Buchan Floating Wind Proposed Export Cable Route SI surveys

European Protected Species Risk Assessment

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1. Introduction

The Floating Energy Allyance (FEA) is progressing the Buchan Offshore Wind project within the Crown Estate Scotland NE8 Plan Option Area (Figure 1.1). This site sits approximately 75 km off the northeast coast of Scotland in c. 70-100 m water depth. The Array Area will have a capacity of c.960 MW.

The location of the export cable route from the Array Area has yet to be defined and will be based on numerous factors. A geophysical and geotechnical survey is required to enable engineering design questions to be answered, and to collect archaeology and benthic baseline information. As the precise location of the export cable route has yet to be decided, an Area of Search (Figure 1.1) has been identified. Within this area, one export cable corridor will be chosen (approximately 1 km in width) where the geophysical and geotechnical surveys will occur. Further environmental (benthic baseline characterisation) surveys will also be conducted in the form of grabs and imaging.

The purpose of this report is to outline the activities proposed for the surveys (described in Section 2) and to assess the potential risk to relevant European Protected Species (EPS) and basking sharks (*Cetorhinus maximus*), in order to ascertain whether EPS and basking shark licences are required and can be awarded.

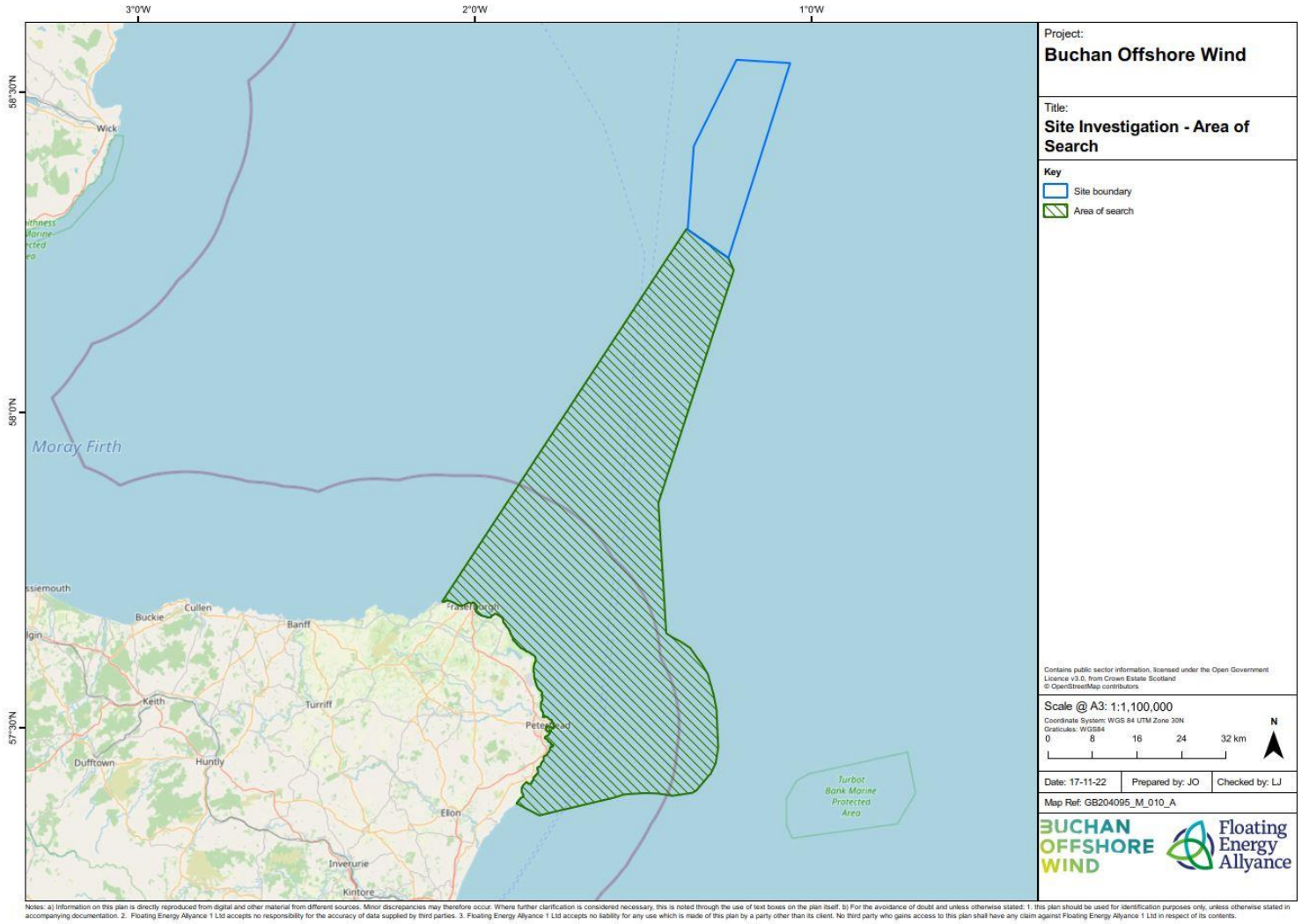

Figure 1.1: Location of the Project Array Area and Cable Route Area of Search

2. Methodology

Details of the proposed geophysical and geotechnical survey work are given below.

Environmental (benthic) survey work (grab/hamon samples and drop down video imagery), along with water sampling for eDNA analysis, will also be carried out from the geophysical and geotechnical survey vessels. Although these surveys are not a consideration in terms of increased noise, they have been considered in relation to increased collision risk.

2.1. Geophysical Surveys

A summary of the proposed geophysical survey and positioning equipment is presented in Table 2.1 below. Frequency and source pressure level (SPL) ranges for equipment types rather than specific makes and models have been presented and assessed.

Table 2.1: Proposed geophysical survey and positioning equipment

Equipment Type	Typical Frequency Range (kHz)	Typical Source Pressure Level (dB re 1 µPa @ 1 m)
Multi-Beam Echo Sounder (MBES)	>200	217-223
Side Scan Sonar (SSS)	>200	210 – 228
Sub-Bottom Profiler (SBP) – sparker/boomer	0.2 – 10	200 – 211
Sub-Bottom Profiler (SBP) – chirp/pinger	85 – 115 (HF) 2 – 22 (LF)	149 – 250
Ultra-Short Baseline System (USBL) positioning equipment	21-31	190 - 207
Altimeter	500	197
Doppler Velocity Logger	1 – 4 MHz	NA
Magnetometer/Gradiometer	No sound emitted	No sound emitted

2.2. Geotechnical Surveys

For the proposed export cable corridor, approximately 80 vibrocores (VC) and Piezocone Penetration Tests (PCPT) are proposed, which will be approximately one every one km.

Table 2.2: Proposed geotechnical survey activities

Activity	Frequency Range (Hz)	Maximum Source Pressure Level (dB (rms) re 1 µPa @ 1 m)	Maximum Source Pressure Level (dB (peak) re 1 µPa @ 1 m)[1]
Vibrocore (VC)	50	188	194

[1] NOAA's User Spreadsheet Tool (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance) was used to convert metrics from rms to peak values. Despite limitations (e.g., accuracy reduced as distance from source increases / created for seismic sources) this conversion is considered adequate for SPL at 1 m from the sound source.

Activity	Frequency Range (Hz)	Maximum Source Pressure Level (dB (rms) re 1 µPa @ 1 m)	Maximum Source Pressure Level (dB (peak) re 1 µPa @ 1 m)[1]
Piezocone Penetration Testing (PCPT)	28	118 – 166	124 – 172
Ultra-Short Base Line (USBL) positioning equipment[2]			See Table 2.1

2.3. Vessel

Vessel MV Northern Maria (or similar) is intended to be used for geophysical (in water depths ≥ 20 m), geotechnical (in water depths ≥ 12 m) and environmental surveys. The MV Northern Maria is 75 m in length.

For water depths greater than those outlined above, a shallow drafted 11.5 m vessel (Mersey Discovery or similar) is intended to be used for geophysical surveys and Nora B a 36 m tug (or similar) for geotechnical surveys will be used.

For geophysical surveys the vessel speeds will be slow (approximately 3-5 knots) whilst for the geotechnical and environmental surveys the vessel will be stationary during sampling.

A Survey Remotely Operated Vehicle (SROV) or Autonomous Underwater Vehicle (AUV) may be used for parts of the geophysical survey work.

2.4. Timing and Duration

The exact timings and durations of surveys are yet to be confirmed but it is the intention that surveys will begin from April 2023 with 24 hour working in water depths ≥ 20 m and 12 hour working in water depths below 20 m. Indicative durations are given in Table 2.3 below.

Table 2.3: Indicative duration of the proposed geophysical and geotechnical survey work along the Export Cable Corridor

Type of survey	Approximate number of days*
Geophysical	16
Geotechnical	17
Environmental (benthic)	18

* Excluding weather and other downtime

[2] Assessed under geophysical survey and positioning equipment.

3. Legal Requirements

All species of cetacean in waters around the UK are considered European Protected Species under Annex IV of the Habitats Directive (Council Directive 92/43/EEC) on 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 (STW); and
- The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) which transposes the Habitat Directive in UK waters beyond 12 nautical miles offshore.

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

The Offshore Regulations state in section 39, 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 manner 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 Secretary of State 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).

Favourable Conservation Status (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 export cable corridor is located both within and outwith the 12 nautical mile limit of Scotland's Territorial Waters. Therefore, the proposed works have the potential to affect animals within both Scottish Territorial and offshore waters.

3.1. Guidance

Draft guidance entitled 'The Protection of Marine European Protected Species from Injury and Disturbance' was first published in March 2010, with a subsequent revision dated June 2010, by the JNCC, Natural England and the Countryside Council for Wales (now the Natural Resources Wales). It is intended that this document be used as a resource when a view is needed as to whether there is potential for an offence of deliberately disturbing or injuring/killing a marine EPS to occur outwith 12 nautical miles, as a result of any activity associated with the proposed works.

The guidance considers certain activities that produce loud noises in areas where an EPS could be present, to have the potential to result in an injury or disturbance offence, unless appropriate mitigation measures are implemented. The risk of an offence being committed is dependent on a number of factors, including the following:

- Presence/absence of EPS;
- Noise associated with the activity and resulting impacts on EPS species;
- Frequency of occurrence of EPS;
- Density of occurrence of EPS; and
- Length of exposure of EPS to noise associated with proposed activities.

The JNCC *et al*. (2010) report also considers that the potential for disturbance from some activities can be considered "trivial". Activities which might be considered trivial include those that lead to "*sporadic disturbances without any likely negative impact on the species*". This applies only to the offshore marine regulations.

For an activity to be considered "non-trivial", the JNCC guidance states that "the disturbance to marine EPS would need to be likely to at least increase the risk of a certain negative impact on the species' Favourable Conservation Status (FCS)".

As a consequence of Regulation 39 (2) in the Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland), disturbance that might be considered trivial through consideration of the JNCC guidance (JNCC *et al.,* 2010), and thus not be deemed to cause an offence under EPS legislation outside the 12 nautical mile Scottish Territorial limit, may require a licence to disturb EPS species within Scottish Territorial Waters. Marine Scotland and Scottish Natural Heritage (SNH) produced guidance for Scottish inshore waters 'The protection of Marine European Protected Species from injury and disturbance' in July 2020. Marine Scotland recognise that the guidance represents a very precautionary approach to the interpretation of the Habitats Directive with regards to EPS '…This guidance reflects a precautionary approach…', 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; and
- Timing and location of the activity.

4. EPS in the Region of the Project

4.1. Cetaceans

The Small Cetaceans in European Atlantic waters and the North Sea (SCANS) III surveys were undertaken in the summer of 2016 (Hammond *et al.,* 2021; Figure 4.1). Densities for most common cetacean species encountered during the survey were estimated for the different survey blocks. The Area of Search is located in three different survey blocks, Block S (c. 73 km^2), Block T (c. 1,275 km^2) and Block R (c. 1,162 km^2). The majority of the Area of Search is located within SCANS III Block T therefore these density estimates have been used. In the absence of a Block T estimate for bottlenose dolphin (*Tursiops truncatus*), the Block R estimate has been used.

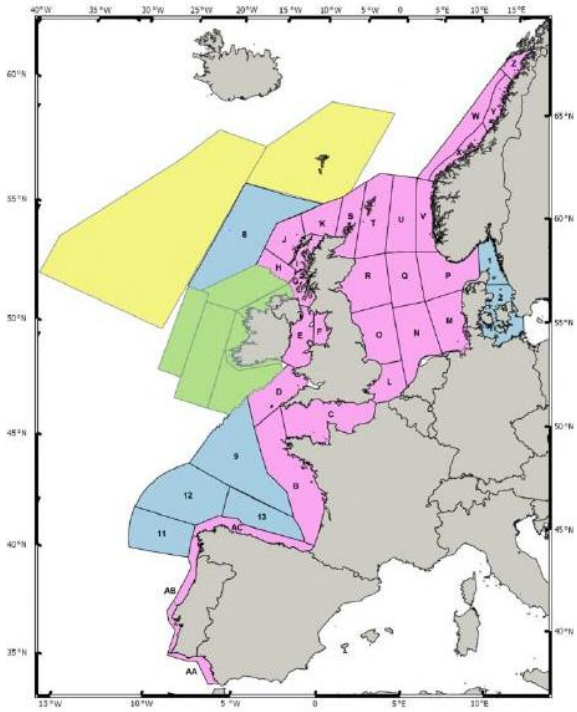

Figure 4.1: Area covered by SCANS III and adjacent surveys (ObSERVE (green) and NASS (yellow)). Pink shaded areas were surveyed by air, blue shaded areas were surveyed by boat. Image taken from Hammond *et al*. (2021)

The Area of Search passes through the Southern Trench Marine Protected Area (MPA) (see Section 4.4) where minke whale (*Balaenoptera acutorostrata*) is a protected feature. Minke whales are mainly seasonal visitors that feed in the prey rich waters in the UK from April to October before migrating to breeding grounds during the winter period. These summer months are considered to be important for the migration to breeding grounds (SNH, 2012). However, some individuals may be present in UK waters year-round (Macleod *et al*., 2004).

Bottlenose dolphins are generally a coastal species with the 'Coastal East Scotland' population known to have high connectivity between the Moray Firth SAC (designated for bottlenose dolphins) and the Firth of Forth (Cheney *et al.* 2013, Quick *et al.* 2014).

The remaining three species which are found in this region in high enough numbers for density estimates include harbour porpoise (*Phocoena phocoena*), white-beaked dolphin (*Lagenorhynchus albirostris*) and white-sided dolphin (*Lagenorhynchus acutus*). The Inter-Agency Marine Mammal Working Group (IAMMWG) (2022) marine mammal management unit (MU) abundances for these species are provided in Table 4.1.

Other species which may be present but have only been rarely sighted within or in the vicinity of the array area and cable route Area of Search include Risso's dolphin (*Grampus griseus*), common dolphin (*Delphinus delphis*), long-

finned pilot whale (*Globicephala melas*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*) and fin whale (*Balaenoptera physalus*).

Table 4.1: Main cetacean species recorded in and around the Project. Proposed reference population information taken from IAMMWG (2022) and information on density taken from Hammond *et al*. (2021)

	Proposed reference population			Information on density (animals per km^2)
Common name	**Management Unit**	**Abundance**	**95% CI**	
Harbour porpoise	North Sea	346,601	289,498 - 419,967	0.402
Bottlenose dolphin	Coastal East Scotland	224	214 – 234	0.0298
	Greater North Sea	2,022	548 – 7,453	
White-beaked dolphin	Celtic and Greater North Seas	43,951	28,439 – 67,924	0.037
White-sided dolphin	Celtic and Greater North Seas	18,128	6,049 – 54,323	0.0209
Minke whale	Celtic and Greater North Seas	20,118	14,061 – 28,786	0.0316

4.2. Marine Turtles

In addition to marine mammals, there are up to four species of marine turtle which have been sighted in Scottish 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). The majority of sightings coincide with increased prey species between July and November however sightings in the North Sea are uncommon with most Scottish sightings concentrated in the north and west of the country ('TURTLE' Database).

4.3. Other (Non-EPS) Species

4.3.1. Basking Sharks

Basking sharks are protected under Schedule 5 of the Wildlife and Countryside Act 1981. The east coast of Scotland is not considered a 'hotspot' for basking sharks but they can be found in low numbers in summer (Austin *et al*., 2019). Basking sharks in UK waters have seasonal migration patterns during winter months whilst some sharks move further offshore to the Scottish continental slope (Doherty *et al*., 2017).

4.3.2. Pinnipeds

There are two species of seal found in UK waters, grey seal (*Halichoerus grypus)* and harbour seal (*Phoca vitulina).* There are no SACs or designated seal haul out sites in close proximity to the Area of Search. The three closest harbour seal SACs (Sanday SAC, Dornoch Firth and Morrich More SAC and Firth of Tay and Eden Estuary SAC) and grey seal SACs (Faray and Holm of Faray SAC, Isle of May SAC and Berwickshire and North Northumberland Coast SAC) are > 100 km from the Project. The Moray Firth had a harbour seal count of 1,077 individuals between 2016 – 2021 with counts consistent with a stable population (SCOS, 2021). Grey seal counts were slightly higher with 1,657 individuals.

Impacts on marine turtles, basking sharks and pinnipeds have been assessed alongside those on cetaceans (Section 5) and any mitigation measures proposed for marine EPS will be applied should they be present.

4.4. Southern Trench Marine Protected Area

The Southern Trench MPA covers an area of 2,398 km^2 and lists minke whale as a protected feature. Minke whales are commonly recorded in the outer Moray Firth between May and October (Robinson *et al.,* 2007; Robinson *et al.,* 2021). Surveys within the outer Moray Firth identified strong spatial preference of minke whales to water depths of between 20 m and 50 m (Robinson *et al.*, 2009). During minke whale boat-based surveys in the Moray Firth over 84% of encounters were categorised as feeding or foraging, with juveniles employing more passive feeding strategies than adults (Robinson *et al.,* 2021). In the MPA, over 70.8% of adult and 97.2% of juvenile minke whales are <10 km from the shore from May to August (Robinson *et al.,* 2021).

Photo-identification studies have identified individuals recorded in the Moray Firth on the west coast of Scotland, showing that individuals which utilise the MPA have a wide scale distribution within Scottish waters and do not solely rely on this area (Stevick, 2007; unpublished data).

The eastern extent of the Southern Trench MPA has lower adjusted densities and modelled persistence of above mean density than that of the western extent of the MPA (Figure 4.2). This is probably due to the location of the Southern Trench itself, which is located offshore between Banff and Fraserburgh. Although the survey/sightings data which the Southern Trench MPA designation was based on were collected ten years ago, it is believed that they are still likely to be accurate due to the species returning to this area due to its geographical features (water depths, sediment type, and benthic slope; Robinson *et al.,* 2009; Robinson *et al.,* 2019). It is therefore unlikely that there will be large variation in spatial distribution between years. It is worth noting that survey effort has not been uniform across the MPA, with efforted concentrated within the Moray Firth and results extrapolated to the eastern extent of the MPA based on geographical features as outlined above (Robinson *et al.,* 2007; Robinson *et al.,* 2021).

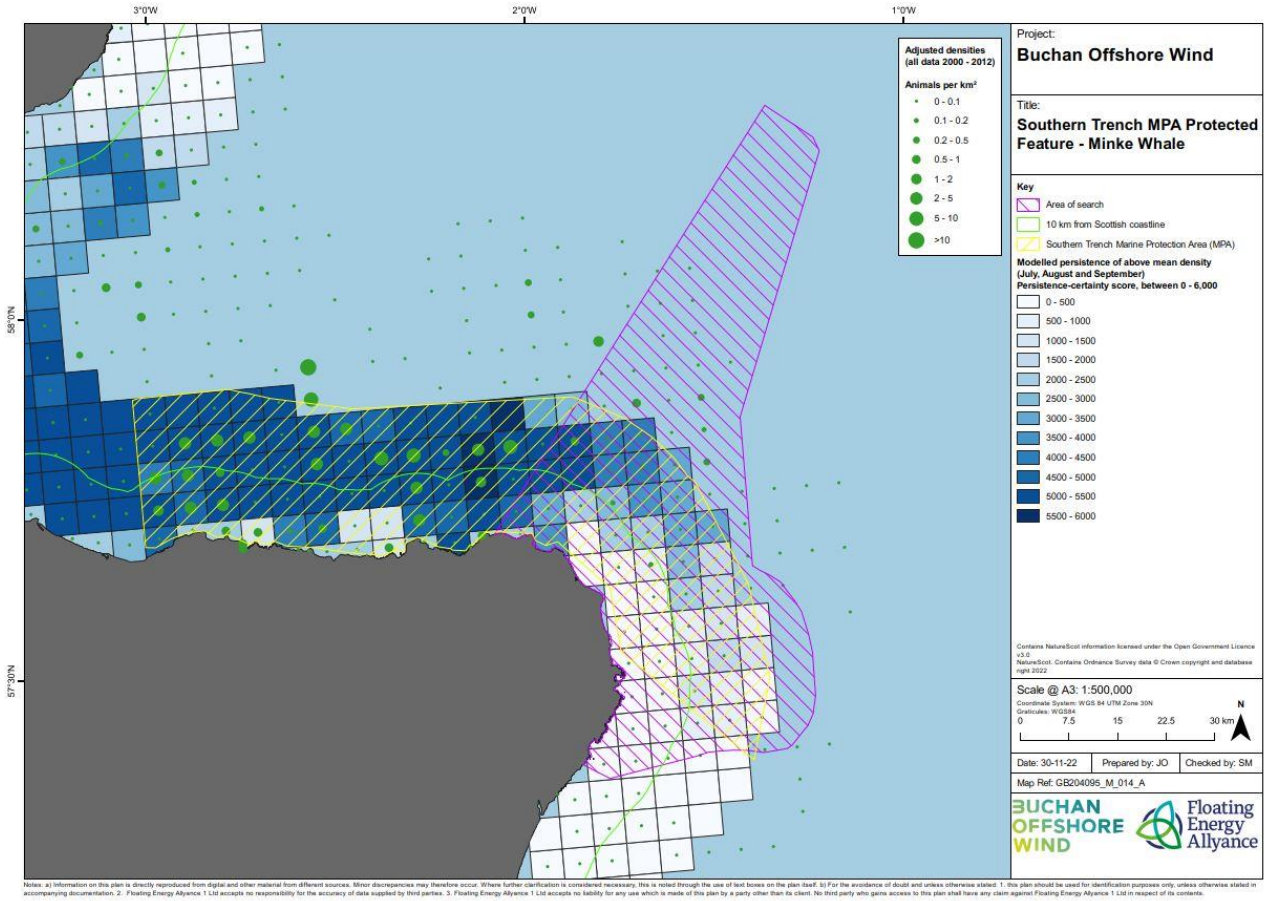

Figure 4.2: Adjusted and modelled densities of minke whale in the Southern Trench MPA (Data taken from NatureScot, 2020)

5. Risk Assessment

5.1. Overview of Potential Impacts

Marine Mammals

Impacts on marine mammals are considered to have the potential to arise through increases in anthropogenic noise or increased collision risk from vessels undertaking the work.

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

- Permanent Threshold Shift (PTS); and
- Behavioural responses.

Marine mammal species have different hearing sensitivity thresholds resulting in different species detecting underwater noise at varying frequency bands (Table 5.1). There is only considered to be potential for effect (either PTS or behavioural responses) where the frequency range of the equipment or activity overlaps with the hearing range of the different functional hearing groups.

Table 5.1: Auditory range for the different marine mammal hearing groups (Southall *et al*., 2019)

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 White-sided dolphin	0.15-160
Very high frequency cetacean	Harbour porpoise	0.2-180
Phocid pinnipeds	Harbour seal Grey seal	0.5-86

**Includes higher cut-off frequency range from NOAA (2018) to cover worst-case scenario for low frequency cetacean auditory bandwidth*

Southall *et al.* (2019) provide thresholds for received sound levels that have the potential to induce the onset of PTS in marine mammals (Table 5.2). These PTS thresholds are based on unweighted, instantaneous peak sound pressure levels (SPLs).

Table 5.2: Comparison of PTS thresholds – SPLs (dB re 1 µPa @ 1 m) - for assessing the potential for auditory injury to occur instantaneously (Southall *et al*., 2019)

Functional hearing group	Example species	Non-pulsed sound*	Pulsed sound
Low frequency cetacean	Minke whale	230	219
High frequency cetacean	Bottlenose dolphin White-beaked dolphin White-sided dolphin	230	230
Very high frequency cetacean	Harbour porpoise	230	202
Phocid pinnipeds	Harbour seal Grey seal	218	218

**Values taken from Southall et al. (2007)*

For behavioural responses, where equipment frequencies and hearing ranges overlap for geophysical survey and positioning equipment, an assessment using information from Thompson *et al.* (2013) and JNCC (2020) has been conducted. In the absence of such information for geotechnical surveys, Nedwell and Brooker (2008) has been used.

Marine Turtles

Due to the low likelihood of occurrence in the cable route Area of Search, the risk to marine turtles from any activity is considered to be negligible. However, any mitigation proposed for cetaceans will also be applied to marine turtles.

Basking Sharks

Basking sharks feed at slow speed very close to the surface and are at risk from collision with boat traffic (Wilding *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 are considered to be nil or negligible, any mitigation measures proposed for EPS will also be applied to basking sharks. The increased risk of collision with survey vessels has been assessed (see Section 5.4).

5.2. Assessment of Increased Noise from Geophysical Survey and Positioning Equipment

5.2.1. Overview of Potential Impacts

The potential for PTS onset and a behavioural response as a result of sound emitted by the geophysical survey and positioning equipment has been summarised in Table 5.3, with the detailed assessment provided below.

Table 5.3: Potential for PTS and/or a behavioural response from geophysical survey equipment

Equipment Type	Potential for PTS	Potential for a behavioural response
MBES	Outwith hearing range	
SSS	Outwith hearing range	
Altimeter	Outwith hearing range	
Doppler Velocity Logger	Outwith hearing range	
USBL	Yes – mitigation required	Yes
SBP (pinger/chirper)	Yes – mitigation required	Yes
SBP (sparker/boomer)	Yes – mitigation required	Yes

5.2.2. PTS

The SBP (sparker/boomer and pinger/chirper) and USBL has the potential to induce the onset of PTS in cetaceans and pinnipeds in close proximity to the sound source if operated at maximum SPLs (Table 5.3; Table 2.1). The presence of the survey vessel itself will likely cause temporary displacement of marine mammals from the zone of potential effect reducing the potential to induce the onset of PTS. This is also considered to apply to the ROV as it will be tethered to a support vessel.

Nonetheless, standard mitigation measures (Section 6) shall be implemented for these pieces of sound emitting equipment (SBP and USBL) to ensure that the potential for PTS onset can be considered to be negligible.

5.2.3. Behavioural response

The JNCC considers a 5 km deterrence range from geophysical survey equipment to be precautionary (JNCC, 2020). On cessation of activities, it is considered that usage of the 5 km Effective Deterrence Range (EDR) by

animals will return to pre-impacted levels, as has been observed following other noise emitting activities such as seismic surveys and piling events (Thompson *et al.,* 2013; Vallejo, 2017). Only the USBL and SBP have the potential to evoke a behavioural response (Table 5.3).

The 5 km radius EDR was used to calculate the area (πr^2) of potential impact (78.5 km^2). Using the area and the SCANS-III animal density estimates (Hammond *et al*., 2021; Table 4.1), the number of animals within the area of potential impact was estimated (Table 5.4). The percentage of the appropriate reference population (IAMMWG, 2022; see Table 4.1) that could potentially be affected was estimated for each species using the number of animals in the area of potential impact divided by the abundance of the reference population multiplied by 100. The percentage of both the Coastal East Scotland and Greater North Sea Management Unit reference populations are presented for bottlenose dolphin because the Project lies within both Management Units. Whilst not all less commonly occurring species of cetacean can be assessed quantitatively, it is considered that any assessment conclusions, or mitigation measures put in place, for the more common species are appropriate/relevant for all cetaceans and pinnipeds.

Any effect resulting from use of the geophysical survey and positioning equipment is likely to be localised, short term and reversible (as per Thompson *et al.,* 2013) and, where it could be estimated, the percentage of the reference population which has the potential to be affected is considered to be negligible (Table 5.4). Furthermore, suitable alternative local habitat is available in the meantime. The potential for behavioural responses, and therefore disturbance, is considered to be trivial (sporadic disturbances without any likely negative impact on the species; JNCC *et al*., 2010; see section 3).

Table 5.4: Number of individuals estimated to have the potential for a behavioural response by geophysical survey equipment

Species	Number of individuals within the area of potential impact (78.5 km^2)	Percentage of reference population which has the potential to be affected
Harbour porpoise	32	0.01
Bottlenose dolphin	2	1.04 (Coastal East Scotland Management Unit) 0.12 (Greater North Sea Management Unit)
White-beaked dolphin	3	0.01
White-sided dolphin	2	0.01
Minke whale	2	0.01

5.3. Assessment of Increased Noise from Geotechnical Survey Activities

5.3.1. Overview of Potential Impacts

The potential for PTS onset and a behavioural response as a result of sound emitted by the geotechnical survey activities has been summarised in Table 5.5, with the detailed assessment provided below.

Table 5.5: Potential for PTS and/or a behavioural response from geotechnical survey activities

Activity	Potential for PTS	Potential for behavioural response
Vibrocoring	No	No
Piezocone Penetration Testing (PCPT)	No	No

5.3.2. PTS

There is no potential for PTS onset as the maximum SPLs of all activities (Table 2.2) are below the PTS threshold for non-pulsed sound sources (Table 5.2).

5.3.3. Behavioural response

The information used in this assessment is based on high quality recordings of a similar operation (pin pile drilling) at another location (Strangford Lough; Nedwell and Brooker, 2008). These recordings were made at ranges of 28 m to 2.13 km from the drilling operation and indicated a source SPL of 162 RMS dB re 1 µPa @ 1 m i.e., comparable to the geotechnical survey work (see Table 2.2). Nedwell and Brooker (2008) assessed the likelihood of avoidance of the drilling noise by marine mammals. The conclusions of the study were that the avoidance ranges for 'significant avoidance in the majority of individuals' and 'low likelihood of disturbance' were 1.5 m and 85 m respectively.

Another assessment on rotary drilling (similar to borehole activities) estimated behavioural avoidance of 7 m for high frequency cetaceans and up to 230 m for very high frequency cetaceans (Barham, 2017).

Therefore, marine mammals are considered to be unlikely to be affected by noise from drilling or, as in this case, geotechnical survey work unless they are in the close vicinity of the work i.e., a small number of meters. Presence in the very close vicinity of the work is unlikely due to small-scale temporary displacement which will occur as a result of the presence of the survey vessel itself and therefore no behavioural responses are predicted.

5.4. Assessment of Increased Collision Risk

5.4.1. Overview of Potential Impacts on Marine Mammals and Basking Sharks

Vessel strikes are a known cause of mortality in the great whale species and basking sharks (Laist *et al*., 2001; Wilson *et al*., 2020). Non-lethal collisions have been documented in these and other species e.g., small cetaceans (Van Waerebeek *et al*., 2007; Bloom and Jager, 1994). 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 cetaceans is often associated with fast, unpredictable boats such as speedboats and jet-skis (Bristow and Reeves, 2001; Gregory and Rowden, 2001; Leung and Leung, 2003; Buckstaff, 2004), while neutral or positive reactions have been observed with larger, slower moving vessels such as cargo ships (Leung and Leung, 2003; Sini *et al.,* 2005).

AUVs are increasingly used to conduct marine mammal surveys and due to the small size, slow speeds (average of 3 – 9 knots) and predictable trajectory they have an additional benefit of further reducing risk of collision with marine species.

Slower vessels following a consistent trajectory allow marine mammals the opportunity to avoid collisions. Marine mammals occur at relatively low abundance in the area of the Project and basking sharks are very infrequent visitors.

5.4.2. Prediction of Impact

All survey vessels will be stationary or travelling at slow speeds, in a predefined trajectory, allowing for animals to predict movement of the vessel and avoid collisions. Marine mammals in the area are exposed to marine traffic on a regular basis and should therefore be habituated to vessel movements. The small number of vessels/vehicles that will be required for these surveys will not significantly increase vessel traffic in the area. Therefore, the potential for collision risk is considered to be negligible for EPS, pinnipeds and basking sharks. The Scottish Marine Wildlife

Watching Code[3] will be followed during transits when vessel speed may be greater. Tethered ROVs or AUVs may also be used and are highly unlikely to pose additional collision risk.

5.5. Assessment of potential impacts on the Southern Trench MPA

Following application of mitigation in relation to use of SBPs and USBLs, the geophysical surveys present negligible risk of PTS in minke whales, though the survey does have the potential to lead to some small scale temporary behavioural response (see Section 5.2.3).

Using the potential EDR for geophysical equipment of 5 km, there is potential for minke whales to be displaced from approximately 3.3% of the MPA at any one time should they be present at the time of year the survey takes place. The geotechnical surveys have a smaller behavioural response range than the geophysical surveys (see Section 5.3.3) and only a maximum of 40 VCs/PCPTs will occur along the whole nearshore proposed cable corridor (i.e., within the 12 NM zone). Considerable preferable alternative habitat will remain available during the surveys as the surveys will largely (and potentially completely) be conducted outside high density areas (Figure 4.2). In addition, as minke whales are known to remain in the area until October they have significant time for feeding before any winter migration.

As such the impact of the survey work on the protected feature (minke whale) is considered negligible and not significant and will not exert pressure on the Conservation Objectives of the MPA.

[3] https://www.nature.scot/professional-advice/land-and-sea-management/managing-coasts-and-seas/scottish-marine-wildlife-watching-code

6. Mitigation Measures

6.1. Sub Bottom Profiler

Standard mitigation measures, as detailed in the "JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys" (JNCC, 2017), will be followed to minimise the potential for PTS onset to arise as a result of operation of the SBP (pinger/chirper/sparker/boomer). These measures include pre-work searches, soft starts (where equipment has the capability) and protocols regarding line changes and breaks in operation. Mitigation measures will be implemented for EPS (including marine turtles), basking sharks and pinnipeds.

6.1.1. Pre-Work Searches

It is intended that at least one dedicated Marine Mammal Observer (MMO) and/or Passive Acoustic Monitoring (PAM) operator will be available to undertake pre-work searches of 30 minutes in length prior to use of the SBP.

Visual searches of a 500 m radius mitigation zone will be conducted when weather conditions, daylight and sea state allow. During the hours of darkness, or when visual observation is not possible due to weather conditions or sea state, a proven PAM system[4] (and operator) will be used.

If marine mammals are detected within the mitigation zone during a pre-work search (either visually or acoustically) or during a search after an unplanned break, the start of work will be delayed until their passage, or the transit of the vessel, results in them being outside the mitigation zone. There will be a minimum of 20 minutes from the time of the last detection within the mitigation zone to the commencement of the work.

As per the 2017 JNCC guidelines, unplanned breaks refer to instances where the SBP ceases pinging unexpectedly during operations. In these instances:

- Work will resume without a pre-work search after unplanned breaks of 10 minutes or less provided that no animals are detected in the mitigation zone during the breakdown period; and
- A full pre-work search will be conducted before work resumes after unplanned breaks of longer than 10 minutes. Any time the MMO/PAM operator has spent observing prior to the breakdown period will contribute to the pre-work search time.

Clear channels of communication between the MMO/PAM operator and relevant crew will be established prior to commencement of any operations. The MMO/PAM operator will be informed sufficiently in advance of any proposed work so that a full pre-work search can be completed prior to work commencing.

6.2. Ultra-Short Baseline System

The USBL is used for the positioning of equipment/vessel and works by emitting sound from the transponder to the beacon. Based on this the following good practice measures regarding USBL will be implemented:

- A 15-minute pre-work search will be undertaken prior to the activation of the USBL during daylight hours. This mitigation zone will be the same as the SBP (500 m) and should a marine mammal enter the mitigation zone a minimum of 15 minutes from the time of the last detection and the commencement of work will occur;
- The pre-work search will be undertaken by an MMO, or by a member of the crew if the USBL is the only piece of equipment for which mitigation is required. The member of crew will have undergone a project specific induction on mitigation requirements;
- The USBL will be operated at the lowest useful sound level and for the shortest possible time period; and
- 2017 JNCC guidelines will be followed for unplanned breaks (see Section 6.1.1).

[4] Hydrophones which have the capability to detect lower frequency and higher frequency cetaceans.

6.3. Transit Watches

The MMO or a nominated competent observer on the bridge of all vessels will keep watch for marine mammals, turtles, basking sharks and seals during all transits to and from the work sites (including between VC/PCPT locations). Any sightings will be communicated to the Master of the vessel as soon as is practicable and the following actions, as per the Scottish Marine Wildlife Watching Code, implemented:

- The Master of the vessel will ensure that animals are avoided to a safe distance (100 m or more) where possible; and
- The Master of the vessel will minimise high powered manoeuvres where this does not impair safety.

7. Conclusion

The conclusions of this assessment are as follows:

- With mitigation (SBP and USBL) in accordance with the 2017 JNCC geophysical survey guidelines and good practice measures (pre-work searches, soft starts where equipment has the capability and protocols regarding line changes and breaks in operations), the potential for PTS onset is considered to be negligible.
- There is considered to be potential for a temporary behavioural response by a small number of animals in response to the proposed survey work (use of SBP and, to a lesser extent, USBL).
- The increased risk of collision for both marine EPS and basking sharks is considered to be negligible.

Therefore, a basking shark licence within 12 NM can be awarded.

In the context of the Regulations applicable to UK waters beyond 12 nautical miles offshore, this potential for a temporary behavioural response by a small number of animals does not constitute an offence. Therefore, an EPS licence covering work outwith the 12 NM limit will not be required.

In the context of the Regulations applicable to STW, this potential for a temporary behavioural response by a small number of animals constitutes an offence. However, this action is not considered to be detrimental to the maintenance of the populations of the species concerned at a Favourable Conservation Status (FCS) in their natural range. Therefore, it is considered that an EPS licence covering use of USBLs and SBPs within STW can be granted.

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Appendix

A. Buchan Floating Wind Cable Route Area of Search Coordinates

Table A.1: Cable Route Area of Search

Latitude	Longitude
Outside 12 NM	
58°17.219'N	1°22.298'W
58°17.206'N	1°22.259'W
58°17.147'N	1°22.085'W
58°14.488'N	1°14.838'W
58°13.327'N	1°13.880'W
57°51.410'N	1°27.303'W
57°39.026'N	1°25.912'W
57°39.026'N	1°25.912'W
57°38.631'N	1°24.781'W
57°38.250'N	1°23.405'W
57°37.631'N	1°21.644'W
57°36.807'N	1°20.566'W
57°36.023'N	1°19.488'W
57°35.115'N	1°18.487'W
57°33.215'N	1°17.486'W
57°31.728'N	1°16.947'W
57°29.784'N	1°16.793'W
57°28.128'N	1°16.639'W
57°26.595'N	1°17.101'W
57°25.559'N	1°18.025'W
57°25.467'N	1°18.246'W
57°24.025'N	1°20.489'W
57°23.776'N	1°21.220'W
57°23.490'N	1°24.794'W
Inside 12 NM	
57°42.024'N	2°5.866'W
57°23.714'N	1°27.505'W
57°23.745'N	1°29.642'W
57°23.683'N	1°31.875'W
57°23.620'N	1°33.358'W
57°23.289'N	1°35.364'W
57°23.286'N	1°35.383'W
57°21.597'N	1°48.556'W

Latitude	Longitude
57°22.773'N	1°52.650'W

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