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Scottish MPA Programme

Assessment against the MPA Selection Guidelines

SEA OF THE HEBRIDES POSSIBLE MPA

JUNE 2019

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Purpose

This document provides details of the assessment of the Sea of the Hebrides possible MPA against the Scottish MPA Selection Guidelines. It presents the assessment for each of the proposed protected features.

We have used the terminology set out in the Selection Guidelines to describe the five main stages in the assessment process from the identification of MPA search locations through to the development of MPA proposals. This area has now become a possible MPA because, following advice from SNH, Scottish Ministers have decided to consult on whether it should be formally designated.

The main terms used are described below.

MPA search location - this describes a location identified at stage 1 until it passes the assessment at stage 4.

Potential area for an MPA - if an MPA search location passes the assessment at stage 4 it goes on to become a potential area for an MPA for consideration at stage 5.

MPA proposal - a potential area for an MPA that has passed the assessment at stage 5 and which has been formally recommended for designation by SNH and/or JNCC to Scottish Ministers.

Possible MPA - an MPA proposal approved by Scottish Ministers for public consultation. From this time the location is given policy protection as if it were designated.

MPA search features - specified marine habitats, species and large-scale features that underpin the selection of MPAs.

Geodiversity features - specified geodiversity interests of the Scottish sea bed categorised under themed 'blocks' that are analogous to the MPA search features for biodiversity.

Representative features - habitats and/or species which are not MPA search features or key geodiversity features. They have been assessed to determine whether they would add to the broader representativity of the network.

Proposed protected feature - any feature (habitats, species, large-scale features [MPA search features and/or representative features] and/or geodiversity features) which has been proposed by SNH and/or JNCC for designation.

Third-party proposal - A proposal submitted by a coastal community or marine interest group.

History of development

Sea of the Hebrides possible MPA (previously named the Skye to Mull search location) was identified for the following MPA search features - basking shark, fronts and minke whale. Marine Geomorphology of the Scottish Shelf Seabed geodiversity features are also present and have been recommended for inclusion.

The Sea of the Hebrides Nature Conservation MPA proposal fully encompasses the WDCS3 Southern Hebrides third-party MPA proposal for minke whale. Other overlapping third-party proposals are encompassed by the existing Small Isles MPA.

Details of supporting evidence are provided in the Sea of the Hebrides possible MPA data confidence assessment.

SEA OF THE HEBRIDES - APPLICATION OF THE MPA SELECTION GUIDELINES

Stage 1 - Identifying search locations that would address any significant gaps in the conservation of MPA search features

Summary of assessment	The Sea of the Hebrides possible MPA encompasses three MPA search features: basking shark, minke whale and fronts. Basking sharks are included on the OSPAR list of threatened and/or declining habitats and species and minke whales are considered to be under threat and/or in decline in Scottish waters. The front feature, which appears during the spring and summer to the south-west of Tiree, provides an important functional link to both basking sharks and minke whales by facilitating favourable feeding conditions. The protected features also include Marine Geomorphology of the Scottish Shelf Seabed interests as represented by the Inner Hebrides Carbonate Production Area.

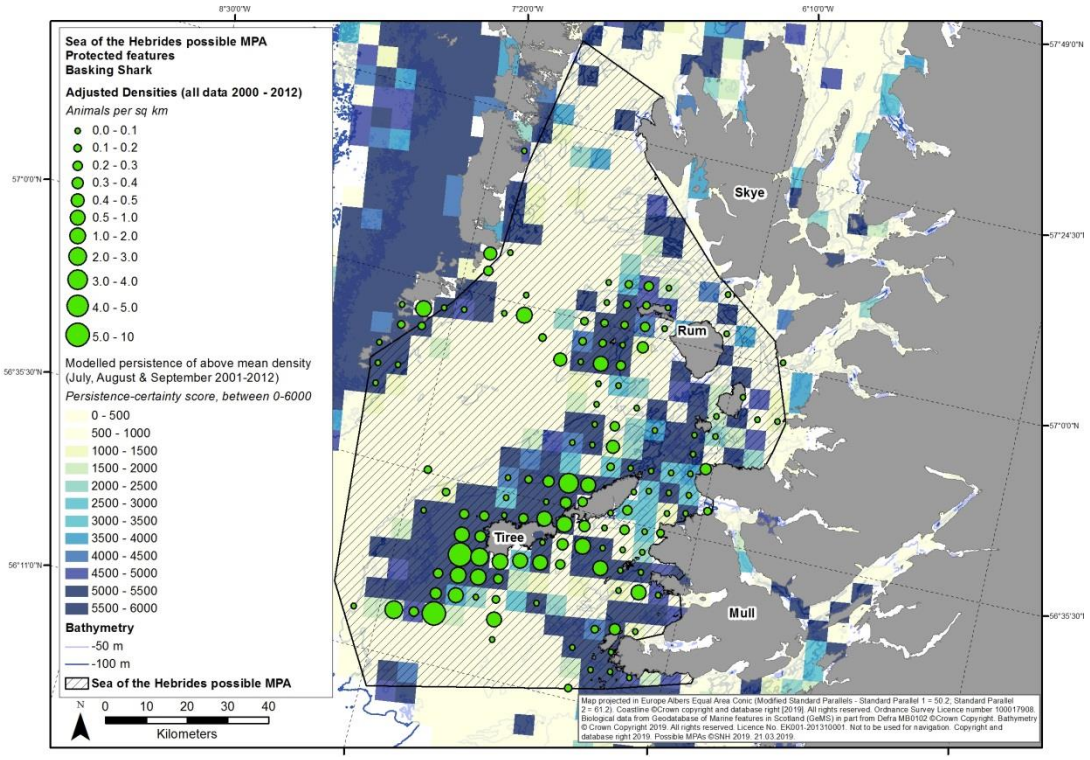
Detailed assessment

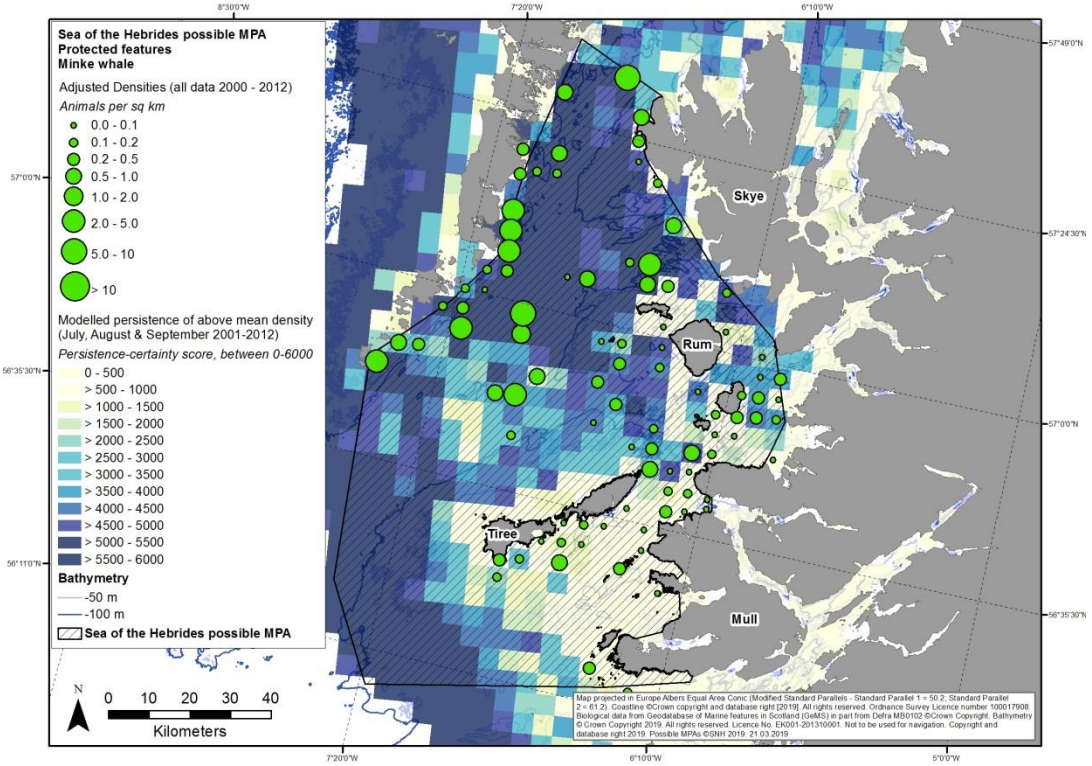
Proposed protected features	**Guideline 1a** *Presence of key features* [MPA search features and geodiversity equivalents]	**Guideline 1b** *Presence of features under threat and/or subject to rapid decline*	**Guideline 1c** *Functional significance for the overall health and diversity of Scottish seas*
Biodiversity			
Basking shark	✓	✓ **OSPAR T&D**[1]	
Fronts	✓		✓
Minke whale	✓	✓ **T&D**[2]	
Geodiversity			
Marine Geomorphology of the Scottish Shelf Seabed - Inner Hebrides Carbonate Production Area	✓		

[1] OSPAR list of Threatened and/or Declining species and habitats (see OSPAR, 2008 a & b). OSPAR Background Document for Basking shark (see OSPAR, 2009).

[2] Feature considered to be under threat and/or in decline in Scottish waters (see https://www.nature.scot/snh-commissioned-report-388-identification-priority-marine-features-scottish-territorial-waters for further details).

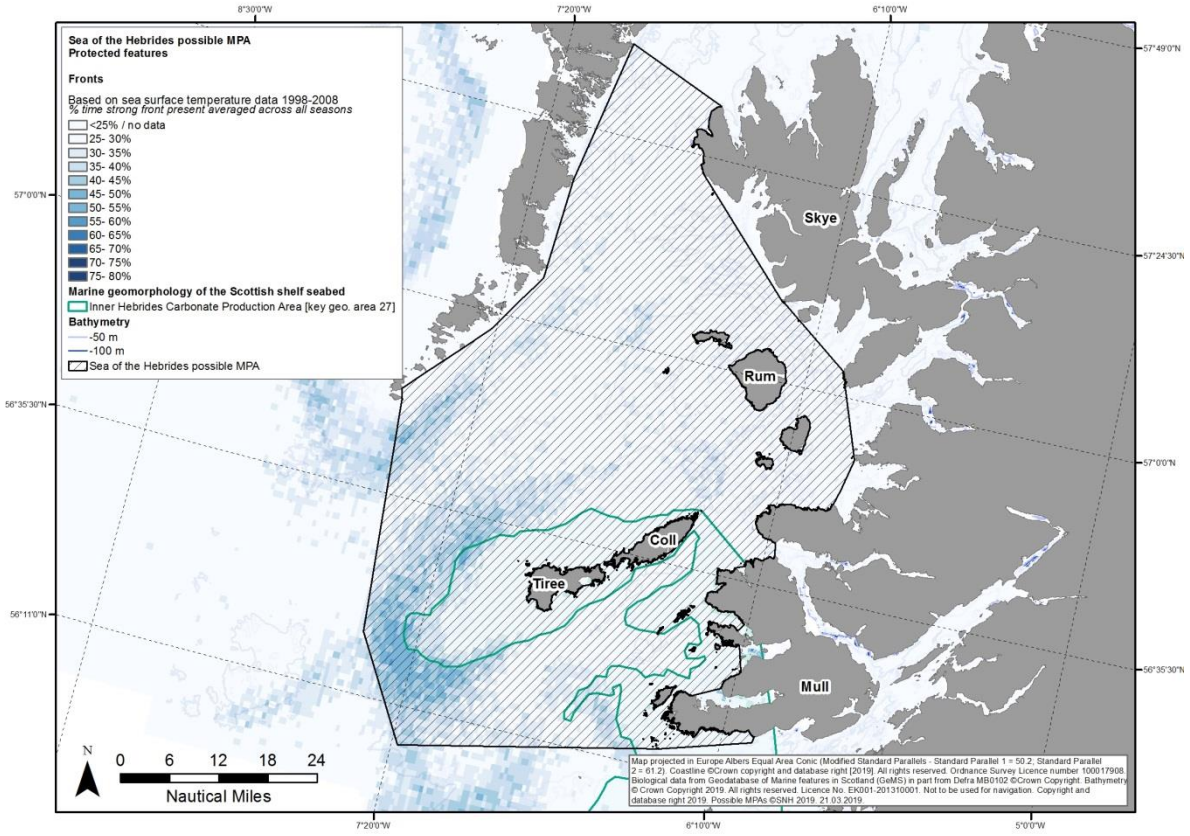
Maps of the Sea of the Hebrides possible MPA showing the modelled/recorded distribution[3] of proposed protected features





[3] Green circles show adjusted density data for basking sharks (top) and minke whales (bottom). Dark blue/blue colour in basking shark and minke whale maps indicates areas in which animals are predicted to be present at above average densities more persistently and with greater confidence. Pale green/yellow indicate lower persistence and confidence. Grid boxes used in modelling work are 5 x 5 km. Data are presented for Scottish territorial waters only because this is the area over which modelling was carried out. For further details of the habitat modelling see: https://www.nature.scot/snh-commissioned-report-594-statistical-approaches-aid-identification-marine-protected-areas-minke.

Maps of the Sea of the Hebrides possible MPA showing the modelled/recorded distributions of proposed protected features (*contd.*)



Interpretation of the fronts MPA search feature

This summary overview is provided to aid interpretation of the terminology used within this technical assessment. The fronts MPA search feature is one of five large-scale features included on the list of MPA search features to represent areas of potential wider significance to the overall health and biodiversity of Scotland's seas. Fronts form at the boundary between two different water bodies, for example where tidally mixed coastal waters meet thermally stratified offshore waters, or where fully saline oceanic waters meet lower salinity inshore waters that have freshwater influence. In identifying MPAs for fronts, the focus has been on those areas in which fronts occur persistently and frequently. Frequently occurring fronts (e.g. spatially and/or seasonally) are widely recognised as supporting enhanced biological activity. Fronts are described in more detail in the SNH and JNCC position paper '*Marine Protected Areas and large-scale features*' (see - https://www.nature.scot/scottish-mpa-project-large-scale-features-position-paper. For further detail on the identification of locations on the Scottish continental shelf in which fronts are present see Miller *et al.* (2014).

Stage 2 - Prioritisation of search locations according to the qualities of the MPA search features they contain

Summary of assessment	The possible MPA contains a combination of features, with functional links between the large-scale fronts feature and both mobile species. It also contains coherent examples of the biodiversity features including the whole of the area to the south-west of Tiree where thermal fronts persistently form, and areas predicted by habitat modelling work to persistently support above average densities of basking sharks and minke whales. The fronts feature is considered to be least damaged/more natural whilst the other features have either been modified by human activity and/or there is some uncertainty over their status. There is a medium to low risk of significant damage by human activity for most of the proposed protected features. Whilst the geodiversity feature generally has a low sensitivity to physical pressures (surface and sub-surface abrasion), parts of this proposed protected feature are highly sensitive. **Two of the four relevant Stage 2 guidelines have been fully met and two partially met**. (Note that Guideline 2b does not apply because it is relevant to habitats only and none of the proposed protected features of this possible MPA are habitats.)

Detailed assessment

Guideline 2a **The search location contains combinations of features, rather than single isolated features, especially if those features are functionally linked**

The possible MPA encompasses three MPA search features comprising two mobile species and one large-scale search feature. Marine Geomorphology of the Scottish Shelf Seabed interests are also included.

- Habitat modelling predicts that areas around Coll, Tiree, Skerryvore and Hyskeir support persistently higher than average densities of basking sharks, whilst the north and west areas of the possible MPA are predicted to support persistently higher than average densities of minke whales. These predictions are backed up by effort-corrected sightings data and targeted tagging research. The latter has demonstrated high levels of basking shark seasonal site fidelity as well as inter-annual site fidelity to the MPA (Witt *et al*., 2016, Doherty *et al*., 2017).
- Tidally / topographically driven thermal fronts occur within the possible MPA and are particularly evident in spring and summer to the south-west of Tiree (Miller *et al.,* 2010). A slightly increased front frequency is observed in the same location based on ocean colour (chlorophyll) data; although this signature is less clear (Miller *et al.,* 2014).
- There is a functional link between basking shark feeding aggregations and plankton rich thermal fronts (as shown by Sims and Quayle (1998) and Sims *et al*. (2000) for England, Preide and Miller (2009) for Scotland and Choy *et al*. (1995) for Florida).
- Fronts are also likely to influence the distribution and availability of minke whale prey. Anderwald *et al.* (2012) found that chlorophyll concentration influenced minke whale distribution in the region during autumn and concluded that this may be due to aggregation of sprat (a key prey species of minke whales) in areas of higher primary productivity.
- The Marine Geomorphology of the Scottish Shelf Seabed interests are represented by the Inner Hebrides Carbonate Production Area. This extensive area of shell-rich sands has been derived over the last few thousand years from carbonate-producing animals that live in or on the sea bed or from coralline algae such as maerl (Brooks *et al*., 2013). Calcium carbonate production is ongoing (due to the continued growth of species such as maerl, horse mussels, fan mussels, cold water corals and infaunal molluscs and echinoids) and the sediment pathways are complex given the variable tidal and wave-induced seabed currents. Whilst subtidally these sediment plains and banks provide habitats for species (e.g. species of sandeel) they can also be washed onshore providing shell sand to adjacent islands, where they are a key component for the biodiversity-rich machair grassland.

Guideline met.

Guideline 2b	The search location contains example(s) of features with a high natural biological diversity
This guideline applies to seabed habitats only	Not relevant to the proposed protected features in the Sea of the Hebrides possible MPA.

Guideline 2c	The search location contains coherent examples of features, rather than smaller, potentially more fragmented ones
Basking shark	Basking sharks are slow to mature (12 to 20 years), are ovoviviparous and have low fecundity (Compagno, 1984 and Sund, 1943). Basking sharks tend to be solitary, but do aggregate in groups to feed in areas of high zooplankton productivity, especially those with seasonally persistent tidal fronts (Speedie *et al.*, 2009). Courtship-like behaviour (e.g. breaching, nose to tail following) seems to be restricted to areas where aggregations of sharks occur (Sims *et al*., 2000, Speedie, *et al*., 2009, Witt *et al.*, 2016); suggesting this behaviour is a consequence of the density of mature individuals found feeding within thermal fronts (Sims *et al*., 2000; Gore *et al*., 2018). Recent research using a citizen science approach has not found a relationship between described following behaviours and sex of shark, but did not rule out the possibility that behaviours are courtship related (Gore *et al*., 2018). There is no information to determine what a minimum viable population for basking sharks might be or the size of area required to protect a viable population. However, there is evidence to suggest the Sea of the Hebrides possible MPA is used for feeding and is potentially important for courtship and breeding success. This evidence includes persistent high levels of sightings per unit effort, together with the significant aggregations of basking sharks and the observation of social and courtship-like behaviour (Speedie, *et al*., 2009; Witt *et al.*, 2016) including new evidence showing basking shark group behaviour close to the seabed (Witt *et al*., 2018).
Fronts	The possible MPA encompasses the whole of an area to the south-west of Tiree where thermal fronts form persistently, particularly during the spring and summer. The fronts form at the boundary between the tidally-mixed zone on the relatively shallow inner shelf of Skerryvore and more stratified waters further away from the inner shelf. The formation of the front in this location is heavily influenced by the local bathymetry in the area and is therefore relatively stable between years. In addition, smaller-scale persistent fronts arise around other headlands and areas with complex topography within the possible MPA.
Minke whale	Minke whales can live for up to 50 years, maturing at around 7-10 years (Anderwald *et al*., 2008), with adults reaching lengths of 6.5-10 m (Reid *et al.,* 2003; Edwards, 2006). Group sizes are generally small (1-3 individuals), although animals may aggregate in larger groups (10-20 individuals) where feeding conditions are good (Reid *et al.,* 2003). There is no information to determine what a minimum viable population for minke whale might be, or the size of an area required to support a viable population. Habitat modelling (Paxton *et al.*, 2014) predicts that the area supports persistently above average densities of the species, while effort-corrected sightings data indicate that relatively high numbers of minke whale occur within the possible MPA, with an apparent peak during the summer feeding season. This season is a key stage in the minke whale life cycle, since animals have to build up sufficient energy reserves during summer (by feeding on prey such as sandeels, sprat and herring) to enable them migrate to winter breeding grounds (SNH, 2012).
2c - Result	**Guideline met.**

Guideline 2d	**The search location contains features considered least damaged / more natural, rather than those heavily modified by human activity**
Basking shark	Basking shark directed fisheries that existed from the 1940s until the 1980s saw catch declines between 50% and 90% within a decade of peak activity (OSPAR, 2008a & b). There are no current estimates of basking shark population sizes in Scotland, the UK or North-east Atlantic. Tentative estimates of approximately 1000 - 2000 basking shark for smaller areas within the pMPA have been made during survey work to support a proposed development application and photo ID work using boat based surveys (Booth *et al*., 2013, Gore *et al*, 2016). These are likely to be conservative for a variety of reasons (e.g. short survey duration and no availability correction, or low levels of re-sightings respectively). Additionally, annual boat based surveys by HWDT indicate the consistent seasonal presence of basking sharks within the Inner Hebrides. Surveys, undertaken as part of Scottish Power Renewables investigation into the previously proposed Argyll Array wind farm development, recorded a total of 918 individual shark observations in a single day to the south-west of Tiree (accessed on 17 February 2014 from The Crown Estate *Marine Data Exchange*[4]). This is the highest number of sharks sighted in a single day anywhere in the UK. The peak size class of basking sharks in Scotland is recorded as between 4-8 m (Bloomfield and Solandt, 2008) and 6-8 m (Speedie, *et al*., 2009). Individuals greater than 8 m have also been observed, suggesting mature individuals are present in Scottish waters (Speedie, *et al*., 2009). The main potential threats to basking sharks appear to be incidental catch and boat collisions/disturbance (OSPAR, 2009; Speedie *et al*., 2009), particularly during summer months. Basking sharks are included on the OSPAR list of threatened and/or declining species and habitats as a result of the decline in numbers due to the fishery, their slow recovery rate and lack of population estimates (OSPAR, 2008a & b).
Fronts	The surface thermal fronts within the possible MPA have persistently occurred in the same locations over time, based on a 10-year time series of satellite derived sea surface temperature data (Miller *et al*., 2010). They are not considered to be heavily modified by human activity.
Minke whale	The 2016 SCANS III survey provided an estimate of 700 minke whales within the blocks that overlap with the possible MPA (the West Coast of Scotland) (Hammond *et al.,* 2017). Within UK waters, effort-corrected sightings data indicate that minke whales are most abundant around Scotland with high numbers off the west coast (within the Sea of the Hebrides and The Minches) and in a broad swathe from the Moray Firth and along the east coast. Habitat modelling predictions suggest that the Sea of the Hebrides supports persistently higher than average densities of minke whale during summer, while annual cetacean surveys by HWDT also indicate the consistent presence of the species. The main threats to minke whale in Scottish waters are considered to be entanglement, vessel collisions and disturbance (Dolman *et al.,* 2006; Koschinski, 2003; Northridge *et al.,* 2010).
Geodiversity	This possible MPA is considered an integral functional part of the Inner Hebrides Carbonate Production Area (representing the Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature). The geodiversity interests are thought to be in a natural state, however, because of the large area of the site and the lack of detailed information, there is some uncertainty in this conclusion.
2d - Result	**Guideline partially met**.

[4] The Crown Estate *Marine Data Exchange* available at http://www.marinedataexchange.co.uk/.

Guideline 2e	The search location contains features considered to be at risk[5] of significant damage by human activity
Basking shark	Based on a regional risk assessment the proposed protected feature is considered to be at a medium risk. Basking sharks are at risk from death or injury as a result of collision with either commercial boats or leisure craft whilst at the surface, entanglement / incidental catch from fishing gear and ropes / nets, and disturbance from boat-based construction activities. Indirect effects on basking sharks through any changes in prey availability are currently considered low risk. There are also potential risks through barriers to species movement, however, the current scale and positioning of infrastructure suggests this is not significant within the possible MPA.
Fronts	**Regional risk assessments have not been completed for large-scale features**. The fronts to the south-west of Tiree are driven primarily by current flow and bathymetry. Activities such as marine energy production or other large-scale development, with the potential to substantially alter either tidal flow or seabed topography could affect the structure and / or distribution of the feature within the possible MPA and its functional role. However, most pressures associated with marine anthropogenic activities are currently considered unlikely to pose a significant risk to the fronts feature within the possible MPA.
Minke whale	Based on a regional risk assessment the proposed protected feature is considered to be at a medium risk. Minke whales are at risk from military activities and seismic survey (underwater noise) and shipping (risk of collision and disturbance). They are also at risk from entanglement / bycatch in fishing gear and ropes / nets, and disturbance from boat-based construction activities. There are indirect risks to minke whales as a result of fishing for prey species within the possible MPA. The possible MPA overlaps with sectoral plan areas for offshore wind and wave energy but there are no specific developments proposed here. Potential risks associated with these activities (barrier to species movement, collision and disturbance) are therefore not currently considered significant.
Geodiversity	**Regional risk assessments have not been completed for geodiversity features**. However, information is available on the likely sensitivity of the feature to pressures arising from human activity (Brooks, 2013). The Marine Geomorphology of the Scottish Shelf Seabed geodiversity feature is primarily considered sensitive to changes in tidal flow, physical change (deposition of materials on the sea bed such as concrete mattresses, rock dumping, and moorings) and physical removal (sediment extraction). These pressures may be associated with marine energy production (wave and tidal turbines and associated infrastructure) or other coastal / nearshore developments. The feature is considered to have a range of sensitivities to pressures associated with fishing activities ranging from high sensitivity of biogenic habitats that form part of the feature (e.g. maerl beds and bivalve beds), to low sensitivity in areas of highly mobile sediments. Most pressures associated with marine anthropogenic activities will not be sufficient to impact geological and geomorphological seabed features as a whole across the possible MPA (Brooks, 2013) although the more sensitive biogenic habitats that are components of this feature could be impacted.
2e - Result	**Guideline partially met**.

[5] Information on the sensitivity of the MPA search features to pressures and their associated activities was taken from Tillin *et al*. (2010). The degree to which an MPA search feature is exposed to activities / pressures to which it is sensitive at a regional scale was assessed to provide a qualitative measure of risk. Risk assessments for the various activities were examined to produce an overall qualitative risk assessment by region (Chaniotis *et al.,* 2014). The conclusions may therefore not reflect the level of risk at the scale of the MPA. Site-specific activities and pressures are considered in further detail within the *conservation objectives and advice to support management* paper produced for this MPA.

Stage 3 - Assessing the appropriate scale of the search location in relation to search features[6] it contains

Assessment
The size of the search location should be adapted where necessary to ensure it is suitable for maintaining the integrity of the features for which the MPA is being considered. Account should also be taken where relevant of the need for effective management of relevant activities
Evidence from modelling work shows that the possible MPA contains areas predicted to support persistently higher than average densities for basking shark and minke whale. The results of the modelling are underpinned by effort-corrected sightings data for both species (2000-2012) and additionally by satellite tagging work for basking shark (2012-2015). The size and shape of the possible MPA is driven by basking sharks for the southern and eastern boundaries, by minke whale for the northern and western boundaries and by fronts in the south-west. The boundary provides good representation of the Marine Geomorphology of the Scottish Shelf Seabed interests as represented by the Inner Hebrides Carbonate Production Area, although this feature also extends outwith the possible MPA. **Guideline met**.

Stage 4 - Assessing the potential effectiveness of managing features within a search location as part of a Nature Conservation MPA

Summary of assessment	**The possible MPA passed the assessment against the Stage 4 guideline**. This resulted in the original MPA search location progressing as a potential area for an MPA to Stage 5.

Detailed assessment
There is a high probability that management measures, and the ability to implement them, will deliver the objectives of the MPA
The conservation objectives for all the protected features within this possible MPA are to 'conserve'. A number of activities are considered capable of affecting the proposed protected features (see 2e above) and there is therefore a need to consider whether additional management is required. Statutory mechanisms exist (e.g. Fisheries Orders or Marine Conservation Orders) to support the introduction of spatial / temporal measures to conserve the features within the possible MPA. For example, Fisheries Orders have already been used to underpin management of marine Special Areas of Conservation and Marine Conservation Orders to support management of MPAs. There are also a range of voluntary measures in place that could contribute to achieving the conservation objectives (e.g. the Scottish Marine Wildlife Watching Code and the existing voluntary awareness and caution zones for basking sharks) and provide a good model for development of spatial management of recreational activities should this be required. There is therefore potential for management measures to be implemented successfully and the conservation objectives of the MPA to be achieved. Further discussion is required with those involved in using the possible MPA to provide clarification on interactions between the protected features and known / potential activities / developments. Additional details are provided in the *conservation objectives and advice to support management* paper produced for this possible MPA.

[6] Setting the size and shape of a possible MPA considers the distribution of both MPA search features and relevant geodiversity features. The latter, which are analogous to the biodiversity search features, were defined after the publication of the MPA Selection Guidelines (refer to Brooks *et al*., 2013).

Stage 5 - Assessment of the contribution of the potential area to the MPA network

Summary of assessment	**Guideline met - if designated the possible MPA would make a significant contribution to the MPA network.**

Detailed assessment

The potential area contributes significantly to the coherence of the MPA network in the seas around Scotland

Assessment of biodiversity features

Feature	Representation	Replication	Linkages	Geographic range & variation	Resilience
Basking sharks	Only area where the following occur - • persistent seasonal presence of high numbers of sharks; • large aggregations or groups; • social behaviour including courtship-like behaviour.	There is no replication within the MPA network, however, on the basis of current evidence there are no other areas within Scottish territorial waters considered to be essential for this species.	Tagging work indicates links with Northern Ireland and the Isle of Man. The results also show evidence of a general southerly migration (via the Celtic sea and West of Ireland) to UK, Ireland, the Bay of Biscay and as far as the Canary Islands. Some individuals remain in Scottish waters or migrate north into Faroe Island waters. This annual migration begins in October.	Whilst the geographic range of basking sharks is much larger than Scotland's seas (the species is widely distributed in coastal waters of warm temperate and boreal regions), only one essential area for basking sharks has been identified within Scottish territorial waters. Therefore including this possible MPA would ensure that the MPA network reflects the known range of essential areas.	Basking sharks are an OSPAR T&D species. If future information highlights other essential areas, then further consideration would be given to identifying additional MPA search locations. (Although see comments relating to minke whales below about the importance of managing MPAs for mobile species within the context of the wider seas.)
Fronts	Seasonally persistent feature with surface-bottom profile. Likely to contribute to favourable feeding conditions for mobile species in the area.	There is replication of fronts within the MPA network in OSPAR Regions II and III in Scottish waters.	Unknown. Links may be supported via the pathway of the Scottish Coastal Current (which runs clockwise around Scotland).	Provides an example of a west coast, continental shelf feature. This complements the other example within OSPAR Region III within the Clyde Sea Sill MPA.	Fronts are not considered to be threatened and/or declining.

Assessment of biodiversity features					
Feature	**Representation**	**Replication**	**Linkages**	**Geographic range & variation**	**Resilience**
Minke whale	Area predicted to support persistently higher than average densities, high effort-corrected sightings, feeding behaviour.	There is replication of minke whales within the MPA network through the Southern Trench possible MPA in OSPAR Region II.	Minke whales are present in greater abundance during their summer feeding season. They then migrate to breeding grounds in autumn (although the locations are unknown).	Provides an example of an area where significant aggregations of minke whale are observed particularly in the summer on the west coast of Scotland.	Two possible MPAs have been identified, one in each of the OSPAR Regions in Scottish waters where minke whales occur in greater abundance. Because they are highly mobile species, the focus should be on managing these MPAs within the context of the wider seas (rather than relying on identifying any additional MPAs).

Assessment of geodiversity features	
Geodiversity features[7]	The Sea of the Hebrides possible MPA lies within the Inner Hebrides Carbonate Production Area, a key geodiversity area in Scottish waters representing an internationally important example of a non-tropical shelf carbonate system (the biological production of marine sediments with high calcium carbonate content - derived from the shells of animals that live in on the seabed or from coralline algae such as maerl) (Brooks *et al.*, 2013; Gordon *et al*., 2013). The Inner Hebrides have wave-dominated west coasts with some coastal dune and machair and relatively tranquil east and north coasts. Sands are mobile and consist mainly of debris from nearby rocky sea floors supplemented by sand dwelling molluscs and echinoids. Low banks of algal carbonates (maerl) are found in shallow water with swifter currents such as Iona Sound. Where currents are strong *Modiolus modiolus* forms low banks of nestled valves (Farrow *et al*., 1978, 1979; Scoffin, 1988). The only known aggregation of fan mussels in the UK, found within the Sound of Canna, (and a protected feature of the Small Isles MPA) contributes to the carbonate production in the area. Our current understanding is that storms continue to drive part of this clastic carbonate ashore, supplying the carbonate sands of the important coastal machair systems (Brooks *et al*., 2013). The hypothesis that there is a present day linkage between offshore carbonates and the onshore machair adds to the case for consideration of conservation measures for the subtidal carbonate production areas of Scotland. The data available on the component geodiversity interests are at a coarse resolution only. **Sources**: Brooks *et al*., 2013; Gordon *et al*., 2013 (and references therein).

[7] For geodiversity the stage 5 assessment primarily considers the potential contribution to the principal 'networks' of marine geodiversity interests present in Scottish waters (representation).

Data sources and bibliography

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