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Section 8 Appendix 8.3
Benthic Ecology
Survey Report

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ENVIRONMENTAL AND BENTHIC ECOLOGY SITE INVESTIGATION RIVER TEES, UK

Survey Period: 24 July – 30 July 2014
Report Number: 140539-1 (01)
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Environmental and Benthic Ecology Site Investigation, River Tees, UK

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Abstract

This report was prepared for York Potash Limited by Fugro Alluvial Offshore Limited (FAOL) and Fugro EMU in accordance with the contract and subsequent communication with York Potash Limited. This survey was conducted to provide an environmental and benthic ecology site investigation on the River Tees, UK.

Fugro EMU conducted daily survey operations onboard the Forth Fighter based out of Middlesbrough, successfully collected 32 benthic 0.1m^2 Day grab samples and 10 2m beam trawls between 24th July and 30th July 2014. Four grab samples were not successfully sampled; three of these sample locations were not attempted as they were inaccessible from the vessel due to shallow water and seabed obstructions. One location was attempted multiple times but no sample was collected due to the hard seabed present.

Muddy sediments dominated the survey area with over 90% of the locations sampled being sandy mud or slightly gravelly sandy mud, the dominant biotope identified within this study was **LS.LSa.MuSa** (Polychaete / bivalve dominated muddy sand shores).

The macrobenthic communities sampled by the Day grab are typical of the Tees estuary with annelids dominating in terms of the number of taxa, abundances and biomass. *Capitella* was the most abundant species recorded with 97% of the total abundance for the taxon attributable to just two sites, BP12 and BP17, these sites were located downstream of a sewage treatment outfall.

The dominant species captured in the trawls was the brown shrimp, *Crangon crangon*. Fish species of conservation interest include, *Gadus morhua* (cod), *Merlangius merlangus* (whiting), *Trisopterus minutus* (poor cod), *Pomatoschistus minutus* (sand goby), *Platichthys flesus* (flounder) and *Pleuronectes platessa* (plaice).

Euchone Limnicola the non-native fan worm from California on the Pacific coast of North America was identified in the survey, it has been previously reported in the Tees since the 1990's.

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Our ref: 140539-1 (01)
Date: 25 November 2014

York Potash Limited
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Dear Sir/Madam

Environmental and Benthic Ecology Site Investigation, River Tees, UK

This report presents data from the environmental and benthic ecology investigation. This report was prepared for York Potash Limited by Fugro Alluvial Offshore Limited (FAOL) in accordance with the contract and subsequent communication with York Potash Limited.

The principal team members for report preparation were Peter Barfield (Principal Marine Consultant) and Alison Bessell (Senior Marine Ecologist).

We thank you for the opportunity to be of service on this project. Please do not hesitate to contact us if you require any additional information.

Yours faithfully,
Fugro Alluvial Offshore Limited

[redacted]

Adrian Pearce
Geotechnical Manager

UKAS TESTING
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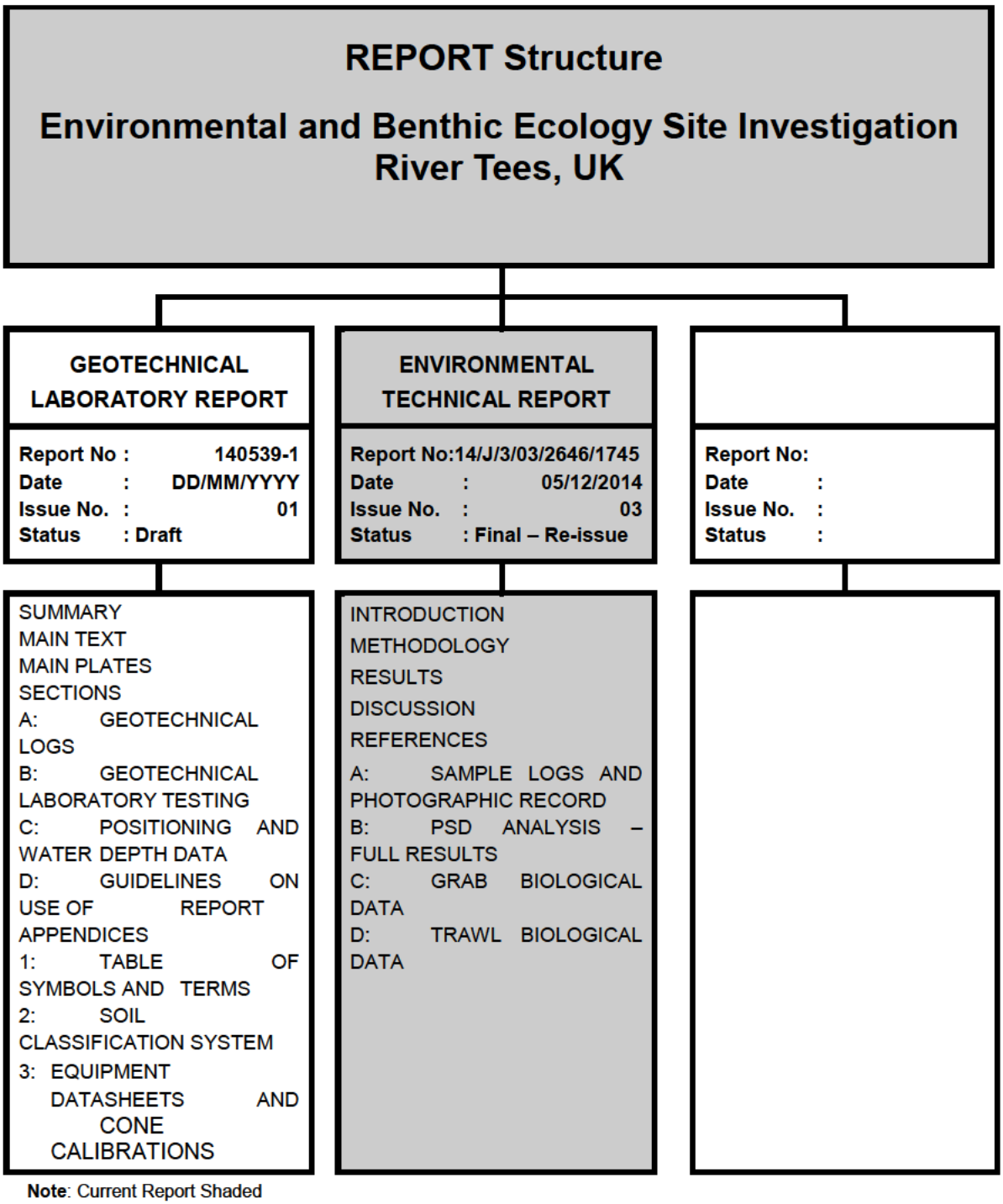
CONTENTS

APPENDICES

TABLES IN THE MAIN TEXT

FIGURES IN THE MAIN TEXT

PLATES IN THE MAIN TEXT



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1. INTRODUCTION

Fugro EMU Limited (Fugro EMU) was contracted by Fugro Alluvial Offshore Limited (FAOL) to provide an environmental and benthic ecology site investigation on the River Tees, UK. The requirements were to undertake benthic sampling to a total of 36 grab samples, and ten 2 m beam trawls.

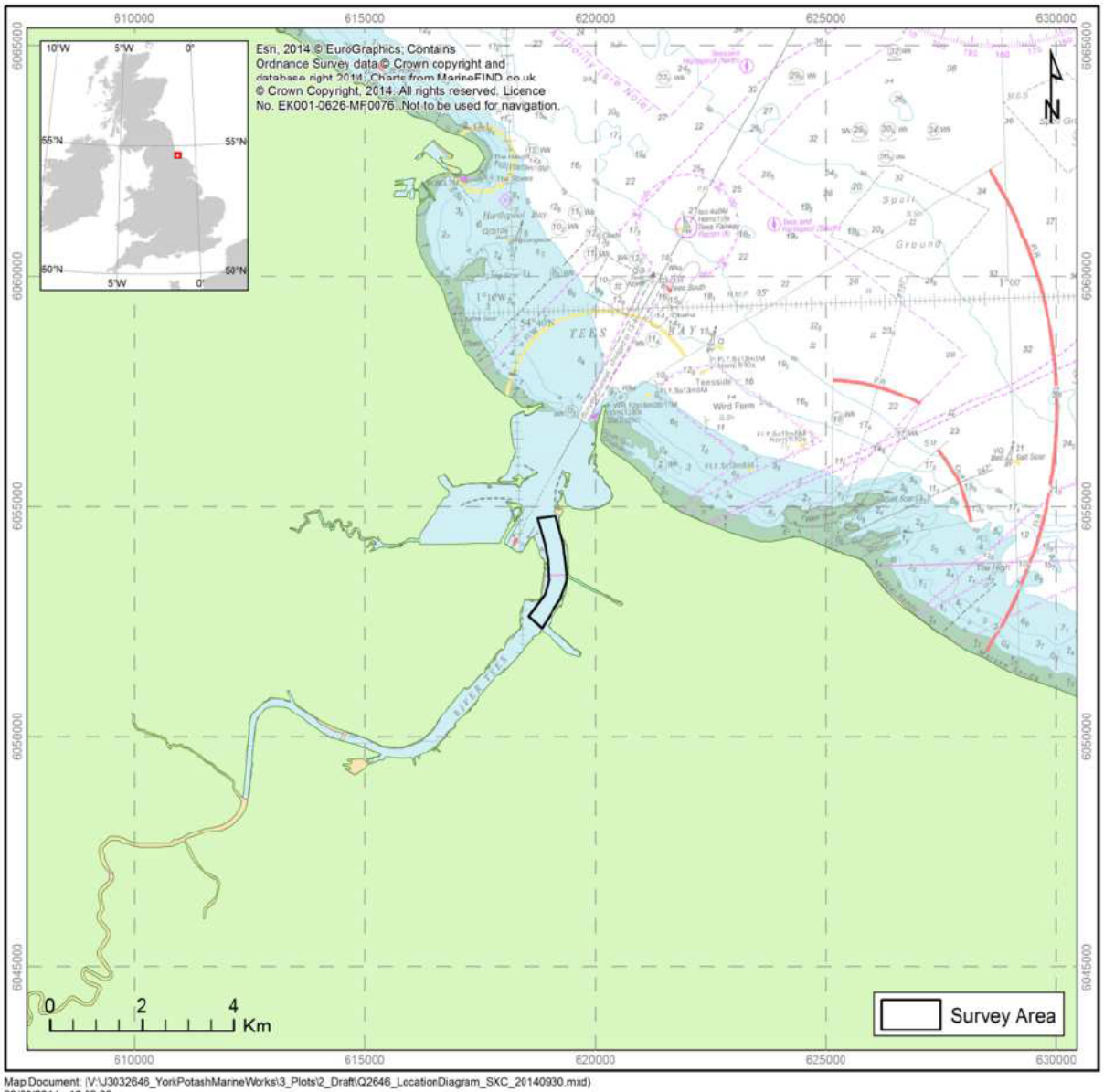

Figure 1.1: Location of the survey area.

This report presents the findings of the benthic ecology survey.

2. METHODOLOGY

2.1 Sampling Survey

Sample positions were generated from the survey design. Grab sample positions were recorded every time the grab touched the seabed as indicated by the winch wire slackening. Trawl positions were recorded at the start and end of each trawl tow. Field logs recorded any deviations from the target locations, or sites that were moved or abandoned. Details can be found in Appendix A.

2.1.1 Grab Sampling

Seabed samples were collected by a 0.1 m^2 Day grab for faunal content and particle size analyses (Figure 2.1). Single replicates were collected at each proposed sample location. Samples of five litres and above were considered acceptable. Samples with a volume less than this were rejected and the station re-sampled to a maximum of three attempts. Unsuccessful samples were retained on board until a successful sample could be achieved. Where a sample was continually below an acceptable level, the site was abandoned and 'no sample' was recorded.

Upon recovery onboard the survey vessel, all grab samples were visually assessed for acceptability (i.e. the sample content had not been subject to partial washout during retrieval, and was of sufficient volume relating to depth of bite). Once accepted, the sample was photographed and described in terms of quality, sediment type and conspicuous fauna. A subsample for Particle Size Distribution (PSD) analysis was collected and placed into a pre-labelled heavy duty plastic bag, and sealed to ensure no loss of fines. It was then frozen and stored prior to being returned to the laboratory. The remaining sample was sieved on a 0.5 mm sieve via a sieving chute and "puddled" to remove residual sediment. The sample was then transferred into pre-labelled buckets, and preserved on site with 4% buffered saline formalin solution. Quantitative seabed samples were successfully collected at 32 of the proposed 36 sites. Four grab samples at site AC03 were attempted, but due to the hard seabed no acceptable samples were recovered. Stations BP06, BP11 and BP16 we not attempted due to depth constraints. Grab logs can be found in Appendix A.1 and photographs associated with each sample are provided in Appendix A.2.

Figure 2.1: Grab sample positions across the survey area

2.1.2 Trawl Sampling

A 2 m wide scientific beam trawl was used for the collection of the epibenthic species (Figure 2.2). These were of the industry standard Lowestoft design and were fitted with a 5 mm aperture mesh liner. The trawls were towed for approximately 5 minutes at a tow speed of around 1.5 knots. Start and end positions of each trawl tow line were recorded. Contents of each trawl were photographed and sorted and epibenthic species identified. A trawl reference collection was compiled, with a photograph and a specimen recorded for each species found. Additional specimens of any problematic species were returned to Fugro EMU's laboratories for further identification. Trawl log data can be found in Appendix A.3 and photographs associated with each trawl sample are provided in Appendix A.4.

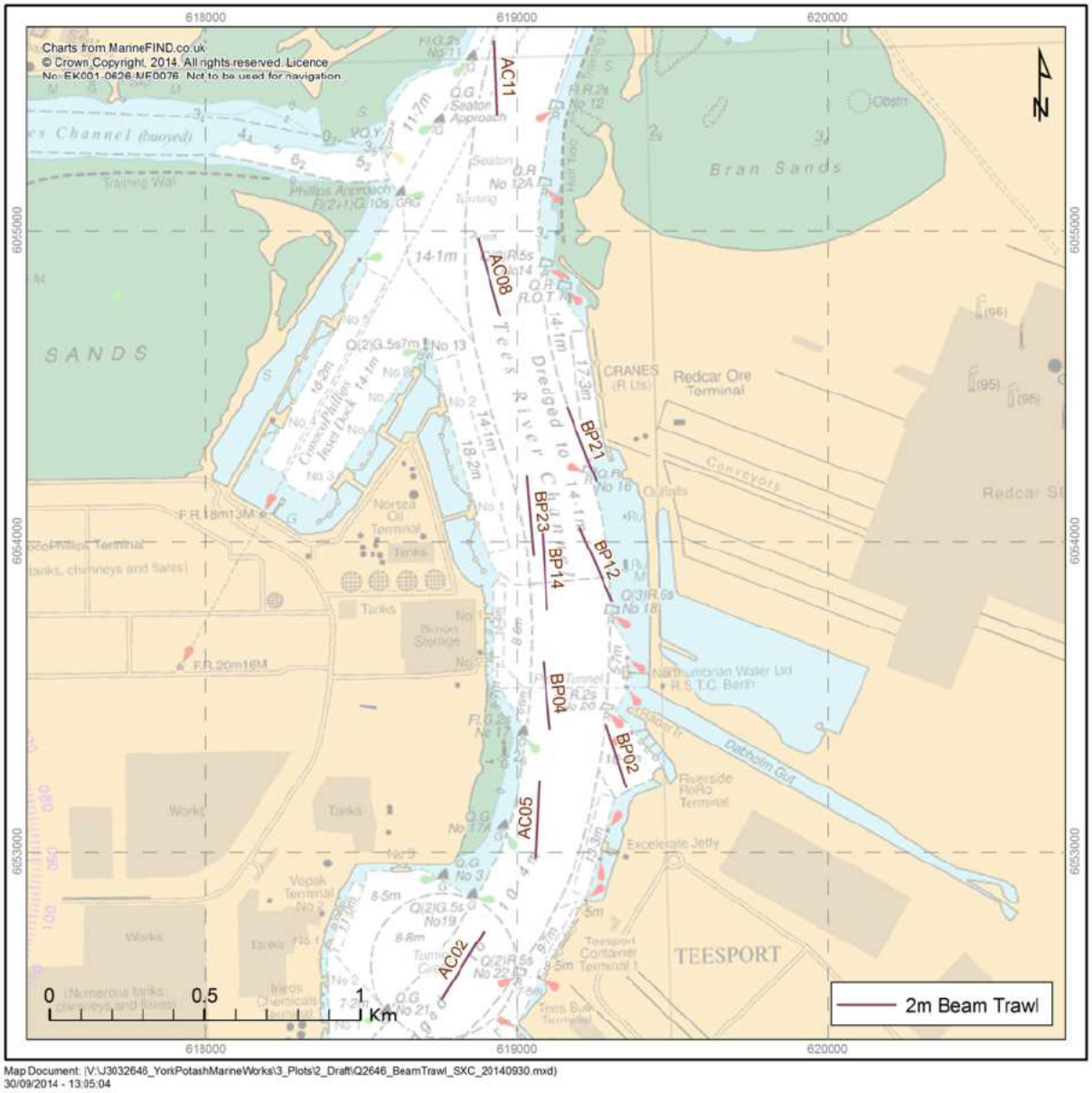

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Figure 2.2: Trawl sample locations across the survey area

2.2 Laboratory Analyses

2.2.1 Particle Size Distribution (PSD) Analysis

2.2.1.1 Wet Split and Dry Sieve Analysis

Particle size analysis was undertaken in accordance with Fugro EMU MET/01 and MET/48 based on BS1377: 1990 Parts 1-2, and the National Marine Biological Association Quality Control scheme's (NMBAQC) best practice guidance document – Particle Size Analysis (PSA) for Supporting Biological Analysis.

Representative material >1 mm was split from the bulk sub-sample and oven dried at 105 ±5°C to constant weight before sieving through a series of sieves with apertures corresponding to 0.5 Phi intervals between 64000 – 1 mm as described by the Wentworth scale. The weight of the sediment fraction retained on each mesh was measured and recorded.

Fugro EMU are UKAS accredited for dry sieve analysis under Fugro EMU MET/01 based on BS1377: 1990 Parts 1-2.

2.2.1.2 Laser Diffraction

Particle size analysis was undertaken in accordance with the Fugro EMU MET/48 based on the National Marine Biological Associations Quality Control scheme's (NMBAQC) best practice guidance document – Particle Size Analysis (PSA) for Supporting Biological Analysis, and Fugro EMU MET/50 based on BS ISO 13320: 2009.

Laser diffraction determines particle size distribution based on the principal of laser ensemble light scattering. For non-spherical particles, a size distribution is reported when samples are run through the laser diffractor, where the predicted scattering pattern for the volumetric sum of spherical particles matches the measured scattering pattern. This is because the technique assumes a spherical particle shape in its optical model. The resulting PSD is different from that obtained by methods based on other physical principles (e.g. sedimentation by the pipette/hydrometer).

Representative material <1 mm was removed from the bulk sub-sample for laser analysis, a minimum of 3 triplicate analyses (mixed samples) or 1 triplicate analyses (sands) were analysed using the laser sizer at 0.5 Phi intervals between <1 mm – <0.2 µm. Laser diffraction was carried out using a Malvern Mastersizer 2000 with a Hydro 2000G dispersion unit.

PSD analysis was undertaken at Fugro EMU's sediment laboratory using in house methods based on BS1377: Parts 1 3: 1990 (dry sieving), and BS13320: 2009 (laser diffraction). Laser Diffraction is not UKAS accredited.

2.2.2 Macrobenthic Analyses

Grab samples were returned to Fugro EMU's National Marine Biological Analytical Quality Control accredited (NMBAQC) benthic laboratory for analysis. Methods for the analysis of macrofaunal samples were carried out in accordance with Fugro EMU's in-house procedures EMU MET/07 (In House Quality Control Methods for the Processing, Identification and Recording of Marine Macro-invertebrates). Formaldehyde fixative was washed out from sample and disposed of accordingly with adherence to COSHH and HSE protocols.

Faunal samples were sorted by elutriation, to remove the less dense fauna. The remaining sediment residue was then scanned for other fauna, e.g. bivalve molluscs etc. Separation of biological material occurred over a 0.5 mm aperture mesh. Large specimens and epifauna on rocks and stones were removed at this stage and placed in appropriate labelled containers and preserved in Industrial Denatured Alcohol (IDA), in preparation for identification.

Following sorting, all faunal samples were identified to species level where possible. Counts were given for all species, except for colonial and encrusting species which were recorded as present. All specimens were stored in IDA preservative.

A full enumerated species list was generated. Nomenclature used in the recording of invertebrate specimens is consistent with the World Register of Marine Species (WoRMS) (Appeltans et al. 2010) unless otherwise stated within the faunal spreadsheet.

A reference collection was compiled with at least one representative specimen of each species included in the collection. Sample residues are stored at Fugro EMU premises, prior to any decisions made by client regarding disposal.

A determination of biomass is a typical component of benthic studies. The data provides an indication of the productivity that is available to major trophic levels. A specific request was made for biomass to the lowest taxonomic level (species level). Scales weigh to 0.0001 g. Biomass conversions were applied using standard conversion factors provided within Ware and Kenny (2011). Faunal biomass analysis was based on a wet-blot method with estimates of ash-free dry weight made based on conversion factors provided by Eleftheriou and Basford (1989). Mollusc biomass included the weight of the flesh and the shell.

Trawl samples were analysed on the vessel. Once the main macrofauna was identified, the remaining residue, where applicable, was returned to the laboratory for more detailed identification. This was required for instance, where the residue consisted of prawns, which could not be identified to species level in the field. Additionally, where large amounts of juvenile flat fish were found, a subsample was often returned for species ID confirmation. Species identification in the field was often slightly more difficult due to the dense amount of mud that coated the area, which obscured identification features even after being washed off.

2.3 Data Analyses

2.3.1 Statistical Analyses

The macro-invertebrate community structure and faunal distributions were investigated by employing univariate diversity indices (e.g. Shannon-Wiener diversity index; Pielou's evenness; and Simpson's dominance index) and multivariate statistical analyses drawn from the Plymouth Marine Laboratories PRIMER v6 (Plymouth Routines in Multivariate Ecological Research) suite of programs (Clarke and Warwick, 2001; Clarke and Gorley, 2006).

The Shannon-Wiener diversity index is a measure of biodiversity based on the number of species present and the number of individuals of each species. If a few species dominate, the index value is low. A greater number of species and a more even distribution of species both result in an increase in Shannon's diversity. Pielou's evenness is a measure of how the number of individuals is distributed across the number of species found in a sample. If the number of individuals is equally spread amongst the species then the community is said to be even. The closer Pielou's evenness is to 1, the more even the distribution of abundance is amongst the species. The nearer the value is to 0, the less even the community is with some species having much higher abundances than others. Simpson's dominance index is a measure of the probability that two individuals randomly selected from a sample will belong to the same species. Simpson's dominance index ranges from 0 (all taxa are equally present) to 1.0 (one taxon dominates the community completely).

Faunal data for multivariate analysis were imported into PRIMER and initially subjected to square root (grab samples) transformation to reduce the influence of any highly abundant taxa and increasing the importance of less abundant species in driving the emergent multivariate patterns. The transformed data were then subjected to hierarchical clustering to identify sample groupings based on the Bray-Curtis index of similarity. This process combines samples into groups starting with the highest mutual similarities and then gradually lowers the similarity level at which groups are formed. The process ends with a single cluster containing all stations and is best expressed as a dendrogram diagram showing the sequential clustering of stations against relative similarity. The similarity profile (SIMPROF) routine was used to identify statistically significant groupings.

The MDS (Multi-dimensional Scaling) procedure uses the same similarity matrix as that used by the cluster analysis to produce an ordination of stations which is multi-dimensional. This attempts to satisfy all of the between-samples relationships indicated by the similarity matrix. This multi-dimensional ordination is then reduced to a two-dimensional representation that is a more accessible and useable representation. The representativeness of this two-dimensional version, in comparison to the multi-dimensional array, is indicated by a stress level. The closer this stress level is to zero, the better the representation.

Similarity percentage (SIMPER) analysis was then applied to the data to rank species in terms of their contribution to both the internal group similarity and “between” group dissimilarity and thereby assist the assessment of the distinctiveness of each community identified and the identification of the characterising taxa. This information is useful for matching with the Marine Habitat Classification System in support of biotope attribution.

Sediment data were also imported into PRIMER and subjected to hierarchical clustering using Euclidean distance as the similarity measure. In addition, Principal Components Analysis (PCA) ordination analysis was performed on the sediment data.

2.3.2 Biotope Classification

Biotopes were allocated in line with the current UK Marine Habitat Classification for Britain and Ireland V4.05 (Connor et al., 2004). The identified biotopes were also consistent with the European Nature Information System (EUNIS) (2012).

Biotopes were assigned to communities as identified by the hierarchical clustering analysis undertaken in conjunction with SIMPROF with the biotope decision support tool BioScribe aiding this process (Hooper et al., 2011). The BioScribe tool matches any list of taxa to the overall community recorded from samples used to categorise biotopes. Confidence indicators and direct links to habitat descriptions from the Marine Habitat Classification for Britain and Ireland are provided to facilitate the process. The tool was used by an experienced ecologist practised in matching UK biotopes to field survey data with codes applied through expert judgment based on the BioScribe outputs and knowledge of the current biotope classification system. All survey data were used to inform the biotope allocation process including the PSD analysis results.

3. RESULTS

3.1 Sediment PSD data

Samples from a total of 32 sites were successfully collected during the survey. Full results of the PSD analyses are provided in Appendix B. The Folk (1954) sediment classification system was used to categorise the sediments. Folk (1954) defines 15 major textural groups based on the relative proportions of three principal constituents:

Gravel (material coarser than 2 mm);

Sand (material between 0.0624 mm and 2 mm);

Mud (defined as all material finer than 0.0625 mm, i.e., silt plus clay).

3.1.1 Descriptive Account

Figure 3.1 presents a summary of the Folk (1954) sediment classifications encountered in the survey area. The distribution of the principal sediment components (gravel, sand and mud) and sediment classifications is shown in Figure 3.2.

The dominant Folk (1954) textural group encountered at 16 of the 32 sites sampled (Figure 3.1; Figure 3.2) was sandy mud (sM). At a further 13 sites, slightly gravelly sandy mud (gravel content all <1%) was recorded. Out of 32 sites, 29 sites were therefore subtle variations of the sandy mud class. This is clearly evident from the grab photographic record (Appendix A.2). The remaining 3 sites comprised Site AC04, a near-shore intertidal location on the northern bank of the Tees, with the highest percentage of sand of any sample from the survey classified as slightly gravelly sand; Site BP01, a near-shore location on the southern side of the Tees classified as gravelly mud; and, Site AC11, a mid-channel location close to the mouth of the Tees with the second highest percentage of sand, classified as slightly gravelly muddy sand (Figure 3.2).

Most of the sites were poorly sorted or very poorly sorted, with one site recorded as moderately sorted. The latter description was attributed to the one site that was described as 'slightly gravelly sand' (Site AC04), with no notable level of mud affecting its Folk classification.

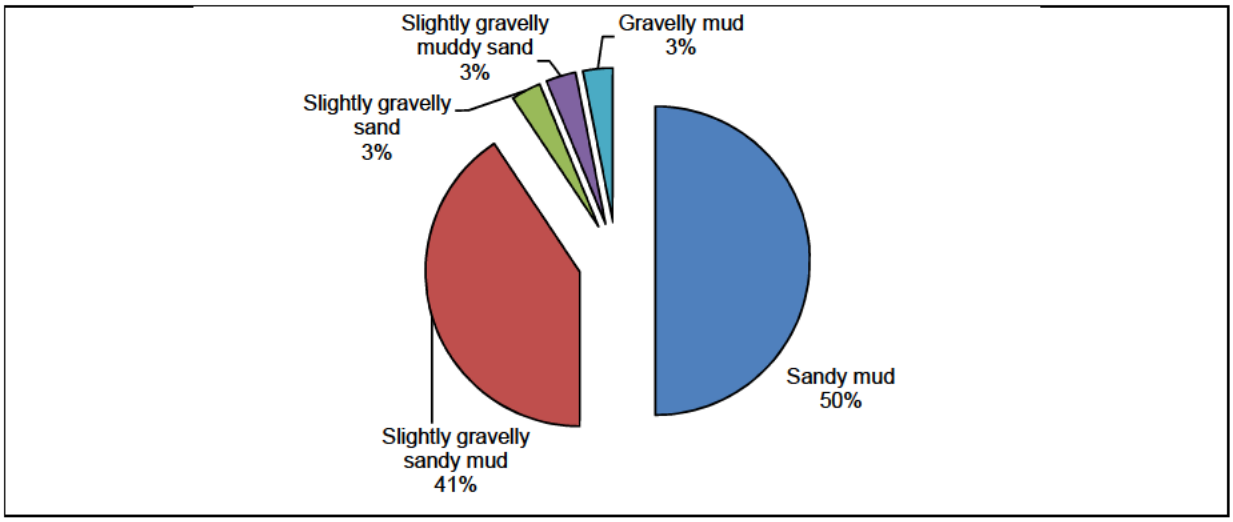

Figure 3.1: The proportions of Folk (1954) textural groups identified from the sample analysis

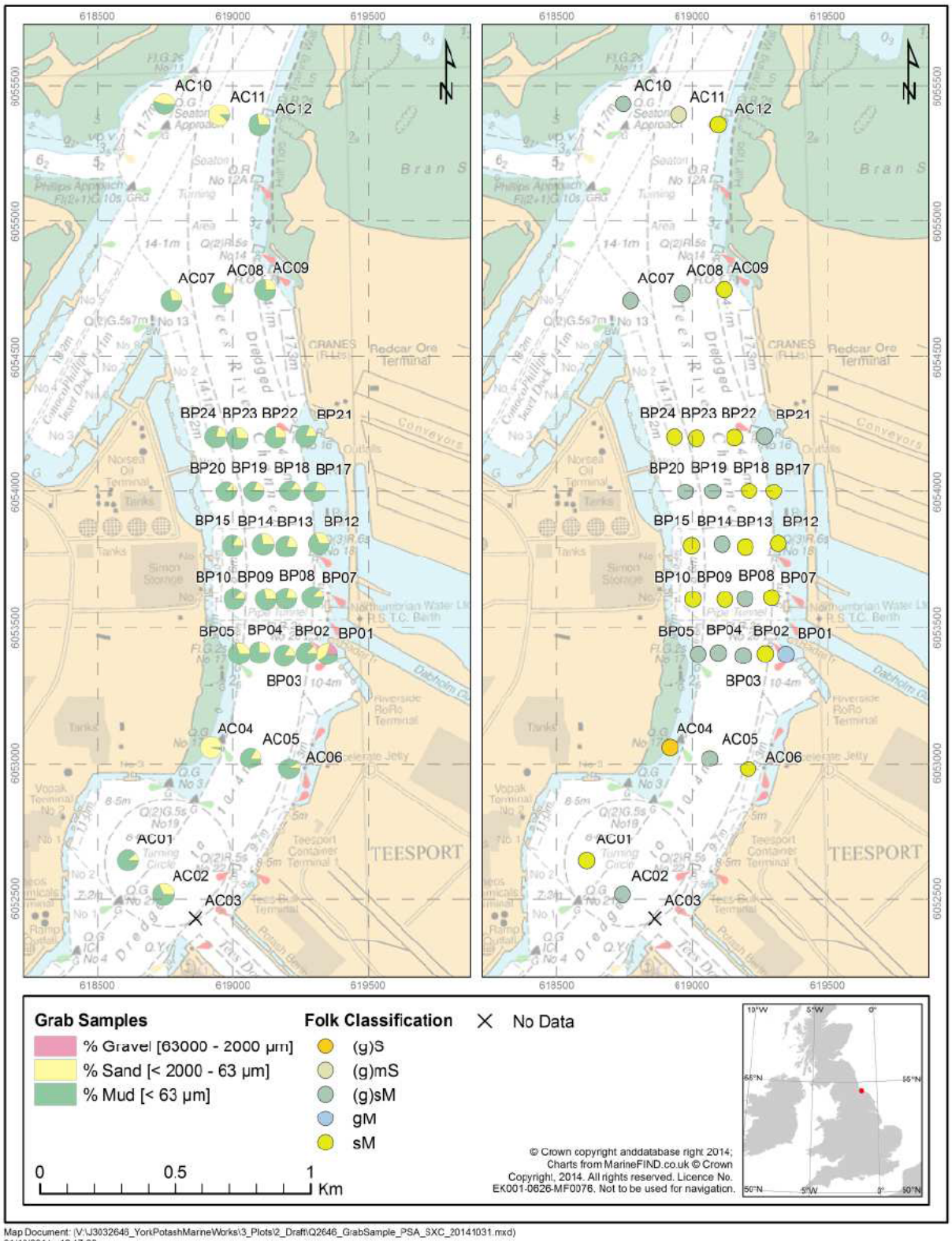

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Figure 3.2: Distribution of the principal sediment components (gravel, sand and mud) across the survey area and corresponding Folk (1954) Class

3.1.2 Multivariate Analysis

The percentage fractional weight sediment data was subjected to multivariate analysis to investigate any sample relationships. Figure 3.3A presents a non-metric MDS ordination of all data generated

from a Euclidean distance resemblance matrix in PRIMER (v6). Ordinations such as this indicate the pattern of site relatedness with, in this instance, samples represented by symbols corresponding to the relevant Folk (1954) textural group and labels giving the site nomenclature. The ordination plot (Figure 3.3A) shows two outlying samples (from Sites AC04 and AC11) that are evidently very different from the group of samples on the left of the plot. In order to observe the relationship between the majority of sites these outliers were removed and the analysis re-run (Figure 3.3B-D). Statistically significant groupings as identified by the SIMPROF routine in PRIMER are illustrated by black lines (Figure 3.3B) but the close overlap between sandy mud and slightly gravelly sandy mud is evident as is the separation between poorly and very poorly sorted sediments (Figure 3.3C and Figure 3.3D respectively).

The very low stress value (0.01 / 0.02) associated with the MDS ordinations indicates that the observable pattern is an excellent representation of the multivariate relationship between samples with no prospect of misinterpretation.

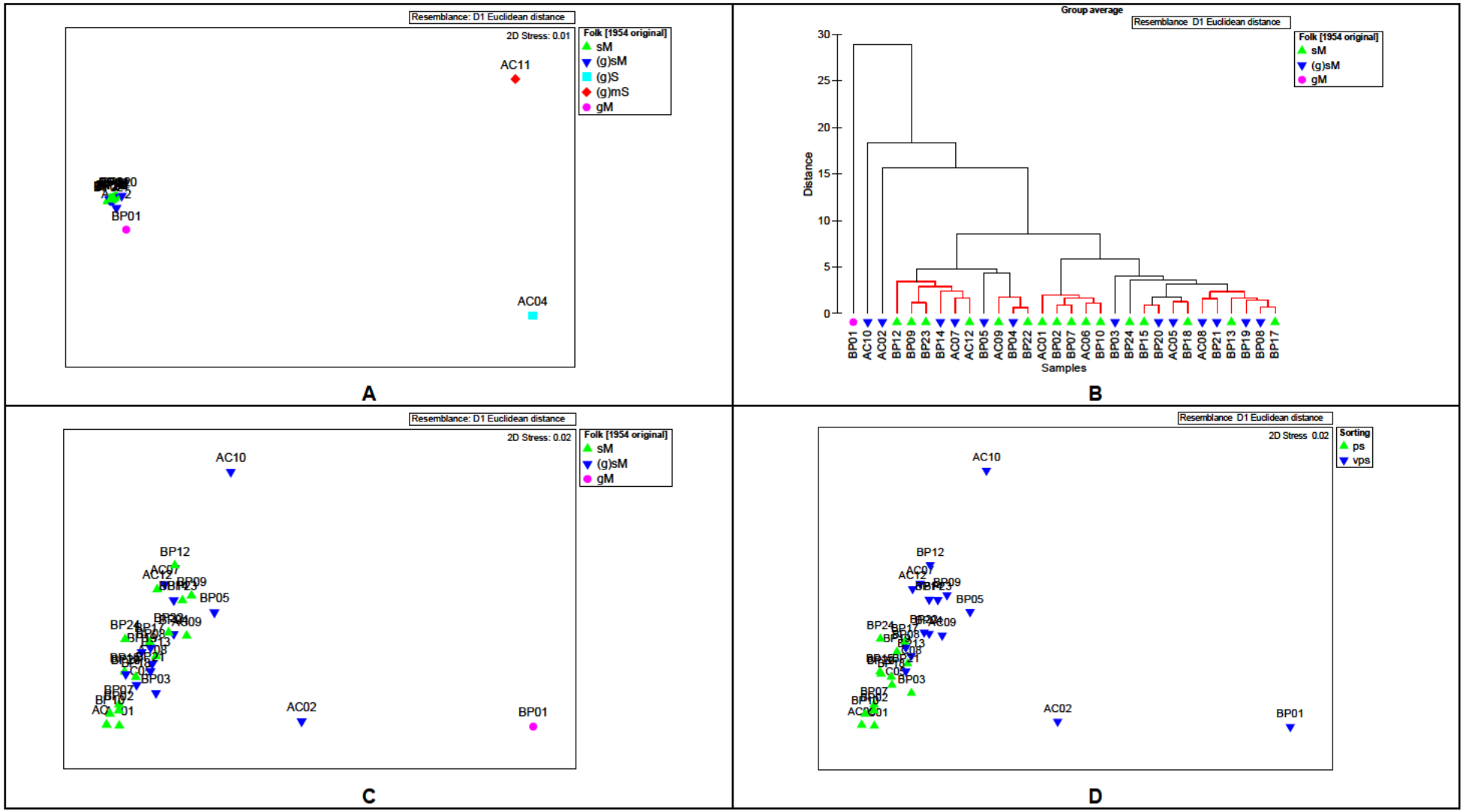

Figure 3.3: Particle size data MDS ordinations and a dendrogram plot (A-D)

Figure 3.4 presents a PCA ordination plot for percentage fractional sediment data to identify the 'principle components' or variables driving the pattern of separation seen amongst the sediment samples. The principal component one (PC1) axis was negatively correlated with the percentage of coarse silt (16 – 31 µm) and accounted for 54.1% of the variation. The second principal component axis (PC2) axis was strongly positively correlated with the percentage of very fine sand (63 - 125µm) and accounted for a further 38.4% of the variation. The percentage of coarse sand (500 - 1000µm) contributed to a further 4.4% of the variation along the principal component three (PC3) axis (not visible in Figure 3.4). The two-dimensional PCA plot can be considered a very good description of the higher multi-dimensional space with PC1 and PC2 together accounting for 92.6% of the variability. The importance of the coarse silt fraction in structuring the multivariate patterns seen is visible from the bubble plot overlay in Figure 3.4.

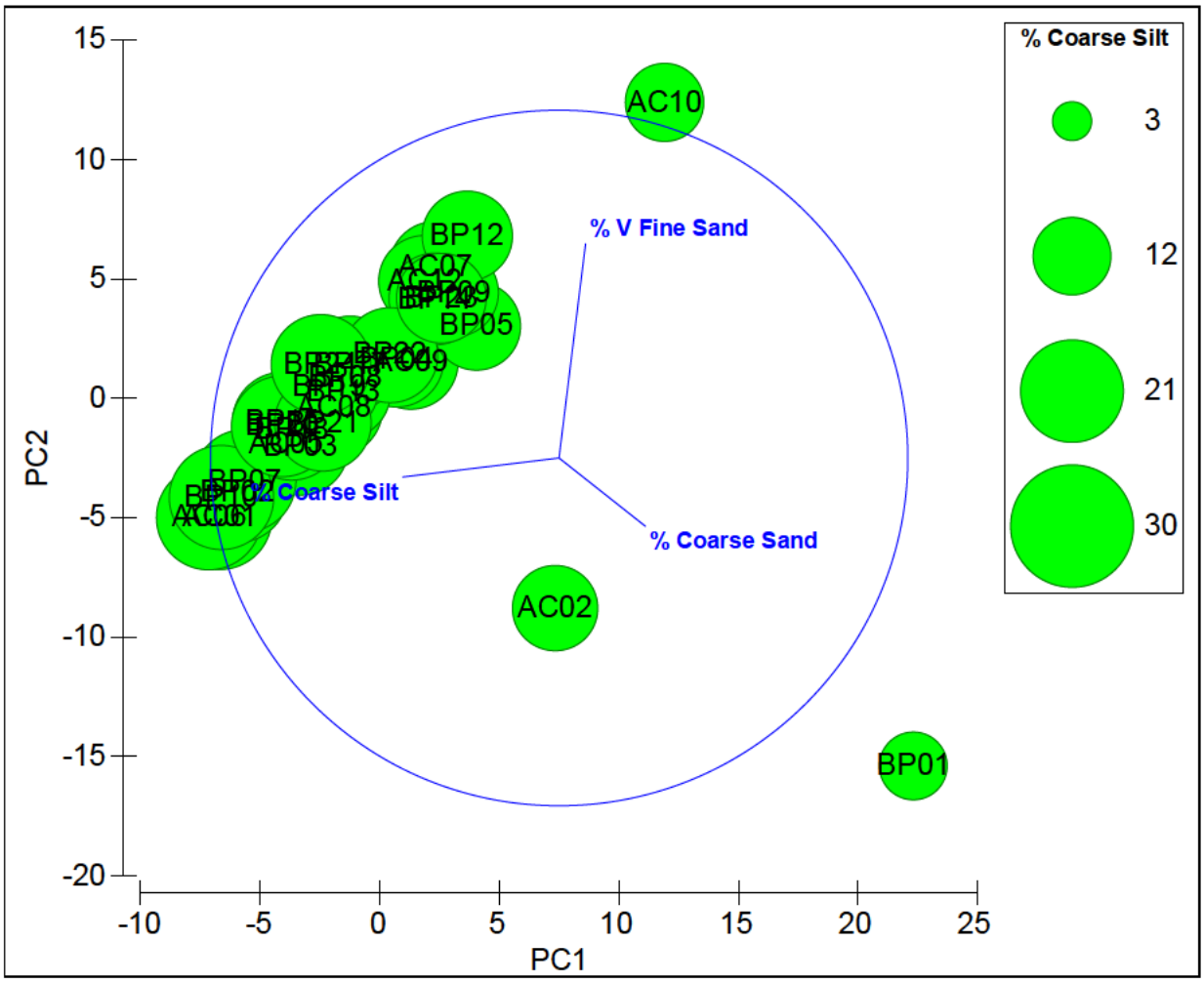

Figure 3.4: Principal components analysis ordination of percentage fractional weight particle size distribution data with the proportion of coarse silt overlaid

3.2 Grab Sample Data

Samples from a total of 32 sites were successfully taken during the survey. The infaunal species abundance raw data and the epifaunal species present (recorded as 'P' when present) from each grab sample are provided in Appendix C together with the biomass per major group (as blotted dry weight). Species data are presented with the relevant AphiaID included as a reference to names currently accepted by the World Register of Marine Species (WoRMS) (Appeltans et al., 2012).

3.2.1 Faunal Abundance

A total of 200 quantitative taxa were recorded from the samples with over 35,330 individuals counted. Colonial epifauna was limited with just 11 qualitative taxa identified (mostly bryozoans with some hydroids).

Quantitatively recorded taxa can be split into five major components or taxonomic groups. The five broad groups are the annelid worms, taxonomically almost entirely made up of polychaetes, or bristle worms, but including some oligochaetes; molluscs; crustaceans; echinoderms; and, 'others', which includes a range of minor phyla such as seapens, anemones, ribbon worms, sea spiders, horseshoe worms and sipunculids or peanut worms. The percentage contribution of each of the major taxonomic groups in terms of number of species and abundance is presented in Figure 3.5A and B.

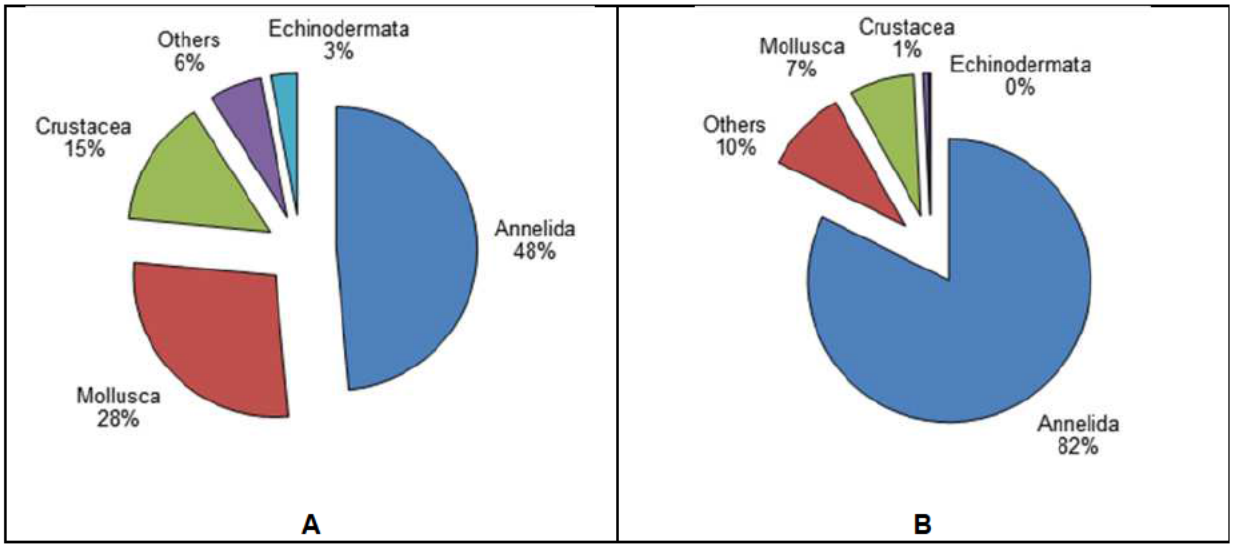

Figure 3.5: Summary of the percentage number of taxa (A) and individuals (B) recorded in each of the five major groups

Polychaetes were the most taxonomically diverse group in the macrobenthic communities sampled and occur in the greatest abundance (Figure 3.5A and B). In terms of the number of taxa encountered polychaetes (48%) were followed by molluscs (28%), crustaceans (15%), others (6%) and lastly echinoderms (3%). The contribution to the total number of individuals provided by the four other major groups is small (18%) in comparison to that of the polychaetes (82%) (Figure 3.5B).

From the quantitative data, the top ten most abundant taxa and frequently recorded taxa in grab samples are presented in Table 3.1. The top ten most abundant organisms accounted for 81% of the total number of individuals recorded from the survey. Eight out of ten of these were annelid worms. The most abundant organism, *Capitella*, was found at thirteen of the thirty-two locations sampled. Eighty percent of the total abundance was attributable to just one site with two sites accounting for 98% (BP12 and BP17 respectively). Both were near-shore sites on the southern side of the Tees downstream of Dabholm Gut. The second most abundant organism, *Euchone limnicola*, occurred at almost 90% of the sites sampled putting it in fourth place on the corresponding list of most frequently occurring species (Table 3.1). Almost 28% of the total abundance occurred at one site, BP24. This was one of the near-shore sites on the north side of the Tees adjacent to the main channel jetties for the North Tees oil refinery. Therefore, unlike *Capitella*, the species was more broadly spread.

E.limnicola is a small, non-native, tube-building sabellid polychaete worm which has been previously recorded from the Tees (Foster-Smith 2000). Four of the top ten most abundant organisms were oligochaete worms, *Limnodrilus* being the most abundant, although only found at a restricted number of sites, i.e. BP01, BP07, BP12 and BP17. Similarly, *Tubificoides benedii*, was most abundant at sites BP01 and BP12 with these two locations accounting for 94% of the total numbers recorded for this species. The other two oligochaetes were more broadly spread with *T. swirencoides* occurring in tenth place for the most frequently recorded taxa. Other commonly recorded taxa were the cirratulid polychaete *Chaetozone gibber*, the cat worm *Nephtys hombergii* and the opheliid polychaete, *Ophelina acuminata*. Almost 85% of taxa were only recorded at ten or fewer sites.

Table 3.1: Top 10 Most Abundant and Frequently Recorded Taxa in Grab Samples

Most abundant taxa			Most frequently occurring taxa (n=32)		
Scientific Name	**Organism type**	**Total**	**Scientific Name**	**Organism type**	**%**
Capitella	Polychaete worm	10584	NEMATODA	Nematode worm	97
Euchone limnicola	Polychaete worm	6578	*Chaetozone gibber*	Polychaete worm	91
NEMATODA	Nematode worm	3190	*Nephtys hombergii*	Polychaete worm	91
Limnodrilus	Oligochaete worm	1864	*Euchone limnicola*	Polychaete worm	88
Mytilus edulis (juv.)	Common mussel	1377	*Mytilus edulis* (juv.)	Common mussel	84
Tubificoides benedii	Oligochaete worm	1245	*Ophelina acuminata*	Polychaete worm	84
Ophryotrocha	Polychaete worm	1107	*Eteone longa* (agg.)	Polychaete worm	78
Tubificoides swirencoides	Oligochaete worm	970	*Mediomastus fragilis*	Polychaete worm	75
Chaetozone gibber	Polychaete worm	926	*Kurtiella bidentata*	Bivalve mollusc	75
Tubificoides galiciensis	Oligochaete worm	787	*Tubificoides swirencoides*	Oligochaete worm	72

3.2.2 Biomass

The results of the species level blotted wet weight biomass are available in Appendix C.3. Values for the five major groups were calculated from this and converted to ash free dry weight (AFDW) (Eleftheriou and Basford, 1989), with the results also presented in Appendix C.3. The dominant phylum with respect to the biomass, measured from the grab samples for the whole survey, was Annelida which accounted for 91% of the total weight (Figure 3.6A). It should be noted that the biomass value for a single large specimen of the shore crab *Carcinus maenas* (142g blotted wet weight) from Site BP20 was removed from the data as its spurious presence obscured the underlying data pattern.

Figure 3.6B illustrates the dominance of the biomass of annelids in the sandy mud sediment type.

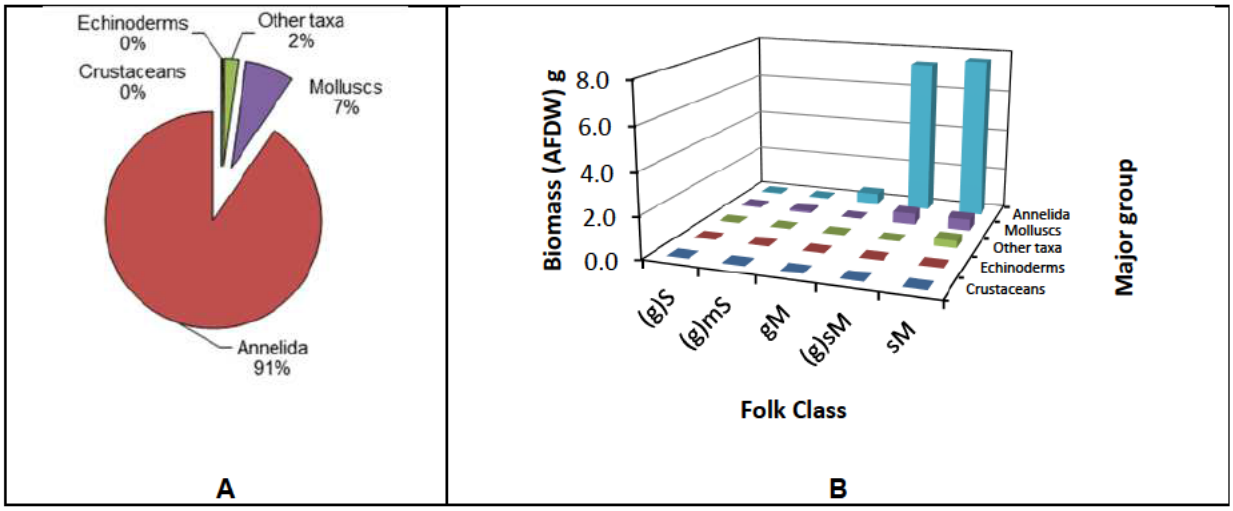

Figure 3.6: Percentage of total AFDW biomass by major group (A) and major group biomass (AFDW, g) across Folk (1954) Class (B)

The species level biomass undertaken allowed for the generation of abundance/biomass comparison (ABC) plots (Appendix C.4). In the majority of plots the biomass curve lies entirely above the abundance curve and the corresponding *W*-statistic is positive and relatively high indicating undisturbed communities, as outlined in Warwick (1986) and Warwick and Clarke (1994), (Appendix C.4). For Sites BP24, BP17, BP23, BP19, AC05, BP20 and BP14, the biomass and abundance curves cross once, and the *W*-statistics, although positive, are low, indicating moderately disturbed communities (Appendix C.4). However, in the plot for Site BP12, the abundance curve lies almost entirely above the biomass curve and the *W*-statistic is slightly negative, indicating a community that is considered to be more severely disturbed (Figure 3.7).

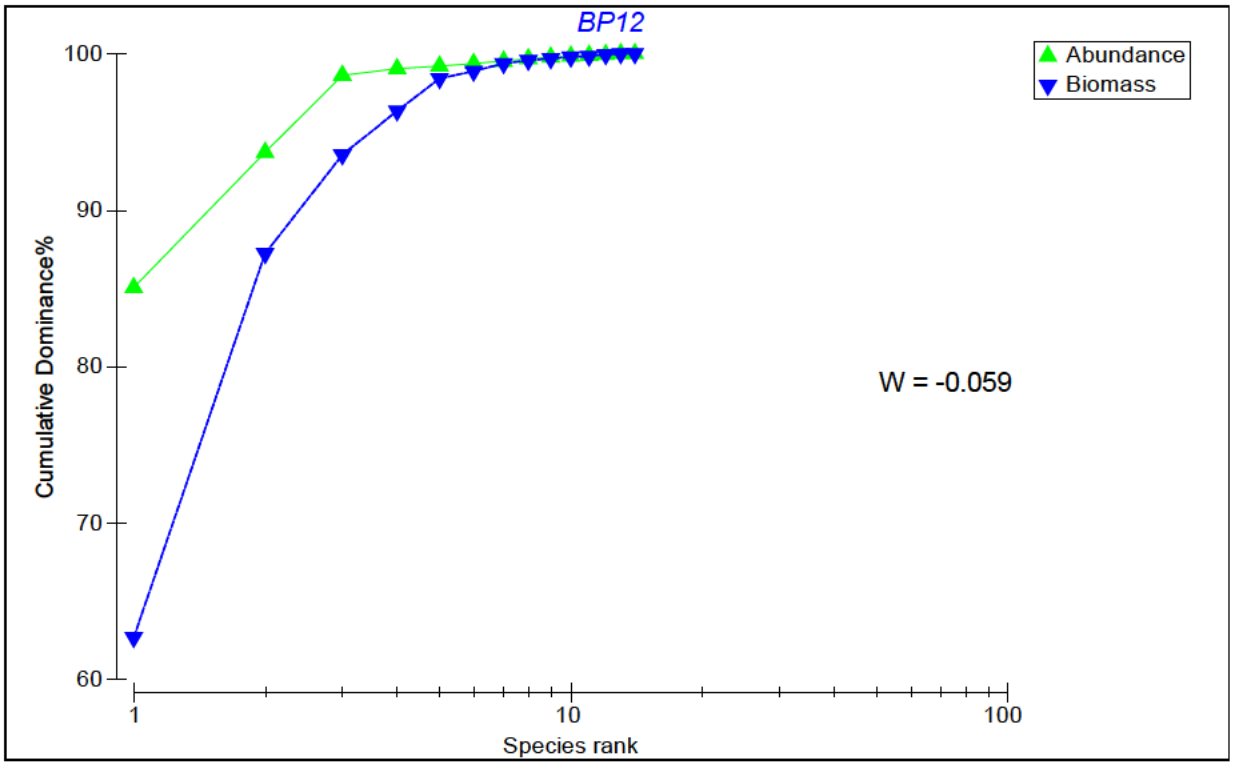

Figure 3.7: ABC plot from Site BP12

3.2.3 Diversity Indices

Diversity indices including the total number of species (S), the total abundance (N), Margalef's Richness (d), Pielou's evenness (J'), Shannon-Wiener diversity index (H'(log_2)) and Simpson's dominance index (λ) were generated for each site from the PRIMER (v6) package of statistical routines (Table 3.2). The site with the lowest number of recorded species (S = 14) and highest abundance (N = 10,017) was BP12 while the highest number of species was found at Site AC11 (S = 70) (Table 3.2).

The ecological status (Dauvin, 2012) based on the Shannon-Weiner diversity index ranged from bad at Site BP12 (H' of 0.84) to high. Four sites fell into this latter category including sites AC07, AC12, BP05 and AC11, with AC11 at the mouth of the Tees having the largest H' value (5.13) for any of the locations sampled (Table 3.2; Figure 3.8A). In general, the results for Pielou's evenness and Simpson's dominance track this order reflecting that high diversity scores are associated with low dominance and high evenness (Table 3.2: Figure 3.8B). Margalef's richness index captures similar information to H' but is included here for completeness (Chainho et al., 2007).

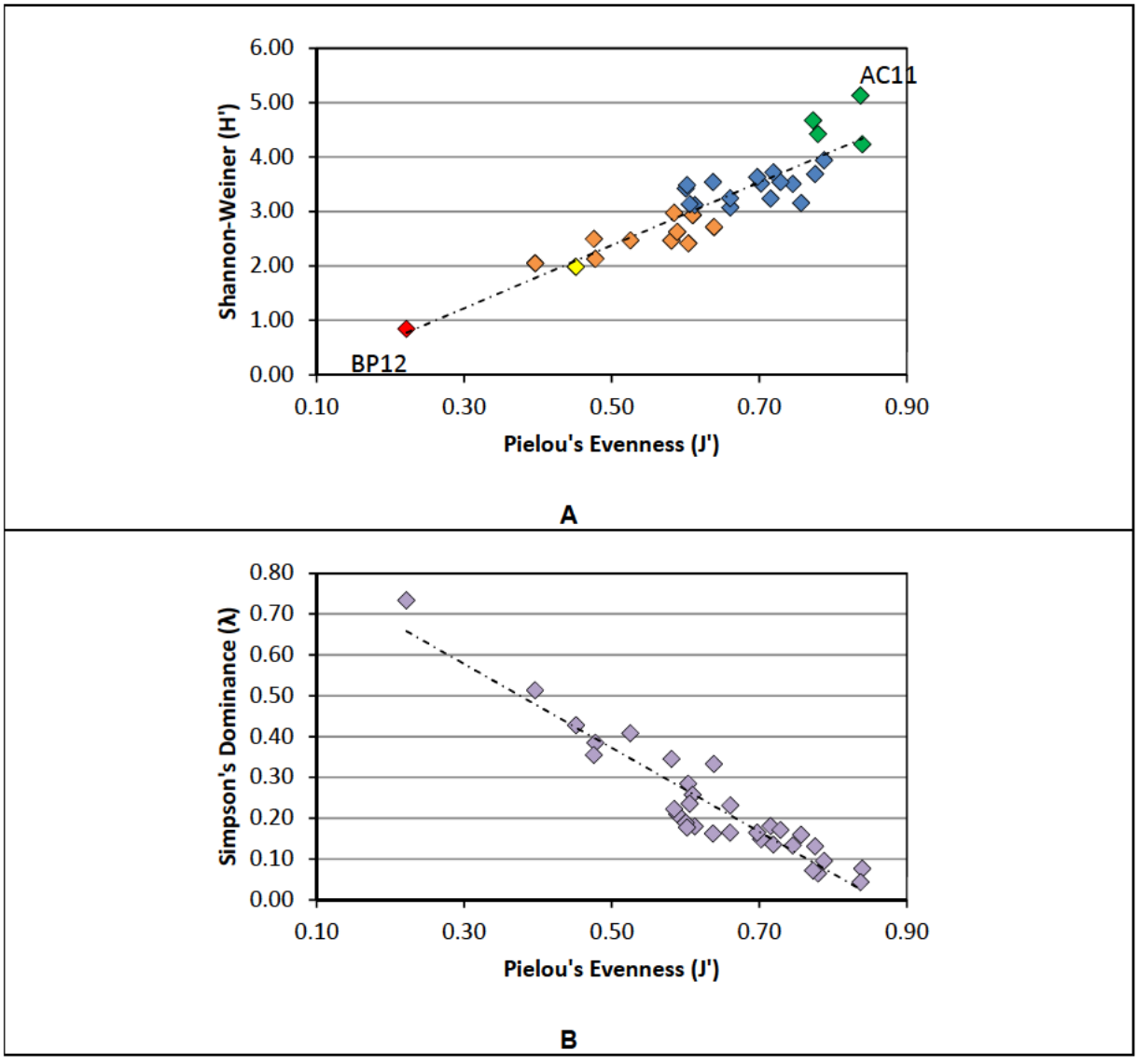

Figure 3.8: Scatter plots of univariate variables J' vs. H' (A) with ecological status colour coded red – bad, yellow – poor, orange – moderate, blue – good and green – high and J' vs. λ (B)

Table 3.2: Univariate Analysis, Ordered by Shannon-Weiner Diversity, from Quantitative Taxa in Grab Samples

Site	Total No. species (S)	Total Abundance (N)	Margalef's Richness (d)	Pielou's evenness (J')	Simpson's dominance (λ)	Shannon-Weiner H'(log_2)	Ecological Status (Dauvin (2012)
BP12	14	10017	1.41	0.22	0.73	0.84	Bad
BP17	21	2944	2.50	0.45	0.43	1.98	Poor
BP24	36	2588	4.45	0.40	0.51	2.05	Moderate
BP19	22	1092	3.00	0.48	0.38	2.13	Moderate
AC04	16	178	2.89	0.60	0.28	2.42	Moderate
BP23	19	908	2.64	0.58	0.35	2.47	Moderate
BP14	26	1292	3.49	0.53	0.41	2.47	Moderate
BP13	38	733	5.61	0.48	0.35	2.50	Moderate
BP01	22	2913	2.63	0.59	0.21	2.63	Moderate
BP22	19	234	3.30	0.64	0.33	2.71	Moderate
BP10	28	498	4.35	0.61	0.26	2.93	Moderate
BP20	34	290	5.82	0.58	0.22	2.97	Moderate
BP09	25	316	4.17	0.66	0.23	3.07	Good
BP07	34	1250	4.63	0.61	0.18	3.12	Good
AC06	36	817	5.22	0.61	0.24	3.13	Good
AC09	18	128	3.50	0.76	0.16	3.16	Good
BP03	23	122	4.58	0.72	0.18	3.24	Good
AC10	30	1348	4.02	0.66	0.16	3.24	Good
AC05	52	816	7.61	0.60	0.19	3.42	Good
BP04	55	1699	7.26	0.60	0.18	3.48	Good
BP08	26	187	4.78	0.75	0.13	3.50	Good
BP02	32	325	5.36	0.70	0.15	3.51	Good
AC08	29	513	4.49	0.73	0.17	3.54	Good
BP15	47	535	7.32	0.64	0.16	3.54	Good
AC02	37	256	6.49	0.70	0.16	3.63	Good
BP21	27	606	4.06	0.78	0.13	3.69	Good
BP18	36	286	6.19	0.72	0.14	3.72	Good
AC01	32	369	5.24	0.79	0.09	3.94	Good
AC07	33	166	6.26	0.84	0.08	4.24	High
AC12	51	786	7.50	0.78	0.06	4.42	High
BP05	66	491	10.49	0.77	0.07	4.67	High
AC11	70	627	10.71	0.84	0.04	5.13	High

3.2.4 Multivariate Analysis

Community structure was investigated using the multivariate sample sorting techniques available in PRIMER (v6). The species abundance data matrix (Appendix C.1) from the Day grab site samples was imported into PRIMER. A mild, square root transformation, was then applied to reduce the influence of quantitatively dominant fauna on any subsequent patterns observed. By increasing the influence of less abundant fauna in the data set the resulting picture derives, to a greater degree, from the broader community rather than being simply driven by a restricted number of numerically dominant taxa.

The Bray-Curtis measure of similarity was then applied to the transformed data to generate a triangular resemblance matrix. In this analysis the resemblance between every pair of samples is based on whether the taxon abundances take similar or dissimilar values. So if two samples were identical their similarity 'S' would be 100% and conversely where two samples have no taxa in common 'S' would equal zero. Another property of the Bray-Curtis coefficient, which makes it a suitable choice ecologically, is that joint absences do not effect 'S'. In other words similarity does not depend on taxa which, though present in the overall dataset, might be absent from both samples.

The resemblance matrix was then subjected to hierarchical group average clustering to produce a tree diagram or dendrogram (Figure 3.9A). This group samples into successively smaller clusters (of larger sizes) as similarity gradually decreases. A SIMPROF test at a significance of 5%, was run in conjunction with this process in order to identify any statistically significant group structure. The level of significance is important because it, '*erects a hurdle over which one must jump before further interpretation is pursued*' (Clarke et al., 2008). The more stringent the significance (e.g. 1% instead of 5%), the harder the hurdle is to overcome, a property which tends to reduce the number of groups identified. In this instance there was no reduction in the number of groups therefore the results presented here are based on the default value of 5%. Eleven SIMPROF groups were generated from this initial analysis. However, as Clarke et al., (2008) explain, '*sample structure identified by a significant SIMPROF test could be rather minimal, and not necessarily biologically important to interpret*'. It is therefore entirely appropriate '*to define coarser groupings*' provided '*that the resulting clusters are always supersets of the SIMPROF groups*'. Three groups were therefore combined yielding nine faunal groups (Figure 3.9B). This analysis provided a more biologically relevant broad ecological picture.

In order to map sample similarity the resemblance matrix was further analysed using the ordination technique of non-metric MDS (Figure 3.10A). The points presented do not represent geographical location but reflect instead the biological similarity of the communities. To be more precise, sites which are placed closer together have very similar communities whilst those further apart have fewer taxa in common, or the same taxa but, '*at very different levels of abundance*' (Clarke and Warwick, 2001).

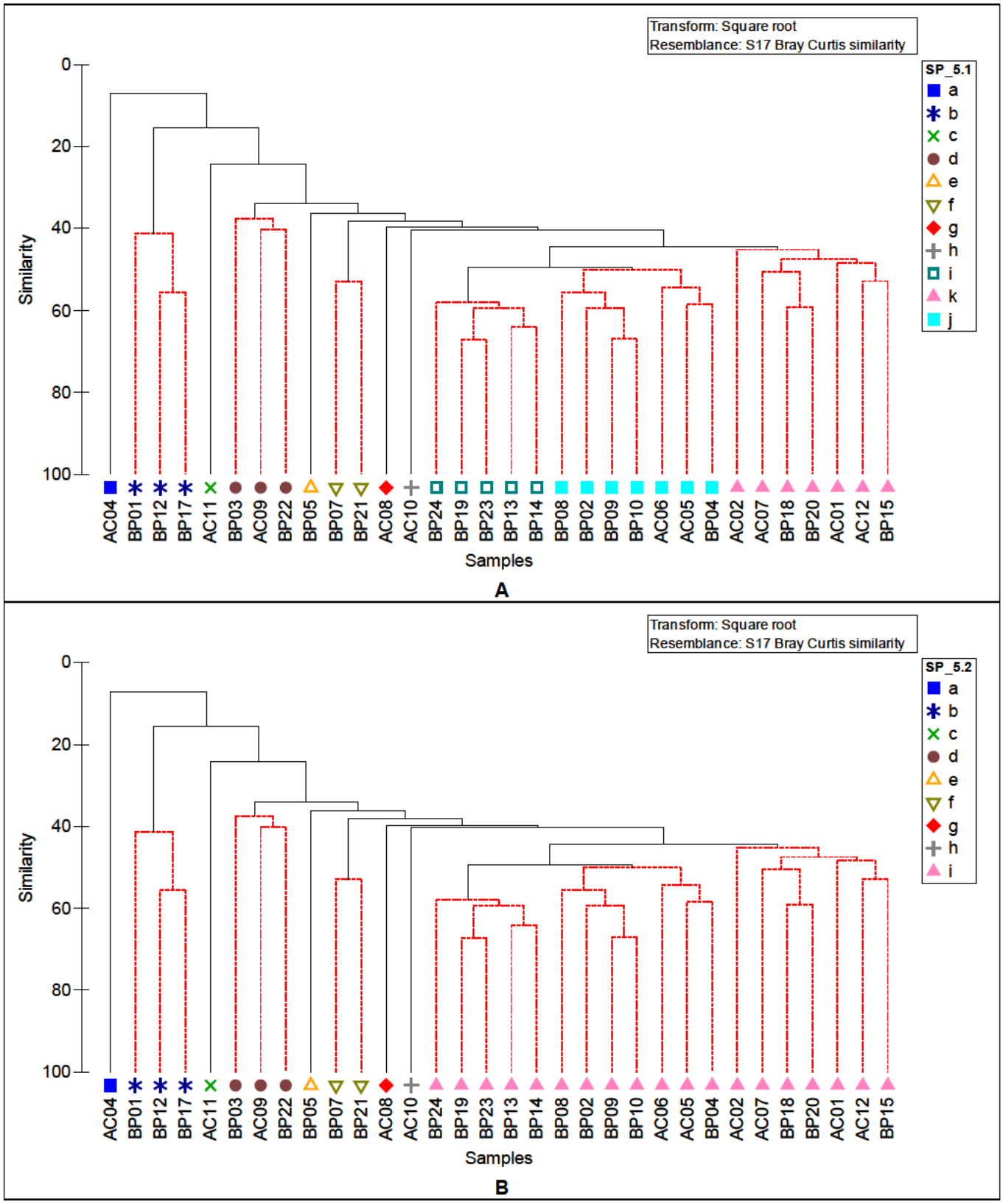

Figure 3.9: Dendrograms based on group average clustering of quantitative macrofaunal grab data with SIMPROF groups shown (A) and superset indicated (B)

Some of the identified SIMPROF faunal groups are associated with particular sedimentary environments as identified by the Folk (1954) classification (Figure 3.10B). The largest group, i.e. group i was comprised of sandy Mud / slightly gravelly sandy Mud (Figure 3.10A and B). The single sample 'groups' a (Site AC04) and c (Site AC11) were the only locations where the sediment was classified as (g)S and (g)mS, respectively (Figure 3.10A and B). However, the relationship was not always clear cut indicating that factors other than the sedimentary environment may also be important in driving the observed multivariate pattern. A good example of this was Site BP01 which was the only location where gravelly Mud was found, but it clustered with sites BP12 and BP17 to form group b both of which were sandy Mud habitats (Figure 3.10A and B).

Note that the stress associated with the MDS plot (Figure 3.10) is 0.14. This indicates that, if the pattern is cross-checked against the identified cluster groups, the ordination is useful and interpretable.

Proportional circles (referred to as bubble plots within PRIMER) generated from the taxa abundance data, and superimposed on the MDS plot, can give a good insight into those fauna which influence the observed multivariate site distribution pattern (Figure 3.10C and D). Taxa were selected from a SIMPER analysis in PRIMER and included those fauna with a high average similarity/standard deviation ratio (Sim/SD) and a high contribution and as such were considered to be good discriminating species (Clarke and Warwick, 2001). SIMPER analysis looks at the role individual species have within group similarity (or, consequently, the separation between groups). The Sim/SD ratio is given by SIMPER as a measure of how consistently each taxon contributes to similarities within groups (Clarke and Warwick, 2001). The full results of the SIMPER analysis are provided in Appendix C.5. *E. limnicola* was, most notably, the primary characteristic species for SIMPROF group i, the largest group identified comprising 19 of the 32 sites sampled from the survey (Figure 3.10C). This species was also dominant in two samples which formed single site groups, sample BP05 (group e) and Site AC10 (group h). *Limnodrilus*, a genus of oligochaete worm associated with freshwater / brackish water environments, was characteristic of groups b and f, a continuous series of five near-shore sites on the south bank from Dabholm Gut seawards (Figure 3.10D).

The preference of *E. limnicola* for coarse silt / very fine sand habitats can be seen if the abundance values for the species are overlain as proportional circles on the sediment PCA plot (Figure 3.11A). For *Limnodrilus* the lack of a preference for a particular sediment type indicates its distribution is governed by more than just particle size (Figure 3.11B).

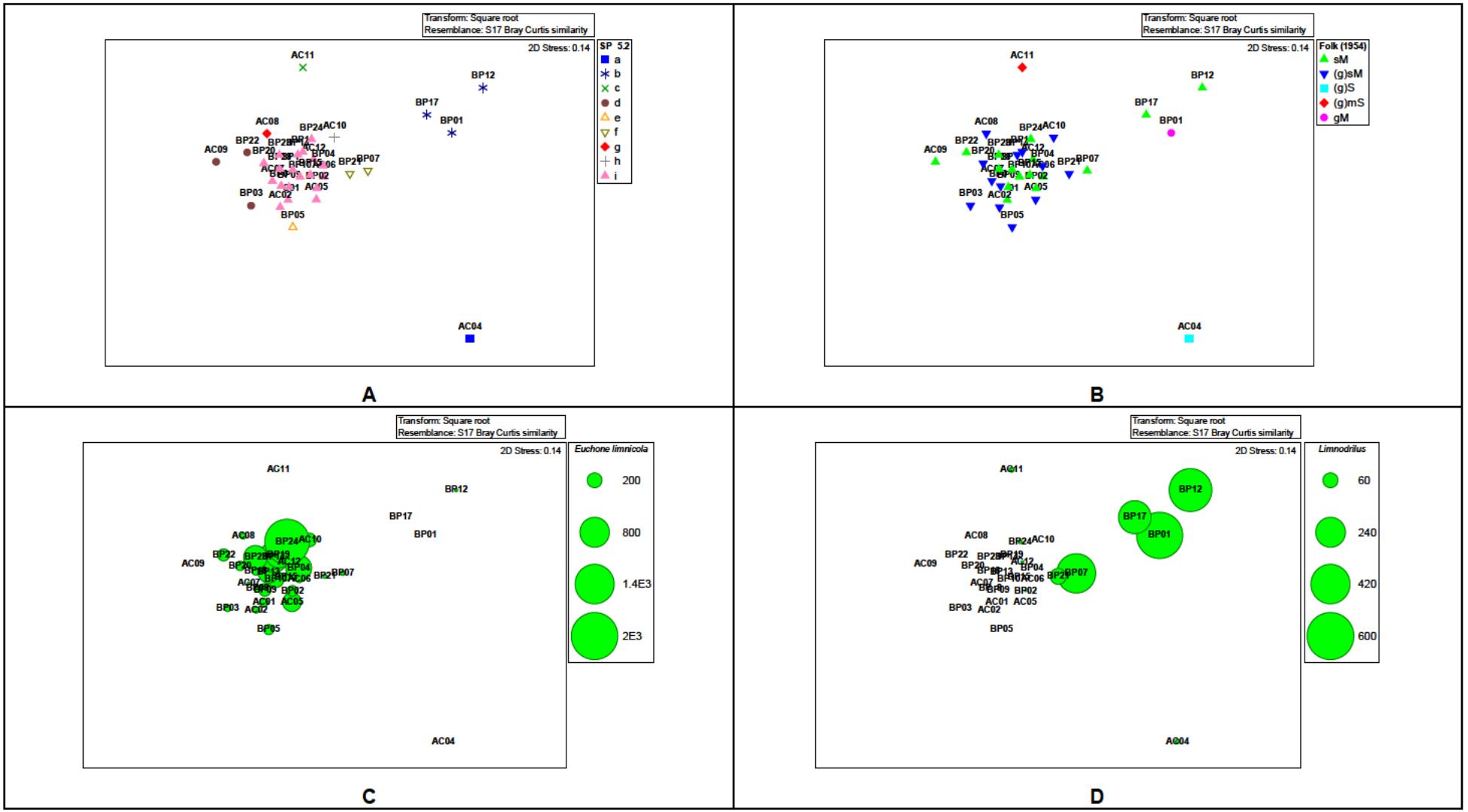

Figure 3.10: MDS ordinations of quantitative macrofaunal grab data with SIMPROF groupings (A), Folk (1954) Class (B), abundance of *E. limnicola* (C) and abundance of *Limnodrilus* (D) overlain

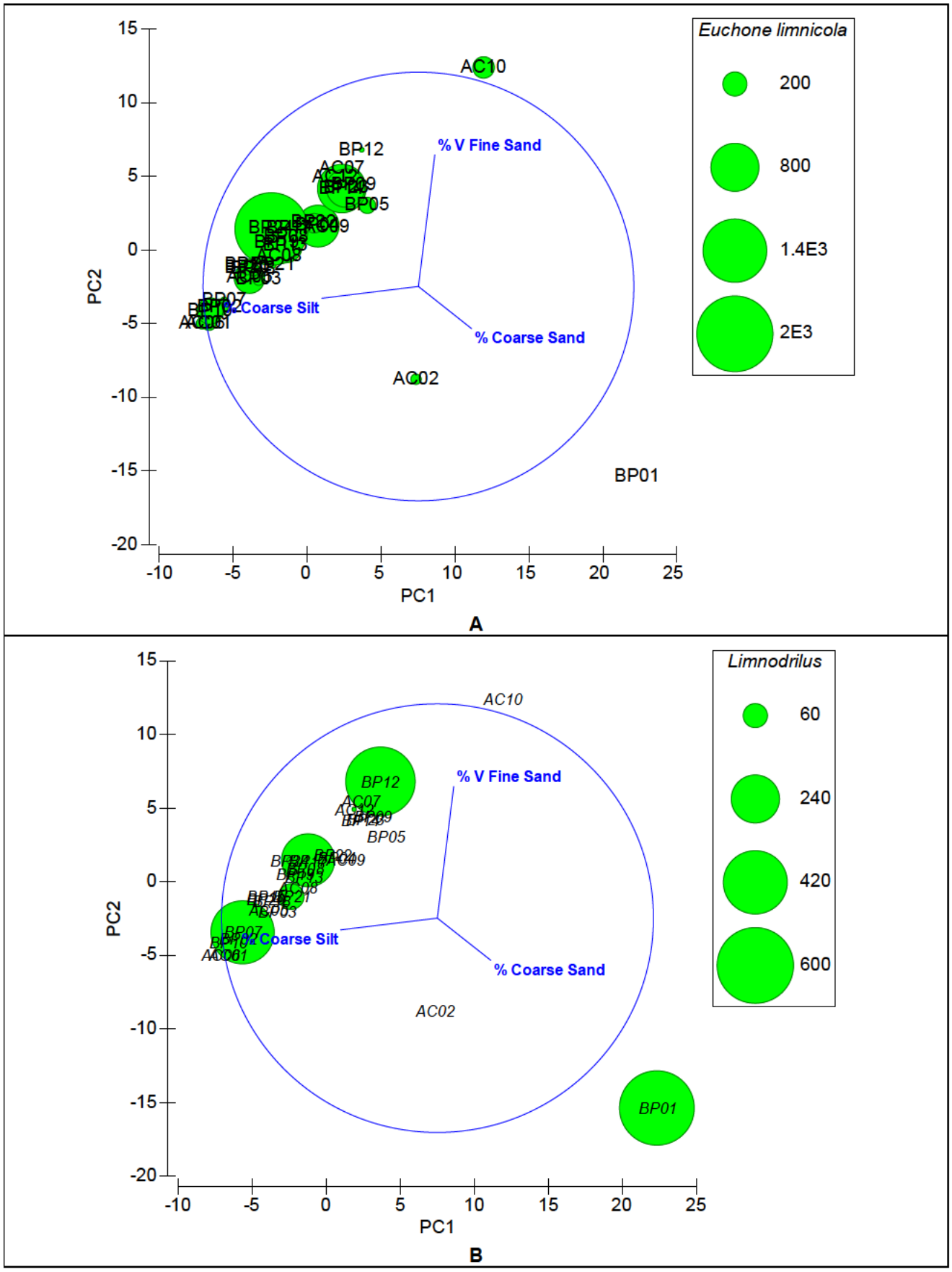

Figure 3.11: Sediment PCA and associated distribution of two characterising species, *E. limnicola* (A) and *Limnodrilus* (B)

Table 3.3 presents a summary of some of the attributes of each of the SIMPROF faunal groupings and includes the associated top five characteristic species identified by the PRIMER (v6) SIMPER routine. A biotope assessment derived from the group data is also provided and visually presented in Figure 3.12. The list of species for a particular group was run through BioScribe, the biotope decision support tool, to cross-check whole community data against the reference samples used by the JNCC to originally describe the habitats in the marine classification system (Hooper et al., 2010). Based on this interrogative and iterative process a biotope was allocated to each group. A total of five biotopes (three full Level 5 biotopes and two Level 4 biotope complexes), consistent with Connor et al. (2004) and the EUNIS habitat Classification 2012, were identified for the survey (Table 3.3).

The dominant biotope complex was **SS.SMu.ISaMu** (Infralittoral sandy mud (Table 3.3)). This is consistent with the results from the particle size analysis. The non-native species *E. limnicola* was very characteristic of this habitat in the survey area. Site AC04 (Group a) was an intertidal location and best fitted the biotope complex **LS.LSa.MuSa** (Polychaete / bivalve dominated muddy sand shores). Group b was best described as **SS.SMu.ISaMu.Cap** (*Capitella capitata* in enriched sublittoral muddy sediments). Connor et al. (2004) note the presence of this biotope in the Tees Estuary and that it can be accompanied by large numbers of the small polychaeta, *Ophryotrocha* (true for Group b). Group f was a similar biotope, **SS.SMu.SMuVS.CapTubi** (*Capitella capitata* and *Tubificoides* spp. in reduced salinity infralittoral muddy sediment). This was identified in the same area as **SS.SMu.ISaMu.Cap** but is a more species rich habitat with less dominance from *Capitella* and fewer *Ophryotrocha*. Both Group b and f were also characterised by the oligochaete *Limnodrilus* which is not typical for these biotopes. Finally, Site AC11 (Group c) in mid channel at the mouth of the Tees was identified as **SS.SSa.IMuSa.FfabMag** (*Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand). This was the location with the greatest number of taxa recorded and the only location characterised by the bean-like tellin *Tellina fabula* (previously *Fabulina fabula*).

Given the limited amount of coarse material and the associated potential attachment points in the areas sampled the contribution of epifaunal species to the communities sampled was very restricted (Appendix C.2).

Table 3.3: Summary Attributes of Faunal Groups (a – i) Derived from Multivariate Sample Sorting of the Grab Data

Faunal group and average similarity	Sites and Folk (1954) Class	*Average* or Total No. species / individuals	Top 5 Species (SIMPER*)	Biotope
a Less than 2 samples in group	AC04 (g)S	16 / 178	*Tharyx* "species A" *Spio martinensis* *Pygospio elegans* *Macoma balthica* *Malacoceros fuliginosus*	LS.LSa.MuSa
b Average similarity: 46.09	BP01, BP12 and BP17 sM (gM)	*19 / 5291*	*Capitella* ***Limnodrilus*** ***Tubificoides benedii*** NEMATODA *Cirriformia tentaculata*	SS.SMu.ISaMu.Cap
c Less than 2 samples in group	AC11 (g)mS	70 / 627	*Tellina fabula* *Scoloplos armiger* *Chaetozone christiei* *Kurtiella bidentata* *Perioculodes longimanus*	SS.SSa.IMuSa.FfabMag
d Average similarity: 38.46	AC09, BP03 and BP22 sM ((g)sM)	*20 / 161*	*Mytilus edulis* (juv.) ***Ophelina acuminata*** *Euchone limnicola* NEMATODA ***Nephtys hombergii***	SS.SMu.ISaMu
e Less than 2 samples in group	BP05 (g)sM	66 / 491	*Euchone limnicola* *Chaetozone gibber* *Mytilus edulis* (juv.) ACTINIARIA *Ophelina acuminata*	SS.SMu.ISaMu
f Average similarity: 52.93	BP07 and BP21 sM / (g)sM	*31 / 928*	NEMATODA *Limnodrilus* *Tubificoides swirencoides* *Mediomastus fragilis* *Chaetozone*	SS.SMu.SMuVS.CapTubi
g Less than 2 samples in group	AC08 (g)sM	29 / 513	*Mytilus edulis* (juv.) *Kurtiella bidentata* *Euchone limnicola* *Euchone* (juv.) *Abra alba*	SS.SMu.ISaMu
h Less than 2 samples in group	AC10 (g)sM	30 / 1348	NEMATODA *Mytilus edulis* (juv.) *Chaetozone gibber* *Euchone limnicola* Sabellinae (juv.)	SS.SMu.ISaMu

i Average similarity: 47.91	AC01, AC02, AC05, AC06, AC07, AC12, BP02, BP04, BP08, BP09, BP10, BP13, BP14, BP15, BP18, BP19, BP20, BP23 and BP24 sM ((g)sM)	35 / 735	***Euchone limnicola*** NEMATODA ***Chaetozone gibber*** *Mytilus edulis* (juv.) *Mediomastus fragilis*	SS.SMu.ISaMu

NOTE:
Folk (1954) Class in brackets means it was not the dominant sediment type. Italics indicate that the number of species and individuals is an average based on the sites contained within the SIMPROF group.
Species in bold had a higher value for the ratio of the average similarity to standard deviation (Sim/SD)
*As faunal groups a, c, e, g and h were C represented by a single site the species selected were identified by ranked abundance, not SIMPER.

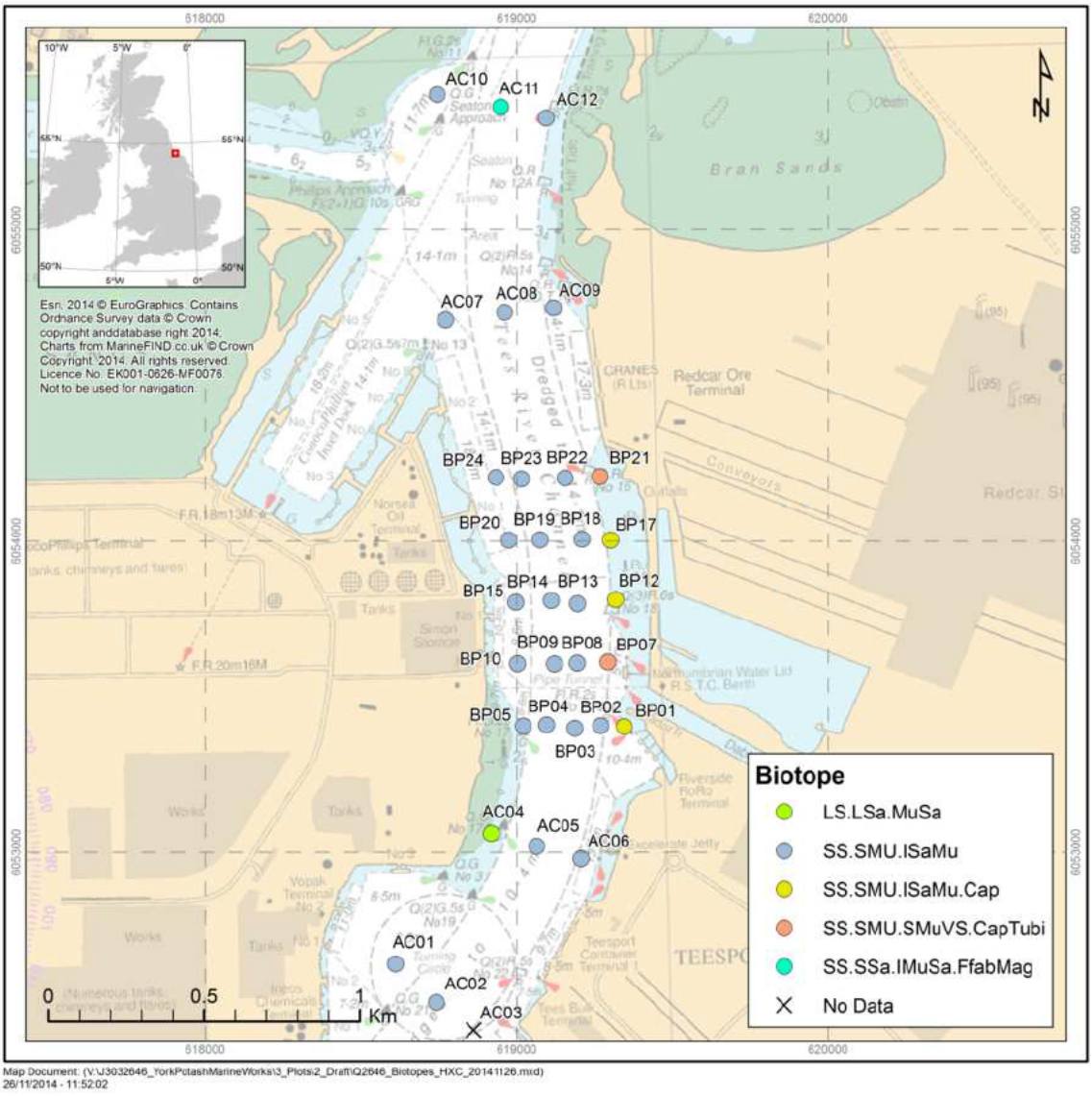

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Figure 3.12: Biotope distribution across the survey area.

3.2.5 Species and Habitats of Conservation Interest

The habitats identified from the survey were correlated with habitats listed for protection as shown in Table 3.4.

Table 3.4: Correlation Table Showing Relationships Between Marine Habitat Classifications and Habitats Listed for Protection (JNCC, 2014)

Biotope	Annex I Habitat	Annex I – Physiographic type	Habitats of Principal Importance	MCZ HOCI
LS.LSa.MuSa Polychaete / bivalve dominated muddy sand shores	Mudflats and sandflats not covered by seawater at low tide	Large shallow inlets and bays	Intertidal mudflats	Subtidal sands and gravels
SS.SMu.ISaMu.Cap *Capitella capitata* in enriched sublittoral muddy sediments	-	-	-	-
SS.SSa.IMuSa.FfabMag *Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand	-	-	Subtidal sands and gravels	Subtidal sands and gravels
SS.SMu.ISaMu Infralittoral sandy mud	-	-	-	-
SS.SMu.SMuVS.CapTubi *Capitella capitata* and *Tubificoides* spp. in reduced salinity infralittoral muddy sediment	-	Estuaries	-	-

Juvenile ocean quahog, *Arctica islandica*, were recorded at six stations (AC08, AC11, BP02, BP04, BP05 and BP15). No adults were recorded in the current study. *A. islandica* is on the OSPAR list of 'Threatened and/or Declining Habitats and Species'. In England it is on the marine conservation zone (MCZ) species list of 'Features of Conservation Interest' (FOCI) created under Part 5 of the Marine and Coastal Access Act 2009. The MCZ ecological network guidance (NE and JNCC, 2010), recommends that the species, *'be protected within MPAs in each regional MCZ project area, where they occur*'. The survey area does not fall within any designated marine protected area.

3.3 Trawl Sample Data

Information regarding assemblages of larger, more mobile epibenthos, together with communities of epibenthic sessile fauna and fish was collected from a series of 10 trawls using 2 m beam trawl gear (see Appendix A.3 for the Trawl log, Appendix A.4 for the deck photos of the trawl content and Appendix D for the raw abundance data and fish length measurements).

A total of 58 species were identified from the contents of the 10 trawls. The most common epibenthic group sampled accounting for a third of the taxa recorded was fish (Pisces) (Figure 3.13A). This was followed by Annelida (21%), Crustacea (19%), Mollusca (19%) and lastly Echinodermata (8%) (Figure 3.13A). In terms of the number of individuals, Crustacea dominated accounting for 89% of the total abundance (Figure 3.13B). Fish accounted for a further 10% followed by Mollusca (7%), Annelida (3%) and Echinodermata (1%) (Figure 3.13B).

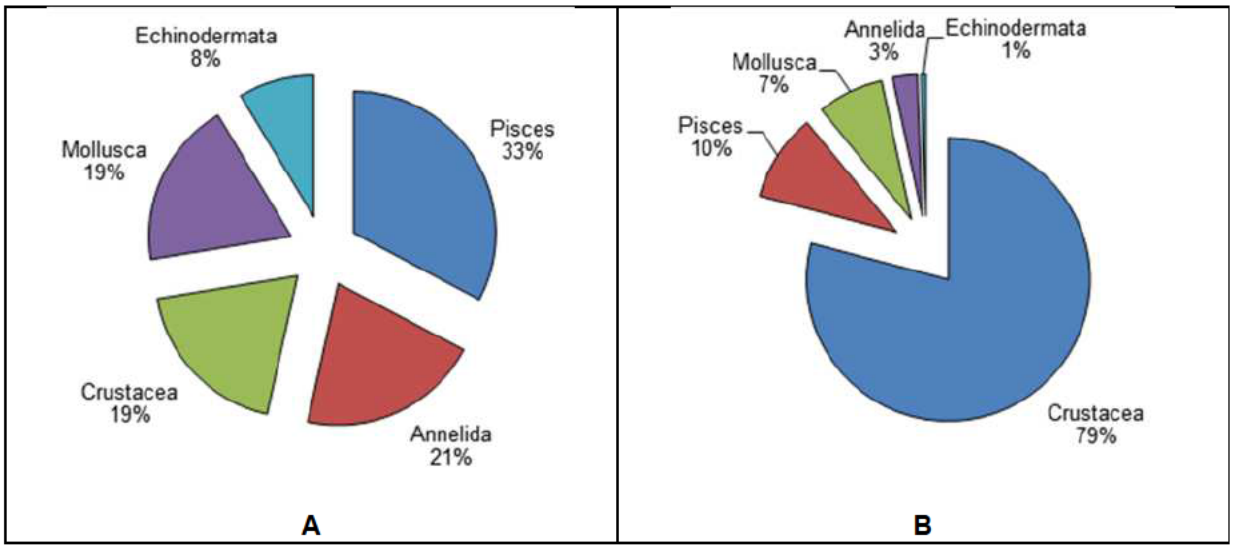

Figure 3.13: Percentage contributions of major taxonomic groups to the total number of taxa recorded (A) to the total abundance (B)

The top ten most abundant and species and the frequency with which they were encountered within the 2 m beam trawl samples are presented in Table 3.5. The brown shrimp was the most numerous species accounting for 72% of all individuals caught and was recorded from all ten trawls. Flatfish were the second most numerous species encountered and again occurred at all trawl sites.

Table 3.5: Total Abundance and Frequency of the Ten Most Abundant Taxa Recorded from the 2 m Beam Trawl Survey (n=10 Trawls).

Species	Common name	Total abundance	No. of trawls
Crangon crangon	Brown shrimp	7468	10
Pleuronectidae	Flatfish	859	10
Abra alba	Bivalve mollusc	488	8
Carcinus maenas	Shore crab	373	9
Abra nitida	Bivalve mollusc	251	6
Nephtys hombergii	Cat worm	163	8
Pandalus montagui	Pink shrimp	158	7
Liocarcinus holsatus	Flying crab	136	8
Terebellides stroemii	Polychaete worm	89	3
Gadus morhua	Cod	82	6

A scatter plot of the total number of fish taxa by total fish abundance is presented in Figure 3.14. Sites BP21 and BP02 (Figure 2.2) were the two sites with the most limited fish populations from the ten locations surveyed.

As Table 3.5 indicated juvenile flatfish recorded as Pleuronectidae were the most abundant fish taxon recorded from the survey. The average length of the specimens captured at all trawl locations was 6 cm (Appendix D). The greatest number of fish taxa were recorded from Site AC11 (Figure 3.14) which also, with one exception was the location where the largest fish were caught (Appendix D). The exception was Site BP12 which had two large flounder of 17 and 19 cm (Appendix D).

The results of the cluster analysis and MDS ordination of the beam trawl catch data (square root transformation) are shown in Figure 3.15A and B respectively. The group average clustering method used to produce the dendrogram incorporated a SIMPROF permutation test to aid interpretation of the presence of statistically valid groupings (Clarke et al., 2008). Only two SIMPROF groups were identified from the data, Group a comprising eight of the ten trawls and Group b two (Trawls BP21 and BP02). These Groups shared similar fauna but in differing abundances, principally for the two taxa *Crangon crangon* and Pleuronectidae. Site BP02 was immediately downstream of Dabholm Gut on the south side of the Tees estuary and Site BP21 was downstream of Dabholm Gut adjacent to the ore terminal for the steel works.

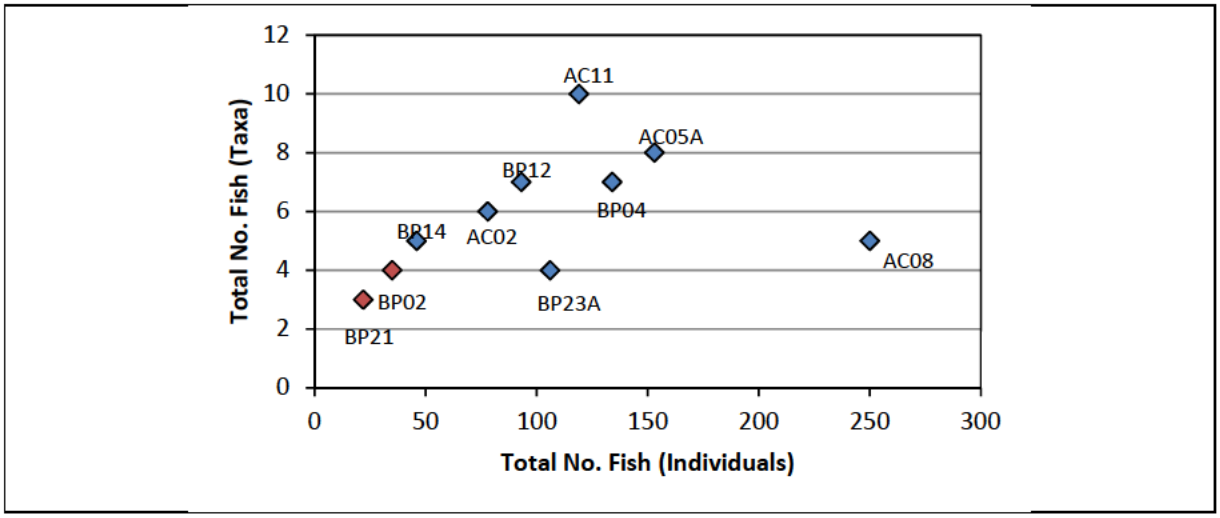

Figure 3.14: The number of fish taxa by abundance for the ten trawl locations

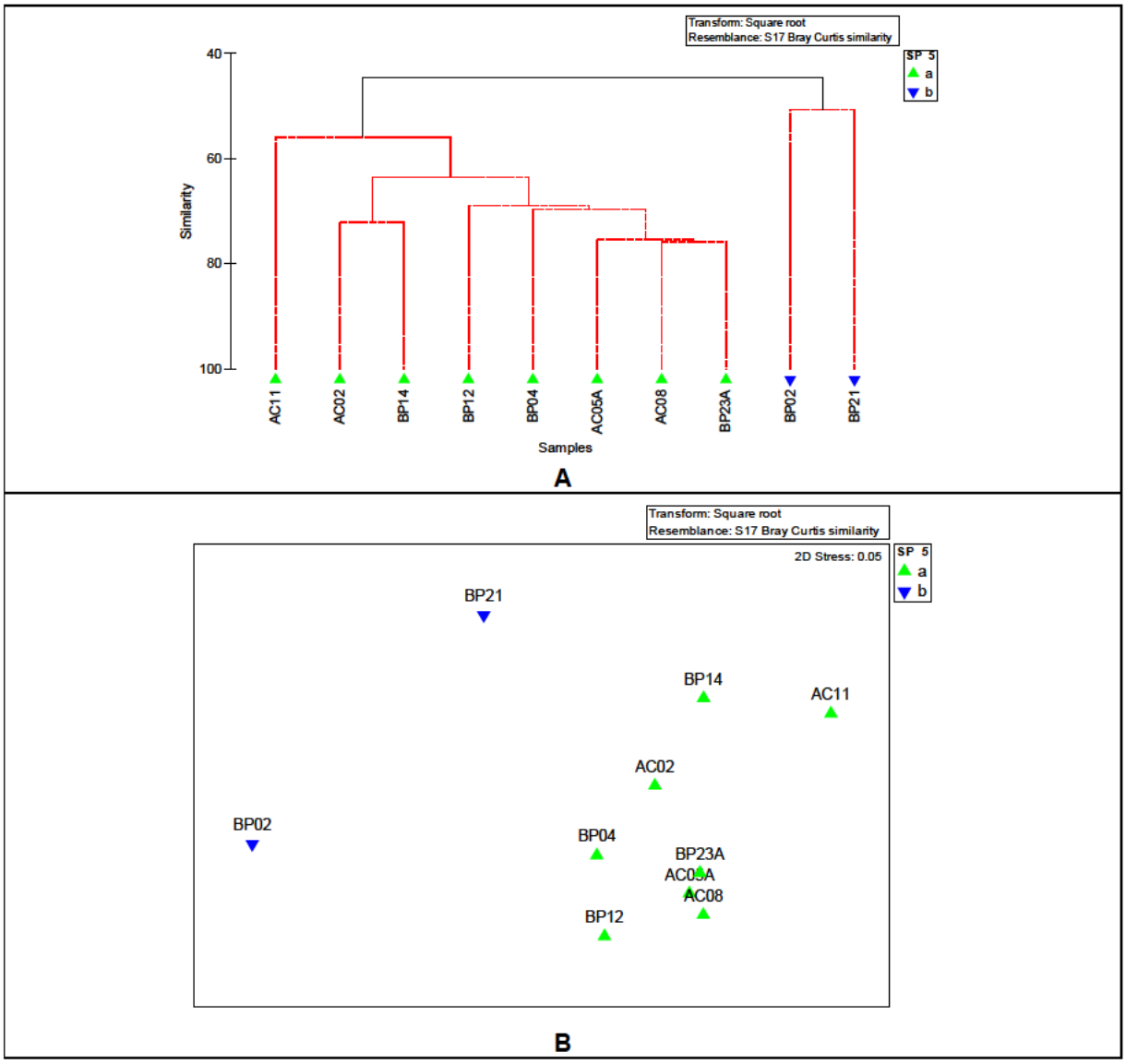

Figure 3.15: Cluster analysis dendrogram and MDS ordination of 2 m beam trawl samples created using group-average link clustering from Bray-Curtis similarities on square-root transformed data

3.3.1 Fish Species of Conservation Interest

Some of the recorded fish species are of conservation interest (Table 3.6).

Table 3.6: Fish Species and the Associated Conservation Interest

Species	Common name	NERC Act 2006	OSPAR	IUCN Red List	Bern Convention
Gadus morhua	Cod	✓	✓	✓	·
Merlangius merlangus	Whiting	✓	·	·	·
Trisopterus minutus	Poor cod	·	·	✓	·
Pomatoschistus minutus	Sand goby	·	·	·	✓
Platichthys flesus	Flounder	·	·	✓	·
Pleuronectes platessa	Plaice	✓	·	✓	·

4. DISCUSSION

4.1.1 Sediment particle size

Muddy sediments dominated with over 90% of the locations sampled being sandy mud or slightly gravelly sandy mud. The pattern of site relatedness generated from the multivariate analysis of the percentage fractional weight sediment data shows the overlap between these two Folk (1954) groups. It also illustrated the separation between sites that were poorly sorted and very poorly sorted. Sorting is a measure of the spread of the grain sizes around the average and may be used as a proxy measure of the energy of the environment (Blott and Pye, 2001; Garrison, 2009). Medium and fine sands tend to exhibit better sorting (low sorting index values) than muds and gravels (Blott and Pye, 2001). It indicates the degree of mixing with poorly sorted sediments, such as those encountered here, being heterogeneous and typical of low energy areas (limited wave and current activity) (Gray and Elliott, 2009). This is entirely consistent with the sheltered nature of the estuarine environment sampled.

The PCA underlined the importance of the mud fraction with over 50% of the variation observed being negatively correlated with coarse silt (31-63 µm). This analysis also provided an insight to the distribution of some of the characterising species from the communities sampled. For example, the non-native fan worm *E. limnicola* preferred the silty fine sand areas whilst the oligochaete *Limnodrilus* was less. This indicated that another variable must be involved in driving the pattern of distribution for the species.

4.1.2 Macrobenthic Communities

The macrobenthic communities sampled by the Day grab are typical of the Tees estuary with annelids dominating in terms of the number of taxa, abundances and biomass. The opportunistic species *Capitella* was the most abundant species recorded with 97% of the total abundance for the taxon attributable to just two sites, BP12 and BP17. The biotope identified for these locations was **SS.SMu.ISaMu.Cap** (*Capitella capitata* in enriched sublittoral muddy sediments), the occurrence of which in the Tees estuary has been reported by Connor et al., (2004). It is worth noting that both these sites occur downstream of the Dabholm Gut which is a sewage treatment outfall. The ABC plots clearly identify Site BP12 (which in fact accounted for 80% of the total number of individuals of *Capitella* recorded from the survey) as being the most severely disturbed community sampled. As Warwick and Clarke (1994) state, '*in undisturbed communities the presence of large organisms results in the biomass curve lying entirely above the abundance curve; in grossly disturbed communities, dominated by large numbers of small individuals, the abundance curve lies entirely above the biomass curve; in moderately disturbed communities, these curves are closely coincident and may cross over one or more times*'. There are seven locations were moderate disturbance is indicated. One of these locations is BP17 and links to the situation described above but five of the remaining six sites are located adjacent to the jetties of the North Tees oil refinery.

It should be noted that estuaries are naturally stressed environments for the fauna living there and this may confound attempts to detect anthropogenic stress using ABC plots (Meire and Dereu, 1990). It may be that in the brackish part of an estuary, increased stress from salinity fluctuations, turbidity, etc. results in crossing curves being the norm (Meire and Dereu, 1990).

Limnodrilus was identified as being characteristic of SIMPROF groups b and f. This species is not considered characteristic of the biotopes ascribed to these locations by Connor et al., (2004). In fact, the taxon is more commonly found in the upper estuarine environment where freshwater influence is stronger and salinities are lower with reduced fluctuations. For example in the biotope **SS.SMu.SMuVS.LhofTtub** (*Limnodrilus hoffmeisteri*, *Tubifex tubifex* and *Gammarus* spp. in low salinity infralittoral muddy sediment) (Connor et al., 2004). Its presence as a characteristic species for the biotopes downstream of Dabholm Gut, is potentially due to the input of freshwater from this stream, creating quasi-upper estuarine conditions here. The influence is clearly not strong enough to enable development of the LhofTub biotope, the position of which is known to fluctuate seasonally depending on freshwater input (Connor et al., 2004) but, does help explain the pattern of distribution seen for the species from the PCA sediment plot which indicated that other factors must be influencing it.

The dominant biotope identified within this study was **SS.SMu.ISaMu** (Infralittoral sandy mud). None of the current Level 5 biotopes in the marine habitat classification were considered suitable to describe these locations and therefore none were assigned. The assemblages encountered at these locations were defined by the presence of the non-native fan worm *E. limnicola*. It may be that a variant could be applied to an existing biotope or a bespoke biotope created but until that occurs it is prudent to be conservative and hence a Level 4 biotope complex was selected.

The presence of the fully biotope **SS.SSa.IMuSa.FfabMag** (*Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand) from the mid-channel site (AC11) nearest the mouth of the Tees and the associated high diversity, is a good indication of the more stable sedimentary and physiological conditions found here.

Juveniles of the ocean quahog *Arctica islandica* were found in samples from the current survey. The species is more commonly found in offshore habitats but is not unknown from estuaries. It is generally understood that the absence of adults does not necessarily imply that the area is sub-optimal habitat for their occurrence. Witbaard and Bergman (2003), for example, report that in the Oyster Ground area of the southern North Sea, recruitment of *A. islandica* to larger size classes is hampered, partly due to insufficiently dense adult stock generating fewer dense spat falls, but also due to intense bottom trawling in the area which has controlled the adult stock. However, Witbaard and Bergman (2003) note that experimental evidence suggests, '*adverse effects of high loads of resuspended sediment on bivalve growth*'. This is due to the admixture of fine silty particles lowering the quality of the food particles creating sub-optimal conditions. Furthermore, it is understood that in the shallow southern Bight of the North Sea one reason for the absence of *A. islandica* could be that high water temperatures in summer exceed their upper limit (16–18°C) for survival (Witbaard and Bergman, 2003).

4.1.3 Trawl data

The dominant species captured in the trawls was the brown shrimp, *Crangon crangon*. Estuaries are important for the shrimp both as nurseries and summer feeding areas so the abundance of *C. crangon* from the current survey is not unusual.

Multivariate analysis indicated two groups with little difference between the majority of stations. Sites BP02 and BP21 which clustered together and were located on the south side of the Tees were in part defined by reduced numbers of brown shrimp and flatfish in comparison to the other locations sampled. These two sites also had very low numbers, in general, of fish both in terms of the species recorded and the abundances counted.

Two large flounder were caught in the trawl carried out at BP12. These two fish were the largest captured during the survey. Trawl BP12 also had large numbers of *C. crangon* but other trawl sites also had similarly large populations of brown shrimp. Potentially, the superabundance of *Capitella* identified from the nearby grab site as present here presents a good feeding opportunity to larger predators such as these flounder as *Capitella* is a known prey item for *Platichthys flesus*.

Several of the fish species captured during the trawling survey are listed for protection.

4.1.4 *Euchone Limnicola*

The non-native fan worm *E. Limnicola* is identified primarily by the characteristic intermediate pre-pygidial depression which lacks lateral wings and has a distinct anterior ridge (Plate 4.1).

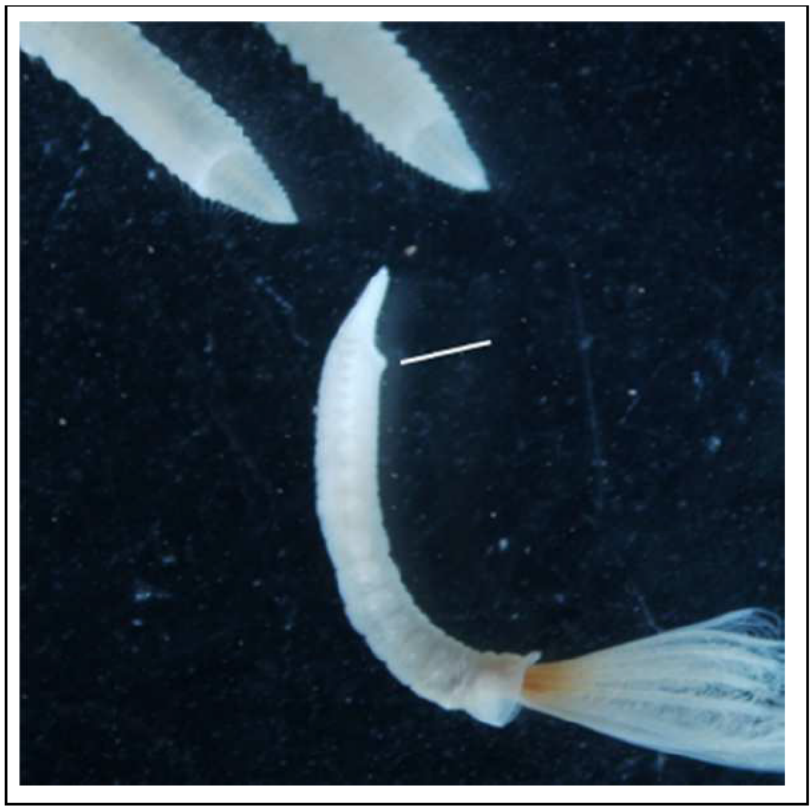

Plate 4.1: Three specimens of the non-native fan worm *E. Limnicola* with the diagnostic feature indicated.

The species is well established in the Tees and has been reported there since the 1990s (Foster-Smith, 2000). Foster-Smith (2000) notes that in, '*1996, it was found as far upstream as Cargo Fleet wharf, generally in mid-channel*'.

It is native to California on the Pacific coast of North America and has been introduced in UK waters and to south-eastern Australia (Botany Bay, Port Phillip Bay, Port of Adelaide) as well as New Zealand

(ports of Timaru and Gisborne). It can be found in marine and estuarine habitats typically in depths of less than 10 m but also up to 24 m. The species is sedentary and can grow to 12 mm in length, burrowing into soft sediments and secreting a mucous layer to enable it to build firm burrow walls. In Australia it has been noted to establish dense populations within the sediments and may be competing with native species for food and space. Importantly, the process of tube building consolidates the sediments, thereby altering the habitat for other organisms. Unlike fouling species, it is thought more likely to be spread by ballast water transfer or by the movement of dredges and dredge spoil material (NIMPIS 2014).

5. REFERENCES

Appeltans, W., Bouchet, P., Boxshall, G.A., De Broyer, C., de Voogd, N.J., Gordon, D.P., Hoeksema, B.W., Horton, T., Kennedy, M., Mees, J., Poore, G.C.B., Read, G., Stöhr, S., Walter, T.C. and Costello, M.J. (eds) (2012). *World Register of Marine Species.* [online] Available at: http://www.marinespecies.org Accessed Oct. 2014.

Blott, S.J. and Pye, K. (2001) GRADISTAT: a grain size distribution and statistics package for the analysis of unconsolidated sediments. *Earth Surface Processes and Landforms* 26, 1237-1248.

Chainho, P., Costa, J.L., Chaves, M.L., Dauer, D.M. and Costa, M.J. (2007). Influence of seasonal variability in benthic invertebrate community structure on the use of biotic indices to assess the ecological status of a Portuguese estuary. *Marine Pollution Bulletin* 54(10): 1586-1597.

Clarke, K. R. and Warwick, R. M. (2001). *Change in marine communities: an approach to statistical analysis and interpretation, 2nd edition*. PRIMER-E: Plymouth.

Clarke, K. R., and Gorley, R. N. (2006). *Primer v6: User Manual/Tutorial*. Primer-E Ltd, Plymouth, UK. 190pp.

Clarke K. R., Somerfield P. J. and Gorley R. N. (2008). Testing of null hypotheses in exploratory community analyses: similarity profiles and biota-environment linkage. *Journal of Experimental Marine Biology and Ecology* 366 56–69.

Connor, D. W., Allen, J. H., Golding, N., Howell, K. L., Lieberknecht, L. M., Northen, K. O. and Reker, J. B. (2004). The Marine Habitat Classification for Britain and Ireland Version 04.05 JNCC, Peterborough, ISBN 1 861 07561 8 (internet version). Available online at: www.jncc.defra.gov.uk/MarineHabitatClassification.

Dauvin, J.C., Alizier, S., Rolet, C., Bakalem, A., Bellan, G., Gomez Gesteira, J.L., Grimes, S., de-la-Ossa-Carretero, J.A., del-Pilar-Ruso, Y., 2012. Response of different benthic indices to diverse human pressures. *Ecological Indicators* 12, 143–153.

Folk, R.L. (1954). The distinction between grain size and mineral composition in sedimentary rock nomenclature. *Journal of Geology*, **62(4)**, 344-359.

Foster-Smith, J. (2000). *The Marine Fauna and Flora of the Cullercoats District: Marine Species Records for the North East Coast of England, Vol. 1*. Penshaw Press. 578 pages.

Garrison, T. (2009). Oceanography: An Invitation to Marine Science. Cengage Learning. 582 pages.

Gray, J.S. and Elliott, M. (2009). Ecology of Marine Sediments: from Science to Management. 2nd ed. Oxford: Oxford University Press. ISBN 978-0-19-856902-2.

Hooper, G., Barfield, P., Thomas, N. and Capasso, E. (2011). *Redefining biotopes at a regional scale and development of a new MNCR biotope decision support tool.* Final report for the MALSF (Marine Aggregate Levy Sustainability Fund), 1/J/1/03/1552/1103, Portchester: EMU.

Meire, P. M. and Dereu, J. (1990). Use of the abundance/biomass comparison method for detecting environmental stress: some considerations based on intertidal macrozoobenthos and bird communities. Journal of Applied Ecology, 27, 210-223.

NIMPIS 2014, Euchone limnicola general information, National Introduced Marine Pest Information System, viewed 17 October 2014 <http://www.marinepests.gov.au/nimpis>.

Natural England & the Joint Nature Conservation Committee (2010). *Marine Conservation Zone Project Ecological Network Guidance*. 144pp. Available online at: http://jncc.defra.gov.uk/PDF/100705_ENG_v10.pdf

Warwick, R. M. (1986). A new method for detecting pollution effects on marine macrobenthic communities. *Mar. Biol,* 92, 557-562.

Warwick, R. M. and Clarke, K. R. (1994). Relearning the ABC: taxonomic changes and abundance/biomass relationships in disturbed benthic communities. *Mar. Biol,* 118, 739-744.

Witbaard, R. and Bergman, M.J.N., 2003. The distribution and population structure of the bivalve *Arctica islandica* L. in the North Sea: what possible factors are involved? *J. Sea Res.,* 50, pp.11 – 25.

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A. SAMPLING LOGS AND PHOTOGRAPHIC RECORD

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A.1 GRAB LOG

Site No.	Date	Fauna Lab. Ref. No.	PSA Lab. Ref. No.	Time (BST)	Depth (m)	OSGB36		Good sample?	Fauna (Day grab - volume L)	PSA (ml)	Photograph of sample?
						Eastings	Northings				
AC01	25/07/2014	12693	12653	08:45	9.1	454125.48	523888.46	Y	Full	100	Y
AC02	25/07/2014	12694	12654	09:37	11.4	454255.62	523762.85	Y	Half	100	Y
AC03	30/07/2014	12695	12655	16:33	9.9	454373.87	523672.11	N			
AC04	28/07/2014	12696	12656	16:24	-0.3	454438.75	524302.91	Y	1/3rd	100	Y
AC05	28/07/2014	12697	12657	15:09	10.5	454584.85	524260.25	Y	Full	100	Y
AC06	28/07/2014	12698	12658	15:30	13.7	454725.98	524219.14	Y	Full	100	Y
AC07	29/07/2014	12711	12671	07:34	13.5	454316.30	525954.52	Y	Full	100	Y
AC08	29/07/2014	12700	12660	08:03	13.9	454505.78	525977.00	Y	Full	100	Y
AC09	29/07/2014	12701	12661	10:49	14.6	454663.51	525988.88	Y	Full	100	Y
AC10	29/07/2014	12702	12662	09:47	10.2	454299.65	526680.08	Y	Full	100	Y
AC11	29/07/2014	12703	12663	10:06	14.8	454503.31	526637.18	Y	Half	100	Y
AC12	29/07/2014	12704	12664	13:59	13.9	454648.93	526599.69	Y	Half	100	Y
BP01	28/07/2014	12705	12665	16:49	8.6	454871.59	524640.92	Y	1/3rd (4.5l)	100	Y
BP02	28/07/2014	12706	12666	17:21	11.6	454795.36	524644.01	Y	Full	100	Y
BP03	30/07/2014	12707	12667	12:47	11.9	454713.24	524637.60	Y	Full	100	Y
BP04	30/07/2014	12708	12668	11:35	10.9	454621.46	524649.57	Y	Full	100	Y
BP05	30/07/2014	12709	12669	11:24	5.7	454547.48	524647.31	Y	Full	100	Y
BP06		12710	12670								
BP07	24/07/2014	12699	12659	17:19	9.7	454821.72	524848.65	Y	Full	100	Y
BP08	30/07/2014	12712	12672	13:39	10.6	454723.31	524846.06	Y	Full	100	Y
BP09	30/07/2014	12713	12673	13:55	10.9	454649.41	524844.61	Y	Full	100	Y
BP10	30/07/2014	12714	12674	14:11	7.6	454531.32	524847.49	Y	Full	100	Y
BP11		12715	12675								
BP12	30/07/2014	12716	12676	15:56	2.6	454848.62	525049.27	Y	Full	100	Y
BP13	30/07/2014	12717	12677	15:07	10.9	454726.97	525038.29	Y	Full	100	Y

BP14	30/07/2014	12718	12678	16:10	11.1	454641.92	525049.39	Y	Full	100	Y
BP15	28/07/2014	12719	12679	17:26	8.0	454528.45	525045.45	Y	Full	100	Y
BP16		12720	12680								
BP17	28/07/2014	12721	12681	16:56	5.9	454835.90	525240.32	Y	Full	100	Y
BP18	28/07/2014	12722	12682	16:28	13.3	454743.92	525245.03	Y	Full	100	Y
BP19	28/07/2014	12723	12683	15:56	13.3	454610.03	525244.39	Y	Full	100	Y
BP20	28/07/2014	12724	12684	15:38	14.7	454508.83	525245.54	Y	Full	100	Y
BP21	28/07/2014	12725	12685	15:17	4.1	454804.16	525444.79	Y	Full	100	Y
BP22	28/07/2014	12726	12686	15:01	13.8	454692.81	525442.06	Y	Full	100	Y
BP23	28/07/2014	12727	12687	14:37	13.5	454552.06	525441.16	Y	Full	100	Y
BP24	28/07/2014	12728	12688	14:25	13.7	454471.47	525447.11	Y	Full	100	Y

Abandoned sites

Site No.	*In-situ* sediment description	Sediment features (includes: burrows, tubes, casts, smell)	Sediment anoxia (includes: None, streaks, patches, layers, depth of layer)	Anthropogenic features (includes: sewage derived material, other)	Conspicuous Fauna
AC01	Anoxic slightly sandy mud	N/A	Total	N/A	Nephtys
AC02	Anoxic gravelly mud	N/A	All mud anoxic	N/A	N/A
AC03					
AC04	Slightly silty sand	None	Patches	None	None
AC05	Anoxic mud	None	All	None	None
AC06	Anoxic mud	None	All	None	None
AC07	Anoxic mud	None	None	None	None
AC08	Sandy mud	None	None	None	None
AC09	Anoxic mud	None	All	None	None
AC10	Anoxic mud	None	All	None	None
AC11	Slightly anoxic sand	None	Streaks	None	None

AC12	Anoxic mud	None	All	None	None
BP01	Sandy anoxic mud with stones	None	All	None	None
BP02	Anoxic mud	None	All	None	Nephtys
BP03	Anoxic mud	None	All	None	None
BP04	Anoxic mud	None	All	None	None
BP05	Slightly sandy anoxic mud	Borrows	All	None	None
BP06					
BP07	Slightly sandy anoxic mud	None	All	None	None
BP08	Anoxic mud	None	All	None	None
BP09	Anoxic mud	None	All	None	None
BP10	Anoxic mud	None	All	None	None
BP11					
BP12	Anoxic mud	None	All	None	None
BP13	Anoxic mud	None	All	None	None
BP14	Anoxic mud	None	All	None	None
BP15	Anoxic mud	N	All	None	None
BP16					
BP17	Anoxic mud	N	All	None	None
BP18	Anoxic mud	N	All	None	None
BP19	Anoxic mud	N	All	None	None
BP20	Anoxic mud	N	All	None	None
BP21	Anoxic mud	N	All	None	None
BP22	Anoxic mud	N	All	None	None
BP23	Anoxic mud	N	All	None	None
BP24	Anoxic mud	N	All	None	None

Abandoned sites

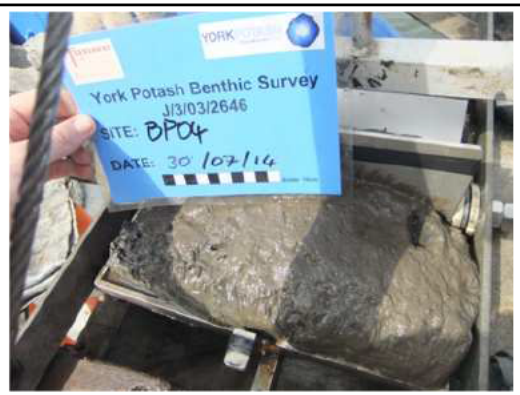
A.2 GRAB PHOTOS

AC01			
AC02			
AC04			No Image

AC05			
AC06			
AC07			No Image

AC08			
AC09			
AC10	No Image		

AC11			
AC12			
BP01	No Image		

BP02			
BP03			
BP04			

BP05			
BP07			No Image
BP08			

BP09			
BP10			
BP12			

BP13			
BP14			
BP15			

BP17			
BP18			
BP19			

BP20			
BP21			
BP22			

BP23	 York Potash Benthic Survey J/3/03/2646 SITE: BP23 DATE: 29/07/14		 York Potash Benthic Survey J/3/03/2646 SITE: BP23 DATE: 29/07/14
BP24	 York Potash Benthic Survey J/3/03/2646 SITE: BP24 DATE: 29/07/14		 York Potash Benthic Survey J/3/03/2646 SITE: BP24 DATE: 29/07/14

A.3 TRAWL LOG

2m Beam Trawling Positions and Related Information

Site No	Date	Type of Gear	Point on line	OSGB36		Time (GMT+1)	Depth (m)	Length of wire out (m)	Trawl Speed (knots)	Distance (m)	Direction of Travel	Comments
				Easting	Northing							
AC02	27/07/14	2m Beam with chains	Start	454270.98	523773.88	11:35	WD12.9	20	1.5	255	Into current	
AC02	27/07/14		End	454409.21	523987.90	11:40						
AC05	27/07/14	2m Beam with chains	Start	454584.56	524278.30	13:31	WD 13.1	30	1.5	235	Into current	Beam trawl did not fish effectively so a redeployment was required.
AC05	27/07/14		End	454560.15	524512.31	13:36						
AC05A	27/07/14	2m Beam with chains	Start	454578.64	524224.81	13:56	WD 13.0	30	1.5	247	Into current	
AC05A	27/07/14		End	454593.97	524471.19	14:01						
AC08	26/07/14	2m Beam with chains	Start	454490.05	525968.10	16:17	WD18.7	37	1.5	256	Into current	
AC08	26/07/14		End	454422.02	526215.20	16:22						
AC11	260/7/14	2m Beam with chains	Start	454489.46	526613.63	15:28	WD19.0	37	1.5	233	Into current	
AC11	26/07/14		End	454483.28	526846.57	15:33						
BP02	25/07/14	2m Beam with chains	Start	454812.90	524644.30	17:28	WD12.7	37	1.5	209	Into current	
BP02	25/07/14		End	454872.60	524444.40	17:33						
BP04	27/07/14	2m Beam with chains	Start	454630.70	524635.85	14:23	WD 14.1	30	1.5	218	Into current	
BP04	27/07/14		End	454612.96	524852.91	14:28						
BP12	260/7/14	2m Beam with chains	Start	454836.16	525045.13	14:51	WD18.7	37	1.5	259	Into current	
BP12	26/07/14		End	454735.88	525283.55	14:56						
BP14	27/07/14	2m Beam with chains	Start	454627.13	525022.01	12:40	WD 13.1	30	1.5	259	Into current	
BP14	27/07/14		End	454615.00	525280.90	12:45						
BP21	27/07/14	2m Beam with chains	Start	454792.24	525430.93	15:39	WD19.0	30	1.5	254	Into current	
BP21	27/07/14		End	454701.65	525668.00	15:44						
BP23	27/07/14	2m Beam with chains	Start	454549.89	525431.15	11:33	WD14.9	37	1.5	238	Into current	Beam trawl net was full of muddy sediment, upon recovery the string holding the cod end closed snapped
BP23	27/07/14		End	454498.42	525663.28	11:38						

												releasing the sample into the water. Resampled.
BP23A	27/07/14	2m Beam	Start	454569.23	525449.07	17:57	WD 18.3	30	1.5	255	Into	
BP23A	27/07/14	with chains	End	454586.66	525195.09	18:02					current	

A.4 TRAWL PHOTOS

AC02

AC05

AC05A

AC08

AC11

BP02

BP04

BP12

BP14

BP21


York Potash Benthic Survey
SITE: BP21
DATE: 27.7.14

BP23


York Potash Benthic Survey
SITE: BP 23
DATE: 27.7.14

B. PSD ANALYSIS – FULL RESULTS

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Test Results: Particle Size Distribution by Dry Sieving (63000 - 1000 µm) and Laser Diffraction (< 1000 - < 0.09 µm) @ 0.5 Phi Intervals
Fugro EMU Job Number: J/3/08/2646
Job Reference: York Potash Benthic Survey

SAMPLE ID:	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04
LAB ID:	12653	12654	12656	12657	12658	12671	12660	12661	12662	12663	12664	12665	12666	12667	12668
Aperture [µm]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]
63000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.05	0.00	0.00	0.00
5600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.05	0.00
4000	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.27	0.00	0.00	0.00
2800	0.00	0.10	0.20	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	5.13	0.00	0.04	0.01
2000	0.00	0.43	0.21	0.02	0.00	0.01	0.03	0.00	0.02	0.06	0.00	5.90	0.00	0.00	0.13
1400	0.00	1.84	0.31	0.02	0.00	0.00	0.02	0.03	0.01	0.08	0.00	8.55	0.00	0.02	0.02
1000	0.00	3.23	0.53	0.06	0.00	0.01	0.03	0.10	0.01	0.12	0.00	7.18	0.00	0.01	0.04
707	0.00	4.68	1.16	0.25	0.03	0.20	0.27	0.19	0.90	0.77	0.32	3.70	0.02	0.00	0.35
500	0.06	4.74	6.40	0.27	0.09	0.41	0.49	0.56	1.22	1.08	0.59	3.80	0.15	0.13	0.62
354	0.21	3.91	18.38	0.38	0.20	0.66	0.70	1.30	2.02	5.17	0.89	3.57	0.26	0.33	1.07
250	0.34	2.76	28.78	0.67	0.35	1.49	1.21	2.53	4.05	14.36	1.56	3.14	0.43	0.66	1.96
177	0.73	2.04	25.81	1.23	0.76	3.35	2.27	3.88	7.14	23.37	2.98	2.59	0.93	1.45	3.29
125	1.60	2.07	12.40	2.32	1.65	5.82	3.73	4.88	9.65	23.83	5.08	2.20	2.00	2.80	4.69
88	3.07	2.75	2.00	4.58	3.11	7.76	5.19	5.56	10.35	15.04	7.22	2.24	3.65	4.52	5.82
63	5.14	3.88	0.00	6.77	5.15	8.68	6.53	6.41	9.73	5.23	8.81	2.74	5.66	6.27	6.86
44.19	7.46	5.19	0.02	8.22	7.49	8.98	7.80	7.59	8.83	0.81	9.58	3.43	7.69	7.76	7.96
31.25	9.39	6.33	0.56	9.14	9.51	9.01	8.86	8.62	7.82	0.87	9.47	4.05	9.27	8.73	8.80
22.10	10.46	7.06	0.61	9.61	10.74	8.70	9.43	8.99	6.62	1.67	8.72	4.45	10.17	9.11	9.03
15.63	10.70	7.39	0.32	9.66	11.13	8.10	9.49	8.73	5.56	1.57	7.88	4.66	10.47	9.09	8.76
11.05	10.34	7.44	0.25	9.40	10.84	7.46	9.19	8.20	5.00	1.08	7.33	4.71	10.31	8.91	8.32
7.81	9.61	7.27	0.39	8.90	10.02	6.89	8.60	7.63	4.81	0.86	6.97	4.57	9.72	8.65	7.80
5.52	8.54	6.82	0.50	8.04	8.68	6.22	7.64	6.90	4.51	0.93	6.38	4.16	8.59	8.14	7.01
3.91	7.13	5.99	0.47	6.73	6.92	5.24	6.24	5.82	3.82	0.97	5.32	3.47	6.95	7.15	5.79
2.76	5.41	4.76	0.36	5.03	4.95	3.94	4.54	4.38	2.83	0.84	3.91	2.59	5.03	5.62	4.26
1.95	3.66	3.36	0.24	3.29	3.13	2.59	2.90	2.88	1.84	0.58	2.54	1.71	3.22	3.87	2.76
1.38	2.27	2.16	0.03	1.95	1.83	1.57	1.70	1.73	1.13	0.35	1.54	1.03	1.91	2.42	1.64
0.98	1.51	1.47	0.00	1.30	1.23	1.07	1.14	1.16	0.79	0.22	1.07	0.67	1.30	1.62	1.11
0.69	1.22	1.18	0.00	1.10	1.09	0.93	1.01	1.00	0.69	0.12	0.94	0.54	1.13	1.34	0.97
0.49	0.90	0.87	0.00	0.83	0.85	0.72	0.78	0.76	0.52	0.00	0.72	0.40	0.87	1.00	0.75
0.35	0.25	0.29	0.00	0.22	0.23	0.17	0.18	0.18	0.12	0.00	0.17	0.09	0.26	0.32	0.18
0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
< 0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Particle Size Distribution by Dry Sieving (63000 - 1000 µm) and Laser Diffraction (< 1000 - < 0.09 µm) @ 0.5 Phi Intervals
J/3/08/2646
York Potash Benthic Survey

BP05	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
12669	12659	12672	12673	12674	12676	12677	12678	12679	12681	12682	12683	12684	12685	12686	12687	12688
Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]	Fractional [%]
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.01	0.00	0.05	0.05	0.00	0.00
0.02	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.02	0.04	0.01	0.00	0.00
0.23	0.01	0.14	0.25	0.00	0.12	0.14	0.23	0.05	0.05	0.05	0.12	0.04	0.14	0.29	0.13	0.02
0.75	0.16	0.29	0.49	0.06	0.39	0.35	0.59	0.26	0.25	0.20	0.34	0.21	0.38	0.55	0.44	0.27
1.76	0.36	0.53	0.89	0.17	0.95	0.63	1.05	0.40	0.56	0.44	0.60	0.37	0.63	0.97	0.99	0.50
3.19	0.59	1.05	1.87	0.37	2.13	1.10	1.97	0.64	1.11	0.77	1.09	0.67	1.10	1.83	1.93	0.94
4.65	1.13	2.16	3.64	0.87	4.07	2.08	3.61	1.40	2.25	1.52	2.08	1.44	1.96	3.15	3.58	1.96
5.73	2.19	3.82	5.71	1.89	6.38	3.58	5.57	2.85	4.01	2.84	3.57	2.79	3.26	4.60	5.56	3.63
6.37	3.77	5.64	7.25	3.46	8.25	5.34	7.10	4.77	5.91	4.58	5.32	4.57	4.82	5.88	7.09	5.65
6.83	5.73	7.25	8.01	5.50	9.09	7.02	7.96	6.79	7.47	6.50	7.08	6.58	6.45	7.03	7.94	7.62
7.29	7.76	8.47	8.33	7.73	9.06	8.37	8.46	8.57	8.58	8.29	8.60	8.53	7.94	8.15	8.39	9.23
7.66	9.40	9.17	8.33	9.58	8.66	9.08	8.68	9.73	9.17	9.50	9.54	9.90	8.96	8.95	8.52	10.07
7.80	10.34	9.30	7.97	10.64	8.24	9.10	8.56	10.12	9.26	9.89	9.70	10.35	9.34	9.13	8.24	10.08
7.73	10.58	9.01	7.43	10.90	7.87	8.75	8.20	9.96	8.99	9.66	9.35	10.03	9.25	8.79	7.73	9.61
7.56	10.28	8.57	7.01	10.56	7.47	8.42	7.81	9.54	8.56	9.20	8.83	9.35	8.96	8.26	7.31	9.01
7.27	9.54	8.05	6.81	9.77	6.90	8.14	7.36	8.88	8.01	8.64	8.23	8.56	8.53	7.68	7.04	8.26
6.68	8.34	7.29	6.51	8.52	6.06	7.56	6.59	7.80	7.20	7.81	7.34	7.59	7.78	6.92	6.62	7.13
5.69	6.73	6.14	5.80	6.83	4.92	6.45	5.40	6.25	6.01	6.53	6.04	6.27	6.55	5.79	5.75	5.60
4.35	4.86	4.63	4.60	4.89	3.58	4.88	3.92	4.45	4.50	4.88	4.42	4.64	4.93	4.33	4.42	3.91
2.94	3.10	3.08	3.19	3.09	2.30	3.24	2.51	2.79	2.99	3.20	2.85	3.00	3.26	2.84	2.98	2.42
1.82	1.82	1.88	2.03	1.79	1.35	1.99	1.49	1.63	1.82	1.93	1.69	1.78	1.98	1.70	1.84	1.40
1.24	1.22	1.28	1.42	1.21	0.87	1.38	1.02	1.12	1.23	1.32	1.16	1.20	1.35	1.15	1.27	0.97
1.03	1.07	1.09	1.21	1.10	0.69	1.19	0.90	1.01	1.03	1.15	1.02	1.05	1.16	0.99	1.10	0.88
0.77	0.83	0.84	0.93	0.86	0.52	0.92	0.70	0.80	0.78	0.88	0.79	0.82	0.90	0.77	0.85	0.69
0.21	0.20	0.23	0.32	0.20	0.13	0.28	0.17	0.19	0.25	0.23	0.19	0.22	0.28	0.21	0.27	0.16
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Test Results: Particle Size Distribution by Dry Sieving (63000 - 1000 µm) and Laser Diffraction (< 1000 - < 0.09 µm) @ 0.5 Phi Intervals
Fugro EMU Job Number: J/3/08/2646
Job Reference: York Potash Benthic Survey

	SAMPLE ID:	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02
	LAB ID:	12653	12654	12655	12657	12658	12671	12660	12661	12662	12663	12664	12665	12666
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Moderately Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Polymodal, Very Poorly Sorted	Unimodal, Poorly Sorted
	FOLK [1954 ORIGINAL]:	Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sand	Slightly Gravelly Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Muddy Sand	Sandy Mud	Gravelly Mud	Sandy Mud
	FOLK [BGS MODIFIED]:	Sandy Mud	Sandy Mud	Sand	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Muddy Sand	Sandy Mud	Gravelly Mud	Sandy Mud
	SEDIMENT NAME:	Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Coarse Sandy Medium Silt	Slightly Very Fine Gravelly Medium Sand	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Very Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Very Coarse Silt	Slightly Very Fine Gravelly Coarse Silty Fine Sand	Very Fine Sandy Very Coarse Silt	Very Fine Gravelly Medium Silt	Very Fine Sandy Coarse Silt
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	29.27	201.73	317.16	41.18	30.14	57.29	49.27	60.48	97.12	191.33	58.25	1316.31	32.44
	SORTING:	43.47	397.76	270.67	97.32	46.47	87.87	99.66	105.63	134.66	155.76	92.27	2279.74	51.16
	SKEWNESS:	4.95	2.91	7.66	14.01	5.55	5.49	8.71	5.00	3.60	6.06	4.27	2.55	5.50
	KURTOSIS:	42.63	13.43	94.79	342.56	63.70	70.53	143.58	45.75	31.09	89.28	28.42	9.21	51.89
METHOD OF MOMENTS Geometric [µm]	MEAN:	14.28	32.10	249.08	16.92	14.97	24.26	19.34	22.36	40.53	134.16	24.15	166.51	15.38
	SORTING:	3.47	7.55	2.22	3.79	3.37	4.13	3.99	4.35	4.49	2.86	4.13	12.97	3.52
	SKEWNESS:	-0.21	0.31	-2.54	-0.07	-0.20	-0.29	-0.04	-0.07	-0.51	-2.04	-0.26	-0.19	-0.17
	KURTOSIS:	2.93	2.20	14.77	2.94	2.99	2.64	2.82	2.60	2.74	9.20	2.69	1.79	2.89
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	6.13	4.96	2.01	5.89	6.06	5.37	5.69	5.48	4.62	2.90	5.37	2.59	6.02
	SORTING:	1.79	2.92	1.15	1.92	1.75	2.04	2.00	2.12	2.17	1.52	2.05	3.70	1.82
	SKEWNESS:	0.21	-0.31	2.54	0.07	0.20	0.29	0.04	0.07	0.51	2.04	0.26	0.19	0.17
	KURTOSIS:	2.83	2.20	14.77	2.94	2.99	2.64	2.82	2.60	2.74	9.20	2.69	1.78	2.89
FOLK AND WARD METHOD [µm]	MEAN:	14.54	35.95	269.50	17.05	15.24	24.86	19.52	22.84	40.88	160.57	24.59	172.50	15.66
	SORTING:	3.49	8.51	1.65	3.74	3.35	4.17	3.98	4.47	4.51	2.31	4.15	13.62	3.52
	SKEWNESS:	-0.07	0.23	-0.01	-0.05	-0.05	-0.10	-0.01	0.00	-0.23	-0.27	-0.11	-0.14	-0.04
	KURTOSIS:	0.97	0.88	1.10	0.93	0.98	0.89	0.95	0.94	0.91	1.87	0.91	0.71	0.97
FOLK AND WARD METHOD [Phi]	MEAN:	6.10	4.80	1.89	5.87	6.04	5.33	5.68	5.45	4.61	2.64	5.35	2.54	6.00
	SORTING:	1.80	3.09	0.73	1.90	1.75	2.06	1.99	2.16	2.17	1.21	2.05	3.77	1.81
	SKEWNESS:	0.07	-0.23	0.01	0.05	0.05	0.10	0.01	0.00	0.23	0.27	0.11	0.14	0.04
	KURTOSIS:	0.97	0.88	1.10	0.93	0.98	0.89	0.95	0.94	0.91	1.87	0.91	0.71	0.97
FOLK AND WARD METHOD [Description]	MEAN:	Medium Silt	Very Coarse Silt	Medium Sand	Coarse Silt	Medium Silt	Coarse Silt	Coarse Silt	Coarse Silt	Very Coarse Silt	Fine Sand	Coarse Silt	Fine Sand	Coarse Silt
	SORTING:	Poorly Sorted	Very Poorly Sorted	Moderately Sorted	Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Coarse Skewed	Symmetrical	Symmetrical	Symmetrical	Fine Skewed	Symmetrical	Symmetrical	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed	Symmetrical
	KURTOSIS:	Mesokurtic	Platykurtic	Mesokurtic	Mesokurtic	Mesokurtic	Platykurtic	Mesokurtic	Mesokurtic	Mesokurtic	Very Leptokurtic	Mesokurtic	Platykurtic	Mesokurtic
	MODE 1 [µm]:	18.86	13.34	301.78	18.86	18.86	37.72	18.86	26.67	106.69	150.89	53.35	1700.00	18.86
	MODE 2 [µm]:	0.00	603.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9600.00	0.00
	MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.34	0.00
	MODE 1 [Phi]:	5.75	6.25	1.75	5.75	5.75	4.75	5.75	5.25	3.25	2.75	4.25	-0.74	5.75
	MODE 2 [Phi]:	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.24	0.00
	MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00
	D10 [µm]:	2.79	2.90	140.81	3.02	3.10	3.58	3.29	3.31	4.72	43.20	3.61	5.25	3.02
	D50 [µm]:	15.19	23.21	266.66	17.53	15.73	27.06	19.50	22.64	51.56	164.45	27.19	239.78	15.99
	D90 [µm]:	67.52	721.74	489.59	87.58	68.38	140.50	115.12	159.85	229.48	331.29	137.74	3659.91	75.57
	(D90 / D10) [µm]:	24.16	248.69	3.48	28.98	22.09	39.27	35.03	48.29	48.64	7.67	38.17	697.59	24.99
	(D90 - D10) [µm]:	64.72	718.84	348.78	84.55	65.28	136.92	111.83	156.54	224.76	288.10	134.13	3654.67	72.55
	(D75 / D25) [µm]:	5.67	20.14	1.90	6.53	5.28	8.06	6.89	8.12	8.61	2.19	7.82	95.13	5.74
	(D75 - D25) [µm]:	28.75	135.79	175.14	37.14	26.61	62.72	43.73	56.09	110.59	129.41	60.02	1590.14	31.18
	D10 [Phi]:	3.89	0.47	1.03	3.51	3.87	2.83	3.12	2.65	2.12	1.59	2.86	-1.87	3.73
	D50 [Phi]:	6.04	5.43	1.89	5.83	5.99	5.21	5.68	5.46	4.28	2.60	5.20	2.06	5.97
	D90 [Phi]:	8.48	8.43	2.83	8.37	8.34	8.13	8.25	8.24	7.73	4.53	8.11	7.57	8.37
	(D90 / D10) [Phi]:	2.18	17.92	2.74	2.38	2.15	2.87	2.65	3.11	3.64	2.84	2.84	4.05	2.25
	(D90 - D10) [Phi]:	4.59	7.96	1.80	4.86	4.47	5.30	5.13	5.59	5.60	2.94	5.25	9.45	4.64
	(D75 / D25) [Phi]:	1.62	2.64	1.66	1.60	1.60	1.70	1.66	1.76	2.04	1.55	1.77	6.60	1.69
	(D75 - D25) [Phi]:	2.50	4.33	0.93	2.71	2.40	3.01	2.79	3.02	3.11	1.13	2.97	6.57	2.52
	% GRAVEL [63000 - 2000 µm]:	0.00	0.53	0.48	0.04	0.00	0.01	0.03	0.00	0.02	0.09	0.00	19.75	0.00
	% SAND [< 2000 - 63 µm]:	11.15	31.90	95.78	16.55	11.34	28.39	20.45	25.43	45.09	89.05	27.45	39.71	13.10
	% MUD [< 63 µm]:	88.85	67.57	3.74	83.41	88.66	71.60	79.51	74.57	54.89	10.87	72.55	40.54	86.90
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.05	0.00
	% FINE GRAVEL:	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.67	0.00
	% V FINE GRAVEL:	0.00	0.53	0.41	0.04	0.00	0.01	0.03	0.00	0.02	0.09	0.00	11.03	0.00
	% V COARSE SAND:	0.00	5.07	0.84	0.08	0.00	0.02	0.04	0.13	0.02	0.20	0.00	15.73	0.00
	% COARSE SAND:	0.06	9.42	7.56	0.53	0.12	0.62	0.76	0.75	2.13	1.85	0.92	7.50	0.17
	% MEDIUM SAND:	0.55	6.67	47.16	1.05	0.55	2.15	1.92	3.82	6.07	19.53	2.45	6.71	0.69
	% FINE SAND:	2.33	4.11	38.22	3.55	2.41	9.17	6.01	8.76	16.79	47.20	8.06	4.79	2.94
	% V FINE SAND:	8.21	6.63	2.00	11.34	8.26	16.44	11.72	11.97	20.08	20.27	16.03	4.98	9.31
	% V COARSE SILT:	16.85	11.52	0.58	17.35	17.01	17.99	16.66	16.21	16.66	1.68	19.05	7.48	16.96
	% COARSE SILT:	21.16	14.46	0.92	19.27	21.07	16.60	19.92	17.72	12.10	0.24	16.61	9.11	20.64
	% MEDIUM SILT:	19.95	14.71	0.64	19.30	20.86	14.35	17.79	15.83	9.61	1.95	14.31	9.28	20.03
	% FINE SILT:	15.67	12.82	0.97	14.77	15.61	11.46	13.87	12.72	8.33	1.90	11.70	7.63	15.55
	% V FINE SILT:	9.07	8.12	0.60	8.32	8.09	6.53	7.45	7.26	4.67	1.42	8.45	4.31	8.25
	% CLAY:	6.15	5.96	0.03	5.41	5.24	4.47	4.82	4.83	3.25	0.69	4.44	2.74	5.47

Test Results: Particle Size Distribution by Dry Sieving (63000 - 1000 µm) and Laser Diffraction (< 1000 - < 0.09 µm) @ 0.5 Phi Intervals
Fugro EMU Job Number: J/3/08/2646
Job Reference: York Potash Benthic Survey

	SAMPLE ID:	BP03	BP04	BP05	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18
	LAB ID:	12667	12668	12669	12659	12672	12673	12674	12676	12677	12678	12679	12681	12682
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted
	FOLK [1954 ORIGINAL]:	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud
	FOLK [BGS MODIFIED]:	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud
	SEDIMENT NAME:	Slightly Fine Gravelly Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Slightly Fine Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Very Coarse Silt	Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	40.96	61.54	87.42	34.30	47.38	58.40	30.91	62.10	45.18	82.22	39.07	45.59	38.71
	SORTING:	175.16	137.55	321.24	54.30	99.23	90.77	44.18	85.74	75.52	109.95	61.49	68.91	51.50
	SKEWNESS:	31.43	9.96	13.06	5.01	13.44	3.89	4.55	3.30	4.72	6.59	5.05	4.06	4.62
	KURTOSIS:	1147.62	157.60	190.12	41.34	325.88	25.12	37.28	19.72	35.61	80.37	42.14	28.37	39.04
METHOD OF MOMENTS Geometric [µm]	MEAN:	15.61	22.23	24.86	16.07	19.26	22.36	15.40	27.00	18.44	24.41	17.99	19.67	17.18
	SORTING:	3.94	4.27	4.81	3.54	4.00	4.51	3.41	4.07	4.05	4.23	3.64	3.95	3.77
	SKEWNESS:	-0.08	-0.05	0.00	-0.15	-0.15	-0.24	-0.22	-0.30	-0.15	-0.18	-0.19	-0.21	-0.17
	KURTOSIS:	2.92	2.76	2.79	2.90	2.75	2.48	2.90	2.59	2.67	2.65	2.86	2.66	2.76
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	6.00	5.49	5.33	5.96	5.70	5.48	6.02	5.21	5.76	5.36	5.80	5.67	5.86
	SORTING:	1.98	2.10	2.27	1.82	2.00	2.17	1.77	2.03	2.02	2.08	1.87	1.98	1.91
	SKEWNESS:	0.08	0.05	0.00	0.15	0.15	0.24	0.22	0.30	0.15	0.18	0.19	0.21	0.17
	KURTOSIS:	2.82	2.75	2.73	2.90	2.75	2.48	2.90	2.58	2.67	2.65	2.86	2.66	2.76
FOLK AND WARD METHOD [µm]	MEAN:	15.83	22.51	25.15	16.28	19.55	22.89	15.71	27.59	18.73	24.92	18.29	20.06	17.42
	SORTING:	3.96	4.31	4.87	3.52	4.02	4.63	3.41	4.14	4.09	4.27	3.63	3.99	3.79
	SKEWNESS:	-0.04	-0.01	-0.01	-0.04	-0.06	-0.09	-0.05	-0.10	-0.05	-0.05	-0.05	-0.06	-0.06
	KURTOSIS:	0.93	0.94	0.89	0.97	0.93	0.88	0.97	0.88	0.93	0.90	0.95	0.92	0.95
FOLK AND WARD METHOD [Phi]	MEAN:	5.98	5.47	5.31	5.94	5.68	5.45	5.99	5.18	5.74	5.33	5.77	5.64	5.84
	SORTING:	1.98	2.11	2.28	1.82	2.01	2.21	1.77	2.05	2.03	2.10	1.86	2.00	1.92
	SKEWNESS:	0.04	0.01	0.01	0.04	0.06	0.09	0.05	0.10	0.05	0.05	0.05	0.06	0.06
	KURTOSIS:	0.93	0.94	0.89	0.97	0.93	0.88	0.97	0.88	0.93	0.90	0.95	0.92	0.95
FOLK AND WARD METHOD [Description]	MEAN:	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt
	SORTING:	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Fine Skewed	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical
	KURTOSIS:	Mesokurtic	Mesokurtic	Platykurtic	Mesokurtic	Mesokurtic	Platykurtic	Mesokurtic	Platykurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic
	MODE 1 [µm]:	26.67	26.67	26.67	18.86	26.67	37.72	18.86	75.44	26.67	37.72	26.67	26.67	26.67
	MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 1 [Phi]:	5.25	5.25	5.25	5.75	5.25	4.75	5.75	3.75	5.25	4.75	5.25	5.25	5.25
	MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D10 [µm]:	2.63	3.41	3.24	3.13	3.11	2.95	3.12	4.06	2.96	3.67	3.34	3.20	3.03
	D50 [µm]:	16.21	22.65	24.92	16.69	20.39	24.69	16.22	30.06	19.46	25.81	18.94	20.95	18.18
	D90 [µm]:	88.36	146.82	190.86	79.29	111.15	148.64	72.35	155.64	109.00	152.28	90.69	112.64	91.00
	(D90 / D10) [µm]:	33.65	43.07	58.95	25.31	35.70	50.31	23.15	38.31	36.76	41.53	27.13	35.23	30.07
	(D90 - D10) [µm]:	85.74	143.41	187.62	76.16	108.03	145.69	69.22	151.58	106.04	148.61	87.34	109.44	87.97
	(D75 / D25) [µm]:	7.17	7.77	10.16	5.71	7.27	9.66	5.45	8.11	7.50	9.27	6.10	7.25	6.49
	(D75 - D25) [µm]:	36.59	54.12	72.46	32.27	45.72	64.11	30.17	69.87	44.49	63.24	38.03	46.98	37.65
	D10 [Phi]:	3.50	2.77	2.39	3.66	3.17	2.75	3.79	2.68	3.20	2.72	3.46	3.15	3.46
	D50 [Phi]:	5.95	5.46	5.33	5.91	5.62	5.33	5.95	5.05	5.68	5.27	5.72	5.58	5.78
	D90 [Phi]:	8.57	8.20	8.27	8.32	8.33	8.40	8.32	7.94	8.40	8.09	8.22	8.29	8.37
	(D90 / D10) [Phi]:	2.45	2.96	3.46	2.27	2.63	3.06	2.20	2.96	2.63	2.98	2.38	2.63	2.42
	(D90 - D10) [Phi]:	5.07	5.43	5.88	4.66	5.16	5.65	4.53	5.26	5.20	5.38	4.76	5.14	4.91
	(D75 / D25) [Phi]:	1.62	1.74	1.92	1.64	1.69	1.96	1.61	1.93	1.69	1.90	1.60	1.69	1.60
	(D75 - D25) [Phi]:	2.84	2.96	3.34	2.51	2.86	3.27	2.45	3.02	2.91	3.05	2.61	2.86	2.70
	% GRAVEL [63000 - 2000 µm]:	0.09	0.14	0.41	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	% SAND [< 2000 - 63 µm]:	16.18	24.71	29.54	13.94	20.92	28.11	12.32	31.38	20.25	28.22	17.14	21.61	16.89
	% MUD [< 63 µm]:	83.73	75.14	70.05	86.06	79.02	71.89	87.68	68.62	79.75	71.77	82.86	78.39	83.11
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% FINE GRAVEL:	0.05	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	% V FINE GRAVEL:	0.04	0.14	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	% V COARSE SAND:	0.02	0.07	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
	% COARSE SAND:	0.13	0.96	0.98	0.17	0.43	0.74	0.06	0.51	0.50	0.82	0.30	0.30	0.24
	% MEDIUM SAND:	0.99	3.02	4.95	0.95	1.58	2.76	0.54	3.08	1.74	3.02	1.03	1.66	1.20
	% FINE SAND:	4.24	7.98	10.37	3.32	5.98	9.35	2.76	10.45	5.66	9.18	4.25	6.26	4.36
	% V FINE SAND:	10.79	12.68	13.20	9.50	12.89	15.26	8.96	17.34	12.36	15.06	11.56	13.38	11.08
	% V COARSE SILT:	16.49	16.75	14.95	17.16	17.64	16.65	17.31	17.72	17.45	17.14	18.31	17.75	17.78
	% COARSE SILT:	19.20	17.79	15.53	20.91	19.31	15.40	21.64	18.11	17.05	16.76	20.00	19.25	19.55
	% MEDIUM SILT:	17.55	16.12	14.83	19.82	16.62	13.62	20.33	14.37	16.56	15.17	18.42	16.58	17.85
	% FINE SILT:	15.30	12.80	12.36	15.07	13.43	12.32	15.35	10.98	14.01	11.99	14.05	13.21	14.34
	% V FINE SILT:	9.50	7.02	7.29	7.97	7.72	7.79	7.98	5.88	8.12	6.43	7.25	7.49	8.09
	% CLAY:	6.69	4.65	5.07	5.13	5.32	5.91	5.17	3.56	5.76	4.26	4.75	5.11	5.51

Test Results: Particle Size Distribution by Dry Sieving (63000 - 1000 µm) and Laser Diffraction (< 1000 - < 0.09 µm) @ 0.5 Phi Int
Fugro EMU Job Number: J/3/09/2646
Job Reference: York Potash Benthic Survey

	SAMPLE ID:	BP19	BP20	BP21	BP22	BP23	BP24
	LAB ID:	12683	12684	12685	12686	12687	12688
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted
	FOLK [1954 ORIGINAL]:	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Slightly Gravelly Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud
	FOLK [BGS MODIFIED]:	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud
	SEDIMENT NAME:	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Slightly Very Fine Gravelly Very Fine Sandy Coarse Silt	Very Fine Sandy Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Coarse Silt
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	46.04	38.85	45.39	56.22	57.38	44.41
	SORTING:	82.71	65.63	96.81	99.47	86.33	65.45
	SKEWNESS:	8.53	8.85	12.36	5.53	3.56	4.16
	KURTOSIS:	160.25	196.04	309.40	55.94	21.66	29.19
METHOD OF MOMENTS Geometric [µm]	MEAN:	19.49	17.68	17.85	21.73	22.69	20.59
	SORTING:	3.89	3.68	4.01	4.20	4.37	3.68
	SKEWNESS:	-0.15	-0.20	-0.07	-0.11	-0.23	-0.24
	KURTOSIS:	2.79	2.95	2.90	2.69	2.51	2.94
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	5.68	5.82	5.81	5.52	5.46	5.60
	SORTING:	1.96	1.88	2.00	2.07	2.13	1.88
	SKEWNESS:	0.15	0.20	0.07	0.11	0.23	0.24
	KURTOSIS:	2.79	2.85	2.80	2.68	2.51	2.84
FOLK AND WARD METHOD [µm]	MEAN:	19.77	17.91	18.02	22.05	23.23	21.09
	SORTING:	3.89	3.67	4.02	4.26	4.47	3.68
	SKEWNESS:	-0.05	-0.07	-0.03	-0.03	-0.08	-0.07
	KURTOSIS:	0.95	0.96	0.95	0.94	0.69	0.95
FOLK AND WARD METHOD [Phi]	MEAN:	5.66	5.80	5.79	5.50	5.43	5.57
	SORTING:	1.96	1.88	2.01	2.09	2.16	1.88
	SKEWNESS:	0.05	0.07	0.03	0.03	0.09	0.07
	KURTOSIS:	0.95	0.96	0.95	0.94	0.69	0.95
FOLK AND WARD METHOD [Description]	MEAN:	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt
	SORTING:	Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical
	KURTOSIS:	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Platykurtic	Mesokurtic
	MODE 1 [µm]:	26.67	26.67	26.67	26.67	37.72	26.67
	MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 1 [Phi]:	5.25	5.25	5.25	5.25	4.75	5.25
	MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00
	MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00
	D10 [µm]:	3.31	3.19	2.98	3.33	3.15	3.76
	D50 [µm]:	20.56	18.91	18.37	22.56	24.87	22.07
	D90 [µm]:	109.60	89.23	104.98	139.35	147.26	106.06
	(D90 / D10) [µm]:	32.84	27.99	35.24	41.82	46.70	28.19
	(D90 - D10) [µm]:	105.30	86.04	102.00	136.02	144.11	102.29
	(D75 / D25) [µm]:	6.76	6.14	7.05	7.68	9.03	6.27
	(D75 - D25) [µm]:	43.96	37.35	40.99	52.87	62.42	44.51
	D10 [Phi]:	3.20	3.49	3.25	2.84	2.76	3.24
	D50 [Phi]:	5.60	5.72	5.77	5.47	5.33	5.50
	D90 [Phi]:	8.24	8.29	8.39	8.23	8.31	8.05
	(D90 / D10) [Phi]:	2.57	2.38	2.58	2.89	3.01	2.49
	(D90 - D10) [Phi]:	5.04	4.81	5.14	5.39	5.55	4.82
	(D75 / D25) [Phi]:	1.64	1.59	1.64	1.73	1.89	1.62
	(D75 - D25) [Phi]:	2.76	2.62	2.82	2.94	3.17	2.65
	% GRAVEL [63000 - 2000 µm]:	0.02	0.01	0.02	0.00	0.00	0.00
	% SAND [< 2000 - 63 µm]:	20.22	16.70	18.83	24.35	27.66	20.59
	% MUD [< 63 µm]:	79.76	83.29	81.15	75.65	72.34	79.41
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00
	% FINE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00
	% V FINE GRAVEL:	0.02	0.01	0.02	0.00	0.00	0.00
	% V COARSE SAND:	0.02	0.02	0.08	0.06	0.00	0.00
	% COARSE SAND:	0.46	0.25	0.52	0.84	0.57	0.29
	% MEDIUM SAND:	1.70	1.04	1.73	2.79	2.92	1.44
	% FINE SAND:	5.65	4.23	5.23	7.75	9.14	5.59
	% V FINE SAND:	12.40	11.15	11.27	12.91	15.03	13.27
	% V COARSE SILT:	18.14	18.43	16.86	17.09	16.91	19.30
	% COARSE SILT:	19.06	20.30	19.56	17.92	15.99	19.69
	% MEDIUM SILT:	17.06	17.91	17.48	15.94	14.36	17.27
	% FINE SILT:	13.38	13.85	14.33	12.71	12.37	12.73
	% V FINE SILT:	7.27	7.64	8.19	7.17	7.40	6.32
	% CLAY:	4.85	5.08	5.66	4.82	5.33	4.10

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C. GRAB BIOLOGICAL DATA

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C.1 INFAUNAL SPECIES ABUNDANCE MATRIX

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Virgularia mirabilis	128539	D0618									4	3						
ACTINIARIA	1360	D0662								1								27
Edwardsiidae	100665	D0759										5						1
CTENOPHORA	1248	E0001	1								12		2	4			9	
NEMERTEA	152391	G0001		1		4	1					2			1		1	
NEMATODA	799	HD0001	13	7		1	367	17	4	11	408	18	66	820	50	2	88	19
Priapulus caudatus	101160	J0007				1												1
SIPUNCULA (juv.)	1268	N0001																
POLYCHAETA	883	P0002	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P
Polynoidae	939	P0025		2														
Polynoidae (juv.)	939	P0025																
Gattyana cirrhosa	130749	P0049																2
Harmothoe	129491	P0050										2						
Malmgrenia andreapolis	147008	P0051											1					
Harmothoe glabra	571832	P0062																
Pholoe	129439	P0091				1												
Pholoe assimilis	130598	P0091	1				1		4									
Pholoe baltica	130599	P0092				1		3	1				10		1			
Pholoe inornata	130601	P0094											1	4			1	8
Sigalionidae (juv.)	943	P0096												4				
Phyllodocidae	931	P0114		1														
Eteone longa (agg.)	130616	P0118	2	10	2	8	5	1	4		12	22	17	4	3		14	2
Phyllodoce	129455	P0139		1		2							1		1			
Phyllodoce (juv.)	129455	P0139									4	1					5	
Phyllodoce groenlandica	334506	P0141						1		1	4		1					
Phyllodoce mucosa	334512	P0145		1		4	2					3	5		30		6	21

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Eumida (juv.)	129446	P0163										4						
Eumida sanguinea	130644	P0167												4				16
Glycera alba	130116	P0256											2					
Goniada maculata	130140	P0271						1										
Oxydromus flexuosus	710680	P0313						1										
Podarkeopsis capensis	130195	P0319															2	1
Alitta virens	234851	P0472																
Nephtys	129370	P0494				3												
Nephtys (juv.)	129370	P0494		2				4	16	4	12	21	9			1	7	
Nephtys assimilis	130353	P0495										1						
Nephtys caeca	130355	P0496																
Nephtys hombergii	130359	P0499			2	5	12	27	16	3	12	1	16		12	3	22	2
Nephtys hystricis	130360	P0500																
Nephtys incisa	130362	P0501															1	
Nephtys kersivalensis	130363	P0502		3	1	15	12	1							4	2	7	15
Paramphinome jeffreysii	129837	P0518	2			1			20	1			35				1	
Lumbrineridae (juv.)	967	P0569										1					3	
Scoletoma (juv.)	129340	P0569													2			
Ophryotrocha	129266	P0613	2	1		2	12		4		32	10	31	804	3		11	
Scoloplos armiger	334772	P0672		1		3		3	4		4	50	3				3	
Spionidae	913	P0720														1		
Aonides paucibranchiata	131107	P0723		1														
Malacoceros fuliginosus	131131	P0737			5						4			4				
Dipolydora coeca (agg)	131117	P0750												1				
Polydora cornuta	131143	P0753	1	9		1										1		2
Prionospio fallax	131157	P0765				4	2	2				6	5		3		3	

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Pseudopolydora pulchra	131169	P0774										1						2
Pygospio elegans	131170	P0776			21													
Paraspio decorata	334397	P0789										19						
Spio martinensis	131185	P0791			47													
Spiophanes bombyx	131187	P0794				1						20						
Streblospio benedicti	131191	P0797				2	2				8		1	8			7	
Magelona (juv.)	129341	P0803										5						
Magelona filiformis	130268	P0805										6						
Magelona johnstoni	130269	P0803										2						
Cirratulidae (juv.)	919	P0822		1										12				
Chaetozone	129242	P0832				2			4									
Chaetozone christiei	152217	P0832										50						
Chaetozone gibber	129953	P0833	30	91		81	14	21	20	15	164	12	72	4	8	29	19	64
Chaetozone setosa	129955	P0834										1						
Chaetozone vivipara	332672	P0827	63	4			15	10			12		93				9	
Cirriformia (juv.)	129245	P0838																
Cirriformia tentaculata	129964	P0839												56				
Tharyx "species A"	129249	P0847			79													
Cossura	129251	P0868				7	30								11	1	7	
Cossura pygodactyla	129985	P0871				1	15								1			
Diplocirrus glaucus	130100	P0878	2			2						1			1		2	1
Capitella	129211	P0906	2		2				4		64	21	1	80				
Mediomastus fragilis	129892	P0919	18	21		29	39	8			16	1	17		18	7	95	4
Arenicola marina	129868	P0931																
Ophelina	129414	P1012	6			1												5
Ophelina acuminata	130500	P1014	25	1		23	9	4	16	40		8	31		5	9	11	24

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Scalibregma inflatum	130980	P1027	1										4	4		8		1
Galathowenia oculata	146950	P1093				29	1					7	1			2	36	
Owenia fusiformis	130544	P1098										9						
Pectinariidae	980	P1100									4							
Pectinariidae (juv.)	980	P1100											2				5	
Lagis koreni	152367	P1107					3	3	4	1		26	3			2	10	1
Sabellaria spinulosa	130867	P1117		7														1
Ampharetidae	981	P1118																1
Melinna palmata	129808	P1124																
Ampharete baltica	129776	P1134																
Anobothrus gracilis	129789	P1147																
Terebellides stroemii	131573	P1175				1									1			10
Terebellinae (juv.)	322588	P1179										1						
Amphitrite figulus	155162	P1181																2
Lanassa venusta	131494	P1193																1
Polycirrus	129710	P1235		1														
Sabellinae	154917	P1257	8			74	1	1							3		6	2
Sabellinae (juv.)	154917	P1257									100							
Euchone (juv.)	129528	P1277							28			11						
Euchone limnicola	332800	P1277	66	38		319	44	9	32		160	3	75		101	40	611	92
Limnodrilus	137388	P1480			5							6	2	576	1			
Tubificoides	137393	P1487		2		2		1					40		4		110	
Tubificoides amplivasatus	137570	P1489			1	22	12						18			1	120	
Tubificoides benedii	137571	P1490				2	1			1		1		304				
Tubificoides pseudogaster (agg)	137582	P1498												32				
Tubificoides swirencoides	137584	P1500	6	7		78	40	4	4		8		60		29		290	1

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Tubificoides galiciensis	137576	P1487	4	1		52	120				8		10	160	21		70	1
Grania	137349	P1524		1														
HIRUDINEA (?)	2041	P1579																
PYCNOGONIDA	1302	Q0002						1										
Ammothella longipes	134614	Q0018							4				2					
ACARI	292684	Q0054									8							
CRUSTACEA	1066	R0001						P						P				P
CRUSTACEA (larva)	1066	R0001																
CIRRIPEDIA (juv.)	1082	R0014																
Verruca stroemia	106257	R0041		1														10
Balanus crenatus	106215	R0077		1														
COPEPODA	1080	R0142		1							8	6	3					
OSTRACODA	1078	R2412																1
AMPHIPODA	1135	S0097																1
Oedicerotidae	101400	S0118																1
Perioculodes longimanus	102915	S0131		2								29						
Hippomedon denticulatus	102570	S0296										1						
Argissa hamatipes	102064	S0360				2						4	7				2	1
Nototropis swammerdamei	488966	S0412										3					1	
Ampelisca brevicornis	101891	S0427										3						
Bathyporeia elegans	103058	S0452			1					2								
Isaeidae	101388	S0537																
Isaeidae (juv.)	101388	S0537																1
Microprotopus maculatus	102380	S0550				1						3						
Pariambus typicus	101857	S0651				1						5	4					1
CUMACEA	1137	S1183								1								

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Pseudocuma longicorne	110627	S1236	1						4	12		22	1				1	
Pseudocuma simile	110628	S1237																
Diastylis	110398	S1247							4									1
Diastylis bradyi	110472	S1248										12				1		
BRACHYURA (megalopa)	106673	S1276				1		1	4		4	1						
Processa	107054	S1362																
Crangonidae	106782	S1380					1											
Crangonidae (juv.)	106782	S1380										1						
Liocarcinus pusillus	107393	S1584																1
Carcinus maenas	107381	S1594																1
MOLLUSCA	51	W0001							P									
CAUDOFOVEATA (juv.)	151365	W0002																
GASTROPODA	101	W0088							4									
GASTROPODA (juv.)	101	W0088				1	2	1							1		1	4
Lacuna vincta	140170	W0292	1															
Rissoidae (juv.)	123	W0324																5
Rissoa parva	141365	W0328								1			1					
Obtusella intersecta	141304	W0365																1
Onoba semicostata (juv.)	141320	W0371	2	1														
Hydrobiidae (juv.)	120	W0381																
Peringia ulvae	151628	W0385	30		3			1										
Euspira nitida	151894	W0491										1						
Parthenina interstincta	817982	W0937																2
Odostomia plicata	141010	W0913				1	1	1	4									2
CEPHALASPIDEA	154	W1002											1					1
CEPHALASPIDEA (juv.)	154	W1002									4	1						

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Retusa umbilicata	156376	W1083										1						
Cylichna cylindracea	139476	W1028										1						
Goniodoris (juv.)	138040	W1300																
BIVALVIA	105	W1560													1			1
Nuculidae (juv.)	204	W1563					1						1				7	19
Nucula (juv.)	138262	W1565																
Nucula nitidosa	140589	W1569		8		2	28	4	20			4	2		2	2	4	13
Ennucula tenuis	140584	W1577											1					
Nuculana minuta	140577	W1595																1
Mytilidae (juv.)	211	W1691													1			4
Mytilus edulis (juv.)	140480	W1695	32	11		2	9	9	192	17	252	4	64	16		4	23	29
Lucinoma borealis	140283	W1829															4	
Thyasira (juv.)	138552	W1835					1	1			4				1	2	1	1
Thyasira flexuosa	141662	W1837											4					3
Diplodonta rotundata (?, juv)	141883	W1864																
Kurtiella bidentata	345281	W1906	9	3		1	6	9	60	14	4	41	41			1	17	8
Cardiidae (juv.)	229	W1938	6			2				2							1	
Parvicardium (juv.)	137739	W1947							4		4							5
Mactridae (juv.)	230	W1967				1				1			1				3	7
Mactra stultorum	140299	W1972				3												
Spisula (juv.)	138159	W1973										3	1					
Ensis (juv.)	138333	W1996										1						
Phaxas pellucidus	140737	W2006										5						
Pharidae (juv.)	23091	W1991										8					1	
Tellininae (juv.)	225468	W2008	16	3	1			2			8	14	2	4			1	3
Tellina tenuis	141595	W2012			1	3												

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Tellina fabula	141587	W2019										67						
Macoma balthica	141579	W2029	2		6									8			5	
Abra	138474	W2058				1	1											
Abra (juv.)	138474	W2058	5									5						1
Abra alba	141433	W2059	6	2		1	2	10	24						3	1	1	
Abra nitida	141435	W2061				1	4	3					10		1		1	1
Abra prismatica	141436	W2062										5						
Arctica islandica (juv.)	138802	W2072							4			2			1		1	2
Veneridae (juv.)	243	W2086						1										3
Polititapes rhomboides	745846	W2113			1													
Mya (juv.)	138211	W2144				8	1									1	26	14
Mya arenaria	140430	W2149		7								3	3					
Corbula gibba	139410	W2157															1	
Hiatella arctica	140103	W2166	1															
Thracioidea (juv.)	382318	W2226																
Phoronis	128545	ZA0003										1						
ECHINODERMATA	1806	ZB0001		P	P							P	P					
Amphiuridae (juv.)	123206	ZB0148		1								3						6
Amphiura filiformis	125080	ZB0154										5					2	
Ophiuridae (juv.)	123200	ZB0165	5															5
SPATANGOIDA (juv.)	123106	ZB0213										1						
Leptopentacta elongata	124635	ZB0280														1	3	1
Leptosynapta bergensis	124462	ZB0292											2					

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Virgularia mirabilis	128539	D0618																
ACTINIARIA	1360	D0662																
Edwardsiidae	100665	D0759																
CTENOPHORA	1248	E0001	2	1									4					16
NEMERTEA	152391	G0001	1		1	3		1	4	4		1		1				4
NEMATODA	799	HD0001	123	4	15	51	20	10	8	183	320	23	192	38	180	8	32	92
Priapulus caudatus	101160	J0007	2							1		1						
SIPUNCULA (juv.)	1268	N0001									4							
POLYCHAETA	883	P0002	P	P	P	P	P	P		P	P	P	P	P	P			P
Polynoidae	939	P0025																
Polynoidae (juv.)	939	P0025												3				
Gattyana cirrhosa	130749	P0049																4
Harmothoe	129491	P0050																
Malmgrenia andreapolis	147008	P0051																
Harmothoe glabra	571832	P0062										1						
Pholoe	129439	P0091													4			
Pholoe assimilis	130598	P0091																
Pholoe baltica	130599	P0092			2		4	2		1	8	1	4		4	4		4
Pholoe inornata	130601	P0094								1				1	4			
Sigalionidae (juv.)	943	P0096																
Phyllodocidae	931	P0114																
Eteone longa (agg.)	130616	P0118	3			16	16	1	16	1	76	1		1	12			12
Phyllodoce	129455	P0139																
Phyllodoce (juv.)	129455	P0139		1				1		1								
Phyllodoce groenlandica	334506	P0141																4
Phyllodoce mucosa	334512	P0145	1			5	16	4	52	7	184		4	1		8	12	48

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Eumida (juv.)	129446	P0163																
Eumida sanguinea	130644	P0167																
Glycera alba	130116	P0256													1			
Goniada maculata	130140	P0271																
Oxydromus flexuosus	710680	P0313																
Podarkeopsis capensis	130195	P0319				2				1	4		4					
Alitta virens	234851	P0472					1								1			
Nephtys	129370	P0494																
Nephtys (juv.)	129370	P0494	1	3				1	4		4	7	4	1		4	4	8
Nephtys assimilis	130353	P0495																
Nephtys caeca	130355	P0496								1								
Nephtys hombergii	130359	P0499	6	14	14	18	4	30	28	1	4	4	16	1	4	4	12	20
Nephtys hystricis	130360	P0500						1	4									
Nephtys incisa	130362	P0501																
Nephtys kersivalensis	130363	P0502	8		3	13				4					4			
Paramphinome jeffreysii	129837	P0518	1	1		1		1	40	1	8	3		1	20	4	24	4
Lumbrineridae (juv.)	967	P0569	2															
Scoletoma (juv.)	129340	P0569																
Ophryotrocha	129266	P0613	36	5				4		5	4		4	1				136
Scoloplos armiger	334772	P0672							4	5		7		2				4
Spionidae	913	P0720																
Aonides paucibranchiata	131107	P0723																
Malacoceros fuliginosus	131131	P0737					40				4					4		
Dipolydora coeca (agg)	131117	P0750																
Polydora cornuta	131143	P0753									4							
Prionospio fallax	131157	P0765		1				3	4	2		3	4				8	

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Pseudopolydora pulchra	131169	P0774																
Pygospio elegans	131170	P0776																
Paraspio decorata	334397	P0789	1							1								
Spio martinensis	131185	P0791																
Spiophanes bombyx	131187	P0794							8									
Streblospio benedicti	131191	P0797	2	1							4		4					
Magelona (juv.)	129341	P0803																
Magelona filiformis	130268	P0805																
Magelona johnstoni	130269	P0803																
Cirratulidae (juv.)	919	P0822																
Chaetozone	129242	P0832	56	2											24	4		
Chaetozone christiei	152217	P0832																
Chaetozone gibber	129953	P0833	11	18	19	16		19	40	46	8	20	8	1	32		32	12
Chaetozone setosa	129955	P0834	1					1			8							
Chaetozone vivipara	332672	P0827	8		2	1		4		41		15		3	12			
Cirriformia (juv.)	129245	P0838					12	1				1						
Cirriformia tentaculata	129964	P0839					12				32	1			4			
Tharyx "species A"	129249	P0847																
Cossura	129251	P0868	1		2	1		5	4	1		1						
Cossura pygodactyla	129985	P0871				2												4
Diplocirrus glaucus	130100	P0878								2		2		3				4
Capitella	129211	P0906	1				8520		8	1	1864				16			
Mediomastus fragilis	129892	P0919	34	25	41	32		11	52	17		3	12		28		8	40
Arenicola marina	129868	P0931														2		
Ophelina	129414	P1012																
Ophelina acuminata	130500	P1014	3	5	2	8		4	28	75		14	4	9	12	4	68	4

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Scalibregma inflatum	130980	P1027					4				36						8	
Galathowenia oculata	146950	P1093														4		
Owenia fusiformis	130544	P1098																
Pectinariidae	980	P1100																
Pectinariidae (juv.)	980	P1100								1								
Lagis koreni	152367	P1107	1	2	10	1		6	12	4		2	12	2		4		12
Sabellaria spinulosa	130867	P1117																
Ampharetidae	981	P1118																
Melinna palmata	129808	P1124				1												
Ampharete baltica	129776	P1134								1								
Anobothrus gracilis	129789	P1147		1				1										4
Terebellides stroemii	131573	P1175			1	4			8						4			
Terebellinae (juv.)	322588	P1179																
Amphitrite figulus	155162	P1181																
Lanassa venusta	131494	P1193																
Polycirrus	129710	P1235								1								
Sabellinae	154917	P1257	4		2			2	16					9		12	8	28
Sabellinae (juv.)	154917	P1257										3						
Euchone (juv.)	129528	P1277																
Euchone limnicola	332800	P1277	17	47	141	238	8	411	816	43		49	636	82	16	132	512	1840
Limnodrilus	137388	P1480	414				496				292				68			4
Tubificoides	137393	P1487	18	5	16	2						1		1	72			
Tubificoides amplivasatus	137570	P1489	126		6													
Tubificoides benedii	137571	P1490					864				60				12			
Tubificoides pseudogaster (agg)	137582	P1498	18															
Tubificoides swirencoides	137584	P1500	90	33	8	29		138	48	15		12	16	2	36			16

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Tubificoides galiciensis	137576	P1487	252	9	5	2		15	16		16	1			20			4
Grania	137349	P1524																
HIRUDINEA (?)	2041	P1579														P		
PYCNOGONIDA	1302	Q0002																
Ammothella longipes	134614	Q0018												1				
ACARI	292684	Q0054																
CRUSTACEA	1066	R0001			P	P							P					
CRUSTACEA (larva)	1066	R0001										1						
CIRRIPEDIA (juv.)	1082	R0014												9				
Verruca stroemia	106257	R0041																
Balanus crenatus	106215	R0077												1				
COPEPODA	1080	R0142								1		3		2				
OSTRACODA	1078	R2412										1						
AMPHIPODA	1135	S0097																
Oedicerotidae	101400	S0118		1														
Perioculodes longimanus	102915	S0131												1				
Hippomedon denticulatus	102570	S0296																
Argissa hamatipes	102064	S0360		1	1					4								
Nototropis swammerdamei	488966	S0412								1				3				
Ampelisca brevicornis	101891	S0427								1								
Bathyporeia elegans	103058	S0452																
Isaeidae	101388	S0537																4
Isaeidae (juv.)	101388	S0537																
Microprotopus maculatus	102380	S0550																
Pariambus typicus	101857	S0651																
CUMACEA	1137	S1183																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Pseudocuma longicorne	110627	S1236			1			1								4		
Pseudocuma simile	110628	S1237								1								
Diastylis	110398	S1247																
Diastylis bradyi	110472	S1248								2								
BRACHYURA (megalopa)	106673	S1276																
Processa	107054	S1362								1								
Crangonidae	106782	S1380																
Crangonidae (juv.)	106782	S1380																
Liocarcinus pusillus	107393	S1584																
Carcinus maenas	107381	S1594												1				
MOLLUSCA	51	W0001																
CAUDOFOVEATA (juv.)	151365	W0002			1													
GASTROPODA	101	W0088																
GASTROPODA (juv.)	101	W0088							4				4					
Lacuna vincta	140170	W0292																
Rissoidae (juv.)	123	W0324								1				2				
Rissoa parva	141365	W0328																
Obtusella intersecta	141304	W0365																
Onoba semicostata (juv.)	141320	W0371																
Hydrobiidae (juv.)	120	W0381				1												
Peringia ulvae	151628	W0385																
Euspira nitida	151894	W0491																
Parthenina interstincta	817982	W0937																
Odostomia plicata	141010	W0913																12
CEPHALASPIDEA	154	W1002																
CEPHALASPIDEA (juv.)	154	W1002																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Retusa umbilicata	156376	W1083																
Cylichna cylindracea	139476	W1028																
Goniodoris (juv.)	138040	W1300												1				
BIVALVIA	105	W1560						1		1								
Nuculidae (juv.)	204	W1563		1				1							4			8
Nucula (juv.)	138262	W1565														8	4	
Nucula nitidosa	140589	W1569		1				11	4				4				4	16
Ennucula tenuis	140584	W1577																
Nuculana minuta	140577	W1595																
Mytilidae (juv.)	211	W1691	2															
Mytilus edulis (juv.)	140480	W1695		2	13	38		20	32	28		83	128	101	8	16	116	128
Lucinoma borealis	140283	W1829																
Thyasira (juv.)	138552	W1835						1		1				1				12
Thyasira flexuosa	141662	W1837		1		1												
Diplodonta rotundata (?, juv)	141883	W1864										1						
Kurtiella bidentata	345281	W1906		2	8	8		11	32	5		2		2		4	28	44
Cardiidae (juv.)	229	W1938	1					1		1		1						
Parvicardium (juv.)	137739	W1947																
Mactridae (juv.)	230	W1967	3					2										
Mactra stultorum	140299	W1972																
Spisula (juv.)	138159	W1973																
Ensis (juv.)	138333	W1996																
Phaxas pellucidus	140737	W2006																
Pharidae (juv.)	23091	W1991																
Tellininae (juv.)	225468	W2008				1		1		2		6	12	1	4		4	12
Tellina tenuis	141595	W2012			1													

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Tellina fabula	141587	W2019																
Macoma balthica	141579	W2029																
Abra	138474	W2058																
Abra (juv.)	138474	W2058																
Abra alba	141433	W2059						2				9	4	1			12	4
Abra nitida	141435	W2061			1	1		2					12			4	12	16
Abra prismatica	141436	W2062																
Arctica islandica (juv.)	138802	W2072								2								
Veneridae (juv.)	243	W2086																
Polititapes rhomboides	745846	W2113																
Mya (juv.)	138211	W2144				2		2		11		1						
Mya arenaria	140430	W2149																
Corbula gibba	139410	W2157																
Hiatella arctica	140103	W2166																
Thracioidea (juv.)	382318	W2226								4								4
Phoronis	128545	ZA0003																
ECHINODERMATA	1806	ZB0001				P												P
Amphiuridae (juv.)	123206	ZB0148																
Amphiura filiformis	125080	ZB0154																
Ophiuridae (juv.)	123200	ZB0165										1						
SPATANGOIDA (juv.)	123106	ZB0213																
Leptopentacta elongata	124635	ZB0280																
Leptosynapta bergensis	124462	ZB0292																

C.2 EPIFAUNAL SPECIES ABUNDANCE MATRIX

TaxonName	AphiaID	SDC	Site Details / Ref. Nos	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05	AC07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
				12693	12694	12696	12697	12698	12699	12700	12701	12702	12703	12704	12705	12706	12707	12708	12709	12711	12712	12713	12714	12716	12717	12718	12719	12721	12722	12723	12724	12725	12726	12727	12728
ANTHOATHECATA?	13551	D0140	009										P																						
Bougainvilliidae	1594	D0246	007																												P				
Sertulariidae	1614	D0407								P																									
Laomedea	117033	D0511	006								P																								
Crisiidae	110806	Y0004											P																						
Crisia	111032	Y0013												P																					
Alcyonidium	110993	Y0073																													P				
Bowerbankia	111023	Y0137	004/005								P			P		P		P									P								
Conopeum reticulum	111351	Y0172																													P				
Electra pilosa	111355	Y0178	010							P																									
Scrupocellaria	110866	Y0274											P																						

Denotes No Live Colonies

Denotes No Epifaunal Component

Note: AC03, BP06, BP11 and BP16 were "no take" sites

C.3 FAUNAL BIOMASS

C.3.1 Faunal Biomass By Taxa

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Virgularia mirabilis	128539	D0618									0.0001							
Edwardsiidae	100665	D0759										0.0075						0.0318
CTENOPHORA	1248	E0001	0.0001								0.0001		0.0001	0.0001			0.0001	
NEMERTEA	152391	G0001		0.0007		0.0075	0.0005					0.0001			0.0006		0.0001	
NEMATODA	799	HD0001	0.0001	0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0036	0.0001	0.0001	0.0132	0.0001	0.0001	0.0001	0.0001
Priapulus caudatus	101160	J0007				0.0014												0.0023
SIPUNCULA (juv.)	1268	N0001																
POLYCHAETA	883	P0002	0.026	0.0185	0.0008	0.2965	0.1207	0.0027		0.0006	0.032	0.0097	0.0094	0.1852	0.0019	0.0065	0.0144	0.0102
Polynoidae	939	P0025		0.0001														
Polynoidae (juv.)	939	P0025																
Gattyana cirrhosa	130749	P0049																0.1313
Harmothoe	129491	P0050										0.0005						
Malmgrenia andreapolis	147008	P0051											0.0005					
Harmothoe glabra	571832	P0062																
Pholoe	129439	P0091				0.0001												
Pholoe assimilis	130598	P0091	0.0001				0.0001		0.0001									
Pholoe baltica	130599	P0092				0.0007		0.0031	0.0001				0.0062		0.0011			
Pholoe inornata	130601	P0094											0.0001	0.0001			0.0001	0.0006
Sigalionidae (juv.)	943	P0096												0.0001				
Phyllodocidae	931	P0114		0.0001														
Eteone longa (agg.)	130616	P0118	0.0003	0.0014	0.0005	0.0036	0.0056	0.0009	0.0001		0.0004	0.0024	0.0118	0.0012	0.0006		0.0072	0.0022
Phyllodoce	129455	P0139		0.0001		0.0001							0.0001		0.0001			
Phyllodoce (juv.)	129455	P0139									0.0001	0.0001					0.0003	
Phyllodoce groenlandica	334506	P0141						0.3542		0.2111	0.7224		0.3338					
Phyllodoce mucosa	334512	P0145		0.0001		0.0003	0.0092					0.0024	0.0141		0.1484		0.0023	0.0564
Eumida (juv.)	129446	P0163										0.0001						

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Eumida sanguinea	130644	P0167												0.0001				0.003
Glycera alba	130116	P0256											0.4627					
Goniada maculata	130140	P0271						0.028										
Oxydromus flexuosus	710680	P0313						0.0001										
Podarkeopsis capensis	130195	P0319															0.0061	0.0004
Alitta virens	234851	P0472																
Nephtys	129370	P0494				0.0075												
Nephtys (juv.)	129370	P0494		0.0001				0.0022	0.0036	0.0006	0.0052	0.0109	0.006			0.0004	0.0038	
Nephtys assimilis	130353	P0495										0.0187						
Nephtys caeca	130355	P0496																
Nephtys hombergii	130359	P0499			0.1339	0.2744	1.4987	5.4838	2.9652	0.529	0.3572	0.0528	1.9213		4.0628	0.3911	5.116	0.1606
Nephtys hystricis	130360	P0500																
Nephtys incisa	130362	P0501															0.0034	
Nephtys kersivalensis	130363	P0502		0.031	0.0012	0.5127	0.1472	0.009							0.1082	0.2122	0.1754	0.2285
Paramphinome jeffreysii	129837	P0518	0.0001			0.0001			0.002	0.0005			0.019				0.0001	
Lumbrineridae (juv.)	967	P0569										0.0001					0.0003	
Scoletoma (juv.)	129340	P0569													0.0001			
Ophryotrocha	129266	P0613	0.0001	0.0001		0.0001	0.0001		0.0001		0.0004	0.0004	0.0008	0.0252	0.0001		0.0001	
Scoloplos armiger	334772	P0672		0.0003		0.0044		0.0004	0.0001		0.0004	0.0286	0.0004				0.0004	
Spionidae	913	P0720														0.0001		
Aonides paucibranchiata	131107	P0723		0.0001														
Malacoceros fuliginosus	131131	P0737			0.0012						0.0001			0.0001				
Dipolydora coeca (agg)	131117	P0750												0.0008				
Polydora cornuta	131143	P0753	0.0003	0.0011		0.0001										0.0001		0.0001
Prionospio fallax	131157	P0765				0.0003	0.0005	0.0001				0.0018	0.0016		0.0007		0.0014	
Pseudopolydora pulchra	131169	P0774										0.0016						0.0007

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Pygospio elegans	131170	P0776			0.0004													
Paraspio decorata	334397	P0789										0.0042						
Spio martinensis	131185	P0791			0.0138													
Spiophanes bombyx	131187	P0794				0.0003						0.0115						
Streblospio benedicti	131191	P0797				0.0001	0.0001				0.0001		0.0001	0.0001			0.0011	
Magelona (juv.)	129341	P0803										0.0001						
Magelona filiformis	130268	P0805										0.0011						
Magelona johnstoni	130269	P0803										0.0007						
Cirratulidae (juv.)	919	P0822		0.0001										0.0001				
Chaetozone	129242	P0832				0.0001			0.0001									
Chaetozone christiei	152217	P0832										0.006						
Chaetozone gibber	129953	P0833	0.0133	0.0425		0.0362	0.0096	0.002	0.006	0.0085	0.1708	0.0056	0.0258	0.0001	0.016	0.0186	0.0066	0.0236
Chaetozone setosa	129955	P0834										0.0001						
Chaetozone vivipara	332672	P0827	0.0091	0.0001			0.0014	0.001			0.0001		0.0081				0.0014	
Cirriformia (juv.)	129245	P0838																
Cirriformia tentaculata	129964	P0839												2.9236				
Tharyx "species A"	129249	P0847			0.0324													
Cossura	129251	P0868				0.0001	0.0023								0.0011	0.0001	0.0004	
Cossura pygodactyla	129985	P0871				0.0001	0.0014								0.0001			
Diplocirrus glaucus	130100	P0878	0.0104			0.0058						0.013			0.0011		0.0052	0.0034
Capitella	129211	P0906	0.0006		0.0001				0.0001		0.0152	0.0041	0.0005	0.024				
Mediomastus fragilis	129892	P0919	0.0006	0.0015		0.0048	0.0103	0.0005			0.0016	0.0001	0.0021		0.0056	0.0015	0.0276	0.001
Arenicola marina	129868	P0931																
Ophelina	129414	P1012	0.0159			0.0144												0.0028
Ophelina acuminata	130500	P1014	0.2282	0.0084		0.1587	0.3117	0.1383	0.3668	0.8373		0.0399	0.613		0.0505	0.0709	0.0662	0.1342
Scalibregma inflatum	130980	P1027	0.0164										0.2242	0.1492		0.0596		0.0018

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Galathowenia oculata	146950	P1093				0.0076	0.0001					0.0014	0.0006			0.0005	0.0058	
Owenia fusiformis	130544	P1098										0.0279						
Pectinariidae	980	P1100									0.0001							
Pectinariidae (juv.)	980	P1100											0.0008				0.0001	
Lagis koreni	152367	P1107					0.0003	0.0003	0.0016	0.0003		0.0131	0.0003			0.0005	0.0101	0.0001
Sabellaria spinulosa	130867	P1117		0.0001														0.0001
Ampharetidae	981	P1118																0.0006
Melinna palmata	129808	P1124																
Ampharete baltica	129776	P1134																
Anobothrus gracilis	129789	P1147																
Terebellides stroemii	131573	P1175				0.1774									0.2395			0.7804
Terebellinae (juv.)	322588	P1179										0.0001						
Amphitrite figulus	155162	P1181																9.39
Lanassa venusta	131494	P1193																0.0001
Polycirrus	129710	P1235		0.0001														
Sabellinae	154917	P1257	0.0009			0.1302	0.0012	0.0001							0.0007		0.0061	0.0014
Sabellinae (juv.)	154917	P1257									0.0016							
Euchone (juv.)	129528	P1277							0.0001			0.0005						
Euchone limnicola	332800	P1277	0.0118	0.0099		0.7179	0.0732	0.0015	0.0028		0.0112	0.0011	0.0028		0.0944	0.0357	0.8661	0.0516
Limnodrilus	137388	P1480			0.0017							0.0008	0.002	0.072	0.0002			
Tubificoides	137393	P1487		0.0001		0.0001		0.0001					0.0036		0.0001		0.009	
Tubificoides amplivasatus	137570	P1489			0.0001	0.0018	0.0001						0.0036			0.0001	0.015	
Tubificoides benedii	137571	P1490				0.0001	0.0004			0.0003		0.0006		0.1008				
Tubificoides pseudogaster (agg)	137582	P1498												0.0096				

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Tubificoides swirencoides	137584	P1500	0.0006	0.001		0.008	0.0052	0.0001	0.0001		0.0004		0.0038		0.0049		0.016	0.0001
Tubificoides galiciensis	137576	P1487	0.0005	0.0001		0.0056	0.0252				0.0008		0.0012	0.0128	0.0048		0.01	0.0001
Grania	137349	P1524		0.0001														
HIRUDINEA (?)	2041	P1579																
PYCNOGONIDA	1302	Q0002						0.0001										
Ammothella longipes	134614	Q0018							0.0004				0.0005					
ACARI	292684	Q0054									0.0001							
CRUSTACEA	1066	R0001						0.0005						0.0012				0.002
CRUSTACEA (larva)	1066	R0001																
COPEPODA	1080	R0142		0.0001							0.0001	0.0001	0.0001					
OSTRACODA	1078	R2412																0.0004
AMPHIPODA	1135	S0097																0.0001
Oedicerotidae	101400	S0118																0.0001
Perioculodes longimanus	102915	S0131		0.0005								0.0029						
Hippomedon denticulatus	102570	S0296										0.0009						
Argissa hamatipes	102064	S0360				0.0001						0.0003	0.001				0.0001	0.0001
Nototropis swammerdamei	488966	S0412										0.0005					0.0001	
Ampelisca brevicornis	101891	S0427										0.0048						
Bathyporeia elegans	103058	S0452			0.0008					0.0009								
Isaeidae	101388	S0537																
Isaeidae (juv.)	101388	S0537																0.0001
Microprotopus	102380	S0550				0.0001						0.0001						

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
maculatus																		
Pariambus typicus	101857	S0651				0.0001						0.0007	0.0001					0.0001
CUMACEA	1137	S1183								0.0001								
Pseudocuma longicorne	110627	S1236	0.0001						0.0012	0.0016		0.0022	0.0001				0.0001	
Pseudocuma simile	110628	S1237																
Diastylis	110398	S1247							0.0016									0.0007
Diastylis bradyi	110472	S1248										0.0084				0.0006		
BRACHYURA (megalopa)	106673	S1276				0.0003		0.0024	0.0001		0.0004	0.0001						
Processa	107054	S1362																
Crangonidae	106782	S1380					0.0039											
Crangonidae (juv.)	106782	S1380										0.0004						
Liocarcinus pusillus	107393	S1584																0.0029
Carcinus maenas	107381	S1594																0.0093
MOLLUSCA	51	W0001							0.006									
CAUDOFOVEATA (juv.)	151365	W0002																
GASTROPODA	101	W0088							0.0012									
GASTROPODA (juv.)	101	W0088				0.0001	0.0001	0.0001							0.0001		0.0001	0.0001
Lacuna vincta	140170	W0292	0.0003															
Rissoidae (juv.)	123	W0324																0.0009
Rissoa parva	141365	W0328								0.0004			0.0005					
Obtusella intersecta	141304	W0365																0.0005
Onoba semicostata (juv.)	141320	W0371	0.0004	0.0001														
Hydrobiidae (juv.)	120	W0381																
Peringia ulvae	151628	W0385	0.0102		0.0034			0.003										
Euspira nitida	151894	W0491										0.0165						

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Parthenina interstincta	817982	W0937																0.0017
Odostomia plicata	141010	W0913				0.0097	0.0024	0.0006	0.0112									0.0023
CEPHALASPIDEA	154	W1002											0.0001					0.0005
CEPHALASPIDEA (juv.)	154	W1002									0.0001	0.0001						
Retusa umbilicata	156376	W1083										0.002						
Cylichna cylindracea	139476	W1028										0.0102						
Goniodoris (juv.)	138040	W1300																
BIVALVIA	105	W1560													0.0001			0.0001
Nuculidae (juv.)	204	W1563					0.0001						0.0001				0.0026	0.0066
Nucula (juv.)	138262	W1565																
Nucula nitidosa	140589	W1569		0.1326		0.0205	0.1834	0.0104	0.1856			0.0234	0.0037		0.0025	0.0074	0.0179	0.0463
Ennucula tenuis	140584	W1577											0.0052					
Nuculana minuta	140577	W1595																0.001
Mytilidae (juv.)	211	W1691													0.0001			0.0001
Mytilus edulis (juv.)	140480	W1695	0.0056	0.0033		0.0004	0.0023	0.0029	0.064	0.0056	0.0668	0.0007	0.0165	0.0044		0.0007	0.0068	0.0113
Lucinoma borealis	140283	W1829															0.004	
Thyasira (juv.)	138552	W1835					0.0009	0.0007			0.002				0.0008	0.0026	0.003	0.0001
Thyasira flexuosa	141662	W1837											0.0089					0.0206
Diplodonta rotundata (?, juv)	141883	W1864																
Kurtiella bidentata	345281	W1906	0.0035	0.0008		0.0012	0.0076	0.0098	0.1092	0.0102	0.0044	0.0282	0.0491			0.0004	0.0183	0.0047
Cardiidae (juv.)	229	W1938	0.0016			0.0003				0.0006							0.0006	
Parvicardium (juv.)	137739	W1947							0.0108		0.0048							0.0036
Mactridae (juv.)	230	W1967				0.0001				0.0001			0.0001				0.0009	0.0039
Mactra stultorum	140299	W1972				0.0025												
Spisula (juv.)	138159	W1973										0.0071	0.0008					

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Ensis (juv.)	138333	W1996										0.0057						
Phaxas pellucidus	140737	W2006										0.9139						
Pharidae (juv.)	23091	W1991										0.0066					0.0001	
Tellininae (juv.)	225468	W2008	0.005	0.0009	0.0001			0.0004			0.004	0.0052	0.0001	0.002			0.0001	0.0015
Tellina tenuis	141595	W2012			0.0046	0.0017												
Tellina fabula	141587	W2019										0.1858						
Macoma balthica	141579	W2029	0.0001		0.6858									0.0001			0.0001	
Abra	138474	W2058				0.0376	0.0175											
Abra (juv.)	138474	W2058	0.0007									0.0107						0.0005
Abra alba	141433	W2059	0.5546	0.1519		0.052	0.1987	0.9155	2.4692						0.2987	0.1058	0.0765	
Abra nitida	141435	W2061				0.0044	0.0831	0.0803					0.324		0.0304		0.0318	0.0042
Abra prismatica	141436	W2062										0.1032						
Arctica islandica (juv.)	138802	W2072							0.0008			0.0001			0.0008		0.0001	0.0001
Veneridae (juv.)	243	W2086						0.0001										0.0018
Polititapes rhomboides	745846	W2113			0.046													
Mya (juv.)	138211	W2144				0.0049	0.0003									0.0005	0.0164	0.0164
Mya arenaria	140430	W2149		0.0048								0.0087	0.0053					
Corbula gibba	139410	W2157															0.0095	
Hiatella arctica	140103	W2166	0.0001															
Thracioidea (juv.)	382318	W2226																
Phoronis	128545	ZA0003										0.0001						
ECHINODERMATA	1806	ZB0001		0.0038	0.0035							0.0246	0.0035					
Amphiuridae (juv.)	123206	ZB0148		0.0003								0.0008						0.0003
Amphiura filiformis	125080	ZB0154										0.0054					0.0087	
Ophiuridae (juv.)	123200	ZB0165	0.0002															0.004
SPATANGOIDA (juv.)	123106	ZB0213										0.0001						

Taxon	AphiaID	SDC	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12	BP01	BP02	BP03	BP04	BP05
Leptopentacta elongata	124635	ZB0280														0.0144	0.0496	0.0078
Leptosynapta bergensis	124462	ZB0292											0.083					

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Virgularia mirabilis	128539	D0618																
Edwardsiidae	100665	D0759																
CTENOPHORA	1248	E0001	0.0001	0.0001									0.0001					0.0001
NEMERTEA	152391	G0001	0.0008		0.0001	0.5727		0.0001	0.0028	0.8293		0.2715		0.0005				0.0056
NEMATODA	799	HD0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0184	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Priapulus caudatus	101160	J0007	0.0094							0.5319		0.0006						
SIPUNCULA (juv.)	1268	N0001									0.0001							
POLYCHAETA	883	P0002	0.073	0.0069	0.022	0.3335	0.1776	0.0022		0.0466	0.156	0.0074	0.0088	0.0005	0.2284			0.0124
Polynoidae	939	P0025																
Polynoidae (juv.)	939	P0025												0.0001				
Gattyana cirrhosa	130749	P0049																0.0096
Harmothoe	129491	P0050																
Malmgrenia andreapolis	147008	P0051																
Harmothoe glabra	571832	P0062										0.0306						
Pholoe	129439	P0091													0.0001			
Pholoe assimilis	130598	P0091																
Pholoe baltica	130599	P0092			0.0039		0.0084	0.0012		0.0011	0.0088	0.001	0.0001		0.0056	0.0001		0.0001
Pholoe inornata	130601	P0094								0.0001				0.0001	0.0001			
Sigalionidae (juv.)	943	P0096																
Phyllodocidae	931	P0114																
Eteone longa (agg.)	130616	P0118	0.0049			0.013	0.0064	0.0007	0.0132	0.0001	0.0356	0.0001		0.001	0.0024			0.0084
Phyllodoce	129455	P0139																
Phyllodoce (juv.)	129455	P0139		0.0001				0.0001		0.0001								
Phyllodoce groenlandica	334506	P0141																1.428
Phyllodoce mucosa	334512	P0145	0.0002			0.0072	0.044	0.0183	0.0652	0.0044	0.4768		0.0001	0.0051		0.0228	0.0001	0.1144
Eumida (juv.)	129446	P0163																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Eumida sanguinea	130644	P0167																
Glycera alba	130116	P0256													0.1066			
Goniada maculata	130140	P0271																
Oxydromus flexuosus	710680	P0313																
Podarkeopsis capensis	130195	P0319				0.0103				0.0026	0.0068		0.0096					
Alitta virens	234851	P0472					5.3216								5.6812			
Nephtys	129370	P0494																
Nephtys (juv.)	129370	P0494	0.0013	0.0007				0.0005	0.0024		0.0036	0.0047	0.0004	0.0007		0.0001	0.0001	0.0068
Nephtys assimilis	130353	P0495																
Nephtys caeca	130355	P0496								0.0012								
Nephtys hombergii	130359	P0499	0.6075	1.0526	2.2458	3.0624	0.01	4.82	2.4972	0.0538	0.2856	0.3183	2.3308	0.061	0.1684	0.1816	0.812	1.4204
Nephtys hystricis	130360	P0500						0.0161	0.0312									
Nephtys incisa	130362	P0501																
Nephtys kersivalensis	130363	P0502	0.2683		0.3878	0.4324				0.004					0.22			
Paramphinome jeffreysii	129837	P0518	0.0001	0.0001		0.0001		0.0003	0.016	0.0001	0.0052	0.0006		0.0005	0.0052	0.0001	0.0068	0.0008
Lumbrineridae (juv.)	967	P0569	0.0001															
Scoletoma (juv.)	129340	P0569																
Ophryotrocha	129266	P0613	0.0011	0.0001				0.0001		0.0001	0.0001		0.0001	0.0001				0.0044
Scoloplos armiger	334772	P0672							0.0036	0.0032		0.0053		0.0007				0.0001
Spionidae	913	P0720																
Aonides paucibranchiata	131107	P0723																
Malacoceros fuliginosus	131131	P0737					0.174				0.0016					0.0001		
Dipolydora coeca (agg)	131117	P0750																
Polydora cornuta	131143	P0753									0.0001							
Prionospio fallax	131157	P0765		0.0001				0.001	0.002	0.0001		0.0007	0.0008				0.0001	
Pseudopolydora pulchra	131169	P0774																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Pygospio elegans	131170	P0776																
Paraspio decorata	334397	P0789	0.0001							0.0001								
Spio martinensis	131185	P0791																
Spiophanes bombyx	131187	P0794							0.0068									
Streblospio benedicti	131191	P0797	0.0006	0.0001							0.0024		0.0012					
Magelona (juv.)	129341	P0803																
Magelona filiformis	130268	P0805																
Magelona johnstoni	130269	P0803																
Cirratulidae (juv.)	919	P0822																
Chaetozone	129242	P0832	0.0025	0.0001											0.0076	0.0001		
Chaetozone christiei	152217	P0832																
Chaetozone gibber	129953	P0833	0.0076	0.0043	0.0082	0.0133		0.0064	0.052	0.0506	0.0032	0.0063	0.0028	0.0004	0.0204		0.0052	0.0032
Chaetozone setosa	129955	P0834	0.0006					0.0012			0.0088							
Chaetozone vivipara	332672	P0827	0.0009		0.0001	0.0001		0.0004		0.0092		0.0028		0.0009	0.0112			
Cirriformia (juv.)	129245	P0838					0.0044	0.0004				0.0001						
Cirriformia tentaculata	129964	P0839					0.2388				0.0128	0.0012			0.0328			
Tharyx "species A"	129249	P0847																
Cossura	129251	P0868	0.0001		0.0001	0.0001		0.0001	0.0001	0.0001		0.0001						
Cossura pygodactyla	129985	P0871				0.0001												0.0001
Diplocirrus glaucus	130100	P0878								0.0038		0.0053		0.0109				0.0136
Capitella	129211	P0906	0.0001				2.086		0.002	0.0007	1.44				0.0088			
Mediomastus fragilis	129892	P0919	0.0257	0.0034	0.0082	0.0069		0.003	0.0104	0.0036		0.0001	0.0001		0.0356		0.0001	0.0032
Arenicola marina	129868	P0931														0.6652		
Ophelina	129414	P1012																
Ophelina acuminata	130500	P1014	0.0487	0.1157	0.0786	0.1453		0.0708	0.73	0.8417		0.2709	0.0904	0.1368	0.07	0.076	1.202	0.064
Scalibregma inflatum	130980	P1027					0.0144				2.2016						0.2892	

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Galathowenia oculata	146950	P1093														0.0001		
Owenia fusiformis	130544	P1098																
Pectinariidae	980	P1100																
Pectinariidae (juv.)	980	P1100								0.0001								
Lagis koreni	152367	P1107	0.0001	0.0001	0.0032	0.0011		0.0008	0.006	0.0038		0.0001	0.006	0.0001		0.0001		0.0016
Sabellaria spinulosa	130867	P1117																
Ampharetidae	981	P1118																
Melinna palmata	129808	P1124				0.0189												
Ampharete baltica	129776	P1134								0.0007								
Anobothrus gracilis	129789	P1147		0.0119				0.0004										0.008
Terebellides stroemii	131573	P1175			0.3328	0.5221			0.8432						0.6424			
Terebellinae (juv.)	322588	P1179																
Amphitrite figulus	155162	P1181																
Lanassa venusta	131494	P1193																
Polycirrus	129710	P1235								0.0092								
Sabellinae	154917	P1257	0.001		0.0006			0.0001	0.0076					0.0034		0.0044	0.0016	0.01
Sabellinae (juv.)	154917	P1257										0.0001						
Euchone (juv.)	129528	P1277																
Euchone limnicola	332800	P1277	0.0073	0.0469	0.1322	0.256	0.0084	0.418	0.7544	0.0079		0.0366	0.5656	0.0568	0.0001	0.0988	0.6652	1.0048
Limnodrilus	137388	P1480	0.0738				0.04				0.0888				0.0124			0.0001
Tubificoides	137393	P1487	0.0001	0.0001	0.0011	0.0001						0.0001		0.0001	0.0012			
Tubificoides amplivasatus	137570	P1489	0.0162		0.0006													
Tubificoides benedii	137571	P1490					0.5328				0.0252				0.0056			
Tubificoides pseudogaster (agg)	137582	P1498	0.0001															

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Tubificoides swirencoides	137584	P1500	0.0036	0.0028	0.0009	0.0037		0.0171	0.0064	0.002		0.0006	0.002	0.0001	0.0028			0.0016
Tubificoides galiciensis	137576	P1487	0.0216	0.0014	0.0008	0.0003		0.0021	0.0036		0.0032	0.0001			0.0001			0.0004
Grania	137349	P1524																
HIRUDINEA (?)	2041	P1579														0.0036		
PYCNOGONIDA	1302	Q0002																
Ammothella longipes	134614	Q0018												0.0001				
ACARI	292684	Q0054																
CRUSTACEA	1066	R0001			0.0001	0.0007							0.0016					
CRUSTACEA (larva)	1066	R0001										0.0001						
COPEPODA	1080	R0142								0.0001		0.0001		0.0001				
OSTRACODA	1078	R2412										0.0001						
AMPHIPODA	1135	S0097																
Oedicerotidae	101400	S0118		0.0001														
Perioculodes longimanus	102915	S0131												0.0001				
Hippomedon denticulatus	102570	S0296																
Argissa hamatipes	102064	S0360		0.0001	0.0001					0.0007								
Nototropis swammerdamei	488966	S0412								0.0001				0.0006				
Ampelisca brevicornis	101891	S0427								0.0001								
Bathyporeia elegans	103058	S0452																
Isaeidae	101388	S0537																0.0001
Isaeidae (juv.)	101388	S0537																
Microprotopus	102380	S0550																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
maculatus																		
Pariambus typicus	101857	S0651																
CUMACEA	1137	S1183																
Pseudocuma longicorne	110627	S1236			0.0001			0.0003								0.0001		
Pseudocuma simile	110628	S1237								0.0001								
Diastylis	110398	S1247																
Diastylis bradyi	110472	S1248								0.0014								
BRACHYURA (megalopa)	106673	S1276																
Processa	107054	S1362								0.0018								
Crangonidae	106782	S1380																
Crangonidae (juv.)	106782	S1380																
Liocarcinus pusillus	107393	S1584																
Carcinus maenas	107381	S1594												142.147				
MOLLUSCA	51	W0001																
CAUDOFOVEATA (juv.)	151365	W0002			0.0006													
GASTROPODA	101	W0088																
GASTROPODA (juv.)	101	W0088							0.0001				0.0001					
Lacuna vincta	140170	W0292																
Rissoidae (juv.)	123	W0324								0.0001				0.0007				
Rissoa parva	141365	W0328																
Obtusella intersecta	141304	W0365																
Onoba semicostata (juv.)	141320	W0371																
Hydrobiidae (juv.)	120	W0381				0.0001												
Peringia ulvae	151628	W0385																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Euspira nitida	151894	W0491																
Parthenina interstincta	817982	W0937																
Odostomia plicata	141010	W0913																0.048
CEPHALASPIDEA	154	W1002																
CEPHALASPIDEA (juv.)	154	W1002																
Retusa umbilicata	156376	W1083																
Cylichna cylindracea	139476	W1028																
Goniodoris (juv.)	138040	W1300												0.0005				
BIVALVIA	105	W1560						0.0001		0.0001								
Nuculidae (juv.)	204	W1563		0.0001				0.0003							0.0001			0.0001
Nucula (juv.)	138262	W1565														0.0076	0.0036	
Nucula nitidosa	140589	W1569		0.0111				0.0664	0.03				0.0524				0.0132	0.0652
Ennucula tenuis	140584	W1577																
Nuculana minuta	140577	W1595																
Mytilidae (juv.)	211	W1691	0.0006															
Mytilus edulis (juv.)	140480	W1695		0.0001	0.0039	0.0104		0.0056	0.0128	0.0085		0.0252	0.0372	0.0318	0.004	0.004	0.0276	0.0472
Lucinoma borealis	140283	W1829																
Thyasira (juv.)	138552	W1835						0.0017		0.0006				0.0011				0.008
Thyasira flexuosa	141662	W1837		0.0087		0.0152												
Diplodonta rotundata (?, juv)	141883	W1864										0.0001						
Kurtiella bidentata	345281	W1906		0.0041	0.0091	0.0082		0.0116	0.0308	0.0065		0.0005		0.0006		0.0048	0.0376	0.07
Cardiidae (juv.)	229	W1938	0.0001					0.0003		0.0001		0.0001						
Parvicardium (juv.)	137739	W1947																
Mactridae (juv.)	230	W1967	0.0001					0.0008										
Mactra stultorum	140299	W1972																

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Spisula (juv.)	138159	W1973																
Ensis (juv.)	138333	W1996																
Phaxas pellucidus	140737	W2006																
Pharidae (juv.)	23091	W1991																
Tellininae (juv.)	225468	W2008				0.0003		0.0002		0.0005		0.0034	0.0064	0.0004	0.0001		0.0001	0.0064
Tellina tenuis	141595	W2012			0.0004													
Tellina fabula	141587	W2019																
Macoma balthica	141579	W2029																
Abra	138474	W2058																
Abra (juv.)	138474	W2058																
Abra alba	141433	W2059						0.1488				1.0939	0.4684	0.1675			1.312	0.4048
Abra nitida	141435	W2061			0.029	0.0195		0.0382					0.6376			0.088	0.316	0.5384
Abra prismatica	141436	W2062																
Arctica islandica (juv.)	138802	W2072								0.0001								
Veneridae (juv.)	243	W2086																
Polititapes rhomboides	745846	W2113																
Mya (juv.)	138211	W2144				0.0012		0.0002		0.0137		0.001						
Mya arenaria	140430	W2149																
Corbula gibba	139410	W2157																
Hiatella arctica	140103	W2166																
Thracioidea (juv.)	382318	W2226								0.0008								0.0001
Phoronis	128545	ZA0003																
ECHINODERMATA	1806	ZB0001				0.0003												0.0092
Amphiuridae (juv.)	123206	ZB0148																
Amphiura filiformis	125080	ZB0154																
Ophiuridae (juv.)	123200	ZB0165										0.0027						

Taxon	AphiaID	SDC	BP07	BP08	BP09	BP10	BP12	BP13	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
SPATANGOIDA (juv.)	123106	ZB0213																
Leptopentacta elongata	124635	ZB0280																
Leptosynapta bergensis	124462	ZB0292																

C.3.2 Faunal Biomass By Major Groups

Data presented as unconverted blot dry weight data

Major Group	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12
Annelida	0.3092	0.0985	0.1853	2.0737	2.1039	6.0257	3.3489	1.5876	1.2881	0.2523	3.6709
Molluscs	0.5821	0.2944	0.7399	0.1354	0.4964	1.0238	2.8520	0.0169	0.0821	1.3281	0.4144
Crustaceans	0.0001	0.0006	0.0008	0.0006	0.0039	0.0024	0.0029	0.0026	0.0005	0.0214	0.0013
Echinoderms	0.0002	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0063	0.0830
Other taxa	0.0002	0.0008	0.0000	0.0090	0.0006	0.0002	0.0005	0.0001	0.0039	0.0078	0.0007

Major Group	BP01	BP02	BP03	BP04	BP05	BP07	BP08	BP09	BP10	BP12	BP13
Annelida	3.3199	4.7411	0.7914	6.3636	10.9751	1.0942	1.2405	3.2049	4.4934	8.4892	5.3791
Molluscs	0.0065	0.3335	0.1174	0.1888	0.1288	0.0008	0.0241	0.0430	0.0549	0.0000	0.2742
Crustaceans	0.0000	0.0000	0.0006	0.0003	0.0138	0.0000	0.0002	0.0002	0.0000	0.0000	0.0003
Echinoderms	0.0000	0.0000	0.0144	0.0583	0.0121	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other taxa	0.0133	0.0007	0.0001	0.0003	0.0342	0.0104	0.0002	0.0002	0.5728	0.0001	0.0002

Major Group	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Annelida	5.0533	1.0044	4.6102	0.6857	3.0100	0.2788	7.0406	1.0495	2.9824	4.1036
Molluscs	0.0737	0.0310	0.0000	1.1242	1.2021	0.2026	0.0042	0.1044	1.7101	1.1882
Crustaceans	0.0000	0.0043	0.0000	0.0003	0.0000	142.1478	0.0000	0.0001	0.0000	0.0001
Echinoderms	0.0000	0.0000	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other taxa	0.0029	1.3613	0.0185	0.2722	0.0002	0.0007	0.0001	0.0001	0.0001	0.0058

Eleftheriou and Basford (1989) Conversion factors

Major Group	Conversion Factor
Polychaetes	0.155
Molluscs	0.085
Crustaceans	0.225
Echinoderms	0.08
Other taxa	0.155

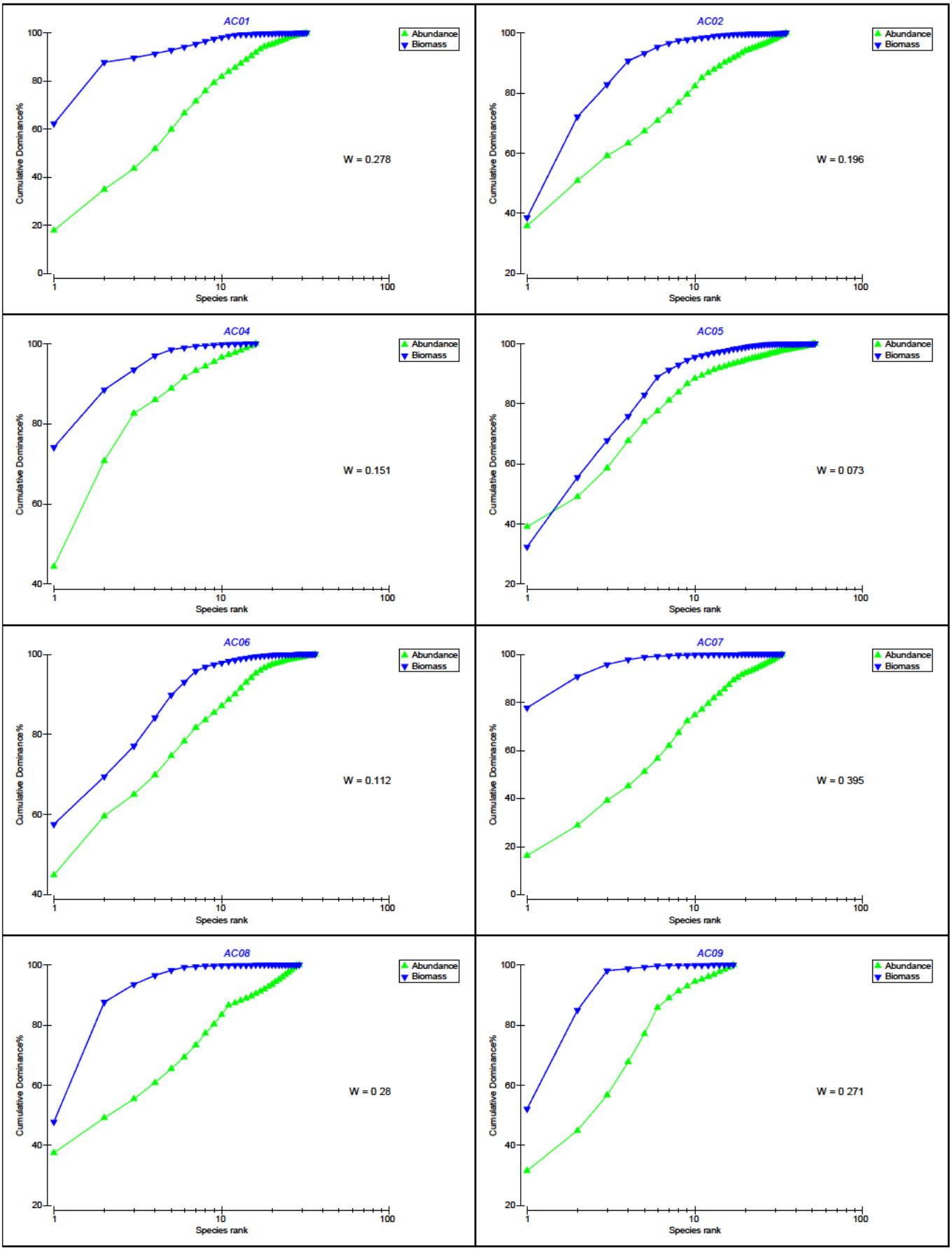
AFDW/WW Conversion factors

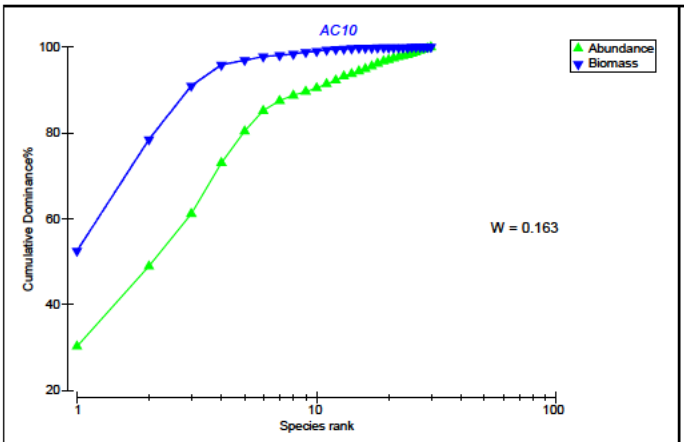
Major Group	AC01	AC02	AC04	AC05	AC06	AC07	AC08	AC09	AC10	AC11	AC12
Annelida	0.04793	0.01527	0.02872	0.32142	0.32610	0.93398	0.51908	0.24608	0.19966	0.03911	0.56899
Molluscs	0.04948	0.02502	0.06289	0.01151	0.04219	0.08702	0.24242	0.00144	0.00698	0.11289	0.03522
Crustaceans	0.00002	0.00014	0.00018	0.00014	0.00088	0.00054	0.00065	0.00059	0.00011	0.00482	0.00029
Echinoderms	0.00002	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00050	0.00664
Other taxa	0.00003	0.00012	0.00000	0.00140	0.00009	0.00003	0.00008	0.00002	0.00060	0.00121	0.00011

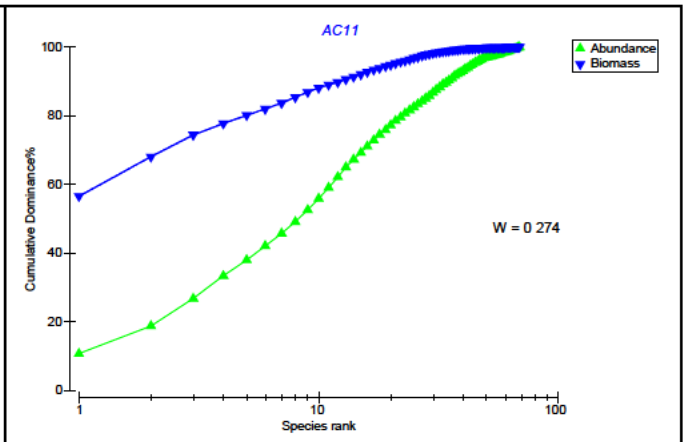
Major Group	BP01	BP02	BP03	BP04	BP05	BP07	BP08	BP09	BP10	BP12	BP13
Annelida	0.51458	0.73487	0.12267	0.98636	1.70114	0.16960	0.19228	0.49676	0.69648	1.31583	0.83376
Molluscs	0.00055	0.02835	0.00998	0.01605	0.01095	0.00007	0.00205	0.00366	0.00467	0.00000	0.02331
Crustaceans	0.00000	0.00000	0.00014	0.00007	0.00311	0.00000	0.00005	0.00005	0.00000	0.00000	0.00007
Echinoderms	0.00000	0.00000	0.00115	0.00466	0.00097	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other taxa	0.00206	0.00011	0.00002	0.00005	0.00530	0.00161	0.00003	0.00003	0.08878	0.00002	0.00003

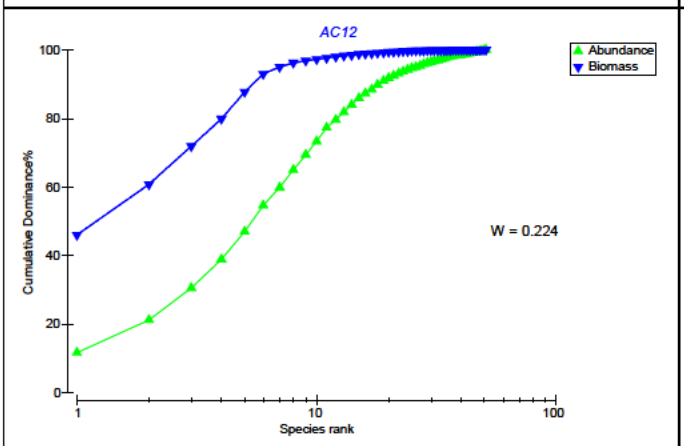
Major Group	BP14	BP15	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24
Annelida	0.78326	0.15568	0.71458	0.10628	0.46655	0.04321	1.09129	0.16267	0.46227	0.63606
Molluscs	0.00626	0.00264	0.00000	0.09556	0.10218	0.01722	0.00036	0.00887	0.14536	0.10100
Crustaceans	0.00000	0.00097	0.00000	0.00007	0.00000	31.98326	0.00000	0.00002	0.00000	0.00002
Echinoderms	0.00000	0.00000	0.00000	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other taxa	0.00045	0.21100	0.00287	0.04219	0.00003	0.00011	0.00002	0.00002	0.00002	0.00090

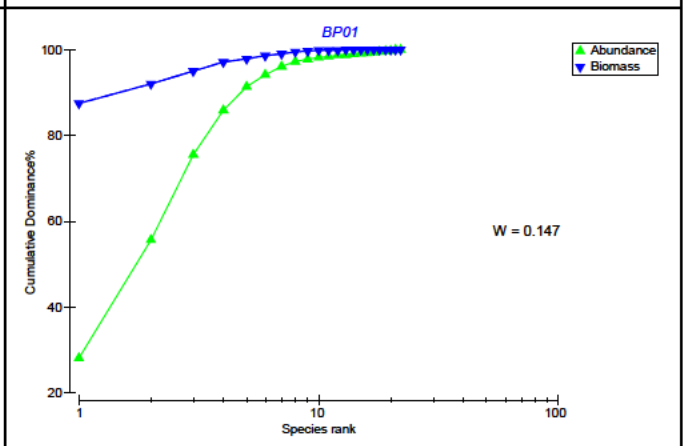
C.4 ABUNDANCE – BIOMASS CURVES (ABC)

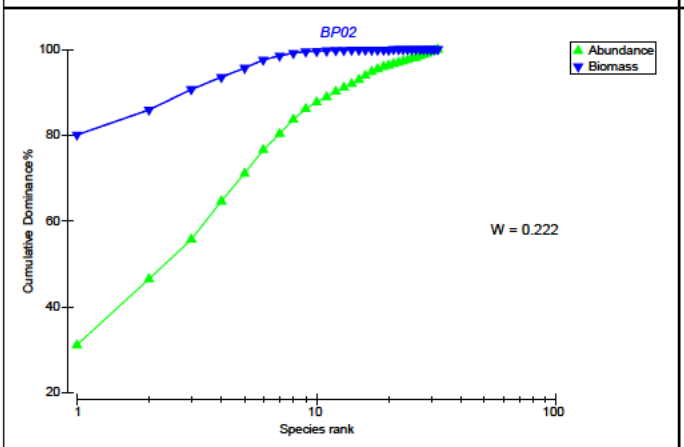

AC01
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.278
AC02
W = 0.196
AC04
W = 0.151
AC05
W = 0 073
AC06
W = 0.112
AC07
W = 0 395
AC08
W = 0 28
AC09
W = 0 271

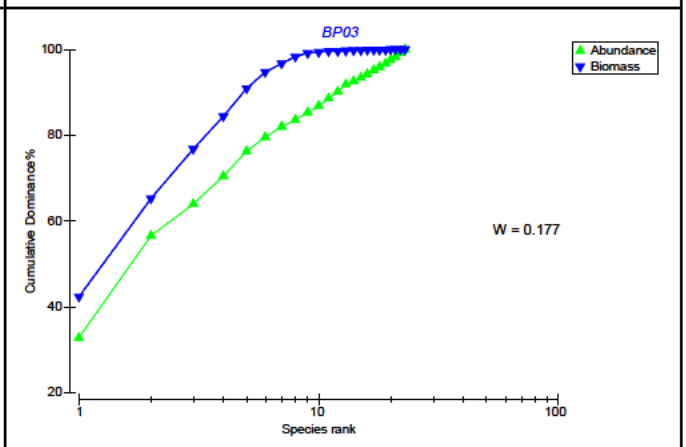

AC10
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.163

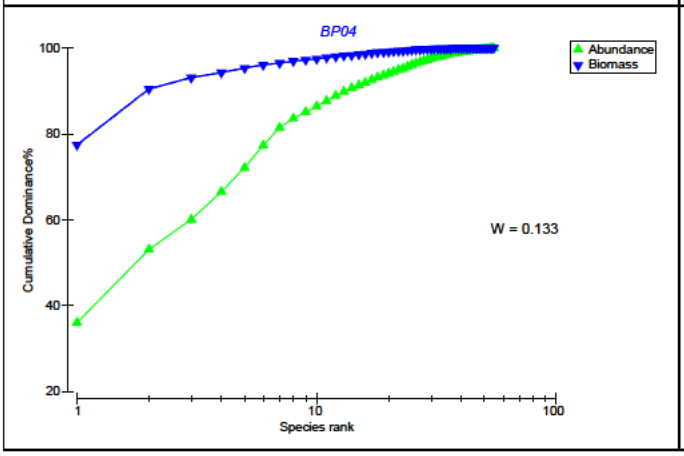

AC11
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.274

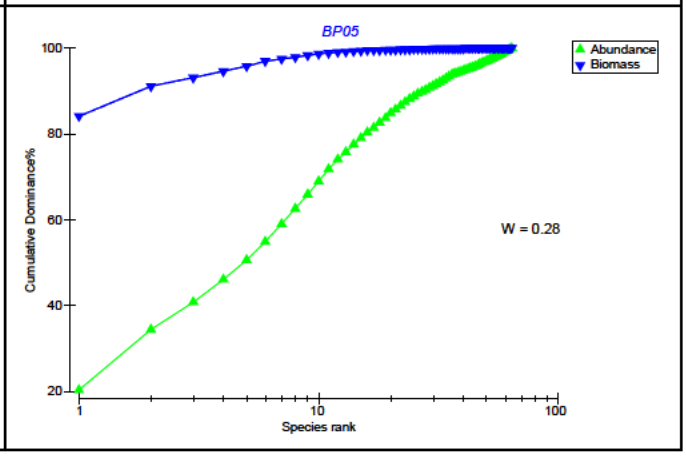

AC12
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.224

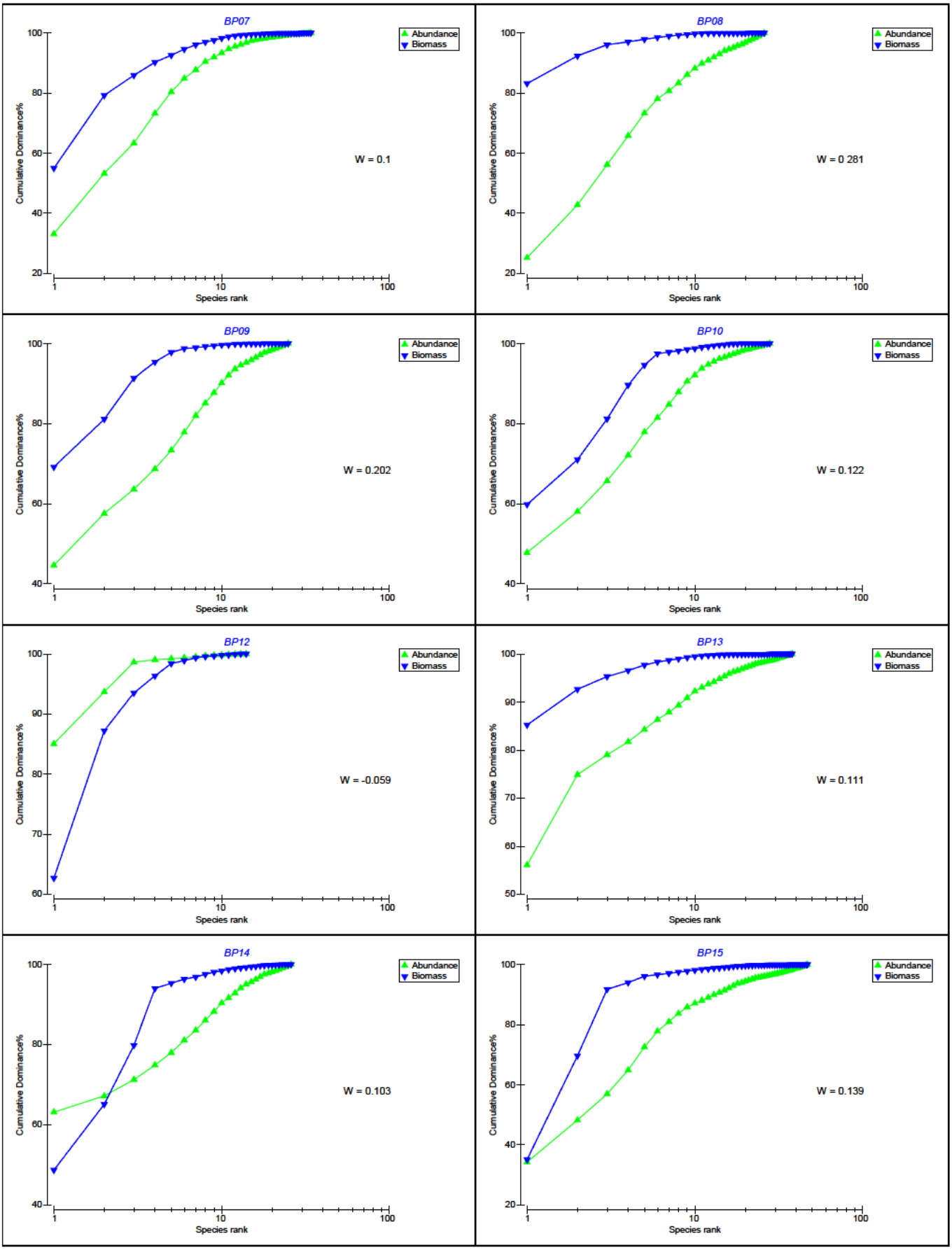

BP01
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.147

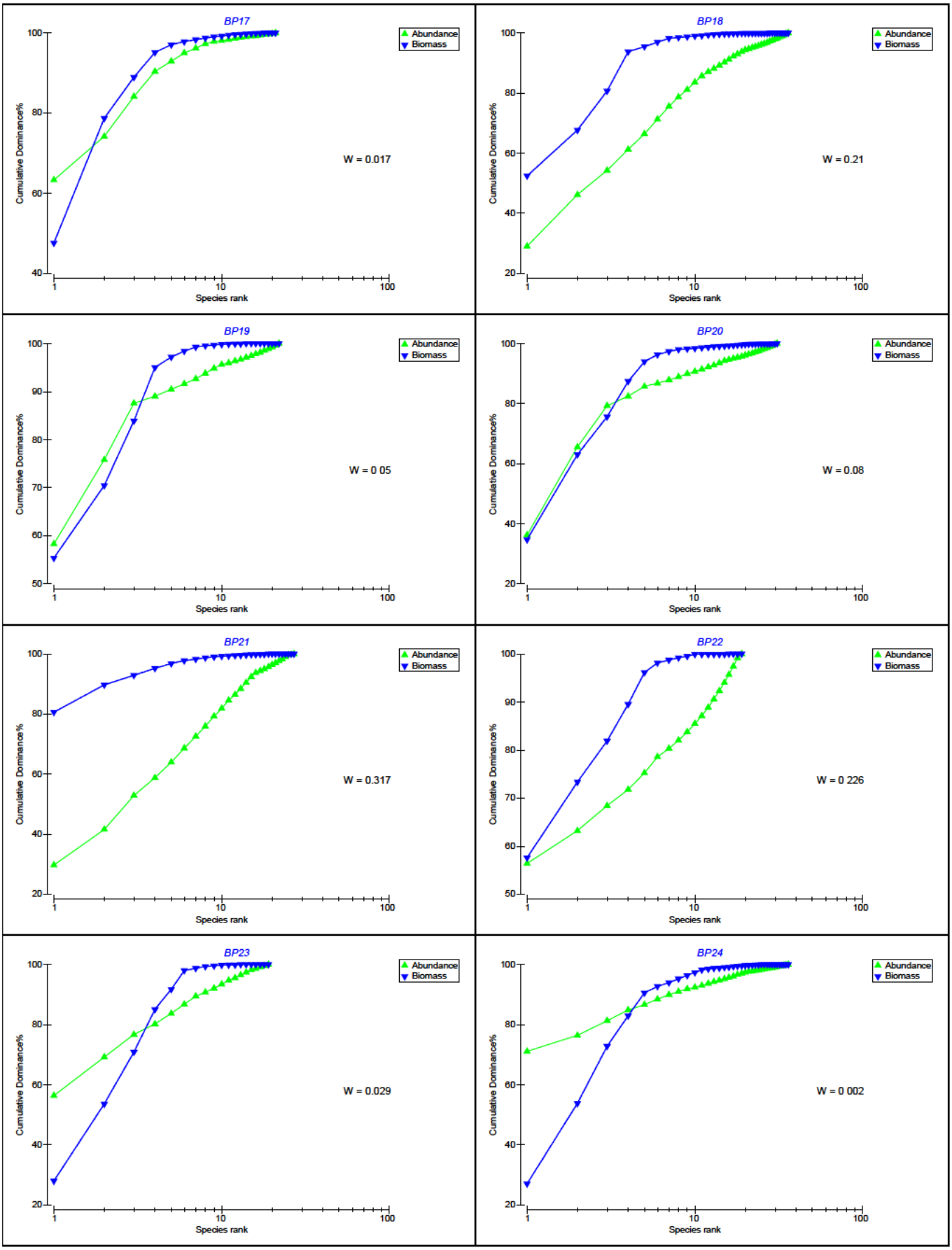

BP02
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.222


BP03
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.177


BP04
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.133


BP05
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.28


BP07
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.1
BP08
W = 0 281
BP09
W = 0.202
BP10
W = 0.122
BP12
W = -0.059
BP13
W = 0.111
BP14
W = 0.103
BP15
W = 0.139


BP17
Abundance
Biomass
Cumulative Dominance%
Species rank
W = 0.017
BP18
W = 0.21
BP19
W = 0 05
BP20
W = 0.08
BP21
W = 0.317
BP22
W = 0 226
BP23
W = 0.029
BP24
W = 0 002

C.5 SIMPER ANALYSIS

SIMPER
Similarity Percentages - species contributions

One-Way Analysis

Data worksheet
Name: Data10
Data type: Abundance
Sample selection: All
Variable selection: All

Parameters
Resemblance: S17 Bray Curtis similarity
Cut off for low contributions: 90.00%

Factor Groups

Sample	SP_5.2
AC01	i
AC02	i
AC05	i
AC06	i
AC07	i
AC12	i
BP02	i
BP04	i
BP08	i
BP09	i
BP10	i
BP13	i
BP14	i
BP15	i
BP18	i
BP19	i
BP20	i
BP23	i
BP24	i
AC04	a
AC08	g
AC09	d
BP03	d
BP22	d
AC10	h
AC11	c
BP01	b
BP12	b

BP17	b
BP05	e
BP07	f
BP21	f

Group b

Average similarity: 46.09

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Capitella	48.14	12.32	1.03	26.73	26.73
Limnodrilus	21.12	11.35	8.25	24.63	51.36
Tubificoides benedii	18.19	6.56	2.13	14.24	65.60
NEMATODA	17.00	5.54	1.11	12.01	77.61
Cirriformia tentaculata	5.53	2.56	2.91	5.55	83.17
Eteone longa (agg.)	4.91	1.61	2.31	3.50	86.67
Malacoceros fuliginosus	3.44	1.21	23.28	2.63	89.30
Scalibregma inflatum	3.33	1.21	23.28	2.63	91.93

Group d

Average similarity: 38.46

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mytilus edulis (juv.)	3.37	5.92	2.46	15.39	15.39
Ophelina acuminata	3.77	5.29	2.99	13.75	29.15
Euchone limnicola	5.94	4.43	0.58	11.51	40.66
NEMATODA	2.52	4.19	2.46	10.88	51.54
Nephtys hombergii	1.82	3.88	12.24	10.08	61.62
Chaetozone gibber	3.09	3.16	0.58	8.21	69.82
Nephtys (juv.)	1.67	2.96	2.46	7.70	77.52
Kurtiella bidentata	2.25	2.96	2.46	7.70	85.22
Lagis koreni	1.47	2.53	6.21	6.57	91.79

Group f

Average similarity: 52.93

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
NEMATODA	12.25	9.19	#######	17.37	17.37
Limnodrilus	14.30	6.84	#######	12.91	30.28
Tubificoides swirencoides	7.74	4.97	#######	9.40	39.68
Mediomastus fragilis	5.56	4.39	#######	8.29	47.97
Chaetozone	6.19	4.06	#######	7.67	55.64
Tubificoides galiciensis	10.17	3.71	#######	7.00	62.64
Tubificoides	6.36	3.52	#######	6.64	69.29
Euchone limnicola	4.06	3.32	#######	6.26	75.55
Chaetozone gibber	4.49	2.75	#######	5.19	80.75
Chaetozone vivipara	3.15	2.34	#######	4.43	85.18
Nephtys hombergii	2.22	1.66	#######	3.13	88.31
Nephtys kersivalensis	2.41	1.66	#######	3.13	91.44

Group i

Average similarity: 47.91

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Euchone limnicola	14.82	8.89	2.10	18.55	18.55
NEMATODA	6.72	4.08	1.85	8.52	27.08
Chaetozone gibber	5.03	3.82	2.40	7.96	35.04
Mytilus edulis (juv.)	5.70	3.60	1.44	7.51	42.55
Mediomastus fragilis	4.60	3.32	1.98	6.94	49.49
Tubificoides swirencoides	5.36	3.13	1.77	6.52	56.01
Ophelina acuminata	3.60	2.39	2.27	4.99	61.00
Nephtys hombergii	3.24	2.22	1.33	4.64	65.64
Kurtiella bidentata	2.88	1.69	1.45	3.52	69.17
Tubificoides galiciensis	2.88	1.12	0.84	2.33	71.50
Eteone longa (agg.)	1.88	0.91	1.01	1.89	73.39
Chaetozone vivipara	2.42	0.90	0.66	1.88	75.27
Phyllodoce mucosa	2.21	0.89	0.87	1.86	77.13
Lagis koreni	1.66	0.89	0.95	1.86	78.99
Nucula nitidosa	1.61	0.72	0.82	1.50	80.49
Ophryotrocha	2.05	0.70	0.83	1.45	81.94
Abra alba	1.32	0.67	0.76	1.41	83.35
Prionospio fallax	1.22	0.66	0.88	1.39	84.73
Sabellinae	1.87	0.65	0.69	1.35	86.09
Tellininae (juv.)	1.33	0.61	0.78	1.28	87.37
Nephtys (juv.)	1.28	0.61	0.73	1.27	88.64
Paramphinome jeffreysii	1.54	0.53	0.72	1.10	89.74
Tubificoides	1.70	0.51	0.61	1.06	90.80

Group a

Less than 2 samples in group

Group c

Less than 2 samples in group

Group e

Less than 2 samples in group

Group g

Less than 2 samples in group

Group h

Less than 2 samples in group

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D. TRAWL BIOLOGICAL DATA

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2m Beam Fish Species Measurements

Trawl	Fish Species Measurements	Total lengths (cm)	Abundance
AC02	*Gadus morhua*	8	1
	Pleuronectes platessa	13 7 5	3
	Pleuronectidae	6 6 7 5 7 6 6 7 6 8 6 8 5 7 6 4 6 6 6 6 7 7 6 8 6 6 6 7 6 7 7 7 6 6 6 6 8 7 8 7	
		8 5 6 5 7 6 6 5 3 5 7 7 5 6 6 8 7 7 5 6 4 6 4 6 6 5 7	67
	Limanda limanda	3 4	2
	Pleuronectidae (juv.)	1 1	2
	Agonus cataphractus	3 2 3	3
AC05A	*Platichthys flesus*	11	1
	Pleuronectidae	8 6 7 6 7 6 5 5 7 6 7 7 6 7 8 9 7 7 6 6 6 6 6 6 4 5 5 5 5 6 4 5 6 7 5 6 6 7 8 6	
		5 8 6 5 7 5 5 7 7 6	50
	Gadinae	4	1
	Limanda limanda	3 2	2
	Pomatoschistus minutus	7 7	2
	Agonus cataphractus	3 3	2
	Gobiidae	1 2	2
	PLEURONECTIFORMES	2	1
AC08	*Gadus morhua*	10 9 9 9 8 9 8 6 9 7 10 7	12
	Pleuronectidae	8 6 6 8 6 5 5 7 6 6 7 5 5 7 7 6 5 6 5 7 4 8 5 6 7 5 6 7 7 7 6 3 6 8 6 7 4 6 6 5	
		6 5 5 7 4 6 7 5 4 5	50
	Agonus cataphractus	4 3 4	3
	Gobiidae	2	1
	PLEURONECTIFORMES	1	1
AC11	*Pollachius pollachius*	12 14 12 11 11 10 13 11 12 10 11 11	12
	Agonus cataphractus	12 9	2
	Gadus morhua	10 10 9 9 6 9 11 10 7 8 7 7 7 6 8	15
	Callionymus lyra	10	1
	Pholis gunnellus	14	1
	Ciliata mustela	7	1
	Pleuronectidae	4 12 7 6 6 5 10 7 4 13 6 8 5 8 6 9 6 7 8 7 4 7 8 6 4 4 8 3 5 7 5 4 4 6 6 7 7 12 8 5	
		5 7 5 6 5 7 5 6 7 5 6 7 6 5 7 5 7 6 6 5 8 8 4 7 4 6 7 5 6 7 6 6 8 6 6 5 5 5 5 6	
		5 5	82
	Pleuronectes platessa	7 6 7	3
	Myoxocephalus scorpius	5	1
	Gobiidae	2	1
BP02	Pleuronectidae	6 4 5 6 5 6 7 6 7 6 5 6 6 7 7 7 6 6 7 5 7 4 6 5 5 6 7 5 6 6 7	31
	Limanda limanda	7 4	2
	Gadus morhua	6	1
	Pomatoschistus minutus	6	1
BP04	*Gadus morhua*	9 8 10 6 6 7 7 9 7 7 9 8 9 8 7 8 8 8 8 7 6 6 8 7 8 7 6 7 7	29
	Pleuronectidae	7 6 7 6 6 6 8 6 7 7 6 6 7 8 5 5 6 6 8 8 6 7 8 5 7 6 7 8 5 7 8 8 6 7 8 5 5 6 6 6	
		7 7 6 5 6 6 7 6 5 5	50
	Pleuronectes platessa	8 3 4	3
	Merlangius merlangus	8 10	2

	Limanda limanda	4																																						1
	Trisopterus minutus	6																																						1
BP12	*Platichthys flesus*	17	19																																					2
	Pleuronectidae	10	5	7	6	5	6	6	8	5	7	7	6	7	6	7	5	7	6	6	5	5	6	8	5	7	6	7	6	6	9	7	7	4	7	5	7	5	5	6	7	
		7	6	5	6	6	6	5	5	5	5	5	5	6	5	6	5	7	6	5	5	6	5	4	6	8	7	5	5	6	5	7	5	5	5	6	4	5	8	6	6	80
	Limanda limanda	4	4																																					2
	Agonus cataphractus	3	3	4	4																																			4
	Merlangius merlangus	5																																						1
	Pleuronectes platessa	7	10	5																																				3
	Ciliata mustela	6																																						1
BP14	*Gadus morhua*	11																																						1
	Pleuronectes platessa	9																																						1
	Pleuronectidae	4	7	5	6	6	5	4	5	7	8	6	5	6	5	7	8	5	7	7	6	6	4	6	6	6	6	7	6	6	8	8	6	5	8	6	7	4	4	6	5	
		6	6																																					42
	Agonus cataphractus	4																																						1
BP21	Pleuronectidae	6	7	5	5	5	7	6	5	7	5	7	8	5	5	6	6	6	5																					18
	Pleuronectes platessa	9	5																																					2
	Pomatoschistus minutus	7																																						1
BP23A	*Gadus morhua*	8	8	7	7	8	7	7	7	6	9	7	6																											12
	Pleuronectidae	4	5	8	5	5	6	6	3	8	5	5	4	7	6	7	8	7	5	7	6	7	5	7	5	5	8	7	7	7	6	7	6	6	6	5	8	6	4	5	6	
		5	7	5	6	7	7	7	7	6	6																													50
	Agonus cataphractus	4																																						1
	Gobiidae	1																																						1

2m Beam Trawl Full Species List

Taxon	MCS Code	Aphia ID	Ref. Coll.#	AC 02	AC 05A	AC 08	AC 11	BP 02	BP 04	BP 12	BP 14	BP 21	BP 23A
Gattyana cirrhosa	P0049	130749	035					1					
Fimbriosthenelais minor	P0110	131065	034					2					
Phyllodoce mucosa	P0145	334512	031									2	
Glycera alba	P0256	130116	024							1		2	
Nephtys	P0494	129370								1			
Nephtys hombergii	P0499	130359	020	8	3	4	1	117	14	12		4	
Nephtys kersivalensis	P0502	130363	033					6					
Nephtys pente	P0505	130352	025							1			
Ophelina acuminata	P1014	130500	023					12		1			
Lagis koreni	P1107	152367	017	1				2	2			2	
Terebellides stroemii	P1175	131573	018					77	2			10	
Amphitrite figulus	P1206	155162	019						2				
Pandalidae	S1370	106789								1			
Pandalus	S1375	107044			1								
Pandalus montagui	S1377	107651	010	12	2	12	1			8	21		102
Crangon	S1383	107007					3						
Crangon crangon	S1385	107552	003	733	1097	1700	161	165	784	1167	397	156	1108
Pagurus bernhardus	S1457	107232				3		1					
BRACHYURA	S1485	106673								2			
Macropodia parva/rostrata	S15?? / S1532	205077	026	1									
Liocarcinus depurator	S1580	107387	004	9	11	5	2	8	10	6	1	5	3
Liocarcinus holsatus	S1581	107388	005	2	8	11	5	4	20	73	6	1	14
Carcinus maenas	S1594	107381	022	27	25	56	87	6	43	83	15	16	30
Littorina littorea	W0296	140262						2					
Aeolidia papillosa	W1484	138709			1								
Nucula nitidosa	W1569	140589	032		2			1					
Mactra stultorum	W1972	140299	036			2							
Phaxas pellucidus	W2006	140737	029									2	
Gari fervensis	W2051	140870	037			2							
Abra	W2058	138474		1				19	2	6			
Abra alba	W2059	141433	016	1	4	10		280	28	143		8	14
Abra nitida	W2061	141435	015			4		190	10	15		14	18
Venus casina	W2091	141934	028	2									
Sepiola atlantica	W2329	141454							1				
Asterias rubens	ZB0100	123776	027	2	3		4		1				4
Ophiothrix fragilis	ZB0124	125131	030									2	
Ophiura albida	ZB0168	124913	006		3	8			6				
Ophiura ophiura	ZB0170	124929	012		1	2			2				
Leptopentacta elongata	ZB0280	124635	013	1					14			4	2

2m Beam Trawl Full Species List

Taxon	MCS Code	Aphia ID	Ref. Coll.#	AC 02	AC 05A	AC 08	AC 11	BP 02	BP 04	BP 12	BP 14	BP 21	BP 23A
ACTINOPTERYGII	ZG0001	10194									1		
Gadinae	ZG0105.1	125469			2								
Ciliata mustela	ZG0111	126448	021				1			1			
Gadus morhua	ZG0116	126436		1		24	15	1	29		1		12
Merlangius merlangus	ZG0123	126438	007						2	1			
Pollachius pollachius	ZG0136	126440					12						
Trisopterus minutus	ZG0144	126446	014						2				
Myoxocephalus scorpius	ZG0281	127203	009				1						
Agonus cataphractus	ZG0291	127190	011	3	2	6	2			4	1		2
Pholis gunnellus	ZG0440	126996					1						
Callionymus lyra	ZG0452	126792					1						
Gobiidae	ZG0455	125537			2	2	1						2
Pomatoschistus minutus	ZG0479	126928	002		2			1				1	
PLEURONECTIFORMES	ZG0545	10331			1	2			2				
Pleuronectidae	ZG0564	125579		67	141	216	82	31	92	80	42	18	90
Pleuronectidae (juv.)	ZG0564	125579		2									
Limanda limanda	ZG0572	127139	001	2	2			2	2	2			
Platichthys flesus	ZG0576	127141			1					2			
Pleuronectes platessa	ZG0578	127143	008	3			3		5	3	1	3	