



JNCC Report

No. 518

**JNCC's advice on scientific questions raised in relation to offshore waters
during the 2013 Marine Scotland consultation on Nature Conservation Marine
Protected Areas (MPAs)**

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Summary

Over the summer of 2013, the Scottish Government undertook a public consultation on possible Nature Conservation MPAs (pMPAs), alongside parallel consultations on the draft National Marine Plan, Priority Marine Features (PMFs) and draft sectoral plans for offshore renewable energy¹.

Marine Scotland sought JNCC's advice on some broad scientific issues raised in their consultation responses, and site specific advice in response to questions on pMPAs located within Scotland's offshore waters. Our advice only focuses on matters raised during the consultation that were of a scientific nature, and does not respond to legislative and policy interpretation issues, or questions relating to policy for MPA management.

¹ <http://www.scotland.gov.uk/Topics/marine/marine-consultation>

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1. Introduction

The Scottish Government launched a formal public consultation on possible Nature Conservation MPAs on 25 July 2013, alongside parallel consultations on the draft National Marine Plan, Priority Marine Features (PMFs) and draft sectoral plans for offshore renewable energy². The 16-week consultation period ended on 13 November 2013. Marine Scotland took forward a comprehensive programme of consultation events and publicity opportunities, combined under the banner of '*Planning Scotland's Seas*'.

Fifty-six public consultation events took place around Scotland between 19 August and 30 October 2013. Coordinated by Marine Scotland, the event series included a number of JNCC and/or Scottish Natural Heritage (SNH) led MPA drop-in sessions, and provided the opportunity for sea users and members of the public to find out about Nature Conservation MPAs. JNCC staff attended 14 of the events.

Respondents were invited to submit their opinions regarding the scientific case for designation, possible management options, the potential socio-economic impacts (based on Marine Scotland's sustainability appraisal), and the ecological coherence of the resultant network.

1.1 Consultation responses

The MPA part of the '*Planning Scotland's Seas*' consultation generated the most responses, with over 14,000 responses submitted. The majority of the responses came from Non-Governmental Organisations (NGOs) and community group led campaigns supporting the overall concept or specific local proposals respectively, although some called for more areas and features to be added to the network. Notwithstanding the campaign responses, Marine Scotland received 332 MPA related responses, of which 216 came from individuals and 116 from organisations. Those responses that could be made public were uploaded to the Scottish Government publications web pages³ on 23 December 2013.

Responses to the consultation covered a broad range of topics, from more general comments on the MPA network and site selection process, through to more site specific comments on both inshore and offshore sites. The full spectrum of positions was voiced within the responses, from respondents calling for more MPAs for a greater number of features, through to those who did not support the need for MPAs.

Several responses made general comments regarding the boundaries of offshore pMPAs, with two respondents including in their submission revised boundary proposals for a limited number of pMPAs.

1.2 Marine Scotland's request for JNCC advice on consultation responses

Marine Scotland officials undertook a preliminary review of the responses and at the end of December 2013 formally requested that JNCC consider specific scientific and evidential aspects of 40 responses.

This report provides JNCC's scientific advice to Marine Scotland on broad issues raised in these 40 consultation responses (Section 2), as well as our site specific advice in response

² <http://www.scotland.gov.uk/Topics/marine/marine-consultation>

³ <http://www.scotland.gov.uk/Publications/2013/12/5987>

to questions on pMPAs located within Scotland's offshore waters (Section 3). Our responses to the broader issues were initially developed in conjunction with our MPA Project partners at SNH (i.e. where the broader issues apply across Scotland's seas). SNH have provided separate formal advice in relation to the 17 pMPAs situated entirely (or primarily) within Scottish territorial waters (within 12nm of the coast) (SNH Report 747).

Our advice focuses only on matters raised during the consultation that were of a scientific nature, and does not respond to legislative and policy interpretation issues, or questions relating to MPA management policy.

1.3 Review of site advice for offshore pMPAs

Some respondents provided detailed site-specific comments on both the evidence base and the proposed site boundaries. JNCC provided detailed site documentation to support the public consultation on possible Nature Conservation MPAs. JNCC have pursued an ongoing programme to collect data and information for the proposed offshore sites. Since the consultation, JNCC have been reviewing the pMPA boundaries and supporting site documentation to take into account data delivered since spring 2013, together with scientific issues raised by consultation respondents. JNCC are providing Marine Scotland with the reviewed boundaries and revised documents to support further discussions with stakeholders, and Ministerial decisions on designation.

2. General responses and JNCC's feedback

2.1 Replication and representation

A number of respondents questioned the basis for replication and representation of the MPA search features within the network, proposing that replication infers there should only be two examples of any feature, one that is identified as the representative example, plus a replicate. Queries were also raised about the appropriate scale for consideration of replication and representation within the network e.g. whether at a Scottish, UK or individual OSPAR Region-level.

The assessment of replication and representation undertaken by SNH and JNCC followed the [Scottish MPA Selection Guidelines](#). Correspondingly, our assessment focussed on Scotland's seas and considered the requirement of the Scottish MPA network. More specifically, replication and representation are part of the assessment against the final stage of the Selection Guidelines i.e. Stage 5. As part of the Stage 5 assessment, we assessed the following existing measures alongside each other:

- potential areas for MPAs (those that passed Stage 4 of the Selection Guidelines);
- existing protected areas (e.g. Special Areas of Conservation); and
- other area-based measures considered to make an appropriate contribution to the network (e.g. fisheries closures established for nature conservation purposes).

This assessment enabled us to take into account any contribution already made to the Scottish MPA network by these existing measures when determining what Nature Conservation MPAs were required.

Further details of the Stage 5 assessment are described in [Section 2.2](#). The text below provides notes on how we undertook the assessments of replication and representation. It is difficult to consider these parts of the guideline in isolation from the rest of the Stage 5 assessment. Therefore, in places the notes below highlight the relationship with assessment of the other parts of the Stage 5 guideline.

Representation

1. This included representing types of some of the same features within the network e.g. for burrowed mud it considered examples of the following four types of the habitat: fireworks anemones; tall seapens; seapens and burrowing megafauna; and, burrowing megafauna and the mud volcano worm.
2. This part of the assessment is linked to the assessment of geographic range and variation e.g. for offshore subtidal sands and gravels we recommended examples on the continental shelf, the continental slope and in the deep-sea and in areas of different water body influence (Atlantic and Arctic water influence). This is because depth, geographic location and water body influence are key factors known to determine the biological composition of offshore subtidal sand and gravel communities.
3. Our consideration of representation did not require the formal identification of a specific 'representative' example of a feature as proposed by some consultation responses. This approach is not a requirement of either the Scottish MPA Selection Guidelines⁴ or the OSPAR Guidelines on Developing an Ecologically Coherent Network (OSPAR, 2006). The latter proposes that a network should aim to '*protect and conserve areas that best represent the range of species, habitats and ecological processes in the OSPAR area*' (see [Section 2.12](#) on ecosystem function for more details).

⁴ <http://www.scotland.gov.uk/Resource/Doc/295194/0114024.pdf>

Replication

4. The assessment against the replication part of the Stage 5 guideline focussed on achieving replication at the scale of Scotland's seas (e.g. the inclusion of more than one example of a feature). Most features readily met this part of the guideline, the exceptions were features for which there were insufficient data to complete an assessment against the Scottish MPA Selection Guidelines for more than one site e.g. native oysters.

There are other parts of the Stage 5 guideline beyond replication that influence the number of sites proposed for a feature:

1. Assessing linkages between features is an important part of the Stage 5 guideline. For example, previous work by Marine Scotland Science on sandeels highlighted discrete regions on the continental shelf between which there is little exchange of sandeels. Therefore, one MPA was recommended in each of these regions either because they are considered important for localised sandeel production or because they represent source populations considered important for restocking of sandeel grounds within that particular region. The exception is the Firth of Forth Banks which is considered important but is already protected by the north-east UK sandeel fishery closure; see [Section 3.3](#) for further information on the Firth of Forth Banks Complex pMPA. Therefore, linkages rather than replication were the determining factor in the number of sites recommended for this feature.
2. The resilience part of the Stage 5 guideline aims to mitigate the risk of loss of a feature from the network by including sufficient examples of that feature. Clearly, the more examples included will reduce the risk of loss of the feature from the network, particularly for features with restricted and/or declining distribution, and/or subject to threat/decline from human activity. For example, five examples of flame shell beds are recommended for inclusion within the network because of its restricted distribution (only within OSPAR Region III⁵) and there is evidence of threat and/or decline in Scotland's seas. Therefore, resilience rather than replication was the determining factor in the number of sites recommended for the flame shell bed feature.

2.2 Contribution to an ecologically coherent network

Linked to the consideration of representation and replication, a number of respondents considered that the proposals encompassed too many examples of some features. They were unclear on the additional aspects of Stage 5 of the MPA Selection Guidelines and their role in determining the adequacy of coverage for individual features.

In Stage 5 of the Scottish MPA Selection Guidelines⁶, the potential areas for MPAs (those that passed through the stage 4 assessment) were considered in terms of the contribution they might make to the MPA network. This assessment focuses on how each potential area for an MPA contributes to the coherence of the MPA network in Scotland's seas. From a feature perspective, the Stage 5 assessment takes a collective look across the pMPAs and considers whether the inclusion of features is adequate to assess that the network of MPAs would be ecologically coherent. The Stage 5 assessment is therefore often referred to as the adequacy assessment. The results of the Stage 5 assessment were key to determining how many MPAs were recommended to Scottish Ministers, and also in determining how many examples of individual features were recommended for inclusion within the network in

⁵ Recent survey work undertaken in Orkney [OSPAR Region II] has confirmed the presence of individual flame shells but there is as yet no evidence of beds.

⁶ <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/mpaguidelines>

Scotland's seas.

Pages 55-57 of the [Scottish MPA Selection Guidelines](#) set out the Stage 5 process in detail. In summary, it comprises:

- **Representation** - Is the feature represented within the Scottish MPA network in the OSPAR regions considered to be important for that feature?
- **Replication** - Is there more than one example of each feature within the Scottish MPA network? If yes, is there replication across the OSPAR Regions in which the feature is recorded?
- **Geographic range and variation** - Does protection for the feature reflect what is known about the geographic range in Scotland's seas; e.g. where examples of the feature are found in sea lochs, in areas away from the coast and further offshore? Does protection for the feature reflect the ecological variation of the feature in Scotland's seas; e.g. examples of the same habitat in different physical conditions with different key and characterising species?
- **Linkages** - Only assessed where there is a good understanding of the relationship between features in different locations to help build connectivity into the network. For this part of the Stage 5 guideline, the focus has been on areas of importance to the life histories of mobile species.
- **Resilience** - Is it considered appropriate to include a greater proportion of threatened and/or declining features within the network?

The Stage 5 assessment first considered the individual features against the different parts of the guideline to determine how many examples of each feature might be required and in what regions. These feature assessments were reviewed against the potential areas for MPAs to see whether the potential areas would be adequate or whether there were likely to be either too many or too few examples of each feature within the network. For example, following the Stage 5 assessment we concluded that it was not necessary to include burrowed mud both within the Shiant East Bank and the Wester Ross pMPA. Therefore, burrowed mud was only recommended within the Wester Ross pMPA. As part of the Stage 5 assessment a review was also carried out of other features that might be required to add to the broader representivity of the network. Further details on work undertaken to consider the broader representivity of the network are given in [section 2.4](#).

A number of respondents felt that it was too early to say whether the network as currently proposed would be ecologically coherent. Even with the progression and identification of MPAs from the remaining MPA search locations and completion of parallel marine Natura workstreams, many felt that a more comprehensive assessment would be required before coherence could be stated with any confidence.

SNH and JNCC's assessment followed the Scottish MPA Selection Guidelines and hence Stage 5 focused on the contribution made by the MPA proposals to the Scottish MPA network (see previous question). In our MPA network advice⁷, we also set out our view on the contribution that the resultant network (including Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSIs) etc.) could make to developing an ecologically coherent network within the OSPAR maritime area. The text below summarises how we undertook this broader assessment. It should be noted that at present an approach to assess progress against each of the OSPAR network principles in a cumulative manner has not been developed at an OSPAR level. Initial assessments by OSPAR have used a simple process that only considers some of the principles where there is sufficient understanding to do so. Therefore, the following text briefly outlines the process followed for our provisional assessment in Scotland's seas. Further details are provided in our 2012

⁷ <http://jncc.defra.gov.uk/PDF/SNH%20and%20JNCC%20MPA%20network%20advice%20-%20Final%20report.pdf>

network advice (SNH & JNCC, 2012).

The initial spatial assessment determined whether the network of sites (MPA proposals and other existing measures) was well-distributed across the parts of Scotland's seas in each of the four OSPAR regions (Regions I, II, III and V). We followed a descriptive approach (i.e. the assessment did not rely on a numerical GIS analysis) that considered the presence of MPAs in each of the major physiographic features/divisions of the seabed:

- Nearshore (e.g. sea lochs, lagoons, estuaries, coastal island groupings etc.).
- Continental shelf away from the coast.
- Continental slope.
- Deep-sea environments further offshore (e.g. seamounts, ridges, channels and sediments plains).

We followed the approach recommended by OSPAR for assessing representivity of the MPA network (assessing replication and representation of EUNIS Level 3 broad-scale habitats). This included assessing the correlation between protected features of existing MPAs and the proposed protected features of the pMPAs against EUNIS Level 3 habitats and counting the number of occurrences within the evolving network in Scotland's seas. Coverage of EUNIS Level 3 habitats was considered adequate if they were represented and replicated in each OSPAR Region in Scotland's seas the feature has been recorded. We also considered coverage of OSPAR Threatened and/or Declining habitats and species for which we consider MPAs are an appropriate conservation mechanism, in a similar manner and approach to that for EUNIS Level 3 broad-scale habitats. The OSPAR T&D habitats and species considered are listed in Table 6 of our 2012 network advice (SNH & JNCC, 2012).

We concluded that the potential MPA network was spatially well distributed; it encompasses the major physiographic units/divisions of the seabed within each of the four OSPAR regions and would provide adequate representation and replication of EUNIS Level 3 broad-scale habitats and OSPAR T&D list features. There are a number of caveats to our conclusions regarding the assumption that the sites progress and suitable management implemented, and other parallel programmes of work to identify SPAs for seabirds etc are completed.

Full details of the assessment are provided in Sections 9 & 10 and Appendices 8 & 9 of the SNH and JNCC 2012 network advice. Further details on wider feature representation within the proposed network, including for EUNIS Level 3 habitats, is also provided in [Section 2.3](#). The process attempted to reflect the aspirations of the three initial spatial tests proposed by OSPAR in 2008⁸ modified to reflect application at a sub-regional level (i.e. within Scotland's seas).

The OSPAR 2008 guidance noted that whilst initial network assessments were likely to be quite basic, they would become increasingly sophisticated as suitable data become more widely available. This assertion was reflected in their subsequent 2013⁹ assessment of the ecological coherence of the wider network of OSPAR MPAs across the North-east Atlantic. The 2013 assessment was referred to by some of those responding to the MPA consultation. The key point to note in the OSPAR 2013 assessment, that differs with that carried out by SNH and JNCC, was that their assessment could not consider whether the features were formally recognised as part of the OSPAR MPAs¹⁰ used in the analysis. Instead, they examined the spatial overlaps between the OSPAR MPAs and the predicted distribution of EUNIS Level 3 seabed habitats. For the purposes of their assessment, protection was

⁸ www.ospar.org/documents/dbase/publications/p00360/p00360_3_initial_tests_ospar_mpa_network%20.pdf

⁹ www.ospar.org/documents/dbase/publications/p00619/p00619_ecological_coherence_report.pdf

¹⁰ In Scottish waters the OSPAR MPAs are a subset of existing marine SACs and SPAs that meet one or more of the OSPAR MPA ecological criteria and have been formally recognised by the OSPAR Commission. Further details are available on the JNCC website - <http://jncc.defra.gov.uk/page-4526>

assumed whether or not the habitats were a formal qualifying feature of the sites. Data to undertake a finer resolution assessment at the scale of the North-east Atlantic are not currently available. Whilst some of the conclusions of the 2013 OSPAR MPA network assessment are quite positive, they do not yet reflect the true status of the network in Scottish waters (i.e. the conclusions over-estimate the protection of features).

Neither the Scottish nor the OSPAR network assessments have been able to take connectivity or ecological processes fully into account (for more information see [Section 2.15](#)). Through the use of large-scale features such as fronts, wider ecosystem function was considered as part of the SNH and JNCC assessment against the Scottish MPA Selection Guidelines (for further information see [Section 2.12](#) on ecosystem function and ecological processes in the network). We are aiming to undertake a more sophisticated assessment of coherence at the first review of the Scottish MPA network in 2018. We will update and re-issue our preliminary assessment (see [SNH and JNCC 2012](#)) in spring/early summer 2014 following Ministerial decisions on which of the possible Nature Conservation MPAs will be formally designated. This revised assessment will provide a baseline against which further progress by 2018 may be gauged.

2.3 MPA Search Features

A number of respondents believed that the list of MPA search features was too restrictive and that the resultant suite of proposed MPAs only covers a very narrow range of interests.

The MPA search feature list was used to guide selection of Nature Conservation MPAs. However, there are already a number of existing protected areas that also contribute to the Scottish MPA network that largely cover other habitats, species including seabirds and geological features. The features included on the MPA search feature list were not only those that we thought would benefit from the protection that could be afforded by an MPA, but were also features that we thought would be useful in highlighting locations of wider conservation interest.

There were a number of reasons why some features weren't included on the original MPA search feature list. These included one or more of the following:

1. A lack of data on their distribution in Scotland's seas.
2. For mobile species, a lack of knowledge on essential areas i.e. areas that support key life stages.
3. The feature was so widely distributed that it would not be useful in helping guide the site selection process.

Part of the Stage 5 assessment included a consideration of features that represented the marine environment more broadly, and were not adequately included in existing measures (or expected to be included through on-going work to identify Natura sites for seabirds and marine mammals). Consequently, a number of additional features were identified in territorial waters as proposed protected features of the pMPAs. These features were primarily seabed sediment communities (including an area used historically for spring spawning herring in the Clyde Sea) - see [Section 2.4](#) on wider representivity.

A number of respondents highlighted other marine features that they felt warrant protection within the network (either through listing as MPA search features to drive site identification or through subsequent recognition as protected features of the proposed MPAs).

Although a number of people responding to the consultation suggested other features that could become protected features of one or more Nature Conservation MPAs, features were only considered if:

1. there was sufficient evidence to assess the feature against the Scottish MPA Selection Guidelines (linked to preceding Q&A);
2. we felt that the feature would be likely to benefit from the protection that could be provided by a Nature Conservation MPA; and
3. the feature was not already adequately protected by existing measures.

Our consideration of additional features proposed by respondents for inclusion within individual MPAs is discussed in more detail regarding seabirds in Section [2.6](#) and cetaceans in Section [2.7](#).

A number of respondents believed that the features used to identify MPAs should be constrained to the list of threatened and/or declining habitats and species recognised by OSPAR (the 'T&D' list).

Both the UK Marine and Coastal Access Act (123(3b)) and the Marine (Scotland) Act (79(3)) place a duty on Ministers to develop a network of conservation sites to protect the range of features present in the UK marine area. Within the legislation, the features to be represented within the network are defined broadly as marine species, habitats (or types of habitats) and features of geological or geomorphological interest.

The OSPAR Threatened and/or Declining habitats and species list (hereinafter referred to as the OSPAR T&D list) is by definition limited in its composition, only encompasses biodiversity interests and is defined at the scale of the wider North-east Atlantic. Whilst it therefore covers some habitats and species of relevance to Scotland, it does not cover the full range of habitats and species present in the UK marine area.

For this reason, when developing the MPA search feature list (Annex 3 of the Scottish MPA Selection Guidelines), SNH and JNCC also considered other habitats and species to sit alongside the OSPAR T&D features for which MPAs are considered appropriate in Scotland's seas to cover the full range of features present. SNH and JNCC also identified a comparable list of features of geodiversity importance. To be included on these lists, relevant features had to be of conservation importance in Scotland's seas and be likely to benefit from the kind of spatial protection that could be provided by a Nature Conservation MPA. As part of this consideration, we were looking to identify features that would guide us to places likely to be of wider conservation interest. We felt that this approach was necessary to ensure that the resulting MPAs would make a significant contribution to the Scottish MPA network, thereby meeting the Scottish MPA Selection Guidelines.

This broad focus of the underpinning legislation is clearly reflected in Stage 1 of the Scottish MPA Selection Guidelines:

- Stage 1a calls for MPAs to contain features considered to be of conservation value at a national or international level, noting that they are likely to comprise: features for which Scotland is considered a stronghold; features considered to be of exceptional scientific importance; and/or, features that are characteristic of Scotland's marine environment.
- Stage 1b calls for the inclusion of biodiversity features considered to be threatened and/or declining across the North-east Atlantic as described by the OSPAR Commission, as well as MPA search features and geodiversity features which are threatened and/or declining within Scottish waters.
- Stage 1c calls for the inclusion of features considered to be critical to the functioning of wider marine ecosystems, such as important feeding, breeding, and spawning or nursery grounds.

2.4 Wider representivity

A number of respondents highlighted that an MPA network that protects only one species of seabird, and only 39 species and habitats in total is not ecologically coherent; that such a network would fail the basic tenets of representivity by encompassing less than 1% of the estimated 6,500 species present in Scottish waters. Some respondents noted the inclusion of a small number of representative features but stated that significantly more needed to be done in this regard.

A commentary regarding the scope of the MPA search features list is provided in [Section 2.3](#).

One of the starting points for identifying Nature Conservations MPAs was to consider the contribution already being made to the network by existing protected areas and other area-based measures (detailed in Carruthers *et al* (2011) and Cunningham *et al* (2011) respectively). This step complied with the policy approach of using Nature Conservation MPAs to complement existing measures.

The SPAs and SSSIs considered to contribute to the network are either estuarine, coastal (covering intertidal habitats upon which the qualifying birds depend) or, in the case of 31 of the SPAs, have been extended into the marine environment. In total, these sites encompass 53 bird species that are dependent on the marine environment, including 22 of the 24 species of seabirds that breed in Scotland (for details see SNH and JNCC's 2012 MPA network advice). Further work is ongoing to identify marine SPAs away from the coast (see [Section 2.6](#)).

The OSPAR Guidance on Developing an Ecologically Coherent Network¹¹ recommends using the EUNIS classification¹² Level 3 habitats as a means to representing the range of habitats and species within the MPA network. We assessed the protection of the EUNIS Level 3 seabed habitats within the evolving Scottish network (both in terms of formally designated features of existing measures together with the MPA proposals). We concluded that subject to the progression of the MPA proposals, all 34 EUNIS Level 3 habitats present in Scottish waters would be protected within each OSPAR region in Scotland's seas where they are present and where possible to do so. We also concluded that the MPA network in Scottish waters would be spatially well distributed (see Section 9 and Appendix 9 of our [2012 network advice](#) for full details).

Some respondents recommended that subsequent assessments should also include consideration of the proportion of each EUNIS habitat protected within the network (OSPAR network guidance proposes 10-20% by area) and the spatial distribution of this protection; this approach is certainly our intention for future assessments.

The 1996 SNH report¹³ that derived the estimate of 6,500 higher marine species within Scottish waters (excluding single-celled micro-organisms, viruses and bacteria) specifically excluded seabirds. The vast majority of the species listed (>6,300) are small animals and algae that, in an MPA context, would not be proposed as protected species features in their own right. They represent species typically associated with a wide range of seabed habitats, including those proposed within the Scottish MPA network. The 6,500 estimate includes

¹¹ http://www.ospar.org/documents/dbase/decrecs/agreements/06-03e_guidance%20ecol%20coherence%20mpa%20network.doc

¹² The primary system for characterising the marine environment in European waters - essentially dividing up the marine area into component habitats that reflect differences in depth, bottom type, exposure etc. and associated communities of species.

¹³ <http://www.snh.org.uk/pdfs/publications/review/063.pdf>

2,500 species of crustaceans (crabs, shrimps, barnacles, copepods and fish lice), 1,600 species of worms, 700 molluscs (slugs, snails, mussels, cockles and clams), 250 Cnidarians (sea anemones, corals, sea fans and jellyfish) and several hundred species each of fish, sponges, echinoderms and bryozoans. Seeking the representation and replication of the EUNIS Level 3 habitats across the network will cover all the predominant habitats found in Scottish waters and therefore will provide the opportunity to represent/protect the full range of species known to occur in each habitat.

The site-specific documents produced for each Nature Conservation MPA detail the diversity of species that are encompassed within individual proposed protected features. For example, within the *Small Isles Assessment against the MPA Selection Guidelines*¹⁴ SNH highlight that survey work in 2010 recorded 194 species associated with a single habitat proposed for protection. This number was based on the collection of seven small sediment samples from the surface of the seabed within the Sound of Canna (each ~0.1m²). The qualifying habitats of existing protected areas are equally diverse. Remote video sampling undertaken in 2005 within the Firth of Lorn SAC recorded 45 distinct habitats representing the 'reef' protected feature. Each of these discrete habitats supports a diverse associated community of mobile and sessile species in its own right.

Whilst it is not possible to quantify the number of species that would be afforded protection within the MPA network with any degree of accuracy, we believe that it would be a significant proportion of the estimated possible 6,500, certainly running to several 1000's of species. This comprises both named protected species features and species associated with habitats identified as protected features.

It is also important to bear in mind that MPAs are not an appropriate mechanism for conserving all forms of marine life in Scotland's seas (see [Section 2.3](#) on MPA features). Effective action for some species needs to be viewed in the wider context of the Scottish Government's 'three-pillar' approach to marine nature conservation¹⁵.

2.5 Burrowed mud in Scottish waters

A number of respondents appeared uncertain about the relationship between the 'burrowed mud' MPA search feature used in the Scottish MPA Project and the OSPAR Threatened and/or Declining (T&D) feature 'sea-pen and burrowing megafauna communities'. Some questioned whether the physical and biological characteristics of the two features were the same. Respondents also questioned whether the OSPAR Commission consider MPAs to be a suitable tool for protection of burrowed mud habitats. In relation to the application of the MPA Selection Guidelines, there were also questions concerning the size of MPAs to protect burrowed mud.

What is the relationship between the Scottish burrowed mud MPA search feature and the OSPAR T&D feature 'sea-pen and burrowing megafauna communities'?

The burrowed mud MPA search feature¹⁶ comprises the following component habitats and species¹⁷:

- Seapens and burrowing megafauna (SS.SMu.CFiMu.SpnMeg¹⁸).

¹⁴ <http://www.snh.gov.uk/docs/A987883.pdf>

¹⁵ <http://www.scotland.gov.uk/Resource/Doc/295194/0115590.pdf>

¹⁶ For more detail refer to the MPA search feature descriptions catalogue on the Scottish Government's website <http://www.scotland.gov.uk/Resource/0041/00413513.doc>

¹⁷ The mud burrowing amphipod *Maera loveni* was also included within the original MPA search feature definition but was dropped as a driver in the MPA selection process due to its short lifespan and ubiquitous, if under-recorded, distribution in burrowed mud habitats in Scottish waters.

- Burrowing megafauna and the mud volcano worm *Maxmuelleria lankesteri* (SS.SMu.CFiMu.MegMax).
- Tall seapen *Funiculina quadrangularis*.
- Fireworks anemone *Pachycerianthus multiplicatus*.

The feature description and more detailed Case Report produced for seapens and burrowing megafauna communities (OSPAR, 2008a¹⁹ & b²⁰) specifically associate both component habitats (SS.SMu.CFiMu.SpMmeg and SS.SMu.CFiMu.MegMax codes) and the tall seapen with the OSPAR T&D feature.

The most obvious differences between the Scottish MPA search feature and the OSPAR T&D feature are:

- recognition of the fireworks anemone as a specific component species of 'burrowed mud' (N.B. the fireworks anemone is present in fine SS.SMu.CFiMu.SpMmeg mud within both of the Nature Conservation MPAs where the species is proposed as a protected feature); and
- the inclusion of a deep-water variant of the seapens and burrowing megafauna habitat in OSPAR Region V that includes different characterising seapen species (*Kophobelemnion stelliferum* and *Umbellula encrinus*) to those typically found on the continental shelf. Such ecological variation is not specifically covered within the current OSPAR T&D feature description.

A further less clear-cut distinction is that the burrowed mud feature also reflects known variation in physical parameters within Scottish waters. The burrowed mud feature therefore includes a wider range sediment types than simply fine muds.

Further information on the burrowed mud MPA search feature and how it relates to the OSPAR T&D feature is provided in a number of previous MPA-related reports. These include the MPA search feature descriptions catalogue¹, a burrowed mud and MPAs 'position paper'²¹ produced for the 4th national MPA stakeholder event in March 2012, and a summary interpretive guide subsequently issued on the Scottish Government's MPA web pages²².

The definition of the OSPAR T&D feature 'sea-pens and burrowing megafauna communities' is the subject of on-going discussions between Contracting Parties as scientific knowledge improves, particularly for deep sea areas (relevant to the next Q&A and the role of seapens in characterising the presence of the OSPAR T&D feature).

Do seapens define the presence of the OSPAR T&D 'sea-pen and burrowing megafauna communities' feature?

OSPAR 2008²³ define the sea-pen and burrowing megafauna communities feature as - "Plains of fine mud, at water depths ranging from 15-200m or more, which are heavily bioturbated by burrowing megafauna, with burrows and mounds typically forming a

¹⁸ Scientific reference (biotope) code used to identify different seabed habitats - this provides an important link to the OSPAR T&D feature.

¹⁹ http://www.ospar.org/documents/DBASE/DECRECS/Agreements/08-06e_OSPAR%20List%20species%20and%20habitats.doc

²⁰ http://qsr2010.ospar.org/media/assessments/p00358_case_reports_species_and_habitats_2008.pdf

²¹ <http://www.scotland.gov.uk/Resource/0038/00389464.doc>

²² <http://www.scotland.gov.uk/Resource/0039/00394205.doc>

²³ http://www.ospar.org/documents/DBASE/DECRECS/Agreements/08-06e_OSPAR%20List%20species%20and%20habitats.doc

*prominent feature of the sediment surface, and which may include conspicuous populations of sea-pens, typically *Virgularia mirabilis* and *Pennatula phosphorea*”.*

The narrative then notes that -

*“...the tall sea-pen *Funiculina quadrangularis* may also be present...”*

At a meeting of the OSPAR Contracting Parties in Bergen in 2011²⁴, a key recommendation was that the presence of burrowing megafauna is the essential defining characteristic of the feature; the presence or absence of seapens does not in itself define the feature.

In summary, seapens may form a prominent feature of the seabed surface, but do not have to be present to define the OSPAR T&D habitat²⁵ (SS.SMu.CFiMu.SpnMeg and/or SS.SMu.CFiMu.MegMax²⁶). This assumption is equally true of the Scottish ‘burrowed mud’ MPA search feature.

What does the OSPAR Commission say about the protection of burrowed mud within MPAs?

OSPAR Recommendation 2010/11²⁷ calls for Contracting Parties to consider the introduction of national legislation to protect sea-pen and burrowing megafauna communities and to consider whether any sites within its jurisdiction justify selection as MPAs for the conservation and recovery of this T&D feature.

The same OSPAR recommendation calls for Contracting Parties to draw relevant issues, such as requests for closing areas to fishing where there may be a significant adverse impact on sea-pen and burrowing megafauna communities from fishing, to the attention of authorities competent for fisheries management - in accordance with Annex V of the OSPAR Convention.

What area is required to represent a viable example of burrowed mud?

Some respondents stated that only 25m² of the burrowed mud MPA search feature needed to be protected within individual MPAs, citing the figure used within a 2010 description²⁸ (a variation of the original one given in 2008 - see previous Q&A) of the OSPAR sea-pen and burrowing megafauna communities T&D feature:

‘Sea-pen and burrowing megafauna communities means plains of fine mud, extending over an area of at least 25m² and at water depths ranging from 15-200 m or more’

However, this figure represents the minimum area that should be considered to represent an occurrence of the habitat in definition terms and not the area required to constitute a viable example of the habitat within an MPA. This distinction is articulated more clearly in a range of other OSPAR documents²⁹ as follows:

²⁴ [OSPAR meeting in Bergen in October 2011 on the improvement of the definitions of OSPAR T&D habitats](#)

²⁵ http://qsr2010.ospar.org/media/assessments/p00358_case_reports_species_and_habitats_2008.pdf

²⁶ The case report for the OSPAR T&D feature specifically references the SS.SMu.CFiMu.SpnMeg and SS.SMu.CFiMu.MegMax codes from the National Marine Habitat Classification for UK & Ireland as well as the equivalent codes from the European Nature Information System (EUNIS) classification (A5.361 and A5.362)

²⁷ [OSPAR Recommendation 2010/11 on furthering the protection and restoration of sea-pen and burrowing megafauna communities in the OSPAR Maritime Area \(OSPAR 10/23/1 - E, Annex 33\)](#)

²⁸ [OSPAR Recommendation 2010/11 on furthering the protection and restoration of sea-pen and burrowing megafauna communities in the OSPAR Maritime Area \(OSPAR 10/23/1 - E, Annex 33\)](#)

²⁹ http://www.ospar.org/documents/DBASE/DECRECS/Agreements/08-06e_OSPAR%20List%20species%20and%20habitats.doc

‘For a habitat to occur at a site, it should extend over an area of at least 25m², but this threshold may need to be higher in offshore areas due to limitations of surveys and sampling.’

It should be noted that the word ‘site’ is not being used here by OSPAR to refer to any form of protected area.

Viability in the context of the Scottish MPA Project refers to the population necessary to be self-supporting, and is reflected as a consideration under Guideline 2c of the Scottish MPA Selection Guidelines. Lancaster *et al* (2014) concluded that viability requirements for burrowed mud in the context of selecting MPAs will vary depending on the physical setting within which the feature occurs:

- In areas with restricted hydrography such as sea lochs, populations are likely to be self-seeding and the focus should be on protecting all known patches of burrowed mud. Priority should be given to areas with greater densities of characterising species.
- Nearshore, in areas of open coast, and further offshore, consideration should be given to local hydrographic conditions and the presence of any topographic features that may influence habitat distribution. Priority in these physical settings should also be given to areas with greater densities of characterising species.

The Fladen Ground pMPAs for instance represent examples of burrowed mud habitat offshore where JNCC gave priority to areas where survey evidence showed relatively greater densities of seapens and burrows. JNCC considered this evidence, along with other topographic features such as the shelf deep feature in the Central Fladen pMPA, when setting the site boundaries.

A number of respondents sought clarity on the wider distribution of the burrowed mud feature within pMPAs in territorial waters, querying why the presence of the feature has not been indicated in the site-specific documentation of all pMPAs in which it is found.

The burrowed mud MPA search feature occurs in sheltered basins along Scotland’s west coast (including sea lochs), throughout the Minch, in the Moray Firth and Firth of Forth, and in the northern North Sea. Patches of burrowed mud are also present in deep water off the west coast, such as around the St. Kilda Basin, along the edge of the Continental Shelf and south of Rockall.

A position paper³⁰ outlining our evolving thinking on representing the burrowed mud MPA search feature within the network was presented to the 4th national MPA stakeholder workshop in March 2012. A short summary guide to the feature, including illustrative distribution maps, was subsequently published on the Marine Scotland website³¹.

More information on the proposed protection of burrowed mud habitat in pMPAs in territorial waters is provided in SNH’s advice on selected responses to the consultation (SNH 2014). Further details on representation and replication within the network and the full Stage 5 ‘adequacy’ assessment process are provided in [Section 2.1](#) and [Section 2.2](#).

³⁰ <http://www.scotland.gov.uk/Resource/0038/00389464.doc>

³¹ <http://www.scotland.gov.uk/Resource/0039/00394205.doc>

2.6 Seabirds in the network

The lack of inclusion of seabirds was noted as a concern for many responses, particularly those responding as part of campaigns.

SNH within 12nm and JNCC beyond 12nm are currently working to provide advice to Scottish Ministers on marine Special Protection Areas (SPAs) under the EC Birds Directive. Marine Scotland is looking at opportunities to disseminate further information in 2014 so that regulators, developers and other users of the sea can be made aware of the locations being considered. Should Ministers decide to hold a public consultation as a result of advice from SNH and JNCC then this is likely to be held after the referendum.

The marine SPA work is being carried out under the following themes:

- **Inshore aggregations of non-breeding waterfowl** - pursued through the detailed survey of specific Areas of Search. Fourteen potentially important Areas of Search have been identified to date.
- **Foraging areas for breeding red-throated divers** - based on survey and modelling of diver foraging to identify the most suitable feeding areas throughout the coastal range of the species.
- **Foraging areas for terns at sea** - a selection of tern colonies has been extensively surveyed with a view to building generic and colony-specific models of tern distribution at sea allowing prediction of the most important feeding areas around Britain.
- **Concentration of shags away from their colonies** - using the existing European Seabirds at Sea (ESAS) database, inshore aerial survey and site-specific data to identify a suite of the best-known aggregations of shags in Scottish waters.
- **Seabird Aggregations** - analysis of the European Seabirds at Sea Database (an extensive collection of effort related at sea bird survey data) to identify aggregations of seabirds (31 species of gulls, terns, petrels and shearwaters, gannets, auks and cormorants) occurring from relatively close to shore, to the British Fisheries limit. Analysis covers breeding, moult and wintering seasons (see Kober *et al* 2012³²).

Relevant seabird colonies and colony extensions have already been classified by Scottish Ministers. Current work on marine SPAs, in combination of possible Nature Conservation MPAs for black guillemot, is expected to complete the Scottish MPA network for seabirds.

2.7 Marine mammals in the network

The lack of inclusion of cetaceans was noted as a concern for many responses, particularly those responding as part of campaigns.

Section 2.2 of the Scottish MPA Selection Guidelines highlights those types of features for which Nature Conservation MPAs are considered appropriate and under what circumstances. For mobile species such as marine mammals, Nature Conservation MPAs are only considered where essential areas for key life cycle stages persist over time, including habitats known to be important for reproduction and nursery stages.

In offshore waters, JNCC consider there is not sufficient evidence available at this time to clearly demonstrate the presence of persistent key life cycle stages or habitats known to be important for reproduction or nursery stages of cetaceans as per Section 2.2 of the Scottish MPA Selection Guidelines for all relevant offshore species. In both territorial and offshore

³² http://jncc.defra.gov.uk/pdf/461_final_web.pdf

waters, a range of measures exist which provide protection to cetaceans in the wider marine environment.

Analyses are currently underway to determine whether discrete and persistent areas of relatively high densities of harbour porpoise and bottlenose dolphins exist in the UK marine area. Subject to the findings of that work, SNH/JNCC (and other country agencies) may provide advice to Ministers later in 2014 on possible areas to designate as SACs.

2.8 Evidence principles

Respondents queried a number of the principles adopted for using evidence in the Scottish MPA Project, for example, suggesting that best available evidence could mean no evidence at all and noting that a reliance on existing data introduces an inherent bias into the site selection process.

How were the principles for using the ‘best available evidence’ applied, and how was this evidence generated?

The Scottish MPA Selection Guidelines set out that Nature Conservation MPAs would be developed through a scientific process involving stakeholders at key stages. The guidelines noted that a lack of scientific certainty should not be used as a reason for postponing MPA selection.

Applying the principle of using the best available evidence constrained the search for MPAs to areas where information was already available, was held by others and could readily be collated, or could be collected within the timescales of the Scottish MPA Project. This facilitated a science-led approach without entailing excessive cost. JNCC and SNH recognise that the approach adopted has the potential to introduce a degree of bias into the site selection process (i.e. by highlighting areas subject to more detailed sampling, in some cases possibly undertaken in relation to development proposals). It should also be noted however, that existing evidence, such as the UKSeaMap2010 and more recent EU SeaMap predictive broadscale habitat mapping projects (Cameron & Askew 2011; McBreen *et al* 2011), helped direct data mining and the targeting and prioritisation of survey effort.

Principles guiding the collection and use of evidence to support the selection of pMPAs are outlined in SNH and JNCC’s 2012 MPA network advice³³. Building a sound evidence-base involved mining existing data held by SNH, JNCC and other marine science organisations, and undertaking new surveys. Application of standard quality assurance processes during data collection and analyses contributed to a robust evidence-base, for example, by using certified laboratories and applying a consistent approach to the internal and external review of commissioned reports. Stakeholder engagement also contributed to data compilation efforts by facilitating data sharing, data verification and identifying opportunities for collaborative research.

As outlined in the principles for data use, the level of evidence required to progress MPA search locations to pMPAs varied depending on the nature of the area and the proposed features. For example, lower levels of scientific certainty in the assessment of feature presence, extent and condition, were considered acceptable in areas where there is a lower risk of damage to protected features from human activities, and therefore likely to be little need for management. As a minimum, recent evidence of biodiversity feature presence was

³³ http://www.snh.org.uk/pdfs/publications/commissioned_reports/547.pdf

required together with a reasonable understanding of feature extent, informed by predictive modelling work in the absence of detailed sampling coverage³⁴.

For each pMPA, JNCC and SNH generated a *Data confidence assessment*³⁵ that provides a summary of the evidence-base used and our confidence in it. The assessments consider the following 'qualities' of the feature data for each pMPA:

- **Age of data** (when were the data collected?).
- **Source of data** (who collected the data, and what for?).
- **Sampling methods/resolution** (how were the data collected, and what can they tell us - e.g. detailed observations of the seabed by divers, grabs deployed from ships sampling the sediment, video footage collected by a Remotely Operated Vehicle).
- **Data coverage** (are there data distributed across the whole area, for all of the features?).

Is the evidence used to support the assessment and selection of pMPAs accessible to everyone?

An important principle applied throughout the selection of pMPAs was that the evidence used would be available to others to ensure transparency in the process. Background material and consultants' reports are published routinely, to show how evidence has been gathered, analysed and applied. These reports are available on JNCC or SNH³⁶ web-pages.

JNCC and SNH provided an overview of how we developed the evidence-base to support the identification of Nature Conservation MPAs in Appendix 2 of the 2012 MPA network advice³⁷.

All evidence used to support MPA selection is subject to quality review before being incorporated into the Geodatabase of Marine features in Scotland's waters (GeMS). GeMS is a live database which will be periodically updated when data become available. Data from GeMS are made available to view and interrogate via Marine Scotland's National Marine Planning interactive (NMPi) web portal³⁸. For future iterations of NMPi, we hope to present relevant biodiversity data so that it clearly shows the protected features of the individual Nature Conservation MPAs. However, some suppliers provided their data to JNCC and SNH for our exclusive use and the data access agreements do not permit its onward transmission to third parties without the permission of the data owner. We are working with data owners to secure third-party copyright permissions to enable the data within GeMS to be downloadable via relevant data portals in future.

As well as being available within NMPi, the boundaries of the pMPAs are available for download in a GIS format from SNH's Natural Spaces web pages³⁹.

A small number of respondents questioned the transparency in the decision-making process - for example why certain features had been included, the justification for the proposed MPA boundaries, why no alternative locations were proposed in territorial waters etc.

³⁴ For example, see the recent report Predictive mapping of proposed protected features within selected possible Nature Conservation MPAs in Scottish territorial waters using available datasets -

http://www.snh.org.uk/pdfs/publications/commissioned_reports/600.pdf

³⁵ <http://www.snh.gov.uk/docs/A1034925.pdf>

³⁶ <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/?q=commissioned%20report>

³⁷ http://www.snh.org.uk/pdfs/publications/commissioned_reports/547.pdf

³⁸ <http://www.scotland.gov.uk/Topics/marine/seamanagement/nmpihome/nmpi>

³⁹ <https://gateway.snh.gov.uk/natural-spaces/index.jsp>

Care was taken by Marine Scotland, JNCC and SNH to involve stakeholders from the beginning of the Scottish MPA Project, and to publish supporting documentation underpinning decisions in the development of the pMPAs, to ensure there was transparency in the decision-making processes.

Details relevant to the inclusion of individual protected features are provided in the *Detailed assessment against the guidelines* document produced for each pMPA. This document also presents the justification for the outer boundaries of the pMPA (see also [Section 2.8](#)) and summarises its overall potential contribution to the MPA network.

A series of other documents published throughout the course of the Scottish MPA Project provide additional context to the recommended suite of sites consulted upon in 2013. Papers produced for the five national stakeholder workshops⁴⁰ undertaken in 2011 and 2012 chart the evolution of the project's evidence-base and explore the original MPA search location options, their boundaries and component features.

Options and alternatives exist for the representation of some offshore features within the network, and Marine Scotland sought views on these options during the consultation. Discussions at the stakeholder workshops and subsequent decisions by SNH meant that in territorial waters the options were narrowed down during the selection process. These decisions were made either because the features were unique (e.g. fan mussels within the Small Isles) or the combinations of features within a pMPA made a unique contribution to the network. Therefore, no options were presented within territorial waters during the formal consultation.

Position papers presented to the workshops⁴¹ outlined the rationale behind the identification of MPA proposals for specific features (black guillemots, burrowed mud, cetaceans etc.) and groups of features (e.g. those within sea lochs). Formal commissioned research reports available on the project partner websites present information on the geodiversity features of importance in Scotland's seas⁴². They present the details of preliminary work undertaken to identify areas considered least damaged/more natural⁴³ and the contribution of existing measures⁴⁴ to the network.

As well as the data on features, the *Management options papers* presented the best available data at the time of consultation on activities occurring within and adjacent to the pMPAs. The need for any management of activities was determined using a range of different evidence including the [Feature Activities Sensitivity Tool](#) (FEAST) (Marine Scotland 2013), published reports and guidance e.g. fisheries management guidance⁴⁵. Other data were derived from discussions with stakeholders e.g. data on recreational anchorages. Further detail on how we developed the management options is provided in [Section 2.13](#).

Was the evidence used subject to independent scrutiny?

Independent expert review was an important component of the Scottish MPA Project. Stakeholders were given the opportunity to review the evidence used and its application, through a series of national workshops⁴⁶ (March 2011 - June 2012) and regular bi-lateral

⁴⁰ <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/WorkshopReports>

⁴¹ <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/140312>

⁴² Brooks, A.J., (2013). Assessing the sensitivity of geodiversity features in Scotland's seas to pressures associated with human activities. *Scottish Natural Heritage Commissioned Report No. 590*.

⁴³ <http://www.scotland.gov.uk/Resource/Doc/295194/0121829.pdf>

⁴⁴ <http://www.scotland.gov.uk/Resource/Doc/295194/0121831.pdf>

⁴⁵ <http://jncc.defra.gov.uk/page-6498>

⁴⁶ <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/engagement/WorkshopReports>

meetings convened by Marine Scotland. Stakeholder views supported a robust assessment against the MPA Selection Guidelines and continue to help strengthen the evidence-base.

Both SNH and JNCC have non-executive independent groups within their corporate governance structures comprising specialists drawn from wider academic, NGO, public and private sector communities. These groups provide independent advice and scrutiny to the executive staff of respective organisations. The JNCC MPA Sub-Group and SNH Scientific Advisory Committee reviewed our draft 2012 MPA advice and subsequent respective 2013 consultation products. These reviews provided an expert examination of the quality of the evidence and the scientific integrity of our gathering, synthesis and interpretation of that evidence. These reviews formed part of the Joint Nature Conservation Committee and the SNH Board (Protected Areas Committee) considerations before they signed-off documents for release to the Scottish Government.

A small number of respondents felt that the peer-review of the underpinning evidence-base and the 'in-house' data quality assessments were not sufficiently rigorous.

Concerns raised during the consultation regarding the qualities of the evidence-base for individual features of the pMPAs are covered in relevant site-specific commentary; see [Section 3](#) for the offshore site specific responses.

SNH and JNCC take the view that the *Data confidence assessments* and *Detailed assessments against the guidelines* documents produced for each site present an open and fair appraisal of the status of the evidence-base and clearly demonstrate how we used evidence to develop the pMPAs. SNH and JNCC are confident that the non-executive independent expert and stakeholder review processes followed to date have been rigorous.

In response to the concerns raised during the consultation, Marine Scotland are undertaking an external review of the current evidence base (April 2014) to consider the quality and use of evidence underpinning the recommendations for the designations.

The reviewer will deliver their report on the evidence base to Marine Scotland in May 2014. JNCC and SNH understand that the reviewer's conclusions will help inform Scottish Minister's decisions on the pMPAs.

2.9 Boundary setting principles

A range of respondents raised concerns relating to the scale of the pMPAs, with areas encompassing often widely distributed features. Some had the perception that the outer limits of the pMPAs were drawn in relation to geographically convenient locations on the map rather than the distribution of proposed protected features. These respondents expressed a preference for the site boundaries to be drawn more tightly around the features - potentially excluding the sea areas in between.

How were the boundaries of the pMPAs derived?

The size and shape of the pMPAs reflect the distribution and extent of the proposed biodiversity and geodiversity protected features. A site-specific explanation is provided as part of stage 3 of the *Detailed Assessment against the MPA Selection Guidelines* document provided for each pMPA.

The boundary setting principles outlined within sections 11.9 and 11.10 of the MPA Selection Guidelines were applied to each pMPA that passed the stage 5 assessment. These principles included:

- drawing the boundaries as closely as possible around the feature(s) to support the MPA acting as a functional whole for the conservation of the features concerned, with consideration given to combining adjacent features into a single MPA;
- for mobile species, taking account of places within the natural range of the species which provide the physical or biological factors essential to their life and reproduction; and
- delineating the footprint of individual protected features and where appropriate combining these into one MPA boundary (in this event, management measures may vary throughout the site depending on the sensitivities of the features present).

Other principles focussed on drawing boundaries to ensure site integrity is not compromised and involved consideration of activities occurring near or within the MPAs. Stakeholder input throughout development of the network, and during consultation, have supported these considerations and helped strengthen the case for the pMPA boundaries.

The MPA Selection Guidelines propose that the boundary setting principles be put into practice by:

- drawing boundaries away from the coast as straight lines, to ensure ease of identification on charts and at sea;
- using complex site shapes, rather than simple square/rectangular boundaries to ensure that the boundary relates closely to the feature(s) of interest;
- locating co-ordinate points so that they are relevant to the feature of interest, rather than at the nearest whole degree or minute point; and
- using 'mosaic' sites, in which MPAs may be made up of more than one discrete area where this is appropriate to ensure the boundary closely reflects the distribution of a feature. For example the Firth of Forth Banks Complex pMPA comprises three areas proposed to protect a diversity of sand and gravel habitats and ocean quahog as well as three distinct shelf bank and mound features.

In accordance with the boundary setting and other general principles set out in the MPA Selection Guidelines (sections 2.5b; 3.2iv; guideline 1c), ecologically functional units such as sea lochs (e.g. Loch Goil) and sounds/bays within natural closing lines (e.g. Wyre and Rousay Sounds) have been included in full where the proposed protected feature(s) are broadly distributed across the pMPAs. Post consultation refinements to the boundaries of the Noss Head, South Arran and North-east Faroe-Shetland Channel pMPAs reflect the full implementation of the boundary setting principles.

Are the pMPA boundaries the same as management boundaries?

Management boundaries may differ from the pMPA boundary. Further details on the development of MPA management measures (based on the sensitivities of the protected features) are provided in [Section 2.11](#). Where pMPAs encompass multiple widely distributed features, management measures may vary throughout the site. In some instances it may be the case that site boundaries are identical to management boundaries. In other instances management zones may be implemented within the site boundary relative to the location of sensitive protected features and/or to ensure protection of the range of different types of features within a site. The development of management measures will take account of any supporting ecological processes as well as the protected features themselves. The MPA Selection Guidelines provide information on these topics.

Marine Scotland is leading the development of management measures for each pMPA. Their consideration of management at a site level will be based on all of the evidence,

information and data that are available. The process will require significant input from stakeholders. The MPA Management Handbook⁴⁷ describes this process.

Further detail is provided in Marine Scotland's draft guidance document '*Principles for spatial fisheries management boundaries for protected features*' which is available online⁴⁸. Draft fisheries management measures have been prepared for a number of the pMPAs to support discussions on displacement⁴⁹; these draft measures are also available online.

2.10 Conservation objectives

Conservation objectives set out the desired quality of the protected feature(s) within each Nature Conservation MPA. They are set for each feature within each pMPA, and are based on assessments carried out using the best available evidence. Although our confidence in the presence of proposed protected features is generally good, our confidence in the quality of these features is often less so. The conservation objectives for the 139 proposed protected features reflect this position; 82 have the conservation objective conserve (uncertain), 53 conserve and four are set to recover.

Information on the approach to setting conservation objectives in the Scottish MPA project is provided in the Nature Conservation [MPA Management Handbook](#).

Why is the conservation objective set to 'conserve' when the condition of a feature is not known?

The purpose of designating a MPA as set out in the Marine Acts⁵⁰ is to 'conserve' its features. Consequently, Marine Scotland's policy is that the default conservation objective is to 'conserve' the feature in the longer term. When the condition for a proposed protected feature is not known, its conservation objective has been set to 'conserve' and the uncertainty of the feature condition is noted alongside the objective. This judgement does not mean that management will not be required for the feature to achieve its objective. Instead, appropriate management to ensure the feature is conserved will be developed using the sensitivity of features to pressures associated with the activities taking place within or near the pMPA. For features that are considered to be highly sensitive to specific pressures associated with an activity, a higher level of management may be required. Conservation objectives are site-specific and do not reflect the status of the wider species population or condition of the feature across Scotland's seas. We tried to identify good examples of the MPA search features as reflected in the various stages of the Scottish MPA Selection Guidelines, so it then follows that many of the conservation objectives have been set to 'conserve'.

By example, the conservation objective for deep-sea sponge aggregations in the Faroe Shetland Sponge Belt was set to conserve (feature condition uncertain). However, the feature is highly sensitive to physical damage by mobile bottom contact fishing gear. JNCC recommend that all mobile bottom contact gear is restricted across the deep-sea sponge aggregations in the pMPA to achieve the objective to conserve the feature in the longer term.

⁴⁷ <http://www.scotland.gov.uk/Resource/0042/00428637.pdf>

⁴⁸ <http://www.scotland.gov.uk/Resource/0044/00442782.pdf>

⁴⁹ <http://www.scotland.gov.uk/Topics/marine/marine-environment/mpanetwork/Displacement/Displacement>

⁵⁰ Section 117 (1) Marine & Coastal Access Act & Section 68 (1) Marine Scotland Act

In offshore waters, why have feature conservation objectives been set to conserve when 2d assessments in the detailed assessment against the selection guidelines suggest exposure to human activities to which they may be sensitive?

As outlined in the [MPA Management Handbook](#), direct evidence of damage is required before a conservation objective of 'recover' would be assigned to a feature. If this evidence is not available, the conservation objective is set to 'conserve'. In offshore waters, we do not have direct evidence of damage to proposed protected features.

The stage 2d assessments used information on the relationship between the pressures exerted by human activities on features and the resultant sensitivity of the features as a proxy for indirectly assessing whether the features would be least damaged/more natural or whether they may have been modified by human activity. The stage 2d assessment discusses the risk that a feature may have been modified by human activity and this risk is reflected in the *Management Options Papers* (see e.g. above for deep-sea sponge aggregations in the Faroe-Shetland Sponge Belt pMPA).

Shouldn't areas of broad-scale habitats be protected from towed gear to allow recovery to their climax community?

The conservation objective for all broad-scale habitats (both inshore and offshore) within the Scottish MPA Project area were set to conserve (some with uncertainty about feature condition). As outlined in [Section 2.12](#), this judgement reflects our limited understanding of the likely ecological condition of the features when not subject to adverse pressures. However, the management options for broad-scale habitats such as offshore subtidal sands and gravels and offshore deep sea mud set out in the *Management Options Papers* recognise the requirement to work towards improving our understanding of the impact of pressures on these features. Marine Scotland continues to hold discussions with sea users to identify appropriate management measures that recognise the uncertainty in our knowledge of feature condition.

The management of broad-scale habitats will be designed to ensure that they achieve their conservation objectives. For example, under the reduce/limit management option, "Appropriate management could include closure of a proportion of the area covered by the feature to damaging gears, and there may be a greater requirement for restrictions on gears that penetrate deeply into the sediment." Feature condition will be monitored to determine whether they are achieving their conservation objectives and management may be adapted accordingly.

2.11 Evidence of impact of activities

What evidence there is to show that fishing practices are harming marine habitats or fish species?

World-wide, there is a substantial body of peer-reviewed published evidence that documents the potential effects of various fishing practices on the seabed and its associated communities. The evidence base used to develop management options for the proposed protected features is detailed in FEAST (Marine Scotland 2013) and the [Fisheries Management Guidance](#)⁵¹ produced by SNH and JNCC.

⁵¹ The JNCC and SNH fisheries management guidance is available on JNCC's webpage: <http://jncc.defra.gov.uk/page-6498>

Why might management be needed when fishing pressure has reduced in recent years as gears have been designed to be more selective, exert less pressure and avoid unwanted by-catch where possible?

The pMPAs are not a mechanism for the management of fish stocks. Although measures such as gear selectivity and avoidance of by-catch have come into use to address fisheries management issues, they are not necessarily appropriate steps for reducing adverse pressure on benthic habitats to ensure that proposed protected features achieve their conservation objectives.

Don't some marine habitats rely on fishing pressure to maintain populations of key species?

Although some argue that fishing may promote the abundance of certain species (e.g. *Nephrops*), research into the effect of fishing on muddy habitats in the UK has shown that fished areas typically support a modified biological community with lower diversity than comparable un-fished areas. Studies noted a reduction or loss of long-lived filter-feeding species and increased abundances of opportunistic scavengers (Ball *et al* 2000; Tuck *et al* 1998). These effects are greatest in more heavily-fished areas suggesting that impact is related to the intensity of fishing (Ball *et al* 2000).

Where is the evidence drawn from that towed gear does not affect sandeels?

The available evidence provided in the [Fisheries Management Guidance for sandeels](#) indicates that from a fisheries perspective only targeted sandeel fisheries and hydraulic dredging pose a significant risk to sandeel populations because of the resulting high mortality. Commercial trawls for whitefish use mesh sizes that are too large to capture sandeels. Scallop dredges can also be a source of mortality but the mesh size and low catch effectiveness of these gear means that they are unlikely to cause a level of mortality that would pose a risk to the conservation objectives.

2.12 Broader ecosystem function and ecological processes in the network

Analysis of the consultation responses indicated a divergence of opinion concerning broader ecosystem function and the maintenance of ecological processes as one objective for developing the MPA network. Some respondents thought ecosystem function had not been adequately taken into consideration and others questioned the justification for including some of the large-scale features within the network.

How has ecosystem function been taken into consideration in developing the network?

The Scottish MPA Selection Guidelines incorporate the concept of function, both in the Guidelines themselves and in the MPA search features. For example, Guideline 1c refers to places that are critical to the functioning of wider marine ecosystems and Guideline 2a refers to combinations of features that are functionally linked. In terms of MPA search features, the focus for the mobile species has been on identifying important locations in the life stages of the species. There are also five large-scale features on the list: fronts, the continental slope, shelf banks and mounds, shelf deeps and seamounts. These large-scale features were included to represent areas of potential wider significance to the health and biological diversity of Scotland's seas as a way of incorporating function into the selection of the MPA network. Further information on large-scale features is provided in a paper produced by SNH

and JNCC for the 4th national MPA stakeholder workshop in 2012⁵². A more detailed position paper will be published in spring 2014 but in the interim, the functional role served by these features within relevant pMPAs is explored within the respective *Detailed Assessment Against the MPA Selection Guidelines*.

Some respondents queried the relationship between large-scale features and the habitats present and species that use such areas, adding to their conservation importance. The respondents asked whether these associated habitats and species should also be protected.

Whilst mobile species such as seabirds and marine mammals may be functionally linked to such large-scale features e.g. foraging along frontal systems, we believe that protecting the larger interest should secure the ecological services it provides. Such an approach is analogous to protecting reefs within an SAC - these serve as a home and foraging areas for a diverse array of different marine organisms but each individual species is not specifically referenced in the site designation order.

How are ecological processes considered within the network?

Both the UK Marine and Coastal Access Act 2009 (s.125-127) and the Marine (Scotland) Act 2010 (s.80; 82 & 83) include provisions to ensure that ecological processes upon which the conservation of protected features of the Nature Conservation MPAs depend are maintained. These provisions are reflected in Appendix 1 of the draft MPA Management Handbook⁵³.

This approach reflects OSPAR Guidance for developing a network of MPAs across the North-east Atlantic (OSPAR, 2006⁵⁴ - paper ref. 06/03e), which sets out that components of the MPA network “*will, individually and collectively, aim to:*

- *protect, conserve and restore species, habitats and ecological processes which are adversely affected as a result of human activities;*
- *prevent degradation of and damage to species, habitats and ecological processes, following the precautionary principle; and*
- *protect and conserve areas that best represent the range of species, habitats and ecological processes in the OSPAR area.”*

See also [Section 2.15](#) on connectivity.

2.13 Approach to management

A number of the consultation responses raised queries regarding the process used to identify management options for the proposed protected features of the pMPAs, and had particular comments in relation to the management of specific sectors and activities. Respondents also raised queries about the evidence used to inform the management options for different features.

2.13.1 General approach to management

JNCC and SNH developed Management Options Papers for each of the pMPAs to support early discussions regarding potential management of human activities. These documents

⁵² <http://www.scotland.gov.uk/Resource/0038/00389524.doc>

⁵³ <http://www.scotland.gov.uk/Resource/0042/00428637.pdf>

⁵⁴ http://www.ospar.org/documents/DBASE/DECRECS/Agreements/06-03e_Guidance%20ecol%20coherence%20MPA%20network.doc

were intended to provide stakeholders with information about the background to the options for management that may be considered within each Nature Conservation MPA. Although the formal consultation process has now finished, discussions regarding management options will continue and will focus on the development and implementation of management measures. Marine Scotland is leading the development of the management measures.

The approach to identifying management options for each activity was risk-based, i.e. the advice focused on where there was believed to be a risk of the proposed protected features not achieving their conservation objectives. The [Feature Activities Sensitivity Tool](#) (FEAST) (Marine Scotland 2013) reflects our current understanding of the sensitivity of features to pressures associated with marine activities. FEAST was the starting point for developing the management options, and clearly outlines the evidence used to assess the sensitivity of features to pressures.

Why do the Management Options Papers only consider activities currently taking place within the pMPA?

The Management Options Papers consider the range of different activities known to be taking place within the possible MPA. The options were defined using a risk-based approach, using the best available knowledge of both the sensitivity of features in the pMPA and the activities occurring within or adjacent to the pMPA. Introducing consideration of all possible future activities or eventualities would not be compatible with taking an evidence-based approach to developing management options and would introduce many uncertainties into the advice.

Why haven't management options been developed for geodiversity features?

In accordance with the approach used for biodiversity features, the management options for proposed protected geodiversity features is based on what is known about their sensitivity to pressures. An assessment of the sensitivity of key geodiversity features in Scotland's seas was published by SNH and JNCC (Brooks 2013), and was the basis for our consideration of geodiversity features in the Management Options Papers. Information on the sensitivity of geodiversity features is also included in FEAST. This sensitivity of geodiversity features has been considered in the Management Options Papers for offshore pMPAs, and will be incorporated into the finalised documents for pMPAs in territorial waters.

In offshore waters, all of the geodiversity features that were considered sensitive to pressures associated with activities within the pMPA also overlapped with a biodiversity feature. The management options presented for the overlapping biodiversity features would also be appropriate for achieving the conservation objectives of the geodiversity features. This is highlighted in the Management Options Papers for the relevant pMPAs.

Why haven't management options been developed for large-scale features?

JNCC considered whether management options to support the achievement of conservation objectives for large-scale features were required. When developing management options for pMPAs that included large-scale features as proposed protected features, for example seamounts and the continental slope, the sensitivity of different components of the large-scale features to pressures was assessed. We concluded there was no significant risk to all large-scale features achieving their conservation objectives, given the scale of the features, and their low sensitivity to pressures associated with activities to which they are exposed. Consequently, no management options for the features themselves were proposed. Instead, the Management Options Papers have focused on the options and risks of the different biological components (the specific named proposed protected features) associated with the large-scale features achieving their conservation objectives. For example, JNCC provided management options for the benthic seamount communities on Rosemary Bank Seamount

and the range of offshore subtidal sand and gravel and offshore deep-sea mud habitats associated with the continental slope area of The Barra Fan and Hebrides Terrace Seamount pMPA.

2.13.2 Fisheries Management

Our advice in relation to fishing activity was presented in the context of three broad options in the Management Options Papers. Fisheries managers have a range of measures available to put these options into practice to managing the risk to protected features. Marine Scotland expect to develop these measures in discussion with sea-users.

Can large areas of MPAs be established free from the impacts of towed gear?

As set out in [Section 2.10](#), JNCC and SNH considered options around the management of pMPAs in terms of the ability of a feature to achieve its conservation objective. The Management Options Papers consider the sensitivity of features to pressures associated with different activities, including towed fishing gears, and highlight any risks that might prevent the achievement of those conservation objectives. JNCC presented a range of different management options using the best available evidence to assess the risk of a feature not achieving its conservation objective. Some of these options may include closing an area to a fishing practice; however, such measures will be considered on a site-by-site basis. Any measures would generally apply only to the part of the site where the feature is present. However, there may be circumstances in which it could be desirable to extend management measures beyond the known area of a feature's distribution, to take account of ecological or geomorphological processes on which the protected feature(s) depend.

Will existing fisheries management measures that have been considered in the management of a pMPA be maintained to ensure long-term protection?

The over-arching objective of the MPA network is to ensure that protected features achieve their conservation objectives and contribute to an ecologically coherent network. The adaptive management approach favoured by Scottish Government enables managers to adapt measures according to emerging evidence, particularly of feature condition. Where existing fisheries management measures contribute to feature protection, an assessment of the risk to achieving the conservation objectives would be necessary prior to removal or alteration of such measures.

How will fisheries management be introduced to offshore pMPAs? (5.03)

Where fisheries management measures are necessary for a MPA located beyond the exclusive competence of Scottish Ministers, Marine Scotland will apply to the European Commission for appropriate management measures using the mechanisms of the Common Fisheries Policy (see Management Options Papers for offshore pMPAs and Marine Scotland's Management Handbook). This process ensures that any measures implemented will apply fairly across all Member State vessels active in Scottish waters. Marine Scotland anticipate their approach will broadly follow that already in place for delivering any fisheries management requirements for Special Areas of Conservation in offshore waters. The European Commission provided [guidance](#) for Member States seeking CFP management measures for marine Natura 2000 sites. Their guidance lists 11 data requirements that the commission considers necessary to support the application for a management measure.

2.13.3 Management of licensed activities

How will the proposed management options for renewables activity be implemented?

Marine Scotland, with advice from JNCC and SNH as required, will assess the impact of licensed activities on the protected features of MPAs through the established Environmental

Impact Assessment (EIA) process. If it can be established during the screening or scoping phases of EIA that the activity is not capable of affecting (other than insignificantly)⁵⁵ the protected features of an MPA, then no further assessment will be necessary. If this cannot be established, then assessment of the potential impacts of the activity on the protected features and achievement of the features' Conservation Objectives must be undertaken. For further information, please refer to the MPA Management Handbook.

How will the proposed management options for oil and gas activity in offshore waters be implemented?

The Department of Energy and Climate Change (DECC), as the regulator for oil and gas activity in the UK, would be responsible for making the decision as to whether a proposed activity and/or development is capable of affecting (other than insignificantly)³ the protected features of a Nature Conservation MPA.

For those activities and/or developments that DECC considers require an EIA, JNCC is willing to engage at an early stage with DECC and the operator to discuss the specific details of the proposed operation and/or development and offer advice on any potential effects. In so doing, JNCC will make reference to information on the sensitivity of the protected features to proposed activities and/or developments that is publicly available through 'FEAST'. The Features, Activities, Sensitivities Tool (Marine Scotland 2013).

JNCC will consider the nature, scale, timing and duration of activities in providing advice. Early engagement will facilitate discussions on the information required to advise on any possible implications to the protected features achieving their conservation objectives. If JNCC identify a potentially significant effect, mitigation measures may be advised. Any such advice provided as part of the licensing process will need to be site and operation specific. On this basis, the information JNCC provides as part of the (present) Management Options Paper is necessarily generic and therefore indicative.

Further information on the regulatory framework concerning oil and gas activity within Nature Conservation MPAs is included in the [MPA Management Handbook](#).

Will there be a greater requirement for surveys to inform licensed activities within offshore designated MPAs?

Early engagement between the regulator, operator and JNCC will help inform the types of questions that need to be answered to determine whether or not the activities taking place as part of the proposed operation will have a significant effect². In turn, this process will help determine the requirements for environmental information to answer these questions. This process will be case-by-case and feature specific. In some instances, it is possible that existing environmental information will be sufficient. In other instances, bespoke environmental survey work may be required.

Will voluntary industry standards be used for offshore licensed activities?

JNCC has published best practice guidelines relating to a number of offshore licensed activities, including the use of marine mammal observers for:

- seismic survey - <http://jncc.defra.gov.uk/page-1534>
- offshore piling - <http://jncc.defra.gov.uk/page-4274>
- the use of explosives - <http://jncc.defra.gov.uk/page-4900>

⁵⁵ Reference to 'affecting (other than insignificantly)' is in relation to the requirements on public authorities in relation to licensed activities taking place within MPAs as set out in the UK and Scottish Marine Acts (Sections 125 and 82 respectively)

2.13.4 Military Activity

How was the sensitivity of features to Military of Defence activity assessed?

The Statement of Intent between the UK Statutory Nature Conservation Bodies and Navy Command HQ provides information about the process used to assess the sensitivity of marine and coastal features to MoD activity; available on the JNCC website http://jncc.defra.gov.uk/pdf/091213_MOD_SNCB_SOI_final.pdf. As part of its Marine Environment and Sustainability Assessment Tool (MESAT), the Royal Navy has produced advice on the suitability of military activities in the vicinity of MPAs across the UK's marine area. The advice is available through an interactive military layer used on electronic charts, which provides guidance on the management of activities and controls or restrictions applicable to those activities in order to safeguard the environmental status of MPAs on a site by site basis.

2.14 Survey and monitoring

A number of respondents emphasised the need for a clear understanding of the baseline condition of the MPA features. There was also a view that an improved understanding of activities and compliance with management measures is required. These two aspects were seen as important for enabling an adaptive approach to management of MPAs in the longer-term and this is certainly the intended way forward.

Our current knowledge of the presence, extent and condition of features within each pMPA is detailed in the *data confidence assessments*. A programme of marine survey work will continue to fill gaps in our knowledge base. Such survey over the first six yearly review cycle (to 2018) will also consider feature-specific needs, including studies to improve our understanding of the relationships between feature condition and differing levels of anthropogenic pressure, for example for 'burrowed mud' where management measures to 'reduce or limit' such pressures have been proposed. At the same time, options for integrated monitoring of marine biodiversity, including within MPAs, are being developed as outlined below.

Monitoring of the condition of MPA features

JNCC, with SNH and other partners, is currently leading a research and development programme to develop an integrated system of monitoring for marine biodiversity across all UK waters. The programme aims to provide a framework for biodiversity monitoring to meet the requirements of monitoring and assessment obligations, including those under the Marine Strategy Framework Directive, Habitats and Birds Directives and the OSPAR Convention. The Programme is preparing monitoring options advice for Governments, and monitoring and assessment of MPAs, including Nature Conservation MPAs, is an integral part of this programme.

Monitoring options under development for MPAs, building on monitoring already carried out for Natura 2000 sites, include:

- identification of a set of measurable characteristics, attributes or indicators that describe the condition of the feature either directly or indirectly, including elements which relate to habitat extent, structure, function, and associated species, and pressures which may affect feature condition;

- setting of broad targets or target ranges for each of these attributes which will better enable us to assess whether the feature is in good condition; and
- identification of appropriate sampling methods and levels of sampling required to provide the statistical power necessary to detect change, and the development of a programme of surveys to assess condition of features within sites.

Monitoring within Nature Conservation MPAs in Scottish waters will aim to:

- enable assessment of condition of the features within sites;
- enable assessment of the degree to which management measures are effective in achieving the conservation objectives for the protected features;
- support the identification of priorities for future protection and/or management; and
- enable Government to fulfil its national and international assessment and reporting commitments in relation to protected areas and help identify where further action may be required.

2.15 Connectivity

Most people who commented on connectivity recognised its importance in developing a network of MPAs and highlighted the risks of not being able to consider it fully.

The OSPAR Commission recognise the importance of connectivity, stating that *‘the MPA network should take into account the linkages between marine ecosystems and the dependence of species and habitats on processes that occur outside the MPA concerned’* (OSPAR 2003). Connectivity is included within three of the principles set out by OSPAR in their guidance on developing an ecologically coherent network of MPAs (OSPAR 2006). In their guidance, OSPAR notes that *‘a lack of knowledge of connectivity should not prevent the development of the network’*. However, whilst recognised as important, at the scale of the North-east Atlantic aspects of MPA network connectivity are poorly understood (OSPAR 2013) and Olsen *et al* (2013) identified connectivity as a research priority for Europe.

At the Scottish scale, the importance of connectivity is recognised in the Scottish MPA Selection Guidelines (see [Section 2.15](#)). Our view is that connectivity is important in determining whether the Scottish MPA network is ecologically coherent, and also in determining the contribution that we make to the OSPAR MPA network. [Section 2.12](#) describes how ecological processes are considered within the network.

How we have considered connectivity more generally at different stages throughout the Scottish MPA Project is described in the section below. We recognise that future reviews of the Scottish MPA network will need to take account of new research on feature linkages across the network as it becomes available.

Some respondents commented on the difficulties in assessing connectivity given our current understanding. Specific reference was made to recent work carried out by Marine Scotland Science. There were a range of views expressed from those who doubted whether connectivity had been achieved to others who felt that it was appropriate to approximate connectivity by ensuring that the network was spatially well-distributed.

Our assessment of connectivity was essentially undertaken in three stages: firstly during application of the Scottish MPA Selection Guidelines to individual sites and features; secondly through the network assessment in our MPA network advice; and thirdly through

incorporation of the results of the modelling work carried out by Marine Scotland Science. These are described below.

The Scottish MPA Selection Guidelines incorporate connectivity, most notably through the considerations during Stages 1 and 5. Our assessment of connectivity during site selection focussed on mobile species and specifically, areas of importance to the life stages of these species where there was a good understanding of this relationship between features and locations. For example, for sandeels, we considered the relationship between a Nature Conservation MPA and the wider marine environment. Based on work undertaken by Marine Scotland Science, discrete areas were identified because they are considered important for localised sandeel production, or because they act as sources of sandeels across the continental shelf. What we are unable to consider at this present time (May 2014), is the potential for connectivity between sites whose proposed protected features are either seabed habitats or species. There are simply insufficient data on the dispersal of most benthic species to make any assessment other than at a generic level based on the average dispersal distance for the range of different types of species larvae known.

In our 2012 MPA network advice, we included an assessment of the adequacy of feature coverage in the Scottish MPA network⁵⁶. One of the tests used was to look at the spatial distribution of the MPA proposals and existing measures - further details also provided in [Section 2.2](#)). We included this assessment because it is one of the three tests used by OSPAR to help provide an initial evaluation of whether the OSPAR MPA network is likely to be ecologically coherent. The spatial distribution test is relevant to connectivity on the basis that if sites are not spatially well-distributed then the sites within the network are not likely to be connected (Ardon 2008). Our conclusion in our 2012 advice was that the Scottish MPA network was spatially well-distributed and therefore the network has the potential to be connected.

In 2013, Marine Scotland Science (MSS) published the results of a bio-physical modelling study that provided an estimate of the extent to which the possible MPAs are likely to be linked through the exchange of species larvae, juveniles or adults (Gallego *et al* 2013). They found that connectivity is influenced by the time larvae spend suspended in the sea, known as the pelagic larval phase duration (PLD), which in turn is a critical determinant of how far larvae are transported by prevailing water currents. There were other factors such as the season of spawning and distance to shore that were also identified as important factors in the degree to which areas are connected; a full explanation of these factors is provided in the final report of the study.

MSS found that species with a longer PLD (≥ 30 days) that were not solely associated with sea lochs or nearshore areas, could be transported by water movement from the Celtic Sea (OSPAR Region III) to the Greater North Sea (OSPAR Region II) within Scotland's seas. Species such as tall seapen and some bivalve molluscs fall into this category. However, the study also found that **connectivity may be low** in the following circumstances:

- For species with a short PLD (e.g. northern feather star aggregations).
- For species present in only a small number of MPAs (including Nature Conservation MPAs as well as others such as Special Areas of Conservation).
- For species present within MPAs that are close to the shore because these are likely to be less dispersive environments than open waters. This lack of dispersion may particularly be the case for west coast sea lochs.
- For species present within MPAs in areas that, whilst in more open waters, are still hydrographically isolated. For example, there is a cyclonic eddy that dominates the central parts of these Grounds. Consequently, the model outputs indicate that self-

⁵⁶ http://www.snh.org.uk/pdfs/publications/commissioned_reports/547.pdf

recruitment of proposed features rather than immigration of recruits from other areas is expected in the pMPAs identified in the Fladen Grounds.

The study also recognised that the higher resolution hydrodynamic models under development and greater ecological knowledge should allow us to improve our estimation of connectivity in the future.

The first review of the MPA network will take place in 2018 and our intention is to take account of any advances to our understanding of connectivity to review the assessments carried out to date. Should the results of this assessment highlight the need for changes to the Scottish MPA network we will provide further advice to Scottish Government.

3. Site specific responses

3.1 Fladen Ground pMPAs

There are three pMPAs in the Fladen Grounds area of the northern North Sea: South-east Fladen, Western Fladen and Central Fladen. All three pMPAs include examples of seapens and burrowing megafauna - a component habitat of the burrowed mud MPA search feature. A 'core' area in the Central Fladen pMPA also contains an example of the tall seapen - another component of the burrowed mud MPA search feature.

JNCC advised at the time of the public consultation that the Central Fladen 'core' area for tall sea pen, together with one other area for seapens and burrowing megafauna from either the Central, Western or South-east Fladen pMPAs were required to meet network adequacy for the feature. These combinations were considered to be ecologically equivalent, although Central Fladen in its entirety was assessed as making a better contribution to the network.

Since the public consultation JNCC have received additional data collected in 2013 that further verifies the presence and extent of burrowed mud within the pMPAs (Eggleton *et al* 2013). These data are included in the revised site documentation packages delivered to Marine Scotland in 2014. JNCC conclude that the options for the seapen and burrowing megafauna component of burrowed mud habitat remain ecologically equivalent.

The boundaries for the three Fladen Ground pMPAs remain unchanged since the public consultation.

Respondents provided comments relevant to the science and evidence base underpinning site identification. These are summarised in the remainder of this section.

Tall sea pen are already represented by a designation in OSPAR Region II and therefore the feature is adequately protected.

The Geodatabase of Marine Features Scotland (GeMS) does not contain any records of tall seapen that occur within existing protected areas in OSPAR Region II in Scottish waters. The only example of burrowed mud considered protected within OSPAR Region II is the seapens and burrowing megafauna component habitat of the burrowed mud MPA search feature in Sullom Voe SAC (Carruthers *et al* 2011).

There is no justification in protecting tall sea pen as part of a pMPA.

Please refer to [Section 2.3](#) on MPA search features.

Burrowed mud is likely to be represented elsewhere in OSPAR Region II.

Before identifying MPA search locations for the MPA search features listed in Annex 3 of the Scottish MPA Selection Guidelines, SNH and JNCC considered the contribution existing protected areas and other area-based measures could make to the protection of MPA search features – including burrowed mud (see Cunningham *et al* 2011 & Carruthers *et al* 2011). This work concluded that only one existing protected area in territorial waters - Sullom Voe SAC, afforded protection to an example of the seapens and burrowing megafauna component of the MPA search feature, as part of the Annex I designated feature large shallow inlets and bays.

In applying the Stage 5 selection guidelines to burrowed mud, we sought representation of the geographic range (reflecting examples in sea lochs/voes, close to the coast, and away from the coast and further offshore) and ecological variation (reflecting examples of the same habitat with different characterising species). In Scotland, the known ecological variants are:

- Seapens and burrowing megafauna;
- Burrowing megafauna and the mud volcano worm;
- Tall seapen; and
- Fireworks anemones.

Burrowed mud is considered to be Threatened and/or Declining in OSPAR Region II. Following the selection guidelines, it is appropriate to include a greater proportion of the known distribution of each of the Threatened and/or Declining features in the Scottish MPA network. This approach required multiple replicates for each component of burrowed mud present in OSPAR Region II, and protection of examples in the different geographical settings where the feature is known to occur.

For OSPAR Region II, only the *Seapens and burrowing megafauna* and the *Tall seapen* components are known to be present in Scottish waters; the latter component is only recorded further offshore. The Central Fladen pMPA was identified to represent both components, with the Central Fladen core providing the best example of the limited records of *Tall seapen* in OSPAR Region II. One of the three pMPA alternatives in the Fladen Grounds (Central Fladen, Western Fladen or South-east Fladen) together with the Southern Trench MPA search location were recommended for *Seapens and burrowing megafauna*. Pending a decision on the Southern Trench MPA search location, burrowed mud representation would be considered adequate in OSPAR Region II based on the data we currently have available.

Scotland has over 75% of the burrowed mud habitat in the OSPAR Maritime Area and so Scotland's potential contribution for burrowed mud in OSPAR Region II is significant to the wider conservation of the feature in the North East Atlantic.

Central Fladen pMPA should be highly protected to provide a benchmark for the feature.

The conservation objective for the *Burrowed mud* feature within the Central Fladen pMPA has been set to 'conserve' (with feature condition 'uncertain'). The Central Fladen pMPA Management Options Paper states the *Burrowed mud* is sensitive to the pressures associated with some activities taking place within the Fladen grounds. JNCC advised on options for managing activities in terms of the likely risk of the burrowed mud feature not achieving its conservation objective.

Only the Central Fladen Core should be designated in the Fladen Grounds.

If only the Central Fladen Core was designated in the Fladen Grounds, the network would be considered inadequate for the *Seapens and burrowing megafauna* component of the burrowed mud habitat in OSPAR Region II (for further information, see [Section 2.5](#)). Furthermore, the network would no longer include the Tunnel Valley feature representative of the Fladen Deep Key Geodiversity Area. JNCC advised the protection of the *Burrowed mud* feature in the Fladen Grounds required the designation of the Central Fladen core for *Tall seapens*, together with one of the three option sites for the *Seapens and burrowing megafauna* component.

The conservation objective for tall seapens in the Central Fladen Core should be recover.

The condition of the *Tall seapen* feature in the Central Fladen Core is currently uncertain so JNCC assigned a 'conserve' conservation objective (to follow the policy advice on setting conservation objectives). However, the uncertainty is highlighted, and JNCC will review the objective when further knowledge and evidence becomes available. Please refer to [Section 2.10](#) for further information on principles for setting conservation objectives.

What evidence was used to identify the presence of burrowed mud in the Fladen Grounds?

JNCC presented the evidence used to support the pMPAs identified in the Fladen Grounds in the Data Confidence Assessment documents for the Central Fladen, Western Fladen and South-east Fladen pMPAs. The Fladen Grounds evidence comprises samples collected from dedicated field surveys led by JNCC, together with opportunistic benthic sampling during fisheries stock assessment surveys and the re-analysis of *Nephrops* stock assessment towed video footage from Marine Scotland Science. These data range in age from 2004 to 2013, and consist of photographic imagery and direct sediment samples (by grab) analysed to determine the habitat type, faunal communities present and biotope determination. Those survey data points determined as the *Seapens and burrowing megafauna* component met the criteria of characterising species abundance described in the current version of the Marine Habitat Classification for Britain & Ireland (Connor *et al* 2004) - SS.SMu.CFiMu.SpMmeg. For the re-analysis of *Nephrops* stock assessment towed video footage, Marine Scotland Science recorded the abundance of seapen species against a semi-quantitative scale of frequency (Allen *et al* 2013). Records listed as 'frequent' or 'abundant' were used to help define the boundaries of the Fladen Ground pMPAs.

3.2. East of Gannet and Montrose Fields

Respondents made specific comments concerning The East of Gannet and Montrose Fields pMPA in relation to its overlap with ongoing oil and gas industry activity. JNCC updated the relevant Management Options Papers to better reflect the agreed process for assessing licensed activities.

The boundary for the pMPA remains unchanged since the public consultation.

Respondents commented that the amount of oil and gas activity taking place within the area questions its status as a Least Damaged/More Natural Area

The initial search location for the East of Gannet and Montrose Fields pMPA was identified based on a Least Damaged/More Natural location. JNCC adjusted the boundary to include the known distribution of MPA search features, as set out in paragraph 5.12 of the MPA Selection Guidelines. This adjustment extended the boundary to include *Ocean Quahog* records and the full extent of *Offshore deep-sea muds* in the location. Whilst there is limited

direct evidence available to infer the condition of the feature, the stage 2d assessment in the Detailed Assessment against the MPA Selection Guidelines does conclude that there is a risk that the proposed protected features may have been modified by human activity. Nonetheless, JNCC scientific assessment concluded that the pMPA would make a valuable contribution to the network for the protection of these features, and management options have been identified in relation to the risk of the features not achieving their conservation objectives.

Several respondents raised concerns regarding overlap of the pMPA with oil and gas activity. Comments also related to technical issues with regard recommendations in the Management Options Papers.

JNCC and Marine Scotland have updated the relevant Management Options Papers to make it clear that the Department for Energy and Climate Change (DECC) is the regulator for oil and gas activity in UK waters. DECC would be responsible for making any decision as to whether a proposed activity and/or development is capable of affecting the protected features of a Nature Conservation MPA (other than insignificantly)⁵⁷. Their judgement will follow the established Environmental Impact Assessment (EIA) process.

3.3. Northern North Sea pMPAs

This section relates to three pMPAs in the Northern North Sea: Firth of Forth Banks Complex, Norwegian Boundary Sediment Plain and Turbot Bank. Marine Scotland asked JNCC to identify science-based alternatives for the features of the proposed Firth of Forth Banks Complex – ocean quahog aggregations, offshore subtidal sands and gravels, and shelf banks and mounds. Norwegian Boundary Sediment Plain is an alternative site to represent ocean quahog aggregations. Turbot Bank was proposed as a pMPA for the protection of sandeel. It was further identified as an alternative to represent offshore subtidal sands and gravels and shelf banks and mounds.

JNCC advised at the time of public consultation that the alternative proposals were of lower biodiversity value than the Firth of Forth Banks Complex pMPA, and that they would not make an equivalent contribution to the network. The Firth of Forth Banks Complex pMPA was JNCC's preferred proposal for designation from a scientific perspective. Since the public consultation, JNCC have received new data to support the presence and extent of offshore subtidal sands and gravels and shelf banks and mounds in the Firth of Forth Banks Complex and Turbot Bank (Eggleton *et al* 2013; Sotheran & Crawford-Avis 2013). These data have been used to update the site documentation packages for these pMPAs. On the basis of these data received, JNCC still consider Firth of Forth Banks Complex pMPA makes a greater ecological contribution to the MPA network in Scotland's seas than the science-based alternatives.

Since the public consultation, the western boundary of the Turbot Bank pMPA has been re-defined to include the entirety of the Turbot Bank shelf bank and mound feature to reflect better definition of the feature from recently collected multibeam sonar data. This change is based on the understanding that sandeels are known to aggregate in dense schools around the edge of banks (van der Kooij *et al* 2008).

The boundary of the Norwegian Boundary Sediment Plain pMPA has undergone a slight simplification to reduce the number of vertices, and also to follow the revised UK Exclusive Economic Zone (EEZ) boundary adopted in April 2014.

⁵⁷ Reference to affecting (other than insignificantly) is in relation to the requirements on public authorities in relation to licensed activities taking place within MPAs as set out in the UK and Scottish Marine Acts (Sections 125 and 82 respectively)

There have been no changes to the boundary of the Firth of Forth Banks Complex pMPA since the public consultation.

Respondents provided a number of comments relevant to the science and evidence base underpinning site identification for these three pMPAs. These are summarised in the remainder of this section together with JNCC's advice taking each pMPA in turn.

3.3.1 Firth of Forth Banks Complex

Why was the area of the proposed Firth of Forth windfarm not excluded from the MPA selection process from the outset?

JNCC identified the initial Firth of Forth Banks Complex search location following a consideration of the Least Damaged/More Natural locations, and other area based measures (Closure of an area for sandeel fisheries in ICES sub-area IV⁵⁸). Partial overlap of the area proposed for the development of an offshore wind-farm with the area considered Least Damaged/More Natural was a consequence of the assessment being based on existing activities only; the proposed development was not an *existing* activity.

The Round 3 wind farm licence area in the Firth of Forth was considered in the Management Options Paper to reflect both the current status of the pMPA and the wind farm development application in the licensing process.

There are three development phases currently proposed for the Firth of Forth offshore wind farm licence area, of which only the first phase has been submitted as a formal application to Marine Scotland Licensing Operations Team at the time of writing (April 2014). JNCC has been liaising with the developer regarding marine nature conservation issues both pre- and post-submission of the development application. This liaison has included discussions about the potential issues arising from the overlap of the Round 3 licence area with the pMPA.

Why are sandeels not included as a proposed protected feature of the Firth of Forth Banks Complex?

The Firth of Forth Banks Complex pMPA overlaps entirely with the area closure for sandeel fisheries in ICES sub-area IV⁵⁹. This measure is a year round closure on sandeel fishing with the exception of a commercial monitoring fishery with a precautionary Total Allowable Catch. Re-opening criteria have not been set for the fisheries closure, but should the closure be removed in the future the decision not to include sandeels as a protected feature will need to be reviewed.

In developing the Management Options Paper for the Firth of Forth Banks Complex, we considered the potential impact from all activities currently taking place within the pMPA, including the Round 3 Windfarm Licensed Area. We have considered available information on the potential impact of renewable energy developments on sandeel populations and find the results inconclusive. For example, a key finding from a recent study in Denmark suggests that construction of offshore renewable installations neither poses a direct benefit or a definitive threat to sandeels and their habitat (Van Deurs *et al* 2012). Furthermore, studies of possible disturbance by seismic survey on sandeel populations indicate there is no lasting damage to those populations and that a short time after disturbance ceases, sandeel behaviour has been observed to return to normal (Hassel *et al* 2004). JNCC is liaising with the developers working in the Firth of Forth Banks Area to best ensure construction practices minimise impact on sandeel numbers in the area.

⁵⁸ Regulation (EU) no 227/2013 of the European Parliament and of the Council of 13 March 2013 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:078:0001:0022:EN:PDF>

JNCC therefore confirms its earlier advice that sandeels are adequately protected by the existing sandeel closure, and do not need to be a protected feature of the Firth of Forth Banks Complex pMPA. However, our position will be reviewed should activities change or further information is published on the impacts of pressures on sandeels associated with marine activities.

Why haven't seabirds been included as a proposed protected feature in the Firth of Forth Banks Complex pMPA?

With the exception of black guillemot, seabirds were not included as MPA search features for the selection of Nature Conservation MPAs as there are mechanisms in place for their protection in Scotland's seas under the EC Birds Directive through the classification of Special Protection Areas (SPAs). The Firth of Forth Banks Complex pMPA overlaps with Areas of Search for SPAs. There is a programme in place to identify a network of marine SPAs by 2015 and to classify as many as possible by that time.

The Marr Bank should be included within the Firth of Forth Banks Complex pMPA.

The pMPA boundary includes all shelf bank and mound features where there is evidence to support their functional significance (see the Detailed Assessment against the MPA Selection Guidelines document for the Firth of Forth Banks Complex). The diversity of *Offshore subtidal sand and gravel habitats* and *Ocean Quahog* records in the area are also adequately represented by the pMPA boundary. Therefore, JNCC consider that the exclusion of Marr Bank does not reduce the integrity of the Firth of Forth Banks Complex pMPA.

3.3.2 Norwegian Boundary Sediment Plain

The data for *Ocean quahog* aggregations in the Norwegian Boundary Sediment Plain pMPA are skewed towards the areas surveyed for oil and gas developments, and the respondent believes the feature is likely to be more widely distributed than the current evidence suggests.

JNCC acknowledge that the evidence available for the feature in this pMPA is skewed towards locations where oil and gas exploration has taken place. Including *Ocean quahog* as a proposed feature of the pMPAs needed the best available evidence and the data collected by the industry during their environmental work forms an important part of our offshore data holdings. The boundaries in relation to the feature are based on the presence of suitable habitat for *Ocean quahog* colonisation as outlined under Stage 3 considerations in the Detailed Assessment against the MPA Selection Guidelines for the pMPA.

3.3.3 Turbot Bank

Why were seabirds not considered when developing management for the Turbot Bank pMPA?

Although seabirds may be present in the vicinity of the pMPA, they have not been included on the list of proposed protected features because there are mechanisms in place for their protection in Scotland's seas under the EC Birds Directive through the classification of Special Protection Areas (SPAs). For further information on the approach taken regarding seabirds, see [Section 2.6](#).

Why is there inconsistency in the proposed management of *Sandeels* in the Mousa to Boddam possible MPA and Turbot Bank possible MPA?

The Management Options Papers for both pMPAs identify that a targeted sandeel fishery would pose a risk to achieving the conservation objective of the protected feature in both

pMPAs; however, the papers note there was no fishery taking place in either site at the time of writing (May 2014).

Furthermore, the closure of an area for sandeel fisheries in ICES sub-area IV⁵⁹ partly overlaps the Turbot Bank pMPA. If a directed sandeel fishery were to develop in the future within the Turbot Bank pMPA, appropriate management would need to be considered. Furthermore, whilst JNCC considers that hydraulic dredging would pose a risk to the status of sandeel populations and therefore require management, the establishment of a hydraulic fishery in the Turbot Bank pMPA is thought to be highly unlikely. As a result, JNCC has not included any advice in the Management Options Paper for Turbot Bank at the present time (May 2014). Hydraulic dredging does take place periodically across inshore waters in Scotland and therefore SNH considered it appropriate to provide advice in the Management Options Paper for Mousa pMPA.

Why is the conservation objective for *Sandeels* in Turbot Bank set to conserve and not recover?

We have limited information on the status of sandeel populations in the Turbot Bank pMPA. The conservation objective was set to 'Conserve with uncertainty' in accordance with Marine Scotland's policy for setting of conservation objectives. Such uncertainty is a consequence of insufficient direct evidence to determine the condition of the proposed protected feature. The Stage 2d assessment [in the Detailed Assessment against the Guidelines for the pMPA] used information on the sensitivity of *Sandeels* to pressures associated with human activities. This approach is a proxy for assessing whether *Sandeels* are considered least damaged/more natural or whether they have been heavily modified by human activity. For work on Nature Conservation MPAs, exposure assessments in isolation are not considered an appropriate means to determine the conservation objectives for the proposed protected features. Direct evidence of damage is required before a conservation objective of 'recover' can be assigned. Accordingly, the Stage 2d assessment discusses the risk that a feature may have been modified by human activity and this judgement is reflected in the Management Options Paper for the Turbot Bank pMPA.

Why are *Offshore subtidal sands and gravels* not included as a proposed protected feature within the Turbot Bank pMPA?

The Turbot Bank pMPA was originally selected for the representation of *Sandeels* following Marine Scotland Science recommendations (Marine Scotland Science 2012), in recognition of the importance of the area as a source for the export of individual sandeels to other areas in east Scotland.

However, Marine Scotland asked JNCC to consider science-based alternatives to the features within the Firth of Forth Banks Complex pMPA following the 4th stakeholder workshop in March 2012. Consequently, Turbot Bank pMPA is also an option for the representation of *Offshore subtidal sands and gravels* and *Shelf banks and mounds* for network adequacy within OSPAR Region II. However, the lesser evidence-base and the relatively lower diversity of habitats indicated by the available evidence led JNCC to conclude that the Turbot Bank pMPA has lower biodiversity and conservation value for *Offshore subtidal sands and gravels* than the Firth of Forth Banks Complex pMPA. JNCC did not consider the Turbot Bank pMPA to be ecologically equivalent to the Firth of Forth Banks Complex pMPA. Furthermore, there are no key geodiversity interests in Turbot Bank pMPA in contrast to the Firth of Forth Banks Complex pMPA. Ministers will make the final decision

⁵⁹ Regulation (EU) no 227/2013 of the European Parliament and of the Council of 13 March 2013 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:078:0001:0022:EN:PDF>

with regards to the science-based alternatives for representing features in the Scottish MPA network.

3.4 Faroe Shetland Channel pMPAs

Marine Scotland received alternative boundary proposals as part of the consultation response for the Faroe-Shetland Sponge Belt and North-east Faroe-Shetland Channel pMPAs. Marine Scotland asked JNCC to provide scientific advice on the implications of these alternative boundaries on the adequacy of coverage of protected features in the network. Marine Scotland is leading discussions with stakeholders to consider the proposals.

In addition to considering the proposals submitted by stakeholders during the consultation, JNCC propose changes to the boundaries of both pMPAs to reduce the number of vertices in the boundaries, and in the case of North-east Faroe Shetland Channel pMPA, to follow the new UK Exclusive Economic Zone (EEZ) adopted in April 2014. However, these revised boundaries may be subject to further changes depending on the outcome of Marine Scotland's discussions with stakeholders.

Respondents provided a number of comments relevant to the science and evidence base underpinning these pMPAs. These are summarised in the remainder of this section together with JNCC's advice.

Marine mammals and seabirds should be considered when developing the management for the Faroe-Shetland Sponge Belt and North-east Faroe-Shetland Channel pMPAs.

Whilst marine mammals and seabirds may be present in the vicinity of the pMPA, they were not included on the list of proposed protected features because there was insufficient evidence to clearly demonstrate the area was important to the life stages of those features. For further information on the approach taken regarding marine mammals, see [Section 2.7](#).

Several respondents raised concerns with regard to the overlap of the pMPAs with oil and gas activity, and queried the viability of recommendations within the Management Options Paper.

JNCC and Marine Scotland have updated the relevant Management Options Papers to make it clear that The Department for Energy and Climate Change (DECC) is the regulator for oil and gas activity in UK waters. DECC would be responsible for making the decision on whether any proposed activity and/or development is capable of affecting the protected features of a Nature Conservation MPA (other than insignificantly)⁶⁰. Their judgement will follow the established Environmental Impact Assessment (EIA) process.

The Faroe-Shetland Sponge Belt pMPA does not make a significant contribution to the MPA network in Scotland's seas.

In combination, the North-east Faroe-Shetland Channel pMPA and Faroe-Shetland Sponge Belt pMPA provide representation and replication for the only records of the OSPAR Threatened and/or Declining habitat *Deep-sea sponge aggregations* in OSPAR Region II of Scotland's seas. The two sites also provide examples of Arctic and Atlantic influenced *Offshore subtidal sand and gravel habitats* on the continental slope in OSPAR Region II, as well as areas of the Faroe-Shetland Channel *continental slope* a large scale feature considered to be of functional significance (see section 2c of the Detailed Assessment

⁶⁰ Reference to affecting (other than insignificantly) is in relation to the requirements on public authorities in relation to licensed activities taking place within MPAs as set out in the UK and Scottish Marine Acts (Sections 125 and 82 respectively)

against the Guidelines document for both pMPAs for further information). *Ocean quahog*, an OSPAR Threatened and/or Declining species, are also present within the Faroe-Shetland Sponge Belt pMPA. JNCC consider that both pMPAs make a significant contribution to the MPA network in Scotland's seas.

Where has the information for the *Ocean quahog* feature in the Faroe-Shetland Sponge Belt pMPA been derived from?

One respondent stated that data supporting the presence of *Ocean quahog* in the pMPA is based on modelled information. This assertion is incorrect. Data recording the presence of *Ocean quahog* in the pMPA were derived from the taxonomic analysis of benthic samples collected from Oil and Gas sector surveys of the Foinaven field. These data were sourced from the Oil and Gas UK database *UK Benthos* – available to download from [Oil and Gas UK website](#).

Ocean quahog aggregations are only listed as Threatened and/or Declining by OSPAR in Region II so why are they included as a protected feature in the Faroe-Shetland Sponge Belt pMPA?

As stated in [Section 2.3](#), the MPA search features list is not just derived from the list of OSPAR Threatened and/or Declining species. Notwithstanding this statement, the Faroe-Shetland Sponge Belt pMPA falls entirely within OSPAR Region II and would make an appropriate contribution to the conservation of *Ocean quahog* aggregations in that region.

Why has *Ocean quahog* been included as a proposed protected feature in the Faroe-Shetland Sponge Belt pMPA, when it is already replicated in two other pMPAs in OSPAR Region II?

The MPA selection guidelines note that it may be appropriate to include a greater proportion of known examples of threatened or declining features in the network on the grounds of increasing resilience for their conservation. *Ocean quahog* is considered Threatened and/or Declining in OSPAR Region II, as such JNCC has recommended greater replication of the feature in the network. Our approach follows the Stage 5 considerations as outlined in Annex 1 of the Scottish MPA Selection Guidelines.

Why are deep-sea sponge aggregations included as proposed protected features in the Faroe-Shetland Channel pMPAs if sponge habitat is present towards the northern part of the North-east Atlantic?

Both the UK Marine & Coastal Access Act (123(3b)) and Marine (Scotland) Act (79(3)) place a duty on Ministers for a network of sites that protect the range of features in the UK marine area. See [Section 2.1](#) for discussion of the development of the MPA network in Scotland. *Deep sea sponge aggregations* are an OSPAR Threatened and/or Declining feature, and a UK Biodiversity Action Plan priority habitat. Consequently, JNCC assessed *Deep-sea sponge aggregations* as an important habitat in the UK context for which MPA-based protection is appropriate. The only records known to occur in the UK are located in Scotland's seas and therefore they were included as an MPA search feature and used to guide the selection of Nature Conservation MPAs.

There are currently seven OSPAR MPAs outwith UK waters that include deep-sea sponge aggregations, six of these are in Areas Beyond National Jurisdiction in OSPAR Regions V and IV (Antialtair, Altair, Josephine and Milne Complex Seamounts, Charlie Gibbs Fracture Zone and Mar North of the Azores) and one in Sweden in OSPAR Region I (Rosterf-Jorden-Vaderof-Jorden). JNCC consider that, pending a decision by Ministers, the proposals in the Faroe-Shetland Channel will make a significant contribution to the conservation of *Deep-sea sponge aggregations* at the scale of the North-east Atlantic by representing the feature in a MPA in OSPAR Region II.

Deep-sea sponge aggregations are not listed as Threatened and/or Declining by OSPAR in Region II so why are they included as a protected feature in the Faroe-Shetland Sponge Belt pMPA?

The Case Report produced by the OSPAR Commission for *Deep-sea sponge aggregations* (OSPAR 2010) describe the feature as occurring in OSPAR Regions I, III, IV and V, but note the presence of the feature in the eastern Skagerrak in OSPAR Region II. Records mapped in the Case Report were downloaded from the OSPAR Database on Threatened and/or Declining habitats in September 2009, which pre-dated the identification of records in the Faroe-Shetland Channel in Scotland's seas in OSPAR Region II. However, the OSPAR guidance does make it clear the habitat is considered to be Threatened and/or Declining in every OSPAR Region it may occur.

Notwithstanding this statement, as stated in [Section 2.3](#), the MPA search features list used to guide the selection of pMPAs was not solely derived from the list of OSPAR Threatened and/or Declining species.

Why have no management options been developed for the continental slope within the North-east Faroe-Shetland Channel pMPA?

Large-scale features such as the *Continental slope* were 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 in the development of the MPA network. The sensitivity of the different components of large-scale features was based on what is known about their sensitivity to different pressures. The *Continental slope* is also a key geodiversity feature, the sensitivity of which was assessed as part of work commissioned by SNH and JNCC (Brooks 2013). JNCC concluded that there was a low risk of the *Continental slope* feature not achieving its conservation objectives due to the scale of the features and their low sensitivity to pressures known to occur in the area. Consequently, JNCC did not propose any management options for the *Continental slope* feature. Instead the Management Options Paper focuses on the risks to the *Offshore subtidal sands and gravels*, *Offshore deep sea muds* and *Deep-sea sponge aggregations* present on the slope achieving their conservation objectives.

Why is the North-east Faroe Shetland Channel pMPA so large?

The North-east Faroe-Shetland Channel pMPA was selected following consideration of Least Damaged/More Natural locations (Faroe-Shetland Channel – see Chaniotis *et al* (2011)). The MPA search location was derived from this Broad Search Area. The boundary was drawn to focus on records of *Deep-sea sponge aggregations*, to reflect the range in diversity of seabed sediments in the Faroe-Shetland Channel, including capturing *Arctic-influenced sediments*, and to include geodiversity features representative of a range of Key Geodiversity Areas in Scotland's seas. Further information is provided in the North-east Faroe Shetland Channel pMPA Detailed Assessment against the MPA Selection Guidelines document. Outwith the continental slope area, the pMPA includes the large number of geodiversity features present in this part of the Faroe-Shetland Channel, including the North Sea Fan, Miller Slide, Pilot Whale Diapirs and West Shetland Margin Contourite Deposits Key Geodiversity Areas. However, it is unlikely that these geodiversity features will require management as stated in the Management Options Paper for the pMPA.

Why have the upper slope and shelf break areas of Faroe-Shetland Channel not been included within the North-east Faroe Shetland Channel pMPA?

Data contained within the Geodatabase of Marine Features Scotland (GeMS) suggests the upper slope and continental shelf area of the Faroe-Shetland Channel comprises *Offshore subtidal sand and gravel habitats*. JNCC's Stage 5 consideration of the network adequacy

for *Offshore subtidal sand and gravel habitats* in the Scottish MPA network assessed representation and replication of the habitat in different depth classes (on the continental shelf, slope and deep-sea) in all the OSPAR Regions the feature is present in Scotland's seas. These depth classes reflect the geographic range and variation of the feature in Scotland's seas. Locations where substrate types are most variable were preferred, recognising the strong influence depth and substrate variability have on the biological diversity associated with sedimentary habitats (Eleftheriou & Basford 1989).

Considering the recommendations for other pMPAs that include *Offshore subtidal sands and gravels* within OSPAR Region II, the continental shelf and slope examples of this feature are considered to be adequately represented elsewhere. Examples of the feature on the continental shelf are included within the Firth of Forth Banks Complex and West Shetland Shelf pMPAs, and examples of the feature on the continental slope are included within the Faroe-Shetland Sponge Belt and North-east Faroe-Shetland Channel pMPAs. JNCC do not consider any requirement for network adequacy to extend the Faroe-Shetland Channel pMPA to include the upper slope and shelf break areas.

3.5 Hatton-Rockall Basin

JNCC received only one comment from the public consultation for this pMPA that queried the need for additional supporting feature data. The boundary of the pMPA has been modified very slightly in shape to reduce the number of vertices.

Further surveys are needed to improve understanding of species richness and deep-sea sponges, as well as the fishing activity taking place.

Surveys by MV Franklin (2006) and RV James Cook (2011) carried out transects in the area of the polygonal faults geodiversity feature in the pMPA and recorded the presence of deep-sea sponges. Fields of the birds nest sponge (*Pheronema carpentarii*) were verified within the pMPA with high confidence (Henry & Roberts 2014), with densities recorded exceeding those set by the OSPAR Commission for the habitat. According to the survey records, *Deep-sea sponge aggregations* in the pMPA are associated with a rich biological community including foraminiferans, ascidians, burrowing cerianthid anemones and polychaetes. A second type of *Deep-sea sponge aggregation* characterised by an encrusting grey sponge on boulder and mud substrata was also verified by Henry & Roberts (2014) within the pMPA. A rich associated fauna were recorded including anemones, ophiuroid brittlestars, crinoids, and ascidians. Further details are provided in the Data Confidence Assessment and Detailed Assessment against the Selection Guidelines documents for the Hatton-Rockall Basin pMPA.

The MPA lies beyond the UK fishery limit and therefore VMS data are managed by the North East Atlantic Fisheries Commission (NEAFC). Evidence of fishing activity taking place within the region of the MPA is limited, and as the pMPA lies outside 'existing fisheries areas' identified by NEAFC as areas of historic fishing activity, it is likely that demersal fishing activity is negligible within the pMPA. Under NEAFC rules, any commercial fishery to take place in the area would require a full environmental assessment. At the time of writing (May 2014), NEAFC have not received any applications for a permit to conduct exploratory fishing in the area.

It is important to note that ICES recommended a closure be applied to bottom fisheries to protect the Vulnerable Marine Ecosystem (VME) encompassing all records of *Deep-sea sponge aggregations* in the Hatton-Rockall Basin pMPA⁶¹. The Management Options Paper

⁶¹http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/NEAFC_Vulnerable_deep-water_habitats.pdf.

for the pMPA recommends that removing bottom contact activity would be the only option that would allow the *Deep-sea sponge aggregations* to achieve their conservation objective. Marine Scotland will work with the North-east Atlantic Fisheries Commission to develop appropriate management of fishing activity for this feature in the pMPA.

3.6. Hebridean slope pMPAs

The following section relates to three pMPAs on the Hebridean continental slope:

- Geike Slide and Hebridean Slope.
- South-west Sula Sgeir and Hebridean Slope.
- The Barra Fan and Hebrides Terrace Seamount.

All three pMPAs were proposed for: burrowed mud, offshore deep-sea muds, offshore subtidal sands and gravels, and areas of the continental slope. The Barra Fan and Hebrides Terrace Seamount pMPA is also proposed for seamounts and their associated communities.

JNCC's advice at the time of public consultation was that Geikie Slide and Hebridean Slope and South-west Sula Sgeir and Hebridean Slope pMPAs were considered to be ecologically equivalent options in terms of their contribution to the development of the MPA network in Scotland's seas, i.e. there is no scientific basis for discerning a preference for any one option. JNCC identified that either one of Geikie Slide and Hebridean Slope pMPA or South-west Sula Sgeir and Hebridean Slope pMPA could be progressed, alongside The Barra Fan and Hebrides Terrace Seamount pMPA, to achieve network adequacy for their features.

Alternative boundary proposals and alternative options for the Hebridean slope pMPA combinations to provide feature protection were submitted by some stakeholders as part of consultation responses for all three Hebridean slope pMPAs. Marine Scotland is leading discussions with stakeholders to consider these proposals. Marine Scotland asked JNCC for scientific advice on the implications for feature protection in the network to support Ministerial decisions on site designation. In addition to this consideration, JNCC proposed slight changes to the boundaries of both pMPAs to reduce the number of vertices, and in the case of The Barra Fan and Hebrides Terrace Seamount pMPA, to align with the new UK Exclusive Economic Zone (EEZ) adopted in April 2014. However, these boundaries may be subject to further changes depending on the outcome of Marine Scotland's discussions with stakeholders.

Respondents provided a number of comments relevant to the science and evidence base underpinning site identification for these three pMPAs. These comments together with JNCC's advice are summarised in the remainder of this section taking each pMPA in turn.

3.6.1 Geikie Slide and Hebridean Slope

Several responses queried the size of the site, and alternative boundary proposals were submitted as part of consultation responses.

Marine Scotland is leading ongoing discussions with stakeholders to consider the proposals they submitted during the consultation. JNCC will provide scientific advice to Marine Scotland on any alternative boundaries if required.

The accuracy of the data collection method for burrowed mud in the Geikie Slide and Hebrides Terrace pMPA is not reflected strongly enough in the data confidence assessment.

Much of the data for *Burrowed mud* in this pMPA were derived from Marine Scotland Science fisheries by-catch data. The original records state that the habitat points represent mid-trawl positions, the duration of which were 1 hour per trawl. Assuming a trawling speed of 3 knots then individual point records could represent a point along a line of approximately 3 nautical miles. Using this assumption, the potential areas where by-catch indicated the *Burrowed mud* habitat (namely deep-water seapens) all fall within the pMPA boundary. JNCC note the spatial accuracy of these data should have been more clearly stated in the site documents. The Data Confidence Assessment documents for all relevant Hebridean slope pMPAs have been updated accordingly.

Why weren't marine mammals considered when developing the management for the Geikie Slide and Hebridean Slope pMPA?

Whilst marine mammals may be present in the vicinity of the pMPA, they were not included on the list of proposed protected features because there was insufficient evidence to clearly demonstrate the area was important to the life stages of those features. For further information on the approach taken regarding marine mammals, see [Section 2.7](#).

Information of gill netting and line fishing activity in the Geikie Slide and Hebridean Slope pMPA is insufficient.

Information about fishing activity in the pMPA was based on the best available evidence. However, JNCC recognise their interpretation of the data was subject to a number of assumptions and we would welcome any additional information from stakeholders to help refine our understanding of these activities. Such additional information would inform the development of management measures.

3.6.2 South-west Sula Sgeir and Hebridean Slope

No specific comments were received concerning this pMPA during the formal consultation.

Several responses queried the size of the site, and alternative boundary proposals were submitted as part of consultation responses.

Marine Scotland is leading ongoing discussions with stakeholders to consider the proposals they submitted during the consultation. JNCC will provide scientific advice to Marine Scotland on any alternative boundaries if required.

3.6.3 The Barra Fan and Hebrides Terrace Seamount

Several responses queried the size of the site, and alternative boundary proposals were submitted as part of consultation responses.

Marine Scotland is leading ongoing discussions with stakeholders to consider the proposals they submitted during the consultation. JNCC will provide scientific advice to Marine Scotland on any alternative boundaries if required.

A respondent sought clarity about the extent of features currently represented by point data records within the Barra Fan and Hebrides Terrace Seamount pMPA.

The boundary of the Barra Fan and Hebrides Terrace Seamount pMPA was drawn using the best available evidence for the location of the features within the area. The Data Confidence Assessment for the pMPA gives the reason for the high confidence in the presence of the features within the pMPA. The data for features on the continental slope, including *Offshore*

subtidal sand and gravels, *Offshore deep-sea muds*, and *Burrowed mud*, were comprised of both point sample data collected from survey work, and maps derived from habitat distribution models. We acknowledge that there are some disparities between the data from these different data sources, and as such, the Data Confidence Assessment recognises that we have a lower level of confidence in the extent of these features. JNCC recognise that further evidence would help define the extent of the features, and would also support an assessment of the condition of the features present within the pMPA. Plans for a future survey in the area will be considered following decisions regarding site designation.

Why weren't marine mammals considered when developing the management for The Barra Fan and Hebrides Terrace Seamount pMPA?

Whilst marine mammals may be present in the vicinity of the pMPA, they were not included on the list of proposed protected features because there was insufficient evidence to clearly demonstrate the area was important to the life stages of those features. For further information on the approach taken regarding marine mammals, see [Section 2.7](#).

Why have no management options been developed for the continental slope and seamount features within The Barra Fan and Hebrides Terrace Seamount pMPA?

Large-scale features, such as the continental shelf and seamounts, were included on the list of MPA search features to represent areas of potential wider functional significance to the overall health and biodiversity of Scotland's seas included in the MPA network. The sensitivity of different components of large-scale features was based on our knowledge of their sensitivity to different pressures. Seamounts and the continental slope are also both key geodiversity features, the sensitivity of which was assessed as part of work commissioned by SNH and JNCC (Brooks 2013). JNCC concluded there is a low risk of the seamount and continental slope features not achieving their conservation objectives given the large scale of the feature and their low sensitivity to pressures associated with activities known to occur in the area. Consequently, JNCC did not consider any management options for the seamount feature or continental slope within the Barra Fan and Hebrides Terrace Seamount pMPA. Instead the Management Options Paper focuses on the risks of the biological communities present on the seamount and along the continental slope achieving their conservation objectives.

What is the status of *Coral gardens* in the Barra Fan and Hebrides Terrace Seamount pMPA?

SNH and JNCC's 2012 network advice report (SNH & JNCC 2012) highlighted the status of *Coral gardens* in the pMPA had not been verified, but that species characteristic of the habitat had been identified as part of a field survey. Recently, the survey data underpinning the pMPA were further analysed (Cross *et al* 2013) and the results were inconclusive as to whether the records present conform to the definition of *Coral gardens habitat* for UK waters in Henry & Roberts (2014). The ICES Working Group for Deep-Water Ecology, who review the distribution of Vulnerable Marine Ecosystems, are considering these results at their meeting in February 2014. It is important to note that the suspected *Coral garden* records overlap with *Seamount communities*, the presence of which have been verified and are a proposed protected feature of the pMPA. The management options for these two MPA search features are identical and any measures implemented to protect the *Seamount communities* would also protect any *Coral gardens* in the same area.

What is the status of *Seamount communities* in the pMPA?

SNH and JNCC's 2012 network advice report (SNH & JNCC 2012) highlighted the status of *Seamount communities* in the pMPA had not been verified, but that species characteristic of the habitat had been identified as part of a field survey. Recently, the survey data underpinning the pMPA was further analysed (Cross *et al* 2013) and the results verified

Seamount communities present within the pMPA. JNCC propose *Seamount communities* are a protected feature of the pMPA. These conclusions were reflected in all site documentation released for the pMPA to support the public consultation in 2013.

Some respondents felt that the Management Options Paper for the Barra Fan and Hebrides Terrace Seamount pMPA only included limited information on pelagic trawling and purse seining, and considered that no informed assessment can be made regarding sustainable harvesting of pelagic and demersal fish species.

Pelagic trawl and purse seining fishing were not considered a risk to the status of the proposed protected habitat features for the Barra Fan and Hebrides Terrace Seamount pMPA. Consequently, JNCC did not consider these activities in any detail within the Management Options Paper. *Orange roughy* is a proposed protected feature. However, a zero Total Allowable Catch implemented for this fishery in ICES Division area VI meant that it was not necessary to consider any further options in the Management Options Paper to manage risk to *Orange roughy* populations.

How will the impacts of fishing on seamount ecosystems and *Orange roughy* be managed?

The sensitivity of *Seamount communities*, including the cold water corals and deep-sea sponges that form part of these communities have been identified in FEAST. This sensitivity is reflected in the Management Options Papers for both the Rosemary Bank and Hebrides Terrace Seamount pMPAs, which recommend the highest level of protection for, and a removal of all bottom contact fishing activity (mobile and static) from, the extent of the seamounts. Furthermore, the ICES Joint Working Group on Deep-water Ecology have recommended that an area of Rosemary Bank be protected as a Vulnerable Marine Ecosystem (VME) to encompass a small number of *Deep-sea sponge aggregations* and *Seamount community* feature records.

In the 1990's, a targeted demersal otter trawl fishery for *Orange roughy* opened up in deep water to the west of Scotland. However, in recent years, a zero Total Allowable Catch (TAC) was implemented for *Orange roughy* in ICES Division area VI, which has effectively ended the fishery in this region. As a result, *Orange roughy* has not been considered further in the context of the Management Options Paper for the pMPA. However, if the zero TAC measure was lifted in the future, it may be necessary to identify management options for any fisheries activities targeting *Orange roughy* populations within this pMPA.

3.7. North-west Orkney

Some stakeholders made comments on North-west Orkney pMPA on the protection of sandeels and the combination of features proposed for protection. These comments have not resulted in any changes to the pMPA boundary, but the pMPA has been modified slightly in shape to reduce the number of vertices. Responses to comments made are provided in the remainder of this section.

Why is the conservation objective for sandeels in North-west Orkney set to conserve rather than recover?

The North-west Orkney pMPA encompasses a highly productive sandeel spawning ground based on the densities of newly emergent sandeel larvae recorded in the area (Wright & Bailey 1996), which provide an important source of recruits for export to grounds around Shetland and south of the Moray Firth (Proctor *et al* 1998). The importance of larval production from this area was confirmed from plankton surveys in the 1960s (Langham 1971) and 1990s (Wright & Bailey 1996; Lynam *et al* 2013). These surveys indicate that sandeel populations in the area have persisted over time and that the North-west of Orkney

area is important for the export of sandeel larvae to other areas. Although there have been attempts to fish for sandeels within the pMPA boundary in the past, there has never been a persistent commercial fishery targeting sandeels because there are not sufficiently large areas of ground suitable for the light fine mesh gear typically used to capture sandeels (Wright *et al* 2000). There are no records of any other human activities undertaken in the area in the past that could affect sandeel populations. Consequently, the sandeel feature is considered to be relatively undisturbed in the pMPA.

Following the public consultation, Marine Scotland Science confirmed there is sustained evidence for sandeel larval supply from the pMPA to other areas. The lack of exploitation and the population data confirm the high likelihood that populations in the area are Least Damaged/More Natural as per Stage 2d considerations in the MPA Selection Guidelines, which leads JNCC to propose that the conservation objective of the sandeel feature changes from 'conserve - feature condition uncertain' to 'conserve'.

Several areas identified for renewable energy development overlap with the North-west Orkney pMPA, however, the overlap has not been reflected in the Management Options Paper.

The North-west Orkney pMPA overlaps with the OWN1 and WN2 areas identified in the Sectoral Marine Plans that formed part of the Planning Scotland Seas consultation (July - November 2013).

We note that the wind, wave and tidal Sectoral Marine Plans remain in draft, and therefore the boundaries and locations of the areas are still provisional. Consequently, any future development in the areas overlapping with the pMPA is unknown; a case-by-case approach will be taken when any development proposal emerges for consideration. In response to stakeholder comments, we have updated the North-west Orkney Management Option Paper to reflect the overlap of the pMPA with potential renewable energy zones.

Why has no management been proposed for the North-west Orkney pMPA?

The sandeel position paper presented at the fourth Scottish MPA stakeholder workshop (Marine Scotland Science 2012) recommended North-west Orkney as a pMPA for the populations of newly hatched sandeel larvae. The area is considered an important source of larval export to restock sandeel grounds around Shetland and south of the Moray Firth (Proctor *et al* 1998; Munk *et al* 2002).

The sandeels [Fisheries Management Guidance](#)⁶² noted that sandeels are considered sensitive to targeted sandeel fishing and the disturbance of seabed sediments associated with hydraulic dredging. Other fishing gears do not appear to pose a significant risk to sandeel populations. Should either a targeted sandeel fishery develop or hydraulic dredging take place within the pMPA in the future, JNCC will review its advice on the need for management of these activities in the North-West Orkney pMPA.

Why are offshore subtidal sands and gravels not included in the list of proposed protected features of the North-west Orkney pMPA?

Our Stage 5 considerations of the adequacy of *Offshore subtidal sand and gravel habitats* in the Scottish MPA network assessed the representation of the habitat in different depth classes (on the continental shelf, slope and deep-sea) in all the OSPAR Regions of Scotland's seas. JNCC recommended locations where the substrate types are most variable

⁶² The JNCC and SNH fisheries management guidance is available on JNCC's webpage: <http://jncc.defra.gov.uk/page-6498>

recognising that depth and substrate variability has a strong influence on the biological diversity associated with sedimentary habitats (Eleftheriou & Basford 1989).

For OSPAR Region II, JNCC concluded the *Offshore subtidal sands and gravels* feature was adequately covered in the network by other sites; continental shelf examples are included within the Firth of Forth Banks Complex and West Shetland Shelf pMPAs, and continental slope examples are included within the Faroe-Shetland Sponge Belt and North-east Faroe-Shetland Channel pMPAs. Therefore, no further representation of offshore subtidal sands and gravels is required to meet network adequacy for this feature.

Why are sandeels included as a proposed protected feature in the North-West Orkney pMPA if they are not recognised as an OSPAR Threatened and/or Declining in Scotland?

Both the UK Marine and Coastal Access Act (123(3b)) and Marine (Scotland) Act (79(3)) place a duty on Ministers for a network of sites that protect the range of features in the UK marine area. Sandeels are a UK Biodiversity Action Plan priority species, and are included on the Scottish Biodiversity list. JNCC and SNH assessed sandeels as an important species in the UK context for which protection in MPAs is appropriate. In accordance with guideline 1b of Annex 1 of the Scottish MPA Selection Guidelines, there is evidence to suggest that sandeels are also declining in Scotland's seas (Baxter *et al* 2011). Consequently, they were included as an MPA search feature and used to guide the selection of Nature Conservation MPAs.

3.8. Rosemary Bank Seamount

Comments on the Rosemary Bank Seamount pMPA received during the consultation suggested the inclusion of marine mammals as protected features and queried protection of the seamount proposed protected feature of the pMPA. These comments have not resulted in any changes to the pMPA boundary, but the pMPA has been modified slightly in shape to reduce the number of boundary vertices and drawing the boundary tightly to the extent of the seamount and geodiversity features. JNCC's responses to these comments are provided in the remainder of this section.

Why were marine mammals not considered when developing the management for the Rosemary Bank pMPA?

Whilst marine mammals may be present in the vicinity of the pMPA, they were not included on the list of proposed protected features because there was insufficient evidence to clearly demonstrate the area was important to the life stages of those features. For further information on the approach taken regarding marine mammals, see [Section 2.7](#).

Why have no management options been developed for the seamount feature in the Rosemary Bank Seamount pMPA?

Large-scale features, such as seamounts, were included on the list of MPA search features to represent areas of potential wider functional significance to the overall health and biodiversity of Scotland's seas included in the MPA network. The sensitivity of different components of large-scale features was based on our knowledge of their sensitivity to pressures. Seamounts are also key geodiversity features, the sensitivity of which was assessed as part of work commissioned by SNH and JNCC (Brooks 2013). JNCC concluded there is a low risk of the seamount feature not achieving its conservation objectives given the large scale of the feature and its low sensitivity to pressures associated with activities known to occur in the area. Consequently, JNCC did not consider any management options for the Rosemary Bank seamount feature. Instead the Management Options Paper focuses on the

risks to the *Seamount communities* and *Deep-sea sponge aggregations* present on the seamount achieving their conservation objectives.

3.9 West Shetland Shelf

Stakeholders questioned the distribution of the offshore subtidal sands and gravels proposed protected feature in West Shetland Shelf pMPA, and the likely management of activities that might impact the feature. These comments have not resulted in any changes to the pMPA boundary, but the pMPA has been modified slightly in shape to reduce the number of vertices. JNCC's responses to these comments are provided in the remainder of this section.

What is the distribution of *Offshore subtidal sand and gravel* habitats within the West Shetland Shelf pMPA?

The evidence base for *Offshore subtidal sands and gravels* on the shelf and slope in the pMPA comes from a variety of survey datasets and different forms of analysis. For feature extent, the habitat map derived from the habitat distribution models developed by the EU SeaMap project⁶³ (Cameron & Askew 2011) predicts that the feature extends across the entirety of the pMPA. The substrate type in the area was determined by a comprehensive coverage of sediment samples sourced from the British Geological Survey. These samples were classified as coarse sediment or sand and muddy sand, which confirm the presence and distribution of *Offshore subtidal sands and gravels* in the pMPA. Further evidence within the MPA came from a habitat characterisation survey in 2011 led by Marine Scotland Science and JNCC, which targeted specific areas in the west and east of the pMPA. The survey sampled a series of discrete blocks and the results increased our confidence in presence, extent and variety of habitat types in those areas. Both grab and photographic imagery samples were collected within the blocks to ground-truth the acoustic data collected. Other more isolated evidence of the feature in the pMPA came from opportunistic samples during a fish stock assessment survey in 2011 and a Strategic Environmental Assessment survey in 1996.

Will areas free from static gear be established within the West Shetland Shelf pMPA to allow recovery from fishing activity?

The conservation objective for the feature within the West Shetland Shelf pMPA has been set to 'Conserve – feature condition uncertain'. Towed fishing gear is already prohibited from the pMPA by the current fisheries closure under the Common Fisheries Policy cod recovery plan. Based on the available evidence, the sensitivity of *Offshore subtidal sands and gravels* to the static gear activity taking place within the pMPA is deemed to be low and as such the risk of not achieving the conservation objective of the feature, based on current levels of activity, is also considered low. However, the Management Options Paper for West Shetland Shelf pMPA does state that "if monitoring showed evidence of detrimental effects as a result of static gear activity in the future it may be necessary to seek a reduction in effort."

⁶³ This project modelled a combination of physical data describing the marine environment with information from biological sampling to refine ecologically-relevant thresholds to produce a broad-scale predictive map of seabed habitats across Europe. Further information is available online at <http://jncc.defra.gov.uk/EUSeaMap>

4. Conclusion and next steps

The current report sets out JNCC's scientific advice to Marine Scotland on both the general and site specific issues raised within the 40 Nature Conservation MPA consultation responses that JNCC were asked to consider by Marine Scotland. The advice relates specifically to pMPAs in offshore waters around Scotland. Advice on pMPAs in Scotland's territorial waters is provided separately by SNH within their report (*SNH report 747*). The advice provided by both SNH and JNCC focuses specifically on scientific issues raised in the consultation responses. Responding to issues relating to policy, legislation or the development of management measures is beyond the remit of both SNH and JNCC.

JNCC's analysis of responses identified that the majority of respondents support the development of the MPA network and the progression of the individual pMPAs to designation. In offshore waters, there are a number of options within the network to represent some features. Further data are now available for some options but these data have not required JNCC to amend its original advice. Respondents provided feedback on their preferences regarding these options that are described in the [Marine Scotland consultation report](#). This information will be provided to Ministers to support decisions on site designation later in 2014.

JNCC considered alternative boundaries proposed by stakeholders for some pMPAs. We have provided advice to Marine Scotland on the ecological implications to the adequacy of coverage of protected features in the network of progressing these alternatives to designation. Having considered the comments received as part of the formal consultation, JNCC recommend that a minimum of 13 of the 16 sites identified in Scotland's offshore waters are designated to contribute to an ecologically coherent network of MPAs.

Next steps

JNCC are revising the site documentation packages that support each of the pMPAs. Updates will take into account any data delivered since spring 2013, along with scientific issues raised within consultation responses. Final versions of the document packages will be available at the time of any site designation.

Respondents made a number of comments within the consultation responses regarding specific site boundaries. Marine Scotland is leading discussions with stakeholders regarding site boundaries. In parallel, JNCC reviewed all site boundaries to determine whether any minor simplifications will be required prior to possible site designation, or to align with changes to the UK's offshore extent following the adoption of the UK EEZ in April 2014.

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