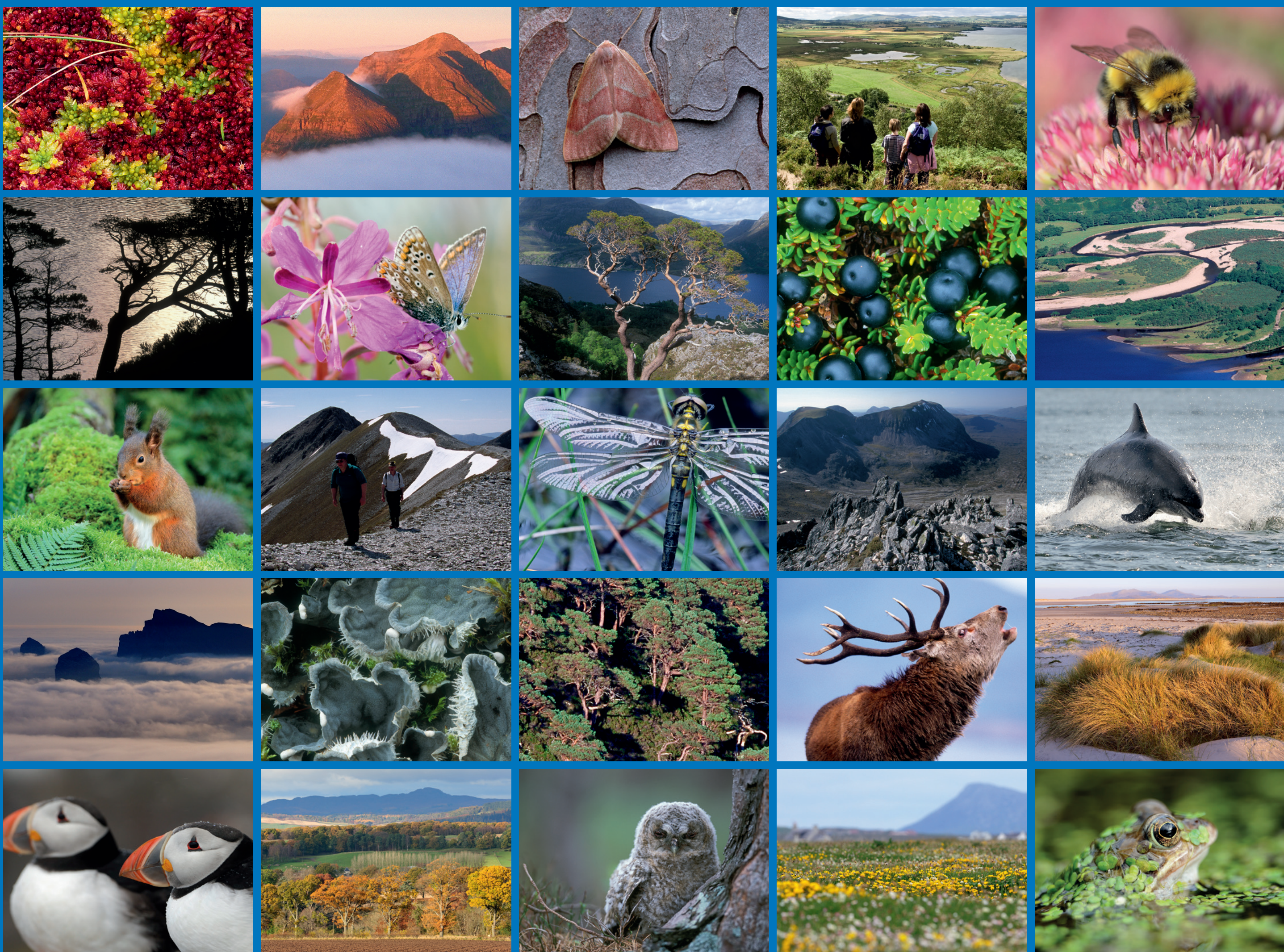
Scottish Natural Heritage
Commissioned Report No. 961

Infaunal and PSA analysis of grab samples collected from the Sound of Barra area, 2016



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COMMISSIONED REPORT

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Infaunal and PSA analysis of grab samples collected from the Sound of Barra area, 2016

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This report should be quoted as:

Franco, A., Dawes, O., Leighton, A., Musk. W., Smyth, K. & Thomson, S. 2017. Infaunal and PSA analysis of grab samples collected from the Sound of Barra area, 2016. *Scottish Natural Heritage Commissioned Report No. 961.*

COMMISSIONED REPORT

Summary

Infaunal and PSA analysis of grab samples collected from the Sound of Barra area, 2016

Commissioned Report No. 961
Project No: 016483
Contractor: Franco, A., Dawes, O., Leighton, A., Musk. W., Smyth. K. & Thomson, S.
Year of publication: 2017

Keywords

Benthos; monitoring; maerl; sandbanks; infauna; biotopes; Sound of Barra

Background

The Sound of Barra Special Area of Conservation (SAC) was designated in 2013 to afford protection for the marine features *Sandbanks which are slightly covered by sea water all the time*, *Reefs,* and *Harbour seal* populations. It has a complex topography and exposed nature, consisting of a mosaic of sandbanks and shallow channels amongst islands and rocky outcrops and as such gives rise to a range of biological communities which include maerl beds and coarse sands. Survey work is underway to improve knowledge of the habitats and species that occur in these sites. Survey work has also been undertaken to monitor the features of interest within these sites to allow for temporal analysis of the protected features.

The aim of the current investigation was to improve knowledge of the current condition of the maerl and coarse sediment habitats on the eastern side of the Sound of Barra SAC. Surveys were carried out by SNH and Marine Scotland Science on board the *MRV Alba na Mara* during 18th-22nd April 2016. This work consisted of quantitative drop-down video surveys as well as the collection of 72 infaunal grab samples and granulometry samples for Particle Size Analysis (PSA). The Institute of Estuarine and Coastal Studies was commissioned to undertake the faunal analysis and PSA of the samples and produce a brief interpretative report to assign biotopes to all of the collected samples. Analysis of the associated video footage is reported separately (Moore, 2017).

Main findings

- Sediments collected within and in the vicinity of the Sound of Barra SAC were generally poorly sorted and made up of sandy-gravel and gravelly-sand, with the gravel and sand components accounting for >95 % of the sediment weight in most cases. The exception was survey box, S1, where the sediments had a mean mud content of 32 %, compared to <9 % elsewhere. There was a gradual increase in mean particle size from S1 in the north to S6 in the middle, then size decreased again towards S9 in the south.

- Live maerl (*Phymatolithon calcareum*), a slow growing, coralline alga, was found in 45 out of 72 samples. Live encrusting coralline algae of the family Corallinaceae were also recorded across the site.

- A total of 588 taxa were identified in the grab samples. The total number of taxa per sample ranged from 22 taxa per 0.1 m^2 at S9 to 138 taxa per 0.1 m^2 at S6.

- Benthos abundance in the samples ranged between 65 individuals per 0.1 m^2 to 498 individuals per 0.1 m^2. An increasing pattern in the mean abundance was detected towards the centre of the SAC, with values peaking in S4, S5 and S6.

- Samples from S1 and S9 differentiated from the other areas mostly due to the absence of the maerl-forming species *Phymatolithon calcareum* and the absence or lower frequency of occurrence of several bryozoan species (e.g. *Chorizopora brongniartii*, *Escharoides mamillata*, *Microporella ciliata* and *Aetea sica*) which were common in the other areas.

- Ten different biotopes or combinations of biotopes were identified across the the sampling area. The most common biotopes were **SS.SCS.ICS.MoeVen**, *Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel; **SS.SCS.CCS.MedLumVen**, *Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel; **SS.SCS.CCS.Blan**, *Branchiostoma lanceolatum* in circalittoral coarse sand with shell gravel; **SS.SSa.CFiSa.ApriBatPo**, *Abra prismatica*, *Bathyporeia elegans* and polychaetes in circalittoral fine sand and **SS.SSa.IMuSa.FfabMag**, *Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand; **SS.SMu.CSaMu.AfilMysAnit**, *Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud. In addition *P. calcareum* was recorded in a number of samples, but not covered by the main biotope description. Note: assigning biotope combinations is not considered an appropriate method for habitat classification and primary biotopes assigned here will be used by SNH for further analysis and interpretation.

- The species composition and sediment type recorded at all sites were consistent with the Annex 1 habitat, *Sandbanks which are slightly covered by sea water all the time*.

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Table of Contents **Page**

1. INTRODUCTION

The Sound of Barra Special Area of Conservation (SAC) was designated in 2013 to afford protection for the marine features *Sandbanks which are slightly covered by sea water all the time*, *Reefs,* and *Harbour seal* populations. The Sound of Barra is located between South Uist and the Island of Barra in the Outer Hebrides (Figure 1) and includes a mosaic of sandbanks and shallow channels amongst islands and rocky outcrops. The complex topography and exposed nature of the Sound gives way to a range of biological communities including maerl beds and mobile sands, while seagrass beds occur in the sheltered, shallow areas (Harries *et al.,* 2007). Maerl and seagrass beds form part of the sandbanks feature and are patchily distributed across the Sound. Maerl beds dominate the eastern side of the Sound and occur in large ripples, with live maerl often confined to the ripple troughs (Harries *et al.,* 2007). Survey work is underway to monitor the features of interest within the sites and to assess changes in species composition over time.

From the 18th-22nd April 2016, a survey was carried out by SNH and Marine Scotland Science on board the MRV *Alba na Mara* to determine the current condition of the maerl and coarse sediment habitats on the eastern side of the Sound of Barra SAC (Figures 2a and 2b). Sampling comprised collection of quantitative drop-down video footage, as well as 72 infaunal grab samples and granulometry samples for Particle Size Analysis (PSA). A summary of the grab sample locations and depth is provided in Annex 1. Analysis of the associated video footage will be reported separately in Moore (2017).

The Institute of Estuarine and Coastal Studies (IECS) was commissioned by SNH to undertake the analysis of the infaunal and PSA samples collected, and to provide a brief interpretative report including the assignment of biotopes to all samples.

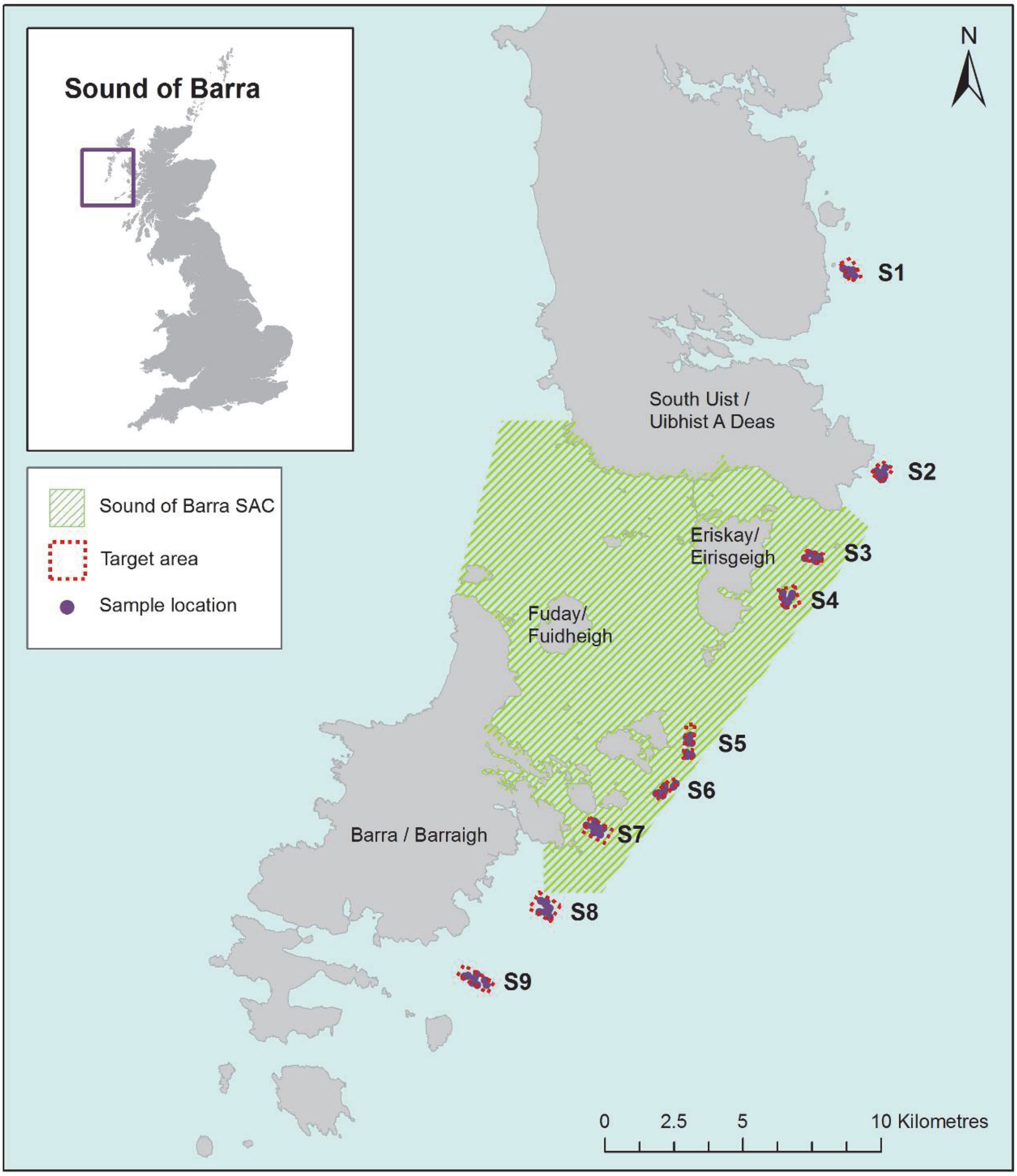


Figure 1. Location of the nine sampling boxes and sampling stations therein, within and outside the eastern side of the Sound of Barra SAC. © Crown copyright and database rights [2017] Ordnance Survey 100017908.

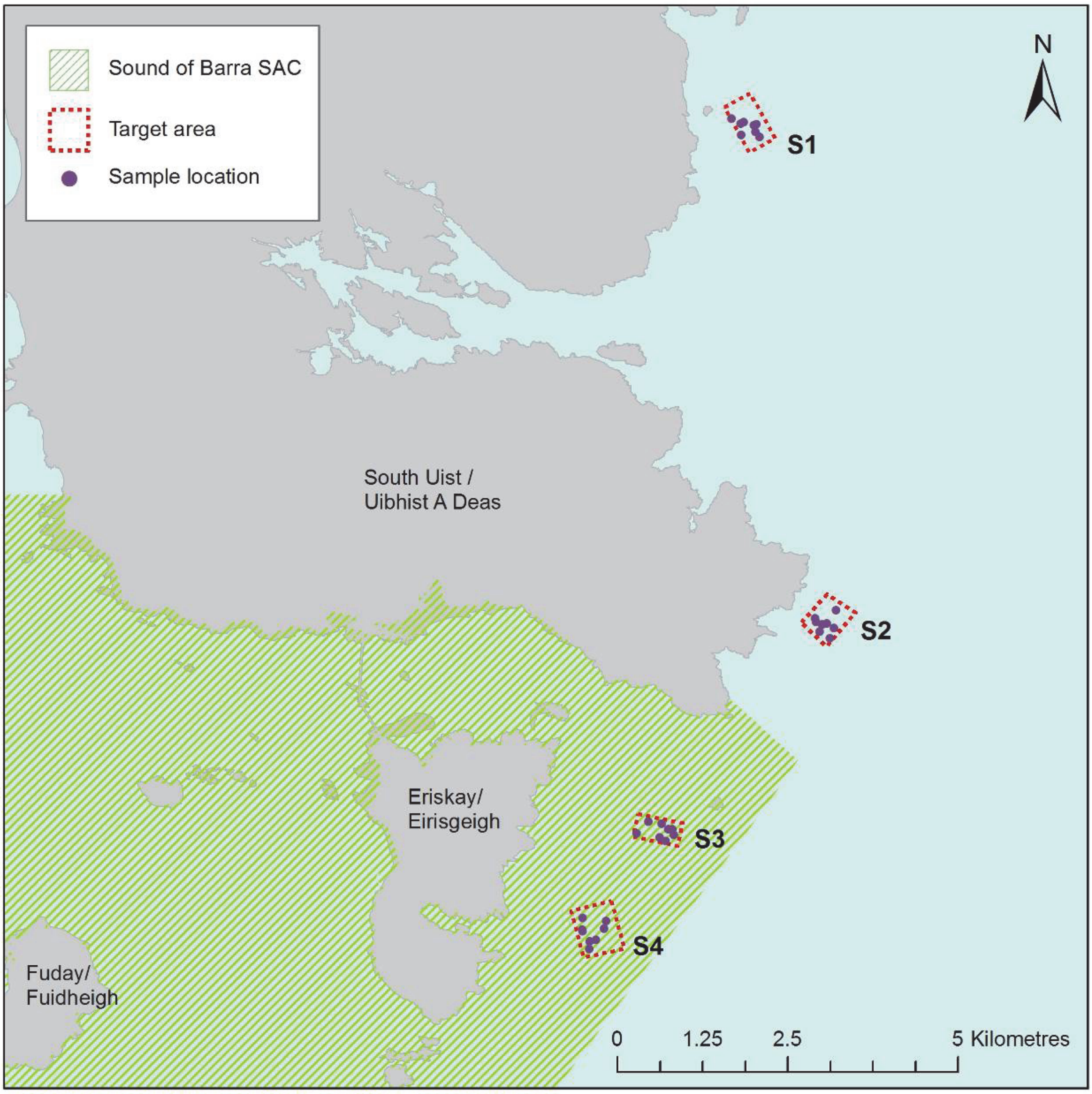


Figure 2a. Northern section of sampling boxes including S1 and S2 located outside of the SAC site and S3 and S4 which were located inside of the SAC site. © Crown copyright and database rights [2017] Ordnance Survey 100017908.

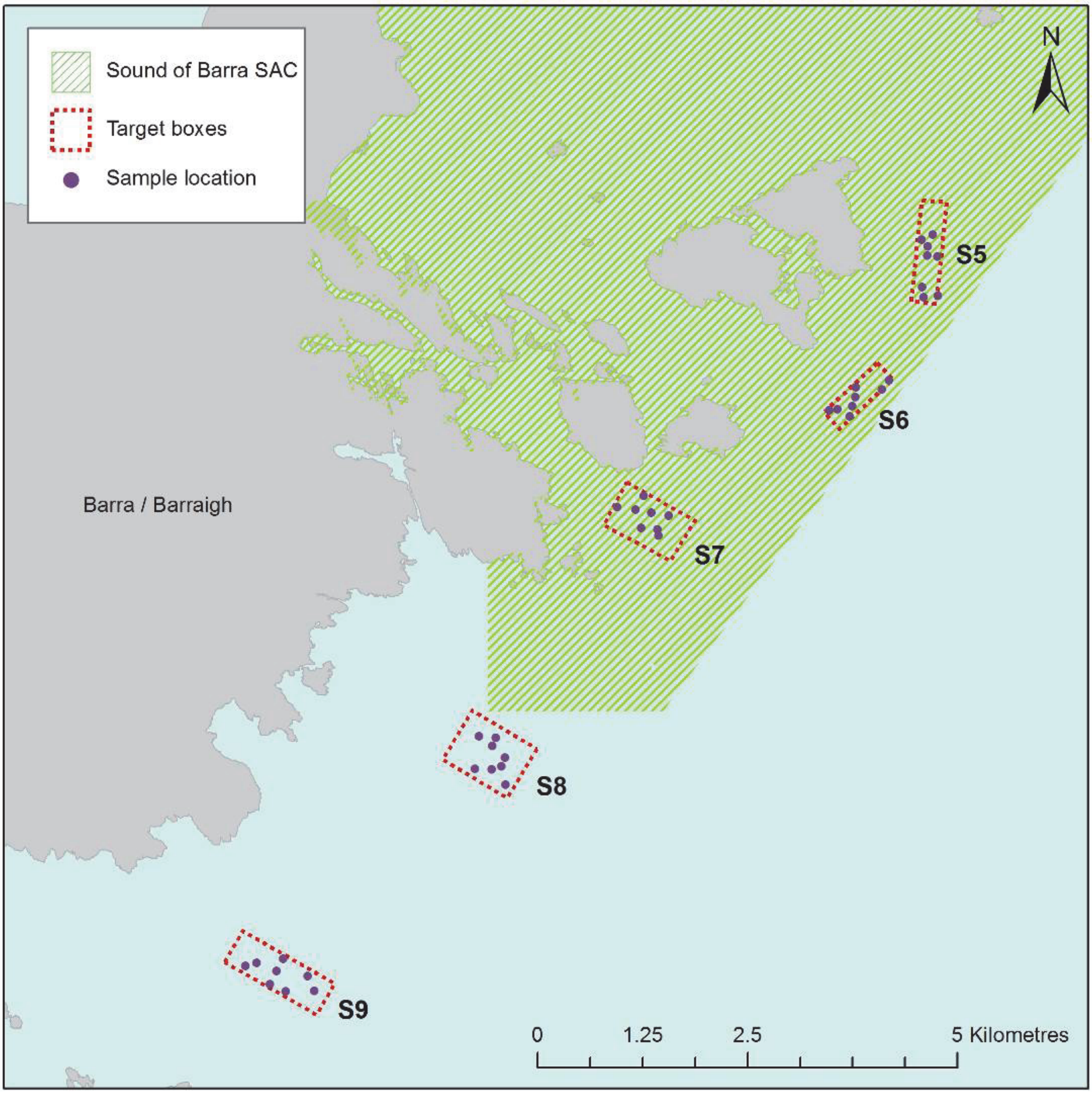


Figure 2b. Southern section of sampling boxes including S5, S6 and S7 located inside of the SAC site and S8 and S9 which were located outside of the SAC site. © Crown copyright and database rights [2017] Ordnance Survey 100017908.

2. METHODS

2.1 Infaunal sample collection

Sampling locations were randomly selected within nine depth stratified sampling boxes (S1-S9), with five boxes (S3-S7) being located inside the SAC, and the remaining four boxes being placed outside the SAC, as control areas to the north (S1-S2) and south (S8-S9) of the SAC (Figure 2a & b). The stations selected to the north of the SAC were relocated due to the presence of creels in the sampling boxes. These boxes were therefore moved slightly and in deeper water than the others. Sampling was restricted to within the boxes to reduce variability and increase the statistical power for assessing a change in biological communities over time. However, some of the areas such as S7 and S8 had not been surveyed previously. Therefore this project serves a secondary purpose - to increase our knowledge of the extent and distribution of the subtidal habitats in this area.

Water depths at the benthic grab stations ranged from 22.0 m to 41.2 m BCD and a single grab sample was collected using a 0.1 m^2 Day grab at each station. Eight grab samples were taken within each sampling box and stations were randomly selected within the boxes to allow for a mixed-effect modelling approach for future assessments (Millar and Anderson, 2004). Once the grab was recovered on board a small sub-sample was removed for separate particle size analysis and stored in a plastic bag before being frozen. Each infaunal sample was passed through a 1 mm mesh sieve. The sieve residue was retained and fixed using buffered formalin.

2.2 Laboratory processing

2.2.1 Maerl analysis

All benthic invertebrate samples were initially processed to identify the presence of live fragments of maerl greater than 4 mm. The fixative, formaldehyde, was removed from each sample using appropriate exposure prevention controls. A nest of sieves was used with the finest sieve 1 mm mesh diameter and the greatest 4 mm mesh diameter. The sample was rinsed with water and all material retained on the 4 mm mesh transferred to a white inspection tray. Any material <4 mm was returned to the original sample container along with the formaldehyde for subsequent analysis. The material >4 mm was homogenised on the tray and one rounded teaspoon of material removed. From this teaspoon up to 50 live fragments of maerl were removed and laid on a white surface. If 50 fragments were not present in the first teaspoon this procedure was repeated until 50 fragments were recorded or until there was no maerl left in the sample, whichever came first. The remaining material was returned to the original sample container ready to be processed for benthic infauna.

Once the live fragments of maerl were all laid out on the white roll, a ruler was added to provide a scale as well as a sample label. A photograph of each sample was then taken (see Figure 3 for an example image) and the maximum length of each live twiglet recorded.

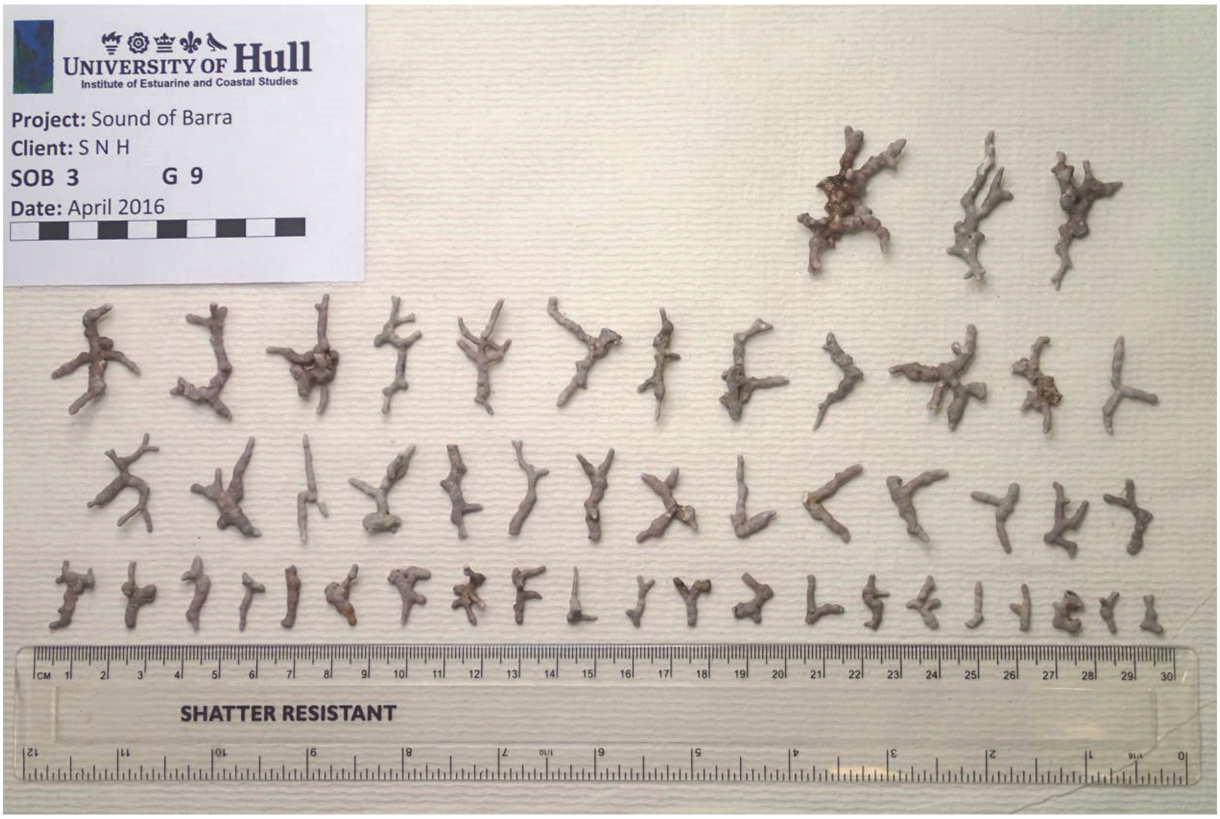


Figure 3. Example of live maerl fragments removed from sample S3_G9.

This report only provides the length data and a copy of the photographs. However, the maerl photographs may be used in the future to look at the morphotypes in more detail (e.g. using imaging software).

2.2.2 Benthic infaunal analysis

All sample processing undertaken by IECS is in line with NMBAQC Scheme guidelines (Worsfold and Hall, 2010).

The fixative, 4% formaldehyde, was decanted from the sample through a 212 µm sieve using appropriate exposure prevention controls as detailed in the IECS Health & Safety documentation. Material retained on the sieve was washed back into the sample. The sample was subsequently washed through a nest of 20 cm diameter stainless steel sieves, with the smallest mesh diameter of 1 mm and the greatest mesh diameter 4 mm, to remove excess fixative as well as fine mud and sand particles. The residue from each sieve was gently washed into white trays. Water was added to the tray and the contents examined by eye using a 1.5x illuminated magnifier. Large specimens were removed and sorted into major phyla. The fauna derived were retained and stored by group in appropriately labelled containers, preserved using 70% Industrial Methylated Spirits (IMS) and passed on for identification. Sieves and trays were washed thoroughly between samples to ensure there was no contamination of subsequent samples. During the sample processing phase a sample proforma was completed to include client, project, area, sample number, date, name of sorter and identifier, description of residue characteristics, notable features, sieve mesh size and whether any problems were encountered.

Identification was undertaken using Olympus SZX7 and SZ40 zoom microscopes with 10x and 20x eyepieces, giving a maximum magnification of up to 80x. An additional 2x objective was used to increase the potential magnification to 160x. Olympus BX41 compound microscopes were used for further magnification if necessary, up to 1000x. Identification of infaunal samples was to the highest possible taxonomic separation (i.e. species). During identification, all individuals were initially separated into families, with part animals being assigned to families where possible. The macrofauna were identified to species level using standard taxonomic keys, low and high power stereoscopic microscopes and dissection when necessary. Incomplete animals without anterior ends were not recorded as individuals to be included in the quantitative dataset. However, they were identified where possible and recorded as being present. Similarly, motile and colonial sessile epibenthic taxa and meiofauna were recorded but not included in the main quantitative data set. IECS follow strict AQC procedures. In addition, regular cross reference identification was carried out by IECS' senior taxonomists throughout the identification process. The taxonomic literature used was essentially as given in and expanded from Rees *et al.* (1990) and reporting nomenclature used Howson and Picton (1997) and the World Register of Marine Species (WoRMS).

2.2.3 Particle size analysis

All PSA samples were processed in accordance with the NMBAQC scheme guidelines (Mason, 2016). A combination of laser analysis, using a Malvern Mastersizer 2000 (laser granulometer) and Hydro 2000 Mu accessory unit (Dispersion unit), and dry sieving was used to process the samples. Prior to processing any conspicuous fauna (>1 mm) was removed and noted. Flora considered to be an integral component of the sediment was not removed. A photograph of each sample and a brief description of the sediment, including material type (e.g. shell) and description based on the Folk triangle categories, was also recorded.

2.2.4 Laser analysis

The bulk sediment sample was mixed thoroughly before processing. The first subsample was taken and passed through a 1 mm sieve to remove any coarse material. The coarse material from the subsample was discarded and the fine material added to the dispersant (water) within the dispersion unit until an obscuration factor of 25 % was reached. Ultrasonic displacement was then used for 20 seconds at a tip displacement of 10 µm and a target obscuration of 30 %. Three measurements were taken using the laser granulometer. All three outputs were checked to make sure they were consistent as part of the IECS QA procedures. A second and third subsample were taken and the process repeated. Replicates were compared for similarity to ensure accurate subsampling. Between each run, the granulometer was thoroughly cleaned using tap water to remove any residual sediment left in the system. The subsampling procedure used is consistent with the recommended procedure identified at the NMBAQC PSA workshop held in February 2014 at the Cefas laboratory in Lowestoft.

2.2.5 Dry sieving

All samples were wet split at 1 mm. The <1 mm fraction was allowed to settle over 24 hours and the water decanted. The water was also decanted from the >1 mm fraction. Both fractions were then placed in an oven at 84˚C for 48 hours. The weight of the dry fine fraction was calculated and the coarse fraction was sieved using an Endecotts sieve shaker and test sieves for 20 minutes. Sieve sizes used were 1 mm, 1.4 mm, 2 mm, 2.8 mm, 4 mm, 5.6 mm, 8 mm, 11.2 mm, 16 mm, 22.4 mm, 31.5 mm, 45 mm, and 63 mm (i.e. at ½ phi intervals).

2.3 Data analysis

2.3.1 Benthic infauna

The sample data collected for the analysis included primary biological parameters such as

- Taxonomic identities.
- Species abundance, expressed as individuals per 0.1 m^2 grab sample.
- Length of live maerl fragments in the samples.

Additional parameters were derived from the sample data to characterise the diversity of the benthic invertebrate community. These were calculated using PRIMER v. 6.1.10 (Plymouth Routines in Marine Ecological Research) and included:

- Total number of species, *S*.
- Shannon-Wiener diversity, *H'*, calculated as:

$$H' = - \sum pi \log_2 pi ,$$

with *pi* being the proportion of individuals of the i^{th} species in the sample. This index incorporates both species richness and evenness (a measure of the distribution of the individuals between the species). Higher values indicate higher diversity.

- Pielou's Evenness index, *J'*, calculated as:

$$J' = H' / \log_2 S ,$$

with *H'* and *S* as defined above. This index gives a measure of the relative abundance of each species with values ranging between 0 and 1. Low values (close to 0) indicate that a community is dominated by one or few species and is of low diversity. Communities where there is an even spread of the individuals between the species (J' values approaching 1) are considered to be diverse.

Mean values and descriptive statistics for primary and derived biological parameters were presented collectively for the stations within each box area, within and outside of the SAC. Standard deviation (SD) and coefficient of variation (%CV, measured as SD/mean*100[1]) were also presented to indicate the degree of variability between samples within each survey box.

In order to support sample allocation to biotopes, a cluster analysis was applied to both presence-absence data (all taxa) and species abundance (for those taxa that were assessed quantitatively) in order to identify similarities in species composition and structure between samples. Species abundances were fourth root transformed and the similarity between samples calculated (Bray-Curtis similarity index) before undertaking the multivariate analysis (using group average algorithm). A SIMPROF (similarity profile permutation) test was applied to the cluster analysis to identify statistically significant ($p < 0.05$) evidence of differentiation among groups of samples (clusters) to aid biotope classification. The SIMPER analysis was also applied to identify species characterising the different groups of stations as identified by the cluster analysis. BIOENV was used to determine relationships between environmental and biological parameters in order to identify the combination of environmental variables which best explained community structure.

[1] Being based on the scaling of the SD on the respective mean value, CV has the advantage of allowing comparisons between data distributions with different measurement unit.

All analyses were undertaken in PRIMER v. 6.1.10.

2.3.2 Particle Size Analysis

The resulting pooled data were processed using Gradistat (Blott and Pye, 2001) to derive the following statistics, based on logarithmic Folk and Ward graphical measures:

- Mean and median grain size (in µm and phi) as measures of average and central tendency.
- Sorting coefficient (the standard deviation or variability around the mean of the sample).
- Skewness (degree of departure from a normal distribution in terms of asymmetry).
- Kurtosis (degree of departure from a normal distribution in terms of peakedness; this is indicative of the concentration of the particles relative to the mean).
- Bulk sediment classes (mud, sand and gravel, as % weight content).

Particle size is presented in this report as mean values in micron (µm) and phi (according to the Wentworth Scale, with particle size increasing with decreasing phi value). The Wentworth scale combines numerical intervals with rational definitions of particle size (e.g. fine sand, coarse silt, etc.), as shown in Annex 2. The conversion between grain size in mm and phi is achieved as follows (Bale and Kenny, 2005):

$$\varphi = -\frac{\log_{10} mm}{\log_{10} 2}$$

3. RESULTS

3.1 Maerl

Live identifiable maerl was found in 45 out of 72 samples as the species *Phymatolithon calcareum*. Where live encrusting coralline algae was present, but was not identifiable to species and as such may or may not have included maerl, it was recorded as Corallinaceae. (Figures 4 & 5, Annex 4). It is of note that these figures and the data in Annex 4 refer solely to live maerl and live Corallinaceae, as dead maerl were not recorded during the benthic sample analysis. However, the presence of dead maerl was noted in unsorted samples, as can be seen also in the grab sample photographs (Figure 4), and this additional information has been integrated in the sample description below.

In the deeper and muddier area (box S1), maerl was only potentially present in one sample as Corallinaceae, whereas it was absent (as live or dead maerl) from the other samples (Figure 5). In the other box to the north of the SAC (S2), live maerl was found in six out of eight samples, and potentially in an additional sample where Corallinaceae was recorded. In the remaining sample, where no live maerl or Corallinaceae were recorded, dead maerl fragments were observed.

Live maerl was commonly found within the SAC (see Figures 5 and 6), occurring in all samples collected from areas S4 and S6, and all but one of the samples from S5. The one sample from S5 that did not contain live identifiable maerl, did potentially contain maerl in the form of live Corallinaceae. In the box area S3, live maerl occurred in six out of eight samples. Dead maerl fragments were observed in all samples from S3 and one of the samples without live maerl did potentially contain maerl in the form of live Corallinaceae. Only in S7, the southernmost area within the SAC, live maerl was found with a lower frequency, occurring in four out of eight samples. However, of the remaining four samples from S7 not containing live maerl, three showed the presence of dead maerl fragments on visual inspection of the sample photographs.

To the south of the SAC, maerl was common in S8, where it occurred in five out of eight samples, however, the remaining three samples contained Corallinaceae, which may potentially have been maerl. A lower frequency was recorded in S9, with only one sample containing live maerl and an additional three samples containing Corallinaceae. No dead maerl fragments were observed in the other samples from S9.

Figure 4. Example images of grab samples containing live maerl rhodoliths from survey box 8.

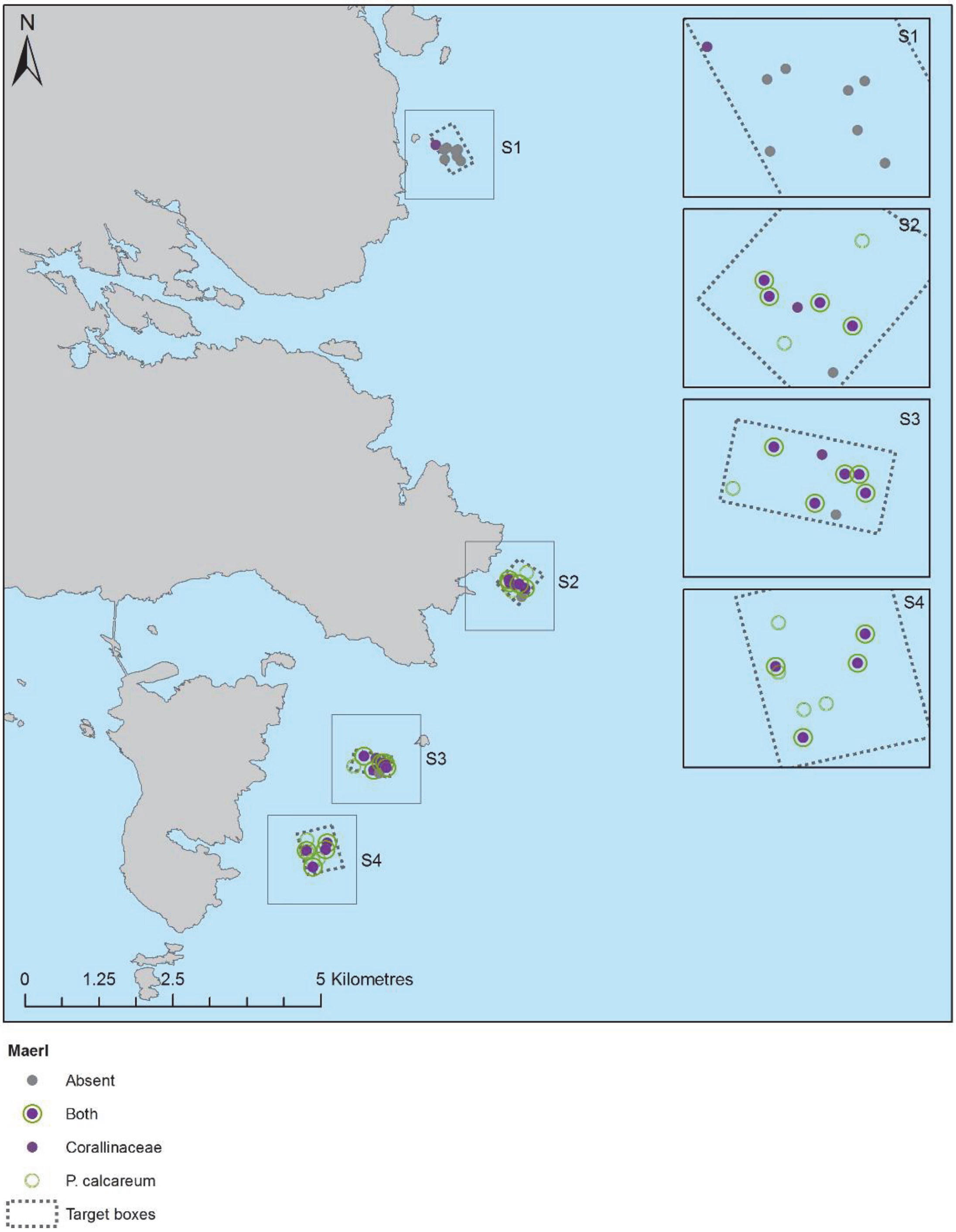


Figure 5. The presence of live maerl in the form of P. calcareum *and the presence of live Corallinceae, which may potentially be maerl, in benthic grab samples collected from the Northern section of the Sound of Barra SAC and adjacent sampling area which includes sampling boxes S1 to S4. © Crown copyright and database rights [2017] Ordnance Survey 100017908.*

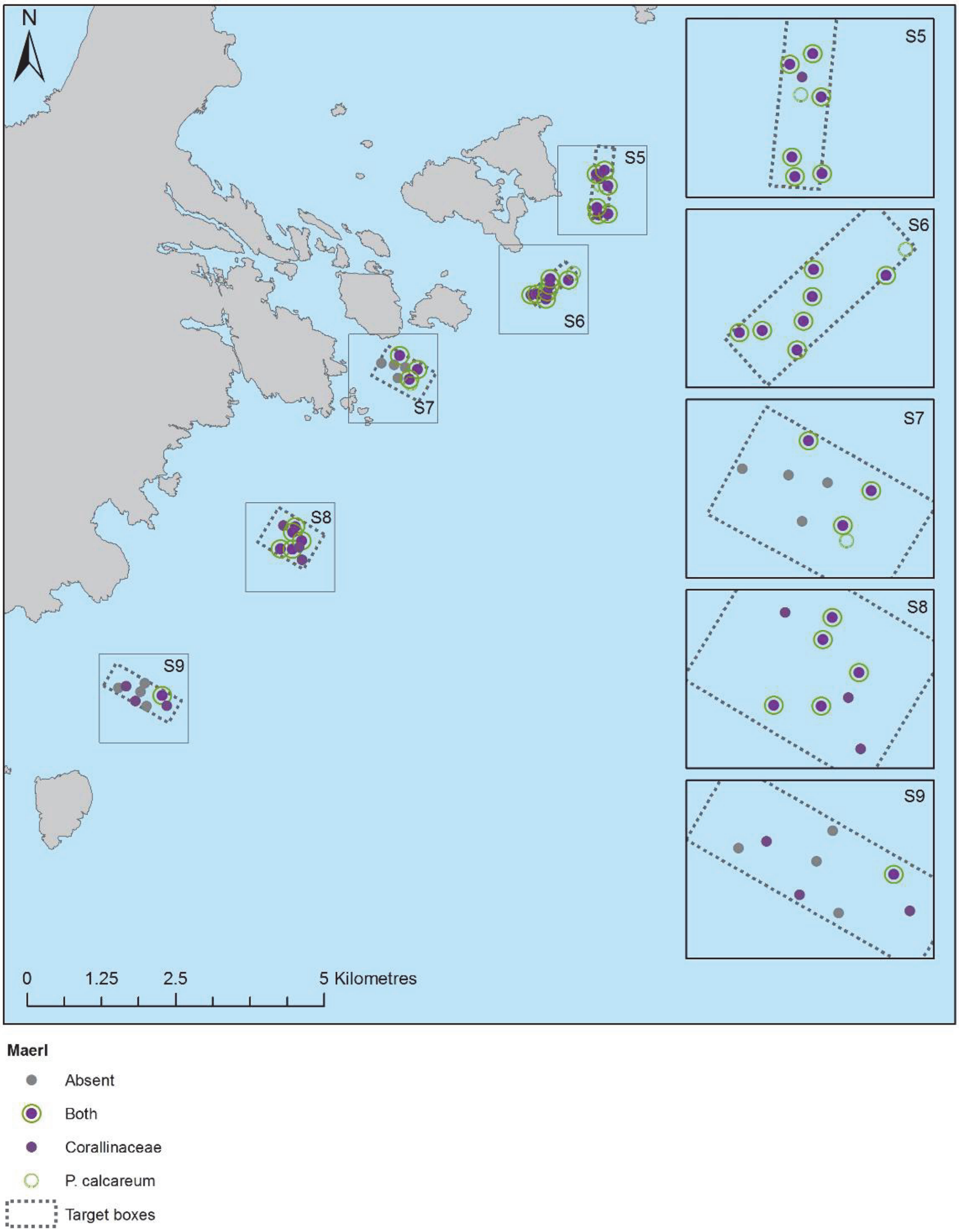


Figure 6. The presence of live maerl in the form of P. calcareum *and the presence of live Corallinceae, which may potentially be maerl, in benthic grab samples collected from the Southern section of the Sound of Barra SAC and adjacent sampling area which includes sampling boxes S5 to S9.*

3.1.1 Maerl measurements

All maerl length measurements refer to *P. calcareum*. In terms of mean length, box S4 has the largest maerl fragments with a mean length of 21.22 mm. Box S9 has the smallest mean length at 17.33 mm. Generally mean fragment length was consistent across all boxes with only 3.88 mm difference between the maximum and minimum mean lengths recorded. Box S9 was the most consistently sized with the lowest standard deviation of the mean as 4.49. This is reflected by maerl in this box varying from 11.87 mm to 24.74 mm. The largest size range was seen in box S6 where the smallest fragment was 6.13mm and the largest 52.67 mm long[2]. However it should also be noted that S9 was only assessed on the basis of one grab sample in which eight maerl fragments were collected (Annex 4), whereas S6 consisted of eight grab samples with a total number of 281 fragments across the grabs. The relative lack of maerl in S9 when compared to the other boxes is reflected in the different biotope type recorded for this box, similarly this also applies for box S2 (Section 1.6.4 & Figures 15 & 16).

3.2 Sedimentary parameters

A full summary of the sample particle size distribution and sediment class descriptions is presented in Annex 5. Sediments collected within and in the vicinity of the Sound of Barra SAC were generally poorly sorted and made up of sandy-gravel and gravelly-sand, with the gravel and sand components accounting for >95 % of the sediment weight in most cases. The only exceptions were the samples collected at stations within box area S1, to the north of the SAC, where gravelly-muddy-sand was found. The mud content in these sediments ranged between 22.7 and 36.9 % (32 % on average) as opposed to values always <9 % in the samples collected in the other areas (Figures 7 & 8).

A clear spatial pattern in the sediment particle size characteristics was evident, with a gradual southward increase in mean particle size from box area S1 (north of the SAC) to S6 (within the SAC), and a decrease in southern areas, particularly S7 (the southernmost box within the SAC) and S9 (the southernmost area to the south of the SAC). As far as regards the sediment differentiation between box area S1 and the others, this was mainly due to the higher mud content in sediments from S1 compared to all other areas (Table 1, Figure 9). This result was mostly ascribed to the depth of this area which was notably greater compared to the other areas (Table 1).

As for the other areas, the observed changes in mean grain size were mostly due to changes in the content of gravel (particularly fine and very fine gravel) and sand (particularly medium, fine and very fine sand) between areas (Figure 9). This was confirmed by the strong significant correlation of these gravel and sand components with the mean particle size (Spearman's rank correlation coefficient >0.8 (absolute value), $p < 0.05$). In general, more sandy sediments occurred in box S2, to the north of the SAC, and towards the south of the sampling area, both within the SAC (S7) and south of it (S9), whereas samples collected in the box area S6, within the SAC, showed consistently more gravelly sediments. A mix of gravelly-sand and sandy-gravel sediments was found in the other areas (excluding S1).

Sediments collected in S1 and S2 (north of the SAC), S4 and S6 (within the SAC), and in S9 (south of the SAC) showed a relatively higher homogeneity in their characteristics between replicate samples collected within a box area, as suggested by the lower coefficients of variation and standard deviations shown in Table 1 and Figure 9 respectively. In turn, a higher variability was present between samples collected within S3, S5, S7 and S8, as also shown by the wider spread of the particle size distribution curves for the sample sediments

2 Please note that only fragments above 4 mm were retained on the sieve and therefore smaller fragments were not assessed.

collected within each of these areas (Annex 5), thus indicating a higher heterogeneity of the substratum within those box areas.

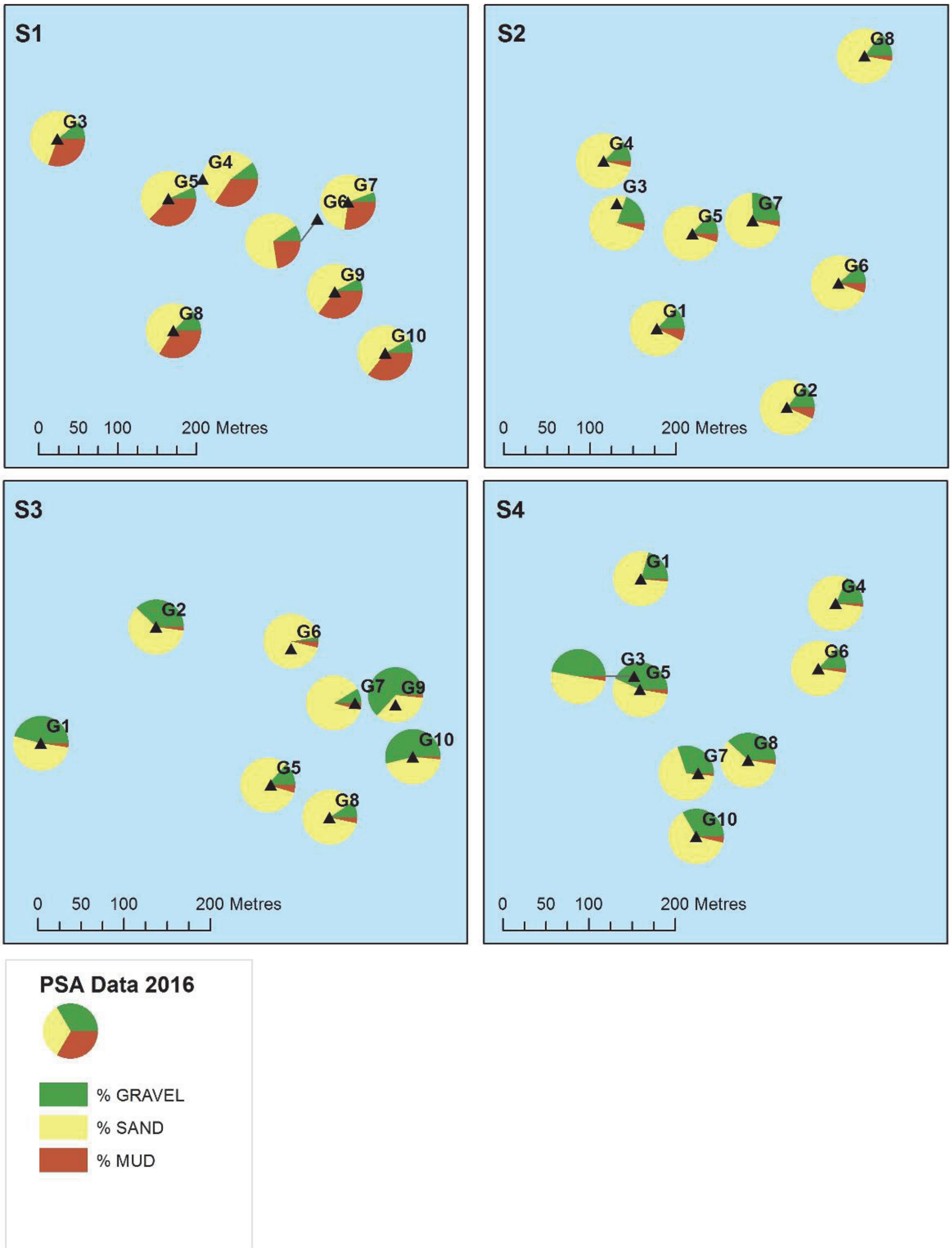


Figure 7. Sediment characteristics in boxes S1- S4, identifying percentage gravel, sand and mud at each station.

Please note: The triangles are positioned over the sample station, however, the pie charts have been slightly offset at a number of stations where necessary to avoid the charts overlapping.

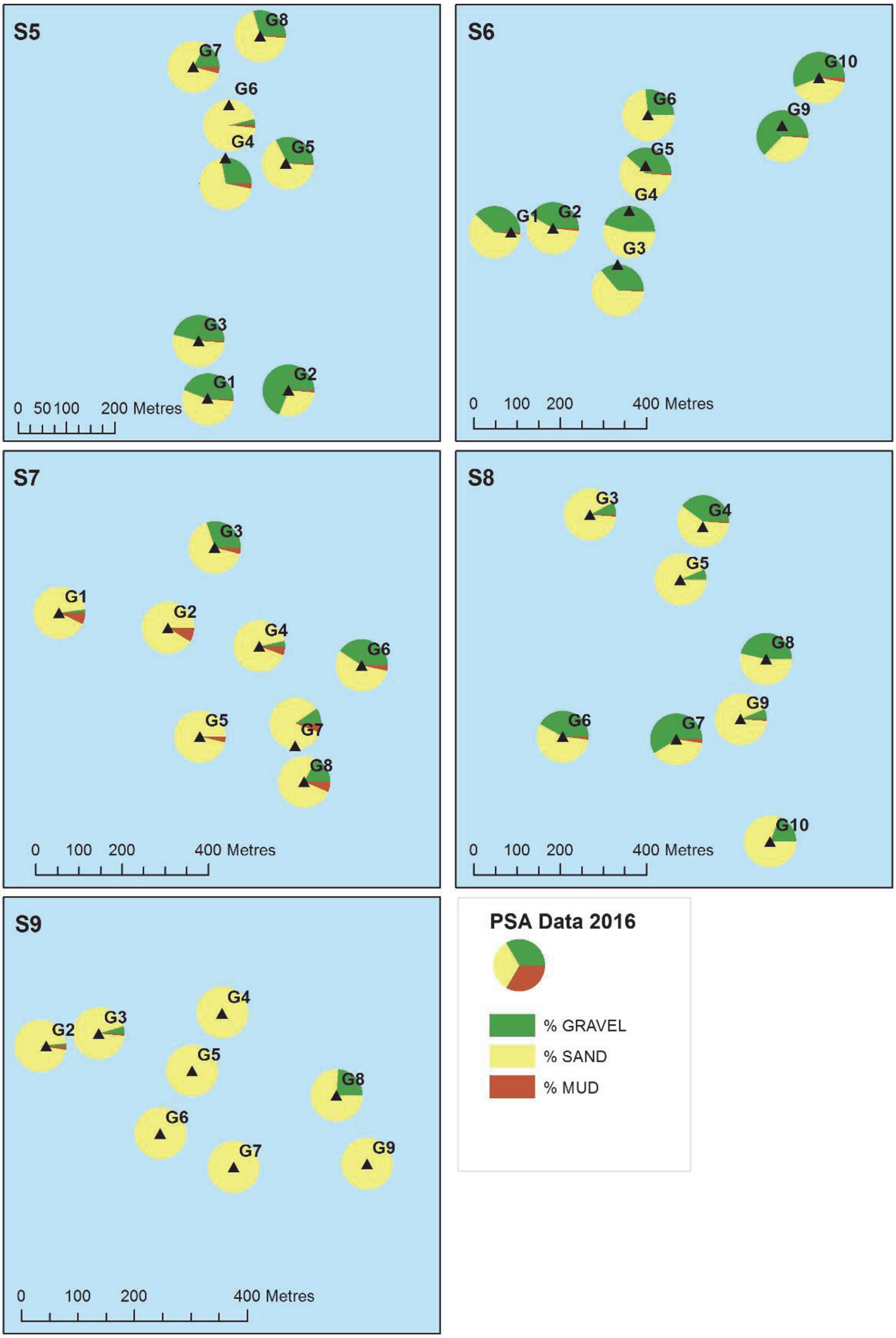


Figure 8. Sediment characteristics in boxes S5 to S9, identifying percentage gravel, sand and mud at each station.

Table 1. Mean values of sediment particle size distribution parameters by sampling boxes (S1 to S9) and areas (distinguished between Sound of Barra SAC area, and the areas to the North and South of it). Sorting, skewness and kurtosis are calculated from particle size distribution in µm (Folk and Ward method). Percentage values in parenthesis are coefficient of variation (standard deviation / mean) showing the variability of the data within each group of stations.

Area	Box	Mean particle size (Phi)	Mean particle size (µm)	Sorting (µm)	Skewness	Kurtosis	Sediment content of Mud	Sediment content of Sand	Sediment content of Gravel	Depth (m BCD)
North	**S1**	2.8	148.65 (19 %)	10.29	-0.29	0.81	32% (15 %)	59% (9 %)	9% (25 %)	35.20 (8 %)
	S2	0.6	684.26 (29 %)	3.38	-0.13	1.17	5% (34 %)	80% (5 %)	16% (30 %)	29.75 (12 %)
SAC	**S3**	0.5	1086.56 (84 %)	2.58	0.03	1.53	3% (41 %)	68% (33 %)	29% (80 %)	26.39 (5 %)
	S4	-0.3	1292.02 (23 %)	2.39	-0.13	1.21	2% (31 %)	67% (19 %)	31% (40 %)	26.35 (3 %)
	S5	-0.6	1573.18 (35 %)	1.94	-0.04	1.14	2% (60 %)	65% (30 %)	34% (58 %)	28.33 (2 %)
	S6	-0.8	1814.89 (18 %)	1.95	-0.07	1.14	1% (48 %)	56% (21 %)	43% (27 %)	29.28 (5 %)
	S7	1.2	583.23 (88 %)	2.89	-0.11	1.53	6% (34 %)	81% (17 %)	13% (115 %)	26.93 (9 %)
South	**S8**	-0.1	1221.61 (45 %)	2.45	-0.06	1.20	1% (69 %)	71% (30 %)	28% (73 %)	27.79 (3 %)
	S9	1.3	450.95 (60 %)	1.83	0.00	0.98	1% (158 %)	95% (9 %)	4% (205 %)	28.63 (9 %)
North	**Total mean**	1.7	416.45 (74 %)	6.84	-0.21	0.99	18% (79 %)	69% (17 %)	12% (39 %)	32.48 (13 %)
SAC	**Total mean**	0.0	1269.98 (54 %)	2.35	-0.06	1.31	3% (68 %)	67% (26 %)	30% (63 %)	27.45 (7 %)
South	**Total mean**	0.6	836.28 (69 %)	2.14	-0.03	1.09	1% (101 %)	83% (24 %)	16% (122 %)	28.21 (7 %)
Overall mean		0.5	983.93 (70 %)	3.30	-0.09	1.19	6% (166 %)	71% (25 %)	23% (81 %)	28.74 (11 %)

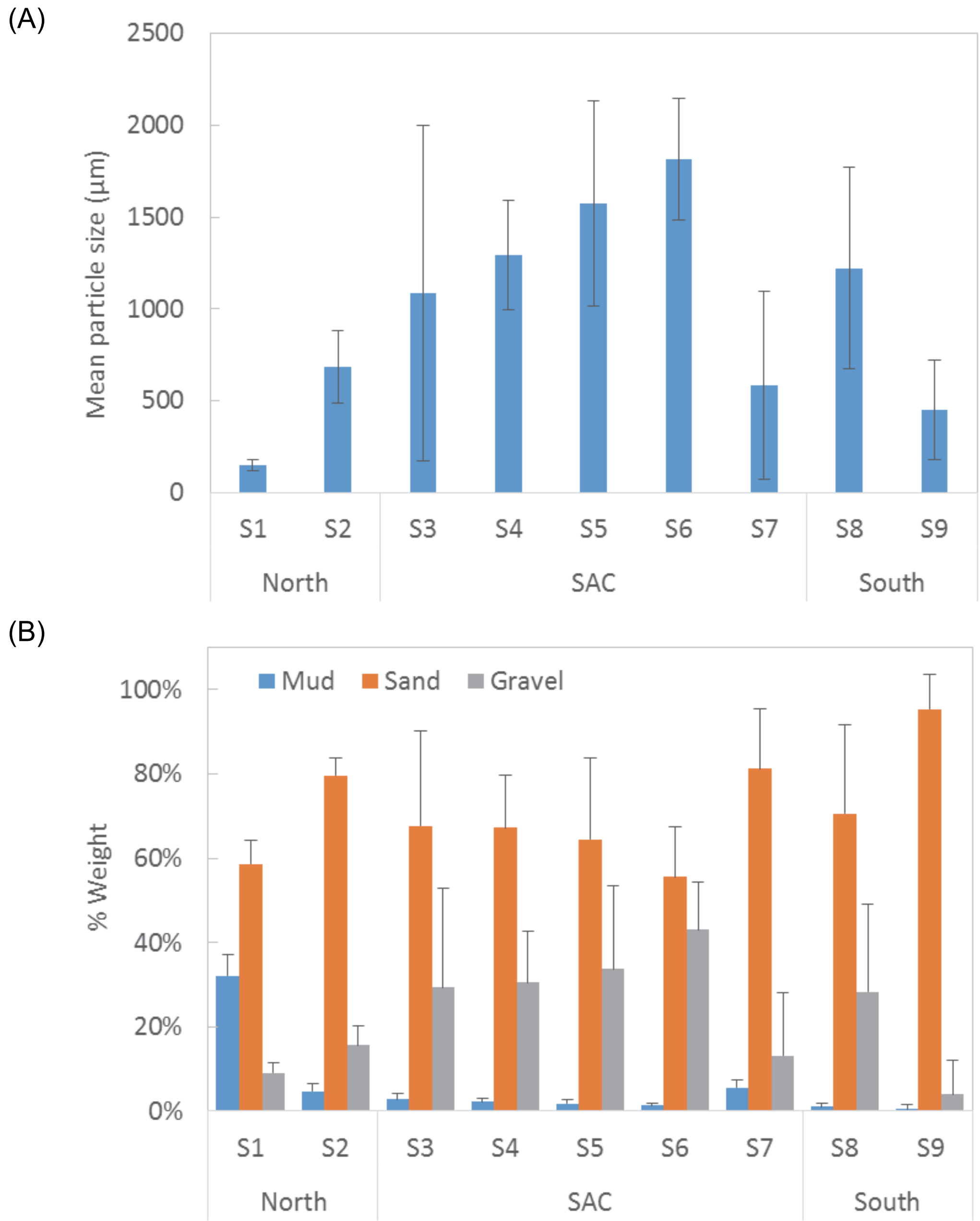


Figure 9. (A) Mean grain size (µm) and (B) % weight of bulk sediment components (mud, gravel and sand) in sediments collected from box areas (S1 to S9) within the Sound of Barra SAC and outside it (North and South). Bars are mean values, and whiskers standard deviation.

3.3 Species composition

Overall, 588 taxa were found in the grab samples collected in 2016 (Annex 6). Of these, 452 were assessed quantitatively (by measuring individual abundance), and 136 qualitatively (as presence-absence). The latter included mostly encrusting or colonial animals (e.g. hydrozoans, bryozoans, ascidians) and seaweed taxa (including maerl-forming coralline algae, other red seaweed and brown seaweed). Nematodes were the most abundant taxon, contributing 15 % of the total abundance and being found in 57 out of 72 samples. Other frequent and abundant taxa belonged to groups that are typically associated with sandy gravelly substrata and included *Polygordius* (anellid polychaetes), *Echinocyamus pusillus* (a pea urchin), *Goodallia triangularis* (a small bivalve) as well as copepod crustaceans. These five taxa contributed a third of the total recorded abundance cumulatively, whereas 90 % of the total recorded abundance was accounted for by 25 % of the taxa that were recorded quantitatively (i.e. 112 out of 452 taxa).

3.3.1 Community descriptors

The total number of taxa per sample ranged between 22 and 138, the former being recorded in one of the samples collected in S9, the latter in one sample collected in S6, with a sample collected in S8 also having >130 taxa (Annex 6). When considering only species assessed quantitatively, the number of taxa per sample ranged from 22 to 91, the former being recorded in one of the samples collected in S9 (the same sample as mentioned above), and the latter in one sample collected in S8 (the same sample as mentioned above). The samples collected in S1 and S2, north of the SAC, showed consistently high numbers of taxa (min. 56/73 (all taxa), and 55/52 (quantitative taxa) in S1/S2 respectively), as indicated by the high mean value for these box areas and the small coefficients of variation and standard deviations (Table 2, Figure 10A). In turn, samples from the southernmost area (S9), south of the SAC, showed the lowest number of taxa, with mean values always below 40, whereas in the remaining box areas the mean number of taxa per sample was always >47.

The total benthic abundance in the samples ranged between 65 ind. 0.1 m^{-2} (in the sample from S9 where the lowest number of species was recorded) to 498 (in a sample from S6) (Annex 6). An increasing pattern in the mean abundance was detected towards the centre of the SAC, with values peaking in S4, S5 and S6 (mean between 280 and 320 ind. 0.1 m^{-2}) and lower mean values recorded to the north (between 160 and 200 ind. 0.1 m^{-2} in S1, S2 and S3) and to the south (between 210 and 250 ind. 0.1 m^{-2} in S7, S8 and S9; Table 2, Figure 10B).

A relatively even distribution of individual abundance between the species in the community was observed in the samples, as indicated by the values of the Pielou's evenness index approaching 1 (ranging 0.6 to 0.9) in most cases and the relatively high values (ranging 3.2 to 5.8) of the Shannon's diversity index (Annex 6). Both diversity indices showed a similar pattern of variation between areas, with lower mean values towards the centre of the SAC (areas S4 to S6), and higher diversity in the samples collected to the north and south of these areas. The exception to this pattern was in survey box S9, which showed the lowest mean diversity (3.7 Shannon's index and 0.7 Pielou's index) (Table 2, 10C & D). The low diversity recorded in the areas at the centre of the SAC (S4 to S6) is likely the result of the higher contribution of few abundant species to the increased benthic numbers observed in these areas. This was the case in particular for nematodes, for example, the polychaete *Polygordius* and copepod crustaceans, all being more frequently found in samples from these areas where also peak numbers of individuals were recorded (Annex 6).

Table 2. Mean values of primary and derived descriptors of the benthic invertebrate community by sampling boxes (S1 to S9) and areas (distinguished between Sound of Barra SAC area, and the areas to the North and South of it). Percentage values in parentheses are coefficient of variation showing the variability of the data within each group of stations.

Area	Box	Total No. of Taxa		Total Abundance	Shannon's	Pielou's
		All	Quantit.	(ind · 0.1 m^{-2})	diversity (H')	evenness (J')
North	**S1**	78 (17 %)	66 (16 %)	161.5 (23 %)	5.4 (4 %)	0.9 (1 %)
	S2	89 (22 %)	64 (17 %)	199.1 (24 %)	5.2 (5 %)	0.9 (5 %)
SAC	**S3**	75 (27 %)	47 (24 %)	197.0 (55 %)	4.5 (8 %)	0.8 (8 %)
	S4	77 (23 %)	54 (18 %)	291.6 (34 %)	4.3 (11 %)	0.7 (10 %)
	S5	69 (23 %)	49 (23 %)	283.3 (35 %)	4.2 (10 %)	0.8 (7 %)
	S6	82 (32 %)	58 (29 %)	317.3 (36 %)	4.4 (10 %)	0.8 (4 %)
	S7	70 (29 %)	55 (27 %)	236.3 (30 %)	4.7 (8 %)	0.8 (3 %)
South	**S8**	81 (35 %)	56 (32 %)	250.5 (40 %)	4.8 (10 %)	0.8 (5 %)
	S9	39 (34 %)	32 (30 %)	214.9 (61 %)	3.7 (7 %)	0.7 (9 %)
North	**Total mean**	84 (20 %)	65 (16 %)	180.3 (26 %)	5.3 (5 %)	0.9 (4 %)
SAC	**Total mean**	74 (26 %)	53 (25 %)	265.1 (39 %)	4.4 (10 %)	0.8 (7 %)
South	**Total mean**	60 (51 %)	44 (43 %)	232.7 (49 %)	4.2 (16 %)	0.8 (9 %)
Overall mean		73 (32 %)	53 (29 %)	239.0 (43 %)	4.6 (13 %)	0.8 (9 %)

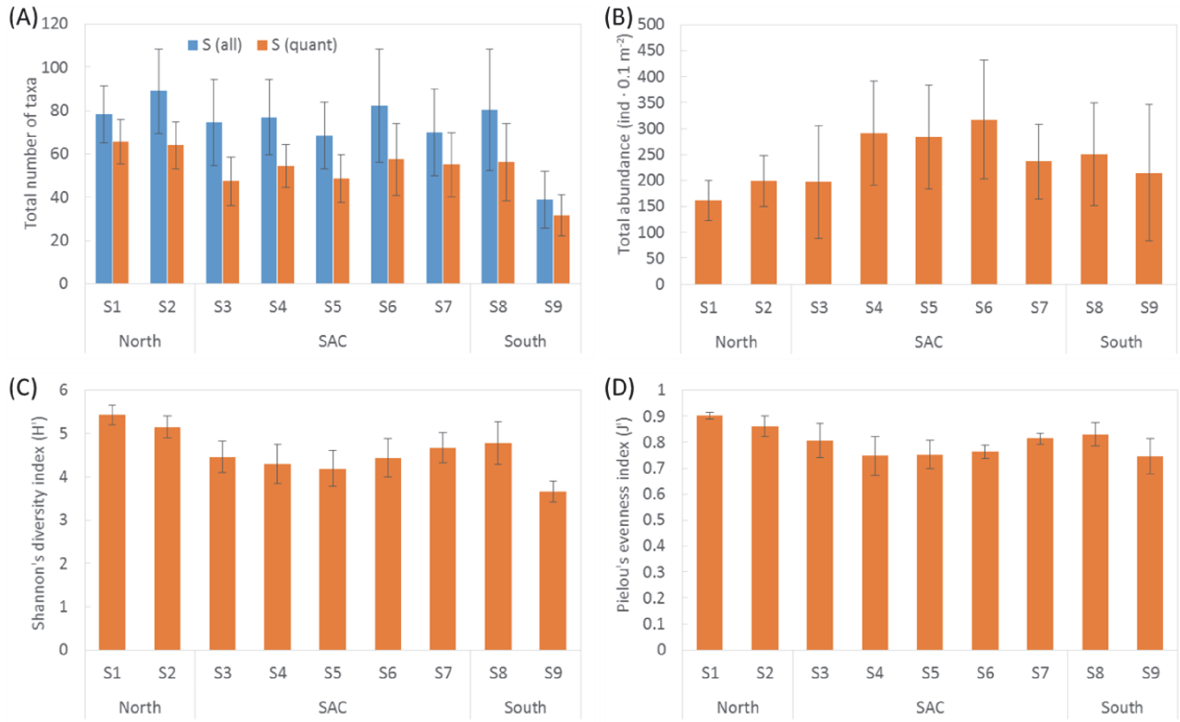


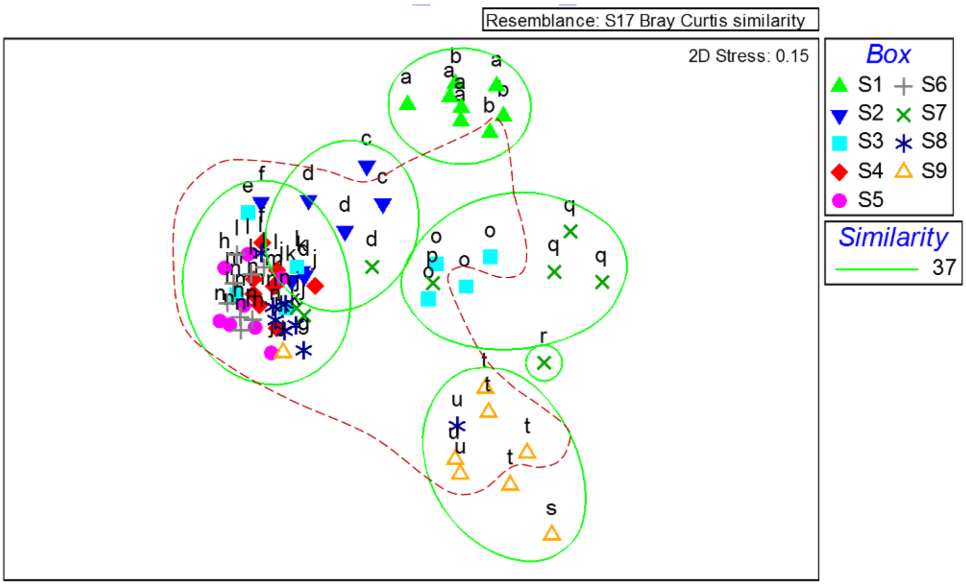
Figure 10. Mean values of primary and derived descriptors of the benthic invertebrate community in samples collected from box areas (S1 to S9) within the Sound of Barra SAC and outside it (North and South): (A) Total number of taxa (overall and quantitative only); (B) Total abundance; (C) Shannon's diversity index; (D) Pielou's evenness index. Bars are mean values, and whiskers represent standard deviation.

3.3.2 Cluster analysis

A cluster analysis was undertaken based on data for all taxa (presence-absence) and for quantitative taxa only (abundance). In the latter case, less frequent species contributing <0.2 % each to the total benthic abundance overall were excluded from the analysis to reduce the effect of species occurring sporadically in the samples on the clustering results (the 0.2 % threshold was chosen as this represents the species percentage abundance in the samples if the species were all evenly distributed in the samples). Ordination plots (non-metric MDS) are also shown in Figure 11 to summarise the multivariate results.

Although there was a certain variability in the grouping of individual samples between the analyses undertaken on species presence-absence and abundance data due to the different nature of the data analysed, there was a good match in the results obtained from the presence-absence and abundance data (Figure 11).This was also indicated by the RELATE test in Primer resulting in a highly significant positive correlation (Spearman's rank correlation coefficient = 0.93, $p < 0.001$) between the sample similarity patterns within the two datasets.

(A)



(B)

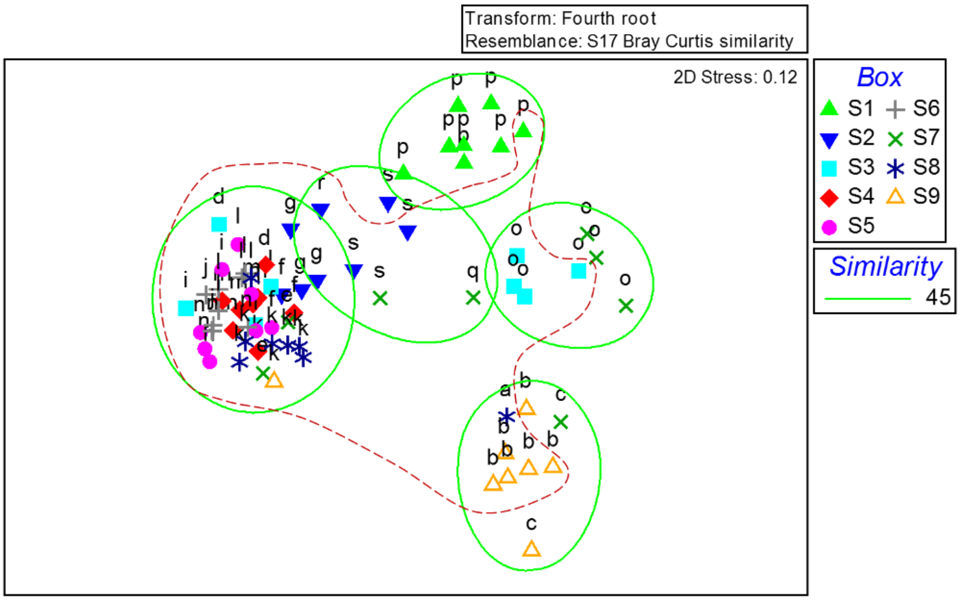


Figure 11. Non-metric multidimensional scaling (MDS) ordination plot of sample similarities based on (A) presence-absence and (B) abundance data of benthic taxa. Symbols in the plot identify sample box areas, green lines encircle main clusters of stations as identified by cluster analysis, whereas letters indicate further grouping of samples as determined by SIMPROF analysis (note that letters are not related between plots). The dashed red line encircles samples where live maerl was found.

Samples from S1, which lie on the northernmost extent of the survey area, differ consistently from the rest of the survey boxes. This is primarily due to the absence of the maerl-forming species *Phymatolithon calcareum*, which is largely present in the samples from survey boxes S2 to S8. Differences were also due to the absence or infrequent occurrence of several bryozoan species (e.g. *Chorizopora brongniartii*, *Escharoides mamillata*, *Microporella ciliata* and *Aetea sica*), which again are common in other areas.

Samples from S9 showed a lower presence of sponges (Porifera), and, as mentioned before, were at the lowest end of the species diversity gradient in the area. Higher abundance of the pea urchin *Echinocyamus pusillus* and of several bivalve species (*Goodallia triangularis*, *Asbjornsenia pygmaea, Crenella decussata* and *Cochlodesma praetenue*) also distinguished samples in S9 from other areas. According to the sediment analysis, these samples were characterised by the highest sandy content, whereas the gravelly component was the lowest compared to other areas, resulting in a slightly gravelly-sandy substratum.

In turn, samples from S1 were characterised by the lowest total abundance and highest diversity, and by the higher frequency and abundance of actiniarians (sea anemones, in particular *Epizoanthus couchii* and *Edwardsia claparedii*), polychaetes such as *Chaetozone* and *Aponuphis bilineata*, and the brittlestar *Amphiura filiformis*. These taxa occurred in association with the higher mud content in the sediments (gravelly-muddy-sand) and higher depth characterising the stations within this area.

A further differentiation was observed in the dendrograms, with the separation of the remaining samples into two main groups, differentiating areas S3 and S7 from the remaining areas (S2, S4, S5, S6 and S8). However, a higher variability in the distribution of the samples between and within these groups was observed compared to the other clusters, indicating a higher spatial heterogeneity in the composition of benthic invertebrate communities (Annex 6). The latter group included samples from areas within the SAC (S4, S5 and S6), and those located north (S2) and south (S8) of the SAC. These were a mixture of gravelly-sand and sandy-gravel sediments where maerl-forming species were present, and with several polychaete (e.g. *Hesiospina similis, Trypanosyllis coeliaca, Syllis garciai/mauretanica, Pisione remota, Syllis pontxioi, Psamathe fusca, Dialychone dunerificta, Malmgrenia ljungmanil* and *Sphaerosyllis bulbosa*) and bryozoan species (e.g. *Scrupocellaria scrupea, Chorizopora brongniartii, Escharoides mamillata, Escharella immersa* and *Microporella ciliata*) also occurring more frequently compared to other areas. A notable higher abundance of dominant taxa such as nematodes, *Polygordius*, and copepod crustaceans also characterised this group of samples, and particularly areas S4, S5 and S6, compared to other areas (Annex 6).

S3 and S7 are the northernmost and southernmost areas within the SAC respectively, with a mixture of gravelly-sand and sandy-gravel sediments. Benthic invertebrate communities in these areas were characterised by the absence or lower frequency and abundance of taxa which in turn dominated in the other areas of the SAC, namely nematodes and *Polygordius* (in this respect, they were more similar to S9). This is likely the reason for the lower abundance and higher diversity recorded in S3 and S7 compared to the other areas in the SAC. A higher abundance of the amphipod *Urothoe elegans*, mollusc gastropods (*Turritella communis*) and bivalves (*Thracia phaseolina, Urothoe elegans, Dosinia, Chamelea striatula* and *Abra prismatica*) also characterised these areas compared to others, and the abundance of the latter three bivalve species was a characteristic shared with samples from area S9 (Annex 6).

3.3.3 Priority Marine Features

There are currently 81 habitats and species considered to be of conservation importance in Scotland's seas which have been listed as Priority Marine Features (PMFs). From this list *Arctica islandica* (ocean quahog) was present in 13 of the 72 benthic grab samples, all of which were located in S3, S7 and S9. Abundances were low, ranging from one individual to six individuals per $0.1m^2$ (Figures 12 & 13). Tide-swept coarse sands with burrowing bivalves recorded under the biotope SS.SCS.ICS.MoeVen (*Moerella* spp. with venerid bivalves in infralittoral gravelly sand) is also classed as a PMF and was recorded at nine stations. All records were located to the south of the survey area with one station in box 7, one in box 8 and the remaining seven in box 9 (Figure 14).

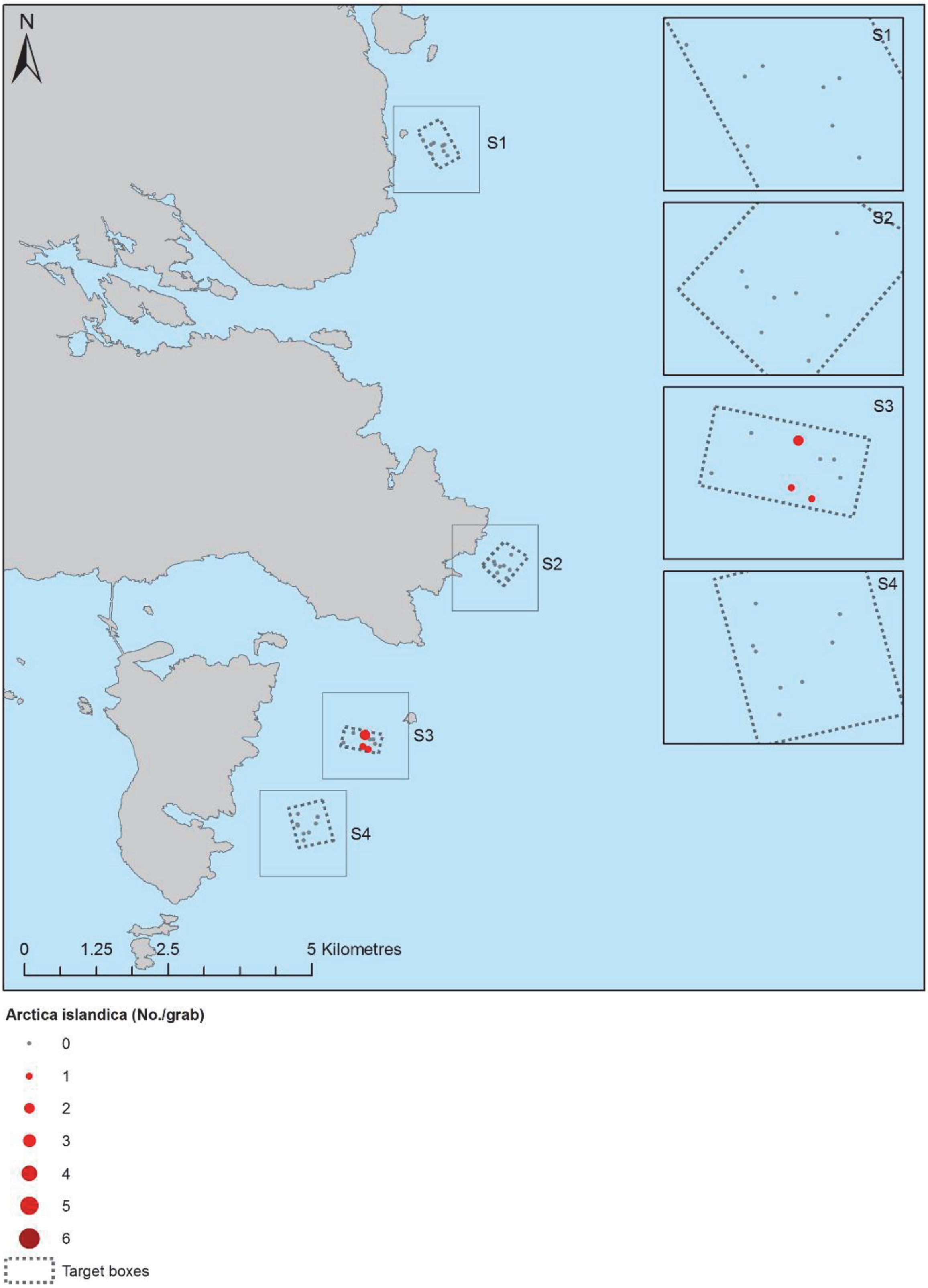


Figure 12. Distribution and abundance of Arctica islandica *recorded within the grab samples collected from the Sound of Barra SAC and surrounding area in April 2016 (Survey boxes S1 to S4). © Crown copyright and database rights [2017] Ordnance Survey 100017908.*

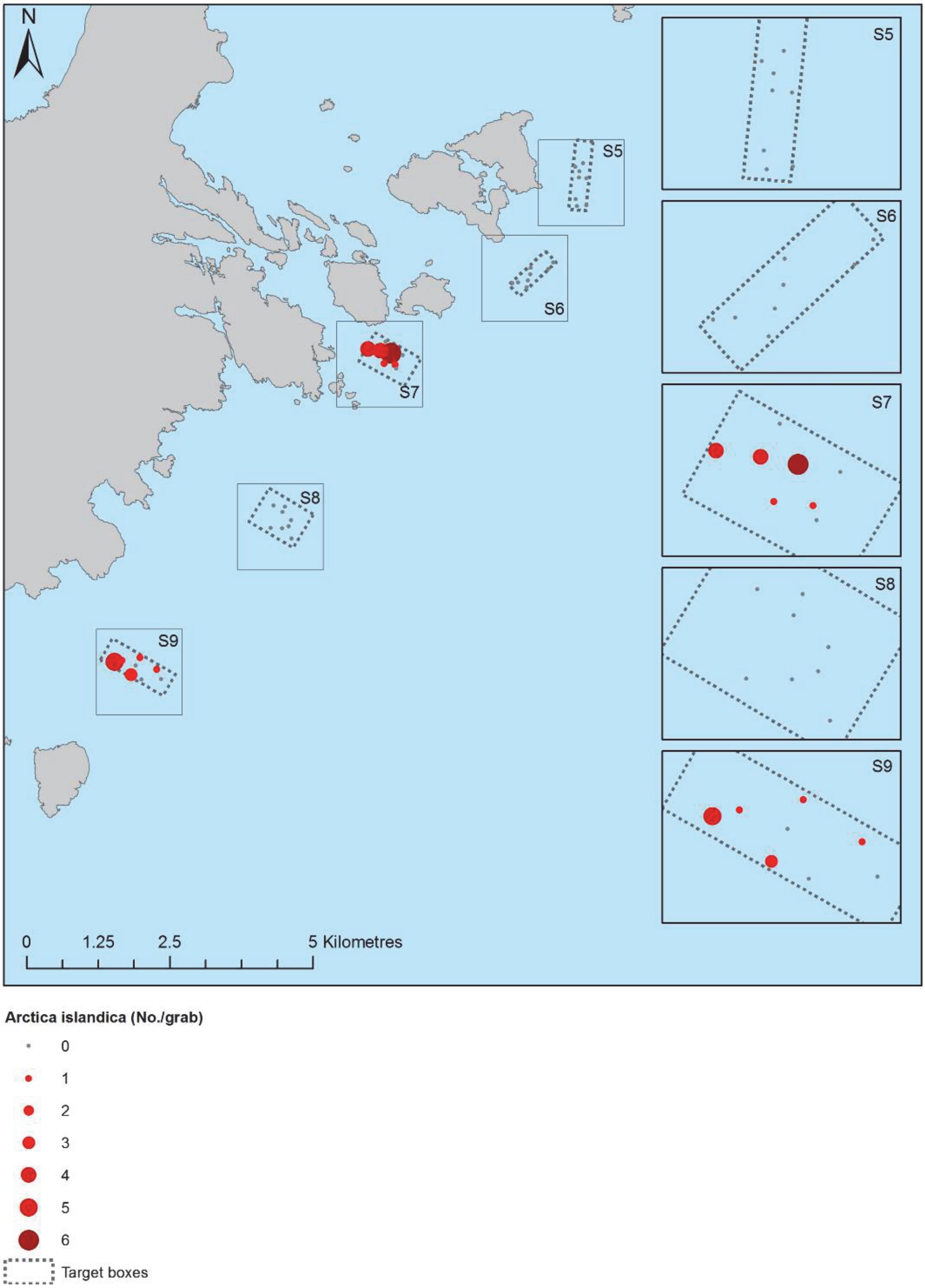


Figure 13. Distribution and abundance of Arctica islandica *recorded within the grab samples collected from the Sound of Barra SAC and surrounding area in April 2016 (survey boxes S5 to S9). © Crown copyright and database rights [2017] Ordnance Survey 100017908.*

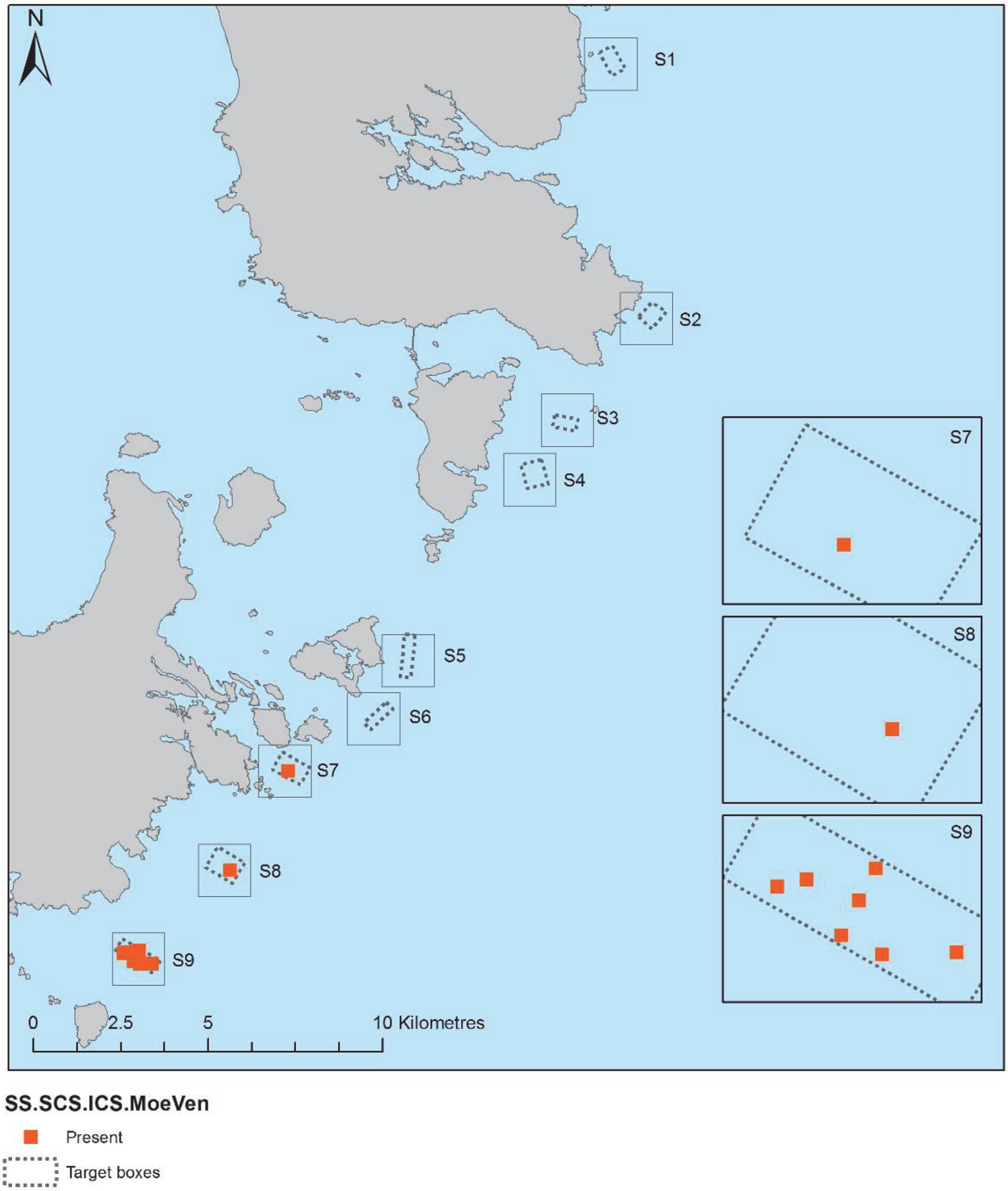


*Figure 14. Presence of the Priority Marine Feature, tide-swept coarse sands with burrowing bivalves (biotope **SS.SCS.ICS.MoeVen**) at sampling stations located in the Sound of Barra and adjacent areas in April 2016. © Crown copyright and database rights [2017] Ordnance Survey 100017908.*

3.3.4 Biotopes

Six different biotopes or combinations[3] of biotopes were identified across the sampling area. These single biotopes or combinations were as follows (primary biotopes in bold):

Biotope classification	Biotope Description
SS.SCS.ICS.MoeVen	**Moerella spp. with venerid bivalves in infralittoral gravelly sand**
SS.SMu.CSaMu.AfilMysAnit/ SS.SCS.CCS.MedLumVen	***Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud** / *Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel
SS.SCS.CCS.MedLumVen	***Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel**
SS.SSa.CFiSa.ApriBatPo/ SS.SCS.CCS.MedLumVen	***Abra prismatica, Bathyporeia elegans and polychaetes in circalittoral fine sand /*** *Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel
SS.SSa.IMuSa.FfabMag/ SS.SCS.CCS.MedLumVen	***Fabulina fabula and Magelona mirabilis with venerid bivalves and amphipods in infralittoral compacted fine muddy sand*** */ Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel
SS.SCS.CCS.Blan/ SS.SCS.CCS.MedLumVen	***Branchiostoma lanceolatum* in circalittoral coarse sand with shell gravel** */ Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel

Biotopes were assigned to the samples based on the results presented above (sediment data and, quantitative and qualitative benthic invertebrate data) and on the biotope classification according to the Marine Habitat Classification for Britain and Ireland Version 04.05 descriptions (Connor *et al*., 2004). This was further informed by the guidance for classifying maerl biotopes found in Moore (2014). The resulting biotope allocation to samples is summarised in Annex 8. Figure 15 also shows the integration of the multivariate (MDS) plots shown previously (Figure 11) with the biotope information shown in Figure 15, and the identification of characterising species of each biotope as assessed by SIMPER analysis shown in Annex 7.

Due to the limitations of SIMPER, the analysis has been undertaken on quantitative data (abundance) only; therefore, presence-absence of taxa recorded qualitatively (including maerl) doesn't contribute to characterising benthos similarities within each biotope. However, information regarding the presence and quantity of maerl was used in conjunction with the quantitative data when assigning biotopes. The MDS cluster analysis has been used for the biotope grouping seen in Annex 8.

The grab samples were classified into the most similar biotope code. For some samples, a primary and secondary biotope code has been provided (as denoted by the / symbol in the biotope classification). A number of stations were found to share characteristics of similar biotopes (see the column "Notes" in Annex 8). Out of the 72 samples collected, 15 samples were characterised by a single biotope.

[3] Biotope combinations are not a recognised method by SNH and primary biotopes will be used for further analysis and interpretation.

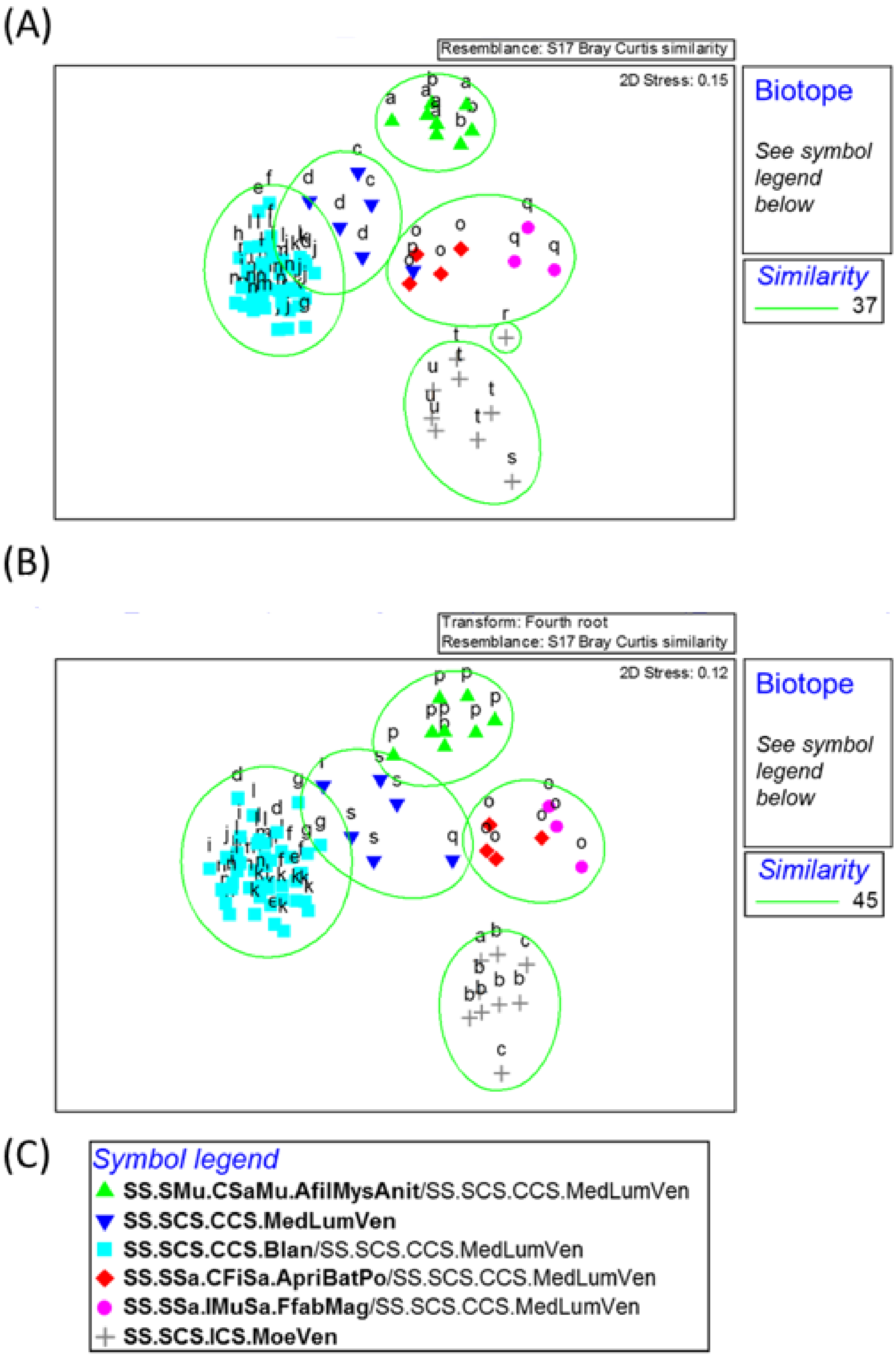


Figure 15. Non-metric multidimensional scaling (MDS) ordination plots as in Figure 11 (A) on presence-absence and (B) on abundance data of benthic taxa. Samples are categorised by biotope, with symbol legend given in (C). Green lines encircle main clusters of stations as identified by cluster analysis, whereas letters indicate further grouping of samples as determined by SIMPROF analysis (note that letters are not related between plots).

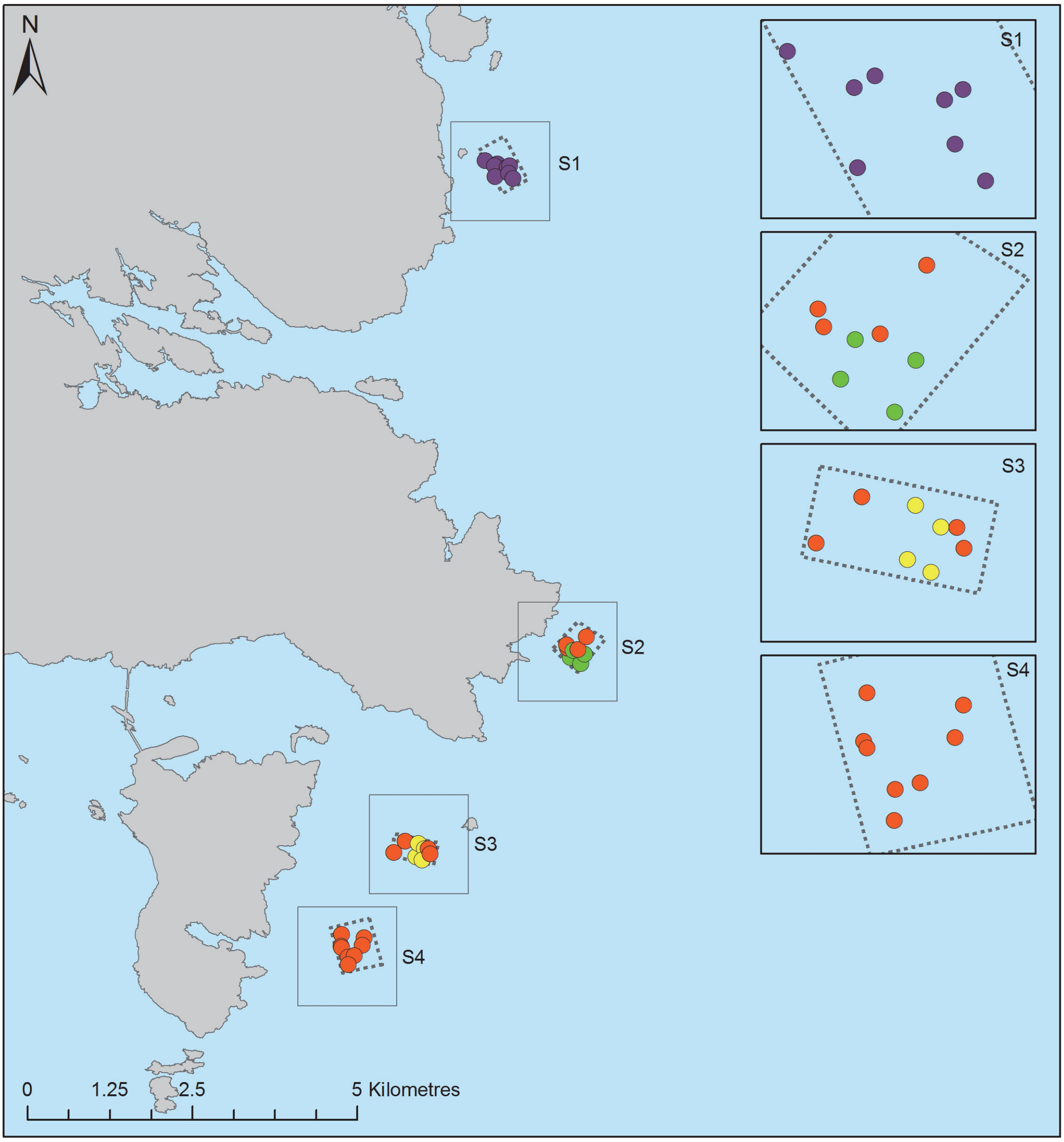
The spatial distribution of biotopes in the north and south of the Sound of Barra is shown in Figures 16 & 17 respectively. The most common biotope combination (represented by the orange circle markers in the figures) was ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen*. This biotope combination occurred in some stations within boxes S2 and S3, all stations in box S4, S5, and S6, most stations in S8 and some within stations in S7, and S9. Generally, the boxes towards the centre of the surveyed area (e.g. S3, 4, 5, 6) had a greater proportion of this biotope within them, and the biotopes became more variable away from the centre of the overall surveyed area. Boxes S3 to S7 are located inside the SAC, and the remaining four boxes are outside the SAC.

The stations within box S2 were evenly split between the aforementioned ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen* and *SS.SCS.CSS.MedLumVen.* So overall were rather similar in composition with *Mediomastus fragilis* and venerid bivalves being the characterising taxa for the box. Survey box S3 also showed two separate biotope combinations, in an even split, but all with the *SS.SCS.CSS.MedLumVen* base type. As in S2, ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen* was present in S3, but what separated this box from the others was that the biotopes in the predominantly sandy central part of the box were a mix of the fine sand biotopes ***SS.SSa.CFiSa.ApriBatPo****/SS.SCS.CSS.MedLumVen.*

Further to the south of the overall surveyed area, box S7 was characterised by a slightly different set of biotopes. ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen* only occurred at two of the eight stations sampled here, with three stations (predominantly with sand present) being ***SS.SSa.IMuSaFfabMag****/SS.SCS.CCS.MedLumVen*. The remaining stations from S7 were coarse sediment biotopes, two being ***SS.SCS.CSS.MedLumVen*** and a single station with ***SS.SCS.ICS.MoeVen***, showing the variability of the substratum in the area from coarse sands and gravels to fine sands and sandy muds via the different characterising species.

The furthest out boxes (S1 in the north and S9 in the south) were different to the other boxes sampled. S1 consisted entirely of the sandy mud biotope ***SS.SMU.CSaMu.AfilMysAnit****/SS.SCS.CCS.MedLumVen* and S9 consisted of seven stations with ***SS.SCS.ICS.MoeVen*** and a single station with ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen*.

Although there was some variability in the grouping of individual samples between the analyses undertaken on species presence-absence (qualitative) and abundance (quantitative) data due to the different nature of the data analysed, the MDS plots showed there was a good match in the results obtained between the presence-absence and abundance data in terms of the biotopes found (Figure 15). Therefore suggesting, with the exception of a few key, habitat forming species that were not quantifiable yet important in biotope classification that the non-quantitative taxa do not contribute notably to the biotope designations presented here. In particular, there was a consistent separation between samples from the biotope ***SS.SMu.CSaMu.AfilMysAnit****/SS.SCs.CCS.MedLumVen,* which corresponded to the northernmost box (S1) and ***SS.SCS.ICS.MoeVen***, which corresponded to the southernmost box (S9) and between them and those from the other areas.



Biotope

- **SS.SCS.CCS.Blan**/SS.SCS.CCS.MedLumVen
- **SS.SCS.CCS.MedLumVen**
- **SS.SCS.ICS.MoeVen**
- **SS.SMu.CSaMu.AfilMysAnit**/SS.SCS.CCS.MedLumVen
- **SS.SSa.CFiSa.ApriBatPo**/SS.SCS.CCS.MedLumVen
- **SS.SSa.IMuSa.FfabMag**/SS.SCS.CCS.MedLumVen
- Target boxes

Figure 16. Biotopes assigned to the grab samples collected from the northern section of the Sound of Barra and adjacent survey area in April 2016. Where a combination of biotopes was assigned, the primary biotope is indicated in bold. © Crown copyright and database rights [2017] Ordnance Survey 100017908.

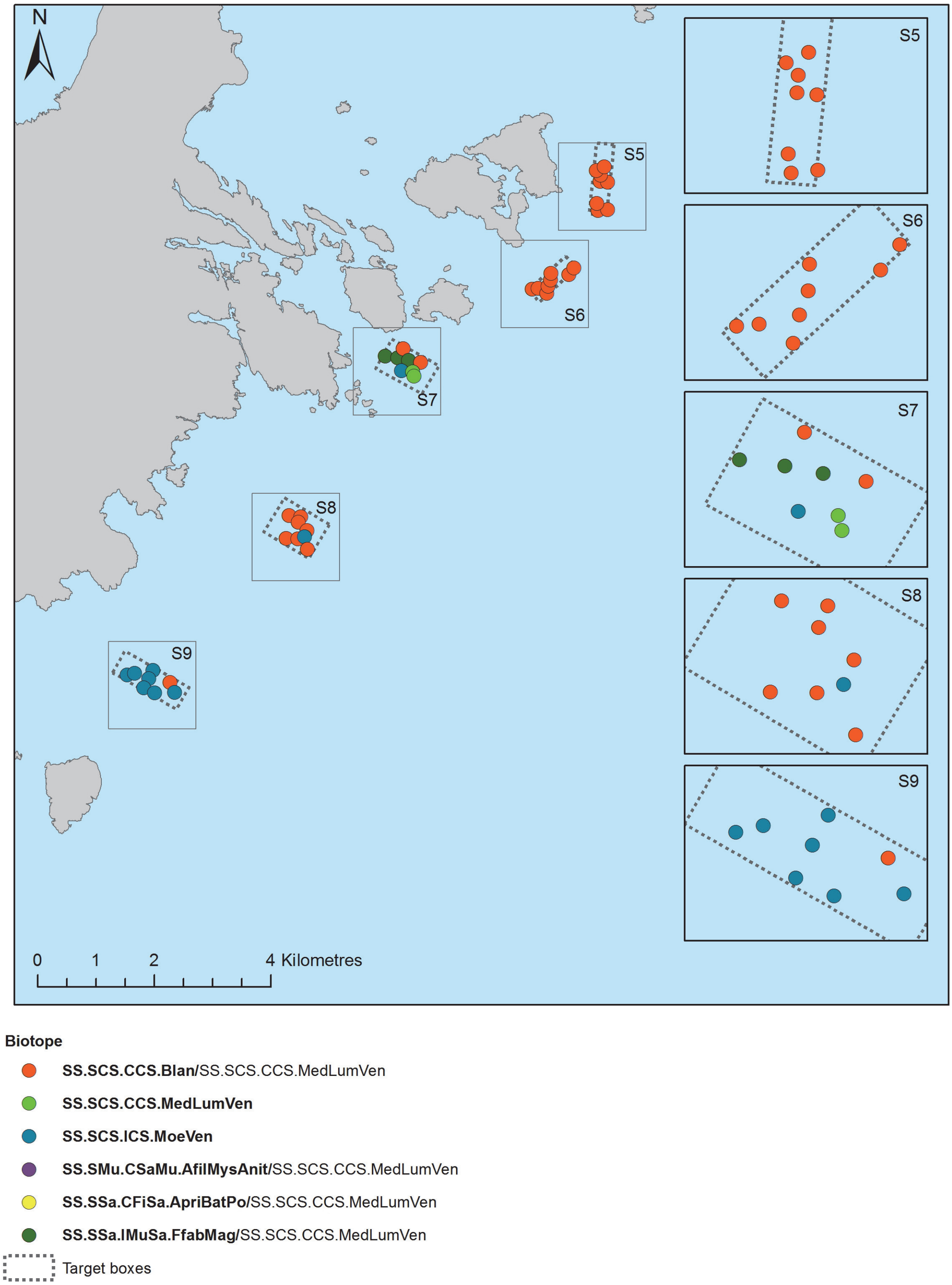


Figure 17. Biotopes assigned to the grab samples collected from the southern section of the Sound of Barra and adjacent survey area in April 2016. Where a combination of biotopes was assigned, the primary biotope is indicated in bold. © Crown copyright and database rights [2017] Ordnance Survey 100017908.

4. DISCUSSION

The sampling stations surveyed in the Sound of Barra area in 2016 included stations located within predetermined survey boxes within the SAC (boxes S3 - S7) as well as outside of the SAC located to the north (boxes S1 & S2) and south (boxes S8 & S9). A large number of taxa were recorded from the survey with 588 taxa identified (452 quantitative taxa and 136 qualitative taxa). There was an increase in mean particle size towards the centre of the sampling area as well as an increase in fauna abundance, particularly in boxes S4, S5 and S6 in the SAC. Nematodes were the most abundant taxa overall, after which *Polygordius* (anellid polychaetes), *Echinocyamus pusillus* (a pea urchin) and *Goodallia triangularis* (a small bivalve) as well as copepod crustaceans were frequent and abundant accounting for a third of the total recorded abundance across the site. These taxa belong to groups that are typically associated with sandy-gravelly substrata.

Live maerl, predominantly *Phymatolithinm calcareum,* was found in low quantities across the majority of the survey area, with the exception of S1, located at the northernmost point of the survey area, where only one of the eight samples recorded live maerl. Survey boxes 7 and 9 to the south of the site contained live maerl in half of the samples collected within each box. The number of maerl fragments retained on a 4 mm sieve also provided an indication of the volume of maerl present within each grab sample. The number of maerl fragments was considered low with two thirds of the samples containing <38 fragments $0.1m^{-2}$. It should be noted that the sampling method and subsequent transport and handling may have caused some degree of damage to the maerl fragments. Therefore, while future comparisons may be useful to show the relative change in maerl size distribution using the same sampling technique, the results presented here should not be used as an absolute measure of maerl size.

The results were consistent with previous surveys in the area which identified maerl to be present over a wide (~902 ha) area within the whole Sound of Barra (Harries *et al.,* 2007), with 23 maerl bed records within the Sound[4] (SNH, 2012), but the abundance of live maerl was often low (Harries *et al.,* 2007). Previous infaunal studies have recorded maerl biotopes here, however, the abundance of maerl within the grab samples collected as part of this study was not considered to be high enough to classify the infaunal sample as a specific maerl biotope. A number of the biotopes assigned did take into account the presence of maerl which was listed in the JNCC biotope description.

An assessment of the biotopes across the site identified the presence of six separate biotopes. Several of the samples showed some similarity to other biotope codes. As such, a secondary biotope class has been added to the primary class. It is hoped that this approach fairly represents the difficulty of classification for some of the samples. The predominant biotope classes were contained in circalittoral coarse sediment biotopes (SS.SCS.CCS), with a small group of infralittoral coarse sediment biotopes (SS.SCS.ICS) at the southern end of the surveyed area. These included **SS.SCS.CCS.MedLumVen** (*Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel) with the characteristic taxa being identified as a significant component at over 85% of the sampling stations.

The most common biotope across the survey area was a combination of **SS.SCS.CCS.Blan** and SS.SCS.CCS.MedLumVen. Sampling stations classed as this combination of biotopes recorded high numbers of *Branchiostoma lanceolatum,* as well as *Polygordius* spp., *Glycera lapidum*, *Echinocyamus pusillus* and *Pisione remota.* These are all characterising species within **SS.SCS.CCS.Blan**, (*Timoclea ovata*, *Glycymeris glycymeris* and *Gari tellinella)*

[4] However, the SAC had, at the time of the SNH (2012) report, not been officially designated hence there was no further information available on these beds.

combined with a more diverse coarse sediment faunal assemblage typical of SS.SCS.CCS.MedLumVen. The amount of *P. calcareum* found in the samples was considered too low to be a maerl bed biotope, but analysis of the video footage from the same survey boxes will clarify the presence and extent of this feature.This combination of biotopes dominated the centre of the survey area accounting for all of the stations within boxes S4, S5 and S6, which were located within the SAC. Biotopes became more variable away from the centre of the overall survey area.

At the southern end of the site, nine stations (predominantly located within S9) were less diverse and typical of the biotope **SS.SCS.ICS.MoeVen** (*Moerella* spp. with venerid bivalves in infralittoral gravelly sand). These samples were classified as tide-swept coarse sands with burrowing bivalves. This biotope is considered to be the shallow water variant of the biotope SS.SCS.CCS.MedLumVen, elements of which were present across the rest of the survey area stretching north up to box S1. This was evident from the inclusion of this biotope in 63 of the 72 station classifications. Primarily this was a result of high numbers of *Mediomastus fragilis* and venerid bivalves recorded at most stations.

Harries *et al.* (2007) recorded SS.SSa.CFiSa.EpusOborApri (*Echinocyamus pusillus*, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand) within the vicinity of box 3, which is very similar to the **SS.SSa.CFiSa.ApriBatpo** recorded in the current study in terms of dominant species. However, they are usually differentiated by sediment type as SS.SSa.CFiSa.EpusOburApri is considered to be characterised by finer sand.

Arctica islandica, the ocean quahog, is listed as a PMF and was found in low numbers (1 to 6/0.1m^2) both inside the SAC within box S3 and S7 as well as to the south of the SAC within box S9.

To the north of the site all stations located within S1 were classified as a combination of **SS.SMu.CSaMu.AfilMysAnit** (*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud) and SS.SCS.CCS.MedLumVen. There was a notable increase in the mud content of the sediment and the absence of live or dead maerl in the majority of the samples. The substratum, water depth or flow rate in this box may be unsuitable for maerl, which is known to develop where there is some tidal flow or where wave action removes fine sediments but is not strong enough to break maerl branches (SNH, 2012).

Overall, the species composition and sediment type recorded at all sites were consistent with the JNCC description of the Annex 1 habitat *Sandbanks which are slightly covered by seawater all the time*. This habitat is one of the primary reasons for the Sound of Barra SAC designation. Broadscale mapping surveys confirmed the presence of sandbanks across the SAC (Harries *et al.,* 2007) and more recent, higher resolution bathymetric survey work[5] is helping to refine our understanding of the distribution of the different Annex I habitats throughout the site (see also Natural Power Consultants Ltd. 2017).

[5] UKHO INSPIRE Portal & Bathymetric DAC - http://aws2.caris.com/ukho/mapViewer/map.action

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ANNEX 1: SUMMARY OF SAMPLE LOCATIONS AND DEPTH

Table A1. Sampling details from the 2016 Sound of Barra SAC grab survey. All depths are corrected to Below Chart Datum (BCD) and co-ordinates are in WGS84.

Station ID	Date	Time (UTC)	Position (decimal degrees)		Depth (m BCD)
			Latitude	Longitude	
S1_G3	20/04/2016	17:00	57.174383	-7.238500	41.2
S1_G4	20/04/2016	16:55	57.174050	-7.235400	36.3
S1_G5	20/04/2016	16:39	57.173800	-7.236083	34.3
S1_G6	20/04/2016	16:44	57.173700	-7.232933	35.3
S1_G7	20/04/2016	16:48	57.173917	-7.232317	34.3
S1_G8	20/04/2016	16:35	57.172300	-7.235767	34.4
S1_G9	20/04/2016	16:30	57.172883	-7.232450	32.4
S1_G10	20/04/2016	16:24	57.172233	-7.231300	33.4
S2_G1	22/04/2016	13:44	57.107850	-7.207683	27.1
S2_G2	22/04/2016	13:33	57.107133	-7.205083	34.2
S2_G3	22/04/2016	13:50	57.109117	-7.208633	27.0
S2_G4	22/04/2016	13:53	57.109550	-7.208950	26.0
S2_G5	22/04/2016	13:58	57.108867	-7.207150	27.9
S2_G6	22/04/2016	13:38	57.108467	-7.204283	36.1
S2_G7	22/04/2016	14:03	57.109050	-7.206017	28.9
S2_G8	22/04/2016	14:09	57.110850	-7.204117	30.8
S3_G1	22/04/2016	12:08	57.079533	-7.248017	26.2
S3_G2	22/04/2016	12:56	57.081183	-7.245450	27.3
S3_G5	22/04/2016	12:18	57.079217	-7.242383	27.3
S3_G6	22/04/2016	12:49	57.081033	-7.242150	27.1
S3_G7	22/04/2016	12:41	57.080383	-7.240500	27.3
S3_G8	22/04/2016	12:22	57.078850	-7.240900	27.3
S3_G9	22/04/2016	12:37	57.080400	-7.239517	25.3
S3_G10	22/04/2016	12:29	57.079733	-7.239000	23.3
S4_G1	22/04/2016	10:06	57.067867	-7.259450	24.9
S4_G3	22/04/2016	10:09	57.066317	-7.259417	25.9
S4_G4	22/04/2016	11:27	57.067717	-7.253750	26.9
S4_G5	22/04/2016	10:14	57.066117	-7.259217	26.0
S4_G6	22/04/2016	11:20	57.066667	-7.254100	26.8
S4_G7	22/04/2016	10:18	57.064867	-7.257350	27.0
S4_G8	22/04/2016	11:14	57.065133	-7.255933	26.7
S4_G10	22/04/2016	11:05	57.063867	-7.257267	26.6
S5_G1	20/04/2016	14:14	57.012467	-7.308800	27.9
S5_G2	20/04/2016	14:19	57.012733	-7.306083	27.9
S5_G3	20/04/2016	14:23	57.013517	-7.309267	28.9
S5_G4	20/04/2016	14:37	57.016950	-7.308833	28.6
S5_G5	20/04/2016	14:29	57.016933	-7.306767	28.7
S5_G6	20/04/2016	14:42	57.017933	-7.308850	27.6
S5_G7	20/04/2016	14:53	57.018583	-7.310167	28.5

Table A1. Continued.

Station ID	Date	Time (UTC)	Position (decimal degrees)		Depth (m BCD)
			Latitude	Longitude	
S5_G8	20/04/2016	14:47	57.019250	-7.307983	28.5
SOB6_G1	20/04/2016	13:24	56.999633	-7.325583	30.5
SOB6_G2	20/04/2016	13:33	56.999783	-7.324000	31.5
SOB6_G3	20/04/2016	13:17	56.999133	-7.321433	28.6
SOB6_G4	20/04/2016	13:28	57.000267	-7.321150	29.5
SOB6_G5	20/04/2016	13:38	57.001233	-7.320667	28.4
SOB6_G6	20/04/2016	13:42	57.002283	-7.320717	28.4
SOB6_G9	20/04/2016	13:55	57.002283	-7.315583	27.2
SOB6_G10	20/04/2016	14:01	57.003333	-7.314333	30.1
SOB7_G1	20/04/2016	12:41	56.987533	-7.365467	28.0
SOB7_G2	20/04/2016	12:46	56.987417	-7.361833	27.9
SOB7_G3	20/04/2016	12:50	56.988933	-7.360500	24.9
SOB7_G4	20/04/2016	12:55	56.987217	-7.358767	28.8
SOB7_G5	20/04/2016	12:35	56.985500	-7.360500	22.0
SOB7_G6	20/04/2016	12:59	56.987017	-7.355333	27.8
SOB7_G7	20/04/2016	12:31	56.985467	-7.357317	29.0
SOB7_G8	20/04/2016	12:28	56.984833	-7.356933	27.0
SOB8_G3	20/04/2016	11:37	56.961917	-7.388933	28.2
SOB8_G4	20/04/2016	11:32	56.961867	-7.385633	28.2
SOB8_G5	20/04/2016	11:26	56.961000	-7.386167	28.2
SOB8_G6	20/04/2016	11:45	56.958367	-7.389217	26.2
SOB8_G7	20/04/2016	11:50	56.958467	-7.385917	27.2
SOB8_G8	20/04/2016	11:22	56.959850	-7.383500	27.1
SOB8_G9	20/04/2016	11:19	56.958867	-7.384100	28.1
SOB8_G10	20/04/2016	11:14	56.956967	-7.382967	29.1
SOB9_G2	20/04/2016	09:34	56.935450	-7.430867	26.2
SOB9_G3	20/04/2016	09:38	56.935833	-7.428733	26.3
SOB9_G4	20/04/2016	10:06	56.936517	-7.423650	26.6
SOB9_G5	20/04/2016	10:11	56.935150	-7.424717	27.7
SOB9_G6	20/04/2016	09:47	56.933667	-7.425833	28.4
SOB9_G7	20/04/2016	09:51	56.933033	-7.422667	29.4
SOB9_G8	20/04/2016	10:17	56.934850	-7.418617	31.8
SOB9_G9	20/04/2016	09:56	56.933350	-7.417117	32.6

ANNEX 2: SEDIMENT GRAIN SIZE SCALE

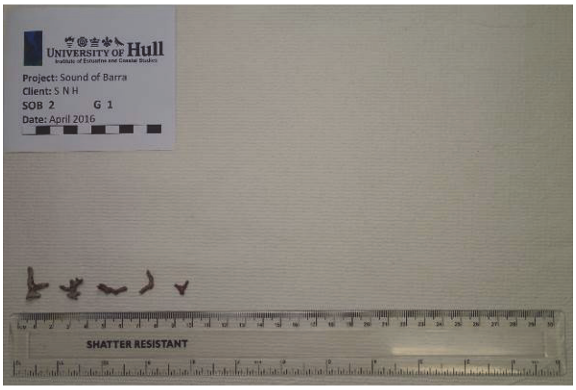
Sediment grain size scale adopted in the Gradistat program, with conversion key between measurement units (phi and mm/µm) and descriptive terminology (Blott and Pye, 2001).

Grain size			Descriptive terminology			
phi	mm/µm		Udden (914) and Wentworth (1922)	Friedman and Sanders (1978)	GRADISTAT program	
				Very large boulders		
-11	2048	mm				
				Large boulders	Very large	
-10	1024					
				Medium boulders	Large	
-9	512		Cobbles			
				Small boulders	Medium	Boulder
-8	256					
				Large cobbles	Small	
-7	128					
				Small cobbles	Very small	
-6	64					
				Very coarse pebbles	Very coarse	
-5	32					
				Coarse pebbles	Coarse	
-4	16		Pebbles			
				Medium pebbles	Medium	Gravel
-3	8					
				Fine pebbles	Fine	
-2	4					
			Granules	Very fine pebbles	Very fine	
-1	2					
			Very coarse sand	Very coarse sand	Very coarse	
0	1					
			Coarse sand	Coarse sand	Coarse	
1	500	µm				
			Medium sand	Medium sand	Medium	Sand
2	250					
			Fine sand	Fine sand	Fine	
3	125					
			Very fine sand	Very fine sand	Very fine	
4	63					
				Very coarse silt	Very coarse	
5	31					
				Coarse silt	Coarse	
6	16		Silt			
				Medium silt	Medium	Silt
7	8					
				Fine silt	Fine	
8	4					
			Clay	Very fine silt	Very fine	
9	2					
				Clay	Clay	

ANNEX 3: PHOTOGRAPHS OF THE MAERL FRAGMENTS

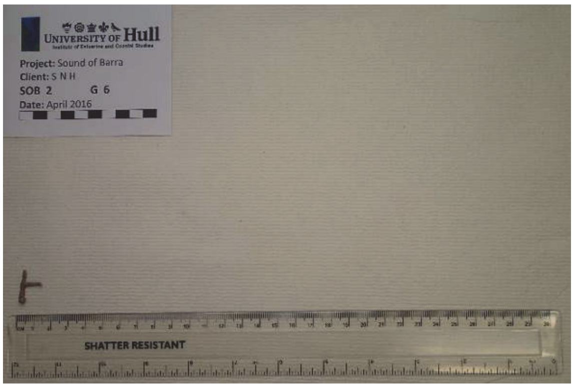
(High resolution photographs are included in the digital annex that accompanies this document)

SOB2
G1



SOB2
G3

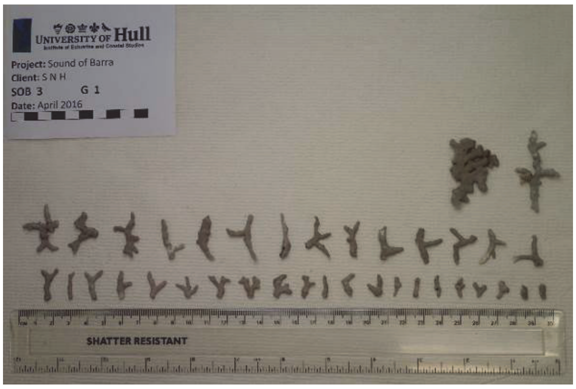
SOB2
G6



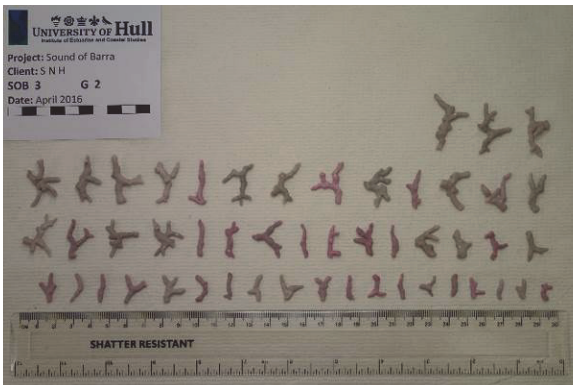
SOB2
G7

SOB2
G8

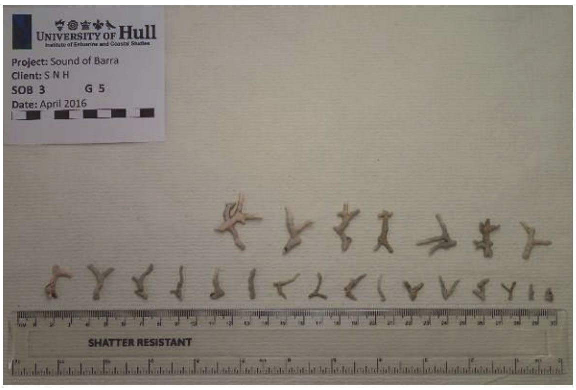
SOB3
G1



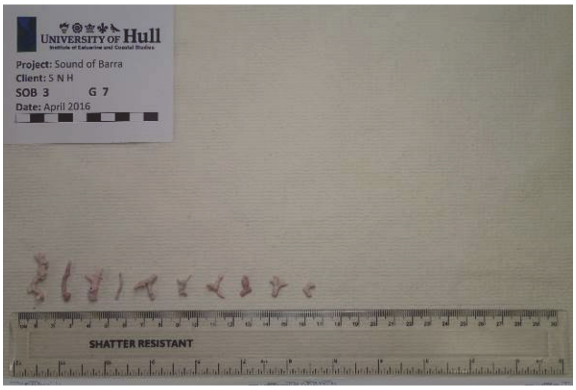
SOB3
G2



SOB3
G5



SOB3
G7



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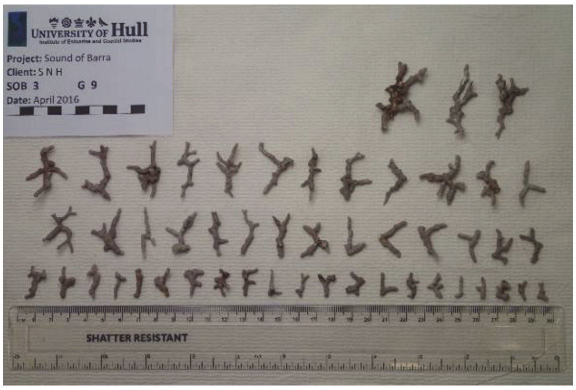
G9



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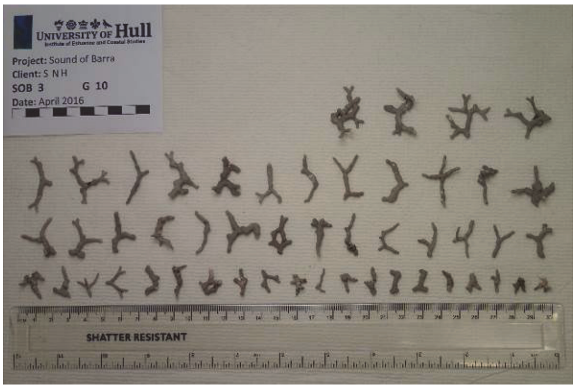
G10



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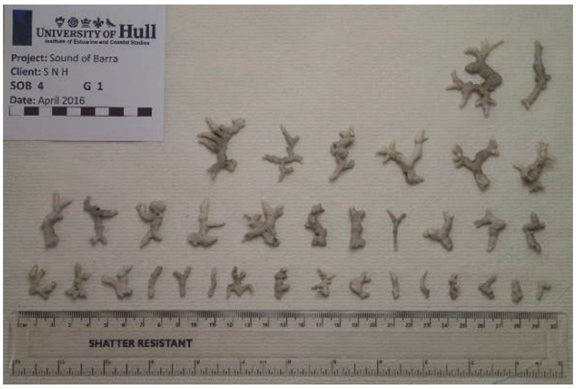
G1



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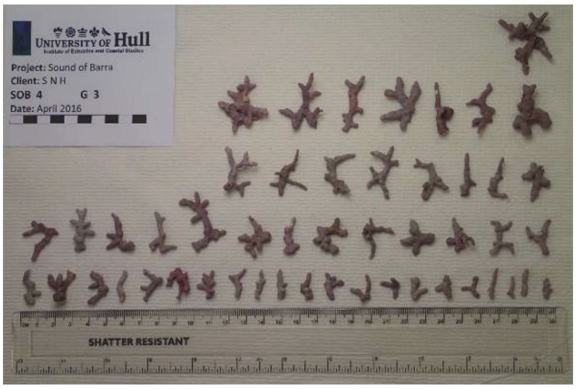
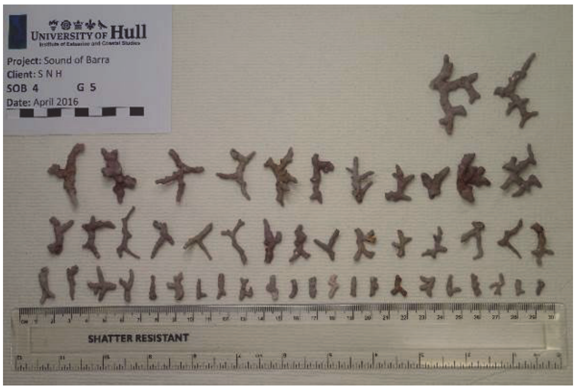
G3



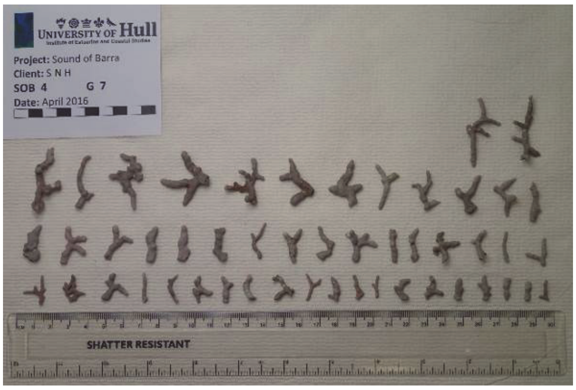
SOB4
G4

SOB4
G5



SOB4
G6

SOB4
G7



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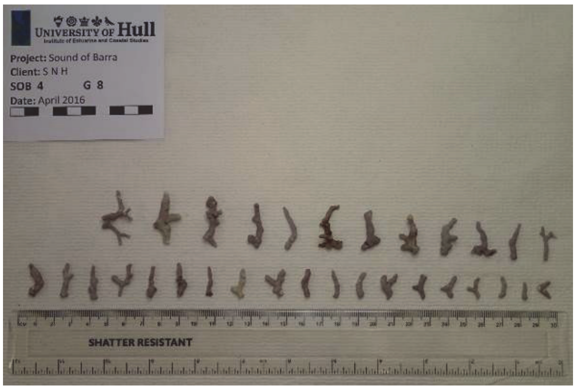
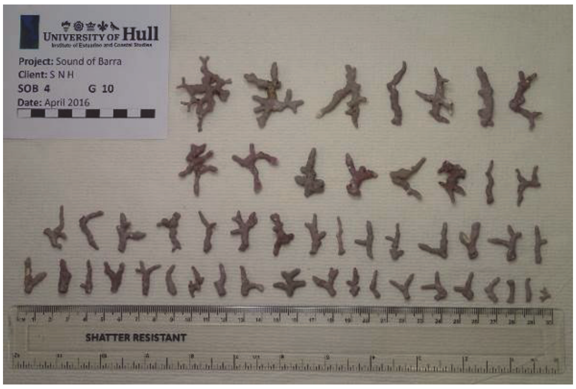
G8



SOB4
G10



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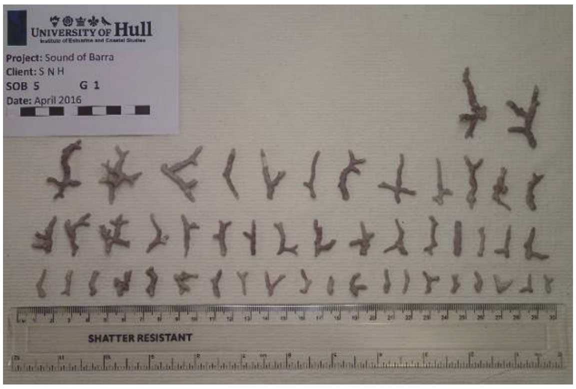
G1



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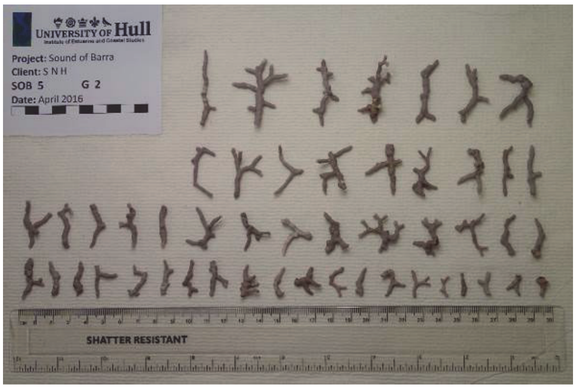
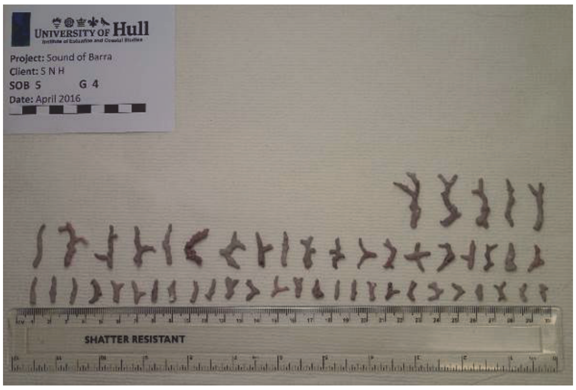
G2

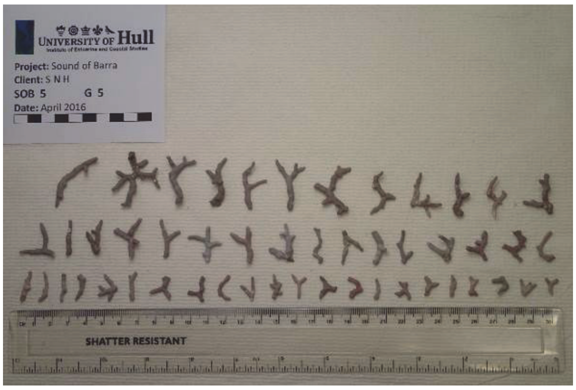


SOB5
G3

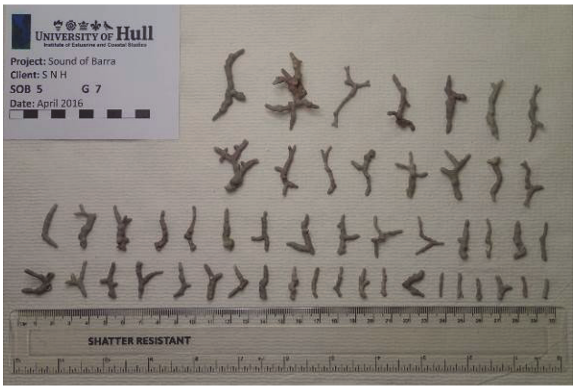
SOB5
G4



SOB5
G5

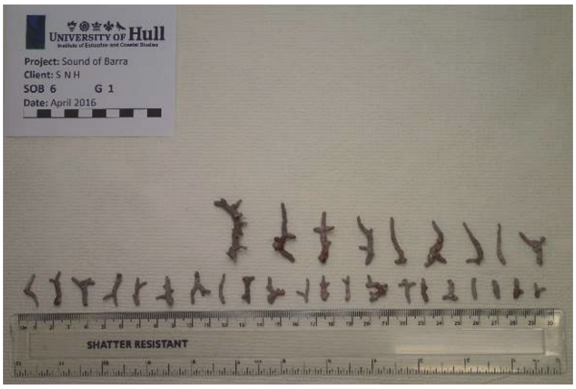


SOB5
G7



SOB5
G8

SOB6
G1



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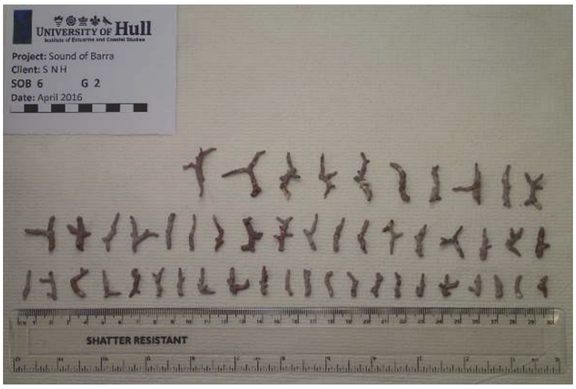
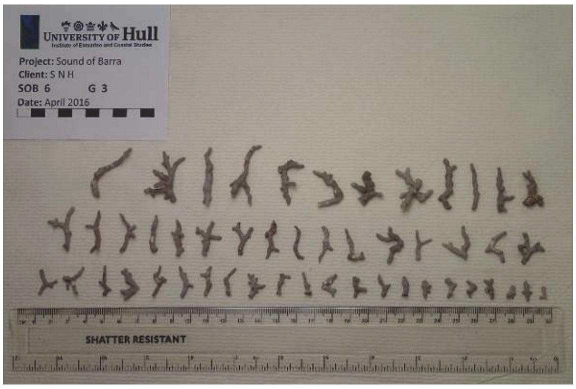
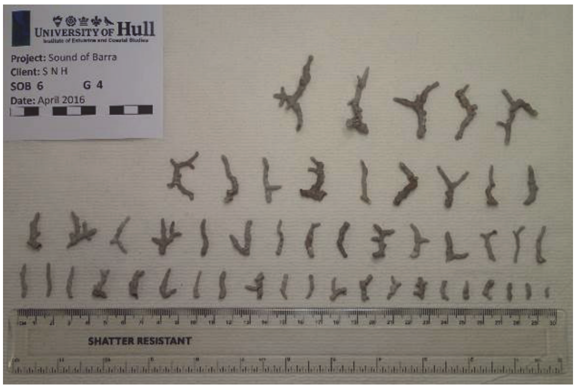
G2



SOB6
G3

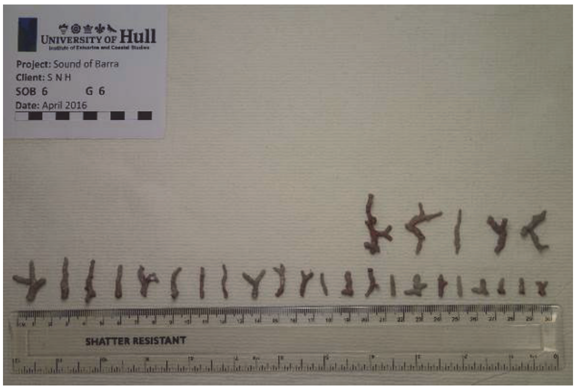


SOB6
G4

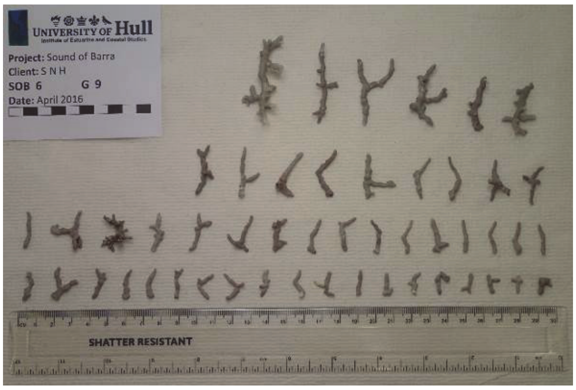


SOB6
G5

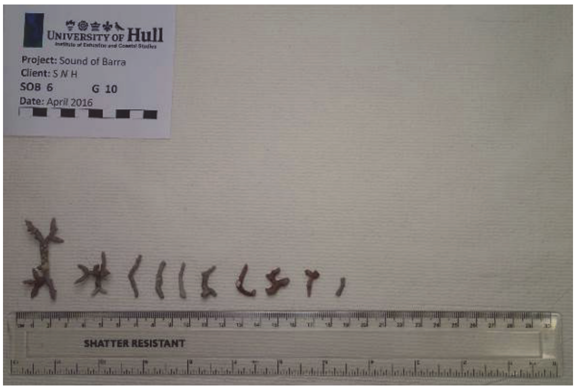
SOB6
G6



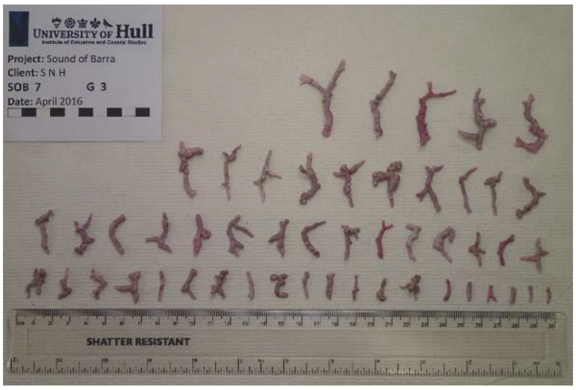
SOB6
G9



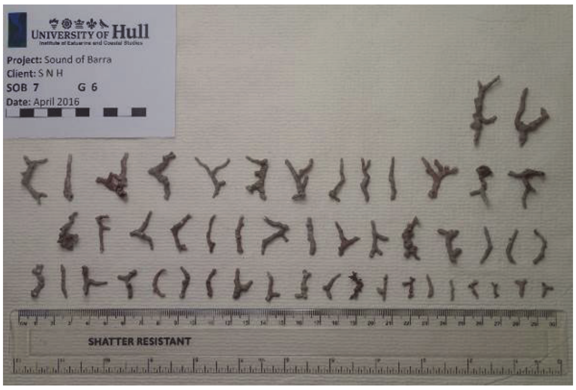
SOB6
G10



SOB7
G3



SOB7
G6



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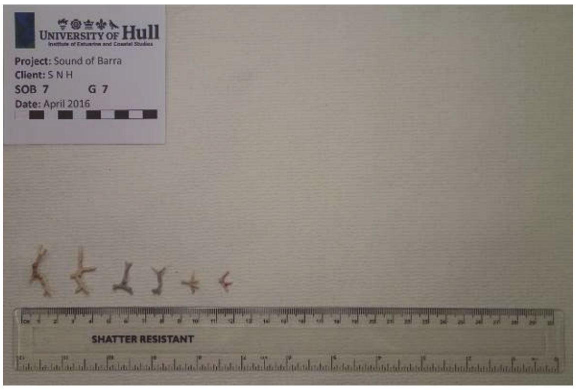
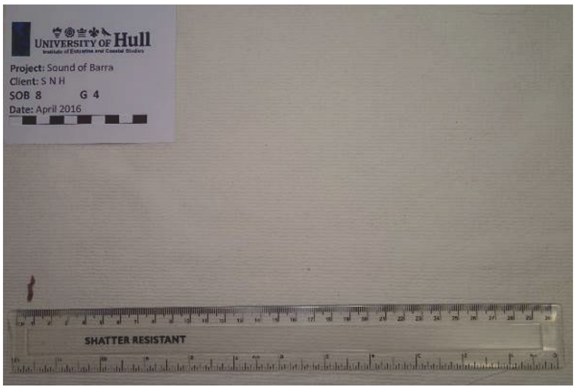
G7

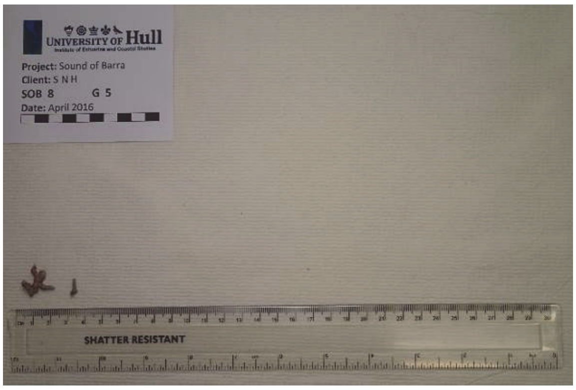


SOB
7G8

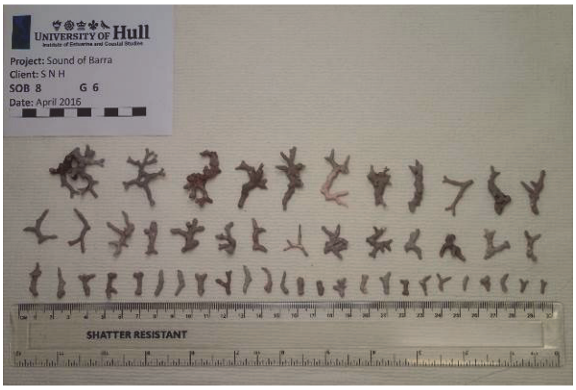
SOB8
G4



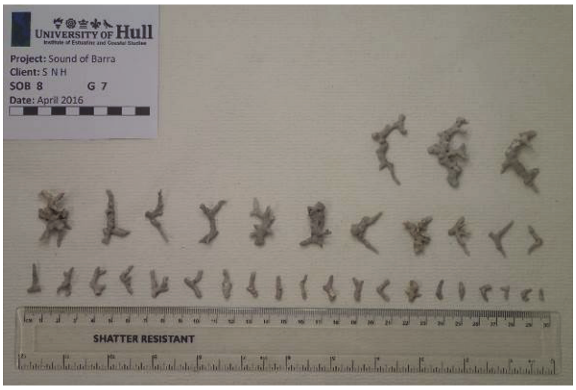
SOB8
G5



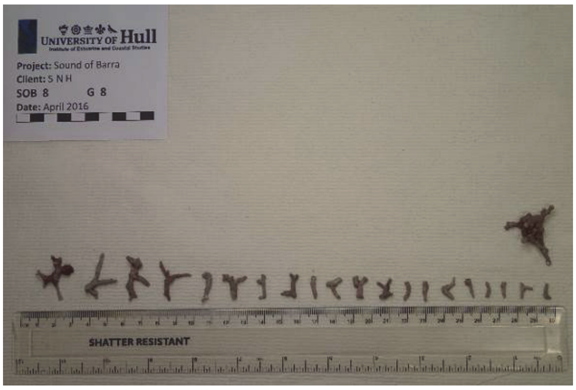
SOB8
G6



SOB8
G7



SOB8
G8



SOB9
G8

ANNEX 4: MAERL FRAGMENT DESCRIPTIVE STATISTICS

Maerl fragment descriptive statistics by box only

Box number	Min length (mm)	Max length (mm)	Mean length (mm)	Standard deviation of mean
2	8.03	43.58	18.1453	7.56352
3	7.06	45.68	19.6869	7.04004
4	8.24	45.57	21.2171	7.60276
5	8.55	44.95	20.5125	7.45355
6	6.13	52.67	19.4820	7.19248
7	7.34	45.45	19.7794	7.00253
8	7.22	41.14	17.8992	8.22990
9	11.87	24.74	17.3350	4.48892

Box number	Grab number	Number of maerl fragments	Min length (mm)	Max length (mm)	Mean length (mm)	Standard deviation of mean
2	1	5	8.52	18.73	14.72	4.16
2	3	6	14.44	43.58	21.33	11.41
2	6	1	18.73	18.73	18.73	*
2	7	16	8.03	32.63	18.56	7.18
2	8	2	12.81	14.28	13.55	1.04
3	1	37	8.08	45.68	18.14	8.28
3	2	50	9.76	32.45	19.31	5.60
3	5	23	7.06	32.64	18.29	6.10
3	7	10	8.18	27.85	15.54	5.81
3	9	50	10.15	43.06	22.23	8.13
3	10	50	9.40	32.63	20.13	6.13
4	1	35	10.86	44.99	23.78	8.39
4	3	50	11.44	35.96	21.94	6.80
4	4	50	8.30	45.57	21.32	8.18
4	5	50	8.24	44.85	20.73	8.75
4	6	7	10.22	30.09	19.33	6.83
4	7	50	10.64	39.53	19.74	7.05
4	8	31	9.91	30.80	18.73	5.46
4	10	50	8.88	44.34	22.36	7.38
5	1	50	9.83	40.62	20.39	7.69
5	2	50	11.03	44.87	23.76	7.90
5	3	50	8.62	39.47	21.71	7.18
5	4	50	8.55	31.64	16.33	5.95
5	5	50	9.56	37.59	18.65	6.39
5	7	50	11.30	44.95	23.14	7.48
5	8	19	11.46	30.57	18.12	5.76
6	1	29	8.07	37.25	18.41	7.18

Box number	Grab number	Number of maerl fragments	Min length (mm)	Max length (mm)	Mean length (mm)	Standard deviation of mean
6	2	50	12.10	30.79	18.59	4.51
6	3	50	7.29	34.95	19.02	6.69
6	4	50	6.13	44.09	19.93	7.47
6	5	15	7.80	36.99	21.76	8.41
6	6	27	8.09	33.73	17.37	6.49
6	9	50	9.94	52.67	21.07	8.62
6	10	10	10.65	47.94	21.52	10.19
7	3	50	8.67	45.45	21.53	8.20
7	6	50	8.69	41.72	20.33	6.29
7	7	6	11.95	29.75	19.84	7.37
7	8	50	7.34	37.06	17.47	5.83
8	4	1	14.28	14.28	14.28	*
8	5	2	9.73	19.41	14.57	6.84
8	6	50	7.47	36.70	17.91	7.86
8	7	34	7.22	41.14	19.72	9.37
8	8	21	8.63	33.25	15.40	7.06
9	8	8	11.87	24.74	17.34	4.49

ANNEX 5: PARTICLE SIZE ANALYSIS

Sediment characteristics for the samples collected at and around Sound of Barra SAC in 2016.

Site Label	Textural Group	Sediment Sorting	Mean Sediment Type	Skewness	Kurtosis
S1_G3	Gravelly Muddy Sand	V Poorly	Fine Sand	Fine Skewed	Platykurtic
S1_G4	Gravelly Muddy Sand	V Poorly	Fine Sand	Fine Skewed	Platykurtic
S1_G5	Gravelly Muddy Sand	V Poorly	V Fine Sand	Fine Skewed	Platykurtic
S1_G6	Gravelly Muddy Sand	V Poorly	Fine Sand	V Fine Skewed	Mesokurtic
S1_G7	Gravelly Muddy Sand	V Poorly	Fine Sand	V Fine Skewed	Platykurtic
S1_G8	Gravelly Muddy Sand	V Poorly	Fine Sand	Fine Skewed	Platykurtic
S1_G9	Gravelly Muddy Sand	V Poorly	Fine Sand	V Fine Skewed	V Platykurtic
S1_G10	Gravelly Muddy Sand	V Poorly	V Fine Sand	V Fine Skewed	Platykurtic
S2_G1	Gravelly Sand	V Poorly	Coarse Sand	V Fine Skewed	Leptokurtic
S2_G2	Gravelly Sand	V Poorly	Medium Sand	Symmetrical	Leptokurtic
S2_G3	Gravelly Sand	Poorly	Coarse Sand	Fine Skewed	Leptokurtic
S2_G4	Gravelly Sand	Poorly	Coarse Sand	Fine Skewed	Leptokurtic
S2_G5	Gravelly Sand	Poorly	Medium Sand	Coarse Skewed	Mesokurtic
S2_G6	Gravelly Sand	Poorly	Medium Sand	Symmetrical	Leptokurtic
S2_G7	Gravelly Sand	Poorly	Coarse Sand	Symmetrical	Leptokurtic
S2_G8	Gravelly Sand	Poorly	Coarse Sand	Fine Skewed	Mesokurtic
S3_G1	Sandy Gravel	Poorly	V Coarse Sand	V Fine Skewed	V Leptokurtic
S3_G2	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Leptokurtic
S3_G5	Gravelly Sand	Poorly	Medium Sand	V Coarse Skewed	V Leptokurtic
S3_G6	Slightly Gravelly Sand	Poorly	Fine Sand	Coarse Skewed	Leptokurtic
S3_G7	Gravelly Sand	Poorly	Fine Sand	Coarse Skewed	V Leptokurtic
S3_G8	Gravelly Sand	Poorly	Medium Sand	V Coarse Skewed	V Leptokurtic
S3_G9	Sandy Gravel	Poorly	V Fine Gravel	Fine Skewed	Leptokurtic
S3_G10	Sandy Gravel	Poorly	V Fine Gravel	Fine Skewed	Leptokurtic
S4_G1	Gravelly Sand	Poorly	V Coarse Sand	Symmetrical	Mesokurtic
S4_G3	Sandy Gravel	Poorly	V Coarse Sand	Fine Skewed	Leptokurtic
S4_G4	Gravelly Sand	Poorly	V Coarse Sand	Symmetrical	Mesokurtic
S4_G5	Sandy Gravel	Poorly	V Coarse Sand	V Fine Skewed	Mesokurtic
S4_G6	Gravelly Sand	Poorly	Coarse Sand	Symmetrical	Leptokurtic
S4_G7	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Leptokurtic
S4_G8	Sandy Gravel	Poorly	V Coarse Sand	V Fine Skewed	Leptokurtic
S4_G10	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	V Leptokurtic
S5_G1	Sandy Gravel	Moderately	V Coarse Sand	Symmetrical	Mesokurtic
S5_G2	Sandy Gravel	Moderately	V Fine Gravel	Symmetrical	Mesokurtic
S5_G3	Sandy Gravel	Moderately	V Coarse Sand	Fine Skewed	Leptokurtic
S5_G4	Gravelly Sand	Moderately	V Coarse Sand	Symmetrical	Leptokurtic

Sediment characteristics for the samples collected at and around Sound of Barra SAC in 2016.

Site Label	Textural Group	Sediment Sorting	Mean Sediment Type	Skewness	Kurtosis
S5_G5	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Platykurtic
S5_G6	Slightly Gravelly Sand	Moderately Well	Coarse Sand	Fine Skewed	Leptokurtic
S5_G7	Gravelly Sand	Poorly	Coarse Sand	Fine Skewed	Leptokurtic
S5_G8	Gravelly Sand	Moderately	V Coarse Sand	Symmetrical	Platykurtic
S6_G1	Sandy Gravel	Moderately	V Coarse Sand	Symmetrical	Leptokurtic
S6_G2	Sandy Gravel	Poorly	V Coarse Sand	Fine Skewed	Mesokurtic
S6_G3	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Mesokurtic
S6_G4	Sandy Gravel	Moderately	V Coarse Sand	Symmetrical	Leptokurtic
S6_G5	Sandy Gravel	Poorly	V Coarse Sand	Fine Skewed	Mesokurtic
S6_G6	Gravelly Sand	Moderately	V Coarse Sand	Symmetrical	Leptokurtic
S6_G9	Sandy Gravel	Moderately	V Fine Gravel	Symmetrical	Mesokurtic
S6_G10	Sandy Gravel	Poorly	V Fine Gravel	Fine Skewed	Leptokurtic
S7_G1	Slightly Gravelly Sand	Poorly	Fine Sand	Fine Skewed	V Leptokurtic
S7_G2	Slightly Gravelly Sand	Poorly	Fine Sand	Fine Skewed	V Leptokurtic
S7_G3	Gravelly Sand	Poorly	V Coarse Sand	V Fine Skewed	Leptokurtic
S7_G4	Slightly Gravelly Sand	Poorly	Fine Sand	Symmetrical	V Leptokurtic
S7_G5	Slightly Gravelly Sand	Moderately	Medium Sand	Fine Skewed	Mesokurtic
S7_G6	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	V Leptokurtic
S7_G7	Gravelly Sand	Poorly	Medium Sand	Symmetrical	Leptokurtic
S7_G8	Gravelly Sand	V Poorly	Medium Sand	Coarse Skewed	Mesokurtic
S8_G3	Gravelly Sand	Moderately	Coarse Sand	Fine Skewed	Leptokurtic
S8_G4	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Leptokurtic
S8_G5	Gravelly Sand	Poorly	Coarse Sand	Symmetrical	Mesokurtic
S8_G6	Sandy Gravel	Poorly	V Coarse Sand	Symmetrical	Platykurtic
S8_G7	Sandy Gravel	Poorly	V Fine Gravel	Fine Skewed	Leptokurtic
S8_G8	Sandy Gravel	Poorly	V Coarse Sand	Fine Skewed	Leptokurtic
S8_G9	Gravelly Sand	Poorly	Medium Sand	Coarse Skewed	Leptokurtic
S8_G10	Gravelly Sand	Poorly	V Coarse Sand	Symmetrical	Leptokurtic
S9_G2	Slightly Gravelly Sand	Moderately	Medium Sand	Symmetrical	Mesokurtic
S9_G3	Slightly Gravelly Sand	Moderately	Medium Sand	Coarse Skewed	Leptokurtic
S9_G4	Slightly Gravelly Sand	Moderately	Medium Sand	Symmetrical	Mesokurtic
S9_G5	Slightly Gravelly Sand	Moderately	Medium Sand	Symmetrical	Mesokurtic
S9_G6	Slightly Gravelly Sand	Moderately	Medium Sand	Symmetrical	Mesokurtic
S9_G7	Slightly Gravelly Sand	Moderately	Medium Sand	Fine Skewed	Mesokurtic
S9_G8	Gravelly Sand	Poorly	V Coarse Sand	Symmetrical	Mesokurtic
S9_G9	Slightly Gravelly Sand	Moderately	Medium Sand	Symmetrical	Mesokurtic

ANNEX 6: BENTHIC INVERTEBRATES

Species list: List of taxa found in the samples collected in and around the Sound of Barra SAC, with indication of their frequency of occurrence in the samples (%) and their overall abundance (as individuals · 0.1 m^{-2}, and as %, for quantitative records).

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
A		Animalia		1.4	1	0.0
A		Animalia	eggs	25.0		
A		*Astrorhiza limicola*		5.6	17	0.1
A		Foraminifera		2.8		
A		*Lagotia viridis*		70.8		
C	1	Porifera		81.9		
C	53	Leucosolenia		5.6		
D	8	*Depastrum cyathiforme*		1.4	1	0.0
D	140	Anthoathecata	?	1.4		
D	155	*Corymorpha nutans*		1.4	1	0.0
D	287	*Merona cornucopiae*		5.6		
D	336	*Lovenella clausa*		1.4		
D	351	*Campanulina pumila*		1.4		
D	390	Halecium		4.2		
D	409	*Abietinaria abietina*		2.8		
D	413	Diphasia		1.4		
D	424	*Hydrallmania falcata*		1.4		
D	427	Sertularella		1.4		
D	433	Sertularia		4.2		
D	452	*Halopteris catharina*		1.4		
D	494	*Campanularia hincksii*		1.4		
D	495	*Campanularia volubilis*		2.8		
D	499	*Rhizocaulus verticillatus*		1.4		
D	502	*Clytia gracilis*		1.4		
D	521	*Obelia longissima*		1.4		
D	593	*Sarcodictyon roseum*		16.7		
D	595	Alcyoniidae		6.9		
D	632	*Cerianthus lloydii*		11.1	10	0.1
D	649	*Epizoanthus couchii*		9.7		
D	766	*Edwardsia claparedii*		48.6	175	1.0
D	783	*Caryophyllia (Caryophyllia) smithii*		2.8	2	0.0
F	2	Turbellaria		20.8	21	0.1
G	1	Nemertea		77.8	150	0.9
G	34	*Tubulanus polymorphus*		15.3	21	0.1
G	39	Cerebratulus		44.4	51	0.3
HD	1	Nematoda		79.2	2560	14.9
K	35	*Loxosomella phascolosomata*		1.4		
K	45	Pedicellina		25.0		
K	50	Barentsia		5.6		
L	1	Chaetognatha		19.4	21	0.1
N	12	Golfingia	juv.	2.8	5	0.0
N	14	*Golfingia (Golfingia) elongata*		11.1	13	0.1
N	17	*Golfingia (Golfingia) vulgaris vulgaris*		4.2	3	0.0

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
N	25	*Nephasoma (Nephasoma) minutum*		68.1	251	1.5
N	28	*Thysanocardia procera*		6.9	13	0.1
N	34	*Phascolion (Phascolion) strombus strombus*		25.0	40	0.2
O	18	*Maxmuelleria lankesteri*		1.4	1	0.0
P	15	*Pisione remota*		50.0	322	1.9
P	17	Aphroditidae	juv.	2.8	2	0.0
P	25	Polynoidae	juv.	2.8	2	0.0
P	50	Harmothoe		29.2	27	0.2
P	50.1	Malmgrenia		19.4	25	0.1
P	51	*Malmgrenia andreapolis*		4.2	4	0.0
P	52	*Harmothoe antilopes*		2.8	3	0.0
P	62	*Harmothoe glabra*		1.4	1	0.0
P	66	*Malmgrenia ljungmani*		31.9	42	0.2
P	70	*Malmgrenia mcintoshi*		9.7	18	0.1
P	82	*Lepidonotus squamatus*		1.4	1	0.0
P	92	*Pholoe inornata*		38.9	66	0.4
P	95	*Pholoe baltica*		20.8	43	0.2
P	103	Sigalion	juv.	2.8	4	0.0
P	104	*Sigalion mathildae*		1.4	1	0.0
P	106	Sthenelais	juv.	1.4	1	0.0
P	111	*Fimbriosthenelais zetlandica*		1.4	1	0.0
P	114	Phyllodocidae	juv.	2.8	2	0.0
P	118	*Eteone longa*	sp. agg.	4.2	3	0.0
P	124	*Hypereteone foliosa*		1.4	1	0.0
P	130	*Mystides caeca*		11.1	9	0.1
P	136	*Pseudomystides limbata*		23.6	22	0.1
P	142	*Phyllodoce lineata*		1.4	1	0.0
P	151	*Eulalia aurea*		13.9	19	0.1
P	153	*Eulalia expusilla*		4.2	3	0.0
P	155	*Eulalia mustela*		34.7	45	0.3
P	164	*Eumida bahusiensis*		2.8	3	0.0
P	167	*Eumida sanguinea*	sp. agg.	43.1	52	0.3
P	171	*Nereiphylla rubiginosa*		25.0	31	0.2
P	176	*Paranaitis kosteriensis*		1.4	1	0.0
P	177	*Paranaitis wahlbergi*		1.4	1	0.0
P	191	*Sige fusigera*		1.4	1	0.0
P	195	*Lacydonia miranda*		18.1	20	0.1
P	255	Glycera	juv.	1.4	2	0.0
P	256	*Glycera alba*		18.1	24	0.1
P	257	*Glycera celtica*		1.4	1	0.0
P	259	*Glycera fallax*		18.1	17	0.1
P	260	*Glycera lapidum*		83.3	338	2.0
P	263/265	Glycera		5.6	4	0.0
P	268	*Glycinde nordmanni*		33.3	59	0.3
P	271	*Goniada maculata*		8.3	12	0.1
P	273	*Goniada pallida*		2.8	2	0.0
P	276	*Goniadella gracilis*		33.3	36	0.2

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
P	282	*Ephesiella abyssorum*		22.2	29	0.2
P	291	*Sphaerodorum gracilis*		11.1	9	0.1
P	300	*Gyptis propinqua*		19.4	22	0.1
P	303	*Hesiospina aurantiaca*		31.9	59	0.3
P	305	*Psamathe fusca*		59.7	177	1.0
P	313	*Oxydromus flexuosus*		1.4	1	0.0
P	317	*Oxydromus pallidus*		1.4	1	0.0
P	319	*Podarkeopsis capensis*		2.8	4	0.0
P	355	*Eurysyllis tuberculata*		4.2	5	0.0
P	362	*Trypanosyllis (Trypanosyllis) coeliaca*		48.6	90	0.5
P	365	*Syllis armillaris*	sp. agg.	31.9	35	0.2
P	367.1	Syllis		51.4	181	1.1
P	369	*Syllis licheri*	?	4.2	3	0.0
P	369.1	*Syllis parapari*		25.0	42	0.2
P	369.2	*Syllis pontxioi*		54.2	234	1.4
P	377	*Dioplosyllis cirrosa*		4.2	4	0.0
P	387	*Odontosyllis fulgurans*		12.5	15	0.1
P	388	*Odontosyllis gibba*		22.2	34	0.2
P	391	*Streptodonta pterochaeta*		2.8	3	0.0
P	392.1	*Streptodonta exsulis*		1.4	1	0.0
P	394	*Palposyllis prosostoma*		2.8	3	0.0
P	421	*Parexogone hebes*		8.3	6	0.0
P	423	*Exogone verugera*		8.3	10	0.1
P	425	*Sphaerosyllis bulbosa*		48.6	273	1.6
P	427	*Sphaerosyllis hystrix*		9.7	8	0.0
P	430	*Sphaerosyllis cf. taylori*		4.2	3	0.0
P	434	Myrianida		1.4	1	0.0
P	478	*Nereis zonata*		1.4	1	0.0
P	493	*Aglaophamus agilis*		16.7	15	0.1
P	494	Nephtys	juv.	9.7	12	0.1
P	495	*Nephtys assimilis*		1.4	2	0.0
P	498	*Nephtys cirrosa*		13.9	27	0.2
P	499	*Nephtys hombergii*		2.8	2	0.0
P	502	*Nephtys kersivalensis*		19.4	23	0.1
P	520	*Pareurythoe borealis*		18.1	124	0.7
P	539	*Aponuphis bilineata*		62.5	179	1.0
P	543	Nothria	juv.	2.8	2	0.0
P	545.1	*Nothria hyperborea*		11.1	13	0.1
P	556	*Leodice harassii*		1.4	1	0.0
P	560	*Eunice vittata*		4.2	4	0.0
P	568	*Lysidice unicornis*		22.2	40	0.2
P	573	*Lumbrineris futilis*		1.4	1	0.0
P	574/579	Lumbrineris		20.8	17	0.1
P	580	*Abyssoninoe hibernica*		6.9	11	0.1
P	583	*Scoletoma magnidentata*		1.4	1	0.0
P	597	*Notocirrus scoticus*		1.4	1	0.0
P	638	*Protodorvillea kefersteini*		20.8	44	0.3

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
P	642	*Schistomeringos neglecta*		15.3	27	0.2
P	665	*Orbinia sertulata*		1.4	1	0.0
P	672	*Scoloplos (Scoloplos) armiger*		9.7	14	0.1
P	685	*Aricidea (Acmira) cerrutii*		12.5	11	0.1
P	690	*Cirrophorus branchiatus*		12.5	19	0.1
P	693	*Levinsenia gracilis*		1.4	1	0.0
P	698	*Paradoneis ilvana*		6.9	7	0.0
P	699	*Paradoneis lyra*		8.3	35	0.2
P	711	*Apistobranchus tenuis*		1.4	1	0.0
P	718	*Poecilochaetus serpens*		1.4	1	0.0
P	723	*Aonides paucibranchiata*		62.5	127	0.7
P	733	*Laonice bahusiensis*		41.7	51	0.3
P	737.1	*Malacoceros girardi*		1.4	1	0.0
P	746	*Prionospio multibranchiata*		2.8	2	0.0
P	747	*Prionospio cirrifera*		1.4	1	0.0
P	750	*Dipolydora coeca*		8.3	7	0.0
P	751	*Dipolydora caulleryi*		5.6	5	0.0
P	754	*Dipolydora flava*		11.1	8	0.0
P	765	*Prionospio fallax*		4.2	17	0.1
P	766	*Aurospio banyulensis*		23.6	36	0.2
P	773	*Pseudopolydora paucibranchiata*		1.4	1	0.0
P	774	*Pseudopolydora pulchra*		1.4	1	0.0
P	786	*Scolelepis korsuni*		2.8	2	0.0
P	792.1	*Spio symphyta*		4.2	3	0.0
P	794	*Spiophanes bombyx*		12.5	16	0.1
P	796	*Spiophanes kroyeri*		9.7	8	0.0
P	804	*Magelona alleni*		11.1	17	0.1
P	805	*Magelona filiformis*		1.4	3	0.0
P	823.1	Aphelochaeta	A	4.2	3	0.0
P	829	*Caulleriella alata*		4.2	3	0.0
P	831	*Chaetozone zetlandica*		2.8	2	0.0
P	832.1	*Chaetozone christiei*		5.6	4	0.0
P	832.2	Chaetozone	D	15.3	78	0.5
P	835	Cirratulus	juv.	2.8	5	0.0
P	836	*Cirratulus cirratus*		1.4	1	0.0
P	838	Cirriformia		4.2	3	0.0
P	840	Dodecaceria		1.4	1	0.0
P	843	Monticellina		11.1	15	0.1
P	846	*Tharyx killariensis*		2.8	2	0.0
P	878	*Diplocirrus glaucus*		16.7	32	0.2
P	879	*Diplocirrus stopbowitzi*		9.7	10	0.1
P	881	*Flabelligera affinis*		2.8	3	0.0
P	889	Macrochaeta		20.8	22	0.1
P	919	*Mediomastus fragilis*		29.2	318	1.8
P	920	Notomastus		41.7	68	0.4
P	925	*Peresiella clymenoides*		4.2	4	0.0
P	927	*Pseudonotomastus southerni*		1.4	1	0.0
P	955	Leiochone		29.2	33	0.2

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
P	959	*Leiochone leiopygos*		1.4	2	0.0
P	960.1	Euclymene	A	4.2	3	0.0
P	964	*Euclymene oerstedi*		4.2	4	0.0
P	971	*Praxillella affinis*		19.4	20	0.1
P	983	Notoproctus		4.2	4	0.0
P	991	*Rhodine loveni*		1.4	1	0.0
P	1000	*Ophelia celtica*		2.8	2	0.0
P	1007	*Travisia forbesii*		1.4	1	0.0
P	1011	*Armandia polyophthalma*		2.8	4	0.0
P	1022	*Asclerocheilus intermedius*		1.4	1	0.0
P	1026	*Scalibregma celticum*		2.8	2	0.0
P	1062	Polygordius		59.7	1081	6.3
P	1069	Protodrilus		2.8	4	0.0
P	1093	*Galathowenia oculata*		23.6	67	0.4
P	1095	*Myriochele danielsseni*		25.0	51	0.3
P	1097	Owenia		30.6	53	0.3
P	1102	*Amphictene auricoma*		16.7	20	0.1
P	1107	*Lagis koreni*		2.8	3	0.0
P	1111	*Petta pusilla*		8.3	12	0.1
P	1117	*Sabellaria spinulosa*		4.2	10	0.1
P	1118	Ampharetidae	juv.	1.4	1	0.0
P	1120.1	*Melinna albicincta*		1.4	1	0.0
P	1135	*Ampharete falcata*		4.2	5	0.0
P	1139	*Ampharete lindstroemi*		15.3	19	0.1
P	1142	*Amphicteis gunneri*		2.8	4	0.0
P	1147	*Anobothrus gracilis*		2.8	2	0.0
P	1160	*Ampharete octocirrata*		5.6	5	0.0
P	1167	*Sosane sulcata*		4.2	3	0.0
P	1174	Terebellides		18.1	50	0.3
P	1177	*Trichobranchus glacialis*		4.2	3	0.0
P	1179	Terebellidae		1.4	1	0.0
P	1195	*Lanice conchilega*		2.8	2	0.0
P	1210	*Nicolea venustula*		1.4	1	0.0
P	1215	*Phisidia aurea*		5.6	5	0.0
P	1216	Pista	juv.	2.8	2	0.0
P	1217.1	*Pista bansei*		41.7	96	0.6
P	1218.1	*Pista mediterranea*		18.1	35	0.2
P	1229	*Amaeana trilobata*		6.9	8	0.0
P	1233	*Lysilla loveni*		1.4	1	0.0
P	1234	*Lysilla nivea*		11.1	14	0.1
P	1235	Polycirrus		30.6	51	0.3
P	1249	*Parathelepus collaris*		22.2	24	0.1
P	1250	Streblosoma		9.7	8	0.0
P	1264.1	*Dialychone dunerificta*		48.6	169	1.0
P	1273	*Parasabella cambrensis*		1.4	1	0.0
P	1277	Euchone	juv.	2.8	3	0.0
P	1280	*Euchone rubrocincta*		4.2	3	0.0
P	1289	*Jasmineira caudata*		8.3	8	0.0

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
P	1315.1	Pseudopotamilla	A	15.3	19	0.1
P	1324	Serpulidae	sp. indet.	8.3	16	0.1
P	1327	*Chitinopoma serrula*		1.4	17	0.1
P	1334	*Hydroides norvegica*		54.2	142	0.8
P	1339	Spirobranchus	sp. indet.	5.6	8	0.0
P	1340	*Spirobranchus lamarcki*		6.9	12	0.1
P	1341	*Spirobranchus triqueter*		30.6	102	0.6
P	1348	*Apomatus similis*		4.2	4	0.0
P	1352	*Filogranula calyculata*		1.4	1	0.0
P	1357	*Metavermilia multicristata*		1.4	5	0.0
P	1524	Grania		51.4	187	1.1
Q	15	*Achelia echinata*		1.4	2	0.0
Q	44	*Anoplodactylus petiolatus*		8.3	8	0.0
R	14.1	Sessilia	Cyprid	2.8	21	0.1
R	14.1	Sessilia	juv.	6.9	72	0.4
R	41	*Verruca stroemia*		44.4	97	0.6
R	76	*Balanus balanus*		6.9	8	0.0
R	77	*Balanus crenatus*		6.9	9	0.1
R	142	Copepoda		62.5	612	3.6
R	2175.1	*Melinnacheres terebellidis*		1.4	1	0.0
R	2426	*Asterope mariae*		12.5	19	0.1
S	8.1	*Nebalia kocatasi*		1.4	1	0.0
S	8.15	*Nebalia reboredae*		2.8	2	0.0
S	11.1	*Sarsinebalia urgorrii*		13.9	11	0.1
S	102	*Apherusa bispinosa*		4.2	3	0.0
S	109	*Eusirus longipes*		2.8	3	0.0
S	125	*Monoculodes carinatus*		1.4	1	0.0
S	126	*Deflexilodes gibbosus*		1.4	1	0.0
S	128	*Deflexilodes subnudus*		1.4	1	0.0
S	131	*Perioculodes longimanus*		5.6	5	0.0
S	135	*Pontocrates arenarius*		13.9	13	0.1
S	138	*Synchelidium maculatum*		9.7	11	0.1
S	140	*Westwoodilla caecula*		6.9	5	0.0
S	151	*Stenopleustes nodifera*		1.4	1	0.0
S	158	*Amphilochus manudens*		1.4	1	0.0
S	177	*Leucothoe incisa*		4.2	4	0.0
S	248	*Urothoe elegans*		13.9	172	1.0
S	249	*Urothoe marina*		15.3	33	0.2
S	254	*Harpinia antennaria*		4.2	7	0.0
S	265	*Parametaphoxus fultoni*		9.7	8	0.0
S	271	Lysianassidae		1.4	1	0.0
S	273.1	*Acidostoma neglectum*		1.4	1	0.0
S	275	*Acidostoma obesum*		1.4	1	0.0
S	296	*Hippomedon denticulatus*		6.9	5	0.0
S	301	*Lepidepecreum longicornis*		11.1	9	0.1
S	305	*Lysianassa plumosa*		4.2	8	0.0
S	330	*Socarnes erythrophthalmus*		16.7	85	0.5
S	337	*Tmetonyx similis*		22.2	21	0.1

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
S	342.1	*Tryphosella lowryi*		8.3	9	0.1
S	396	*Liljeborgia kinahani*		1.4	1	0.0
S	410	*Nototropis falcatus*		1.4	1	0.0
S	413	*Atylus vedlomensis*		9.7	10	0.1
S	423	Ampelisca		1.4	1	0.0
S	427	*Ampelisca brevicornis*		13.9	16	0.1
S	429	*Ampelisca diadema*		5.6	9	0.1
S	438	*Ampelisca spinipes*		1.4	1	0.0
S	440	*Ampelisca tenuicornis*		6.9	5	0.0
S	442	*Ampelisca typica*		18.1	21	0.1
S	451	Bathyporeia	juv.	1.4	1	0.0
S	452	*Bathyporeia elegans*		9.7	24	0.1
S	453	*Bathyporeia gracilis*		9.7	17	0.1
S	459	*Bathyporeia tenuipes*		4.2	5	0.0
S	498	*Abludomelita obtusata*		2.8	4	0.0
S	502	*Animoceradocus semiserratus*		38.9	168	1.0
S	503	Cheirocratus	female.	2.8	4	0.0
S	519	*Othomaera othonis*		15.3	20	0.1
S	521	*Maerella tenuimana*		1.4	1	0.0
S	539	*Megamphopus cornutus*		4.2	3	0.0
S	540	*Gammaropsis lobata*		9.7	8	0.0
S	541	*Gammaropsis maculata*		1.4	1	0.0
S	552	*Photis longicaudata*		4.2	5	0.0
S	581	Autonoe	female.	2.8	3	0.0
S	588	*Leptocheirus hirsutimanus*		19.4	43	0.2
S	589	*Leptocheirus pectinatus*		2.8	2	0.0
S	619	*Siphonoecetes (Centraloecetes) striatus*		2.8	2	0.0
S	651	*Pariambus typicus*		4.2	4	0.0
S	657	*Phtisica marina*		1.4	1	0.0
S	659	*Pseudoprotella phasma*		1.4	1	0.0
S	792	Gnathiidae	praniza/ female	26.4	29	0.2
S	793.1	Gnathia	A	27.8	43	0.2
S	794	*Gnathia dentata*		8.3	14	0.1
S	796	*Gnathia oxyuraea*		2.8	2	0.0
S	797	*Gnathia vorax*		2.8	3	0.0
S	803	*Anthura gracilis*		4.2	3	0.0
S	844	*Natatolana borealis*		2.8	2	0.0
S	849	*Conilera cylindracea*		18.1	38	0.2
S	853	*Eurydice inermis*		40.3	74	0.4
S	863	*Cymodoce truncata*		12.5	10	0.1
S	892	*Janira maculosa*		1.4	1	0.0
S	951	*Astacilla dilatata*		2.8	2	0.0
S	1140	*Pseudoparatanais batei*		1.4	1	0.0
S	1154	*Paratyphlotanais microcheles*		1.4	1	0.0
S	1191	*Vaunthompsonia cristata*		1.4	1	0.0
S	1194	*Bodotria arenosa*		4.2	17	0.1

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
S	1203	*Iphinoe trispinosa*		2.8	2	0.0
S	1213	*Leucon (Leucon) nasica*		1.4	1	0.0
S	1218	*Campylaspis legendrei*		4.2	3	0.0
S	1226	*Nannastacus brevicaudatus*		1.4	1	0.0
S	1228	*Nannastacus unguiculatus*		1.4	1	0.0
S	1237	*Pseudocuma (Pseudocuma) simile*		2.8	2	0.0
S	1251	*Diastylis laevis*		1.4	1	0.0
S	1257	*Diastyloides biplicatus*		1.4	1	0.0
S	1276	Decapoda	Zoea	6.9	6	0.0
S	1448	*Anapagurus hyndmanni*		4.2	7	0.0
S	1454	Pagurus	juv.	2.8	2	0.0
S	1472	*Galathea intermedia*		15.3	17	0.1
S	1508	*Ebalia tuberosa*		1.4	1	0.0
S	1509	*Ebalia tumefacta*		1.4	1	0.0
S	1535	Eurynome	juv.	1.4	1	0.0
S	1555	*Atelecyclus rotundatus*		2.8	2	0.0
S	1577	Liocarcinus	juv.	4.2	3	0.0
S	1580	*Liocarcinus depurator*		1.4	1	0.0
S	1584	*Liocarcinus pusillus*	juv.	2.8	2	0.0
W	9	*Chaetoderma nitidulum*		1.4	1	0.0
W	11	*Falcidens crossotus*		4.2	8	0.0
W	30	*Neomenia carinata*		1.4	2	0.0
W	53	*Leptochiton asellus*		43.1	156	0.9
W	54	*Leptochiton cancellatus*		51.4	223	1.3
W	86	*Acanthochitona crinita*		1.4	1	0.0
W	88	Gastropoda		2.8	2	0.0
W	161	*Gibbula tumida*		4.2	4	0.0
W	174	*Jujubinus montagui*		6.9	9	0.1
W	223	*Testudinalia testudinalis*		2.8	6	0.0
W	270	*Turritella communis*		16.7	78	0.5
W	344	*Alvania punctura*		1.4	1	0.0
W	430	*Aporrhais pespelecani*		1.4	1	0.0
W	490	*Euspira montagui*		4.2	4	0.0
W	491	*Euspira nitida*		19.4	17	0.1
W	553	*Epitonium trevelyanum*		1.4	1	0.0
W	591	*Aclis minor*		1.4	1	0.0
W	603	*Eulima bilineata*		1.4	1	0.0
W	634	*Melanella alba*		1.4	1	0.0
W	669	*Vitreolina philippi*		1.4	1	0.0
W	747	*Tritia incrassata*		1.4	3	0.0
W	913	*Odostomia plicata*		1.4	1	0.0
W	916	*Odostomia unidentata*		2.8	3	0.0
W	919	Brachystomia		1.4	2	0.0
W	930	*Chrysallida sarsi*		1.4	1	0.0
W	959	*Ondina diaphana*		1.4	1	0.0
W	960	*Ondina divisa*		1.4	1	0.0
W	1028	*Cylichna cylindracea*		1.4	1	0.0
W	1035	Philinidae		1.4	1	0.0

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
W	1059	*Diaphana minuta*		2.8	2	0.0
W	1083	*Retusa umbilicata*		1.4	1	0.0
W	1099	Hedylopsis		13.9	12	0.1
W	1336	*Adalaria proxima*		1.4	1	0.0
W	1444	*Eubranchidae*		2.8	4	0.0
W	1519	*Antalis entalis*		8.3	13	0.1
W	1560	Bivalvia		1.4	1	0.0
W	1569	*Nucula nitidosa*		1.4	1	0.0
W	1688	*Glycymeris glycymeris*	juv/adult	37.5	85	0.5
W	1695	*Mytilus edulis*	juv.	1.4	1	0.0
W	1702	*Modiolus (Modiolus) modiolus*	juv.	1.4	1	0.0
W	1708	*Modiolula phaseolina*	juv.	26.4	36	0.2
W	1715	*Crenella decussata*		22.2	162	0.9
W	1718	*Musculus subpictus*		1.4	1	0.0
W	1746	*Limatula subauriculata*		23.6	27	0.2
W	1785	*Palliolum striatum*		1.4	1	0.0
W	1805	Anomiidae	juv.	9.7	8	0.0
W	1814	*Pododesmus patelliformis*		1.4	1	0.0
W	1827	*Myrtea spinifera*		8.3	14	0.1
W	1829	*Lucinoma borealis*		6.9	7	0.0
W	1836.1	*Thyasira biplicata*		1.4	2	0.0
W	1837	*Thyasira flexuosa*		2.8	4	0.0
W	1852	*Adontorhina similis*		1.4	1	0.0
W	1864	*Diplodonta rotundata*		1.4	1	0.0
W	1875	*Kellia suborbicularis*		1.4	1	0.0
W	1902	*Tellimya ferruginosa*		1.4	1	0.0
W	1906	*Kurtiella bidentata*		16.7	50	0.3
W	1929	*Goodallia triangularis*		56.9	627	3.6
W	1950	*Parvicardium minimum*		2.8	3	0.0
W	1951	*Parvicardium pinnulatum*		15.3	16	0.1
W	1952	*Parvicardium scabrum*		12.5	15	0.1
W	1973	Spisula	juv.	33.3	94	0.5
W	1975	*Spisula elliptica*		9.7	16	0.1
W	1996	Ensis	juv.	1.4	1	0.0
W	2006	*Phaxas pellucidus*		4.2	3	0.0
W	2015	*Arcopagia crassa*		20.8	24	0.1
W	2019	*Fabulina fabula*		4.2	29	0.2
W	2021	*Moerella donacina*		5.6	4	0.0
W	2023	*Asbjornsenia pygmaea*		50.0	280	1.6
W	2048	*Gari costulata*		6.9	5	0.0
W	2049	*Gari tellinella*		59.7	265	1.5
W	2051	*Gari fervensis*		15.3	31	0.2
W	2056	*Azorinus chamasolen*		2.8	2	0.0
W	2059	*Abra alba*		4.2	4	0.0
W	2061	*Abra nitida*		1.4	2	0.0
W	2062	*Abra prismatica*		22.2	74	0.4
W	2072	*Arctica islandica*		18.1	31	0.2
W	2086	Veneridae	juv.	1.4	1	0.0

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
W	2091	*Venus casina*	juv/adult	31.9	28	0.2
W	2095	*Gouldia minima*		41.7	93	0.5
W	2098	*Chamelea striatula*		23.6	92	0.5
W	2100	*Clausinella fasciata*		70.8	179	1.0
W	2104	*Timoclea ovata*		75.0	225	1.3
W	2111	Tapes	juv.	2.8	2	0.0
W	2113	*Polititapes rhomboides*		15.3	12	0.1
W	2126	Dosinia	juv.	59.7	357	2.1
W	2128	*Dosinia lupinus*		8.3	12	0.1
W	2130	*Dosinia exoleta*		16.7	17	0.1
W	2139	*Mysia undata*		2.8	3	0.0
W	2147	*Mya truncata*	juv.	6.9	9	0.1
W	2157	*Corbula gibba*		1.4	1	0.0
W	2166	*Hiatella arctica*		6.9	12	0.1
W	2229	*Thracia convexa*		1.4	1	0.0
W	2231	*Thracia phaseolina*		8.3	49	0.3
W	2233	*Thracia villosiuscula*		44.4	71	0.4
W	2239	*Cochlodesma praetenue*		23.6	101	0.6
W	2247	*Lyonsia norwegica*		1.4	1	0.0
W	2252	*Pandora pinna*		1.4	1	0.0
X	8	*Novocrania anomala*		2.8	2	0.0
Y	8	*Crisidia cornuta*		20.8		
Y	13	Crisia		37.5		
Y	16	*Crisia denticulata*		27.8		
Y	17	*Crisia eburnea*		1.4		
Y	30	*Tubulipora liliacea*		16.7		
Y	41	*Plagioecia patina*		19.4		
Y	46	*Desmeplagioecia amphorae*		2.8		
Y	52	*Annectocyma major*		4.2		
Y	54	*Entalophoroecia deflexa*		6.9		
Y	57	*Hornera lichenoides*		1.4		
Y	66	*Disporella hispida*		13.9		
Y	73	Alcyonidium		1.4		
Y	76	*Alcyonidium diaphanum*		1.4		
Y	80	*Alcyonidioides mytili*		12.5		
Y	81	*Alcyonidium parasiticum*		2.8		
Y	88	*Arachnidium fibrosum*		1.4		
Y	91	Nolella		16.7		
Y	135	*Amathia lendigera*		1.4		
Y	137	Amathia		2.8		
Y	154	*Aetea anguina*		23.6		
Y	155	*Aetea sica*		47.2		
Y	160	Scruparia		18.1		
Y	162	*Scruparia chelata*		1.4		
Y	165	*Eucratea loricata*		18.1		
Y	178	*Electra pilosa*		11.1		
Y	180	*Pyripora catenularia*		5.6		
Y	187	*Flustra foliacea*		12.5		

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
Y	194	*Securiflustra securifrons*		19.4		
Y	204	*Callopora dumerilii*		1.4		
Y	205	*Callopora lineata*		2.8		
Y	210	*Crassimarginatella solidula*		6.9		
Y	212	*Cauloramphus spiniferum*		6.9		
Y	223	*Amphiblestrum flemingii*		1.4		
Y	234	*Membraniporella nitida*		1.4		
Y	243.1	Bugulina		8.3		
Y	252	*Dendrobeania fessa*		2.8		
Y	256	*Bicellariella ciliata*		1.4		
Y	261	*Beania mirabilis*		1.4		
Y	275.1	*Cradoscrupocellaria*		36.1		
Y	278	*Scrupocellaria scrupea*		26.4		
Y	279	*Scrupocellaria scruposa*		58.3		
Y	286	*Micropora coriacea*		12.5		
Y	291	*Rosseliana rosselii*		6.9		
Y	299	Cellaria		15.3		
Y	308	*Cribrilina annulata*		31.9		
Y	310	*Cribrilina punctata*		4.2		
Y	314	*Collarina balzaci*		37.5		
Y	315	Puellina		19.4		
Y	321	*Puellina innominata*		22.2		
Y	327	*Figularia figularis*		8.3		
Y	331	Hippothoa		2.8		
Y	337	*Celleporella hyalina*		6.9		
Y	344	*Chorizopora brongniartii*		38.9		
Y	359	*Escharoides mamillata*		43.1		
Y	364	*Escharella immersa*		1.4		
Y	370	*Escharella ventricosa*		2.8		
Y	376	*Neolagenipora collaris*		11.1		
Y	382	Porella		1.4		
Y	414	*Hippoporina pertusa*		1.4		
Y	418	*Pentapora foliacea*		16.7		
Y	421	*Phylactella labrosa*		2.8		
Y	439	*Escharina hyndmanni*		5.6		
Y	440	*Escharina johnstoni*		4.2		
Y	457	*Prenantia cheilostoma*		1.4		
Y	461	*Smittoidea amplissima*		2.8		
Y	462	*Smittoidea marmorea*		6.9		
Y	465	*Parasmittina trispinosa*		1.4		
Y	468	*Schizomavella (Schizomavella) auriculata*		33.3		
Y	471	*Schizomavella (Calvetomavella) discoidea*		5.6		
Y	474	*Schizomavella (Schizomavella) linearis*		1.4		
Y	480	*Microporella ciliata*		51.4		
Y	483	*Fenestrulina malusii*		16.7		

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
Y	489	*Haplopoma impressum*		2.8		
Y	495	*Cellepora pumicosa*		1.4		
Y	497	*Celleporina decipiens*		2.8		
Y	502	*Lagenipora lepralioides*		4.2		
Y	504	*Turbicellepora avicularis*		2.8		
Y	530	*Schizotheca fissa*		4.2		
ZA	3	Phoronis		22.2	29	0.2
ZA	3	Phoronis	Boring	34.7		
ZB	26	*Astropecten irregularis*		4.2	3	0.0
ZB	123	Ophiothrix	juv.	1.4	1	0.0
ZB	124	*Ophiothrix fragilis*		1.4	1	0.0
ZB	128	*Ophiocomina nigra*		12.5	59	0.3
ZB	143	*Ophiactis balli*		5.6	4	0.0
ZB	147	*Ophiopholis aculeata*		1.4	1	0.0
ZB	148	Amphiuridae	juv.	8.3	18	0.1
ZB	152	*Amphiura chiajei*		2.8	12	0.1
ZB	154	*Amphiura filiformis*		25.0	103	0.6
ZB	157	*Amphiura (Ophiopeltis) securigera*		15.3	15	0.1
ZB	161	*Amphipholis squamata*		48.6	233	1.4
ZB	165	Ophiuridae	juv.	12.5	15	0.1
ZB	167	*Ophiocten affinis*		9.7	14	0.1
ZB	168	*Ophiura albida*		1.4	1	0.0
ZB	190	Echinidea	juv.	4.2	3	0.0
ZB	212	*Echinocyamus pusillus*		93.1	853	5.0
ZB	222	Echinocardium	juv.	1.4	1	0.0
ZB	224	*Echinocardium flavescens*		1.4	1	0.0
ZB	228	*Brissopsis lyrifera*		1.4	1	0.0
ZB	260	*Neopentadactyla mixta*		2.8	2	0.0
ZB	280	*Leptopentacta elongata*		4.2	3	0.0
ZB	291	Leptosynapta		1.4	1	0.0
ZB	292	*Leptosynapta bergensis*		1.4	1	0.0
ZB	297	*Leptosynapta minuta*		29.2	50	0.3
ZB	299	*Labidoplax buskii*		5.6	6	0.0
ZC	12	Enteropneusta		2.8	3	0.0
ZD	2	Ascidiacea	juv.	16.7	15	0.1
ZD	11	*Pycnoclavella aurilucens*	?	1.4		
ZD	20	Polyclinidae		1.4		
ZD	41	Didemnidae		27.8		
ZD	115	*Polycarpa pomaria*		1.4	1	0.0
ZG	1	Actinopterygii	eggs	1.4	76	0.4
ZG	1	Actinopterygii	Larvae	1.4	2	0.0
ZG	441	Ammodytidae	juv.	1.4	1	0.0
ZG	443	*Ammodytes marinus*		23.6	33	0.2
ZG	446	*Gymnammodytes semisquamatus*		1.4	1	0.0
		Branchiostoma lanceolatum		45.8	112	0.7
ZM	1	Rhodophyta		55.6		
ZM	1	Rhodophyta		18.1		
ZM	188	Hildenbrandiaceae		34.7		

MCS	Code	Taxon	Qualifier	Freq %	Abundance	
					ind · 0.1 m^{-2}	%
ZM	194	Corallinaceae		62.5		
ZM	255	*Phymatolithon calcareum*		62.5		
ZM	406	Phyllophora		20.8		
ZM	443	*Plocamium cartilagineum*		73.6		
ZM	470.1	Callithamniaceae		12.5		
ZM	507	Ceramium		2.8		
ZM	538	*Halurus equisetifolius*		2.8		
ZM	539	*Halurus flosculosus*		2.8		
ZM	551	*Plumaria plumosa*		6.9		
ZM	556	*Ptilota gunneri*		8.3		
ZM	581	*Heterosiphonia plumosa*		50.0		
ZM	592	*Cryptopleura ramosa*		54.2		
ZM	594	*Delesseria sanguinea*		1.4		
ZM	616	*Phycodrys rubens*		1.4		
ZM	655	Polysiphonia		29.2		
ZM	682	Pterosiphonia		37.5		
ZR	1	CHROMOPHYCOTA		4.2		
ZR	186	Petalonia	?	1.4		
ZR	271	*Cutleria multifida*		9.7		
ZR	288	Sphacelaria		9.7		
ZR	305	*Halopteris filicina*		54.2		
ZR	313	*Dictyota dichotoma*		50.0		
ZS	195	Cladophora		25.0		
ZZ		Diatom		1.4		

Diversity by sample: Abundance and diversity in benthic invertebrate samples

Box	Area	Sample	S (all)	S (quant)	Tot A (ind/0 .1m2)	J'	H'	*Phymatolithon calcareum*	Corallinaceae	*P. calcareum* & Corallinaceae	Plastic
S1	North	S1_G3	91	67	203	0.9	5.3		m	m	P
S1	North	S1_G4	82	72	180	0.9	5.6				
S1	North	S1_G5	79	59	133	0.9	5.3				P
S1	North	S1_G6	85	70	178	0.9	5.6				
S1	North	S1_G7	56	52	104	0.9	5.1				
S1	North	S1_G8	93	83	211	0.9	5.8				
S1	North	S1_G9	79	68	154	0.9	5.5				
S1	North	S1_G10	61	54	129	0.9	5.2				
S2	North	S2_G1	89	62	167	0.9	5.4	M		M	
S2	North	S2_G2	76	63	281	0.8	4.9				
S2	North	S2_G3	75	55	154	0.9	5.3	M	m	Mm	
S2	North	S2_G4	91	58	203	0.8	4.8	M	m	Mm	
S2	North	S2_G5	134	88	258	0.8	5.4		m	m	
S2	North	S2_G6	84	70	211	0.9	5.5	M	m	Mm	
S2	North	S2_G7	90	56	155	0.9	5.1	M	m	Mm	
S2	North	S2_G8	73	60	164	0.9	5.0	M		M	
S3	SAC	S3_G1	49	38	126	0.8	4.3	M		M	P
S3	SAC	S3_G2	71	44	258	0.7	4.0	M	m	Mm	
S3	SAC	S3_G5	69	48	160	0.8	4.6	M	m	Mm	
S3	SAC	S3_G6	76	44	130	0.9	4.7		m	m	
S3	SAC	S3_G7	80	47	124	0.9	5.0	M	m	Mm	P
S3	SAC	S3_G8	60	40	107	0.9	4.6				P
S3	SAC	S3_G9	117	74	426	0.7	4.6	M	m	Mm	
S3	SAC	S3_G10	74	44	245	0.7	4.0	M	m	Mm	
S4	SAC	S4_G1	77	51	175	0.8	4.7	M		M	
S4	SAC	S4_G3	59	46	218	0.7	4.0	M	m	Mm	P
S4	SAC	S4_G4	109	75	399	0.8	4.9	M	m	Mm	
S4	SAC	S4_G5	68	46	148	0.9	4.8	M		M	P
S4	SAC	S4_G6	81	55	374	0.7	4.3	M	m	Mm	
S4	SAC	S4_G7	61	46	372	0.7	3.8	M		M	
S4	SAC	S4_G8	66	55	366	0.6	3.7	M		M	
S4	SAC	S4_G10	95	61	281	0.7	4.3	M	m	Mm	
S5	SAC	S5_G1	79	45	175	0.8	4.4	M	m	Mm	
S5	SAC	S5_G2	87	63	326	0.8	5.0	M	m	Mm	
S5	SAC	S5_G3	70	59	471	0.7	4.3	M	m	Mm	
S5	SAC	S5_G4	54	36	237	0.7	3.8	M		M	
S5	SAC	S5_G5	56	41	174	0.8	4.2	M	m	Mm	
S5	SAC	S5_G6	50	42	246	0.8	4.1		m	m	
S5	SAC	S5_G7	62	40	277	0.7	3.6	M	m	Mm	
S5	SAC	S5_G8	90	62	360	0.7	4.1	M	m	Mm	
S6	SAC	S6_G1	99	66	336	0.8	4.7	M	m	Mm	
S6	SAC	S6_G2	62	38	174	0.7	3.8	M	m	Mm	
S6	SAC	S6_G3	64	47	238	0.7	4.1	M	m	Mm	P

Box	Area	Sample	S (all)	S (quant)	Tot A (ind/0 .1m2)	J'	H'	*Phymatolithon calcareum*	Corallinaceae	*P. calcareum* & Corallinaceae	Plastic
S6	SAC	S6_G4	62	43	200	0.8	4.2	M	m	Mm	
S6	SAC	S6_G5	75	63	498	0.8	4.5	M	m	Mm	
S6	SAC	S6_G6	69	48	282	0.7	4.1	M	m	Mm	
S6	SAC	S6_G9	89	66	377	0.8	4.8	M	m	Mm	P
S6	SAC	S6_G10	138	89	433	0.8	5.1	M		M	P
S7	SAC	S7_G1	77	67	280	0.8	5.1				
S7	SAC	S7_G2	59	49	242	0.8	4.6				P
S7	SAC	S7_G3	63	49	238	0.8	4.4	M	m	Mm	P
S7	SAC	S7_G4	74	56	260	0.8	4.7				
S7	SAC	S7_G5	47	33	93	0.8	4.2				
S7	SAC	S7_G6	63	54	233	0.8	4.8	M	m	Mm	
S7	SAC	S7_G7	63	49	199	0.8	4.4	M	m	Mm	
S7	SAC	S7_G8	114	83	345	0.8	5.2	M		M	P
S8	South	S8_G3	80	57	228	0.8	4.8		m	m	
S8	South	S8_G4	100	65	341	0.8	4.9	M	m	Mm	P
S8	South	S8_G5	74	48	173	0.9	4.8	M	m	Mm	P
S8	South	S8_G6	84	57	185	0.9	5.1	M	m	Mm	P
S8	South	S8_G7	132	91	405	0.9	5.7	M	m	Mm	
S8	South	S8_G8	71	48	255	0.8	4.2	M	m	Mm	
S8	South	S8_G9	33	28	103	0.9	4.1		m	m	P
S8	South	S8_G10	70	55	314	0.8	4.6		m	m	
S9	South	S9_G2	49	37	245	0.8	3.9				
S9	South	S9_G3	35	30	171	0.8	3.8		m	m	P
S9	South	S9_G4	22	22	65	0.8	3.7				
S9	South	S9_G5	27	26	214	0.8	3.6				
S9	South	S9_G6	41	31	246	0.7	3.5		m	m	
S9	South	S9_G7	41	31	229	0.6	3.2				
S9	South	S9_G8	64	52	482	0.7	3.8	M	m	Mm	
S9	South	S9_G9	32	23	67	0.8	3.7		m	m	

ANNEX 7: SIMPER ANALYSIS (BIOTOPES)

Results of SIMPER analysis undertaken on the quantitative dataset (benthic species abundance) using biotopes as sample groups. The average similarity between samples within each biotope group is given together with the list of characterising species contributing to 90 % cumulatively to the similarity within the biotope.

Group ***SS.SMu.CSaMu.AfilMysAnit****/SS.SCS.CCS.MedLumVen* Average similarity: 62.36			
Species	Av.Abund	Contrib%	Cum.%
Edwardsia claparedii	1.87	8.72	8.72
Chaetozone	1.67	7.25	15.97
Aponuphis bilineata	1.51	6.69	22.67
Terebellides	1.46	6.25	28.91
Amphiura filiformis	1.54	5.97	34.88
Echinocyamus pusillus	1.38	5.89	40.77
Lysidice unicornis	1.23	4.85	45.62
Glycinde nordmanni	1.2	4.38	50.01
Kurtiella bidentata	1.13	4.17	54.18
COPEPODA	1.03	3.82	58
Notomastus	0.93	3.77	61.77
Dosinia	0.97	3.75	65.52
Pholoe baltica	1.11	3.43	68.95
NEMATODA	1.05	3.13	72.08
Galathowenia oculata	0.87	2.94	75.02
Phascolion (Phascolion) strombus strombus	0.94	2.81	77.82
Timoclea ovata	0.89	2.73	80.56
NEMERTEA	0.87	2.7	83.26
Glycera lapidum	0.77	2.03	85.29
Turritella communis	0.8	1.9	87.18
Clausinella fasciata	0.69	1.81	88.99
Cerebratulus	0.69	1.64	90.63
Group ***SS.SCS.CCS.MedLumVen*** Average similarity: 57.14			
Species	Av.Abund	Contrib%	Cum.%
Echinocyamus pusillus	1.91	5.9	5.9
Mediomastus fragilis	1.91	5.48	11.38
Nephasoma (Nephasoma) minutum	1.69	4.75	16.13
NEMERTEA	1.34	4.39	20.53
Pista bansei	1.34	4.18	24.71
Timoclea ovata	1.61	4.14	28.85
Glycera lapidum	1.3	4.12	32.98
NEMATODA	1.48	4.05	37.03
Pholoe inornata	1.26	3.64	40.67
Cerebratulus	1.07	3.4	44.07
Aponuphis bilineata	1.32	3.1	47.17
Spirobranchus triqueter	1.46	3.05	50.22
Leptochiton asellus	1.22	2.95	53.17
Hydroides norvegica	1.19	2.78	55.95
Dosinia	1.35	2.72	58.68
Verruca stroemia	1.2	2.43	61.11
Leptochiton cancellatus	1.09	2.43	63.55
Myriochele danielsseni	1.06	2.42	65.96
Modiolula phaseolina	1.05	2.39	68.35

Clausinella fasciata	0.93	2.33	70.68
Glycinde nordmanni	0.94	2.22	72.9
Polycirrus	0.94	1.65	74.55
Aonides paucibranchiata	0.89	1.55	76.1
COPEPODA	0.86	1.52	77.61
Eumida sanguinea	0.8	1.46	79.07
Edwardsia claparedii	0.9	1.35	80.42
Syllis armillaris	0.7	1.31	81.73
Laonice bahusiensis	0.73	1.28	83.01
Pista malmgreni	0.75	1.27	84.28
Urothoe elegans	0.9	1.02	85.31
Sessilia	0.92	0.88	86.19
Lysidice unicornis	0.56	0.85	87.04
Gari tellinella	0.62	0.79	87.83
Dialychone dunerificta	0.73	0.76	88.59
Paradoneis lyra	0.69	0.74	89.33
Gouldia minima	0.59	0.73	90.06
Group ***SS.SCS.CCS.Blan****/SS.SCS.CCS.MedLumVen* Average similarity: 58.98			
Species	Av.Abund	Contrib%	Cum.%
NEMATODA	2.67	8.17	8.17
Polygordius	2.07	6	14.18
Glycera lapidum	1.6	5.07	19.25
Echinocyamus pusillus	1.59	4.34	23.59
Psamathe fusca	1.29	3.62	27.21
Pisione remota	1.38	3.55	30.76
Gari tellinella	1.35	3.5	34.26
NEMERTEA	1.17	3.38	37.65
Syllis pontxioi	1.3	3.3	40.95
Clausinella fasciata	1.15	2.87	43.82
COPEPODA	1.32	2.64	46.46
Sphaerosyllis bulbosa	1.2	2.58	49.03
Syllis garciai/mauretanica	1.13	2.57	51.61
Grania	1.1	2.48	54.09
Amphipholis squamata	1.11	2.3	56.38
Leptochiton cancellatus	1.09	2.28	58.67
Branchiostoma lanceolatum	0.99	2.24	60.9
Dialychone dunerificta	1.03	2.22	63.12
Nephasoma (Nephasoma) minutum	1	2.18	65.3
Trypanosyllis coeliaca	0.94	2.15	67.46
Aonides paucibranchiata	0.91	1.99	69.44
Timoclea ovata	0.91	1.97	71.41
Goodallia triangularis	1.11	1.97	73.38
Animoceradocus semiserratus	0.94	1.69	75.07
Hydroides norvegica	0.83	1.5	76.57
Eurydice inermis	0.75	1.4	77.97
Glycymeris glycymeris	0.77	1.35	79.32
Asbjornsenia pygmaea	0.72	1.26	80.57
Gouldia minima	0.74	1.24	81.81
Aponuphis bilineata	0.7	1.06	82.87
Verruca stroemia	0.64	1.03	83.9
Notomastus	0.61	0.96	84.86
Malmgrenia ljungmani	0.59	0.94	85.81
Hesiospina similis	0.62	0.92	86.73

Laonice bahusiensis	0.58	0.92	87.65
Thracia villosiuscula	0.59	0.91	88.56
Goniadella gracilis	0.56	0.88	89.44
Leptosynapta minuta	0.6	0.88	90.32
*Group S**S.SSa.CFiSa.ApriBatPo**/SS.SCS.CCS.MedLumVen* Average similarity: 61.68			
Species	Av.Abund	Contrib%	Cum.%
Dosinia	1.91	8.77	8.77
Echinocyamus pusillus	1.88	8.74	17.52
Chamelea striatula	1.65	6.83	24.35
COPEPODA	1.49	6.47	30.82
Galathowenia oculata	1.44	5.87	36.69
Abra prismatica	1.41	5.82	42.51
Myriochele danielsseni	1.37	5.74	48.25
Pista bansei	1.31	5.66	53.91
Urothoe elegans	1.34	5.36	59.27
Hydroides norvegica	1.05	4.89	64.16
Nephasoma (Nephasoma) minutum	1.19	3.08	67.24
Edwardsia claparedii	1.01	3.05	70.28
Turritella communis	1.02	2.89	73.18
Glycinde nordmanni	0.93	2.86	76.04
Owenia	0.95	2.67	78.71
Pholoe inornata	0.83	2.44	81.15
Goodallia triangularis	0.92	2.31	83.46
Leptochiton asellus	0.8	2.31	85.78
Aonides paucibranchiata	0.75	2.31	88.09
Amphiura filiformis	0.75	2.31	90.4
*Group **SS.SSa.IMuSa.FfabMag**/SS.SCS.CCS.MedLumVen* Average similarity: 70.51			
Species	Av.Abund	Contrib%	Cum.%
Urothoe elegans	2.44	9.69	9.69
Dosinia	2.16	8.98	18.66
Turritella communis	2.01	8.42	27.08
Chamelea striatula	1.73	7.27	34.36
Abra prismatica	1.76	6.67	41.03
Nephasoma (Nephasoma) minutum	1.63	6.33	47.36
Amphiura filiformis	1.49	6.16	53.53
Thracia phaseolina	1.8	6.1	59.63
Edwardsia claparedii	1.48	5.89	65.52
Galathowenia oculata	1.52	5.18	70.69
Paradoneis lyra	1.49	4.94	75.63
Owenia	1.37	4.91	80.54
Aonides paucibranchiata	1.06	4.28	84.82
Echinocyamus pusillus	1.39	2.84	87.66
Timoclea ovata	1.08	2.08	89.74
Phascolion (Phascolion) strombus strombus	0.91	1.75	91.48
*Group **SS.SCS.ICS.MoeVen*** Average similarity: 61.94			
Species	Av.Abund	Contrib%	Cum.%
Asbjornsenia pygmaea	2.06	12.62	12.62
Dosinia	1.85	11.65	24.27
Cochlodesma praetenue	1.69	10.47	34.74
Echinocyamus pusillus	1.92	9.5	44.24
Crenella decussata	1.76	9.42	53.66

Goodallia triangularis	1.72	7.03	60.69
Abra prismatica	1.1	6.38	67.07
Aponuphis bilineata	0.92	4.65	71.72
Thracia villosiuscula	1.02	4.33	76.05
Chamelea striatula	0.97	4.27	80.31
Timoclea ovata	0.87	4.1	84.42
Owenia	0.79	3.12	87.54
Glycera lapidum	0.7	3.11	90.65

ANNEX 8: BIOTOPES

Sediment description, biotope classification and supporting notes for each grab sample listed per group as identified during cluster analysis.

Grp	Site	Sediment type	Biotope classification	Notes
Grp 1	S1_G4	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G3	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G5	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G7	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G9	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G8	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G6	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 1	S1_G10	gravelly muddy Sand	**SS.SMU.CSaMu.AfilMysAnit**/ SS.SCS.CCS.MedLumVen	Biotope has elements of sandy mud biotope AfilMysAnit mixed with coarse venerid biotope such as MedLumVen. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx.
Grp 2	S2_G1	gravelly Sand	**SS.SCS.CCS.MedLumVen**	Also similar to muddier mixed sediment biotope SS.SMX.CMx.MysThyMx particularly in that it contains Maerl.
Grp 2	S2_G2	gravelly Sand	**SS.SCS.CCS.MedLumVen**	
Grp 2	S2_G6	gravelly Sand	**SS.SCS.CCS.MedLumVen** similar to grp 1 biotopes	Also similar to mixed sediment biotope SS.SMx.CMx.MysThyMx particularly in that it contains Maerl.
Grp 2	S2_G5	gravelly Sand	**SS.SCS.CCS.MedLumVen**	
Grp 2	S7_G7	gravelly Sand	**SS.SCS.CCS.MedLumVen**	Also similar to muddy mixed sediment biotope SS.SMx.CMx.MysThyMx particularly in that it contains Maerl.
Grp 2	S7_G8	gravelly Sand	**SS.SCS.CCS.MedLumVen**	Also similar to muddy mixed sediment biotope SS.SMx.CMx.MysThyMx particularly in that it contains Maerl.
Grp 3	S3_G7	gravelly Sand	**SS.SSA.CFiSa.ApriBatPo**/ SS.SCS.CCS.MedLumVen	Contains elements of sand biotope (A. prismatica and Bathyporeia) mixed with a coarse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains

				Maerl and colonial epibiota.
Grp 3	S3_G6	slightly gravelly Sand	**SS.SSA.CFiSa.ApriBatPo**/ SS.SCS.CCS.MedLumVen	Contains elements of sand biotope (A. prismatica and Bathyporeia)mixed with a coarse venerid biotope.
Grp 3	S3_G5	gravelly Sand	**SS.SSA.CFiSa.ApriBatPo**/ SS.SCS.CCS.MedLumVen	Contains elements of sand biotope (A. prismatica and Bathyporeia) mixed with a coarse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 3	S3_G8	gravelly Sand	**SS.SSA.CFiSa.ApriBatPo**/ SS.SCS.CCS.MedLumVen	Contains elements of sand biotope (A. prismatica and Bathyporeia)mixed with a coarse venerid biotope.
Grp 3	S7_G2	slightly gravelly Sand	**SS.SSA.IMuSa.FfabMag**/ SS.SCS.CCS.MedLumVen	Contains elements of sandy mud biotope such as Fabulina fabula, Mysella and Amphiura filiformis mixed with a coarse venerid biotope.
Grp 3	S7_G1	slightly gravelly Sand	**SS.SSA.IMuSa.FfabMag**/ SS.SCS.CCS.MedLumVen	Contains elements of sandy mud biotope such as Fabulina fabula, Mysella and Amphiura filiformis mixed with a coarse venerid biotope.
Grp 3	S7_G4	slightly gravelly Sand	**SS.SSA.IMuSa.FfabMag**/ SS.SCS.CCS.MedLumVen	Contains elements of sandy mud biotope such as Fabulina fabula, Mysella and Amphiura filiformis mixed with a coarse venerid biotope.
Grp 4	S2_G4	gravelly Sand	**SS.SCS.CCS.Blan**/ SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S2_G7	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S2_G3	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S2_G8	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S3_G1	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S3_G10	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S3_G9	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S3_G2	sandy Gravel	**SS.SCS.CCS.Blan/**	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar

			SS.SCS.CCS.MedLumVen	to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G5	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G6	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G3	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G8	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G1	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G4	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G10	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S4_G7	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G6	slightly gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope.
Grp 4	S5_G7	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G5	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G2	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G3	sandy Gravel	**SS.SCS.CCS.Blan/**	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar

			SS.SCS.CCS.MedLumVen	to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G8	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G1	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S5_G4	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G2	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G4	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G10	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G9	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G1	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G5	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G6	gravelly sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S6_G3	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S7_G3	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.

Grp 4	S7_G6	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S8_G3	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope.
Grp 4	S8_G5	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S8_G10	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope.
Grp 4	S8_G6	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S8_G8	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S8_G4	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S8_G7	sandy Gravel	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope. Also similar to muddier mixed sediment biotope SS.SMx.CMx.MysThyMx in that it contains Maerl and colonial epibiota.
Grp 4	S9_G8	gravelly Sand	**SS.SCS.CCS.Blan/** SS.SCS.CCS.MedLumVen	Contains elements of coarse sediment Blan biotope with more diverse venerid biotope.
Grp 5	S7_G5	Gravelly Sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S8_G9	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G7	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G9	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G2	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G5	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G3	slightly	**SS.SCS.ICS.MoeVen**	

		gravelly sand		
Grp 5	S9_G6	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	
Grp 5	S9_G4	slightly gravelly sand	**SS.SCS.ICS.MoeVen**	

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ISBN: 978-1-78391-434-0

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