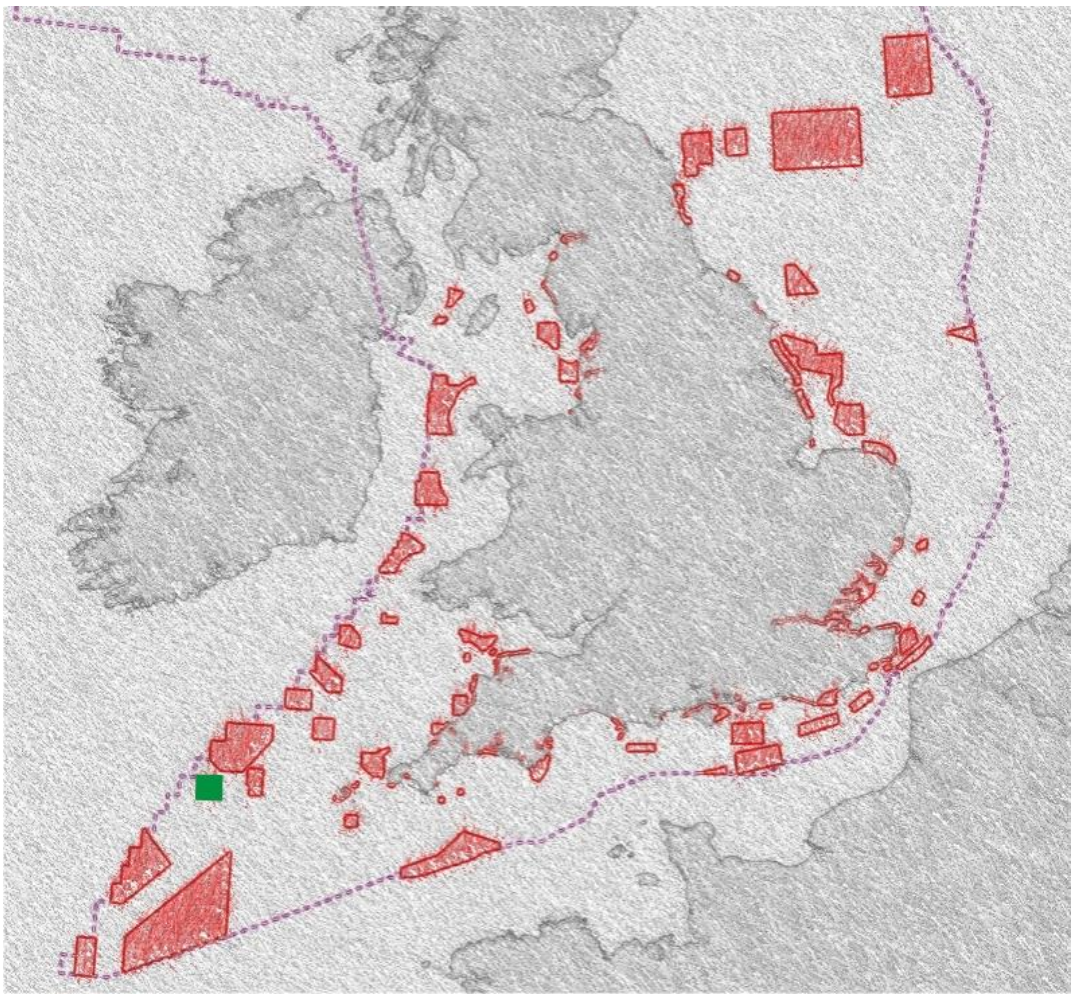
Department
for Environment
Food & Rural Affairs

North-West of Jones Bank rMCZ Post-survey Site Report

Contract Reference: MB0120
Report Number: 19
Version 6
August 2015



Cefas NATURAL ENGLAND JNCC Joint Nature Conservation Committee Environment Agency

Project Title: Marine Protected Areas Data and Evidnece Co-ordination Programme
Report No: 19. Title: North-West of Jones Bank rMCZ Post-survey Site Report
Defra Project Code: MB0120
Defra Contract Manager: Carole Kelly

Funded by:

Department for Environment, Food and Rural Affairs (Defra)
Marine Science and Evidence Unit
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Acknowledgements

We thank Andrew Colenutt (CCO) for reviewing earlier drafts of this report and Gareth Grewcock (CCO) for advice regarding GIS mapping.

Cefas Document Control

Title: North-West of Jones Bank rMCZ Post-survey Site Report

Submitted to:	rMCZ Project Steering Group
Date submitted:	February 2015
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Approved by & date:	Christopher Barrio (14/08/2015)
Version:	6

Version Control History			
Author	**Date**	**Comment**	**Version**
Dr Alice Jones	17th July 2013	First draft	1
Dr Tim Le Bas & Dr Russell Wynn	19th July 2013	Amended draft	2
Dr Alice Jones	7th August 2013	Revised draft following Cefas QC	3
Dr Alice Jones	23rd January 2014	Revised draft following Cefas QC	4
Dr Sue Ware	3rd February 2015	Revised draft following MPAG review	5
Dr Chris Barrio	14th August 2015	Final revisions addressed	6

Table of Contents

List of Tables

List of Figures

1 Executive Summary: Report Card

This report details the findings of a dedicated seabed survey at the North-West of Jones Bank recommended Marine Conservation Zone (rMCZ). The site is being considered for inclusion in a network of Marine Protected Areas (MPAs) in UK waters, designed to meet conservation objectives under the Marine and Coastal Access Act 2009. Prior to the dedicated survey, the site assessment had been made on the basis of 'best available evidence', drawn largely from historical data, modelled habitat maps and stakeholder knowledge of the area. The purpose of the survey was to provide direct evidence of the presence and extent of the broadscale habitats (BSH) and habitat FOCI (Features of Conservation Importance) that had been detailed in the original Site Assessment Document (SAD) (Lieberknecht et al, 2011).

This Executive Summary is presented in the form of a Report Card comparing the characteristics predicted in the original SAD with the updated habitat map and new sample data that result from the two surveys of the site conducted by Gardline in March 2012 (Job #9060) and Cefas in July 2012 (CEND10/12). The comparison covers broadscale habitats (BSH) and habitat and species FOCI.

1.1 Features proposed in the SAD for inclusion within the MCZ designation

Feature	Extent according to SAD (2011)	Extent in SAD sub-area subject to 2012 survey	Extent according to updated habitat map	Accordance between sub-area of SAD map and updated habitat map	
Broadscale Habitats (BSH)				**Presence**	**Extent**
A5.1 Subtidal coarse sediment	3.75 km^2	3.75 km^2	13.66 km^2	✓	+9.91 km^2
A5.2 Subtidal sand	5.90 km^2	5.90 km^{2**}	36.85 km^2	✓	+30.95 km^2
A5.3 Subtidal mud	388.45 km^2	295.43 km^2	253.34 km^2	✓	- 42.09 km^2
Habitat FOCI					
Subtidal Sands and Gravels*****	9.65 km^2	9.65 km^2	50.51 km^2	✓	+40.86 km^2
Species FOCI					
None proposed	N/A	N/A	N/A	N/A	N/A

**** The extent of this habitat FOCI has been re-calculated by summing the extent estimates of the 'A5.1 Subtidal coarse sediment' and 'A5.2 Subtidal sand' BSHs in the SAD.***
N.B. Spatial extents for all BSH and Habitat FOCI have been adjusted to compare the updated habitat map extents with the sub-area of the SAD covering the same extent as that covered by the newly acquired data.

1.2 Features present but not proposed in the SAD for inclusion within the rMCZ designation

Feature	Extent according to SAD (2011)	Extent according to updated habitat map	Accordance between SAD and updated habitat map	
Broadscale Habitats (BSH)			**Presence**	**Extent**
A5.4 Subtidal mixed sediments	0 km^2	1.15 km^2	×	+1.15 km^2
Habitat FOCI				
Mud Habitats in Deepwater	0 km^2	253.34 km^2	×	+253.34 km^2
Sea-Pen and Burrowing Megafauna Communities*	0 km^2	Unknown	×	Unknown
Species FOCI				
None	N/A	N/A	N/A	N/A

NB. Spatial extents for all BSH and Habitat FOCI have been adjusted to compare the updated habitat map extents with the sub-area of the SAD covering the same extent as that covered by the newly acquired data.

****The presence of this Habitat FOCI is known from the video and still images, but the extent of its coverage has not been estimated.***

1.3 Evidence of human activities occurring within the rMCZ

There is evidence from the multibeam backscatter image that demersal trawling occurs within this rMCZ. Numerous trawl marks, left by bottom-towed fishing gear, can be clearly identified within the boundary of the rMCZ (Appendix 3).

2 Introduction

In accordance with the Marine and Coastal Access Act 2009, the UK is committed to the development and implementation of a network of Marine Protected Areas (MPAs). The network will incorporate existing designated sites (e.g., Special Areas of Conservation and Special Protection Areas) along with a number of newly designated sites which, within the English territorial waters and offshore waters of England, Wales and Northern Ireland, will be termed Marine Conservation Zones (MCZs). In support of this initiative, four Regional MCZ Projects were set up to select sites that could contribute to this network because they contain one or more features specified in the Ecological Network Guidance (ENG; Natural England and the JNCC, 2010). The Regional MCZ Projects proposed a total of 127 recommended MCZs (rMCZs) and compiled a Site Assessment Document (SAD) for each site, summarising what evidence was available for the presence and extent of the various habitat, species and geological features specified in the ENG and for which the site was being recommended.

Due to the scarcity of survey-derived seabed habitat maps in UK waters, these assessments were necessarily made using 'best available evidence', which included historical data, modelled habitat maps and stakeholder knowledge of the areas concerned.

It became apparent that the 'best available evidence' on features for which some sites had been recommended as MCZs was of variable quality. Consequently, Defra initiated a number of measures aimed at improving the evidence base, one of which took the form of a dedicated survey programme, implemented and co-ordinated by Cefas, to collect and interpret new survey data at selected rMCZ sites. This report provides an interpretation of the survey data collected jointly by Gardline, Cefas and JNCC personnel at the North-West of Jones Bank rMCZ site during two cruises which took place in March and July 2012.

2.1 Location of the rMCZ

The North-West of Jones Bank rMCZ is a square block, approximately 400 km^2 located at the boundary between the Western Channel and Celtic Sea, approximately 180 km due west from Land's End at the southwest tip of Cornwall (Figure 1).

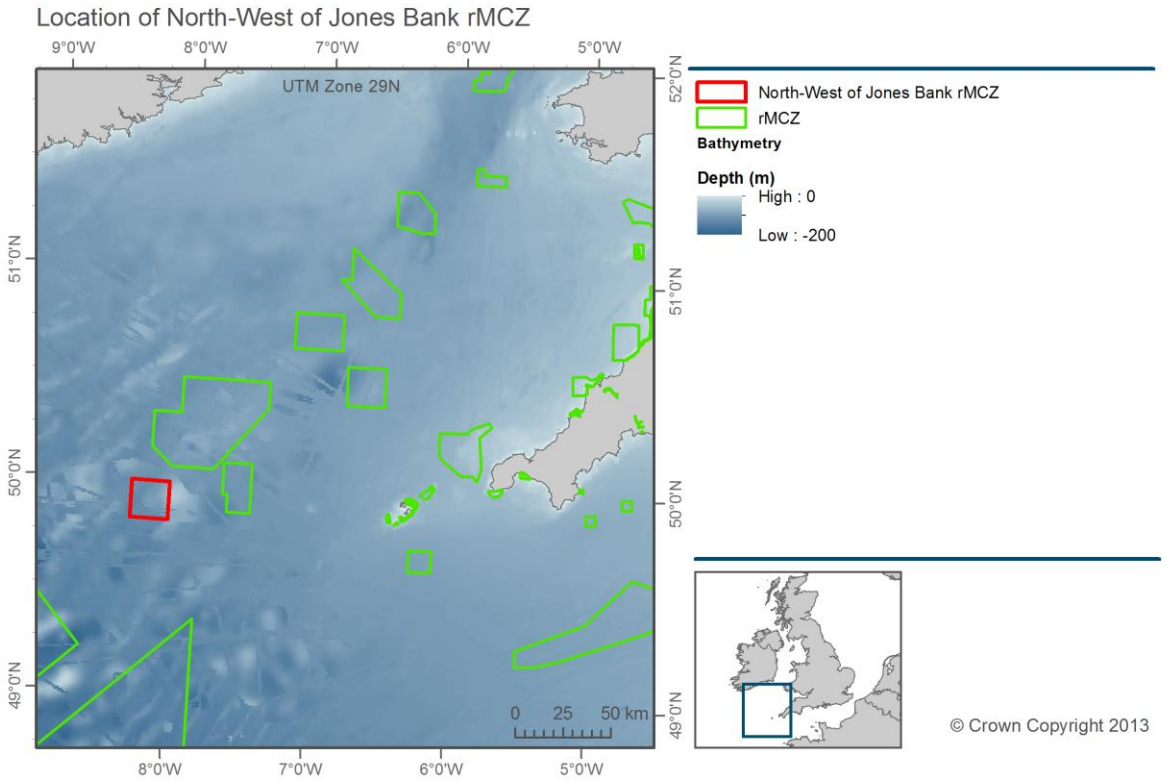

Figure 1. Location of the North-West of Jones Bank rMCZ. Bathymetry is from the GEBCO Digital Atlas (published by the British Oceanographic Data Centre on behalf of IOC and IHO, 2003).

2.2 Rationale for site position and designation

The North-West of Jones Bank rMCZ was included in the proposed network because of its contribution to Ecological Network Guidance (ENG) criteria to broadscale habitats, and its added ecological importance. For a detailed site description see 'Finding Sanctuary Final Report and Recommendations, 2011' (Lieberknecht et al., 2011, section II.3.4) and 'The Marine Conservation Zone Project: Ecological Network Guidance' (Natural England and the JNCC, 2010).

2.2.1 Broadscale habitats proposed for designation

Three broadscale habitats were included in the recommendations for designation at this site (Table 1). See Annex 1 for a full list of broadscale habitat features listed in the ENG.

Table 1. Broadscale habitats for which this rMCZ was proposed for designation.

EUNIS code & Broadscale Habitat	Spatial extent according to the SAD
A5.1 Subtidal coarse sediment	3.75 km^2
A5.2 Subtidal sand	5.90 km^2
A5.3 Subtidal mud	388.45 km^2

2.2.2 Habitat FOCI proposed for designation

Annex 2 presents the habitat FOCI listed in the ENG. The habitat FOCI 'Subtidal sands and gravels' was included in the recommendations for designation at this site (Table 2). The estimated spatial extent for this habitat FOCI in the SAD was calculated using seabed sediment data layers from the British Geological Survey DigSBS250 GIS product (for further information see Seeley et al, 2010), rather than by combining the extent of the UK SeaMap 'subtidal coarse sediment' and 'subtidal sand' broadscale habitats given in Table 1.

Table 2. Habitat FOCI for which this rMCZ was proposed for designation.

Habitat FOCI	Spatial extent according to SAD
Subtidal Sands and Gravels	9.65 km^{2}*

* ***The extent of this Habitat FOCI has been re-calculated by summing the extent estimates of the 'A5.1 Subtidal coarse sediment' and 'A5.2 Subtidal sand' BSH, in accordance with guidance from the JNCC and NE.***

2.2.3 Species FOCI proposed for designation

No 'Low or limited mobility species' and no 'Highly mobile species' FOCI were included in the recommendations for designation of this rMCZ (Table 3). The full list of these species FOCI is presented in Annexes 3 and 4.

Table 3. Species FOCI for which this rMCZ was proposed for designation.

Species FOCI	
Low or limited mobility species FOCI	None
Highly mobile species FOCI	None

2.3 Rationale for prioritising this rMCZ for additional evidence collection

Prioritisation of rMCZ sites for further evidence collection was informed by a gap analysis and evidence assessment. The prime objective was to elevate the confidence status for as many rMCZs as feasible to support designation in terms of the amount and quality of evidence for the presence and extent of broadscale habitat features and habitat and species FOCI. The confidence status was originally assessed in the SADs according Technical Protocol E (Natural England and the JNCC, 2012).

The confidence score for the presence and extent of broadscale habitats and habitat FOCI reported for the North-West of Jones Bank rMCZ was 'Low/Moderate' (JNCC and Natural England, 2012). This site was therefore prioritised for additional evidence collection.

2.4 Survey aims and objectives

Primary Objectives

- To collect acoustic and ground-truthing data to allow the production of an updated map which could be used to inform the presence of broadscale

habitats and habitat FOCI, and allow estimates to be made of their spatial extent within the rMCZ.

Secondary Objectives

- To provide evidence, where possible, of the presence of species FOCI listed within the ENG (Annexes 3 and 4) within the rMCZ.
- To report evidence of human activity occurring within the rMCZ during the course of the survey.

It should be emphasised that surveys were not primarily designed to address the secondary objectives under the current programme of work.

Whilst the newly collected data will be utilised for the purposes of reporting against the primary objectives of the current programme of work (given above), it is recognised that these data will be valuable for informing the assessment and monitoring of condition of given habitat features in the future.

3 Methods

3.1 Acoustic data acquisition

Multibeam bathymetry and backscatter data were used to assist in the planning and interpretation of seabed habitats. The bathymetric data were collected and processed in accordance with the International Hydrographic Organisation (IHO) Standards for Hydrographic Surveys - Order 1 (Special Publication 44, Edition 4).

Two datasets were used:

1) The main multibeam bathymetry and backscatter dataset for the site was collected between 29th February and 31st March 2012 on a survey carried out by Gardline aboard the MV *Tridens* (9060). This dataset covered approximately 75 % of the proposed rMCZ site. These data were collected using a hull-mounted Simrad EM710 echo sounder (calibrated by a patch test at the start of the survey).

The acoustic data were processed using Caris HIPS and SIPS (version 7.1). Tidal information was loaded to the relevant files and the survey lines merged. The merging process combines all sensor data along with tidal and offset information to produce updated soundings files, prior to depth editing. Depth data were processed using the Swathe Editor function, where each line is cleaned manually and statistically for noise. The dataset is gridded to create a Bathymetry Associated with Statistical Error (BASE) Surface with different child layers to enable further processing and checking using the Subset function. A BASE surface is a geo-referenced image of a multi-attributed, weighted mean surface. The gridding technique used is a combination of range and swathe angle weighting. The range weight is inversely proportional to the distance from the node (the position of the node is determined during the creation of the fieldsheet): soundings closer to the node have more weighting. The swathe angle weighting ensures that higher value is given to beams from the inner part of the swathe than to outer beams from adjacent lines. The surface is created using a single resolution of 2 m x 2 m, which is determined by several factors including system, water depth, line spacing and data quality.

Velocity profiles were undertaken using a Valeport 650 MKII MIDAS velocity probe whilst the vessel was static and, when required, during data acquisition whilst vessel speed was reduced to 4 knots.

Backscatter data were also processed using Caris HIPS and SIPS (version 7.1) software. There is no ability to make gain changes on the backscatter data during acquisition on the EM710 and during processing, gains were not altered either in order to maintain uniform gain across the whole site. There was some breakup of the backscatter data due to the marginal weather that the survey was conducted in at times, but it was agreed that the data were fit for purpose and met the requirements of Cefas and so acquisition continued.

2) A further survey was carried out by Cefas and JNCC on the RV *Cefas Endeavour* between 11th and 12th July 2012. The aim of this cruise was to collect additional benthic samples from within the rMCZ area, although some lines of multibeam acoustic data were also recorded whilst transiting between sampling stations. These

data cover approximately 6 % of the rMCZ site. The raw multibeam bathymetry data were processed using Caris HIPS. Tidal information was gathered using a CNAV 3050 DGPS receiver. Tidal height data were smoothed and extracted to reduce the effects of tidal height on the bathymetry data. The soundings were cleaned and smoothed, using Caris, to IHO order 1. Multibeam backscatter data were processed with Fledermaus Geocoder Toolbox (FMGT) to produce standard and floating point (FP) geotiffs.

See Appendix 2 for images derived from both sets of acoustic data.

3.2 Ground-truth sample acquisition

Ground-truth samples were collected on both the Gardline and Cefas survey cruises from 50 stations in total, which were positioned within the sedimentary habitats using a triangular lattice grid overlaid on the Site Assessment Document (SAD) habitat map. Benthic grabs were taken at 44 stations to collect sediments and infauna. An underwater camera system was deployed at 17 stations to collect video and still images of the seabed (Figure 2; Appendix 1).

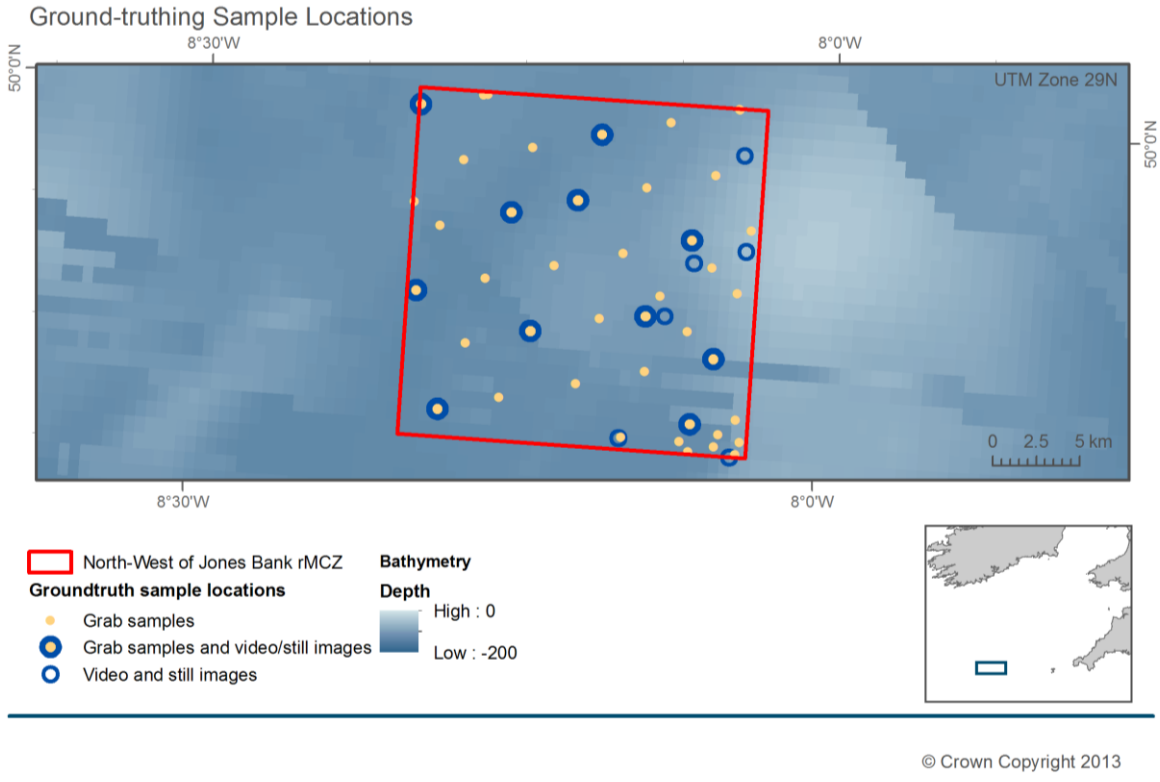

Figure 2. Location of ground truth sampling sites in the North-West of Jones Bank rMCZ. Bathymetry is from the GEBCO Digital Atlas (published by the British Oceanographic Data Centre on behalf of IOC and IHO, 2003).

Grab sample acquisition:

The survey carried out by Gardline (9060) in March 2012 used two instruments to collect a total of 36 grab samples from the seafloor. These were an in-house constructed, modified stainless-steel 0.1 m^2 Day Grab, and a 0.1 m^2 mini Hamon grab. Eight additional grab samples were collected on the Cefas cruise

(CEND10/12) in July 2012, using a 0.1 m^2 mini Hamon grab fitted with a video camera (this combined gear is known as a 'HamCam'). This allowed an image of the undisturbed seabed to be obtained before each grab sample.

Grab samples deemed acceptable for analyses were photographed and described prior to sub-sampling. A sub-sample of sediment was taken (either using a 3 cm diameter corer for samples acquired using the Day grab, or approx. 0.5 litres from Hamon grab samples) and placed into a labelled plastic container for later Particle Size Analysis (PSA). The volume of the remaining sample was measured and recorded, then sieved over a 1 mm mesh to collect the benthic fauna. The retained faunal samples were preserved in a known concentration (less than 20 %) of 'formalin' for later processing ashore.

Video and still image sample acquisition:

Within the broadscale habitat areas identified in the SAD, camera sledge deployments were made during both surveys at a subset of stations sampled by the grab, and also at 6 additional stations where grab samples were not collected successfully. The camera images helped to characterise the surficial sediments and associated epifaunal communities. The total number of camera deployments for each BSH varied depending on the uniformity of the habitat and their spatial extent. The methods used on the two surveys are outlined below:

1) Gardline survey (9060), March 2012. Still images of the seabed were collected by means of a digital stills camera system with dedicated strobe and video lamps, mounted within a stainless steel frame. Standard definition (SD) video footage was collected at all stations where images were collected. At some stations, additional footage was acquired using a high definition (HD) camera. An Ultra Short Baseline (USBL) positioning beacon was attached to the camera frame. SD footage was viewed in real time via an umbilical, assisting in the control of the digital stills camera. This allowed for shot selection, in the event that the system recorded a sediment change or feature of interest at the seafloor.

A minimum of fourteen seabed photographs were taken at each station using a drift transect technique, separated by a gap time of approximately 1 minute. This technique allowed the frame to move progressively along the seabed as the vessel traversed the work area on its thrusters or drifted. The vessel would position 600 m in-line with the target and then drift over the station. Recording was commenced when the camera position was approximately 150 m from target location. Images were captured remotely using the surface control unit and stored on the camera's internal memory card. Video footage was overlaid with time, position, depth and recorded directly onto VHS video and DVD and DVC tape. On completion, photographs were downloaded onto a PC, via a USB download cable, and copied onto CD-Rom. All CDs, DVDs, DVC tapes and videos were labelled with the relevant job details, write-protected and stored. Footage was downloaded from the HD camera and stored on an expansion drive.

2) Cefas survey (CEND 10/12), July 2012. Video observations were made with a camera sledge system, having a video camera with capability to also capture still images. Illumination was provided by two Cefas high intensity LED striplights and a dedicated flash unit. The camera was oriented to provide a forward oblique view of the seabed and was fitted with a four-spot (red) laser-scaling device which projected

the corners of a 17 cm x 17 cm square along the axis of the lens onto the seabed, in order to provide a reference scale in the video. A further (green) horizontal laser helped to visualise the rugosity of the seabed on the moving video image (but was not always clearly visible in the still images).

Set-up and operation followed the MESH 'Recommended Operating Guidelines (ROG) for underwater video and photographic imaging techniques' (Coggan et al., 2007). Video was recorded simultaneously to a Sony GV-HD700 DV tape and a computer hard drive. A video overlay was used to provide station metadata, time and GPS position (of the vessel) in the recorded video image.

Camera sledge transects lasted a minimum of 10 minutes, with the sledge being towed at c. 0.5 knots (c. 0.25 m s^{-1}) along the desired transect line. Still images were captured at regular one minute intervals and also opportunistically if specific features of interest were encountered. The sledge was controlled by a winch operator with sight of the video monitor and note made of the amount of tow cable deployed to allow a 'lay-back' calculation to be applied to estimate the position of the sledge.

For further detail on ground-truth sample collection see 'The North-West of Jones Bank rMCZ Survey Report' (Coggan, 2012) and 'Lot 6 – Northwest Jones Bank DEFRA MCZ programme 2012 Acquisition Report, March 2012' (Gardline, 2012).

Video and still images were analysed following an established protocol developed and used by Cefas (Coggan and Howell, 2005; JNCC, in prep.; see Annex 5).

3.3 Production of the updated habitat map

All new maps and their derivatives have been based on a WGS84 datum. A new habitat map for the site was produced by analysing and interpreting the available acoustic data and the ground-truth data collected by the dedicated surveys of this site.

The mapping process involved the production of derived datasets from the bathymetry data using tools in the ArcGIS v.10 Spatial Analyst Toolbox (slope, aspect and hillshade) and the DEM Surface Tools add-in (surface area/rugosity), as detailed in Table 4. These data layers, and the processed depth and backscatter data layers, were used to create a broadscale habitat map of the rMCZ area through expert visual interpretation. The absence of a full coverage acoustic data set across the entire site precluded the use of automated approaches in the interpretation carried out to produce the updated habitat map.

Areas exhibiting different characteristics in the acoustic data were identified and digitised in ArcGIS v.10. Sediment type was then assigned to each delineated area of the seabed using information from the ground-truthing data (both from sediment PSA and visual classification based on video and still images). Where there was an absence of acoustic data the broadscale habitat map has been manually interpolated using expert judgement.

Table 4. Description of derivatives calculated from bathymetry data.

Derivative	Description
Slope	The slope (gradient in degrees) for each cell of the bathymetry grid using the maximum change in elevation of each cell and its 8 neighbours (Burrough and McDonnell, 1998).
Roughness (surface area ratio)	A measure of topographic roughness. Calculated by dividing the surface area of a cell and its 8 neighbours by the planimetric area of these 9 cells (Jenness, 2004).
Aspect	Identifies the downslope direction of the maximum rate of change in value from each cell and its 8 neighbours. Can be thought of as the slope direction. Measured in clockwise degrees from 0 (due north). Flat areas with no downslope are given a value of -1 (Burrough and McDonnell, 1998).
Hillshade	Creates a shaded relief from a bathymetry surface by considering the illumination source angle and shadows. Creating a hillshade layer greatly enhances the visualisation of bathymetry (depth) data (Burrough and McDonnell, 1998).

3.4 Quality of the updated map

The technical quality of the updated habitat map was assessed using the MESH 'Confidence Assessment' Tool[1], originally developed by an international consortium of marine scientists working on the MESH (Mapping European Seabed Habitats) project. This tool considers the provenance of the data used to make a biotope/habitat map, including the techniques and technology used to characterise the physical and biological environment and the expertise of the people who had made the map. In its original implementation it was used to make an auditable judgement of the confidence that could be placed in a range of existing, local biotope maps that had been developed using different techniques and data inputs, but were to be used in compiling a full coverage map for north-west Europe. Where two of the original maps overlapped, that with the highest MESH confidence score would take precedence in the compiled map.

Subsequent to the MESH project, the confidence assessment tool has been applied to provide a benchmark score that reflects the technical quality of newly developed habitat/biotope maps. Both physical and biological survey data are required to achieve the top mark of 100, but as the current rMCZ exercise requires the mapping of broadscale physical habitats, not biotopes, it excludes the need for biological data. In the absence of biological data, the maximum score attainable for a physical habitat map is 88.

In applying the tool to the current work, none of the weighting options were altered; that is, the tool was applied in its standard form, as downloaded from the internet.

[1] http://www.searchmesh.net/confidence/confidenceAssessment.html [Accessed 24/01/2014]

4 Results

4.1 Site Assessment Document (SAD) habitat map

The SAD habitat map (Figure 3) was produced using modelled data from the UKSeaMap (McBreen, 2010). For further detail see Lieberknecht et al. (2011).

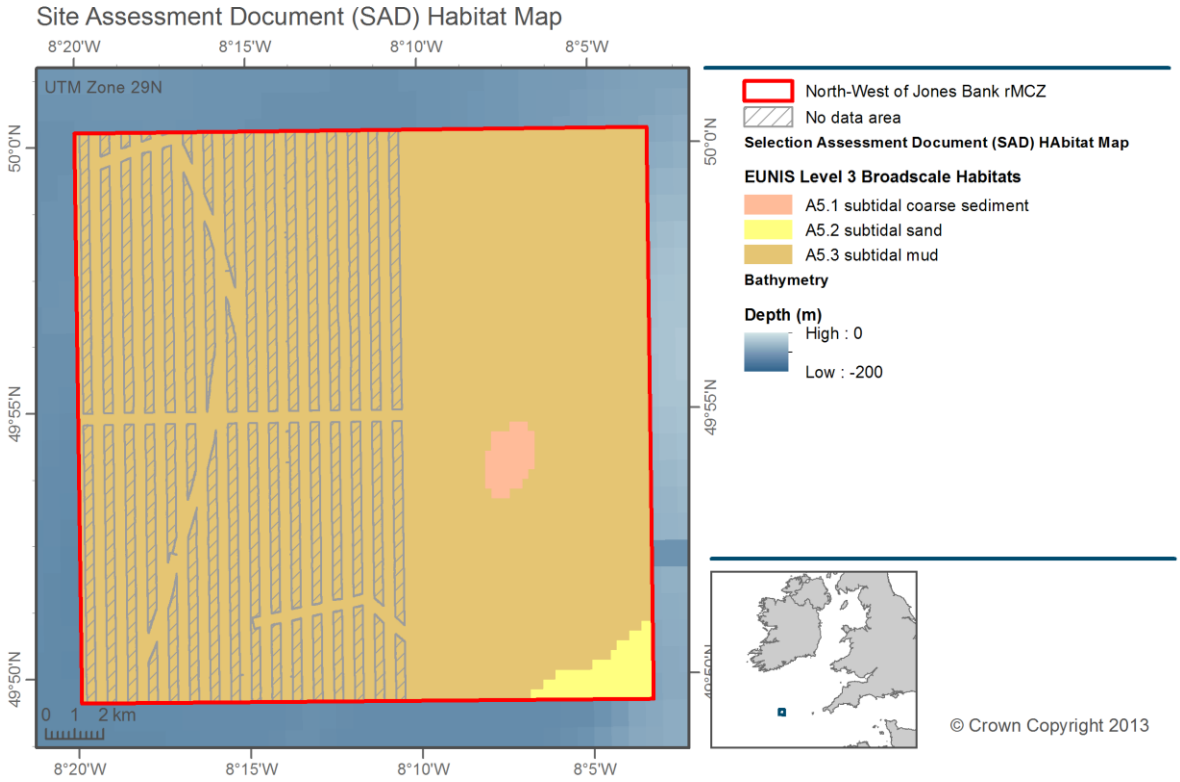

Figure 3. Habitat map from the Site Assessment Document (SAD). The hashed 'No data area' refers to the parts of the site where no new data were collected during the 2012 surveys.

4.2 Updated habitat map based on new survey data

The updated habitat map, resulting from an integrated analysis of the data collected in the 2012 dedicated surveys, is presented in Figure 4. There was an area of ~90 km^2 where no acoustic data were collected. Where the acoustic data gaps occur, the broadscale habitat map has been manually interpolated and, as Figure 4 illustrates, presents the interpolated areas of habitat in a separate colour within the map and legend.

The estimated extent of the broadscale habitats and habitat FOCI from the SAD were re-calculated for the sub-area of the site that was covered by the new survey data. This has enabled 'like-for-like' comparison of the spatial extent of each BSH/FOCI in the original SAD and in the site report for this rMCZ.

The list of benthic taxa found in the grab and video samples is presented in Appendix 4; a total of 159 infaunal taxa were recorded from the grab samples and 191 epifaunal taxa were recorded from the video and still image data.

A summary of the sediment PSA derived from the grab samples is given in Appendix 5. Of the 44 stations where a sample was obtained, muddy sediment was recorded at 34 stations, sandy sediment at five stations, coarse sediment at two stations, and mixed sediments at three stations.

The analysis of the seabed video and stills is summarised in Appendix 6. Example still images of the BSHs and habitat FOCI recorded at this rMCZ during the survey are given in Appendices 7 and 8 respectively.

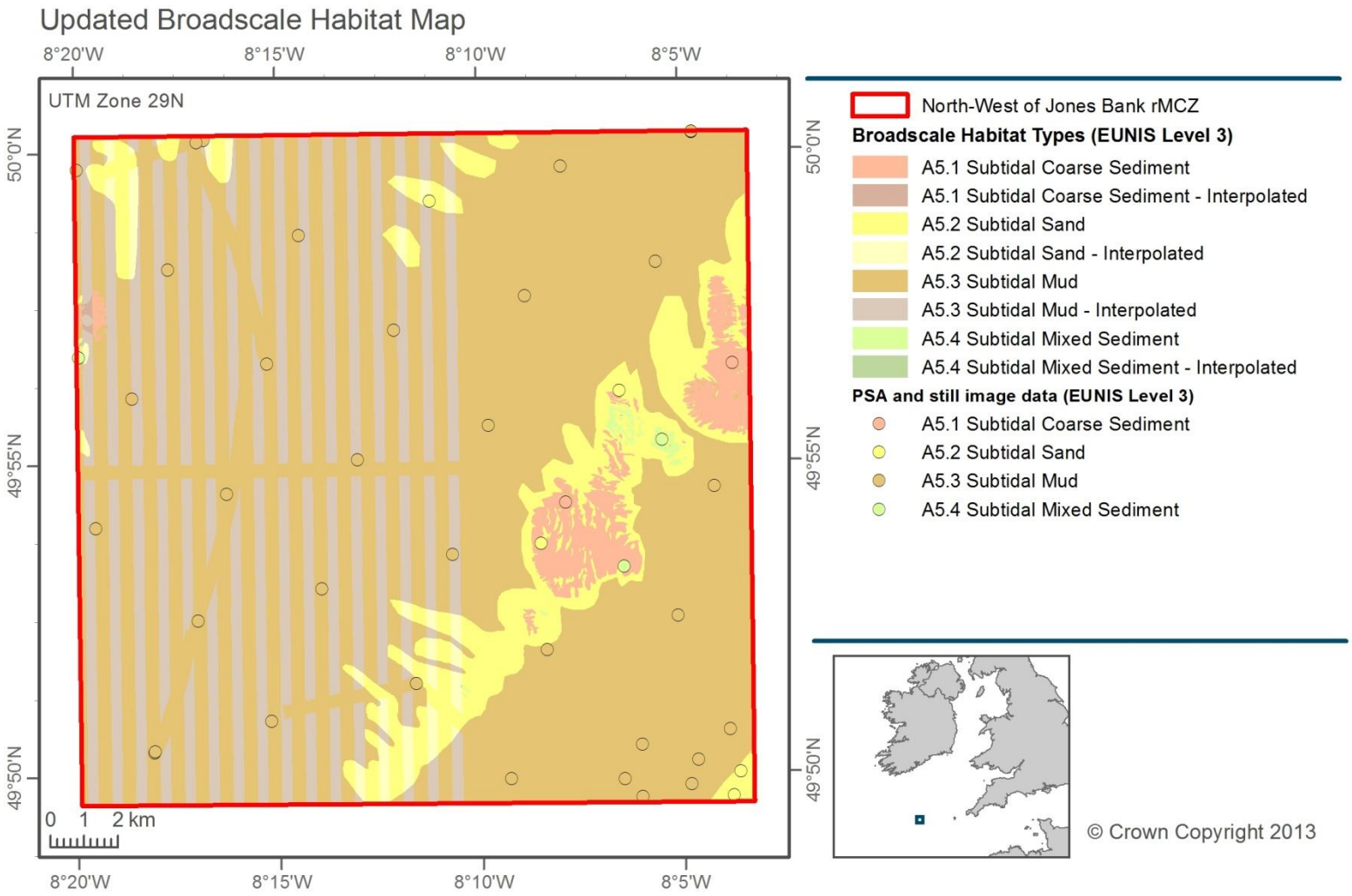

Figure 4. Updated map of broadscale habitats based on newly acquired survey data (grey shading indicates areas where underlying MBES data are absent).

4.3 Quality of the updated habitat map

The results of the MESH confidence assessment are shown in Figure 5. Both the acoustic data collected on the Gardline survey (9060 in March 2012) and on the Cefas survey (CEND 10/12 in July 2012) received a score of 84 from the MESH Confidence Assessment Tool. These scores are out of a possible 88 for a purely physical habitat map.

There are gaps in the acoustic data in the western part of the site. Approximately 23% of the site is not covered by the acoustic datasets. The 'no data areas' have been attributed a confidence score of 0 and are represented as interpolated habitats in Figure 4.

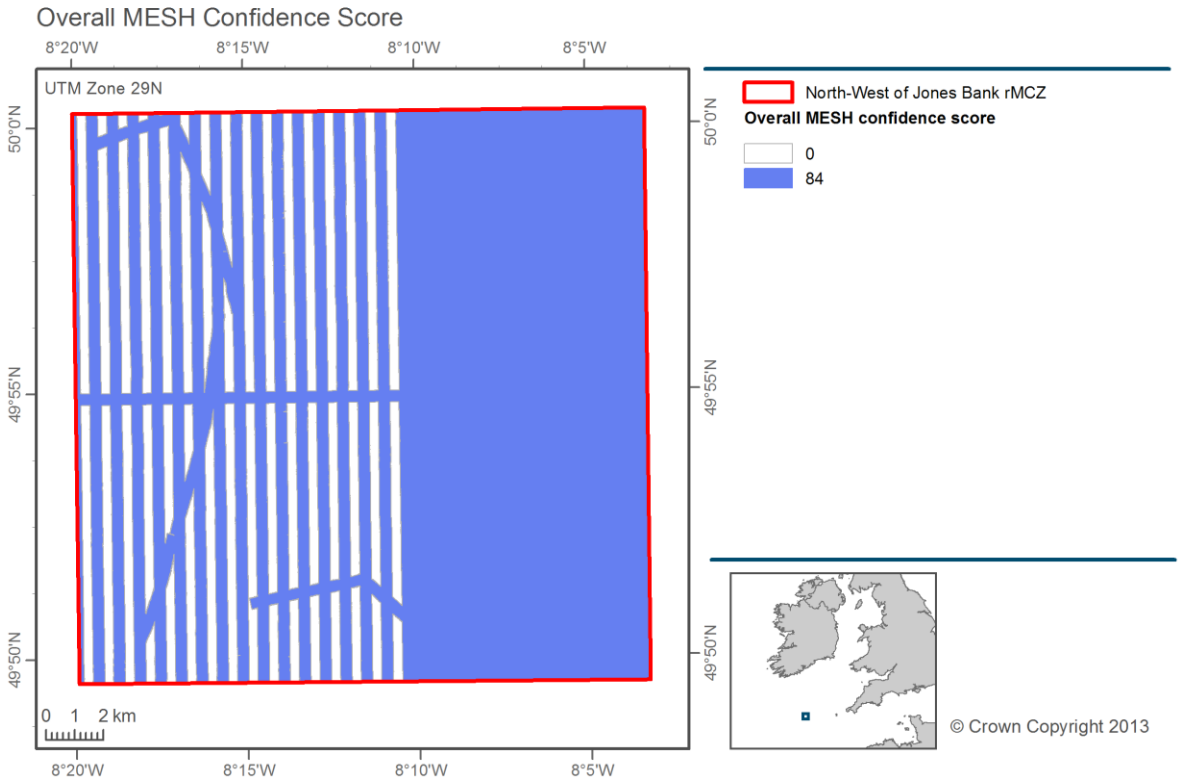

Figure 5. Overall MESH confidence score for the updated habitat map.

4.4 Broadscale habitats identified

Broadscale habitats were interpreted and mapped for the 77% of the area of the rMCZ site for which acoustic data were available. The habitat map produced for the remaining area, where acoustic data were absent, was based on manual interpolation using expert judgement.

'A5.3 Subtidal mud' was the most widespread broadscale habitat type, occupying approximately two thirds of the rMCZ site (Figure 4, Table 5) and was to be found to be most prevalent in the deeper sections of the site, in particular in the central and western parts.

‘A5.2 Subtidal sand’ was estimated to occupy 9.3% of the site and is present in clear longitudinal features, associated with shallower depths and often topped with ‘A5.1 Subtidal coarse sediment’ habitats, which occupied approximately 3.4% of the total area. ‘A5.4 Subtidal mixed sediments’ was also present, in association with the sand and coarse sediment features, but its extent was estimated at just 0.3% of the area of the site.

The habitat map produced for an area of 92.83 km^2, in the western side of the rMCZ, was based on interpolation of data due to the absence of acoustic data within these regions of the site (Figure 4 and Figure 5). This interpolated section constitutes 23% of the full area of the rMCZ.

Table 5. Broadscale habitats identified in this rMCZ.

Broadscale Habitat Type (EUNIS Level 3)	Spatial extent according to the SAD for the entire rMCZ.	Spatial extent within the sub-area of new survey data	Spatial extent according to the updated habitat map
A5.1 Subtidal coarse sediment	3.75 km^2	3.75 km^2	13.66 km^2
A5.2 Subtidal sand	5.90 km^2	5.90 km^2	36.85 km^2
A5.3 Subtidal mud	388.45 km^2	295.43 km^2	253.34 km^2
A5.4 Subtidal mixed sediments	0 km^2	0 km^2	1.15 km^2

4.5 Habitat FOCI identified

The habitat map presented in the SAD estimated that 328.44 km^2 (> 80%) of the North-West of Jones Bank rMCZ was covered by the habitat FOCI ‘Subtidal Sands and Gravels’. This estimate was derived from MB102 (2C) data (Lieberknecht et al., 2011), largely based on the BGS DigSBS250 modelled seabed sediment data layers. However, this estimate does not appear to agree with the UKSeaMap modelled broadscale habitat classification for the site, or the updated broadscale habitat map based on the new data collected at the site, which shows that much of the area is made up of muddy sediment (Figure 4). This discrepancy is likely to be due to the filters used when extracting data from DigSBS250, which are based on Folk sediment type classifications. Seeley et al. (2010) state that the Folk types ‘sand’, ‘gravel’, ‘sandy gravel’, ‘gravelly sand’, ‘muddy sand’, ‘slightly gravelly sand’ and ‘slightly gravelly muddy sand’ were all used to feed into the ‘Subtidal Sands and Gravels’ habitat layer produced for the MB102 (2C). The inclusion of some sediment types from the ‘mud’ end of the spectrum in this process, may have led to the discrepancy that we see here between the SAD estimated extent and the updated estimated extent of the habitat FOCI ‘Subtidal Sands and Gravels’. As a result of this discrepancy, and in line with recent guidance produced by the JNCC and NE (in prep.), the SAD extent estimate for the habitat FOCI ‘Subtidal Sands and Gravels’ has been recalculated by summing the extent values of the ‘A5.1 Subtidal coarse sediment’ and ‘A5.2 Subtidal sand’ broadscale habitats. The recalculated estimate for the extent of this FOCI, based on the extent of the SAD broadscale habitats, was 9.65 km^2. There is a large discrepancy between the original (328.44 km^2) and recalculated (9.65 km^2) extent estimates for this FOCI, which is the result of the different methods of extent estimation.

The updated habitat map shows that the majority of the site is comprised of the broadscale habitat ‘A5.3 Subtidal mud’ and therefore has been classified as containing the habitat FOCI ‘Mud Habitats in Deep Water’ as specified in Appendix 8

of the ENG guidance (Natural England and JNCC, 2010). Figure 6 includes the interpolated sections of Habitat FOCI, although these extents have not been included in the spatial extent calculations.

Evidence of sea-pens and burrowing megafauna were identified in the video and still image analysis at a number of sampling stations (Figure 6). These included general observations of burrows and casts within the muddy substratum, as well as identification of sea-pens (*Vigularia mirabilia*), burrowing anemones (such as *Cerianthus lloydii*), burrowing crustaceans (e.g. *Nephrops norvegicus*) and burrowing worms (e.g. Sabellida sp.). Evidence of the habitat FOCI 'Sea-Pen and Burrowing Megafauna Communities' was identified in the biological data from all the video tow sites, and in 112 of the 164 still images collected within the rMCZ site. This FOCI was evidenced by a single element, or combination of elements from the following list: burrows and/or casts in the sediment; burrowing species of worm, crustacean, or anemone; sea-pen(s). One or more of these features was identified in each of the images data sources that were classified as containing this habitat FOCI. The seabed image data suggests that this habitat FOCI is distributed widely throughout the rMCZ area, particularly coinciding with areas of 'Mud Habitats in Deepwater' habitat FOCI, however it was not felt sensible to extrapolate an areal coverage estimate for the 'Sea-Pen and Burrowing Megafauna Communities' habitat FOCI from the point records in the image data.

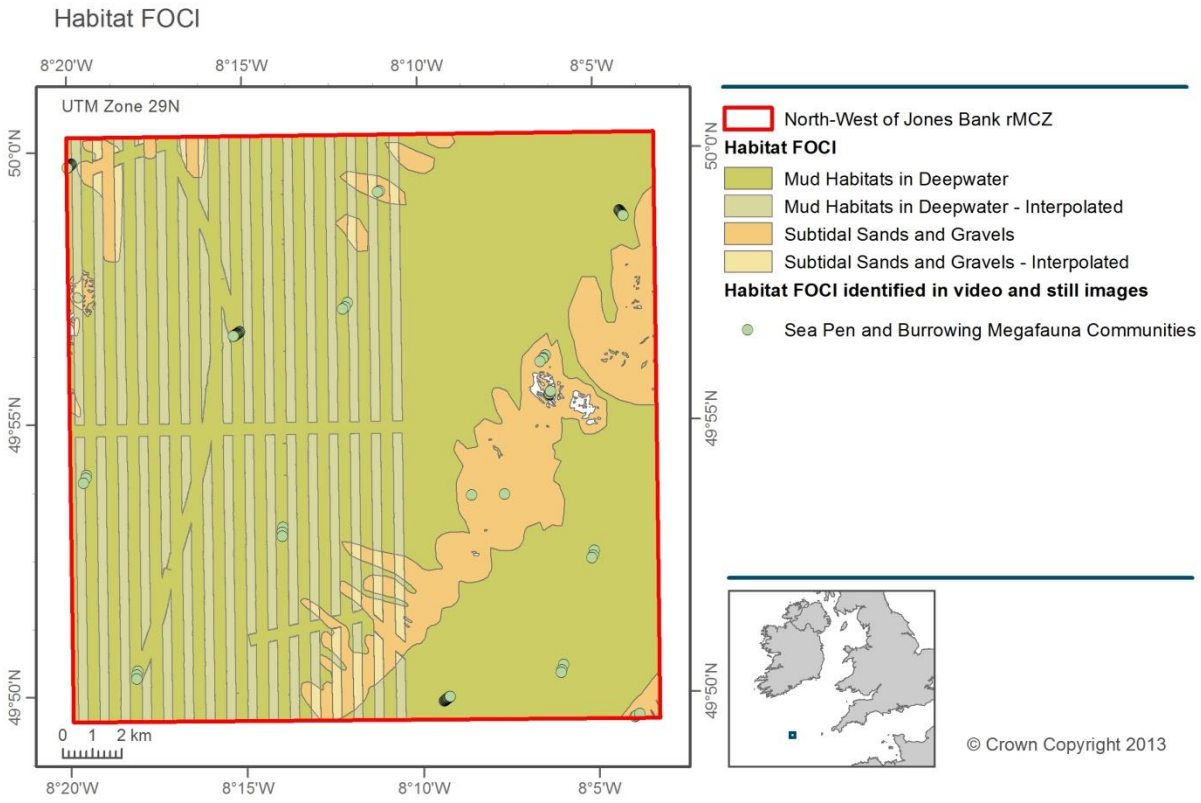

Figure 6. Habitat FOCI identified in the updated habitat map.

Table 6. Habitat FOCI identified in this rMCZ.

Habitat FOCI	Spatial extent according to the SAD	Spatial extent within the sub-area of new survey data	Spatial extent according to the updated habitat map
Mud Habitats in Deepwater	0 km^2	0 km^2	253.34 km^2
Subtidal Sands and Gravels*	9.65 km^2	9.65 km^2	50.51 km^2
Sea-pen and Burrowing Megafauna Communities	0 km^2	0 km^2	Unknown**

****The extent of this habitat FOCI has been re-calculated by summing the extent estimates of the 'A5.1 Subtidal coarse sediment' and 'A5.2 Subtidal sand' BSHs given in the SAD.***

*****The presence of this Habitat FOCI is known from the video and still images, but the extent of its coverage has not been estimated.***

4.6 Species FOCI identified

There were no species FOCI identified in either the grab or video samples, however, a number of notable species of conservation interest were identified from the image analysis, although these species are not listed as FOCI for the rMCZ network. The UK Biodiversity Action Plan (BAP) priority species *Pachycerianthus multiplicatus* and *Arachnanthus sarsi* (http://jncc.defra.gov.uk/page-5167) were recorded on one occasion each (at sampling stations CS01_STN_201 and CS05_STN197 respectively). *P. multiplicatus* is a large, burrowing, fireworks anemone reported to be generally confined to a few of the Scottish sea lochs and some sheltered inlets off the west of Ireland (JNCC, 2010). *A. sarsi* is considered to be a very rare anemone, which has only previously been reported in shallower waters (10 - 36 m) around western Scotland and north-west Ireland (JNCC, 2010a). A further rare species of anemone, *Mescmaea mitchellii,* was identified in the image data from station CS01_STN201. This species has only been recorded from relatively few locations previously (Wood, 2005). Additionally, broken shell fragments of the fan mussel *Atrina fragilis* were also identified in the image data from the same site (CS01_STN201). This is considered to be one of the most endangered molluscs in UK waters and is the subject of a Species Action Plan (SAP) (JNCC, 2010b).

Table 7. Species FOCI identified in this rMCZ.

Species FOCI	Previously recorded within rMCZ	Identified during evidence gathering survey
Low or Limited Mobility Species FOCI	None recorded	None recorded
Highly Mobile Species FOCI	None recorded	None recorded

4.7 Quality Assurance (QA) and Quality Control (QC)

4.7.1 Acoustic data

The acoustic data utilised for production of the updated habitat map were collected and processed in compliance with the International Hydrographic Organisation (IHO) Standards for Hydrographic Surveys - Order 1 (Special Publication 44, Edition 4). The accompanying multibeam backscatter data were reviewed and processed by specialist Cefas staff to ensure these data were suitable for use in the subsequent interpretations and production of the updated habitat map.

4.7.2 Particle Size Analysis (PSA) of sediments

PSA was carried out by Kenneth Pye Associated Ltd. and Cefas, following standard laboratory practice and the results checked by specialist Cefas staff following the recommendations of the National Marine Biological Analytical Quality Control (NMBAQC) scheme (Mason, 2011). Results of the PSA are shown in Appendix 5.

4.7.3 Infaunal samples from grabs

Infaunal samples were processed by Thompson Unicomarine Ltd. and MES Ltd. following standard laboratory practices and results checked following the recommendations of the National Marine Biological Analytical Quality Control (NMBAQC) scheme (Worsfold and Hall, 2010).

4.7.4 Video and still images and analysis

Video and photographic stills were processed by Envision Mapping in accordance with the guidance documents developed by Cefas and the JNCC for the acquisition and processing of video and stills data (Coggan and Howell, 2005; JNCC, in prep.; summarised in Annex 5).

4.8 Data limitations and adequacy of the updated habitat map

A source of potential misclassification of habitats arises from the location of ground-truthing samples in relation to habitat types, as well as possible errors on the exact position of grab sample locations, which are plotted as the GPS-derived position of the ship at the time of grab deployment, but in reality some offset may apply.

The survey has provided substantial, robust evidence for the presence of the four mapped broad scale habitats (Figure 4). However, as it is impractical (and undesirable) to sample the entire area of the site with grabs and video, there is a chance that a BSH or FOCI may exist within the site that has not been recorded, especially if it was limited in extent.

The precise location of the boundaries between the broadscale habitats depicted on the map should be regarded as indicative, not definitive. In nature, such boundaries are rarely abrupt. Instead it is typical for one BSH to grade into another across a transitional boundary. In contrast, the mapped boundaries are abrupt and have been placed using best professional judgment. This may have implications when calculating the overall extent of any of the mapped habitats or FOCI.

It should be noted that there was a relatively large area of the rMCZ site where no acoustic data were collected (92.83 km^2), and therefore broadscale habitats and habitat FOCI were interpolated these areas of the site.

Information from the video and still image data from the 2012 research cruises was used to inform the location of the habitat FOCI 'Sea-Pen and Burrowing Megafauna Communities', and these have been included as point records in the FOCI habitat map (Figure 4). The image data provides strong evidence for the presence of 'Sea-Pen and Burrowing Megafauna Communities' habitat FOCI throughout the rMCZ area, although they cannot support an assessment of the extent of this FOCI habitat. The extent of this type of habitat FOCI cannot be determined from the acoustic data, as it relies on the identification of specific biological communities.

4.8.1 Presence of Species FOCI

No species FOCI were included in the recommendations for proposal of this rMCZ, and no evidence of species FOCI was found in the updated analysis for this report.

4.9 Observations of human impacts on the seabed

A number of trawl marks have been identified in the acoustic backscatter data and are outlined in the map in Appendix 3. This provides evidence of demersal fishing activity occurring within this site.

5 Conclusions

5.1 Presence and extent of broadscale habitats

5.1.1 Presence

- The 2012 dedicated survey has confirmed the presence of the 'A5.1 Subtidal coarse sediment', 'A5.2 Subtidal sand' and 'A5.3 Subtidal mud' broadscale habitats that were included in the recommendations made by the SAD for designating this site as an MCZ.
- There were no broadscale habitats identified in the SAD which were not identified in the 2012 dedicated surveys.
- The 2012 dedicated survey has confirmed the presence of 'A5.4 Subtidal mixed sediments' broadscale habitat. This BSH was not included in the recommendations made by the SAD for designating this site as an MCZ.

5.1.2 Extent

- The spatial extent of the 'A5.1 Subtidal coarse sediment' BSH on the updated habitat map is 13.66 km^2. This is an increase of 9.91 km^2 when compared with the spatial extent estimated in the SAD habitat map (within the sub-area with data coverage from the 2012 surveys).
- The spatial extent of the 'A5.2 Subtidal sand' BSH on the updated habitat map is 36.85 km^2. This is an increase of 30.95 km^2 on the spatial extent estimated in the SAD habitat map (within the sub-area with data coverage from the 2012 surveys).
- The spatial extent of the 'A5.3 Subtidal mud' BSH on the updated habitat map is 253.34 km^2, which is a decrease of 42.09 km^2 when compared with the estimated extent in the SAD habitat map (within the sub-area with data coverage from the 2012 surveys).
- The spatial extent of the 'A5.4 Subtidal mixed sediments' BSH on the updated habitat map is 1.15 km^2. This BSH was not identified in the SAD habitat map.

5.2 Presence and extent of habitat FOCI

5.2.1 Presence

- The 2012 dedicated survey has confirmed the presence of the 'Subtidal Sands and Gravel' habitat FOCI that was included in the recommendations made by the SAD for designating this site as an MCZ.
- The 2012 dedicated survey has confirmed the presence of the 'Mud Habitats in Deepwater' and 'Sea-pen and Burrowing Megafauna Communities' habitat FOCI at this site. These habitat FOCI were not included in the recommendations made by the SAD for designating this site as an rMCZ.

5.2.2 Extent and distribution

- The spatial extent of the 'Subtidal Sands and Gravel' habitat FOCI on the updated habitat map is 50.51 km^2. This is 40.86 km^2 greater than the spatial extent in the SAD habitat map (within the sub-area with data coverage from the 2012 surveys). Note that the SAD extent estimate for this FOCI was recalculated by summing the extents of the 'A5.1 Subtidal coarse sediment' and 'A5.2 Subtidal sand' BSHs, in accordance with recent guidance from the JNCC and NE (in prep.).

- The spatial extent of the 'Mud Habitats in Deepwater' habitat FOCI on the updated habitat map is 253.34 km^2. This habitat FOCI was not identified in the SAD habitat map.

- There is strong evidence to support the presence of the 'Sea-pen and Burrowing Megafauna Communities' habitat FOCI on the updated habitat map, however the extent of this FOCI cannot be estimated accurately from the image data. This habitat FOCI was not identified in the SAD habitat map.

5.3 Presence and distribution of species FOCI

5.3.1 Low or limited mobility species

- No low or limited mobility species FOCI were recorded at this site by the 2012 dedicated survey. These observations are consistent with the evidence presented in the SAD.

5.3.2 Highly mobile species FOCI

- No highly mobile species FOCI were recorded at this site by the 2012 dedicated survey. These observations are consistent with the evidence presented in the SAD.

5.4 Evidence of human activities impacting the seabed

There is evidence from the multibeam backscatter data of demersal fishing activity occurring within the rMCZ in the form of trawl marks, visible in the acoustic data (Appendix 3).

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Data sources

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Annexes

Annex 1. Broadscale habitat features listed in the ENG.

Broadscale Habitat Type	EUNIS Level 3 Code
High Energy Intertidal Rock	A1.1
Moderate Energy Intertidal Rock	A1.2
Low Energy Intertidal Rock	A1.3
Intertidal Coarse Sediment	A2.1
Intertidal Sand and Muddy Sand	A2.2
Intertidal Mud	A2.3
Intertidal Mixed Sediments	A2.4
Coastal Saltmarshes and Saline Reed Beds	A2.5
Intertidal Sediments Dominated by Aquatic Angiosperms	A2.6
Intertidal Biogenic Reefs	A2.7
High Energy Infralittoral Rock*	A3.1
Moderate Energy Infralittoral Rock*	A3.2
Low Energy Infralittoral Rock*	A3.3
High Energy Circalittoral Rock**	A4.1
Moderate Energy Circalittoral Rock**	A4.2
Low Energy Circalittoral Rock**	A4.3
Subtidal Coarse Sediment	A5.1
Subtidal Sand	A5.2
Subtidal Mud	A5.3
Subtidal Mixed Sediment	A5.4
Subtidal Macrophyte Dominated Sediment	A5.5
Subtidal Biogenic Reef	A5.6
Deep Seabed***	A6

**** Infralittoral rock includes habitats of bedrock, boulders and cobble which occur in the shallow subtidal zone and typically support seaweed communities***

***** Circalittoral rock is characterised by animal dominated communities, rather than seaweed dominated communities***

****** The deep seabed* broadscale habitat *encompasses several different habitat sub-types, all of which should be protected within the MPA network. The* broadscale habitat *deep seabed habitat is found only in the south-west of the MCZ project area and MCZs identified for this* broadscale habitat *should seek to protect the variety of sub-types known to occur in the region.***

Annex 2. Habitat FOCI listed in the ENG.

Habitat Features of Conservation Importance (FOCI)
Blue Mussel Beds (including intertidal beds on mixed and sandy sediments)**
Coldwater Coral Reefs ***
Coral Gardens***
Deepsea Sponge Aggregations***
Estuarine Rocky Habitats
File Shell Beds***
Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats
Intertidal Underboulder Communities
Littoral Chalk Communities
Maerl Beds
Horse Mussel (*Modiolus modiolus*) Beds
Mud Habitats in Deepwater
Sea-pen and Burrowing Megafauna Communities
Native Oyster (*Ostrea edulis*) Beds
Peat and Clay Exposures
Honeycomb Worm (*Sabellaria alveolata*) reefs
Ross Worm (*Sabellaria spinulosa*) reefs
Seagrass Beds
Sheltered Muddy Gravels
Subtidal Chalk
Subtidal Sands and Gravels
Tide-Swept Channels

**** Habitat FOCI have been identified from the 'OSPAR List of Threatened and/or Declining Species and Habitats' and the 'UK List of Priority Species and Habitats (UK BAP)'.***
***** Only includes 'natural' beds on a variety of sediment types. Excludes artificially created mussel beds and those which occur on rocks and boulders.***
****** Coldwater coral reefs, coral gardens, deep sea sponge aggregations and file shell beds currently do not have distributional data which demonstrate their presence within the MCZ project area.***

Annex 3. Low or limited mobility species FOCI listed in the ENG.

Group	Scientific name	Common Name
Brown Algae	*Padina pavonica*	Peacock's Tail
Red Algae	*Cruoria cruoriaeformis* *Grateloupia montagnei* *Lithothamnion corallioides* *Phymatolithon calcareum*	Burgundy Maerl Paint Weed Grateloup's little-Lobed Weed Coral Maerl Common Maerl
Annelida	*Alkmaria romijni*** *Armandia cirrhosa***	Tentacled Lagoon Worm** Lagoon Sand Worm**
Teleostei	*Gobius cobitis* *Gobius couchi* *Hippocampus guttulatus* *Hippocampus hippocampus*	Giant Goby Couch's Goby Long Snouted Seahorse Short Snouted Seahorse
Bryozoa	*Victorella pavida*	Trembling Sea Mat
Cnidaria	*Amphianthus dohrnii* *Eunicella verrucosa* *Haliclystus auricula* *Leptosammia pruvoti* *Lucernariopsis campanulata* *Lucernariopsis cruxmelitensis* *Nematostella vectensis*	Sea Fan Anemone Pink Sea Fan Stalked jellyfish Sunset Cup Coral Stalked Jellyfish Stalked Jellyfish Starlet Sea Anemone
Crustacea	*Gammarus insensibilis*** *Gitanopsis bispinosa* *Pollicipes pollicipes* *Palinurus elephas*	Lagoon Sand Shrimp** Amphipod Gooseneck Barnacle Spiny Lobster
Mollusca	*Arctica islandica* *Atrina pectinata* *Caecum armoricum*** *Ostrea edulis* *Paludinella littorina* *Tenellia adspersa***	Ocean Quahog Fan Mussel Defolin's Lagoon Snail** Native Oyster Sea Snail Lagoon Sea Slug**

**** Species FOCI have been identified from the 'OSPAR List of Threatened and/or Declining Species and Habitats', the 'UK List of Priority Species and Habitats (UK BAP)' and Schedule 5 of the Wildlife and Countryside Act.***

***** Those lagoonal species FOCI may be afforded sufficient protection through coastal lagoons designated as SACs under the EC Habitats Directive. However, this needs to be assessed by individual regional projects.***

Annex 4. Highly mobile species FOCI listed in the ENG.

Group	Scientific name	Common Name
Teleostei	*Osmerus eperlanus* *Anguilla anguilla*	Smelt European Eel
Elasmobranchii	*Raja undulata*	Undulate Ray

**** Species FOCI have been identified from the 'OSPAR List of Threatened and/or Declining Species and Habitats', the 'UK List of Priority Species and Habitats (UK BAP)' and Schedule 5 of the Wildlife and Countryside Act.***

Annex 5. Video and stills processing protocol.

The purpose of the analysis of the video and still images is to identify what habitats exist in a video record, provide semi-quantitative data on their physical and biological characteristics and to note where one habitat changes to another. A minimum of 10% of the videos should be re-analysed for QA purposes.

Video Analysis

- The video record is initially viewed rapidly (at approximately 4x normal speed) in order to segment it into sections representing different habitats. The start and end points of each segment are logged, and each segment subsequently subject to more detailed analysis. Brief changes in habitat type lasting less than one minute of the video record are considered as incidental patches and are not logged.

- For each segment, note the start and end time and position from the information on the video overlay. View the segment at normal or slower than normal speed, noting the physical and biological characteristics, such as substrate type, seabed character, species and life forms present. For each taxon record an actual abundance (where feasible) or a semi quantitative abundance (e.g. SACFOR scale).

- Record the analyses on the video pro-forma provided (paper and/or electronic), which is a modified version of the Sublittoral Habitat Recording Form used in the MNCR surveys.

- When each segment has been analysed, review the information recorded and assign the segment to one of the broadscale habitat (BSH) types or Habitat FOCI listed in the Ecological Network Guidance (as reproduced in Annexes 1 and 2 above). Note also any species FOCI observed (as per Annex 3 above).

Stills analysis

- Still images should be analysed separately, to supplement and validate the video analysis, and provide more detailed (i.e. higher resolution) information than can be extracted from a moving video image.

- For each segment of video, select three still images that are representative of the BSH or FOCI to which the video segment has been assigned. For each image, note the time and position it was taken, using information from the associated video overlay.

- View the image at normal or greater than normal magnification, noting the physical and biological characteristics, such as substrate type, seabed character, species and life forms present. For each taxon record an actual abundance (where feasible) or a semi quantitative abundance (e.g. SACFOR scale).

- Record the analysis on the stills pro-forma provided (paper and/or electronic), which is a modified version of the Sublittoral Habitat Recording Form used in the MNCR surveys. Assign each still image to the same BSH or Habitat FOCI as its ‘parent’ segment in the video.

Taxon identification

In all analyses, the identification of taxa should be limited to a level that can be confidently achieved from the available image. Hence, taxon identity could range from the 'life form' level (e.g. sponge, hydroid, anemone) to the species level (e.g. *Asterias rubens*, *Alcyonium digitatum*). Avoid the temptation to guess the species identity if it can not be determined positively from the image. For example, *Pomatoceros* sp. would be acceptable, but *Pomatoceros triqueter* would not, as the specific identification normally requires the specimen to be inspected under a microscope.

Appendices

Appendix 1. Survey metadata (Gardline cruise (Job #9060) and CEND10/12))

Date	Cruise	Stn No.	Stn Code	Gear	Latitude	Longitude
29/03/2012	9060	JB(NW)ENV01	ENV01	Day Grab	49.83201	-8.15458
20/03/2012	9060	JB(NW)ENV02	ENV02	Day Grab	49.83989	-8.30175
19/03/2012	9060	JB(NW)ENV03	ENV03	Day Grab	49.84083	-8.10038
30/03/2012	9060	JB(NW)ENV06	ENV06	Day Grab	49.86648	-8.13914
29/03/2012	9060	JB(NW)ENV08	ENV08	Day Grab	49.87529	-8.0849
20/03/2012	9060	JB(NW)ENV09	ENV09	Day Grab	49.88326	-8.23219
30/03/2012	9060	JB(NW)ENV10	ENV10	Day Grab	49.89212	-8.17794
20/03/2012	9060	JB(NW)ENV11	ENV11	Day Grab	49.89996	-8.3253
19/03/2012	9060	JB(NW)ENV12	ENV12	Day Grab	49.90886	-8.27106
30/03/2012	9060	JB(NW)ENV13	ENV13	Day Grab	49.90975	-8.0694
30/03/2012	9060	JB(NW)ENV14	ENV14	Day Grab	49.91774	-8.21679
29/03/2012	9060	JB(NW)ENV15	ENV15	Day Grab	49.92658	-8.16251
20/03/2012	9060	JB(NW)ENV16	ENV16	Day Grab	49.93445	-8.30997
19/03/2012	9060	JB(NW)ENV17	ENV17	Day Grab	49.93541	-8.10821
29/03/2012	9060	JB(NW)ENV19	ENV19	Day Grab	49.95221	-8.20138
29/03/2012	9060	JB(NW)ENV20	ENV20	Day Grab	49.96105	-8.14706
29/03/2012	9060	JB(NW)ENV21	ENV21	Day Grab	49.96893	-8.29462
29/03/2012	9060	JB(NW)ENV22	ENV22	Day Grab	49.96987	-8.09271
29/03/2012	9060	JB(NW)ENV23	ENV23	Day Grab	49.97782	-8.2403
19/03/2012	9060	JB(NW)ENV24	ENV24	Day Grab	49.98668	-8.18595
29/03/2012	9060	JB(NW)ENV25	ENV25	Day Grab	49.99552	-8.13159
29/03/2012	9060	JB(NW)ENV26	ENV26	Day Grab	50.00341	-8.27926
29/03/2012	9060	JB(NW)ENV27	ENV27	Day Grab	50.00433	-8.0772
30/03/2012	9060	JB(NW)ENV29	ENV29	Day Grab	49.82685	-8.10037
19/03/2012	9060	JB(NW)ENV30	ENV30	Day Grab	49.82699	-8.06263
30/03/2012	9060	JB(NW)ENV32	ENV32	Day Grab	49.83015	-8.08005
29/03/2012	9060	JB(NW)ENV33	ENV33	Day Grab	49.83166	-8.10763
29/03/2012	9060	JB(NW)ENV36	ENV36	HamCam	49.83345	-8.05972
30/03/2012	9060	JB(NW)ENV37	ENV37	Day Grab	49.83662	-8.07715
30/03/2012	9060	JB(NW)ENV40	ENV40	Day Grab	49.84472	-8.06408
29/03/2012	9060	JB(NW)ENV46	ENV46	Mini Hamon Grab	49.90575	-8.13096
28/03/2012	9060	JB(NW)ENV48	ENV48	Mini Hamon Grab	49.94559	-8.33181
29/03/2012	9060	JB(NW)ENV50	ENV50	Mini Hamon Grab	49.92225	-8.09086
22/03/2012	9060	JB(NW)ENV52	ENV52	Mini Hamon Grab	49.94252	-8.06141
29/03/2012	9060	JB(NW)ENV54	ENV54	Mini Hamon Grab	49.88855	-8.10708
29/03/2012	9060	JB(NW)ENV55	ENV55	Mini Hamon Grab	49.89481	-8.14133
31/03/2012	9060	JB(NW)ENV2	ENV2	Camera Sledge	49.84119	-8.30144
31/03/2012	9060	JB(NW)ENV2	ENV2	Camera Sledge	49.84008	-8.30176
31/03/2012	9060	JB(NW)ENV2	ENV2	Camera Sledge	49.83893	-8.30186

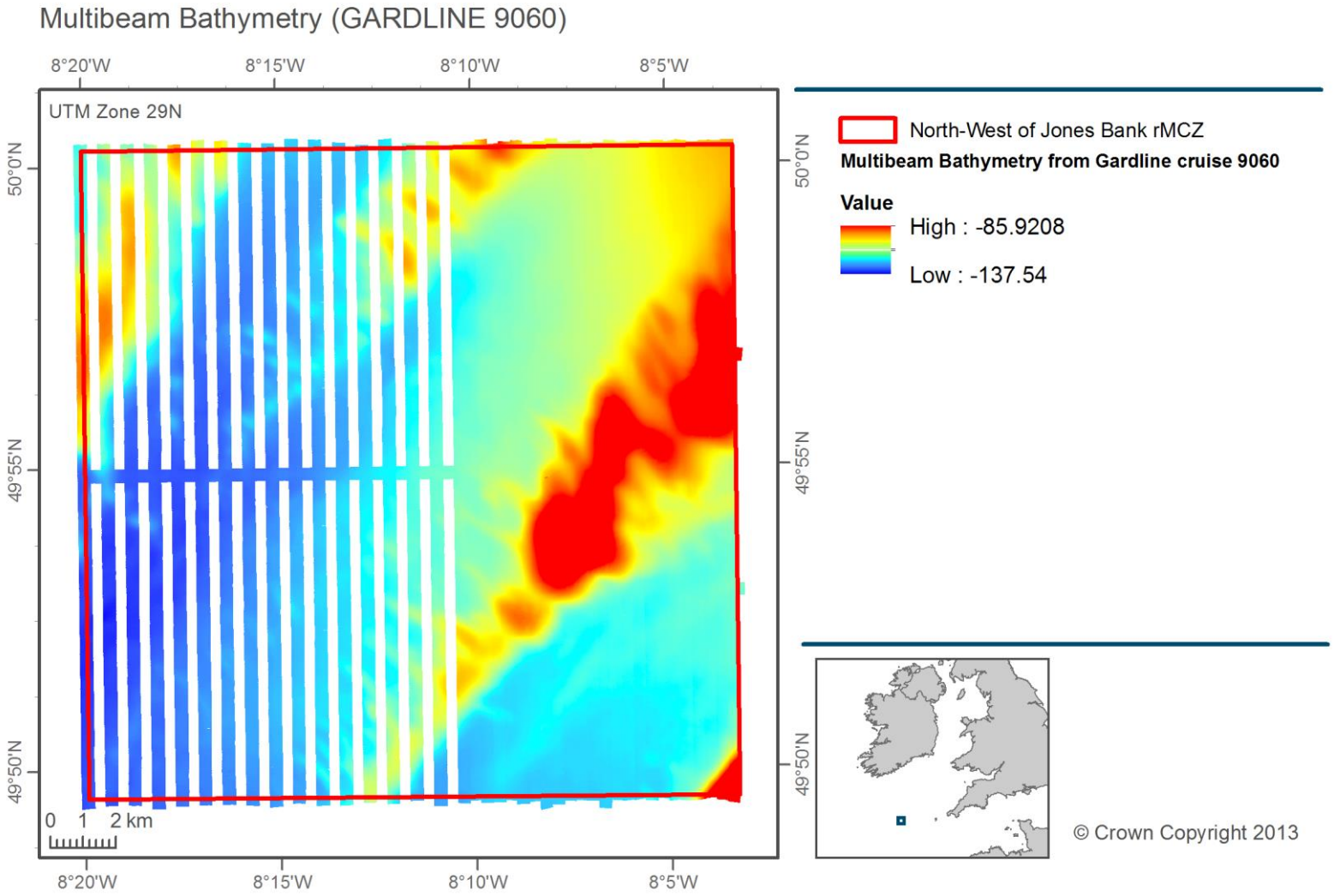
Date	Cruise	Stn No.	Stn Code	Gear	Latitude	Longitude
31/03/2012	9060	JB(NW)ENV3	ENV3	Camera Sledge	49.84199	-8.09972
31/03/2012	9060	JB(NW)ENV3	ENV3	Camera Sledge	49.84035	-8.10047
31/03/2012	9060	JB(NW)ENV3	ENV3	Camera Sledge	49.83951	-8.10082
31/03/2012	9060	JB(NW)ENV8	ENV8	Camera Sledge	49.87667	-8.08438
31/03/2012	9060	JB(NW)ENV8	ENV8	Camera Sledge	49.87528	-8.08486
31/03/2012	9060	JB(NW)ENV8	ENV8	Camera Sledge	49.87448	-8.08562
31/03/2012	9060	JB(NW)ENV9	ENV9	Camera Sledge	49.88486	-8.23204
31/03/2012	9060	JB(NW)ENV9	ENV9	Camera Sledge	49.88333	-8.23215
31/03/2012	9060	JB(NW)ENV9	ENV9	Camera Sledge	49.88216	-8.23223
30/03/2012	9060	JB(NW)ENV11	ENV11	Camera Sledge	49.9012	-8.32485
30/03/2012	9060	JB(NW)ENV11	ENV11	Camera Sledge	49.90034	-8.32516
30/03/2012	9060	JB(NW)ENV11	ENV11	Camera Sledge	49.89885	-8.3262
30/03/2012	9060	JB(NW)ENV17	ENV17	Camera Sledge	49.93658	-8.10651
30/03/2012	9060	JB(NW)ENV17	ENV17	Camera Sledge	49.9358	-8.1075
30/03/2012	9060	JB(NW)ENV17	ENV17	Camera Sledge	49.935	-8.10879
30/03/2012	9060	JB(NW)ENV17a	ENV17a	Camera Sledge	49.93562	-8.10782
30/03/2012	9060	JB(NW)ENV17a	ENV17a	Camera Sledge	49.93518	-8.10857
30/03/2012	9060	JB(NW)ENV17a	ENV17a	Camera Sledge	49.93471	-8.10927
30/03/2012	9060	JB(NW)ENV19	ENV19	Camera Sledge	49.95334	-8.20028
30/03/2012	9060	JB(NW)ENV19	ENV19	Camera Sledge	49.95204	-8.20133
30/03/2012	9060	JB(NW)ENV19	ENV19	Camera Sledge	49.95151	-8.20259
30/03/2012	9060	JB(NW)ENV24	ENV24	Camera Sledge	49.98747	-8.1845
30/03/2012	9060	JB(NW)ENV24	ENV24	Camera Sledge	49.98721	-8.18529
30/03/2012	9060	JB(NW)ENV24	ENV24	Camera Sledge	49.98628	-8.18643
31/03/2012	9060	JB(NW)ENV41	ENV41	Camera Sledge	49.89535	-8.12585
31/03/2012	9060	JB(NW)ENV41	ENV41	Camera Sledge	49.89434	-8.12668
31/03/2012	9060	JB(NW)ENV41	ENV41	Camera Sledge	49.89356	-8.1274
30/03/2012	9060	JB(NW)ENV51	ENV51	Camera Sledge	49.9315	-8.06425
30/03/2012	9060	JB(NW)ENV51	ENV51	Camera Sledge	49.92988	-8.06667
30/03/2012	9060	JB(NW)ENV51	ENV51	Camera Sledge	49.92888	-8.06919
30/03/2012	9060	JB(NW)ENV51a	ENV51a	Camera Sledge	49.93105	-8.0649
30/03/2012	9060	JB(NW)ENV51a	ENV51a	Camera Sledge	49.92999	-8.0667
30/03/2012	9060	JB(NW)ENV51a	ENV51a	Camera Sledge	49.92849	-8.06887
31/03/2012	9060	JB(NW)ENV55	ENV55	Camera Sledge	49.89568	-8.14001
31/03/2012	9060	JB(NW)ENV55	ENV55	Camera Sledge	49.89471	-8.14158
31/03/2012	9060	JB(NW)ENV55	ENV55	Camera Sledge	49.8941	-8.14236
31/03/2012	9060	JB(NW)ENV02	ENV2	Camera Sledge	49.83989	-8.30175
31/03/2012	9060	JB(NW)ENV03	ENV3	Camera Sledge	49.84083	-8.10038
31/03/2012	9060	JB(NW)ENV08	ENV8	Camera Sledge	49.87529	-8.0849
31/03/2012	9060	JB(NW)ENV09	ENV9	Camera Sledge	49.88326	-8.23219
30/03/2012	9060	JB(NW)ENV11	ENV11	Camera Sledge	49.89996	-8.3253
30/03/2012	9060	JB(NW)ENV17	ENV17	Camera Sledge	49.93541	-8.10821
30/03/2012	9060	JB(NW)ENV17	ENV17a	Camera Sledge	49.93541	-8.10821
30/03/2012	9060	JB(NW)ENV19	ENV19	Camera Sledge	49.95221	-8.20138
30/03/2012	9060	JB(NW)ENV24	ENV24	Camera Sledge	49.98668	-8.18595
31/03/2012	9060	JB(NW)ENV41	ENV41	Camera Sledge	49.89565	-8.12532
30/03/2012	9060	JB(NW)ENV51	ENV51	Camera Sledge	49.94817	-8.06433
30/03/2012	9060	JB(NW)ENV51	ENV51a	Camera Sledge	49.93133	-8.0645
31/03/2012	9060	JB(NW)ENV55	ENV55	Camera Sledge	49.89481	-8.14133

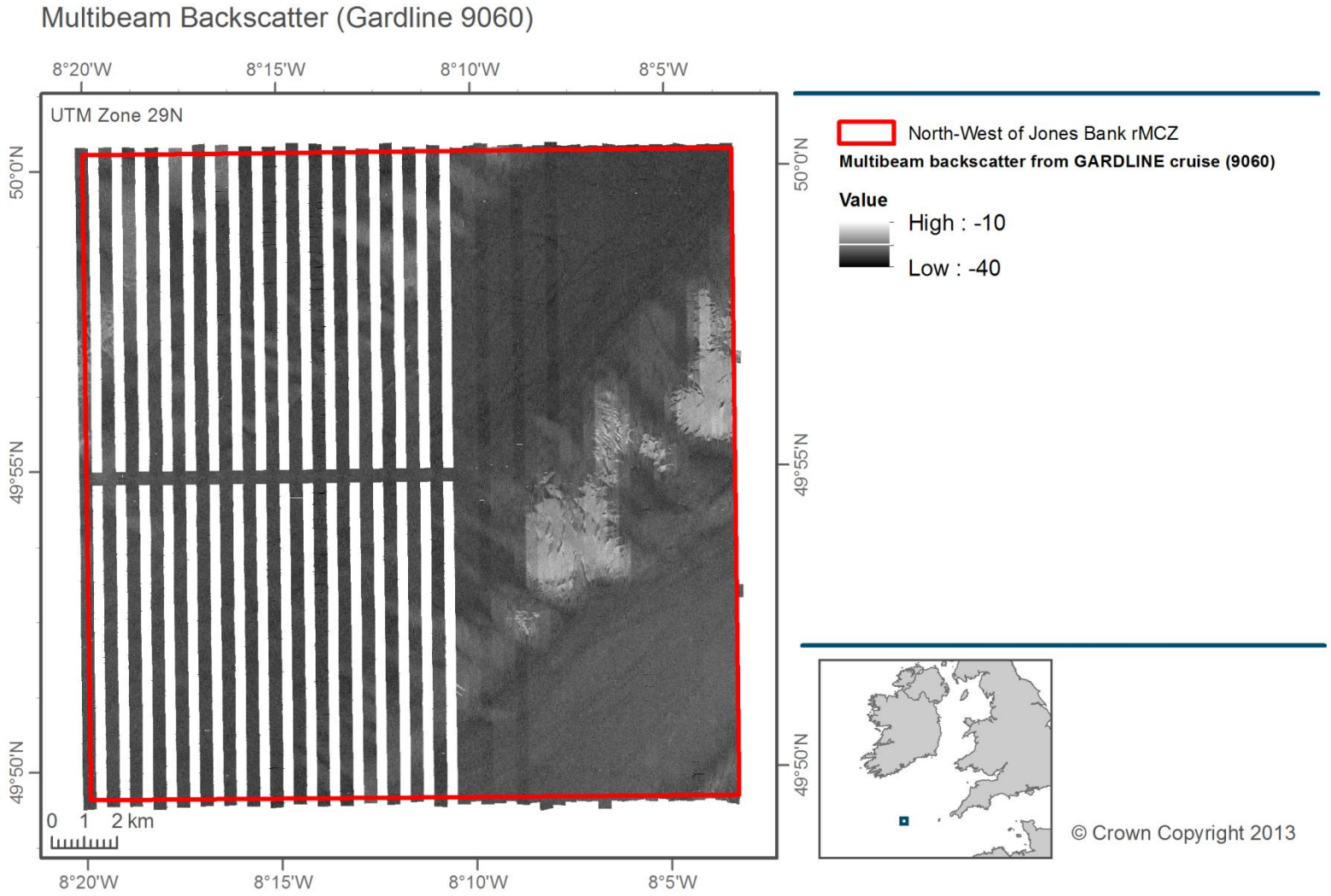
Date	Cruise	Stn No.	Stn Code	Gear	Latitude	Longitude
11/07/2012	CEND10_12	185	NWJB01	HamCam	50.00291	-8.28246
11/07/2012	CEND10_12	192	NWJB02	HamCam	49.84015	-8.30154
11/07/2012	CEND10_12	190	NWJB03	HamCam	49.87491	-8.2834
11/07/2012	CEND10_12	193	NWJB04	HamCam	49.84802	-8.2534
11/07/2012	CEND10_12	182	NWJB05	HamCam	49.99577	-8.33203
11/07/2012	CEND10_12	187	NWJB06	HamCam	49.94357	-8.25406
12/07/2012	CEND10_12	195	NWJB07	HamCam	49.85772	-8.19338
12/07/2012	CEND10_12	205	NWJB08	HamCam	50.00451	-8.07729
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99649	-8.33064
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99644	-8.33086
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99633	-8.33098
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99624	-8.33116
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99614	-8.3313
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99607	-8.33151
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99596	-8.33164
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99586	-8.33175
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99575	-8.33189
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99565	-8.33207
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.9956	-8.33227
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99555	-8.33245
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99553	-8.33247
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99546	-8.33254
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99541	-8.33261
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99533	-8.33273
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94474	-8.2516
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94468	-8.25175
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94459	-8.25195
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94442	-8.2523
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94435	-8.25246
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94426	-8.25262
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94419	-8.25281
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94411	-8.25298
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94405	-8.25311
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94403	-8.25315
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94395	-8.25334
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94386	-8.25351
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94378	-8.25369
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94372	-8.25383
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94363	-8.254
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94355	-8.25419
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94346	-8.25439
12/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94342	-8.25455
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92371	-8.10547
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92384	-8.10542
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92396	-8.10532
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.9241	-8.10522
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92421	-8.10517
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92422	-8.10515
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92436	-8.10507

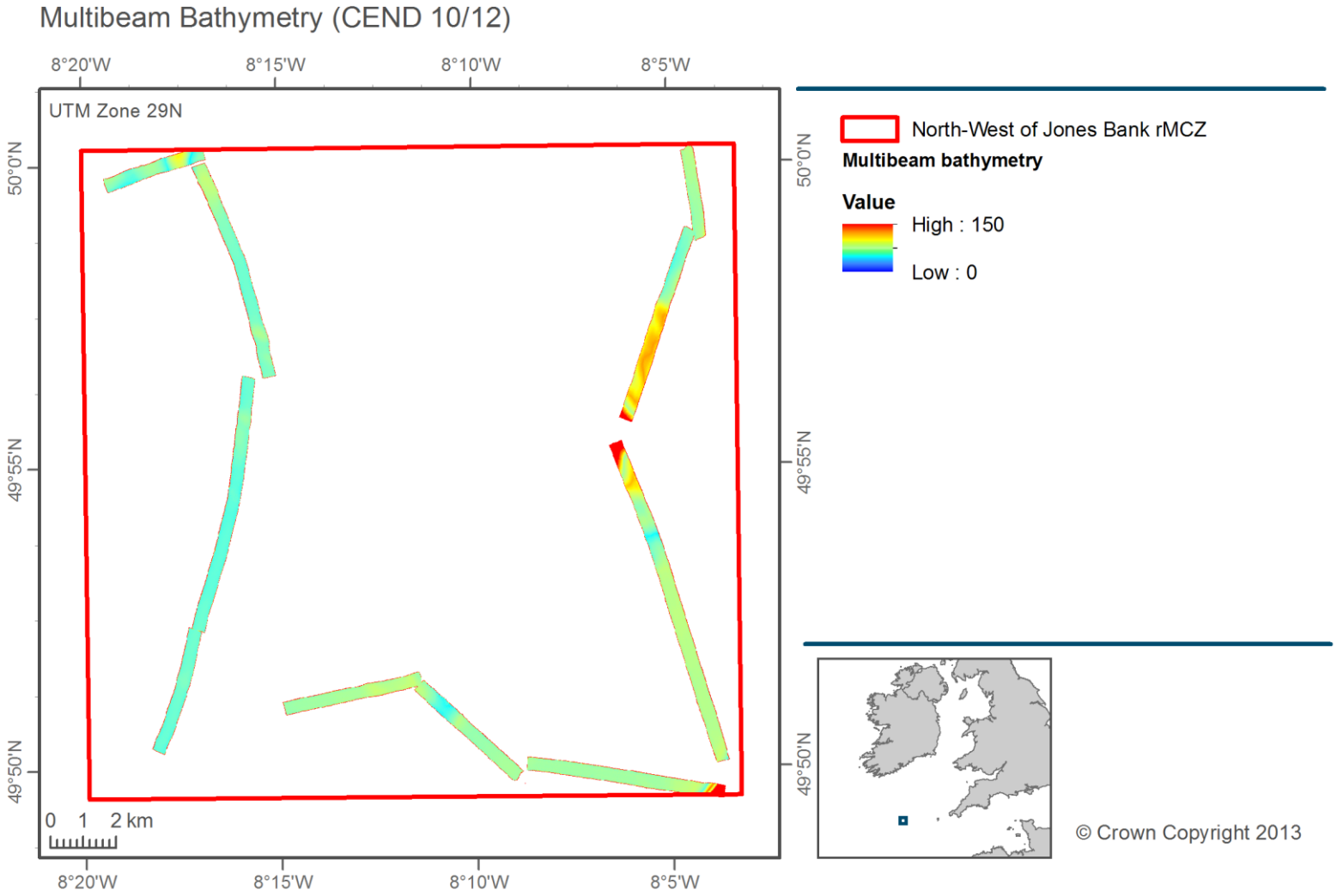
Date	Cruise	Stn No.	Stn Code	Gear	Latitude	Longitude
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92449	-8.10499
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92462	-8.10493
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.9247	-8.10487
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92486	-8.10476
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.925	-8.10466
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92513	-8.1046
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92526	-8.10453
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92538	-8.10443
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92547	-8.1044
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92551	-8.10437
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92557	-8.10434
12/07/2012	CEND10_12	201	NWJB_CS01	Camera Sledge	49.92566	-8.10426
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98082	-8.07068
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.9808	-8.07066
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98071	-8.07055
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.9806	-8.07044
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98047	-8.0703
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98036	-8.0702
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98024	-8.07008
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98019	-8.07003
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98012	-8.06993
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.98002	-8.06984
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.9799	-8.06973
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97977	-8.06962
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97966	-8.0695
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97956	-8.06939
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97953	-8.06937
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97942	-8.06923
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97931	-8.06915
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97918	-8.06901
12/07/2012	CEND10_12	203	NWJB_CS02	Camera Sledge	49.97908	-8.06889
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83124	-8.15629
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83125	-8.15625
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83132	-8.15612
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83141	-8.15594
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83149	-8.15579
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83157	-8.15562
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83166	-8.15543
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83169	-8.15539
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83175	-8.15529
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.8318	-8.15522
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83185	-8.15507
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83192	-8.15496
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.832	-8.15477
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83202	-8.15474
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83209	-8.1546
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83215	-8.15449
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83225	-8.15425
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83234	-8.15408

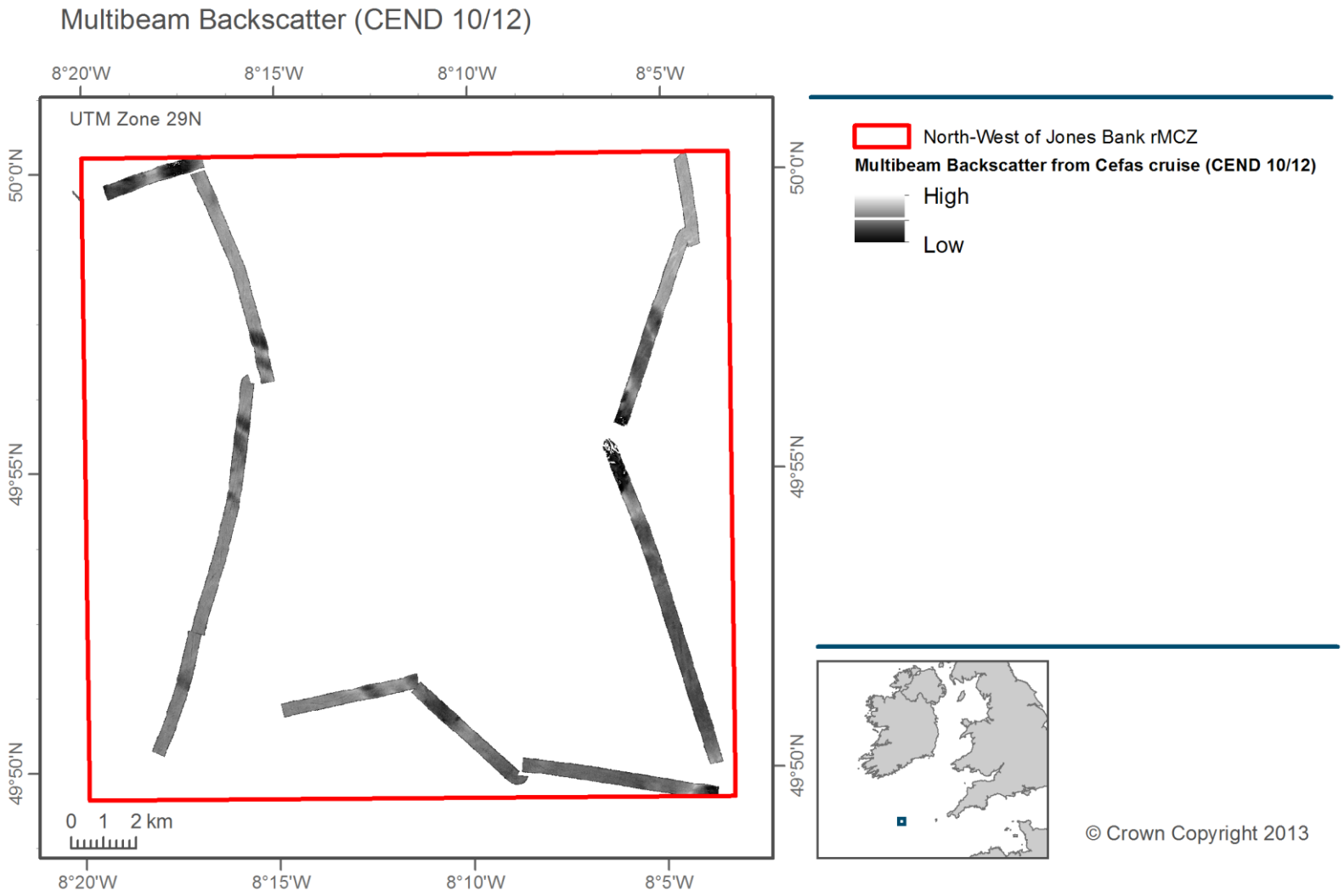
Date	Cruise	Stn No.	Stn Code	Gear	Latitude	Longitude
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.8324	-8.15391
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83248	-8.15374
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83253	-8.15366
12/07/2012	CEND10_12	197	NWJB_CS05	Camera Sledge	49.83258	-8.15357
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82537	-8.06718
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82545	-8.06697
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82552	-8.0668
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82561	-8.0666
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82561	-8.06656
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82566	-8.06642
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82573	-8.06624
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82578	-8.06611
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82584	-8.06597
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82588	-8.06587
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82595	-8.06568
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82602	-8.0655
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82606	-8.0654
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82607	-8.06538
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.8261	-8.06526
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82615	-8.06515
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82621	-8.06501
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82623	-8.06495
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.8263	-8.06477
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82637	-8.06461
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82639	-8.06456
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82641	-8.06451
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82642	-8.06447
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82646	-8.06439
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82652	-8.06421
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82656	-8.06411
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.8266	-8.06403
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82667	-8.06385
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.8267	-8.06376
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.82674	-8.06366
12/07/2012	CEND10_12	199	NWJB_CS06	Camera Sledge	49.8268	-8.06347
11/07/2012	CEND10_12	183	NWJB05	Camera Sledge	49.99649	-8.33064
11/07/2012	CEND10_12	188	NWJB06	Camera Sledge	49.94474	-8.2516
12/07/2012	CEND10_12	201	CS01	Camera Sledge	49.92371	-8.10547
13/07/2012	CEND10_12	201	CS01	Camera Sledge	49.92423	-8.10507
14/07/2012	CEND10_12	201	CS01	Camera Sledge	49.92473	-8.10486
15/07/2012	CEND10_12	201	CS01	Camera Sledge	49.92513	-8.1046
16/07/2012	CEND10_12	203	CS02	Camera Sledge	49.98082	-8.07068
17/07/2012	CEND10_12	197	CS05	Camera Sledge	49.83124	-8.15629
18/07/2012	CEND10_12	199	CS06	Camera Sledge	49.82537	-8.06718

Appendix 2. Outputs from acoustic surveys




Multibeam Backscatter (Gardline 9060)
8°20'W
8°15'W
8°10'W
8°5'W
UTM Zone 29N
50°0'N
49°55'N
49°50'N
0 1 2 km
North-West of Jones Bank rMCZ
Multibeam backscatter from GARDLINE cruise (9060)
Value
High : -10
Low : -40
© Crown Copyright 2013


Multibeam Bathymetry (CEND 10/12)
8°20'W
8°15'W
8°10'W
8°5'W
UTM Zone 29N
50°0'N
49°55'N
49°50'N
0 1 2 km
North-West of Jones Bank rMCZ
Multibeam bathymetry
Value
High : 150
Low : 0
© Crown Copyright 2013


Multibeam Backscatter (CEND 10/12)
8°20'W
8°15'W
8°10'W
8°5'W
UTM Zone 29N
50°0'N
49°55'N
49°50'N
0 1 2 km
North-West of Jones Bank rMCZ
Multibeam Backscatter from Cefas cruise (CEND 10/12)
High
Low
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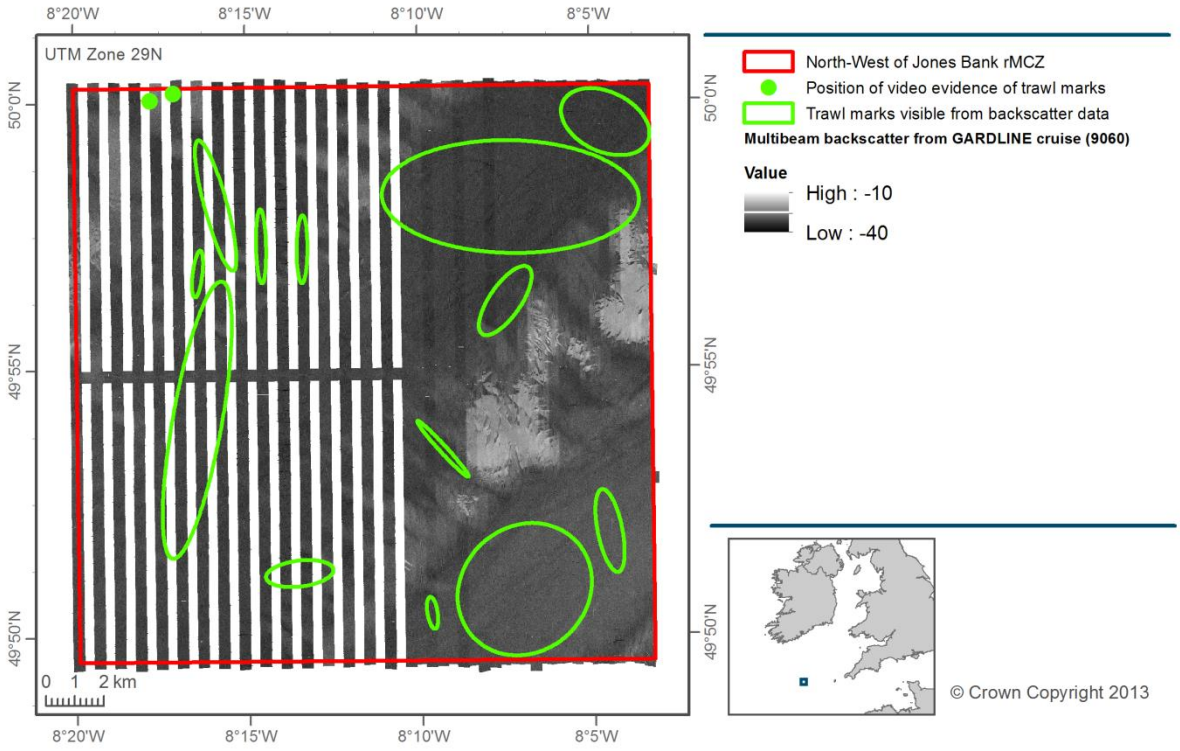
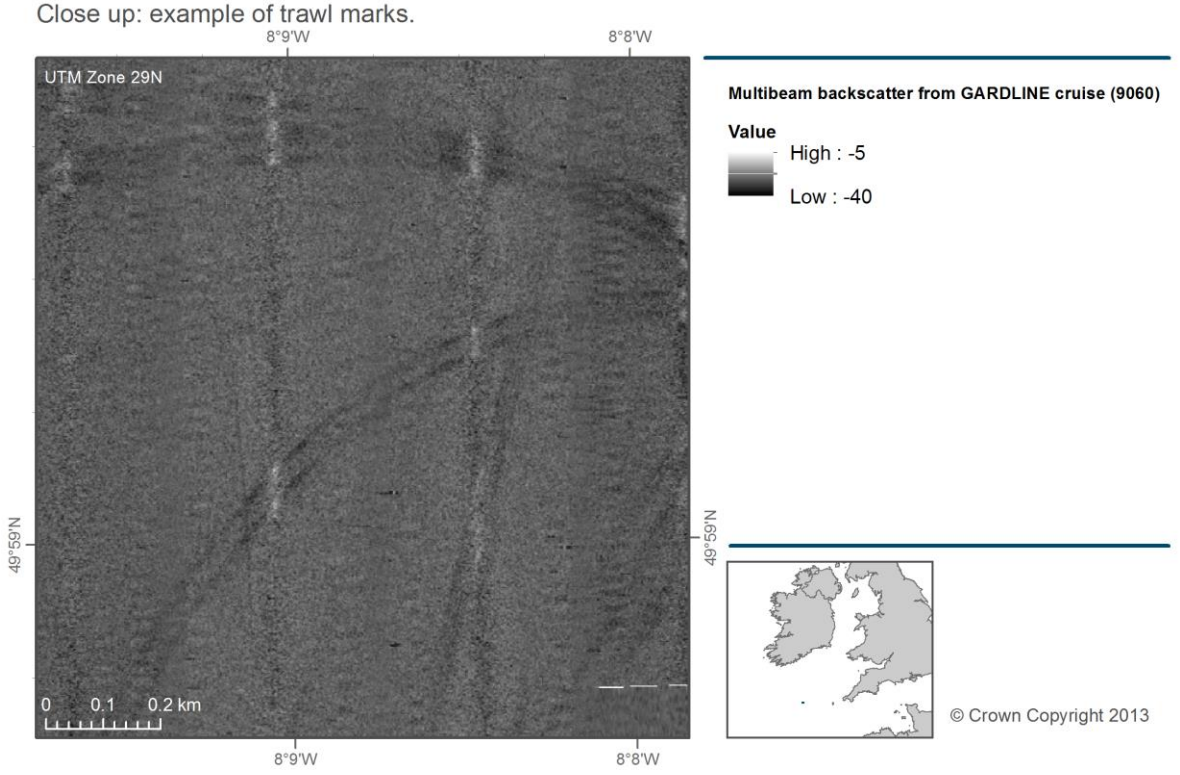
Appendix 3. Evidence of human activities within the rMCZ

Human Activities with the rMCZ



Human Activities with the rMCZ.
Close up: example of trawl marks.



Appendix 4. Species list

Species list for grab samples from both cruises (Species FOCI indicated by grey shading if present). Percentage occurrence was calculated as the 'Number of samples where the species occurs/total number of samples' x 100.

Taxa	% Occurrence
FORAMINIFERA	
Astrorhiza	2
CHLOROPHYTA	
Enteromorpha	2
HYDROIDS, CORALS, JELLYFISH, ANEMONES	
FILIFERA	14
Cerianthus lloydii	11
Edwardsia claparedii	9
ACTINIARIA	4
Edwardsiidae	2
FLATWORMS	
Monticellina	7
TURBELLARIA	7
RIBBONWORMS	
NEMERTEA	50
ROUNDWORMS	
NEMATODA	14
ARROW WORMS	
Sagittidae	7
PEANUT WORMS	
Aspidosiphon muelleri	2
Golfingia elongata	2
Phascolion strombus	2
SEGMENTED WORMS	
Dasybranchus	82
Terebellides stroemi	59
Nephtys hystricis	55
Spiophanes kroyeri	55
Galathowenia oculata	50
Glycera rouxii	50
Prionospio dubia	50
Abyssoninoe hibernica	48
Praxillella affinis (Type A)	48
Notomastus	32
Magelona minuta	30
Amphicteis gunneri	27
Lumbrineris gracilis	27
Nephtys incisa	27
Diplocirrus glaucus	25
Ampharete lindstroemi	23
Peresiella clymenoides	23

Taxa	% Occurrence
Glycinde nordmanni	21
Ampharete falcata	18
Scoloplos armiger	18
Aricidea catherinae	16
Aricidea laubieri	16
Eclysippe vanelli	14
Maldanidae	14
Aponuphis bilineata	11
Jasmineira elegans	11
Aglaophamus rubella	9
Goniada maculata	9
Nephtys hombergii	9
Nephtys kersivalensis	9
Polycirrus	9
Prionospio fallax	9
Scalibregma inflatum	9
Sthenelais limicola	9
Eunereis longissima	7
Glycera fallax	7
Glycera lapidum (agg)	7
Malmgrenia arenicolae	7
Mediomastus fragilis	7
Minuspio multibranchiata	7
Cirrophorus branchiatus	5
Clymenura	5
Ditrupa arietina	5
Euchone	5
Eulalia mustela	5
Glycera alba	5
Nephtys (juv)	5
Ophelina acuminata	5
Poecilochaetus serpens	5
Sphaerosyllis bulbosa	5
Streblosoma bairdi	5
Trichobranchus roseus	5
Ancistrosyllis groenlandica	4
Amaeana trilobata	2
Amphictene auricoma	2
Aonides paucibranchiata	2
Autolytus	2
Glycinde nordmanni (epitoke)	2
Goniada maculata (epitoke)	2
Goniadella gracilis	2
Goniadella gracilis (epitoke)	2
Grania	2
Harmothoe fernandi (?)	2

Taxa	% Occurrence
Jasmineira caudata	2
Laonice bahusiensis	2
Marphysa kinbergi (?)	2
Mesochaetopterus	2
Nicolea venustula	2
Ophelia borealis	2
Ophelina cylindricaudata	2
Owenia fusiformis	2
Paradoneis eliasoni	2
Pisione remota	2
Podarkeopsis capensis	2
Polygordius	2
Scolelepis korsuni	2
Scoletoma magnidentata	2
Sige fusigera	2
Spiophanes bombyx	2
SEA SPIDERS	
Paranymphon spinosum	5
CRUSTACEANS	
Ampelisca spinipes	55
Goneplax rhomboides	30
COPEPODA	23
Unciola planipes	18
Ampelisca spinifer	14
Ampelisca tenuicornis	9
Paguridae (juv)	9
Alpheus glaber	7
Solenocera membranacea	7
Cheirocratus	5
Ebalia (Juv)	5
Siphonoecetes striatus	5
Acidostoma obesum (sensu Stoddart & Lowry)	2
Ampelisca	2
Atelecyclus rotundatus (juv)	2
Callianassa subterranea (juv)	2
DECAPODA	2
Eriopisa elongata	2
Eudorella truncatula	2
Eusirus longipes	2
Hippomedon denticulatus	2
Makrokylindrus (juv)	2
Natatolana borealis	2
Perioculodes longimanus	2
Processa nouveli	2
Tmetonyx	2

Taxa	% Occurrence
MOLLUSCS	
Thyasira polygona	57
Abra nitida	52
Nucula sulcata	43
Corbula gibba	30
Falcidens crossotus	27
Myrtea spinifera	14
Phaxas pellucidus	11
Mangelia brachystoma	9
Alvania abyssicola	7
Parvicardium minimum	7
Euspira pulchella	5
Axinulus croulinensis	2
Cylichna cylindracea	2
Epitonium trevelyanum	2
Euspira fusca	2
Kurtiella tumidula	2
Lucinoma borealis	2
Lucinoma borealis (juv)	2
Mytilus edulis (juv)	2
PELECYPODA	2
Spisula (juv)	2
Turritella communis	2
BRYOZOANS	
Triticella flava	5
Escharella immersa	2
Porella concinna	2
ENTOPROCTA	
Loxosomella varians	50
HORSESHOE WORMS	
Phoronis	18
SEA STARS, URCHINS, SEA CUCUMBERS	
Amphiuridae (juv)	18
Echinocyamus pusillus	14
Ophiuridae (juv)	9
SPATANGOIDA (juv)	9
Amphiura filiformis	5
Amphipholis squamata	2
Astropecten irregularis	2
Echinocardium flavescens	2
Ophiura albida	2
SPATANGOIDA	2
FISH	
OSTEICHTHYES (eggs)	2

Species list for video samples (Species FOCI indicated by grey shading if present). Percentage occurrence was calculated as the 'Number of video samples where the species occurs/total number of video samples' x 100.

Taxa	% Occurrence
SPONGES	
Porifera	4
HYDROIDS, CORALS, JELLYFISH, ANEMONES	
Anthozoa	58
Cerianthus lloydii	54
Virgularia mirabilis	25
Edwardsia	13
Adamsia	8
Pachycerianthus	8
Arachnanthus sarsi	4
Ctenophora	4
Mesacmaea mitchellii	4
Peachia	4
SEGMENTED WORMS	
Sabella pavonina	38
Ditrupa arietina	33
Myxicola infundibulum	4
Nephtys	4
CRUSTACEANS	
Caridea	67
Nephrops norvegicus	46
Pagurus prideaux	33
Munida rugosa	17
Pagurus	13
Liocarcinus depurator	8
Brachyuran	4
Cumacean/Euphasid	4
Macropodia	4
MOLLUSCS	
Aequipecten opercularis	25
Turritella communis	21
Turritella	8
Atrina fragilis	4
Octopoda	4
SEA STARS, URCHINS, SEA CUCUMBERS	
Asterias rubens	17
Ophiura	13
Ophiura albida	13
Astropecten irregularis	8
Ophiura ophiura	8
Asteroidea	4
Luidia ciliaris	4

Taxa	% Occurrence
Unidentified starfish	4
FISH	
Glyptocephalus cynoglossus	38
Gadidae	25
Unidentified fish	13
Chondrichthyes	8
Pisces	8
Ammodytes	4
Gobiidae	4
Phycis blennoides	4
Soleidae	4

Appendix 5. Analyses of sediment samples: classification and composition

Stn No.	Stn Code	Latitude	Longitude	Sediment Description	EUNIS Level 3/BSH	Gravel (%)	Sand (%)	Silt/clay (%)
JB(NW)ENV01	ENV01	49.832011	-8.154578	mud and sandy mud	A5.3 Subtidal Mud	0.50	73.06	26.44
JB(NW)ENV02	ENV02	49.839891	-8.301748	mud and sandy mud	A5.3 Subtidal Mud	0.02	70.87	29.11
JB(NW)ENV03	ENV03	49.84083	-8.10038	mud and sandy mud	A5.3 Subtidal Mud	0.02	74.46	25.52
JB(NW)ENV06	ENV06	49.866479	-8.139138	mud and sandy mud	A5.3 Subtidal Mud	0.00	76.51	23.49
JB(NW)ENV08	ENV08	49.875291	-8.084898	mud and sandy mud	A5.3 Subtidal Mud	0.09	72.56	27.35
JB(NW)ENV09	ENV09	49.883258	-8.232186	mud and sandy mud	A5.3 Subtidal Mud	0.02	65.77	34.20
JB(NW)ENV10	ENV10	49.892115	-8.177943	mud and sandy mud	A5.3 Subtidal Mud	0.00	64.69	35.31
JB(NW)ENV11	ENV11	49.899958	-8.325303	mud and sandy mud	A5.3 Subtidal Mud	0.12	65.93	33.95
JB(NW)ENV12	ENV12	49.908858	-8.271056	mud and sandy mud	A5.3 Subtidal Mud	0.00	63.86	36.14
JB(NW)ENV13	ENV13	49.90975	-8.069401	mud and sandy mud	A5.3 Subtidal Mud	0.00	73.11	26.89
JB(NW)ENV14	ENV14	49.917735	-8.216791	mud and sandy mud	A5.3 Subtidal Mud	0.03	67.17	32.80
JB(NW)ENV15	ENV15	49.926584	-8.162508	mud and sandy mud	A5.3 Subtidal Mud	0.00	65.50	34.50
JB(NW)ENV16	ENV16	49.934445	-8.309973	mud and sandy mud	A5.3 Subtidal Mud	0.00	64.14	35.86
JB(NW)ENV17	ENV17	49.935409	-8.108206	sand and muddy sand	A5.2 Subtidal Sand	2.83	95.20	1.97
JB(NW)ENV19	ENV19	49.952208	-8.201379	mud and sandy mud	A5.3 Subtidal Mud	0.00	64.70	35.30
JB(NW)ENV20	ENV20	49.961053	-8.147056	mud and sandy mud	A5.3 Subtidal Mud	0.00	55.70	44.30
JB(NW)ENV21	ENV21	49.968929	-8.294624	mud and sandy mud	A5.3 Subtidal Mud	0.00	59.23	40.77
JB(NW)ENV22	ENV22	49.969869	-8.092713	mud and sandy mud	A5.3 Subtidal Mud	0.00	60.92	39.08
JB(NW)ENV23	ENV23	49.977818	-8.240296	mud and sandy mud	A5.3 Subtidal Mud	0.00	57.91	42.09
JB(NW)ENV24	ENV24	49.986681	-8.185951	sand and muddy sand	A5.2 Subtidal Sand	0.00	91.09	8.91
JB(NW)ENV25	ENV25	49.995518	-8.131586	mud and sandy mud	A5.3 Subtidal Mud	0.00	60.76	39.24
JB(NW)ENV26	ENV26	50.003413	-8.279258	mud and sandy mud	A5.3 Subtidal Mud	0.05	69.83	30.11
JB(NW)ENV27	ENV27	50.00433	-8.077203	mud and sandy mud	A5.3 Subtidal Mud	0.00	57.37	42.63
JB(NW)ENV29	ENV29	49.826853	-8.100372	mud and sandy mud	A5.3 Subtidal Mud	0.00	58.68	41.32
JB(NW)ENV30	ENV30	49.826988	-8.062628	sand and muddy sand	A5.2 Subtidal Sand	0.15	99.85	0.00
JB(NW)ENV32	ENV32	49.830153	-8.080048	mud and sandy mud	A5.3 Subtidal Mud	0.03	67.67	32.30
JB(NW)ENV33	ENV33	49.831663	-8.107633	mud and sandy mud	A5.3 Subtidal Mud	0.00	70.65	29.35
JB(NW)ENV36	ENV36	49.83345	-8.059723	sand and muddy sand	A5.2 Subtidal Sand	0.01	80.52	19.46
JB(NW)ENV37	ENV37	49.836615	-8.077146	mud and sandy mud	A5.3 Subtidal Mud	0.02	69.11	30.87

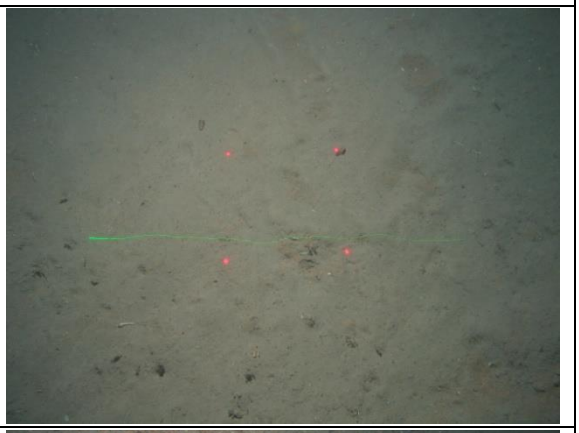
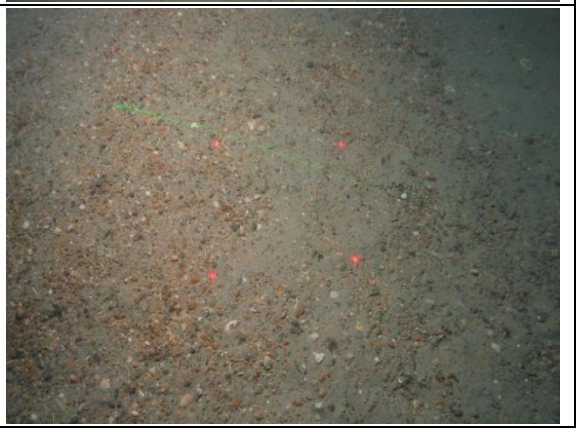
Stn No.	Stn Code	Latitude	Longitude	Sediment Description	EUNIS Level 3/BSH	Gravel (%)	Sand (%)	Silt/clay (%)
JB(NW)ENV40	ENV40	49.844723	-8.064076	mud and sandy mud	A5.3 Subtidal Mud	0.00	64.55	35.45
JB(NW)ENV46	ENV46	49.905753	-8.130958	coarse sediment	A5.1 Subtidal Coarse Sediment	13.05	84.44	2.50
JB(NW)ENV48	ENV48	49.945588	-8.33181	mixed sediments	A5.4 Subtidal Mixed Sediments	8.52	76.04	15.44
JB(NW)ENV50	ENV50	49.922246	-8.090859	mixed sediments	A5.4 Subtidal Mixed Sediments	38.54	52.06	9.41
JB(NW)ENV52	ENV52	49.942519	-8.061405	coarse sediment	A5.1 Subtidal Coarse Sediment	20.48	75.52	4.00
JB(NW)ENV54	ENV54	49.888545	-8.107084	mixed sediments	A5.4 Subtidal Mixed Sediments	39.58	44.54	15.88
JB(NW)ENV55	ENV55	49.894811	-8.141331	sand and muddy sand	A5.2 Subtidal Sand	1.96	97.41	0.64
185	NWJB01	50.00291	-8.28246	mud and sandy mud	A5.3 Subtidal Mud	1.81	61	37.19
192	NWJB02	49.84015	-8.30154	mud and sandy mud	A5.3 Subtidal Mud	0.02	66.94	33.03
190	NWJB03	49.87491	-8.2834	mud and sandy mud	A5.3 Subtidal Mud	0.05	65.29	34.66
193	NWJB04	49.84802	-8.2534	mud and sandy mud	A5.3 Subtidal Mud	0.07	66.43	33.5
182	NWJB05	49.99577	-8.33203	mud and sandy mud	A5.3 Subtidal Mud	0	51.78	48.22
187	NWJB06	49.94357	-8.25406	mud and sandy mud	A5.3 Subtidal Mud	0	54.95	45.05
195	NWJB07	49.85772	-8.19338	mud and sandy mud	A5.3 Subtidal Mud	0.01	69.37	30.62
205	NWJB08	50.00451	-8.07729	mud and sandy mud	A5.3 Subtidal Mud	0.02	57.36	42.62

Appendix 6. BSH/EUNIS Level 3 descriptions derived from video and stills

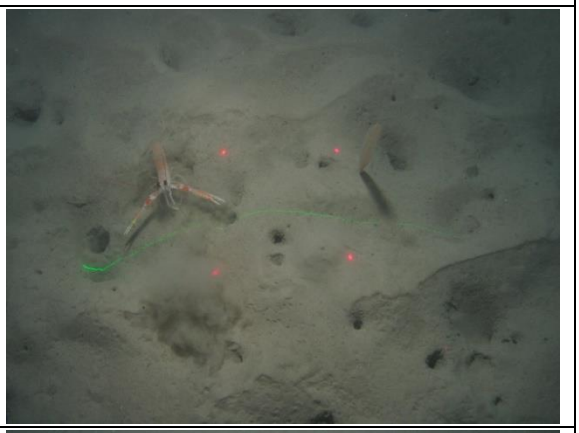
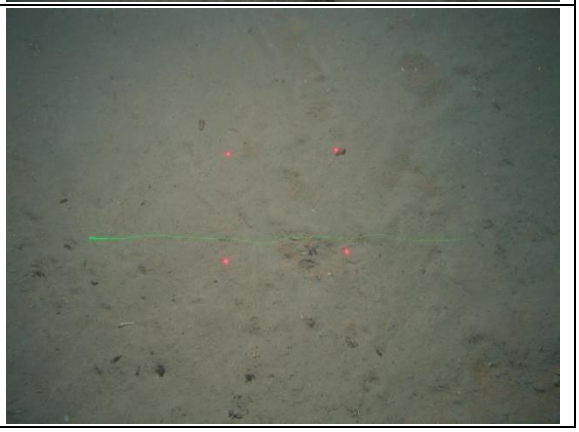
Stn No.	Stn Code	Latitude	Longitude	Habitat No.	No. of stills	Sediment Description	EUNIS Level 3/BSH	MNCR Code
JB(NW)ENV02	ENV2	49.83989	-8.301748	1	3	Mud with burrows and tracks	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV03	ENV3	49.84083	-8.10038	1	3	Mud with burrows and tracks and very sparse shell fragments	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV08	ENV8	49.87529	-8.084898	1	3	Mud with burrows and tracks and very sparse shell fragments	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV09	ENV9	49.88325	-8.232186	1	3	Mud with burrows and tracks	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV11	ENV11	49.89995	-8.325303	1	3	Mud with burrows and tracks	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV17	ENV17	49.93540	-8.108206	1	3	Mud with Ditrupa shells and fragments of polychaeta tubes	A5.3 - Subtidal Mud	SS.SMu.CFiMu
JB(NW)ENV17	ENV17a	49.93540	-8.108206	1	3	Mud with Ditrupa shells and fragments of polychaeta tubes	A5.3 - Subtidal Mud	SS.SMu.CFiMu
JB(NW)ENV19	ENV19	49.95220	-8.201379	1	3	Mud with burrows and tracks, and occasional ripples	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV24	ENV24	49.98668	-8.185951	1	3	Mud with patches of coarse sediment, dense Ditrupa shells, burrows and occasional ripples	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV41	ENV41	49.89565	-8.12532	1	3	Mud with fragments of polychaeta tubes, empty shells and patches of coarse sediment and gravel	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV51	ENV51	49.94817	-8.06433	1	3	Mud with fragments of polychaeta tubes, empty shells and patches of coarse sediment and gravel	A5.3 - Subtidal Mud	SS.SMu

Stn No.	Stn Code	Latitude	Longitude	Habitat No.	No. of stills	Sediment Description	EUNIS Level 3/BSH	MNCR Code
JB(NW)ENV51	ENV51a	49.93133	-8.0645	1	3	Mud with fragments of polychaeta tubes, empty shells and patches of coarse sediment and gravel	A5.3 - Subtidal Mud	SS.SMu
JB(NW)ENV55	ENV55	49.89481	-8.141331	1	3	Mud with few fragments of polychaeta tubes and empty shells	A5.3 - Subtidal Mud	SS.SMu
183	NWJB_05	49.9958	-8.33202	1	16	Fine mud with Burrowing Megafauna Communities	A5.3 - Subtidal Mud	SS.SMu.CFiMu
201_S1	NWJB_CS01	49.9248	-8.10467	1	7	Sparse fauna on circalittoral fine mud	A5.3 - Subtidal Mud	SS.SMu.CFiMu
201_S2	NWJB_CS01	49.92548	-8.10425	2	3	Sparse fauna on pebbly circalittoral fine mud	A5.4 - Subtidal Mixed Sediments	SS.SMx.CMx
201_S3	NWJB_CS01	49.91917	-8.10404	1	3	Sparse fauna on circalittoral fine mud	A5.3 - Subtidal Mud	SS.SMu.CFiMu
203	NWJB_CS02	49.97996	-8.0699	1	19	Fine mud with Burrowing Megafauna Communities	A5.3 - Subtidal Mud	SS.SMu.CFiMu
199_S1	NWJB_CS06	49.82597	-8.06545	1	11	Sparse fauna on circalittoral sandy mud	A5.3 - Subtidal Mud	SS.SMu.CSaMu
199_S2	NWJB_CS06	49.82661	-8.06378	2	4	*Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediments	A5.4 - Subtidal Mixed Sediments	SS.SMx.CMx.ClloMx
199_S3	NWJB_CS06	49.82672	-8.065	1	16	Sparse fauna on circalittoral sandy mud	A5.3 - Subtidal Mud	SS.SMu.CSaMu

Appendix 7. Example images from survey of broadscale habitats

Broadscale Habitats	Description	Example Image
A5.1: Sublittoral coarse sediment	**Coarse sediments including coarse sand, gravel, pebbles, shingle and cobbles which are often unstable due to tidal currents and/or wave action.**	**No Image Available**
A5.2: Sublittoral sand	**Clean medium to fine sands or non-cohesive slightly muddy sands on open coasts, offshore or in estuaries and marine inlets.**	**No Image Available**
A5.3 Subtidal Mud	**Sublittoral mud and cohesive sandy mud extending from the extreme lower shore to offshore, circalittoral habitats.**	
A5.4: Sublittoral mixed sediments	**Sublittoral mixed (heterogeneous) sediments found from the extreme low water mark to deep offshore circalittoral habitats.**	

Appendix 8. Example images from survey of habitat FOCI

Habitat FOCI	Description	Example Image
Subtidal Sands and Gravel	**Sand and gravel seabeds widespread around the UK**	**No Image Available**
Sea-pen and Burrowing Megafauna Communities	**Areas of stable muddy seabed, where animals burrow below and sea-pens protrude from the surface**	
Mud Habitats in Deep Water	**Mud habitats in deep water (circalittoral muds) occur below 20-30 m in many areas of the UK's marine environment, including marine inlets such as sea lochs.**	

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