



Department  
for Environment  
Food & Rural Affairs

**In-depth review of evidence supporting the recommended  
Marine Conservation Zones**

**Project Report**

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Project Title: In-depth review of evidence supporting the recommended Marine Conservation Zones

## **Project Plan**

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# Executive Summary

## Introduction

The Ministerial Statement on Marine Conservation Zones (MCZs) published on 15 November 2011 included a commitment to an in-depth review of the evidence base for all the Regional MCZ Projects' site recommendations. In addition to the work being taken forward by Natural England and the Joint Nature Conservation Committee (JNCC), Defra appointed ABP Marine Environmental Research Ltd (ABPmer), supported by the Marine Biological Association of the UK (MBA) and Marine Planning Consultants (MPC) to undertake an independent review of the evidence.

The aim of this independent review was to build on and extend the evidence-specific work of the Regional MCZ Projects and the evidence assessments being carried out by Natural England and JNCC which will be used to support the designation of MCZs. The work reported here was undertaken in the period February 2012 to February 2013.

The key objectives for the study were to:

- To undertake a comprehensive review of the evidence underpinning the 127 MCZ recommendations from the Regional MCZ Projects and to identify any additional evidence relevant to these; and
- To advise on the confidence that may be placed in the evidence for each feature originally recommended within each the first tranche of sites (referred to as Tranche 1<sup>1</sup> sites), informed by the Evidence Protocols developed by JNCC and Natural England (JNCC & Natural England, 2012).

This report describes the approach that has been applied to meet the objectives as set out above and reports Site Evidence Reviews for all the 127 recommended MCZs. The report also includes our confidence assessments for all Ecological Network Guidance (ENG) features recommended by the Regional MCZ Projects within Tranche 1 sites that are proposed for designation as part of the Government's consultation issued in December 2012. This comprises a total of 43 sites across the four MCZ regions.

The UK is committed to establishing coherent network of Marine Protected Areas (MPAs) in accordance with its commitments under the Marine & Coastal Access Act 2009, Marine (Scotland) Act and Northern Ireland Bill and the wider OSPAR network. This UK MPA network will contribute to a wider North East Atlantic MPA network and will include European Marine Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)), the marine components of Ramsar sites and Sites of Scientific Special

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<sup>1</sup> Note that the MB0116 study assessed all features proposed for designation by the Regional MCZ Project within Tranche 1 sites as opposed to the reduced list of features proposed for designation within the Government's MCZ consultation.

Interest (SSSIs), Marine Conservation Zones (MCZs) (English and Welsh waters), Nature Conservation MPAs (Scottish inshore waters and the Scottish offshore region), and future MCZs in Northern Ireland territorial waters.

The development of proposals for MCZs has been taking place since 2009 beginning with the establishment of the four Regional MCZ Projects - Balanced Seas (BS), Finding Sanctuary (FS), Irish Sea Conservation Zones (ISCZ) and Net Gain (NG) in line with national guidance (Natural England & JNCC, 2010). The Regional Projects submitted their Recommendations to the Statutory Nature Conservation Bodies (SNCBs) Natural England and JNCC in September 2011. Since that time, the SNCBs have been developing their advice to Department of Environment, Food and Rural Affairs (Defra) Ministers on the MCZ proposals and have been taking forward a number of tasks to facilitate this. This advice was submitted in July 2012.

The study was conducted in parallel to the work undertaken by Natural England and JNCC on the scientific confidence in the Regional MCZ Project recommendations. In order to ensure that the outputs are as comparable as possible and understand why differences may occur, the project was asked to utilise the same data sources used for the Natural England and JNCC advice in addition to any data sourced by the project.

The outputs of the work will be used to inform updated assessments of confidence for sites to be designated in 2013, and future tranches.

## **Methodology**

An overall methodology and reporting procedure were developed for the study based on the project specification and discussions with Defra and the Project Steering Group (PSG). In particular, this took account of Defra's requirements in relation to project outputs and to ensure consistency with parallel work being undertaken by JNCC/Natural England. The methodology involved four main tasks: evidence gathering, a confidence assessment, a data gap analysis and prioritisation exercise and reporting, described briefly below.

### Evidence Gathering

Data already used by the Regional MCZ Projects in the MCZ process were collated from the following sources:

- MB0102 spatial data layers;
- UK SeaMap 2010 and Mapping European Seabed Habitats (MESH) data (21 March 2012 v2.);
- Spatial data and grey literature acquired by MCZ Regional Projects; and
- Spatial data acquired and made available by the SNCBs.

Additional evidence was identified through a number of different approaches including:

- Detailed literature searches through the MBA, Defra and Centre for Environment, Fisheries and Aquaculture Science (Cefas) libraries;
- Identification of potential additional industry data sets based on the location of key industries;
- Review of project team organisations internal databases;
- Investigation of Olex data holdings;
- Communication with MCZ Stakeholders;
- Contact with specific industry sectors;
- Contact with organisations collecting and holding marine data;
- Contact with academics and feature experts; and
- Use of aerial photography from web based sources.

Relevant data were obtained where possible and quality checked prior to acceptance within the project (see Section 2.1.1). If the data were not in a suitable digital format (i.e. could not be readily included in a GIS environment, see Section 3.1) they were converted to a digital geo-referenced form where practicable and appropriate metadata were added to the records as necessary.

### Confidence Assessment

A confidence assessment was carried out on the available ecological data for all features as recommended within the Regional MCZ Projects advice for Tranche 1 sites proposed for designation within the Government's December 2012 consultation to determine confidence in:

- The presence of Ecological Network Guidance (ENG) features proposed for designation;
- The spatial extent of ENG features proposed for designation, an approach which differed between the SNCBs and this project ;
- The condition (quality) of ENG features proposed for designation; and
- The proposed boundaries for each site, relative to the distribution and extent of ENG features proposed for designation.

It should be noted that the collation of socio-economic data for the sites was not part of this contract.

For the assessments of feature presence and extent, Protocol E (JNCC and Natural England, 2012) was followed, with the exception that the protocol was modified to permit assessment of new data (see Section 4.2.1). The original protocol was drafted to permit assessment of the confidence in the presence and extent of features identified in the feature maps accompanying the Regional MCZ Project recommendations. Minor modifications to the protocol were therefore made to accommodate the assessment of new data acquired within this study. In addition moderation was made to the confidence assessment for feature extent when it was greater than that given for the feature presence, in line with the approach taken by the SNCBs, these are discussed in Section 4.2.1. The assessment of feature condition was undertaken following Protocol F (JNCC and Natural England, 2012) and used the sensitivity matrix in MB0102 and activity data collated in MB0106. For the

assessment of proposed site boundaries, there was no pre-existing methodology, and a new methodology was therefore established. The outcomes of the assessments for each feature/site (high/moderate/low/no confidence) were recorded in a series of Excel spreadsheets documenting the evidence available, the evidence that informed the confidence assessment and the justification for each assessment for Tranche 1 sites.

### Gap Analysis and Prioritisation Process

Following completion of the confidence assessment, a gap analysis and prioritisation exercise was carried out for the Tranche 1 sites to identify remaining weaknesses in the evidence base and to suggest priorities for future action to address these gaps. The gap analysis took account of the outcomes of the confidence assessment. The prioritisation exercise sought to identify new survey priorities and priorities for acquiring additional identified data sets for all 127 Regional MCZ Project recommended sites (see Appendix O), taking account of the nature and scale of the gaps, likely availability of additional information and the emerging data stream from additional Defra funded survey work being co-ordinated by Cefas (Defra project MB0120).

### Reporting

Key final outputs from the study include:

- A project report detailing the findings of work on the Tranche 1 sites and the provision of Site Evidence Reviews (SERs) (this report);
- A series of spreadsheets providing an audit trail for the confidence assessments (Appendix K);
- A series of SERs for each of the Tranche 1 sites which summarise the ecological evidence base for relevant features within each site, detail the additional information that has been collated and present an overall confidence assessment for each feature in relation to presence, extent, condition and site boundaries: and
- SERs for all non Tranche 1 sites detailing available evidence either obtained or identified (Appendix L).

### **Findings**

The collation of existing evidence covering all 127 MCZ recommendations encountered a number of challenges due to gaps in the documentation of data sources and incomplete metadata provided with some of the data layers within the Regional MCZ Project datasets (as provided to MB0116 by the SNCBs) and some data licensing issues. This significantly extended the work to identify existing data sources and also affected the confidence assessment scores where it was not possible to access key data sets because of data licence restrictions. A number of errors in the data sets supplied and used by the SNCBs were identified through the course of this study, including projection errors, duplicate data, inappropriate use of polygon data, and a lack of clear definition of the feature or any original attribute information. While many of these errors have been rectified in subsequent SNCB assessments,

a number of them have remained in the data that were used to inform the Tranche1 confidence assessments for the public consultation (see Appendix P for detail). Owing to licence restrictions, some data sets used by the SNCBs were not available to this study. In particular, BGS data points which were translated by JNCC into substrate information and the version of Marine Recorder compiled and used by JNCC which contained data that were not publically available and not available to ABPmer.

The wider evidence review identified and collated a large range of relevant ecological data on the features proposed for designation within each of the 127 rMCZ/ rRA sites, with over 780 additional information sources being identified. Evidence was acquired for approximately 38% of these sources, but only 19% of these yielded spatial data, any of these that were relevant to the Tranche 1, sites were subsequently used in the confidence assessments. Delays in establishing a data licensing agreement hampered acquisition of industry data. While some good quality additional data sources have been obtained or identified, the exercise suggests that the majority of the most relevant data sources had already been accessed by the MCZ projects with the exception of some industry held data and some data collected after the cut-off date for MB0102 data layers, and photographic data collected for a number of inshore sites by Natural England.

Application of the confidence assessment protocols for presence and extent of ENG features within the Tranche 1 rMCZ sites proved to be challenging, complex and time consuming. Our assessments have indicated that the protocols are open to different interpretation, thus hampering consistency of application. A number of meetings and internal workshops were held with JNCC and Natural England to understand some of these differences and to promote greater consistency, but some differences in interpretation remain. These differences include the extent to which the protocols for presence and extent were adapted to accommodate new data highlighted above. In addition, expert judgement and local knowledge was applied to a greater extent by the SNCBs in their assessments, compared to this study which had a greater focus on documentary evidence. Differences also remain relating to the weight attached to photographic evidence and the rigour with which point data was used to validate polygon data. Subjectivity in the interpretation of the protocol, especially when considering new data obtained after the Regional MCZ Projects had made their recommendations, lead to instances where Natural England and JNCC applied the protocol differently.

The differences in Protocol E interpretation contribute to differences in the confidence scores obtained by the SNCBs and MB0116, particularly the weight attached to photographic evidence and the use of expert judgement. Further differences in the confidence scores have arisen where different approaches have been used by MB0116 and the SNCBs when assessing data points which may have been duplicates (see Section 4.2.2) and in the data available to the different studies (largely the BGS point data and additional Marine Recorder data available to the SNCBs and the additional data obtained within MB0116).



The confidence assessments for presence and extent (Table S1) indicate that 58% of assessments for feature presence in Tranche 1 sites carried out in the MB0116 project were recorded as either having low or no confidence. For feature extent, 68% of assessments were recorded as either having low or no confidence<sup>2</sup> (see Tables 8 to 11 in Section 4.3).

The confidence assessments for feature condition indicated confidence as 'low' or 'no confidence' for 91% features in all Tranche 1 sites (Table S1). This is because all of the assessments were based on vulnerability and pressures which, under the protocol, are classified as low confidence unless there is good evidence, based on the later stages of the protocol, on the presence and extent of human pressures relative to the extent of the feature to warrant raising the confidence to medium.

The confidence assessments for site boundaries, based on the methodology used by MB0116, also largely indicate low confidence (Table S1). This is because for most sites, there is no clear relationship between feature boundaries and site boundaries.

**Table S1. Number of features (or sites for boundaries) with given confidence score by region for Tranche 1 sites.**

Regional Project	Presence				Extent				Condition				Boundaries		
	H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
Balanced Seas	19	15	26	7	10	13	37	7	0	1	60	6	0	1	8
Finding Sanctuary	44	74	164	20	29	64	189	20	0	36	241	25	0	0	27
Irish Sea Conservation Zones	5	3	8	0	2	3	11	0	0	0	0	16	0	0	4
Net Gain	4	2	7	0	3	2	8	0	0	0	13	0	0	0	3
<b>Total</b>	<b>72</b>	<b>94</b>	<b>205</b>	<b>27</b>	<b>44</b>	<b>82</b>	<b>245</b>	<b>27</b>	<b>0</b>	<b>37</b>	<b>314</b>	<b>47</b>	<b>0</b>	<b>1</b>	<b>42</b>

Confidence Scores: H = High, M = Moderate, L = Low, N = No confidence

A large number of data gaps (where confidence is less than high) have been identified for presence, extent and condition within Tranche 1 sites. Gaps for some of these sites are being addressed by the Cefas co-ordinated survey programme. Priorities for addressing remaining data gaps have been identified (see Appendix O). We suggest that as a minimum, it is important to confirm (with moderate or high confidence) the presence of features within a site before including them on the list of features for designation. In addition, where conservation objectives for features are likely to drive management measures, then it is important that there is reasonable appreciation (with moderate or high confidence) of feature extent to facilitate spatial targeting of those measures.

<sup>2</sup> Note that this study has assessed all features proposed for designation by the Regional MCZ Project within Tranche 1 sites as opposed to the reduced list of features proposed for designation within the Government's MCZ consultation.

The prioritisation exercise for acquisition of known additional data sets, covering all Regional MCZ Project sites, and or processing of recently acquired data sets has identified 59 data sets of high and medium priority, see Section 5.3 and Appendix O). In addition, there are 154 lower priority data sets and sources which may yield additional data, depending on the time and resources available for such a task, although it may not be possible to obtain many of the sources due to confidentiality or accessibility issues.

## **Conclusions**

The study has identified a number of issues with gaps in the documentation of data sources and metadata from the Regional MCZ Projects and by the SNCBs which have limited the usefulness of these data sources. Wider lessons also need to be learned in terms of data management practices and in improving access to marine data. It is understood that the errors identified during the data collation process in the SNCB-held data have/are being corrected in further iterations of the MCZ designation process.

Issues have been encountered in seeking to apply the confidence assessment methodologies for presence and extent. The protocols are complex and time consuming to apply which creates challenges in applying them consistently and in accommodating data that is not geo-referenced. For example, differing approaches have been adopted between MB0116 and the SNCBs and between the JNCC and Natural England when accommodating new data within the assessments. There are also differences between MB0116 and the SNCBs in the rigour with which point data has been used to validate polygon data. Differences are also evident in the weight attached to photographic data and the use of expert judgement (in the absence of verifiable evidence). The SNCBs are currently seeking to refine and simplify Protocol E. We suggest that a consistent approach to its application should be adopted between JNCC and Natural England.

The gap analysis has shown that data are still required to confirm assurance that features are present and that their extent is understood. This requirement will in part be covered by the information gathered from surveys already carried out under the Cefas co-ordinated survey programme which will significantly improve the evidence base for those sites already surveyed. Acquisition of identified high and medium priority data sets should also be pursued so that additional information can be incorporated into the public consultation material.

## **List of Considerations**

**Consideration 1 (para 7.1)** that JNCC and Natural England continue to address documentation of data sources and attribute information as a priority to provide clarity in the ecological evidence supporting MCZ designations. It is understood that the errors identified during the data collection exercise in the SNCB-held data are being corrected in further iterations of the MCZ designation process.

**Consideration 2 (para 7.1)** that within the MCZ project and for organisations managing similar projects or supplying data to them in the future, there is adherence to good practice in data management, working to agreed data standards, including the application of metadata and version control to MEDIN standards.

**Consideration 3 (Para 7.3)** that the delivery of improvements in the capture and management of marine ecological data is given a higher profile within the UK Marine Monitoring and Assessment Strategy (UKMMAS) community and by the Marine Science Co-ordination Committee (MSCC).

**Consideration 4 (Para 7.4)** that all relevant ecological data from the various strands of the MCZ project are brought together in a single place (a central MCZ database) and that data licensing issues are addressed as a priority to facilitate this.

**Consideration 5 (Para 7.4)** that in the longer term Defra develops a common data sharing agreement across the Defra family that also permits others to access and make use of data on Defra's behalf.

**Consideration 6 (Para 7.5)** that the SNCBs work to refine and simplify Protocol E is progressed, and that a consistent approach to its application is adopted between JNCC and Natural England.

**Consideration 7 (Para 7.9)** that outputs from the Cefas co-ordinated survey programme are incorporated within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process.

**Consideration 8 (Para 7.10)** that efforts are made to acquire all of the identified high and medium priority data sets and to incorporate them within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process.

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# 1. Introduction

- 1.1 The aim of this independent review was to build on and extend the evidence-specific work of the Regional MCZ Projects and the evidence assessments being carried out by Natural England and JNCC which will be used to support the designation of MCZs. The work reported here was undertaken in the period February 2012 to February 2013. The key objectives for the study were to:
- To undertake a comprehensive review of the evidence underpinning the 127 MCZ recommendations from the Regional MCZ Projects and to identify any additional evidence relevant to these; and
  - To advise on the confidence that may be placed in the evidence for each feature within each of the first tranche of sites (known as Tranche 1 sites) site, informed by the Evidence Protocols developed by JNCC and Natural England (JNCC & Natural England, 2012).
- 1.2 This report describes the approach that has been applied and reports site evidence reviews for all the 127 recommended MCZs and Reference Areas (RAs). The report also includes our confidence assessments for the Tranche 1 that are proposed for designation as part of the Government's consultation issued in December 2012. This comprises a total of 43 sites across the four MCZ regions.
- 1.3 The study was undertaken in parallel to the advice provided by Natural England and JNCC on the scientific confidence in the Regional MCZ Project recommendations. In order to ensure that the outputs are as comparable as possible and understand why differences may occur, the project was asked to utilise the same data sources used for the Natural England and JNCC advice in addition to any data sourced by the project.
- 1.4 It should be noted that the confidence assessments undertaken in this study used the best available evidence for the features recommended in the Tranche 1 sites, an approach which allowed the addition of new data to be considered. In contrast, the SNCBs carried out their assessments primarily against the feature extents as recommended by the Regional MCZ Projects i.e. making a comparison against the Site Assessment Document maps (see Section 4.4 for comparison of approaches).
- 1.5 The outputs of the work will be used to inform updated assessments of confidence for sites to be designated in 2013, and future tranches.
- 1.6 The UK is committed to establishing a coherent network of Marine Protected Areas (MPAs) in accordance with its commitments under the Marine & Coastal Access Act 2009, Marine (Scotland) Act and Northern Ireland Bill and the wider OSPAR network. This UK MPA

network will contribute to a wider North East Atlantic MPA network and will include European Marine Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)), the marine components of Ramsar sites and Sites of Scientific Special Interest (SSSIs), Marine Conservation Zones (MCZs) (English and Welsh waters), Nature Conservation MPAs (Scottish inshore waters and the Scottish offshore region), and future MCZs in Northern Ireland territorial waters.

1.7 The development of proposals for MCZs has been taking place over the past two years through four Regional MCZ Projects - Balanced Seas (BS), Finding Sanctuary (FS), Irish Sea Conservation Zones (ISCZ) and Net Gain (NG) (Figure 1) in line with national guidance (Natural England & JNCC, 2010 and Defra, 2010). The Regional MCZ Projects submitted their Recommendations to the Statutory Nature Conservation Bodies (SNCBs), Natural England and JNCC in September 2011:

- Balanced Seas (BS, 2011);
- Finding Sanctuary (FS, 2011);
- Irish Sea Conservation Zones (ISCZ, 2011); and
- Net Gain (NG, 2011).

1.8 The SNCBs are tasked with providing advice to the Department for Food, Environment and Rural Affairs (Defra) Ministers on the MCZ proposals and have been taking forward a number of tasks to facilitate this including submitting their formal advice in July 2012 (Natural England & JNCC, 2012). Formal public consultation on MCZs began in December 2012 (Defra, 2012) recommending a first tranche of sites for designation in 2013.

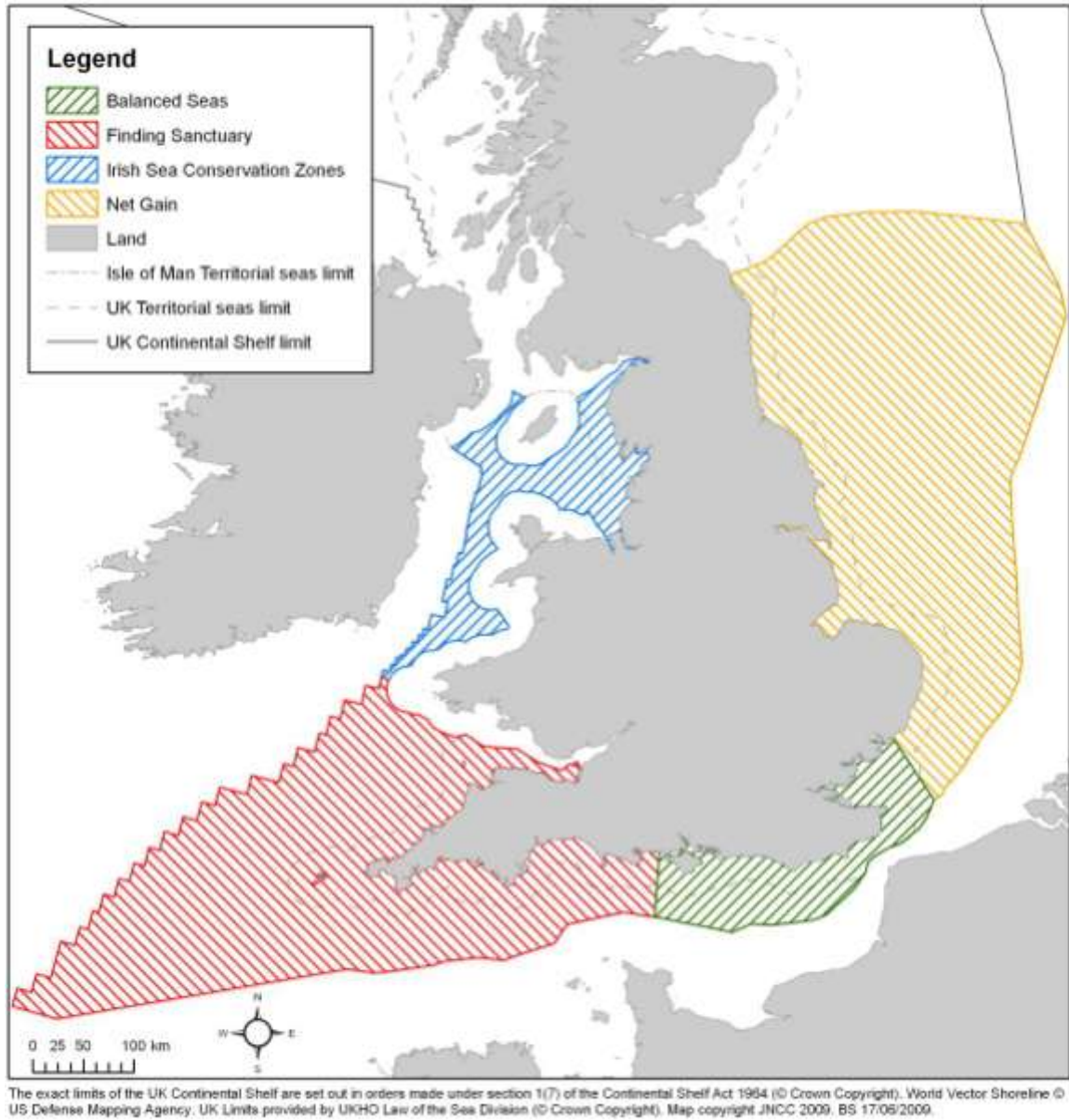
1.9 In developing their Considerations for MCZs, the Regional MCZ Projects drew extensively on national information developed under the Defra-led project MB0102<sup>3</sup>, MESH and UKSeaMap, supplemented by additional data provided by stakeholders, particularly from industry, environmental Non-governmental Organisations (NGOs), academics and local records. In many cases, the Regional MCZ Projects were able to improve the quality of evidence available to support the identification of suitable locations for MCZ.

1.10 Following submission of the Regional MCZ Project Recommendations, the MPA Science Advisory Panel (SAP) carried out a brief evidence review. The SAP identified a number of gaps in the evidence base, based on the knowledge of individual SAP members (SAP, 2011).

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<sup>3</sup> Project outputs available from:  
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=16368>





**Figure 1: Regional MCZ Project Boundaries**

1.11 The Ministerial Statement on MCZs published on 15 November 2011 included a commitment to an in-depth review of the evidence base for all the Regional MCZ Projects' site Recommendations. In addition to the work being taken forward by Natural England and JNCC, Defra commissioned ABP Marine Environmental Research Ltd (ABPmer), supported by the Marine Biological Association of the UK (MBA) and Marine Planning Consultants (MPC) to undertake an independent review of the evidence.

1.12 The study has been taken forward through completion of the following tasks:

- Identification and collation of relevant existing data (through this project and from the Regional MCZ Projects) and additional evidence;
- Confidence assessment on spatially geo-referenced available data (confidence in feature presence, extent and condition; confidence in site boundaries) for Tranche 1 sites; and
- Gap analysis and prioritisation exercise to inform the focus of future effort on data acquisition.

1.13 The study was undertaken in parallel with an ongoing survey programme for rMCZ/rReference Area (rRA) MCZ co-ordinated by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) in partnership with the Environment Agency, JNCC, Natural England and Defra. Initial survey reports (detailing the work that had been undertaken on each research cruise) for 11 sites out of total of 40 that were surveyed in spring 2012 (Appendix A) were made available in mid-June 2012 but full data for the sites were not available during the initial period of this study. Further surveys are still ongoing and full data from these and other possible future surveys will not be available before 2013. Information on the 40 sites surveyed in spring 2012 was used to inform the prioritisation exercise. Although data for four habitat maps were made available in October 2012, none of these covered the sites being considered in Tranche 1.

1.14 This report provides details of the methodologies that have been applied in undertaking the evidence review, summarises the results of the confidence assessments for all features recommended by the Regional MCZ Projects within the Tranche 1 sites (see Table 1) based on data available at the end of 2012. The report comments on the key findings of these assessments (see Section 4 and Appendix K) and on the data found for all rMCZ and rRA sites. In addition information gathered under this project for all remaining sites are provided in the site specific SERs (see Appendix L).

1.15 The Tranche 1 sites considered for confidence assessment within this report are listed in Table 1 and have been assessed for all features originally put forward by the Regional MCZ Projects.

**Table 1: Tranche 1 rMCZs considered within this report.**

Regional MCZ Project	MCZ Name	Site Number
Balanced Seas	Stour and Orwell Estuaries	BS02
	Blackwater, Crouch, Roach and Colne Estuaries	BS03
	Medway Estuary	BS06
	Thanet Coast	BS07
	Folkestone Pomerania	BS11.4
	Hythe Bay	BS26
	Beachy Head West	BS13.2
	Kingmere	BS16
	Pagham Harbour	BS25.1

Regional MCZ Project	MCZ Name	Site Number
Finding Sanctuary	East of Haig Fras	FS07
	Southwest Deepes (West)	FS02
	The Canyons	FS01
	Lundy	FS41
	Padstow Bay and Surrounds	FS38
	Isles of Scilly – covering 13 individual sites	FS35 a-m
	The Manacles	FS32
	Upper Fowey and Pont Pill	FS29
	Whitsand and Looe Bay	FS28
	Tamar Estuary	FS27
	Skerries Bank and Surround	FS24
	Torbay	FS22
	Chesil Beach and Stennis Ledges	FS19
	South of Dorset	FS16
	Poole Rocks	FS14
Irish Sea Conservation Zones	Cumbria Coast	ISCZ11
	Fylde Offshore	ISCZ8
	Hilbre Island Group	ISCZ14
	North of Celtic Deep	ISCZ5
Net Gain	Aln Estuary	NG13a
	Swallow Sand	NG16
	Rock Unique	NG15

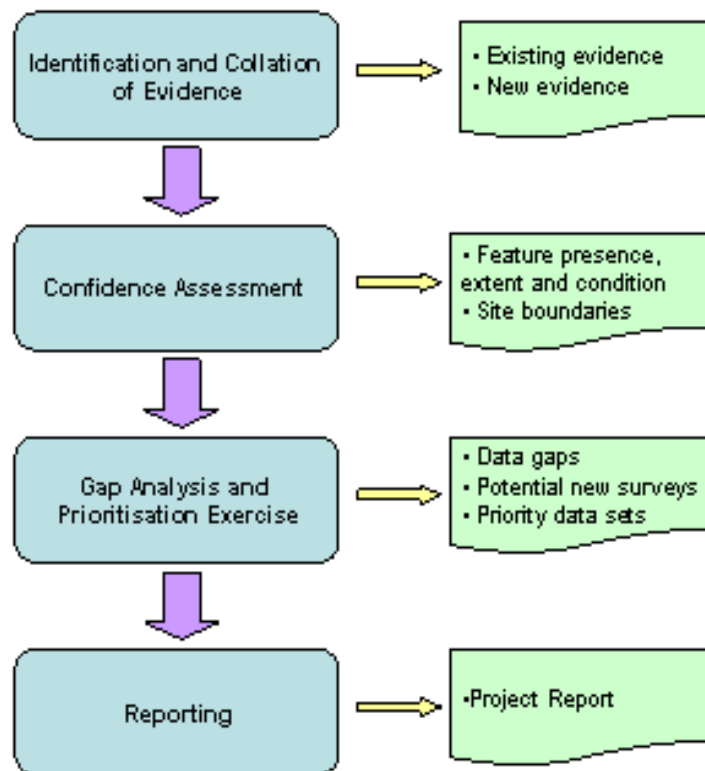
1.16 The report is structured into the following sections:

- Section 1 - Introduction (this section);
- Section 2 - Overview of methodology;
- Section 3 - Identification and collation of evidence;
- Section 4 - Confidence assessment;
- Section 5 - Gap analysis and prioritisation exercise;
- Section 6 - Summary of results and key findings; and
- Section 7 - Conclusions and Considerations.

## 2. Overview of Methodology

### 2.1 Outline Tasks

2.1 An overall methodology and reporting procedure were developed for the study based on the project specification and discussions with Defra and the Project Steering Group (PSG). In particular, this took account of Defra's requirements in relation to project outputs and to ensure consistency with parallel work being undertaken by JNCC/Natural England. Figure 2 provides a summary of the key tasks undertaken during this study and the relationship between these tasks.



**Figure 2: Key Project Tasks and Their Relationships**

### 2.1.1 Evidence Gathering

2.2 A full description of the methodology used to identify and acquire relevant data is presented in Section 3, together with a description of the key findings.

2.3 Data already used by the Regional Projects and the SNCBs in the MCZ process were collated from the following sources:

- MB0102 spatial data layers;
- MESH combined (UKSeaMap 2010, REC and MB0102 intertidal);
- Spatial data and grey literature acquired by Regional MCZ Projects; and
- Spatial data acquired by the SNCBs.

2.4 Additional evidence was identified through a number of different approaches including:

- Guidance provided by SAP;
- Detailed literature searches through the MBA, Defra and Cefas libraries;

- Identification of potential additional industry data sets based on the location of key industries;
  - Review of project team organisations internal databases;
  - Investigation of Olex<sup>4</sup> data holdings;
  - Communication with MCZ Stakeholders;
  - Contact with specific industry sectors;
  - Contact with organisations collecting and holding marine data; and
  - Contact with academics and feature experts.
- 2.5 The searches for additional evidence were focused on Ecological Network Guidance (ENG) features proposed for designation within individual sites. However, where relevant data were obtained for ENG features not proposed for designation within individual sites, or non-ENG features (such as birds). This information was also retained where appropriate.
- 2.6 As relevant data were obtained all were quality checked by ABPmer using standard data checks prior to acceptance within the project (see Section 3.1). If the data were not in a suitable digital format they were converted to a digital geo-referenced form where practicable and appropriate attribute information were added to the records as necessary. All data usage is recorded in Appendices C1 and C2.

### **2.1.2 Confidence Assessment**

- 2.7 Full details of the confidence assessment methodology to the Tranche 1 sites applied are presented in Section 4, together with a description of the key findings.
- 2.8 A confidence assessment was carried out on the available data to determine confidence in:
1. The presence of ENG features proposed for designation;
  2. The spatial extent of ENG features proposed for designation;
  3. The condition (quality) of ENG features proposed for designation; and
  4. The proposed boundaries for each site, relative to the distribution and extent of ENG features proposed for designation.
- 2.9 For the assessments of feature presence and extent, Protocol E (JNCC and Natural England, 2012) was followed, with the exception that the protocol was modified to permit assessment of new data (see Appendix J). The original protocol was drafted to permit assessment of the confidence in the presence and extent of features identified in the feature maps accompanying the Regional MCZ Project

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<sup>4</sup> Olex is an online spatial database, hosting a wide range of physical data: [http://www.olex.no/index\\_e.html](http://www.olex.no/index_e.html).

recommendations. Minor modifications to the protocol were therefore made to accommodate the assessment of new data acquired within this study. In addition moderations were made when the confidence in extent of a feature was assessed as being greater than that given to presence, in these instances the extent was reduced to match the presence score in accordance with the application made by the SNCBs. The assessment of feature condition was undertaken following Protocol F (JNCC and Natural England, 2012). For the assessment of proposed site boundaries, there was no pre-existing methodology, and a new methodology was therefore established. The outcomes of the assessments for each feature/site (high/moderate/low/no confidence) were recorded in a series of Excel spreadsheets documenting the evidence available, the evidence that informed the confidence assessment for Tranche 1 sites and the justification for each assessment for Tranche 1 sites (see Appendix K).

- 2.10 Outputs from the confidence assessment were also documented in a series of SERs which summarised the outcomes of the confidence assessments and the key evidence on which they were based. In addition SERs were produced for all non Tranche 1 rMCZ and rRA sites but without the confidence assessments.

### **2.1.3 Data Gap Analysis and Prioritisation**

- 2.11 The detailed gap analysis and prioritisation exercise methodology is provided in Section 5, together with a description of the key findings.
- 2.12 Following completion of the confidence assessment, a gap analysis and prioritisation exercise was carried out to identify remaining weaknesses in the evidence base and to suggest priorities for future action to address these gaps. The gap analysis took account of the outcomes of the confidence assessment. The prioritisation exercise sought to identify the requirements and priorities for addressing these gaps, taking account of the nature and scale of the gaps, likely availability of additional information and the emerging data stream from additional survey work being co-ordinated by Cefas<sup>5</sup>.

## **2.2 Project Steering Group**

- 2.13 The study has been overseen by a Project Steering Group (PSG) comprising representatives from:
- Defra;
  - JNCC;
  - Natural England;
  - The former SAP;
  - Cefas;
  - University of Kent:

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<sup>5</sup> Cefas co-ordinated survey programme. Defra Project MB0120.

- Marine Management Organisation (MMO); and
- The Crown Estate (TCE).

2.14 The PSG met on two occasions and provided helpful input into the development of the methodology and in commenting on draft outputs.

## 2.3 Stakeholder Engagement

2.15 Stakeholder engagement was managed by ABPmer through a series of detailed working spreadsheets divided by MCZ Region and by cross cutting activities e.g. contact with experts, these were shared between the study team. In addition to engagement with the PSG, the study team also made contact with a wide range of additional stakeholders to discuss the availability of additional data. This included email contact with all stakeholders on the MCZ Regional Stakeholder lists through JNCC and Natural England. Details about the project were also advertised via the CMS newsletter<sup>6</sup>. A list of all stakeholder organisations that were contacted by the study team or which contacted the study team is provided at Appendix B.

## 2.4 Project Outputs

2.16 Key outputs from the study include:

- The project report (this report);
- A series of spreadsheets providing an audit trail for the confidence assessments for Tranche 1 sites only;
- A series of SERs for each rMCZ Tranche 1 site which summarise the enhanced ecological evidence base for relevant features within each site, detail the additional information that had been collated, identify further relevant data sets that might improve confidence if they could be acquired, and present an overall confidence assessment for each feature in relation to presence, extent, condition and site boundaries;
- A series of SERs for the non Tranche 1 sites which detail the additional information that had been collated and identify further relevant data sets that might improve confidence if they could be acquired;
- Spatial data layers for additional ecological evidence (where available and subject to any data licensing restrictions);
- Ecological data sets for additional ecological evidence (where available and subject to any data licensing restrictions); and
- References and reports relating to additional ecological evidence (where these were obtained and subject to any copyright restrictions).

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<sup>6</sup> <http://www.coastms.co.uk/newsitems>

## **3. Identification and Collation of Evidence**

### **3.1 Introduction**

- 3.1 Data already acquired within the MCZ project by the Regional MCZ Projects were provided by JNCC and Natural England. This included geo-referenced data (see Appendix C for details) and literature (published and grey). All data were reviewed for relevance and documented within the Evidence spreadsheets for all rMCZ and rRA sites (see Appendix L) if sufficient information was provided with the digital data to describe their provenance they were used within the confidence assessments for Tranche 1.
- 3.2 Where JNCC/Natural England referenced datasets in addition to those supplied or obtained within the MB0116 project these were documented in Appendix C, in the Evidence spreadsheets (Appendix K) and in the SERs.
- 3.3 A number of different approaches were then used to search for and identify additional relevant data as detailed in Section 2.1.1. This exercise was carried out primarily between 1 March and 30 June 2012.
- 3.4 These searches were used primarily to capture any additional data not included within MB0102, UKSeaMap, Regional Environmental Characterisation (REC) or MESH or that were not clearly referenced by the Regional MCZ Projects.
- 3.5 All data (both those described above and all newly sourced data) were subject to basic quality checks prior to acceptance within the project geodatabase. All data were added to a 'Data in' folder and then moved to a 'Data for GIS' folder once it had been assessed for suitability as spatial data, once these checks had been made these data were then processed and used. These checks included:
- Checking data projections (i.e. that a coordinate system was supplied with the data in order for them to be spatially plotted). Data were not used if the projection was not defined;
  - Checking version control and data lineage to reduce double counting of survey data. Data were not used if there was insufficient metadata or attribute information to provide confidence in, for example, where the data came from or how it had been collected or collated; and
  - Reviewing data files for obvious errors, omissions or inconsistencies.
- 3.6 All datasets were sorted to include only the ENG features of interest. It should be noted that where data sources (reports or spreadsheets) provided information on sample particle size these were not translated



into EUNIS codes, as part of this contract. However they were recorded as anecdotal evidence and noted as data that were not available to the project on the SERs (see Appendix L). Clarification was sought from data providers and owners where necessary if any of the above was unclear.

- 3.7 Where digital data were available, they were processed and geo-referenced to a common format and stored in a geodatabase. Where reports contained information on the ENG features of interest that coincided with the site boundaries and that had associated geographic positions, the data were entered into a spreadsheet and added to the geodatabase. Any data that were identified but could not be supplied in digital format, due either to time limitations of the project, or because they were not available in suitable formats (i.e. unprocessed data or presented in descriptive reports with no clear positioning information) were recorded as additional available evidence within the confidence assessment spreadsheets and were used in the assessments to confirm the presence and extent of the features after all the digital data had been considered, see Section 4.
- 3.8 Spatial data were collated and stored within a project geodatabase within ArcGIS v10 (which can be also supplied in v9.3). All data were converted to 'Europe\_Albers\_Equal\_Area\_Conic\_modified' projections with modified parallels of Standard parallel 1: 50.20000000 and Standard parallel 2: 58.50000000. This is the standard projection used by JNCC for national datasets encompassing inshore and offshore data.
- 3.9 Data agreements were used where possible to provide for wider use. However, in the absence of a central agreement, all the agreements (six) which were provided by the data holders and have limited the use of the data to within this particular project only. All data gathered within this project are detailed in Appendix C, Table C2.

## **3.2 Methodology**

### **3.2.1 Collation of Known Existing Data**

- 3.10 A wide range of existing data has already been acquired by the Regional MCZ Projects, in particular, this included:
- MB0102 data layers for habitats and species of conservation importance;
  - UKSeaMap 2010, REC and MESH; and
  - Spatial data and grey literature acquired by Regional MCZ Projects.
- 3.11 JNCC/Natural England, as part of their project to provide advice to Defra also collated data from a number of additional sources, including:

- British Geological Survey (BGS) public data substrate samples;
  - Cefas sampling data;
  - UK Benthos database;
  - Marine Recorder snapshot;
  - Environment Agency database, understood to contain smelt and eel data which was obtained and the WIMS database;
  - JNCC/Natural England surveys;
  - Defra/UKHO digital elevation model (DEM) version 1 Arc second and 6 Arc second covering the whole of UK.; and
  - Photographic evidence provided by Natural England local staff.
- 3.12 These data were acquired where possible, however it was not possible to obtain access to the BGS sediment data used by JNCC owing to BGS licensing restrictions (relating mainly to third party data being included in the data supplied), because although the sample locations are publicly available, the underlying data were provided to JNCC under a special agreement. These data have been worked up by JNCC to obtain EUNIS codes thus providing additional validation points for Broad Scale Habitats and Habitat FOCI which were not available to the MB0116 project.
- 3.13 In addition the data contained within the Marine Recorder suite used by JNCC included datasets which can be made publically available, and datasets which were provided to JNCC with terms and conditions that can prohibit the data being passed on to a third party. Due to these restrictions, JNCC was not in a position to provide the full suite of Marine Recorder data to the MB0116 contract.
- 3.14 Regional MCZ Project spatial data were provided to MB0116 by the SNCBs, and although metadata was provided in a MEDIN compliant format the shapefiles lacked attribute information (see Appendix C1). Discussions with the Natural England data manger clarified some of the outstanding issues and where possible datasets were subsequently processed and used. Grey literature was made available to the study on 11 June 2012, however all the information supplied had already been identified by the MB0116 Project Team and sourced if appropriate.
- 3.15 A list of data sources accessed by Regional MCZ Projects and the SNCBs is provided at Appendix C.

### **3.2.2 Literature Reviews**

- 3.16 For the purposes of the MB0116 study, data was sourced for all 127 sites as recommended by the Regional MCZ Projects. This activity was undertaken during the period March to June 2012. In order to conduct a thorough literature search to find additional evidence of the presence, condition and extent of features for which the sites were recommended, the following methodology was followed.

## Definition of the Search Terms

3.17 All known scientific and common names for low or limited mobility Features of Conservation Importance (FOCI) and highly mobile species FOCI listed in the ENG (Table 2) were identified from the Marine Life Information Network (MarLIN) database which contains known names used for species in use since 1950. Additional search terms for selected Broad Scale Habitats (BSH) and Habitats FOCI listed in the ENG are shown in Table 3. For several of the Habitat FOCI (HOCI) there were too many representative or characterising species within the habitat to provide a specific search. Therefore, any literature sources for these Habitats FOCI have been identified via the Species FOCI (SOCI) which are known to occur within the Habitat FOCI as listed in the ENG (Table 3). In terms of conducting a literature search for the BSH, it was considered that the BSH feature names would be too general for using as search terms therefore they were defined by physical and chemical (salinity) measures rather than biological parameters (reef habitats being the exception). Search terms for the BSH of 'Coastal saltmarsh and saline reedbeds' and 'Intertidal biogenic reefs' have however been included (Table 3).

**Table 2: Search terms for low or limited mobility FOCI and highly mobile species FOCI listed in the ENG**

Scientific name	Scientific synonyms*	Common name	Common name (alternative)
<i>Alkmaria romijni</i>		Tentacled lagoon worm	
<i>Amphianthus dohrnii</i>		Sea fan anemone	
<i>Anguilla anguilla</i>		European eel	Common Eel Eel European glass eel Yellow Eel
<i>Arctica islandica</i>	<i>Cyprina islandica</i>	Ocean quahog	Icelandic cyprine Iceland cyprin
<i>Caecum armoricum</i>	<i>Caecum incomptum</i>	DeFolin's lagoon snail	
<i>Cruoria cruoriaeformis</i>	<i>Cruoria purpurea</i> <i>Contarinia cruoriaeformis</i>	Burgundy maerl paint weed	
<i>Eunicella verrucosa</i>		Pink sea fan	Broad sea fan
<i>Gammarus insensibilis</i>		Lagoon sand shrimp	
<i>Gobius cobitis</i>	<i>Gobius capito</i>	Giant goby	
<i>Gobius couchi</i>		Couch's goby	
<i>Grateloupia montagnei</i>	<i>Dermocorynus montagnei</i>	Grateloup's little-lobed weed	
<i>Haliclystus auricula</i>	<i>Lucernaria auricula</i>	Stalked jellyfish	
<i>Haliclystus octoradiatus</i>	<i>Lucernaria octoradiatus</i>	Stalked jellyfish	
<i>Hippocampus guttulatus</i>	<i>Hippocampus ramulosus</i>	Long-snouted sea horse	Sea horse
<i>Hippocampus hippocampus</i>		Short-snouted sea horse	Sea horse Short snouted sea horse
<i>Leptopsammia pruvoti</i>	<i>Leptopsammia microcardia</i>	Sunset cup-coral	Yellow coral
<i>Lithothamnion corallioides</i>	<i>Lithothamnion calcareum f. palmatifidum</i> <i>Lithothamnion norvegicum</i>	Maerl	Coral maerl Rhodolith
<i>Lucernariopsis campanulata</i>		Stalked jellyfish	
<i>Lucernariopsis cruxmelitensis</i>		Stalked jellyfish	St John's jellyfish

Scientific name	Scientific synonyms*	Common name	Common name (alternative)
<i>Nematostella vectensis</i>	<i>Nematostella pellucida</i>	Starlet sea anemone	
<i>Osmerus eperlanus</i>		Smelt	European smelt Rainbow smelt Sparling
<i>Ostrea edulis</i>		Native oyster	Common Oyster Native Irish Oyster European flat oyster
<i>Padina pavonica</i>	<i>Padina pavonia</i> <i>Fucus pavonicus</i>	Peacock's tail seaweed	Peacock's tail
<i>Palinurus elephas</i>	<i>Astacus elephas</i>	Spiny lobster	Common spiny lobster Crawfish European spiny lobster Red crab Sea crayfish
<i>Paludinella littorina</i>		Sea snail	Lagoon snail Lagoon sea snail
<i>Phymatolithon calcareum</i>	<i>Lithothamnion calcareum</i> <i>Millepora calcarea</i> <i>Melobesia calcarea</i> <i>Spongites calcarea</i> <i>Paraspora calcarea</i> <i>Millepora polymorpha</i> <i>Apora polymorpha</i> <i>Melobesia compressa</i> <i>Lithothamnion polymorphum</i> <i>Phymatolithon</i> <i>Eleutherospora polymorpha</i>	Maerl	Common maerl Rhodolith Celtic maerl
<i>Raja undulata</i>	<i>Raja fenestr</i> <i>Raja mosaic</i> <i>Raja atra</i> <i>Raja picta</i>	Undulate ray	Undulate Skate Painted Ray
<i>Tenellia adspersa</i>	<i>Tenellia pallida</i>	Lagoon sea slug	
<i>Victorella pavid</i>		Trembling sea mat	

\* as identified in MarLIN database

**Table 3: Search terms for Broad Scale Habitats and Habitats FOCI listed in the ENG**

Broad scale habitat and Habitat FOCI search terms	Other search terms
Blue Mussel beds (including intertidal beds on mixed and sandy sediments)	<i>Mytilus edulis</i> , Blue Mussel, Mussel bed
Cold-water coral reefs	<i>Lophelia</i> , <i>Madrepora</i> , <i>Solenosmilia variabilis</i> , Deep coral
Estuarine rocky habitats	<i>Hippocampus hippocampus</i> and <i>Ostrea edulis</i> (included in the Species FOCI literature search)  Estuary rocky habitat  There are too many representative or characterizing species within this habitat to provide a specific search.
Fragile sponge & anthozoan communities on subtidal rocky habitats	<i>Amphiathus dohrnii</i> , <i>Eunicella verrucosa</i> , <i>Leptopsammia pruvoti</i> (included in the Species FOCI literature search)  There are too many representative or characterizing species within this habitat to provide a specific search
<i>Sabellaria alveolata</i> reefs	<i>Sabellaria alveolata</i> , <i>Sabella alveolata</i> , Honeycomb worm, worm reef
Horse mussel ( <i>Modiolus modiolus</i> ) beds	<i>Modiolus</i> , <i>Mytilus modiolus</i>

Broad scale habitat and Habitat FOCI search terms	Other search terms
Intertidal biogenic reefs	<i>Mytilus</i> , <i>Modiolus</i> , <i>Ostrea</i> , <i>Sabellaria</i> , reef, mussel reef
Intertidal under boulder communities	<i>Paludinella littorina</i> and <i>Gobius couchi</i> (included in the Species FOCI literature search). Boulder communities, under boulder, under rock
Littoral chalk communities	Chalk community, limestone, rock-borer community, soft rock community
Maërl beds	<i>Phymatolithon calcareum</i> , <i>Grateloupia montagnei</i> , <i>Cruoria cruoriaeformis</i> , <i>Lithothamnion corallioides</i> (included in the Species FOCI literature search). <i>Lithothamnion glaciale</i> , Rhodolith, Maerl
Mud habitats in deep water	Clay habitat, mud burrows and mounds, fine muddy sand beds
Native Oyster ( <i>Ostrea edulis</i> ) beds	<i>Ostrea edulis</i> , native oyster, common oyster, European flat oyster
Peat & clay exposures	<i>Petricola pholadiformis</i> , <i>Pholas dactylus</i> , Piddock, marine peat or clay, coastal peat or clay
Ross worm ( <i>Sabellaria spinulosa</i> ) reefs	<i>Sabellaria spinulosa</i> , Ross worm, Worm reef
Seagrass beds	<i>Hippocampus guttulatus</i> , <i>Hippocampus hippocampus</i> , <i>Haliclystus auricular</i> , <i>Lucernariopsis campanulata</i> (included in the Species FOCI literature search). <i>Zostera</i> , Common eel grass, Dwarf eel grass, Eelgrass beds seagrass meadow, eelgrass vegetation, <i>Ruppia</i> beds.
Sea-pen and burrowing megafauna communities	<i>Virgularia mirabilis</i> , <i>Pennatula phosphorea</i> , <i>Funiculina quadrangularis</i> , Tall sea pen, Fireworks anemone, Slender sea pen, Phosphorescent sea pen, mounds and burrows.
Sheltered muddy gravels	<i>Nematostella vectensis</i> and <i>Ostrea edulis</i> (included in the Species FOCI literature search). There are too many representative or characterizing species within this habitat to provide a specific search
Subtidal chalk	<i>Petricola pholadiformis</i> , <i>Pholas dactylus</i> , Piddock, Chalk
Subtidal sands and gravels	<i>Arctica islandica</i> and <i>Ostrea edulis</i> (included in the Species FOCI literature search). There are too many representative or characterizing species within this habitat to provide a specific search.
Tide-swept channels	Tide-swept channel, Tidal channel, Tidal Races, Tidal Rapids
Coastal saltmarsh and saline reedbeds	<i>Victorella pavid</i> a (included in the Species FOCI literature search). Saltmarsh, Reeds, Beds

## Literature Search and Sift for Relevance

### First stage

3.18 A search for the identified terms, based on the detail given above, (Tables 2 and 3) was conducted using online retrieval from journals and bibliographic databases provided by the National Marine Biological Library (NMBL<sup>7</sup>, Plymouth). The resources used were:

- Science Direct,
- Aquatic Sciences and Fisheries Abstracts (ASFA),
- Web of Knowledge,
- Google Scholar, and
- NMBL Library catalogue.

<sup>7</sup> NMBL, Plymouth: [www.mba.ac.uk/nmb/](http://www.mba.ac.uk/nmb/).

- 3.19 Where the search engine enabled the use of multiple search terms, the search results were filtered for UK relevance only. The first 100 UK references were extracted and entered into the reference management software EndNote. Where the search engine did not support multiple search terms then the titles, keywords and abstracts of the first 100 results were assessed for UK relevance. Those that were UK relevant were added to a project EndNote.
- 3.20 In addition to the MBA literature search, staff at the Defra and Cefas libraries conducted searches from their literature holdings. Defra staff also conducted a literature search using the BioSciences Information Service of Biological Abstracts (BIOSIS) database. Both organisations provided the MBA with a citation list of the search results. Defra identified a total of 3288 references (this search was not UK specific) and Cefas identified 21. From these references the MBA identified 17 additional references that had not been found during the initial literature search. This resulted in a total of 1337 relevant references being identified as having the potential to provide additional evidence of the presence, condition and extent of features for which a Regional MCZ Project recommended site may be designated. These were added to a project EndNote.

### ***Second stage***

- 3.21 In order to identify references that may provide additional evidence of the presence, condition and extent of features for which a Regional MCZ Project site may be designated the literature was sifted against the following criteria:

#### **Reasons to retain reference**

- UK specific;
- Contains a geographical location (presence or extent of species or habitat within an MCZ or RA); and
- Contains evidence of the condition of the feature within an MCZ or RA.

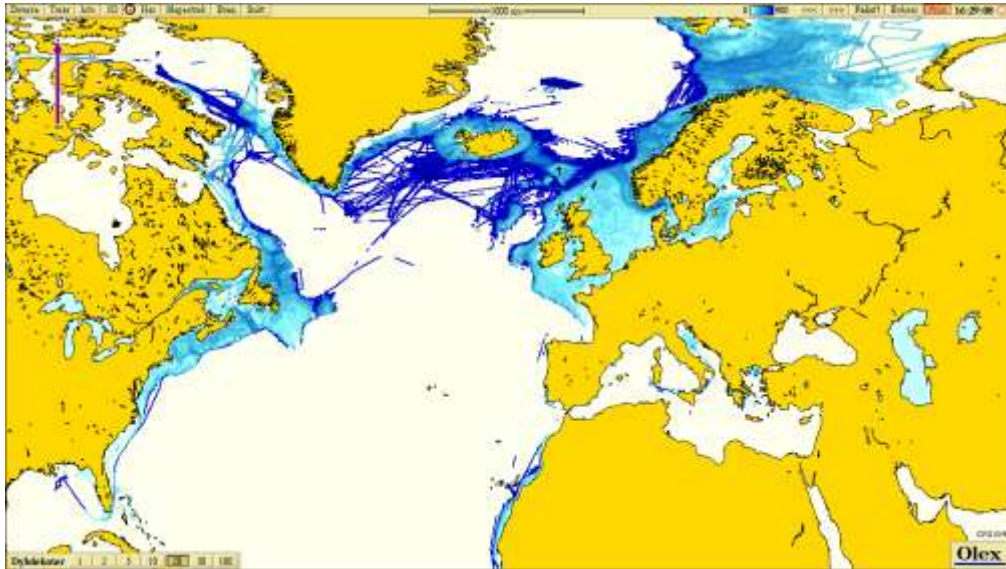
#### **Reasons to discard reference**

- Not UK specific;
- Referenced in the Regional MCZ Project Recommendation reports;
- Referenced in the Defra reports MB0102 2B, 2C and 2F; and
- Laboratory experiments i.e. contained no information regarding presence, extent or condition of species or habitat.

### **3.2.3 Investigation of Olex Data Holdings**

- 3.22 Olex is a system for navigation, fishery plotting and ocean mapping, built around a principle of bathymetric data sharing. Vessels, predominantly those working in the fisheries sector, equipped with

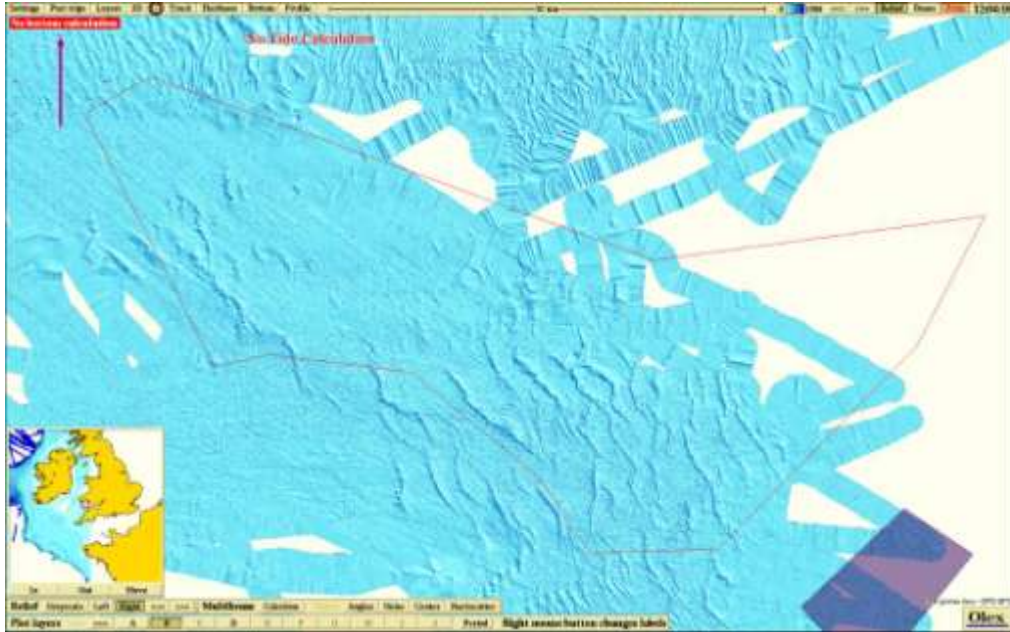
echosounders, Global Positioning System (GPS) and the Olex system collect large quantities of depth data in the form of singlebeam and multibeam data, as well as Acoustic Ground Discrimination Systems (ADGS) data. Any data collected is submitted to Olex and in return licence holders receive an annual update of the entire database of shared depth measurements for the UK (Figure 3).



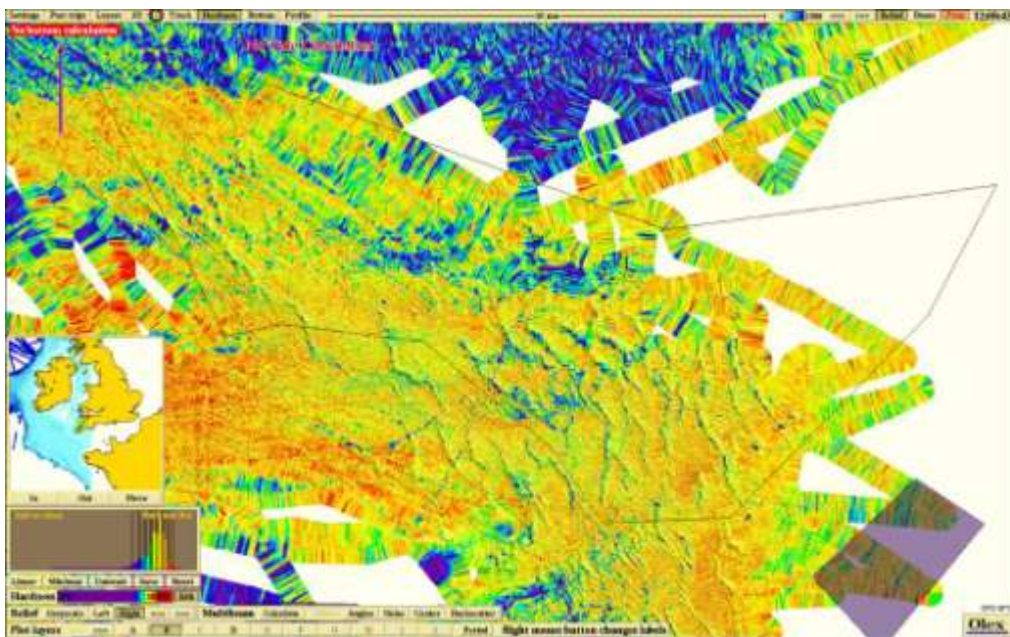
**Figure 3: Chart Illustrating the Coverage of the Shared Olex Database (December, 2011)**

- 3.23 Singlebeam and multibeam data can be used to analyse the presence of seabed features through depth and backscatter (hardness) measurements. Multibeam can provide data at a horizontal resolution of around 0.5m, whereas the horizontal resolution of data collected using single beam is typically around 5m. Whilst these acoustic data are primarily used to identify physical features (e.g. sandwaves) they can also be used to detect some biological features (e.g. biogenic reefs) where the data resolution is high enough. Acoustic backscatter data can also be used to help identify the type of substrate, presence of rock in particular, as well as the location of softer marine organism communities as found in biogenic reefs.
- 3.24 Olex data were not utilised by any of the Regional MCZ Projects and could therefore provide additional evidence relating to the presence and extent of physical and biological features. Unfortunately only single beam data are available in the vicinity of rMCZs and rRAs. Coverage ranging from 1 to 95% was identified at 57 of the rMCZs and rRAs and of these only seven had backscatter data associated with the records.
- 3.25 All of the data available from Olex in the vicinity of the rMCZs and rRAs was found to be of a 5m resolution or less (see Figure 4) and backscatter data were only available for a small number of sites (Figure 5). This source of data was therefore identified as being of low priority for acquisition and Olex data was not used in the confidence assessments.





**Figure 4: Chart Illustrating Singlebeam Data at the North of Lundy rMCZ, Sourced from Olex (December, 2011)**



**Figure 5: Chart Illustrating Singlebeam Backscatter Data at the North of Lundy rMCZ, Sourced from Olex (December, 2011)**

### 3.2.4 Communication with MCZ Stakeholders

3.26 In order to maximise the reach of the search for additional evidence, a letter was emailed to all 3124 stakeholders on the Defra consultation list (which includes all the stakeholders involved at national or regional level in the MCZ process) in March 2012 alerting them to the project and inviting them to provide additional data (see Appendix D). In March



2012, Defra also circulated Issue 9 of the MCZ Newsletter which again invited stakeholders to submit any additional relevant ecological data (see Appendix D).

### **3.2.5 Contact with Industry**

3.27 A number of approaches were adopted in seeking to identify and acquire industry data:

- National level communication (email/phone) was undertaken with the commercial fisheries, offshore renewables, oil & gas and marine aggregates sectors;
- Identification of potential spatial overlaps between key marine industries (marine aggregate extraction sites, subsea cables and pipelines, oil and gas licence areas, port and harbour developments, power stations, outfalls and offshore wind farm sites) and the 127 recommended Regional MCZ Projects sites to identify locations for which data might be available. Environmental Statements relating to these developments were then sourced from the MMO, Department of Energy and Climate Change (DECC), the EA and private developers, where they were not freely available on the internet. Environmental Statements were reviewed by the project team and raw data or interpreted habitat maps were then requested where they were thought to add significant evidence to the presence, extent or condition of any ENG features identified within the rMCZs or rRAs (see Appendix E for further details);
- The project consortia for this work includes two consultancies who are regularly involved in the collection and review of environmental data during the course of Environmental Impact Assessments (EIAs); ABPmer and MPC, who are part of the Gardline Group of companies. As a means of maximising on the experience of the consortia in this area, internal databases were also interrogated to identify any data that could provide additional evidence in support of the MCZ designation process; and
- Email/telephone contact with fishermen and fishermen's representatives involved in Regional MCZ Projects to seek to identify additional data from the commercial fishing data.

3.28 Where potential data sources were identified, these were followed up with the relevant data owners and acquired where possible. Any habitat maps or point data sourced through this route were included in the project geodatabase and were interrogated during subsequent confidence assessments.

### **3.2.6 Contact with Organisations Holding Marine Data**

3.29 A wide range of organisations holding marine data were contacted to identify additional data sources to those used by the RPs. In particular,

this involved contacting organisations that had previously contributed data to the MB0102 project to obtain data acquired since September 2009, the cut-off date for data to be included in the MB0102 data layers. The following data owners were contacted:

- **MEDIN Searches:** The Marine Environmental Data and Information Network (MEDIN) data discovery portal (<http://portal.oceannet.org/search/full>) was queried by drawing boxes in the WebGIS which encompassed each rMCZ and rRA. This resulted in metadata outputs for each dataset found within the specified box, including data owners contact details. This process was repeated for all of the rMCZs and rRAs after which the results were combined and duplicates removed.

MEDIN datasets were reviewed for their potential to provide additional evidence in support of the rMCZ and rRAs and datasets already used by the Regional MCZ Projects were identified (where possible). Highest priority was given to data that were collected post 2000, that contained both biological and geological data and those that included a habitat map. The 'party who can be contacted for acquiring knowledge about or acquisition of the resource' described in the MEDIN metadata, was approached directly to source the data where it had not already been sourced through other means.

- **Marine Recorder Snapshot/ NBN Species Records:** A number of Marine Recorder snapshots have been provided to the project. These include an update of the data captured within MB0102, i.e. since the cut off date of 1 April 2009, this was supplied by MBA on 30 May 2012. A snapshot of the South West Approaches Canyons survey was supplied by JNCC on 17 May 2012. In addition the Marine Conservation Society (MCS) provided snapshots of all Wildlife Trust data for 2011 for each Regional MCZ Project area. They also supplied all previously submitted data (1980s - 2011) for completeness.
- **Cefas:** Cefas were contacted with regard to the following: Identification of benthic data acquired since September 2009; identification of additional relevant benthic data records and sources not accessed by MB0102; identification of epifaunal data from beam trawl and groundfish surveys. In addition they were also asked for data identified within the literature searches. In addition Cefas were commissioned to undertake a number of surveys of the rMCz and rRA sites, as identified in Appendix A, the habitat maps arising from four of these site surveys have been included in the data capture process.
- **AFBINI:** The Agri-Food and Biosciences Institute (Northern Ireland; AFBINI) were contacted with regards their data holdings for the Irish Sea Conservation Zones, this resulted in the

provision of data and supporting documentation with specific reference to the Pisces Reef Complex.

- **Coastal Observatories:** The three Coastal Observatories, namely Plymouth, Liverpool Bay and Channel Coastal Observatory (CCO) together with the now defunct North East Observatory were contacted with respect to any relevant data holdings. The Plymouth Observatory provided some terrestrial and intertidal data which was already held within the SW Habitat Mapping project of 2012, Liverpool Bay replied that it did not hold information on the features of interest and the North East Observatory had downloadable data which was interrogated. The CCO is in the process of collating and providing a habitat map for the Isle of Wight coastline, this however had not been processed in time to be used within this project. The data to be used for the mapping was based on surveys by the EA and local Wildlife Trusts. Aerial photography from the CCO was used to help confirm the presence and extent of intertidal BSHs.
- **Natural England:** Local Natural England offices were contacted for any survey data that they might have held that had been collected since 2009, the cut off date for MB0102. Data holdings that were provided to the MB0102 project for the intertidal layer but that were not included due to time constraints e.g. The Wash (mudflats), Essex Estuaries SAC and Hampshire and Isle of Wight *Zostera* and eelgrass data.
- **Wildlife Trusts:** The Devon Wildlife Trust was contacted for a national overview of the Trust's data holdings. It was established that the southern England Trusts were most active in the collection of marine data and therefore Cornwall, Dorset, Devon, Hampshire, Isle of Wight and Kent and Essex were either contacted or contacted the project team themselves and have provided data. No other data were identified from this source.
- **IFCAs:** All Inshore Fisheries and Conservation Authorities (IFCAs) were contacted by phone and these calls were followed up with an explanatory email, The Sussex IFCA was able to provide survey data.
- **Environment Agency (EA):** *WFD Benthic Data* - Benthic data and associated Particle Size Analysis (PSA) data collected as part of the Water Framework Directive (WFD) national monitoring programme was provided to the project by the EA through their National Customer Contact Centre (NCCC). Smelt and eel data were obtained which were also used by Natural England, it is still unclear what the WIMS database holds and where it might be available, discussions are ongoing with the Natural England data manager.

- **BGS Public Data Substrate Types:** The BGS publishes sediment sample locations on the website which are publically available for download, however the sample descriptions and PSA data behind the sample points are not. Discussions with BGS suggest that although the data are being collated and appropriate metadata being gathered at the moment these will not be ready for this project.
- **UK Benthos:** The UK Benthos data since 2009 was accessed and was found to contain over 400,000 potentially useful data records. However it was concluded that the contents overlapped considerably with the Digital Energy Atlas and Library (DEAL) and that the majority of relevant records had therefore already been considered. Data held in the UK Benthos database were also found to be in a projection that could not easily be translated for use in the current project.
- **British Oceanographic Data Centre (BODC):** BODC is a national facility for preserving and distributing oceanographic and marine data. BODC were contacted regarding this project and the Rivers, Atmosphere and Coasts Study (RACS) that they hold were requested. Unfortunately these were not made available to the project in the time available, but may provide further evidence in support of the rMCZs if pursued further.
- **Marine Aggregate Regional Environmental Assessment Groups:** The Anglian Offshore Dredging Association (AODA) and the Humber Aggregate Dredging Association (HADA) were contacted regarding their regional environmental assessment data. The HADA agreed to supply their REA data for use in the project but unfortunately this was not provided within the project deadlines.
- **European Data Catalogues:** The following European data catalogues were interrogated for biological and geological datasets that overlap the rMCZ and rRAs:
  - European Marine Observation and Data network (EMODnet) (<http://bio.emodnet.eu/portal/index.php>);
  - Flanders Institute for Marine Research (VLIZ) (<http://www.vliz.be/vmdcdata/wlist.php?ThemID=12>); Marine Biodiversity and Ecosystem Functioning EU Network of Excellence (MarBEF) Data System (<http://www.marbef.org/data/imis.php?module=dataset&show=searchfrm>);
  - European Ocean Biogeographic Information System (EurOBIS) (<http://www.marbef.org/data/eurobissearch.php>); and
  - North Sea Benthos Project: (<http://www.vliz.be/vmdcdata/nsbp/>).

3.30 There was a lot of overlap between these data catalogues and consequently the search was confined to an interrogation of the databases using the terms “Benthos, Benthic, Sediment and UK” which returned over 19,000 records. Once cross-checked with data already used by the Regional MCZ Projects this list was reduced to five datasets which were subsequently sourced. These included the 1986 and 2000 North Sea Benthos datasets, 2000-2002 North Sea data collected by Cefas and some data held in the Data Archive for Seabed Species and Habitats (DASSH).

- **Environmental Records Centre of the North East of England (ERIC):** ERIC is a collation of data from various local interest groups in the North East including Natural England, the Wildlife Trust, the Big Sea Survey and Biodiversity Partnerships. The website itself was searched for relevant datasets and the project coordinator has also been contacted directly. It would appear that this data source is in its infancy and does not yet contain a great deal of data. ERIC have however recently obtained a large cetacean dataset which may provide useful information of areas of additional ecological importance.
- **Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS):** Data from Isles of Scilly and Cornwall were supplied via the RPs.

### **3.2.7 Consultation with Academics and Feature Experts**

3.31 The SAP Evidence Review identified a number of potential additional data sources that did not appear to have been referenced by the Regional MCZ Projects. A list of potential additional data sources was compiled and followed up with individual former SAP members where necessary. Where new sources of evidence were identified, these were acquired where possible as detailed in Appendix G.

3.32 Further discussions were held with a number of former SAP members and academic researchers to identify potential additional data sources not identified in the SAP evidence review.

### **3.2.8 Collation of Intertidal Photography**

3.33 In addition for the Tranche 1 sites only, intertidal photography was used where available. For sites where aerial photographic evidence was not available from the CCO, imagery from BING was identified, for sites within Net Gain. However due to their resolution BING and CCO imagery were only used to confirm and not increase the confidence of the assessments. In addition Natural England supplied photographs taken at a few of the Tranche 1 sites. Where these were geo-referenced and had been specifically taken to confirm the presence of the feature within the rMCZ they were used as an addition data point within the confidence assessment.

### 3.3 Findings

3.34 A list of additional references identified through the literature search is presented in Appendix F. Appendix G summarises the types of additional data identified and acquired as a result of:

- Communication with MCZ stakeholders;
- Contact with industry;
- Contact with organisations holding marine data; and
- Consultation with academics and feature experts.

3.35 Table 4 summarises the additional evidence identified by search type, the number of data sets subsequently acquired and whether this included spatial data. Over 780 information sources were identified, but only 38% of these could be acquired and only 19% of these yielded spatial data that could be used in the confidence assessments (see Appendix C2). These tables include the additional data that was received after the original cut off date of 1 June 2012 and the four surveys provided by Cefas.

**Table 4: Summary of additional evidence sources identified and acquired**

Search method	No. of additional evidence records			No. of sources with relevant geo-referenced spatial data
	Identified	Requested	Acquired	
Literature Review (See Appendix F)	345	-	127	9
Communication with MCZ Stakeholders (see Appendix B)	11	11	10	3
Contact with industry stakeholders (see Appendix G)	148	148	49	15
Contact with organisations holding marine data (see Appendix G)	216	94	65	21
Contact with academics and feature experts (see Appendix G)	61	1	31	9
Photographic evidence	3	-	3	3*
<b>Total</b>	<b>784</b>	<b>256</b>	<b>295</b>	<b>57</b>

\* denotes data sets that were used to confirm presence/extent of intertidal features such as photography rather than spatial data in point or polygon data that could be quantified sourced from BING, CCO and Natural England photographs.

3.36 A list of all additional spatial data sets acquired by the study is provided in Appendix C2. Table 4 shows that 57 sources of data were identified as having relevant geo-referenced spatial data, these provided 65 datalayers that could be used within the confidence assessments. The following additional data sets have been identified which provide significant spatial evidence:

- SeaSearch (up to December 2011), covering all areas;
- Marine Recorder (since April 2009) and covering all areas;
- HabMap, for Irish Sea Conservation Zones;

- Hampshire and Isle of Wight Wildlife Trust Seagrass Inventory, Balanced Seas;
  - Cefas rMCZ habitat map data;
  - Sussex IFCA ; and
  - Channel Coastal Observatory aerial photography.
- 3.37 The main reasons data could not be acquired were either due to lack of time, unwillingness of the data owner to release the data, or the data simply not being available in a suitable format. These data sources were prioritised for acquisition in Section 5. A key barrier in acquiring data was the development of a suitable data-sharing agreement. The PSG had originally agreed that Defra lawyers draft an agreement, but this was not possible because the advice given from the Defra data team was that the agreement should be set up by the Defra owner and signed by the users. The project team utilised their in-house legal department to draft an appropriate agreement, however in the time available, only six stakeholders were able to consider this.
- 3.38 Quality issues were encountered both with data sets already used within the MCZ process and with newly identified data sets. These included projection errors, duplicate data points (where more than one data set included data points from the same surveys), erroneous data (for example, where feature polygon data had been derived from point data using inappropriate methods), issues with translation of data to EUNIS codes, incorrect naming of data sets and inadequate version control. For example, several hundred duplicate data points were identified across different data sets and more than 20 existing MCZ data sets were rejected on the basis of other errors (see Appendix C). These issues are a common problem in marine datasets relating to habitats and species.
- 3.39 Identified issues were addressed where possible. For example, within the REC data the classification to EUNIS levels was unclear i.e. multiple fields relating to EUNIS codes and limited documentation on final delivered data sets. This issue was resolved through detailed discussions with individuals involved in the REC projects so that the appropriate data was utilised to its fullest. To tackle any projection errors all the original data sets were re-projected into a single projected coordinate system (Albers equal area conic) using standard re-projection transformations. Duplicate data were addressed during the assessment stage and discounted when both the available attribute information and the geographical extent were the same.
- 3.40 Where Regional MCZ Project spatial data lacked metadata, particularly to describe lineage, or attribute information and it was not possible to confirm the source of the data, these data sets were not used within the MB0116 confidence assessment process. Examples are detailed in Appendix C1.

## **4. Confidence Assessment**

### **4.1 Introduction**

4.1 The confidence assessments undertaken for the features as recommended by the Regional MCZ Projects for Tranche 1 sites in this study have taken account all the geo-referenced data available to the MB0116 projects at the end of December 2012, including newly acquired data, to determine confidence in:

1. The presence of ENG features proposed for designation;
2. The spatial extent of ENG features proposed for designation;
3. The condition (quality) of ENG features proposed for designation; and
4. The proposed boundaries for each site, relative to the distribution and extent of ENG features proposed for designation.

4.2 It should be noted that the collation of socio-economic data were not considered under this contract.

4.3 The confidence assessments have been documented in a series of Excel spreadsheets (see template in Appendix H) to provide a clear audit trail for each assessment and to identify the specific data that has been used to inform each confidence assessment.

4.4 Outputs from the confidence assessment were also documented in a series of SERs (see Appendix I for template) which summarised the outcomes of the confidence assessments and the key evidence on which they were based.

### **4.2 Methodology**

#### **4.2.1 Definition of Confidence Assessment Protocols**

4.5 To assess confidence in the presence and extent of ENG features proposed for designation within each Tranche 1 site, the methodologies set out in Protocol E (JNCC & Natural England, 2012) have been applied with minor modification to enable the assessment of additional data. Natural England employed Marine Mapping Ltd. to translate the protocols into a series of flow diagrams/ series of steps to progress through using the available spatially referenced data sets within a Geographic Information System (GIS) framework. These were first reviewed to ensure that the project team were confident that they adhered to the principles of the protocols. In addition Marine Mapping Ltd provided specific advice to this project to ensure there was a sufficient understanding of how to apply the sequence of steps within the flow diagrams.



- 4.6 The original flow diagrams, as supplied by Marine Mapping, were updated following discussions with Defra and the SNCBs. These modifications were primarily made to allow for the consideration of new data within the assessment process. Modifications were in relation to BSH presence where it was ensured that a High confidence score could not be achieved without validation points and BSH extent which required an assessment of the distribution of validation points within the best available mapped polygon data (as opposed to the mapped location of the recommendation within the Regional MCZ Project Site Assessment Documents (see Section 4.4 for more detail on the different approaches adopted by MB0116 and the SNCBs). In addition the extent confidence scores were moderated to ensure that in no instances were they higher than the respective presence score. The final version of the flow diagrams used within this project can be found in Appendix J.
- 4.7 Two sets of information were used outside the GIS framework; this information was still used following the criteria outlined within Protocol E, however, it could not be added to the GIS database. Firstly aerial photography provided by The Channel Coastal Observatory<sup>8</sup> was used to help validate confidence in intertidal BSHs. Secondly anecdotal information retrieved from scientific papers or survey reports which did not have exact coordinate information but did provide descriptive ENG feature detail i.e. provision of a map displaying sample points, a habitat map derived from survey data or detail description of a feature location, was used post the GIS assessment where applicable. This was primarily used to adjust confidence scores for presence and only occasionally for extent.
- 4.8 To assess confidence in the condition of ENG features proposed for designation within each site, the methodology set out in Protocol F (JNCC & Natural England, 2012) has been applied. The detailed application of these protocols is described in Appendix J. No pre-existing methodology was available for assessing confidence in site boundaries and a new protocol has been developed and applied (see Appendix J). The key criteria applied in the confidence assessments are summarised below, but for full details, please refer to the relevant appendices.

### **Confidence Assessment for Presence**

- 4.9 Table 5 summarises the criteria developed within Protocol E to assess confidence in the presence of BSH, habitat FOCI and species FOCI. A confidence score was first assigned using the data held within the GIS database according to the flow diagrams within Appendix J. The additional aerial photographs (obtained from CCO) from which it was possible to verify the presence of intertidal BSH were used to

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<sup>8</sup> Accessed from:  
[http://www.channelcoast.org/data\\_management/online\\_data\\_catalogue/metadata/search/index2.php](http://www.channelcoast.org/data_management/online_data_catalogue/metadata/search/index2.php)

supplement the assessment process. The CCO aerial photography was considered to be equivalent to a habitat map, where the photography had high enough resolution to identify the BSH. The final step in the process was the review of any spatially descriptive anecdotal evidence to determine whether it met any of the criteria within Table 5 and as such could be used in assigning a confidence score. The overall presence confidence score was therefore determined from all of the spatially available datasets, the CCO imagery (for intertidal BSH only) and anecdotal information. No confidence can also be achieved through no data being available for the feature as adopted in MB0116.

**Table 5: Confidence assessment criteria for feature presence**

<b>BSH</b>	<b>FOCI habitats</b>	<b>FOCI species</b>
<b>High confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence to demonstrate feature presence, with most records in agreement.</li> </ul>	<b>High confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence to demonstrate feature presence, with most records in agreement. For highly variable habitats only records up to 6 years old.</li> </ul>	<b>High confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence of species presence supported by multiple records up to 6 years old.</li> </ul>
<b>Moderate confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence to demonstrate presence of 'parent'* feature, with many records in agreement.</li> </ul>	<b>Moderate confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence to demonstrate feature presence, with many records in agreement. For highly variable habitats records up to 12 years old.</li> </ul>	<b>Moderate confidence</b> <ul style="list-style-type: none"> <li>▪ Quantifiable or verifiable evidence of species presence supported by multiple records up to 12 years old.</li> </ul>
<b>Low confidence</b> <ul style="list-style-type: none"> <li>▪ Unquantifiable or unverified evidence only to indicate feature presence; OR</li> <li>▪ Only one record available.</li> </ul>	<b>Low confidence</b> <ul style="list-style-type: none"> <li>▪ Unquantifiable or unverified evidence only to indicate feature presence; OR</li> <li>▪ Only one record available.</li> </ul>	<b>Low confidence</b> <ul style="list-style-type: none"> <li>▪ Unquantifiable or unverified evidence only to indicate feature presence; OR</li> <li>▪ Only one record available: OR</li> <li>▪ Records older than 12 years</li> </ul>
<b>No confidence</b> <ul style="list-style-type: none"> <li>▪ Available evidence is conflicting with respect to habitat type.</li> </ul>	<b>No confidence</b> <ul style="list-style-type: none"> <li>▪ Available evidence is conflicting with respect to habitat type.</li> </ul>	<b>No confidence</b> <ul style="list-style-type: none"> <li>▪ Available information indicates the species have been identified at the wrong location.</li> </ul>
<p>* In this protocol the parent feature refers to the EUNIS Level 2 habitat to which the broad-scale habitat belongs (e.g. the broad-scale habitat 'High energy circalittoral rock' belongs to the EUNIS Level 2 habitat 'Circalittoral rock').</p>		

### Confidence Assessment for Extent

4.10 Table 6 summarises the criteria developed within Protocol E to assess confidence in the extent of BSH, habitat FOCI and species FOCI. The same procedure was followed to determine the confidence in extent as that applied for presence (see Paragraph 4.5). However the feature extent confidence score were less likely to be adjusted through the use of imagery and anecdotal evidence as feature extent is more reliant on the data being represented spatially. In addition, where initial confidence scores for feature extent were higher than the scores for feature presence, the extent scores were moderated downwards to match the corresponding score for presence. Such moderation was also applied by the SNCBs in their assessments and was necessary to address an artefact of the methodology.

**Table 6: Confidence assessment criteria for feature extent**

<b>BSH</b>	<b>FOCI habitats</b>	<b>FOCI species</b>
<p><b>High confidence</b></p> <ul style="list-style-type: none"> <li>▪ Habitat map with mesh score of <math>\geq 58</math> and multiple validation points distributed over more than 50% of the feature polygon(s); OR</li> <li>▪ Modelled map with multiple validation points distributed over more than 50% of the feature polygon(s).</li> </ul>	<p><b>High confidence</b></p> <ul style="list-style-type: none"> <li>▪ Habitat extent supported by survey data (habitat map survey or remote sensing data) covering most of the feature; OR</li> <li>▪ Sample data distributed across most of the feature.</li> </ul>	<p><b>High confidence</b></p> <ul style="list-style-type: none"> <li>▪ Records from surveys contain evidence on the distribution and/ or abundance of the species across and/ or within the site AND data are less than 6 years old.</li> </ul>
<p><b>Moderate confidence</b></p> <ul style="list-style-type: none"> <li>▪ Habitat map with mesh score of <math>\geq 58</math> and multiple validation points not distributed over more than 50% of the feature polygon(s); OR</li> <li>▪ Modelled map with multiple validation points not distributed over more than 50% of the feature polygon(s).</li> </ul>	<p><b>Moderate confidence</b></p> <ul style="list-style-type: none"> <li>▪ Habitat extent supported by survey data (habitat map from survey or remote sensing data) covering some of the feature; OR</li> <li>▪ Sample data distributed across some of the feature.</li> </ul>	<p><b>Moderate confidence</b></p> <ul style="list-style-type: none"> <li>▪ Records from surveys contain evidence on the distribution and/ or abundance of the species across and/ or within the site AND data are less than 12 years old.</li> </ul>
<p><b>Low confidence</b></p> <ul style="list-style-type: none"> <li>▪ Modelled map with no validation points; OR</li> <li>▪ Habitat map with mesh score of <math>\geq 58</math> and no validation points; OR</li> <li>▪ Only point data available.</li> </ul>	<p><b>Low confidence</b></p> <ul style="list-style-type: none"> <li>▪ Only modelled habitat map available; OR</li> <li>▪ Single sample record</li> </ul>	<p><b>Low confidence</b></p> <ul style="list-style-type: none"> <li>▪ Records from surveys contain evidence on the distribution and/ or abundance of the species across and/ or within the site AND data are older than 12 years old.</li> </ul>

### Confidence Assessment for Condition

4.11 Protocol F presents methods and criteria for undertaking confidence assessments of feature condition based on direct evidence and vulnerability assessment. All of the assessments of feature condition reported in the Regional MCZ Project Site Assessment Documents are based on vulnerability assessment rather than direct evidence. The following parameters are required to undertake a confidence assessment for condition based on a vulnerability assessment:

- Feature extent;
- Features sensitivities to pressures;
- Pressures associated with activities;
- Human activities data; and
- Biological data.

4.12 Given the underlying uncertainties in applying the vulnerability assessment process there is inherently a low confidence for feature condition except where additional criteria are met.

4.13 Where there is a moderate or high confidence in the extent of a feature, scientific confidence of feature condition derived from a vulnerability assessment could potentially be increased. Under the protocol, confidence in feature condition derived from a vulnerability assessment can be raised to moderate where an activity is known to occur over a feature which exposes it to pressures to which it is known to be highly sensitive.

## Confidence Assessment for Site Boundaries

4.14 The confidence assessment for site boundaries principally takes account of the confidence in feature extent and the degree to which site boundaries are linked to feature boundaries (for all features as recommended by Regional MCZ Projects for each Tranche 1 site). The rationale for this is that where there is low confidence in feature extent, there is likely to be low confidence in the position of the feature boundary relative to the site boundary. In normal circumstances, there might also be a general expectation that site boundaries would be broadly aligned to feature boundaries, although it is recognised that there may sometimes be reasons why site boundaries are configured differently, for example, for ease of management, or where a feature has a particularly extensive distribution and it is not necessary to incorporate all of the feature within the site.

4.15 The following criteria have been used to determine confidence in relation to site boundaries:

- **High Confidence:**
  - High confidence in feature extent for  $\geq 80\%$  of habitat features proposed for designation in rMCZ; **AND**
  - Site boundaries closely follow (i.e. are well aligned to) the feature boundaries i.e. based on a map of all features in relation to the proposed boundary.
- **Moderate Confidence:**
  - High confidence in feature extent for  $< 80\%$  of habitat features proposed for designation in rMCZ; **AND**
  - Moderate or high confidence in feature extent for  $\geq 50\%$  of habitat features in rMCZ; **AND**
  - Site boundaries closely follow the feature boundaries.
- **Low Confidence:**
  - Low confidence in feature extent for  $> 50\%$  of habitat features proposed for designation in rMCZ; **AND/OR**
  - Site boundaries do not obviously follow the feature boundaries (i.e. the feature boundary is well within or extends outside the proposed boundary).

### 4.2.2 Data Preparation

4.16 To complete the GIS assessment using the flow diagrams, relied on the availability of digital geo-referenced spatial data to inform the confidence assessments. This information was collated within a geodatabase. Where the acquired data were not supplied in a suitable format it was first geo-referenced where feasible before being added to geodatabase. Where this was not possible, the information was documented in the confidence assessment spreadsheets (see below) for use in the confidence assessment process. Further data preparation was not required for the anecdotal evidence. The data

preparation steps detailed below relate purely to the data collated within the geodatabase.

- 4.17 All spatial data were converted to a consistent projection (Albers Equal Area Conic with modified parallels) and held within a spatial database within ArcGIS v 10 (also available as v 9.3). This projection was chosen because it was consistent with that used by JNCC and allowed the area covered by each feature to be calculated where appropriate.
- 4.18 The datalayers were prepared to ensure they incorporated all of the necessary attribute data to undertake the confidence assessment. This process included the standardisation of the feature names to ensure they were wholly consistent with the ENG feature classification. The naming convention as adopted in MB0102 Task 2C (Seeley *et al.* 2010b) was used to translate the original species, habitats and BSH codes to those equivalent in the ENG listing. All non ENG features were deleted from each of the datalayers.
- 4.19 The datalayers were each intersected with the boundary of the rMCZs (version dated 25 April 2012) to identify all of the spatial data sets that were available for each feature within each rMCZ. This information was exported into an excel spreadsheet creating a spatial data summary which incorporated all of the key attribute information as summarised in Table 7. The datalayers were also intersected using a 1 km buffer around each of the rMCZs for use in the boundary assessments, in order to check how closely the feature and site boundaries were aligned. This buffer was chosen as it allowed all features to be considered at the same time taking account differences in depths for the different features. Duplicate records were identified and deleted at this stage wherever it was possible to cross reference the survey codes and dates assigned to each dataset. A further check for duplicate data was undertaken, using expert judgement, when applying the confidence assessment protocols.

**Table 7: Spatial data summary**

Column heading	Description
Unique ID	Dataset, Layer, MCZ, polygon no. This was designed to help link the summary spatial data to the spatial database.
MCZ Name	Name of MCZ
MCZ code	MCZ Code
Data Source	e.g. MB0102, MESH, REC, UKSEMAP etc
Geometry	Point or polygon
Feature Name	Standardised feature name
Alternative Feature Name	Any additional detail regarding the feature from the original file
Original Layer name	Datalayer the spatial data came from (links to geodatabase)
Feature intersect area	Area of feature within MCZ (only applicable to polygons)
Survey ID	Survey ID
Survey Name	Survey Name
Survey Site	Survey Site
Sample ID	Sample ID
Sample Date	Sample Date
Determiner	Name of person/ organisation responsible for delivering survey results.
Confidence	MESH confidence score for polygons where available

4.20 The spatial data summary spreadsheets were linked to the spatial geodatabase which allowed cross referencing between these two information sources.

### **4.2.3 Application of Protocols**

4.21 A detailed methodology guidance document was produced at the outset of the confidence assessments (Appendix J). This was supported by a workshop which was designed to standardise the approach used by all project partners. The confidence assessments were led by the following partners and cross checks made by ABPmer to ensure consistency, any differences were passed back to the appropriate partner to re-assess and address :

- MBA – Presence and extent for Finding Sanctuary and Balanced Seas;
- MPC – Presence and extent for Net Gain; and
- ABPmer – Presence and extent for Irish Sea Conservation Zones and condition and boundaries for all regions.

4.22 Spreadsheets were prepared to collate all the information available to inform the confidence assessment process. All of the evidence available to this project was first recorded according to the following colour codes:

- Data available at the outset of this project - Blue text;
- New spatially referenced data - Red text; and
- Anecdotal/ non spatial information - Green text; and
- Aerial photography – Purple text.

4.23 Similarly the data used to complete the confidence assessments and the resulting confidence scores assigned during the course of this project were documented in the adjacent column. An example of the evidence summary spreadsheets template can be found in Appendix H and the completed sheets are provided in Appendix K.

4.24 In a number of instances, particularly in the context of HOCl presence and extent, a manual check was required to assign a confidence score, Manual checks were all undertaken by ABPmer to ensure that a consistent approach was applied to this task. Similarly ABPmer undertook an overall QA of the confidence assessment spreadsheets to ensure a consistent approach had been used by all of the project team.

### **Presence and Extent**

4.25 The presence and extent confidence assessments were completed following the amended flow diagrams prepared by Marine Mapping Ltd. It was possible to progress through a number of the steps within the flow diagrams solely using the spatial data summary spreadsheets for

each region. In other instances there was a requirement for cross referencing with the GIS spatial database. Following the application of the flow diagrams the aerial imagery (that was not included within the geodatabase) and the anecdotal information relating to the respective features was used, in accordance with the principles of the protocol, to determine a final confidence score. A full audit trail was maintained to capture the outputs of each step in the application of the confidence assessment criteria. This information was summarised including the data sources used and the rationale for each confidence score and transferred into the confidence assessment spreadsheets (Appendix K).

- 4.26 In agreement with Defra and the SNCBs it was determined that the confidence score for the extent of a feature could not exceed the respective presence score. In a number of instances the extent score (as derived from following the flow diagrams) was therefore moderated down to ensure it did not exceed the score assigned to the presence of the respective feature.
- 4.27 The confidence assessment scores were also compared with those derived by the SNCBs (see Section 4.4).

### **Condition Assessments**

- 4.28 The basis of the condition confidence assessment for all features was the vulnerability assessment outlined in protocol F identified in Section 4.2.1. By definition the condition confidence assessment score will always be low where it has been based on a vulnerability assessment unless additional specific criteria have been met. In the first instance it is only possible to improve the confidence score where there is a moderate or high confidence in feature extent. Where this criterion was fulfilled the sensitivity matrices produced as Task 3A, part of MB0102 project (Tillin *et al.*, 2010b) were consulted to determine which of the ENG features were highly sensitive to a pressure with moderate or high confidence. The only features that were not considered in MB0102 were the smelt *Osmerus eperlanus*, eel *Anguilla anguilla* and undulate ray *Raja undulata* where expert judgement has been applied to determine which pressures these species are sensitive to.
- 4.29 The next step involved determining which activities result in pressures to which the features that require further assessment are sensitive. This resulted in an activity verses pressure matrix for each of the applicable ENG features based on the overarching pressures verses activity matrix developed by JNCC for Defra in 2010 and is based on worksheet entitled "1. Activities-Pressures" in the OSPAR Assessment Framework. The activities list was further refined to be relevant to the scale of the feature. Activities which were not considered to overlap with the entirety of a feature were excluded from the assessment based on the guidelines in Protocol F.

- 4.30 The spatial activity datalayers were intersected with the rMCZ boundaries to determine which activities occur within each rMCZ along with the spatial coverage of the activities relative to the rMCZ as a whole. This was used to determine overlap of activity with MCZs which contain sensitive features. The overlapping activities and potentially sensitive ENG features were reviewed to determine whether the benchmark for sensitivity had been reached. Where this occurred the confidence score was increased to medium.

### **Boundary Assessments**

- 4.31 The percentage of features within each of the respective rMCZs that had a high confidence for extent was determined. In addition the datalayers that were used to determine the confidence in extent were viewed within the GIS to determine how well the feature boundaries followed the site boundaries. The results from the application of these three criteria were used to define the boundary confidence score according to the rules outlined in Section 4.2.2. The resulting confidence score was transferred into the SER documents.

### **Limitations Encountered in Application of Protocols**

- 4.32 Through the application of the protocols a number of limitations have been identified. In summary these include:
- Complexity of presence and extent protocols and their application;
  - The use of habitat maps from a range of sources;
  - The use of predictive modelling;
  - The requirement for manual checks; and
  - The relatively subjective use of anecdotal information and/ or expert local knowledge.
- 4.33 While the protocols for presence and extent are based on relatively simple rules, the application of the protocols is complex and time consuming, involving extensive GIS analysis and manual checking.
- 4.34 Elements of the confidence assessments use habitat/biotope polygons to verify the presence and extent of habitats, particularly for BSH. This method requires the user to determine the percentage overlap between matching polygons within the proposed feature boundary and therefore makes the assumption that the polygons have been derived and categorised in the same way. Since the biotope maps have been sourced from a number of different surveys and have been created by a number of different individuals and organisations the degree to which consistency is achieved between datasets is unknown and therefore not all habitat maps have been assigned a MESH score.



- 4.35 It is possible to determine the same low confidence score for the presence of a BSH derived from a habitat map with a MESH<sup>9</sup> score of greater than 58 (which signifies ground truthing had been undertaken as part of the survey) as a polygon based on modelled data alone. It is also possible to get differing confidence scores for HOCl and BSH within the same rMCZ despite being essentially the same feature. This is a result of the differing criteria used to assign confidence in these different feature types.
- 4.36 Where manual checks are required, particularly for the determination of presence and extent of HOCl where only point data is available, a degree of subjectivity is required. Within this project all such assessments have been undertaken by the same two individuals to ensure a consistent approach has been followed.
- 4.37 The protocols are primarily evidence driven. The use of expert judgement in the absence of verifiable evidence undermines this approach to some extent.

### **4.3 Findings**

- 4.38 The outputs from the confidence assessments for all features recommended by Regional MCZ Projects are documented in a series of Excel spreadsheets (Appendix K), available in electronic format separately. The completed Site Evidence Reviews are documented in Appendix L, available in electronic format separately.
- 4.39 The results of the confidence assessments are summarised in a series of tables below. Tables 8 to 11 identify by region, the number of features within each Tranche 1 site for each confidence category (High, Moderate, Low or None) for presence, extent and condition and the site confidence score in relation to boundaries.
- 4.40 The proportion of features recording a high or medium confidence for presence ranged from 39% (Finding Sanctuary) to 50% (Balanced Seas and Irish Sea Conservation Zones). The proportion of features recording a high or medium confidence for extent ranged from 30% (Finding Sanctuary) to 38% (Net Gain). In cases where a higher confidence score was obtained for extent compared to presence as a result of an artefact of the methodology for the presence and extent protocols, these were moderated in line with the presence score. This approach was consistent with that adopted by the SNCBs. Where such changes have been made, this has been identified in the excel spreadsheets and in the SER documents. This is discussed further in Section 7.

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<sup>9</sup> For explanation of The MESH Confidence Assessment Scheme please refer to the following website <http://www.searchmesh.net/default.aspx?page=1693>

4.41 83% of all features had low confidence for condition, as all assessments had been based on the Vulnerability Assessment. Only two of the regions had features with confidence assessments that were elevated to moderate confidence. These included 0.6% of features in Balanced Seas and 12% of features in Finding Sanctuary.

4.42 The great majority of sites (97%) were recorded as having low confidence in relation to site boundaries, as few sites had boundaries that were clearly linked to feature distributions i.e. that the features were present within the rMCZ but the boundary did not closely follow the shape of them.

**Table 8: Number of features (or sites for boundaries) with given confidence score for Balanced Seas Tranche 1 sites**

Balanced Seas	Presence				Extent				Condition				Boundaries		
	H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
Stour and Orwell Estuaries	3	2	3	3	1	2	5	3	0	0	9	2	-	-	✓
Blackwater, Crouch, Roach and Colne Estuaries	2	1	3	0	2	1	3	0	0	0	6	0	-	-	✓
Medway Estuary	3	4	3	0	1	2	7	0	0	0	10	0	-	-	✓
Thanet Coast	3	2	6	1	0	3	8	1	0	0	11	1	-	-	✓
Folkestone Pomerania	1	2	3	2	0	1	5	2	0	0	6	2	-	-	✓
Beachy Head West	4	2	5	0	3	2	6	0	0	0	11	0	-	-	✓
Kingmere	0	0	2	0	0	0	2	0	0	0	2	0	-	-	✓
Pagham Harbour	1	2	0	1	1	2	0	1	0	0	3	1	-	✓	-
Hythe Bay	2	0	1	0	2	0	1	0	0	1	2	0	-	-	✓
<b>Total</b>	<b>19</b>	<b>15</b>	<b>26</b>	<b>7</b>	<b>10</b>	<b>13</b>	<b>37</b>	<b>7</b>	<b>0</b>	<b>1</b>	<b>60</b>	<b>6</b>	<b>-</b>	<b>-</b>	<b>8</b>

**Table 9: Number of features (or sites for boundaries) with given confidence score for Finding Sanctuary Tranche 1 sites**

Finding Sanctuary	Presence				Extent				Condition				Boundaries		
	H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
The Canyons	1	0	3	0	1	0	3	0	0	1	3	0	-	-	✓
Southwest Deep (West)	0	0	3	0	0	0	3	0	0	0	3	0	-	-	✓
East of Haig Fras	0	0	3	0	0	0	3	0	0	0	3	0	-	-	✓
Poole Rocks	1	0	4	0	1	0	4	0	0	0	5	0	-	-	✓
South of Dorset	1	1	3	0	0	0	5	0	0	0	5	0	-	-	✓
Chesil Beach and Stennis Ledges	2	3	2	0	2	2	3	0	0	0	7	0	-	-	✓
Torbay	4	4	6	0	1	5	8	0	0	1	13	0	-	-	✓
Skerries Bank and Surround	2	7	7	0	1	3	12	0	0	1	15	0	-	-	✓
Tamar Estuary	0	2	4	0	0	1	5	0	0	0	6	0	-	-	✓
Whitsand and Looe Bay	5	6	6	0	3	7	7	0	0	4	13	0	-	-	✓
Upper Fowey and Pont Pill	2	1	5	0	2	1	5	0	0	0	8	0	-	-	✓
The Manacles	2	5	10	0	2	5	10	0	0	3	14	0	-	-	✓
Isles of Scilly 35a	0	4	4	1	0	2	6	1	0	0	7	2	-	-	✓
35b	1	0	2	4	0	1	2	4	0	0	3	4	-	-	✓
35c	0	1	6	1	0	1	6	1	0	1	6	1	-	-	✓
35d	0	0	5	4	0	0	5	4	0	0	5	4	-	-	✓
35e	1	1	11	2	1	1	11	2	0	1	11	3	-	-	✓
35f	3	3	10	1	1	5	10	1	0	3	12	2	-	-	✓
35g	1	5	9	1	0	3	12	1	0	2	13	1	-	-	✓

Finding	Sanctuary	Presence				Extent				Condition				Boundaries		
		H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
	35h	3	2	9	1	3	2	9	1	0	4	10	1	-	-	✓
	35i	3	6	9	1	2	5	11	1	0	2	16	1	-	-	✓
	35j	3	8	12	1	2	6	15	1	0	5	18	1	-	-	✓
	35k	5	4	5	0	5	3	6	0	0	4	10	0	-	-	✓
	35l	0	4	7	2	0	4	7	2	0	1	9	3	-	-	✓
	35m	0	4	9	1	0	3	10	1	0	0	12	2	-	-	✓
	Padstow Bay and Surrounds															✓
	Lundy	2	3	10	0	1	3	11	0	0	1	14	0	-	-	✓
		2	0	0	0	1	1	0	0	0	2	0	0	-	-	✓
	<b>Total</b>							18				24				
		44	74	164	20	29	64	9	20	0	36	1	25	-	-	27

**Table 10: Number of features (or sites for boundaries) with given confidence score for Irish Sea Conservation Zones Tranche 1 sites**

Irish Sea Conservation Zones	Presence				Extent				Condition				Boundaries		
	H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
North of Celtic Deep	0	3	1	0	0	3	1	0	0	0	4	0	-	-	✓
Fylde Offshore	0	0	2	0	0	0	2	0	0	0	2	0	-	-	✓
Cumbria Coast	5	0	3	0	2	0	6	0	0	0	8	0	-	-	✓
Hilbre Island Group	0	0	2	0	0	0	2	0	0	0	2	0	-	-	✓
<b>Total</b>	5	3	8	0	2	3	11	0	0	0	16	0	-	-	4

**Table 11: Number of features (or sites for boundaries) with given confidence score for Net Gain Tranche 1 sites**

Net Gain	Presence				Extent				Condition				Boundaries		
	H	M	L	N	H	M	L	N	H	M	L	N	H	M	L
Aln Estuary	2	0	4	0	1	0	5	0	0	0	6	0	-	-	✓
Rock Unique	0	2	2	0	0	2	2	0	0	0	4	0	-	-	✓
Swallow Sand	2	0	1	0	2	0	1	0	0	0	3	0	-	-	✓
<b>Total</b>	4	2	7	0	3	2	8	0	0	0	13	0	-	-	3

#### 4.4 Comparison with the SNCBs Outputs

4.43 Following completion of the initial confidence assessments within this project a number of meetings were held with the SNCBs to compare the corresponding outputs. These meetings were undertaken to ensure that the methodologies used in applying the protocols by all parties were fully understood and that where discrepancies in confidence scores were apparent that the reasons for these could be fully understood. Appendix P shows comparisons of specific feature presence and extent confidence assessments and discusses the reasons behind these differences. The key reasons for the observed differences in score are summarised below.

4.44 Firstly it was established that there were some significant differences in the way the confidence assessment protocols have been applied by the SNCBs within MB0116 (this project). This primarily relates to the datasets to which the confidence assessments have been applied. In essence:

- MB0116 assessed the confidence of the presence and extent of each feature based on their mapped distribution from the best available datasets;
- JNCC assessed the confidence of the presence and extent of each BSH and HOCI as mapped within the Site Assessment Documents produced by the Regional MCZ Projects. In contrast Natural England used a combination of both of these approaches; and
- The approach used for SOCI, by all parties, was to determine the presence and extent of each feature based on the best available datasets.

4.45 In all instances the best available data were used to undertake the confidence assessments (i.e. those available to the SNCBs and to MB0116 at the time of undertaking the assessments). The differences in approach relate to whether the confidence assessment in presence and extent of each feature was based on their mapped distribution from the best available datasets (i.e. MB0116 and Natural England) or the features as mapped by the Regional MCZ Projects (i.e. JNCC).

4.46 It was apparent that a number of the datasets that were available to JNCC and Natural England in undertaking their assessments were not available to this project. Examples of datasets that were not available to this project when making such comparisons included BGS point data (which was a data layer derived by JNCC through the translation of sediment to biotope data), a version of Marine Recorder which contained data only accessible to JNCC, geo-referenced images, designated site condition data and academic research communicated directly to the Regional MCZ Projects or to the SNCBs. It is understood, however, that where JNCC were wholly reliant on BGS point data for the purposes of validation that they moderated the score down to reflect the uncertainties associated with this dataset.

4.47 Differences were also apparent in terms of the interpretation of different datasets. A degree of judgement was required, which has resulted in different methods being employed to solve any issues. The key examples of different interpretation are described below:

- Identification of duplicate records which could influence the number of validation points available for a feature. MB0116 kept as much of the original attribute information provided within datasets (date of survey, name of surveyors etc.) enabling discounting of duplicate data if all attributes were the same. This

was further verified by checking for datasets which geographically were in exactly the same place, see Appendix P. This check was particularly relevant when new data were found e.g. versions of Marine Recorder received from different NGOs.

- For one site, Regional MCZ Project had used point data to construct polygon data for features by using the buffer tool to create polygons around individual points. This was inappropriate in reference to the protocol methodology as the points will have validated the polygons which were created from the points (BS11.4 (Folkestone Pomerania) see Appendix P);
- The overlap of validation points within polygon data was approached differently and was exacerbated when a number of datasets were found to be within an rMCZ. MB0116 strictly followed the flow diagrams, as given in Appendix J, where the percentage of the specific feature data points which overlapped a feature polygon, as opposed to all data points, was used to assign a confidence score. The SNCB methodology mainly looked to find any overlapping data points which would validate the feature polygon and the percentage of all data points was not always calculated;
- The greatest differences in scores between the SNCBs and MB0116 were seen for the BSH features. A number of polygon data sets relating to BSH contained a MESH confidence score for each individual polygon, if a polygon had a MESH confidence equal to or above 58 then the polygon had underlying sample points verifying the polygon. The MB0116 methodology still needed multiple overlapping verification data points to obtain a high score; the original underlying data samples were not always available. The SNCBs assumed that if the whole polygon lay within the rMCZ boundary and had a verifying MESH score then data points were not needed to obtain a confidence score above low;
- Intertidal sites created an additional complexity in that following the first SNCB advice they additionally had local advisors who could go to rMCZ sites which had little verification evidence for the feature and confirm the presence of the feature. However, this information had to be integrated into the confidence assessment protocol. The SNCBs assumed that this additional local advisor data, in the form of geo-referenced photographs, allowed for a high score to be achieved. The MB0116 methodology was to treat the photographs as an extra data point for that feature; this approach resulted in lower confidence scores than that which the SNCBs achieved with the same data. In addition the CCO aerial photography was used by both the SNCBs and MB0116 to help validate the confidence in intertidal BSH sites, although again the use of these data within the assessments was applied differently. Natural England used these data in a similar fashion to the geo-referenced photographs they gained from local advisors to achieve a moderate or high score i.e. a high score could be achieved by

using these data alone. The MB0116 project, in contrast, sought to integrate these additional spatial data by following the protocol and treating the aerial photography as an additional polygon for that feature. To gain a moderate or high score for presence and extent these data had to be verified by feature data points and/or polygons;

- For some subtidal sites, photographic evidence was used by the SNCBs to elevate confidence scores. However, in this study, such information was simply used to add an additional data point to the site record, which may or may not have increased confidence in the presence or extent of a feature.

4.48 Evidence to verify the presence and extent of features in the form of survey reports or journal papers which could not be added into GIS were utilised by both the SNCBs and MB0116. This information was highly subjective; MB0116 used this in only a small number of sites to increase confidence scores and could never achieve a moderate or high score with this anecdotal evidence alone (i.e. non geo-referenced information). The SNCBs used these data sources in a higher number of rMCZ sites and gave it more weighting in the confidence score for the features.

4.49 Further to understanding the use of Protocol E the meetings held with the SNCBs served an additional purpose in ensuring that the audit trails provided by the SNCBs to support their recommendations were fully comprehensive.

## **5. Gap Analysis and Prioritisation Exercise**

### **5.1 Introduction**

5.1 A gap analysis and prioritisation exercise was carried out on all features recommended by Regional MCZ projects for Tranche 1 sites to identify remaining weaknesses in the evidence base and to suggest priorities for future actions to address these gaps. The gap analysis took account of the outcomes of the confidence assessment.

5.2 The prioritisation exercise sought to identify the requirements and priorities for addressing these gaps. This included:

- Consideration of priorities for additional marine surveys, taking account of the nature and scale of the gaps, the relative irreplaceability of the features, and assumptions about the extent to which these gaps might be addressed by data being collected under the Cefas co-ordinated survey programme; and
- Priorities for acquisition of additional data identified through data searches, but not acquired within the time scales of the study, or data that was acquired within the study but could not be

included because of the date of receipt and/or the effort required to process the data into a useable form.

## 5.2 Methodology

### 5.1.1 Data Gaps

5.3 Data gaps have been identified where features (these being any that were recommended by Regional MCZ Projects) within individual sites had confidence scores of less than high and documented in a series of four spreadsheets for presence, extent and condition. A separate assessment was made for site boundaries.

### 5.1.2 Prioritisation for Potential Future Surveys

5.4 The prioritisation process for identifying potential additional surveys has been based on the following criteria (see Table 12 and Appendix N):

- The presence of one or more features proposed for designation for which there is no confidence in extent;
- The presence of >50% of features proposed for designation for which there is no or low confidence in extent;
- The proportion of features within individual sites assessed as having high confidence for extent;
- The relative irreplaceability of features - where features proposed for designation have a restricted distribution<sup>10</sup>, and where a large proportion of the regional resource<sup>11</sup> is proposed for protection; and
- Assumptions about the availability and utility of evidence collected through the Cefas co-ordinated survey programme<sup>12</sup>.

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<sup>10</sup> The following features proposed for designation with MCZ were identified as having a restricted distribution:

- Habitats of Conservation Importance – cold water coral reefs, maerl beds, tide-swept channels;
- Species of Conservation Importance - *Padina pavonica*, *Cruoria cruoriaeformis*, *Grateloupia montagnei*, *Lithothamnion corallioides*, *Phymatolithon calcareum*, *Armandia cirrhosa*, *Gobius cobitis*, *Gobius couchi*, *Victorella pavida*, *Amphianthus dohrnii*, *Leptopsammia pruvoti*, *Gammarus insensibilis*, *Pollicipes pollicipes*, *Atrina pectinata*, *Caecum armoricum*, *Paludinella littorina*, *Tenellia adspersa*.

<sup>11</sup> The proportion of the resource proposed for protection was estimated based on summary tables within the four Regional MCZ Project reports identifying the number of feature points proposed for protection within existing MPAs/recommended MCZ compared to the total number of feature points within the region.

<sup>12</sup> Our initial methodology sought to apply a draft confidence assessment for presence and extent on those Cefas surveys for which initial survey reports were available as a means of determining whether confidence was likely to improve and thus contribute to the prioritisation process. However, this approach resulted in little improvement in confidence scores (as the initial survey reports did not present validated habitat maps). The approach was abandoned in favour of the common sense assumption that sites that had been subject to high quality survey should not be a high priority for short-term survey.

- 5.5 To apply the methodology, the number of features with no confidence in extent and the proportion of features with no or low confidence was calculated for each site. Where one or more features within a site had no confidence or where >50% of features had no or low confidence, these individual sites were automatically given a high priority. If any of the Tranche 1 sites had been subject to a recent Cefas co-ordinated survey, the priority was then amended to low, on the basis that these surveys would provide high quality evidence and therefore should not require immediate resurvey.
- 5.6 For the remaining sites the proportion of features assessed as having high confidence for extent was calculated. A prioritisation process was then applied based on the criteria in Table 12. An initial prioritisation score was then derived using a weighting and scoring system (Table 13).

**Table 12: Prioritisation of factors to inform potential future survey priorities**

Criterion	Low priority	Medium priority	High priority
Outcome from gap analysis (taking account of Cefas initial survey reports and other likely sources of data)	≥80% ENG features proposed for designation within site have high confidence for extent	≥50% - <80% of ENG features proposed for designation within site have high confidence for extent	<50% of ENG features proposed for designation within site have high confidence for extent
Irreplaceability	No restricted distribution features present in site or all restricted distribution features present have high confidence in extent	1 or more ENG features proposed for designation within site has restricted distribution and less than high confidence for extent. Up to 20% of resource occurs within regional rMCZs	1 or more ENG features proposed for designation within site has restricted distribution and less than high confidence for extent. Greater than 20% of resource occurs within regional rMCZs

**Table 13: Derivation of initial prioritisation scores for potential future survey priorities**

		Prioritisation from gap analysis		
		L	M	H
Prioritisation based on irreplaceability	L	L	M	H
	M	L	M	H
	H	M	H	H

- 5.7 Where sites had been subject to a recent Cefas co-ordinated survey, it was assumed that the survey would be sufficient to support designation proposals and the priority for these sites was therefore automatically adjusted to low.
- 5.8 The audit trail and outcome of the prioritisation process has been documented in Appendix N.



5.9 It is recognised that it has not been possible to take into account data that are likely to become available from a number of surveys being undertaken by third parties not directly related to the MCZ programme, but which may provide useful information for rMCZ. Where we are aware of such surveys, we have prioritised them for data acquisition (see section 5.1.3 below).

### 5.1.3 Prioritisation of Acquisition and Processing of Additional Data Identified Through Data Searches

5.10 A simple process was applied to determine priorities for acquiring additional existing data identified through data searches and for processing data already acquired but which had not be processed into a format suitable for use within the confidence assessments.

5.11 All the Cefas co-ordinated rMCZ surveys have been assigned a high priority, as their acquisition is necessary to justify the low survey prioritisation score. Similarly, where other surveys have been identified that are anticipated to provide high quality data (for example, the CCO Ramsgate to Minnis Bay survey and a number of Maritime & Coastguard Agency (MCA) surveys) these have also been assigned a high priority.

5.12 Those data sources that are considered likely to provide information relevant to a number of rMCZ/ rRA (e.g. regional or national data sets) or which are considered to provide significant additional data for individual sites have been afforded a medium priority. All other data sources have been assigned a low priority. The outcome of the prioritisation exercise has been documented in a spreadsheet.

## 5.3 Findings

5.13 Appendix M presents the outcome of the data gap analysis in three separate spreadsheets for presence, extent and condition of all Tranche 1 site features. Table 14 summarises data gaps by site for each MCZ Region whereby a gap has been defined as a site having less than high confidence for one or more features (or less than high confidence for boundaries).

**Table 14: Number of sites with data gaps (by MCZ Region)**

MCZ Region	No of Sites	Presence	Extent	Condition	Boundaries
Balanced Seas	9	9	9	9	9
Finding Sanctuary	27 (includes 13 for Isles of Scilly)	26	27	27	27
Irish Sea Conservation Zones	4	4	4	4	4
Net Gain	3	3	3	3	3
Total	<b>43</b>	<b>42</b>	<b>43</b>	<b>43</b>	<b>43</b>

- 5.14 Table 14 indicates that there are data gaps occurring in 98% of sites for presence, extent, condition and boundaries. Appendix M provides a more fine grained analysis of the data gaps for presence, extent and condition by feature. This confirms that the data gaps for many sites are substantial.
- 5.15 Appendix N presents the outcome of the prioritisation exercise to identify site priorities for potential future surveys. This information is summarised by MCZ region in Table 15 which reflects the position that even taking account of initial information from some of the Cefas co-ordinated surveys undertaken in 2012/13 (North of Celtic Deep, Rock Unique and East of Haig Fras) 59% of the features recommended for designation by Regional MCZ Projects within Tranche 1 sites have low or no confidence in presence and 69% have low or no confidence in extent.

**Table 15: Prioritisation of sites for potential future survey (by MCZ Region)**

Regional Project Area	Low Priority	Medium Priority	High Priority
Balanced Seas	3	0	6
Finding Sanctuary	2	1	24
Irish Sea Conservation Zones	1	0	3
Net Gain	1	1	1

- 5.16 Appendix O prioritises the acquisition of existing data identified within this study but which could not be acquired within the project time scales and also data which has been acquired but which requires further processing for it to be used within the confidence assessments. Fifty-nine data sets were identified as being of high or medium priority as detailed below, (N.B. these exclude any identified by the SNCBs which are identified within their advice such as JNCC and Natural England verification surveys (Defra, 2012)):

- High Priority:
  - Initial survey reports and full survey reports for the 40 surveys carried out under Cefas co-ordinated 2012/13 survey programme;
  - Various surveys being completed by CCO and MCA which are expected to generate good quality habitat maps covering some relevant MCZ areas; and
  - 10 site specific surveys undertaken by a range of different organisations that have generated habitat maps, including intertidal surveys and subtidal surveys.
- Medium priority:
  - Data from Environmental Statements for Offshore Windfarms and Oil and Gas areas;
  - Cefas epibenthic data; and
  - MSc and PhD. Thesis.

## **6. Discussion of Results and Key Findings**

### **6.1 Evidence Review**

- 6.1 The evidence review has identified and collated a wide range of relevant ecological data on all features recommended by Regional MCZ Projects within each rMCZ/ rRA.
- 6.2 Particular challenges have been encountered in seeking to identify and collate evidence stated as having been used by the Regional MCZ Projects and by JNCC and Natural England. This partly reflects issues of data licensing (some data available to Natural England and JNCC could not be made available to this study), but also gaps in the documentation of data sources, inadequate attribute information provided with some of the data layers. This significantly extended the work to identify existing data sources and also affected the confidence assessment scores for Tranche 1 sites where we were not able to access key data sets because of data non-availability or licence restrictions.
- 6.3 A wide range of additional relevant evidence has been identified through the evidence searches (over 780 different sources). Evidence was acquired for 37% of these sources, but only 19% of these yielded spatial data that were relevant to the Tranche 1, sites were subsequently used in the confidence assessments. All data supplied by the SNCBs (including the Regional MCZ Projects data) were used as far as possible with the exception of datasets where documentation of the data was insufficient to permit it to be used within the confidence assessment process, for example, data with no or vague information on sample locations, missing information on projection and other inadequacies in the accompanying metadata (see Section 3.3 and Appendix C2).
- 6.4 The process of identifying, requesting, acquiring and transforming data has required a very high level of effort. While some good quality additional data sources have been obtained or identified, the exercise suggests that the majority of the most relevant data sources had already been accessed by the Regional MCZ Projects, with the exception of some industry held data and some data collected after the cut-off date for MB0102 data layers, and photographic data collected for a number of inshore sites by Natural England. This is an unsurprising result, given the prior investment in the Defra-led MB0102 work to collate existing evidence and the work of the Regional MCZ Projects to identify regional and local data sources. However, notwithstanding the limited additional data obtained, the exercise carried out in this MB0116 project represents good value for money, given the high costs associated with the acquisition of primary survey data. For example, offshore survey can cost upwards of £10k per day

for vessel hire with substantial additional costs associated with sample processing and analysis. A recent biological survey of intertidal sediments of the Humber Estuary undertaken for Natural England cost £40k.

- 6.5 A number of industry data sources were identified. However, the project team were unable to access these due to the lack of a suitable data-sharing agreement that enabled data to be shared between all parties. The PSG had originally agreed that Defra lawyers draft an agreement, but this was not possible due to Defra data team requirements. The project team utilised an in-house legal department to draft an appropriate agreement. Within the project timeline, it was only possible to conclude six local agreements with data providers in order ensure that the data were used within the project. The holders of these data will need to be contacted to discuss the onwards use of their information.

## **6.2 Confidence Assessments**

- 6.6 Application of the confidence assessment protocols for presence and extent has proved challenging, complex and time consuming. Our assessments have indicated that the protocols are open to different interpretation, thus hampering consistency of application. Underlying issues in the data used/provided by SNCBs have significantly hampered work to understand and reconcile differences between the SNCB confidence scores and those obtained in this study.
- 6.7 A number of meetings and internal workshops were held with JNCC and Natural England to seek to promote consistency, but some minor differences in interpretation remain. In particular, the requirement in this study to take account of new data has necessarily required some adaptation of Protocol E which is focused on assessing confidence in the feature maps presented in the Regional MCZ Project Site Assessment Documents.
- 6.8 Notwithstanding efforts to achieve consistency with the confidence scores obtained by the SNCBs, a number of differences remain. Reasons for these differences include differences in the data used, application of the confidence assessment methodology and underlying errors within Regional MCZ Project data. The main differences in data used relate to additional data obtained by this study and data licensing restrictions which precluded use of BGS point data and some Marine Recorder data – this particularly accounted for some of the differences in offshore sites. Duplicate data points within SNCB records also accounted for some minor differences in confidence scores. However, the largest differences relate to the application of Protocol E, in particular, the weight attached to photographs, the use of expert judgement differences in the application of the protocol to new data, and the rigour with which point data was used to validate polygon data.

- 6.9 The confidence assessments for feature condition indicate confidence is low for virtually all features in all sites. This is because the methodology based on vulnerability assessment, necessarily assigns low confidence unless there is good evidence on the presence and extent of human pressures relative to the extent of the feature to warrant raising the confidence to medium. In the absence of good information on the condition (environmental state) of the features, it is unlikely to be possible to significantly increase confidence in feature condition. The current confidence assessment methodology for feature condition is focused on confirming the presence of pressures and impacts (i.e. focused on the strength of evidence to support a 'recover' objective in rMCZ). For sites which are subject to no or low levels of human pressure, it would be possible to increase confidence in feature condition by modifying the methodology to take account of the absence of pressures (i.e. focused on the strength of evidence to support a 'maintain' objective in rMCZ).
- 6.10 The confidence assessments for site boundaries also largely indicate low confidence. This is because for most sites, there is no clear relationship between feature boundaries and site boundaries. It is important to note here that the low confidence scores do not necessarily mean that boundaries have been incorrectly drawn; rather they reflect the stakeholder led approach of the Regional MCZ Projects. We recognise that in many cases site boundaries have been developed through agreement with relevant stakeholders and may therefore have a high level of public support.

### **6.3 Evidence Gap Analysis and Prioritisation Exercise**

- 6.11 A large number of data gaps (where confidence is less than high) have been identified for presence, extent and condition for Tranche 1 sites. Gaps for some of these sites are being addressed by the Cefas co-ordinated survey programme. Priorities for addressing remaining data gaps have been identified. We suggest that as a minimum, it is important to confirm (with moderate or high confidence) the presence of features within a site before including them on the list of features for designation. In addition, where conservation objectives for features are likely to drive management measures, then it is important that there is reasonable appreciation (with moderate or high confidence) of feature extent to facilitate spatial targeting of those measures.
- 6.12 While we have identified priorities at a site level, the information generated within this study could be used to help to target survey requirements towards specific features, feature categories or properties of features (presence, extent, condition). Given the relative ease and speed with which intertidal surveys may be completed, it may be possible to make more rapid progress in surveying intertidal features (subject to any seasonal survey requirements).

- 6.13 As noted above, there is a general lack of information on feature condition and collection of such information in the short-term is unrealistic because of the intensive nature of survey that would be required to provide clear evidence of feature condition. Where particular concerns arise about conservation objective setting during the public consultation process, it may be possible to target individual sites for additional survey to better inform objective setting.
- 6.14 For site boundaries, the assessments draw on information on feature extent. There is little point in undertaking additional survey work specifically in relation to site boundaries but such surveys could have some value in resolving concerns about boundary setting should these arise during the public consultation.
- 6.15 The prioritisation exercise for acquisition of known additional data sets and or processing of recently acquired data sets has identified a relatively small number of high and medium priority data sets. In addition, there are a large number of lower priority data sets and sources which may yield additional data, depending on the time and resources available for such a task, although it may not be possible to obtain many of the sources due to confidentiality or accessibility issues.

## 7. Conclusions and Considerations

### 7.1 Evidence Collection

- 7.1 Identification of the existing data used by Regional MCZ Projects, JNCC and Natural England has proven challenging, owing to gaps in documentation of data sources. Problems have also been encountered in seeking to access and make use of some of these data due to data licensing issues. It is understood that that JNCC and Natural England continue to address documentation of data sources and attribute information issues to provide greater clarity in the ecological evidence supporting MCZ designations. (**Consideration 1**). It is also important that within the MCZ project and for organisations managing similar projects or supplying data to them in the future, there is adherence to good practice in data management, working to agreed data standards, including the application of metadata and version control, an example being the many versions of Marine Recorder (**Consideration 2**).
- 7.2 The exercise to identify and acquire additional data identified over 780 sources of relevant data. However, it has only been possible to acquire around 290 of these data sources due to difficulties in obtaining the data for various reasons, including data confidentiality, data cost/licensing restrictions and the low priority afforded to data provision by data owners. Of the sources acquired, only 19% of these yielded spatial data that were relevant to the Tranche 1 sites and which were subsequently used in the confidence assessments. It has not been

possible to make use of many of the potential sources owing to data format or deficiencies in data recording.

- 7.3 The difficulties encountered within the study in seeking to acquire data demonstrate that the UK remains a long way from the 'collect once, use many times' philosophy. We note the recommendations of the Habitats Regulations Review in relation to marine data and also the recent Natural England report on joint monitoring in Natura 2000 sites (MPC *et al*, 2012) which have both highlighted the need to improve processes for data sharing and management. Clear opportunities exist for improving the capture and management of marine ecological data through the processes established by MEDIN and the marine Data Archive Centres (DACs). We recommend that the delivery of improvements in the capture and management of marine ecological data is given a higher profile within the UK Marine Monitoring and Assessment Strategy (UKMMAS) community and by the Marine Science Co-ordination Committee (MSCC) (**Consideration 3**).
- 7.4 There is also a need to address data licensing issues. Some data sets used by the Regional MCZ Projects and JNCC and Natural England could not be made available to this study and many of the spatial data sets acquired by this study are only licensed for use within this study. Similarly, developing a data-sharing agreement for industry data was complex. Licensing restrictions significantly hamper data sharing. It is important that all relevant ecological data from the various strands of the MCZ project are brought together in a single place (a central MCZ database) and it is recommended that data licensing issues are addressed as a priority to facilitate this (**Consideration 4**). It is also recommended that in the longer term Defra develops a common data sharing agreement across the Defra family that also permits others to access and make use of data on Defra's behalf (**Consideration 5**).

## 7.2 Confidence Assessments

- 7.5 A number of issues have been identified with the application of the JNCC and Natural England confidence assessment protocols for presence and extent. For example, differing approaches have been adopted between this study and between Natural England and JNCC for accommodating new data within the assessments. There are also differences in the rigour with which point data has been used to validate polygon data. Differences are also evident in the weight attached to photographic data and the use of expert judgement (in the absence of verifiable evidence). It is recommended that the SNCBs seek to refine and simplify Protocol E and that a consistent approach to its application is adopted between JNCC and Natural England (**Consideration 6**).
- 7.6 The confidence assessments for feature condition indicate confidence is low for virtually all features in all of the sites. This is due to the lack of good ecological data on the condition (environmental state) of

features proposed for designation in rMCZ/rRA MCZ. It is unlikely to be possible to collect adequate ecological data in the short-term and consideration of feature condition will need to continue to be based on vulnerability assessment.

- 7.7 The confidence assessments for site boundaries also largely indicate low confidence. This is because for most sites, there is no clear relationship between feature boundaries and site boundaries. This outcome reflects the stakeholder led approach used to identify the proposed boundaries

### 7.3 Gap Analysis and Prioritisation Exercise

- 7.8 The exercise to identify potential priorities for site surveys has identified that there are Tranche 1 sites which have gaps in data (see Section 5) however some of these gaps have been filled by the Cefas co-ordinated survey programme. We suggest that as a minimum, it is important to confirm the presence of features within a site before including them on the list of features for designation. In addition, where conservation objectives for features are likely to drive management measures, then it is important that there is a reasonable appreciation of feature extent to facilitate spatial targeting of those measures.
- 7.9 The prioritisation takes account of the relevant surveys carried out under the Cefas co-ordinated survey programme. It is recommended that outputs from the Cefas co-ordinated survey programme are incorporated within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process. **(Consideration 7)**. These surveys are generating high quality data characterising the BSH and some of the habitat FOCI and will significantly improve the quality of the evidence base for the sites surveyed.
- 7.10 The prioritisation exercise for acquisition of known additional data sets and/or processing of recently acquired data sets has identified a relatively small number of high and medium priority data sets. It is recommended that efforts are made to acquire all of the identified high and medium priority data sets and to incorporate them within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process **(Consideration 8)**. Subject to a data-sharing agreement, further industry data may become available. In addition, there are a large number of lower priority data sets and sources which may yield additional data, depending on the time and resources available for such a task, although it may not be possible to obtain all of the sources due to confidentiality or accessibility issues. Nonetheless, it is more cost effective to utilise existing data rather than gather new data through survey.



## 7.4 List of Considerations refer to comments in Executive Summary.

**Consideration 1 (para 7.1)** that JNCC and Natural England continue to address documentation of data sources and attribute information as a priority to provide clarity in the ecological evidence supporting MCZ designations. It is understood that the errors identified during the data collection exercise in the SNCB-held data are being corrected in further iterations of the MCZ designation process.

**Consideration 2 (para 7.1)** that within the MCZ project and for organisations managing similar projects or supplying data to them in the future, there is adherence to good practice in data management, working to agreed data standards, including the application of metadata and version control to MEDIN standards.

**Consideration 3 (Para 7.3)** that the delivery of improvements in the capture and management of marine ecological data is given a higher profile within the UK Marine Monitoring and Assessment Strategy (UKMMAS) community and by the Marine Science Co-ordination Committee (MSCC).

**Consideration 4 (Para 7.4)** that all relevant ecological data from the various strands of the MCZ project are brought together in a single place (a central MCZ database) and that data licensing issues are addressed as a priority to facilitate this.

**Consideration 5 (Para 7.4)** that in the longer term Defra develops a common data sharing agreement across the Defra family that also permits others to access and make use of data on Defra's behalf.

**Consideration 6 (Para 7.5)** that the SNCBs work to refine and simplify Protocol E is progressed, and that a consistent approach to its application is adopted between JNCC and Natural England.

**Consideration 7 (Para 7.9)** that outputs from the Cefas co-ordinated survey programme are incorporated within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process.

**Consideration 8 (Para 7.10)** that efforts are made to acquire all of the identified high and medium priority data sets and to incorporate them within a central MCZ database as soon as possible, to inform further iterations of the MCZ designation process.

## Abbreviations

ABPmer	ABP Marine Environmental Research Ltd
ADGS	Acoustic Ground Discrimination Systems
AFBINI	Agri-Food and Biosciences Institute (Northern Ireland)
ASFA	Aquatic Sciences and Fisheries Abstracts
BGS	British Geological Survey
BIOSIS	BioSciences Information Service of Biological Abstracts
BS	Balanced Seas
BSH	Broad Scale Habitat
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CCO	Channel Coastal Observatory
DACs	Data Archive Centres
DASSH	Data Archive for Seabed Species and Habitats
DEAL	Digital Energy Atlas and Library
DECC	Department of Energy and Climate Change
Defra	Department for Food, Environment and Rural Affairs
EA	Environment Agency
EIA	Environmental Impact Assessment
EMODnet	European Marine Observation and Data Network
ENG	Ecological Network Guidance
ERIC	Environmental Records Centre of the North East of England
EurOBIS	European Ocean Biogeographic Information System
FOCI	Features of Conservation Importance
FS	Finding Sanctuary
GIS	Geographical Information System
GPS	Global Positioning System
HOCI	Habitats of Conservation Importance
IFCA	Inshore Fisheries and Conservation Authority
ISCZ	Irish Sea Conservation Zones
JNCC	Joint Nature Conservation Committee
MarBEF	Marine Biodiversity and Ecosystem Functioning EU Network of Excellence Data System
MarLIN	The Marine Life Information Network
MBA	Marine Biological Association of the UK
MCA	Marine and Coastguard Agency
MCS	Marine Conservation Society
MCZ	Marine Conservation Zone
MEDIN	The Marine Environmental Data and Information Network
MESH	Mapping European Seabed Habitats
MMO	Marine Management Organisation
MPA	Marine Protected Area
MPC	Marine Planning Consultants
MSCC	Marine Science and Co-ordination Committee
NBN	National Biodiversity Network
NCCC	National Customer Contact Centre
NG	Net Gain
NGO	Non-governmental Organization
NMBL	National Marine Biological Library
PSA	Particle Size Analysis

PSG	Project Steering Group
RA	Reference Area
rMCZ	Recommended Marine Conservation Zone
rRA	Recommended Reference Area
RP	Regional MCZ Project
REC	Regional Environmental Characterisation
SAC	Special Area of Conservation
SAP	Scientific Advisory Panel
SNCBs	Statutory Nature Conservation Bodies
SPA	Special Protection Area
TCE	The Crown Estate
UK	United Kingdom
UKMMAS	UK Marine Monitoring and Assessment Strategy
UKOOA	UK Offshore Operators Association
VLIZ	Flanders Institute for Marine Research
WFD	Water Framework Directive

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## Appendices

- A: List of Cefas Surveys 2011-12
- B: List of Stakeholders contacted/Responding
- C: List of Existing Data Sources Accessed by MCZ Regional Projects and JNCC/Natural England
- D: Defra MCZ Stakeholder Letter and Newsletter
- E: Methodology for Identifying Potentially Co-Located Industries
- F: List of References identified from Literature Review
- G: List of Evidence Identified from Other Searches
- H: Confidence Assessment Template
- I: Site Evidence Review Template
- J: Confidence Assessment Methodology
- K: Confidence Assessment Spreadsheets
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- M: Data Gap Spreadsheets (Presence, Extent, Condition, Boundaries)
- N: Prioritisation for Potential Future Surveys
- O: Prioritisation for Acquisition of Additional Data Sources
- P: Examples of Comparisons between SNCB and MB0116 Confidence Assessments