



**Identifying potential site options to help complete the
Marine Protected Area network in the waters around
England**

October 2016

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Executive Summary

This document outlines a staged approach to identifying potential site options to complete Defra's contribution to the Marine Protected Areas (MPA) network in Secretary of State waters around England and offshore waters of Northern Ireland. The approach outlines three main stages. During the first stage JNCC and Natural England will explore six potential methods to identify areas of search that could yield potential site options to fill identified gaps in the network. The second stage seeks to ensure stakeholders are fully engaged in the process by providing opportunities for input on the areas of search being considered. The final stage is the production by JNCC and Natural England of their scientific advice on potential site options. A JNCC-Natural England Ecological Gaps Working Group has been created to oversee this process. This document outlines that throughout the process, stakeholders will be engaged so that their views can be reflected within proposals as they are developed.

1. Purpose

The purpose of this document is to outline the approach that the Joint Nature Conservation Committee (JNCC) and Natural England will take to identify potential site options to complete the Marine Protected Areas (MPAs) network in the Defra Secretary of State waters around England and offshore waters of Northern Ireland¹. It will also describe how sea users and interest groups will be asked to input to the process to inform our pre-consultation advice to Government, and the scope of our advice to help inform Defra's decisions on the third tranche of Marine Conservation Zones (MCZs) designations.

2. Background

The UK MPA Network

Designating Marine Protected Areas (MPAs) is an important measure in helping to conserve the marine environment. The UK Government and Devolved Administrations committed to creating an ecologically coherent network of MPAs in UK waters and, in 2012, published a statement on the expected UK contribution to an ecologically coherent MPA network in the

¹ More information is available at: <http://jncc.defra.gov.uk/default.aspx?page=4549>

north-east Atlantic². A variety of designated MPAs³ will create this UK network and contribute to wider European and global initiatives.

The UK MPA network is underpinned by the guidance published by the Oslo/Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)⁴ on developing an ecologically coherent network of MPAs. Seven MPA network design principles to be applied to the UK were adapted and identified by the UK Government's Department for Environment Food and Rural Affairs (Defra) in 2010⁵. JNCC and Natural England used these principles to develop the Ecological Network Guidance (ENG)⁶ to provide scientific criteria on the identification of MPAs to deliver an ecologically coherent network in the Defra Secretary of State waters around England and offshore waters of Northern Ireland (See Figure 1).

The existing MPA network in the Defra Secretary of State around England and offshore waters of Northern Ireland forms part of this wider international network (See Figure 1 and further described in Annex 1). Together the different MPA types, each of which protects examples of marine biodiversity, will deliver benefits more effectively than individual MPAs can achieve alone.

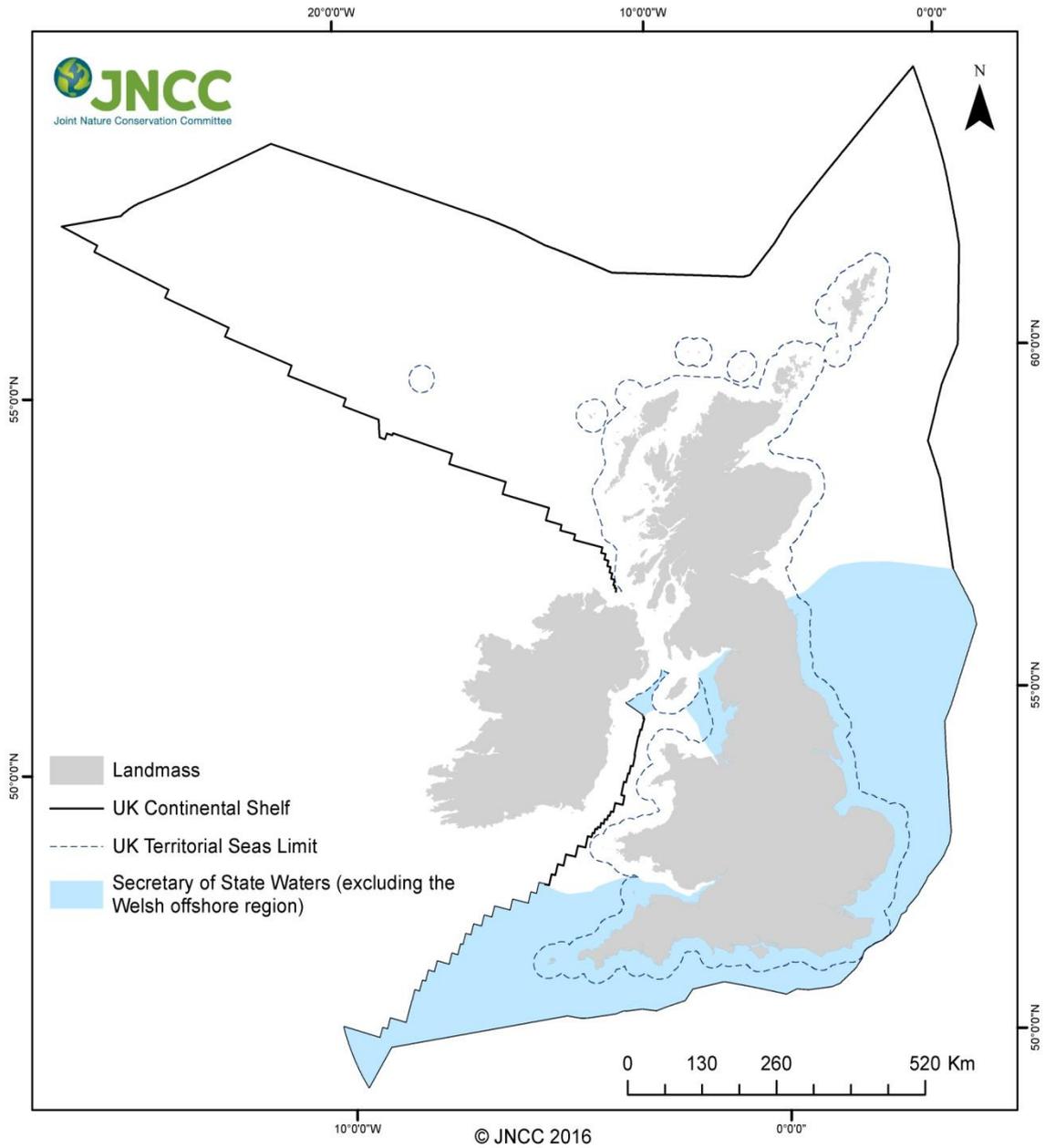
² Joint Administrations Statement. 2012. UK Contribution to Ecologically Coherent MPA Network in the North East Atlantic. Available at: <http://www.scotland.gov.uk/Resource/0041/00411304.pdf>

³ Examples of different types of MPAs are Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), Ramsar sites and Nature Conservation Marine Protected Areas (NCMPAs) and Marine Conservation Zones (MCZs).

⁴ OSPAR Commission (2006). Guidance on developing an ecologically coherent network of OSPAR marine protected areas. No. 2006-03. Available at: http://jncc.defra.gov.uk/pdf/06-03e_Guidance%20ecol%20coherence%20MPA%20network.pdf

⁵ Defra (2010) Guidance on selection and designation of Marine Conservation Zones (Note 1), Department for Environment, Food and Rural Affairs. Available at: <http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/biodiversity/marine/documents/guidance-note1.pdf>

⁶ JNCC and Natural England, Ecological Network Guidance (ENG), 2012. Available at: http://jncc.defra.gov.uk/pdf/100705_ENG_v10.pdf



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Figure 1: The UK Marine Area under jurisdiction of the Defra Secretary of State that comprises the MCZ Project Area.

The Marine Conservation Zone designation process

Marine Conservation Zones (MCZs)⁷ are a form of MPA created under the Marine and Coastal Access Act 2009 (MCAA)⁸ to conserve marine animals, plants and their habitats, together with areas of seabed important for their geomorphological and geological features.

At the request of Defra, JNCC and Natural England set up a project in 2008 to give sea users and interest groups (stakeholders) the opportunity to recommend MCZs to the UK Government. The MCZ Project was divided into four regional areas that covered the inshore waters around England and the offshore waters around England, Wales⁹ and Northern Ireland, known as the 'Defra Secretary of State waters around England and offshore waters of Northern Ireland' (Figure 1). These four regional areas were administered by four regional MCZ projects. The governments in Wales, Scotland and Northern Ireland have also taken forward projects to identify and designate national MPAs in their waters.

Using the ENG as a basis for identifying sites, the regional MCZ projects recommended 127 MCZs in September 2011. To evaluate how the recommended MCZs (rMCZs) compared with the requirements of the ENG and the MCZ Project Guidance¹⁰ Defra requested that JNCC and Natural England complete a review; advice was provided in July 2012. Since then JNCC and Natural England have been advising Defra on the designation of these sites (Figure 2) to complete an ecologically coherent network of MPAs.

⁷ More information is available at: <http://jncc.defra.gov.uk/page-4882>

⁸ Marine & Coastal Access Act 2009, available at: <http://www.legislation.gov.uk/ukpga/2009/23/contents>

⁹ JNCC and Natural England are no longer considering sites in offshore waters adjacent to Wales. Since these sites were put forward by the regional MCZ projects, the Silk Commission on Welsh devolution recommended that marine conservation in the offshore area adjacent to Wales should be devolved to the Welsh Government. More information is available at:

<https://www.gov.uk/government/publications/powers-for-a-purpose-towards-a-lasting-devolution-settlement-for-wales>

¹⁰ JNCC and Natural England, Project Delivery Guidance on the process to select Marine Conservation Zones. Available at: <http://jncc.defra.gov.uk/page-4881>

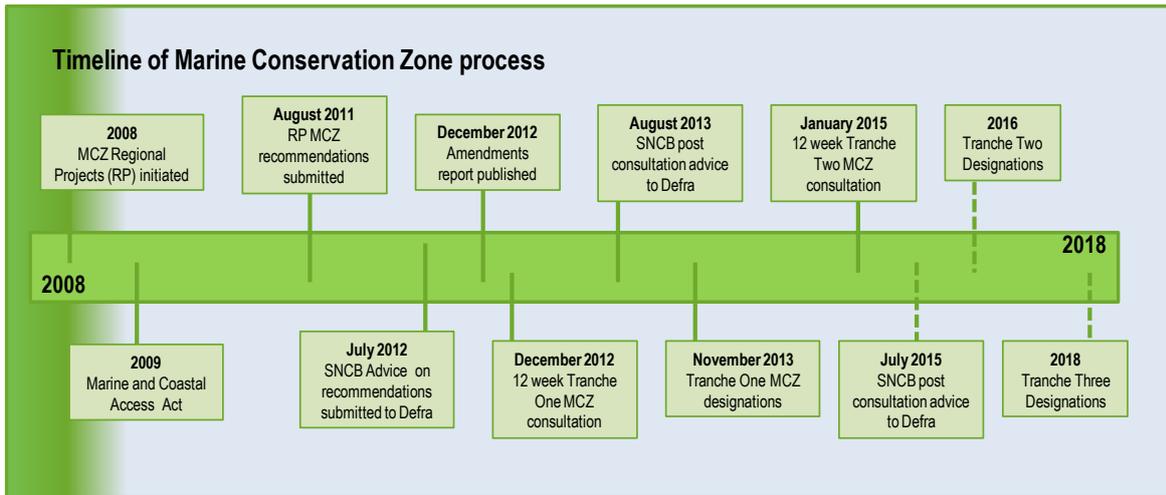


Figure 2. Historical and projected MCZ timeline of milestones and documents.

After the first tranche of MCZs were designated in 2013, JNCC and Natural England were commissioned by Defra to identify any gaps in the existing network to inform Defra’s decisions on a second tranche of MCZs. JNCC used information that was compiled in summer 2013 as part of a UK MPA stocktake to complete this assessment, with the identified gaps termed ‘big gaps’.

What is a ‘big gap’ or ‘gap’?

In its broadest context, an ecological gap exists when a particular species or habitat are not sufficiently represented in a conservation network to ensure long-term protection. In the context of the UK MPA network, a ‘gap’ exists when the group of criteria set to assess the network ecological coherence are not met. These criteria are defined within the Ecological Network Guidance and necessary to achieve an ecologically coherent network of Marine MPAs. A ‘big gap’ was a term used during JNCC’s Summer 2013 network analysis and was considered to exist when the OSPAR MPA network principles⁴ of ‘Features’, ‘Representativity’, ‘Resilience’ and ‘Connectivity’ were not met.

In autumn 2014, and assuming a second tranche of MCZs was designated in 2015, Defra asked JNCC to review progress towards an ecologically coherent UK MPA network. This information was essential to inform a decision on whether any further MPAs might be required beyond 2015 to meet national and international policy commitments as previously referred to. All assessments of progress towards the MPA network¹¹ commitments were

¹¹ Assessing progress towards an ecologically coherent network of MPAs in SoS in 2014, JNCC, November 2014. Available at: http://jncc.defra.gov.uk/pdf/JNCC_NetworkProgressInSoSWaters_2014.pdf

undertaken against the biogeographic regions defined by the Charting Progress 2 project (CP2)¹².

Following JNCC’s review in 2014¹³, it was recognised that designating all sites and features selected for consultation in 2015 as a second tranche of MCZs would make notable progress towards meeting policy commitments for a network of MPAs in the Defra Secretary of State waters around England and offshore waters of Northern Ireland. Many of the ‘big gaps’ identified in JNCC’s 2014 assessment would be filled and the network would be well connected in UK waters. However, JNCC identified some remaining shortfalls as outlined in the report published in late winter 2014¹¹. In early 2015, JNCC received updated information on UK MPAs as part of an ongoing UK MPA stocktake by the UK Statutory Nature Conservation Bodies (SNCBs). These data included more detailed information on the features protected in MPAs. JNCC used these data for a further review of Defra’s progress towards meeting their MPA network obligations in Secretary of State waters around England and offshore waters of Northern Ireland¹⁴. The study identified any shortfalls that were then reviewed by JNCC and Natural England to inform the designation of a third tranche of MCZs during the present Parliament (Table 1).

Table 1: Summary of JNCC led MPA network analyses in Defra Secretary of State waters around England and offshore waters of Northern Ireland.

JNCC commissioned network analyses for Defra	Summary of analyses
2013	JNCC developed the approach to identify potential “big gaps” in the network based on criteria that took into account both the OSPAR MPA network principles and guidance published by the OSPAR Commission.
2014	Defra asked JNCC to review progress towards the MPA network assuming the second tranche of sites are designated.
2016	Defra asked JNCC to review the progress that has been made towards completing their contribution to the UK MPA network, which also enabled the contribution of the list of remaining rMCZs to be considered. The review has identified remaining shortfalls in the UK MPA Network for which further sites may be required to fill as part of Tranche Three.

¹² Charting Progress 2, Defra, July 2010. Available at:

<http://webarchive.nationalarchives.gov.uk/20141203181034/http://chartingprogress.defra.gov.uk/>

¹³ Identifying the remaining MCZ site options that would fill big gaps in the existing MPA network around England and offshore waters of Wales & Northern Ireland, JNCC, February 2014. Available at:

http://jncc.defra.gov.uk/pdf/140224_BigGapsMethod_v8.pdf

¹⁴ JNCC, Assessing progress towards an ecologically coherent MPA network in Secretary of State Waters in 2016, October 2016. Available at: <http://jncc.defra.gov.uk/page-7119>

Using our improved knowledge of ‘gaps’ in the MPA network and available information on the occurrence and distribution of MCZ features, along with information on socio-economic implications, Defra, JNCC and Natural England recognise that the remaining rMCZs¹⁵ cannot fully complete the UK MPA Network in the Defra Secretary of State waters around England and offshore waters of Northern Ireland in line with the seven principles of the ENG. In this context, Defra have asked JNCC and Natural England to identify any potential site options beyond the remaining rMCZs that could fill the remaining ecological gaps for both habitats and species in the existing MPA network. JNCC and Natural England will provide scientific advice to Defra on any new site options in February 2017.

3. Scope of JNCC and Natural England’s advice

To inform the choice of site options included in a consultation on the third Tranche of MCZs, JNCC and Natural England will provide the following advice to Defra on any new site options:

- a. Ecological advice on site options to fill gaps in the network comprising:
 - i. Confidence in the evidence on the presence and, where applicable, extent of habitats and species,
 - ii. Assessment of the condition of each feature through either direct evidence or the appropriate general management approach (GMA) (i.e. Maintain/Recover)
 - iii. An assessment of which features/sites are considered to be at risk;
- b. An audit report outlining the evidence and decisions upon which site options have been based and why, and summarising stakeholder opinion on the sites;
- c. Where possible, advice on the potential management that may be required to maintain or recover each feature to favourable condition will be provided to inform the draft Impact Assessment (IA). This advice will be drafted in partnership with regulators and submitted to Defra to meet their IA development timetable.

4. The approach to filling residual gaps in the Defra Secretary of State waters

JNCC and Natural England will implement a new process to identify and provide advice on potential site options beyond the remaining rMCZs for both habitats and species in the existing MPA network.

¹⁵ Note that this includes consideration of features of rMCZs, and in some cases whole rMCZs, that were previously not taken forward for designation by Defra due to various reasons but are now being reconsidered in light of new information.

Recognising the designation timetable, JNCC and Natural England considered a variety of international and UK approaches that could deliver a robust, evidence based process that considers stakeholders' views on each potential site option. Figure 3 sets out the staged approach we have developed to identify options and provide advice to Defra to fill gaps in the MPA network. Further details are provided in Section 6.

A description of the other potential methods considered but ruled out is included in Annex 2.

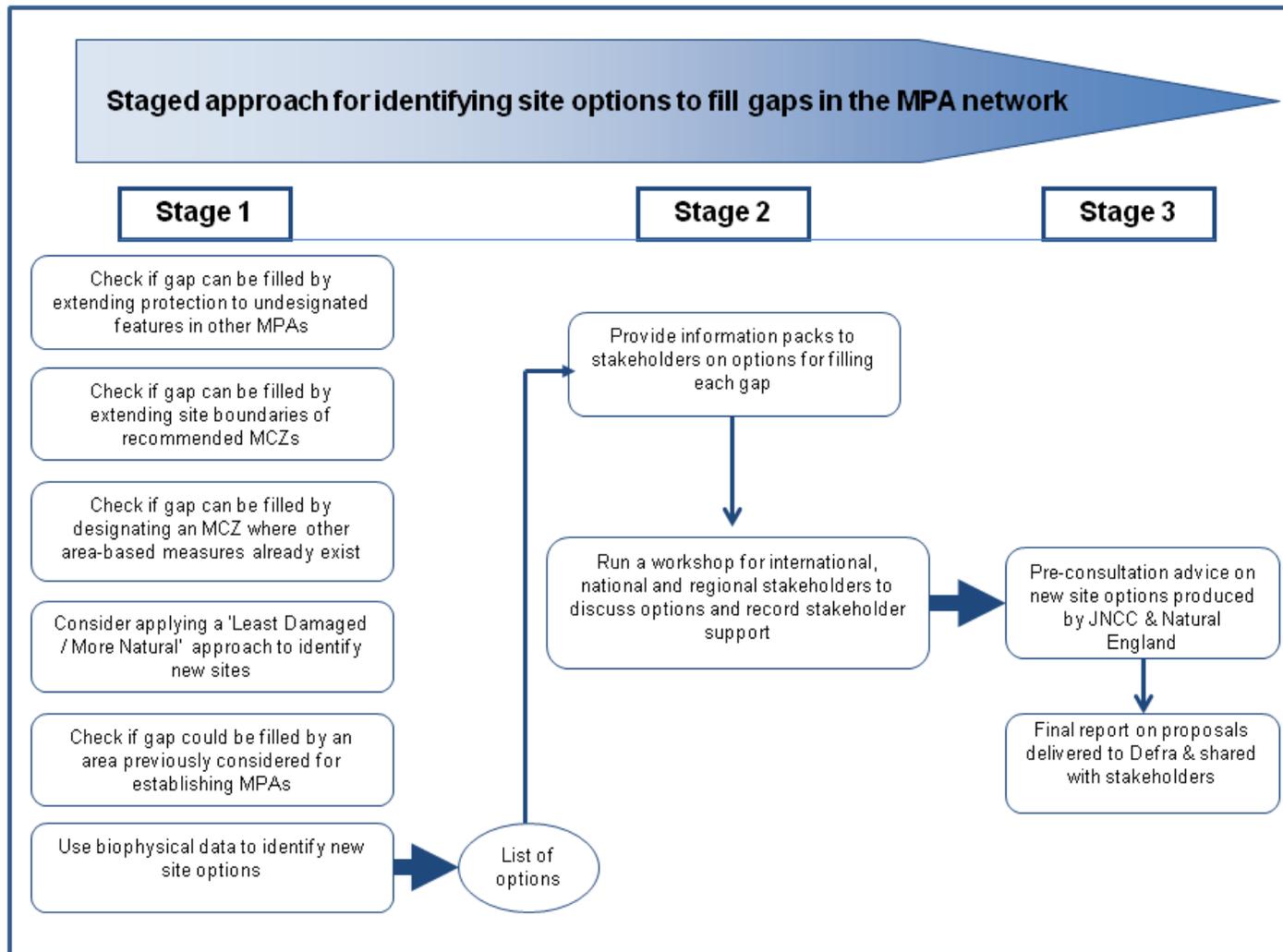


Figure 3: Staged approach for identifying sites to fill gaps in the existing MPA network.

5. Stakeholder engagement

JNCC and Natural England are acutely aware of the importance of stakeholder engagement throughout the process of identifying any new areas for protection that might subsequently require management action that affects stakeholder activities. JNCC and Natural England will create opportunities to enable both UK and European stakeholders to inform the boundaries of any potential new protected areas and to record their support or opposition for these options. These stakeholder views will be captured within our final advice to Defra. Further detail on these opportunities is set out in Section 6.

6. Detailed description of the staged approach

Stage 1: identify options that could fill gaps in the network

This section sets out the methodology that will be used to identify options that could fill gaps in the network. JNCC and Natural England will explore the six potential methods below to identify the most appropriate boundaries of areas of search that could yield potential site options to fill identified gaps in the network and meet viability guidelines (as outlined in the ENG). For each feature-based gap identified by the 2016 network analysis (Table 1), the JNCC - Natural England Ecological Gaps Working Group (see Section 7 on Governance approach) will apply the most appropriate method (or methods) to identify areas of search to be progressed to wider consultation in Stage 2.

Where possible and applicable, more than one option for some feature-based gaps may be taken forward to Stage 2. These alternative options may have been identified through just one of the methods below or indeed each may have been derived by different methods. Identification will primarily be driven by the potential ecological contribution each option will make to meeting the ENG along with data quality and availability. Potential socio-economic implications for each area of search will be considered by the group in preparation for stakeholder engagement. This information, along with the justification for the application of one or more of the methods set out below, will be documented in stakeholder information packs (see Stage 2) and the SNCB advice documents.

Method 1: Protect undesignated features in existing MPAs

Within JNCC's network analyses, each MPA was analysed to determine what features the site protects. Many designated sites – in particular MCZs, Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs) – do not protect all MCZ features that may occur within them. This method seeks to fill gaps in the MPA network by protecting

these features in existing designated sites. Such protection could be achieved by adding features to existing MCZs or by designating a new MCZ over or within an existing MPA (SAC or SPA in particular³), particularly where existing management measures offer no guarantee of protecting the undesignated features. Where this method is used to identify a gap-filling option, JNCC and Natural England will consider whether there are sufficient data for the non-designated feature to be progressed to Stage 2 of the process.

In addition, where this option is pursued, JNCC and Natural England will document management measures within the existing MPA. This information will be presented as part of the socio-economic implications in Stage 2, particularly where the gap-filling feature is considered to not already be afforded protection by an existing management measure(s) and therefore may incur additional socio-economic costs.

Method 2: Extend rMCZs to protect any features that would fill a gap but exist outside of the recommended boundary

This option seeks to identify any features that would fill a gap but are not currently contained within the boundary of an rMCZ which is being considered in Tranche 3. Boundary extensions will be considered where there are sufficient data for the feature to be designated following extension of the boundary.

Method 3: Consideration of the benefit of existing area-based measures

This option involves considering areas within the marine environment that are closed to certain activities either permanently or temporally. Such area based measures are most frequently intended for purposes other than marine nature conservation but they may contribute to conservation of the wider marine ecosystem and, more specifically, could contribute as part of the MPA network, either directly if designated as MCZs or indirectly if not designated. This method is included to use experience gained through a similar process undertaken during the Scottish Nature Conservation MPA project¹⁶.

Where this method is pursued for a given feature-based gap, relevant information will be collated including: the intended or expected longevity of the management measure; whether there are aims and objectives specifically relating to biodiversity; and whether the effectiveness of the management measure for MPA network features is (or can be) measured by monitoring and evaluation. This information, which will help provide insight to the security of such a measure in providing protection for a given feature, will be used in

¹⁶ Assessing the contribution of other area-based measures to the ecological coherence of the MPA network in Scotland's seas (2011). Available at: <http://www.gov.scot/Resource/Doc/295194/0121831.pdf>

Stage 2 in order to help evaluate the advantages and disadvantages of designating the area as a MCZ to help achieve an ecologically coherent network. Discussions with those involved in regulating, managing and/or using these areas will also inform this evaluation. For illustrative purposes, the following are examples of existing area based measures that are considered as part of this option:

- Voluntary Marine Nature Reserves;
- Ministry of Defence areas (noise and degaussing ranges, firing danger areas/ranges);
- Areas with restrictions in place to mainly support fisheries management (ICES/NEAFC closures and inshore fisheries restrictions (e.g. byelaws) ;
- Safety exclusion zones around renewable developments and oil and gas developments.

Method 4: Apply a 'Least Damaged/More Natural' approach to identify areas where there are fewer human activities occurring and therefore potentially less damaged habitats

This method uses a 'Least Damaged / More Natural' approach to identify areas of lower human activity which may in turn be areas containing features that are potentially in more favourable condition than in more heavily used areas. This approach is adapted from that used to help identify Nature Conservation MPAs in Scotland's seas¹⁷.

To identify areas considered as least damaged/more natural, a list of those pressures from human activities that can cause adverse impacts on the marine environment was identified and associated with the feature-specific sensitivity assessment(s) for such pressures derived from Defra contract MB0102¹⁸ and [Marlin](#). Activity data layers will be used to identify areas that might be considered 'least damaged'.

Where this method is applied, biophysical data for any areas that may be considered 'Least Damaged / More Natural' will be reviewed to determine what features these areas contain and whether they could fill any gaps in the MPA network, including whether the data are sufficient for the area to progress to designation.

¹⁷ Chaniotis *et al* 2011. Identifying locations considered to be least damaged/more natural in Scotland's seas. Final report produced by the Joint Nature Conservation Committee, Scottish Natural Heritage and Marine Scotland for the Scottish Marine Protected Areas Project. Available at: <http://www.gov.scot/Resource/Doc/295194/0121828.pdf>

¹⁸ Tillin, H.M., Hull, S.C. & Tyler-Walters, H.T.W., 2010. Accessing and developing the required biophysical datasets and data layers for Marine Protected Areas network planning and wider marine spatial planning purposes. Report No 22 Task 3 Development of a Sensitivity Tool (pressures-MXZ/MPA features).

Where this method is considered, a detailed technical annex explaining the information and methods used will be added to the final report. It is worth noting that this method is likely to have limited applicability to the inshore region due to the higher levels of human activity, and principally focuses on gaps offshore where there are potentially more shortfalls in achieving adequacy targets (and therefore where there are more options around the location of sites to fill these gaps).

Method 5: Use areas previously considered for establishing MPAs to fill gaps

This method involves considering areas which have previously been considered for an MPA designation in order to fill gaps in the MPA network. These areas include 'Areas of Search' which were previously considered for SACs but did not progress. Further, when Defra made its announcement on the designation of the first tranche of MCZs in November 2012, some of the rMCZs were chosen to not be progressed for various reasons (primarily lack of data or socio-economic costs). Depending on the particular area in question, it could be reconsidered on the basis of any new biophysical data and improved socio-economic impact understanding. Where this method is considered for a given gap, the available biophysical data for a previously considered MPA area will be reviewed to ensure the presence and extent of the gap-filling feature are supported by sufficient data. This method is therefore likely to also consider features that were not originally identified for protection within the original proposal. In particular, this method will also be considered in combination with Method 2.

Method 6: Determine new areas to fill gaps in the MPA network solely by looking at available biophysical data

This method involves identifying areas to fill a gap in the MPA network using existing biophysical datasets. JNCC and Natural England will explore the available data and use expert judgement to determine whether data would be sufficient for an area to be taken forward as an MCZ. Such expert judgement will be reviewed by the JNCC-Natural England Ecological Gaps Working Group and will be recorded within the information packs for Stage 2 and future advice documents.

Stage 2: Stakeholder engagement to refine options that could fill gaps in the network

At the beginning of Stage 2 JNCC and Natural England will contact UK and European stakeholders, explaining the aims and objectives of the process to identify potential options to fill remaining ecological gaps in the MPA network, including the opportunities for

stakeholders to engage and the objectives and expectations of any planned workshop or meeting.

Recognising that stakeholders will have an interest in different sites, appropriate workshops or meetings will be run by either JNCC or Natural England (or both) to provide an opportunity for those stakeholders to give their views on which of the options could be progressed and how boundaries could be adjusted to gain their support for sites.

Information packs will be made available to inform each workshop/meeting setting out:

- Our current understanding of the gaps in the network;
- The options that have been identified to address those gaps (including provisional boundaries) and the method(s) used to do so;
- The ecological contribution each option would make to the network and the quality of the supporting biophysical data; and
- A reflection on potential socio-economic considerations (where known at this stage).

Following stakeholder engagement, a final list of options will then be produced and JNCC and Natural England will develop scientific advice for Defra as set out in Stage 3 of the process.

Stage 3: Provision of advice to Defra

Stage 3 is focused on JNCC and Natural England's scientific advice to Defra on the potential site options that would help complete the MPA network. The likely scope of our advice is set out in Section 3. It will be developed in line with our organisational evidence standards and will be subject to the same quality assurance procedures used during the development of our respective past MCZ advice packages to Defra.

JNCC and Natural England will share their formal advice with Defra on gap filling options with stakeholders.

7. Governance of approach

A JNCC-Natural England Ecological Gaps Working Group has been created to identify the site options and to prepare the advice on those options. The Group comprises specialist staff from the JNCC and Natural England, together with representation from Defra policy officials. While Defra are members of the group, they will not determine or influence any scientific advice that JNCC and Natural England may wish to give Defra outside of the Group. Defra's

main role within the working group will be to provide policy views and socio-economic advice for each option as it develops. At times this group may include parties outside of those members to the Group where JNCC and Natural England jointly deem it necessary.

The group is responsible for analysing the outputs of the JNCC MPA network analysis and agreeing on potential site options required to address gaps in the MPA network in the Defra Secretary of State waters around England and offshore waters of Northern Ireland in line with the seven network principles set out in the Ecological Network Guidance. Furthermore, it will decide on who will be responsible for progressing site options, ensuring stakeholders are appropriately engaged and that the final proposals are sufficiently quality assured prior to the submission of final advice to Defra. The working group will report to JNCC and Natural England's internal governance systems respectively to ensure the process and products comply with each organisation's corporate standards.

Annex 1: Geographical Scope

The geographical scope of this present paper is the Defra Secretary of State waters around England and offshore waters of Northern Ireland (see Figure 1). OSPAR guidance⁴ recommended that a MPA network should take into account biogeographic variation in marine features. Previous work within the UK has identified regional seas to best reflect biogeographic variation at the UK scale¹⁹. JNCC's network analyses have used the Charting Progress 2 (CP2) reporting regions¹² that overlap with Defra marine waters as the biogeographic regions for MPA network assessment. These regions are:

- Northern North Sea;
- Southern North Sea;
- Eastern Channel;
- Western Channel and Celtic Sea;
- Irish Sea.

The Northern North Sea includes both Scottish and English waters, the Western Channel and Celtic Sea includes both English and Welsh waters and the Irish Sea includes English, Welsh, Northern Irish and Scottish waters. Consequently, there are MPAs outside of Defra marine waters but within those CP2 reporting regions that contribute to the network assessment.

¹⁹ Sue Gubbay, JNCC Report No: 946, A review of the use of biogeography and different biogeographic scales in MPA network assessment, April 2014. Available at: http://jncc.defra.gov.uk/pdf/Report496_web.pdf.

Annex 2: Other approaches considered to identify site options to fill gaps in the MPA network

JNCC and Natural England considered other potential routes to identify site options, noting there was limited time and resource available to complete the work within the overall timetable for the Tranche Three MCZ process. Furthermore, we considered our previous MCZ experience and wider experience from more recent MPA programmes in Scotland and Northern Ireland when considering possible routes to identify new site options.

Using a stakeholder led process to identify further areas

Description:

In keeping with the approach taken for identifying recommended MCZs through the regional MCZ project, JNCC and Natural England considered a process whereby stakeholders representative of the interests in the marine environment would be able to collectively determine preferred sites to fill MPA network gaps.

Advantages:

- Where data are sparse, using local stakeholder knowledge is an effective way of identifying sites;
- Involving stakeholders early in MPA processes is common and important best practice in MPA designations all over the world; and
- Could use previously built networks of stakeholders that were effective in the regional MCZ project process.

Disadvantages:

- Resource intensive approach that requires significant stakeholder input; and
- Significant technical knowledge and experience needed to interpret data and information in such a manner to identify site options (based on comments from Regional MCZ Project stakeholders); and
- Areas that are determined may not be data sufficient (low confidence in data can also be a problem) to progress to designation and thus if these areas are taken forward, new data may need to be gathered resulting in a delay to designation of sites.

In cases where feature data are sparse, there will be few or no options for stakeholders to identify sites unless further data unbeknown to JNCC or Natural England are immediately available. Therefore, stakeholder engagement will not drive the identification of sites for most gaps in the MPA network but will be integrated into the new sites process.

Using a modelling approach to determine areas with sufficient data and low levels of activity

Description:

Marxan is a software tool used in conservation planning to help design MPA networks. Marxan works by selecting sites for protection to create efficient MPA networks that meet user-defined conservation targets while trying to minimise socio-economic costs. These costs include parameters that are generally proxies for socio-economic costs (e.g. human activities such as fishing intensity or windfarms). Additional information that needs to be fed in Marxan includes features of interest, such as habitat types and species presence. Each run of Marxan produces a network design. Network designs that do not meet the conservation targets are considered as expensive options and can be discarded. Marxan outputs include a series of maps with different shapes and a report with information on the results for each run. An example of Marxan on the development of MPA network fisheries reserves for the North Sea was developed by Roberts and Mason 2008²⁰.

Advantages:

- Incorporates costs of socio-economics and available biophysical data and therefore may ensure areas chosen are of less commercial interest but meet data requirements;
- Objective analysis that helps to visualise complex data layers in a simple manner; and
- Targets are easy to establish.

Disadvantages:

- Data intensive and reliant on data that may not fully reflect the socio-economic impact (i.e. areas may be selected where lower levels of activity, but may still have a high socio-economic cost);
- Process is extremely complex and since the process is seeking to fill gaps in the MPA network, not design a new MPA network from scratch, Marxan may not be an appropriate tool;
- May result in MPAs that possibly do not meet some or all of the network design principles; and
- May result in new areas that can be considered but which may not fill any gaps in the MPA network.

This method was not taken forward to identify sites to fill gaps in the MPA network as it would involve a significant amount of time and resource and would not necessarily help to fill the few remaining gaps in the MPA network.

²⁰ Return to Abundance: A Case for Marine Reserves in the North. Available at: http://www.wwf.org.uk/filelibrary/pdf/marine_reserves_north_sea.pdf

Version control:

Version	Date	Author	Reason/Comments
0.1	27/01/2016	Alexandra Cunha (JNCC)	Initial draft
0.2	29/04/2016	Alexandra Cunha & Ollie Payne (JNCC)	Revised version incorporating comments from Natural England and JNCC staff
1.0	28/06/2016	Heidi Pardoe, Jamie Davies (NE)	Revised version of the paper by Natural England – changes made to format/style
1.1	27/07/2016	Heidi Pardoe (NE) & Ollie Payne (JNCC)	Incorporated final JNCC, Natural England and Defra comments.
2.0	21/09/2016	Heidi Pardoe (NE) & Ollie Payne (JNCC)	Final signed off version.

Distribution list:

Copy	Version	Date	Issued to
Electronic	0.1	27/01/16	Paul Ivory, James Highfield, Hazel Selley, Emma Wheater, Ross Bullimore (Natural England), Jemma Lonsdale (Defra), Ollie Payne, Jon Davies (JNCC).
Electronic	0.2	29/04/16	Paul Ivory, James Highfield, Hazel Selley, Emma Wheater, Ross Bullimore, Heidi Pardoe, Mark Duffy (Natural England), Jemma Lonsdale, Paul McLeod (Defra), Jon Davies (JNCC)
Electronic	1.0	28/06/16	Paul Ivory, James Highfield, Mark Duffy, Roger Covey, Angela Moffat, Chris Pirie, Ian Saunders, Hazel Selley (Natural England), Alexandra Cunha, Ollie Payne, Jon Davies (JNCC)
Electronic	1.1	28/07/16	Angela Moffat (Natural England) and Jon Davies (JNCC)
Electronic	2.0	21/09/16	Final published version