-IV surveys for the

overlapping blocks and so are listed as “none recorded”. Common bottlenose dolphin were not detected in SCANS-IV surveys, however they are present in high numbers in the inner and southern coastal areas of the Moray Firth (e.g. the Moray Firth SAC designated for common bottlenose dolphin) with a suggested connection to common bottlenose dolphin sightings around Orkney (Orcadian Wildlife, 2024). Therefore, values from SCANS-III surveys have been used here as they are considered representative.

Calculations have been performed for the Inshore Survey Study Area, based on the inshore section of the cable corridor (500m) area plus a 5km buffer (the EDR). This area is representative of the maximum area of disturbance for EPS from geophysical surveys, with the area of potential for PTS to be considerably smaller (i.e. within 10s of meters from the source). As a precautionary measure, this risk assessment will consider the total number of individuals with the potential for disturbance or injury to encompass this entire area plus buffer.

Species mentioned above with no defined UK MU (common dolphin, Atlantic white-sided dolphin, killer whale, long-finned pilot whale, beaked whale spp., sperm whale, and humpback whale) are assessed as having no individuals likely to be affected; however, they are included here as there may have been historical sightings recorded, despite a lack of current population data. The results of these calculations are presented below in Table 5-4.

TABLE 5-4 SUMMARY OF POTENTIAL IMPACTS FROM SURVEY OPERATIONS

Species	Species Density (individuals/km²)		Species Abundance (n) in respective MU	Individuals potentially impacted in the Inshore Survey Study Area (447.62km²)	Percentage of the reference population
	Block CS-K	Block NS-E			
Harbour Porpoise	0.281	0.516	346,601 (NS)	231	0.07
Common Dolphin	None recorded	None recorded	102,656 (CGNS)	0[a]	0
Atlantic White-sided Dolphin	None recorded	0.015	18,128 (CGNS)	7	0.03
Common Bottlenose Dolphin	0.0037[b]	None recorded	2,022 (GNS)	2	0.10
White-beaked Dolphin	0.135	0.178	43,951 (CGNS)	80	0.18
Risso's Dolphin	0.038	0.070	12,262 (CGNS)	31	0.25
Killer Whale	None recorded	None recorded	No MU	0[a]	0
Long-finned Pilot Whale	None recorded	None recorded	No MU	0[a]	0
Beaked Whale spp.	None recorded	None recorded	No MU	0[a]	0
Minke Whale	0.012	0.012	20,118 (CGNS)	5	0.02
Humpback Whale	None recorded	None recorded	No MU	0[a]	0
Fin Whale	None recorded	None recorded	No MU	0[a]	0

Note: [a] No recorded sightings within SCANS-IV Block CS-K nor NS-E, but may have historical or infrequent presence in the area; [b] Density obtained from SCANS-III Survey Block S

From the calculations in Table 5-4, it is noted that there is the potential for the proposed activities to impact on a number of the species that may be present in the area. Harbour porpoise have the potential for the greatest number of individuals to be impacted, at 231, equating to 0.07% of the reference population. The species with the highest percentage of the reference population to be potentially impacted is predicted to be Risso's dolphin, however this is still less than half a percent (0.25% and 31 individuals).

It should be noted that the total area over which these calculations were carried out is highly conservative and represents a precautionary approach to ensure protection and conservation of marine resources. It is also important to consider that surveys will be short-term, with overall low intensity of underwater sound, thus any potential impacts are likely to be of low magnitude.

It should also be recognised that background vessel traffic is highly variable in the area. The area between Orkney and Shetland is frequented by a moderate number of vessels (MarineTraffic, 2024). Established shipping routes link these islands, thus there is existing vessel traffic in the area. It is not expected that the limited number of additional vessels associated with the proposed works will have measurable impact above this background variability, further suggesting that any increases in collision risk or injury and disturbance from underwater sound to EPS because of increased vessel traffic, will be low.

5.2.2 BASKING SHARK IMPACTS

In the absence of noise modelling data the assessment of magnitude of impact on basking shark is based on available scientific literature and follows a precautionary approach.

Whilst there is no reference population available for basking shark within the waters between Orkney and Shetland, observed adjusted densities of basking shark across all seasons from 2000-2012 give a density of 0.0-0.10 individuals/5 km^2 cell based on the available data (Paxton, 2014). Within the potential area of disturbance of 447.62km^2, it can be estimated that a worst-case number of 9 individuals will be disturbed as a result of the proposed surveys, however this value is highly precautionary and given the extremely low sightings in the area (HWDT, 2024d), the number of individuals disturbed likely to be much lower. Whilst this cannot be compared to a wider reference population, it is recognised Orkney and Shetland are not key areas for basking shark as shown by low presence records (HWDT, 2024d), and that basking shark shown strong fidelity and high densities in other areas such as the Sea of the Hebrides MPA.

As the number of impacted individuals is highly precautionary, and the Inshore Survey Study Area is not a known key area for basking shark, magnitude is considered to be low.

5.3 IMPACTS ON PROTECTED AREAS

The closest SAC to the Inshore Survey Study Area with EPS as a qualifying feature is the Yell Sound Coast SAC, designated for otter. Otter foraging activities in Shetland are almost

exclusively marine (Kruuk and Moorhouse, 1990), and using shallow waters within 100m of shore (Kruuk and Moorhouse, 1991). As surveys are predicted to be >250m from shore, and as sound attenuates more quickly in shallow waters the proposed surveys are not predicted to result in any disturbance or injury to this EPS. Furthermore, Yell Sound Coast SAC is a semi-enclosed area, therefore not exposed to direct sound transmission from the surveys. This species is therefore not considered further within this risk assessment. There are no predicted impacts on protected areas designated for EPS, therefore there will be **no significant effect** on the Conservation Objectives of these protected areas.

5.4 CUMULATIVE IMPACTS

During periods where other activities take place concurrently with the proposed surveys there is the potential for cumulative impacts to occur. The closest sources of ongoing non-impulsive underwater sound as a result of the standard operation and maintenance are the Beatrice and Moray Offshore Windfarms (OWFs). However, these sources are >150km away from the Inshore Survey Study Area and therefore unlikely to constitute a significant increase on existing anthropogenic ambient sound levels, given the volume of existing vessel traffic in the area. There are several pre-construction OWFs in the wider area, the closest of which are Ayre and Arven South, however both projects are in pre-planning and therefore construction is not expected to commence on either project before the proposed surveys will be conducted.

Based on the extremely short-term duration of the proposed surveys (~3 days), and the spatial separation of the Inshore Survey Study Area from that of operational and pre-construction OWFs in the region, the **negligible or low** likelihood of impact from assessed impact pathways, and the time between projects, a cumulative impact from these OWF is not considered likely to occur.

5.5 MITIGATION MEASURES

Mitigation measures for the proposed surveys are based on the JNCC guidelines for minimising risk to marine mammals from geophysical surveys (JNCC, 2017). These guidelines are designed to reduce the risk of impacts associated with geophysical surveys on the UK continental shelf and are based on conservative assumptions.

The proposed surveys will aim to minimise risk through the planning, active mitigation (described below), and reporting phases. In addition to obtaining an EPS licence, the surveys will consider the minimum technical specifications required to complete the work, bearing in mind the marine mammal species present in the Inshore Survey Study Area. Before survey operations commence, EGS will communicate with the MMO, MDLOT and the SFF in an effort to attain the most recent species and habitat characterization information and guidelines pertaining to the behaviour of marine mammal species.

Prior to any surveys, a bridge officer experienced in marine mammal identification will perform a search of the mitigation zone. The mitigation zone encompasses a 500m radius from the centre of the source location. The duration of the search will be 30 minutes as the maximum depth of the area to be surveyed is <200m. If marine mammals are detected in the mitigation

zone during this period, the soft start will be delayed until 20 minutes have passed from the time of the last detection within the mitigation zone.

Any crew member shall have the authority to stop all project activities if they believe project operations have the potential to threaten or 'take' a marine mammal. All in-water work shall be postponed or suspended when marine mammal species come within 300m of the vessel.

Not all geophysical survey equipment proposed for use in the survey operations are capable of undertaking "soft start" procedures, however, where the devices allow this, it shall be used. For electromagnetic sources including SBP, SSS and MBES, it may not be practical to ramp up power in a uniform manner for a soft start procedure. However, where practical this will be undertaken.

MBES in shallow waters are thought to fall outside of the hearing frequencies of EPS species and are likely to attenuate quickly, therefore mitigation is not required for the water depths within the Inshore Survey Study Area (<200m).

In addition to these mitigation measures, the bridge officer will complete standardised marine mammal recording forms (e.g., 'deck form'). Regulators may suggest a specific observation report format for UK waters. All marine mammal observations will be recorded on the bridge. Data sheets shall include the date and time of each sighting. The location of each sighting will be noted using the ship's differential GPS. The type of each animal will be recorded, along with the number of animals. Their behaviour will be noted, together with their heading if they are moving. The direction, range, and bearing of the animal(s) from the vessel will be recorded. The remarks section may include more details of the sightings. Anecdotal information will be recorded on other wildlife, particularly sea birds, along with any association such wildlife had with marine mammals or with project operations. Finally, the remarks section also will include notes as to when each operation began and ended, and the nature of each operation; this will be included in the Party Chief's Daily Operations Report. Mitigation measures will be posted on the vessel bridge along with emergency contact number for the MMO, MDLOT and for the appropriate stranding hotline.

Additional mitigation against collision risk will also be in place for large, slow-moving EPS. A Warning Zone is established at 0.5nm (~925m) from the survey vessel, within which any large EPS will be kept under watch in case they move toward the vessel. The vessel will not cut in front of any large EPS, will not separate any mother-calf pair, and if a large EPS is observed on an intersect course, the vessel will reduce speed or alter course until the EPS has safely passed. If a large EPS is moving on a parallel course, the vessel will maintain a steady speed and course but will not go faster than the animal. If a large EPS becomes evasive or defensive, operations and vessel movement will stop until the EPS has left the area. If an EPS appears to be approaching any project operation, the bridge crew shall make the survey crew aware that actions to reduce the possibility of collision may be necessary. A Marine Mammal Protection Plan (MMPP) will also be in place for all surveys, and includes the measures discussed above.

5.6 CONCLUSION

The outcomes of the step-wise risk assessment demonstrates that no significant impacts are predicted to occur associated with the proposed activities on EPS. The species most likely to be exposed to negative impacts from underwater sound from survey equipment is harbour porpoise, as the auditory range of this species falls within the range of frequencies emitted by survey activities including MBES, SBP, and USBL. However, it is predicted that only 0.14% of the harbour porpoise reference population could potentially be impacted by the proposed activities. A greater proportion of the reference population of Risso's dolphin (0.36%) could potentially be impacted by underwater sound associated with the proposed activities, however as for harbour porpoise, these impacts will be minimised through the short-term nature and low intensity of the proposed surveys, the spatial separation between the proposed surveys and high-usage areas for cetaceans, the highly mobile nature of marine EPS present in the area, and mitigation measures. There is also the potential for injury or disturbance below favourable conservation status to Atlantic white-sided dolphin (0.05% of reference population), bottlenose dolphin (0.09%), white-beaked dolphin (0.23%) and minke whale (0.05%). In line with the above considerations, overall predicted impacts to EPS from exposure to increased underwater sound is low.

The risk assessment also has shown that while the risk of a disturbance occurring due to underwater sound caused by geophysical equipment is likely to be low, it cannot be completely ruled out. Therefore, **an EPS licence for the survey operations will be required** on a precautionary basis.

The outcomes of this risk assessment suggest that it is highly unlikely that basking shark will be present in the area. Furthermore, sound generated by surveys and associated vessel traffic will not impact basking shark, and while there is a minimal risk of collision, this will be reduced through adherence with best practice guidance. However, as this risk cannot be ruled out completely, a **basking shark licence application will be submitted** for proposed survey operations.

6. EPS LICENCE ASSESSMENT

Any EPS licence application (under regulation 44(2)) must undergo a detailed assessment of whether a licence may be granted. This assessment is comprised of three tests, which have been designed to ascertain: 1) whether the purpose of the licence relates to those specified in the Habitat Regulations; 2) whether there are any/no satisfactory alternatives to the proposed activity (that would not result in an offence); and 3) that the undertaking of the proposed activity will not negatively impact the maintenance of the population of the EPS concerned, at a favourable conservation status. An EPS licence application must pass all three of these tests before it may be granted.

6.1 TEST 1: PURPOSE

Regulation 44 (2) of the Conservation (Natural Habitats, &c.) Regulations 1994 lists the purposes where an EPS licence is appropriate. Regulation 44 (as amended) states:

(1) Regulations 39, 41 and 43 do not apply to anything done for any of the following purposes under and in accordance with the terms of a licence granted by the appropriate authority.

(2) The purposes referred to in paragraph (1) are

a) scientific, research or educational purposes;

b) ringing or marking, or examining any ring or mark on, wild animals;

c) conserving wild animals, including wild birds, or wild plants or introducing them to particular areas;

ca) conserving natural habitats;

d) protecting any zoological or botanical collection;

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;

f) preventing the spread of disease; or

g) preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, or any other form of property or to fisheries.

The proposed surveys meet the requirements of Test 1 as the activity can be classified under Regulation 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 surveys will enable the installation of a telecommunications cable that will bring social and economic benefits to the human population. Furthermore, the proposed surveys will allow the possibility of a change in cable route if the proposed route is found to cross any areas of environmentally valuable or unique seabed (e.g. stony reef habitats).

6.2 TEST 2: ALTERNATIVES

There must be no satisfactory alternative (Regulation 44(3)(a))

An EPS licence may only be granted where Marine Scotland is satisfied that there is no satisfactory alternative to the proposed activity.

6.2.1 OPTION 1: NO ACTIVITY

The first option is to not perform the proposed survey activity, however as shown in Test 1 there is a need for the surveys to be completed. In order to proceed with planning and installation for the new telecommunications cable there is an essential regulatory requirement

for data collection on physical and biological properties of the seabed along the proposed cable route.

The data obtained from the proposed survey activities will provide a greater understanding of the potential pathways for impact on biological receptors, validate desk-based assessments, and will inform route selection so that any impacts can be minimised. Therefore, it is not advisable to consider this option as a viable alternative.

6.2.2 OPTION 2: DIFFERENT EQUIPMENT

The equipment that is presented in this document has been selected as to have a low impact on EPS while also being sufficient (in terms of acoustic frequency and SPL) to achieve the required depth and resolution for surveys. As detailed in Section 5.1.2, only the SBP and USBL are likely to cause disturbance to EPS. To further reduce the acoustic properties of the equipment would affect their functionality and capacity to perform the work required.

6.2.3 OPTION 3: LOCATION SHIFT

There could be a shift in location of the proposed activity, however, the cable route has been selected by the system installer and owner. It accounts for multiple constraints including but not limited to:

- Areas of protected seabed (e.g. MPAs);
- Archaeologically sensitive areas (e.g. protected shipwreck sites);
- Existing seabed infrastructure (e.g. pipelines, cables, OWFs);
- Designated maritime areas (e.g. anchorages, traffic zones, dumping grounds);
- Military interests (e.g. exercise areas, military cables);
- Wartime activities (e.g. minefields);
- Known seabed obstructions (e.g. shipwrecks); and,
- Known areas of adverse seabed topography.

The cable route must also be commercially viable (e.g. a reasonably direct route). The proposed cable route has been promulgated to potential seabed stakeholders through bodies such as the International Cable Protection Committee (ICPC). During this stakeholder engagement, military bodies have already requested a reroute in the UK EEZ to avoid sensitive seabed infrastructure. For these reasons, a further shift in location of the cable route is not considered an appropriate alternative.

6.2.4 OPTION 4: DIFFERENT TIMING

The surveys must be conducted during the summer period due to severe weather constraints. Weather statistics indicate that zero workable weather periods are possible from November through to February to the west of Orkney and Shetland, and only 10% of scheduled time would be operational in March to April, and October. The target months of June to August are

therefore the only possible months when sea conditions will allow survey work to progress for approximately 50% of the time.

6.2.5 OPTION 5: CURRENT SCENARIO

The best viable option has been assessed as the current scenario, in conjunction with the risk assessment contained within this document, and best practice measures outlined in Section 5.5.

6.3 TEST 3: CONSERVATION OBJECTIVES

The action authorised must not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range (Regulation 44(3)(b))

An EPS licence will not be granted if the proposed activity is detrimental to the maintenance of the population of the EPS affected at a favourable conservation status in their natural range. When assessing the Favourable Conservation Status (FCS) for cetaceans, the application should refer to the relevant cetacean Management Units. Article 1(i) of the Habitats Directive defines FCS of a species as follows:

> *Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within its natural range.*
>
> *The conservation status will be taken as 'favourable' when:*
>
> - *population dynamics data on the species concerned indicates that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and*
> - *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 populations on a long-term basis.*

There is the maximum potential for 0.05-0.36% of the reference population for any EPS to be temporarily disturbed due to the survey operations. None of the populations are predicted to be affected beyond 0.5% of the reference population. Should any disturbance occur, it is likely to be short-term in duration and limited spatially. Any disturbed individuals are predicted to recover within a short timeframe (several days) following the cessation of disturbance due to their high mobility and ability to use surrounding habitat beyond the impacts of the proposed surveys if displaced. It is therefore not predicted that any significant population-level impacts, such as a reduction in the ability to reproduce or forage, will occur as a result of the activities outlined in this document.

Following the definitions outlined for FCS for cetaceans, the proposed surveys are assessed as having no significant detrimental impact on any of the populations of the species concerned.

6.4 SUMMARY

The proposed survey activities therefore satisfy all three EPS licence assessment tests. The activities have a licensable purpose, have considered all alternatives, and will maintain a favourable conservation status for all potentially impacted EPS. However, as there is the potential for negligible risk of disturbance to some species due to underwater sound produced by geophysical survey equipment, **an inshore EPS licence (for disturbance) will be required for the Project**, to undertake the proposed surveys.

Underwater sound generation is not predicted to negatively impact basking shark, and the project will employ mitigation measures to counteract the risk of collision in the form of crew members on watch. However, as there is a non-zero risk, **a basking shark licence will be obtained** for the surveys.

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