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Marine Conservation Zone Benthic Community Analysis

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Summary

The Joint Nature Conservation Committee (JNCC) commissioned a range of research to collect information on the marine environment within offshore Marine Conservation Zones (MCZs). These data were gathered to provide evidence to underpin the MCZ designation or site recommendation. Surveys were undertaken to characterise the seabed habitats and their associated communities and enable broad-scale mapping to inform decisions for marine nature conservation.

Seven of the MCZ sites surveyed were prioritised for biotope classification using benthic community statistical analysis. Envision Mapping Ltd. undertook this analysis and present their findings in this report.

MCZ/rMCZ Sites analysed:

- Holderness Offshore rMCZ
- Inner Bank rMCZ
- North-West of Jones Bank MCZ
- South of the Isles of Scilly rMCZ
- Farnes East MCZ
- Greater Haig Fras MCZ
- Offshore Overfalls MCZ

The data analysed were collected using a combination of benthic grab (typically a 0.1m^2 mini Hamon grab) and towed/dropped down video to obtain infaunal data and epibenthic data. Infaunal data were enumerated by counts and biomass, epibenthic data were analysed to SACFOR/counts/%cover. Particle Size Analysis (PSA) data were available to accompany the data.

The overarching approach to analysis was to process the data consistently and standardise the information for statistical analysis. Significant biological groupings were identified within the datasets using the results of infaunal and PSA analysis. Any correspondence between biota groups and sediment PSA data was explored and then matched to biotopes from the Marine Habitat Classification for Britain and Ireland Version 15.03 using published biological comparative tables and biotope descriptions, following the most current guidance.Where there was insufficient species data, the allocation of habitat type was derived from the physical habitat data available. Epibenthic data was statistically analysed for two of the MCZ sites (North-West of Jones Bank MCZ and Offshore Overfalls MCZ) where epibenthic communities were considered important or a mixture of hard/consolidated substrata and softer sediment were present.

Multivariate analysis of data from each area was undertaken and the communities present within each MCZ/rMCZ identified. The following biotopes were assigned using the Marine Habitat Classification for Britain and Ireland (JNCC 2015) after multivariate analysis of the survey data. Table 1 shows the biotopes found within each MCZ/rMCZ site.

Table 1. The habitats and biotopes found to occur within each MCZ/rMCZ site.

Site	Biotopes*
Holderness Offshore rMCZ	SS.SSa.CFiSa
	SS.SMu.CSaMu
	SS.SMx.OMx.PoVen
Inner Bank rMCZ	SS.SSa.CFiSa
	SS.SSa.CFiSa.EpusOborApri
	SS.SMu.CSaMu
	SS.SCS.CCS
	SS.SCS.CCS.MedLumVen
	SS.SMx.CMx
	SS.SMx.OMx.PoVen
North-West of Jones Bank MCZ	SS.SSa.OSa
	SS.SSa.OSa.Dari
	SS.SMu.OMu
	SS.SCS.OCS
	SS.SMx.OMx
South of the Isles of Scilly rMCZ	SS.SSa.OSa
	SS.SSa.OSa
	SS.SSa.CFiSa.EpusOborApri
	SS.SCS.CCS.MedLumVen
	SS.SMx.OMx
	SS.SMx.OMx.PoVen
Farnes East MCZ	SS.SSa.OSa.OfusAfil
	SS.SSa.CFiSa.EpusOborApri
	SS.SMu.CSaMu.ThyNten
	SS.SCS.OCS
	SS.SCS.OCS
	SS.SMx.OMx
Greater Haig Fras MCZ	SS.SSa.OSa
	SS.SMu.OMu
	SS.SCS.OCS
	SS.SMx.OMx
Offshore Overfalls MCZ	SS.SCS.CCS
	SS.SCS.CCS.MedLumVen

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

The results and analyses from the projects have a range of limitations, issues and assumptions associated with each stage of data processing, analysis and production of results. These range from data acquisition limitations such as finite resources and survey strategies which may result in generalisations or extrapolations being required, through to data handling and processing which summarises large data sets and in doing so may lose some finer details within the data. Additionally, the use of multivariate statistical routines to identify significant groupings within the data is advantageous but the final allocation of habitat or biotope is often investigator led and some level of subjectivity may be introduced at this stage. To minimise this effect all results underwent quality control procedures which are documented.

Contents

1 Introduction

The Marine and Coastal Access Act 2009 allows for the creation of Marine Protected Areas (MPA) called Marine Conservation Zones (MCZs). Under this Act, MCZs protect a range of nationally important marine wildlife, habitats, geology and geomorphology and can be designated anywhere in English and Welsh inshore and UK offshore waters. MCZs in English inshore and English, Welsh and Northern Irish offshore waters have been identified through the Marine Conservation Zone Project. To date 50 MCZs have been designated following this project. Site Information Centres[1] have been developed by JNCC for MCZs designated in offshore waters or which cross the territorial/offshore boundary. Defra has announced a third tranche of MCZs for designation to assist in completing an ecologically coherent network of MPAs in UK waters.

Government policy dictates that MCZs should be designated based on "best available evidence". To this end, The Joint Nature Conservation Committee (JNCC) commissioned a range of research to collect information on the marine environment within offshore Marine Conservation Zones (MCZs) and these data were gathered to provide evidence to underpin the MCZ designation or site recommendation. Surveys have been undertaken to characterise the seabed habitats and their associated communities, and enable broad-scale mapping to inform decisions for marine nature conservation. Summary details of the surveys are provided with full survey methodologies and results found in a series of reports (CEFAS 2012-2014 & Defra 2015a, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g & Gardline 2012)

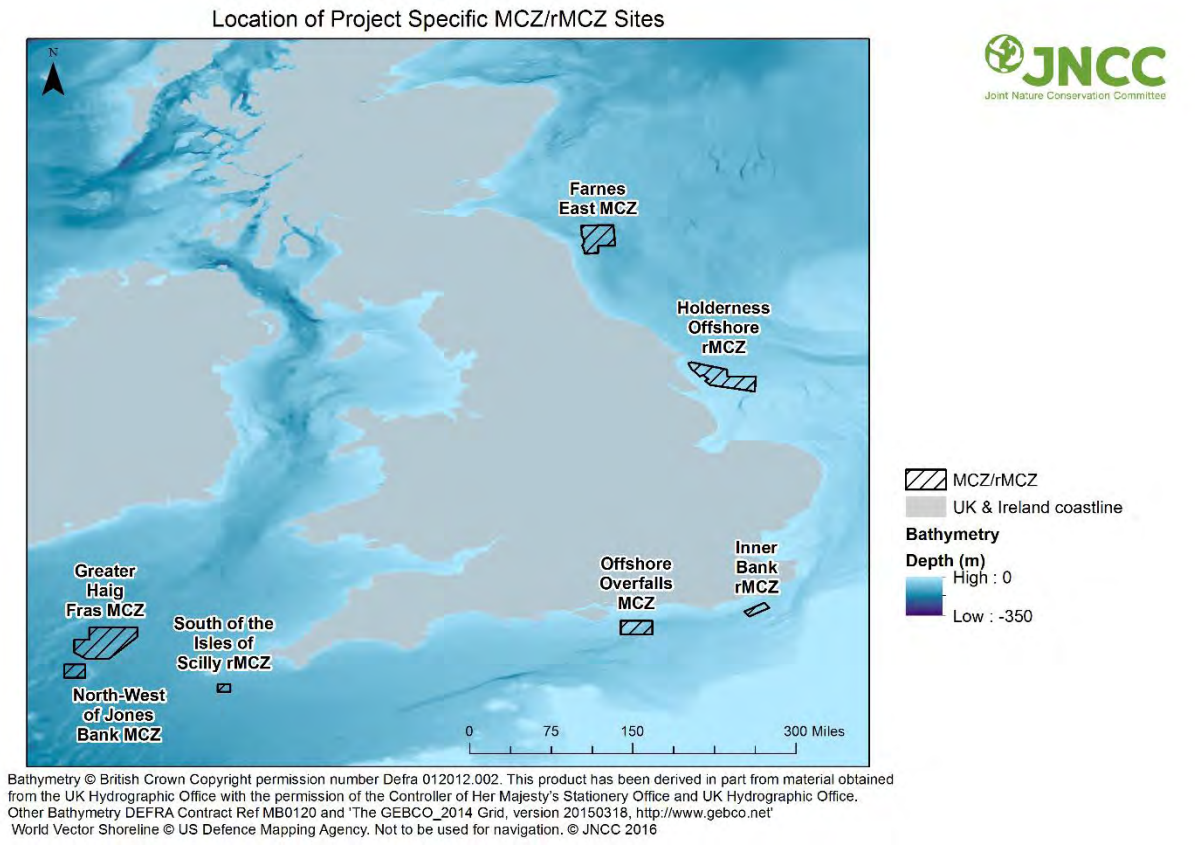

Figure 1. Location of project MCZ/rMCZ sites

Seven of the MCZ sites surveyed were prioritised for biotope classification using benthic community statistical analysis. These are shown in Figure 1 and presented in Table 2. The

[1] JNCC Site Information Centres for offshore MPAs. Available at http://jncc.Defra.gov.uk/page-6895

data available for the analysis were collected using a combination of benthic grab (typically a 0.1m^2 mini Hamon grab) and towed/dropped down video to obtain infaunal data and epibenthic data. Infaunal data were enumerated by counts and biomass, epibenthic data were analysed to SACFOR/counts/%cover. Particle Size Analysis (PSA) data were available to accompany the data.

Full survey methodologies and results are detailed in a series of reports (CEFAS 2012-2014 & Defra 2015a, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g & Gardline 2012).

Table 2. MCZ sites with number of benthic sample stations.

Site	Benthic Sample Stations
Holderness Offshore rMCZ	40
Inner Bank rMCZ	67
North-West of Jones Bank MCZ	44
South of the Isles of Scilly rMCZ	54
Farnes East MCZ	103
Greater Haig Fras MCZ	53
Offshore Overfalls MCZ	59

This report provides details for the common methodology and approach which was adopted for the community analysis. This includes methods for the data handling and analysis of infaunal and epifaunal datasets, how the epifaunal data was used to support the infaunal analysis and how any associated geophysical acoustic data were used to provide contextual information.

In addition to a brief introduction of each MCZ/rMCZ site location and designated features, any site specific data processing stages are detailed and followed by a summary of the physical habitats identified within each site. Details of the outputs of multivariate and univariate statistical routines are illustrated and the characterising features identified from the analysis are provided along with how these are associated with the habitats and biotopes allocated to the data.

A summary of the results obtained in the context of each site's conservation features is provided and the limitations of the process and outputs described.

Data appendices are included within the report to provide the outputs of the analyses for each sample station. The quality assurance and quality checks of analyses for this report are detailed in Appendix 3.

Throughout this report the term 'biotope' is used to describe seabed communities identified to level 5 or 6 of the Marine Habitat Classification for Britain and Ireland (JNCC 2015) where the biological information structures the classification and discriminates between community types. Where the biological information does not allow this level of discrimination or where only the physical attributes of the seabed are used for community identification the term 'habitat' is used.

Maps are presented as figures throughout the report and where possible standard colour schemes and a map template have been used. For certain maps which show sample station by sediment or habitat type, non-standard colours have been used as these better illustrate and discriminate the difference between classes. The relationship between the colours utilised and the standard EUNIS colour scheme is detailed in the Appendix 2.

2 General Methods and Approach

The overarching approach to analysis was to process the data consistently to standardise the information for statistical analysis. Cluster analysis was employed using PRIMER-E software to identify significant biological groupings within the datasets using the results of infaunal and PSA analysis. Any correspondence between biota cluster groups and sediment PSA data was explored and then matched to biotopes from the Marine Habitat Classification for Britain and Ireland Version 15.03 (JNCC 2015) using published biological comparative tables and biotope descriptions and following the most recent guidance (Parry 2015).

Where there was insufficient species data, the allocation of habitat type was derived from the PSA data available. A number of primary and derived biological parameters values (i.e. total numbers; abundances; species richness and diversity indices) could also be calculated from the species matrices and were used where appropriate to further inform analysis of the site data. Epibenthic data were statistically analysed where epibenthic communities were considered important or a mixture of hard/consolidated substrata and softer sediment were present.

It should be noted that some site PSA data/broad scale mapping is currently in draft form and subject to change at a later date.

For several sites, epibenthic data were available in the form of video and still imagery analysis outputs and raw data. Where relevant these data were reviewed and cross referenced to sample stations from which infaunal data were available to assist in benthic community classification and identification.

Throughout this report the term ‘biotope’ is used to describe seabed communities identified to level 5 or 6 of the Marine Habitat Classification for Britain and Ireland (JNCC 2015) where the biological information structures the classification and discriminates between community types. Where the biological information does not allow this level of discrimination or where only the physical attributes of the seabed are used for community identification the term ‘habitat’ is used.

The data provided from each survey was treated independently. Each MCZ site survey was conducted by different staff at different times and data sets were analysed by different contractors. Due to the differences in sampling and surveying methods results between sites are not comparable. Benthic grab data and drop-down camera data from the same sites were also analysed separately due to differences in sampling equipment.

The generic methods for processing and analysing data are outlinedbelow with specific adaptations or modifications used for each site detailed in the relevant sections.

2.1 Infaunal Analysis and Processing

Infaunal sample data were processed to produce a consistent dataset which was suitable for analysis within statistical packages, PRIMER-E. This process is illustrated in Figure 2 which shows the key stages in the process to account for any inconsistency between sample types, volumes and methods employed during data collection.

Benthic infaunal data were collated into a master Excel spreadsheet for each site for the purpose of the data analysis. The following rationalisations were used in preparing the data for statistical analysis:

- taxon names were checked and some amended to make compatible with the accepted species names on the WoRMS species list;

- removal of lifeforms such as eggs or larva: early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;

- removal of juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;

- removal of taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;

- removal of species such as fish: mobile species are removed as they do not form part of the infaunal community and are not permanent members of the community structure;

- removal of nematodes and copepods: meiofauna are removed due to their small size resulting in a risk of undersampling and potential high numbers which can have an overriding influence on the analysis;

- removal of taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts;

- in some cases, data included a mixture of presence and abundance scores for the same species – in these instances, where only a few presence scores occurred within a wider set of abundance data, these were given a value of 1 and were amalgamated within the data, in order that these species could still be included in the analysis rather than discarded;

- taxa with only presence/absence data, mainly epibenthic species such as hydroids and bryozoans, were excluded in the total number of taxa and in the univariate analysis when calculating diversity indices.

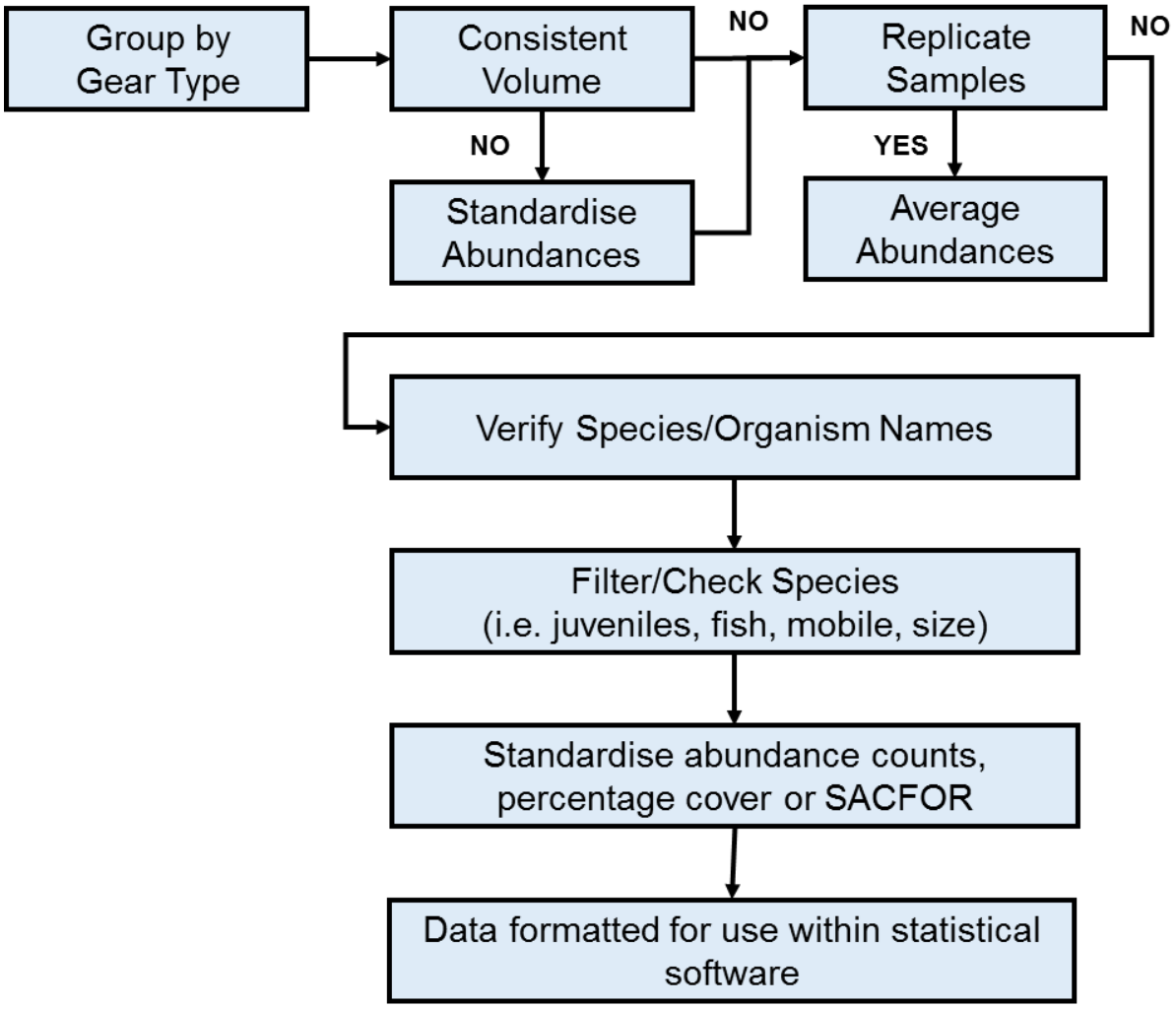

Figure 2. Methodological process for handling data gathered through grab sampling.

2.1.1 Univariate analysis

There are a number of species diversity indices available and for the purpose of this report those most used in literature have been calculated. PRIMER-E was used to calculate the species diversity indices listed below:

- number of species (S): the number of species present;
- number of individuals (N): total number of individuals counted;
- Margalef's index (d): a measure of the number of species present for a given number of individuals. The higher the index, the greater the diversity;
- Pielou's evenness (J'): shows how equally the individuals in a population are distributed. J'=0 – 1. J' is higher, the less variation in the samples.

2.1.2 Multivariate Cluster analysis

Multivariate analysis was used as guidance in biotope assignment and the primary tool for the statistical analysis of the infaunal data was the PRIMER-E software package.
To obtain a measure of the degree of similarity in the faunal composition of each site, cluster analysis was carried out based on a Bray-Curtis similarity index. Prior to analysis, the data from each site required standardisation to reduce discrepancies resulting from observed variability between sample volumes. Variations in the multivariate cluster analysis are detailed in each site section within this report. In general, as the data consisted of sparse

faunal abundance and species richness, with the occasional high abundance of one or two species, square-root or fourth-root transformation were applied. This has the effect of down-weighting the importance of the highly abundant species, so that similarities not only depend on their values but also those of less common taxa. Statistical tests used were Hierarchical Clustering, non-metric Multidimensional Scaling (MDS) Ordination and Species Contributions (SIMPER).

The clustering technique aims to find 'natural groupings' of samples such that samples within a group are more similar to each other, generally, than samples in different groups (Clarke & Warwick 2001). Hierarchical agglomerative methods are the most commonly used clustering techniques. These usually take a similarity matrix, such as Bray-Curtis, and successfully fuse the samples into groups and the groups into larger clusters. The result of the hierarchical clustering is represented by a dendrogram, with samples that are similar linking together towards the higher end of the similarity scale and those that are less similar linking towards the lower end. Various computations were executed to investigate the effect of species removal and/or aggregation on the outcome of the analysis.

The data were examined further to determine the characteristic fauna of the cluster groupings recognised by the clustering technique. The SIMPER (similarity percentages) routine examines and ranks the role of each taxon in contributing to the separation between two groups of samples, or the closeness of the samples within a group. SIMPER was used to determine the main taxa that contributed most to the distinctiveness of the groups identified in the classification process. The species that cumulatively made up 90% of the samples were used and the resulting lists represent the percentage contributions of each species, placed in decreasing order.

Any correspondence between biota groups and sediment PSA data was explored and then matched to biotopes from the Marine Habitat Classification for Britain and Ireland Version 15.03 (JNCC 2015) using the published biological comparative tables and biotope descriptions, and the most recent guidance (Parry 2015). Where there was insufficient species data, the habitat allocation was derived solely from the geological PSA data available for that site.

Data were pooled into higher taxonomic levels and interrogated to explore whether this would improve the cluster groupings. However, the results of this process did not notably benefit the cluster analysis process and data were left at the lowest taxonomic level available.

2.2 Epibenthic Analysis and Processing

2.2.1 Statistical analysis of epibenthic data

For two sites, Offshore Overfalls MCZ and North-West of Jones Bank MCZ epibenthic video data were available. These data consisted of taxa matrices for samples within the MCZ sites.

These sites have epibenthic communities which are considered important within their conservation status. To provide information on the biological communities present these data were processed in a similar manner to the infauna data.

A consistent taxa spreadsheet based upon presence or absence data was used to undertake statistical tests including Hierarchical Clustering, non-metric Multidimensional Scaling (MDS) Ordination and Species Contributions (SIMPER).

The clustering technique aims to find 'natural groupings' of samples such that samples within a group are more similar to each other, generally, than samples in different groups (Clarke & Warwick 2001)

Mixed success was made with the data analyses. Data from Offshore Overalls MCZ consisted of 21 video records. Hierarchical clustering and MDS ordination showed no significant difference between the samples and therefore biotopes which had been previously assigned by expert interpretation were used to summarise the data.

For North-West of Jones Bank MCZ, 23 video records were analysed. These data did show some statistical significant clustering and the associated taxa could be matched to communities and habitats.

2.2.2 Review of epibenthic imagery and footage

Video and still images were reviewed and cross referenced to sample stations from which infaunal data were available. This process assisted in identifying possible biotopes present and to determine the nature of the seabed at each sample location and throughout the MCZ sites. This information assisted the assignment of biotopes to the infaunal samples where they may have been ambiguous or the infaunal statistical analysis did not clearly identify biological groupings.

For example, infaunal data analysis from Farnes East MCZ data showed some statistical groups with a diverse infaunal community which could not easily be allocated to a habitat or biotope. Review of the camera images from the site showed a mosaic of sediment types which could explain the varied nature of the samples and assisted in allocating community types to the sample data.

2.3 Acoustic/geophysical data

For some of the sites, geophysical data obtained from a multibeam echosounder (MBES) were available. Table 3 provides a summary of the data available and used within the analysis process. The bathymetry and backscatter images or data were imported into GIS which then provided contextual information to assist with the allocation of community types to sample data. The bathymetry was especially helpful in determining which biological depth zone (infralittoral, circalittoral or deep circalittoral) some of the samples should be attributed with. The topography of the seabed can also be visualised which aids understanding in the distribution of habitats/biotopes associated with sample points.

Where site specific bathymetry or backscatter data were not available, or coverage was only partial, the Defra marine digital elevation model (DEM) data (Defra 2015) were used to create the best available background and contextual information for the data analysis.

Table 3. Multibeam bathymetry and backscatter data available for each MCZ or rMCZ site

Site	Bathymetric data	Backscatter Data
Holderness Offshore rMCZ	Partial coverage MBES bathymetry data; Defra DEM used to infill.	Partial coverage backscatter data
Inner Bank rMCZ	No MBES data; Defra DEM used	None
North-West of Jones Bank MCZ	Bathymetry data for the majority of the site; Defra DEM used to infill.	Backscatter data for the majority of the site
South of the Isles of Scilly rMCZ	Defra DEM used	None
Farnes East MCZ	Bathymetry data for the majority of the site; Defra DEM used to infill.	Backscatter data for the majority of the site
Greater Haig Fras MCZ	Partial coverage bathymetry data; Limited coverage of Defra data	Partial coverage backscatter data
Offshore Overfalls MCZ	Partial coverage backscatter data; Defra DEM used to infill.	Partial coverage backscatter data

3 Results

Multivariate analysis was undertaken on the infaunal samples to explore significant variation between the samples and to aid with the assignment of biotopes. The classification dendrogram, the ordination plot and the average species composition of the resulting classes were used to justify and describe the characteristics of the groups. The process also draws upon dominant sediment types and the geographic plot of the groups, which show where there are marked spatial clusters in the data.

For each rMCZ/MCZ a summary is provided detailing a brief overview of the site and its conservation features for context and reference, a description of the statistical analysis undertaken and the results, including:

- a site summary;
- summary of the physical habitats present, including maps of sediment composition and physical habitats;
- details of the site specific data processing and analysis;
- summary of the characterising species and communities
- biotope allocation, including relationship to current EUNIS/JNCC habitat classification and maps of location of cluster groupings and biotopes allocated; and
- new biotopes.

For each site data tables are provided in appendices which give details derived from the physical PSA data and also details of the biological data derived from statistical analysis and processing.

An initial table includes the sediment proportions from each sample station, the broad scale habitat identified from this along with any descriptions from data processing logs and geographic positions for each station.

A second table shows details of the sediment description, the multivariate group and the biotope or habitat (Marine Habitat Classification for Britain and Ireland (JNCC 2015) and EUNIS classes) assigned to each sample station with any comments noted from the processing such as impoverished samples or physical mismatched between sediment types and biotopes assigned.

3.1 Holderness Offshore rMCZ

Located 11.4km offshore from the Holderness coast (Figure 3), this area ranges between 10 - 50 metres in depth. The seafloor consists of mixed and coarse sediment interspersed with small cobbles, creating a mosaic of habitats for attaching and burrowing creatures. This area is significant for crustaceans, including edible crabs and common lobster (UK Wildlife Trusts 2016).

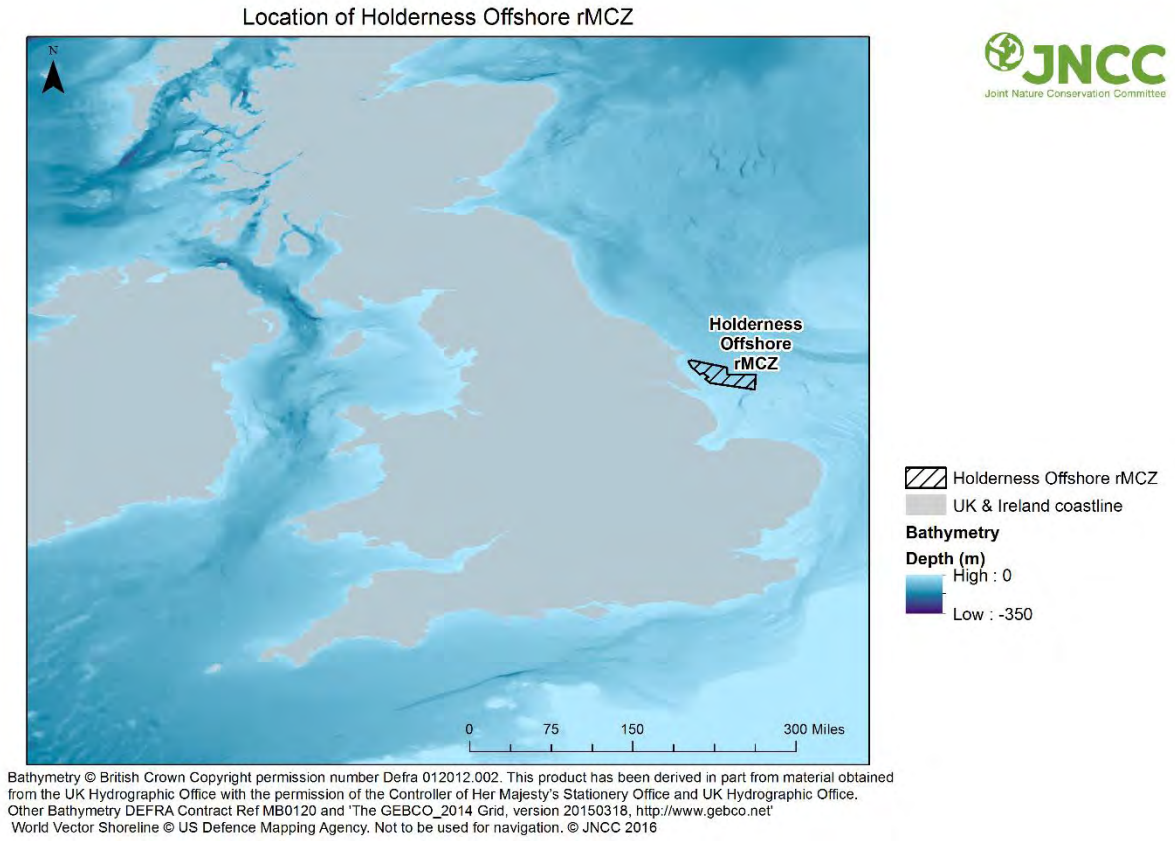

Figure 3. Holderness Offshore rMCZ location

The site was recommended for designation by the regional MCZ project due to the presence of broad-scale habitat types 'Subtidal sand', 'Subtidal coarse sediment' and 'Subtidal mixed sediments'. The site also includes a record of the Ocean quahog (*Arctica Islandica)* which is an MCZ Feature of Conservation Importance (FOCI).

Holderness Offshore rMCZ was surveyed in May 2012 (CEFAS 2013a). Sedimentary habitats were sampled by grab (0.1m^2 mini Hamon grab) and underwater drop down video and stills camera. Multibeam bathymetry and backscatter data were collected opportunistically on transit between the sampling stations. A full account of the survey methods and results can be found in (CEFAS 2013a and Defra 2015d).

3.1.1 Site specific data processing and analysis

In total, 212 taxa were recorded from the 40 samples collected (Figure 4). Twenty-six taxa, which included juveniles, damaged or indeterminate identification were pooled to a higher taxonomic level prior to statistical analysis. These data were pooled, rather than discarded, due to their relatively low numbers, and as the identification was to a genus level or a level to which other taxa had been identified within the dataset. Juvenile records consisted of very low numbers (three individuals or less) which are unlikely to have any overriding influence

within the statistical analysis. There were no presence/absence data available so no manipulation of these data were required. A list of the pooled taxa is provided in Table 4.

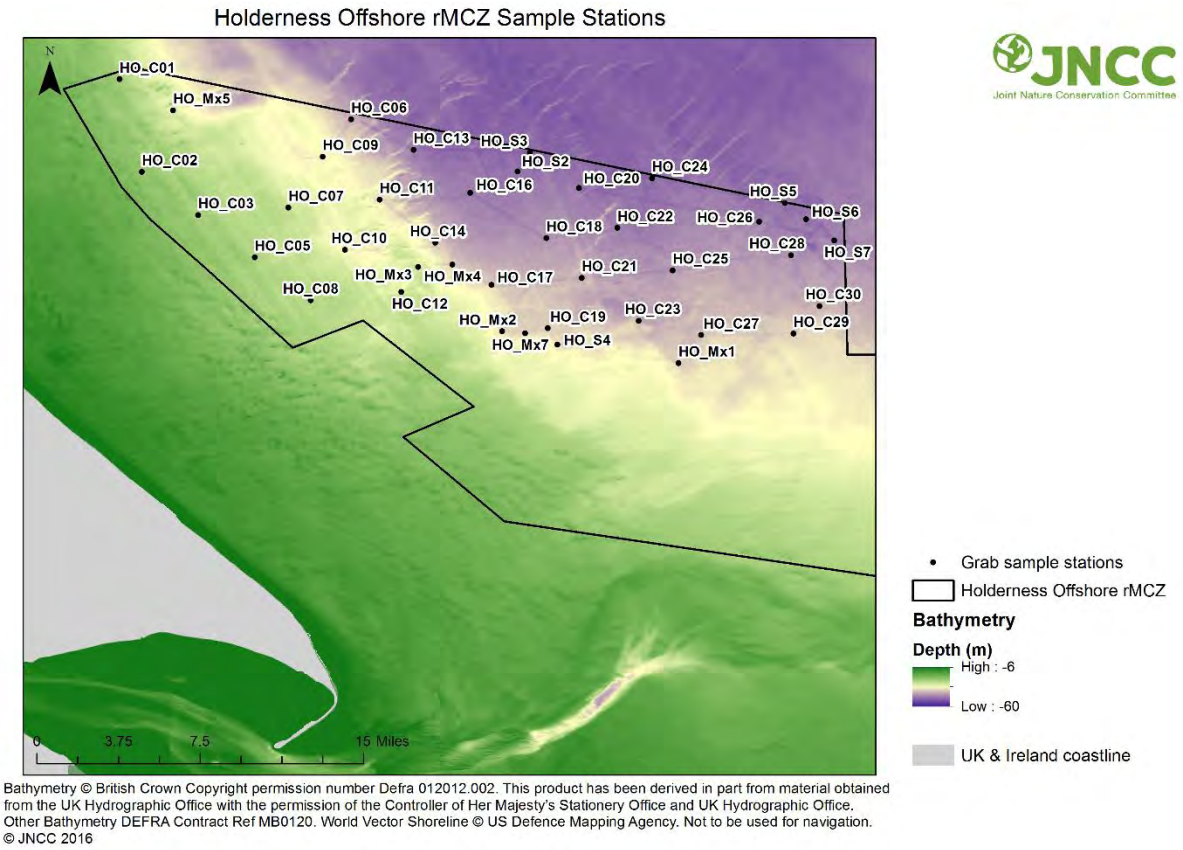

Figure 4. Holderness Offshore rMCZ sample stations

Table 4. Taxa removed from Holderness Offshore rMCZ data

Taxa	Action	Taxa	Action
Ampelisca indet. dam.	Pooled	Ophiuridae indet. juv.	Pooled
Amphiura indet. juv.	Pooled	Ophiurids	Pooled
Aricidea indet. dam.	Pooled	Ophiuroidea indet. juv.	Pooled
Bathyporeia indet. dam.	Pooled	Paguridae indet. dam.	Pooled
Bivalve indet. decal.	Pooled	Phyllodocidae indet. juv.	Pooled
Calianassinae indet.dam.	Pooled	Platyhelminthes indet.	Pooled
Caridea indet. dam.	Pooled	Polynoidae indet. dam.	Pooled
Cheirocratus indet. females	Pooled	Sabellidae indet. dam	Pooled
Gastropoda indet. decal.	Pooled	Sabellidae sp. indet. A	Pooled
Maldanidae indet. juv.	Pooled	Sipuncula indet. juv.	Pooled
Melitidae indet. dam.	Pooled	Syliidae indet. (heterochaete male)	Pooled
Nemertea indet.	Pooled	Thracia indet. juv.	Pooled
Ophiura indet. dam.	Pooled	Trochidae indet. juv.	Pooled

NOTE: Pooled indicates taxa have been incorporated within records at a higher taxonomic level

3.1.2 Summary of physical habitats

A summary of key parameters of particle size analysis data is provided in Table 48 available in Appendix 1. The particle size data from Holderness Offshore rMCZ show the predominant sediments to be coarse in nature with gravel and sands predominating. Sandier substrates are found at sites (HO_C12 and HO_Mx3) while other sites (H0_C08, HO_C13, HO_C28, HO_S2) have a mud fraction which dominates the substrate but with a significant gravel fraction (20-40%) present meaning they are classified as the broad-scale habitat Subtidal mixed sediments. A single station (HO_C14) recorded low levels of gravel and a sand to mud ratio which falls within the broad scale habitat Subtidal mud, however this classification is borderline with the broad-scale habitat Subtidal sand (79% sand, 21% silt/mud).

The spatial distribution of sediment types is illustrated in Figure 5 and Figure 6 which highlight sediment composition (% sand, gravel and mud) and sediment type respectively.

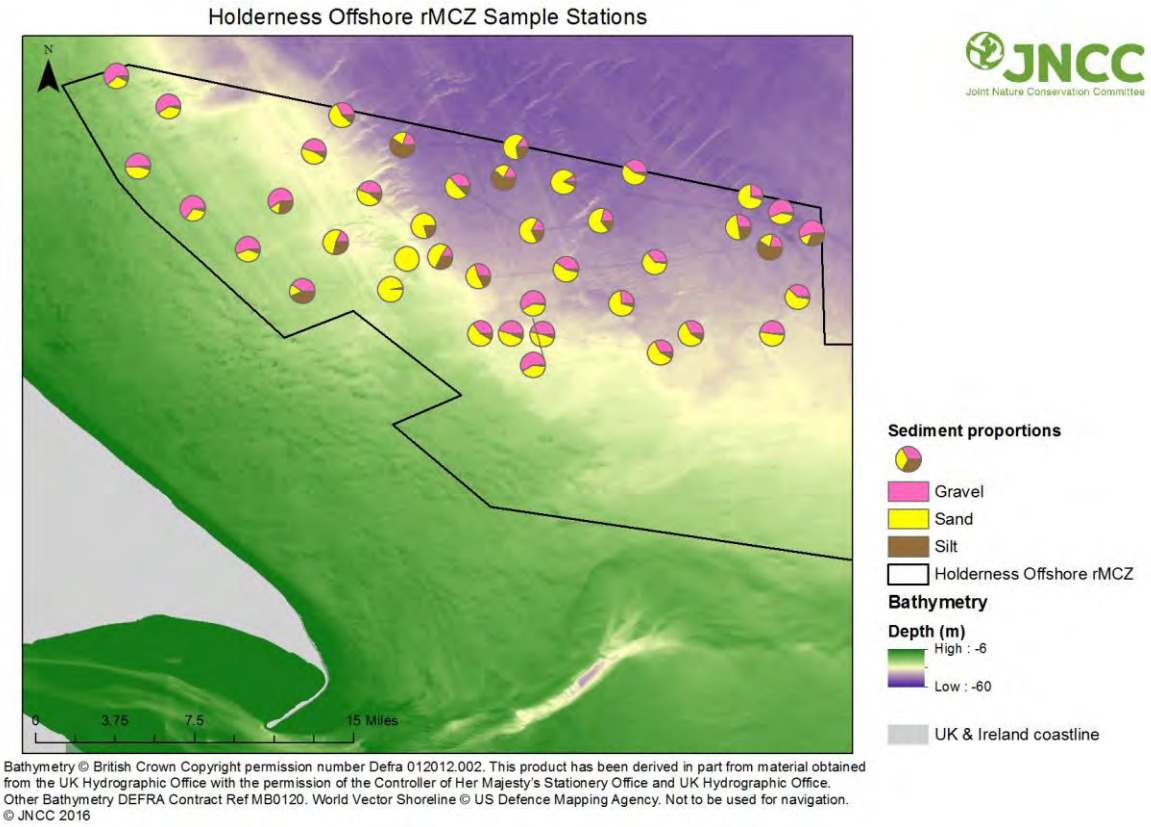

Figure 5. Holderness Offshore rMCZ sediment composition of grab samples.

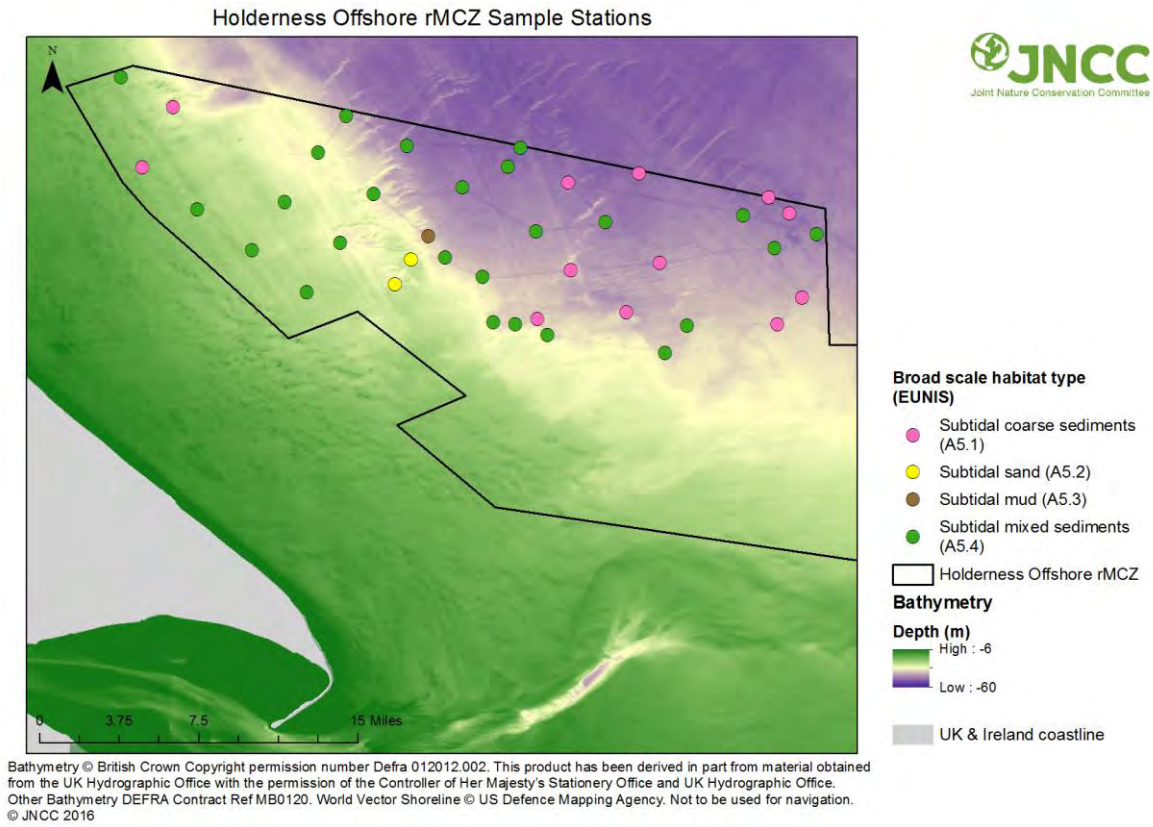

Figure 6. Holderness Offshore rMCZ broad-scale habitat of grab samples.

3.1.3 Statistical results for Holderness Offshore rMCZ

The SIMPROF routine was used to define sample groups with similar species composition and Figure 7 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, square root transformed abundances. Due to the homogeneity of the infaunal community a 'slice' at a similarity level of 30% was used to differentiate between the main groupings. This similarity slice was used to group samples which otherwise are separated due to only small variations, which show no practical ecological groupings, within an otherwise homogeneous community.

Figure 8 shows the three dimensional MDS plot of the same similarities. The stress value of 0.13 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from about 16% to 75%, with two groups identified ('a' & 'c') and one outlying sample ('b'). The taxa that contributed to the two main groups are shown in Table 6 excluding the outlying group 'b' as it had less than 2 samples. The taxa which contributed to greater than 1% of the similarity for each of the biological groups based on the results of the SIMPER analysis are shown in Table 6. The main divisions between samples split group 'a' from groups 'b' and 'c' at about 16% similarity whilst group 'b' was separated from group 'c' at around 25% similarity.

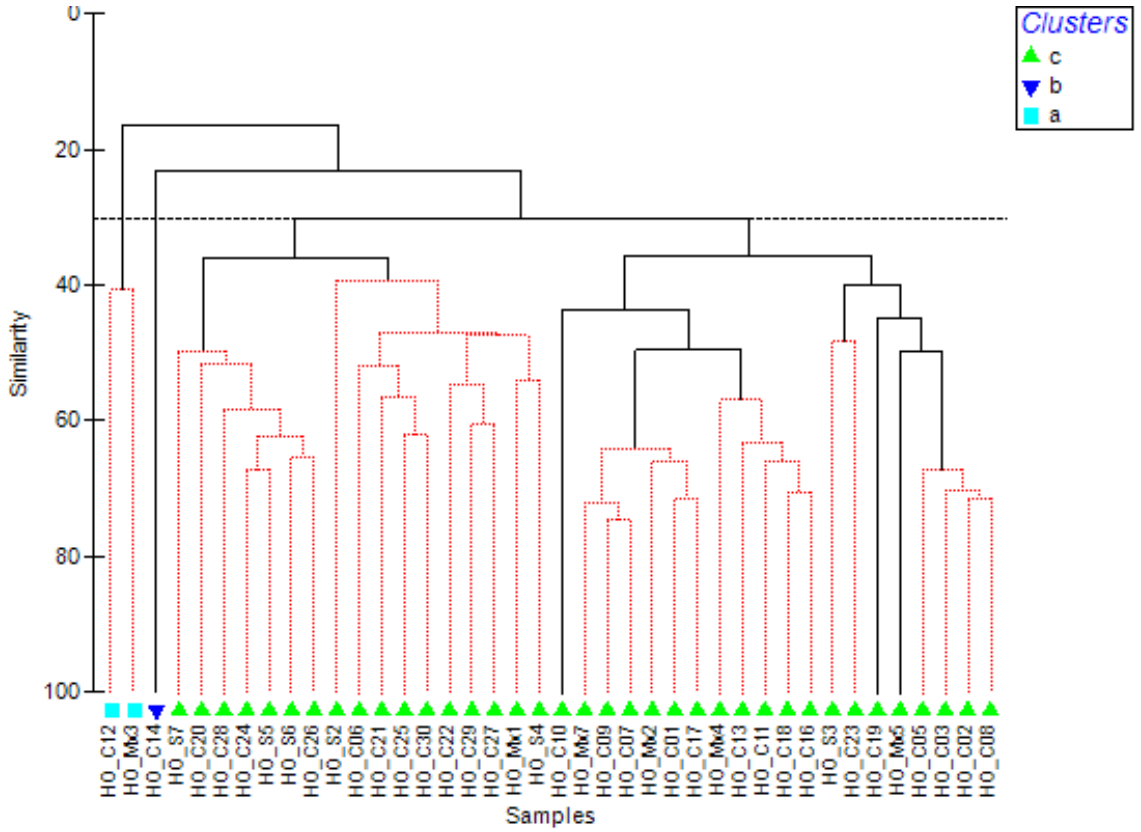

Figure 7. Holderness Offshore rMCZ dendrogram using similarities from abundance data

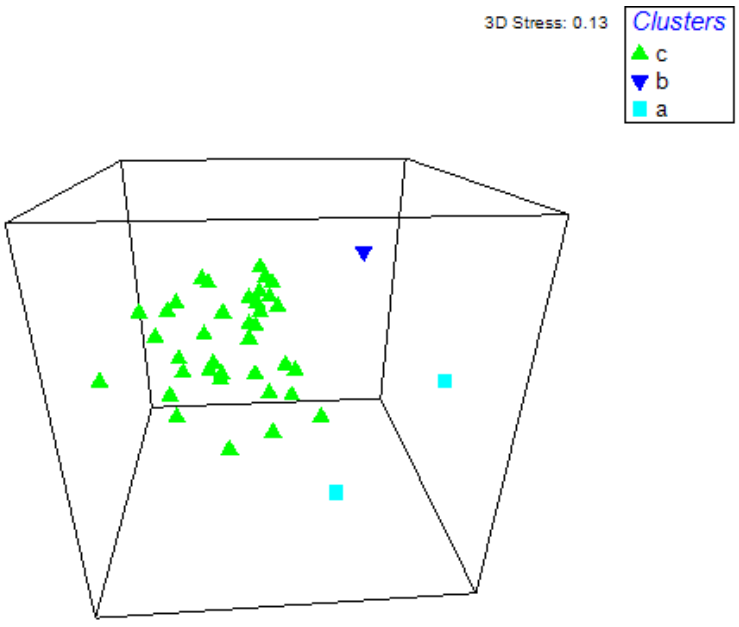

Figure 8. Holderness Offshore rMCZ MDS plot from abundance data.

3.1.4 Univariate results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 5.

The samples from Holderness Offshore rMCZ showed a high level of homogeneity, as revealed in the multivariate analysis where the samples showed no practical ecological groupings, and a similarity slice was used to group samples which otherwise were separated only due to small variations.

The univariate analysis results showed that for the majority of stations which belonged to the large group 'c', the densities of infaunal organisms were variable, with the number of taxa recorded (per sample) ranging from 13 to 46 (mean 30.22) and the number of individuals (per sample) ranging from 27 to 325 (mean 98.97).The group also appears to exhibit a variable but moderate level of diversity in terms of Margalef's index (ranging from 3.64 to 9.361, mean 6.49) and a variable level of evenness with Pielou's index ranging from 0.47 to 0.96, with a mean of 0.82.

Conversely, the remaining three samples in group 'a' and 'b' showed much lower species densities (mean no. of total taxa per sample was 11 for group 'a' and 9 for group 'b', and mean no. of individuals per sample 23.5 and 20 respectively) and therefore reflected more impoverished samples. The diversity indices were also low, with a mean of 3.13 for group 'a' and 2.67 for group 'b' for the Margalef's index. Pielou's index of evenness is again high for both of these groups (mean of 0.87 and 0.94) which supports the previously described homogeneity of the samples with only small variations in biological composition.

Table 5. Diversity indices and summary univariate statistics for Holderness Offshore rMCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
HO_C12	a	7	15	2.22	0.93
HO_Mx3	a	15	32	4.04	0.8
HO_C14	b	9	20	2.67	0.94
HO_C01	c	33	121	6.67	0.68
HO_C02	c	35	125	7.04	0.8
HO_C03	c	24	75	5.33	0.89
HO_C05	c	29	87	6.27	0.9
HO_C06	c	32	79	7.09	0.91
HO_C07	c	32	133	6.34	0.72
HO_C08	c	33	92	7.08	0.92
HO_C09	c	44	127	8.88	0.83
HO_C10	c	35	73	7.92	0.9
HO_C11	c	31	152	5.97	0.77
HO_C13	c	46	108	9.61	0.9
HO_C16	c	35	81	7.74	0.83
HO_C17	c	41	325	6.92	0.53
HO_C18	c	41	126	8.27	0.84
HO_C19	c	32	57	7.67	0.96
HO_C20	c	27	48	6.72	0.94
HO_C21	c	33	106	6.86	0.76

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
HO_C22	c	32	110	6.6	0.85
HO_C23	c	22	54	5.26	0.9
HO_C24	c	29	80	6.39	0.84
HO_C25	c	23	59	5.4	0.83
HO_C26	c	27	64	6.25	0.92
HO_C27	c	34	115	6.95	0.77
HO_C28	c	19	38	4.95	0.94
HO_C29	c	35	115	7.17	0.69
HO_C30	c	22	83	4.75	0.71
HO_Mx1	c	40	87	8.73	0.94
HO_Mx2	c	25	222	4.44	0.47
HO_Mx4	c	19	91	3.99	0.63
HO_Mx5	c	29	45	7.36	0.96
HO_Mx7	c	41	188	7.64	0.71
HO_S2	c	13	27	3.64	0.9
HO_S3	c	24	83	5.2	0.7
HO_S4	c	32	73	7.23	0.88
HO_S5	c	20	61	4.62	0.9
HO_S6	c	22	46	5.48	0.92
HO_S7	c	27	106	5.58	0.64

3.1.5 Summary of characterising species and communities

The two samples of group ‘a’ (stations HO_C12 & HO_Mx3) were characterised by slightly gravelly sand with *Ophelia borealis, Nephtys cirrosa* and *Scoloplos (Scoloplos) armiger*. The largest group ‘c’, which comprised the stations with most gravel fractions of sediment, was characterised by comparatively high numbers of the errant polychaete, *Lumbrineris gracilis* along with species such as *Urothoe elegans, Glycera lapidum, Goniada maculata* and *Scoloplos (Scoloplos) armiger*.

The outlying group ‘b’ (HO_C14) was characterised by slightly gravelly muddy sand with low numbers of polychaetes and bivalves such as *Lumbrineris gracilis* and *Abra nitida*, with taxa such as *Caulleriella alata, Glycera lapidum* and *Mediomastus fragilis*.

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 6, excluding the outlying group which had less than two samples, for which data cannot be generated.

Table 6. Characterising species for multivariate groups at Holderness Offshore rMCZ, showing those with a contribution of over 1%.

Group 'c' Species/Taxa	**Average Abundance**	**%age contribution**
Lumbrineris gracilis	2.73	11.18
Nemertea	1.68	9.02
Urothoe elegans	2.57	8.63
Glycera lapidum	1.59	8.2
Goniada maculata	1.29	5.78
Scoloplos armiger	1.37	5.59
Polynoidae	1.13	4.96
Pholoe assimilis	1.11	4.54
Polycirrus medusa	1.13	4.16
Amphiura	1.18	3.94
Melinna cristata	1.65	3.47
Echinocyamus pusillus	1.32	3.24
Abra nitida	0.93	2.64
Owenia fusiformis	0.7	1.64
Nuculana minuta	0.65	1.6
Ophelia borealis	0.88	1.59
Cheirocratus	0.77	1.49
Leptocheirus hirsutimanus	0.78	1.48
Leiochone johnstoni	0.69	1.44
Galathea intermedia	0.64	1.32
Amphiura filiformis	0.68	1.32
Amphicteis gunneri	0.77	1.28
Scalibregma celticum	0.54	1.2
Aonides paucibranchiata	0.6	1.03
Group 'a' Species/Taxa	**Average Abundance**	**%age contribution**
Ophelia borealis	5.98	49.08
Nephtys cirrosa	3.93	32.28
Scoloplos armiger	2.27	18.64

3.1.6 Biotope allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 7 with the spatial distribution of the groups and biotopes illustrated in Figure 9 and Figure 10. Table 49 in Appendix 1 presents details for each sample station with the multivariate group and the biotope or habitat assigned to each sample along with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

The two sampling stations within group 'a' were characterised by low numbers of taxa and individuals with *Ophelia borealis* and *Nephtys cirrosa* being the dominant species present. The presence of species such as these indicates elements of biotopes such as SS.SSa.IFiSa.NcirBat (*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand) and SS.SSa.CFiSa.EpusOborApri (*Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica*

in circalittoral fine sand). The depth range of over 30m would suggest that these stations are an impoverished version of **SS.SSa.CFiSas.EpusOborApri.**

Stations within group 'c' included a range of polychaetes and molluscs, such as *Lumbrineris gracilis, Glycera lapidum, Abra nitida* and *Nuculana minuta* as well as amphipods (*Urothoe elegans* and *Leptocheirus hirsutimanus*). These species are often recorded in offshore mixed sediment and as such the stations within this group have been assigned **SS.SMx.OMx.PoVen** (Polychaete-rich deep *Venus* community in offshore mixed sediments).

The outlying station HO_C14 (group 'b') had an impoverished infaunal community with only nine taxa and 20 individuals present in the sample, therefore, it was necessary to revert back to the physical data to attribute habitat type. The substrate at this station had a low gravel content and as such was assigned **SS.SMu.CSaMu** (Circalittoral sandy mud).

In summary Table 8 shows the biotope and habitats found within Holderness Offshore rMCZ with the characterising species and seabed substrate for each.

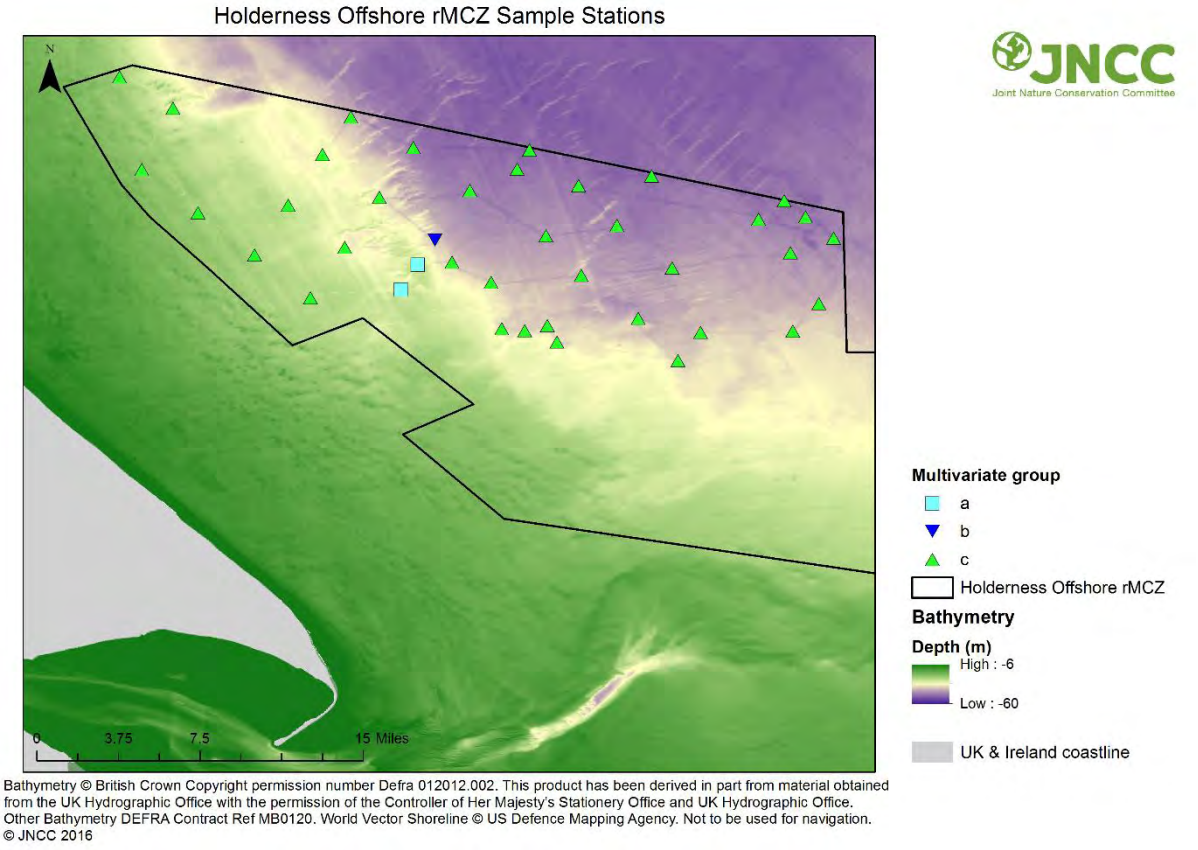

Figure 9. Holderness Offshore rMCZ sample stations showing multivariate groups.

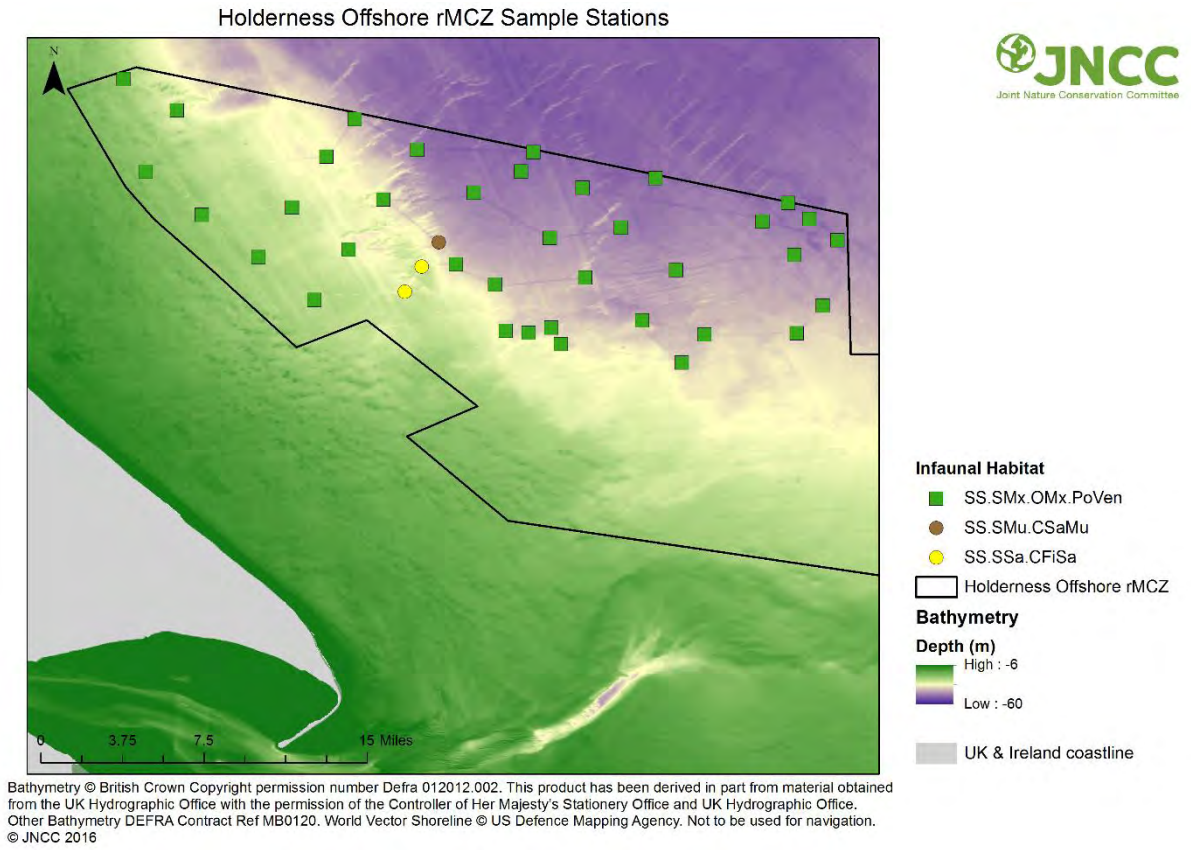

Figure 10. Holderness Offshore rMCZ sample stations showing biotope/habitats.

Table 7. Summary of multivariate statistical groups and associated habitats and biotopes from the Holderness Offshore rMCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	2	SS.SSa.CFiSa	Subtidal sand
b	1	SS.SMu.CSaMu	Subtidal mud
c	37	SS.SMx.OMx.PoVen	Subtidal mixed sediments Subtidal coarse sediment

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 8. Summary of habitats/biotopes found within Holderness Offshore rMCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SSa.CFiSa	30.5 – 30.7	Sand and muddy sand	*Ophelia borealis, Nephtys cirrosa, Scoloplos armiger*	a
SS.SMu.CSaMu	38.7	Mud and sandy mud	Polychaetes & Bivalves	b
SS.SMx.OMx.PoVen	21.9 – 50.1	Coarse/ mixed sediments	*Lumbrineris gracilis*, Nemertea, *Urothoe elegans, Glycera lapidum, Goniada maculate, Scoloplos armiger,* Polynoidae	c

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.1.7 Site Summary

Holderness Offshore rMCZ was recommended for designation based on the presence of broad-scale habitats 'Subtidal sand', 'Subtidal coarse sediment' and 'Subtidal mixed sediments', and the majority of samples within the site have been allocated to habitats and biotopes which are part of these broad-scale habitats (with the exception of one sample, allocated to SS.SMu.CSaMu, part of the broad-scale habitat Subtidal mud)'.

The composition of the samples would therefore support the presence of the proposed features. Table 9 provides a summary for the habitats and biotopes present within Holderness Offshore rMCZ with associated broad-scale habitats and other analysis notes. Additionally, a single sample station (H0632) also has a record of the ocean quahog (*Arctica Islandica)* which is an MCZ FOCI.

Table 9. Summary table for the habitat/biotopes for Holderness Offshore rMCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.CFiSa	Subtidal sand	a	31	*Ophelia borealis, Nephtys cirrosa, Scoloplos armiger*	Possibly an impoverished version of SS.SSa.CFiSa.EpusOborApri; reverted to higher level in classification as uncertain
SS.SMu.CSaMu	Subtidal mud	b	38	Polychaetes & Bivalves	Impoverished community; reverted to physical data to assign habitat type
SS.SMx.OMx.PoVen	Subtidal mixed sediments/ Subtidal coarse sediment	c	22 – 50	*Lumbrineris gracilis*, Nemertea, *Urothoe elegans, Glycera lapidum, Goniada maculata, Scoloplos armiger*, Polynoidae	Charactering species best match SS.SMx.OMx.PoVen, although physical mismatch for some samples (coarse sediment)

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.2 Inner Bank rMCZ

The Inner Bank rMCZ is located in the English Channel (Figure 11) measuring 119km^2 with water depths between 21 and 52m. This site contains a range of broad-scale habitats and the site is also considered an area of additional ecological importance, with an ancient river system increasing the complexity of the sea floor features; as well as containing a seasonal thermal front and nursery and spawning grounds for fish species (Defra 2013).

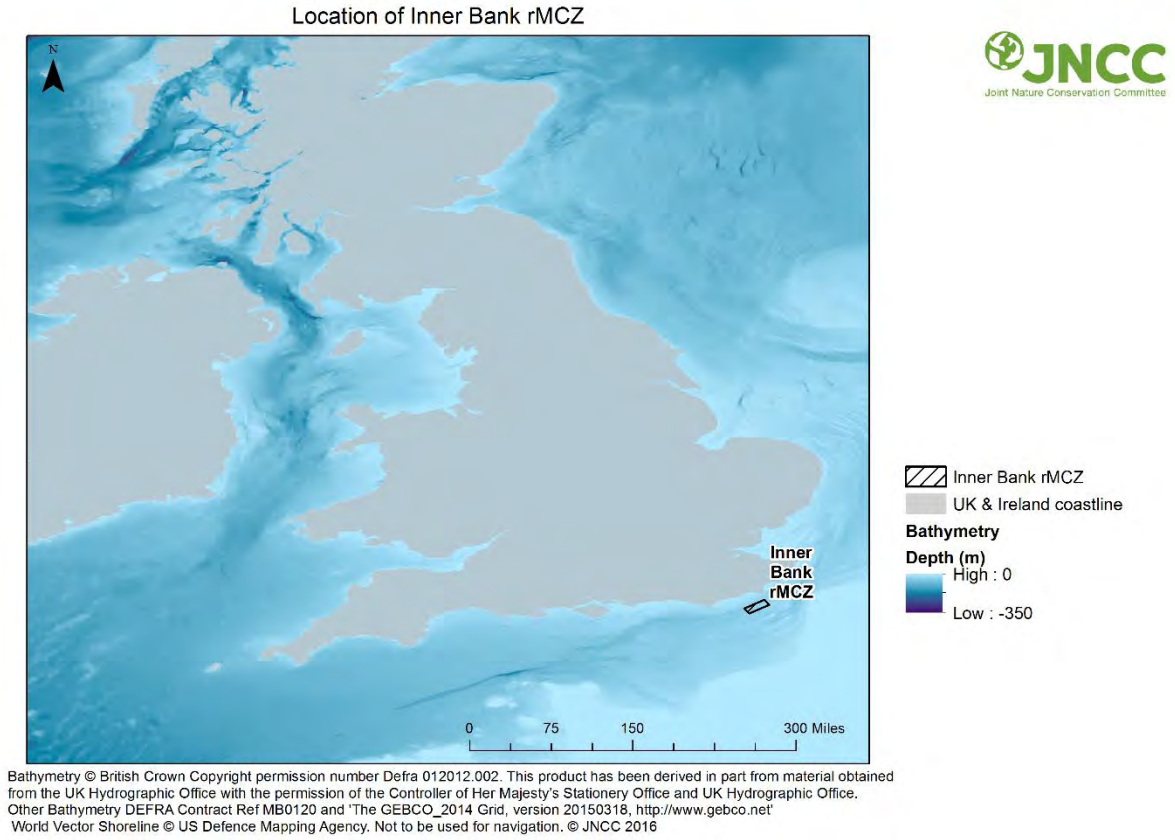

Figure 11. Inner Bank rMCZ location.

The site was designed to protect broad-scale habitat types and increase the representation of 'Subtidal coarse sediment' and 'Subtidal sand' in the region.

Inner Bank rMCZ was surveyed in January 2014 (CEFAS 2014b) and was sampled using a grab (0.1m^2 mini Hamon grab) and underwater drop down video and stills camera. A full account of the survey methods and results can be found in CEFAS 2014b and Defra 2015e. Bathymetric data for the site has been collected by the Civil Hydrography Programme and the data incorporated within the Defra bathymetric data set used throughout this project.

3.2.1 Site specific data processing and analysis

In total, 250 taxa were recorded from the 67 samples collected (Figure 12). Fifty-five taxa were removed and a list of the removed taxa is provided in Table 10. These included:

- lifeforms such as eggs or epitokes: early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature. These were often the only record of the taxa at this site and present in relatively high numbers which can have an overriding influence on the analysis;
- taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;
- nematodes and copepods: meiofauna are removed due to their small size and high numbers which can have an overriding influence on the analysis as the high numbers dominate any statistical clustering and similarity analyses; and

- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts.

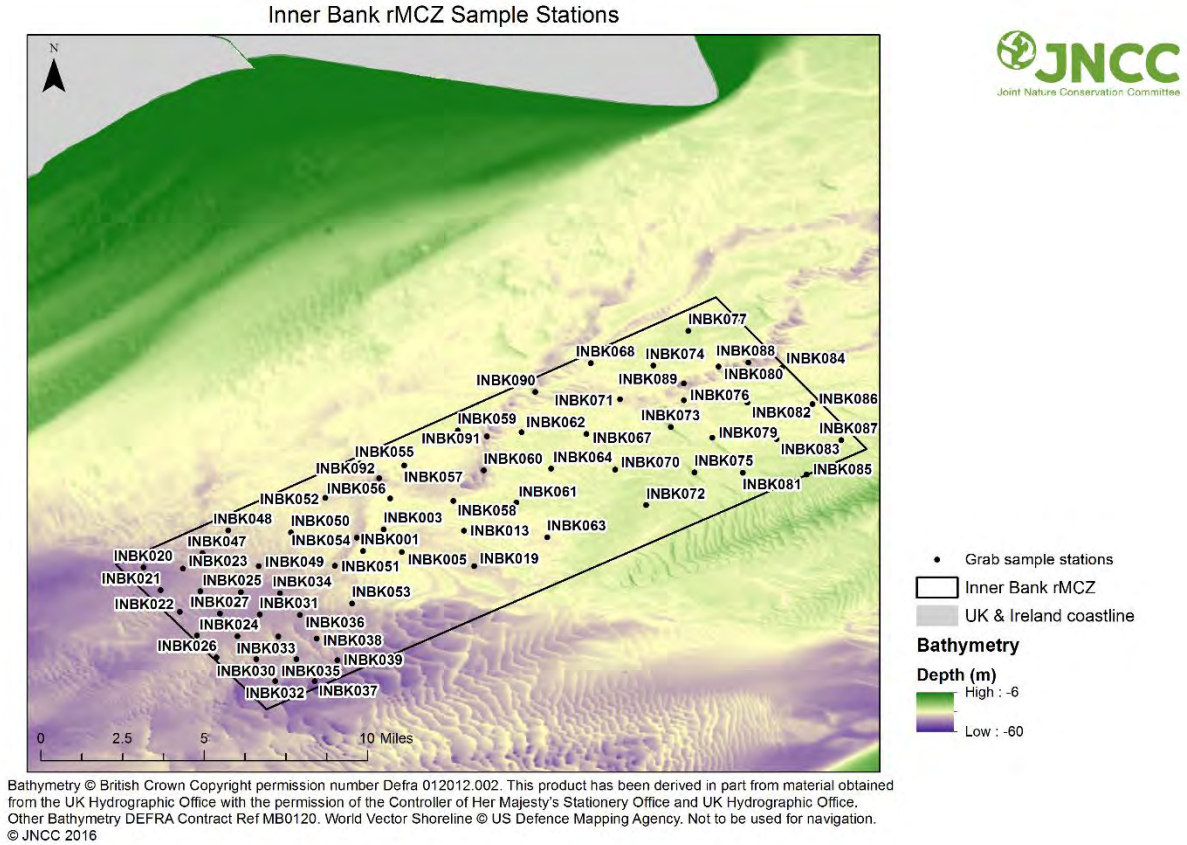

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Figure 12. Inner Bank rMCZ sample stations.

Table 10. Taxa removed from Inner Bank rMCZ data.

Taxa	Reason Removed	Taxa	Reason Removed
Abra	Juveniles	Magelonidae	Presence data only
Actinopterygii	Eggs	Maldanidae	Presence data only
Ampharete lindstroemi	Aggregation/turf	*Marphysa bellii*	Juveniles
Amphipoda	Damaged	Nephtys	Damaged/juveniles/presence
Amphiuridae	Juveniles	Nereididae	Juveniles
Aphroditidae	Juveniles	Nuculidae	Juveniles
Barnea parva	Juveniles	Onchidorididae	Juveniles
Bathyporeia	Juveniles	*Ophiothrix fragilis*	Juveniles
Bivalvia	Presence data only	Ophiuridae	Juveniles
Cirratulus	Juveniles	Ophiuroidea	Presence data only
Copepoda	Meiofauna/parasitic	Paguridae	Juveniles
Cucumariidae	Juveniles	*Parexogone hebes*	Epitoke
Diplodonta rotundata	Juveniles	Pedunculata	Juveniles
Dosinia	Juveniles	Pharidae	Juveniles
Echinidea	Juveniles	Phyllodocidae	Juveniles
Ensis	Damaged/juveniles	Polynoidae	Juveniles
Eumida	Juveniles	Polyplacophora	Juveniles
Eunice	Juveniles	Spatangoida	Juveniles
Glyceridae	Damaged	Spisula	Juveniles
Glycymeris glycymeris	Juveniles	*Sthenelais limicola*	Presence data only
Holothuriidae	Presence data only	Tellinidae	Juveniles

Taxa	Reason Removed	Taxa	Reason Removed
Lepidonotus squamatus	Juveniles	Terebellidae	Juveniles/presence data only
Leptosynapta	Juveniles	Thracia	Juveniles
Mactridae	Juveniles	*Thracia villosiuscula*	Presence data only
Maerella tenuimana	Presence data only	*Upogebia deltaura*	Juveniles

3.2.2 Summary of physical habitats

A summary of key parameters of particle size analysis data is provided in Table 50, available in Appendix 1, which shows the area to be dominated by sand with varying proportions of gravel altering the overall sediment type. One station (INBK049) shows a higher proportion of silt/mud (71%). Throughout the site, sandier seabed is found in the deeper 'channels', and slopes with gravels influencing the shallower banks.

The spatial distribution of sediment types is illustrated in Figure 13 which highlights sediment composition (% sand, gravel and mud) overlayed on the broad-scale habitat map.

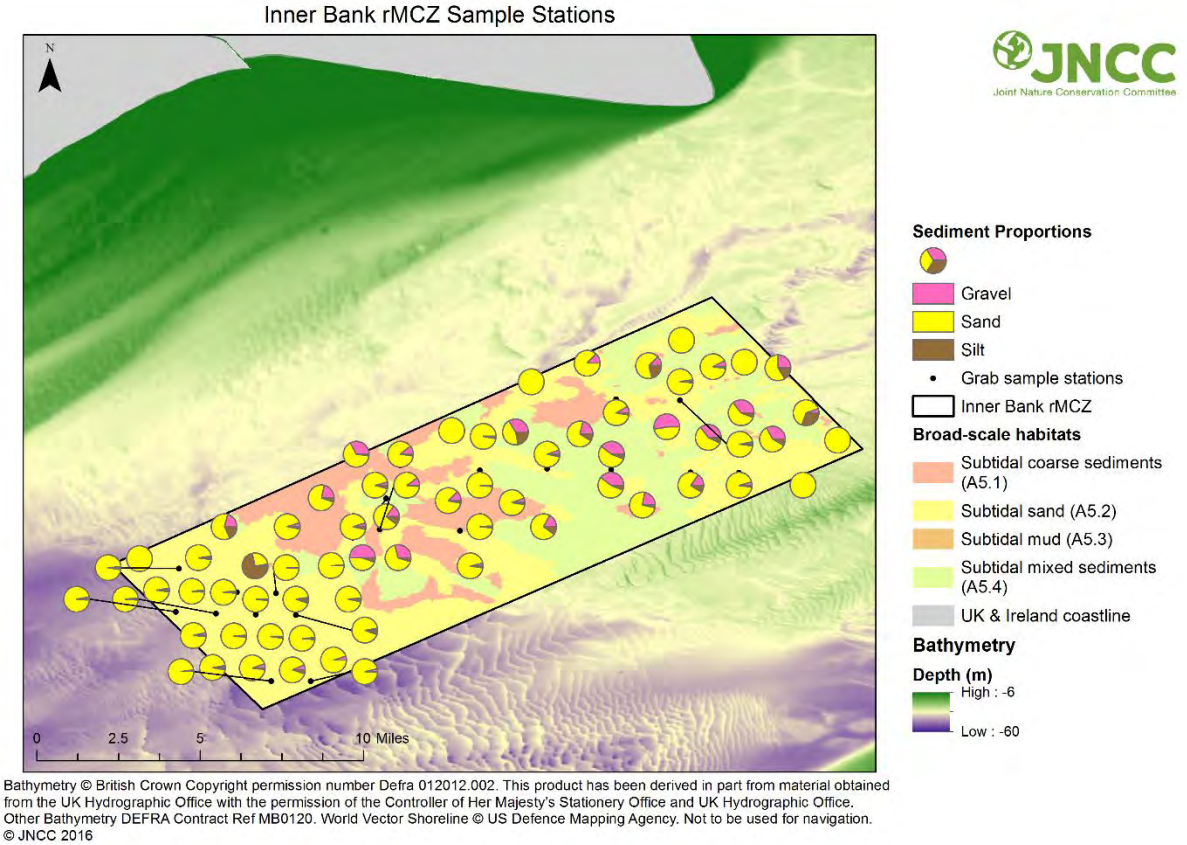

Figure 13. Inner Bank rMCZ sediment composition of grab samples with broad-scale habitat map.

3.2.3 Statistical results for Inner Bank rMCZ

The SIMPROF routine was used to define sample groups with similar species composition and Figure 14 displays the results of the cluster analysis on the infaunal data. As the raw data consisted of sparse faunal abundance and species richness, with high abundance of one or two species, fourth root transformation was applied which has the effect of down-weighting the importance of the highly abundant species, so that similarities not only depend on their values but also those of less common taxa.

The dendrogram in Figure 14 is based on group-averaged Bray-Curtis similarities computed on the standardised, fourth root transformed abundances.
Figure 15 shows the three dimensional MDS plot of the same similarities. The stress value of 0.16 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from about 10% to 63%, with three groups identified ('b', 'd' & 'g') and four outlying samples ('a', 'c', 'e' & 'f'). The taxa that contributed to the three main groups are shown in Table 12, excluding the outlying groups as they had less than two samples in each group. The taxa which contributed to greater than 1% of the similarity for each of the biological groups based on the results of the SIMPER analysis are shown. The main divisions between samples split group 'a' from the other groups at 10% similarity whilst group 'b' was separated from groups 'c' to 'g' at around 15% similarity. Group 'g' consists of the amalgamation of two sub-groups at a similarity level of about 35%.

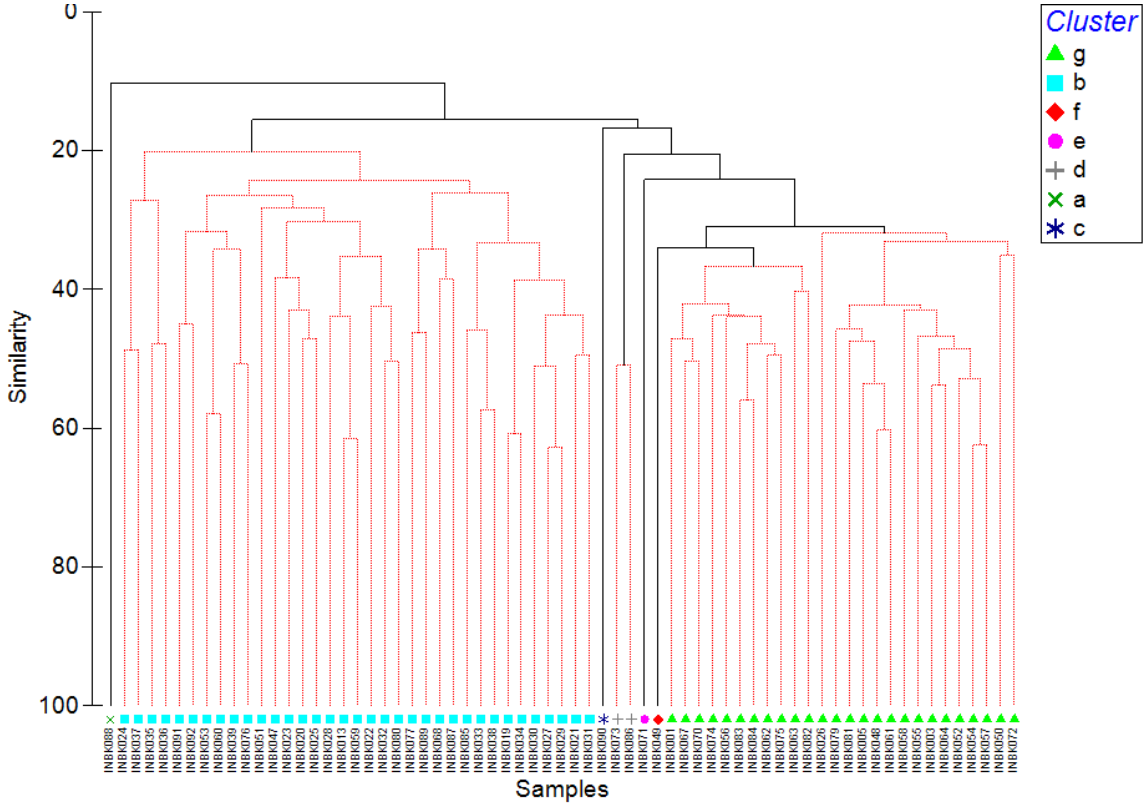

Figure 14. Inner Bank rMCZ dendrogram using similarities from abundance data.

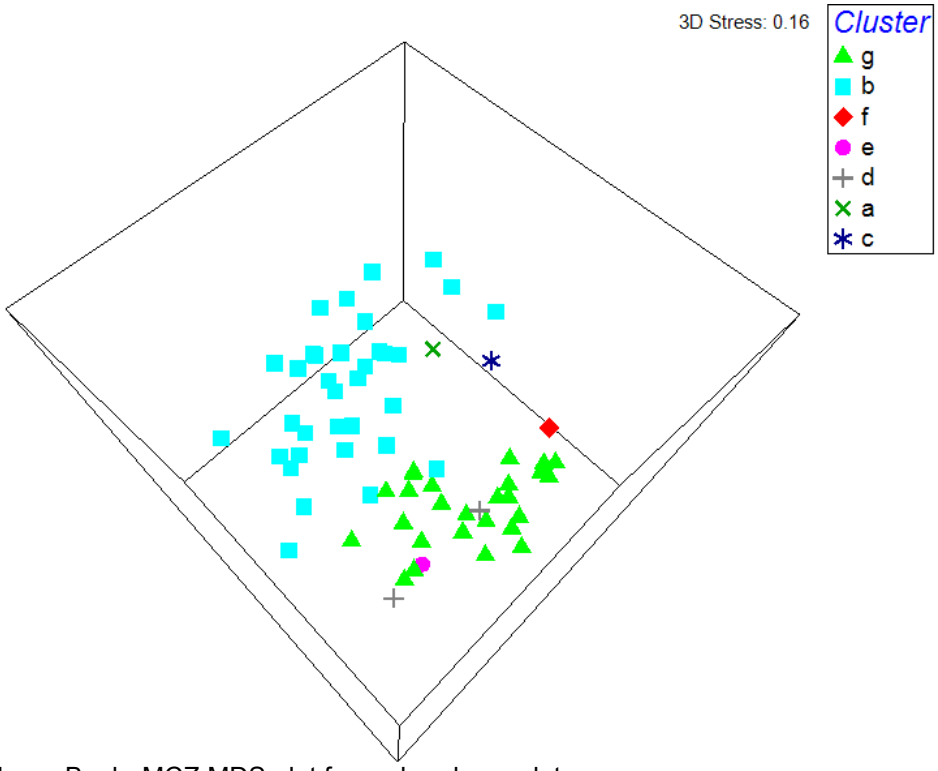

Figure 15. Inner Bank rMCZ MDS plot from abundance data.

3.2.4 Univariate results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 11.

The samples from Inner Bank rMCZ had sparse faunal abundance and multivariate analysis resulted in seven groups, with the majority of samples clustering into the larger groups 'b' and 'g'.

The univariate analysis results showed that for group 'b', the densities of infaunal organisms were very low, with the number of taxa recorded (per sample) ranging from 3 to 15 (mean 8.8) and the number of individuals (per sample) ranging from 3 to 45 (mean 16.02). The group appears to exhibit a low to moderate level of diversity in terms of Margalef's index (range from 1.56 to 4.33, mean 2.89) and a high level of evenness with Pielou's index ranging from 0.70 to 1.00 and a mean of 0.91.

For group 'g', the densities of infaunal organisms were higher than group 'b' but still suggesting impoverished communities, with the number of taxa recorded (per sample) ranging from 9 to 55 (mean 29.11) and the number of individuals (per sample) ranging from 10 to 144 (mean 74.84).This group exhibits a variable level of diversity in terms of Margalef's index, ranging from moderate (2.77) to high (11.06) with a mean of 6.51, and a high level of evenness with Pielou's index ranging from 0.80 to 0.98 and a mean of 0.89 indicating little variation within the samples.

The six remaining samples in groups 'a', 'c', 'd', 'e' and 'f' also showed low species densities. The no. of total taxa per sample for all these groups was 10 or below except for group 'f' with 33 taxa in the sample. The mean no. of individuals per sample for all of these groups was 20 or below, also excepting group 'f' with 72 individuals in the sample. The higher numbers in group 'f' still suggest impoverished samples. The majority of these groups also show a

moderate level of diversity, similar to group ‘b’, with Margalef’s indices of between 2.4 to 3.08, however group ‘f’ shows a higher diversity with an index value of 7.48. Pielou’s index of evenness is again high for all of these groups (all above 0.92) indicating only small variations in biological composition.

Table 11. Diversity indices and summary univariate statistics Inner Bank rMCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
INBK088	a	7	7	3.08	1
INBK013	b	11	29	2.97	0.81
INBK019	b	7	16	2.16	0.86
INBK020	b	10	27	2.73	0.7
INBK021	b	7	14	2.27	0.86
INBK022	b	9	11	3.34	0.98
INBK023	b	10	14	3.41	0.97
INBK024	b	4	5	1.86	0.96
INBK025	b	10	15	3.32	0.96
INBK027	b	12	21	3.61	0.93
INBK028	b	5	7	2.06	0.96
INBK029	b	9	17	2.82	0.96
INBK030	b	13	16	4.33	0.98
INBK031	b	9	16	2.89	0.94
INBK032	b	7	15	2.22	0.88
INBK033	b	6	12	2.01	0.91
INBK034	b	6	10	2.17	0.9
INBK035	b	15	27	4.25	0.89
INBK036	b	10	40	2.44	0.78
INBK037	b	9	19	2.72	0.88
INBK038	b	5	13	1.56	0.89
INBK039	b	9	14	3.03	0.96
INBK047	b	9	12	3.22	0.95
INBK051	b	9	11	3.34	0.98
INBK053	b	10	11	3.75	0.99
INBK059	b	14	45	3.42	0.77
INBK060	b	13	26	3.68	0.88
INBK068	b	5	6	2.23	0.97
INBK076	b	7	11	2.5	0.92
INBK077	b	8	15	2.58	0.85
INBK080	b	12	13	4.29	0.99
INBK085	b	3	3	1.82	1
INBK087	b	5	6	2.23	0.97
INBK089	b	9	13	3.12	0.92
INBK091	b	12	17	3.88	0.96
INBK092	b	9	14	3.03	0.96
INBK090	c	6	8	2.4	0.97
INBK073	d	10	21	2.96	0.92
INBK086	d	8	14	2.65	0.97

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
INBK071	e	8	18	2.42	0.93
INBK049	f	33	72	7.48	0.92
INBK001	g	42	99	8.92	0.94
INBK003	g	15	29	4.16	0.88
INBK005	g	17	34	4.54	0.94
INBK026	g	14	27	3.94	0.81
INBK048	g	25	95	5.27	0.89
INBK050	g	18	30	5	0.86
INBK052	g	21	45	5.25	0.88
INBK054	g	19	75	4.17	0.8
INBK055	g	9	18	2.77	0.89
INBK056	g	42	144	8.25	0.88
INBK057	g	22	48	5.42	0.9
INBK058	g	12	16	3.97	0.98
INBK061	g	15	40	3.8	0.91
INBK062	g	39	72	8.89	0.95
INBK063	g	33	91	7.09	0.92
INBK064	g	15	29	4.16	0.89
INBK067	g	55	132	11.06	0.91
INBK070	g	48	124	9.75	0.91
INBK072	g	9	10	3.47	0.98
INBK074	g	36	127	7.23	0.89
INBK075	g	42	143	8.26	0.9
INBK079	g	33	94	7.04	0.89
INBK081	g	33	95	7.03	0.88
INBK082	g	41	84	9.03	0.9
INBK083	g	51	116	10.52	0.89
INBK084	g	51	129	10.29	0.89

3.2.5 Summary of characterising species and communities

Group ‘a’ which comprised just a single station in the group (station INBK088) was characterised by sand with low numbers of taxa such as *Nephtys kersivalensis, Scoloplos (Scoloplos) armiger, Spiophanes bombyx* and *Bathyporeia* sp.

The largest group, which included thirty-five samples, clustered together at about 20% similarity to form group ‘b’. The taxa which contributed to greater than 5% of the similarity within this group were *Nephtys cirrosa, Scoloplos (Scoloplos) armiger*, *Echinocyamus pusillus*, Nemertea and *Ophelia borealis*.

Group ‘c’ (station INBK090), group ‘d’ (stations INBK073 and INBK086), group ‘e’ (station INBK071) and group ‘f’ (station INBK049) were characterised by relatively low numbers of taxa with a greater occurrence of species such as *Kurtiella bidentata* and *Callianassa subterranea* at the muddier station INBK049 (group ‘f’).

Group ‘g’ which included the amalgamation of two groups of stations with relatively similar infauna was characterised by *Echinocyamus pusillus, Aonides paucibranchiata, Caulleriella alata, Notomastus* sp. and *Lumbrineris cingulata.*

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 12, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated (Group a,c,e,f).

Table 12. Characterising species for multivariate groups at Inner Bank rMCZ, showing those with a contribution of over 1%.

Group ‘b’		
Species/Taxa	**Average Abundance**	**%age contribution**
Nephtys cirrosa	1.47	24.17
Scoloplos (Scoloplos) armiger	1.30	19.07
Echinocyamus pusillus	1.07	11.51
Nemertea	0.87	9.34
Ophelia borealis	0.84	8.28
Bathyporeia elegans	0.67	5.16
Abra prismatica	0.62	4.57
Lumbrineris cingulata	0.54	3.40
Chaetozone zetlandica	0.50	3.14
Spiophanes bombyx	0.47	2.29

Group ‘d’		
Species/Taxa	**Average Abundance**	**%age contribution**
Glycera lapidum	2.02	23.91
Eulalia mustela	1.85	21.60
Syllis garciai	1.56	18.16
Pseudonotomastus southerni	1.81	18.16
Polycirrus	1.71	18.16

Group ‘h’		
Species/Taxa	**Average Abundance**	**%age contribution**
Echinocyamus pusillus	1.91	16.51
Aonides paucibranchiata	1.49	12.29
Notomastus	1.37	8.96
Caulleriella alata	1.21	8.79
Glycera lapidum	1.11	7.58
Nemertea	1.12	6.42
Lumbrineris cingulata	1.11	5.94
Syllis garciai	0.91	4.58
Nephtys cirrosa	0.79	3.95
Polycirrus	0.89	3.84
Clymenura	0.77	3.48
Nucula hanleyi	0.75	3.09
Pholoe baltica	0.72	2.74
Syllis hyalina	0.54	1.58
Spisula elliptica	0.52	1.45

Table 12 continued: Characterising species for multivariate groups at Inner Bank rMCZ, showing those with a contribution of over 1%.

Group 'g' Species/Taxa	Average Abundance	%age contribution
Lumbrineris cingulata	1.54	6.80
Echinocyamus pusillus	1.53	6.50
Polycirrus	1.33	5.52
Nemertea	1.21	4.78
Caulleriella alata	1.22	4.73
Poecilochaetus serpens	1.20	4.51
Glycera lapidum	1.15	4.48
Notomastus	1.19	4.10
Mediomastus fragilis	1.09	3.75
Lagis koreni	0.85	3.09
Clymenura	0.95	2.98
Aonides paucibranchiata	1.03	2.93
Urothoe elegans	1.05	2.90
Pholoe baltica	0.90	2.71
Upogebia deltaura	0.79	2.52
Golfingia	0.72	2.29
Glycinde nordmanni	0.73	2.28
Amphipholis squamata	0.84	2.07
Kurtiella bidentata	0.77	2.05
Sarsinebalia typhlops	0.67	1.72
Nucula hanleyi	0.66	1.45
Marphysa bellii	0.63	1.42
Diplodonta rotundata	0.68	1.40
Spiophanes bombyx	0.56	1.27
Euclymene droebachiensis	0.57	1.00

3.2.6 Biotope allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. The taxa which were removed during data processing prior to statistical analysis were reviewed and considered within the biotope allocation process.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 13 with the spatial distribution of the groups and biotopes illustrated in Figure 16 and Figure 17. Table 51 in Appendix 1 presents the multivariate group and the biotope or habitat assigned to each sample with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

Sampling stations within group 'b' were characterised by *Nephtys cirrosa, Scoloplos (Scoloplos) armiger, Echinocyamus pusillus, Ophelia borealis, Bathyporeia elegans* and *Abra prismatica*. The community in group 'b' correlated to both SS.SSa.CFiSa.EpusOborApri (*Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica* in circalittoral fine sand) and SS.SSa.IFiSa.NcirBat (*Nephtys cirrosa* and *Bathyporeia* spp. in

infralittoral sand), however, the bathymetry data provided supported the allocation of the slightly deeper, circalittoral biotope, **SS.SSa.CFiSa.EpusOborApr**.

Four of the stations (INBK088, INBK090, INBK071 and INBK049) were assigned to groups ‘a’, ‘d’, ‘e’ and ‘f’ respectively but only contained one sample per ‘group’. Sampling stations INBK088, INBK071 and INBK090 were impoverished with the total number of taxa ranging from 6 to 8 per sample, and the total number of individuals ranging from 7 to 18. The two stations within group ‘d’ (INBK073 and INBK086) also had somewhat impoverished, variable infaunal communities. No characterising species could be matched to biotopes for these stations. Therefore, it was necessary to revert back to the physical data to attribute habitat types. Station INBK088 (group ‘a’) included few taxa with only singular occurrences of mainly polychaete species within the sample and was assigned **SS.SSa.CFiSa** (Circalittoral fine sand). Station INBK090 (group ‘c’) was also assigned SS.SSa.CFiSa and station INBK073 (group ‘d’) and station INBK071 (group ‘e’) were assigned **SS.SCS.CCS** (Circalittoral coarse sediment). Station INBK086 (group ‘d’) was assigned the mixed sediment habitat type, **SS.SMx.CMx**.

At station INBK049 (group ‘f’) there was a greater occurrence of species such as *Kurtiella bidentata, Upogebia deltaura* and *Callianassa subterranea*. The characterising species of this sample corresponded with the increase in silt content of the sediment at this station and as such has been identified as **SS.SMu.CSaMu** (Circalittoral sandy mud).

It is apparent that stations within group ‘g’ were distinguished by different proportions of a common pool of frequently recorded taxa such as *Lumbrineris cingulata, Echinocyamus pusillus, Caulleriella alata* and *Glycera lapidum*. These species are representative of both the circalittoral coarse sediment biotope SS.SCS.CCS.MedLumVen (*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel) and the offshore circalittoral mixed sediment habitat, SS.SMx.OMx.PoVen (Polychaete-rich deep *Venus* community in offshore mixed sediments). Therefore, stations with gravelly sand were assigned **SS.SCS.CCS.MedLumVen** and those with an increased silt content were classified as **SS.SMx.OMx.PoVen**.

In summary, Table 14 shows the biotope and habitats found within Inner Bank rMCZ with the characterising species and seabed substrate for each.

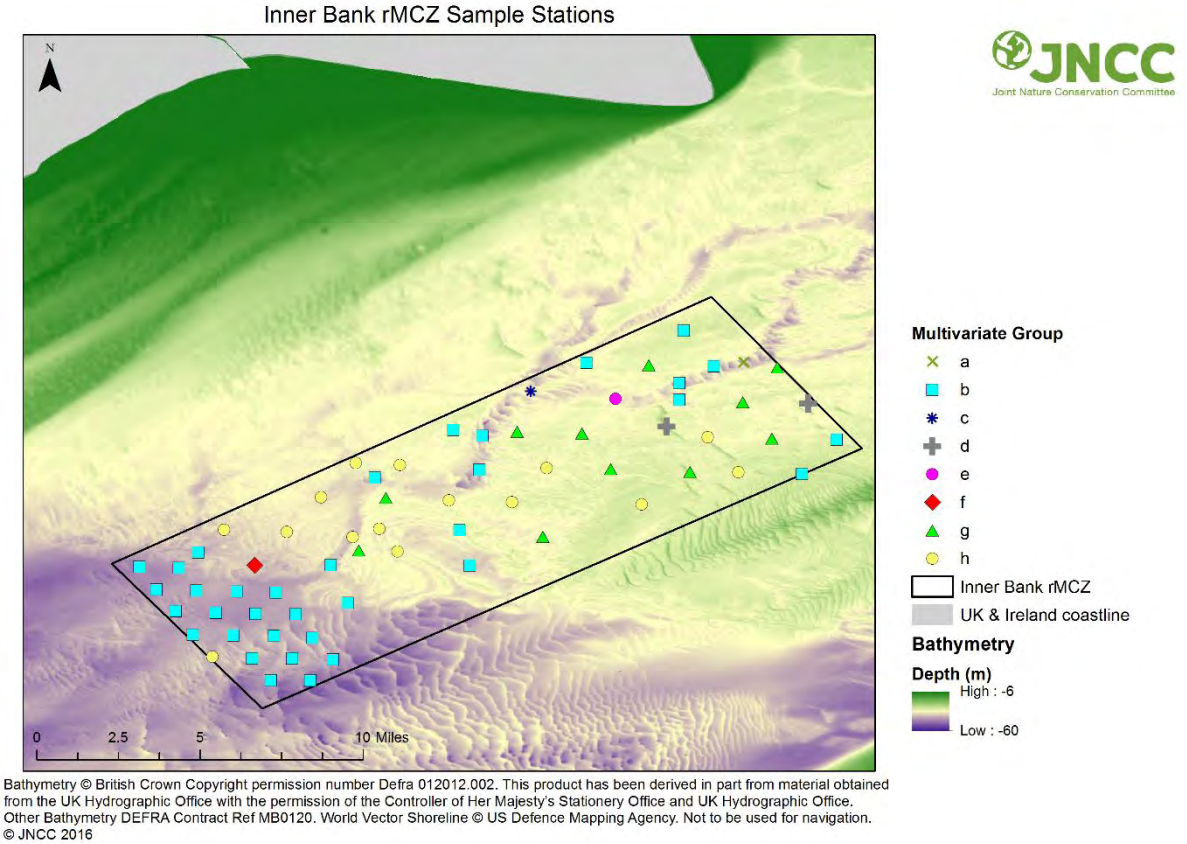

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Figure 16. Inner Bank rMCZ sample stations showing multivariate groups.

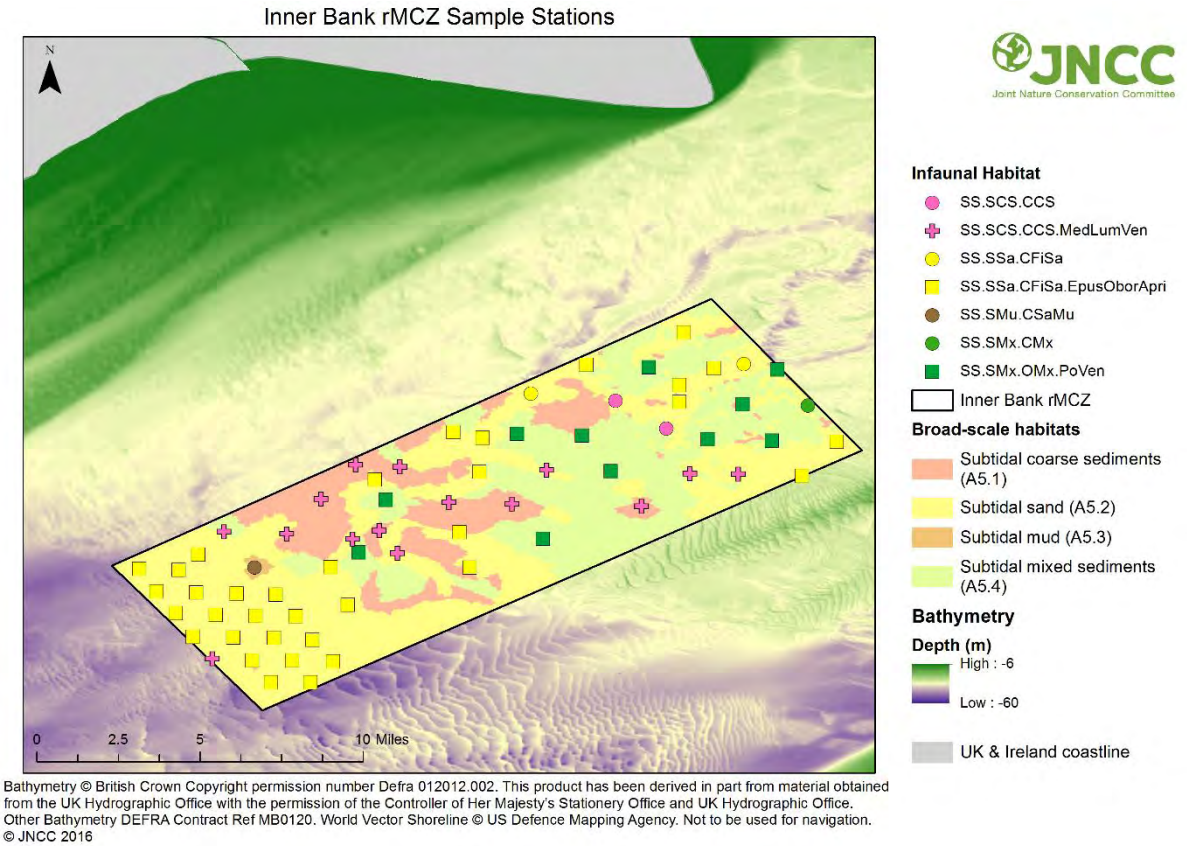

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Figure 17. Inner Bank rMCZ sample stations showing biotope/habitats.

Table 13. Summary of multivariate statistical groups and associated habitats and biotopes from the Inner Bank rMCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	1	SS.SSa.CFiSa	Subtidal sand
b	35	SS.SSa.CFiSa.EpusOborApri	Subtidal sand Subtidal coarse sediment
c	1	SS.SSa.CFiSa	Subtidal sand
d	2	SS.SCS.CCS	Subtidal coarse sediment
		SS.SMx.CMx	Subtidal mixed sediments
e	1	SS.SCS.CCS	Subtidal coarse sediment
f	1	SS.SMu.CSaMu	Subtidal mud
g	14	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment
	11	SS.SMx.OMx.PoVen	Subtidal mixed sediments

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 14. Summary of habitats/biotopes found within Inner Bank rMCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SSa.CFiSa	40 - 44	Sand and muddy sand	*Nephtys kersivalensis*, *Scoloplos armiger*, *Spiophanes bombyx*, Bathyporeia *Caulleriella alata*, *Magelona filiformis*	a, c
SS.SSa.CFiSa.EpusOborApri	31 - 53	Sand and muddy sand/ coarse sediment	*Nephtys cirrosa*, *Scoloplos armiger*, Echinocyamus, *Ophelia borealis*, Nemertea, *Bathyporeia elegans*, *Abra prismatica*	b
SS.SMx.CMx	37 - 39	Mixed/ coarse sediment	Glycera lapidum, Eulalia mustela, Syllis garciai	d
SS.SCS.CCS	32	Coarse sediment	Syllis garciai, Lumbrineris cingulata, Pseudonotomastus southerni	e
SS.SMu.CSaMu	45	Mud and sandy mud	Lumbrineris cingulata, Echinocyamus pusillus, Polycirrus, Nemertea	f

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SCS.CCS.MedLumVen	33 - 43	Coarse sediment and sand	*Echinocyamus pusillus, Anoides paucibranchiata*, Notomastus, *Caulleriella alata*	g
SS.SMx.OMx.PoVen	33 - 42	Mixed sediment	*Echinocyamus pusillus, Anoides paucibranchiata*, Notomastus, *Caulleriella alata*	g

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.2.7 Site Summary

Inner Bank rMCZ was recommended by the regional MCZ project to protect the broad-scale habitat types 'Moderate energy circalittoral rock' in the area and increase the representation of 'Subtidal coarse sediment' and 'Subtidal sand' in the region. Whilst the infaunal samples are unlikely to detect the presence of circalittoral rock, of the 66 samples analysed, 53 (80%) support the presence of Subtidal coarse sediment' and 'Subtidal sand' in the area. Table 15 provides a summary for the habitats and biotopes present within Inner Bank rMCZ with associated broad-scale habitats and other analysis notes.

Table 15. Summary table for the habitat/biotopes for Inner Bank rMCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.CFiSa	Subtidal sand	a	40 - 44	*Nephtys kersivalensis*, *Scoloplos armiger*, *Spiophanes bombyx*, Bathyporeia *Caulleriella alata*, *Magelona filiformis*	Impoverished community; reverted to physical data to assign habitat type
SS.SSa.CFiSa.EpusOborApr	Subtidal sand/ Subtidal coarse sediment	b	31 - 53	*Nephtys cirrosa*, *Scoloplos armiger*, *Echinocyamus pusillus*, *Ophelia borealis*, Nemertea, *Bathyporeia elegans*, *Abra prismatica*	Characterising species of both circalittoral and infralittoral fine sand biotopes; depth indicated circalittoral most appropriate

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.CFiSa	Subtidal sand	c	40 - 44	*Nephtys kersivalensis*, *Scoloplos armiger*, *Spiophanes bombyx*, Bathyporeia *Caulleriella alata*, *Magelona filiformis*	Impoverished community; reverted to physical data to assign habitat type
SS.SCS.CCS SS.SMx.CMx	Subtidal coarse sediment/ Subtidal mixed sediments	d	37 - 39	*Glycera lapidum, Eulalia mustela, Syllis garciai*	Impoverished community; reverted to physical data to assign habitat type
SS.SCS.CCS	Subtidal coarse sediment	e	32	*Syllis garciai, Lumbrineris cingulata, Pseudonotomastus southerni*	Impoverished community; reverted to physical data to assign habitat type
SS.SMu.CSaMu	Subtidal mud	f	45	*Lumbrineris cingulata, Echinocyamus pusillus*, Polycirrus, Nemertea	Impoverished community; reverted to physical data to assign habitat type
SS.SCS.CCS.MedLumVen SS.SMx.OMx.PoVen	Subtidal coarse sediment/ Subtidal mixed sediments	g	33 - 43	*Echinocyamus pusillus, Anoides paucibranchiata*, Notomastus, *Caulleriella alata*	Biotopes assigned based on characterising species and physical data for each station within this group; either SS.SCS.CCS. MedLumVen or SS.SMx.OMx.Po Ven according to substrate type

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.3 North-West of Jones Bank MCZ

North-West of Jones Bank MCZ is an offshore site, which is around 165km west of Land's End (Figure 18). The site covers around 400km^2 and protects a diverse range of habitats and associated species. Protected features within the site include the habitat Feature of Conservation Importance (FOCI); Sea-pen and burrowing megafauna communities as well as the broad-scale habitats Subtidal mud, Subtial coarse sediment, Subtidal sand and Subtidal mixed sediments. These are important habitats for many animals, like worms, cockles, urchins and sea cucumbers. Larger fauna includes mud shrimps and fish which live

within this habitat and burrow into the mud, creating a network of burrows which shelter smaller creatures, and also provides a habitat for sea-pens (JNCC 2015c).

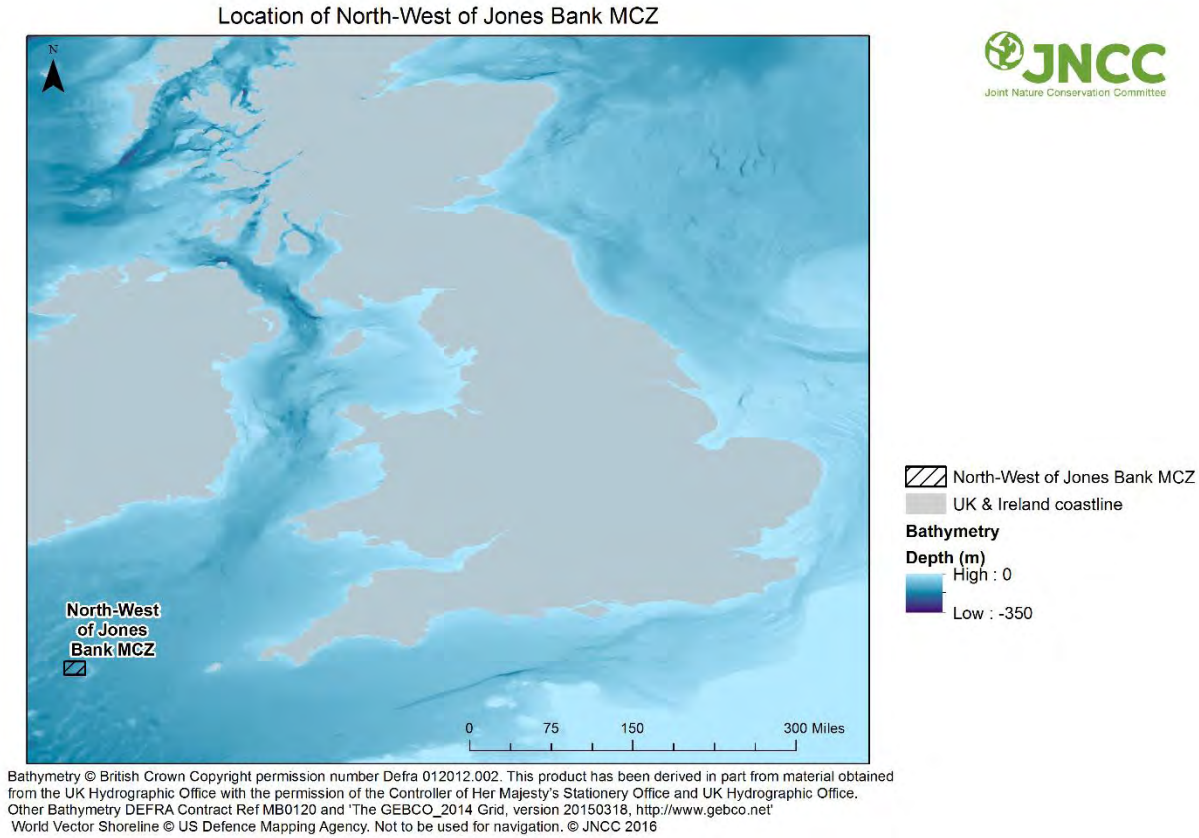

Figure 18. North-West of Jones Bank MCZ location.

This site is designated to protect the following broad-scale habitat features: Subtidal coarse sediment; Subtidal sand; Subtidal mixed sediments and Subtidal mud along with the habitat FOCI Sea-pen and burrowing megafauna communities (JNCC 2015c).

North-West of Jones Bank MCZ initial site evaluation survey was carried out in March 2012 (Gardline 2012) which acquired sediment samples with a Day grab and Hamon grab (0.1m^2), camera stills and video data as well as multibeam bathymetry and backscatter data.The area was visited again in July 2012 (CEFAS 2012b) where multibeam bathymetry and backscatter data were opportunistically acquired on transit between the sampling stations which were surveyed by grab (0.1m^2 mini Hamon grab) and underwater drop down video and stills camera. A full account of the survey methods and results can be found in Gardline 2012, CEFAS 2012b and Defra 2015f.

3.3.1 Site specific data processing and analysis

In total, 164 taxa were recorded from the 44 samples collected (Figure 19). Thirty-eight taxa were removed prior to statistical analysis and are listed in Table 16. These included:

- lifeforms such as eggs or epitokes: early or transitional life stages of most marine species which are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;

- taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;
- species such as fish: mobile species are removed as they do not form part of the infaunal community and are not permanent members of the community structure;
- nematodes and copepods: meiofauna are removed due to their small size and high numbers which can have an overriding influence on the analysis as the high numbers dominate any statistical clustering and similarity analyses;
- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data (such as counts); and
- in some cases, data included a mixture of presence and abundance scores for the same species – in these instances, where only a few presence scores occurred within a wider set of abundance data, these were given a value of 1 and were amalgamated within the data, in order that these species could still be included in the analysis rather than discarded.

Table 16. Taxa removed from North-West of Jones Bank MCZ data

Taxa	Reason Removed	Taxa	Reason Removed
Amaeana trilobata	Presence data only	Maldanidae	Presence data only
Ampelisca spinipes (juv)	Juvenile record & presence data only	*Mytilus edulis* (juv)	Juvenile record
Amphiuridae (juv)	Juvenile record & mixed count and presence data	NEMERTEA	P records replace with value of 1
Atelecyclus rotundatus (juv)	Juvenile record & presence data only	Nephtys (juv)	Juvenile record
Autolytus	Presence data only	*Ophelia borealis*	Presence data only
Callianassa subterranea (juv)	Single juvenile record	Ophiuridae (juv)	Juvenile record & mixed count and presence data
DECAPODA	Presence data only	OSTEICHTHYES (eggs)	Removed single count record and relevance questionable
Ebalia (juv)	Removed juvenile record	Paguridae (juv)	Removed juvenile record
Enteromorpha	Presence data only	PELECYPODA	Presence data only
Escharella immerse	Presence data only	Phoronis	Presence data only
FILIFERA	Presence data only	*Phoronis ovalis* (?)	Presence data only
Galathowenia oculata	Presence data only amalgamated	*Praxillella affinis* (Type A)	Presence data only amalgamated
Glycera rouxii	Presence data only amalgamated	*Prionospio dubia*	Presence data only amalgamated
Glycinde nordmanni	Presence data only amalgamated	Sagittidae	Presence data only amalgamated
Glycinde nordmanni (epitoke)	Pooled with non epitoke records	SPATANGOIDA	Presence data only
Goniada maculata (epitoke)	Pooled with non epitoke records	SPATANGOIDA (juv)	Juvenile record & mixed count and presence data
Goniadella gracilis (epitoke)	Pooled with non epitoke records	*Triticella flava*	Presence data only
Loxosomella varians	Presence data only	Nematoda	Overriding influence
Makrokylindrus (juv)	Removed single juvenile record	Copepoda	Overriding influence

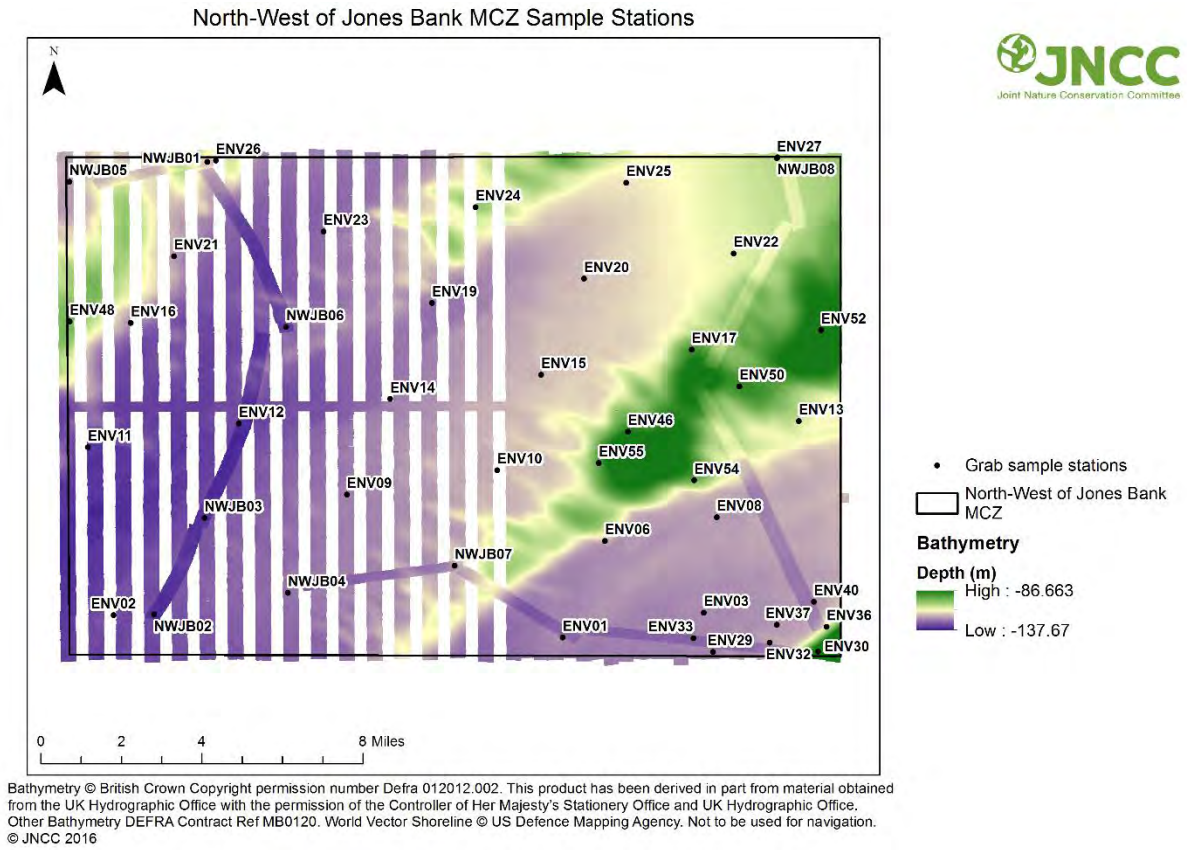

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Figure 19. North-West of Jones Bank MCZ sample stations.

3.3.2 Summary of physical habitats

The spatial distribution of sediment types is illustrated in Figure 20 which highlights sediment composition (% sand, gravel and mud) overlayed on the broad-scale habitat map generated from the 2012 surveys. A summary of key parameters of particle size analysis data provided in Table 52 in Appendix 1.

The majority of the samples (35) show the seabed to have significant silt content and have been classified as the broad-scale habitat 'Subtidal mud'. Only a minority of sample stations vary from this, with three being allocated a mixed habitat biotope and only two samples (ENV24 & ENV55) being classified as subtidal sand from PSA data.

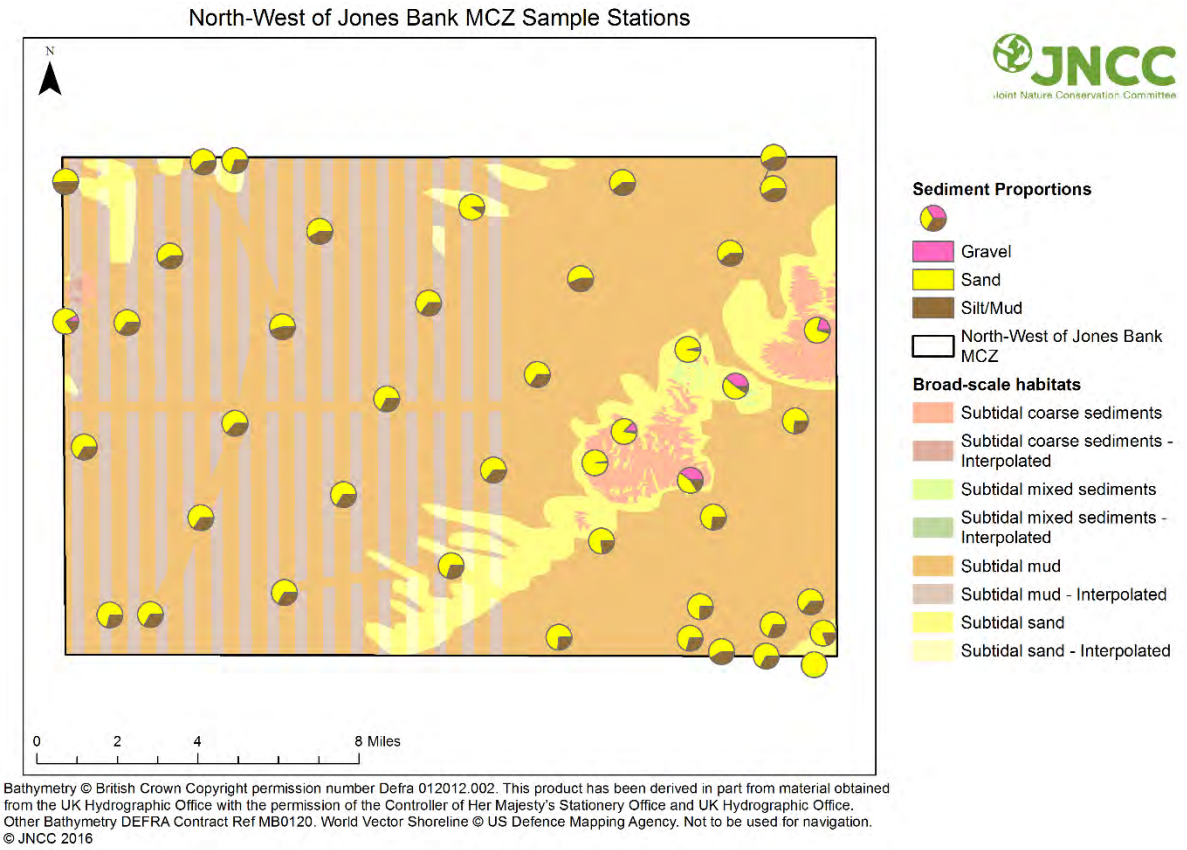

Figure 20. North-West of Jones Bank MCZ sediment composition of grab samples with broad-scale habitat map.

3.3.3 Statistical results for North-West of Jones Bank MCZ

The SIMPROF routine was used to define sample groups with similar species composition Figure 21 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, square root transformed abundances.

Figure 22 shows the three dimensional MDS plot of the same similarities. The stress value of 0.13 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from about 3% to 66%, with two groups identified ('b' & 'f') and four outlying samples ('a', 'c', 'd' & 'e'). The taxa that contributed to the two main groups are shown in Table 18, excluding the outlying groups as they had less than 2 samples in each group.

The taxa which contributed to greater than 1% of the similarity for each of the biological groups based on the results of the SIMPER analysis are shown. The main divisions between samples split group 'a' from the other groups at about 3% similarity whilst group 'b' was separated from the rest of the groups at around 12% similarity. The outlying groups 'c', 'd' and 'e' were separated from group 'f' at under 28% similarity.

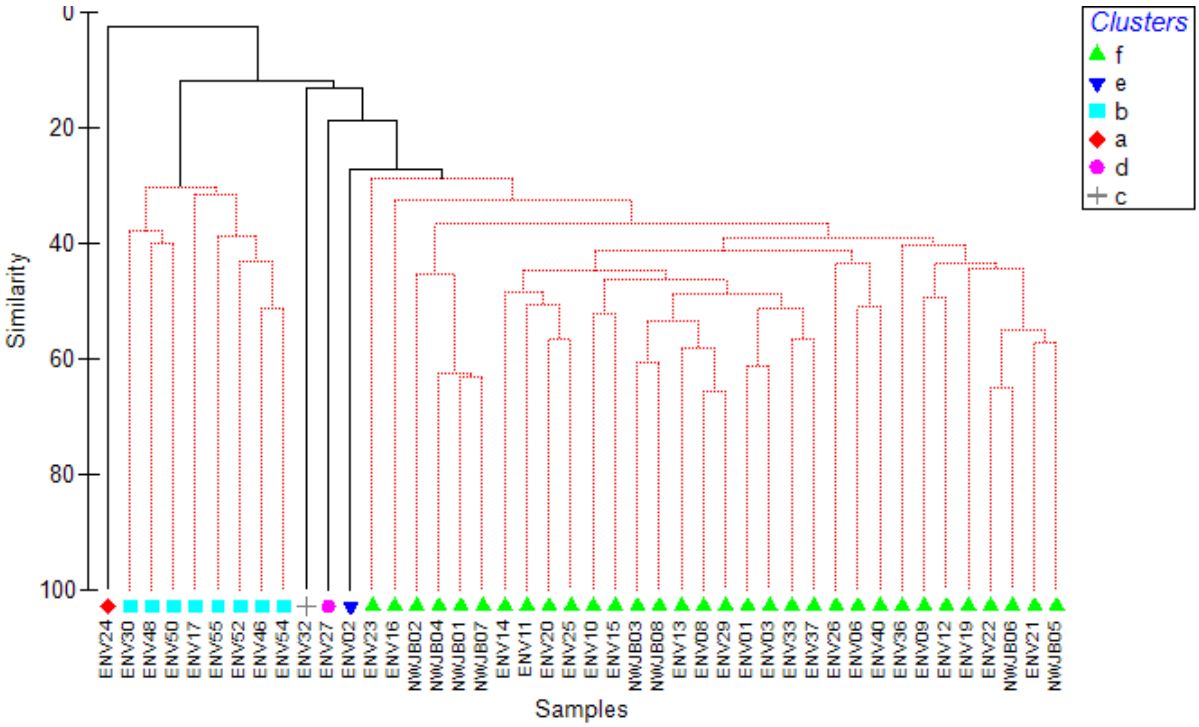

Figure 21. North-West of Jones Bank MCZ dendrogram using similarities from abundance data.

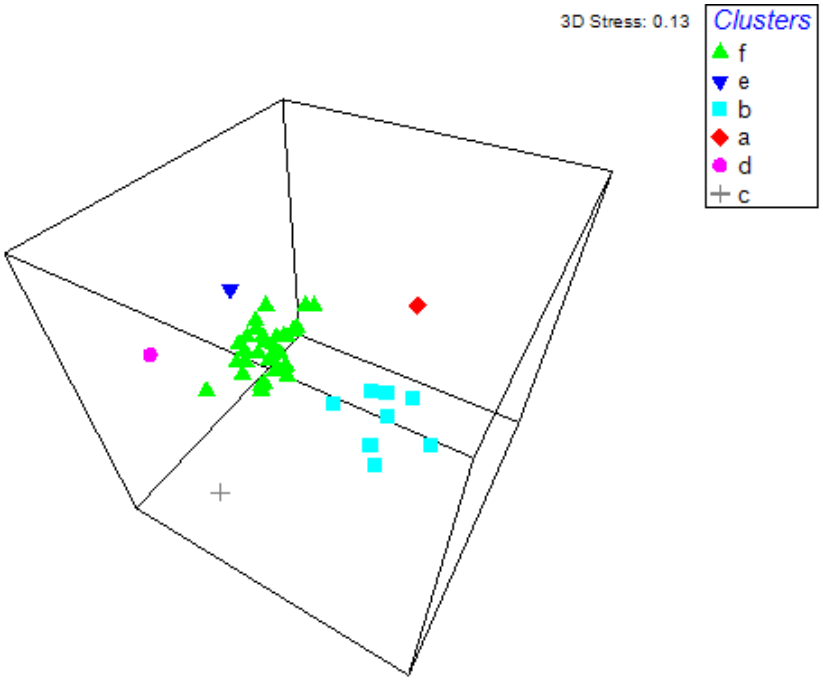

Figure 22. North-West of Jones Bank MCZ MDS plot from abundance data.

3.3.4 Univariate results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 17.

The multivariate analysis for North-West of Jones Bank MCZ resulted in six groups, with the majority of samples clustering into the larger groups ‘b’ and ‘f’, and the remaining groups ‘a’, ‘c’, ‘d’ and ‘e’ all containing only one sample station each.

The univariate analysis results showed that for group ‘b’, the densities of infaunal organisms were low, with the number of taxa recorded (per sample) ranging from 9 to 27 (mean 15.88) and the number of individuals (per sample) ranging from 15 to 125, but with a mean of only 52.25. The group appears to exhibit a variable but moderate level of diversity in terms of Margalef’s index (range from 2.95 to 6.14, mean 3.89) and a moderate level of evenness with Pielou’s index ranging from 0.33 to 0.90 and a mean of 0.77.

For group ‘f’, the densities of infaunal organisms were variable but also low, suggestive of impoverished communities, with the number of taxa recorded (per sample) ranging from 5 to 33 (mean 18.03) and the number of individuals (per sample) ranging from 6 to 212 (mean 55.09). This group also exhibits a variable but moderate level of diversity in terms of Margalef’s index, ranging from 1.82 to 7.69, with a mean of 4.35, and a variable but moderate level of evenness with Pielou’s index ranging from 0.40 to 0.98 and a mean of 0.79.

The three sample stations represented in groups ‘c’, ‘d’, and ‘e’ also show relatively low species densities, with a total no. of taxa per sample of 11 or below and a mean no. of individuals per sample of 20 or below, which suggest impoverished communities. These groups also show a moderate level of diversity, with Margalef’s indices of between 1.24 and 3.46, and a high level of evenness with a Pielou’s index value of above 0.92. The remaining group ‘a’ was characterised by a high number of the serpulid polychaete, *Ditrupa arietina,* and this is reflected in the low number of total taxa per sample (7) but relatively high number of individuals (128), low diversity (Margalef’s index of 1.24) and low level of evenness (Pielou’s index of 0.18).

Table 17. Diversity indices and summary univariate statistics for North-West of Jones Bank MCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
ENV24	a	7	128	1.24	0.18
ENV17	b	13	39	3.28	0.69
ENV30	b	9	15	2.95	0.86
ENV46	b	15	44	3.7	0.8
ENV48	b	12	30	3.23	0.9
ENV50	b	25	80	5.48	0.87
ENV52	b	16	125	3.11	0.33
ENV54	b	27	69	6.14	0.85
ENV55	b	10	16	3.25	0.83
ENV32	c	9	13	3.12	0.92
ENV27	d	7	9	2.73	0.94
ENV02	e	11	18	3.46	0.95
ENV01	f	24	77	5.29	0.88
ENV03	f	17	61	3.89	0.63
ENV06	f	18	36	4.74	0.88
ENV08	f	25	110	5.11	0.57
ENV09	f	16	38	4.12	0.79
ENV10	f	18	30	5	0.9

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
ENV11	f	18	39	4.64	0.86
ENV12	f	14	23	4.15	0.92
ENV13	f	28	74	6.27	0.87
ENV14	f	10	23	2.87	0.78
ENV15	f	11	24	3.15	0.79
ENV16	f	10	13	3.51	0.98
ENV19	f	5	6	2.23	0.97
ENV20	f	10	35	2.53	0.61
ENV21	f	7	27	1.82	0.66
ENV22	f	9	34	2.27	0.71
ENV23	f	12	17	3.88	0.96
ENV25	f	13	29	3.56	0.89
ENV26	f	24	58	5.66	0.82
ENV29	f	29	75	6.49	0.68
ENV33	f	20	47	4.93	0.8
ENV36	f	21	50	5.11	0.74
ENV37	f	19	65	4.31	0.83
ENV40	f	21	46	5.22	0.91
NWJB01	f	30	122	6.04	0.8
NWJB02	f	19	50	4.6	0.82
NWJB03	f	19	49	4.63	0.74
NWJB04	f	33	64	7.69	0.93
NWJB05	f	12	92	2.43	0.4
NWJB06	f	9	32	2.31	0.7
NWJB07	f	27	105	5.59	0.86
NWJB08	f	29	212	5.23	0.54

3.3.5 Summary of characterising species and communities

The largest group which included thirty-two stations clustered together at about 36% similarity to form group ‘f’. The sandy mud characteristic of these stations had an infaunal community dominated by capitellids of the genus *Dasybranchus* along with species such as *Thyasira biplicata, Terebellides stroemii, Abra nitida* and *Nephtys hystericis*.

Eight stations clustered together at about 30% similarity to form group ‘b’. The community was dominated by the amphipod, *Unciola planipes* which contributed to about 43% of the group’s similarity. Other species characteristic of this group included *Notomastus* sp., *Cerianthus lloydii*, Nemertea and *Aponuphis bilineata*.

The outlying group ‘a’ (station ENV24) was characterised by subtidal sand with a high number of the serpulid polychaete, *Ditrupa arietina*. The remaining three outlying groups ‘c’, ‘d’ and ‘e’ (stations ENV32, ENV27 and ENV02) in sandy mud were characterised by relatively low numbers of taxa with variable infaunal communities.

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 18, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated.

Table 18. Characterising species for multivariate groups at North-West of Jones Bank MCZ infaunal, showing those with a contribution of over 1%.

Group 'f' Species/Taxa	**Average Abundance**	**%age contribution**
Dasybranchus	5.42	30.8
Thyasira biplicata	1.82	7.28
Terebellides stroemii	1.56	5.85
Abra nitida	1.64	5.79
Nephtys hystricis	1.41	5.28
Abyssoninoe hibernica	1.36	4.66
Ampelisca spinipes	1.48	4.38
Glycera unicornis	1.2	4.19
Prionospio dubia	1.19	3.93
Praxillella affinis	1.19	3.81
Spiophanes kroyeri	1.08	3.6
Galathowenia oculata	0.94	2.62
Nucula sulcata	0.94	2.52
Nemertea	0.87	2.21
Corbula gibba	0.82	1.58
Magelona minuta	0.92	1.5
Group 'b' Species/Taxa	**Average Abundance**	**%age contribution**
Unciola planipes	5.87	43.55
Notomastus	2.01	10.19
Cerianthus lloydii	1.52	6.82
Nemertea	1.47	5.94
Aponuphis bilineata	1.17	4.84
Dasybranchus	1.46	4.12
Hilbigneris gracilis	1.21	3.46
Aglaophamus agilis	0.94	3.37
Echinocyamus pusillus	1.49	3.11
Polycirrus	0.92	2.97
Spiophanes kroyeri	0.87	2.37

3.3.6 Biotope allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. The taxa which were removed during data processing prior to statistical analysis were reviewed and considered within the biotope allocation process.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 19 with the spatial distribution of the groups and biotopes illustrated in Figure 23 and Figure 24. Table 53 in Appendix 1 presents the multivariate group and the biotope or habitat assigned to each sample with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

Infaunal samples were cross-referenced with epibenthic stations and still images and video footage were utilised to assist in verifying the nature of the seabed and the likely community types to occur in the site.

Group 'b' included a diverse infaunal assemblage with species such as *Unciola planipes, Notomastus* sp, *Cerianthus lloydii* and *Aponuphis bilineata* which could not be assigned to any particular biotope. Therefore, given the diverse range of substrates within this group the assignment of habitats was based on the physical data provided for each station. Stations ENV17, ENV30, ENV46 and ENV55 were assigned **SS.SSa.OSa** (offshore circalittoral sand) and the more gravelly stations ENV46 and ENV52 were assigned **SS.SCS.OCS** (Offshore circalittoral coarse sediment). The stations ENV48, ENV50 and ENV54 have an increased silt content and so have been assigned **SS.SMx.OMx** (Offshore circalittoral mixed sediments).

The sampling stations within group 'f' were characterised by deep, sandy mud with an infaunal community dominated by capitellids along with species such as *Thyasira biplicata, Terebellides stroemii* and *Abra nitida*. The infaunal community of group 'f' does not correlate exactly to existing offshore or circalittoral biotopes and as such has been assigned **SS.SMu.OMu** (Offshore circalittoral mud).

The outlying group 'a' was characterised by high numbers of *Ditrupa arietina* in deep circalittoral sand and as such has been assigned the newly established biotope, **SS.SSa.OSa.Dari** (Deep circalittoral muddy sand with *Ditrupa arietina*).

Three of the stations (ENV32, ENV27 & ENV02) were assigned to groups 'c', 'd' and 'e' respectively but only contained one sample per 'group'. These stations were an impoverished version of group 'f', lacking the presence of capitellids, and as such have been assigned SS.SMu.OMu (offshore circalittoral mud).

In summary Table 20 shows the biotope and habitats found within North-West of Jones Bank MCZ with the characterising species and seabed substrate for each.

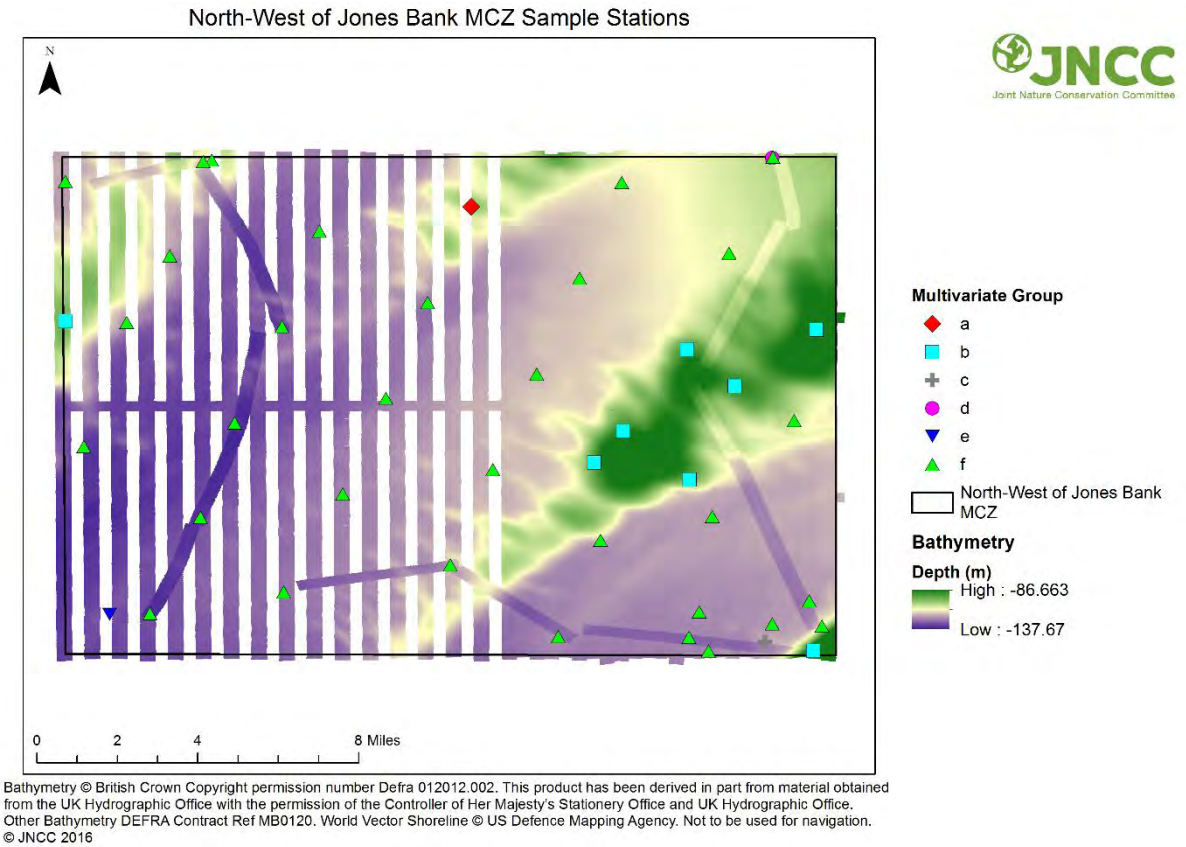

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Figure 23. North-West of Jones Bank MCZ sample stations showing multivariate groups.

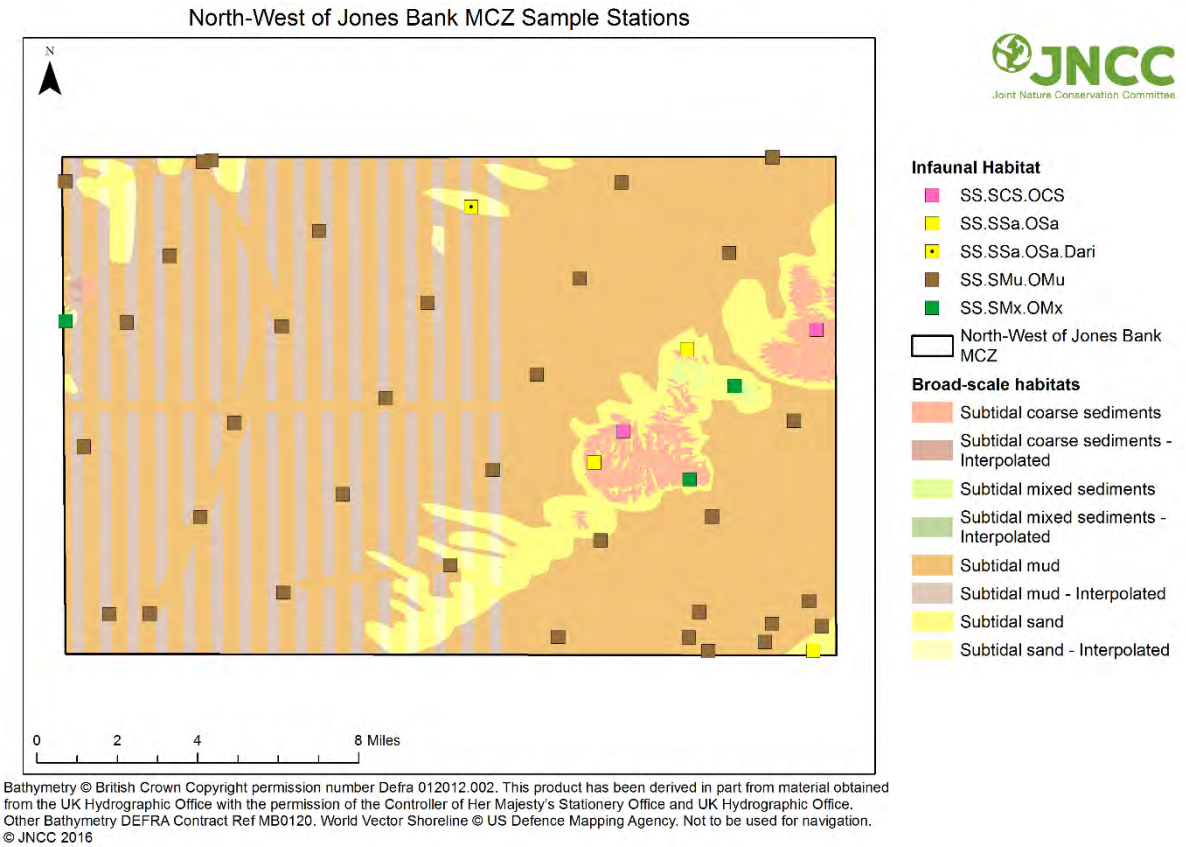

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Figure 24. North-West of Jones Bank MCZ samples showing biotope/habitats.

Table 19. Summary of multivariate statistical groups and associated habitats and biotopes for North-West of Jones Bank MCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	1	SS.SSa.OSa.Dari	Subtidal sand
b	3	SS.SSa.OSa	Subtidal sand
	2	SS.SCS.OCS	Subtidal coarse sediment
	3	SS.SMx.OMx	Subtidal mixed sediments
c	1	SS.SMu.OMu	Subtidal mud
d	1	SS.SMu.OMu	Subtidal mud
e	1	SS.SMu.OMu	Subtidal mud
f	32	SS.SMu.OMu	Subtidal mud

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 20. Summary of habitats/biotopes found within North-West of Jones Bank MCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SSa.OSa.Dari	118	Sand and muddy sand	*Ditrupa arietina*	a
SS.SSa.OSa	104 - 114	Sand and muddy sand	*Unciola planipes,* *Notomastus,* *Cerianthus lloydii,* Nemertea	b
SS.SMx.OMx	113 - 117	Mixed sediments	*Unciola planipes,* Notomastus, *Cerianthus lloydii,* Nemertea	b
SS.SCS.OCS	108 - 111	Coarse sediment	*Unciola planipes,* Notomastus, *Cerianthus lloydii,* Nemertea	b
SS.SMu.OMu	120 - 136	Mud and sandy mud	Polychaetes & bivalves Dasybranchus, *Thyasira biplicata,* *Terebellides stroemii,* *Abra nitida,* *Nephtys hystricis*	c, d, e, f

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.3.7 Epibenthic Analysis

Multivariate analysis was undertaken on the 23 epifaunal video samples (Figure 27) available for North-West of Jones Bank MCZ to explore significant variation between the samples and to aid with the assignment of biotopes.

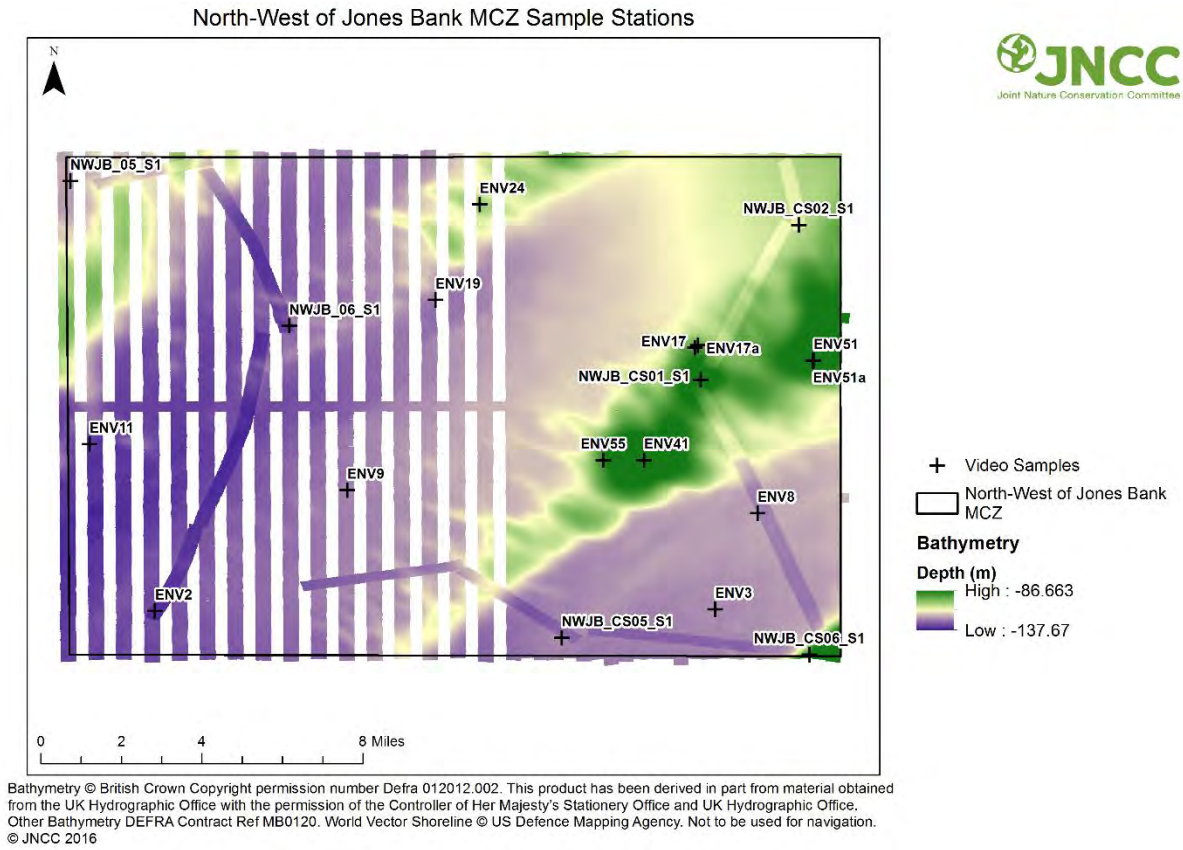

Figure 25. North-West of Jones Bank MCZ video sample stations.

The data for the video samples were provided as SACFOR abundances. As no counts or abundance data were available, the data was changed to presence/absence data and underwent a presence/absence transformation within PRIMER-E.

The classification dendrogram, ordination plot and the average species composition of the resulting classes were used to justify and describe the characteristics of the groups.

The SIMPROF routine was used to define sample groups with similar species composition and Figure 26 displays the results of the cluster analysis. The dendrogram is based on group-averaged Bray-Curtis similarities computed on presence/absence transformed abundances. Figure 27 shows an MDS plot of the same similarities. The stress value of 0.15 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

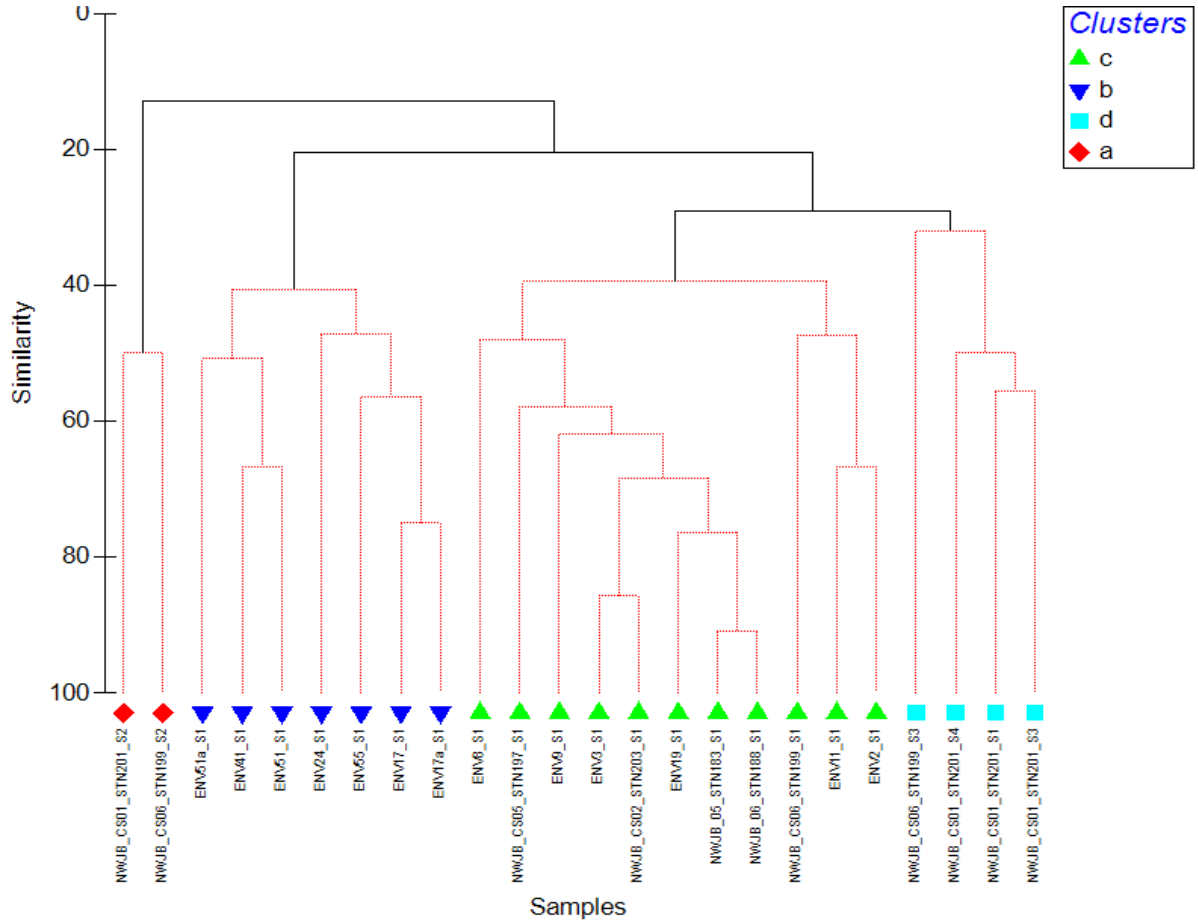

Figure 26. North-West of Jones Bank MCZ dendrogram using similarities from abundance data for epibenthic video data.

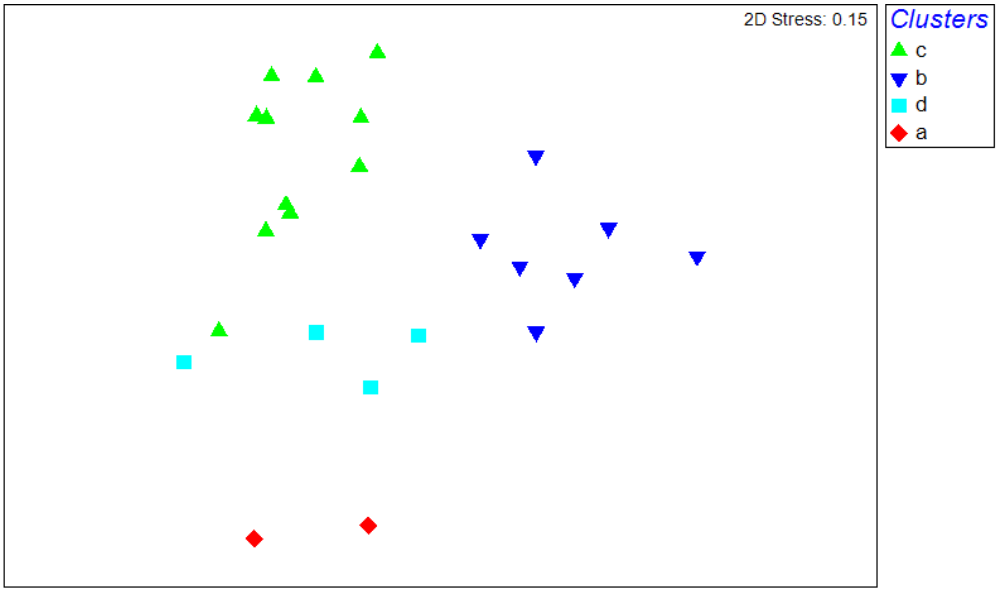

Figure 27. North-West of Jones Bank MCZ MDS plot of presence/absence data from epibenthic video data.

The similarities between samples ranged from 13% to 90%, with four groups identified (‘a’, ‘b’, ‘c’ & ‘d’). The taxa that contributed to the four main groups are shown in Table 21. The taxa which contributed to greater than 1% of the similarity for each of the biological groups

based on the results of the SIMPER analysis are shown. The main divisions between samples split group ‘a’ from the other groups at about 13% similarity whilst group ‘b’ was separated from groups ‘c’ and ‘d’ at around 20% similarity. Group ‘c’ separated from group ‘d’ at just over 30% similarity.

Table 21. Characterising species for multivariate groups at North-West of Jones Bank MCZ epibenthic data.

Group ‘c’ Species/Taxa	**Average Abundance**	**%age contribution**
Caridea	1	38.89
Nephrops norvegicus	0.91	32.42
Anthozoa	0.64	14.77
Glyptocephalus cynoglossus	0.36	3.9
Cerianthus lloydii	0.36	3.85
Group ‘b’ Species/Taxa	**Average Abundance**	**%age contribution**
Pagurus prideaux	1	22.26
Sabella pavonina	1	22.26
Glyptocephalus cynoglossus	0.71	9.67
Aequipecten opercularis	0.57	7.35
Anthozoa	0.57	5.86
Gadidae	0.57	5.86
Asterias rubens	0.57	5.72
Munida rugosa	0.57	5.31
Edwardsia	0.43	3.46
Ditrupa arietina	0.43	2.77
Group ‘d’ Species/Taxa	**Average Abundance**	**%age contribution**
Cerianthus lloydii	1	26.74
Pagurus	0.75	13.37
Anthozoa	0.75	12.38
Ditrupa arietina	0.75	12.38
Pagurus prideaux	1	22.26
Sabella pavonina	1	22.26
Glyptocephalus cynoglossus	0.71	9.67

Summary of characterising species and communities

The two stations within group ‘a’ (NWJB_CS01_S2 & NWJB_CS06_2) were characterised by the tube-dwelling anemone, *Cerianthus lloydii* from the multivariate analysis. These stations were assigned to SS.SMx.CMx (Circalittoral mixed sediments) and SS.SMx.CMx.ClloMx (*Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediments) from the expert interpretation of the video. No infaunal samples coincided with these video stations.

Group ‘b’ was comprised of seven stations which were characterised by species such as *Pagurus prideaux, Sabella pavonina, Aequipecten opercularis*, *Asterias rubens* and unidentified anemones from the multivariate analysis. All of the stations within this group can

be summarised by SS.SMu (Sublittoral cohesive mud and sandy mud communities) from the expert interpretation of the video (Envision 2012). Comparison of these sites with spatially coincident grab samples show there to be a physical mismatch between grabs and video with the grab samples being classified as SS.SSa.OSa (offshore circalittoral sand) or the variation of SS.SSa.OSa.Dari.

Examination of the imagery from the stations where these mismatches occur show the stations to have a surficial layer of fine sediment with an underlying sandier substrate. It is likely the video samples identified the muddier substrate on the surface with the grab sample selecting the sandier underlying sediment which would explain the mismatch. It is noted from the video analysis report (Envision 2012) that "The unattached surface-living serpulid *Ditrupa arietina*, with its distinctive curved shell, was seen on a number of videos and stills and formed very dense aggregations at some sites." which would seem to support the SS.SSa.OSa.Dari biotope.

The largest group 'c' included eleven stations which had an epifaunal community characterised by Caridea., *Nephrops norvegicus*, *Cerianthus lloydii* as well as other unidentified anemones. Almost all the stations can be summarised by the SS.SMu (Sublittoral cohesive mud and sandy mud communities) with one slightly sandier station being classified as SS.SMu.CSaMu (Circalittoral sandy mud) from the expert interpretation of the video (Envision, 2012).

The mud substrate indicated in the video data supported evidence from grab data, which recorded an Offshore circalittoral mud community. The epifaunal community found in group c was most similar to the biotope Seapens and burrowing megafauna in circalittoral fine mud (SS.SMu.CFiMu.SpnMeg), being characterised by *Nephrops norvegicus* and *Cerianthus lloydii*. However, as no sea pens were recorded, this biotope was not considered to be a match and the 'parent' habitat Circalittoral fine mud was assigned. This level 4 habitat differs from that assigned to infauna, but this is not considered an issue as biotopes within Circalittoral fine mud and Offshore circalittoral mud can overlap in range and have been known to occur.

The four stations within group 'd' were characterised by Caridea, *Cerianthus lloydii, Pagurus* sp., *Ditrupa arietina* and unidentified anemones. Three of the four stations within group 'd' were assigned SS.SMu.CSaMu (Circalittoral sandy mud) and one station (NWJB_CS01_S4) was assigned SS.SMx.CMx. No infaunal samples coincide with these video stations.

Figure 28 shows the epibenthic video samples (curved oblong shapes) alongside the infaunal grab sample data with their associated communities.

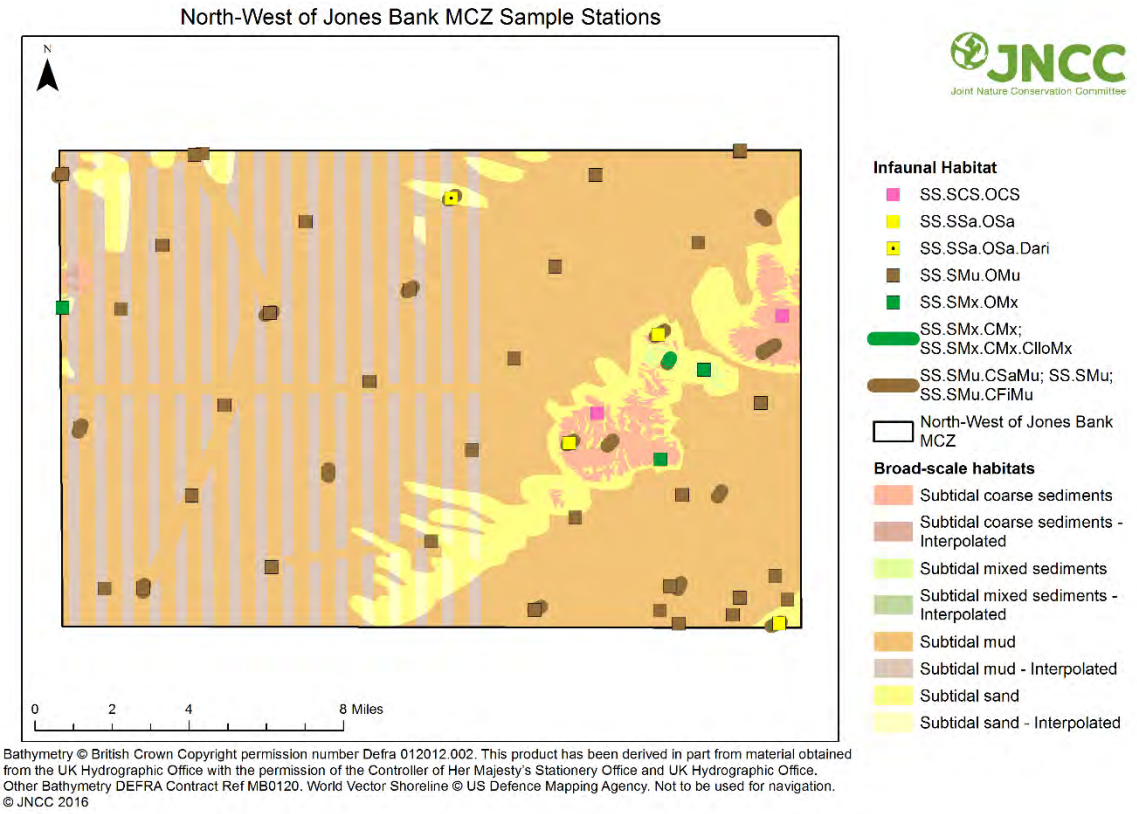

Figure 28. North-West of Jones Bank MCZ video and grab sample stations showing biotopes/habitats on a broad-scale habitat map of the site.

3.3.8 Site Summary

North-West of Jones Bank MCZ is designated in order to protect the following broad-scale habitats: Subtidal coarse sediment; Subtidal sand; Subtidal mixed sediments; Subtidal mud and the habitat feature of conservation importance (FOCI): Sea-pen and burrowing megafauna communities.

The samples analysed were attributed to habitats (SS.SMu.OMu. SS.SCS.OCS, SS.SSa.OSa, SS.SMx.OMx) or the biotope (SS.SSa.OSa.Dari), all of which are part of the broad-scale habitats listed above and therefore support the presence of these features.

The epifaunal community associated with the habitat SS.SMu.OMu was similar to the biotope 'Sea-pen and burrowing megafauna communities', and included the burrowing megafauna such as the Norwegian lobster (*Nephrops norvegicus)* and the lesser cylinder anemone (*Cerianthus lloydii).* Despite no sea pens being recorded, the area still may be considered for the MCZ habitat FOCI Sea-pen and burrowing megafauna communities as seapens can be removed by human activity.

Table 22 provides a summary for the habitats and biotopes present within North-West of Jones Bank MCZ with associated broad-scale habitats and other analysis notes.

Table 22. Summary table for the habitat/biotopes for North-West of Jones Bank MCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.OSa.Dari	Subtidal sand	a	118	*Ditrupa arietina*	High numbers of *Ditrupa arietina*
SS.SSa.OSa SS.SCS.OCS SS.SMx.OMx	Subtidal sand/ Subtidal coarse sediment/ Subtidal mixed sediments	b	104 - 117	*Unciola planipes, Notomastus, Cerianthus lloydii,* Nemertea	Diverse infaunal assemblage; reverted to physical data to assign habitat type
SS.SMu.OMu	Subtidal mud	c - f	120 - 136	Dasybranchus*, Thyasira biplicata, Terebellides stroemii, Abra nitida, Nephtys hystricis*	Infaunal community does not correlate to an existing biotope; best match to SS.SMu.OMu

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.4 South of the Isles of Scilly rMCZ

Located 15km south of the Isles of Scilly (Figure 29), this recommended MCZ was recommended for the protection of subtidal sand and coarse sediment habitats found here.

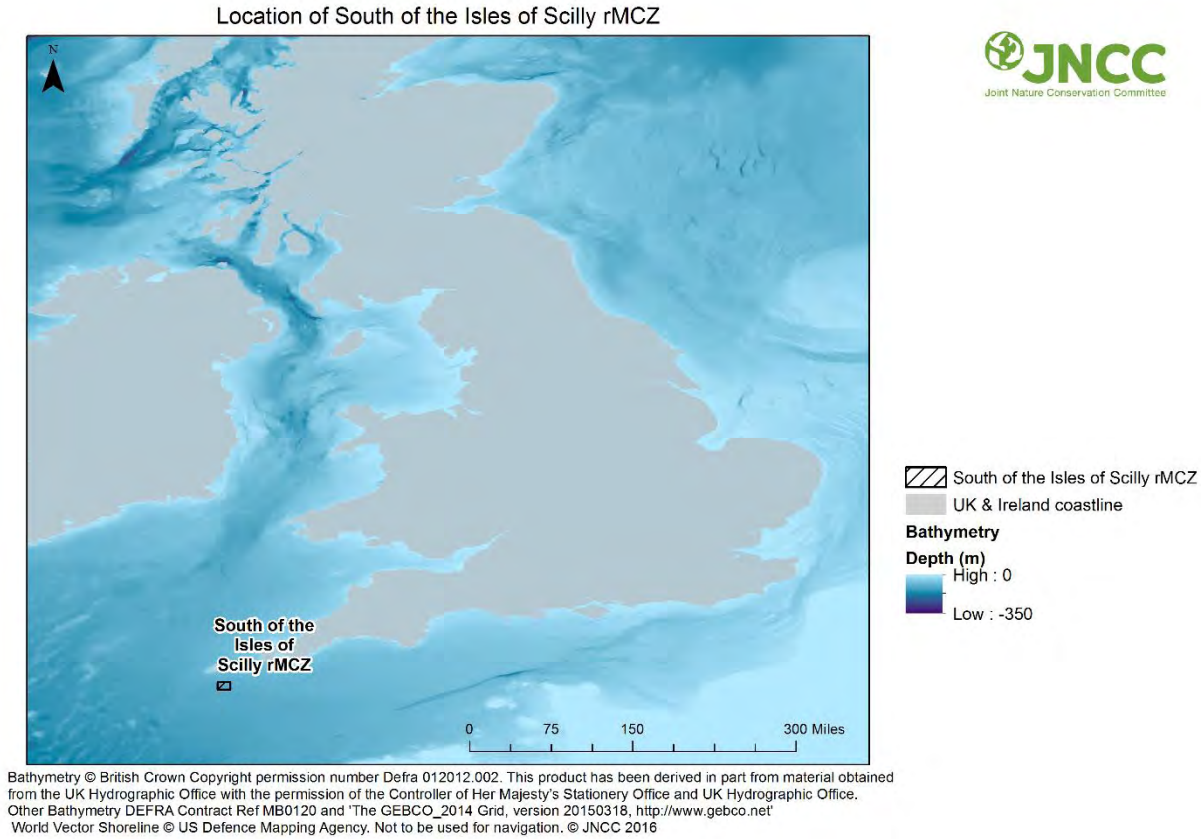

Figure 29. South of the Isles of Scilly rMCZ location.

South of the Isles of Scilly rMCZ was surveyed May 2013 (CEFAS 2013c) with the aim to achieve 100% acoustic coverage from MBES and complete a ground truthing survey using both sediment grabs and seabed imagery. Each of the planned stations were sampled using a 0.1m^2 mini Hamon grab and a camera sledge system comprising a video camera with capability to capture still images. A full account of the survey methods and results can be found in CEFAS 2013c and Defra 2015a.

3.4.1 Site specific data processing and analysis

In total, 421 taxa were recorded from the 54 samples collected (Figure 30). One hundred and twenty-four taxa were removed prior to statistical analysis and are listed in Table 23. These included:

- lifeforms such as eggs, larva and epitokes: early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;
- taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;

- nematodes and copepods: meiofauna are removed due to their small size and high numbers which can have an overriding influence on the analysis as the high numbers dominate any statistical clustering and similarity analyses; and
- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts

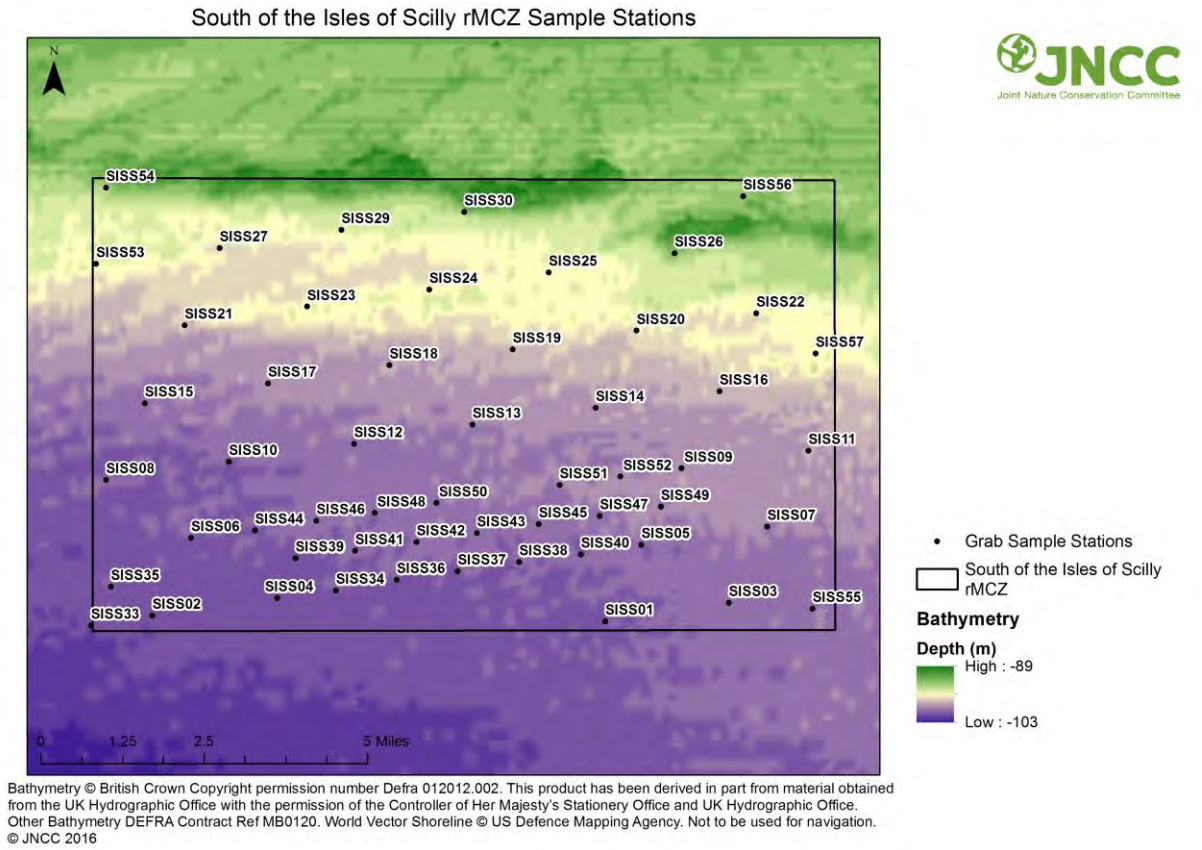

Figure 30. South of the Isles of Scilly rMCZ sample stations.

Table 23. Taxa removed from South of the Isles of Scilly rMCZ data.

Taxa	Reason Removed	Taxa	Reason Removed
Rhodophyta	Presence data only	Mysida	Presence data only
Animalia	Presence data only	Gammaropsis	Uncertain ID
Lagotia viridis	Presence data only	*Astacilla longicornis*	Presence data only
Porifera	Presence data only	Paguridae	Juveniles
Demospongiae	Presence data only	Galathea	Juveniles
Poecilosclerida	Presence data only	Ebalia	Juveniles
Hydrozoa	Presence data only	Eurynome	Juveniles
Filifera	Presence data only	Nudibranchia	Juveniles
Halecium	Presence data only	Goniodoridídae	Juveniles
Nemertesia	Presence data only	Lomanotus	Juveniles
Plumularia setacea	Presence data only	*Atrina fragilis*	Juveniles
Abietinaria abietina	Presence data only	Pectinida	Juveniles
Sertularella	Presence data only	*Aequipecten opercularis*	Juveniles
Sertularia	Presence data only	Anomiidae	Juveniles
Stegopoma	Presence data only	Spisula	Juveniles

Taxa	Reason Removed	Taxa	Reason Removed
Eudendrium	Presence data only	*Gari costulata*	Juveniles
Tubulariidae	Presence data only	Abra	Juveniles
Campanulariidae	Presence data only	Veneridae	Juveniles
Clytia hemisphaerica	Presence data only	Dosinia	Juveniles
Obelia	Presence data only	Pharidae	Juveniles
Obelia longissima	Presence data only	Thracia	Juveniles
Cerianthus lloydii	Juveniles	Bryozoa	Presence data only
Epizoanthus incrustatus	Presence data only	Tubulipora	Presence data only
Epizoanthus	Presence data only	*Alcyonidium diaphanum*	Presence data only
Pedicellina	Presence data only	*Alcyonidium mamillatum*	Presence data only
Sipuncula	Presence data only	*Alcyonidium parasiticum*	Presence data only
Terebellomorpha	Presence data only	*Vesicularia spinosa*	Presence data only
Aphroditidae	Juveniles	*Conopeum reticulum*	Presence data only
Aphrodita aculeata	Juveniles	*Electra pilosa*	Presence data only
Polynoinae	Juveniles	*Amphiblestrum*	Presence data only
Sigalionidae	Presence data only & juveniles	*Amphiblestrum auritum*	Presence data only
Phyllodocidae	Presence data only	*Bicellariella ciliata*	Presence data only
Caryophyllia (Caryophyllia) smithii	Presence data only	Bugula	Presence data only
Glyceridae	Presence data only	*Beania mirabilis*	Presence data only
Goniadidae	Presence data only	*Scrupocellaria scruposa*	Presence data only
Hesionidae	Presence data only	Tricellaria	Presence data only
Syllidae	Presence data only	*Tricellaria inopinata*	Presence data only
Exogone verugera	Epitoke	Cellaria	Presence data only
Nereididae	Juveniles	Escharella	Presence data only
Nephtyidae	Presence data only	*Escharella immersa*	Presence data only
Nephtys	Juveniles	*Escharella variolosa*	Presence data only
Aglaophamus agilis	Presence data only	*Escharella ventricosa*	Presence data only
Eunicida	Presence data only	*Pentapora fascialis*	Presence data only
Marphysa bellii	Juveniles	*Omalosecosa ramulosa*	Presence data only
Lumbrineridae	Presence data only	*Turbicellepora avicularis*	Presence data only
Orbiniidae	Presence data only	Abra	Presence data only
Spionidae	Presence data only	Amphiuridae	Presence data & juveniles
Prionospio	Juveniles	Ophiuridae	Presence data & juveniles
Spiophanes	Presence data only	Echinidea	Juveniles
Cirratulidae	Presence data only	Holothuriidae	Juveniles
Chaetozone	Presence data & juveniles	Cucumariidae	Juveniles
Mesochaetopterus	Presence data only	Cucumariidae	Presence data only
Capitellidae	Presence data only	Synaptidae	Juveniles
Maldanidae	Presence data only	Ascidiacea	Juveniles
Praxillella affinis	Presence data only	Perciformes	Juveniles
Oweniidae	Presence data only	*Solea solea*	Presence data only
Terebellida	Presence data only	Didemnidae	Presence data only
Ampharetidae	Presence data & juveniles	Leptosynapta	Presence data only
Arenicolidae	Presence data only	Chone	Uncertain ID

Taxa	Reason Removed	Taxa	Reason Removed
Microclymene tricirrata	Presence data only	Decapoda	Presence data & larva/juveniles
Sabellidae	Presence data & juveniles	Copepoda	Overriding influence
Serpulidae	Juveniles	Nematoda	Overriding influence

3.4.2 Summary of physical habitats

The spatial distribution of sediment types is illustrated in Figure 31 which highlights sediment composition (% sand, gravel and mud) overlayed on the broad-scale habitat map generated from the 2013 surbey data. A summary of key parameters of particle size analysis data is provided in Table 54 in Appendix 1.

The majority of the samples (29) show the seabed to consist of coarse sediment types with very little silt content. There are a number of sites (11) which are classified as sandy sediments with the remaining samples (14) being a mixed substrate type.

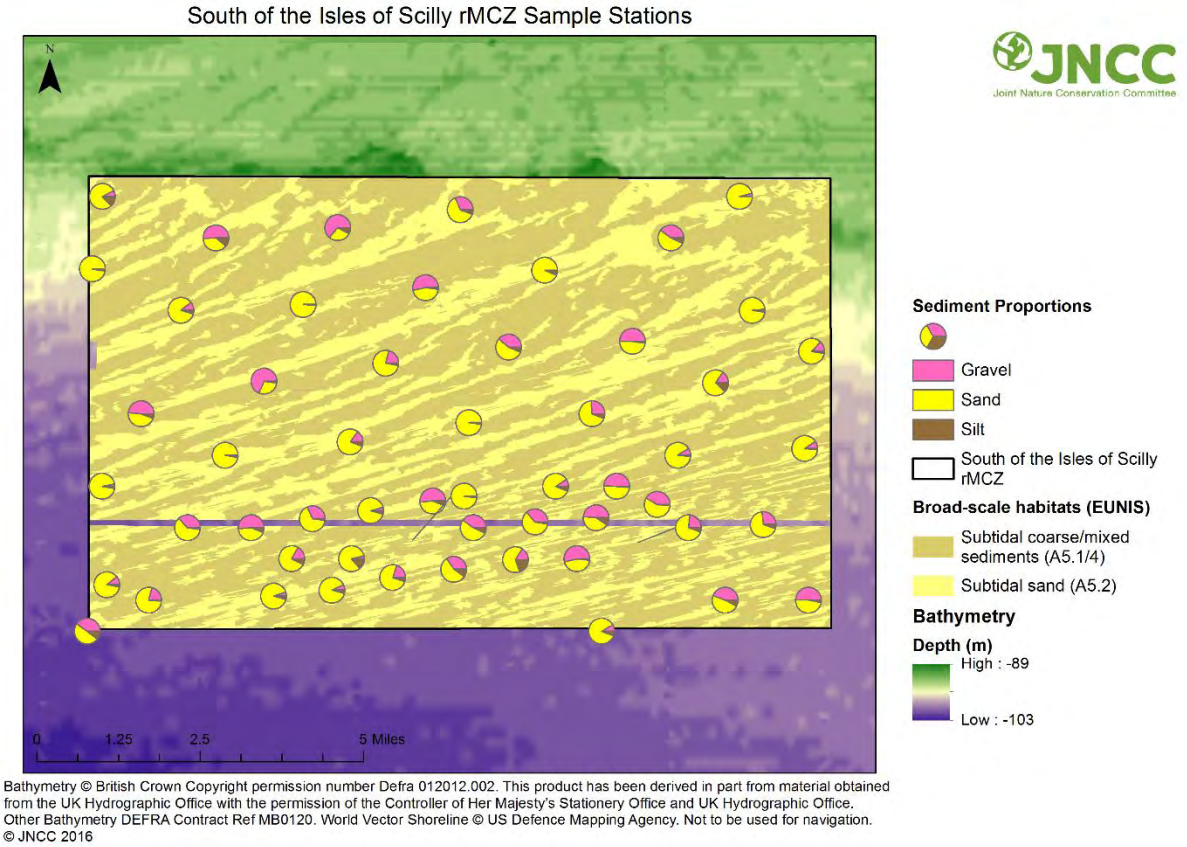

Figure 31. South of the Isles of Scilly rMCZ sediment composition of grab samples with borad-scale habitat map.

3.4.3 Statistical results for South of the Isles of Scilly rMCZ

The SIMPROF routine was used to define sample groups with similar species composition and Figure 32 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, square root transformed abundances.

Figure 33 shows the three dimensional MDS plot using group average Bray-Curtis similarities from square root transformed abundance data. The stress value of 0.16 gives

confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from 5% to 56%, with three groups identified (‘c’, ‘d’ & ‘i’) and six outlying samples (‘a’, b’, ‘e’, ‘f’, ‘g’ & ‘h’). The taxa which contributed greater than 1% of the similarity for the three groups are shown in Table 25, excluding the outlying groups as they had less than two samples in each group. .

The main divisions between samples split group ‘c’ from groups ‘d’ to ‘i’ at about 15% similarity whilst group ‘d’ was separated from groups ‘e’ to ‘i’ at around 17% similarity. Group ‘i’ consists of the amalgamation of two sub-groups at a similarity level of about 28%.

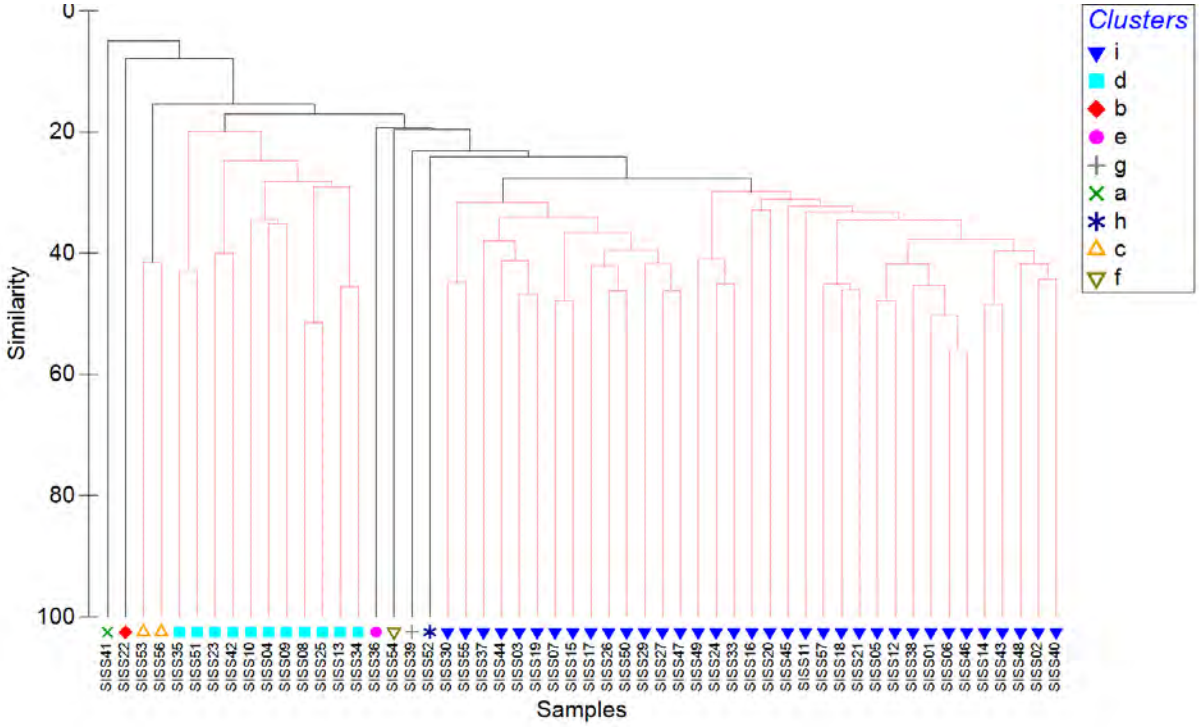

Figure 32. South of the Isles of Scilly rMCZ Dendrogram using similarities from abundance data.

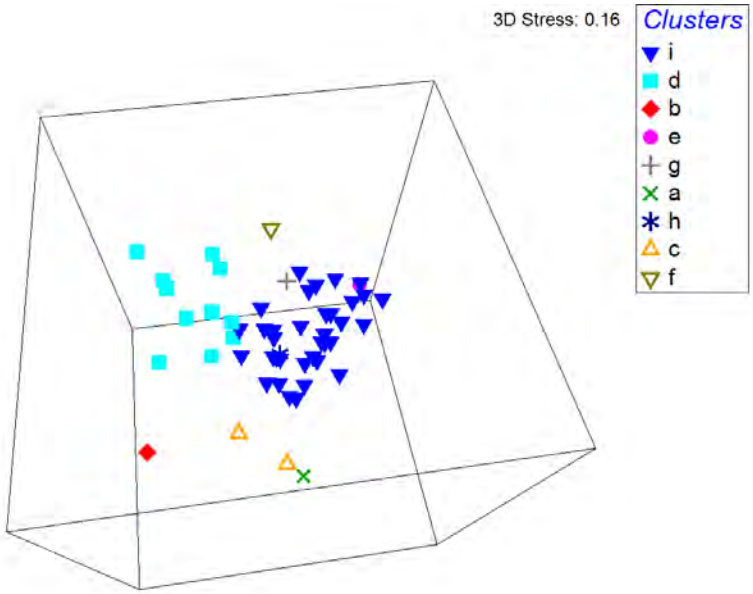

Figure 33. South of the Isles of Scilly rMCZ MDS from abundance data.

3.4.4 Univariate analysis

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 24.

The multivariate analysis for South of the Isles of Scilly rMCZ resulted in nine groups, with the majority of samples clustering into the larger groups 'd' and 'i', two samples in group 'c' and the remaining groups 'a', 'b', 'e', 'f', 'g' and 'h' all containing only one sample station each.

The univariate analysis results showed that for group 'd' the densities of infaunal organisms were very low, with the number of taxa recorded (per sample) ranging from 8 to 18 (mean 13.40) and the number of individuals (per sample) ranging from only 10 to 32, and a mean of 22.10. The group appears to exhibit a low to moderate level of diversity in terms of Margalef's index (range from 2.82 to 5.05, mean 4.01) and a high level of evenness with Pielou's index ranging from 0.85 to 0.97 and a mean of 0.92.

For group 'i', the densities of infaunal organisms were marginally higher, but still suggestive of impoverished communities, with the number of taxa recorded (per sample) ranging from 18 to 57 (mean 34.49) and the number of individuals (per sample) ranging from 23 to 183 (mean 80.80).This group exhibits a moderate to high level of diversity in terms of Margalef's index, ranging from 4.82 to 10.75, with a mean of 7.71, and a moderate to high level of evenness with Pielou's index ranging from 0.76 to 0.97 and a mean of 0.89.

The groups 'b', 'c', 'e', 'f', 'g' and 'h' also showed low species densities similar to groups 'd' and 'i', with the total no. of taxa per sample ranging from 13 to 26, and the no. of individuals per sample ranging from 14 to 55. These groups also show a moderate level of diversity, with Margalef's indices of between 4.08 and 6.35, and a high level of evenness with a Pielou's index value of above 0.85. The remaining group 'a' was a very impoverished station with only three individuals in three taxa found in the sample, and a correspondingly low

diversity (Margalef's index of 1.82) and high level of evenness (Pielou's index of 1.00) indicating only small variations in biological composition.

Table 24. Diversity indices and summary univariate statistics for South of the Isles of Scilly rMCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
SISS41	a	3	3	1.82	1
SISS22	b	13	14	4.55	0.99
SISS53	c	23	39	6.01	0.94
SISS56	c	24	39	6.28	0.94
SISS04	d	20	42	5.08	0.92
SISS08	d	15	25	4.35	0.92
SISS09	d	16	29	4.45	0.89
SISS10	d	16	24	4.72	0.9
SISS13	d	13	21	3.94	0.93
SISS23	d	8	10	3.04	0.95
SISS25	d	13	18	4.15	0.97
SISS34	d	16	32	4.33	0.91
SISS35	d	18	29	5.05	0.9
SISS42	d	9	17	2.82	0.85
SISS51	d	10	16	3.25	0.95
SISS36	e	15	31	4.08	0.92
SISS54	f	15	20	4.67	0.95
SISS39	g	26	55	6.24	0.85
SISS52	h	23	32	6.35	0.97
SISS01	i	28	51	6.87	0.95
SISS02	i	28	51	6.87	0.91
SISS03	i	35	82	7.72	0.93
SISS05	i	33	52	8.1	0.93
SISS06	i	25	49	6.17	0.94
SISS07	i	31	59	7.36	0.85
SISS11	i	39	98	8.29	0.88
SISS12	i	44	72	10.05	0.95
SISS14	i	33	69	7.56	0.92
SISS15	i	43	75	9.73	0.9
SISS16	i	23	32	6.35	0.93
SISS17	i	51	138	10.15	0.85
SISS18	i	29	109	5.97	0.79
SISS19	i	32	63	7.48	0.92
SISS20	i	18	23	5.42	0.97
SISS21	i	30	78	6.66	0.85
SISS24	i	26	51	6.36	0.87
SISS26	i	57	183	10.75	0.76
SISS27	i	45	170	8.57	0.8
SISS29	i	40	110	8.3	0.78
SISS30	i	30	59	7.11	0.9

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
SISS33	i	27	91	5.76	0.83
SISS37	i	31	50	7.67	0.93
SISS38	i	23	51	5.6	0.86
SISS40	i	45	128	9.07	0.92
SISS43	i	51	121	10.43	0.91
SISS44	i	28	72	6.31	0.89
SISS45	i	41	63	9.65	0.95
SISS46	i	30	67	6.9	0.89
SISS47	i	46	145	9.04	0.82
SISS48	i	45	96	9.64	0.93
SISS49	i	18	34	4.82	0.91
SISS50	i	39	119	7.95	0.82
SISS55	i	24	37	6.37	0.92
SISS57	i	39	80	8.67	0.9

3.4.5 Summary of characterising species and communities

Groups ‘a’ and ‘b’ were comprised of just a single station in each group (SISS41 and SISS22 respectively) characterised by deep slightly gravelly sand. Group ‘a’ was an impoverished station with only one individual of each of the species *Aphelochaeta* sp. *Capitella* sp. and *Mediomastus fragilis* present in the sample. Group ‘b’ was characterised by species such as *Glycera unicornis, Ophelia borealis*, *Bathyporeia elegans* and *Goniadella gracilis*.

The two stations of group ‘c’ (SISS53 and SISS56) were characterised by slightly gravelly sand with *Moerella pygmaea*, Nemertea, *Pisione remota* and *Protodorvillea kefersteini*.

Group ‘d’ included eleven stations in deep, slightly gravelly sand characterised by species such as *Abra prismatica, Ophelia borealis*, *Aponuphis bilineata* and *Echinocyamus pusillus*.

Outlying groups ‘e’, ‘g’ and ‘h’ (stations SISS36, SISS39 & SISS52 respectively) were characterised by gravelly sand with an increase in silt content at group ‘f’ (station SISS54). These groups were comprised of somewhat variable infaunal communities between stations with species such as *Lumbrineris cingulata*, Nemertea and *Glycera lapidum*.

The largest group ‘i’ which included the amalgamation of two groups of stations with relatively similar infauna were characterised by *Lumbrineris cingulata, Aponuphis bilineata, Echinocyamus pusillus, Cerianthus lloydii, Medoimastus fragilis* and *Glycera lapidum*. All stations in this group were in deep, gravelly sand or muddy sandy gravel.

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 25, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated.

Table 25. Characterising species for multivariate groups at South of the Isles of Scilly rMCZ infauna, showing those with a contribution of over 1%.

Group 'i' Species/Taxa	**Average Abundance**	**%age contribution**
Lumbrineris cingulata	3	13.26
Aponuphis bilineata	2.1	8.45
Notomastus	1.95	8.12
Echinocyamus pusillus	1.92	7.74
Cerianthus lloydii	1.74	7.14
Mediomastus fragilis	1.87	5.71
Glycera lapidum	1.33	5.38
Nemertea	1.29	4.89
Goniadella gracilis	1.06	2.71
Glycinde nordmanni	0.83	2.54
Aonides paucibranchiata	0.93	2.26
Edwardsiidae	0.83	1.97
Spiophanes kroyeri	0.92	1.91
Ampelisca spinipes	0.71	1.56
Cirrophorus branchiatus	0.62	1.44
Abra prismatica	0.69	1.43
Sabellaria spinulosa	0.94	1.26
Lanice conchilega	0.65	1.24
Actiniaria	0.59	1.06
Group 'd' Species/Taxa	**Average Abundance**	**%age contribution**
Abra prismatica	3.62	31.72
Ophelia borealis	2.12	12.54
Aponuphis bilineata	1.93	9.09
Echinocyamus pusillus	2.11	7.73
Spiophanes bombyx	1.17	6.09
Scoloplos (Scoloplos) armiger	1.16	5.75
Marphysa bellii	1.14	4.59
Cerianthus lloydii	1.26	3.61
Lumbrineris cingulata	1.01	2.68
Eurydice spinigera	0.86	2.36
Mediomastus fragilis	0.69	1.4
Nemertea	0.68	1.34
Phoronis	0.66	1.31
Group 'c' Species/Taxa	**Average Abundance**	**%age contribution**
Moerella pygmaea	3.24	17.3
Nemertea	2.81	14.98
Pisione remota	2.96	12.23
Protodorvillea kefersteini	2.55	12.23
Prionospio cirrifera	1.62	8.65
Mediomastus fragilis	1.62	8.65
Maerella tenuimana	1.62	8.65
Bivalvia	1.62	8.65

3.4.6 Biotope Allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. The taxa which were removed during data processing prior to statistical analysis were reviewed and considered within the biotope allocation process.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 26, with the spatial distribution of the groups and biotopes illustrated in Figure 34 and Figure 35. Table 55 in Appendix 1 presents the multivariate group and the biotope or habitat assigned to each sample with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

The two sampling stations within group ‘c’ were characterised by *Moerella pygmaea*, Nemertea, *Pisione remota* and *Protodorvillea kefersteini*. These species are characteristic of the infralittoral coarse biotope SS.SCS.ICS.MoeVen. However, as the stations within group ‘c’ were located at a depth of 98m, an impoverished version of the similar deeper water biotope **SS.SCS.CCS.MedLumVen** (*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel) has been suggested, albeit with somewhat reduced numbers of *Mediomastus fragilis*.

Group ‘d’ was composed of deep, slightly gravelly sand characterised by *Abra prismatica, Ophelia borealis* and *Echinocyamus pusillus*. These species are often recorded with circalittoral fine sand communities; therefore, group ‘d’ has been assigned **SS.SSa.CFiSa.EpusOboApri** (*Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica* in circalittoral fine sand).

Four of the stations (SISS36, SISS54, SISS39 & SISS52) were assigned to groups ‘e’, ‘f’, ‘g’ and ‘h’ respectively but only contained one sample per ‘group’. These stations showed similarity of substrate to stations within group ‘i’ with reduced numbers of characterising species and as such have been assigned biotopes allocated to group ‘i’.

Stations within group ‘i’ were distinguished by different proportions of frequently recorded taxa such as *Lumbrineris cingulata*, *Aponuphis bilineata, Echinocyamus pusillus, Medoimastus fragilis* and *Glycera lapidum.* These species are representative of both the circalittoral coarse sediment biotope SS.SCS.CCS.MedLumVen (*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel) and the offshore circalittoral mixed sediment habitat, SS.SMx.OMx. The depth of the stations within group ‘i’ ranged from 98m to 107m, with either gravelly sand or muddy sandy gravel, therefore, **SS.SCS.CCS.MedLumVen** or **SS.SMx.OMx** was assigned based on the substrate recorded for each station.

In summary Table 27 shows the biotope and habitats found within South of the Isles of Scilly rMCZ with the characterising species and seabed substrate for each.

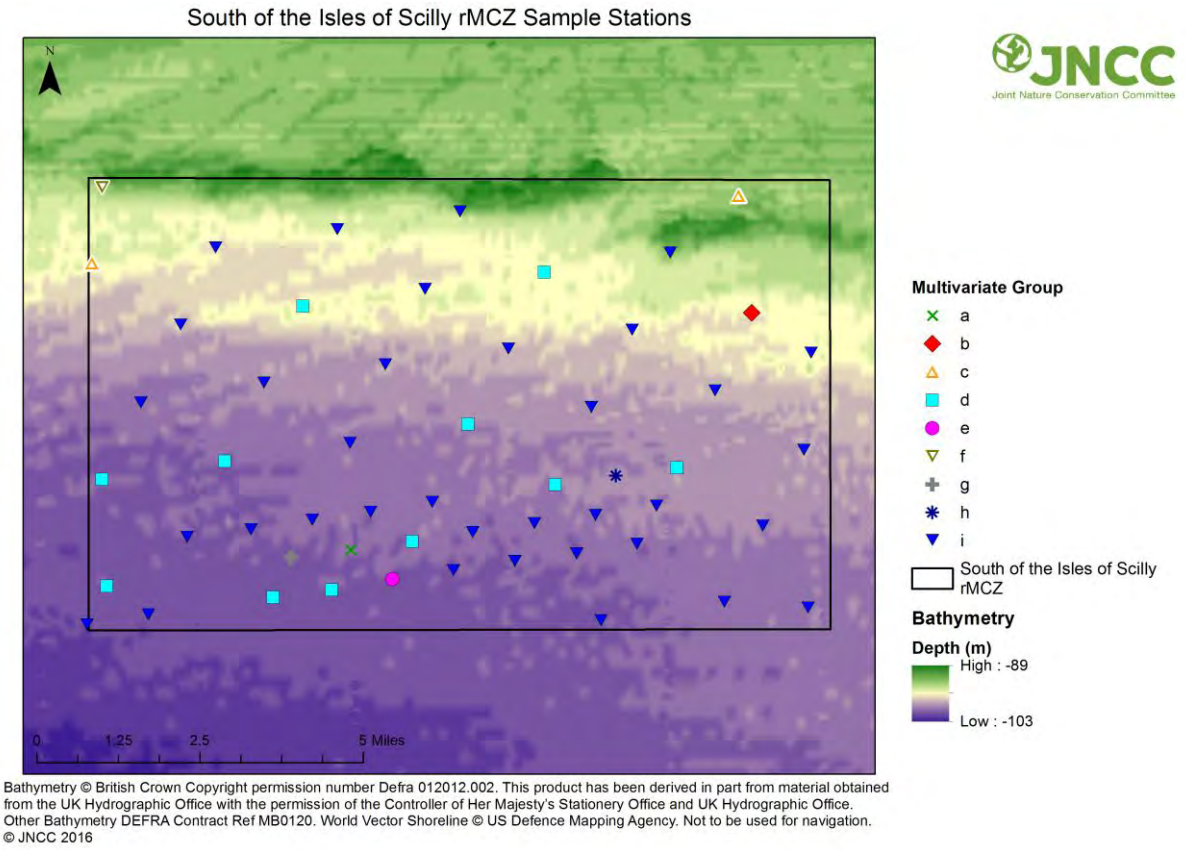

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Figure 34. South of the Isles of Scilly rMCZ sample stations showing multivariate groups.

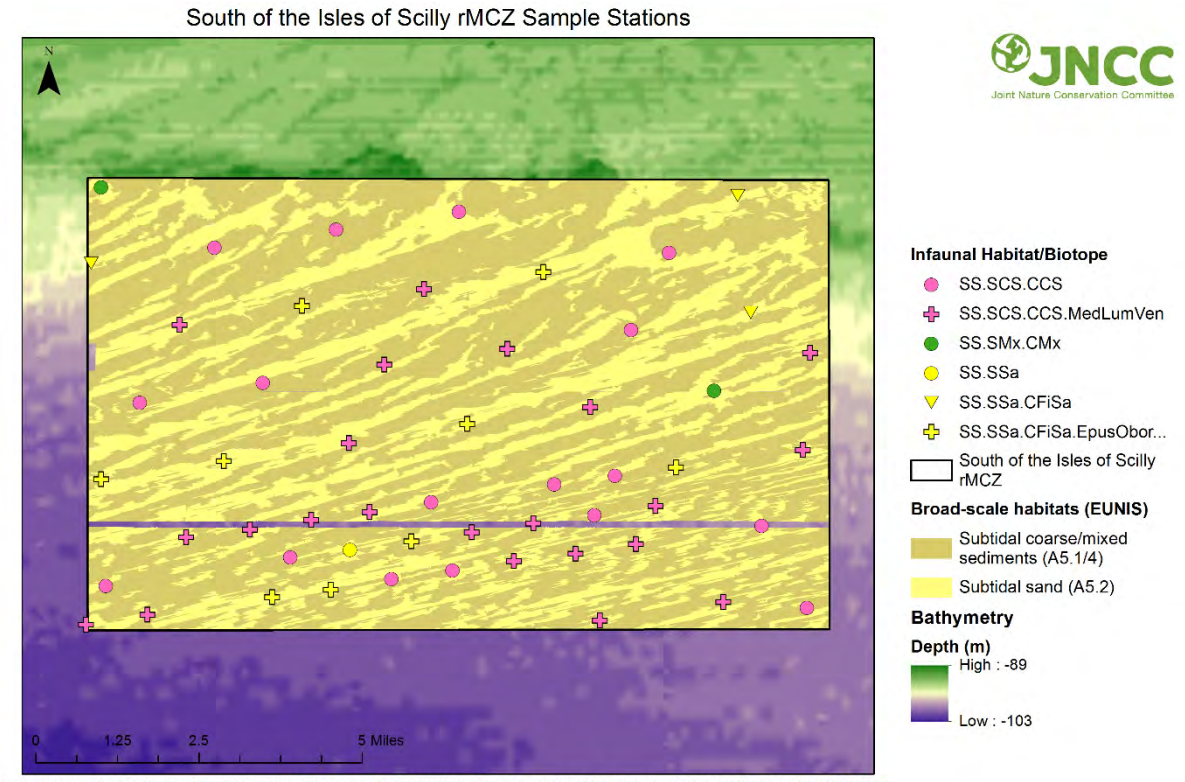

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Figure 35. South of the Isles of Scilly rMCZ sample stations showing biotope/habitats.

Table 26. Summary of multivariate statistical groups and associated habitats and biotopes from the South of the Isles of Scilly rMCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	1	SS.SSa.OSa	Subtidal sand
b	1	SS.SSa.OSa	Subtidal sand
c	2	SS.SCS.CCS.MedLumVen	Subtidal sand
d	11	SS.SSa.CFiSa.EpusOborApri	Subtidal sand Subtidal coarse sediment
e	1	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment
f	1	SS.SMx.OMx	Subtidal mixed sediments
g	1	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment
h	1	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment
i	22	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment
	13	SS.SMx.OMx.PoVen	Subtidal mixed sediments

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 27. Summary of habitats/biotopes found within South of the Isles of Scilly rMCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SSa.OSa	101 - 103	Sand and muddy sand	Aphelochaeta, Capitella, *Mediomastus fragilis* *Glycera unicornis*, *Bathyporeia elegans*, *Cheirocratus*	a, b
SS.SCS.CCS.MedLumVen	98 - 107	Coarse sediment	*Aponuphis bilineata*, *Cerianthus lloydii*, *Cirrophorus branchiatus*, *Echinocyamus pusillus*, *Euclymene lombricoides*, *Eurydice spinigera*, *Glycera lapidum*, *Goniadella gracilis*, *Lumbrineris cingulata*, Magelona, *Mediomastus fragilis*, *Moerella pygmaea*, Nemertea, Notomastus, *Ophelia borealis*, *Pisione remota*, *Protodorvillea kefersteini*, *Terebellides stroemii*,	c,e,g,h,i
SS.SSa.CFiSa.EpusOborApri	100 - 107	Sand and muddy sand/ coarse sediment	*Abra prismatica*, *Ophelia borealis*, *Aponuphis bilineata*, *Echinocyamus pusillus*	d
SS.SMx.OMx	99	Mixed sediments	*Lumbrineris cingulata*, *Glycera alba*, *Eurydice pulchra*,	f

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SMx.OMx.PoVen	98 - 104	Mixed sediments	*Lumbrineris cingulata, Aponuphis bilineata,* Notomastus*, Echinocyamus pusillus, Cerianthus lloydii, Mediomastus fragilis*	i

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.4.7 Site Summary

South of the Isles of Scilly is recommended for MCZ designation due to the broad-scale habitats Subtidal sand and Subtidal coarse sediment found within the site. The majority of samples analysed in this study (74%) were associated with these habitats. Table 28 provides a summary for the habitats and biotopes present within South of the Isles of Scilly rMCZ with associated broad-scale habitats and other analysis notes.

Table 28. Summary table for the habitat/biotopes for South of the Isles of Scilly rMCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.OSa	Subtidal sand	a, b	101-103	Aphelochaeta*,* Capitella*, Mediomastus fragilis Glycera unicornis, Bathyporeia elegans, Cheirocratus*	Impoverished communities; reverted to physical data to assign habitat type
SS.SCS.CCS. MedLumVen	Subtidal coarse sediment	c	98	*Moerella pygmaea,* Nemertea*, Pisione Remota, Protodorvillea kefersteini*	Characteristic species of SS.SCS.ICS.MoeVen; however, an impoverished version of similar deeper water biotope SS.SCS.CCS.MedLum Ven assigned
SS.SS.CFiSa. EpusOborApri	Subtidal sand	d	100 - 107	*Abra prismatica, Ophelia borealis, Echinocyamus pusillus*	Species and physical data best match to SS.SSa.CFiSa.EpusObor Apri

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SCS.CCS. MedLumVen	Subtidal coarse sediment	e, g, h	98 - 107	*Aponuphis bilineata, Cerianthus lloydii*, *Cirrophorus branchiatus*, *Echinocyamus pusillus, Euclymene lombricoides, Eurydice spinigera, Glycera lapidum, Goniadella gracilis, Lumbrineris cingulata,* Magelona, *Mediomastus fragilis, Moerella pygmaea*,	Impoverished versions of biotope assigned to group 'i'
SS.SMx.OMx	Subtidal mixed sediments	f	99	*Lumbrineris cingulata, Glycera alba, Eurydice pulchra*	Impoverished version of SS.SMx.OMx.PoVen; reverted to higher level habitat
SS.SCS.CCS. MedLumVen SS.SMx.OMx.PoVen	Subtidal coarse sediment/Sub-tidal mixed sediments	i	98 - 107	*Lumbrineris cingulata, Aponuphis bilineata,* Notomastus *Echinocyamus pusillus, Cerianthus lloydii, Mediomastus fragilis*	Biotopes assigned based on characterising species and physical data for each station within this group; either SS.SCS.CCS.MedLumVen or SS.SMx.OMx.PoVen according to substrate type

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.5 Farnes East MCZ

Farnes East MCZ is located 11km off the Northumberland coast within close proximity to the Farnes Islands (Figure 36). The sea bed is predominantly composed of the broad-scale habitats Subtidal coarse sediment, Subtidal sand and Subtidal mixed sediments, with small patches of Moderate energy circalittoral rock.

A glacial trench, which forms the deepest part of the MCZ, contains the broad-scale habitat Subtidal mud. This is an important substrate and ideal for delicate blonde and red sea pens and burrowing animals like the Norway lobster (*Nephrops norvegicus*) and the ocean quahog (*Arctica islandica*).

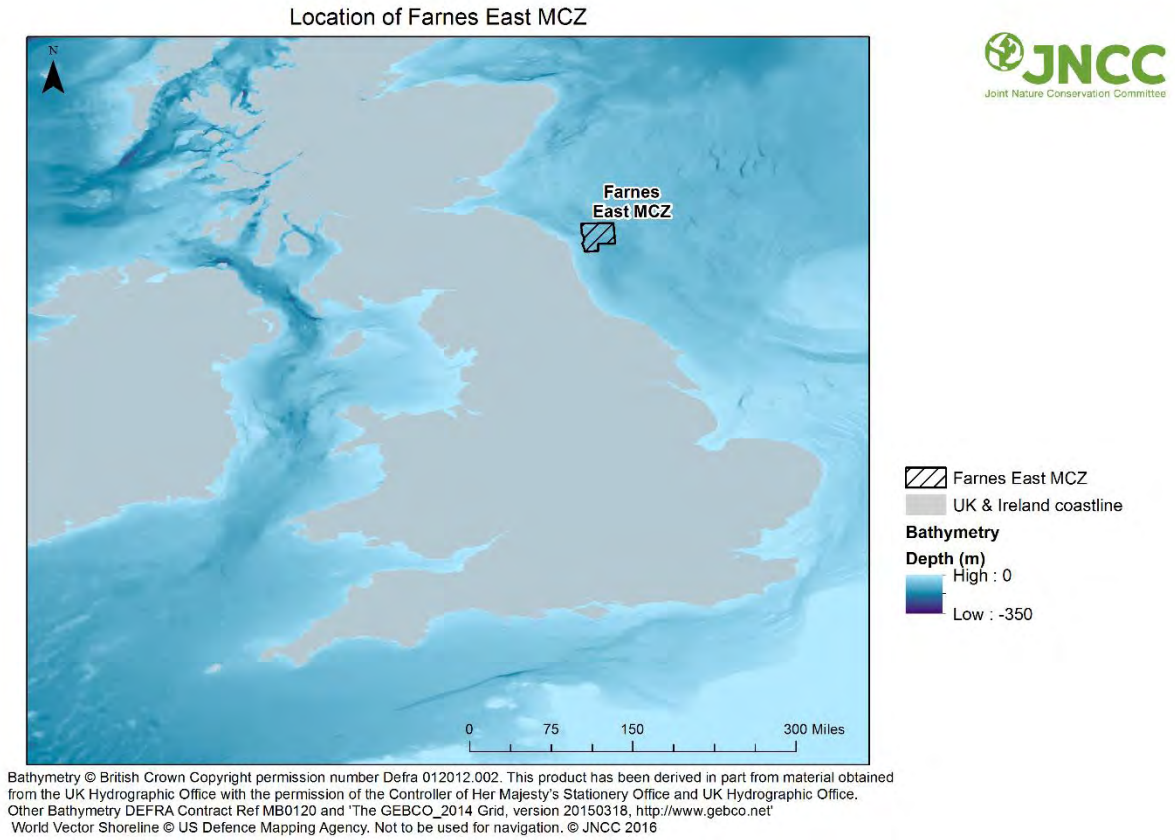

Figure 36. Farnes East MCZ location.

The site is designed to protect broad-scale habitats:'Moderate energy circalittoral rock', 'Subtidal coarse sediment', 'Subtidal sand', 'Subtidal mud' and 'Subtidal mixed sediments'. Other designated features are the habitat feature of conservation importance (FOCI) 'Sea-pen and burrowing megafauna communities' and the species FOCI 'Ocean quahog (*Arctica islandica*)' (JNCC 2015a).

The Farnes East MCZ survey was undertaken in March 2012 (CEFAS 2012a) with sedimentary habitats being sampled by grab (0.1m^2 mini Hamon grab) and underwater camera sled (video and still images). Civil Hydrographic Programme bathymetric data existed for some of the site with full coverage MBES bathymetry and backscatter data acquired for most of the remainder of the site during February/March 2012. A return survey to ground-truth areas of potential habitat or features of conservation interest was carried out during March 2014 (CEFAS 2014a). A full account of the survey methods and results can be found in CEFAS (2012a, 2014a) and Defra (2015b).

3.5.1 Site specific data processing and analysis

In total, 271 taxa were recorded from the 103 samples collected (Figure 37). One hundred and twenty-two taxa were removed prior to statistical analysis and are listed in Table 29.

These included:

- lifeforms such as eggs, larva and epitokes: early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;
- taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;
- species such as fish: mobile species are removed as they do not form part of the infaunal community and are not permanent members of the community structure;
- nematodes and copepods: meiofauna are removed due to their small size and high numbers which can have an overriding influence on the analysis as the high numbers dominate any statistical clustering and similarity analyses; and
- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts
- the sedentary polychaete, *Galathowenia oculata* was present throughout the sampling stations in comparatively high numbers and as such was removed prior to the multivariate analysis as its presence was felt to overly influence the analysis.

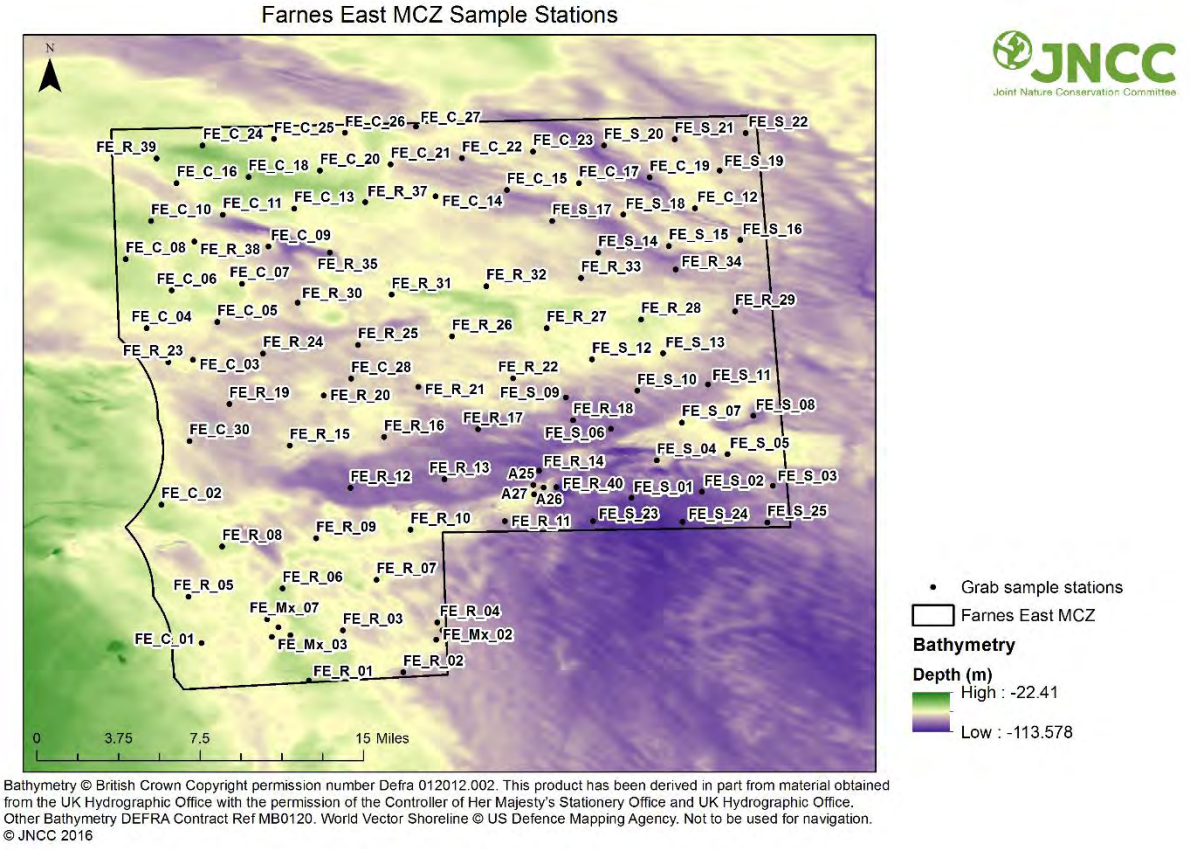

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Figure 37. Farnes East MCZ sample stations.

Table 29. Taxa removed from the Farnes East MCZ data

Taxa	Reason Removed	Taxa	Reason Removed
Animalia	Presence only data	*Buccinum undatum*	Juveniles
Lagotia viridis	Presence only data	*Nassarius (Hinia)*	Eggs
Porifera	Presence only data	Modiolus	Juveniles
Clathrina	Presence only data	Pectinidae	Juveniles
Tubulariidae	Presence only data	*Palliolum striatum*	Juveniles
Filifera	Presence only data	Anomiidae	Juveniles
Eudendrium	Presence only data	*Lucinoma borealis*	Juveniles
Bougainvilliidae	Presence only data	Astartidae	Juveniles
Hydractiniidae	Presence only data	Spisula	Juveniles
Calycella syringa	Presence only data	*Spisula solida*	Juveniles
Lafoea dumosa	Presence only data	Gari	Juveniles
Halecium	Presence only data	*Gari fervensis*	Juveniles
Abietinaria abietina	Presence only data	*Arctica islandica*	Juveniles
Diphasia	Presence only data	Cuspidaria	Juveniles
Hydrallmania falcata	Presence only data	Crisia	Presence only data
Sertularella	Presence only data	Tubulipora	Presence only data
Sertularia	Presence only data	*Alcyonidium diaphanum*	Presence only data
Thuiaria thuja	Presence only data	*Alcyonidium parasiticum*	Presence only data
Plumulariidae	Presence only data	*Alderina imbellis*	Presence only data
Halopteris catharina	Presence only data	*Amphiblestrum auritum*	Presence only data
Kirchenpaueria pinnata	Presence only data	*Crisularia plumosa*	Presence only data
Nemertesia	Presence only data	*Crisularia purpurotincta*	Presence only data
Schizotricha frutescens	Presence only data	*Bicellariella ciliata*	Presence only data
Campanulariidae	Presence only data	*Dendrobeania fruticosa*	Presence only data
Clytia gracilis	Presence only data	*Dendrobeania murrayana*	Presence only data
Clytia hemisphaerica	Presence only data	*Scrupocellaria scruposa*	Presence only data
Alcyonium digitatum	Presence only data	Cellaria	Presence only data
Loxosomella atkinsae	Presence only data	*Cribrilina punctata*	Presence only data
Pedicellina	Presence only data	*Escharella immersa*	Presence only data
Nephasoma	Uncertain ID	*Escharella ventricosa*	Presence only data
Aphrodita aculeata	Juveniles	*Porella concinna*	Presence only data
Glycera fallax	Presence only data	*Parasmittina trispinosa*	Presence only data
Eusyllis blomstrandi	Epitoke	*Microporella ciliata*	Presence only data
Nephtys	Juveniles	Reteporella	Presence only data
Chaetopterus	Presence only data	Dosinia	Juveniles
Syllis cornuta	Presence only data	*Chamelea striatula*	Juveniles
Aglaophamus agilis	Presence only data	*Clausinella fasciata*	Juveniles
Cirratulus	Juveniles	*Mya truncata*	Juveniles
Cirratulus caudatus	Presence only data	Thracia	Juveniles
Cirriformia	Juveniles	*Cochlodesma praetenue*	Juveniles
Cirriformia tentaculata	Presence only data	Asteroidea	Juveniles
Maldanidae	Presence only data	*Ophiothrix fragilis*	Juveniles
Proclymene muelleri	Presence only data	*Ophiactis balli*	Juveniles
Petaloproctus	Presence only data	Amphiuridae	Juveniles

Taxa	Reason Removed	Taxa	Reason Removed
Oedicerotidae	Presence only data	Ophiuridae	Juveniles
Parapleustes bicuspis	Presence only data	Echinidea	Juveniles
Ampelisca	Juveniles	*Psammechinus miliaris*	Juveniles
Gnathiidae	Juveniles	*Echinus esculentus*	Juveniles
Astacilla	Juveniles	Spatangoida	Juveniles
Diastylis	Juveniles	Echinocardium	Presence only data
Callianassa subterranea	Juveniles	Cucumariidae	Juveniles
Paguridae	Juveniles	Leptosynapta	Presence only data
Galathea intermedia	Juveniles	Ascidiacea	Juveniles
Ebalia	Juveniles	Didemnidae	Presence only data
Decapoda	Presence only data	*Leptosynapta bergensis*	Presence only data
Pontophilus spinosus	Presence only data	Actinopterygii	Eggs
Hyas araneus	Juveniles	Actinopterygii	Juveniles
Inachus	Juveniles	*Ammodytes tobianus*	Presence only data
Liocarcinus	Juveniles	Gobiidae	Presence only data
Turritella communis	Juveniles	Copepoda	Overriding influence
Capulus ungaricus	Juveniles	Nematoda	Overriding influence
Galathowenia oculata	Overriding influence		

3.5.2 Summary of physical habitats

Seabed sediment composition from the grab samples show Farnes East MCZ to have a wide range of sediment types with mixed, sand and coarse substrates spread throughout the site. The south east of the site has an area of silt/mud influenced sediment as does the extreme north-east of the site.

The spatial distribution of sediment types is illustrated in Figure 38 which highlights sediment composition (% sand, gravel and mud) overlayed on the broad-scale habitat map generated from the 2012 survey. A summary of key parameters of particle size analysis data is provided in Table 56 in Appendix 1.

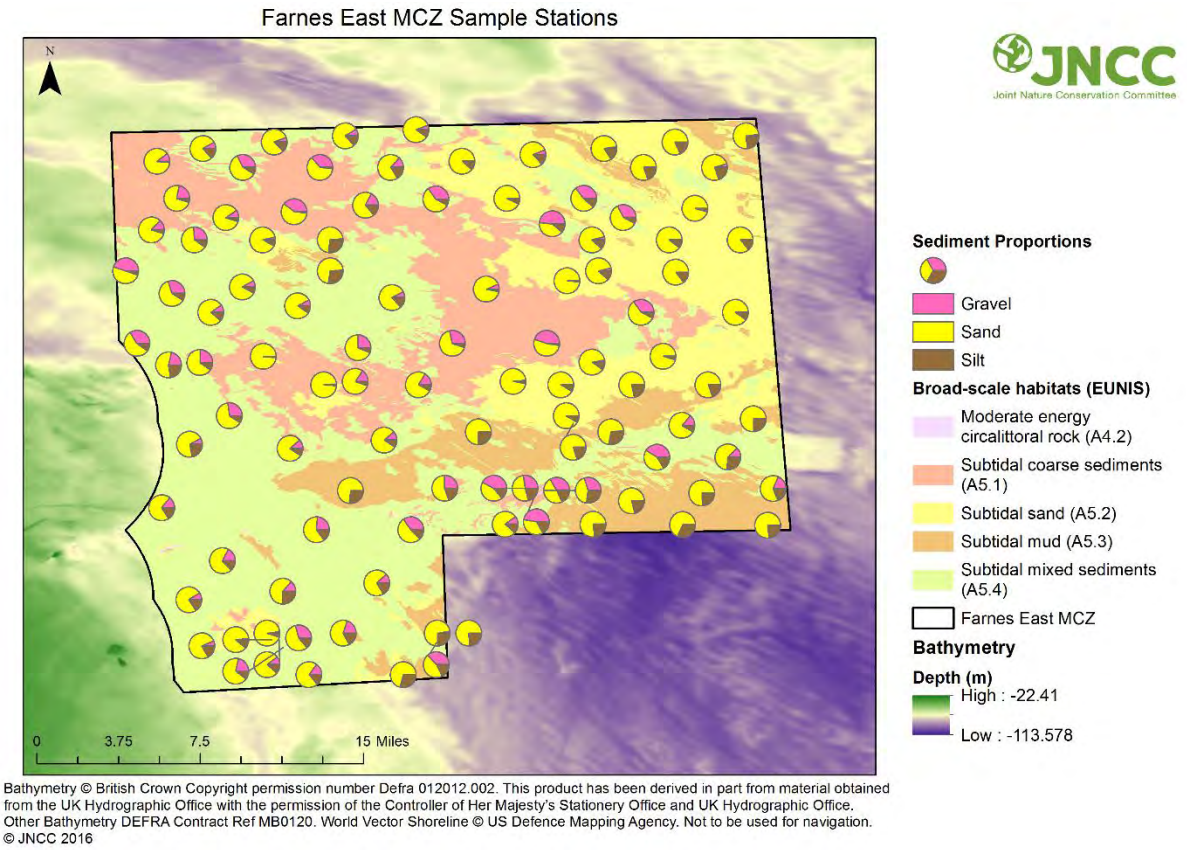

Figure 38. Farnes East MCZ sediment composition of grab samples with broad-scale habitat map.

3.5.3 Statistical results for Farnes East MCZ

Due to the homogeneity of the infaunal community for the majority of samples within this site, a slice at a similarity level of 30% was used to differentiate between the main groupings (see Figure 39). This similarity slice was used to group samples which otherwise are separated due to small variations and show no practical ecological groupings within an otherwise homogeneous community.

The SIMPROF routine was used to define sample groups with similar species composition and Figure 39 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, fourth root transformed abundances.

The number of individuals (per sample) ranged from 22 to 595, therefore, a fourth root transformation was applied, as this has the effect of down-weighting the importance of the highly abundant species, so that similarities not only depend on their values but also those of less common taxa.

Figure 40 shows the three dimensional MDS plot of the same similarities. The stress value of 0.15 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from 19% to 62%, with four groups identified ('c,', 'e', 'f' & 'h') and six outlying samples ('a', 'b', 'd', 'g', 'i' & 'j'). The taxa that contributed greater than 1% of the similarity for each of the four major groups are shown in Table 31, based on the results of the SIMPER analysis. The table excludes the outlying groups as they had less than two samples in each group for which data could not be generated.

The main divisions between samples split group ‘c’ from groups ‘e’, ‘f’ and ‘h’ at around 22% similarity. Groups ‘e’, ‘f’ and ‘h’ were more closely related and separated at about 28% similarity. Group ‘e’ consists of the amalgamation of two sub-groups at a similarity level of about 35%.

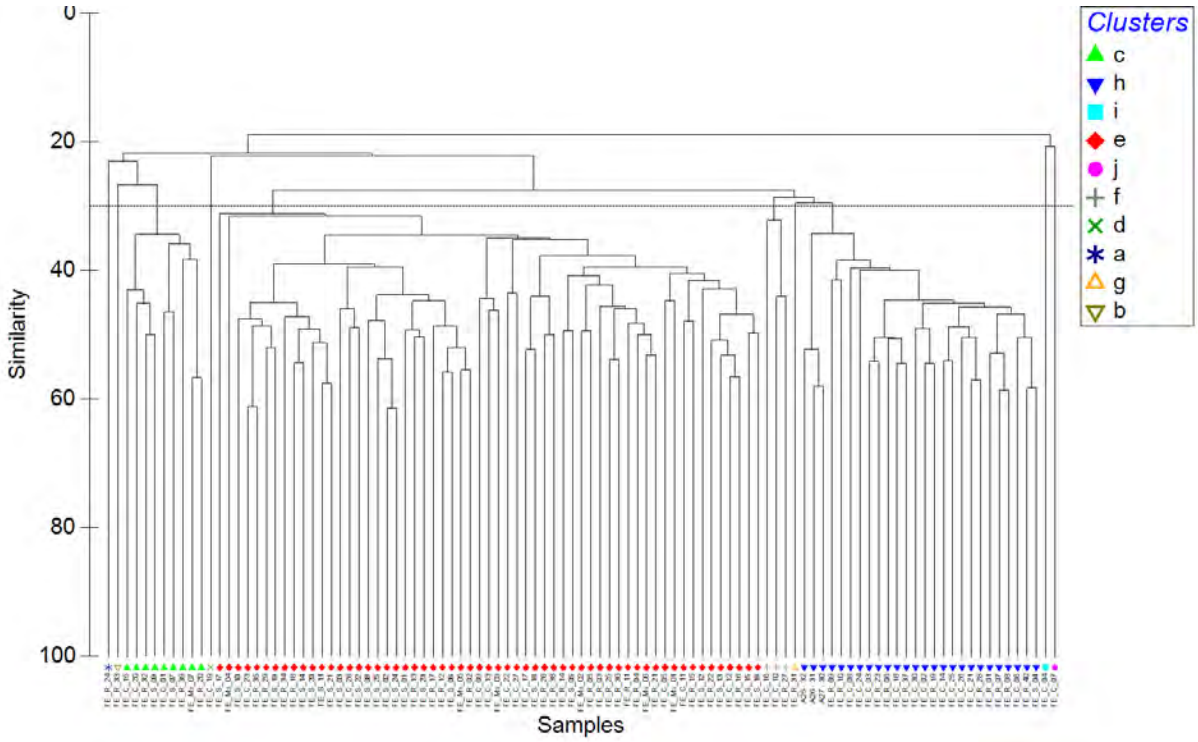

Figure 39. Farnes East MCZ dendrogram using similarities from abundance data.

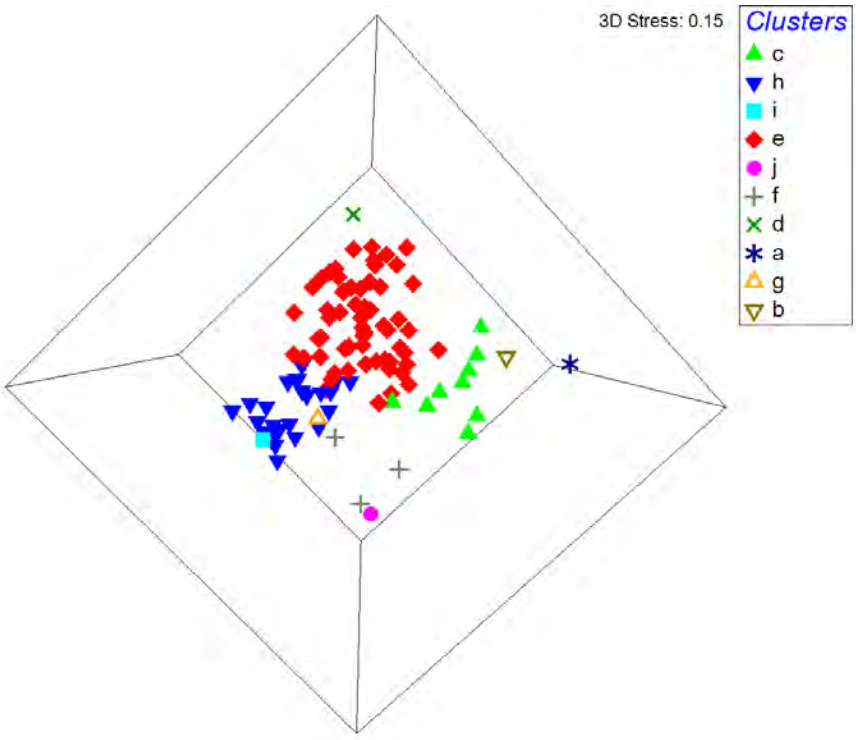

Figure 40. Farnes East MCZ MDS plot abundance data.

3.5.4 Univariate results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 30.

The multivariate analysis for Farnes East MCZ resulted in ten groups, with the majority of samples clustering into the larger groups 'c', 'e' and 'h', three samples in group 'f' and the remaining groups 'a', 'b', 'd', 'g', 'i' and 'j' all containing only one sample station each.

The univariate analysis results showed that for group 'c', the densities of infaunal organisms were moderate, with the number of taxa recorded (per sample) ranging from 14 to 38 (mean 24.44) and the number of individuals (per sample) ranging from 36 to 124, with a mean of 63.77. The group appears to exhibit moderate levels of diversity in terms of Margalef's index (ranging from 3.63 to 8.80, mean 5.68) and a high level of evenness with Pielou's index ranging from 0.72 to 0.92 and a mean of 0.84.

For group 'e', the densities of infaunal organisms were higher, with the number of taxa recorded (per sample) ranging from 23 to 60 (mean 35.30) and the number of individuals (per sample) ranging from 37 to 396 (mean 109.57). This group exhibits a moderate to high level of diversity in terms of Margalef's index, ranging from 4.65 to 11.08, with a mean of 7.41, and a variable level of evenness with Pielou's index ranging from 0.48 to 0.95 and a mean of 0.82.

For group 'h', the densities of infaunal organisms were again high, with the number of taxa recorded (per sample) ranging from 36 to 80 (mean 60.48) and the number of individuals (per sample) ranging from 86 to 531 (mean 224.44). This group also exhibits a high level of diversity in terms of Margalef's index, ranging from 7.70 to 13.57, with a mean of 11.10, and a moderate to high level of evenness with Pielou's index ranging from 0.56 to 0.93 and a mean of 0.82.

The groups 'a', 'b', 'd', 'f', 'i' and 'j' also showed moderate species densities similar to group 'c', with the total no. of taxa per sample of ranging from 12 to 42, and the no. of individuals per sample ranging from 22 to 120. These groups also show a moderate level of diversity, with Margalef's indices of between 3.56 and 8.56, and a moderate to high level of evenness, with Pielou's index ranging from 0.68 to 0.98. The remaining group 'g' had a high species density with 62 taxa recorded and 595 individuals, and a high diversity (Margalef's index of 9.55) and low level of evenness (Pielou's index of 0.45).

Table 30. Diversity indices and summary univariate statistics for Farnes East MCZ infaunal samples

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
FE_R_24	a	12	22	3.56	0.92
FE_R_33	b	19	24	5.66	0.98
FE_C_01	c	24	42	6.15	0.9
FE_C_15	c	21	55	4.99	0.82
FE_C_20	c	24	72	5.38	0.85
FE_Mx_07	c	35	124	7.05	0.82
FE_R_20	c	24	83	5.2	0.72
FE_R_32	c	20	54	4.76	0.79
FE_R_39	c	20	41	5.12	0.84
FE_S_07	c	38	67	8.8	0.92

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
FE_S_09	c	14	36	3.63	0.9
FE_C_19	d	23	72	5.14	0.81
FE_C_05	e	36	90	7.78	0.92
FE_C_09	e	27	62	6.3	0.91
FE_C_11	e	32	80	7.07	0.86
FE_C_12	e	37	104	7.75	0.89
FE_C_13	e	29	74	6.51	0.87
FE_C_17	e	39	80	8.67	0.89
FE_C_22	e	23	60	5.37	0.89
FE_C_23	e	45	192	8.37	0.72
FE_C_27	e	40	99	8.49	0.85
FE_C_28	e	33	63	7.72	0.92
FE_Mx_01	e	43	96	9.2	0.92
FE_Mx_02	e	42	118	8.59	0.84
FE_Mx_03	e	29	83	6.34	0.87
FE_Mx_04	e	26	49	6.42	0.9
FE_Mx_05	e	41	212	7.47	0.55
FE_Mx_06	e	37	95	7.91	0.88
FE_R_02	e	47	106	9.86	0.92
FE_R_03	e	38	139	7.5	0.79
FE_R_04	e	46	146	9.03	0.79
FE_R_05	e	53	177	10.05	0.86
FE_R_06	e	60	205	11.08	0.8
FE_R_11	e	30	75	6.72	0.84
FE_R_12	e	47	396	7.69	0.48
FE_R_13	e	29	79	6.41	0.81
FE_R_14	e	33	193	6.08	0.55
FE_R_15	e	40	92	8.62	0.84
FE_R_16	e	32	77	7.14	0.9
FE_R_17	e	29	116	5.89	0.62
FE_R_18	e	27	112	5.51	0.7
FE_R_21	e	39	88	8.49	0.91
FE_R_22	e	23	37	6.09	0.95
FE_R_25	e	41	112	8.48	0.86
FE_R_26	e	35	93	7.5	0.82
FE_R_29	e	31	99	6.53	0.8
FE_R_30	e	41	130	8.22	0.83
FE_R_34	e	25	114	5.07	0.72
FE_R_35	e	42	153	8.15	0.75
FE_R_38	e	50	99	10.66	0.91
FE_S_01	e	37	111	7.64	0.78
FE_S_02	e	40	120	8.15	0.88
FE_S_03	e	27	50	6.65	0.94
FE_S_05	e	40	78	8.95	0.92

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
FE_S_06	e	42	151	8.17	0.83
FE_S_08	e	34	92	7.3	0.84
FE_S_10	e	25	67	5.71	0.79
FE_S_11	e	32	114	6.55	0.72
FE_S_12	e	46	110	9.57	0.88
FE_S_13	e	27	59	6.38	0.84
FE_S_14	e	30	136	5.9	0.7
FE_S_15	e	28	64	6.49	0.85
FE_S_16	e	34	70	7.77	0.89
FE_S_17	e	32	167	6.06	0.52
FE_S_18	e	40	106	8.36	0.86
FE_S_19	e	26	74	5.81	0.76
FE_S_20	e	23	113	4.65	0.63
FE_S_21	e	23	38	6.05	0.94
FE_S_22	e	36	179	6.75	0.58
FE_S_23	e	33	88	7.15	0.86
FE_S_24	e	33	95	7.03	0.86
FE_S_25	e	33	97	6.99	0.87
FE_C_10	f	42	120	8.56	0.85
FE_C_16	f	28	87	6.05	0.79
FE_R_27	f	34	80	7.53	0.91
FE_R_31	g	62	595	9.55	0.45
A25 - 32	h	69	277	12.09	0.83
A26 - 31	h	70	373	11.65	0.77
A27 - 30	h	77	531	12.11	0.56
FE_C_02	h	67	262	11.85	0.83
FE_C_03	h	53	111	11.04	0.93
FE_C_06	h	57	141	11.32	0.89
FE_C_08	h	36	94	7.7	0.88
FE_C_14	h	58	211	10.65	0.74
FE_C_18	h	80	365	13.39	0.82
FE_C_21	h	77	284	13.45	0.82
FE_C_24	h	60	241	10.76	0.79
FE_C_25	h	50	154	9.73	0.82
FE_C_26	h	59	162	11.4	0.84
FE_C_30	h	67	218	12.26	0.89
FE_R_01	h	40	137	7.93	0.84
FE_R_07	h	65	234	11.73	0.85
FE_R_08	h	50	120	10.24	0.84
FE_R_09	h	43	131	8.62	0.82
FE_R_10	h	64	264	11.3	0.84
FE_R_19	h	48	86	10.55	0.92
FE_R_23	h	63	213	11.56	0.8
FE_R_28	h	77	271	13.57	0.84

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
FE_R_37	h	76	278	13.33	0.86
FE_R_40	h	50	228	9.03	0.71
FE_S_04	h	56	225	10.15	0.81
FE_C_04	i	28	84	6.09	0.68
FE_C_07	j	31	96	6.57	0.8

3.5.5 Summary of characterising species and communities

Groups 'a' and 'b' which comprised just a single station in each group (stations FE_R_24 & FE_R_33 respectively) were characterised by slightly gravelly sand with low numbers of species such as *Abra prismatica, Ophelia borealis* and *Aricidea (Acmira) catherinae*. Group 'c' comprised the sandier stations which were characterised by moderately deep slightly gravelly sand with *Echinocyamus pusillus, Ophelia borealis, Glycera lapidum, Owenia fusiformis* and *Abra prismatica*.

The largest group which included sixty stations clustered together at about 35% similarity to form group 'e'. This group was an amalgamation of two sub-groups with a similar faunal assemblage characterised by *Owenia fusiformis, Amphiura filiformis, Scoloplos (Scoloplos) armiger, Hilbigerneris gracilis* and *Diplocirrus glaucus*.

The three stations of group 'f' (FE_C_16, FE_C_10 & FE_R_27) were characterised by moderately deep gravelly sand with species such as *Echinocyamus pusillus, Leptochiton asellus, Paradoneis lyra, Clymenura* sp. and *Paramphinome jeffreysii*.

The twenty-five stations of group 'h' were characterised by gravelly muddy sand with *Hydroides norvegica, Leptochiton asellus, Hilbigneris gracilis, Glycera lapidum* and Serpulidae.

The remaining outlying stations, group 'g' (FE_R_31), group 'i' (FE_C_04) and group 'j' (FE_C_07), with the exception of group 'd' (FE_C_19), had varied infaunal communities which comprised of species such as *Hydroides norvegica, Cheirocratus* sp. and *Atylus vedlomensis*. Group 'd' had a greater occurrence of species such as *Thyasira flexuosa, Amphiura filiformis, Diplocirrrus glaucus* and *Scoloplos (Scoloplos) armiger.*

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 31, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated.

Table 31. Characterising species for multivariate groups Farnes East MCZ infaunal samples, showing those with a contribution of over 1%.

Group 'c' Species/Taxa	Average Abundance	%age contribution
Echinocyamus pusillus	2.07	17
Ophelia borealis	1.87	14.68
Glycera lapidum	1.33	9.26
Nemertea	1.17	8.15
Owenia fusiformis	1.01	6.19
Abra prismatica	1.03	6.14
Scoloplos (Scoloplos) armiger	0.91	5.42
Edwardsia claparedii	0.95	4.68

Echinocardium flavescens	0.7	2.77
Tellimya ferruginosa	0.71	2.67
Kurtiella bidentata	0.61	2.08
Moerella pygmaea	0.63	1.83
Amphiura filiformis	0.58	1.82
Myriochele	0.57	1.66
Glycera alba	0.56	1.59
Polycirrus	0.58	1.47
Group 'h' Species/Taxa	**Average Abundance**	**%age contribution**
Hydroides norvegica	1.47	4.75
Leptochiton asellus	1.36	4.65
Nemertea	1.22	4.41
Hilbigneris gracilis	1.34	4
Serpulidae	1.25	3.71
Notomastus	1.06	3.28
Glycera lapidum	0.96	3.24
Glycera alba	0.98	3.09
Ampharete octocirrata	1.01	2.96
Paramphinome jeffreysii	1.03	2.79
Echinocyamus pusillus	1.03	2.74
Terebellides stroemii	0.89	2.66
Sabellaria spinulosa	0.98	2.42
Owenia fusiformis	0.85	2.33
Anobothrus gracilis	0.79	2.19
Pholoe baltica	0.79	2.14
Glycinde nordmanni	0.76	2.13
Spiophanes kroyeri	0.84	2.11
Peresiella clymenoides	0.77	1.83
Scoloplos (Scoloplos) armiger	0.71	1.71
Parvicardium pinnulatum	0.71	1.59
Goniada maculata	0.65	1.51
Polycirrus	0.63	1.44
Ampharete lindstroemi	0.63	1.43
Diplocirrus glaucus	0.63	1.41
Trichobranchus roseus	0.66	1.39
Paraphoxus oculatus	0.61	1.36
Mediomastus fragilis	0.64	1.35
Cerianthus lloydii	0.59	1.2
Ophiactis balli	0.61	1.11
Harmothoe impar	0.52	1.02
Paradoneis lyra	0.62	1.02
Group 'e' Species/Taxa	**Average Abundance**	**%age contribution**
Owenia fusiformis	1.3	7.55
Nemertea	1.28	6.76

Amphiura filiformis	1.29	6.42
Scoloplos (Scoloplos) armiger	1.12	5.43
Hilbigneris gracilis	1.1	4.63
Diplocirrus glaucus	1.07	4.61
Glycera alba	0.96	4.23
Edwardsia claparedii	0.98	4.22
Echinocyamus pusillus	0.99	3.81
Notomastus	0.89	3.65
Anobothrus gracilis	0.93	3.51
Phoronis	0.86	3.32
Thyasira flexuosa	0.9	2.9
Ennucula tenuis	0.78	2.89
Paramphinome jeffreysii	0.81	2.89
Kurtiella bidentata	0.83	2.84
Paradoneis lyra	0.68	1.97
Goniada maculata	0.58	1.67
Nephtys hombergii	0.56	1.53
Trichobranchus roseus	0.58	1.52
Spiophanes bombyx	0.52	1.3
Spiophanes kroyeri	0.53	1.29
Chaetozone setosa	0.51	1.2
Lucinoma borealis	0.47	1.1
Prionospio	0.45	1.04

Group 'f' Species/Taxa	**Average Abundance**	**%age contribution**
Echinocyamus pusillus	1.79	11.78
Leptochiton asellus	1.34	8.6
Paradoneis lyra	1.34	8.6
Clymenura	1.12	7.07
Nemertea	1.12	7.07
Notomastus	1.23	7.07
Paramphinome jeffreysii	1.05	6.95
Sabellaria spinulosa	1.4	6.95
Hydroides norvegica	1.4	4.66
Urothoe marina	1.19	3.79
Atylus vedlomensis	0.86	2.56
Cerianthus lloydii	0.76	2.56
Aonides paucibranchiata	0.94	2.48
Ampharete octocirrata	0.78	2.29
Aricidea (Acmira) cerrutii	0.74	2.29
Glycera lapidum	0.84	2.29
Sarsinebalia	0.74	2.29
Onchidoris	0.7	2.23

3.5.6 Biotope Allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. The taxa which were removed during data processing prior to statistical analysis were reviewed and considered within the biotope allocation process.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 32 with the spatial distribution of the groups and biotopes illustrated in Figure 41 and Figure 42. Table 57 in Appendix 1 presents the multivariate group and the biotope or habitat assigned to each sample with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

Infaunal samples were cross-referenced with epibenthic stations and still images and video footage were utilised to assist in determining the nature of the seabed and the likely community types to occur in the site.

Sampling stations within group ‘c’ and the two outlying stations (FE_R_24 & FE_R_33) were characterised by *Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica* which suggest the presence of **SS.SSa.CFiSa.EpusOborApri** (*Echinocyamus pusillus, Ophelia borealis* and *Abra prismatica* in circalittoral fine sand).

The largest group ‘e’ which included the amalgamation of two sub-groups of stations was characterised by *Owenia fusiformis*, Nemertea, *Amphiura filiformis, Scoloplos (Scoloplos) armiger, Hilbigneris gracilis* and *Diplocirrus glaucus* to varying extents. The stations with a muddier sand substrate were seen to be a good match with **SS.SSa.OSa.OfusAfil** (*Owenia fusiformis* and *Amphiura filiformis* in offshore circalittoral sand or muddy sand), whereas, the stations with an increased silt content (sandy mud) and higher numbers of *Thyasira flexuosa* have been classified as **SS.SMu.CSaMu.ThyNten** (*Thyasira* spp. and *Nuculoma tenuis* in circalittoral sandy mud) despite the lack of *Nuculoma tenuis* present in the samples. Other stations within group ‘e’ which exhibited a coarser or more mixed substrate were assigned level four habitat types based on the physical data provided.

Stations within groups ‘g’, ‘h’ and ‘i’ with gravelly muddy sand and characterised by species such as *Hydroides norvegica, Leptochiton asellus, Hilbigneris gracilis* and Nermertea have been assigned to **SS.SMx.OMx** (Offshore circalittoral mixed sediment).

The three stations within group ‘f’ (FE_C_10, FE_C_16 & FE_R_27) were characterised by gravelly sand/sandy gravel with *Echinocyamus pusillus, Leptochiton asellus, Paradoneis lyra* and *Clymenura* sp, and as such have been assigned **SS.SCS.OCS** (Offshore circalittoral coarse sand).

The final two outlying stations belonging to group ‘i’ and group ‘j’ (FE_C_04 & FE_C_07 respectively) have been assigned level four habitat types based on the physical data provided for these stations.

In summary Table 33 shows the biotope and habitats found within Farnes East MCZ with the characterising species and seabed substrate for each.

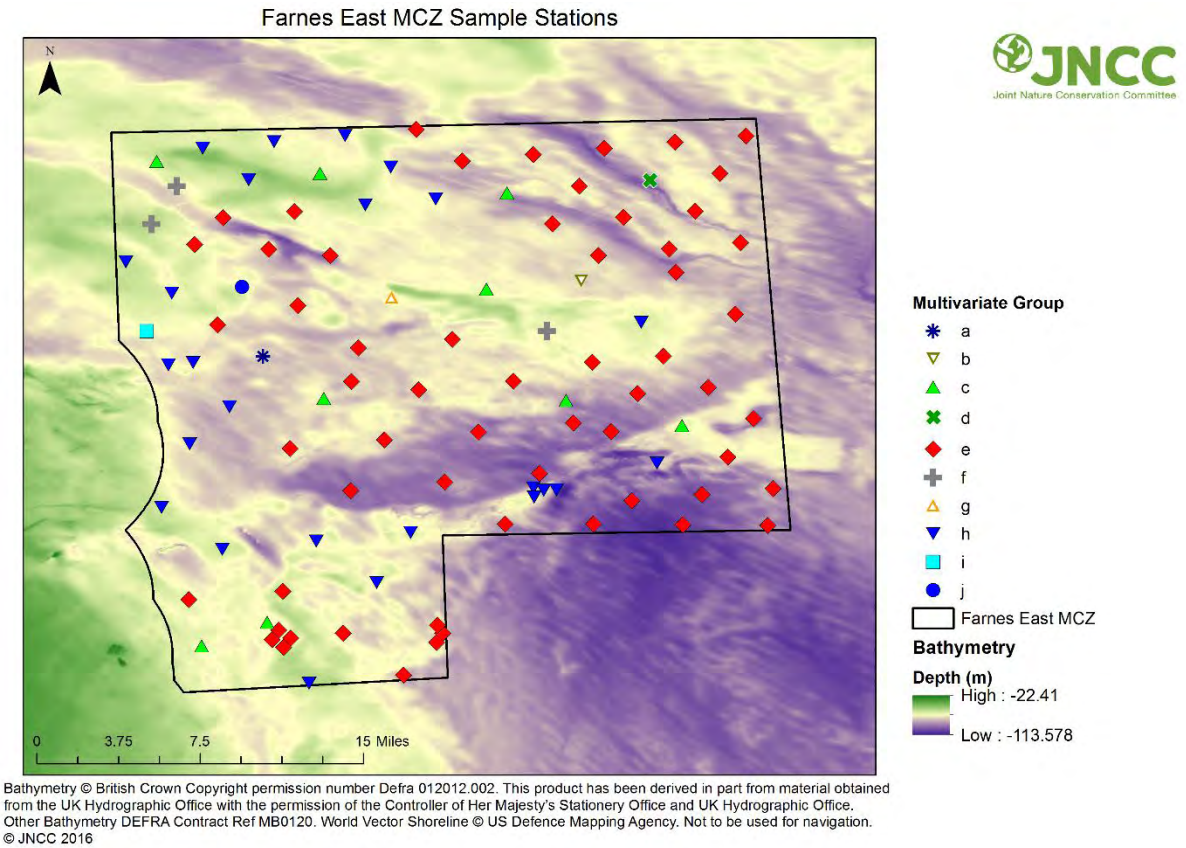

Figure 41. Farnes East MCZ sample stations showing multivariate groups.

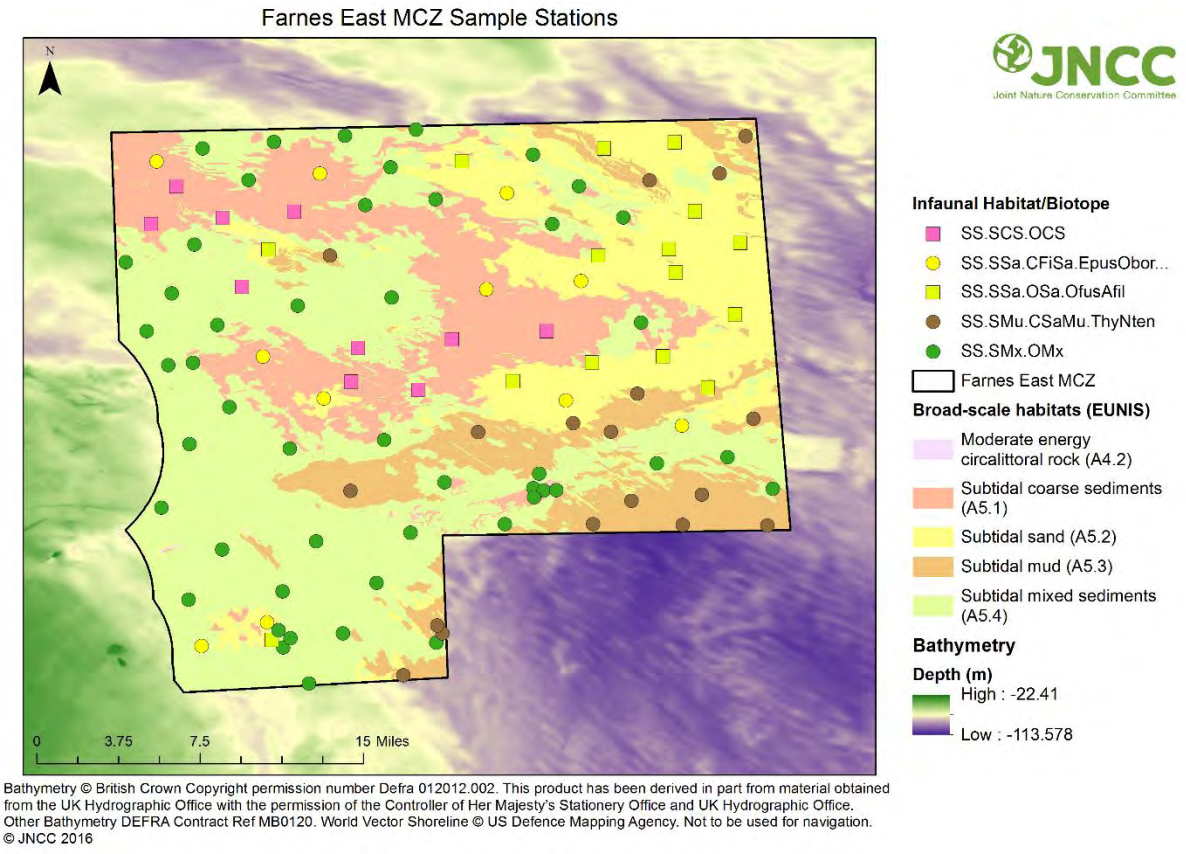

Figure 42. Farnes East MCZ sample stations showing biotope/habitats.

Table 32. Summary of multivariate statistical groups and associated habitats and biotopes from Farnes East MCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	1	SS.SSa.CFiSa.EpusOborApri	Subtidal sand
b	1	SS.SSa.CFiSa.EpusOborApri	Subtidal sand
c	9	SS.SSa.CFiSa.EpusOborApri	Subtidal sand Subtidal coarse sediment Subtidal mixed sediments
d	1	SS.SMu.CSaMu.ThyNten	Subtidal sand
e	22	SS.SMx.OMx	Subtidal mixed sediments
	17	SS.SMu.CSaMu.ThyNten	Subtidal mud
	15	SS.SSa.OSa.OfusAfil	Subtidal sand
	6	SS.SCS.OCS	Subtidall coarse sediment
f	3	SS.SCS.OCS	Subtidal coarse sediment
g	1	SS.SMx.OMx	Subtidal mixed sediments
h	25	SS.SMx.OMx	Subtidal mixed sediments
i	1	SS.SMx.OMx	Subtidal mixed sediments
j	1	SS.SCS.OCS	Subtidal coarse sediment

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 33. Summary of habitats/biotopes found within Farnes East MCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SSa.CFiSa.EpusOborApri	63 - 87	Sand and muddy sand/ coarse sediment	*Abra prismatica, Echinocyamus pusillus, Glycera lapidum Moerella pygmaea, Ophelia borealis, Owenia fusiformis*	a,b,c
SS.SMu.CSaMu.ThyNten	68 - 108	Mud and sandy mud	*Thyasira flexuosa, Diplocirrus glaucus, Scoloplos armiger Owenia fusiformis, Amphiura filiformis, Hilbigneris gracilis*	d,e
SS.SMx.OMx	56 - 101	Mixed sediments	*Amphiura filiformis, Ascidiella scabra* Cheirocratus, Clymenura, *Circeis spirillum, Hilbigneris gracilis, Hydroides norvegica, Leptochiton asellus*, Notomastus, *Owenia fusiformis, Scoloplos armiger*	e,g,h,i

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SCS.OCS	56 - 82	Coarse sediment	*Amphiura filiformis, Atylus vedlomensis* Cheirocratus, Clymenura, *Echinocyamus pusillus, Hilbigneris gracilis Leptochiton asellus*, Notomastus, *Owenia fusiformis, Paradonis lyra, Scoloplos armiger*	e,f,j
SS.SSa.OSa.OfusAfil	69 - 90	Sand and muddy sand	*Owenia fusiformis, Amphiura filiformis, Scoloplos armiger, Hilbigneris gracilis*	e

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.5.7 Site Summary

Farnes East MCZ is designed to protect the broad-scale habitats:'Moderate energy circalittoral rock', 'Subtidal coarse sediment', 'Subtidal sand', 'Subtidal mud' and 'Subtidal mixed sediments. All all samples within the site have been allocated to habitats and biotopes which are part of these broad-scale habitats and therefore support the presence of these features.

Two sample stations (FE_C_02 and FE_C_15) also have a records of the ocean quahog (*Arctica Islandica)* which is a species feature of conservation importance (FOCI). Table 34 provides a summary for the habitats and biotopes present within Farnes East MCZ with associated broad-scale habitats and other analysis notes.

Table 34. Summary table for the habitat/biotopes for Farnes East MCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SSa.CFiSa.EpusOborApri	Subtidal sand	a, b, c	63 - 87	*Abra prismatica, Echinocyamus pusillus, Glycera lapidum Moerella pygmaea, Ophelia borealis, Owenia fusiformis*	Species and physical data best match to SS.SSa.CFiSa.EpusOborApri
SS.SMu.CSaMu.ThyNten	Subtidal sand	d	92	*Thyasira flexuosa, Diplocirrus glaucus, Scoloplos armiger Owenia fusiformis, Amphiura filiformis, Hilbigneris gracilis*	Biology supports SS.SMu.CMuSa.ThyNten; substrate borderline sandy mud
SS.SMx.OMx SS.SMu.CSaMu.ThyNten SS.SSa.OSa.OfusAfil SS.SCS.OCS	Subtidal sand/ Subtidal mixed sediments/ Subtidal mud/ Subtidal coarse sediment	e	61 - 105	*Owenia fusiformis,* Nemertea, *Amphiura filiformis, Scoloplos (Scoloplos) armiger, Hilbigneris gracilis*	Biotopes assigned based on characterising species and physical data for each station within this group; best match to SS.SSa.OSa.OfusAfil or SS.Mu.CSaMu.ThyNten according to substrate. Level four habitat types allocated to coarser stations within this group
SS.SCS.OCS	Subtidal coarse sediment	f	56 - 67	*Echinocyamus pusillus, Leptochiton asellus, Paradoneis lyra*, Clymenura	Species and physical data best match to SS.SCS.OCS

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SMx.OMx	Subtidal mixed sediments	g, h	56 - 101	*Hydroides norvegica, Leptochiton asellus, Hilbigneris gracilis*, Nemertea	Species and physical data best match to SS.SMx.OMx
SS.SMx.OMx	Subtidal mixed sediments	i	68	Cheirocratus, Notomastus, Clymenura, *Hydroides norvegica, Ascidiella scabra*	Level four habitat assigned based on physical data
SS.SCS.OCS	Subtidal coarse sediment	j	62	Cheirocratus, Notomastus, Clymenura, *Atylus vedlumensis*	Level four habitat assigned based on physical data

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.6 Greater Haig Fras MCZ

Greater Haig Fras MCZ is an offshore site situated to the south west of England, approximately 120km west of Land's End in Cornwall (Figure 43).

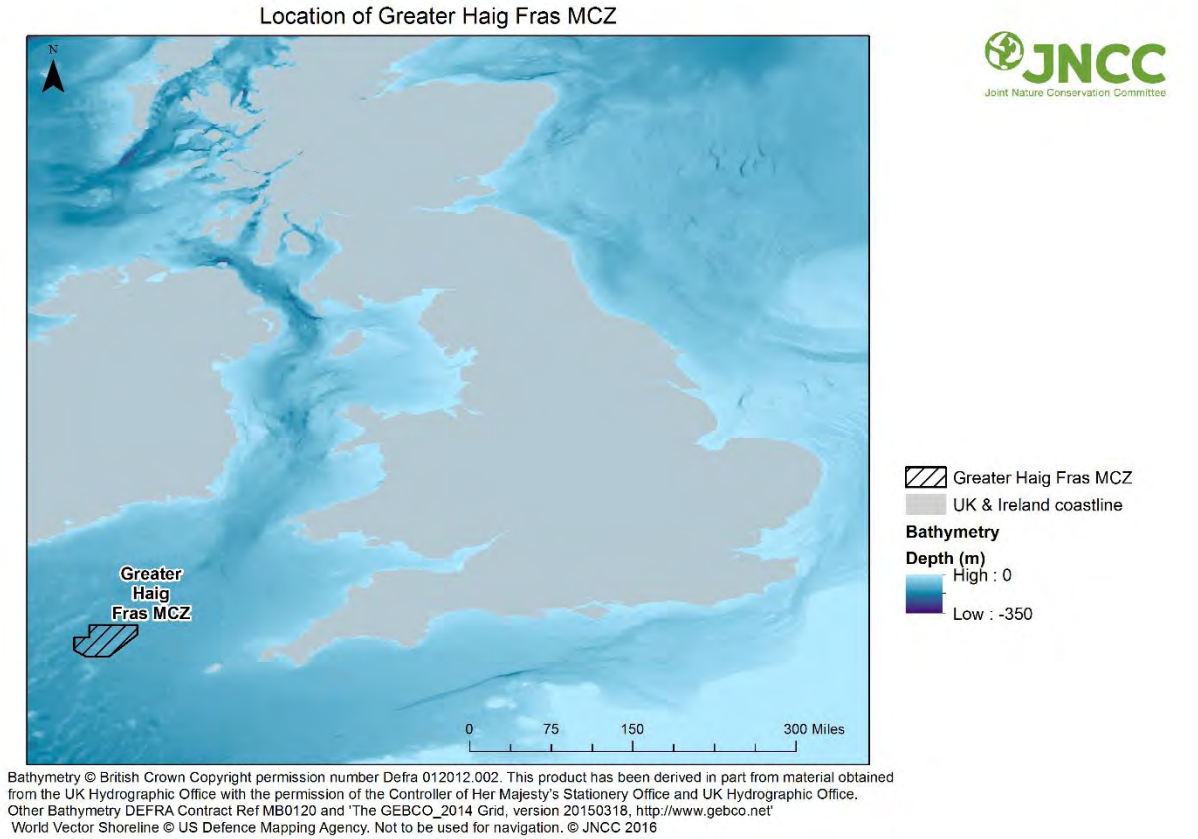

Figure 43. Greater Haig Fras MCZ location.

The site protects approximately 2,041km^2 of continental shelf seabed that surrounds an isolated fully submarine bedrock outcrop; the Haig Fras rock complex geological feature.This isolated underwater granite rock complex was designated as a Special Area of Conservation (SAC) under the Habitats Directive in December 2015. It is the only substantial area of rocky reefs in the Celtic Sea (JNCC 2015e). The seabed surrounding this outcrop has a diverse range of sediment types from mud to coarse and mixed sediments. These habitats are known to support a range of animal species, including those which live within the sediments such as small burrowing worms and bivalve molluscs to urchins, starfish and some crustaceans that live on the sediment surface (JNCC 2015c).

The Greater Haig Fras MCZ is designed to protect the broad-scale habitat types 'Subtidal coarse sediment', 'Subtidal sand', 'Subtidal mud' and 'Subtidal mixed sediments'. Other designated features are the habitat Feature of Conservation Importance (FOCI) 'Sea-pen and burrowing megafauna communities' and the geological feature - the Haig Fras Rock Complex (JNCC 2015c).

Greater Haig Fras MCZ site evaluation survey was carried out in July 2012 (CEFAS 2013c). Acoustic survey 'corridors' (in effect single survey lines) which aligned with sampling stations laid out in a triangular 5km grid were collected along with opportunistic data on transit between stations. Grab samples were collected by grab (0.1m^2 mini Hamon grab) and underwater camera sled (video and still images). A full account of the survey methods and results can be found in CEFAS (2013c) and Defra (2015c).

JNCC is currently undertaking biological community analysis of data collected in the Haig Fras SAC. This work is currently under review and will be published on the JNCC website in due course (JNCC, in prep).

3.6.1 Site specific data processing and analysis

DEFRA bathymetric data only covers a small proportion of the Greater Haig Fras site and MBES data (CEFAS 2013c) collected for sample locations has been used for context at this site. Three stations were identified that had PSA data but had no matching infaunal data, these were samples GHF10, GHF24 and GHF41. Sample GHF10 only had two litres of material collected which was used for PSA and no macrofaunal analysis was undertaken. Similarly, only PSA was carried out on the sample collected from station GHF41 and the sample from station GHF24 was deemed not valid and was disposed of with no analysis undertaken.

In total, 318 taxa were recorded from the 53 samples collected (Figure 44). Sixty-nine taxa were removed prior to statistical analysis and are listed in Table 35. These included:

- lifeforms such as eggs: early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;
- nematodes and copepods: meiofauna are removed due to their small size and high numbers which can have an overriding influence on the analysis as the high numbers dominate any statistical clustering and similarity analyses; and
- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts

It is noted a single presence record of the seapen (*Virgularis mirablis*) has been removed and as this species can be significant when assigning the biotope ‘Seapens and burrowing megafauna in circalittoral fine mud’ reference to this was made when biotopes for the site were considered.

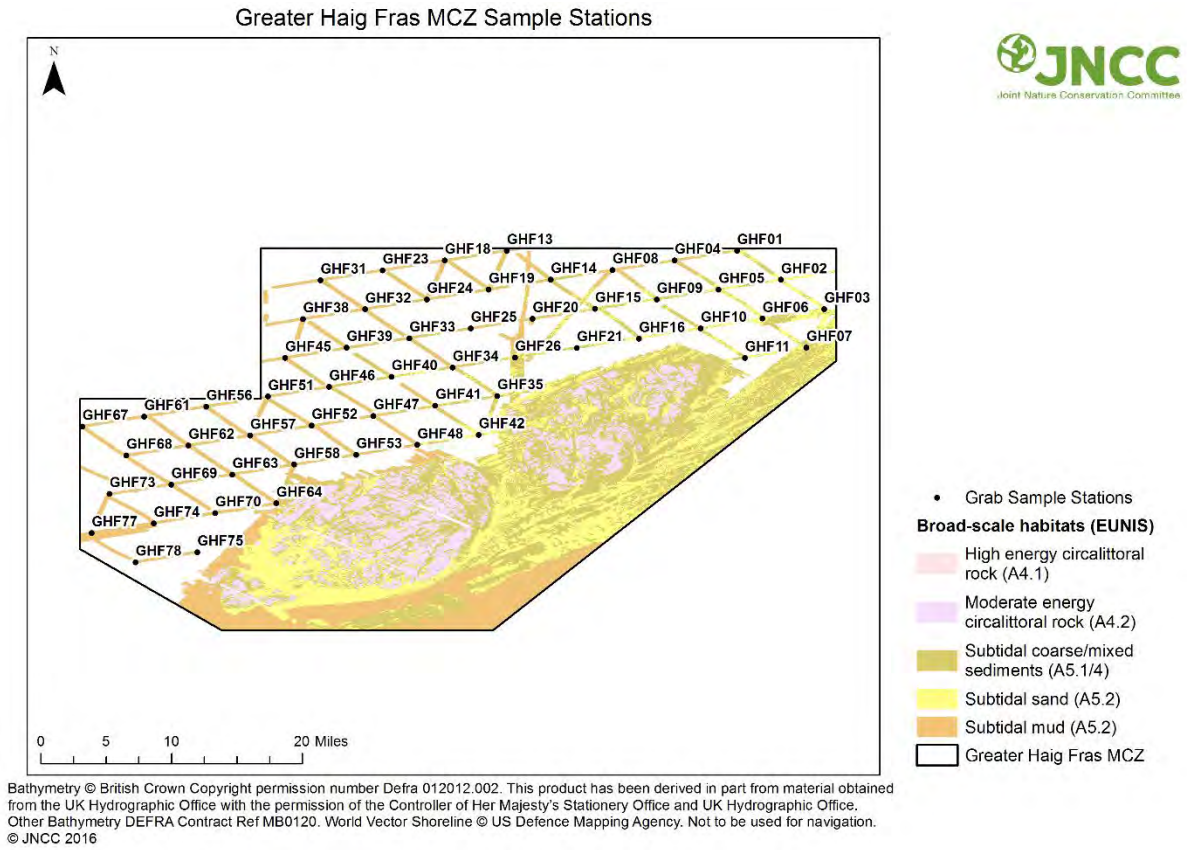

Figure 44. Greater Haig Fras MCZ sample stations with available broad-scale habitat map.

Table 35. Taxa removed from Greater Haig Fras MCZ data.

Taxa	Reason Removed	Taxa	Reason Removed
Animalia	Eggs	*Lovenella clausa*	Presence only data
Alderina imbellis	Presence only data	*Loxosomella varians*	Presence only data
Amphiuridae	Presence only data	*Lucinoma borealis (juv)*	Juveniles
Phyllodoce lineata	Presence only data	*Malmgrenia arenicolae*	Presence only data
Ancistrosyllis groenlandica	Presence only data	*Malmgrenia ljungmani*	Presence only data
Animoceradocus semiserratus	Presence only data	*Marphysa kinbergi*	Presence only data
Aphelochaeta	Presence only data	*Melinnacheres steenstrupi*	Presence only data
Aphrodita aculeata	Presence only data	*Microcharon harrisi*	Presence only data
Aricidea (Acmira) simonae	Presence only data	*Microporella ciliata*	Presence only data
Astrorhizidae	Presence only data	*Myodocopida*	Presence only data
Bathyporeia elegans	Presence only data	*Mystides caeca*	Presence only data
Brissopsis lyrifera	Presence only data	*Ophelia celtica*	Presence only data
Callianassa subterranea (juv)	Juveniles	*Oxydromus pallidus*	Presence only data
Campanulariidae	Presence only data	*Palliolum tigerinum (juv)*	Juveniles
Campanulina pumila	Presence only data	*Paramphitrite tetrabranchia*	Presence only data
Cellaria	Presence only data	*Paranaitis kosteriensis*	Presence only data
Chaetozone christiei	Presence only data	*Pentapora fascialis*	Presence only data
Cirriformia	Juveniles	*Philocheras bispinosus bispinosus*	Presence only data
Cirrophorus branchiatus	Presence only data	Phoronis	Presence only data
Cirrophorus furcatus	Presence only data	*Phylactella labrosa*	Presence only data
Clytia hemisphaerica	Presence only data	Pontocrates	Presence only data
COPEPODA	Presence only data	*Aurospio banyulensis*	Presence only data

Taxa	Reason Removed	Taxa	Reason Removed
Decapoda	Presence only data	*Sabellaria spinulosa*	Presence only data
Disporella hispida	Presence only data	*Scalibregma celticum*	Presence only data
Dosinia lupinus	Presence only data	*Schizomavella (Schizomavella) auriculata*	Presence only data
Ebalia	Juveniles	*Scrupocellaria scruposa*	Presence only data
Escharella immersa	Presence only data	*Spio filicornis*	Presence only data
Escharella ventricosa	Presence only data	Spiophanes	Presence only data
Eumida sanguinea	Presence only data	*Triticella flava*	Presence only data
Eunereis longissima	Presence only data	Tubulipora	Presence only data
Filifera	Presence only data	*Virgularia mirabilis*	Presence only data
Ione thoracica	Presence only data	*Vitreolina philippi*	Presence only data
Lagotia viridis	Presence only data	*Amphiblestrum flemingii*	Juveniles
Leptosynapta minuta	Presence only data	Nematoda	Overriding analysis
Leuckartiara octona	Presence only data		

3.6.2 Summary of physical habitats

A summary of key parameters of particle size analysis data is provided in Table 58. Muds and muddy sands dominate the deeper areas of the MCZ with sands and muddy sands being more prevalent in the shallower areas. Sediments containing gravel are only present in patches through the central region of the sampled areas and these form a mixed substratum with the occasional coarse sediment where silt/mud content is lower.

The spatial distribution of sediment types is illustrated in Figure 45 which highlights sediment composition (% sand, gravel and mud) overlayed on the available broad-scale habitat map.

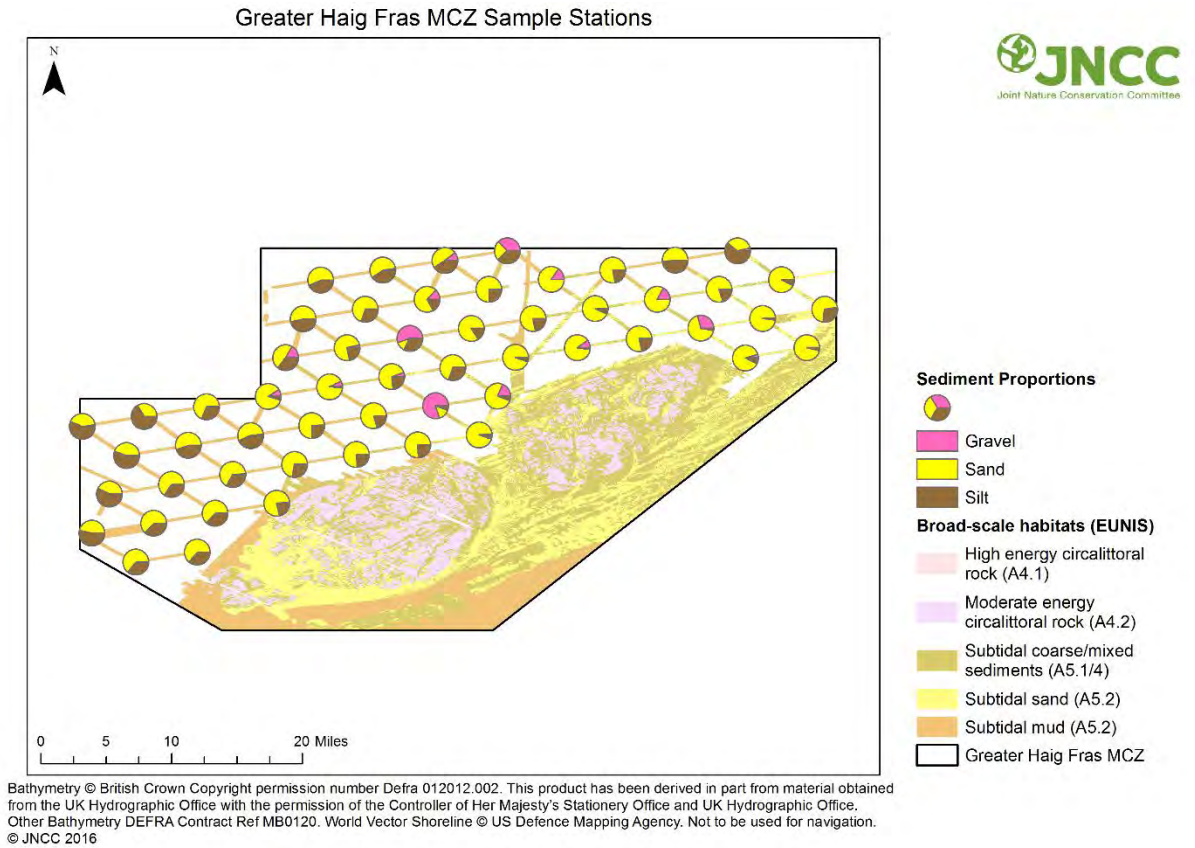

Figure 45. Greater Haig Fras MCZ sediment composition of grab samples with available broad-scale habitat map.

3.6.3 Statistical Results for Greater Haigh Fras MCZ

The SIMPROF routine was used to define sample groups with similar species composition and Figure 46 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, square root transformed abundances. Due to the homogeneity of the infaunal community a slice at a similarity level of 30% was used to differentiate between the main groupings. This similarity 'slice' was used to group samples which otherwise are separated due to small variations, showing no practical ecological groupings within an otherwise homogeneous community.

Figure 47 shows the three dimensional MDS plot of the same similarities. The stress value of 0.12 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from 15% to 68%, with four groups identified ('a', 'b', 'c' & 'e') and one outlying group 'd' at a similarity level of 30%. The taxa which contributed to greater than 1% of the similarity for each of the biological groups based on the results of the SIMPER analysis are shown in Table 37. The main divisions between samples split group 'a' from the other groups at 15% similarity whilst group 'e' was separated from groups 'b' and 'c' at around 22% similarity. Groups 'b' and 'c' were more closely related and separated at about 28% similarity.

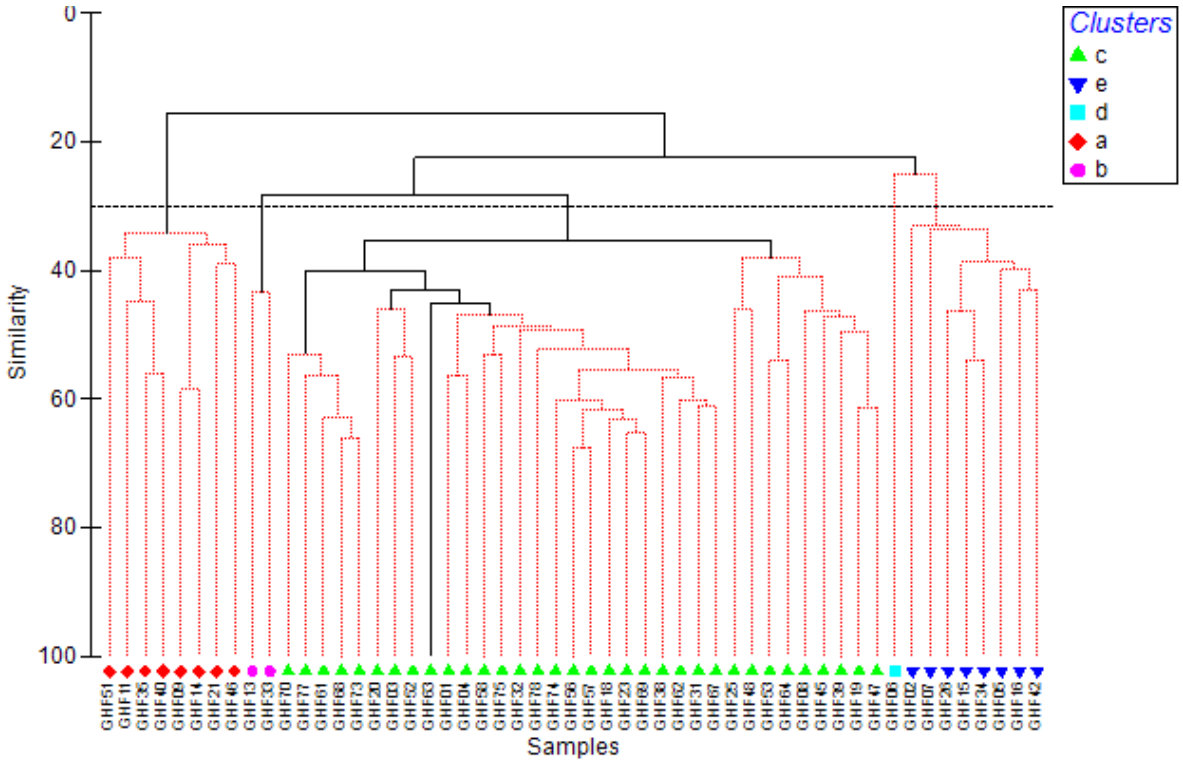

Figure 46. Greater Haig Fras MCZ dendrogram using similarities from abundance data.

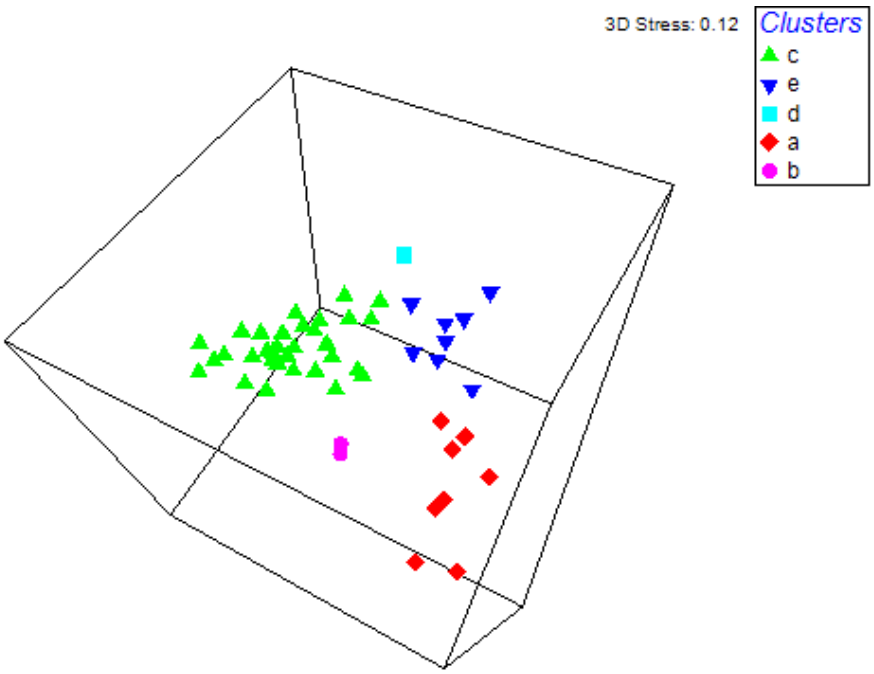

Figure 47. Greater Haig Fras MCZ MDS plot from abundance data.

3.6.4 Univariate results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 36.

The multivariate analysis for Greater Haigh Fras MCZ resulted in six groups, with the majority of samples clustering into the larger group 'c', groups 'a' and 'e' containing six and eight samples respectively, and the remaining groups 'a', 'b', and 'd', all containing only one or two sample stations.

The univariate analysis results showed that for group 'c', the densities of infaunal organisms were moderate, with the number of taxa recorded (per sample) ranging from 10 to 54 (mean 30.88) and the number of individuals (per sample) ranging from 33 to 371, with a mean of 132.15. The group appears to exhibit variable levels of diversity in terms of Margalef's index (range from 2.51 to 10.04, mean 6.25) and also a variable level of evenness with Pielou's index ranging from 0.31 to 0.92 and a mean of 0.74.

For group 'a', the densities of infaunal organisms were also moderate, with the number of taxa recorded (per sample) ranging from 17 to 39 (mean 24.67) and the number of individuals (per sample) ranging from 29 to 124 (mean 56.00). This group exhibits moderate levels of diversity in terms of Margalef's index, ranging from 4.75 to 7.88, with a mean of 5.95, and a high level of evenness with Pielou's index ranging from 0.84 to 0.94 and a mean of 0.91.

For group 'e', the densities of infaunal organisms were low to moderate, with the number of taxa recorded (per sample) ranging from 20 to 33 (mean 24.88) and the number of individuals (per sample) ranging from 41 to 72 (mean 49.50). This group also exhibits moderate levels of diversity in terms of Margalef's index, ranging from 5.02 to 7.48, with a

mean of 6.12, and a high level of evenness with Pielou's index ranging from 0.88 to 0.95 and a mean of 0.92.

The groups 'a', 'b', and 'd' also showed moderate species densities, with the total no. of taxa per sample ranging from 13 to 33, and the no. of individuals per sample ranging from 19 to 103. These groups also show moderate levels of diversity, with Margalef's indices of between 4.08 and 6.9, and a high level of evenness and Pielou's index ranging from 0.76 to 0.96.

Table 36. Diversity indices and summary univariate statistics for Greater Haig Fras MCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
GHF09	a	21	62	4.85	0.9
GHF11	a	25	51	6.1	0.94
GHF14	a	21	50	5.11	0.92
GHF21	a	22	40	5.69	0.94
GHF35	a	24	44	6.08	0.91
GHF40	a	17	29	4.75	0.92
GHF46	a	25	49	6.17	0.93
GHF51	a	39	124	7.88	0.84
GHF13	b	33	103	6.9	0.79
GHF33	b	28	85	6.08	0.76
GHF01	c	47	351	7.85	0.51
GHF03	c	51	363	8.48	0.61
GHF04	c	29	346	4.79	0.31
GHF08	c	35	75	7.87	0.91
GHF18	c	40	195	7.4	0.72
GHF19	c	29	96	6.13	0.79
GHF20	c	33	62	7.75	0.92
GHF23	c	42	183	7.87	0.69
GHF25	c	28	81	6.14	0.88
GHF31	c	23	85	4.95	0.7
GHF32	c	54	196	10.04	0.76
GHF38	c	24	60	5.62	0.76
GHF39	c	35	91	7.54	0.91
GHF45	c	33	75	7.41	0.9
GHF47	c	33	106	6.86	0.83
GHF48	c	22	77	4.83	0.77
GHF52	c	39	132	7.78	0.83
GHF53	c	34	106	7.08	0.84
GHF56	c	45	371	7.44	0.58
GHF57	c	41	238	7.31	0.66
GHF58	c	39	171	7.39	0.78
GHF61	c	11	46	2.61	0.62
GHF62	c	24	100	4.99	0.59
GHF63	c	28	74	6.27	0.82
GHF64	c	31	67	7.13	0.9
GHF67	c	24	100	4.99	0.65
GHF68	c	14	79	2.98	0.48

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
GHF69	c	34	150	6.59	0.68
GHF70	c	16	45	3.94	0.8
GHF73	c	10	36	2.51	0.69
GHF74	c	23	91	4.88	0.7
GHF75	c	36	134	7.15	0.8
GHF77	c	11	33	2.86	0.8
GHF78	c	32	78	7.12	0.86
GHF06	d	13	19	4.08	0.96
GHF02	e	27	47	6.75	0.9
GHF05	e	33	72	7.48	0.92
GHF07	e	21	42	5.35	0.94
GHF15	e	23	41	5.92	0.95
GHF16	e	27	56	6.46	0.88
GHF26	e	22	43	5.58	0.91
GHF34	e	26	51	6.36	0.95
GHF42	e	20	44	5.02	0.9

3.6.5 Summary of characterising species and communities

Group ‘a’ included eight stations characterised by deep, gravelly sand with species such as *Goniadella gracilis, Chaetozone Christie, Aponuphis bilineata, Polygordius* and *Pisione remota.*

Group ‘b’ included two stations (GHF13 and GHF33) in deep, muddy gravel characterised by polychaetes such as *Dasybranchus* spp., *Hilbigneris gracilis* and *Spiophanes kroyeri* as well as the tube-dwelling anemone, *Cerianthus lloydii*.

The largest group included thirty-four stations clustered together at about 36% similarity to form group ‘c’. The stations within group ‘c’ were characterised by high numbers of the polychaete, *Dasybranchus* spp. and the bivalve mollusc, *Corbula gibba* along with other taxa such as *Terebellides stroemii, Glycera unicornis* and *Magelona minuta.*

The eight sampling stations of group ‘e’ clustered together at about 33% similarity with one outlying station, GHF06, which separated from this group at about 25% similarity. Group ‘d’ was characterised by deep, slightly gravelly sand with high numbers of the pea urchin, *Echinocyamus pusillus* and the bivalve mollusc, *Abra prismatica* and other taxa such as Nemertea and *Aonides paucibranchiata*. Station GHF06 (group ‘d’) was comprised of a similar faunal assemblage to group ‘e’ but in relatively lower numbers.

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 37, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated.

Table 37. Characterising species for multivariate groups at Greater Haig Fras MCZ, showing those with a contribution of over 1%.

Group 'c' **Species/Taxa**	**Average Abundance**	**%age contribution**
Dasybranchus	5.32	23.72
Corbula gibba	2.92	11.64
Abra nitida	1.91	6.51
Terebellides stroemii	1.37	4.76
Nemertea	1.32	4.63
Glycera unicornis	1.21	4.53
Magelona minuta	1.54	4.48
Spiophanes kroyeri	1.19	4.2
Phaxas pellucidus	1.36	3.73
Ampharete lindstroemi	1.06	3.33
Ampelisca spinipes	1	2.73
Galathowenia oculata	0.89	2.48
Amphicteis gunneri	0.78	2.07
Hilbigneris gracilis	0.9	2.06
Nephtys hystricis	0.64	1.67
Parvicardium minimum	0.77	1.41
Eclysippe vanelli	0.69	1.38
Ampharete falcata	0.57	1.29
Praxillella affinis	0.52	1.06

Group 'e' **Species/Taxa**	**Average Abundance**	**%age contribution**
Echinocyamus pusillus	3.41	16.57
Abra prismatica	2.52	13.08
Nemertea	2.11	9.87
Aonides paucibranchiata	1.72	6.98
Dasybranchus	1.8	5.84
Galathowenia oculata	1.53	5.81
Spiophanes bombyx	1.82	5.29
Spiophanes kroyeri	1.24	3.28
Aponuphis bilineata	1.01	3.09
Hilbigneris gracilis	1.64	3.03
Phaxas pellucidus	1.17	2.92
Aricidea (Acmira) laubieri	1.08	2.35
Sthenelais limicola	1.05	2.16
Ampelisca spinipes	1.03	1.83
Terebellides stroemii	0.79	1.82
Myriochele	0.94	1.77
Scoloplos (Scoloplos) armiger	0.84	1.62
Urothoe elegans	0.7	1.61
Polycirrus	0.78	1.13

Group 'a' Species/Taxa	Average Abundance	%age contribution
Goniadella gracilis	3	15.32
Chaetozone christiei (Type B)	2.43	9.57
Aponuphis bilineata	2.45	9.38
Nemertea	1.8	5.92
Dasybranchus	1.75	5.72
Pistella lornensis	1.45	5.59
Polygordius	1.7	5.43
Pisione remota	1.78	5.33
Galathowenia oculata	1.33	4.79
Aspidosiphon (Aspidosiphon) muelleri muelleri	1.25	3.58
Spiophanes kroyeri	1.17	3.2
Eulalia mustela	1.02	2.92
Glycera oxycephala	1.01	2.78
Echinocyamus pusillus	0.95	2.13
Protodorvillea kefersteini	0.91	1.89
Sphaerosyllis bulbosa	0.82	1.85
Aglaophamus agilis	0.64	1.43
Grania	0.82	1.43
Chone	0.88	1.37
Syllis	0.77	1.28

Group 'b' Species/Taxa	Average Abundance	%age contribution
Dasybranchus	5.03	24.87
Hilbigneris gracilis	4.68	19.85
Spiophanes kroyeri	2.21	8.59
Cerianthus lloydii	1.63	7.86
Notomastus	2.49	7.86
Ampelisca spinipes	1.65	5.56
Aspidosiphon (Aspidosiphon) muelleri muelleri	1.41	5.56
Laonice bahusiensis	1.04	4.96
Palliolum tigerinum	1.04	4.96

3.6.6 Biotope allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 38 with the spatial distribution of the groups and biotopes illustrated in Figure 48 and Figure 49. Table 59 in Appendix 1 presents the multivariate group and the biotope or habitat assigned to each sample with any comments noted from the processing such as impoverished samples or physical mismatches between sediment types and the biotopes assigned.

Sampling stations within group ‘a’ were characterised by *Goniadella gracilis, Chaetozone christiei, Aponuphis bilineata* and Nemertea. Although the community in group ‘a’ did not correlate exactly to existing offshore or circalittoral biotopes, there is currently sparse biological information provided for offshore coarse sediments; therefore, group ‘a’ has been assigned **SS.SCS.OCS** (Offshore circalittoral coarse sediment) based on the physical data provided.

The two stations of group ‘b’ (GHF13 and GHF33) were characterised by muddy gravel with the dominant taxa including the polychaetes, *Dasybranchus* spp. and *Hilbigneris gracilis* and as such have been assigned **SS.SMx.OMx** (Offshore circalittoral mixed sediment).

Group ‘c’ was composed of the muddiest stations with sandy mud characterised by *Dasybranchus* spp., *Corbula gibba, Abra nitida* and *Terebellides stroemii* and as such these stations best match the level four habitat, **SS.SMu.OMu** (Offshore circalittoral mud). At one station (GHF78) in group ‘c’, the presence of *Virgularia mirabilis* (Seapen - taxa removed as presence only recording) and one specimen of *Goneplax rhomboides* (angular crab which burrows into muddy sand) was recorded which could justify the allocation of **SS.SMu.CFiMu.SpnMeg** (Seapens and burrowing megafauna in circalittoral fine mud) and MCZ habitat FOCI ‘Sea-pen and burrowing megafauna communities’.

The larger numbers *Echinocyamus pusillus* and *Abra prismatica* in group ‘e’ supported the sandier substrate at these stations and as such were assigned to **SS.SSa.OSa** (Offshore circalittoral sand). The less rich station, GHF06, was assigned the same habitat type.

In summary Table 39 shows the biotope and habitats found within Greater Haig Fras MCZ with the characterising species and seabed substrate for each.

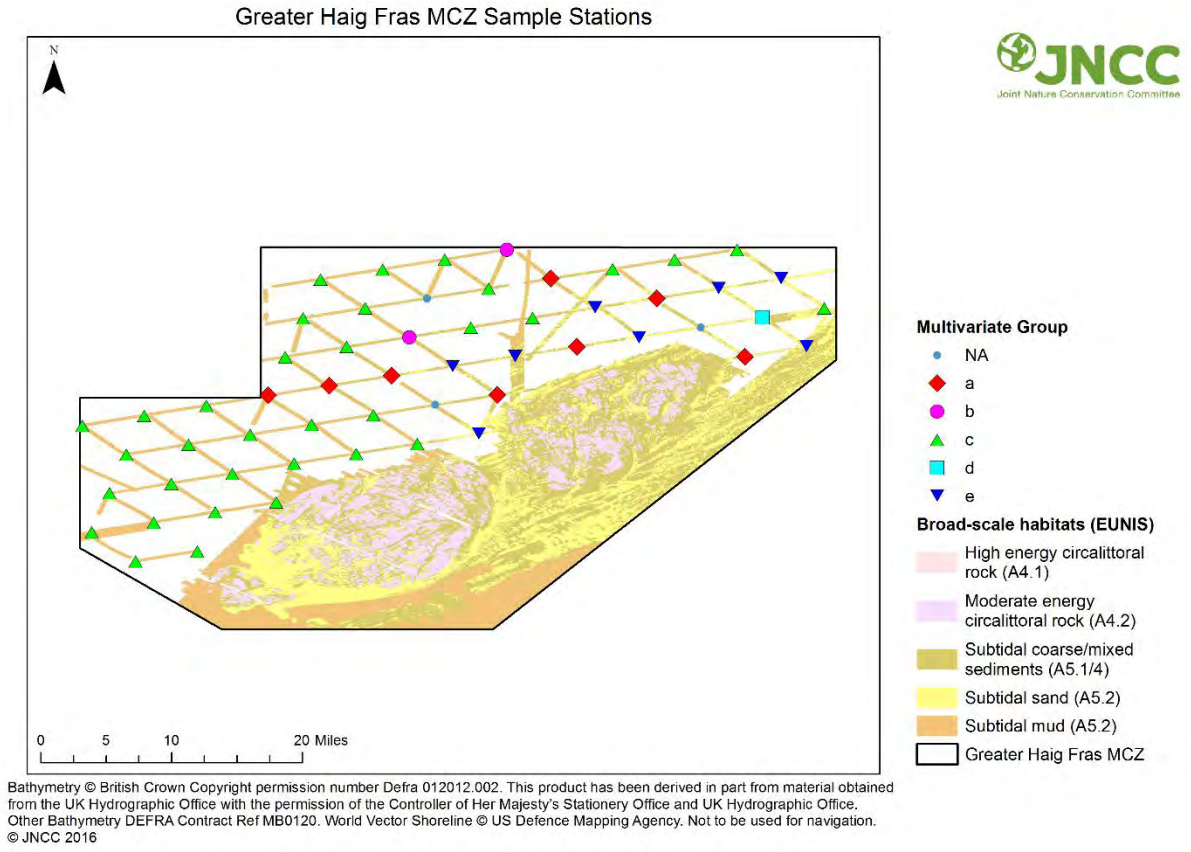

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Figure 48. Greater Haig Fras MCZ sample stations showing multivariate groups.

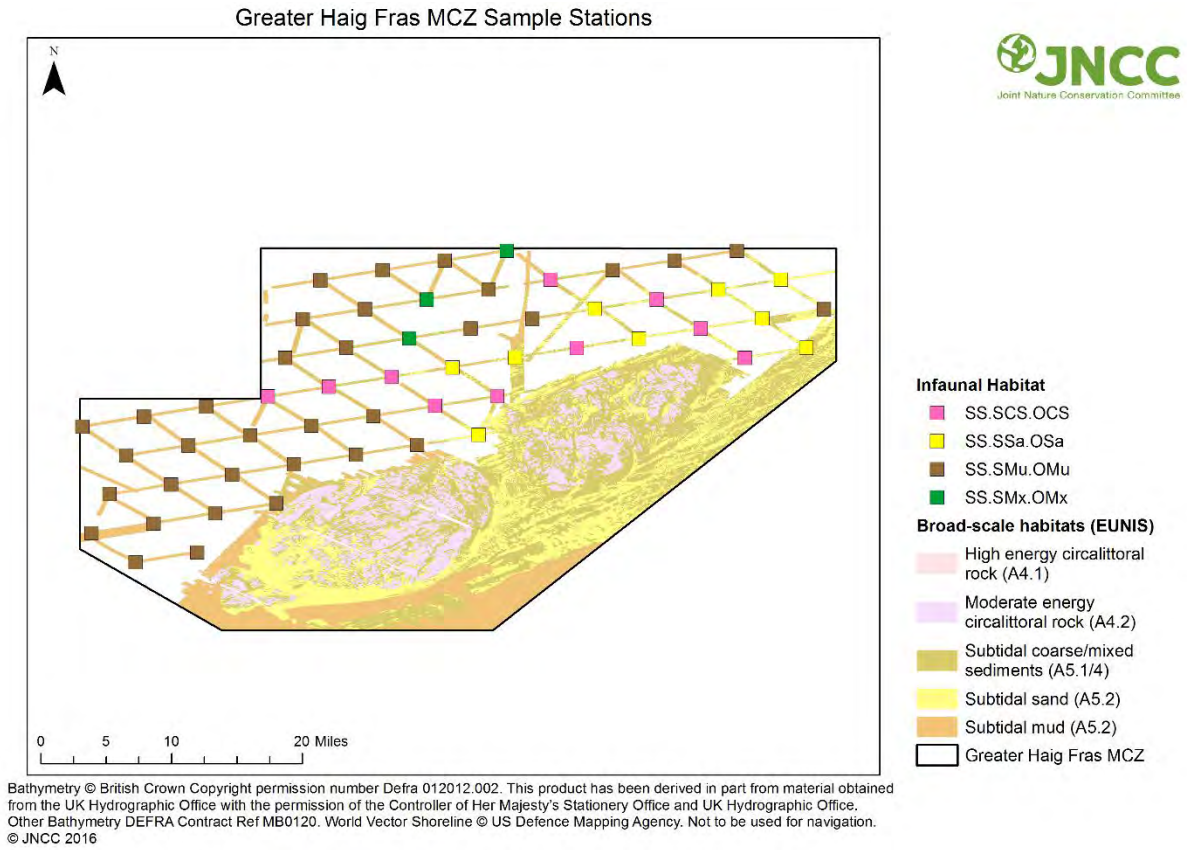

Figure 49. Greater Haig Fras MCZ sample stations showing biotope/habitats.

Table 38. Summary of multivariate statistical groups and associated habitats and biotopes from the Greater Haig Fras MCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	8	SS.SCS.OCS	Subtidal coarse sediment Subtidal sand
b	2	SS.SMx.OMx	Subtidal mixed sediments
c	34	SS.SMu.OMu	Subtidal mud Subtidal mixed sediments
d	1	SS.SSa.OSa	Subtidal sand
e	8	SS.SSa.OSa	Subtidal sand Subtidal mud

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 39. Summary of habitats/biotopes found within Greater Haig Fras MCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SCS.OCS	92 - 112	Coarse sediment	*Goniadella gracilis, Chaetozone christiei, Aponupis bilineata*	a
SS.SMx.OMx	105 - 107	Mixed sediments	*Dasybranchus, Hilbigneris gracilis, Spiophanes kroyeri*	b
SS.SMu.OMu	98 - 128	Mud and	*Dasybranchus,*	c

		sandy mud	*Corbula gibba,* *Abra nitida*	
SS.SSa.OSa	95	Sand and muddy sand	*Dasybranchus,* *Aricidea cerrutii,* Polycirrus *Echinocyamus pusillus,* *Abra prismatica,* Nemertea	d, e

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.6.7 Site Summary

Greater Haig Fras MCZ is designated to protect the broad-scale habitat 'Subtidal coarse sediment', 'Subtidal sand', 'Subtidal mud' and 'Subtidal mixed sediments'. All samples within the site have been allocated to habitats and biotopes which are part of these broad-scale habitats and therefore support the presence of these features.

Table 40 provides a summary for the habitats and biotopes present within Greater Haig Fras MCZ with associated broad-scale habitats and other analysis notes.

Table 40. Summary table for the habitat/biotopes for Greater Haig Fras MCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SCS.OCS	Subtidal coarse sediment/ Subtidal sand	a	92 – 112	*Goniadella gracilis,* *Chaetozone christiei,* *Aponupis bilineata*	Infaunal community does not correlate to an existing biotope; best match to SS.SCS.OCS based on physical data
SS.SMx.OMx	Subtidal mixed sediments	b	105 – 107	Dasybranchus, *Hilbigneris gracilis,* *Spiophanes kroyeri*	Species and physical data best match to SS.SMx.OMx
SS.SMu.OMu	Subtidal mud/ Subtidal mixed sediments	c	98 – 128	Dasybranchus, *Corbula gibba,* *Abra nitida*	Species and physical data best match to SS.SMu.OMu
SS.SSa.OSa	Subtidal sand/ Subtidal mud	d, e	95	Dasybranchus, *Aricidea cerrutii,* Polycirrus *Echinocyamus pusillus,* *Abra prismatica,* Nemertea	Species and physical data best match to SS.SSa.OSa

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.7 Offshore Overfalls MCZ

The Offshore Overfalls MCZ is a joint inshore and offshore site located in the eastern English Channel, approximately 18km south-east of the Isle of Wight (Figure 50). The seabed is predominantly coarse sediments with areas of sand, mixed sediments and exposed bedrock.

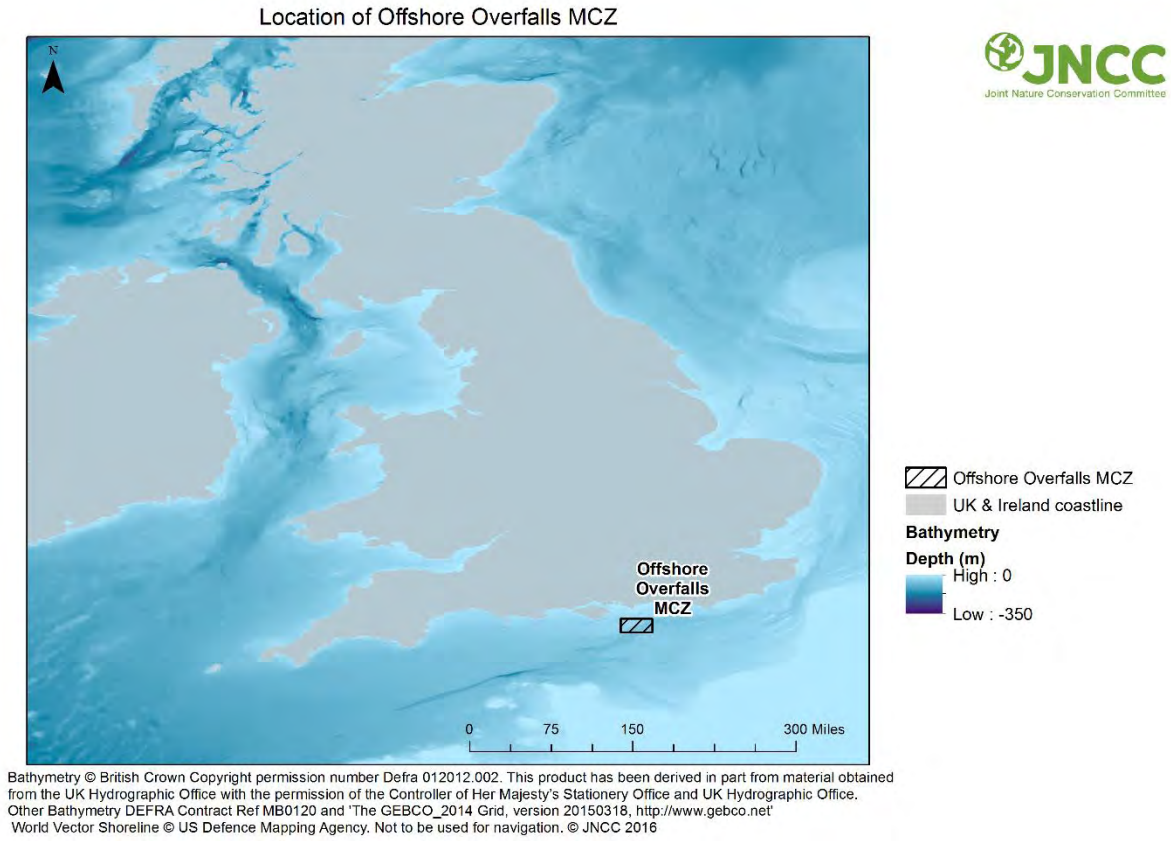

Figure 50. Offshore Overfalls MCZ location.

The site protects 593km^2 of seabed, including the English Channel outburst flood geomorphological features which are quaternary fluvio-glacial erosion features. The varieties of habitats found in the site support a diverse range of species. Sponges, hydroids and bryozoans cover the cobbles and boulders where crabs, sea stars and sea urchins abound. Burrowing worms live within the sediment alongside burrowing anemones and bivalves such as scallops.

The site was designated to protect the broad-scale habitats 'Subtidal coarse sediment', 'Subtidal sand' and 'Subtidal mixed sediments', along with the geomorphological feature of the English Channel outburst flood feature (JNCC 2015d).

Offshore Overfalls MCZ survey was carried in June 2012 (CEFAS 2013b). Multibeam bathymetry and sidescan data were collected along prospecting lines across the site, with additional areas targeted for potential features of conservation interest. Sediment samples were collected by grab (0.1 m^2 mini Hamon grab) and underwater camera sled (video and still images). A full account of the survey methods and results can be found in CEFAS (2013b) and Defra (2015g).

3.7.1 Site specific data processing and analysis

In total, 288 taxa were recorded from the 59 samples collected (Figure 51). Forty-seven taxa, were removed prior to statistical analysis and are listed in Table 41. These included:

- lifeforms such as eggs or larva (zoea): early or transitional life stages of most marine species are often ephemeral and only a temporary phase of the life cycle and therefore may not represent the taxa which typically structure the community;
- juveniles: can also be ephemeral in nature and when present in high numbers can have an overriding influence on the analysis;
- taxa with damage/uncertain identification: ambiguous records which could introduce uncertainty are removed to reduce discrepancies due to misidentification;
- species such as fish: mobile species are removed as they do not form part of the infaunal community and are not permanent members of the community structure;
- taxa with only presence/absence data (majority of which are epifaunal species): the presence/absence records are incompatible with the abundance data such as counts

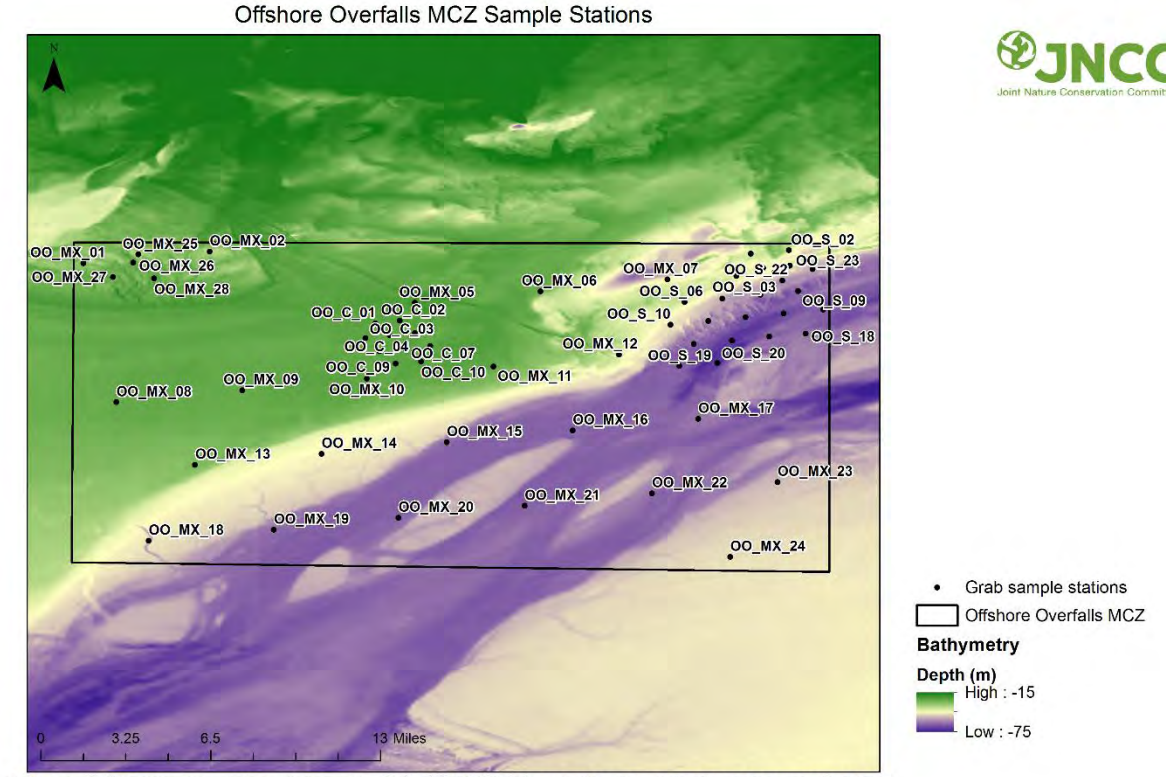

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Figure 51. Offshore Overfalls MCZ sample stations.

Table 41. Taxa removed from the Offshore Overfalls MCZ data.

Taxa	Reason Removed	Taxa	Reason Removed
Abra sp. Indet dam.	Damaged	Nereididae	Damaged/juveniles
Amphicteis	Juveniles	Nichomachinae sp. Indet	Indetermined
Annelida fragments	Fragments	Opheliidae	Juveniles
Autolytinae	Stolon (fragment)	*Ophiothrix fragilis* fragments	Fragments
Bivalvia sp. Indet dam.	Damaged	Ophiura	Juveniles
Chlamys	Juveniles	Ophiura sp. fragments	Fragments
Crustacea Fragments	Fragments	Ophiuroidea indet. juv.	Juveniles
Decapoda fragments	Fragments	Phyllodocidae	Damaged/juveniles
Decapoda indet. zoea	zoea (larval form)	Polynoidae	Damaged/juveniles
Echinodermata Fragments	Fragments	*Psammechinus miliaris*	Juveniles
Eulalia sp. juv.	Juveniles	Sabellidae	Damaged
Eunicidae sp. Fragments	Fragments	Sipuncula sp. juv./dam.	Damaged/juveniles
Eunicidae sp. juv.	Juveniles	Spionidae	Damaged
Gammaridea	Damaged	Spirobranchus sp. Indet. Dam	Damaged
Gastropoda sp. Indet damaged	Damaged	Syllidae	Damaged
Glycera indet juv.	Juveniles	Terebellida	Damaged
Gobiesocidae	Juveniles	Balanus	Presence data
Hesionidae	Damaged	Campanulariidae	Presence data
Liocarcinus	Juveniles	Tubulanus	Presence data
Lumbrineridae	Juveniles	Goniadidae	No species present
Maldanidae	Damaged	Sipuncula sp. juv./dam.	Damaged/juveniles
Melitidae	Damaged	Spisula sp.juv	Juveniles
Mollusca Fragments	Fragments	*Ammodytes tobianus*	Not infaunal
Nephtys indet. Dam./juv.	Damaged/juveniles		

3.7.2 Summary of physical habitats

A summary of key parameters of particle size analysis data is provided in Table 60 in Appendix 1. The majority of the samples (75%) are shown to be coarse sediments with only one station (OO_S_07) being predominantly sand, the remaining samples comprise of mixed substratum and occur in the shallower areas to the north-east and north-western areas of the site.

The spatial distribution of sediment types is illustrated in Figure 38 which highlights sediment composition (% sand, gravel and mud) and the broad-scale habitat map generated from the 2012 survey.

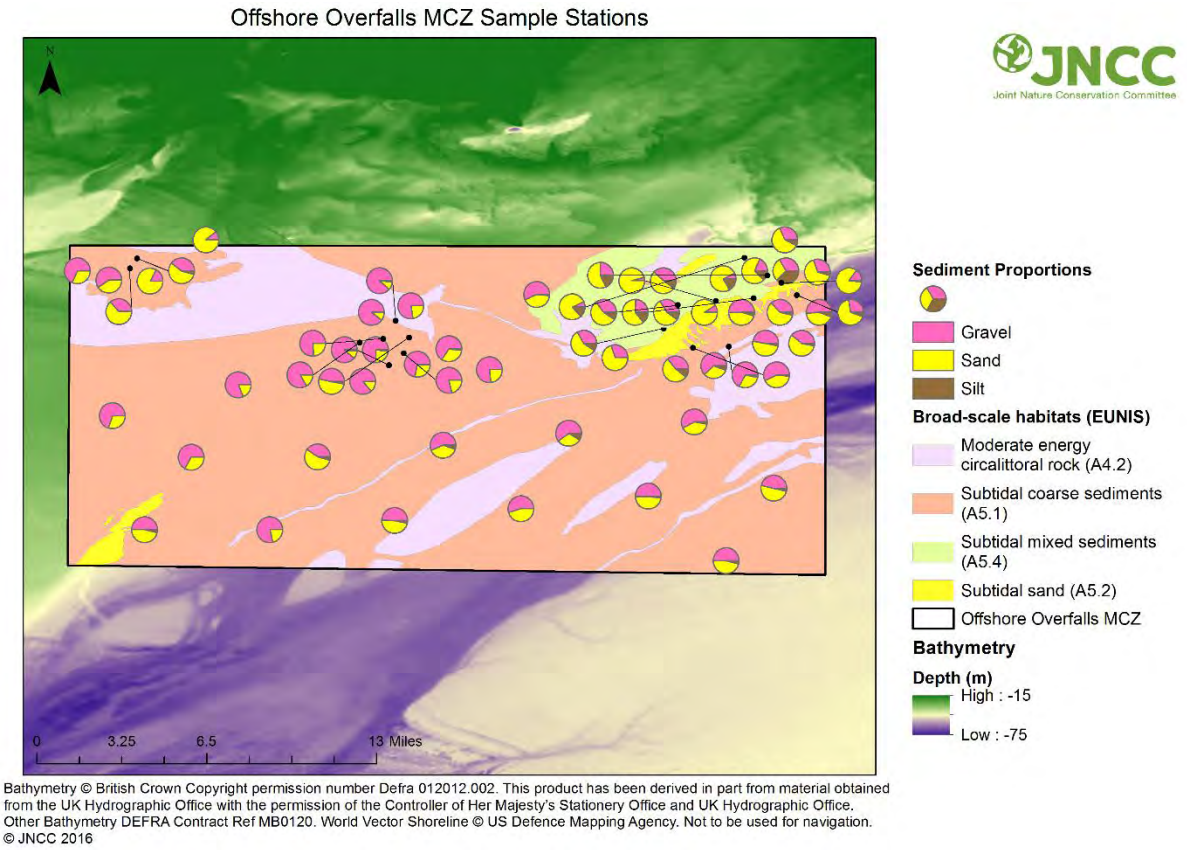


Figure 52. Offshore Overfalls MCZ sediment composition of grab samples with broad-scale habitat map.

3.7.3 Statistical results for Offshore Overfalls MCZ

The SIMPROF routine was used to define sample groups with similar species composition and Figure 53 displays the results of the cluster analysis on the infaunal data. The dendrogram is based on group-averaged Bray-Curtis similarities computed on standardised, square root transformed abundances. Due to the homogeneity of the infaunal community a slice at a similarity level of 20% was used to differentiate between the main groupings. This similarity 'slice' was used to group samples which otherwise are separated due to small variations showing no practical ecological groupings within an otherwise homogeneous community.

Figure 54 shows the three dimensional MDS plot of the same similarities. The stress value of 0.17 gives confidence that the three dimensional plot is an accurate representation of the sample relationships.

The similarities between samples ranged from about 10% to 60%, with three groups identified ('c', 'd' & 'f') and three outlying samples ('a', 'b' & 'e'). The taxa that contributed to the three main groups are shown in Table 43, excluding the outlying groups as they had less than 2 samples in each group. The taxa which contributed to greater than 1% of the similarity for each of the biological groups based on the results of the SIMPER analysis are shown. The main division between samples split group 'f' from the other groups at about 15% similarity.

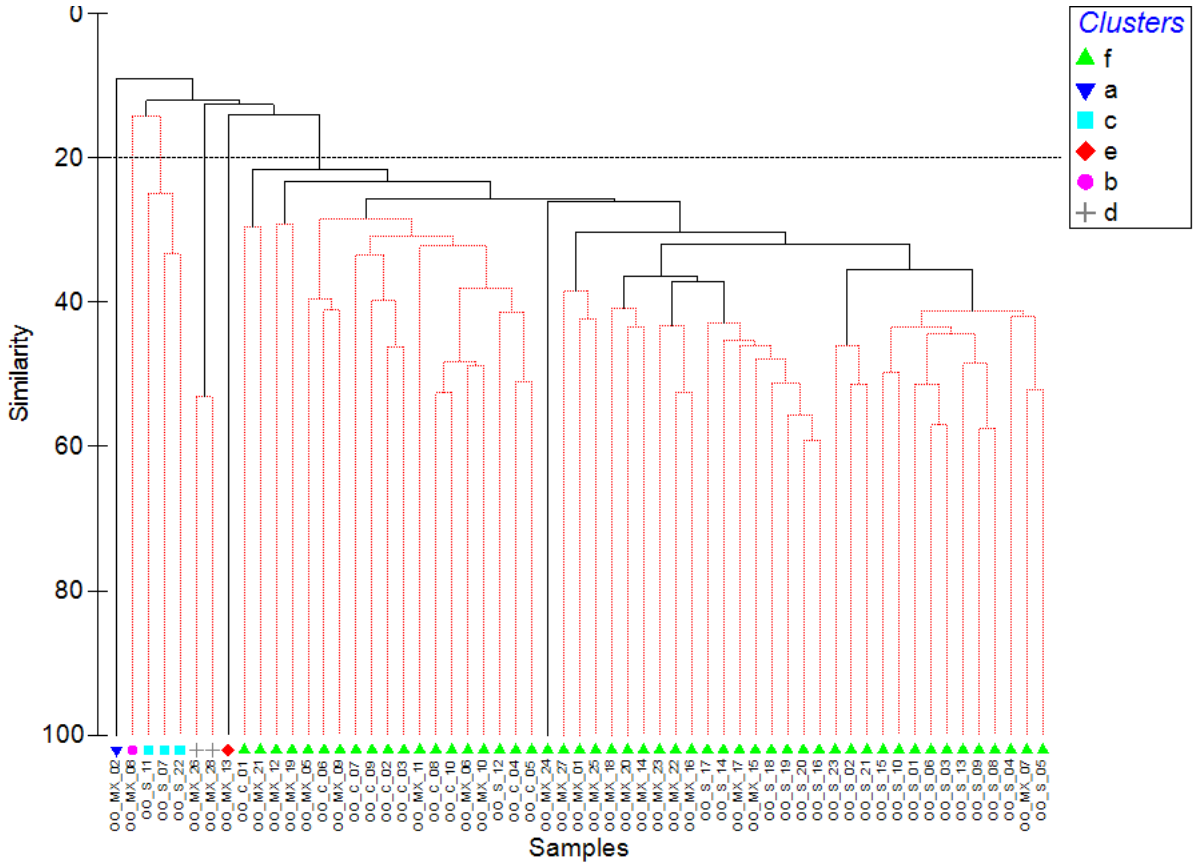


Figure 53. Offshore Overfalls MCZ dendrogram using similarities from abundance data.

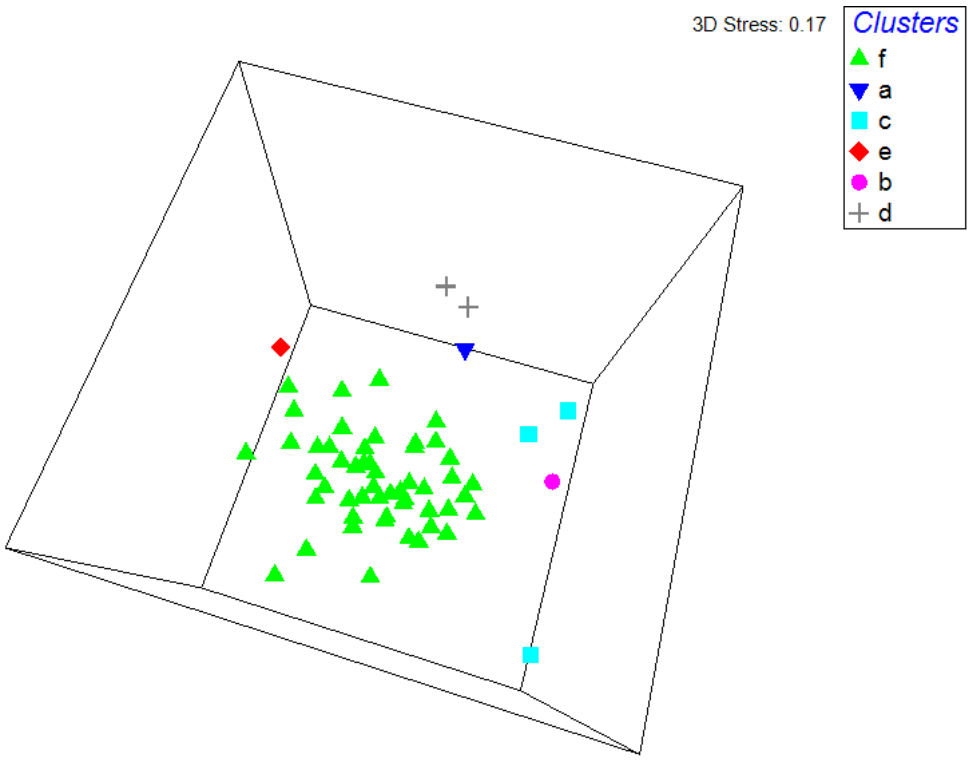


Figure 54. Offshore Overfalls MCZ MDS plot from abundance data.

3.7.4 Univariate Results

The numbers of taxa per sample (S), number of individuals per sample (N), values of Margalef's species richness index (d) and Pielou's evenness index (J') are presented in Table 42.

The multivariate analysis for Offshore Overfalls MCZ resulted in six groups, with the majority of samples clustering into one large group 'f', three sample stations in group 'c', two sample stations in group 'd', and only one sample station in groups 'a', 'b', and 'e'.

The univariate analysis results showed that for group 'f', the densities of infaunal organisms were low to moderate, with the number of taxa recorded (per sample) ranging from 8 to 49 (mean 26.35) and the number of individuals (per sample) ranging from 8 to 210, with a mean of 65.86. The group appears to exhibit variable levels of diversity in terms of Margalef's index (ranging from 3.18 to 9.89, mean 6.14) and also a variable level of evenness with Pielou's index ranging from 0.63 to 1.00 and a mean of 0.88.

For group 'c', the densities of infaunal organisms were low suggesting an impoverished community, with the number of taxa recorded (per sample) ranging from 6 to 8 (mean 7.00) and the number of individuals (per sample) ranging from 11 to 13 (mean 12.00). This group exhibits low levels of diversity in terms of Margalef's index, ranging from 1.95 to 2.92, with a mean of 2.43, and a high level of evenness with Pielou's index ranging from 0.90 to 0.96 and a mean of 0.94.

The groups 'a', 'b', and 'd' also showed low species densities, with the total no. of taxa per sample ranging from 3 to 7, and the no. of individuals per sample ranging from 5 to 11. These groups also showed low levels of diversity, with Margalef's indices of between 1.24 and 2.73, and a high level of evenness and Pielou's index ranging from 0.79 to 1.00. The remaining group 'e' had a slightly higher species density with 21 taxa and 125 individuals recorded, and a moderate diversity (Margalef's index of 4.14) and level of evenness (Pielou's index of 0.47) suggesting the presence of a few dominating species.

Table 42. Diversity indices and summary univariate statistics for Offshore Overfalls MCZ infaunal samples.

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
OO_MX_02	a	4	4	2.16	1
OO_MX_08	b	7	9	2.73	0.97
OO_S_07	c	7	12	2.41	0.9
OO_S_11	c	6	13	1.95	0.96
OO_S_22	c	8	11	2.92	0.95
OO_MX_26	d	3	5	1.24	0.86
OO_MX_28	d	6	11	2.09	0.79
OO_MX_13	e	21	125	4.14	0.47
OO_C_01	f	13	19	4.08	0.94
OO_C_02	f	21	42	5.35	0.9
OO_C_03	f	19	44	4.76	0.81
OO_C_04	f	25	43	6.38	0.92
OO_C_05	f	22	38	5.77	0.96
OO_C_06	f	12	19	3.74	0.95
OO_C_07	f	16	24	4.72	0.96
OO_C_08	f	32	72	7.25	0.81

Station code	Group	Total taxa (S)	Total individuals (N)	Margalef's (d)	Pielou's (J')
OO_C_09	f	14	23	4.15	0.91
OO_C_10	f	30	74	6.74	0.73
OO_MX_01	f	31	62	7.27	0.96
OO_MX_05	f	8	8	3.37	1
OO_MX_06	f	23	77	5.06	0.69
OO_MX_07	f	36	82	7.94	0.9
OO_MX_09	f	16	21	4.93	0.96
OO_MX_10	f	21	72	4.68	0.63
OO_MX_11	f	28	60	6.59	0.88
OO_MX_12	f	10	17	3.18	0.85
OO_MX_14	f	36	74	8.13	0.88
OO_MX_15	f	23	46	5.75	0.94
OO_MX_16	f	31	59	7.36	0.89
OO_MX_17	f	29	62	6.78	0.92
OO_MX_18	f	29	86	6.29	0.88
OO_MX_19	f	20	29	5.64	0.96
OO_MX_20	f	23	52	5.57	0.88
OO_MX_21	f	12	20	3.67	0.91
OO_MX_22	f	23	48	5.68	0.89
OO_MX_23	f	49	128	9.89	0.88
OO_MX_24	f	20	91	4.21	0.85
OO_MX_25	f	43	101	9.1	0.91
OO_MX_27	f	24	39	6.28	0.93
OO_S_01	f	47	194	8.73	0.84
OO_S_02	f	44	210	8.04	0.82
OO_S_03	f	35	97	7.43	0.87
OO_S_04	f	18	34	4.82	0.91
OO_S_05	f	32	66	7.4	0.92
OO_S_06	f	30	74	6.74	0.83
OO_S_08	f	30	83	6.56	0.85
OO_S_09	f	34	85	7.43	0.88
OO_S_10	f	23	55	5.49	0.89
OO_S_12	f	16	41	4.04	0.85
OO_S_13	f	30	64	6.97	0.88
OO_S_14	f	37	84	8.12	0.87
OO_S_15	f	33	57	7.91	0.91
OO_S_16	f	24	92	5.09	0.84
OO_S_17	f	26	48	6.46	0.9
OO_S_18	f	14	27	3.94	0.89
OO_S_19	f	26	79	5.72	0.81
OO_S_20	f	31	84	6.77	0.84
OO_S_21	f	38	130	7.6	0.88
OO_S_23	f	37	123	7.48	0.84

3.7.5 Summary of characterising species and communities

Outlying groups ‘a’ and ‘b’ (stations OO_MX_02 & OO_MX_08 respectively) were relatively similar and were characterised by sandy gravel/gravelly sand with impoverished infaunal communities.

The three stations within group ‘c’ (stations OO_S_11, OO_S_07 & OO_S_22) in (slightly) gravelly sand were characterised by species such as *Spisula elliptica, Nephtys cirrosa, Hilbigneris gracilis, Spio armata* and *Glycera lapidum*.

Group ‘d’ (stations OO_MX_26 & OO_MX_28) was characterised by sandy gravel/gravelly sand with low numbers of infauna including *Glycera lapidum* and *Notomastus latericeus*. Outlying group ‘e’ (station OO_MX_13) in sandy gravel was characterised by species such as *Sabellaria spinulosa, Musculus discors* and *Eunereis longissimi*.

The largest group ‘f’ was characterised by species such as *Notomastus latericeus, Hilbigneris gracilis, Spirobranchus lamarcki, Echinocyamus pusillus* and *Glycera lapidum*.

The species which form the characterising species for each of these groups, with a percentage contribution of over 1%, are shown in Table 43, excluding the outlying groups which had 2 or less samples in each group for which data cannot be generated.

Table 43. Characterising species for multivariate groups within Offshore Overfalls MCZ infaunal samples, showing those with a contribution of over 1%.

Group ‘f’ Species/Taxa	**Average Abundance**	**%age contribution**
Notomastus latericeus	2.5	14.15
Hilbigneris gracilis	2.51	13.07
Spirobranchus lamarcki	2.3	8.88
Echinocyamus pusillus	2.13	8.36
Glycera lapidum	1.27	5.58
Laonice bahusiensis	1.31	4.54
Nemertea	1.15	4.53
Leptochiton asellus	1.06	3.69
Polycirrus medusa	0.97	3.13
Leiochone johnstoni	0.9	2.93
Ophiothrix fragilis	0.9	2.06
Mediomastus fragilis	0.83	2.05
Polycirrus	0.78	1.92
Pisidia longicornis	0.84	1.63
Sabellaria spinulosa	0.8	1.5
Pholoe inornata	0.64	1.47
Aonides paucibranchiata	0.53	1.06
Group ‘c’ Species/Taxa	**Average Abundance**	**%age contribution**
Spisula elliptica	3.69	45.52
Nephtys cirrosa	2.31	14.05
Hilbigneris gracilis	2.67	13.73
Spio armata	1.89	13.55

Glycera lapidum	1.97	13.15
Group 'd' Species/Taxa	**Average Abundance**	**%age contribution**
Glycera lapidum	7.57	71.01
Notomastus latericeus	3.74	28.99

Table 44. Summary of habitats/biotopes found within Holderness Offshore rMCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SCS.CCS	22 - 56	Coarse sediment	*Eunereis longissimi Glycera lapidum, Hilbigneris gracilis, Lanice conchilega Musculus discors, Nephtys cirrosa, Notomastus latericeus Ophelai borealis, Parapleustes bicuspis*, Polycirrus, *Sabellaria spinulosa, Spio armata, Spisula elliptica, Syllis variegata*	ab,c,d,e
SS.SCS.CCS.MedLumVen	17 - 68	Coarse/ mixed sediments	*Echinocyamus pusillus*, *Glycera lapidum Hilbigneris gracilis*, *Notomastus latericeus*, *Spiroranchus lamarcki*	f

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.7.6 Biotope Allocation

The groupings produced from the multivariate analysis have been matched to biotopes as defined by the Marine Habitats Classification for Britain and Ireland (JNCC 2015) and using the recent guidance by Parry (2015). Possible candidate biotopes were selected on the basis of species composition, physical parameters, such as sediment and depth, and the results of the multivariate analysis. The taxa which were removed during data processing prior to statistical analysis were reviewed and considered within the biotope allocation process.

A description of habitat types/biotopes allocated to each of the sampling stations is given below and summarised in Table 45 and detailed in Appendix1, Table 60 and Table 61The spatial distribution of the groups and biotopes are illustrated in Figure 55 and Figure 56.

Infaunal samples were cross-referenced with epibenthic stations and still images and video footage were utilised to assist in determining the nature of the seabed and the likely community types to occur in the site.

Sampling stations OO_MX_02 and OO_MX_08 were impoverished with the total number of taxa ranging from four to seven and the total number of individuals ranging from four to nine, therefore, it was necessary to revert back to physical data to attribute the habitat type, **SS.SCS.CCS** (Circalittoral coarse sediment).

The infaunal community of group ‘c’ consisted of the presence of *Spisula elliptica, Nephtys cirrosa, Hilbigneris gracilis* and *Glycera lapidum*, which are often recorded in SS.SCS.ICS.Glap (*Glycera lapidum* in impoverished mobile gravel and sand). However, the depth of 56m for these stations suggested a deeper circalittoral biotope and SS.SCS.CCS (Circalittoral coarse sediment) has been assigned.

Group ‘d’ (stations OO_MX_26 & OO_MX_28) included impoverished sampling stations with the total number of taxa ranging from three to six per station, and the total number of individuals ranging from five to eleven. Therefore, it was necessary to revert back to the physical data to assign the habitat type SS.SCS.CCS (Circalittoral coarse sand) as there was insufficient taxa to assign an appropriate biotope.

Stations within group ‘f’ were characterised by comparatively high numbers of *Notomastus latericeus, Hilbigneris gracilis*, *Spirobranchus lamarcki* along with *Echinocyamus pusillus* and *Glycera lapidum*. As such these stations have been assigned the biotope **SS.SCS.CCS.MedLumVen** (*Mediomastus fragilis, Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel), albeit with a somewhat reduced *Mediomastus fragilis* component.

In summary Table 46 shows the biotope and habitats found within Offshore Overfalls MCZ with the characterising species and seabed substrate for each.

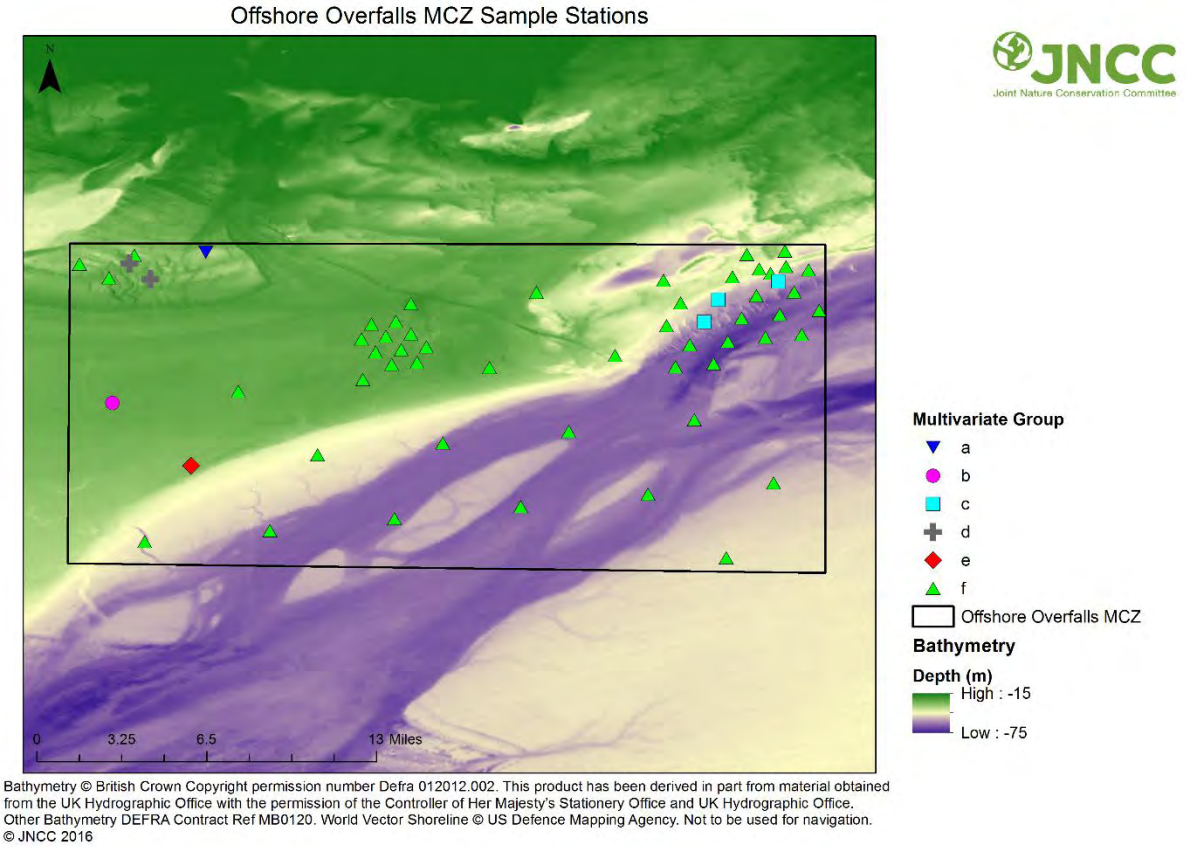


Figure 55. Offshore Overfalls MCZ sample stations showing multivariate groups.

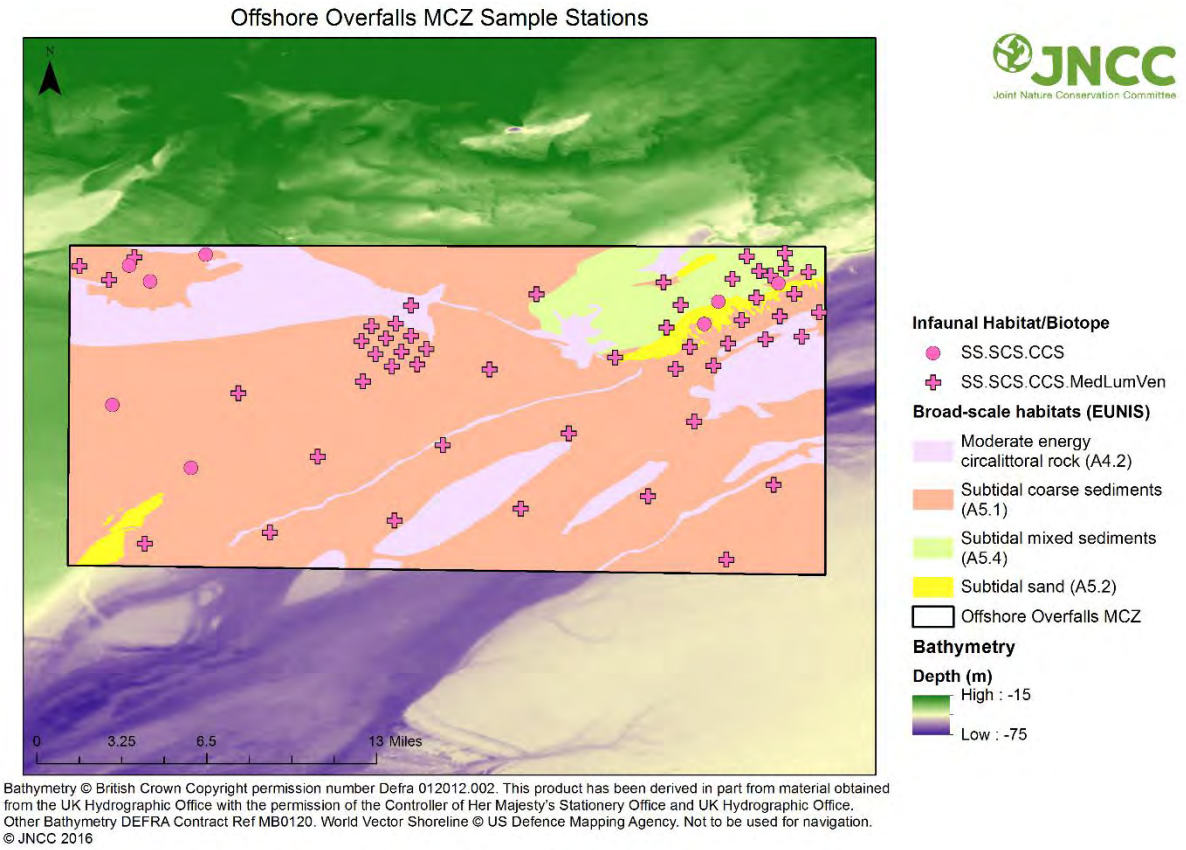


Figure 56. Offshore Overfalls MCZ sample stations showing biotope/habitats.

Table 45. Summary of multivariate statistical groups and associated habitats and biotopes from the Offshore Overfalls MCZ.

Multivariate Group	Number of Samples	Biotope Code*	Broad-scale Habitat
a	1	SS.SCS.CCS	Subtidal coarse sediment
b	1	SS.SCS.CCS	Subtidal coarse sediment
c	3	SS.SCS.CCS	Subtidal coarse sediment Subtidal sand
d	2	SS.SCS.CCS	Subtidal coarse sediment
e	1	SS.SCS.CCS	Subtidal coarse sediment
f	51	SS.SCS.CCS.MedLumVen	Subtidal coarse sediment Subtidal mixed sediments

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

Table 46. Summary of habitats/biotopes found within Offshore Overfalls MCZ.

Habitat/Biotope*	Depth range (m)	Substratum	Infaunal community	Multivariate groups
SS.SCS.OCS	92 - 112	Coarse sediment	*Eunereis longissimi Glycera lapidum, Hilbigneris gracilis, Lanice conchilega Musculus discors, Nephtys cirrosa, Notomastus latericeus Ophelai borealis, Parapleustes bicuspis, Polycirrus, Sabellaria spinulosa, Spio armata, Spisula elliptica, Syllis variegata*	a,b,c,d,e
SS.SCS.CCS.MedLumVen	17-68	Coarse/ mixed sediments	*Notomastus latericeus, Hilbigneris gracilis, Spiroranchus lamarcki, Echinocyamus pusillus, Glycera lapidum*	f

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

3.7.7 Epibenthic Analysis

Epibenthic data obtained from video data for 21 sites (Figure 57) within the Offshore Overfalls MCZ were analysed using multivariate statistics.

The data for the video samples were provided as SACFOR abundances. As no counts or abundance data were available, the data was changed to presence/absence data and underwent a presence/absence transformation within PRIMER-E.

Results from this proved to be inconclusive with two statistically distinct groups being revealed but when examined further these had very little biological difference with lower numbers of taxa present likely to be causing the dissimilarity.

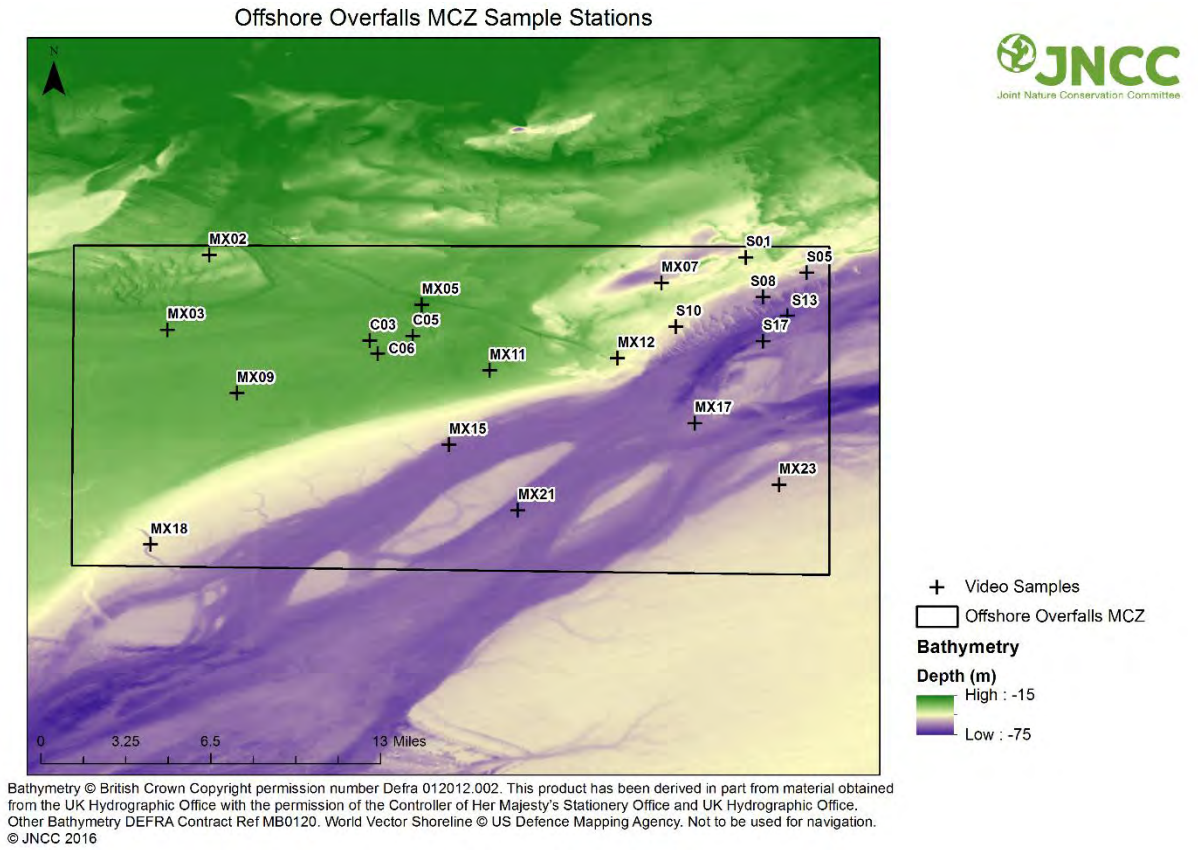


Figure 57. Offshore Overfalls MCZ video sample stations.

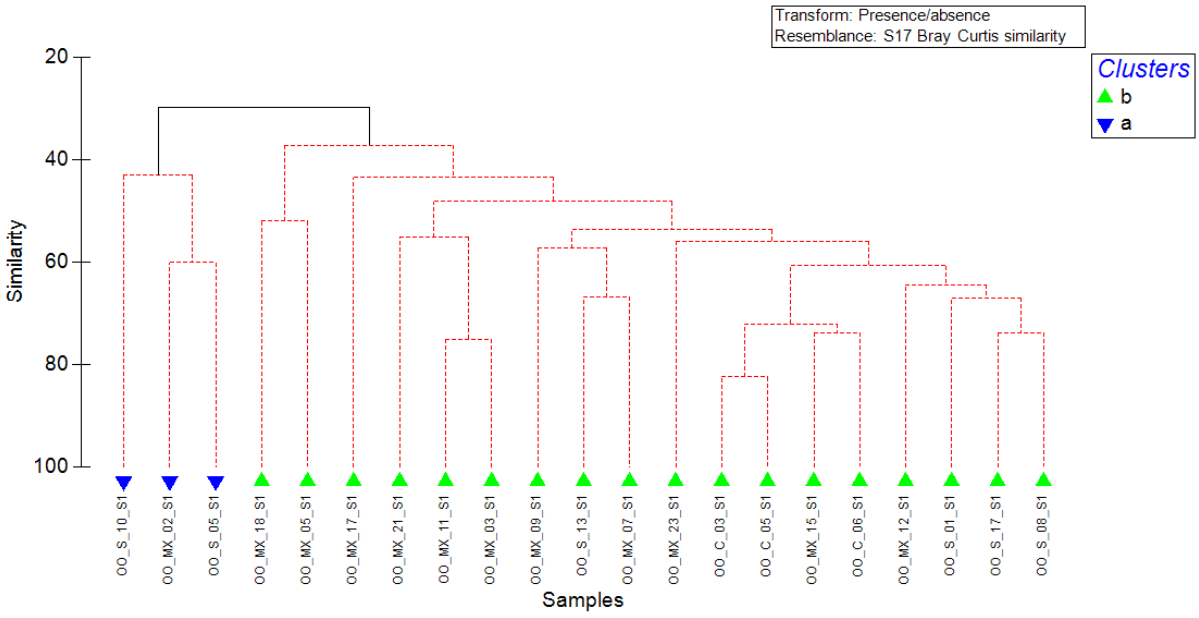


Figure 58. Offshore Overfalls MCZ dendrogram using similarities from abundance data for epibenthic video data.

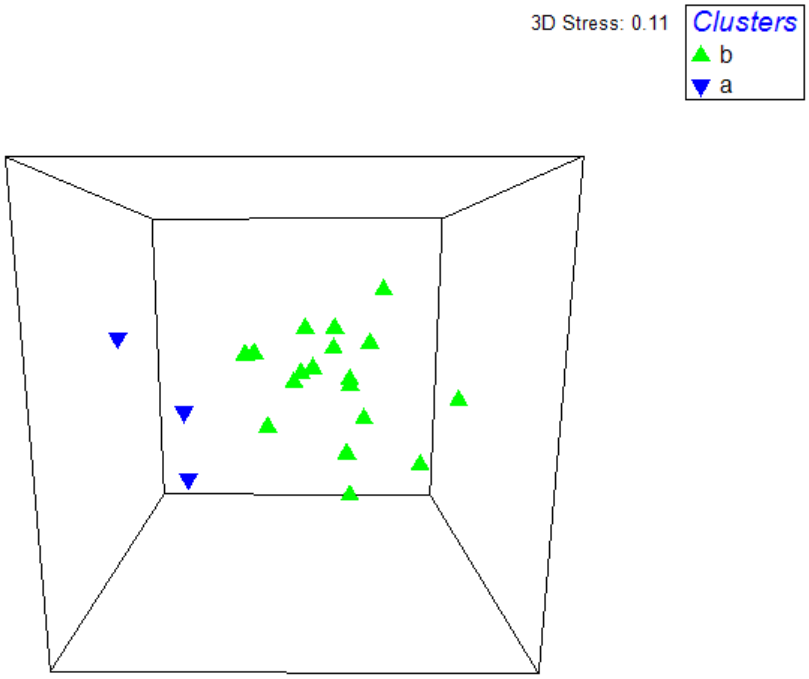


Figure 59. Offshore Overfalls MCZ MDS plot from presence/absence data from epibenthic video data.

The two groups identified showed little biological difference other than group ‘b’ having a greater presence of faunal turf species. As this analysis revealed little biological discrimination between the stations the communities assigned by expert visual interpretation (Seastar 2012) were reverted to and these are shown with the infaunal communities in Figure 60.

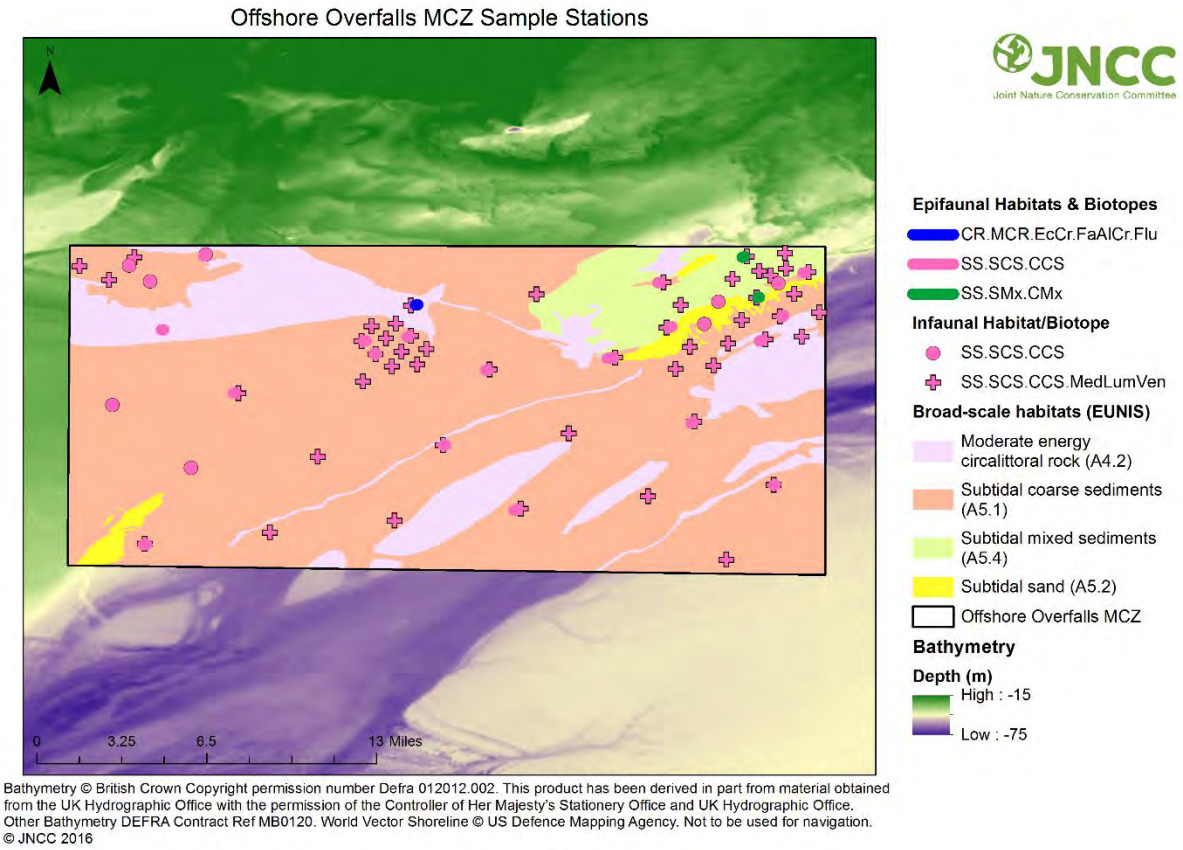


Figure 60. Offshore Overfalls MCZ video and grab sample stations showing biotope/habitats.

In general, the epibenthic video analysis and infaunal analysis concur with 18 of 21 sites being allocated to the same habitat from both video and infaunal processing. In places (video sites MX05, S01 & S08) the epibenthic video communities identified from video differ from infaunal communities.

MX05 is identified as CR.MCR.EcCr.FaAlCr.Flu (*Flustra foliacea* on slightly scoured silty circalittoral rock) yet the associated infaunal sample (OO_MX_05) is attributed to SS.SCS.CCS.MedLumVen (*Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel). This difference can be explained by the samples station not being precisely spatially coincident with a distance of over 150m between positions recorded for the two samples. If the seabed was heterogeneous then it is possible the two samples selected different seabed habitats and the CR.MCR.EcCr.FaAlCr.Flu biotope is identified as scoured suggesting proximity to a sedimentary habitat.

The remaining mismatched stations are allocated to SS.SMx.CMx (Circalittoral mixed sediment) from video analysis and SS.SCS.CCS (Circalittoral coarse sediment) from infaunal analysis but it is noted the broad scale habitat for the station is Subtidal mixed sediments suggesting the infaunal species composition is not exclusively found within the coarse sediments.

3.7.8 Site Summary

Offshore Overfalls MCZ is designated to protect the broad-scale habitats'Subtidal coarse sediment', 'Subtidal sand' and 'Subtidal mixed sediments'. All infaunal samples and all, except one, epifaunal samples within the site have been allocated to habitats and biotopes which are part of these broad-scale habitats and therefore support the presence of these

features. Table 47 provides a summary for the habitats and biotopes present within Offshore Overfalls MCZ with associated broad-scale habitats and other analysis notes.

Table 47. Summary table for the habitat/biotopes for Offshore Overfalls MCZ.

Biotope Code*	Broad-scale Habitat	Group	Depth (m)	Infaunal community	Comments
SS.SCS.CCS	Subtidal coarse sediment	a, b	92 - 112	Sparse polychaetes	Impoverished communities; reverted to physical data to assign habitat type
SS.SCS.CCS	Subtidal coarse sediment	c	56	*Spisula elliptica, Nephtys cirrosa, Hilbigneris gracilis, Glycera lapidum*	Characteristic species of SS.SCS.ICS.Glap; depth suggests a deeper circalittoral biotope
SS.SCS.CCS	Subtidal coarse sediment	d	22 - 24	*Glycera lapidum, Notomastus latericeus*	Impoverished community; reverted to physical data to assign habitat type
SS.SCS.CCS	Subtidal coarse sediment	e	30	*Sabellaria spinulosa, Musculus discors, Eunereis longissimi*	Higher numbers of *Sabellaria spinulosa* differentiates this group, not enough numbers to constitute at reef
SS.SCS.CCS. MedLumVen	Subtidal coarse sediment/ Subtidal mixed sediments	f	17 - 68	*Notomastus latericeus, Hilbigneris gracilis, Spiroranchus lamarcki, Echinocyamus pusillus, Glycera lapidum*	Species and physical data best match to SS.SCS.CCS.MedLum Ven, with a reduced *Mediomastus fragilis* component

* Marine Habitat Classification for Britain and Ireland (JNCC 2015)

4 Limitations

The results and analyses from the projects have a range of limitations, issues and assumptions associated with each stage of data processing, analysis and production of results.

All data sources are assumed to be accurate and of suitable quality to be processed and undergo analyses and it is noted all data have been produced to national guidelines where applicable. Within certain sites (Farnes East MCZ and North-West of Jones Bank MCZ) data from multiple surveys were analysed. These datasets were collected at different times, by different contractors using different sampling equipment. In these cases, it has been assumed that the data are equivalent and comparable and data were processed together. No bias was noted between sampling devices or timescales; however, no specific investigation has been undertaken as part of this project to detect any variation.

When processing data, certain steps are taken to attempt to standardise the dataset and ensure data are suitable for analysis. This includes the removal of taxa records which are assumed to be either irrelevant to community structure or which provide overriding influences on analysis. Data provided solely in presence/absence information are also generally excluded as they can no be used in combination with abundance (count) data for multivariate analysis. The effect of this process is moderated by reviewing the removed taxa at a later stage to determine if their presence may have influenced the final results and where they should be considered characterising species for biotope allocation.

The underlying statistical analysis routine, Bray Curtis similarity, assumes that data are from equivalent samples (size or volume) and whilst data do undergo standardisation routines there still may be an effect of small sample sizes in the analysis and outputs. The total number of taxa which are found in each sample could be due to natural variation such as impoverishment or alternatively due to small sample size which is difficult to standardise. To mitigate this limitation, the field reports were reviewed for each site and this information has been noted and accounted for where relevant.

The multivariate groups derived as part of the analysis undertaken within this project are used to identify the habitat and biotopes present within each site. Matching results to the habitat classification is not a precise science and the opinion of the analyst in the choice of a suitable biotope introduces some subjectivity. This should be considered if the data is utilised within further studies. A thorough quality control process ensured all results from this report were verified by a second analyst who was not involved with the data processing; mitigating this limitation.

Whilst undertaking the analysis, epibenthic data (video and still images) were reviewed to confirm or provide guidance on biotopes which may be present within sites. In some cases, (specifically, Offshore Overfalls MCZ and North-West of Jones Bank MCZ) video or still imagery were not available for all infaunal samples. Coincidence video/still data and grab sample data for all sample stations could have been of assistance and may be considered a limitation within the data available. It is therefore recommended that where resources allow, coincident epibenthic and infaunal data are collected or made available.

The timescales (08/02/2016-31/03/2016) for this project were restricted, and whilst some sites (Offshore Overfalls MCZ and North-West of Jones Bank MCZ) have benefited from epifaunal data being analysed from video and still images, limited time has meant groundtruthing data (video and stills) were used as a reference source only for the remaining sites. A more complete analysis with consideration of the eipfaunal data would have been incorporated into the results had more time been allocated.

Each individual MCZ/rMCZ site has been surveyed separately, with each site survey being conducted by a range of staff or contractors, over varying timescales, and the resulting data processed and analysed by various sources. As these factors vary between sites, each MCZ/rMCZ site has been considered independently and analysed as such. This introduces the limitation that the results for each site cannot be compared and it is recommended that comparisons between MCZ/rMCZ sites are not made.

Sample data for the MCZ/rMCZ is limited in terms of number of sample stations and the distribution of sample stations throughout each site. Each survey has restricted resources and scientifically justified sampling strategies have been used to optimise sampling for specific features or geographic areas. These sampling strategies and locations provide an evidence base which is extrapolated across the whole site and this may generalise the site or overlook the presence of habitat mosaics or other small scale variations.

5 References

CEFAS. 2014a. *Farnes East rMCZ 2014 Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp36

CEFAS. 2014b. *Inner Bank rMCZ Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp54

CEFAS. 2013a. *Holderness Offshore rMCZ Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp38

CEFAS. 2013b. *Offshore Overfalls rMCZ Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp48

CEFAS. 2013c. *South of the Isles of Scilly recommended Marine Conservation Zone (rMCZ) Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp69

CEFAS. 2013c. *Greater Haig Fras rMCZ Survey Report.* Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp90

CEFAS. 2012a. *Farnes East rMCZ Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp39

CEFAS. 2012b. *North West of Jones Bank rMCZ Survey Report*. Centre for Environment, Fisheries and Aquaculture Science, Lowestoft. pp51

Defra. 2015a. *South of the Isles of Scilly rMCZ Post-survey Site Report*. Contract Reference: MB0120. Report Number **47** Report to DEFRA pp58

Defra. 2015b. *Farnes East rMCZ Post-survey Site Report*. Contract Reference: MB0120. Report Number **3**. Department for Environment Food and Rural Affairs, London. pp86

Defra. 2015c. *Greater Haig Fras rMCZ Post-survey Site Report.* Contract Reference: MB0120. Report Number **6**. Department for Environment Food and Rural Affairs, London. pp76

Defra. 2015d. *Holderness Offshore rMCZ Post-survey Site Report*. Contract Reference: MB0120. Report Number **44** Report to DEFRA pp50

Defra. 2015e. *Inner Bank rMCZ Post-survey Site Report*. Contract Reference: MB0120. Report Number **48** Department for Environment Food and Rural Affairs, London. pp60

Defra. 2015f. *North-West of Jones Bank rMCZ Post-survey Site Report*. Contract Reference: MB0120 Report Number **19** Department for Environment Food and Rural Affairs, London. pp62

Defra. 2015g. *Offshore Overfalls rMCZ Post-survey Site Report*. Contract Reference: MB0120 Report Number **41** Department for Environment Food and Rural Affairs, London. pp54

Defra. 2013. *Marine Conservation Zones:Consultation on proposals for designation in 2013.* Department for Environment Food and Rural Affairs, London. pp88

Defra. 2012. Digital Elevation Model Bathymetry Data (Astrium, 2012 accessed in 2016)

CLARKE, K.R. & WARWICK, R.M. 2001. A further biodiversity index applicable to species lists: variation in taxonomic distinctness. *Marine Ecology Progress Series* **216**, 265-278

ENVISION. 2012. *North West Jones Bank rMCZ Video Analysis Report*. Report to CEFAS Envision Mapping Ltd., Newcastle upon Tyne. pp8

GARDLINE. 2012. *Northwest Jones Bank Defra MCZ Programme 2012 Acquisition Report*. Contract Reference: C5650 Report to CEFAS/DEFRA pp262

JNCC. 2015. The Marine Habitat Classification for Britain and Ireland Version .**15.03** [Online]. [Accessed March 2016]. Available from: jncc.Defra.gov.uk/MarineHabitatClassification

JNCC. 2015a. Farnes East MCZ Site Information. [Online]. [Accessed March, 2016]. Available from: http://jncc.Defra.gov.uk/page-6773

JNCC. 2015b. Greater Haig Fras MCZ Site Information [Online]. [Accessed March, 2016]. Available from: http://jncc.Defra.gov.uk/page-7135

JNCC. 2015c. North-West of Jones Bank MCZ Site Information [Online]. [Accessed March, 2016]. Available from: http://jncc.Defra.gov.uk/page-7134

JNCC. 2015d. Offshore Overfalls MCZ Site Information [Online]. [Accessed March, 2016]. Available from: http://jncc.Defra.gov.uk/page-6776

JNCC, 2015 e, Haig Fras SAC Site Information Centre [Online].]. [Accessed March, 2016]. Available from: http://jncc.Defra.gov.uk/page-6533

JNCC. (in prep) *Greater Haig Fras MCZ biological community analysis.* Available online when published.

PARRY, M.E.V. 2015. Guidance on Assigning Benthic Biotopes using EUNIS or the Marine Habitat Classification of Britain and Ireland *JNCC report* No. 546 Joint Nature Conservation Committee, Peterborough

SEASTAR. 2013 Video analysis fauna matrix v2_CORRECTED_ADC_20130411.xlsx. Accesed February 2016.

UK WILDLIFE TRUSTS. 2016 Holderness Offshore recommended Marine Conservation Zone Factsheet. Online]. [Accessed March, 2016]. Available from: http://www.wildlifetrusts.org/MCZ/holderness-offshore

6 Appendix 1: Data tables

6.1 Holderness Offshore rMCZ Data Tables

6.1.1 Holderness Offshore rMCZ Samples with physical sediment description and summary with broad-scale habitat type

Table 48. Holderness Offshore rMCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
616	HO_C1	54.0167	0.0035	mixed sediments	Subtidal mixed sediments	62.24	30.43	7.33
624	HO_C2	53.9551	0.0182	coarse sediment	Subtidal coarse sediment	51.22	44.01	4.77
674	HO_C3	53.9263	0.0557	mixed sediments	Subtidal mixed sediments	64.67	31.46	3.88
677	HO_C5	53.8984	0.0933	mixed sediments	Subtidal mixed sediments	55.58	39.78	4.64
632	HO_C6	53.9901	0.1575	mixed sediments	Subtidal mixed sediments	32.04	56.79	11.17
672	HO_C7	53.9314	0.1157	mixed sediments	Subtidal mixed sediments	59.41	13.27	27.33
679	HO_C8	53.8698	0.1305	mixed sediments	Subtidal mixed sediments	40.64	15.54	43.82
630	HO_C9	53.9652	0.1385	mixed sediments	Subtidal mixed sediments	45.15	47.08	7.77
669	HO_C10	53.9033	0.1534	mixed sediments	Subtidal mixed sediments	18.15	53.14	28.71
664	HO_C11	53.9367	0.1765	mixed sediments	Subtidal mixed sediments	44.85	44.02	11.12
682	HO_C12	53.8752	0.1908	sand and muddy sand	Subtidal sand	2.64	97.33	0.03
635	HO_C13	53.9698	0.1991	mixed sediments	Subtidal mixed sediments	19.66	20.98	59.36
667	HO_C14	53.9080	0.2136	mud and sandy mud	Subtidal mud	0.70	78.71	20.59
662	HO_C16	53.9413	0.2369	mixed sediments	Subtidal mixed sediments	36.52	50.95	12.53
689	HO_C17	53.8800	0.2509	mixed sediments	Subtidal mixed sediments	29.62	52.88	17.50
660	HO_C18	53.9112	0.2875	mixed sediments	Subtidal mixed sediments	18.68	62.59	18.73
717	HO_C19	53.8514	0.2883	coarse sediment	Subtidal coarse sediment	57.86	40.42	1.72
655	HO_C20	53.9444	0.3092	coarse sediment	Subtidal coarse sediment	8.97	85.65	5.38
692	HO_C21	53.8847	0.3110	coarse sediment	Subtidal coarse sediment	39.43	56.87	3.70
657	HO_C22	53.9179	0.3347	mixed sediments	Subtidal mixed sediments	20.69	65.05	14.26
708	HO_C23	53.8562	0.3489	coarse sediment	Subtidal coarse sediment	26.86	68.97	4.17
643	HO_C24	53.9509	0.3577	coarse sediment	Subtidal coarse sediment	38.62	57.16	4.22
695	HO_C25	53.8897	0.3716	coarse sediment	Subtidal coarse sediment	35.80	63.00	1.20

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
653	HO_C26	53.9221	0.4289	mixed sediments	Subtidal mixed sediments	27.29	50.21	22.50
706	HO_C27	53.8468	0.3904	mixed sediments	Subtidal mixed sediments	32.97	58.14	8.89
698	HO_C28	53.8997	0.4502	mixed sediments	Subtidal mixed sediments	21.81	18.71	59.48
703	HO_C29	53.8477	0.4519	coarse sediment	Subtidal coarse sediment	47.76	50.30	1.95
701	HO_C30	53.8659	0.4691	coarse sediment	Subtidal coarse sediment	37.67	60.06	2.27
711	HO_Mx1	53.8280	0.3754	mixed sediments	Subtidal mixed sediments	32.93	59.67	7.40
722	HO_Mx2	53.8491	0.2580	mixed sediments	Subtidal mixed sediments	35.47	56.92	7.61
684	HO_Mx3	53.8919	0.2020	sand and muddy sand	Subtidal sand	0.81	99.19	0.01
686	HO_Mx4	53.8935	0.2249	mixed sediments	Subtidal mixed sediments	15.89	52.16	31.96
619	HO_Mx5	53.9960	0.0391	coarse sediment	Subtidal coarse sediment	58.96	38.17	2.87
720	HO_Mx7	53.8479	0.2732	mixed sediments	Subtidal mixed sediments	45.78	47.53	6.69
641	HO_S2	53.9555	0.2683	mixed sediments	Subtidal mixed sediments	17.79	21.20	61.01
637	HO_S3	53.9682	0.2765	mixed sediments	Subtidal mixed sediments	14.99	62.78	22.23
714	HO_S4	53.8404	0.2948	mixed sediments	Subtidal mixed sediments	46.20	48.33	5.46
646	HO_S5	53.9344	0.4461	coarse sediment	Subtidal coarse sediment	24.43	71.71	3.86
648	HO_S6	53.9237	0.4602	coarse sediment	Subtidal coarse sediment	56.18	40.22	3.60
651	HO_S7	53.9095	0.4789	mixed sediments	Subtidal mixed sediments	55.51	13.14	31.34

6.1.2 Holderness Offshore rMCZ Samples with associated habitats and biotopes

Table 49. Holderness Offshore rMCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
616	HO_C01	-24.5	SLIGHTLY MUDDY GRAVELLY SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
624	HO_C02	-21.9	MUDDY SANDY GRAVEL WITH CLAY	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
674	HO_C03		SANDY GRAVEL WITH BROCKEN SHELL	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
677	HO_C05	-24.5	GRAVEL, MUDDY GRAVEL.	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
632	HO_C06	-42.6	COARSE SAND WITH GRAVEL	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
672	HO_C07	-29.0	MUDDY, SANDY AND GRAVEL	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
679	HO_C08	-26.2	GRAVELLY CLAY MUD	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
630	HO_C09	-33.9	GRAVELLY COARSE SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
669	HO_C10	-33.7	BOULDER CLAY; MUDDY SANDY GRAVEL AND CLAY	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
664	HO_C11	-37.5	muddy sandy gravel	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
682	HO_C12	-30.5	COARSE SANDY GRAVEL	a	Subtidal sand	SS.SSa.CFiSa	A5.25	Impoverished version of SS.SSa.CFiSa.EpusOborApri
635	HO_C13	-48.0	GRAVELLY MUDDY SAND (CLAY MUD)	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
667	HO_C14	-38.7	SAND AND CLAY	b	Subtidal mud	SS.SMu.CSaMu	A5.35	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
662	HO_C16	-47.6	Gravelly, muddy sand with some clay	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
689	HO_C17	-38.9	GRAVELLY SANDY MUD	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
660	HO_C18	-45.3	Muddy sand gravel	c	Subtidal mixed Sediments	SS.SMx.OMx.PoVen	A5.451	
717	HO_C19	-37.9	SANDY GRAVEL	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
655	HO_C20	-49.4	SAND WITH SHELL FRAG	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
692	HO_C21	-42.9	GRAVELLY SAND	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
657	HO_C22	-46.7	GRAVELY SAND WITH SHELL FRAG	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
708	HO_C23	-40.3	GRAVELLY SAND	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
643	HO_C24	-49.5	GRAVELLY SAND	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
695	HO_C25	-44.5	GRAVELLY SAND WITH SHELL FRAG	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
653	HO_C26	-47.7	GRAVELLY mUDDY SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
706	HO_C27	-40.0	GRAVELLY SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
698	HO_C28	-44.3	MUDDY GRAVELLY SAND (CLAY MUD)	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
703	HO_C29	-39.1	GRAVELLY SAND	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
701	HO_C30	-40.8	GRAVELLY SAND WITH SHELL	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
711	HO_Mx1	-38.7	GRAVELLY SAND	c	Subtidal mixed	SS.SMx.OMx.PoVen	A5.451	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
					sediments			
722	HO_Mx2	-37.3	GRAVELLY SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
684	HO_Mx3	-30.7	Sand with broken shell	a	Subtidal sand	SS.SSa.CFiSa	A5.23	Impoverished version of SS.SSa.CFiSa.EpusOborApri
686	HO_Mx4	-39.2	Sand and clay with gravel	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
619	HO_Mx5	-31.0	SLIGHTLY MUDDY GRAVELLY SAND WITH CLAY	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
720	HO_Mx7	-37.7	SANDY GRAVEL	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
641	HO_S2	-49.0	MUDDY SAND (CLAY MUD)	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
637	HO_S3	-50.1	GRAVELLY SANDY MUD (CLAY MUD)	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
714	HO_S4	-36.1	COARSE SAND	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
646	HO_S5	-47.9	GRAVELLY SAND WITH SHELL FRAG	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
648	HO_S6	-46.5	GRAVELLY SAND	c	Subtidal coarse sediment	SS.SMx.OMx.PoVen	A5.451	Physical mismatch - substrate coarse
651	HO_S7	-47.5	GRAVELLY MUDDY SAND (CLAY MUD)	c	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	

6.2 Inner Bank rMCZ Data Tables

6.2.1 Inner Bank rMCZ Samples with physical sediment description and summary with broad-scale habitat type

Table 50. Inner Bank rMCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
309	INBK001	50.71360	0.82332	mixed sediments	Subtidal mixed sediments	49.85	44.27	5.87
302	INBK003	50.72311	0.83240	coarse sediment	Subtidal coarse sediment	10.01	88.53	1.46
304	INBK005	50.71308	0.84053	coarse sediment	Subtidal coarse sediment	29.10	66.23	4.67
391	INBK013	50.72252	0.86813	sand and muddy sand	Subtidal sand	1.09	97.11	1.80
393	INBK019	50.70687	0.87259	sand and muddy sand	Subtidal sand	3.71	94.02	2.27
357	INBK020	50.70625	0.72588	sand and muddy sand	Subtidal sand	0.82	99.18	0.00
360	INBK021	50.69626	0.73350	sand and muddy sand	Subtidal sand	2.34	95.57	2.09
361	INBK022	50.68655	0.74202	sand and muddy sand	Subtidal sand	2.52	96.34	1.14
349	INBK023	50.70573	0.74336	sand and muddy sand	Subtidal sand	1.67	95.79	2.54
364	INBK024	50.67609	0.74971	sand and muddy sand	Subtidal sand	3.82	94.93	1.25
352	INBK025	50.69573	0.75114	sand and muddy sand	Subtidal sand	1.43	97.46	1.11
344	INBK026	50.66640	0.75828	sand and muddy sand	Subtidal sand	2.97	94.47	2.56
353	INBK027	50.68586	0.75980	sand and muddy sand	Subtidal sand	1.27	97.51	1.22
356	INBK028	50.67583	0.76768	sand and muddy sand	Subtidal sand	1.35	97.39	1.27
348	INBK029	50.69529	0.76912	sand and muddy sand	Subtidal sand	1.53	97.06	1.41
340	INBK030	50.66565	0.77595	coarse sediment	Subtidal coarse sediment	5.75	92.31	1.94
332	INBK031	50.68544	0.77745	sand and muddy sand	Subtidal sand	0.87	97.19	1.95
341	INBK032	50.65591	0.78432	sand and muddy sand	Subtidal sand	2.09	96.98	0.93
333	INBK033	50.67564	0.78577	sand and muddy sand	Subtidal sand	0.61	97.52	1.87
324	INBK034	50.69481	0.78652	sand and muddy sand	Subtidal sand	0.96	97.94	1.10
336	INBK035	50.66555	0.79373	coarse sediment	Subtidal coarse sediment	6.57	88.35	5.07
325	INBK036	50.68526	0.79525	sand and muddy sand	Subtidal sand	2.37	92.02	5.61
337	INBK037	50.65588	0.80186	sand and muddy sand	Subtidal sand	3.60	95.07	1.33
328	INBK038	50.67480	0.80284	sand and muddy sand	Subtidal sand	1.21	97.28	1.50
329	INBK039	50.66524	0.81193	sand and muddy sand	Subtidal sand	4.97	94.69	0.34
345	INBK047	50.71272	0.75205	sand and muddy sand	Subtidal sand	1.93	95.68	2.39

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
320	INBK048	50.72269	0.76347	mixed sediments	Subtidal mixed sediments	20.75	61.57	17.67
321	INBK049	50.70690	0.77706	mud and sandy mud	Subtidal mud	2.58	25.81	71.61
313	INBK050	50.72184	0.79139	sand and muddy sand	Subtidal sand	4.91	92.37	2.72
316	INBK051	50.70704	0.81088	sand and muddy sand	Subtidal sand	1.29	97.84	0.87
305	INBK052	50.73714	0.80652	coarse sediment	Subtidal coarse sediment	21.24	73.37	5.39
317	INBK053	50.69031	0.81847	sand and muddy sand	Subtidal sand	1.37	95.12	3.51
308	INBK054	50.71944	0.82064	sand and muddy sand	Subtidal sand	4.93	91.16	3.91
294	INBK055	50.75237	0.82196	coarse sediment	Subtidal coarse sediment	32.58	65.18	2.25
299	INBK056	50.73683	0.83536	mixed sediments	Subtidal mixed sediments	15.50	74.07	10.43
289	INBK057	50.75153	0.84161	coarse sediment	Subtidal coarse sediment	11.05	86.68	2.27
291	INBK058	50.73581	0.86330	coarse sediment	Subtidal coarse sediment	12.57	84.54	2.89
285	INBK059	50.76697	0.86539	sand and muddy sand	Subtidal sand	0.92	99.08	0.00
286	INBK060	50.74939	0.87683	sand and muddy sand	Subtidal sand	0.61	97.59	1.80
385	INBK061	50.73500	0.89134	coarse sediment	Subtidal coarse sediment	5.85	91.54	2.61
278	INBK062	50.76627	0.89370	mixed sediments	Subtidal mixed sediments	33.92	43.93	22.15
386	INBK063	50.71959	0.90506	mixed sediments	Subtidal mixed sediments	17.26	72.83	9.91
281	INBK064	50.75014	0.90666	coarse sediment	Subtidal coarse sediment	5.24	91.56	3.20
274	INBK067	50.76546	0.92245	mixed sediments	Subtidal mixed sediments	21.11	69.71	9.18
270	INBK068	50.79679	0.92439	coarse sediment	Subtidal coarse sediment	12.79	87.21	0.00
380	INBK070	50.74961	0.93519	mixed sediments	Subtidal mixed sediments	39.66	54.18	6.16
273	INBK071	50.78086	0.93735	coarse sediment	Subtidal coarse sediment	8.54	88.77	2.69
381	INBK072	50.73389	0.94896	coarse sediment	Subtidal coarse sediment	22.02	74.65	3.33
269	INBK073	50.76856	0.95980	coarse sediment	Subtidal coarse sediment	52.75	47.22	0.03
265	INBK074	50.79574	0.95201	mixed sediments	Subtidal mixed sediments	11.99	67.20	20.81
377	INBK075	50.74839	0.97036	mixed sediments	Subtidal mixed sediments	15.06	75.75	9.19
266	INBK076	50.78039	0.96567	sand and muddy sand	Subtidal sand	3.14	94.96	1.90
257	INBK077	50.81117	0.96759	sand and muddy sand	Subtidal sand	0.80	99.20	0.00
373	INBK079	50.76383	0.97826	mixed sediments	Subtidal mixed sediments	35.40	57.68	6.93
258	INBK080	50.79529	0.98096	coarse sediment	Subtidal coarse sediment	7.40	89.92	2.68
376	INBK081	50.74821	0.99184	sand and muddy sand	Subtidal sand	4.30	93.62	2.07
261	INBK082	50.77930	0.99384	coarse sediment	Subtidal coarse sediment	35.81	58.51	5.68

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
369	INBK083	50.76311	1.00670	mixed sediments	Subtidal mixed sediments	33.04	58.51	8.45
253	INBK084	50.79469	1.00915	mixed sediments	Subtidal mixed sediments	25.48	57.84	16.67
372	INBK085	50.74744	1.02015	sand and muddy sand	Subtidal sand	0.37	99.63	0.00
365	INBK086	50.77870	1.02264	mixed sediments	Subtidal mixed sediments	5.50	64.30	30.20
368	INBK087	50.76268	1.03551	sand and muddy sand	Subtidal sand	0.78	99.22	0.00
254	INBK088	50.79715	0.99423	sand and muddy sand	Subtidal sand	0.89	99.11	0.00
262	INBK089	50.78780	0.96568	sand and muddy sand	Subtidal sand	2.62	96.08	1.30
277	INBK090	50.78400	0.89969	sand and muddy sand	Subtidal sand	0.43	99.57	0.00
282	INBK091	50.76434	0.87832	sand and muddy sand	Subtidal sand	0.95	96.42	2.63
295	INBK092	50.74585	0.83046	sand and muddy sand	Subtidal sand	4.32	91.40	4.27

6.2.2 Inner Bank rMCZ Samples with associated habitats and biotopes

Table 51. Inner Bank rMCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
309	INBK001	35	SANDY GRAVEL	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
302	INBK003	41	VERY SHELLY SAND	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
304	INBK005	40	COARSE SAND, GRAVEL	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
391	INBK013	38	SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
393	INBK019	43	SANDY MUD AND SHELL FRAGMENTS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
357	INBK020	52	CLEAN SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
360	INBK021	53	SLIGHTLY GRAVELLY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
361	INBK022	50	CLEAN SLIGHTLY GRAVELLY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
349	INBK023	47	SANDY MUD	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
364	INBK024	48	GRAVELLY SHELLY SAND AND SOME ANOXIC MUD	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
352	INBK025	49	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
344	INBK026	42	MUDDY SAND WITH SHELL FRAGS	g	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate sand
353	INBK027	52	SLIGHTLY SHELLY CLEAN SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
356	INBK028	50	CLEAN SLIGHTLY SHELLY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
348	INBK029	47	MUDDY SAND WITH SHELL	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
340	INBK030	44	MUDDY SAND WITH SOME SHELL	b	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
332	INBK031	50	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
341	INBK032	45	MUDDY SAND WITH SHELL FRAGMENTS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
333	INBK033	49	MUDDY SAND WITH SHELLS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
324	INBK034	50	SAND WITH MUD	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
336	INBK035	46	SANDY MUD	b	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
325	INBK036	50	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
337	INBK037	53	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
328	INBK038	49	MUD AND SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
329	INBK039	49	MUDDY SAND; SHELL FRAGMENTS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
345	INBK047	44	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
320	INBK048	42	COARSE SHELLY SAND	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
321	INBK049	45	CLAY AND MUD	f	Subtidal mud	SS.SMu.CSaMu	A5.35	
313	INBK050	37	SHELLY SAND	g	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate sand
316	INBK051	39	COARSE SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
305	INBK052	40	SHELLY SAND	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
317	INBK053	40	SLIGHTLY MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
308	INBK054	43	GRAVELLY, SHELLY SAND	g	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate sand
294	INBK055	42	SLIGHTLY SHELLY PEBBLY SAND	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
299	INBK056	41	GRAVELLY SHELLY COARSE SAND	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
289	INBK057	39	MUDDY SAND WITH SHELL FRAGS	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
291	INBK058	40	SAND WITH SHELLY FRAGMENTS	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
285	INBK059	35	MUDDY SAND WITH SHELL FRAGMENTS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
286	INBK060	49	SANDY MUD	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
385	INBK061	38	MUDDY SAND	g	Subtidal coarse	SS.SCS.CCS.MedLumVen	A5.142	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
					sediment			
278	INBK062	35	GRAVELLY SAND WITH SHELLS AND MUD	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
386	INBK063		SANDY MUD WITH SHELL FRAGMENTS	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
281	INBK064	34	MUDDY SAND WITH SHELL	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
274	INBK067	33	COARSE	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
270	INBK068	37	SAND WITH SHELL FRAGMENTS	b	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	
380	INBK070	39	SANDY MUD WITH SHELL FRAGMENTS AND PEBBLES	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
273	INBK071	32	SHELLY SAND	e	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Based on physical
381	INBK072	38	SANDY MUD WITH SHELL FRAGMENTS AND PEBBLES	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
269	INBK073	39	COARSE SHELLY SAND	d	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Based on physical
265	INBK074	38	GRAVELLY SANDY MUD	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
377	INBK075		GRAVELLY, SHELLY, MUDDY SAND	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
266	INBK076	42	MUDDY SAND WITH SHELL FRAGMENTS	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
257	INBK077	35	CLEAN SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
373	INBK079	35	SANDY SHELLY GRAVEL	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
258	INBK080	41	CLEAN SLIGHTLY SHELLY SAND	b	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
376	INBK081	33	COARSE SHELLY SAND	g	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate sand
261	INBK082	38	SLIGHTLY SANDY PEBBLY WITH SHELL	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
			FRAGMENTS					
369	INBK083	33	SANDY GRAVEL	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
253	INBK084	35	GRAVELLY MUDDY SAND	g	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
372	INBK085	31	CLEAN SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
365	INBK086	37	COARSE SAND AND MUD WITH SANDSTONE	d	Subtidal mixed sediments	SS.SMx.CMx	A5.44	Based on physical
368	INBK087	32	SLIGHTLY SHELLY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
254	INBK088	44	CLEAN SAND	a	Subtidal sand	SS.SSa.CFiSa	A5.25	Outlier; based on physical
262	INBK089	50	SLIGHTLY SHELLY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
277	INBK090	40	SAND WITH FEW SHELLS	c	Subtidal sand	SS.SSa.CFiSa	A5.25	Impoverished; based on physical
282	INBK091	43	SAND WITH OCCASIONAL SHELL	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
295	INBK092	50	MUDDY SAND	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	

6.3 North-West of Jones Bank MCZ Data Tables

6.3.1 North-West of Jones Bank MCZ Samples with physical sediment description and summary with broad-scale habitat type

Table 52. North-West of Jones Bank MCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
29	ENV01	49.83196	-8.15454	mud and sandy mud	Subtidal mud	0.50	73.06	26.44
15	ENV02	49.83995	-8.31613	mud and sandy mud	Subtidal mud	0.02	70.87	29.11
36	ENV03	49.84080	-8.10373	mud and sandy mud	Subtidal mud	0.02	74.46	25.52
18	ENV06	49.86658	-8.13930	mud and sandy mud	Subtidal mud	0.00	76.51	23.49
4	ENV08	49.87516	-8.09903	mud and sandy mud	Subtidal mud	0.09	72.56	27.35
26	ENV09	49.88324	-8.23217	mud and sandy mud	Subtidal mud	0.02	65.77	34.20
47	ENV10	49.89205	-8.17815	mud and sandy mud	Subtidal mud	0.00	64.69	35.31
32	ENV11	49.90032	-8.32540	mud and sandy mud	Subtidal mud	0.12	65.93	33.95
19	ENV12	49.90887	-8.27113	mud and sandy mud	Subtidal mud	0.00	63.86	36.14
46	ENV13	49.90970	-8.06953	mud and sandy mud	Subtidal mud	0.00	73.11	26.89
17	ENV14	49.91767	-8.21660	mud and sandy mud	Subtidal mud	0.03	67.17	32.80
8	ENV15	49.92641	-8.16234	mud and sandy mud	Subtidal mud	0.00	65.50	34.50
53	ENV16	49.94504	-8.30995	mud and sandy mud	Subtidal mud	0.00	64.14	35.86
45	ENV17	49.93541	-8.10815	sand and muddy sand	Subtidal sand	2.83	95.20	1.97
44	ENV19	49.95213	-8.20152	mud and sandy mud	Subtidal mud	0.00	64.70	35.30
3	ENV20	49.96089	-8.14685	mud and sandy mud	Subtidal mud	0.00	55.70	44.30
34	ENV21	49.96898	-8.29445	mud and sandy mud	Subtidal mud	0.00	59.23	40.77
43	ENV22	49.96998	-8.09299	mud and sandy mud	Subtidal mud	0.00	60.92	39.08
40	ENV23	49.97789	-8.24064	mud and sandy mud	Subtidal mud	0.00	57.91	42.09
37	ENV24	49.98661	-8.18590	sand and muddy sand	Subtidal sand	0.00	91.09	8.91
35	ENV25	49.99540	-8.13169	mud and sandy mud	Subtidal mud	0.00	60.76	39.24
1	ENV26	49.00341	-8.27937	mud and sandy mud	Subtidal mud	0.05	69.83	30.11
39	ENV27	49.00427	-8.07742	mud and sandy mud	Subtidal mud	0.00	57.37	42.63
41	ENV29	49.82676	-8.10039	mud and sandy mud	Subtidal mud	0.00	58.68	41.32
48	ENV30	49.82691	-8.06271	sand and muddy sand	Subtidal sand	0.15	99.85	0.00

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
5	ENV32	49.83003	-8.08006	mud and sandy mud	Subtidal mud	0.03	67.67	32.30
49	ENV33	49.83164	-8.10743	mud and sandy mud	Subtidal mud	0.00	70.65	29.35
30	ENV36	49.83576	-8.05953	sand and muddy sand	Subtidal mud	0.01	80.52	19.46
28	ENV37	49.83646	-8.07748	mud and sandy mud	Subtidal mud	0.02	69.11	30.87
50	ENV40	49.84473	-8.06413	mud and sandy mud	Subtidal mud	0.00	64.55	35.45
51	ENV46	49.90587	-8.13106	coarse sediment	Subtidal coarse sediment	13.05	84.44	2.50
25	ENV48	49.94551	-8.33196	mixed sediments	Subtidal mixed sediments	8.52	76.04	15.44
23	ENV50	49.92223	-8.09099	mixed sediments	Subtidal mixed sediments	38.54	52.06	9.41
24	ENV52	49.94242	-8.06157	coarse sediment	Subtidal coarse sediment	20.48	75.52	4.00
21	ENV54	49.88841	-8.10725	mixed sediments	Subtidal mixed sediments	39.58	44.54	15.88
27	ENV55	49.89464	-8.14158	sand and muddy sand	Subtidal sand	1.96	97.41	0.64
185	NWJB01	50.00291	-8.28246	mud and sandy mud	Subtidal mud	1.81	61.00	37.19
192	NWJB02	49.84015	-8.30154	mud and sandy mud	Subtidal mud	0.02	66.94	33.03
190	NWJB03	49.87491	-8.28340	mud and sandy mud	Subtidal mud	0.05	65.29	34.66
193	NWJB04	49.84802	-8.25340	mud and sandy mud	Subtidal mud	0.07	66.43	33.50
182	NWJB05	49.99577	-8.33203	mud and sandy mud	Subtidal mud	0.00	51.78	48.22
187	NWJB06	49.94357	-8.25406	mud and sandy mud	Subtidal mud	0.00	54.95	45.05
195	NWJB07	49.85772	-8.19338	mud and sandy mud	Subtidal mud	0.01	69.37	30.62
205	NWJB08	50.00451	-8.07729	mud and sandy mud	Subtidal mud	0.02	57.36	42.62

6.3.2 North-West of Jones Bank MCZ Samples with associated habitats and biotopes

Table 53. North-West of Jones Bank MCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
29	ENV01	-132	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
15	ENV02	-134	Muddy SAND	e	Subtidal mud	SS.SMu.OMu	A5.37	Impoversied version of multivariate group f without capitellids
36	ENV03	-130	SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
18	ENV06	-128	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
4	ENV08	-129	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
26	ENV09	-131	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.38	
47	ENV10	-128	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
32	ENV11	-136	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
19	ENV12	-136	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
46	ENV13	-122	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
17	ENV14	-131	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
8	ENV15	-128	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
53	ENV16	-129	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
45	ENV17	-114	SAND	b	Subtidal sand	SS.SSa.OSa	A5.27	
44	ENV19	-131	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
3	ENV20	-127	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
34	ENV21	-129	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
43	ENV22	-123	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
40	ENV23	-132	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
37	ENV24	-118	SAND	a	Subtidal sand	SS.SSa.OSa.Dari	A5.27x	Possible Offshore Ditrupa biotope (see Swallow Sands) Deep circalittoral muddy sand with Ditrupa arietina
35	ENV25	-125	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
1	ENV26	-125	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
39	ENV27	-120	Muddy SAND	d	Subtidal mud	SS.SMu.OMu	A5.37	Impoversied

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
								version of multivariate group f without capitellids
41	ENV29	-131	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
48	ENV30	-104	SAND	b	Subtidal sand	SS.SSa.OSa	A5.27	
5	ENV32	-129	Muddy SAND	c	Subtidal mud	SS.SMu.OMu	A5.37	Impoversied version of multivariate group f without capitellids
49	ENV33	-133	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
30	ENV36	-123	Sandy MUD	f	Subtidal mud	SS.SMu.OMu	A5.37	
28	ENV37	-130	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
50	ENV40	-132	Muddy SAND	f	Subtidal mud	SS.SMu.OMu	A5.37	
51	ENV46	-111	SAND	b	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Multivariate analysis shows similarity to SS.SSa.Osa but physical biotope used
25	ENV48	-117	Slightly gravelly, muddy SAND	b	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Multivariate analysis shows similarity to SS.Ssa.Osa but physical biotope used
23	ENV50	-113	Slightly gravelly, sandy MUD	b	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Multivariate analysis shows similarity to SS.Ssa.Osa but physical biotope used
24	ENV52	-108	Gravelly SAND	b	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Multivariate analysis shows similarity to SS.Ssa.Osa but physical biotope

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
								used
21	ENV54	-116	Muddy SAND	b	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Multivariate analysis shows similarity to SS.Ssa.Osa but physical biotope used
27	ENV55	-114	Muddy SAND	b	Subtidal sand	SS.SSa.OSa	A5.27	
185	NWJB01	-127	Mud: Mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
192	NWJB02	-136	Mud: Sandy mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
190	NWJB03	-136	Mud: Mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
193	NWJB04	-132	Mud: Sandy mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
182	NWJB05	-129	Mud: Sandy mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
187	NWJB06	-135	Mud: Mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
195	NWJB07	-129	Mud: Sandy mud	f	Subtidal mud	SS.SMu.OMu	A5.37	
205	NWJB08	-120	Mud: Mud	f	Subtidal mud	SS.SMu.OMu	A5.37	

6.4 South of the Isles of Scilly rMCZ Data Tables

6.4.1 South of the Isles of Scilly rMCZ: Samples with physical sediment description and summary with broad-scale habitat type

Table 54. South of the Isles of Scilly rMCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
337	SISS01	49.64223	-6.18063	coarse sediment	Subtidal coarse sediment	8.47	85.72	5.81
285	SISS02	49.64351	-6.28112	coarse sediment	Subtidal coarse sediment	20.77	78.23	1.00
339	SISS03	49.64636	-6.15324	mixed sediments	Subtidal mixed sediments	44.34	47.93	7.72
296	SISS04	49.64737	-6.25342	coarse sediment	Subtidal coarse sediment	5.06	90.87	4.07
334	SISS05	49.65919	-6.17266	coarse sediment	Subtidal coarse sediment	23.48	71.00	5.52
286	SISS06	49.66069	-6.27249	coarse sediment	Subtidal coarse sediment	37.11	60.91	1.98
342	SISS07	49.66320	-6.14478	coarse sediment	Subtidal coarse sediment	26.35	68.52	5.14
282	SISS08	49.67357	-6.29142	sand and muddy sand	Subtidal sand	2.88	94.45	2.67
329	SISS09	49.67616	-6.16375	coarse sediment	Subtidal coarse sediment	8.96	89.36	1.68
287	SISS10	49.67760	-6.26414	sand and muddy sand	Subtidal sand	0.94	96.38	2.68
343	SISS11	49.68007	-6.13561	coarse sediment	Subtidal coarse sediment	9.42	89.08	1.50
299	SISS12	49.68156	-6.23639	coarse sediment	Subtidal coarse sediment	14.94	78.96	6.10
306	SISS13	49.68582	-6.21011	sand and muddy sand	Subtidal sand	0.53	97.48	1.99
318	SISS14	49.68957	-6.18278	coarse sediment	Subtidal coarse sediment	25.93	68.56	5.50
281	SISS15	49.69056	-6.28277	mixed sediments	Subtidal mixed sediments	48.32	45.89	5.79
327	SISS16	49.69320	-6.15535	mixed sediments	Subtidal mixed sediments	15.33	72.85	11.81
294	SISS17	49.69497	-6.25550	coarse sediment	Subtidal coarse sediment	68.22	29.50	2.28
300	SISS18	49.69897	-6.22853	coarse sediment	Subtidal coarse sediment	21.10	76.00	2.90
305	SISS19	49.70250	-6.20124	coarse sediment	Subtidal coarse sediment	38.90	55.00	6.11
320	SISS20	49.70664	-6.17376	coarse sediment	Subtidal coarse sediment	49.76	47.91	2.33
289	SISS21	49.70784	-6.27396	coarse sediment	Subtidal coarse sediment	10.57	84.90	4.53
326	SISS22	49.71046	-6.14721	sand and muddy sand	Subtidal sand	1.14	96.16	2.69

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
293	SISS23	49.71197	-6.24682	sand and muddy sand	Subtidal sand	0.38	98.33	1.29
301	SISS24	49.71571	-6.21969	coarse sediment	Subtidal coarse sediment	53.34	44.69	1.96
304	SISS25	49.71957	-6.19325	sand and muddy sand	Subtidal sand	0.31	93.23	6.46
322	SISS26	49.72377	-6.16528	mixed sediments	Subtidal mixed sediments	39.79	53.41	6.80
291	SISS27	49.72492	-6.26620	mixed sediments	Subtidal mixed sediments	50.57	38.25	11.18
292	SISS29	49.72900	-6.23916	mixed sediments	Subtidal mixed sediments	63.96	28.22	7.81
302	SISS30	49.73295	-6.21197	coarse sediment	Subtidal coarse sediment	31.25	62.98	5.78
284	SISS33	49.64130	-6.29472	mixed sediments	Subtidal mixed sediments	40.06	49.46	10.49
310	SISS34	49.64910	-6.24041	coarse sediment	Subtidal coarse sediment	7.42	88.48	4.10
283	SISS35	49.64988	-6.29033	coarse sediment	Subtidal coarse sediment	11.02	86.14	2.84
311	SISS36	49.65145	-6.22697	coarse sediment	Subtidal coarse sediment	20.12	74.82	5.06
313	SISS37	49.65332	-6.21340	mixed sediments	Subtidal mixed sediments	34.34	55.92	9.75
315	SISS38	49.65540	-6.19974	mixed sediments	Subtidal mixed sediments	16.44	64.16	19.41
297	SISS39	49.65625	-6.24936	coarse sediment	Subtidal coarse sediment	17.38	75.02	7.59
336	SISS40	49.65706	-6.18610	coarse sediment	Subtidal coarse sediment	53.87	44.34	1.79
309	SISS41	49.65786	-6.23611	sand and muddy sand	Subtidal sand	3.70	82.94	13.35
312	SISS42	49.65981	-6.22254	sand and muddy sand	Subtidal sand	0.40	97.74	1.86
314	SISS43	49.66176	-6.20911	mixed sediments	Subtidal mixed sediments	39.96	53.04	7.00
295	SISS44	49.66237	-6.25835	mixed sediments	Subtidal mixed sediments	51.12	42.66	6.22
316	SISS45	49.66379	-6.19542	coarse sediment	Subtidal coarse sediment	35.90	61.79	2.31
298	SISS46	49.66451	-6.24475	coarse sediment	Subtidal coarse sediment	31.80	66.32	1.88
333	SISS47	49.66558	-6.18188	mixed sediments	Subtidal mixed sediments	48.64	42.34	9.02
308	SISS48	49.66629	-6.23182	sand and muddy sand	Subtidal sand	4.57	91.21	4.21
332	SISS49	49.66766	-6.16833	coarse sediment	Subtidal coarse sediment	41.66	57.00	1.34
307	SISS50	49.66844	-6.21809	mixed sediments	Subtidal mixed sediments	51.35	42.36	6.29
317	SISS51	49.67243	-6.19081	coarse sediment	Subtidal coarse sediment	9.36	84.46	6.18
330	SISS52	49.67432	-6.17729	coarse sediment	Subtidal coarse sediment	49.23	49.25	1.52
280	SISS53	49.72147	-6.29357	sand and muddy sand	Subtidal sand	0.80	96.79	2.41

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
358	SISS54	49.73834	-6.29139	mixed sediments	Subtidal mixed sediments	7.54	79.63	12.82
340	SISS55	49.64507	-6.13472	coarse sediment	Subtidal coarse sediment	49.82	47.42	2.76
323	SISS56	49.73641	-6.15005	sand and muddy sand	Subtidal sand	4.11	95.38	0.51
344	SISS57	49.70159	-6.13404	coarse sediment	Subtidal coarse sediment	13.00	84.24	2.76

6.4.2 South of the Isles of Scilly rMCZ Samples with associated habitats and biotopes

Table 55. South of the Isles of Scilly rMCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
337	SISS01	103	Gravelly sand with muddy patches	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
285	SISS02	104	Sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
339	SISS03	104	Gravelly muddy sand	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
296	SISS04	107	Shelly Sand	d	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
334	SISS05	102	Gravelly sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
286	SISS06	104	Mixed	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
342	SISS07	105	Gravelly sand lots of shell and small amount of mud	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
282	SISS08	104	Sand	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
329	SISS09	104	Sand	d	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
287	SISS10	103	Sand	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
343	SISS11	103	Biogenic sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
299	SISS12	106	Shelly gravelly sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
306	SISS13	102	Sand	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
318	SISS14	104	Mixed	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
281	SISS15	98	Mixed (Sand, gravel, mud, shell)	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
327	SISS16	102	Bigenic sand (gravel and mud)	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
294	SISS17	104	Muddy Sand gravel	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
300	SISS18	105	gravell shelly sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
305	SISS19	102	Gravel	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
320	SISS20	103	Coarse	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
289	SISS21	102	Shelly sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
326	SISS22	101	Biogenic sand (coarse)	b	Subtidal sand	SS.SSa.OSa	A5.27	
293	SISS23	101	Sand	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
301	SISS24	101	Gravelly biogenic sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
304	SISS25	100	Sand (Slightly Muddy)	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
322	SISS26	98	Biogenic with large gravel	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
291	SISS27	101	Muddy Gravelly Sand	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
292	SISS29	100	Muddy Gravelly Sand	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
302	SISS30	99	Sand and cobble, gravelly sand, contained cobble	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
284	SISS33	102	Mixed	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
310	SISS34	104	Muddy patches, coarse sand	d	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
283	SISS35	104	Mixed	d	Subtidal coarse	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
					sediment			- substrate coarse
311	SISS36	103	Coarse sand with mud	e	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
313	SISS37	103	Gravelly sand	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
315	SISS38	103	Coarse, gravelly sand with muddy patches	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
297	SISS39	106	Slightly gravelly sand	g	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
336	SISS40	102	Sandy gravel	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
309	SISS41	103	Muddy sand	a	Subtidal sand	SS.Sa.OSa	A5.27	Impoverished
312	SISS42	103	Sand	d	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
314	SISS43	103	Mixed, coarse sand and muddy patches	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
295	SISS44	104	Muddy sand gravel	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
316	SISS45	103	Gravelly sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
298	SISS46	107	Gravelly Sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
333	SISS47	103	Muddy gravel	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
308	SISS48	102	Muddy Patches in Coarse Sand	i	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch -substrate sand
332	SISS49	102	Sandy gravel	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
307	SISS50	104	Slightly Muddy Coarse Sand	i	Subtidal mixed sediments	SS.SMx.OMx.PoVen	A5.451	
317	SISS51	103	Mixed	d	Subtidal coarse	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
					sediment			-substrate coarse
330	SISS52	103	Coarse	h	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
280	SISS53	98	Coarse sand, biogenic	c	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.141	Physical mismatch - substrate sand
358	SISS54	99	Muddy sand with biogenic material and large gravels	f	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
340	SISS55	104	Gravelly sand with mud	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
323	SISS56	98	Coarse. Sand with biogenic material	c	Subtidal sand	SS.SCS.CCS.MedLumVen	A5.141	Physical mismatch - substrate sand
344	SISS57	104	Biogenic sand	i	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	

6.5 Farnes East MCZ Data Tables

6.5.1 Farnes East MCZ: Samples with physical sediment description and summary with broad-scale habitat type

Table 56. Farnes East MCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
365	FE_C_01	55.49923	-1.39480	mixed sediments	Subtidal mixed sediments	6.36	76.73	16.91
323	FE_C_02	55.59114	-1.42156	mixed sediments	Subtidal mixed sediments	14.20	69.55	16.25
300	FE_C_03	55.68757	-1.40064	mixed sediments	Subtidal mixed sediments	24.65	65.51	9.83
278	FE_C_04	55.70849	-1.43135	mixed sediments	Subtidal mixed sediments	34.07	55.90	10.03
280	FE_C_05	55.71253	-1.38426	mixed sediments	Subtidal mixed sediments	9.43	79.07	11.50
277	FE_C_06	55.73354	-1.41464	mixed sediments	Subtidal mixed sediments	30.02	61.13	8.85
276	FE_C_07	55.73789	-1.36787	coarse sediment	Subtidal coarse sediment	7.96	84.34	7.70
255	FE_C_08	55.75439	-1.44538	coarse sediment	Subtidal coarse sediment	45.11	49.47	5.43
259	FE_C_09	55.76283	-1.35031	sand and muddy sand	Subtidal sand	3.42	88.60	7.98
254	FE_C_10	55.77967	-1.42839	coarse sediment	Subtidal coarse sediment	13.14	82.22	4.64
258	FE_C_11	55.78385	-1.38067	coarse sediment	Subtidal coarse sediment	10.18	84.98	4.83
269	FE_C_12	55.78817	-1.06661	sand and muddy sand	Subtidal sand	0.40	95.32	4.28
260	FE_C_13	55.78791	-1.33330	coarse sediment	Subtidal coarse sediment	39.85	58.41	1.74
263	FE_C_14	55.79620	-1.23916	mixed sediments	Subtidal mixed sediments	34.96	57.31	7.73
264	FE_C_15	55.80037	-1.19169	sand and muddy sand	Subtidal sand	0.42	92.74	6.84
253	FE_C_16	55.80482	-1.41142	coarse sediment	Subtidal coarse sediment	22.07	72.99	4.94
265	FE_C_17	55.80489	-1.14372	mixed sediments	Subtidal mixed sediments	35.48	52.95	11.57
248	FE_C_18	55.80901	-1.36360	mixed sediments	Subtidal mixed sediments	32.22	59.27	8.51
266	FE_C_19	55.80874	-1.09661	sand and muddy sand	Subtidal sand	0.10	80.41	19.49
245	FE_C_20	55.81321	-1.31613	coarse sediment	Subtidal coarse sediment	36.24	62.16	1.61
243	FE_C_21	55.81735	-1.26916	mixed sediments	Subtidal mixed sediments	13.30	70.21	16.49
239	FE_C_22	55.82145	-1.22167	sand and muddy sand	Subtidal sand	0.29	88.16	11.55
238	FE_C_23	55.82577	-1.17442	mixed sediments	Subtidal mixed sediments	6.05	81.00	12.95

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
249	FE_C_24	55.82994	-1.39407	mixed sediments	Subtidal mixed sediments	8.19	78.34	13.48
247	FE_C_25	55.83418	-1.34665	mixed sediments	Subtidal mixed sediments	5.98	81.29	12.73
244	FE_C_26	55.83828	-1.29937	mixed sediments	Subtidal mixed sediments	8.82	78.09	13.09
241	FE_C_27	55.84248	-1.25225	mixed sediments	Subtidal mixed sediments	5.68	84.23	10.08
305	FE_C_28	55.67495	-1.29522	coarse sediment	Subtidal coarse sediment	15.59	79.36	5.05
322	FE_C_30	55.63336	-1.40296	mixed sediments	Subtidal mixed sediments	7.72	70.32	21.96
358	FE_Mx_01	55.49833	-1.34050	mixed sediments	Subtidal mixed sediments	21.68	67.76	10.55
352	FE_Mx_02	55.50138	-1.23875	mixed sediments	Subtidal mixed sediments	36.79	45.97	17.24
360	FE_Mx_03	55.50336	-1.34812	sand and muddy sand	Subtidal sand	1.33	87.58	11.09
361	FE_Mx_04	55.50439	-1.33582	mixed sediments	Subtidal mixed sediments	29.11	57.23	13.66
351	FE_Mx_05	55.50764	-1.23450	mud and sandy mud	Subtidal mud	0.60	75.81	23.59
362	FE_Mx_06	55.50966	-1.34383	mixed sediments	Subtidal mixed sediments	10.91	77.64	11.45
364	FE_Mx_07	55.51496	-1.35127	sand and muddy sand	Subtidal sand	2.08	93.04	4.88
355	FE_R_01	55.47427	-1.32342	mixed sediments	Subtidal mixed sediments	15.15	71.08	13.77
354	FE_R_02	55.47977	-1.26068	mud and sandy mud	Subtidal mud	0.71	70.40	28.89
357	FE_R_03	55.50760	-1.30077	mixed sediments	Subtidal mixed sediments	20.08	62.76	17.16
349	FE_R_04	55.51294	-1.23807	mud and sandy mud	Subtidal mud	2.27	73.16	24.56
344	FE_R_05	55.52989	-1.40352	mixed sediments	Subtidal mixed sediments	9.10	75.29	15.61
346	FE_R_06	55.53550	-1.34088	mixed sediments	Subtidal mixed sediments	13.90	60.98	25.12
347	FE_R_07	55.54106	-1.27835	mixed sediments	Subtidal mixed sediments	11.81	71.41	16.78
343	FE_R_08	55.56329	-1.38113	mixed sediments	Subtidal mixed sediments	17.41	69.60	12.99
341	FE_R_09	55.56888	-1.31854	mixed sediments	Subtidal mixed sediments	23.77	61.23	15.00
340	FE_R_10	55.57439	-1.25576	mixed sediments	Subtidal mixed sediments	34.89	52.46	12.65
338	FE_R_11	55.58010	-1.19303	mixed sediments	Subtidal mixed sediments	10.18	78.45	11.37
325	FE_R_12	55.60243	-1.29583	mud and sandy mud	Subtidal mud	0.26	73.05	26.69
326	FE_R_13	55.60804	-1.23316	mixed sediments	Subtidal mixed sediments	25.17	54.84	19.99
327	FE_R_14	55.61370	-1.17027	mixed sediments	Subtidal mixed sediments	27.59	51.25	21.16
321	FE_R_15	55.63047	-1.33616	mixed sediments	Subtidal mixed sediments	11.42	78.92	9.66

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
320	FE_R_16	55.63606	-1.27352	mixed sediments	Subtidal mixed sediments	11.41	79.32	9.28
319	FE_R_17	55.64143	-1.21078	mud and sandy mud	Subtidal mud	0.06	74.86	25.08
317	FE_R_18	55.64722	-1.14766	mud and sandy mud	Subtidal mud	0.19	79.69	20.12
303	FE_R_19	55.65808	-1.37641	mixed sediments	Subtidal mixed sediments	26.90	64.02	9.08
304	FE_R_20	55.66385	-1.31363	sand and muddy sand	Subtidal sand	1.07	97.60	1.34
307	FE_R_21	55.66942	-1.25068	coarse sediment	Subtidal coarse sediment	16.14	75.76	8.10
308	FE_R_22	55.67515	-1.18764	sand and muddy sand	Subtidal sand	1.23	95.60	3.18
302	FE_R_23	55.68599	-1.41698	mixed sediments	Subtidal mixed sediments	21.04	56.65	22.31
299	FE_R_24	55.69165	-1.35392	sand and muddy sand	Subtidal sand	0.98	97.63	1.39
298	FE_R_25	55.69731	-1.29082	coarse sediment	Subtidal coarse sediment	25.35	68.71	5.93
296	FE_R_26	55.70298	-1.22819	coarse sediment	Subtidal coarse sediment	28.52	66.25	5.23
295	FE_R_27	55.70857	-1.16524	coarse sediment	Subtidal coarse sediment	44.68	52.77	2.56
294	FE_R_28	55.71418	-1.10247	mixed sediments	Subtidal mixed sediments	34.80	57.67	7.53
292	FE_R_29	55.71965	-1.03984	sand and muddy sand	Subtidal sand	0.39	89.97	9.64
281	FE_R_30	55.72528	-1.33098	mixed sediments	Subtidal mixed sediments	7.71	82.63	9.66
282	FE_R_31	55.73076	-1.26829	mixed sediments	Subtidal mixed sediments	7.51	79.22	13.27
284	FE_R_32	55.73635	-1.20547	coarse sediment	Subtidal coarse sediment	6.33	90.74	2.94
285	FE_R_33	55.74188	-1.14234	sand and muddy sand	Subtidal sand	0.11	98.76	1.13
290	FE_R_34	55.74760	-1.07945	sand and muddy sand	Subtidal sand	0.06	85.71	14.23
274	FE_R_35	55.75878	-1.30937	mud and sandy mud	Subtidal mud	1.14	71.53	27.34
261	FE_R_37	55.79224	-1.28593	mixed sediments	Subtidal mixed sediments	17.61	68.45	13.94
256	FE_R_38	55.76610	-1.39971	mixed sediments	Subtidal mixed sediments	26.29	64.06	9.65
250	FE_R_39	55.82135	-1.42476	coarse sediment	Subtidal coarse sediment	10.37	88.05	1.59
328	FE_R_40	55.60268	-1.15871	mixed sediments	Subtidal mixed sediments	33.45	48.54	18.01
335	FE_S_01	55.59560	-1.10889	mud and sandy mud	Subtidal mud	0.49	78.67	20.84
331	FE_S_02	55.59974	-1.06211	mud and sandy mud	Subtidal mud	0.06	75.82	24.12
332	FE_S_03	55.60379	-1.01470	mixed sediments	Subtidal mixed sediments	18.50	62.59	18.91
329	FE_S_04	55.62055	-1.09199	mixed sediments	Subtidal mixed sediments	40.92	42.58	16.50

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
330	FE_S_05	55.62472	-1.04488	mixed sediments	Subtidal mixed sediments	11.99	62.32	25.69
316	FE_S_06	55.64159	-1.12252	mud and sandy mud	Subtidal mud	1.17	70.92	27.91
315	FE_S_07	55.64571	-1.07533	coarse sediment	Subtidal coarse sediment	13.73	77.88	8.39
314	FE_S_08	55.65018	-1.02784	mud and sandy mud	Subtidal mud	0.21	75.23	24.56
318	FE_S_09	55.66241	-1.15241	sand and muddy sand	Subtidal sand	0.03	91.67	8.30
312	FE_S_10	55.66684	-1.10500	mud and sandy mud	Subtidal mud	0.02	78.27	21.71
313	FE_S_11	55.67100	-1.05791	sand and muddy sand	Subtidal sand	0.06	80.48	19.45
310	FE_S_12	55.68781	-1.13513	sand and muddy sand	Subtidal sand	2.92	87.57	9.52
311	FE_S_13	55.69181	-1.08785	sand and muddy sand	Subtidal sand	0.59	94.68	4.72
286	FE_S_14	55.75873	-1.13085	sand and muddy sand	Subtidal sand	3.97	84.06	11.97
288	FE_S_15	55.76302	-1.08384	sand and muddy sand	Subtidal sand	0.37	88.99	10.64
289	FE_S_16	55.76715	-1.03653	sand and muddy sand	Subtidal sand	0.58	85.61	13.81
271	FE_S_17	55.77982	-1.16160	mixed sediments	Subtidal mixed sediments	48.32	40.19	11.49
270	FE_S_18	55.78403	-1.11429	mixed sediments	Subtidal mixed sediments	32.70	59.72	7.58
268	FE_S_19	55.81325	-1.05015	mud and sandy mud	Subtidal mud	4.65	75.67	19.67
237	FE_S_20	55.82989	-1.12712	sand and muddy sand	Subtidal sand	2.19	82.05	15.75
236	FE_S_21	55.83413	-1.07994	sand and muddy sand	Subtidal sand	0.06	81.78	18.17
235	FE_S_22	55.83823	-1.03271	mud and sandy mud	Subtidal mud	1.92	75.14	22.94
336	FE_S_23	55.58011	-1.13438	mud and sandy mud	Subtidal mud	0.13	76.77	23.09
334	FE_S_24	55.57982	-1.07489	mud and sandy mud	Subtidal mud	0.00	68.10	31.90
333	FE_S_25	55.57938	-1.01831	mud and sandy mud	Subtidal mud	0.03	77.10	22.87
30	A27	55.59799	-1.17368	mixed sediments	Subtidal mixed sediments	47.25	35.69	17.05
31	A26	55.60259	-1.16715	mixed sediments	Subtidal mixed sediments	29.75	42.92	27.33
32	A25	55.60417	-1.17409	mixed sediments	Subtidal mixed sediments	41.93	43.81	14.26

6.5.2 Farnes East MCZ: Samples with associated habitats and biotopes

Table 57. Farnes East MCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
32	A25	81	Gravelly mud	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
31	A26	91	Muddy, gravelly, sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
30	A27	75	Coarse, sand, gravel, cobble	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
365	FE_C_01	68	Sand: Slightly shelly sand (Mixed)	c	Subtidal mixed sediments	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate mixed
323	FE_C_02	78	Mixed: Muddy sandy gravel	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
300	FE_C_03	74	Mixed: Gravelly muddy sand with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
278	FE_C_04	68	Mixed: Slightly gravelly, shelly, muddy sand (Sand)	i	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
280	FE_C_05	79	Mixed: Slightly muddy, sandy gravel	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
277	FE_C_06	64	Mixed: Muddy, gravelly, shelly sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
276	FE_C_07	62	Mixed: Muddy, gravelly, shelly sand (Sand)	j	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
255	FE_C_08	59	Coarse: Slightly shelly sand with gravel	h	Subtidal coarse sediment	SS.SMx.OMx	A5.45	Physical mismatch - substrate coarse
259	FE_C_09	75	Mixed: Gravelly, shelly, muddy sand (Sand)	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
254	FE_C_10	56	Coarse: Coarse sand with gravels	f	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
258	FE_C_11	77	Coarse: Gravelly, shelly	e	Subtidal coarse	SS.SCS.OCS	A5.15	Based on physical

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
			sand		sediment			
269	FE_C_12	72	Sand: Muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
260	FE_C_13	68	Coarse: Gravelly shelly sand	e	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Based on physical
263	FE_C_14	75	Mixed: Gravelly, shelly, muddy sand with pebbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
264	FE_C_15	83	Sand: Shelly sand	c	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
253	FE_C_16	67	Sand: Gravelly sand with shell fragments (Coarse)	f	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
265	FE_C_17	72	Mixed: Muddy sand with cobbles	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
248	FE_C_18	59	Mixed: Gravelly, shelly, muddy sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
266	FE_C_19	92	Sand: Muddy sand	d	Subtidal sand	SS.SMu.CSaMu.ThyNten	A5.352	Biology supports SS.SMu.CMuSa.ThyNten, physical borderline sandy mud
245	FE_C_20	68	Mixed: Slightly muddy and shelly sand with a few pebbles	c	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
243	FE_C_21	75	Mixed: Muddy sandy gravel	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
239	FE_C_22	85	Sand: Slightly shelly, muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
238	FE_C_23	77	Mixed: Muddy, slightly shelly, slightly gravelly sand	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
249	FE_C_24	56	Sand: Gravelly, shelly, slightly muddy sand (Mixed)	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
247	FE_C_25	56	Coarse: Pebbles, shells and sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
244	FE_C_26	76	Coarse: Gravelly, shelly sand (Mixed)	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
241	FE_C_27	84	Sand: Gravelly, shelly, muddy sand (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
305	FE_C_28	82	Mixed: Shelly, gravelly, muddy sand, with cobbles	e	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
322	FE_C_30	78	Mixed: Muddy sandy shell/gravel	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
358	FE_Mx_01	61	Coarse: Gravelly sand with cobbles (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
352	FE_Mx_02	79	Coarse: Gravelly sand (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
360	FE_Mx_03	69	Mixed: Gravelly, shelly muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
361	FE_Mx_04	67	Mixed: Gravelly, muddy sand	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
351	FE_Mx_05	85	Mud: Muddy sand with shells	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples , other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
362	FE_Mx_0	71	Mixed: Gravelly muddy	e	Subtidal mixed	SS.SMx.OMx	A5.45	Based on physical

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
	6		shelly sand		sediments			
364	FE_Mx_07	69	Sand: Sand(fine) with shells	c	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
355	FE_R_01	60	Mixed: Gravelly muddy sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
354	FE_R_02	85	Mud: Muddy sand with shells	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples , other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
357	FE_R_03	75	Mixed: Muddy gravelly sand with cobbles	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
349	FE_R_04	78	Mud: Muddy sand with shell	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples , other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
344	FE_R_05	70	Mixed: Coarse muddy shelly gravel	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
346	FE_R_06	64	Mixed: Muddy gravelly shelly sand with cobbles	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
347	FE_R_07	80	Mixed: Muddy gravely sand with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
343	FE_R_08	68	Coarse: Gravelly, shelly sand with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
			(Mixed)					
341	FE_R_09	74	Mixed: Muddy gravelly sand with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
340	FE_R_10	63	Mixed: Muddy, sandy gravels, some slates	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
338	FE_R_11	86	Mixed: Muddy sand (fine) with pebbles and some shells	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
325	FE_R_12	100	Mud: Slightly shelly, sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples , other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
326	FE_R_13	96	Sand: Muddy sand (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
327	FE_R_14	101	Mixed: Gravelly (shell) muddy sand	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
321	FE_R_15	77	Sand: Slightly gravelly, slightly muddy sand (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
320	FE_R_16	79	Sand: Slightly muddy, shelly sand	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
319	FE_R_17	95	Sand: Muddy sand (Mud)	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
317	FE_R_18	90	Mud: Muddy sand	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
303	FE_R_19	83	Mixed: Muddy gravelly sand with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
304	FE_R_20	75	Sand: Sand	c	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
307	FE_R_21	81	Sand: Shelly, muddy sand (coarse) (Coarse)	e	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Based on physical
308	FE_R_22	75	Sand: Slighty muddy shelly sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
302	FE_R_23	73	Mixed: Gravelly sand with mud and shell	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
299	FE_R_24	81	Coarse: Coarse shelly sand (Sand)	a	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	Impoverished
298	FE_R_25	71	Sand: Muddy sand with shell (Coarse)	e	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Based on physical
296	FE_R_26	68	Coarse: Gravelly sand with cobbles	e	Subtidal coarse sediment	SS.SCS.OCS	A5.15	Based on physical

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
295	FE_R_27	66	Mixed : Slightly muddy, sand with pebbles (Coarse)	f	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
294	FE_R_28	64	Mixed: Slightly muddy, sandy gravel with cobbles	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
292	FE_R_29	84	Sand: Muddy sand (fine) with small shells	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
281	FE_R_30	80	Mixed: Muddy sandy gravel	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
282	FE_R_31	73	Mixed: Muddy sandy gravel	g	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Very high numbers of Circeis spirillum
284	FE_R_32	72	Sand: Slightly muddy, shelly sand (fine)	c	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
285	FE_R_33	83	Sand: Slightly muddy sand (fine)	b	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
290	FE_R_34	90	Mud: Slightly shelly, sandy mud	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
274	FE_R_35	88	Sand: Muddy, shelly sand	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
261	FE_R_37	65	Mixed: Muddy, gravelly sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
256	FE_R_38	69	Coarse: Slightly shelly sand with gravels (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
250	FE_R_39	63	Coarse: Slightly shelly sand with pebbles	c	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
328	FE_R_40	101	Mixed: Slightly muddy, gravelly (shell) sand	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
335	FE_S_01	101	Mud: Sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
331	FE_S_02	105	Mud: Slightly shelly, sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
332	FE_S_03	85	Mud: Shelly, sandy mud (Mixed)	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
329	FE_S_04	83	Mixed: Muddy gravel	h	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
330	FE_S_05	77	Mixed: Muddy, gravelly sand	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
316	FE_S_06	94	Mud: Muddy sand with shells	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
								possibly SS.SMu.OMu.PjerThyAfil
315	FE_S_07	68	Mixed: Muddy sandy gravel	c	Subtidal coarse sediment	SS.SSa.CFiSa.EpusOborApri	A5.251	Physical mismatch - substrate coarse
314	FE_S_08	89	Mud: Muddy sand	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
318	FE_S_09	87	Sand: Muddy sand	c	Subtidal sand	SS.SSa.CFiSa.EpusOborApri	A5.251	
312	FE_S_10	68	Sand: Muddy sand	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
313	FE_S_11	87	Mud: Muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
310	FE_S_12	73	Sand: Muddy shelly sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
311	FE_S_13	70	Sand: Shelly muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
286	FE_S_14	83	Sand: Shelly muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
288	FE_S_15	80	Sand: Slightly shelly	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
			muddy sand					
289	FE_S_16	78	Coarse: Shelly, gravelly sand (coarse) (Mixed)	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
271	FE_S_17	76	Mixed: Shelly muddy sand with cobble	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
270	FE_S_18	74	Mixed: Muddy sand with cobbles	e	Subtidal mixed sediments	SS.SMx.OMx	A5.45	Based on physical
268	FE_S_19	80	Sand: Muddy shelly sand (Mud)	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
237	FE_S_20	80	Sand: Slightly shelly muddy sand	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
236	FE_S_21	82	Sand: Muddy sand (fine)	e	Subtidal sand	SS.SSa.OSa.OfusAfil	A5.272	
235	FE_S_22	80	Mixed: Gravelly muddy sand with shell	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
336	FE_S_23	105	Mud: Slightly shelly, sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
								possibly SS.SMu.OMu.PjerThyAfil
334	FE_S_24	108	Mud: Sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil
333	FE_S_25	97	Mud: Sandy mud	e	Subtidal mud	SS.SMu.CSaMu.ThyNten	A5.352	Although no Nuculoma present in samples, other species suggest this biotope or possibly SS.SMu.OMu.PjerThyAfil

6.6 Greater Haig Fras MCZ Data Tables

6.6.1 Greater Haig Fras MCZ Samples with physical sediment description and summary with broad-scale habitat type

Table 58. Greater Haig Fras MCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
173	GHF01	50.49709	-7.47120	mud and sandy mud	Subtidal mud	3.47	35.92	60.62
176	GHF02	50.46510	-7.42251	sand and muddy sand	Subtidal sand	0.84	91.88	7.28
179	GHF03	50.43254	-7.37452	mud and sandy mud	Subtidal mud	2.12	70.83	27.05
172	GHF04	50.48676	-7.54052	mud and sandy mud	Subtidal mud	0.69	51.00	48.31
170	GHF05	50.45430	-7.49184	sand and muddy sand	Subtidal sand	0.33	80.38	19.29
168	GHF06	50.42211	-7.44333	sand and muddy sand	Subtidal sand	0.79	97.31	1.90
166	GHF07	50.38986	-7.39440	sand and muddy sand	Subtidal sand	0.51	95.86	3.63
157	GHF08	50.47583	-7.60945	mud and sandy mud	Subtidal mud	0.33	77.88	21.79
160	GHF09	50.44323	-7.56034	coarse sediment	Subtidal coarse sediment	16.82	82.23	0.95
162	GHF10	50.41141	-7.51181	coarse sediment	Subtidal coarse sediment	29.20	68.02	2.78
164	GHF11	50.37848	-7.46246	sand and muddy sand	Subtidal sand	4.43	88.27	7.29
128	GHF13	50.49722	-7.72654	mixed sediments	Subtidal mixed sediments	37.01	25.37	37.62
131	GHF14	50.46531	-7.67788	coarse sediment	Subtidal coarse sediment	15.20	84.03	0.77
133	GHF15	50.43297	-7.62895	sand and muddy sand	Subtidal sand	0.38	93.24	6.38
135	GHF16	50.39977	-7.58014	mud and sandy	Subtidal mud	0.10	78.53	21.37

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
				mud				
124	GHF18	50.48656	-7.79560	mixed sediments	Subtidal mixed sediments	10.66	48.59	40.76
126	GHF19	50.45429	-7.74680	mud and sandy mud	Subtidal mud	0.27	75.53	24.19
139	GHF20	50.42202	-7.69804	mud and sandy mud	Subtidal mud	0.58	77.92	21.50
137	GHF21	50.38957	-7.64897	coarse sediment	Subtidal coarse sediment	10.17	88.13	1.70
120	GHF23	50.47565	-7.86445	mud and sandy mud	Subtidal mud	2.43	57.31	40.26
122	GHF24	50.44332	-7.81547	mixed sediments	Subtidal mixed sediments	12.98	70.02	17.00
140	GHF25	50.41119	-7.76643	sand and muddy sand	Subtidal sand	0.02	84.16	15.82
149	GHF26	50.37897	-7.71741	sand and muddy sand	Subtidal sand	0.38	94.43	5.19
119	GHF31	50.46459	-7.93339	mud and sandy mud	Subtidal mud	0.82	56.40	42.78
117	GHF32	50.43237	-7.88377	mud and sandy mud	Subtidal mud	0.03	69.70	30.27
114	GHF33	50.40014	-7.83461	mixed sediments	Subtidal mixed sediments	55.57	12.06	32.37
112	GHF34	50.36776	-7.78679	mud and sandy mud	Subtidal mud	0.59	69.17	30.24
110	GHF35	50.33622	-7.73727	coarse sediment	Subtidal coarse sediment	18.23	76.39	5.38
98	GHF38	50.42157	-7.95281	mud and sandy mud	Subtidal mud	0.93	53.01	46.06
100	GHF39	50.38985	-7.90425	mud and sandy mud	Subtidal mud	3.63	74.63	21.74
102	GHF40	50.35775	-7.85466	mixed sediments	Subtidal mixed sediments	5.36	71.59	23.05
104	GHF41	50.32549	-7.80596	coarse sediment	Subtidal coarse sediment	80.04	13.96	5.99
108	GHF42	50.29316	-7.75776	sand and muddy	Subtidal sand	1.32	93.87	4.81

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
				sand				
94	GHF45	50.37856	-7.97225	mixed sediments	Subtidal mixed sediments	16.58	47.49	35.93
92	GHF46	50.34652	-7.92365	coarse sediment	Subtidal coarse sediment	7.01	91.60	1.38
89	GHF47	50.31433	-7.87471	mud and sandy mud	Subtidal mud	0.56	79.29	20.16
87	GHF48	50.28207	-7.82582	mud and sandy mud	Subtidal mud	0.11	76.25	23.63
82	GHF51	50.33573	-7.99163	coarse sediment	Subtidal coarse sediment	9.02	86.67	4.31
84	GHF52	50.30354	-7.94313	mud and sandy mud	Subtidal mud	1.08	74.46	24.46
86	GHF53	50.27124	-7.89373	mud and sandy mud	Subtidal mud	0.30	75.65	24.05
78	GHF56	50.32445	-8.05983	mud and sandy mud	Subtidal mud	0.15	68.50	31.36
76	GHF57	50.29239	-8.01123	mud and sandy mud	Subtidal mud	1.75	54.73	43.52
73	GHF58	50.26039	-7.96250	mud and sandy mud	Subtidal mud	0.36	72.18	27.46
64	GHF61	50.31347	-8.12881	mud and sandy mud	Subtidal mud	0.21	34.02	65.77
67	GHF62	50.28150	-8.07986	mud and sandy mud	Subtidal mud	0.03	55.30	44.68
69	GHF63	50.24927	-8.03090	mud and sandy mud	Subtidal mud	1.25	65.66	33.09
71	GHF64	50.21741	-7.98217	mud and sandy mud	Subtidal mud	1.31	77.50	21.19
63	GHF67	50.30251	-8.19745	mud and sandy mud	Subtidal mud	2.63	40.91	56.46
61	GHF68	50.27038	-8.14841	mud and sandy mud	Subtidal mud	0.04	44.57	55.38

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
59	GHF69	50.23822	-8.09864	mud and sandy mud	Subtidal mud	0.06	65.16	34.78
57	GHF70	50.20646	-8.05012	mud and sandy mud	Subtidal mud	0.04	63.02	36.93
52	GHF73	50.22773	-8.16734	mud and sandy mud	Subtidal mud	0.05	42.84	57.11
55	GHF74	50.19527	-8.11824	mud and sandy mud	Subtidal mud	0.00	63.19	36.81
41	GHF75	50.16320	-8.06987	mud and sandy mud	Subtidal mud	0.16	63.23	36.62
49	GHF77	50.18447	-8.18689	mud and sandy mud	Subtidal mud	0.02	46.41	53.57
42	GHF78	50.15215	-8.13819	mud and sandy mud	Subtidal mud	0.03	64.00	35.97

6.6.2 Greater Haig Fras MCZ Samples with associated habitats and biotopes

Table 59. Greater Haig Fras MCZ: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
173	GHF01	105	Mud: Slightly shelly mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
176	GHF02	97	Sand: Shelly sand	e	Subtidal sand	SS.SSa.OSa	A5.27	
179	GHF03	98	Sand: Muddy sand	c	Subtidal mud	SS.SMu.OMu	A5.37	
172	GHF04	106	Mud: Muddy sand/sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
170	GHF05	101	Mud: Muddy sand	e	Subtidal sand	SS.SSa.OSa	A5.27	
168	GHF06	95	Sand: Slightly muddy, shelly sand	d	Subtidal sand	SS.SSa.OSa	A5.27	
166	GHF07	97	Sand: Slightly muddy, shelly sand/gravel	e	Subtidal sand	SS.SSa.OSa	A5.27	
157	GHF08	104	Sand: Muddy sand	c	Subtidal mud	SS.SMu.OMu	A5.37	
160	GHF09	103	Coarse: Shelly gravel	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
162	GHF10	98	Coarse: Gravelly, shelly, sandy (coarse) gravel	NA	Subtidal coarse sediment	SS.SCS.OCS	A5.15	no macrofaunal sample, only PSA
164	GHF11	92	Coarse: Slightly muddy shelly sand/ gravel (Mixed?)	a	Subtidal sand	SS.SCS.OCS	A5.15	Physical mismatch - substrate sand
128	GHF13	105	Mixed: Muddy (clay?), shelly gravel	b	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
131	GHF14	106	Mixed: Muddy gravel	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
133	GHF15	103	Sand: Muddy sand	e	Subtidal sand	SS.SSa.OSa	A5.27	
135	GHF16	102	Sand: Muddy sand	e	Subtidal mud	SS.SSa.OSa	A5.27	Physical mismatch - substrate mud
124	GHF18	108	Mixed: Shelly mud	c	Subtidal mixed sediments	SS.SMu.OMu	A5.37	Physical mismatch - substrate mixed

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
126	GHF19	105	Sand: Shelly, muddy sand (Mixed?)	c	Subtidal mud	SS.SMu.OMu	A5.37	
139	GHF20	104	Mud: Muddy sand containing shell (Mixed?)	c	Subtidal mud	SS.SMu.OMu	A5.37	
137	GHF21	103	Mixed: Muddy, shelly, sandy gravel/gravelly sand	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
120	GHF23	112	Mixed: Shelly muddy sand/sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
122	GHF24	111	Mixed: Shelly mud	NA	Subtidal mixed sediments	SS.SMx.OMx	A5.45	no macrofaunal sample, only PSA
140	GHF25	103	Sand: Muddy sand	c	Subtidal sand	SS.SMu.OMu	A5.37	Physical mismatch - substrate sand
149	GHF26	104	Sand: Sand	e	Subtidal sand	SS.SSa.OSa	A5.27	
119	GHF31	118	Mud: Shelly mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
117	GHF32	114	Sand: Muddy sand/sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
114	GHF33	107	Mixed: Sandy muddy gravel	b	Subtidal mixed sediments	SS.SMx.OMx	A5.45	
112	GHF34	106	Sand: Muddy sand	e	Subtidal mud	SS.SSa.OSa	A5.27	Physical mismatch - substrate mud
110	GHF35	105	Mixed: Gravelly muddy sand	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
98	GHF38	117	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
100	GHF39	107	Mud: Sandy mud containing shell	c	Subtidal mud	SS.SMu.OMu	A5.37	
102	GHF40	103	Mixed: Gravelly sand containing shell and mud(clay?)	a	Subtidal mixed sediments	SS.SCS.OCS	A5.15	Physical mismatch - substrate mixed
104	GHF41	104	Coarse: Gravel	NA	Subtidal coarse	SS.SCS.OCS	A5.15	no macrofaunal

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
					sediment			sample, only PSA
108	GHF42	105	Sand: Muddy sand	e	Subtidal sand	SS.SSa.OSa	A5.27	
94	GHF45	113	Mixed: Muddy sand/sandy mud containing shell	c	Subtidal mixed sediments	SS.SMu.OMu	A5.37	Physical mismatch - substrate mixed
92	GHF46	107	Coarse: Sandy gravel	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
89	GHF47	106	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
87	GHF48	105	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
82	GHF51	112	Coarse: Slightly muddy, shelly sandy gravel containing broken shell fragments (Mixed?)	a	Subtidal coarse sediment	SS.SCS.OCS	A5.15	
84	GHF52	111	Mixed: Muddy, shelly gravelly sand	c	Subtidal mud	SS.SMu.OMu	A5.37	
86	GHF53	107	Mixed: Gravelly shelly sandy mud/ muddy sand.	c	Subtidal mud	SS.SMu.OMu	A5.37	
78	GHF56	120	Mud:Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
76	GHF57	114	Mixed: Shelly, gravelly mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
73	GHF58	111	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
64	GHF61	128	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
67	GHF62	114	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
69	GHF63	110	Mixed: Slightly shelly, sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
71	GHF64	107	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
63	GHF67	121	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
61	GHF68	128	Mud: Sandy mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
59	GHF69	116	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
57	GHF70	114	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
52	GHF73	128	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
55	GHF74	117	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
41	GHF75	115	Mud: Shelly mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
49	GHF77	124	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	
42	GHF78	115	Mud: Mud	c	Subtidal mud	SS.SMu.OMu	A5.37	

6.7 Offshore Overfalls MCZ Data Tables

6.7.1 Offshore Overfalls MCZ: Samples with physical sediment description and summary with broad-scale habitat type

Table 60. Offshore Overfalls MCZ: Sediment description, broad-scale habitat and composition details for each sample station.

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
177	OO_C_01	50.53986	-0.76499	coarse sediment	Subtidal coarse sediment	88.95	10.52	0.53
175	OO_C_02	50.54129	-0.75149	coarse sediment	Subtidal coarse sediment	88.54	10.00	1.46
178	OO_C_03	50.53156	-0.77050	coarse sediment	Subtidal coarse sediment	83.36	16.31	0.33
180	OO_C_04	50.53316	-0.75689	coarse sediment	Subtidal coarse sediment	75.37	23.86	0.77
181	OO_C_05	50.53444	-0.74308	coarse sediment	Subtidal coarse sediment	46.76	50.21	3.03
189	OO_C_06	50.52449	-0.76265	coarse sediment	Subtidal coarse sediment	75.33	23.53	1.14
186	OO_C_07	50.52582	-0.74839	coarse sediment	Subtidal coarse sediment	78.50	21.01	0.49
184	OO_C_08	50.52730	-0.73449	coarse sediment	Subtidal coarse sediment	65.76	32.28	1.96
192	OO_C_09	50.51749	-0.75376	coarse sediment	Subtidal coarse sediment	89.02	9.80	1.18
194	OO_C_10	50.51878	-0.73955	coarse sediment	Subtidal coarse sediment	71.94	26.99	1.07
212	OO_MX_01	50.57310	-0.92674	coarse sediment	Subtidal coarse sediment	67.69	31.56	0.75
209	OO_MX_02	50.57964	-0.85678	coarse sediment	Subtidal coarse sediment	11.30	88.68	0.02
172	OO_MX_05	50.55121	-0.74309	coarse sediment	Subtidal coarse sediment	76.91	22.74	0.35
170	OO_MX_06	50.55747	-0.67338	coarse sediment	Subtidal coarse sediment	57.15	41.32	1.53
155	OO_MX_07	50.56417	-0.60312	coarse sediment	Subtidal coarse sediment	37.97	52.22	9.81
204	OO_MX_08	50.49617	-0.90863	coarse sediment	Subtidal coarse sediment	69.62	29.92	0.46
201	OO_MX_09	50.50268	-0.83883	coarse sediment	Subtidal coarse sediment	81.14	18.62	0.24
199	OO_MX_10	50.50927	-0.76970	coarse sediment	Subtidal coarse sediment	86.19	13.67	0.14
196	OO_MX_11	50.51580	-0.69952	coarse sediment	Subtidal coarse sediment	76.41	23.59	0.00
131	OO_MX_12	50.52245	-0.62985	coarse sediment	Subtidal coarse sediment	30.18	69.17	0.64
105	OO_MX_13	50.46146	-0.86490	coarse sediment	Subtidal coarse sediment	66.36	33.32	0.32
107	OO_MX_14	50.46747	-0.79485	coarse sediment	Subtidal coarse sediment	40.50	55.28	4.22
110	OO_MX_15	50.47396	-0.72533	mixed sediments	Subtidal mixed sediments	56.57	38.45	4.98

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
113	OO_MX_16	50.48048	-0.65562	mixed sediments	Subtidal mixed sediments	59.89	31.49	8.62
115	OO_MX_17	50.48690	-0.58595	coarse sediment	Subtidal coarse sediment	57.72	39.51	2.78
102	OO_MX_18	50.41939	-0.89075	coarse sediment	Subtidal coarse sediment	49.70	46.69	3.60
100	OO_MX_19	50.42556	-0.82125	coarse sediment	Subtidal coarse sediment	78.12	21.35	0.53
98	OO_MX_20	50.43214	-0.75214	coarse sediment	Subtidal coarse sediment	49.02	47.97	3.01
95	OO_MX_21	50.43872	-0.68208	coarse sediment	Subtidal coarse sediment	54.14	45.47	0.40
93	OO_MX_22	50.44569	-0.61158	coarse sediment	Subtidal coarse sediment	50.65	47.12	2.23
88	OO_MX_23	50.45201	-0.54194	coarse sediment	Subtidal coarse sediment	46.38	50.04	3.57
91	OO_MX_24	50.41040	-0.56828	coarse sediment	Subtidal coarse sediment	49.55	46.72	3.73
363	OO_MX_25	50.57798	-0.89634	coarse sediment	Subtidal coarse sedimen	39.32	56.45	4.24
364	OO_MX_26	50.57353	-0.89922	coarse sediment	Subtidal coarse sediment	36.31	63.69	0.00
365	OO_MX_27	50.56543	-0.91054	coarse sediment	Subtidal coarse sediment	58.90	40.16	0.94
366	OO_MX_28	50.56483	-0.88768	coarse sediment	Subtidal coarse sediment	17.21	82.69	0.10
167	OO_S_01	50.57846	-0.55684	mixed sediments	Subtidal mixed sediments	6.72	79.83	13.45
165	OO_S_02	50.58038	-0.53573	mixed sediments	Subtidal mixed sediments	31.99	60.56	7.46
158	OO_S_03	50.56609	-0.56479	mixed sediments	Subtidal mixed sediments	7.26	76.10	16.64
160	OO_S_04	50.56799	-0.54375	mixed sediments	Subtidal mixed sediments	24.92	56.80	18.28
162	OO_S_05	50.56984	-0.52263	coarse sediment	Subtidal coarse sediment	30.07	65.83	4.11
153	OO_S_06	50.55170	-0.59352	mixed sediments	Subtidal mixed sediments	34.97	55.56	9.47
151	OO_S_07	50.55357	-0.57258	sand and muddy sand	Subtidal sand	4.44	95.56	0.00
148	OO_S_08	50.55565	-0.55152	mixed sediments	Subtidal mixed sediments	24.06	61.69	14.26
146	OO_S_09	50.55763	-0.53060	coarse sediment	Subtidal coarse sediment	27.59	66.92	5.49
134	OO_S_10	50.53899	-0.60135	mixed sediments	Subtidal mixed sediments	33.18	57.48	9.35
137	OO_S_11	50.54105	-0.58030	coarse sediment	Subtidal coarse sediment	8.93	91.07	0.00
139	OO_S_12	50.54323	-0.55967	coarse sediment	Subtidal coarse sediment	50.49	44.92	4.59
141	OO_S_13	50.54529	-0.53847	coarse sediment	Subtidal coarse sediment	36.95	59.30	3.75
144	OO_S_14	50.54736	-0.51673	mixed sediments	Subtidal mixed sediments	51.34	42.70	5.95
129	OO_S_15	50.52835	-0.58829	coarse sediment	Subtidal coarse sediment	57.04	41.30	1.65

Station No.	Station code	Latitude	Longitude	Sediment description	Broad-scale habitat	Gravel (%)	Sand (%)	Silt (%)
127	OO_S_16	50.53025	-0.56725	coarse sediment	Subtidal coarse sediment	67.18	29.57	3.25
124	OO_S_17	50.53249	-0.54648	coarse sediment	Subtidal coarse sediment	47.14	49.99	2.88
122	OO_S_18	50.53403	-0.52644	coarse sediment	Subtidal coarse sediment	38.99	57.82	3.20
118	OO_S_19	50.51613	-0.59627	mixed sediments	Subtidal mixed sediments	35.83	53.54	10.63
120	OO_S_20	50.51801	-0.57522	mixed sediments	Subtidal mixed sediments	61.84	32.17	5.99
360	OO_S_21	50.57047	-0.54991	mixed sediments	Subtidal mixed sediments	18.55	69.22	12.23
362	OO_S_22	50.56365	-0.53932	coarse sediment	Subtidal coarse sediment	15.07	83.52	1.41
361	OO_S_23	50.57171	-0.53511	mixed sediments	Subtidal mixed sediments	33.58	28.76	37.66

6.7.2 Offshore Overfalls MCZ:Samples with associated habitats and biotopes

Table 61. Offshore Overfalls: Summary of habitat types and biotopes for sample stations.

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
177	OO_C_01	21	Coarse: Sandy gravel with chalk and cobbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
175	OO_C_02	24	Coarse: Gravelly, sandy cobbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
178	OO_C_03	22	Coarse: Slightly muddy, sandy gravel with cobbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
180	OO_C_04	24	Coarse: Slightly muddy, sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
181	OO_C_05	25	Coarse: Slightly muddy, sandy gravel with chalk and cobbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
189	OO_C_06		Coarse: Sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
186	OO_C_07		Coarse: Sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
184	OO_C_08		Coarse: Sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
192	OO_C_09	27	Coarse: Sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
194	OO_C_10	25	Coarse: Sandy gravel with cobbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
212	OO_MX_01	30	Mixed: Slightly muddy, sandy gravel (coarse?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
209	OO_MX_02	39	Sand: Shelly sand	a	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Very impoverished; biotope assignment based on physical data

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
172	OO_MX_05	17	Coarse:Slightly muddy, sandy gravel (mixed?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
170	OO_MX_06	23	Coarse: Slightly muddy, sandy gravel (mixed?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
155	OO_MX_07	47	Mixed: Slightly muddy,sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
204	OO_MX_08	25	Coarse: Sandy gravel with cobbles	b	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Impoverished; biotope assignment based on physical data
201	OO_MX_09	24	Coarse: Shelly gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
199	OO_MX_10	24	Coarse: Cobbles and gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
196	OO_MX_11	26	Coarse: Chalky, gravelly sand	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
131	OO_MX_12	40	Mixed: Silty sand with pebbles	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
105	OO_MX_13	30	Mixed: Muddy gravel, flint cobbles	e	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Higher numbers of Sabellaria spinulosa differentiates this sample
107	OO_MX_14	44	Mixed: Muddy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
110	OO_MX_15	62	Mixed: Muddy gravel, cobbles	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
113	OO_MX_16		Mixed: Muddy gravel	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
115	OO_MX_17	64	Mixed: Shelly, sandy	f	Subtidal coarse	SS.SCS.CCS.MedLumVen	A5.142	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
			gravel (coarse?)		sediment			
102	OO_MX_18	45	Mixed: Muddy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
100	OO_MX_19	58	Mixed: Muddy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
98	OO_MX_20	60	Mixed: Muddy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
95	OO_MX_21	61	Sand: Muddy sand (coarse)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
93	OO_MX_22	60	Mixed: Slightly muddy,sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
88	OO_MX_23	55	Mixed: Muddy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
91	OO_MX_24	48	Mixed: Muddy sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
363	OO_MX_25	36	Mixed: Slightly muddy, sandy gravel (coarse?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
364	OO_MX_26	22	Coarse: Sandy shelly gravel	d	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Very impoverished
365	OO_MX_27	28	Coarse: Sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
366	OO_MX_28	24	Mixed: Slightly muddy, sandy shelly gravel (coarse?)	d	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Very impoverished
167	OO_S_01	38	Coarse: Slightly muddy, sandy gravel (mixed?)	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
165	OO_S_02	40	Coarse: Slightly muddy, gravelly sand (mixed?)	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
158	OO_S_03	41	Sand: Sand	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
160	OO_S_04	45	Mixed: Gravelly sand with clay lumps	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	
162	OO_S_05	48	Coarse: Slightly muddy, sandy gravel (mixed?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
153	OO_S_06	44	Coarse: Sandy gravel	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
151	OO_S_07		Coarse: Shelly sand	c	Subtidal sand	SS.SCS.CCS	A5.14	Physical mismatch - substrate sand; Multivariate analysis shows similarity to SS.SCS.ICS.Glap but depth indicates SS.SCS.CCS
148	OO_S_08	59	Mixed: Muddy, gravelly sand	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
146	OO_S_09	?	Coarse: Gravelly sand	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
134	OO_S_10	47	Coarse: Shelly sand with cobbles	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
137	OO_S_11	56	Coarse: Shelly sand	c	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Multivariate analysis shows similarity to SS.SCS.ICS.Glap but depth indicates SS.SCS.CCS
139	OO_S_12	64	Coarse: Sandy, silty gravel (mixed?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	

Station No.	Station code	Depth	Sediment Description	Group	Broad-scale habitat	MHCBI Biotope code	EUNIS code	Comment
141	OO_S_13	64	Coarse: Sandy, silty gravel (mixed?)	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
144	OO_S_14	67	Coarse: Gravelly sand	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
129	OO_S_15	63	Mixed: Silty shelly sand with pebbles and gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
127	OO_S_16	68	Mixed: Muddy, sandy gravel	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
124	OO_S_17	63	Mixed: Gravelly, muddy sand	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
122	OO_S_18	61	Mixed: Gravelly, muddy sand	f	Subtidal coarse sediment	SS.SCS.CCS.MedLumVen	A5.142	
118	OO_S_19	66	Coarse: Gravelly sand	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
120	OO_S_20	65	Coarse: Silty sandy gravel (mixed?)	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
360	OO_S_21	40	Mixed: Muddy, sandy gravel	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed
362	OO_S_22	56	Mixed: Slightly gravelly, slightly shelly, muddy sand	c	Subtidal coarse sediment	SS.SCS.CCS	A5.14	Multivariate analysis shows similarity to SS.SCS.ICS.Glap but depth indicates SS.SCS.CCS
361	OO_S_23	41	Mixed: Slightly mudy, sandy gravel over clay	f	Subtidal mixed sediments	SS.SCS.CCS.MedLumVen	A5.142	Physical mismatch - substrate mixed

7 Appendix 2: Colour Schemes

Maps are presented as figures throughout the report and where possible standard colour schemes have been used. For certain maps which show sample station by sediment or habitat type, non-standard colours have been used as these better illustrate and discriminate the difference between classes. The standard EUNIS colour for each habitat is provided below with the alternate colour used within this report, and red, green and blue values are given for reference.

A5.1; Subtidal coarse sediment; Gravels/Coarse Sediments, SS.SCS

	colour	RED	GREEN	BLUE
EUNIS		255	187	153
ALTERNATE		255	105	190

A5.2; Sublittoral Sand; Sands & Muddy Sands, SS.SSa

	colour	RED	GREEN	BLUE
EUNIS		255	255	128
ALTERNATE		255	255	0

A5.3; Sublittoral Mud; Muds &Sandy Muds; SS.SMu

	colour	RED	GREEN	BLUE
EUNIS		229	197	115
ALTERNATE		145	110	060

A5.4; Subtidal mixed sediments; Subtidal Mixed Sediments; SS.SMx

	colour	RED	GREEN	BLUE
EUNIS		221	255	153
ALTERNATE		000	160	060

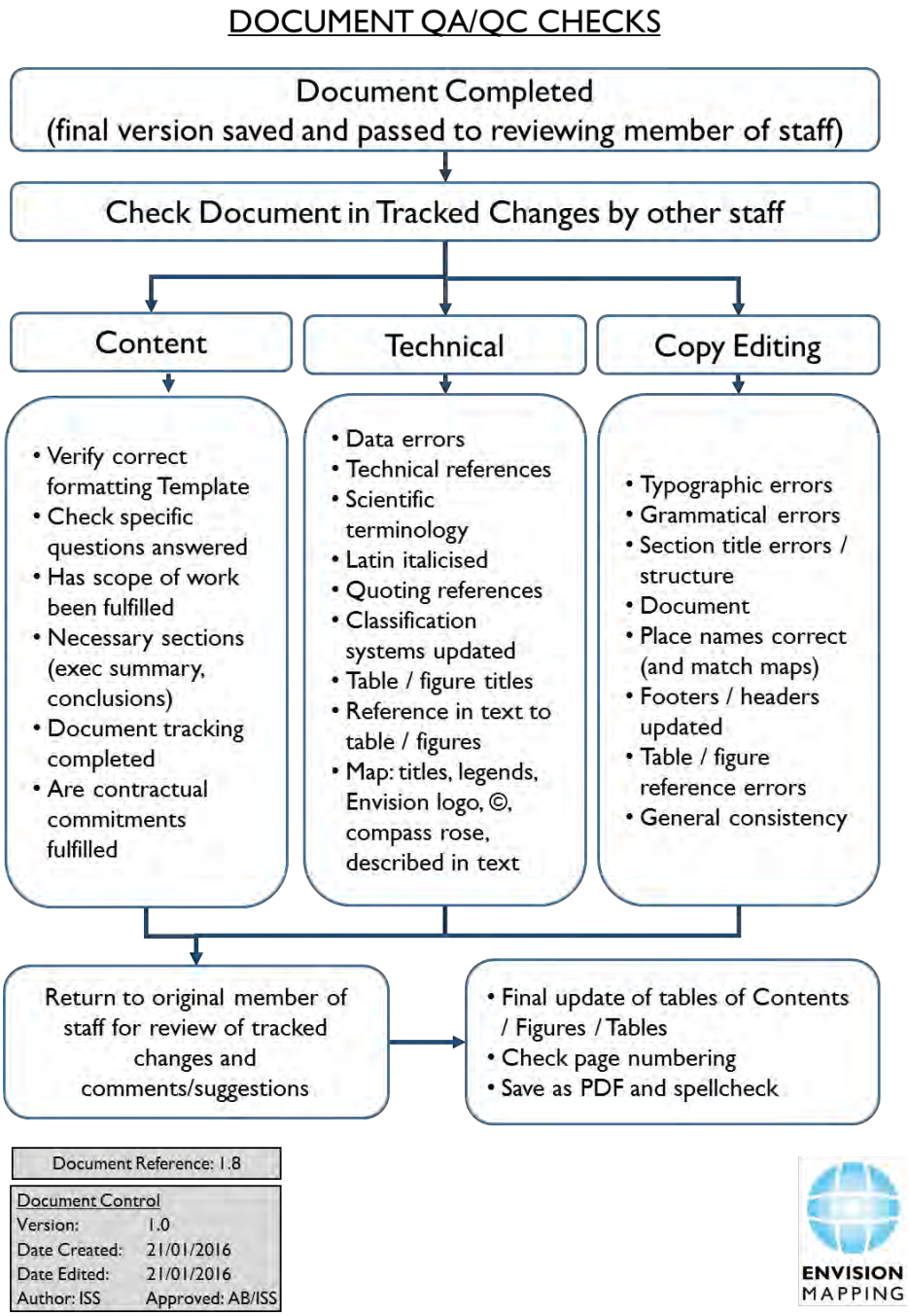
8 Appendix 3: Quality Assurance and Audit Trail

To ensure there is agreement on the biotopes assigned, it is required that a minimum of 10% of data (biotope samples) were checked by a 3rd party/analyst who did not undertake the original data processing, statistical analysis or biotope allocation. Once the 3rd party is satisfied that data from a survey have been analysed correctly this is verified in the table below. For this project 100% of data and sample biotope allocation were checked and verified.

Site	Action	Analyst	Reviewer	Checked
Farnes East MCZ	Data handling checked, prior to import to primer for analysis	RW	ISS	YES
	Statistical analysis outputs verified	RW	ISS	YES
	Biotope allocation for each sample agreed	RW	ISS	YES
Greater Haig Fras MCZ	Data handling checked, prior to import to primer for analysis	RW	ISS	YES
	Statistical analysis outputs verified	RW	ISS	YES
	Biotope allocation for each sample agreed	RW	ISS	YES
Holderness Offshore rMCZ	Data handling checked, prior to import to primer for analysis	ISS	RW	YES
	Statistical analysis outputs verified	ISS	RW	YES
	Biotope allocation for each sample agreed	ISS	RW	YES
Inner Bank rMCZ	Data handling checked, prior to import to primer for analysis	RW	ISS	YES
	Statistical analysis outputs verified	RW	ISS	YES
	Biotope allocation for each sample agreed	RW	ISS	YES
North-West of Jones Bank MCZ	Data handling checked, prior to import to primer for analysis	ISS	RW	YES
	Statistical analysis outputs verified	ISS	RW	YES
	Biotope allocation for each sample agreed	ISS	RW	YES
Offshore Overfalls MCZ	Data handling checked, prior to import to primer for analysis	RW	ISS	YES
	Statistical analysis outputs verified	RW	ISS	YES
	Biotope allocation for each sample agreed	RW	ISS	YES

Site	Action	Analyst	Reviewer	Checked
South of Isles of Scilly rMCZ	Data handling checked, prior to import to primer for analysis	RW	ISS	YES
	Statistical analysis outputs verified	RW	ISS	YES
	Biotope allocation for each sample agreed	RW	ISS	YES

Final documents undergo review and checks according to the following processes.



9 List of Figures

10 List of Tables