Appendix I: European Protected Species Risk Assessment

Islay Community Demonstration project

EPS Risk Assessment

Flex Marine Power Ltd

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Document history

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Contents

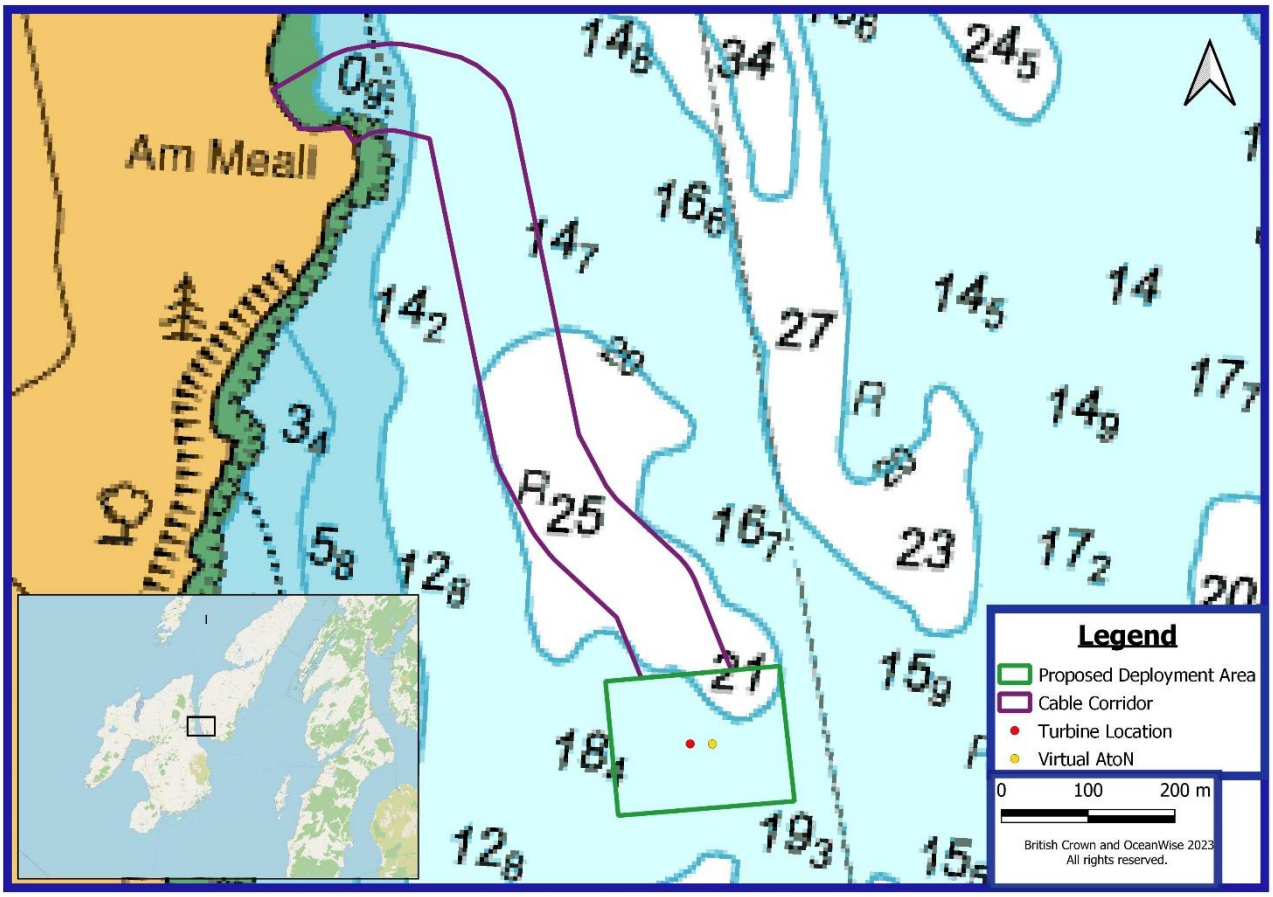
1. Introduction

Flex Marine Power Ltd (FMP), in association with Islay Energy Trust, is proposing to install a single SwimmerTurbine™, rated up to 70 kW in the Sound of Islay, Scotland (Figure 1.1), with the power being transmitted to Islay for private connection. The technology has undergone a number of scaled-up trials, including in collaboration with Queens University at Strangford Lough, NI. The Project was awarded a Marine Licence in June 2022.

The purpose of this Risk Assessment is to:

- Describe the activities which will be undertaken during the lifetime of the Project (section 2);
- Describe the legislation and guidance applicable to this assessment (section 3);
- Describe the European Protected Species (EPS)[1] and other marine megafauna likely to be present in the region of the Project (section 4);
- Assess whether there is any risk to marine EPS as a result of the proposed work (section 5);
- Describe any proposed mitigation and monitoring (section 6); and
- Ascertain whether EPS and basking shark licences are required and can be awarded (section 7).

Figure 1.1: Location of the Project in the Sound of Islay, Scotland



Source: Project EMP

[1] EPS include all species of cetaceans (whales, dolphins and porpoises), marine turtles and the Atlantic sturgeon.

2. Planned Work

2.1. Pre-Construction Phase

A bathymetric survey of the proposed turbine area and cable route (Figure 1.1) will be conducted using the equipment types described in Table 2.1. Typical frequency ranges and source levels for each type of equipment (from a range of specification sheets) have been provided. The survey is expected to take no longer than two-three days (excluding any delays e.g., due to weather) and will be conducted during daylight hours only. A single vessel will be required.

Table 2.1: Proposed bathymetric survey equipment

Equipment type	Typical frequency range (kHz)	Typical source pressure level (SPL; dB re 1 µPa @ 1 m)
Multi-Beam Echo Sounder (MBES)	> 200	217-223
Side Scan Sonar (SSS)	> 200 (though capability of equipment can be lower)	210-228
Sub-Bottom Profiler (SBP) – pinger	85-115 (HF) 2-22 (LF)	149-250
Ultra-Short Baseline (USBL) system	18-55	< 202 (though capability of equipment can be 190-220)
Magnetometer	No sound emitted	No sound emitted

Source: Equipment specification sheets

2.2. Construction and Installation Phase

The installation process for a full-scale SwimmerTurbine™ including all anchors and moorings was successfully demonstrated at Strangford Lough in 2020 using a multi-cat vessel operating during slack water periods. The same approach will be adopted for this Project. Key steps (and durations) relevant to the marine aspects of the works can be summarised as follows:

- Transport the gravity clump weight and other mooring components to the turbine area and lift and lower into the water using the vessel's winch/crane (this mooring installation operation will be undertaken during a number of slack water intervals over a period of 4-5 days depending on sea conditions);
- Tow/carry the turbine assembly to the turbine area and install at the mooring (1 day); and
- Lay seabed umbilical from turbine site to onshore infrastructure (for minimal seabed disturbance this will be a gravity-retained reeled cable lay operation) (1-3 days).

This process is described in detail in the Project's Environmental Management Plan (EMP).

The total time for installation is expected to be approximately 7-12 days (subject to weather conditions).

The proposed vessels are detailed in Table 2.2.

Table 2.2: Vessels proposed for use during installation

Vessel	Use
Multi-cat equipped with an ROV	Anchor and mooring transport, installation and removal Cable lay Device transport, installation and removal
Rigid hulled inflatable boat (RHIB)	Cable lay At-sea visual inspection Safety boat
Landing craft	Offload of onshore infrastructure (iso-cube box/cabin) and tractor at beach

Source: Project EMP

2.3. Operation and Maintenance Phase

Electricity will be generated at the SwimmerTurbine™ and exported to the shore using an armoured umbilical laid on the seabed. The distance between the turbine and the onshore infrastructure is c. 1 km. Rather than having a physical marker, a virtual aid to navigation[2] (AtoN) will be used which will be 'located' approximately 25 m to the east of the turbine and broadcast to vessels as a virtual East Cardinal Buoy (see Figure 1.1). All vessels with an AIS system will see this cardinal marker. It is worth noting that the proposed AtoN location is approximately 130 m within the red sector of the Carraig Mhor light and so outwith the main shipping channel.

Maintenance offshore will be scheduled within 30-minute slack water windows. Daily maintenance visits will be required during commissioning. Weekly maintenance visits will be required during the initial 16-week period following commissioning. Maintenance visits will be monthly thereafter during normal operations. A RHIB will be used.

There is also the likelihood that the turbine needs to be towed to Port Askaig for quarterly inspections and maintenance. There may also be a requirement for approximately 5 additional removal operations during early-stage operations period. A multi-cat will be used. If detailed maintenance/inspection work is required, it may then be removed from the water for workshop operations locally.

The SwimmerTurbine™ has been developed to allow operations and maintenance routines to be achieved locally. Control and monitoring and safety systems are built in to allow remote controlled startup, running and shutdown. The turbine can easily be raised if required to facilitate inspection or servicing. A suitably qualified local electrician will be contracted to deliver servicing of equipment in the shoreside cabin.

2.4. Decommissioning Phase

Full decommissioning of the SwimmerTurbine™ was demonstrated at Strangford Lough in 2021 using a multi-cat vessel operating during slack tides. Machine removal at Strangford was achieved in one slack tide window. Full mooring and anchoring removal were then achieved during two further days of vessel operations. Nothing remained on the seabed following this. The same procedure will be followed for this project. Key steps will be:

- Remove nacelle then recover cable to a vessel mounted reel, starting at the onshore site and progressing back towards the machine (~3 days);
- Raise and unclip the turbine assembly from the mooring and tow/carry all items to shore (1 day);

[2] A virtual aid to navigation is digital information, broadcast from an Automatic Identification System (AIS) station, to display an aid to navigation that does not physically exist in the water. Virtual aids to navigation are visible on vessels' AIS Minimum Keyboard and Display (MKD), or as a symbol on an appropriate display system.

- Recover the gravity clump weight and other mooring components over a number of slack tide windows using the vessel's winch/crane (~4 days); and
- Remove onshore equipment cabin and decommission any associated connection infrastructure (~1 day).

Full decommissioning is expected to take no more than ~9 days (subject to weather windows).

3. Legal Requirement

This Project and its potential effects lie wholly within Scottish Territorial Waters (STW).

The need to consider EPS in STW comes from 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. The 'Habitats Regulations' provide for the designation of protected European sites (Special Areas of Conservation (SACs)) and the protection of EPS as designated under the Habitats Directive. They state (under section 39) that it is an offence to deliberately or recklessly:

- Capture, injure or kill a wild animal of an EPS;
- Harass a wild animal or group of wild animals of an EPS;
- Disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;
- Disturb such an animal while it is rearing or otherwise caring for its young;
- Obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;
- Disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- Disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- Disturb such an animal while it is migrating or hibernating; and
- Disturb any dolphin, porpoise or whale (cetacean).

Exemptions (EPS licences) may be granted by Scottish Ministers provided that:

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

Conservation status will be taken as favourable when:

- 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.

3.1. Guidance

Marine Scotland and Scottish Natural Heritage (SNH – now NatureScot) released updated guidance on the protection of marine EPS from injury and disturbance in Scottish inshore waters in July 2020 (Marine Scotland and SNH, 2020). This guidance is intended to help the reader assess the following and has been used to conduct this Risk Assessment:

- The likelihood of an offence being committed (as an incidental result of a lawful activity);
- If this can be avoided or minimised; and
- Where this cannot be avoided or minimised, whether the activity could go ahead under licence.

It should be noted that, given the uncertainties surrounding the issue of disturbance and marine EPS, the (Marine Scotland and SNH) guidance for Scottish inshore waters represents a more precautionary interpretation of the Habitats Directive than the guidance for England, Wales and the UK offshore marine area does.

4. EPS in the Region of the Project

4.1. Cetaceans

The most common cetacean species in the region of the project is harbour porpoise (*Phocoena phocoena*). Harbour porpoises are present off Islay year-round. Other cetacean species which may occur on a less common or even seasonal basis include minke whale (*Balaenoptera acutorostrata;* Anderwald *et al*., 2012) and a number of dolphin species. The species likely to be present are listed in Table 4.1 along with their SCANS-IV (Block CS-F) density and IAMMWG (2023) Management Unit abundance estimates which have been used in the Risk Assessment (section 5).

Table 4.1: Density and reference population abundance information for cetacean species likely to be present in the region of the Project

Species	Density (animals per km²)	Reference population		
		Management Unit	Abundance	95% CI
Minke whale	0.0137	Celtic and Greater North Seas	20,118	14,061 – 28,786
Bottlenose dolphin	0.0425	Coastal West Scotland and the Hebrides	45	33-66
Common dolphin	0.0544	Celtic and Greater North Seas	102,656	58,932 – 178,822
Risso's dolphin	0.0027	Celtic and Greater North Seas	12,262	5,227 – 28,764
Harbour porpoise	0.201	West Scotland	28,936	21,140 – 39,608

Source: Gilles et al. (2023); IAMMWG (2023)

4.2. Marine Turtles

Four species of marine turtle are occasional visitors to Scottish waters: Leatherback turtle (*Dermochelys coriacea)*, loggerhead turtle (*Caretta caretta*), Kemp's ridley turtle (*Lepidochelys kempii*), and green turtle (*Chelonia mydas*). Records include at-sea sightings as well as strandings.

The leatherback is the most commonly recorded turtle species in UK waters where it is thought to be at the most extreme northern limit of its natural range. The majority of sightings occur between July and October when the sea is at its warmest (Langton *et al*., 1996).

4.3. Other (not EPS) Species

4.3.1. Basking Sharks

Western Scotland is considered a UK 'hotspot' for basking sharks with surface sightings frequent in summer months (Witt *et al*., 2012; Austin *et al.,* 2019). Basking sharks occupy shallow coastal waters during summer months (July to September), predominantly using surface waters, but move to deeper waters from autumn onwards (Witt *et al*., 2016). From tagging studies there is evidence that some sharks remain relatively close to Scotland throughout the winter while others disperse into the north-east Atlantic Ocean or through the Irish Sea into the Celtic Sea and Bay of Biscay (Witt *et al*., 2016). In the Witt tagging study, basking sharks occurred in shallow waters over rocky substratum, with low to moderate (relative) tidal speeds (Witt *et al*., 2016).

Basking sharks (*Cetorhinus maximus*) are protected under Schedule 5 of the Wildlife and Countryside Act 1981.

4.3.2. Pinnipeds

Both species of seal found in UK waters (grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*)) are common in the region of the Project.

The total Scotland grey seal population is estimated at 129,100 (SCOS, 2022). The most recent (2016-2019) August count for the west Scotland region is 4,174 (SCOS, 2022). Off Islay the greatest aggregations were in the north. Grey seal pup production in the west of Scotland is stable and likely at the limit of the number of pups that can be supported by the surrounding seas.

The total Scotland harbour seal population is estimated at 36,600 (95% CI 30,000 – 48,800). The most recent (2016-2019) August count for the west Scotland region is 15,600 (SCOS, 2022). Off Islay the greatest aggregations were in the south and east. There are significant differences in harbour seal population trends between regions. The west of Scotland regions are increasing slightly. All other regions are either stable at a depleted level after recent declines or depleted and still declining.

Both species are listed on Annexes II and IV of the EU Habitats Directive. They are also protected under the Marine (Scotland) Act 2010 and it is an offence to 'intentionally or recklessly harass' seals at designated haul out sites under the Protection of Seals (Designation of Seal haul-Out Sites) (Scotland) Order 2014.

Impacts on marine turtles, basking sharks and pinnipeds have been assessed alongside those on cetaceans, and any mitigation measures proposed will be applied to all species should they be present.

4.4. Relevant Designations

4.4.1. Special Areas of Conservation (SACs)

The following SACs are located in the region of the Project:

- Inner Hebrides and the Minches SAC (harbour porpoise) is c.10 km to the north;
- Treshnish Isles SAC (grey seal) is c.75 km to the north west; and
- South-East Islay Skerries SAC (harbour seal) is c.20 km to the south.

4.4.2. Marine Protected Areas (MPAs)

The Sea of the Hebrides Marine Protected Area (MPA) lies c.45 km north of the Project. Minke whales and basking sharks are listed as features.

4.4.3. Designated Seal Haul Out Sites

There are no designated seal haul out sites within the Sound of Islay. The closest designated haul out sites are on Jura, Nave Island, and Oronsay.

5. Risk Assessment

During the lifetime of the Project, there is potential for marine EPS and basking sharks to be impacted. The key potential impacts, and the phases of the Project to which they are relevant, are shown in Table 5.1.

Table 5.1: Key potential impacts and phases of the Project to which they are relevant

Potential impact	Project phase			
	Bathymetric surveys	Construction	Operation and maintenance	Decommissioning
Increased anthropogenic noise from use of geophysical survey equipment	✓			
Collision risk (vessels)	✓	✓	✓	✓
Collision risk (blades)			✓	
Entanglement (tether and umbilical)			✓	
EMF			✓	

5.1. Increased Anthropogenic Noise from Use of Geophysical Survey Equipment

5.1.1. Background Information on the Criteria and Thresholds Relevant to Assessment of the Potential Effects of Underwater Noise

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

- Auditory injury – 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 5.2). 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. Basking sharks are not sensitive to underwater noise changes (Wilson *et al*., 2023).

Table 5.2: Auditory range for the different marine mammal hearing groups

Functional hearing group	Example species	Estimated auditory bandwidth (kHz)
Low frequency cetacean	Minke whale	0.007-35
High frequency cetacean	Bottlenose dolphin	0.15-160
Very high frequency cetacean	Harbour porpoise	0.2-180
Phocid carnivores in water	Harbour seal Grey seal	0.5-86

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

Southall *et al*. (2019) provide thresholds for received sound levels that have the potential to induce the onset of PTS in marine mammals (Table 5.3). These PTS thresholds are based on unweighted, instantaneous peak sound pressure levels (SPLs).

Table 5.3: PTS thresholds – SPLs (dB re 1 µPa @ 1 m) – for assessing the potential for auditory injury to occur instantaneously

Functional hearing group	Example species	Pulsed sound
Low frequency cetacean	Minke whale	219
High frequency cetacean	Bottlenose dolphin	230
Very high frequency cetacean	Harbour porpoise	202
Phocid carnivores in water	Harbour seal Grey seal	218

Source: Southall et al. (2019).

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.

5.1.2. Assessment

The potential for PTS onset and a behavioural response as a result of sound emitted by the geophysical survey equipment has been summarised in Table 5.4, with the detailed assessments provided below. Although the quantitative assessment only considers the cetacean species for which density estimates are available, any mitigation measures put in place will also be applied to other species which may occur (basking sharks, marine turtles, and seals).

Table 5.4: Potential for PTS and/or a behavioural response from geophysical survey equipment

Equipment type	Potential for PTS	Potential for a behavioural response
MBES	No – outwith hearing range (will be operated at > 200 kHz)	No
SSS	No – outwith hearing range (will be operated at > 200 kHz)	No
SBP	Yes – mitigation required	Yes
USBL	No – SPL below all thresholds (will be operated at < 202 dB re 1 µPa)	Yes

5.1.2.1. PTS

The SBP has the potential to induce the onset of PTS in cetaceans and pinnipeds in close proximity to the sound source if operated at SPLs > 202 dB re 1 µPa (Table 5.4; 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 to ensure that the potential for PTS onset can be considered to be nil.

5.1.2.2. Behavioural Response

Only the USBL and SBP have the potential to evoke a behavioural response (Table 5.4; Table 2.1). The JNCC considers a 5 km effective deterrence range (EDR) from geophysical survey equipment to be precautionary (JNCC, 2020).

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-IV animal density estimates (Gilles *et al*., 2023; Table 4.1), the number of animals within the area of potential impact was estimated (Table 5.5). The percentage of the appropriate reference population (IAMMWG, 2023; 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) to provide context.

The number of individuals estimated to respond behaviourally varied from < 1 (Risso's dolphin) to 16 (harbour porpoise; Table 5.5). With the exception of bottlenose dolphin, the percentage of the population this represents was always ≤ 0.05% i.e., negligible. Bottlenose dolphins are not evenly distributed; the small west coast community (Cheney *et al*., 2013) occurs in groups which range widely. Most of the time, no bottlenose dolphins will be present within the Sound of Islay.

On cessation of survey activity it is considered that use of the area 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 *et al*., 2017). The duration of the proposed survey is short and suitable alternative local habitat is available.

Table 5.5: Number of individuals estimated to have the potential to respond behaviourally to noise from geophysical survey equipment

Species	Number of individuals	Percentage of reference population
Minke whale	1	< 0.01
Bottlenose dolphin	3	7.42
Common dolphin	4	< 0.01
Risso's dolphin	< 1	< 0.01
Harbour porpoise	16	0.05

5.2. Collision Risk

5.2.1. Vessels

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).

A small number of vessels is required during the lifetime of the Project (see section 2). In the main, vessels will either be stationary (e.g., when installing the device) or moving slowly (e.g., when conducting bathymetric surveys or laying the cable) therefore the potential for collisions is negligible. During transits (between Port Askaig and the site – a distance of c. 2 km), when vessel speed may be greater, transit watches (section 6.2) will be conducted.

5.2.2. Blades

Collision with blades is considered as a potential risk during the operation and maintenance phase.

As agreed with NatureScot during consultation, collision risk modelling (document number 1267076) was carried out in order to assess the implications of potential collisions with this single small-scale tidal turbine for harbour porpoise, harbour seal, and grey seal (which are the most common species in the region of the Project; see section 4). Both rotor sizes under consideration were modelled.

Using the avoidance rate recommended for use by NatureScot, the predicted annual collision rate was < 1 individual per year for all species (Table 5.6). This is considered to represent negligible risk.

Table 5.6: Predicted annual collision rate

Species	Scenario 1 (5 m diameter rotor)	Scenario 2 (3.28 m diameter rotor)
Harbour porpoise	0.23	0.12
Grey seal	0.02	0.01
Harbour seal	0.13	0.06

Source: Collision risk modelling report (document number 1267076).

5.3. Entanglement

Moorings such as those proposed for marine renewable energy devices pose a relatively modest risk in terms of entanglement for most marine megafauna (Benjamins *et al*., 2014). In the case of the single SwimmerTurbine™ the mooring system comprises of a combination of taut steel rope and chain. Although the risk of entanglement in a taut mooring is negligible, there is potential for the smaller species to become entangled in derelict fishing gear if it has become attached to the mooring itself. Technical monitoring of the SwimmerTurbine™ will be undertaken for operational purposes using equipment installed on the device with outputs monitored in real time using cloud-based communications (see section 6.3). These systems will allow FMP to detect any entanglement event should it occur and enable any necessary inspections to be actioned as soon as possible. A virtual aid to navigation (rather than a physical marker) will be used presenting no risk of either primary or secondary entanglement.

5.4. EMF

Electric and magnetic fields (EMF) may be emitted by the umbilical. EMF has the potential to alter the behaviour of marine organisms able to detect the fields. There is little direct evidence of the impact of EMF on marine EPS, seals, or basking sharks. While individuals may be able to detect electric and/or magnetic fields at close range, any attraction or avoidance behaviour is likely to be very small-scale (in the order of a few m) at worst – and therefore unlikely to result in any effects of consequence. EMF is therefore considered to represent negligible risk.

6. Mitigation and Monitoring

6.1. Sub Bottom Profiler

In order to minimise the potential for PTS onset from use of the SBP, 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. These measures include pre-work searches, soft starts (where equipment has the capability) and protocols regarding line changes and breaks in operation.

At least one Marine Mammal Observer (MMO) will be available to undertake 30-minute pre-work searches of a 500 m radius mitigation zone prior to use of the SBP. Surveys will be conducted during daylight hours only but, should there be a requirement to work outside daylight hours the use of an appropriate passive acoustic monitoring (PAM) system and operator will be considered.

If marine mammals, turtles or basking sharks are detected within the mitigation zone during a pre-work search, or during a search after an unplanned break, the start of the 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 has spent observing prior to the breakdown period will contribute to the pre-work search time.

Clear channels of communication between the MMO and relevant crew will be established prior to commencement of any operations. The MMO 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. Transit Watches

In order to mitigate the potential for collisions, a nominated competent observer on each vessel will keep watch for marine mammals, turtles, and basking sharks during all transits between Port Askaig and the proposed deployment area. All 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 (SMWWC) and Project EMP, implemented:

- Speed will be reduced to 6 knots when any marine mammals are sighted within or near to transit routes, where consistent with crew and navigational safety and the completion of constrained operations;
- A steady speed and course will be maintained where possible if a marine mammal approaches a project vessel;
- Care will be taken to avoid splitting up groups, or mothers and young;
- Minimum approach distances (as stated in the SMWWC) for vessels on approach to marine mammals will be adhered to, although this may be varied according to species and circumstance. Specifics will be agreed with NatureScot and listed in the updated EMP and implemented; and
- Sudden unpredictable changes in speed, direction and engine noise will be avoided to avoid disturbance to any marine mammals in the vicinity.

6.3. Collision Risk and Entanglement

Technical monitoring of the SwimmerTurbine™ will be undertaken for operational purposes using equipment installed on the device with outputs monitored in real time using cloud-based communications. Remote sensors on the device will be used to monitor pitch and roll and accelerometers will be used to identify any movement. Using an inertial/GPS system for the device, the movement of the device will be monitored, and an alert will be triggered if the system moves outside of the operational parameters. The control system will have a shock sensor for the purpose of giving indication should an object strike the device. These systems will allow FMP to detect any changes or failings in the moorings or any entanglement event should it occur and enable any necessary inspections or retrieval operations to be actioned as soon as possible. In the highly unlikely event that any of the key device components should become detached from their substructure, an alarm will immediately be sent to the operator on duty who will co-ordinate retrieval operations.

7. Assessment of Potential Offence

7.1. Increased Anthropogenic Noise from use of Geophysical Survey Equipment

The SBP has the potential to induce the onset of PTS in cetaceans and pinnipeds in close proximity to the sound source if operated at SPLs > 202 dB re 1 µPa. Although 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 to negligible, mitigation will be undertaken (section 6.1). With mitigation, the potential for PTS onset can be considered to be nil. There is therefore no potential for offence for this aspect of the proposed work (and no licence required).

Both the USBL and the SBP have the potential to evoke a behavioural response. Using a precautionary approach to the assessment, behavioural responses may be displayed by up to 16 harbour porpoise, 4 common dolphin, 3 bottlenose dolphin and 1 minke whale. The percentage of the reference populations these numbers represent is very small (mostly < 0.01%). The duration of the proposed survey is short (2 days) and suitable alternative local habitat is available. Such disturbance will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range therefore an EPS licence (covering use of USBL and SBP equipment) can be awarded for this aspect of the proposed work.

7.2. Collision Risk

7.2.1. Vessels

When working, vessels will either be stationary (e.g., when installing the device) or moving slowly (e.g., when conducting bathymetric surveys or laying the cable). During transits (between Port Askaig and the site – a distance of c.2 km), when vessel speed may be greater, transit watches (section 6.2) will be conducted. The potential for collisions is negligible therefore there is no potential for offence for this aspect of the proposed work (and no licence required).

7.2.2. Blades

The potential for collisions with blades is negligible for both EPS and basking sharks. Monitoring will include shock sensors (to detect collisions; see section 6.3). Following a collision detection, operational and performance parameters will be reviewed. If parameters are significantly adverse a shutdown will occur. There is therefore no potential for offence for this aspect of the proposed work (and no licence required).

7.3. Entanglement

The potential for entanglement is negligible for both EPS and basking sharks. Real time monitoring of device orientation and movement will be undertaken (see section 6.3). There is therefore no potential for offence for this aspect of the proposed work (and no licence required).

7.4. EMF

The potential for EMF effects is negligible for both EPS and basking sharks. There is therefore no potential for offence for this aspect of the proposed work (and no licence required).

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