Baseline Study of the Marine Ecology at the Humber Gateway Offshore Wind Farm Development

Report to: Environmental Resources Management (ERM)

Institute of Estuarine and Coastal Studies
University of Hull

20 January 2006

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For and on behalf of the Institute of Estuarine and Coastal Studies	
Approved by:	_____
Signed:	_____
Position:	_____
Date:	_____

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1. INTRODUCTION

E.ON UK Renewables proposes to construct a wind farm near Easington on the East Yorkshire coast. This development will comprise up to 80 turbines sited within a development area of 35 km^2, lying approximately 8 km offshore. Offshore wind farm developments are listed under Annex II of the Environmental Impact Assessment Directive (97/11/EC) as 'installations for the harnessing of wind power for energy production (windfarms)' and, as such, an Environmental Impact Assessment must be carried out in support of any application for development consent (CEFAS, 2004).

The construction, operation and decommissioning of an offshore wind farm will inevitably impact upon the physical properties of the sea bed and the quality of the overlying water which, in turn may impact upon the benthic communities. These organisms are an important source of prey for fish and epifaunal species and therefore, any impact on the benthic communities will impact upon organisms at higher trophic levels. Similarly, marine mammals and sea birds rely on fish as a source of prey. It is therefore necessary to characterise the benthic and epibenthic communities to ensure that no sensitive species or habitats are present within the proposed development area and to assess the recovery potential of the species present following any construction work.

Of particular interest along the Holderness coast is the widespread distribution of *Sabellaria spinulosa*, a suspension feeding polychaete which creates and inhabits tubes made of sand attached to cobbles and stones. Whilst it is generally a solitary species, it can form raised reefs on the seabed of up to several metres across and up to 60 cm in depth (English Nature, 1999; Northern Ireland Habitat Action Plan, 2005). These 'biogenic' reefs provide habitat for a variety of epifaunal species and significantly increase the diversity of an area. As such, *S. spinulosa* is considered to be a key structuring species and its distribution, density and the presence of any biogenic reefs within the area must be determined, together with the potential for damage during and after construction work.

Given the significance of the local inshore waters to the regions commercial fishing fleet, it was important to assess the diversity and scale of the commercial resource and non-target species which form an important link in the ecological sequence. Whilst it was not feasible to carry out long term stock assessments of both the shellfish and fin fish stocks, a limited assessment was considered to be beneficial in terms of assessing and characterising the whole ecological component.

Similarly, the outer Humber estuary is an important nursery ground for juvenile flatfish (plaice, sole, dab, turbot, brill and flounder) and some elasmobranch species. The proposed development site also lies within herring spawning grounds and it is important that usage of the area by juvenile or spawning fish, together with the potential for any impact on these species is assessed.

1.1. Aims and objectives

The Institute of Estuarine and Coastal Studies was commissioned by Environmental Resources Management (ERM), on behalf of the developer (E.ON UK Renewables), to carry out an evaluation of the marine ecology present both within the immediate development site and in adjacent waters. The assessment and methods utilised were in compliance with the

DEFRA Guidance note for Environmental Impact Assessment in respect of FEPA and CPA requirements (Version 2 – June 2004). In addition, all methodologies were agreed with CEFAS prior to initiation.

In accordance with the above guidelines, the assessment aimed to investigate the subtidal invertebrate assemblage, both infaunal and epifaunal, the intertidal infaunal assemblages (at the cable landfall), the composition of the fish communities, their spawning potential and the juvenile component. The following surveys were carried out:

- Subtidal macrofaunal sampling (December 2004)
- Intertidal macrofaunal sampling (April 2005)
- Epifaunal trawling (October 2004)
- Fish surveys carried out in November 2004 and March 2005 to account for seasonal variation (due to migration, spawning and recruitment) in the structure and species composition of the fish communities.
- Characterisation of *Sabellaria* species at specific sites where presence was highlighted by the macrofaunal and epifaunal surveys.

2. METHODS

2.1. Field sampling

2.1.1. SUBTIDAL SURVEY

2.1.1.1. BENTHIC MACROFAUNA

The survey was designed to characterise the subtidal infauna and sediments present within the proposed turbine site, cable route and adjacent waters to the north and south of the development area, in order to account for tidal excursion. In addition, sampling stations were included to act as control sites to enable future monitoring of un-impacted areas and to enable assessment of the level of impact within the development site. Stratified sampling was carried out with sampling stations being chosen based on a grid system. Guidance documents (Boyd, 2002; CEFAS, 2004) were used to determine the sampling strategy which was then agreed by CEFAS.

In total, macrofaunal sampling was carried out at 54 stations, 20 being within the proposed development area, 18 being along the proposed cable route and surrounding area and 12 being within the tidal excursion (six to the north and six to the south of the proposed development area). An additional four control stations were situated outside the area of influence, two to the east and two to the north of the development area (Figure 1). Three replicate samples were taken at 23 of these stations with one sample being taken from the remaining 31 stations. This was to enable adequate spatial coverage (ensuring representative sampling of the different habitats) whilst allowing statistical comparison with future data sets (e.g. post construction monitoring) to determine the level of any impact. Replicate sampling at these stations also allowed an assessment of the degree of variability within the benthic communities to be made (between and within sites). Replicate samples were taken from 8 stations within the development area, 7 stations along the cable route, at all the control sites and at 5 stations within the area of the tidal excursion to the north and south.

Sampling was carried out using a local vessel and crew with knowledge of the survey area (Maggie M), with a Sercell NR51 DGPS for position fixing. Prior to commencement of the survey, Defra and the North Eastern Sea Fisheries Committee were informed of the survey positions, date, timing and expected duration. Sampling was carried out in December 2004.

A 0.1 m^2 Hamon grab was used and the position, water depth, sea state, time and weather conditions were recorded at each site. Upon recovery, the samples were examined and photographed in order to determine the sample volume, visual characteristics of the sediment, the presence of anoxia and the presence of epifauna. Particular attention was paid to the presence of *Sabellaria* species. Any sample composed of fine sand or mud which was less than 8 litres in volume was rejected with samples composed of hard substrata (stones, shell, gravel) being rejected if a volume of 6 litres was not achieved. A sub-sample of approximately 50 ml of sediment was removed, placed in a plastic bag, and stored in a cool box for particle size analysis (single replicate at each site).

The remainder of the sample was placed in a container, before being washed through a nest of sieves (5 mm and 1 mm) in order to remove the macrofauna. This sieving technique

allowed removal of large material (e.g. rocks, stones, gravel), thus minimising damage to the organisms. The sieve residue was then transferred to a plastic bucket and preserved using a solution of borax buffered 4% formo saline containing rose bengal vital stain. The IECS methodology follows that given by Rees *et al.* (1990) and a full survey log was maintained throughout (Appendix 1).

At three designated stations, an additional grab sample was collected for chemical analysis including; metals, PAH compounds, PCBs, water soluble boron, selenium and oil and grease. Samples for chemical analysis were collected using a stainless steel Shipek grab to ensure that no cross contamination of metals occurred. All samples were stored in amber glass jars and placed in cool boxes. Analysis was carried out by ALcontrol Laboratories (UKAS accredited) immediately after the survey.

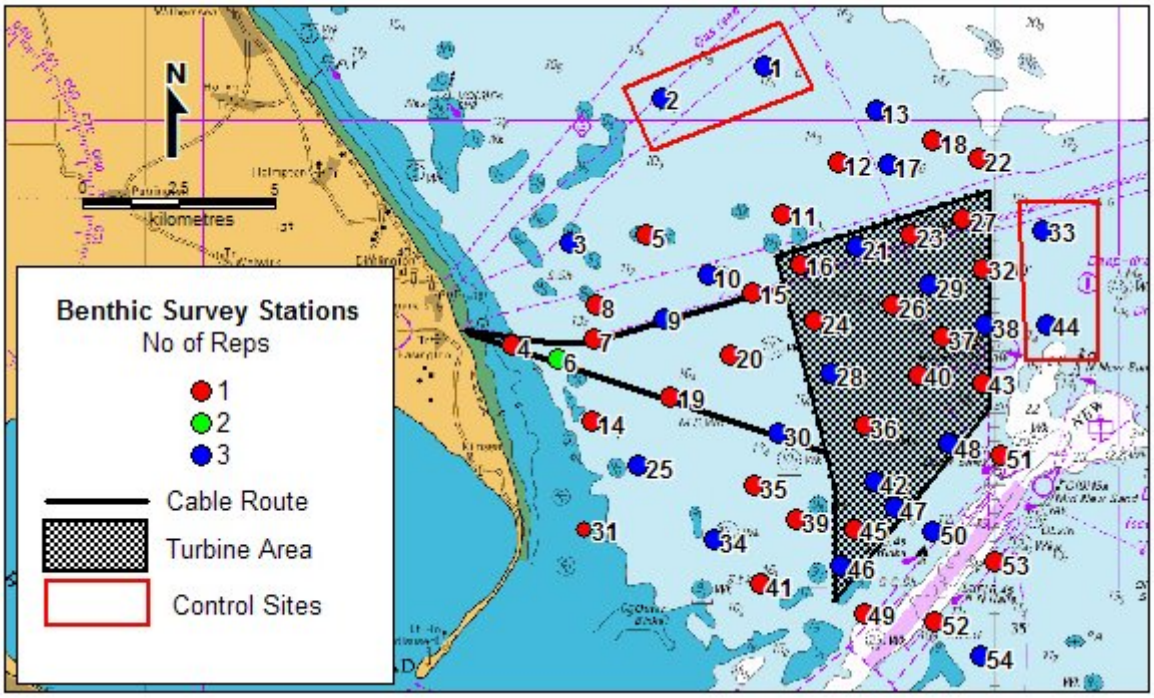


Figure 1. Subtidal benthic sampling stations indicating degree of replication

2.1.1.2. EPIFAUNA

A series of trawl routes were identified (Figure 2), following consultation with CEFAS. A total of 29 trawl routes were chosen (including controls) to ensure spatial coverage of the proposed development area, the cable route and the predicted tidal excursion. The nearshore coastal margin of the Holderness coast (Spurn lighthouse to Witter (north of Hornsea)) is a no trawl area under North Eastern Sea Fisheries Committee (NESFC) byelaws and therefore, special dispensation to use trawl gears within the site was required from both NESFC and DEFRA.

Epifaunal sampling was carried out for 10 minutes at each site, using a 2 m beam trawl with a 10 mm mesh and a 6 mm cod end liner. The trawl comprised two 60x550x500 mm detachable steel shoes with a 2120 mm steel tube brace and was towed at a speed of 1.5-2

knots. Following sampling, the trawl was brought to the surface and the sample recovered by opening the cod end over a stainless steel hopper. The net was examined and any remaining epifauna or fish were added to the sample before re-deployment at the next station. The start and end position of each trawl was recorded using GPS.

The invertebrates were identified to species level (where possible), enumerated and returned to the sea. Examples of each species were retained for a reference collection. Organisms which could not be identified were preserved in a solution of borax buffered 4% formo-saline, containing rose bengal vital stain, and were retained for laboratory analysis. Where excessively large numbers of a particular species (e.g. Crangonidae, Pandalidae) were collected, an assessment of volume was made and abundance estimated based on the number of organisms required to fill a 1 litre volumetric flask and the total number of flasks filled (e.g. 300 *Pandalus montagui* = 1L, 10L = 3000 *P. montagui*).

Epifaunal sampling was carried out in October 2004. A full survey log was maintained throughout with position, water depth, total catch volume and the proportion of rocks, cobbles, shell, weed and other debris recorded.

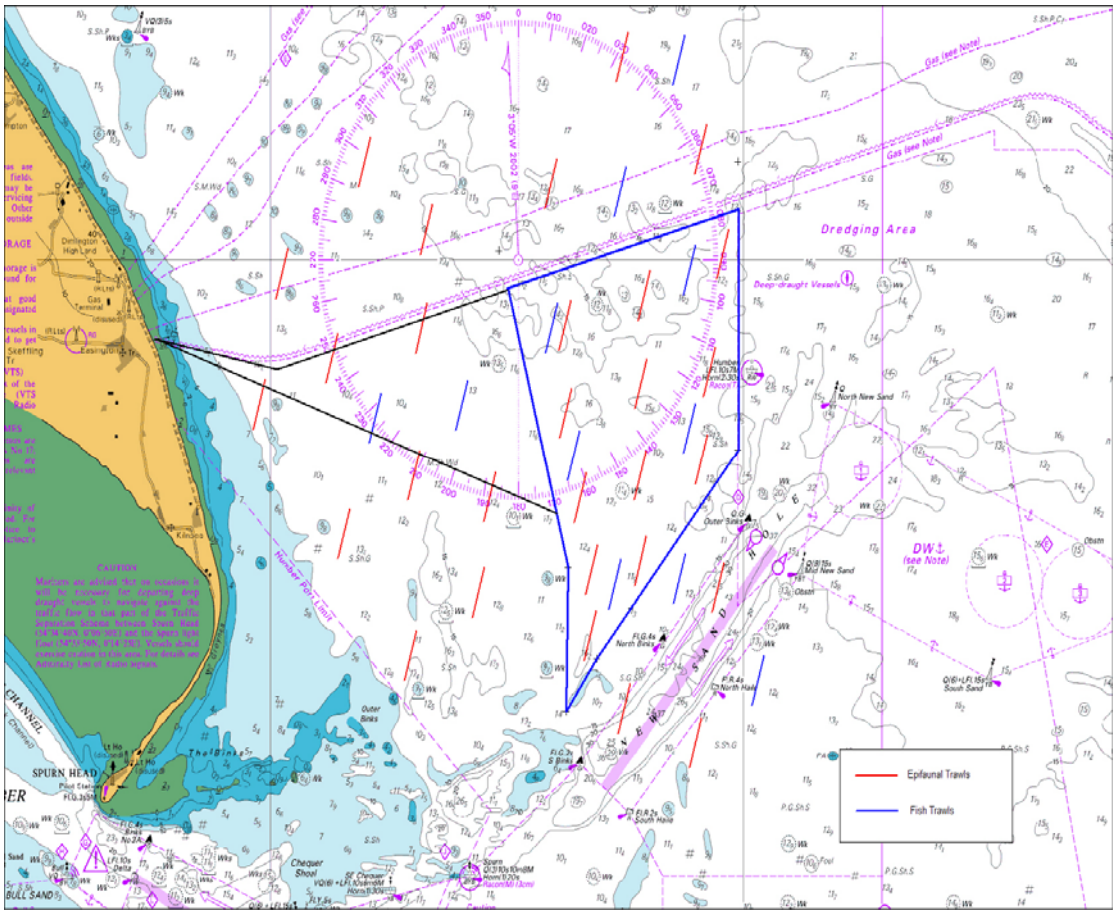


Figure 2. Epifaunal and Fish Trawl Sites

2.1.2. INTERTIDAL SURVEYS

Sampling was carried out along three high to low shore transects, each comprising three sampling stations (high, mid and low shore). Five replicate cores were taken to a depth of 15 cm using a 0.01m^2 diameter corer. This gave a total of 45 cores. One replicate sample was taken from each station for particle size and organic content (expressed as % loss on ignition) analysis. All samples (sediment and macrofaunal) were placed in pre-labelled, sealable plastic bags. Upon return to the laboratory, sediment samples were frozen and macrofaunal samples were transferred to plastic buckets and preserved using a borax buffered 4% formo-saline solution containing rose bengal. Sampling was timed to coincide with a spring tide to ensure maximum coverage of the intertidal area. The position of each site was recorded using GPS and the physical characteristics of the sediment were described and photographed.

2.1.3. FISH SURVEYS

2.1.3.1. GEAR

Following discussion with CEFAS fisheries scientists, the preferred gear type for the fish assessment was considered to be a 4 m otter trawl which was deployed during November 2004. During the deployment the gear frequently became snagged on the seabed resulting in significant damage to the net and leading chains. Similar damage was frequently experienced during the epifaunal survey. The 4 m otter trawl comprised an 80mm mesh net with a 10mm mesh liner, and was towed at a speed of between 3 to 4 knots. Three foot six inch doors were used and the trawl is similar to that employed by CEFAS for their bass surveys. The specification for the trawl was;

- 9 m fishing line
- 12 m total length
- 80 mm mesh
- 10 mm cod end liner
- 150 mm rubber discs

Following consultation with local fishing operators, who indicated that they rarely fished the area with trawl gears due to the rough nature of the seabed, it was recommended that larger gears with rockhopper discs would be the only feasible method of accurately sampling the fish communities within the area.

These recommendations were proposed to CEFAS fisheries scientists, who agreed the gear change and for the March 2005 fish survey, the following gears were deployed.

- 11 m fishing line
- 15 m total length
- 80 mm mesh
- 10 mm cod end liner
- 5ft doors
- 350 mm rubber discs (rockhopper)

These gears were successfully deployed although some trawls were abandoned due to the abundance of static fishing gears along and adjacent to the trawl route.

2.1.3.2. SURVEY METHODOLOGY

Prior to commencement of the survey, 15 trawl sites were identified ensuring coverage of the proposed development site, the cable route and the predicted tidal excursion. Sites were chosen based on information regarding hydrodynamics and sediment characteristics. The date, timing, expected duration and trawl path positions were forwarded to DEFRA and the local Sea Fisheries Committee (NESFC). Dispensation to trawl was requested and provided by the North Eastern Sea Fisheries Committee. Dispensation from the provisions of council regulation 850/98 to catch and retain undersized fish for scientific research was granted by DEFRA.

This area is intensively fished using static gear (potting), and whilst it was intended that the trawls would stay rigidly within the predetermined trawl paths the positioning of static fishing gears across the proposed trawl route could not be identified until the survey commenced. This did not present a problem during the November 2004 survey, but during the March 2005 survey it was occasionally necessary to alter trawl paths in order to avoid static fishing gear.

At each station, the otter trawl was lowered to the seabed and towed for 30 minutes, with the time commencing at the point at which the winch was locked. Upon completion of the 30 minute period, the trawl was hauled to the surface and the sample recovered. The cod end was opened over a stainless steel hopper to contain the whole catch, and the fish species were separated from the epifaunal invertebrates. All fish and shellfish were identified to species level (where possible) with a sub-sample of common species being measured for length, weight and sex (when possible) to allow determination of year class strengths across the area. Any epifaunal and fish species not identified onboard were retained for laboratory identification, with all other organisms being returned to the sea.

Data output was in the form of diversity, abundance, catch per unit effort, size distribution and sex (where possible). It is acknowledged that beam and/or otter trawling are not the most effective methods of quantifying lobster and crab. However, an alternative method of data collection (potting effort) is currently being pursued by consultants on behalf of E.ON UK Renewables in conjunction with the local fishermen utilising the area.

To evaluate the predator-prey relationships, stomach analysis was carried out on a percentage of the dominant fish species encompassing all age and size classes where available. This analysis was to provide information on the usage of the site and determine the relationships between the fish, epifauna and infauna. The stomach and vital organs were removed from the fish by making an incision across the throat and then down to the anus. The oesophagus was then severed behind the gills, with the opening restricted by forceps. The digestive tract was cut at the anus and the stomach and vital organs removed and placed in a borax buffered 4% formo-saline solution in labelled containers. The stomach cavity, throat and mouth were then checked for any regurgitated items and the gonad condition logged, if relevant.

A full survey log was maintained throughout the survey detailing start and finish position, trawl code, sea state, depth, position and type of any static gears, and time and duration of trawl.

2.1.4. *SABELLARIA ALVEOLATA* SURVEYS

2.1.4.1. RATIONALE

During the subtidal benthic survey (December 2004), the honeycomb worm *Sabellaria alveolata* was identified at 12 of the 54 sampling stations. These stations were largely situated between 2 and 4 km offshore at depths of 10-15 m, although some stations were more than 6 km offshore. The 11 stations were outside of the proposed development area, with one station (46) located on the south western edge of the turbine site. The epifaunal survey (October 2004) also highlighted the presence of *S. alveolata.*

The presence of *S. alveolata* is of particular note since the reefs produced by this species are classed as a priority habitat under the UK Biodiversity Action Plan (UK Biodiversity Group, 1999). *S. alveolata* is a sedentary, tube dwelling polycheate which colonises hard substrata such as cobbles, boulders and areas of mixed sediment composed of cobbles and sand. Where dense aggregations of this species occur, the tubes can form large biogenic reefs (Holt *et al.*, 1998) which increase habitat heterogeneity, providing crevices and overhangs available for colonisation by a number of species which would otherwise be absent from the area. Therefore, they lead to significantly increased species diversity and are included as a sub-feature of the specific 'marine reefs' habitat defined in Annex 1 of the Habitats Directive (92/43/EEC) (Allen *et al.*, 2002).

S. alveolata is primarily an intertidal / shallow subtidal species which is generally found on the west coast of Britain. Given its conservation importance, it was considered necessary to map the distribution and density of the species and to determine the status of any reef structures found.

2.1.4.2. SURVEY MEHODOLOGY

Sampling was carried out, using a towed video, at the 12 benthic survey stations at which *S. alveolata* was found. A minimum of 5 minutes was allowed for each video recording with the maximum length of time being dependent upon vessel movement, current strength and water clarity. The video camera was kept as close to the seabed as possible to allow for a clear representation of the bed and faunal type to be recorded. The optimal timing for video surveying in the marine environment is during prolonged calm conditions. This is usually during early spring or mid-summer, during neap tides. In addition to the towed video, the RoxAnn system was deployed in order to characterise the sediments.

At each site, the start and end time of the video recording was noted along with the start and end position. The characteristics of any structures produced by *S. alveolata* were described, including an estimation of extent, reef height and density (e.g. continuous reef or small patchy crusts) and reef health (e.g. signs of erosion, heavy siltation, tube size). In addition, the substratum characteristics were noted together with any epifaunal and floral species. This procedure was repeated six times at 10 m intervals from each sampling station. Where the habitat/substrata differed from that under investigation, the sampling position was relocated to a comparable area.

2.2. Laboratory analysis

2.2.1. FAUNAL ANALYSIS

2.2.1.1. BENTHIC MACROFAUNA (INTERTIDAL AND SUBTIDAL)

Upon return to the laboratory, the preserved macrofaunal samples were agitated to ensure mixing and allowed to stand for at least 72 hours at 10˚C in order to allow staining of the organisms. Following staining, the formalin was decanted off (through a sieve to avoid the loss of any organisms) and the samples rinsed through a nest of sieves (5 mm and 1 mm) to remove any remaining formalin. It should be noted that formaldehyde and rose bengal are carcinogenic toxins and, as a consequence, careful handling of these substances is required. The preparation of rose bengal took place under fume extraction, using eye protection and gloves. Preparation of the borax buffered formo-saline solution was carried out outdoors, again using eye protection, respiratory protection, protective clothing and gloves. Similarly, protection was used when handling formalin at sea.

The sieve residue was washed into white trays, agitated and the light fraction decanted off into a separate tray. This procedure was carried out three times and the light fraction was examined as a sub-sample of the heavy fraction. Samples were sorted into families under a fluorescent lamp with 1.5x magnification, or, in the case of small organisms, under a binocular microscope. The samples were stored in 70% alcohol and subsequently identified to species level (where possible) using Olympus SZ40 zoom microscopes with 10X and 20X eyepieces, giving a maximum magnification of up to 80X. Where necessary, Olympus BX41 compound microscopes were used for further magnification of up to 1000X. Incomplete animals without anterior ends were identified as far as possible and recorded as being 'present'. These organisms were not included in any quantitative analysis. Encrusting organisms and meiofauna were recorded as being present or absent. Regular cross reference identification was carried out to ensure quality assurance.

The taxonomic literature used was essentially as given in Rees *et al.* (1990), and reporting nomenclature was according to Howson & Picton (1997).

2.2.1.2. EPIFAUNA

All organisms retained for laboratory analysis were rinsed through a 1 mm sieve, to remove the formalin, and subsequently identified to species level (where possible) as described in Section 2.2.1.1. Following rinsing, as described above, organisms attached to rocks were either removed or identified whilst on the rock. Since the method of sampling was not quantitative (only a selection or organisms were retained for laboratory identification), species were recorded as being present or absent.

2.2.2. FISH STOMACH ANALYSIS

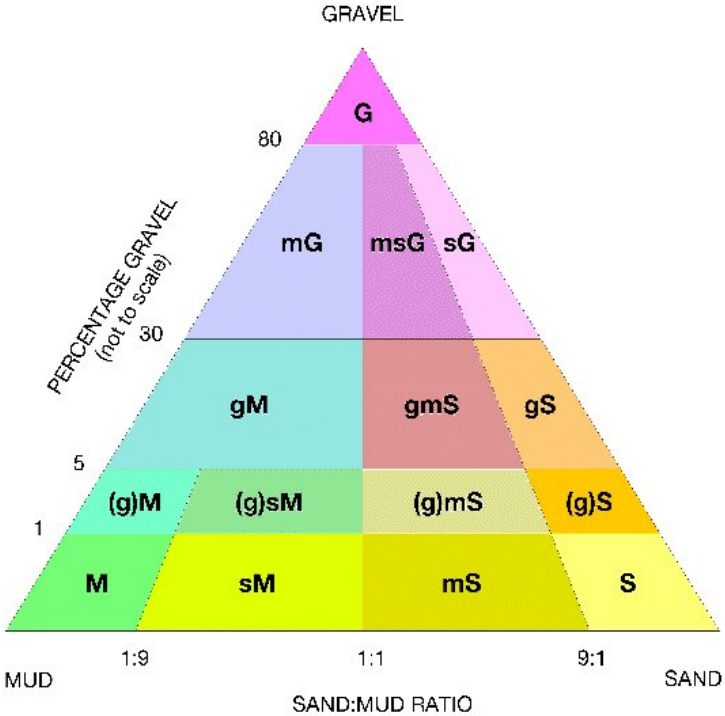
The stomach and vital organs were removed and preserved in the field. Upon return to the laboratory, the stomach and oesophagus were separated from the rest of the sample and opened up using a standard dissection kit. The contents were carefully removed using forceps and placed in labelled vials containing 70% Ethanol in freshwater. The excavated stomach and oesophagus were gently washed in a tray to remove all prey and debris and

were assessed in relation to the stomach volume (recorded as a percentage of stomach fullness). The vital organs and emptied stomach were then returned to the original container and the remaining stomach contents sieved through a 300 µm mesh and examined under an Olympus SZ40 zoom microscope with 10x and 20x eyepieces.

Compound microscopes were used for further magnification of up to 1000x to identify and enumerate small organisms. During identification, all whole organisms were enumerated, with part animals being assigned to families were possible, although, headless body parts were not counted individually.

2.2.3. SEDIMENT ANALYSIS

Sediment samples were frozen and stored until analysis was carried out. Particle size distribution was analysed using a Malvern Mastersizer™ (for fractions less than 2 mm) together with dry sieving through a nest of sieves. The pooled data were subsequently processed using the Malvern Mastersizer™ software to derive statistics such as mean and median grain size, sorting coefficient, skewness and bulk sediment classes (% silt, sand and gravel). Dried and pre-weighed sediment samples were placed in a muffle furnace at 480˚C for 4 hours and the organic carbon content was expressed as % loss on ignition on re-weighing of the cooled sample. The ratio of percent sand:silt was calculated and the percentage of gravel added in order to determine the sediment type according to Folk (1954) (Figure 3). These parameters were input into GIS and presented on maps in order to indicate any spatial patterns.



KEY

M	Mud	**sM**	Sandy mud	**(g)M**	Slightly gravelly mud
(g)sM	Slightly gravelly sandy mud	**gM**	Gravelly mud	**S**	Sand
mS	Muddy sand	**(g)S**	Slightly gravelly sand	**(g)mS**	Slightly gravelly muddy sand
gms	Gravelly muddy sand	**gS**	Gravelly sand	**G**	Gravel
mG	Muddy gravel	**msG**	Muddy sandy gravel	**SG**	Sandy gravel

Figure 3. Folk classification (source: British Geological Survey, 2004).

2.3. Data analysis

2.3.1. UNIVARIATE ANALYSIS

Mean values and descriptive statistics for primary and derived biological parameters were presented for the survey area as a whole and for individual sites. These parameters were calculated for infaunal species (collected during grab sampling) and epifaunal species (collected during beam trawling). The following biological parameters were calculated using PRIMER v. 5 (Plymouth Routines in Marine Ecological Research) and SPSS v. 12:

- The total number of species (S) at each site and for survey area as a whole;
- Total abundance (A) of organisms / 0.1 m^{-2} at each site;
- Abundance ratio (A/S) which gives an indication of the level of dominance of particular species within a community. High values indicate a low number of organisms spread between a large number of species whereas low values indicate few species each with a large number of individuals (i.e. the community is dominated by very few species occurring at high abundances).
- Shannon-Weiner diversity (H'), incorporating both species richness and evenness (a measure of the distribution of the individuals between the species). High values indicate high diversity.

  $$\mathbf{H' = - \sum p_i \log_2 p_i}$$

  Where: S = number of species
  N = total number of individuals
  p_i = proportion of individuals in the *i*th species
- Pielous Evenness index (J') gives a measure of the relative abundance of each species. Low values (close to zero) indicate that a community is dominated by one or few species and indicate low diversity. Communities where there is an even spread of the individuals between the species (J' values approaching 1) are considered to be diverse.

  $$\mathbf{J' = H' / \log S}$$

Description of the biological communities for individual sites and for the survey area as a whole (based on mean abundance values for each species) was carried out by ranking the species in terms of their abundance, percentage contribution to the community (% dominance) and cumulative percent dominance.

2.3.2. MULTIVARIATE ANALYSIS

Multivariate techniques allow comparison of communities based on their component species and their relative importance in terms of abundance (or other parameters). Such techniques enable the interpretation of large data sets as a whole rather than examination of different components individually. Calculation of the Bray-Curtis similarity coefficient gives the percentage similarity between each pair of samples (i.e all samples are compared with each

other) and can be plotted in the form of a dendogram so that groups of samples with distinct community structures can be identified.

Prior to analysis, the data were examined and rare, patchy or absent species and sites containing no species were identified. Species abundance data were summed across the 54 stations and those occurring less than five times across the whole area were excluded. In addition, those species occurring at only one or very few sites in low abundances, were removed. Species which contribute little to the community can obscure patterns in the data, making interpretation difficult, and may cause interference with some multivariate techniques. Therefore, it is often appropriate to exclude such species from the analysis. Similarly, many techniques assume homogeneity of variance within the data and transformation (e.g. square root or log transformation) may be required in order to obtain a realistic and interpretable output. All multivariate analyses were carried out using PRIMER.

3. RESULTS

3.1. Sediment characteristics.

The sediment characteristics were highly variable across the area, as demonstrated by the high coefficient of variation values (%CV), although the sediments were generally composed of coarse sands (<1φ) and gravels / pebbles (-1 - -3 φ) (Table 1; Figure 4). The sorting coefficient (SD) ranged from 1.06 to 2.9, indicating poorly sorted sediments composed of a range of particle sizes. Median phi values ranged from 0.45 φ (0.7 mm) at station 51 (coarse sand) to -3.13 φ (8.8 mm) at station 31 (gravel / pebble). The finest sediments were found at stations 18, 27, 28, 30, 50, 51 and 52, where median phi values ranged from -0.94 to 0.45 φ (<2 mm), with the coarsest sediment being found at stations 6, 12, 23, 31 and 40 where median phi values were all less than -3 φ (>8 mm). Particle size distribution plots for each station are presented in Appendix 2.

Gravel content ranged from 32% at station 50 to 85% at station 31 with over 75% gravel being present in sediments from stations 4, 23, 31, 38 and 46. The minimum sand content was generally found in sediments with the highest gravel content. Maximum values were recorded from stations 18, 50 and 51 which all had more than 55% and sand content ranged from 18% (station 23) to 67% (station 50). Both silt and organic content were extremely low at all sites with the highest organic content values corresponding to sediments with the highest silt content. Maximum values were recorded from stations 18 (8.1%) and 30 (5.1%) for silt and organic content, respectively. Sediments from stations 49 and 50 contained no silt and those from stations 4, 23, 31, 32, 33, 38, 48, 49 and 50 all contained less than 0.2%. Organic content at the majority of stations was less than 2%, the minimum being 0.9% at station 33. According to Folk (1954), the sediments at the majority of the stations were classed as sandy gravel with muddy sandy gravel being found at 13 stations and gravel being found at 2 stations (Table 1; Figure 5).

Concentrations of PAH compounds were all below the detection limit of 0.35 mg kg^{-1} (Table 2), although it should be noted that these concentrations could potentially exceed the Canadian Sediment Quality Guidelines (SQG) and the Probable Effects Levels (PEL) for freshwaters (CCME, 2001). However, these compounds bind readily to organic matter and are generally found in higher concentrations in areas where the particle size is small and the silt and organic content of the sediment are high. Given the coarse nature of the sediments and the low organic content (generally less than 2%), PAH compounds are not expected to be present in high concentrations. Their potential for exceedance must, however, be considered. Furthermore, sediment samples were taken from the surface (top 10 cm) and provide no indication of contaminant levels at depth.

With the exception of nickel at ST4 (Table 2), concentrations of all metals were considered to be low, being either below both the PEL and SQG or below the limit of detection. The mean nickel concentration (across the whole area) was 11.18 mg kg^{-1}, below the SQG. Furthermore, the maximum nickel concentration of 16.5 mg kg^{-1} at ST4 was only slightly higher than the SQG, and the potential for pollution by this substance is thus considered low.

No standards were available for PCBs although concentrations of all congeners were below the limit of detection. Selenium and chromium VI concentrations were also below detection

limits at all sites. Concentrations of oil and grease ranged from 39-80 mg kg^{-1} (mean of 55), and the boron concentration ranged from 4.2-18.1 mg kg^{-1} (mean of 9.2).

It is of note that Environmental Quality Standards for the determinands examined in the present report do not currently exist for marine sediments. As such, the actual impact of the release of any of these contaminants is not known and cannot be accurately predicted, however, it is not expected to be an issue. Comparison with the SQG and PELs provides a useful indication of contaminant levels which should not be exceeded in freshwater sediments, but this should be treated as a guide only.

Table 1. Sediment characteristics for each site with descriptive statistics for the whole area.

Station	Mean grain size (phi)	Median grain size (phi)	Gravel (%)	Sand (%)	Silt/Clay (%)	Organic (%LOI)	Kurtosis	Skew	SD	Folks class.
1	-1.01	-1.71	56.53	38.14	5.33	1.38	0.69	0.5	2.42	msG
2	-1.55	-2.5	70.84	27.47	1.69	1.95	0.82	0.69	1.91	sG
3	-1.4	-2.42	64.93	31.61	3.45	1.64	0.72	0.69	2.15	sG
4	-1.94	-2.15	76.07	23.84	0.1	1.40	0.88	0.35	1.3	sG
5	-1.4	-2.31	66.46	30.8	2.74	1.45	0.8	0.65	2.11	sG
6	-1.56	-3.01	68.38	28.79	2.82	1.66	0.87	0.91	2.23	sG
7	-1.25	-1.97	57.06	40.23	2.71	1.44	0.65	0.52	2.13	sG
8	-1.55	-2.42	66.5	31.81	1.68	1.20	0.7	0.65	1.88	sG
9	-1.25	-2.06	61.11	37.52	1.37	1.45	0.64	0.55	2.1	sG
10	-1.2	-1.67	59.77	38.72	1.51	4.57	0.71	0.38	1.99	sG
11	-1.86	-2.63	71.5	27.11	1.38	1.95	0.82	0.7	1.63	sG
12	-1.56	-3.02	72.84	24.06	3.1	1.63	0.94	0.91	2.14	msG
13	-1.52	-2.81	70.16	25.23	4.62	1.91	0.94	0.83	2.17	msG
14	-0.98	-1.24	54.88	42.56	2.56	1.52	0.86	0.27	2.11	sG
15	-1.83	-2.52	72.43	26.87	0.71	1.43	0.88	0.65	1.65	sG
16	-1.27	-1.92	64.78	33.53	1.69	1.62	0.85	0.49	1.96	sG
17	-1.65	-2.65	73.92	24.33	1.75	1.01	1	0.75	1.88	sG
18	-0.12	-0.03	36.57	55.3	8.13	1.95	1.13	0.15	2.61	msG
19	-0.93	-2	58.87	37.98	3.15	1.41	0.57	0.59	2.43	sG
20	-0.9	-1.08	50.7	46.34	2.96	1.83	0.61	0.2	2.14	sG
21	-1.33	-2.5	63.74	32.53	3.73	1.60	0.63	0.73	2.22	msG
22	-1.08	-1.22	54.42	44.34	1.43	1.70	0.67	0.16	1.86	sG
23	-2.31	-3.01	81.88	18.11	0.01	1.79	1.33	0.85	1.38	G
24	-1.69	-2.91	73.74	25.14	1.12	1.69	0.95	0.85	1.92	sG
25	-1.19	-1.92	61.22	36.39	2.4	1.02	0.7	0.51	2.16	sG
26	-0.97	-1.26	52.48	42.48	5.04	1.89	0.73	0.31	2.3	msG
27	-0.56	-0.47	43.45	49.97	6.58	1.70	0.9	0.16	2.58	msG
28	-0.83	-0.91	49.22	47.85	2.93	2.10	0.55	0.12	2.06	sG
29	-0.98	-1.34	54.28	40.12	5.6	1.65	0.81	0.37	2.38	msG
30	-0.29	-0.2	44.96	47.46	7.58	5.09	0.83	0.17	2.9	msG
31	-2.53	-3.13	85.02	14.93	0.05	1.64	1.92	0.9	1.24	G
32	-1.71	-2.54	68.83	30.98	0.19	1.75	0.75	0.67	1.72	sG
33	-1.33	-2.05	59.3	40.59	0.1	0.94	0.55	0.5	1.89	sG
34	-0.92	-1.93	55.28	42.56	2.16	1.64	0.49	0.55	2.35	sG
35	-0.86	-1.38	53.28	44.54	2.18	1.57	0.55	0.34	2.23	sG
36	-1.17	-1.81	57.99	39.23	2.77	1.55	0.58	0.45	2.06	sG
37	-1.09	-1.56	56.01	39.57	4.42	1.75	0.69	0.39	2.17	msG
38	-2.03	-2.9	77.05	22.87	0.08	1.47	1.01	0.82	1.55	sG
39	-1.41	-2.43	65.78	33.27	0.95	1.45	0.66	0.68	2.01	sG
40	-1.64	-3.01	71.11	27.07	1.83	1.90	0.79	0.89	2	sG
41	-1.47	-2.65	69.01	30.73	0.27	1.22	0.75	0.76	2.03	sG
42	-1.69	-2.74	69.4	30.39	0.2	1.80	0.74	0.78	1.84	sG
43	-1.39	-2.63	67.37	27.39	5.24	2.72	0.76	0.79	2.41	msG
44	-1.55	-2.58	67.41	29.49	3.09	1.58	0.73	0.72	1.93	sG
45	-0.95	-1.47	54.58	43.12	2.3	1.64	0.54	0.35	2.16	sG
46	-1.95	-2.98	75.98	23.47	0.55	1.44	1.06	0.87	1.74	sG
47	-1.26	-1.19	53.51	46.2	0.3	1.56	0.64	0.04	1.68	sG
48	-1.4	-2.21	64.31	35.52	0.17	1.79	0.62	0.57	1.88	sG
49	-1.53	-2.77	57.76	42.24	0	1.05	0.5	0.8	1.97	sG
50	-0.6	-0.56	32.43	67.57	0	1.53	1.22	-0.12	1.06	sG
51	-0.14	0.45	35.94	62.73	1.33	1.61	0.66	-0.4	1.83	sG
52	-0.91	-0.94	49.48	47.23	3.29	1.12	0.51	0.07	1.98	sG
53	-1.59	-2.8	67.46	26.43	6.11	3.44	1.08	0.84	2.33	msG
54	-1.16	-2.28	59.17	34.49	6.34	2.06	0.75	0.7	2.6	msG
Mean	-1.3	-1.99	61.6	35.9	2.5	1.8	0.79	0.5	2.03	
SD	0.48	0.86	11.21	10.5	2.1	0.70	0.2	0.3	0.3	
SE	0.07	0.12	1.52	1.4	0.3	0.1	0.03	0.04	0.05	
% CV	36.9	42.8	18.2	29.3	85	41.4	30.5	55.5	17.2	
Min	-2.5	-3.1	32.4	14.9	0	0.9	0.5	-0.9	1.06	
Max	-0.12	0.5	85	67.6	8.13	5.1	1.9	0.4	2.9	

*SD = sorting coefficient. G = gravel; sG = sandy gravel; msG = muddy sandy gravel.

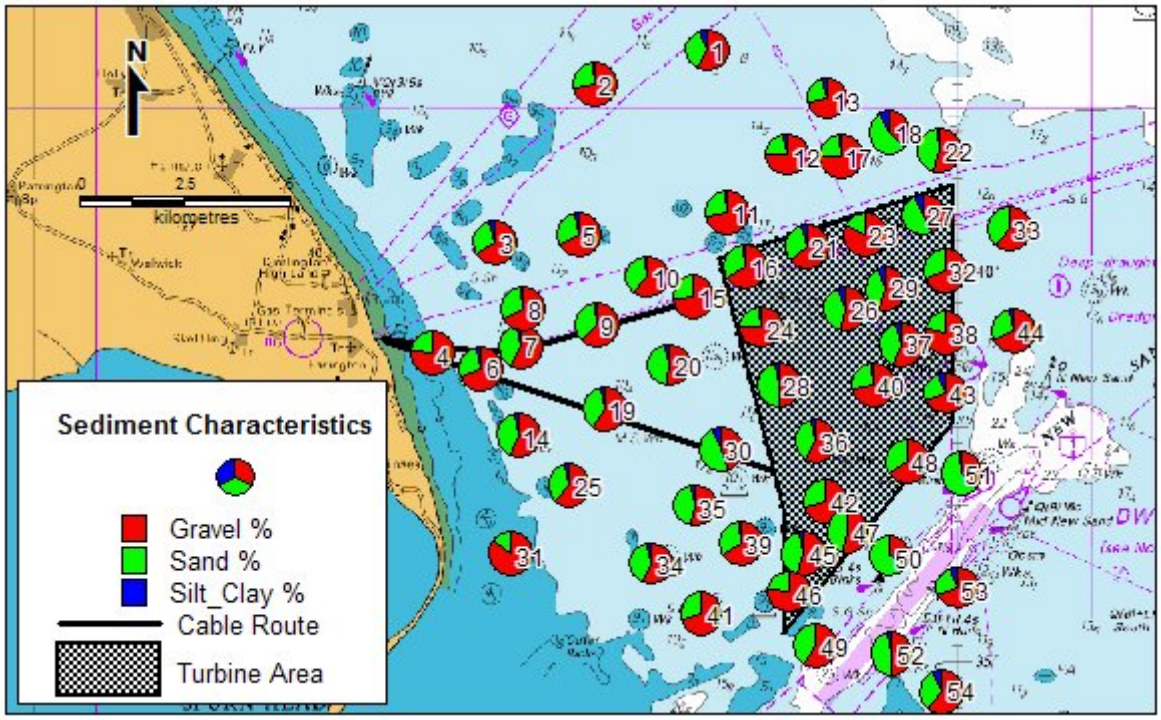


Figure 4. Sediment characteristics showing the percent gravel, sand and silt.

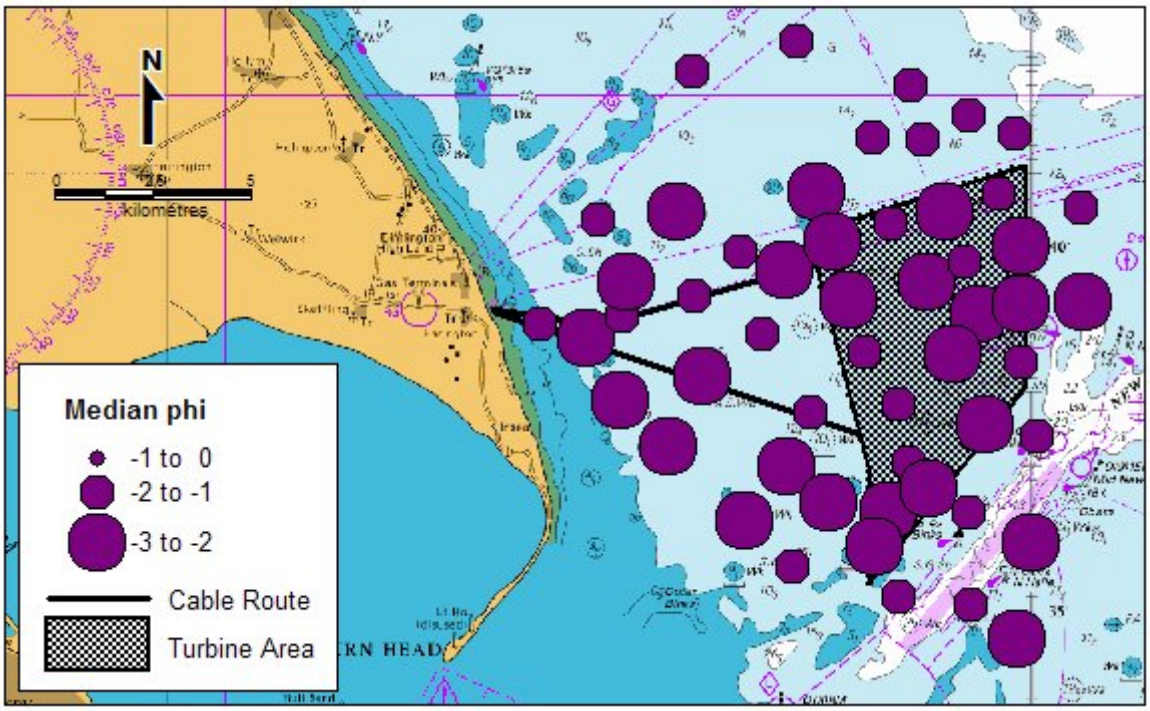


Figure 5. Spatial Variation in Median phi Values

Table 2. Contaminant concentrations with Canadian Sediment Quality Guidelines (SQG) and Probable Effects Levels (PEL).

	ST4	ST5	ST6	Mean	SQG	PEL	Unit
PAH compunds							
Acenaphthene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	6.71	88.9	ug kg^{-1}
Acenaphthylene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	5.87	128	ug kg^{-1}
Anthracene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	46.9	245	ug kg^{-1}
Benzo (a) Anthracene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	74.8	693	ug kg^{-1}
Benzo (a) Pyrene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	88.8	763	ug kg^{-1}
Benzo (b&k) Fluoranthene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	-	-	-
Benzo (g,h,i) Perylene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	-	-	-
Chrysene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	108	846	ug kg^{-1}
Dibenzo (a,h) Anthracene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	6.22	135	ug kg^{-1}
Fluoranthene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	113	1494	ug kg^{-1}
Fluorene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	21.2	144	ug kg^{-1}
Indeno (1,2,3-cd) pyrene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	-	-	-
Naphthalene (mg kg^{-1})	<0.291	<0.33	<0.61	<0.41	34.6	391	ug kg^{-1}
Phenanthrene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	86.7	544	ug kg^{-1}
Pyrene (mg kg^{-1})	<0.28	<0.33	<0.34	<0.32	153	1398	ug kg^{-1}
PAH Total (EPA 16) (mg kg^{-1})	<4.20	<4.95	<5.10	4.75	-	-	-
Metals							
Arsenic (mg kg^{-1})	6.63	5.13	5.01	5.59	7.24	41.6	mg kg^{-1}
Cadmium (mg kg^{-1})	0.112	<0.06	<0.06	<0.23	0.7	4.2	mg kg^{-1}
Chromium (mg kg^{-1})	13.2	6.06	8.51	9.26	52.3	160	mg kg^{-1}
Chromium (VI) (mg kg^{-1})	<10.00	<10.00	<10.00	<10.00	-	-	-
Copper (mg kg^{-1})	7.84	5.77	<5.00	6.20	18.7	108	mg kg^{-1}
Lead (mg kg^{-1})	8.67	11.6	7.05	9.11	30.2	112	mg kg^{-1}
Mercury (mg kg^{-1})	<0.15	<0.15	<0.15	<0.15	0.13	0.7	mg kg^{-1}
Nickel (mg kg^{-1})	**16.5**	8.03	9.01	11.18	15.9		mg kg^{-1}
Zinc (mg kg^{-1})	42.9	37.1	29.3	36.43	124	271	mg kg^{-1}
Other contaminants							
Oil & grease (mg kg^{-1})	80	38.9	45.2	54.70	-	-	-
PCBs (incl. 28, 52, 118, 138, 153, 180) (µg kg^{-1}))	<1.12	<1.32	<1.36	<1.27	-	-	-
Air Dried Solids (%)	96.1	87.4	85.3	89.60	-	-	-
Stones > 10mm (%)	9.47	0	0	3.16	-	-	-
Selenium (mg kg^{-1})	0.40	0.40	0.40	0.40	-	-	-
Boron (water soluble) (mg kg^{-1})	18.1	5.3	4.21	9.20	-	-	-

* Bold indicates exceedance of SQG, < denotes a concentration below detection limits

3.2. Subtidal benthic infauna

3.2.1. BIOLOGICAL PARAMETERS.

The biological parameters were highly variable across the area reflecting the coarse and variable nature of the sediments. The number of species ranged from 0 at station 31 to 83 at station 12 (mean of 40, Table 3), with stations 4, 7, 31, 32, 48 and 50 all containing less than 20 species and stations 12, 19, 21, 26 and 27 containing 70 or more species (Figure 6). There was no clearly defined pattern in the number of species present, although many of the stations with the highest species diversity were located in the northern part of the survey area (Figure 7).

Mean organisms abundance over the whole survey area was 167 individuals / 0.1 m^2 and was highly variable across the survey area, as demonstrated by the high coefficient of variation value (%CV) (Table 2). Those stations with the lowest number of species also had the lowest total abundance (less than 30 individuals / 0.1 m^2), whereas over 400 individuals / 0.1 m^2 were recorded from stations 12, 15, 27, 34, 40 and 54 (Figure 8). The maximum total abundance was recorded from station 12 (563 / 0.1 m^2) and the minimum from stations 31 (0 / 0.1 m^2) and 50 (9.7 / 0.1 m^2) (Figure 9).

Table 3. Descriptive statistics for the biological characteristics of the survey area as a whole.

	Mean	SD	SE	% CV	Minimum	Maximum
S	40	17.9	2.43	45.1	0	83.0
A	166.8	138.3	18.82	82.9	0	563.0
H'	2.8	0.7	0.09	23.0	0	3.8
J'	0.8	0.1	0.02	15.8	0.46	1.0
A/S	3.7	2.3	0.31	60.9	0	11.8

* S = number of species; A = abundance; H'(loge) = Shannon-Weiner diversity; J' = Pielous Evenness index; A/S = abundance ratio.

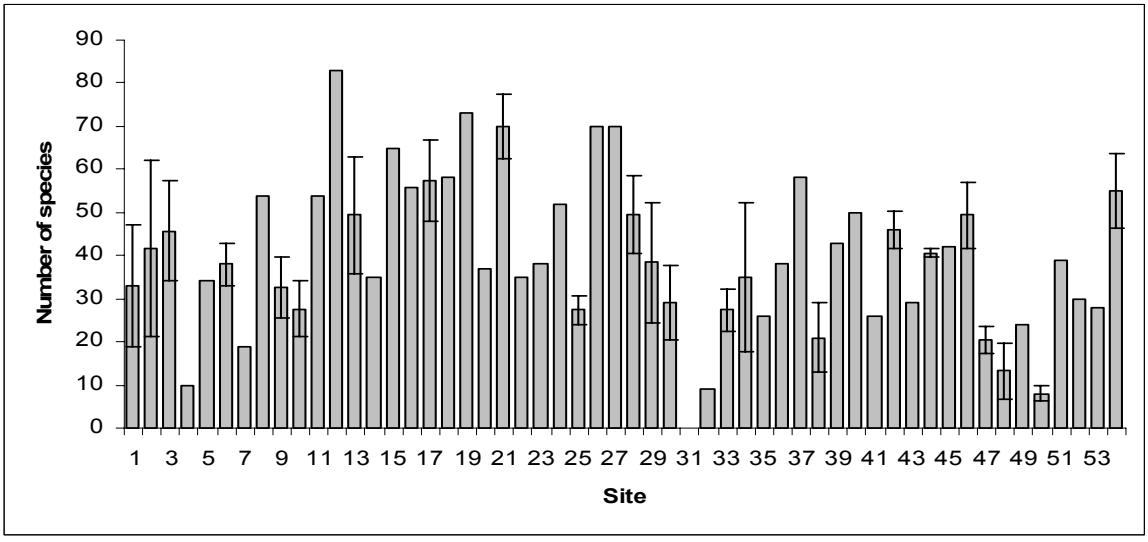


Figure 6. Number of species (mean ± SD).

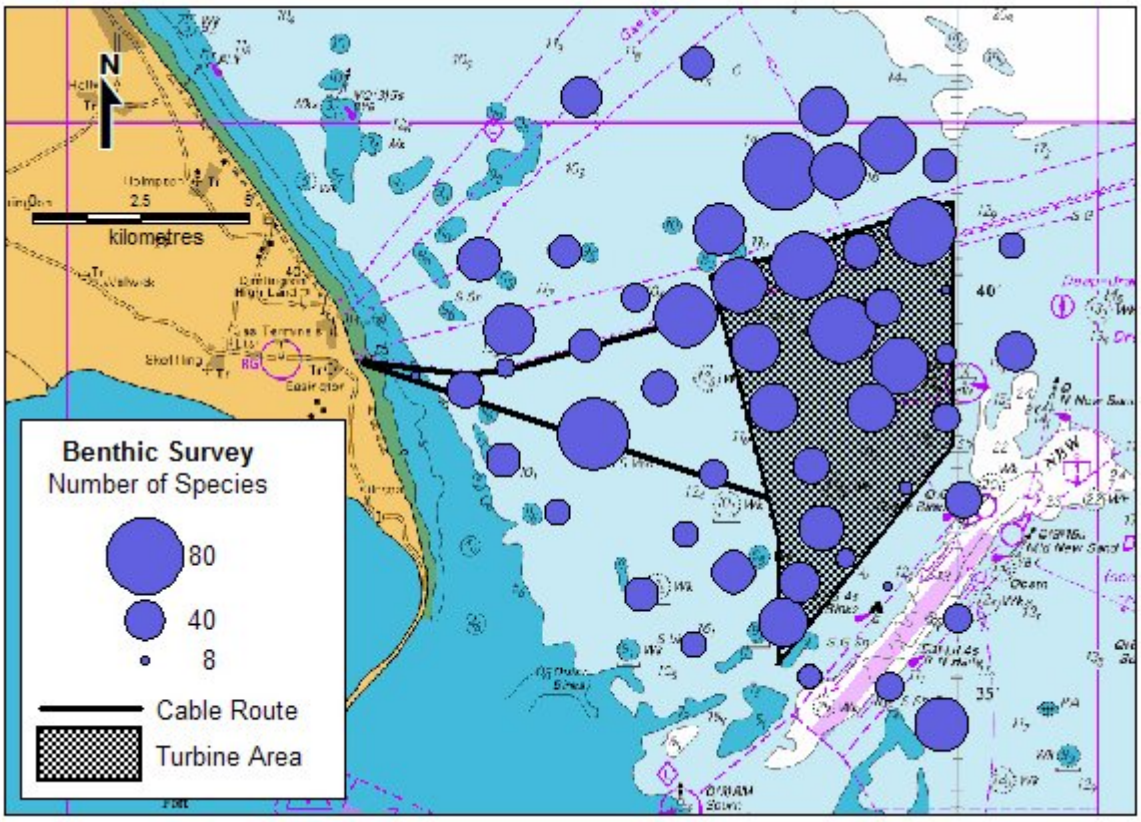


Figure 7. Geographical distribution of the number of species found.

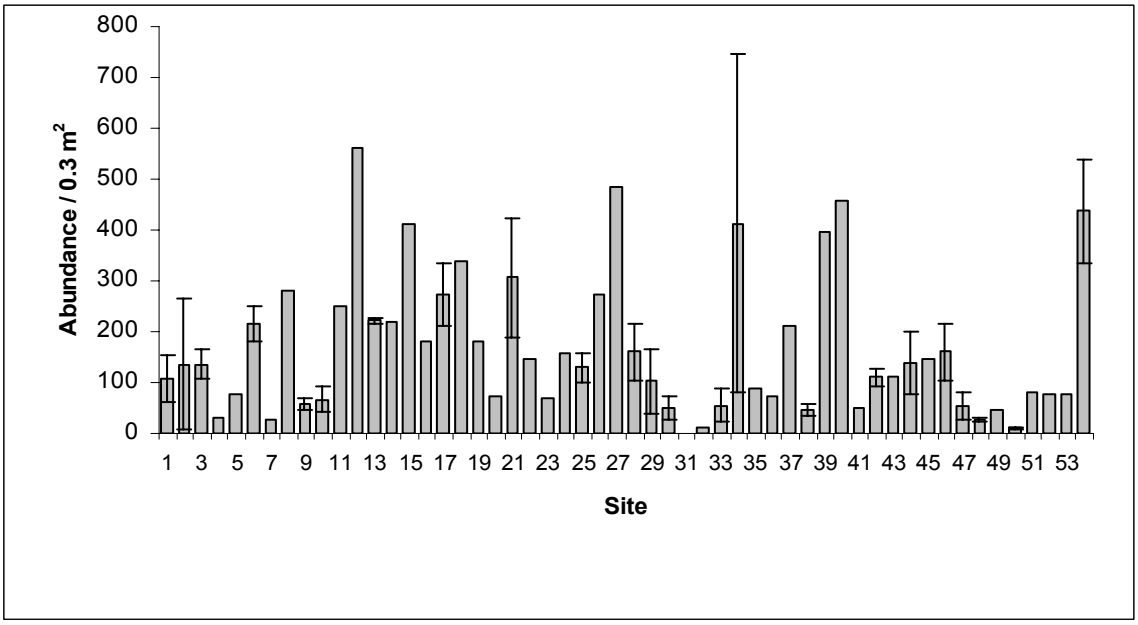


Figure 8. Total abundance / 0.1 m2 (mean ± SD).

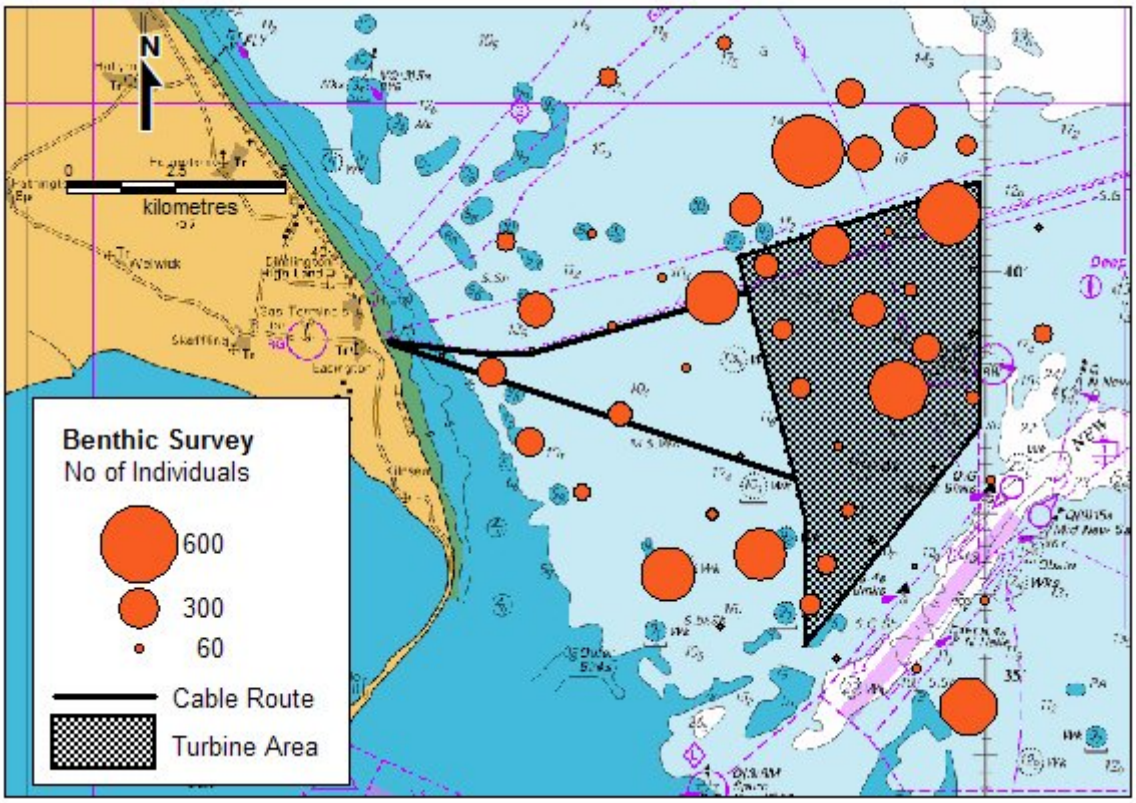


Figure 9. Geographical distribution of abundance (mean).

Shannon-Weiner diversity (H'(log_2)) values ranged from 1.6 at station 4 to 3.8 at station 19 (Figures 10 and 11), with a total mean for the area of 2.8 (Table 3). Diversity at stations 21, 23, 26, 36 and 42 was greater than 3.5, whilst values of less than 2 were recorded from stations 4, 31, 34, 39 and 40. Pielous evenness index (J') was highest at station 50 (0.98) and lowest at station 39 (0.49) (mean for the whole survey area of 0.8 (Table 3)). Values at stations 7, 9, 20, 23, 30, 32, 33, 36, 42, 49, 50 and 53 were greater than 0.9 although values at the majority of stations were close to 1 (Figure 12). Moderate to high values of J' generally indicate a reasonable spread of the individuals between the species in a sample and normally indicate moderate to high diversity. However, in this case, many of the sites with high evenness are also those with very low abundance and low numbers of species (e.g., station 50) indicating that each species is represented by very few individuals and is probably patchy in its distribution.

Abundance ratio (A/S) values ranged from 1.2 at station 50 (0 at station 31) to 11.8 at station 34, with low values being associated with sites where low abundances were recorded (Figure 13).

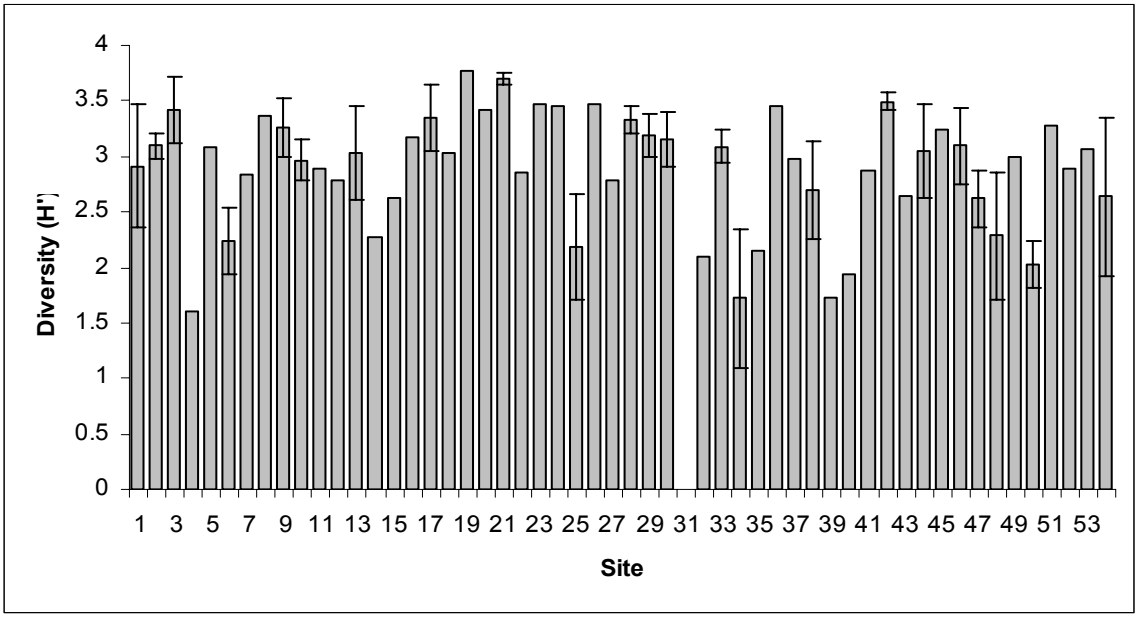


Figure 10. Shannon-Weiner diversity (H') (mean ± SD).

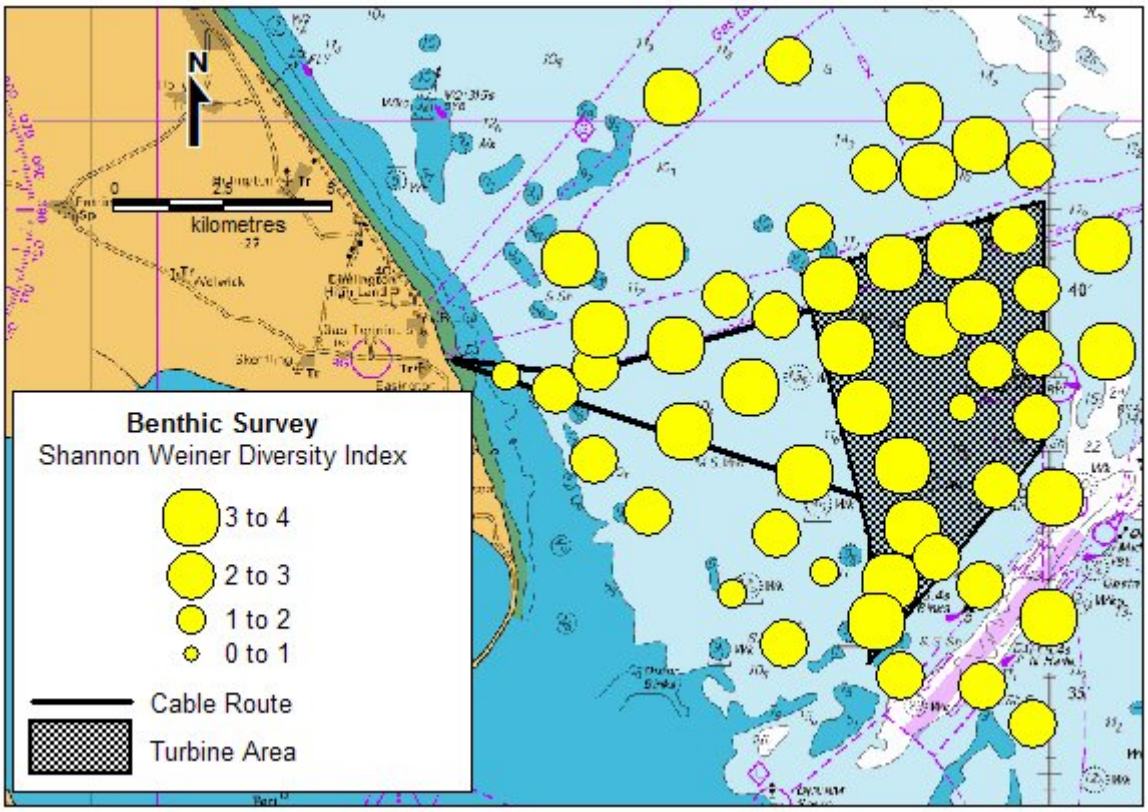


Figure 11. Geographical distribution of Shannon-Weiner diversity (H').

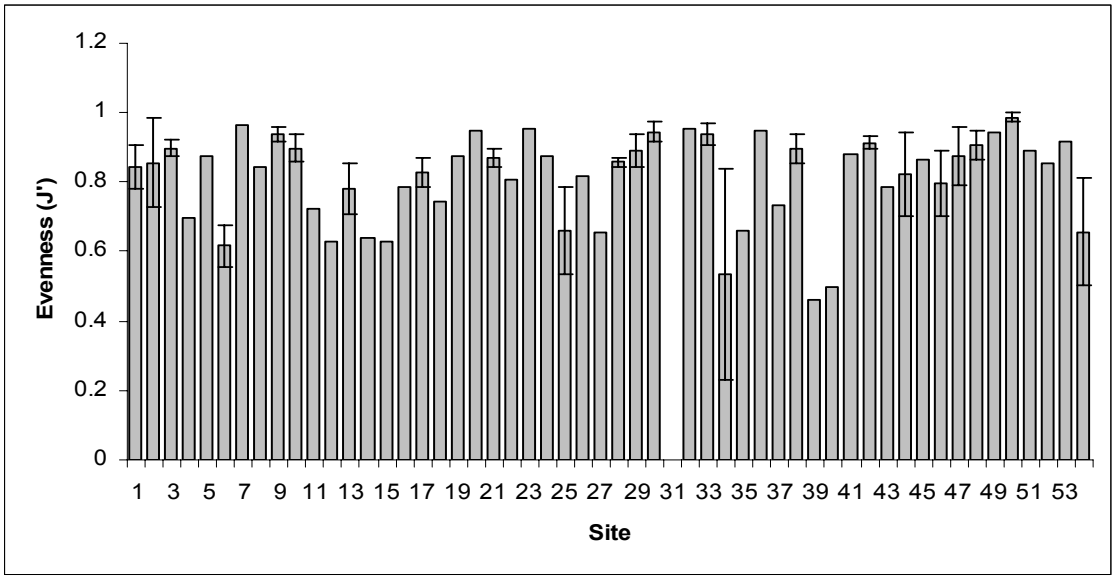


Figure 12. Pielous Evenness Index (J') (mean ± SD).

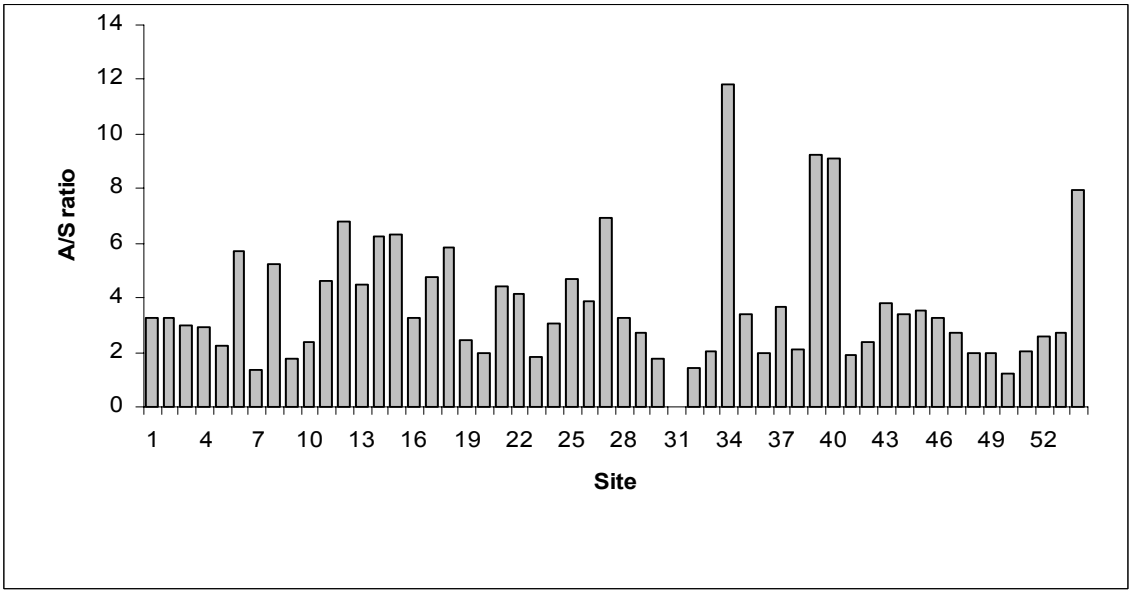


Figure 13. Abundance ratio (A/S).

3.2.2. TAXONOMIC DIVERSIFICATION

The subtidal faunal benthic survey recorded 357 species representative of 22 phyla or classes of marine invertebrates. However, some of these major groups were represented by a single species or were present in just a few samples. From the data (Figure 14), polychaeta (class), bivalvia (class) and amphipoda (order) were the dominant taxonomic groups. In order to give clearer representation of the major taxonomic groups, those faunal groups that contributed less than 5 individuals were removed from the analysis, and the orders and sub-orders were placed under their representative class (*e.g.* Gastropoda, Opisthobranchia and Bivalvia have all been placed within the Mollusca class) (Figure 15). The data show that the dominant class of invertebrates throughout the survey area were polycheates with 166 species being recorded. The next major group were crustaceans with 89 species from 10 major orders within the crustacean phyla, the dominant orders were; amphipoda (49 species), decapoda (19 species) and isopoda (10 species). Molluscs were also well represented, with 67 species being recorded in total, the dominant classes being bivalvia (or Pelecypoda) (40 species), Gastropoda (19 species) and Opisthobranchia (8 species).

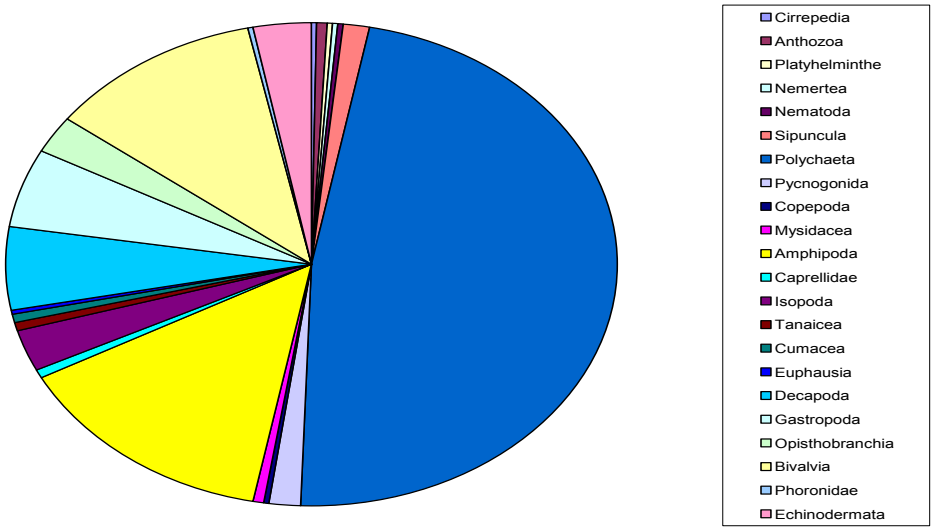


Figure 14. Taxonomic diversification of subtidal faunal benthic samples showing all representative groups.

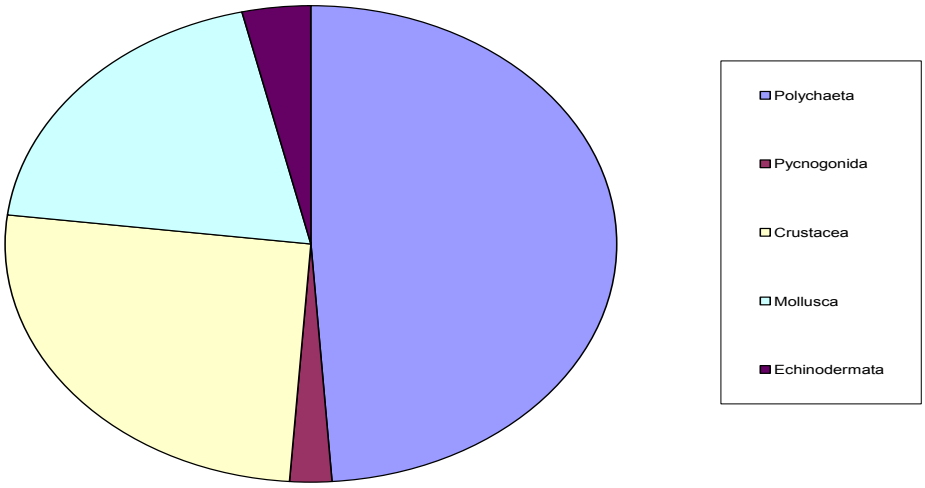


Figure 15. Taxonomic diversification of subtidal faunal benthic samples showing all major representative groups.

3.2.3. COMMUNITY ANALYSIS.

A total of 357 species were recorded from the survey area as a whole. These species were highly variable in their distribution and abundance. The top 80% of the community was composed of 44 species, dominated by *Pisidia longicornis*, *Sabellaria alveolata, Salmacina dysteri,* Nematodes*, Mediomastus fragilis, Sabellaria spinulosa, Galathea intermedia, Leptocheirus hirsutimanus, Hiatella arctica, Achelia echinata* and *Spio armata* (Table 4). Collectively, these eleven species comprised 50% of the community. The most abundant species was *Pisidia longicornis* which was present in 41 samples and the dominant species in 17 samples, representing between 13.5% and 45% of the community (Appendix 3). Abundances of this species ranged from 20 / 0.1 m^2 at site 1 to 285 / 0.1 m^2 at site 40 (mean of 30).

Sabellaria alveolata was present at 12 stations and dominant at eight stations with abundances ranging from 30 to 298 individuals / 0.1 m^2 (mean of 18) (Appendix 3) and dominance ranging from 10 to 67% (mean of 11%). The majority of stations where *S. alveolata* was found were in the western (most inshore) part of the survey area. *Sabellaria spinulosa* was also abundant at 36 stations with abundance ranging from 1 to 224 individuals / 0.1 m^2 (mean of 4.23) (Appendix 3) and dominance ranging from 9.1 to 50.5% (mean of 2.49) (Appendix 3). *S. spinulosa* was also the dominant species at seven sites.

A more comprehensive description of the communities present was given using multidimensional scaling (MDS) and cluster analysis. MDS, using all replicate data (Figure 16), did not show any distinct groups of sites but did indicate a reasonable degree of similarity between replicate grab samples. This can be seen more clearly in Figure 17 where the similarity between replicate grabs is generally around 40%, with some replicate grabs being over 60% similar in terms of their species composition. These results indicate that the degree of replication, in combination with single replicate grabs from selected stations, was sufficient to characterise the benthic communities in the area. Such an approach allowed increased spatial coverage within the sampling area without compromising replication. Figures 16 and 17 also allowed identification of a number of stations considered to be outliers, showing very little similarity to any other sites. These included stations 4, 7, 32, 38, 41, 47, 48, 50 and 51.

Table 4. Mean abundance and dominance of the key (top 80%) infaunal species for the survey area as a whole.

Species	Mean A	% Dom	Cumulative %
Pisidia longicornis	30.33	17.85	17.85
Sabellaria alveolata	18.28	10.76	28.61
Salmacina dysteri	6.88	4.05	32.65
Nematoda	6.04	3.56	36.21
Mediomastus fragilis	4.96	2.92	39.13
Sabellaria spinulosa	4.23	2.49	41.61
Galathea intermedia	4.15	2.44	44.06
Leptocheirus hirsutimanus	3.40	2.00	46.06
Hiatella arctica	3.25	1.91	47.97
Achelia echinata	3.16	1.86	49.83
Spio armata	2.95	1.74	51.56
Pomatoceros lamarcki	2.83	1.67	53.23
Gibbula tumida	2.52	1.48	54.71
Juv. Harmothoe sp.	2.52	1.48	56.19
Heteranomia squamula	2.40	1.41	57.61
Lepidonotus squamatus	2.35	1.38	58.99
Amphipholis squamata	1.96	1.15	60.14
Polycirrus norvegicus	1.95	1.15	61.29
Protodorvillea kefersteinia	1.86	1.09	62.38
Pholoe balthica	1.84	1.08	63.46
Polycirrus sp.	1.81	1.07	64.53
Phoronis sp.	1.78	1.05	65.58
Eumida sanguinea	1.76	1.04	66.61
Caulleriella alata	1.51	0.89	67.50
Cheirocratus sundevallii	1.44	0.85	68.35
Cheirocratus sp.	1.34	0.79	69.14
Mytilus edulis	1.32	0.78	69.91
Sphaerosyllis hystrix	1.28	0.75	70.66
Juv. *Leptocheirus* sp.	1.26	0.74	71.40
Musculus discors	1.19	0.70	72.11
Nemertea	1.16	0.68	72.79
Typosyllis sp. A (White)	1.14	0.67	73.47
Chone filicaudata	1.13	0.66	74.13
Typosyllis armillaris	1.11	0.66	74.78
Nucula nucleus	1.09	0.64	75.43
Typosyllis sp. B (Striped)	0.99	0.58	76.01
Glycera lapidum	0.97	0.57	76.58
Ophiopholis aculeata	0.97	0.57	77.15
Sphaerosyllis bulbosa	0.96	0.57	77.72
Polydora caeca	0.89	0.52	78.24
Copepoda	0.86	0.50	78.74
Scalibregma celticum	0.85	0.50	79.24
Gibbula cineraria	0.77	0.45	79.69
Pholoe inornata	0.76	0.45	80.14

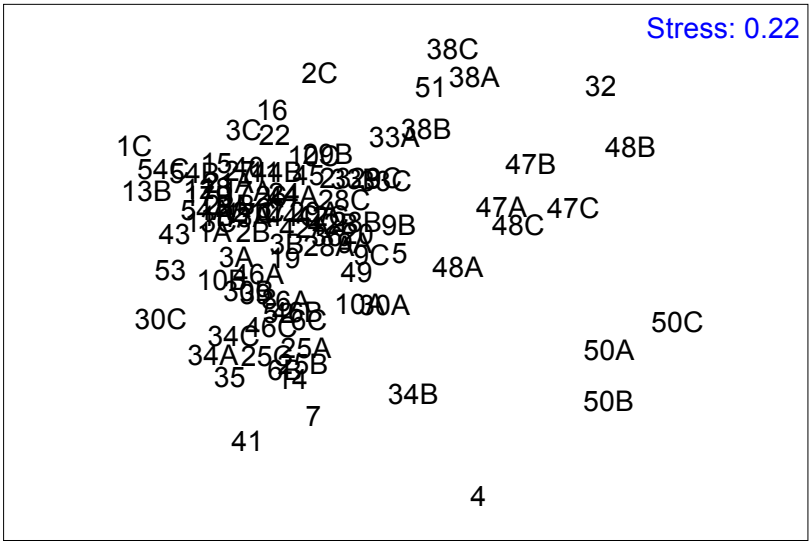


Figure 16. MDS plot (√ transformed data) of species abundance based on replicate grab data.

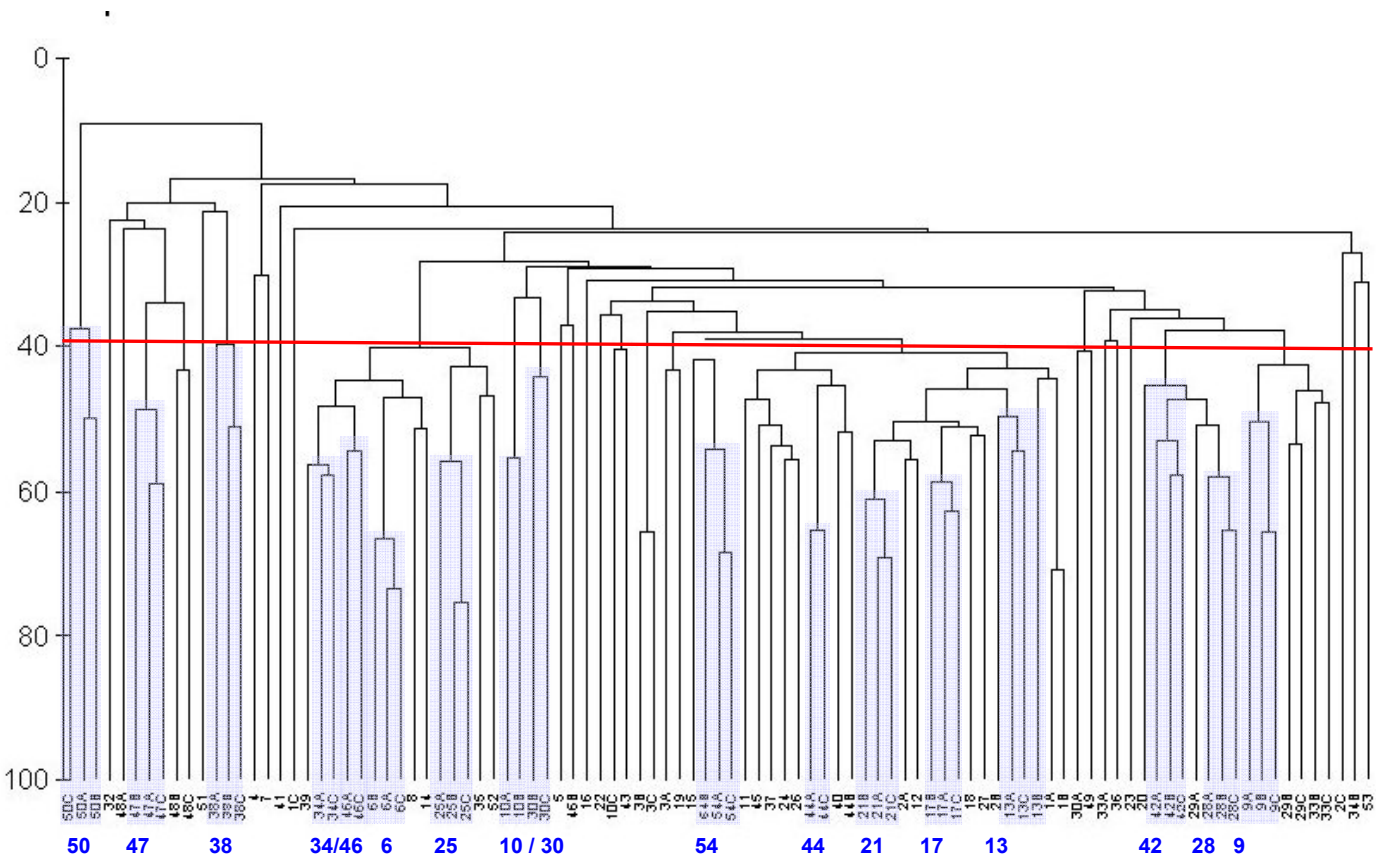


Figure 17. Cluster analysis (√ transformed data) of species abundance based on replicate grab data. Replicates with the highest degree of similarity are highlighted in purple.

Initial MDS and cluster analysis (based on mean abundance data), using a square root transformation, were carried out using all species except those occurring in very low abundances at very few sites (a total of 135 species). These analyses reflected the variability in the data across the area but did not reveal any distinct groups of stations or any significant similarity between stations in terms of their species composition. The analysis was therefore repeated using the 44 species comprising the top 80% of the community.

Removing the scarce species improved the similarity slightly although the communities across the site as a whole are still considered to be highly variable. As with the replicate data, the MDS plot (Figure 18) did not reveal any distinct groups of sites but did highlight those sites which could be classed as outliers. The most extreme of these included stations 4, 32 and 50 with stations 5, 7, 38, 41, 47, 48 and 51 also being separated from the main group, as was shown in Figure 16. However, cluster analysis allowed broad classification of the stations into 13 groups (Figure 19) although variability was still high and similarity between these groups generally did not exceed 60%. Of these, groups 1 (station 32), 12 (stations 7, 41 and 51) and 13 (stations 4 and 50) contained the lowest numbers of species (10, 24 and 15, respectively) and the lowest mean abundance (6, 14 and 10 individuals / 0.1 m^2). Groups 4, 8 and 9 were the richest with a mean of 196, 314 and 269 individuals / 0.1 m^2 and over 40 species. A summary of mean abundances and number of species for each group is given in Appendix 3, together with the community composition for each group. Mean sediment parameters are presented in Table 5 and the sediments were generally classed as sandy gravels (Folk, 1954), with the exception of groups 9 and 11 which were classed as muddy sandy gravels. The replicate abundance data are presented in Appendix 4.

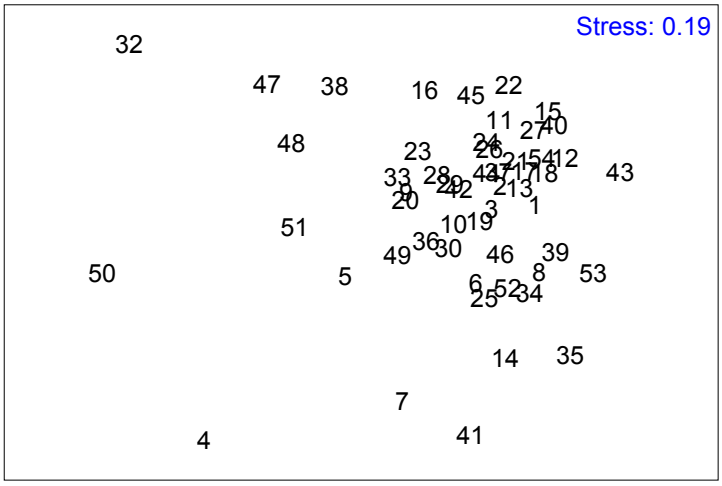


Figure 18. MDS plot (√ transformation) of species abundance based on mean values of the dominant species (top 80% of the community).

Group 1 (station 32) had the lowest number of species and abundance and was composed largely of the polychaetes *Chone filicaudata* and *Glycera lapidum*. Together with copepods and nematodes these four taxa accounted for 80% of the community. Stations within this group had the coarsest sediments (-2.5 φ), with the highest gravel content (69%). The station within this group was less than 20% similar to those in group 13, 30% similar to stations in group 2 and approximately 25% similar to stations in all other groups.

Species richness in group 2 was considerably higher, as was total abundance although these values were low in comparison to other groups. These communities were dominated by the polychaete *Sphaerosyllis bulbosa* (21% of the community) which, together with nematodes, *Leptocheirus hirsutimanus, Eumida sanguinea* and *Sphaerosyllis hystrix*, accounted for 60% of the community.

Group 3 (approximately 25% similar to groups 1 and 2) consisted of station 5 only. The number of species and abundance was comparatively low at this station and the community was composed primarily of *Mediomastus fragilis, Chone filicaudata, Spio armata* and nematodes. The sediments at this station were coarse (median φ of -2.31) with a high gravel content (66.5%), low sand and organic matter content and a moderate silt content (in comparison to other groups).

Similarity between groups increased between groups 4 and 10 with a maximum of just over 60% between groups 9 and 10 and a minimum of approximately 45% between groups 4 and 5. The number of species (mean of 41) and total abundance (mean of 195 individuals / 0.1 m^2) increased considerably within Group 4. These communities were dominated by *Sabellaria alveolata* (55%) and *Sabellaria spinulosa* which, collectively, accounted for 61% of the community. Other species within the top 80% included *H. arctica, Mytilus edulis, P. longicornis, Pomatoceros lamarcki, M. fragilis* and nematodes. Median phi, sand and gravel content were moderate (in comparison to other groups) with values of -2.15 φ, 62% and 36%, respectively. Silt and organic content were relatively low although it should be noted that values for these parameters were low for all groups and differences between them are considered negligible.

Groups 5 and 6 were approximately 40% similar and the communities present were composed of similar species. Differences between these two groups were largely due to the proportional representation of each species together with differences in total abundance (106 and 58 individuals / 0.1 m^2, respectively) and number of species (28 and 42, respectively). In addition, *S. spinulosa* was present at stations within in group 6 but not within group 5. Communities within group 5 were dominated by the decapod species *P. longicornis* (33%) with *Musculus discors, Heteranomia squamula, Typosyllis armillaris* and *Polycirrus norvegicus* being present within the top 60% of the community.

Group 6 communities were dominated by nematodes although it should be noted that this taxon only contributed 10% to the community and, with respect to the whole sample, there was a relatively even spread of the individuals between the species (i.e. no one species was considered to be truly dominant). Other key species included *L. hirsutimanus, P. lamarcki, P. longicornis, M. fragilis, Galathea intermedia, S. armata, P. kefersteinia, Sphaerosyllis bulbosa* and *Polycirrus* sp. (top 50% of the community). *S. spinulosa* was also present but in low abundances, contributing only 2.9% to the community. The sediment characteristics of these two groups were very similar and were relatively fine in comparison with other groups. Median phi values were -1.93 and -1.8 φ for groups 5 and 6, respectively with gravel content being around 60% within both groups and sand content being 36% (group 5) and 39% (group 6).

Groups 7, 8, 9 and 10 were approximately 50% similar to each other and just less than 50% similar to group 6 and were all dominated by *P. longicornis*. Again, differences between these groups were due to differences in the proportional representation of the species

present, with many species being common to all groups, together with differences in total abundance and the number of species. Groups 8, 9 and 10 had the highest number of species and relatively high total abundance with values for group 7 being moderate (in the context of the present study). Similarly, the sediment characteristics for groups 8, 9 and 10 were very similar with median phi values ranging from -2 to -2.3, gravel content ranging from 61–64% and sand content being 33-34%.

The sediments at stations within group 7 were considerably finer (median φ = -1.69), with 58% gravel and 38% sand. It is of note that the communities within groups 8, 9 and 10 were also more similar to each other than to those in group 7. The communities in group 7 were primarily composed of *P. longicornis* (15%), *S. spinulosa* (13%)*, M. fragilis, Lepidonotus squamatus,* nematodes and *Achelia echinata* which collectively, accounted for 51% of the community. *S. spinulosa* was present in all other groups but in very low abundances, contributing 0.7–1.6% to the community.

Group 8 was dominated by *P. longicornis* (30%) and *S. dysteri* (27%) whilst group 9 was dominated by *P. longicornis* (40%), *A. echinata* (5.4%) and *Heteranomia squamala* (4.5%). Nematodes and *M. fragilis* were key taxa within all three groups, particularly group 10 where they were within the top 45% of the community, along with *P. longicornis.*

The communities in group 11 were approximately 30% similar to groups 3-10. These communities were dominated by the amphipod *Leptocheirus hirsutimanus* (30%) with *C. filicaudata, M. fragilis, Amphipholis squamata* and *S. armata* all contributing to the top 50%. *S. spinulosa* was also present but, again, in low abundances contributing just 2% to the community. The number of species and total abundance were moderate in comparison with other groups. The sediments were comparatively coarse (median φ = -2.36) with a high gravel content (66%) and low sand content (30%).

Stations within groups 12 (stations 41, 7, 51) and 13 (stations 4, 50) also had low numbers of species and, in the case of group 12, low abundance. Median phi values were lowest for these two groups (mean of 1.4 φ), indicating finer sediments than those present at other stations. Similarly, gravel content was lowest (54%), sand content highest (45%) and silt and organic content were comparatively low. The community within group 12 (approximately 30 % similar to stations within Groups 1-11) was dominated by *Sabellaria spinulosa* (24%), with *M. fragilis, L. hirsutimanus, Hiatella arctica* and *Spio armata* accounting for the top 60% of the community. *S. alveolata* was also present but was not abundant, contributing only 2.7% to the community.

Stations within group 13 (less than 20% similar to all other groups) were dominated by the polychaete *Protodorvillea kefersteinia* (57% of the community) with *Glycera lapidum* and *M. fragilis* also contributing significantly. It is of note that the similarity between stations within group 12 and within group 13 was extremely low (20-25%). Whilst the degree of similarity is not necessarily sufficient to group these stations, their community compositions are broadly similar, differing only in terms of the dominance of each species and the total abundance. Hence, they have been grouped for the purpose of summarising the data set. The number of species at stations within these groups was high, given the low abundance and in many cases, each species was represented by one individual. Therefore, the data were extremely variable and as demonstrated in Figure 18 and 19, stations within these groups were considered to be outliers.

In terms of the national biotope classification (Connor *et al*, 2004) the majority of the infaunal communities described above are variants of the *Sabellaria* biotopes SS.SBR.PoR.SspiMx (*Sabellaria spinulosa* on stable circalittoral mixed sediment) and SS.SBR.PoR.SalvMx (*Sabellaria alveolata* on variable salinity sublittoral mixed sediment), although a number of the groups described above (e.g. groups 6 to 11) have relatively low numbers of *Sabellaria*. These groups are difficult to classify and are likely to be either impoverished forms of the above *Sabellaria* biotopes, or classified as biotopes from SS.SCS.ICS (Infralittoral Coarse Sediment) or SS.SMx (Sublittoral Mixed Sediment). The video footage highlights the mixed nature of the seabed which is predominantly comprised of cobbles, pebbles and boulders on sand and gravel. Such habitats have a varied epibiota and biotopes such as SS.SCS.CCS.PomB (*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles) or SS.SMx.CMx.FluHyd (*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment) are also evident.

Within the sand and gravelly sand other infaunal biotopes are present. For example, certain groups derived from cluster analysis (e.g. groups 1 to 3) are possibly impoverished or poorly sampled variants of SS.SCS.ICS.Glap (*Glycera lapidum* in impoverished infralittoral mobile gravel and sand) or SS.SCS.CCS.MedLumVen (*Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel). Sites in group 13 resemble SS.SCS.CCS.Pkef (*Protodorvillea kefersteini* and other polychaetes in impoverished circalittoral mixed gravelly sand).

The inherent variability and patchiness of the described communities is typical for habitats of mixed coarse sediment, and in such areas the epifaunal community is often a better descriptor of community type and diversity than the infauna, particularly as such habitats are difficult to sample quantitatively. It is likely that given the dynamic nature of the area the biotopes will vary over time in terms of species composition and abundance, although the broader biotope and habitat complexes may be relatively consistent.

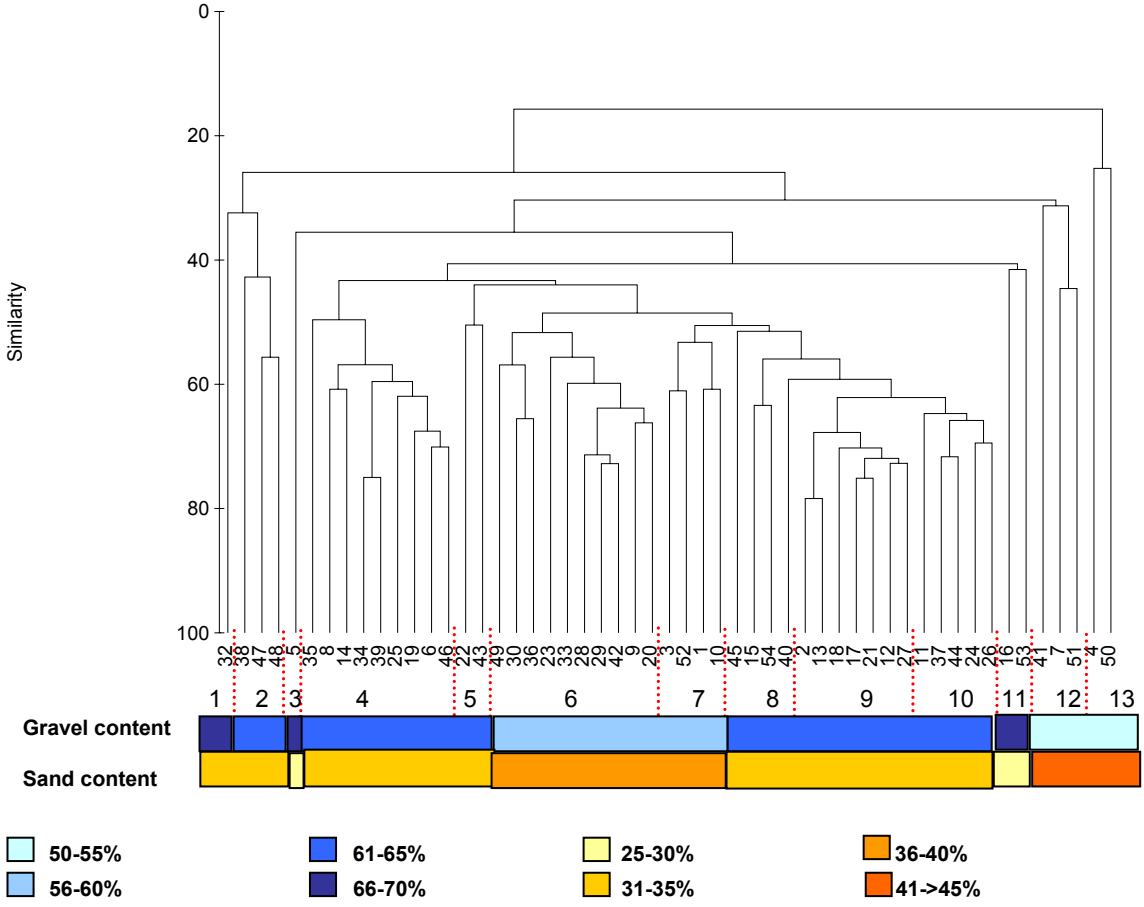


Figure 19. Cluster analysis (√ transformation) of species abundance based on mean values of the dominant species (top 80% of the community).

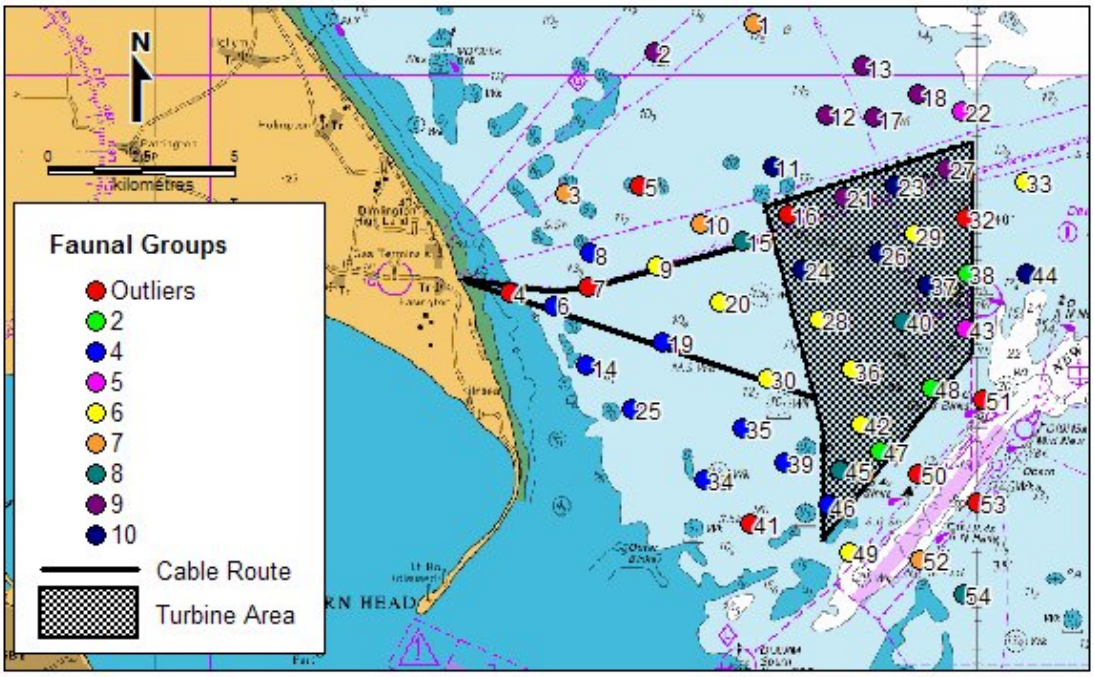


Figure 20. Distribution of Major Community Types.

Table 5. Mean sediment characteristics for each group.

Group	S	A	Median phi	Gravel (%)	Sand (%)	Silt/Clay (%)	Organic (%LOI)	Folk class.*
1	6	10	-2.54	68.83	30.98	0.19	1.75	sG
2	29	27	-2.10	64.96	34.86	0.18	1.60	sG
3	14	53	-2.31	66.46	30.8	2.74	1.45	sG
4	41	195	-2.15	62.24	35.71	2.05	1.43	sG
5	28	106	-1.93	60.90	35.87	3.34	2.21	sG
6	42	58	-1.80	58.66	38.99	2.35	1.93	sG
7	39	72	-1.69	57.68	38.93	3.40	2.18	sG
8	44	314	-2.32	64.32	32.89	2.80	1.76	sG
9	43	269	-2.00	61.65	34.13	4.23	1.68	msG
10	44	162	-2.19	64.23	32.76	3.01	1.77	sG
11	28	93	-2.36	66.12	29.98	3.90	2.53	msG
12	22	24	-1.39	54.00	44.56	1.44	1.42	sG
13	10	15	-1.36	54.25	45.71	0.05	1.46	sG

*G = gravel; sG = sandy gravel; msG = muddy sandy gravel.

3.3. Subtidal Benthic Epifauna

A total of 75 qualitative epifaunal species and 28 quantitative species were recorded from 27 2 m beam trawls (trawl stations 12, 27 & 29 being abandoned). The mean number of species per trawl was 26 (20 qualitative and 6 quantitative) and in terms of quantitative taxa there was a mean abundance of 17 individuals per trawl.

As shown in Figure 21 the quantitative epifaunal component was dominated by five major groups namely Bryozoa (38 spp.), Crustacea (19 spp.), Hydrozoa (15 spp.), Polychaeta (13 spp.) and Mollusca (12 spp.). Bryozoans also accounted for 60% of the occurrence of all qualitative taxa. For the purpose of the epifaunal evaluation fish species (10 recorded) have been omitted from the dominant group classification; however the phylum has been included in further analysis of the data.

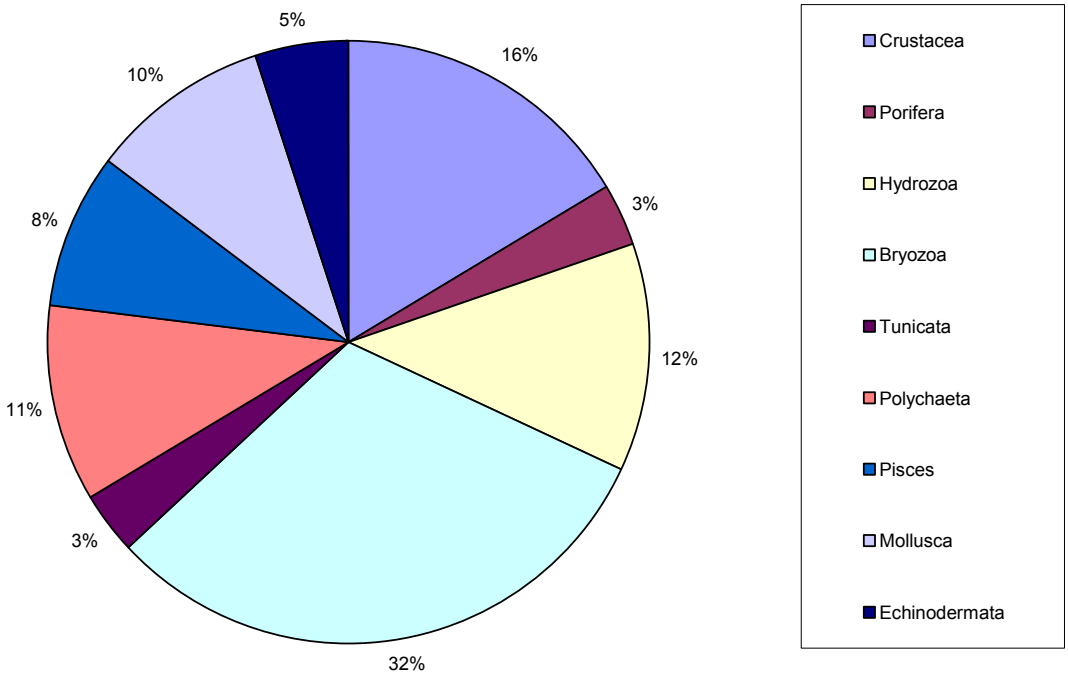


Figure 21. Taxonomic groups recorded from the epifaunal trawl samples.

Some of the taxonomic groups were largely dominated by a single taxa, for example *Hymeniacidon perleve* accounted for 55% of recorded poriferan species within all trawls, whilst *Eupolymnia* sp. accounted for 45% of all polychaetes recorded during the epifaunal survey. Within other taxonomic groups a greater diversity was evident with a variety of taxa dominating. For example, five species accounted for 71% of the occurrence of hydrozoan species (*Diphasia* sp., *Sertularia argentea, Sertularella rugosa, Lafoea dumosa* & *Campanulariidae* spp.). Similarly, five species of bryozoan (*Crisidia cornuta, Crisia eburnean*, *Amathia lendigera*, *Flustra foliacea* & *Scrupocellaria reptans*) contributed 33% of the occurrence within the epifaunal trawls.

The spatial distribution of the trawls and the number of taxa recorded for each trawl is shown in Figure 22. The most species rich trawls (with between 30 and 40 qualitative taxa) were at stations 1, 8, 15 and 18 of which two stations (15 and 18) were within the turbine site. Species richness at the majority of trawls ranged from 10 to 30 taxa per trawl with only 5 stations having less than 10 taxa. No clear spatial distribution in terms of species richness was apparent.

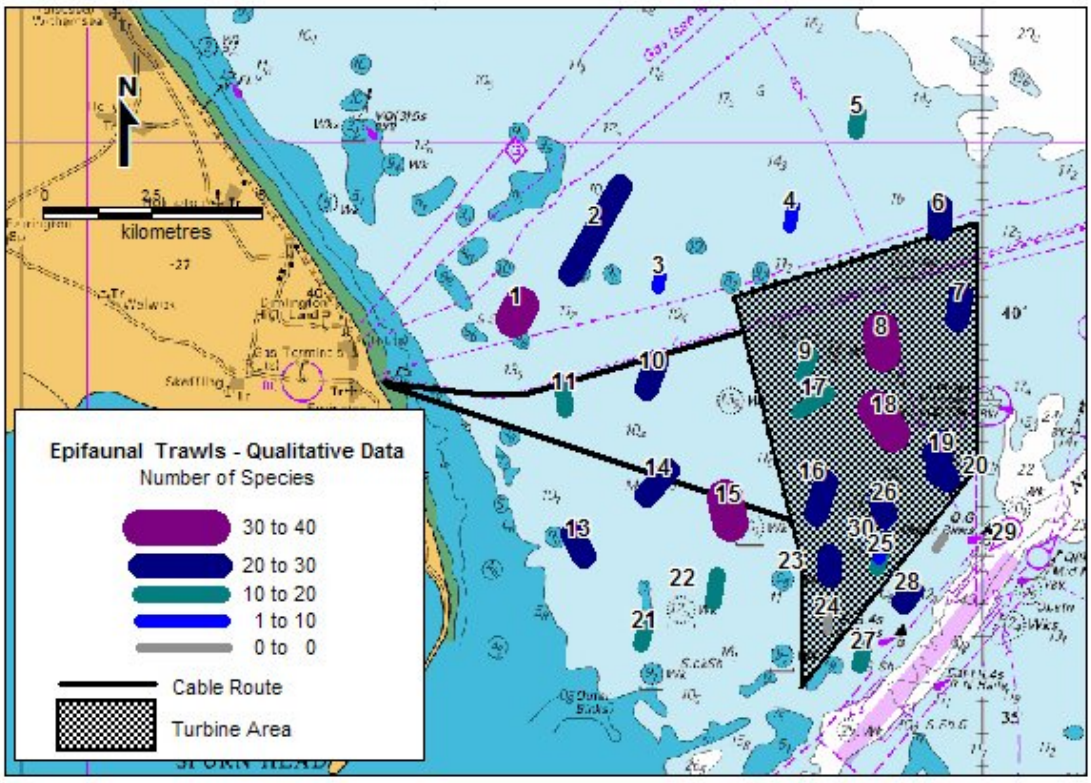


Figure 22. Qualitative data for epifaunal trawls.

The quantitative component of the epifaunal community was dominated by three major groups (Crustacea, Echinodermata & Mollusca). Within these groups a few species dominated the assemblage. The crustacean assemblage was dominated by the pink shrimp (*Pandalus montagui*), the livid swimming crab (*Liocarcinus holsatus*) and the velvet swimming crab (*Necora puber*) which together accounted for 78% of the total abundance.

The molluscan assemblage was dominated by a single species (*Musculus discors*) which comprised 62% of the total mollusc abundance. The echinoderms were also dominated by a single species (*Echinus esculentus*) which accounted for nearly 60% of echinoderm abundance. There appeared to be no clear spatial pattern in terms of the species abundance of quantitatively recorded taxa (Figure 24) with the majority of sites containing less than 20 individuals.

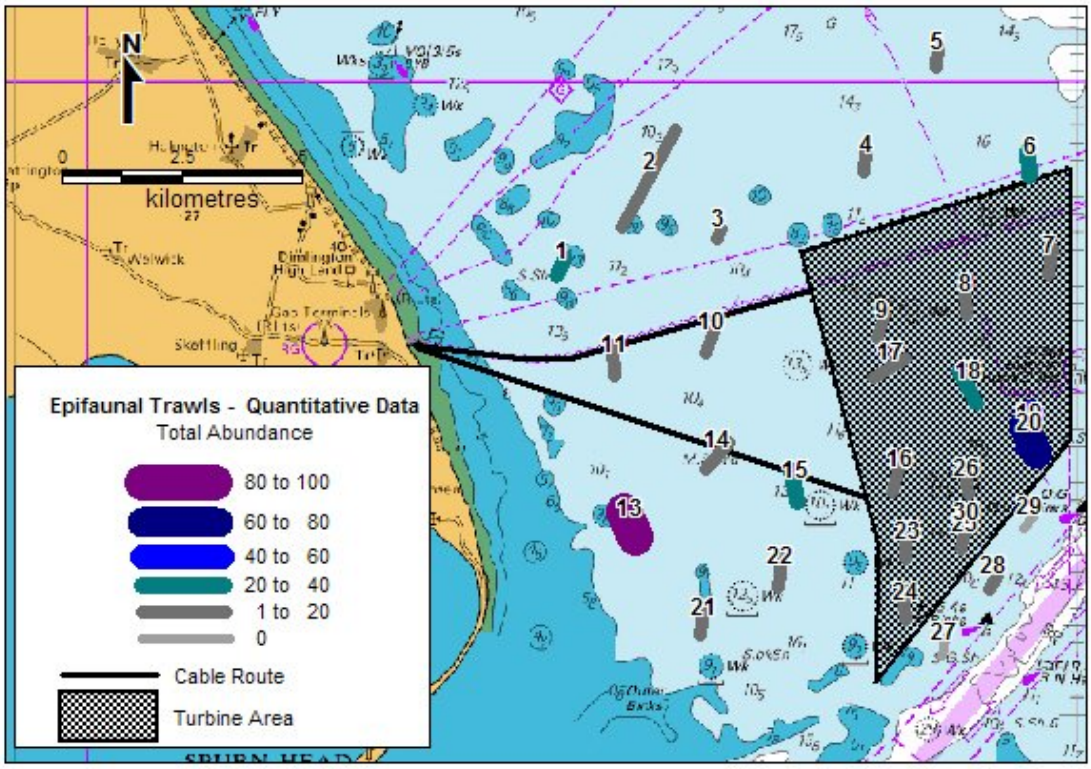


Figure 23. Epifaunal abundance.

3.3.1 ADDITIONAL EPIFAUNAL DATA

During the beam trawl survey carried out in March 2005 to assess the fish populations (Section 3.4) a number of epifaunal taxa were also recorded. Whilst the nature of the seabed restricted the length and duration of trawls, in terms of fully characterising the epifaunal communities, the data obtained from this survey provided useful additional information to complement the data obtained from the dedicated epifaunal survey.

Data derived from the 11 sites trawled during the 2005 beam trawl survey (Figure 24) indicated that the epifaunal assemblage largely comprised of decapod species with species such as the crabs *Liocarcinus* spp. and *Necora puber* and the lobster *Homarus gammarus* dominating and comprising 64% of the total abundance (Table 6). The pink shrimp *Pandalus montagui* (13.5%) and the echinoderm species *Echinus esculentis* (7.5%) were also relatively common, whilst other species of decapods (*Cancer pagurus, Carcinus maenas* and *Macropodia linaresi*) or echinoderms, (*Crossaster papposus, Asterias rubens* and *Henricia sanguinolenta*) were present in low numbers. The squid *Loligo forbesii* was also present in low abundances. In total 14 epifaunal species were recorded from the 11 trawls (mean of 6.6 per trawl) with a mean total abundance of 56 individuals per trawl (Table 7). Values of diversity (Shannon's H') and evenness (Pielou's J) were moderate to low (mean H' = 1.3, mean J' = 0.7). The epifaunal species (Crustacea and echinoderms) recorded during the March 2005 fish survey were broadly similar to those recorded during the dedicated epifaunal survey, although due to the difference in gear type and mesh size the two datasets are not directly comparable.

Table 6. Mean abundance and dominance of the fish species for the survey area as a whole.

Epifauna from March 2005 Fish survey	Mean	% Dom	Cum %
Liocarcinus holsatus	10.0	17.9	17.9
Homarus gammarus	9.2	16.4	34.3
Liocarcinus depurator	8.6	15.4	49.7
Necora puber	7.8	14.0	63.6
Pandalus montagui	7.5	13.5	77.1
Liocarcinus sp. Indet	6.5	11.5	88.6
Echinus esculentsis	4.2	7.5	96.1
Crossaster papposus	0.7	1.3	97.4
Cancer pagurus	0.5	0.8	98.2
Asterias rubens	0.4	0.6	98.9
Carcinus maenas	0.3	0.5	99.4
Macropodia linaresi	0.2	0.3	99.7
Loligo forbesii	0.1	0.2	99.8
Henricia sanguinolenta	0.1	0.2	100.0
Mean abundance	**56**	**100**	
Total number of species	**14**		
Mean number of species	**6.6**		
Mean H'	**1.3**		
Mean J'	**0.7**		

Table 7. Descriptive statistics for the epifaunal invertebrates for each site.

	EPIFAUNAL INVERTEBRATES			
Trawl	**S**	**A**	**J'**	**H'**
1	6	26	0.9	1.6
2	6	11	0.9	1.5
3	7	70	0.7	1.3
4	6	42	0.9	1.6
5	6	74	0.8	1.5
6	7	31	0.7	1.4
7	6	34	0.6	1.0
8	7	70	0.6	1.2
9	10	158	0.7	1.7
10	5	25	0.8	1.3
12	7	75	0.4	0.8

* S = number of species; A = abundance; H'(loge) = Shannon-Weiner diversity; J' = Pielous Evenness index.

3.4. Fish communities

The dedicated fish survey carried out in November 2004 using a 4 m otter trawl was largely unsuccessful due to the rough nature of the seabed. In total 5 trawls were carried out with varying degrees of success. The trawl was damaged on a number of occasions which ultimately culminated in the abandonment of the fish survey in order to investigate alternative methods for assessment. The data collected during these trawls are considered unsuitable for the purposes of describing the fish community, as the net was extensively damaged on each deployment of the gear. However, the fish recorded were broadly comparable to those found in previous surveys and included *Merlangius merlangus* (whiting) and *Trisopterus luscus* (pouting) with other species such as *Platichthys flesus* (flounder) and *Pomatoschistus pictus* (painted goby) present in lower numbers. The fish species recorded during the November 2004 epifaunal survey indicated that the assemblage was dominated by *Taurulus bubalis* (long-spined sea scorpion) and *Trisopterus luscus* (pouting) which collectively accounted for almost 60% of the community. Other key species included *Myoxocephalus scorpius* (short spined sea scorpion) and *Merlangius merlangus* (whiting). No juvenile or adult flatfish were captured during this survey.

DEFRA Guidance (V2 June 2004) states that for juvenile fish and flatfish a 2-m beam trawl is appropriate and that sampling duration should be 5-15 minutes, depending on the quantities of fish in the area. Whilst characterisation of the epifaunal community (Section 3.3.1) using the 2-m beam trawl was somewhat restricted by ground type (length/duration of sampling) the actual sampling duration of the trawls did comply with the DEFRA guidance and as such the data generated on the fish assemblage is considered to be appropriate for the juvenile fish evaluation. For the March 2005 fish survey (using significantly more robust gears as described in Section 2.5.1, successful trawls were carried out at 11 of the 12 stations as shown in Figures 24 to 26. In total 21 fish species were recorded from the 11 trawls, with a mean number of species per trawl of 8.5 and a mean abundance per trawl of 101 individuals (Table 8).

The fish community (taking the survey area as a whole) was dominated by *Taurulus bubalis* (long-spined sea scorpion) and *Merlangius merlangus* (whiting) which collectively, accounted for 78% of the community. Other key species included *Agonus cataphractus* (pogge), *Trisopterus luscus* (pouting), *Clupea harengus* (herring), *Gadus morhua* (cod), *Limanda limanda* (dab) and *Platichthys flesus* (flounder).

Species richness and abundance in the trawls was variable. Although no clear spatial pattern (Figures 25 and 26) was revealed, the most diverse sites were located at the southern end of the turbine site adjacent to New Sand Hole. For example, trawls 8 and 3 were the most diverse in terms of number of taxa (11 taxa), Shannon-Weiner diversity (H' = 1.8 and 1.7, respectively) and evenness (J' = 0.74 and 0.72, respectively) as shown in Figure 25 and Table 9. However, these sites had comparatively low total abundance (60 and 58 individuals, respectively). Trawl sites 1, 9, 10 and 12 showed the lowest diversity with the number of taxa ranging from 5 to 8 per trawl whilst Shannon's H' ranged from 0.6 to 1.3. Trawls 1 and 12 also had the lowest abundance (40 and 41 individuals respectively) whilst abundance was highest at trawl 9 (224 individuals).

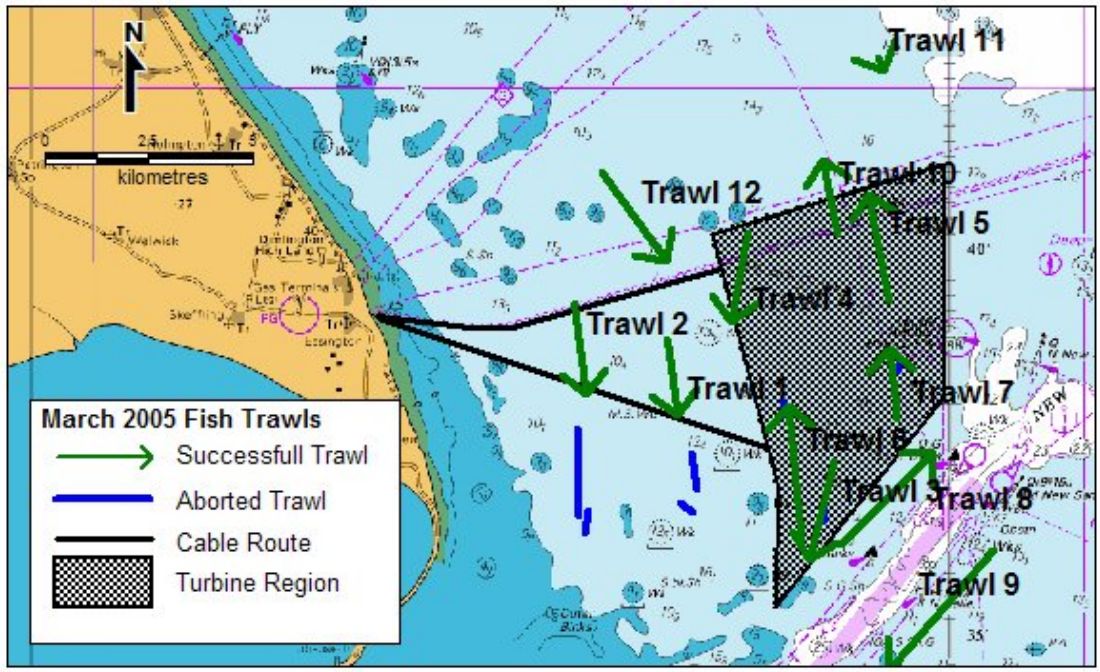


Figure 24. March 2005 fish trawl positions.

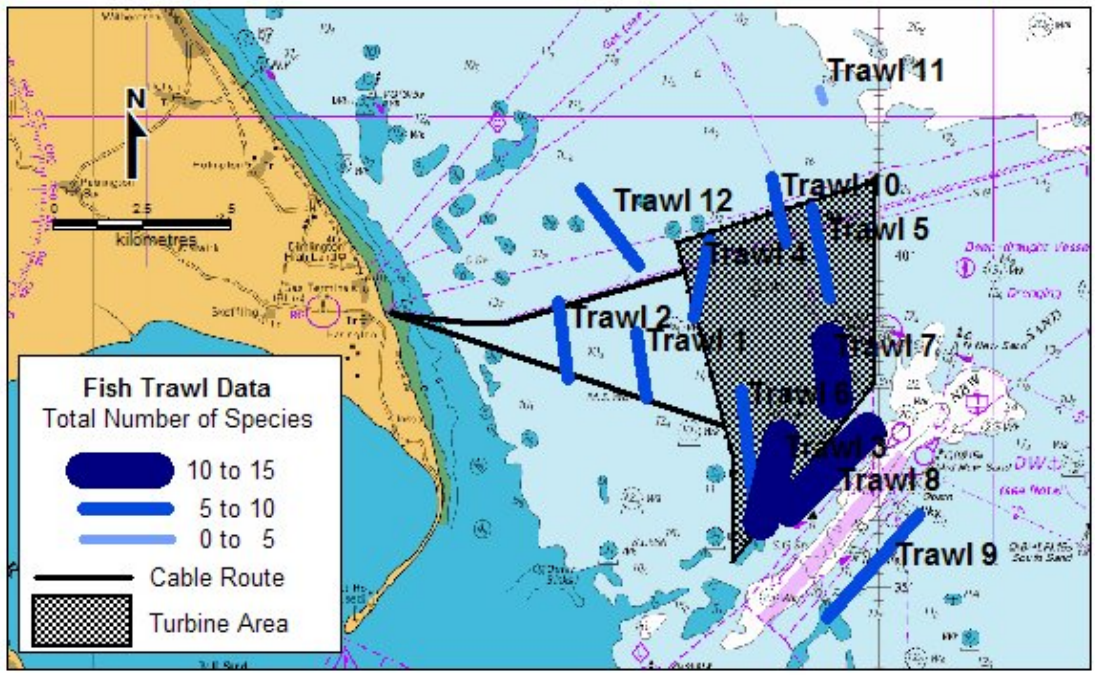


Figure 25. March fish survey species richness.

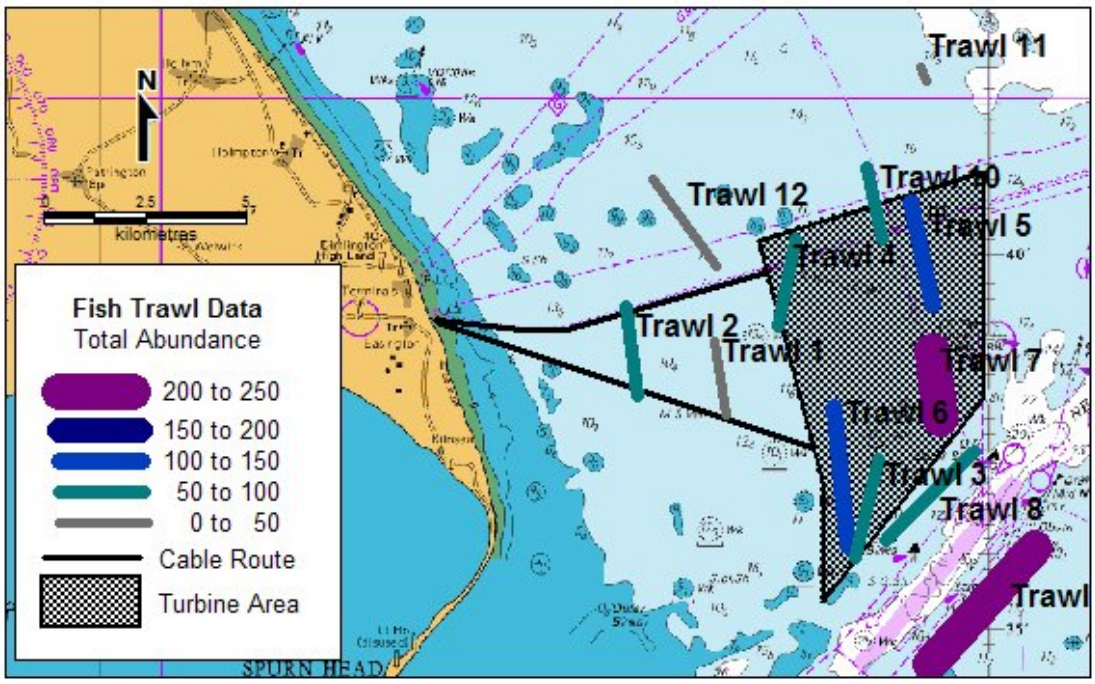


Figure 26. Fish trawl abundance.

Table 8. Mean abundance and dominance of the fish species for the survey area as a whole.

	Mean	% Dom	Cum %
Taurulus bubalis	46.4	45.9	45.9
Merlanguis merlangus	32.4	32.0	77.9
Agonus cataphractus	6.4	6.3	84.2
Trisopterus luscus	4.0	4.0	88.2
Clupea harengus	3.4	3.3	91.5
Gadus morhua	2.3	2.3	93.8
Limanda limanda	2.1	2.1	95.9
Platichthys flesus	1.0	1.0	96.8
Liparis liparis	0.7	0.7	97.6
Callionymus lyra	0.5	0.5	98.0
Microstomus kitt	0.5	0.5	98.5
Liparis montagui	0.4	0.4	98.8
Ciliata mustela	0.3	0.3	99.1
Solea solea	0.3	0.3	99.4
Mustelus mustelus	0.1	0.1	99.5
Raja clavata	0.1	0.1	99.5
Sprattus sprattus	0.1	0.1	99.6
Cyclopterus lumpus	0.1	0.1	99.7
Mullus surmuletus	0.1	0.1	99.8
Echiichthys vipera	0.1	0.1	99.9
Pholis gunnellus	0.1	0.1	100.0
Mean abundance	**101**	**100**	
Total number of species	**21.0**		
Mean number of species	**8.5**		
Mean H'	**1.4**		
Mean J'	**0.6**		

Table 9. Descriptive statistics for the fish and epifaunal invertebrates for each site.

	FISH			
Trawl	**S**	**A**	**J'**	**H'**
1	7	40	0.6	1.2
2	9	77	0.7	1.6
3	11	58	0.7	1.7
4	9	86	0.6	1.4
5	9	111	0.7	1.5
6	9	107	0.6	1.4
7	10	220	0.6	1.4
8	11	60	0.7	1.8
9	8	224	0.3	0.6
10	6	87	0.7	1.3
12	5	41	0.7	1.1

* S = number of species; A = abundance; H'(log_2) = Shannon-Weiner diversity; J' = Pielous Evenness index.

3.4.1. PREDATOR PREY RELATIONSHIPS

To evaluate the relationship between fish and invertebrate fauna in the area (Table 10), stomach analysis was carried out on the dominant species caught during the March 2005 fish trawl survey. In total 5 key fish species were analysed, although only the cod (*Gadus morhua*), whiting (*Merlanguis merlangus*), flounder (*Platichthys flesus*) and dab (*Limanda limanda*) contained adequate material to enable an assessment. The herring (*Clupea harengus*) was also analysed but contained no identifiable material.

Table 10 Fish species investigated by way of stomach analysis

Species	Site (Trawl No.)	Length (cms)	Pre-analysis Stomach weight (gms)	Post- analysis Stomach weight (gms)	% stomach fullness	% Partially Digested Material
Dab (*Limanda limanda*)	T1	24	7.91	7.02	5	100
Dab (*Limanda limanda*)	T2	19	1.9	1.54	20	40
Dab (*Limanda limanda*)	T2	22	5.12	4.99	10	80
Dab (*Limanda limanda*)	T3	28	9.7	8.44	15	50
Dab (*Limanda limanda*)	T3	24	3.94	2.69	35	10
Dab (*Limanda limanda*)	T3	23	3.4	2.1	60	40
Dab (*Limanda limanda*)	T3	25	6.45	5.95	20	100
Dab (*Limanda limanda*)	T3	22	2.9	1.8	10	50
Dab (*Limanda limanda*)	T3	18	1.12	0.99	5	90
Dab (*Limanda limanda*)	T5	29	10.7	7.86	40	75
Dab (*Limanda limanda*)	T5	17	2.14	0.89	60	50
Dab (*Limanda limanda*)	T8	21	4.2	1.32	80	25
Dab (*Limanda limanda*)	T8	20	5.64	2.39	65	10
Flounder (*Platichthys flesus*)	T1	25	4.77	2.45	50	10
Flounder (*Platichthys flesus*)	T2	23	3.46	1.22	80	20
Flounder (*Platichthys flesus*)	T2	26	5.99	2.65	55	10
Flounder (*Platichthys flesus*)	T4	22	4.95	1.57	75	20
Flounder (*Platichthys flesus*)	T8	14	4.22	2.63	45	20
Flounder (*Platichthys flesus*)	T8	27	7.86	5.64	25	90
Flounder (*Platichthys flesus*)	T8	31	11.55	7.29	55	40

Table 10. (cont.)

Species	Site (Trawl No.)	Length (cms)	Pre-analysis Stomach weight (gms)	Post- analysis Stomach weight (gms)	% stomach fullness	% Partially Digested Material
Herring (*Clupea harengus*)	T1	28	9.2	9.03	10	40
Herring (*Clupea harengus*)	T2	26	3.62	3.59	0	0
Herring (*Clupea harengus*)	T4	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T4	29	7.95	7.75	10	100
Herring (*Clupea harengus*)	T5	27	3.05	2.88	5	100
Herring (*Clupea harengus*)	T5	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T5	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T5	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T7	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T7	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T7	24	3.87	3.72	5	100
Herring (*Clupea harengus*)	T7	24	3.87	3.72	5	100
Cod (*Gadus morhua*)	T2	39	16.08	8.27	75	10
Cod (*Gadus morhua*)	T2	26	9.22	5.49	50	5
Cod (*Gadus morhua*)	T2	15	1.55	0.86	45	5
Cod (*Gadus morhua*)	T3	17	3.96	1.12	75	15
Cod (*Gadus morhua*)	T4	46	23.43	11.37	75	0
Cod (*Gadus morhua*)	T5	35	17.29	8.46	80	0
Cod (*Gadus morhua*)	T5	42	20.47	9.22	60	10
Cod (*Gadus morhua*)	T6	37	17.86	13.71	25	25
Cod (*Gadus morhua*)	T6	44	25.88	10.08	100	15
Cod (*Gadus morhua*)	T7	40	20.71	9.72	75	30
Cod (*Gadus morhua*)	T7	13	4.5	1.87	60	10
Cod (*Gadus morhua*)	T7	12	2.38	1.1	60	25
Cod (*Gadus morhua*)	T8	53	32.45	12.45	100	15
Cod (*Gadus morhua*)	T10	45	26.33	10.16	90	25

Table 10. (cont.)

Species	Site (Trawl No.)	Length (cms)	Pre-analysis Stomach weight (gms)	Post- analysis Stomach weight (gms)	% stomach fullness	% Partially Digested Material
Whiting (*Merlanguis merlangus)*	T1	13	5.24	3.64	25	10
Whiting (*Merlanguis merlangus)*	T1	32	11.36	4.22	75	10
Whiting (*Merlanguis merlangus)*	T1	36	15.29	6.91	75	15
Whiting (*Merlanguis merlangus)*	T2	33	14.87	4.07	100	25
Whiting (*Merlanguis merlangus)*	T2	32	13.53	8.22	25	10
Whiting (*Merlanguis merlangus)*	T2	17	6.94	2.95	50	25
Whiting (*Merlanguis merlangus)*	T2	26	16.21	7.39	60	15
Whiting (*Merlanguis merlangus)*	T3	25	16.55	5.26	60	10
Whiting (*Merlanguis merlangus)*	T3	12	4.54	2.25	75	20
Whiting (*Merlanguis merlangus)*	T3	26	11.23	3.44	100	20
Whiting (*Merlanguis merlangus)*	T3	31	17.86	6.75	75	15
Whiting (*Merlanguis merlangus)*	T3	27	13.45	5.36	50	5
Whiting (*Merlanguis merlangus)*	T3	31	15.15	7.89	75	15
Whiting (*Merlanguis merlangus)*	T4	16	5.93	1.98	100	25
Whiting (*Merlanguis merlangus)*	T4	28	9.27	2.27	75	25
Whiting (*Merlanguis merlangus)*	T4	35	18.56	6.88	80	0
Whiting (*Merlanguis merlangus)*	T4	34	18.03	7.29	75	15

3.4.1.1. DAB (*LIMANDA LIMANDA*)

The dab (*Limanda limanda*) is considered to have a relatively diverse diet (Figure 27). Whilst the majority of the stomach contents were unidentified partially digested material, crustaceans and polycheates form the principal component of dab dietary requirements. Of those organisms identified, the crustaceans *Pandalus montagui, Pisidia longicornis* along with polycheate debris formed the key constituents. These species were also frequently recorded during the benthic and epifaunal surveys.

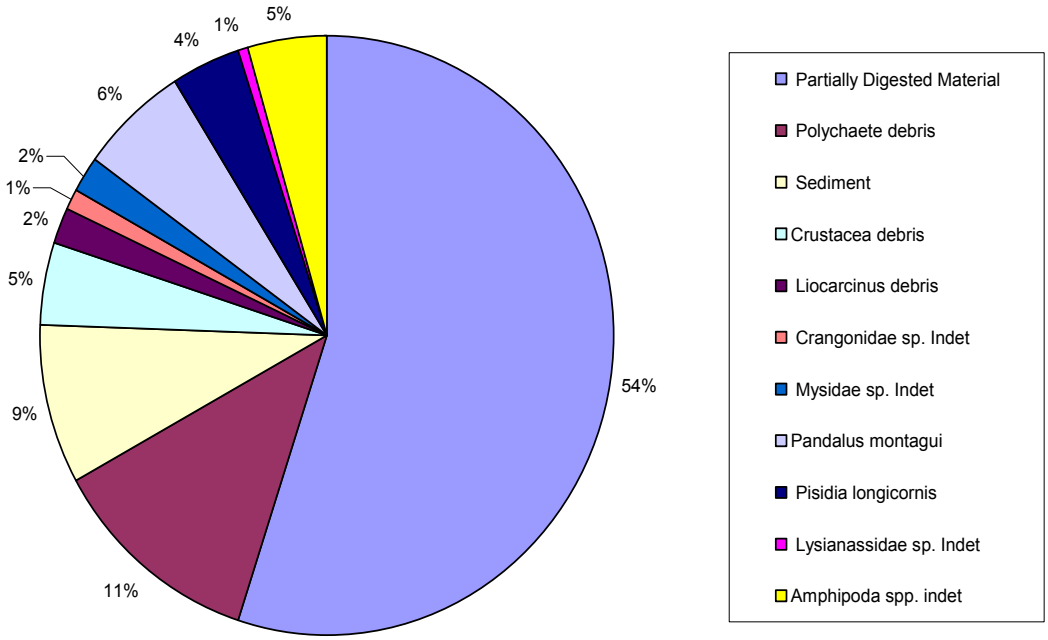


Figure 27. Stomach contents and prey items of Dab (*Limanda limanda*).

3.4.1.2. FLOUNDER (*PLATICHTHYS FLESUS*)

The flounder (*Platichthys flesus*) has a diverse diet with crustaceans forming the bulk of the identifiable species. The largest component recorded was unidentifiable, partially digested material (Figure 28). The main identified species included *Pandalus montagui*, Crangonidae, *Pisidia longicornis* and Amphipoda species. Crustacean debris also contributed a relatively major component, whilst the relatively small proportion of polychaete debris indicated that this group was of less importance.

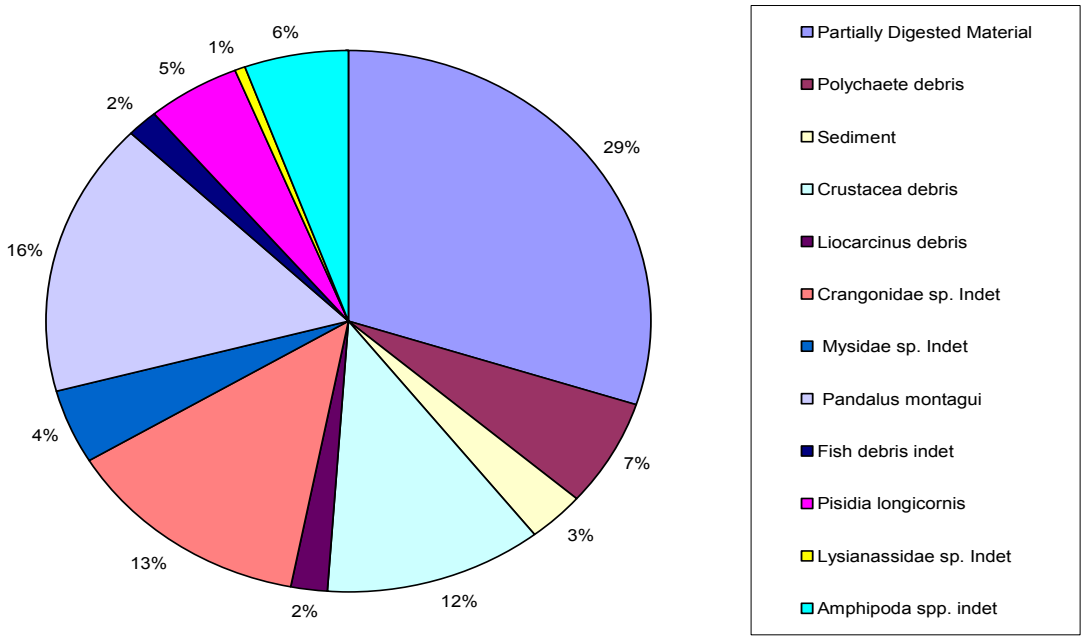


Figure 28. Stomach contents and prey items of Flounder (Platichthys flesus).

3.4.1.3. COD (*GADUS MORHUA*)

The stomach contents of cod (*Gadus morhua*), as shown in Figure 29, indicate a varied diet. However, there appeared to be a difference between size ranges in terms of dietary preference, with larger fish showing a preference for other fish species as prey items. Stomachs from mature cod contained some crustacea but the principle prey items were fish such as *Merlanguis merlangus* and *Sprattus sprattus*. Juvenile and adolescent fish however showed a more varied diet which primarily comprised of crustaceans such as *Pandalus montagui* and Crangonidae.

Two specimens analysed from trawl six (37 cm & 44 cm in length) contained a relatively high percentage composition (45% and 35% respectively) of brittlestars (Ophiuroidea). The largest cod caught during the survey (53 cm long, in trawl T8) had the most diverse diet which included *Pandalus montagui* and Crangonidae, *Merlanguis merlangus, Sprattus sprattus* and the only edible crab (*Cancer pagurus*) recorded during the analyses.

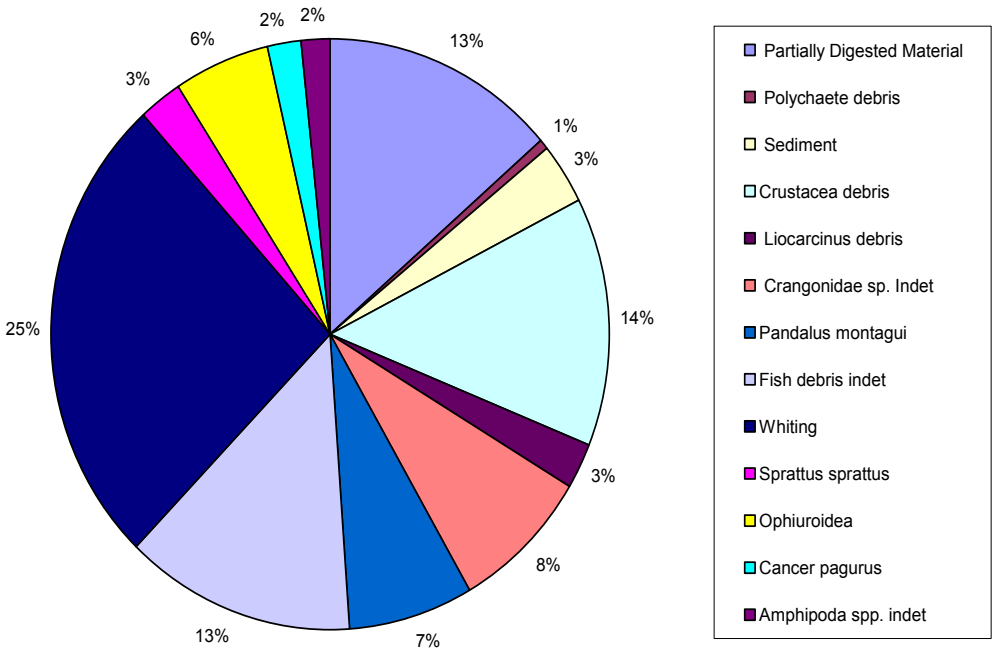


Figure 29. Stomach contents and prey items of Cod (Gadus morhua).

3.4.1.4. WHITING (*MERLANGUIS MERLANGUS*)

Whiting stomach contents (Figure 30) showed the species has a distinct preference for fish, and in particular a preference for its own kind. Of the fish species identified, whiting represented 22% of the total contents recorded and contributed to the 67% of total items of fish origin. Crustacea contributed approximately 15% of the remaining prey items, which comprised predominantly of *Pandalus montagui, Crangonidae* species and other crustacean debris. Partially digested material accounted for a further 15% of the total, with polychaete debris contributing just 2%.

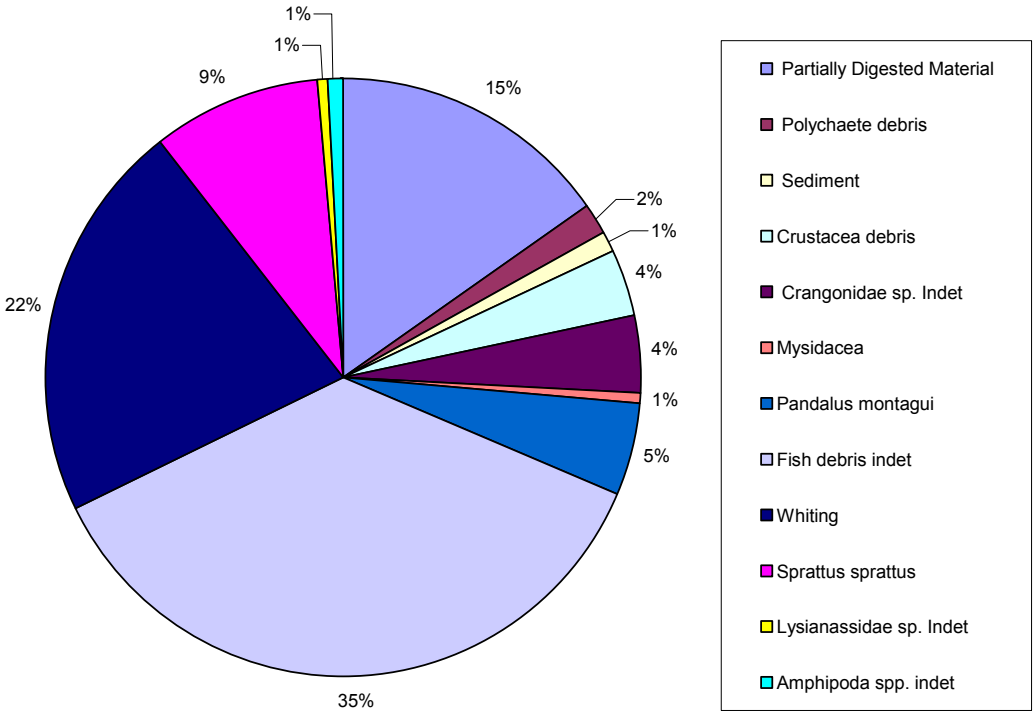


Figure 30. Stomach contents and prey items of Whiting (Merlanguis merlangus).

3.4.2. AGE GROUP ANALYSIS OF DOMINANT FISH SPECIES

The lengths of abundant fish, taken during the survey, allowed an evaluation of age groups present across the area (November and March). However, analysis of the data is dependent upon collecting adequate numbers of fish to enable any specific patterns to be identified. For the November 2004 fish survey, the abundance of fish captured during the survey did not facilitate the production of age and growth analysis, therefore the following findings were derived from fish caught during the March 2005 fish survey.

The following section examines the age groups of fish species present across the site, although some species of commercial value were not present in high enough densities to facilitate cohort analysis (age groups). Some species e.g. the sea scorpion (*Taurulus bubalis*) were present in large enough numbers to evaluate the size classes present. However, due to difficulties in the handling of this fish, the high numbers recorded and the obvious presence of all cohorts (visual inspection of, this species was not included in the length frequency analysis.

Within the dataset four species of fish and one crustacean species were recorded in adequate abundance to enable an analysis of the age structure present throughout the survey area.

3.4.2.1. WHITING (*MERLANGIUS MERLANGUS*)

The cohort analysis (length frequency) indicates that a single cohort (age group) dominates the assemblage during March, although there is a reduced older component (26 – 33cm).

Figure 31 indicates that the dominant cohort is the 1gp (up to 2 years old), with 2gp whiting (up to 3 years old) less abundant, there is limited evidence to indicate the presence of 3gp fish within the data (>33cm). There is no evidence of the 0gp which is usually represented at this time of year (March) by individuals in the 5–10cm range, although it is likely that such fish would take up residence in the Humber estuary and along inshore areas. It is probable that the age groups are intermediate between cohorts and the juvenile cohort is likely to be the result of the 2004 year class (0gp) progressing into the 1gp.

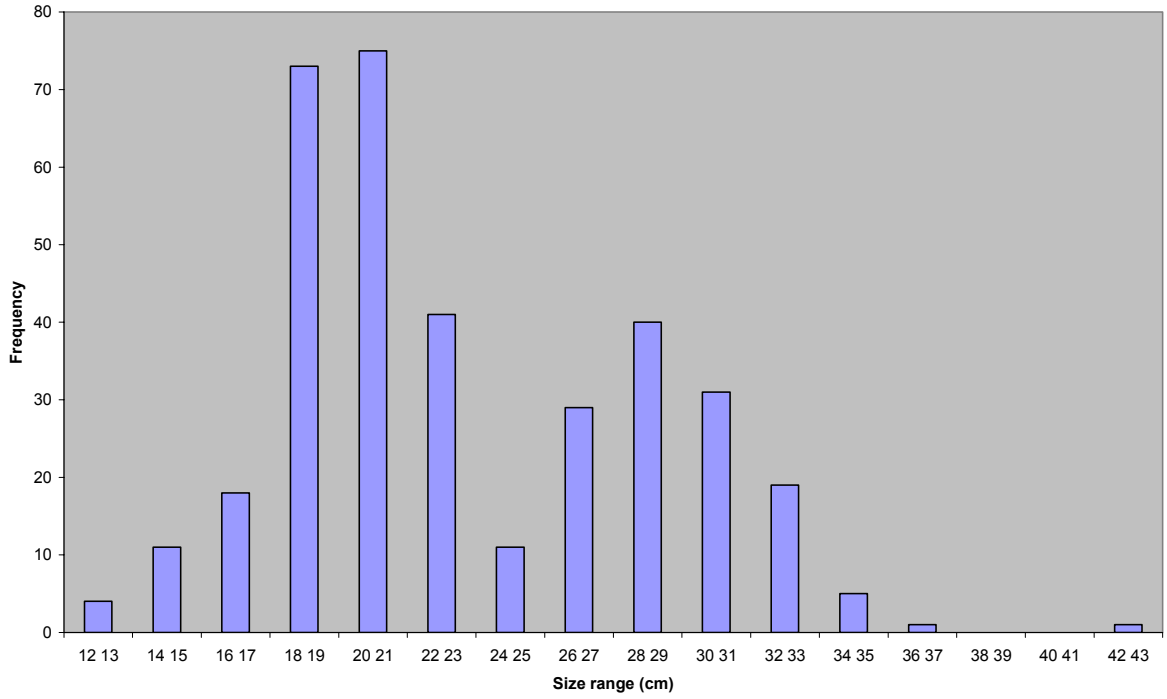


Figure 31 Length frequency analysis of Whiting (*Merlanguis merlangus*).

3.4.2.2. COD (*GADUS MORHUA*)

The length frequency data for cod were difficult to categorise due to the limited number of entries, however, there is value in producing a length frequency histogram in order to illustrate that the site does support the species and that all expected size ranges are present (Figure 32). The largest cohort present is the 0gp and the reduced availability of older cohorts is likely to be a reflection of the overall stock status, which within the North Sea, is considered to be depleted.

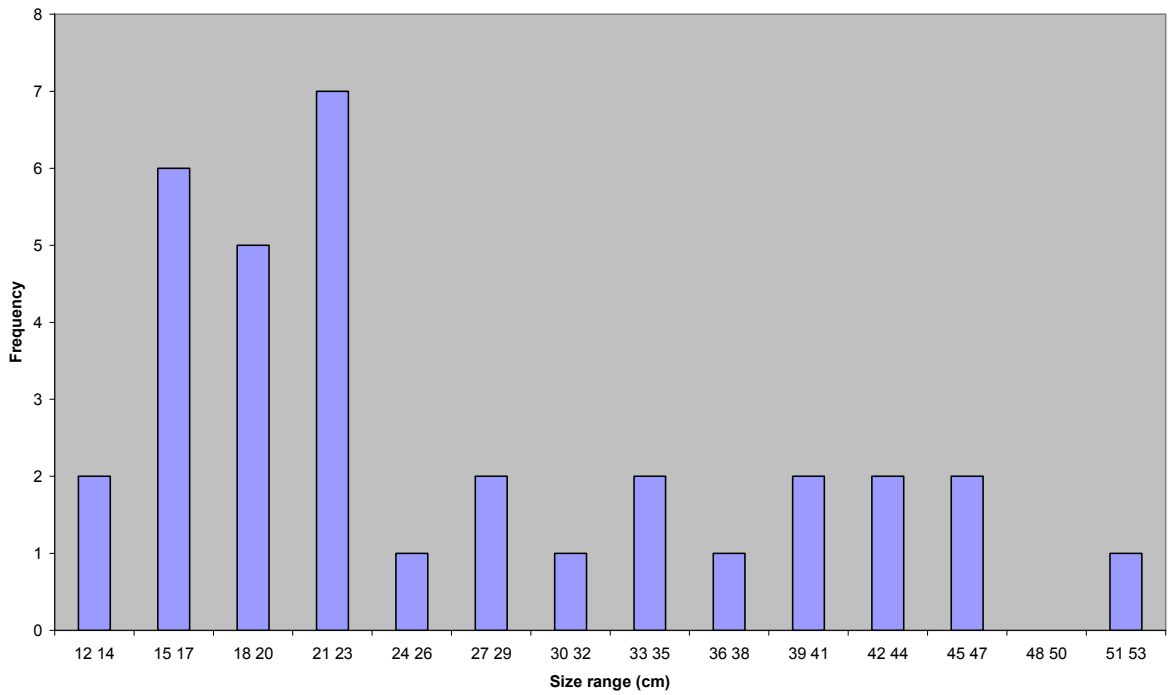


Figure 32. Length frequency analysis of Cod (Gadus morhua).

3.4.2.3. DAB (*LIMANDA LIMANDA*)

Data collected in adjacent areas for other projects shows that dab, a commonly recorded fish species along this stretch of coastline, and is the commonest flatfish species in this region. Seabed type is an important factor that determines the distribution of the species. Within the survey area it is not considered that the seabed is 'typical' flatfish terrain.

Figure 33 indicates that it is difficult to determine specific cohorts from size frequency analysis of the dab data, possibly due to the relatively low abundance recorded. There is, however, some indication that the composition is dominated by adolescent to maturing adult fish. The intermediate 1gp to 2gp (2003 year class) appear to be present in low abundance, although between the 12-26 cm size classes it is difficult to determine which cohorts are present. Wheeler (1969) gives some guidance on the likely size ranges and growth for dab, which is considered to be slower than other flatfish species. Using this information on likely length by age, the 3gp and 4gp probably comprise the size classes within the 12-26cm range.

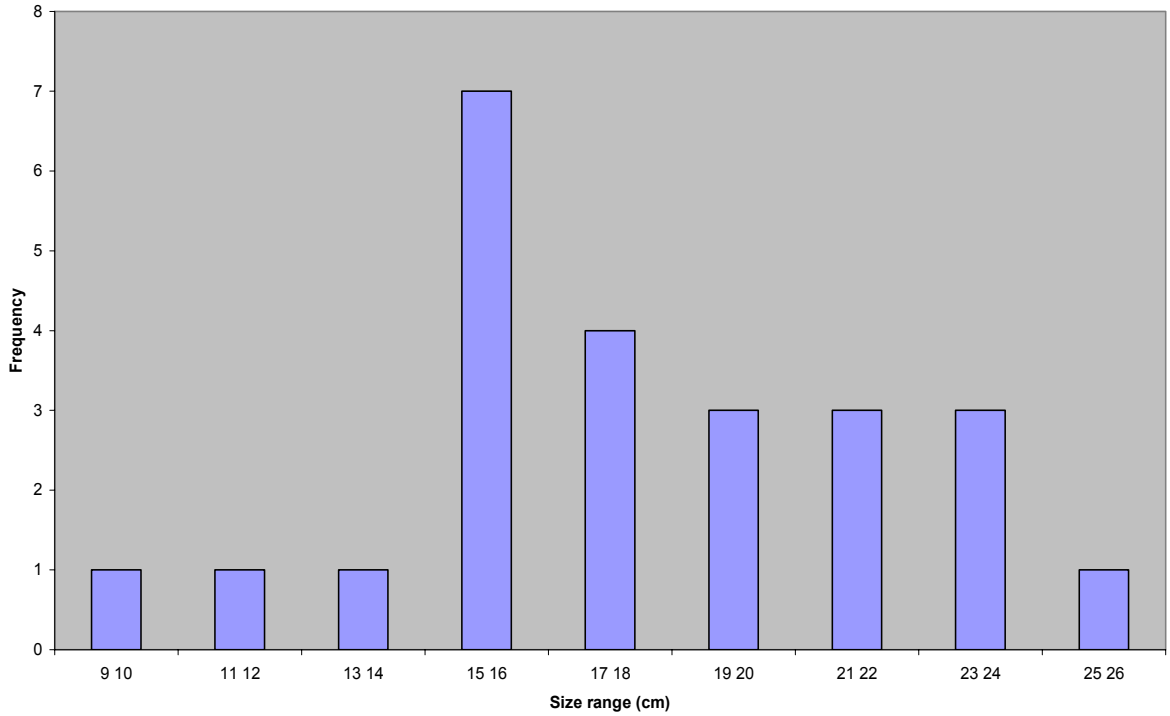


Figure 33 Length frequency analysis of Dab (*Limanda limanda*).

3.4.2.4. HERRING (*CLUPEA HARENGUS*)

The size frequency analysis of the herring data (Figure 34) indicate that assemblage is dominated by adult forms, and these data are comparable to that recorded within the Humber Estuary and further north along the Holderness coast (Proctor, 2004).

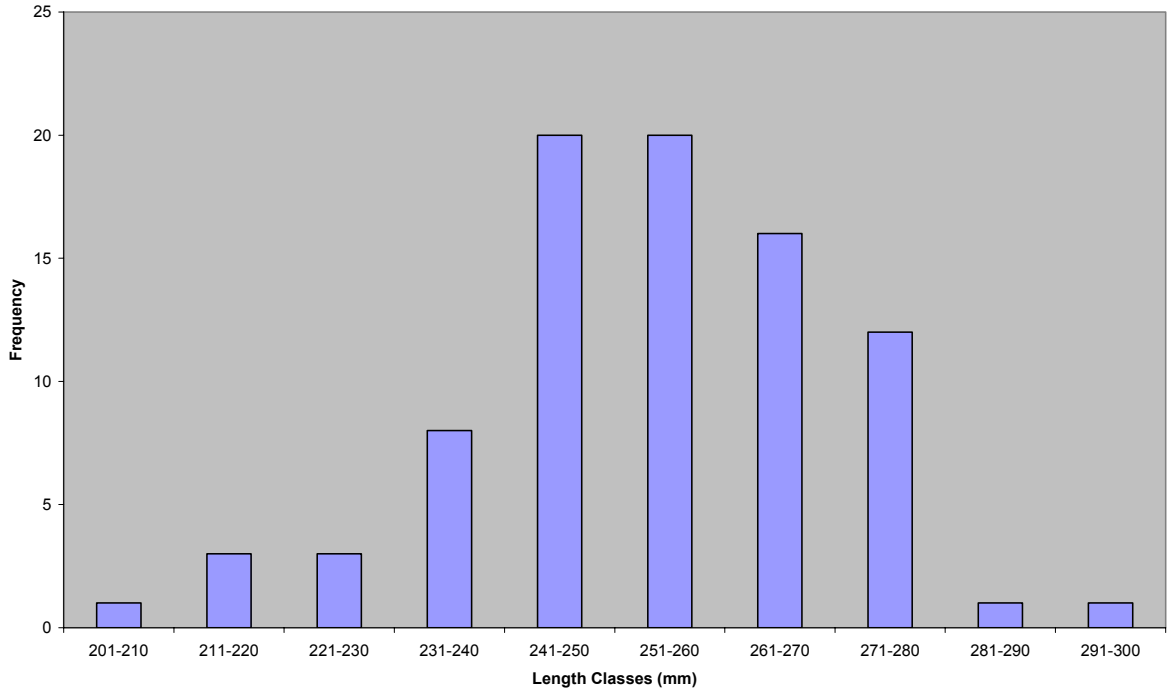


Figure 34. Length frequency of Herring (*Clupea harengus*).

3.4.2.5. LOBSTER (*HOMARUS GAMMARUS*)

Whilst not a fin fish species, the length frequency of lobster was evaluated due to its commercial importance locally. The data indicate 5 possible size classes within the survey area (Figure 35) with a relatively even spread within each size class, although those above the current minimum landing size (87mm) appear to be relatively poorly represented. It should be noted however, that trawling is not the optimal means to assess shellfish and the data are provided here in order to support other commercial data available. The lowest size class may not be truly representative, as it is likely that lobsters of this size are less mobile than larger size groups. The data however, do indicate the size range of lobsters present within the survey area. The ratio of males to females was 1:1.

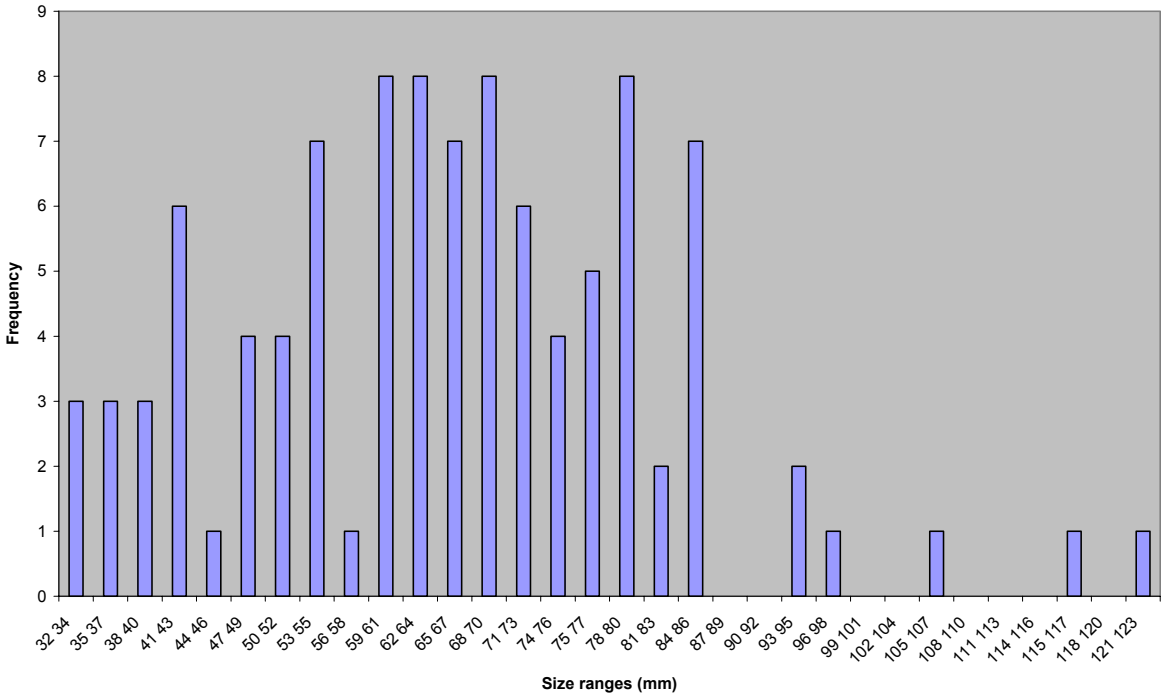


Figure 35. Length frequency analysis of Lobster (Homarus gammarus).

3.4.3. SPAWNING POTENTIAL

A large proportion of the fish caught during the March 2005 fish survey were immature and or adolescents, and of those species investigated for spawning potential only three species exhibited any gonad maturation. Those species that were evaluated but showed no spawning potential included herring (*Clupea harengus*) and flounder (*Platichthys flesus*). The dab (*Limanda limanda*) were spent, although this was based on just a few individuals. The remaining three species investigated included cod (*Gadus morhua)*, whiting (*Merlanguis merlangus*) and pouting (*Trisopterus luscus*), all three species exhibited variable stages of gonad maturation, although the degree of development varied according to size range.

All cod investigated over 32cm in length exhibited ripening gonads, and of these 8 were female and 3 male. The whiting contained ripe gonads, although at a later stage of development, again there was a greater percentage occurrence of females to males

(approximately. 12:1). The pouting appeared to have the highest development in terms of gonads, with males releasing sperm during handling.

3.5. Intertidal Infauna

The invertebrate fauna community recorded during the intertidal survey was extremely impoverished as is expected for this stretch of the coastline which is particularly dynamic with highly degree of mobile sediment. In total, 4 species and 14 individuals were recorded from 12 samples out of a total of 45 faunal samples collected, which represented a presence of fauna in 27% of the samples taken. The dominant species was the Isopod *Eurydice pulchra* which accounted for 50% occurrence of all invertebrates recorded, with the amphipods *Pontocrates arenarius* and *Haustorius arenarius* each contributing approximately 22% of the total abundance. The other species recorded was the mollusc *Crepidula fornicata*, which was recorded on a single occasion. Due to the extremely low density and diversity of infaunal species further data analysis has not been carried out.

The sediment types throughout the intertidal area are predominantly comprised of highly mobile sands; with some sampling stations containing a small degree of gravel. The species recorded at these stations are typical for such mobile environments. The organic content of sediment within the sampling area is extremely low, with a maximum recorded of 1.37% at the upper shore station of the proposed cable route (central transect). This is possibly as a result of the proximity to the fine sedimentary cliffs.

3.6. Sabellaria species

The subtidal benthic survey identified areas within the cable route and south western edge of the turbine box that contained the Honeycomb worm *Sabellaria alvelolata* and the Ross worm *Sabellaria spinulosa in* varying abundance. In total 12 benthic stations contained *Sabellaria alveolata,* with abundances ranging from 1 to 467 individuals per 0.1m^2 grab (Figure 36). The survey also identified 37 stations which contained *Sabellaria spinulosa* in varying densities, ranging between 1 to 32 individuals per 0.1m^2 grab (Figure 37). *Sabellaria alveolata* was largely absent from the turbine site. Both species were found in higher numbers inshore of the windfarm site, with relatively low abundances of Sabellaria found in the turbine area.

Due to the presence of Sabellaria in the vicinity of the proposed windfarm a dedicated survey was initiated to evaluate the scale and status of any potential reef features. Drop down underwater video was deployed (in conjunction with a RoxAnn Acoustic Ground Discrimination System) at the 12 benthic sampling stations in which *Sabellaria alveolata* was identified. A further 6 benthic sampling sites within the turbine site were also investigated. Whilst it was hoped to carry out a larger scale evaluation, poor visibility and inclement weather during optimal sampling tides restricted access. The results of this survey are given in a separate report. The results of the acoustic survey (Figures 39 and 40) did not identify distinct areas of reef. The survey did, however, show areas of seabed potentially suitable for *Sabellaria* colonisation. In general (as found with the geophysical survey), the majority of the area comprised of a mixture of pebbles, cobbles and boulders in sand and gravely sand. Sediments were harder further offshore where a tightly packed ‘carpet’ of cobbles and pebbles was often found. Whilst inshore within the Humber plume, a more mixed habitat with a degree of siltation was evident.

Despite restrictions to the video survey due to poor visibility and strong tides it was possible to determine some areas of *Sabellaria,* although it was not possible to specifically determine which identify to species level. Whilst *Sabellaria* appeared to be quite widely distributed, it was generally low lying with a sparse distribution. There was no evidence of the extensive and large upstanding reef like structures more associated with populations of *S. alveolata* found on the south and west coasts of the UK. Where identified, the *Sabellaria* occasionally appears to be attached to rocks and boulders, giving a mound or hummock appearance, and at station 14 some larger clumps (possibly *S. alveolata*) were visible. In most observations, however, the species formed low lying crusts on or between cobbles with a relatively patchy distribution. A number of representative snapshots from the video survey are given in Figures 41 to 45 which show the nature of the seabed and typical *Sabellaria* growth form at a number of stations (station numbers refer to the benthic grab stations).

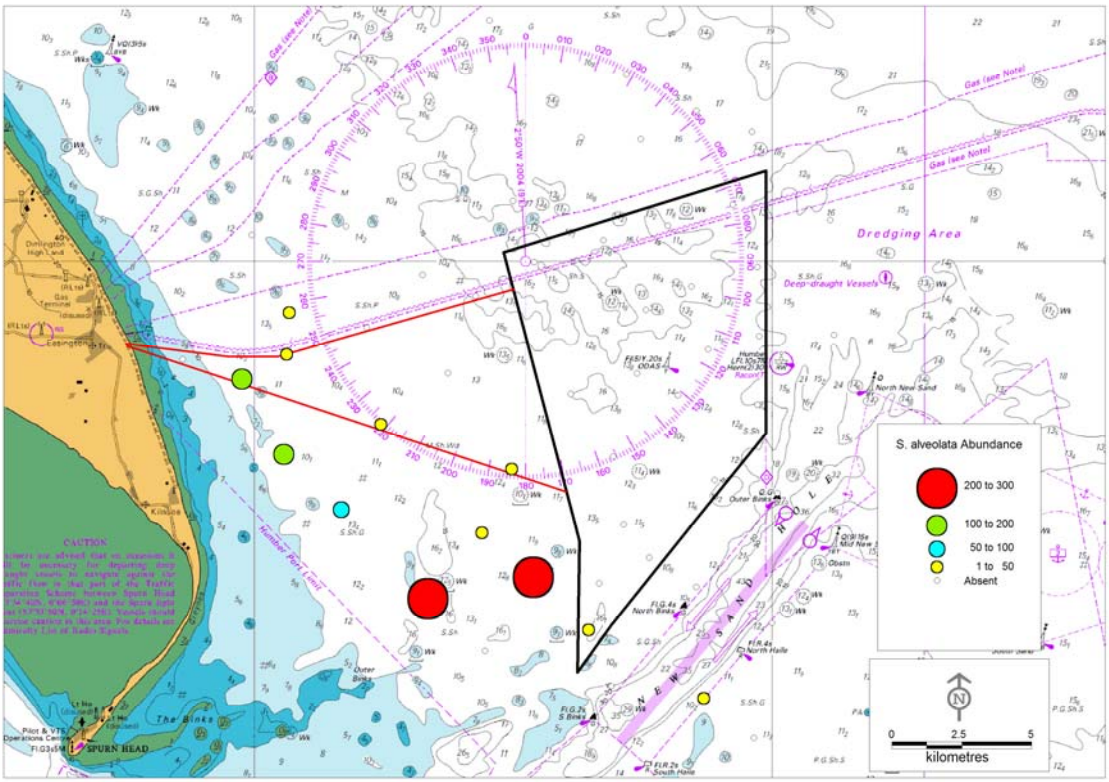


Figure 36. Distribution of Sabellaria alveolata (mean abundance per site) from benthic survey.

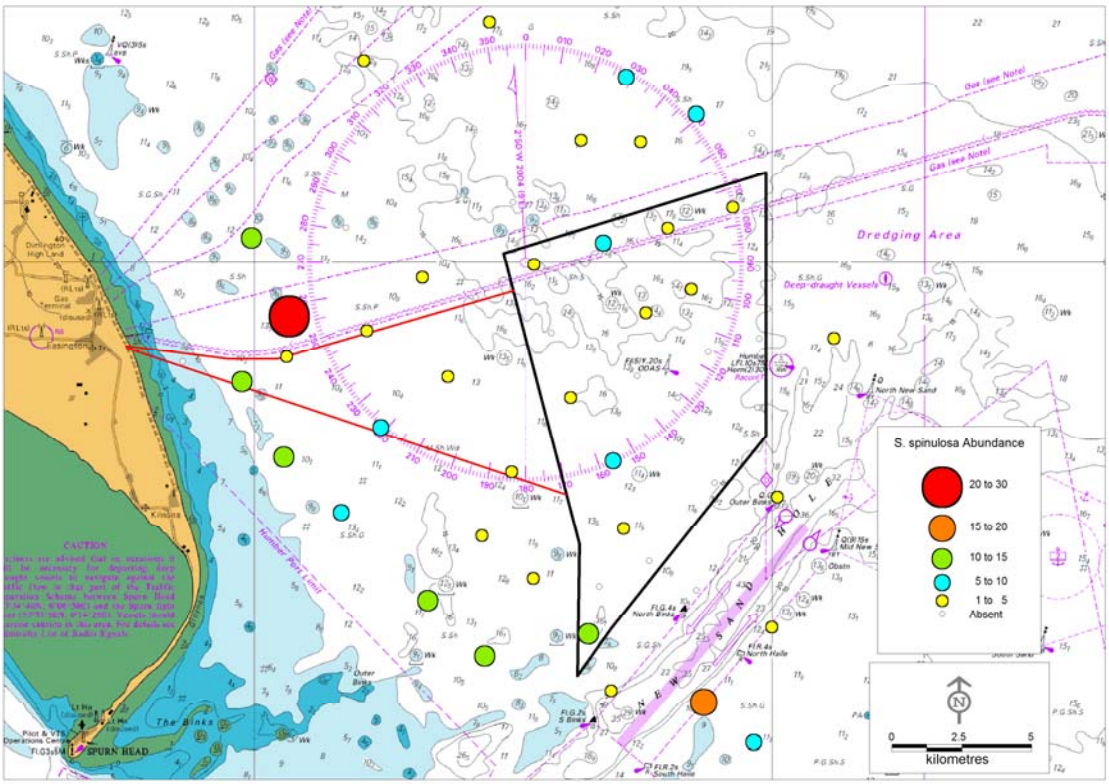


Figure 37. Distribution of *Sabellaria spinulosa* (mean abundance per site) from benthic survey.

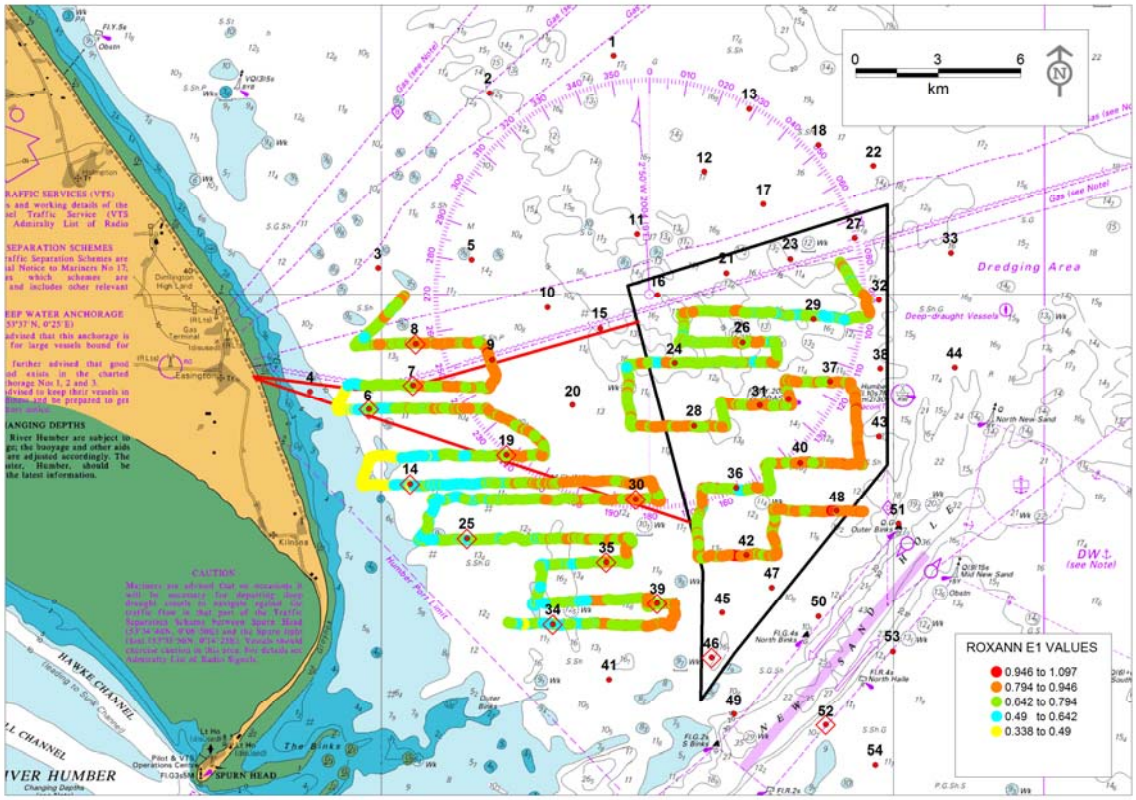


Figure 38. E1 values (roughness) from acoustic survey.

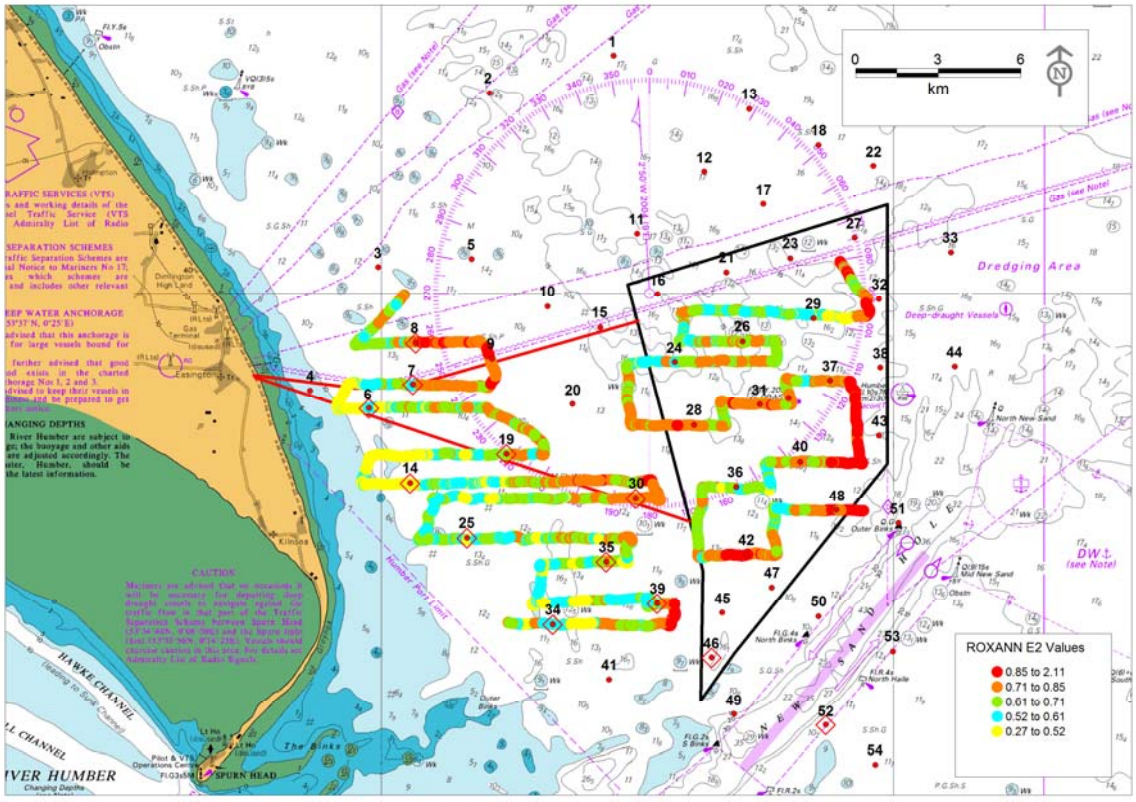


Figure 39. E2 values (hardness) from acoustic survey.

Figure 40. Seabed at site 7 showing patchy encrusting *Sabellaria*.

Figure 41. Seabed at site 14 (note larger clump of *Sabellaria*).

Figure 42. Seabed at site 19.

Figure 43. Seabed at site 25 showing patchy encrusting *Sabellaria*.

Figure 44. Seabed at site 52 showing patchy encrusting *Sabellaria*.

4. DISCUSSION

4.1. Subtidal Benthic Communities

The sediment characteristics were highly variable across the area, although the sediments were generally composed of coarse sands and gravels. The highly variable sorting coefficient indicates poorly sorted sediments composed of a range of particle sizes with no particular areas of extensive homogenous substrata. Both silt and organic content were extremely low at all sites, with the highest organic content values corresponding to sediments with the highest silt content.

A total of 357 species were recorded during the survey, which were highly variable in their distribution and abundance. This variability reflects the variable nature of the sediment characteristics within the survey area as a whole.

The results of the subtidal benthic survey show that within the immediate vicinity of the turbine site, and along the Holderness coast, the area is relatively rich in terms of the diversity of infaunal invertebrates. There is also a higher species richness/diversity within the central and northern areas of the turbine box, including adjacent sampling stations to the north, in comparison to those in the southern area of the turbine site and adjacent waters. Analysis of the data indicated that the community was dominated by the decapod crustacean *Pisidia longicornis*, which represented almost 18% of the whole community abundance and was recorded at 42 out of the 54 sites. The Honeycomb worm (*Sabellaria alveolata*) represented over 10% of the total abundance, despite being recorded at only 12 of the 54 benthic sampling stations. The remaining key species, in terms of abundance, were dominated by sedentary polychaetes, amphipod and decapod crustaceans.

The seabed is dominated by gravely sand together with shelly cobble and occasional lag boulders. The abundance and diversity of the species present appear to be a function of the relatively course substratum. The variability of these communities is dependent on the variable nature of the substratum and dynamics of the coastal area, including the influence of the Humber Estuary. The opportunistic nature of the key decapods, in conjunction with the more sedentary nature of many of the key polychaete species, indicates that organic inputs from the coastal margin and Humber Estuary play an important role in the community, and as such, seasonal suspended organic inputs may be vital in sustaining the community.

4.2 *Sabellaria Species*

The subtidal benthic survey identified areas within the cable route and south western edge of the turbine box that contained varying abundance of the Honeycomb worm *Sabellaria alvelolata* and the Ross worm S. spinulosa (Figures 36 and 37).

The video survey, in conjunction with a RoxAnn acoustic ground discrimination system, confirmed that the seabed was primarily comprised of a mixture of cobbles, pebbles and boulders in sand or gravelly sand. Of the areas of *Sabellaria* identified, it is generally low-lying and encrusting on/between cobbles or attached to rocks and boulders in a mound or hummock formation. Distribution is quite patchy with a relatively low tube density and no evidence of large, extensive reef structures were found.

Abundance of *S. spinulosa* were generally low (<30 per 0.1m^2) particularly within the turbine area. There was no evidence from the surveys carried out to suggest that the species is present in any form other than the characteristic low lying, encrusting type. Extensive reef features (as found in The Wash for example) were not evident. Previous surveys carried out by the Institute indicate that this form of *S. spinulosa* dominates the Holderness coastline where it is a common species within subtidal benthic communities where suitable conditions are found.

Relatively high numbers of *Sabellaria alveolata* were recorded from the benthic survey, and some populations of *Sabellaria* were encountered outside the windfarm development, (above 300 individuals/0.1 m^2). Video footage also revealed more extensive sheets of encrusting *Sabellaria* in some areas which occasionally formed patchy, slightly elevated hummocks e.g. at site 14 (again outside the turbine site).

Due to the variable nature of its growth form and distribution, the precise definition of a *Sabellaria* reef is unclear. For *S. spinulosa* it has been suggested that areas where more than 500 individuals / 0.1 m^2 are recorded (with extensive coverage and structures up to 30cm above the bed) are of sufficient quality to constitute a reef (Foster-Smith and White, 2001). More recent studies suggest that numbers of in excess of 375 per 0.1m^2 would distinguish reefs which are sufficiently distinct from other biotopes (Foster-Smith and Hendrick, 2003) and these abundances could be a useful indicator of reef quality. In the current study such abundances were recorded at one benthic station. Given the abundances and structure of *Sabellaria* shown from the grab and video surveys it would appear that in many areas and particularly in the windfarm site the populations of *Sabellaria* are of moderate to low 'quality' (in terms of abundance and lifeform). The results of the current study indicate that the main areas where higher quality *Sabellaria* communities may be found tend to be inshore of the windfarm site (although video work within the turbine site itself was limited due to tidal/weather constraints). It is recommended that further clarification (particularly along the cable route) is carried out prior to any construction due to the high degree of temporal variation often encountered with the species. However, it is likely that microrouteing / micrositing of the cables / turbines should mitigate against any significant direct impact to *Sabellaria* populations.

During the video survey weather patterns and water quality played an important role in the quality of images collected. Persistent onshore winds made surveying within the turbine box difficult, as did the effects of the Humber plume in terms of water clarity. Frequently, calm days coincided with less than optimal tidal cycles (relatively spring tides and or minimal time availability due to predominant ebb cycle), fast moving currents do not allow for slow migration of video equipment over the seabed. It is considered that for the purposes of the present evaluation, the deployment of the video in conjunction with the RoxAnn ground discrimination is adequate to determine the present status of the *Sabellaria* species within the area, although more targeted surveys will be required to describe the condition of *Sabellaria alveolata* and *S. spinulosa* prior to and following construction phases.

4.3 Intertidal Invertebrate Communities

Infaunal invertebrates in the intertidal area were extremely sparse with a total of four species recorded, and only 14 individuals found across the area as a whole. Consequently, the intertidal area is considered extremely impoverished with low diversity both at individual sites and across the whole survey area. The isopod *Eurydice pulchra* was the dominant species overall at the mid and lower shore sites with the exception of the lower shore sampling stations which were characterised by the amphipod *Haustorius arenarius*. *Pontocrates arenarius* was also recorded occasionally in the upper, mid and lower shore sampling stations. The intertidal species found and their abundances were considered to be characteristic of sediments composed of mobile coarse material with very little organic matter.

The sediments at all sites were largely composed of coarse sand, with the highest proportions of gravel at sites T2 (upper shore) and T3 (upper shore). In general the silt content was negligible with the highest concentration found at the upper shore site. It is possible that the beach works being undertaken for the Langeled project may have contributed to somewhat higher organic content in the upper shore area, although the organic content of the sediment throughout the intetidal zone was extremely low. It is considered that such impoverished and patchy infaunal communities are typical for dynamic mobile sandy beaches and representative of much of the coastline in this area.

4.4. Epifaunal Communities

The predominance of sessile species (hydrozoan, bryozoan and tunicate) illustrates the coarse nature of the substratum with a total of 75 qualitative epifaunal species as opposed to 28 quantitative species being recorded from 27 2m beam trawls. The video analysis further indicates the problems encountered during the epifaunal and fish surveys (damaged gears and nets), where large boulders are scattered across the seabed throughout the whole area. These hard surfaces provide ideal habitat for suspension and filter feeding organisms alike, a feature also noted within the infaunal survey where many of the key species were of a similar feeding guild.

The data indicate that the area as a whole has a similar community type, and the turbine site is comparable in terms of species diversity to that in adjacent waters. This is likely to be a feature of the substratum, where as with the benthic infaunal community, opportunistic species predominate. The mobile epifaunal species recorded are, on the whole, opportunistic species of a scavenging and or predatory nature. This community is dominated by three major groups (Crustacea, Echinodermata & Mollusca) and within these groups a few species dominated the assemblage. The epifaunal assemblage is characteristic of this stretch of coastline, although subtle changes in diversity and dominance can be expected during alternative seasons. The elevated suspended sediments present during the winter months may stagnate growth of sessile organisms and in some instances the feeding and reproductive polyps of hydroids may die off, leaving bare stolons. As the levels of suspended sediment decrease during settled weather patterns (spring/summer), the polyps begin to regenerate and the colony and or individuals grow to levels expected for the species and season. It is clear from trawl data that the greater diversity and abundance is found along the nearshore coastal margin, grading to an almost impoverished epifaunal community directly inshore.

4.5. Fish Communities

The fish communities appear to be dominated by small forms and benthic species. However, it must be stressed that significant problems where encountered during the initial fish survey carried out in November 2004 due to the rough nature of the seabed. In total 5 trawls were carried out with a minimal degree of success. As a consequence, the data collected during these trawls are considered unsuitable for the purpose of describing the fish community, although the fish recorded *e.g. Merlanguis merlangus* (whiting) and *Trisopterus luscus* (pouting) are comparable to previous surveys.

The fish community (using data recorded during the November 2004 epifaunal survey) was dominated by *Taurulus bubalis* (long-spined sea scorpion) and *Trisopterus luscus* (pouting). Other key species included *Myoxocephalus scorpius* (short spined sea scorpion) and *Merlangius merlangus* (whiting). No juvenile or adult flatfish were captured during the deployment of the 2-m beam trawl and from these data the fish communities during the late winter period appear to be dominated by small demersal and benthic species. However, anecdotal evidence from fishermen deploying other static gears within the turbine site and nearshore waters during the same time period, should be taken into account. For a limited time scale during November and December, cod (*Gadus morhua*) was the target species with varying degrees of success, however, the density and occurrence of the species is unquantifiable due to a lack of site specific data.

The fish survey carried out during March 2005 used more robust gears and as a consequence the survey was considered to be largely successful. A total of 21 fish species were recorded from 11 trawls, although the assemblage was again dominated by small demersal and benthic species. As found in previous surveys, both within the site and in adjacent waters the short spined sea scorpion (*Taurulus bubalis*) was the domiant species which in conjunction with the whiting (*Merlangius merlangus*) represented 78% of the total fish abundance. Other key species included *Agonus cataphractus* (pogge), *Trisopterus luscus* (pouting), *Clupea harengus* (herring), *Gadus morhua* (cod), *Limanda limanda* (dab) and *Platichthys flesus* (flounder). However, such species were generally present in low numbers.

There was no evidence of juvenile flatfish abundance, either during late autumn or spring. It is likely that, given the nearshore coastal margin of the Holderness coast is considered to be a key migratory corridor for juvenile flatfish that much of this movement towards the nursery areas both within the Wash and Humber Estuary from spawning grounds to north is likely to occur within the coastal fringe.

The age and growth analysis carried out on dominant species indicate that the area is used predominantly by adolescent and maturing adults, although benthic species are present across their whole size range. For many species the nearshore coastal margins and Humber Estuary afford a greater level of protection, offer a variety of manageable prey, and function as nursery areas to many species including juvenile sole, plaice, dab, cod and whiting. The site is of no great significance to fish communities when compared to adjacent areas, and as such these fish communities reflect the density, diversity and age groups found throughout the Bridlington Bay area as a whole.

The length frequency data for lobster indicate that all size classes up to the minimum landing size (87mm) are relatively abundant within the survey area, with a comparatively even

spread within each size class. However, there is a significant decline once the minimum landing size is attained. These findings are considered as typical for the Bridlington Bay area which supports a significant commercial crustacean fishery. The lobster data are not intended to replace any site specific target assessment as trawling is not the optimal means to assess shellfish, but to support other commercial data available.

An important aspect of the fisheries ecological evaluation was the presence and or absence of fish in a spawning condition, especially herring. For the first survey (autumn 2004) no herring were recorded. Of the herring data collected during the March 2005 survey, there was no evidence of any spawning potential, although the species was recorded in low abundance. Other species investigated included whiting (*Merlangius merlangus*), pouting (*Trispoterus luscus*), cod (*Gadus morhua*), flounder (*Platichthys flesus*) and dab (*Limanda limanda*). All exhibited a very small degree of adult spawning potential, with the exception of the dab, which on the whole were sub-adults and where adult specimens were recorded, they were spent. The whiting showed a higher degree of ripe males and females than any other species, although the whiting assemblage was dominated by juvenile or sub-adult forms. The pouting and cod of a mature stage had ripe gonads (9 and 6 respectively), although the cod were considered to be of a poor quality.

Stomach analysis carried out on a range of abundant species indicates the importance of mobile epifauna, especially the crustacea. A range of species including dab, flounder, cod and whiting predate upon a range of crustacea to a greater or lesser degree. The flatfish fed predominantly of prawns and shrimp (*Pandalus montagui* and Crangonidae), whilst the gadoids (cod and whiting) fed predominantly on fish, with whiting being the dominant prey item for both species. The site therefore is important to fish in terms of availability of prey, however, the principal prey items are mobile, found throughout the general area and subject to seasonal fluctuation in terms of presence and availability.

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APPENDIX 1.

Humber Gateway 2004 Subtidal Benthic Survey Log

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	2	A	16:15	53. 42. 328	0. 12. 113	7/12/04	22.6m	No	No	Muddy sandy gravel	Yes	W2-3	Smooth
Humber wind	2	B	16:22	53. 42. 328	0. 12. 113	7/12/04	22.6m	No	No	Empty	No	W2-3	Smooth
Humber wind	2	B	16:34	53. 42. 326	0. 12. 112	7/12/04	22.4m	No	No	Large stone	No	W2-3	Smooth
Humber wind	2	B	16:46	53. 42. 328	0. 12. 113	7/12/04	22.6m	No	Yes	Muddy sandy gravel	Yes	W2-3	Smooth
Humber wind	2	C	16:55	53. 42. 328	0. 12. 113	7/12/04	22.6m	No	No	Muddy sandy gravel	Yes	W2-3	Smooth
Humber wind	1	A	17:25	53. 42. 761	0. 14.539	7/12/04	24.1m	No	No	Large stone	No	W2-3	Smooth
Humber wind	1	A	17:30	53. 42. 760	0. 14.537	7/12/04	24.2m	No	No	Large stone	No	W2-3	Smooth
Humber wind	1	A	17:34	53. 42. 761	0. 14.540	7/12/04	24.2m	No	Yes	Sandy muddy gravel	Yes	W2-3	Smooth
Humber wind	1	B	17:38	53. 42. 761	0. 14.539	7/12/04	24.2m	No	No	Sandy muddy gravel	Yes	W2-3	Smooth
Humber wind	1	C	17:45	53. 42. 761	0. 14.539	7/12/04	24.2m	No	No	Sandy muddy gravel	Yes	W2-3	Smooth
Humber wind	13	A	18:03	53. 42. 144	0. 17. 184	7/12/04	24.7m	No	No	Muddy sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	13	B	18:11	53. 42. 144	0. 17. 185	7/12/04	24.6m	No	No	Empty	No	W2-3	Smooth
Humber wind	13	B	18:22	53. 42. 143	0. 17. 184	7/12/04	24.7m	No	Yes	Muddy sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	13	C	18:30	53. 42. 144	0. 17. 184	7/12/04	24.7m	No	No	Muddy sandy gravel with cobble and clay	Yes	W2-3	Smooth
Humber wind	18	A	18:39	53. 41. 722	0. 18. 534	7/12/04	24.3m	No	Yes	Muddy sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	22	A	18:55	53. 41. 484	0. 19. 611	7/12/04	22m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	22	A	18:58	53. 41. 484	0. 19. 610	7/12/04	22m	No	No	Empty	No	W2-3	Smooth
Humber wind	22	A	19:05	53. 41. 483	0. 19. 612	7/12/04	22m	No	No	Large stone	No	W2-3	Smooth
Humber wind	22	A	19:10	53. 41. 484	0. 19. 611	7/12/04	22.1m	No	Yes	Muddy sandy gravel with cobble and clay	Yes	W2-3	Smooth
Humber wind	33	A	19:21	53. 40. 475	0. 21. 123	7/12/04	22.2m	Yes	No	Muddy sandy gravel with cobble and *Lanice* present	Yes	W2-3	Smooth
Humber wind	33	B	19:28	53. 40. 476	0. 21. 124	7/12/04	22.1m	No	No	Few cobbles and shell	No	W2-3	Smooth

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	33	B	19:35	53. 40. 476	0. 21. 123	7/12/04	22.2m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	33	C	19:40	53. 40. 476	0. 21. 124	7/12/04	22.2m	Yes	Yes	Muddy sandy gravel with cobble and shell, Barnacles present	Yes	W2-3	Smooth
Humber wind	44	A	19:52	53. 39. 155	0. 21. 197	7/12/04	26.1m	No	Yes	Muddy sandy gravel with cobble, shell and large stone	No	W2-3	Smooth
Humber wind	44	B	19:59	53. 39. 155	0. 21. 197	7/12/04	26.1m	No	Yes	Large stone	No	W2-3	Smooth
Humber wind	44	B	20:07	53. 39. 154	0. 21. 197	7/12/04	26.1m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	44	C	20:15	53. 39. 155	0. 21. 197	7/12/04	26.1m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	44	Me	20:22	53. 39. 155	0. 21. 197	7/12/04	26.1m	No	No	N/A	Yes	W2-3	Smooth
Humber wind	37	A	07:25	53. 38. 989	0. 18. 762	8/12/04	17.6m	No	Yes	Muddy sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	43	A	07:40	53. 38. 350	0. 19. 720	8/12/04	19.2m	No	Yes	Muddy sandy gravel with cobble and clay	Yes	W2-3	Smooth
Humber wind	51	A	08:01	53. 37. 333	0. 20. 103	8/12/04	29.6m	Yes	Yes	Sandy gravel with *Lanice*	Yes	W2-3	Smooth
Humber wind	53	A	08:20	53. 35. 847	0. 19. 993	8/12/04	17.6m	No	No	Empty	No	W2-3	Smooth
Humber wind	53	A	08:25	53. 35. 847	0. 19. 993	8/12/04	17.6m	No	No	Empty	No	W2-3	Smooth
Humber wind	53	A	08:38	53. 35. 847	0. 19. 993	8/12/04	17.6m	No	Yes	Muddy sandy gravel with clay	Yes	W2-3	Smooth
Humber wind	54	A	08:45	53. 34. 523	0. 19. 647	8/12/04	17.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	54	A	08:56	53. 34. 523	0. 19. 646	8/12/04	17.2m	No	Yes	Muddy sandy gravel with cobble and clay	Yes	W2-3	Smooth
Humber wind	54	B	09:03	53. 34. 523	0. 19. 646	8/12/04	17.2m	Yes	No	Muddy sandy gravel with clay, *Asterias* present	Yes	W2-3	Smooth
Humber wind	54	C	09:10	53. 34. 523	0. 19. 647	8/12/04	17.2m	No	No	Medium/Coarse Sand	No	W2-3	Smooth
Humber wind	54	C	09:15	53. 34. 522	0. 19. 646	8/12/04	17.2m	No	No	Muddy sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	54	Me	09:22	53. 34. 522	0. 19. 646	8/12/04	17.2m	No	No	N/A	Yes	W2-3	Smooth
Humber wind	52	A	09:32	53. 34. 990	0. 18. 680	8/12/04	16.4m	No	No	Empty	No	W2-3	Smooth

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	52	A	09:37	53. 34. 990	0. 18. 680	8/12/04	16.4m	No	Yes	Muddy sandy gravel with cobble and clay	Yes	W2-3	Smooth
Humber wind	50	A	09:48	53. 36. 259	0. 18. 534	8/12/04	16.4m	No	Yes	Medium - fine gravel	Yes	W2-3	Smooth
Humber wind	50	B	09:52	53. 36. 259	0. 18. 534	8/12/04	16.4m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	50	B	09:59	53. 36. 258	0. 18. 534	8/12/04	16.4m	No	No	Medium - fine gravel with cobble	Yes	W2-3	Smooth
Humber wind	50	C	10:05	53. 36. 258	0. 18. 534	8/12/04	16.4m	No	No	Empty	No	W2-3	Smooth
Humber wind	50	C	10:10	53. 36. 259	0. 18. 534	8/12/04	16.4m	No	No	Medium - fine gravel	Yes	W2-3	Smooth
Humber wind	47	A	10:22	53. 36. 593	0. 17. 622	8/12/04	18.4m	No	Yes	Coarse Sandy gravel with shell	Yes	W2-3	Smooth
Humber wind	47	B	10:34	53. 36. 593	0. 17. 622	8/12/04	18.4m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	47	B	10:39	53. 36. 593	0. 17. 622	8/12/04	18.4m	No	No	Coarse Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	47	C	10:45	53. 36. 593	0. 17. 622	8/12/04	18.4m	No	No	Coarse Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	47	Me	10:58	53. 36. 593	0. 17. 622	8/12/04	18.4m	No	No	N/A	Yes	W2-3	Smooth
Humber wind	48	A	11:17	53. 37. 390	0. 18. 853	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	11:28	53. 37. 391	0. 18. 852	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	11:31	53. 37. 389	0. 18. 851	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	11:46	53. 37. 392	0. 18. 851	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	11:52	53. 37. 378	0. 18. 601	8/12/04	20.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	12:00	53. 37. 378	0. 18. 601	8/12/04	20.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	A	12:16	53. 37. 484	0. 18. 891	8/12/04	21.8m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	48	B	12:20	53. 37. 484	0. 18. 891	8/12/04	21.8m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	B	12:27	53. 37. 484	0. 18. 890	8/12/04	21.8m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	48	C	12:36	53. 37. 484	0. 18. 890	8/12/04	21.8m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	C	12:41	53. 37. 482	0. 18. 891	8/12/04	21.8m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	48	C	12:48	53. 37. 483	0. 18. 890	8/12/04	21.8m	Yes	Yes	Muddy sandy gravel with shell	Yes	W2-3	Smooth

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	38	A	12:57	53. 39. 141	0. 19. 747	8/12/04	22m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	38	B	13:04	53. 39. 141	0. 19. 747	8/12/04	22m	No	No	Empty	No	W2-3	Smooth
Humber wind	38	B	13:11	53. 39. 142	0. 19. 745	8/12/04	22.2m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	38	C	13:17	53. 39. 142	0. 19. 745	8/12/04	22.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	38	C	13:22	53. 39. 141	0. 19. 746	8/12/04	22.4m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	32	A	13:30	53. 39. 937	0. 19. 720	8/12/04	20m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	27	A	13:37	53. 40. 649	0. 19. 246	8/12/04	24.2m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	17	A	13:46	53. 41. 040	0. 17. 458	8/12/04	26.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	17	A	13:52	53. 41. 040	0. 17. 458	8/12/04	26.2m	Yes	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	17	B	13:59	53. 41. 040	0. 17. 458	8/12/04	26.2m	Yes	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	17	C	14:05	53. 41. 040	0. 17. 458	8/12/04	26.2m	Yes	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	12	A	14:15	53. 41. 419	0. 16. 308	8/12/04	25.8m	Yes	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	11	A	14:26	53. 40. 693	0. 14. 995	8/12/04	23.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	11	A	14:30	53. 40. 693	0. 14. 995	8/12/04	23.2m	Yes	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	16	A	14:39	53. 39. 992	0. 15. 396	8/12/04	24.8m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	16	A	14:48	53. 39. 992	0. 15. 396	8/12/04	24.8m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	16	A	14:54	53. 39. 992	0. 15. 396	8/12/04	24.8m	Yes	Yes	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	21	A	15:02	53. 40. 246	0. 16. 737	8/12/04	24.8m	No	No	Jaws jammed	No	W2-3	Smooth

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	21	A	15:05	53. 40. 246	0. 16. 737	8/12/04	24.8m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	21	B	15:12	53. 40. 246	0. 16. 737	8/12/04	24.8m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	21	C	15:17	53. 40. 246	0. 16. 737	8/12/04	24.8m	No	No	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	23	A	15:30	53. 40. 410	0. 17. 987	8/12/04	23.8m	No	Yes	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	29	A	15:44	53. 39. 710	0. 18. 443	8/12/04	23.7m	No	Yes	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	29	B	15:56	53. 39. 710	0. 18. 443	8/12/04	23.7m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	29	B	16:05	53. 39. 710	0. 18. 443	8/12/04	23.7m	Yes	No	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	29	C	16:12	53. 39. 710	0. 18. 443	8/12/04	23.7m	Yes	No	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	29	Me	16:20	53. 39. 710	0. 18. 443	8/12/04	23.7m	No	No	N/A	No	W2-3	Smooth
Humber wind	26	A	16:30	53. 39. 444	0. 17. 056	8/12/04	22.2m	Yes	Yes	Muddy sandy gravel with cobble and shell and large stones	Yes	W2-3	Smooth
Humber wind	24	A	16:37	53. 39. 206	0. 15. 734	8/12/04	23.2m	No	No	Empty	No	W2-3	Smooth
Humber wind	24	A	16:44	53. 39. 206	0. 15. 734	8/12/04	23.2m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	28	A	16:55	53. 38. 474	0. 16. 108	8/12/04	22.8m	No	Yes	Sandy gravel with cobble and high amount of shell	Yes	W2-3	Smooth
Humber wind	28	B	16:59	53. 38. 474	0. 16. 108	8/12/04	22.8m	No	No	Empty	No	W2-3	Smooth
Humber wind	28	B	17:05	53. 38. 474	0. 16. 108	8/12/04	22.8m	No	No	Sandy gravel with cobble and high amount of shell	Yes	W2-3	Smooth
Humber wind	28	C	17:12	53. 38. 474	0. 16. 108	8/12/04	22.8m	No	No	Sandy gravel with cobble and high amount of shell	Yes	W2-3	Smooth

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	28	Me	17:17	53. 38. 474	0. 16. 108	8/12/04	22.8m	No	No	N/A	Yes	W2-3	Smooth
Humber wind	31	A	17:22	53. 38. 713	0. 17. 394	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	31	A	17:30	53. 38. 713	0. 17. 394	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	31	A	17:35	53. 38. 712	0. 17. 391	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	31	A	17:42	53. 38. 712	0. 17. 392	8/12/04	21.6m	No	Yes	Too small amount of sediment	No	W2-3	Smooth
Humber wind	31	A	17:51	53. 38. 711	0. 17. 389	8/12/04	21.6m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	Data buoy	A	18:07	53. 38. 785	0. 17. 952	8/12/04	21.2m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	Data buoy	B	18:15	53. 38. 785	0. 17. 952	8/12/04	21.2m	No	Yes	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	Data buoy	C	18:21	53. 38. 785	0. 17. 952	8/12/04	21.2m	No	No	Jaws jammed	No	W2-3	Smooth
Humber wind	Data buoy	C	18:32	53. 38. 785	0. 17. 952	8/12/04	21.2m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	40	A	18:49	53. 38. 046	0. 18. 178	8/12/04	19.4m	No	Yes	Muddy sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	36	A	18:58	53. 37. 753	0. 16. 929	8/12/04	20.6m	No	Yes	Sandy gravel with cobble	Yes	W2-3	Smooth
Humber wind	42	A	19:10	53. 36. 973	0. 17. 129	8/12/04	18.3m	No	No	Strong tide run	No	W2-3	Smooth
Humber wind	42	A	19:17	53. 36. 973	0. 17. 129	8/12/04	18.3m	No	No	Strong tide run	No	W2-3	Smooth
Humber wind	42	A	19:24	53. 36. 973	0. 17. 129	8/12/04	18.3m	No	No	Strong tide run	No	W2-3	Smooth
Humber wind	42	A	19:32	53. 36. 973	0. 17. 129	8/12/04	18.3m	Yes	Yes	Sandy gravel with large cobble and shell, *Lanice* and *Cancer* present	Yes	W2-3	Smooth
Humber wind	42	B	19:43	53. 36. 973	0. 17. 129	8/12/04	18.3m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	42	C	19:45	53. 36. 973	0. 17. 129	8/12/04	18.3m	No	No	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Humber wind	45	A	20:00	53. 36. 300	0. 16. 655	8/12/04	18.4m	No	Yes	Sandy gravel with cobble and shell	Yes	W2-3	Smooth
Station	**Site**	**Rep**	**Time**	**North**	**East**	**Date**	**Sea Bed Depth (M)**	**Mobile Epifauna**	**PSA**	**Sediment**	**Successful grab**	**Wind**	**Sea state**

Humber wind	46	A	20:17	53. 35. 779	0. 16. 454	8/12/04	20m	Yes	Yes	Sandy gravel with cobble and shell, *Lanice* present	Yes	W2-3	Smooth
Humber wind	46	B	20:22	53. 35. 779	0. 16. 454	8/12/04	20m	Yes	No	Sandy gravel with cobble and shell, *Lanice* present	Yes	W2-3	Smooth
Humber wind	46	C	20:35	53. 35. 779	0. 16. 454	8/12/04	20m	Yes	No	Sandy gravel with cobble and shell, *Sabellaria spinulosa* present	Yes	W2-3	Smooth
Humber wind	49	A	07:32	53. 35. 120	0. 16. 892	9/12/04	20.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	49	A	07:37	53. 35. 120	0. 16. 892	9/12/04	20.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	49	A	07:45	53. 35. 119	0. 16. 892	9/12/04	20.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	49	A	07:56	53. 35. 119	0. 16. 890	9/12/04	20.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	49	A	08:03	53. 35. 120	0. 16. 891	9/12/04	20.2m	No	Yes	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	41	A	08:23	53. 35. 523	0. 14. 450	9/12/04	19.4m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	41	A	08:33	53. 35. 523	0. 14. 450	9/12/04	19.4m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	41	A	08:37	53. 35. 523	0. 14. 450	9/12/04	19.4m	No	Yes	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	34	A	08:45	53. 36. 162	0. 13. 353	9/12/04	18m	Yes	Yes	Sandy gravel with cobble and shell, *Sabellaria spinulosa* present	Yes	SSE 2	Slight
Humber wind	34	B	08:51	53. 36. 162	0. 13. 353	9/12/04	18m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	34	B	08:55	53. 36. 162	0. 13. 353	9/12/04	18m	Yes	No	Sandy gravel with cobble and shell, *Sabellaria spinulosa* present	Yes	SSE 2	Slight
Humber wind	34	C	09:05	53. 36. 162	0. 13. 353	9/12/04	18m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	34	C	09:09	53. 36. 162	0. 13. 353	9/12/04	18m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	34	C	09:14	53. 36. 161	0. 13. 351	9/12/04	18m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	34	C	09:18	53. 36. 162	0. 13. 353	9/12/04	18m	Yes	No	Sandy gravel with cobble and shell, *Sabellaria spinulosa* present	Yes	SSE 2	Slight

Station	**Site**	**Rep**	**Time**	**North**	**East**	**Date**	**Sea Bed Depth (M)**	**Mobile Epifauna**	**PSA**	**Sediment**	**Successful grab**	**Wind**	**Sea state**

Station	Site	Rep	Time	North	East	Date	Sea Bed Depth (M)	Mobile Epifauna	PSA	Sediment	Successful grab	Wind	Sea state
Humber wind	39	A	09:25	53. 36. 406	0. 15. 385	9/12/04	18.2m	No	No	Empty	No	SSE 2	Slight
Humber wind	39	A	09:30	53. 36. 406	0. 15. 385	9/12/04	18.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	39	A	09:34	53. 36. 406	0. 15. 385	9/12/04	18.2m	Yes	Yes	Muddy sandy gravel with cobble and shell, *Sabellaria spinulosa* present	Yes	SSE 2	Slight
Humber wind	35	A	09:40	53. 36. 889	0. 14. 393	9/12/04	18m	No	No	Empty	No	SSE 2	Slight
Humber wind	35	A	09:44	53. 36. 889	0. 14. 393	9/12/04	18m	Yes	Yes	Muddy sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	30	A	09:54	53. 37. 621	0. 14. 972	9/12/04	19m	No	Yes	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	30	B	09:59	53. 37. 621	0. 14. 972	9/12/04	19m	No	No	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	30	C	10:06	53. 37. 621	0. 14. 972	9/12/04	19m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	30	C	10:14	53. 37. 621	0. 14. 972	9/12/04	19m	Yes	No	Sandy gravel with cobble and shell, *Sabellaria spinulosa* and Mytilus present	Yes	SSE 2	Slight
Humber wind	20	A	10:23	53. 38. 716	0. 13. 735	9/12/04	19.2m	Yes	Yes	Sandy gravel with cobble and shell, Mytilus present, slight anoxic layer	Yes	SSE 2	Slight
Humber wind	15	A	10:35	53. 39. 604	0. 14. 276	9/12/04	20m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	15	A	10:41	53. 39. 604	0. 14. 276	9/12/04	20m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	15	A	10:48	53. 39. 604	0. 14. 276	9/12/04	20m	Yes	Yes	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	10	A	10:55	53. 39. 848	0. 13. 244	9/12/04	19m	No	No	Empty	No	SSE 2	Slight
Humber wind	10	A	11:02	53. 39. 848	0. 13. 244	9/12/04	19m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	10	A	11:09	53. 39. 848	0. 13. 244	9/12/04	19.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	10	A	11:15	53. 39. 848	0. 13. 244	9/12/04	19.2m	No	No	Empty	No	SSE 2	Slight

Humber wind	10	A	11:15	53. 39. 848	0. 13. 244	9/12/04	19.2m	No	No	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	10	B	11:21	53. 39. 848	0. 13. 244	9/12/04	19.2m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	10	B	11:26	53. 39. 848	0. 13. 244	9/12/04	19m	No	No	Empty	No	SSE 2	Slight
Humber wind	10	B	11:34	53. 39. 848	0. 13. 244	9/12/04	19.1m	No	Yes	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	10	C	11:40	53. 39. 848	0. 13. 244	9/12/04	19.3m	No	No	Empty	No	SSE 2	Slight
Humber wind	10	C	11:44	53. 39. 848	0. 13. 244	9/12/04	19.3m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	10	C	11:48	53. 39. 848	0. 13. 244	9/12/04	19.2m	No	No	Empty	No	SSE 2	Slight
Humber wind	10	C	11:57	53. 39. 848	0. 13. 244	9/12/04	19.2m	Yes	No	Sandy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	5	A	11:47	53. 40. 401	0. 11. 766	9/12/04	18.6m	No	Yes	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	3	A	12:02	53. 40. 306	0. 9. 941	9/12/04	19.6m	No	No	Empty	No	SSE 2	Slight
Humber wind	3	A	12:10	53. 40. 306	0. 9. 941	9/12/04	19.6m	Yes	Yes	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	3	B	12:15	53. 40. 306	0. 9. 941	9/12/04	19.6m	No	No	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	3	C	12:22	53. 40. 306	0. 9. 941	9/12/04	19.6m	No	No	Empty	No	SSE 2	Slight
Humber wind	3	C	12:29	53. 40. 306	0. 9. 941	9/12/04	19.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	3	C	12:35	53. 40. 306	0. 9. 941	9/12/04	19.6m	No	No	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	8	A	12:54	53. 39. 426	0. 10. 672	9/12/04	20m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	8	A	13:04	53. 39. 426	0. 10. 672	9/12/04	20m	No	Yes	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	7	A	13:25	53. 38. 945	0. 10. 619	9/12/04	21.4m	No	Yes	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	6	A	13:41	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	6	A	13:45	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	6	A	13:50	53. 38. 667	0. 9. 760	9/12/04	20.6m	Yes	Yes	Sandy muddy gravel with cobble and shell, *Flustra* present	Yes	SSE 2	Slight
Humber wind	6	B	13:56	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Station	**Site**	**Rep**	**Time**	**North**	**East**	**Date**	**Sea Bed Depth (M)**	**Mobile Epifauna**	**PSA**	**Sediment**	**Successful grab**	**Wind**	**Sea state**
Humber wind	6	C	14:04	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight

Humber wind	6	C	14:11	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	6	C	14:18	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	6	C	14:27	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	6	C	14:32	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	Empty	No	SSE 2	Slight
Humber wind	6	C	14:32	53. 38. 667	0. 9. 760	9/12/04	20.6m	No	No	No Sample collected	No	SSE 2	Slight
Humber wind	4	A	14:45	53. 38. 873	0. 8. 610	9/12/04	16.8m	No	Yes	Sandy muddy gravel with cobble	Yes	SSE 2	Slight
Humber wind	14	A	15:10	53. 37. 801	0. 10. 564	9/12/04	20m	No	No	Empty	No	SSE 2	Slight
Humber wind	14	A	15:15	53. 37. 799	0. 10. 562	9/12/04	20m	No	No	Empty	No	SSE 2	Slight
Humber wind	14	A	15:19	53. 37. 801	0. 10. 561	9/12/04	20m	No	No	Thin cl;ay scrape	No	SSE 2	Slight
Humber wind	14	A	15:27	53. 37. 800	0. 10. 560	9/12/04	20m	No	No	Thin clay scrape	No	SSE 2	Slight
Humber wind	14	A	15:34	53. 37. 798	0. 10. 567	9/12/04	20.1m	No	Yes	Sandy muddy gravel with cobble and clay scrape	Yes	SSE 2	Slight
Humber wind	25	A	15:52	53. 37. 160	0. 11. 675	9/12/04	21m	No	No	Sandy muddy gravel with cobble	Yes	SSE 2	Slight
Humber wind	25	B	15:59	53. 37. 160	0. 11. 675	9/12/04	21m	Yes	No	Sandy muddy gravel with cobble and shell, *Sabellaria spinulosa* and *Flustra* present	Yes	SSE 2	Slight
Humber wind	25	C	16:07	53. 37. 160	0. 11. 675	9/12/04	21m	No	No	Empty	No	SSE 2	Slight
Humber wind	25	C	16:18	53. 37. 158	0. 11. 674	9/12/04	21m	No	No	Empty	No	SSE 2	Slight
Humber wind	25	C	16:26	53. 37. 161	0. 11. 676	9/12/04	21m	Yes	Yes	Sandy muddy gravel with cobble, *Sabellaria spinulosa*, *Cancer* and *Flustra* present	Yes	SSE 2	Slight
Humber wind	19	A	17:11	53. 38. 139	0. 12. 443	9/12/04	23m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	19	A	17:19	53. 38. 139	0. 12. 443	9/12/04	23m	No	Yes	Sandy muddy gravel with cobble and clay scrape	Yes	SSE 2	Slight
Humber wind	9	A	17:36	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	Yes	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	9	B	17:45	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Empty	No	SSE 2	Slight
Station	**Site**	**Rep**	**Time**	**North**	**East**	**Date**	**Sea Bed Depth (M)**	**Mobile Epifauna**	**PSA**	**Sediment**	**Successful grab**	**Wind**	**Sea state**
Humber wind	9	B	17:54	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Empty	No	SSE 2	Slight

Humber wind	9	B	17:58	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:05	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Empty	No	SSE 2	Slight
Humber wind	9	B	18:12	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:20	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:25	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:33	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:39	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Empty	No	SSE 2	Slight
Humber wind	9	B	18:44	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:52	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Jaws jammed	No	SSE 2	Slight
Humber wind	9	B	18:56	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Sandy muddy gravel with cobble and shell	Yes	SSE 2	Slight
Humber wind	9	C	19:04	53. 39. 242	0. 12. 166	9/12/04	22.6m	No	No	Sandy muddy gravel with large stones, cobble and shell	Yes	SSE 2	Slight

APPENDIX 2. SEDIMENT PARTICLE SIZE DISTRIBUTION.

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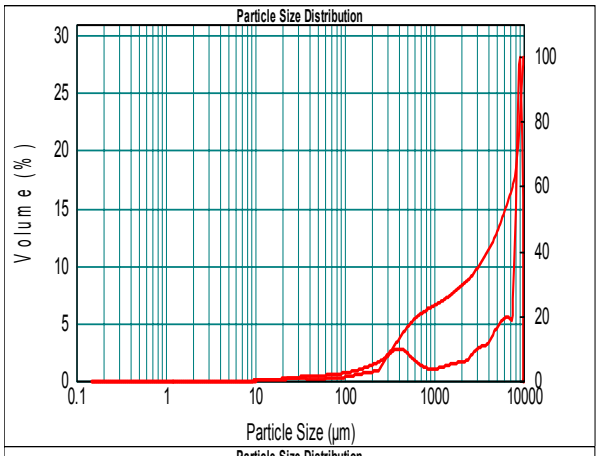

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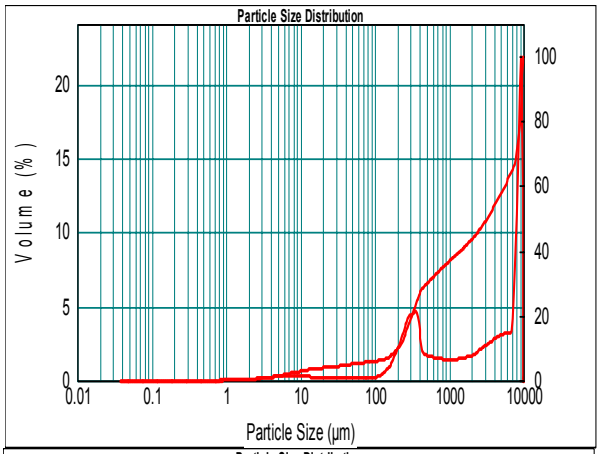

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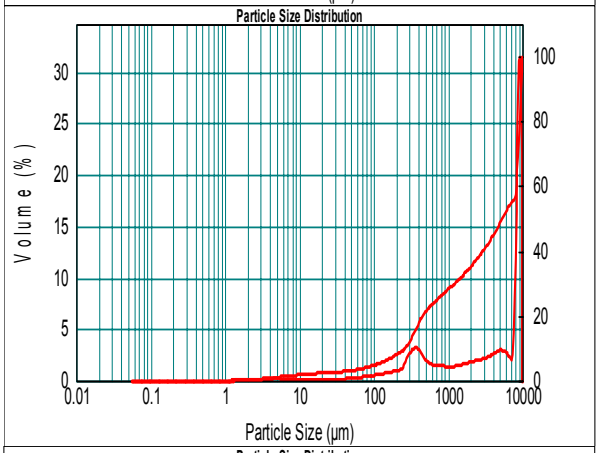

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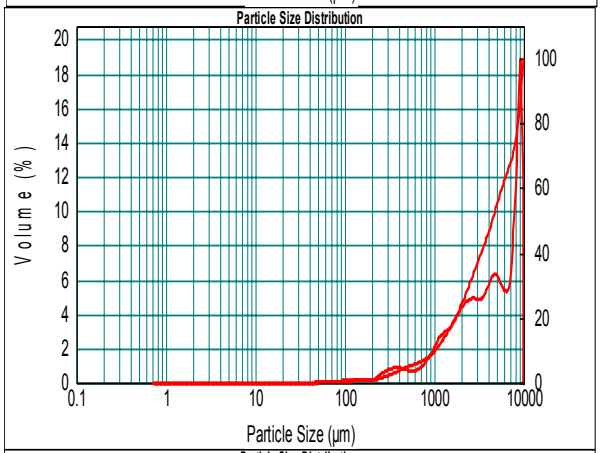

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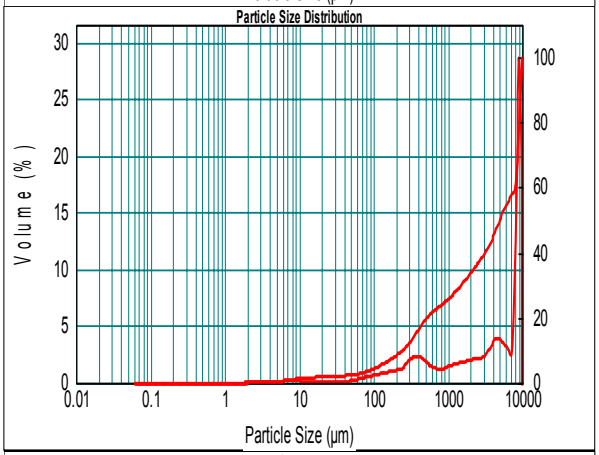

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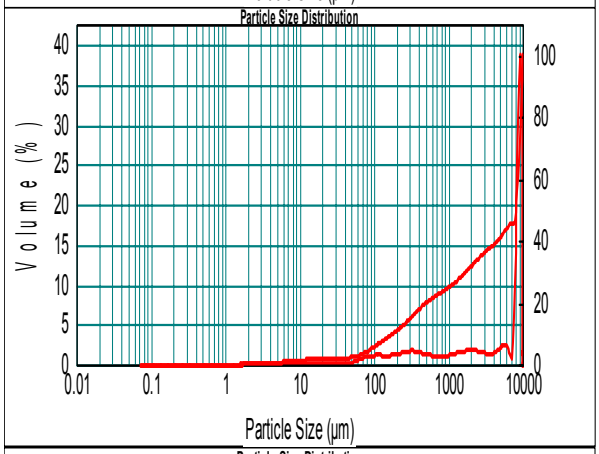

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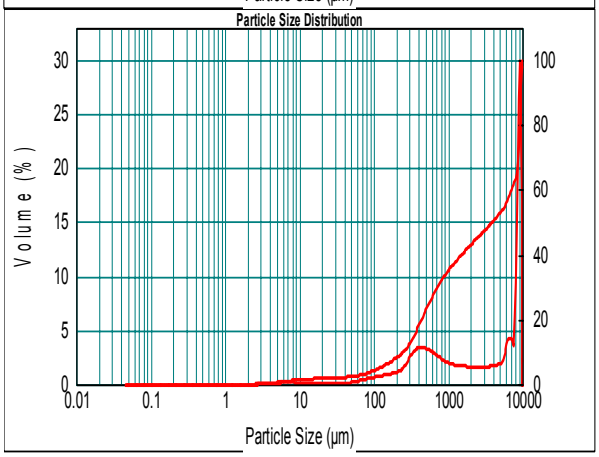

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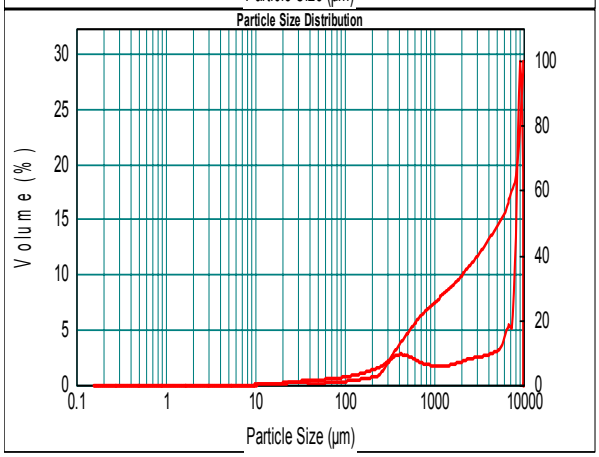

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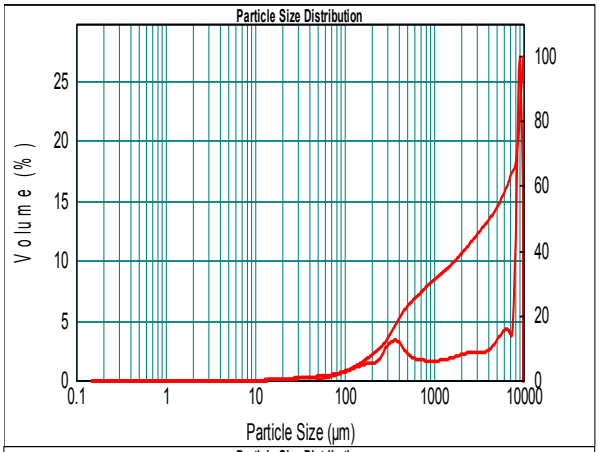

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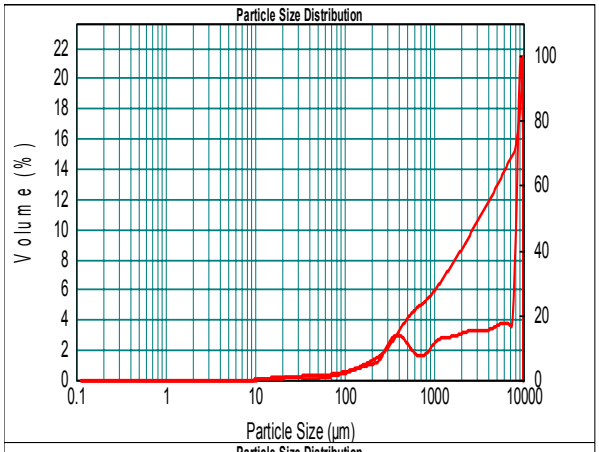

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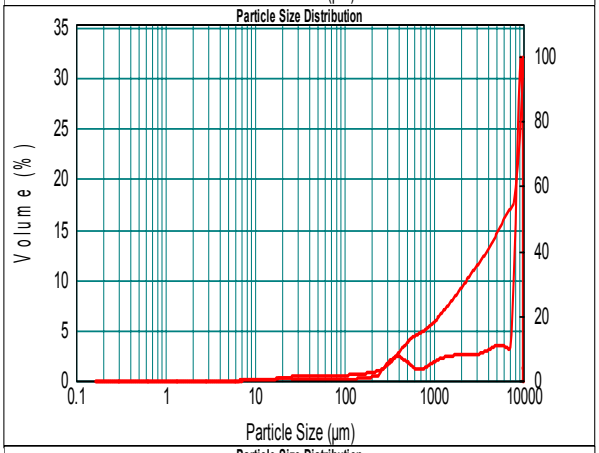

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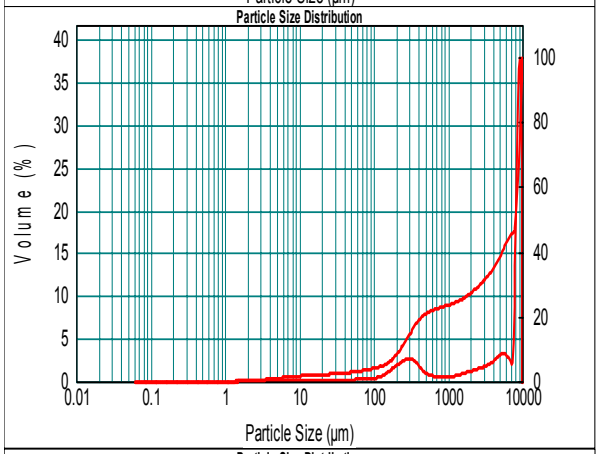

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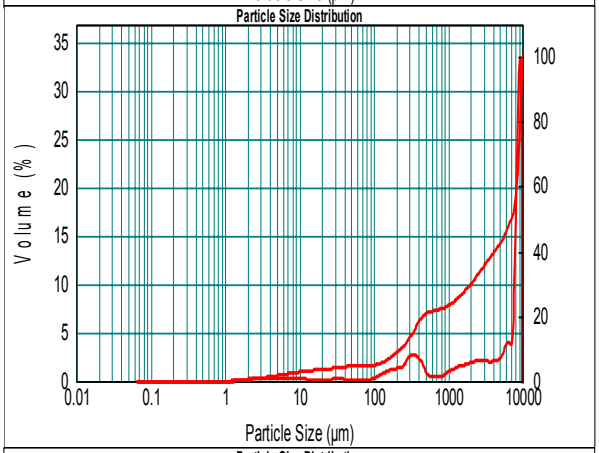

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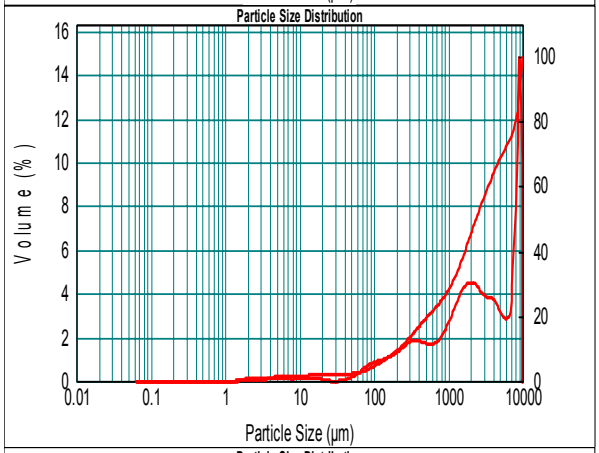

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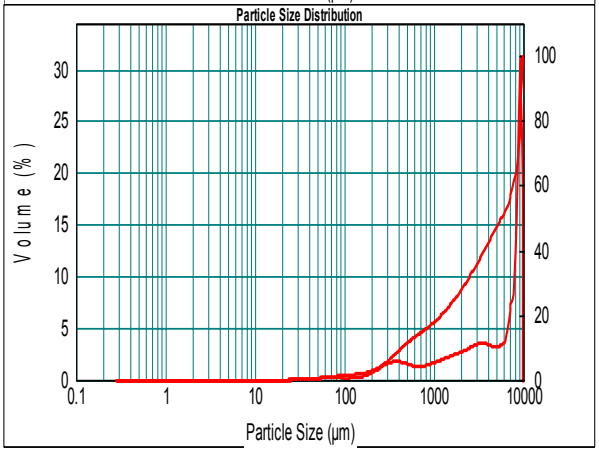

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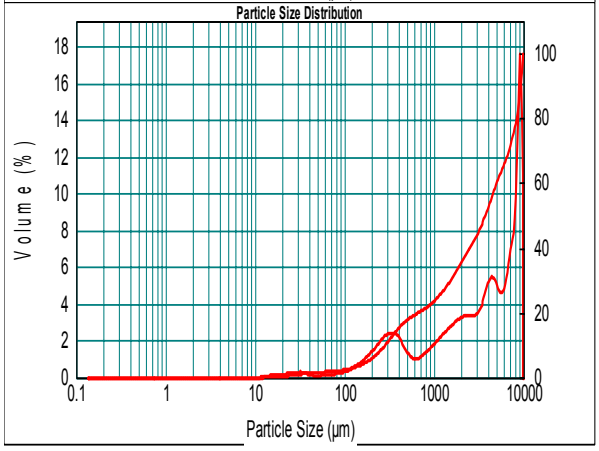

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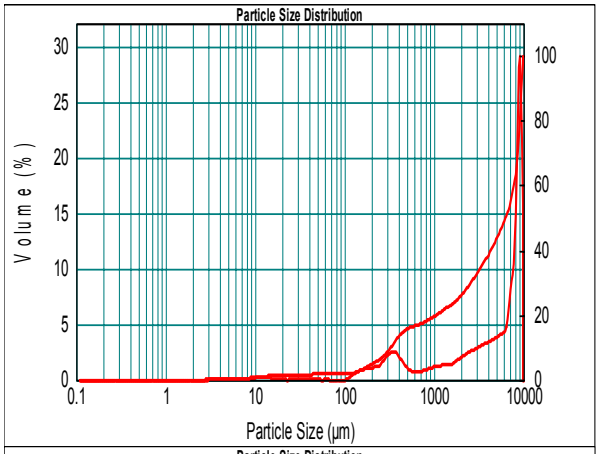

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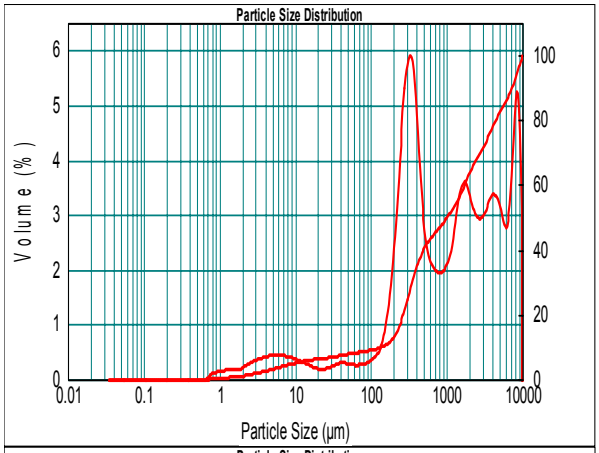

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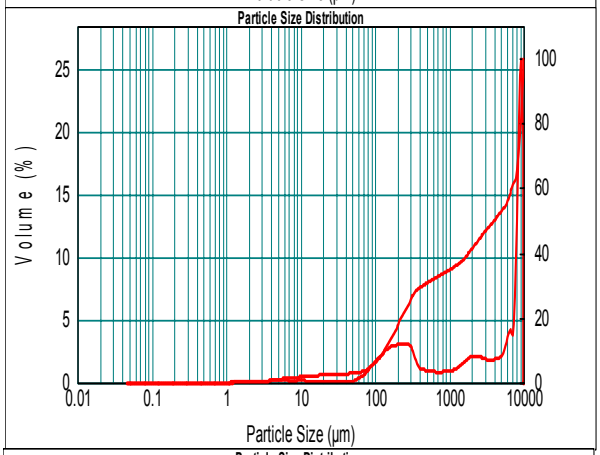

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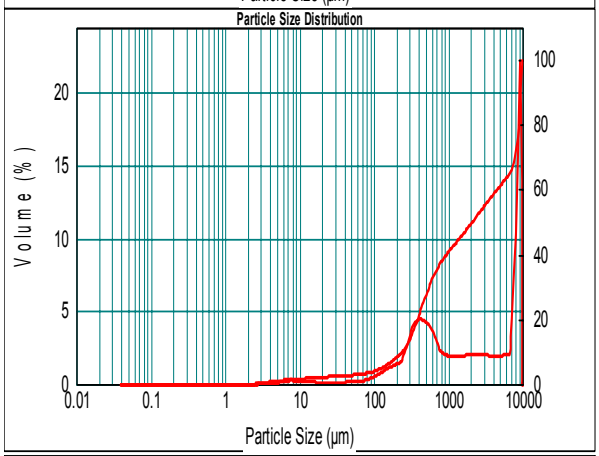

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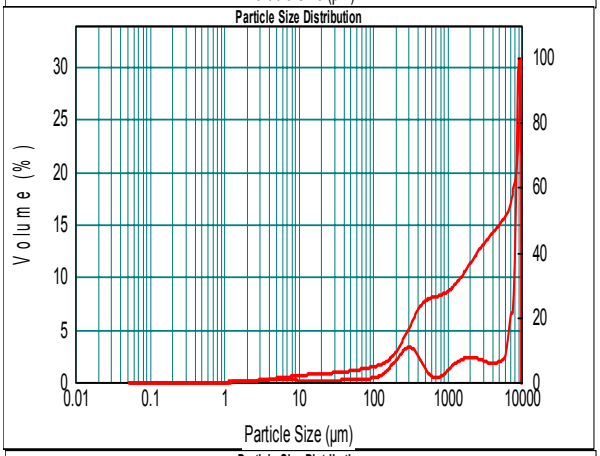

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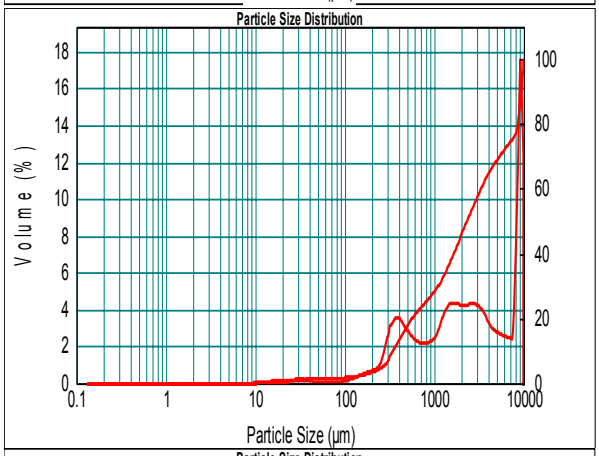

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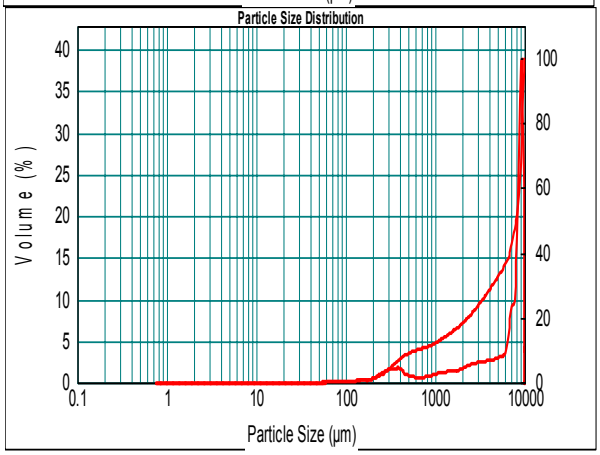

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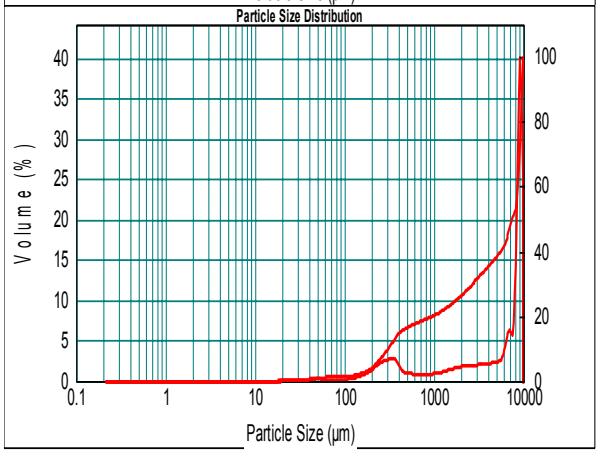

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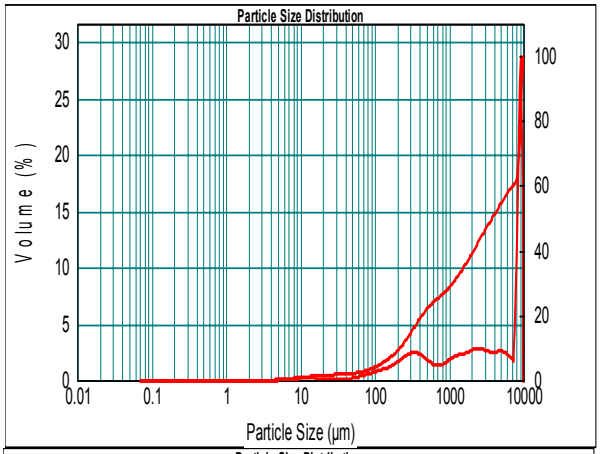

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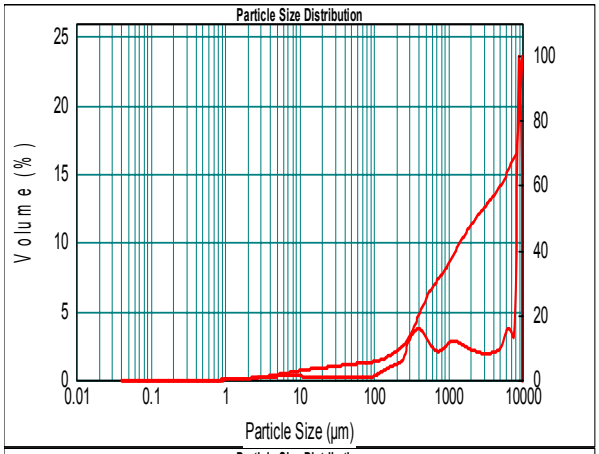

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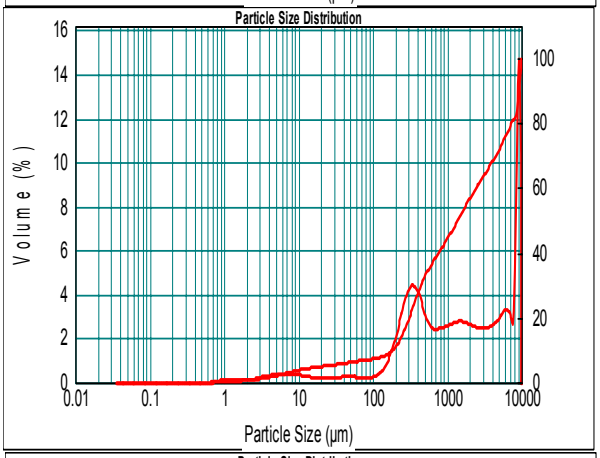

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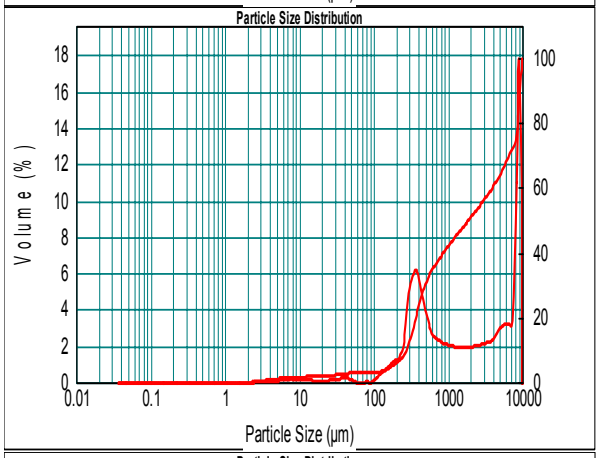

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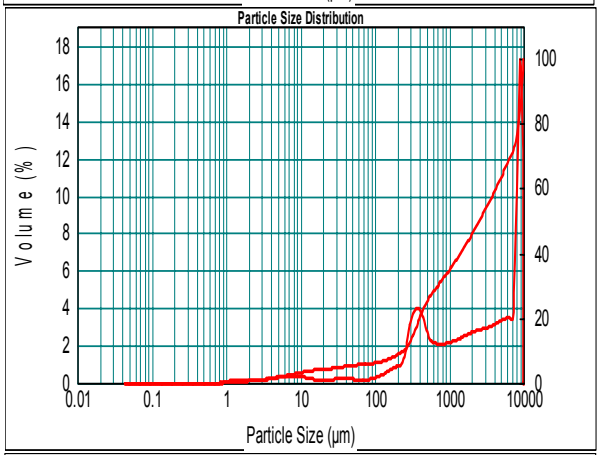

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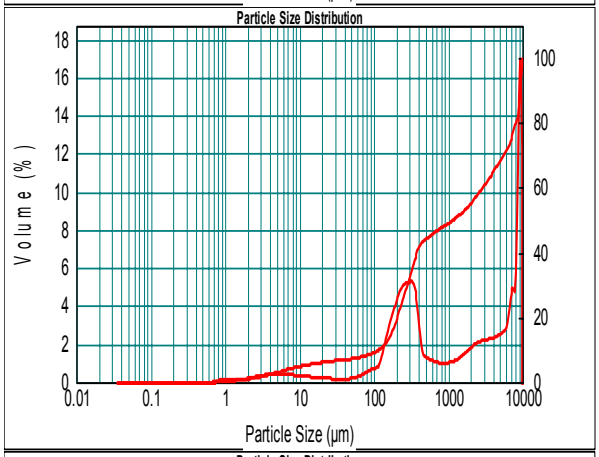

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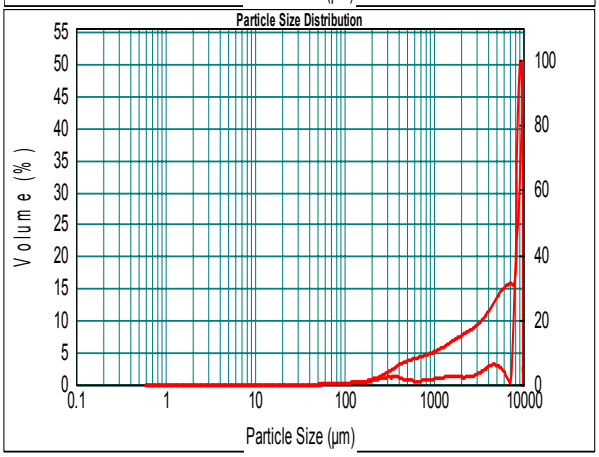

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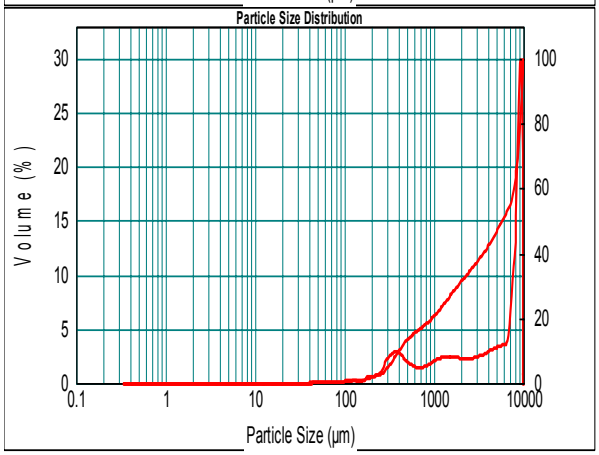

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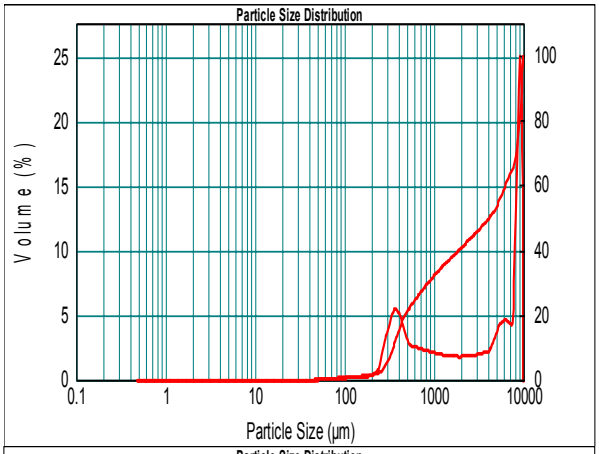

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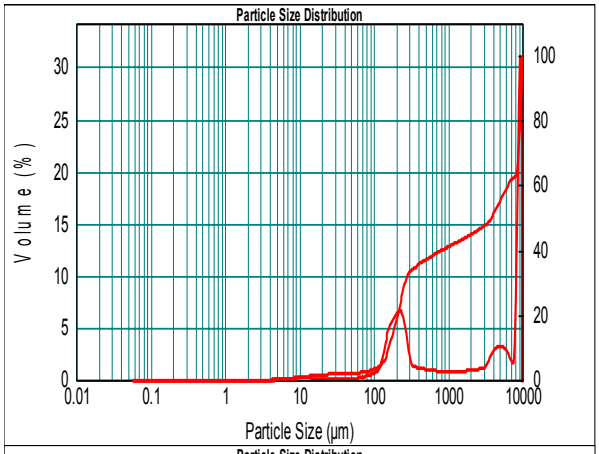

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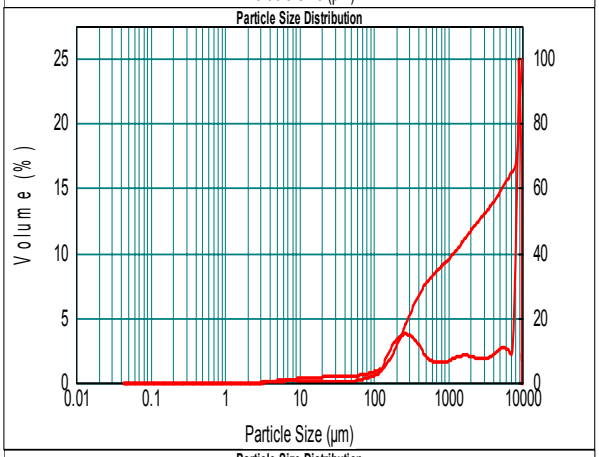

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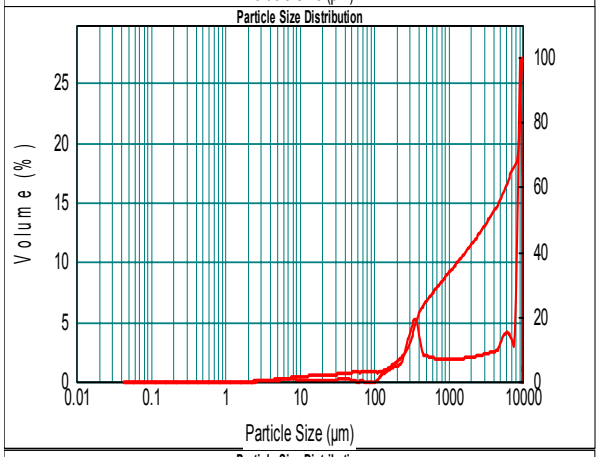

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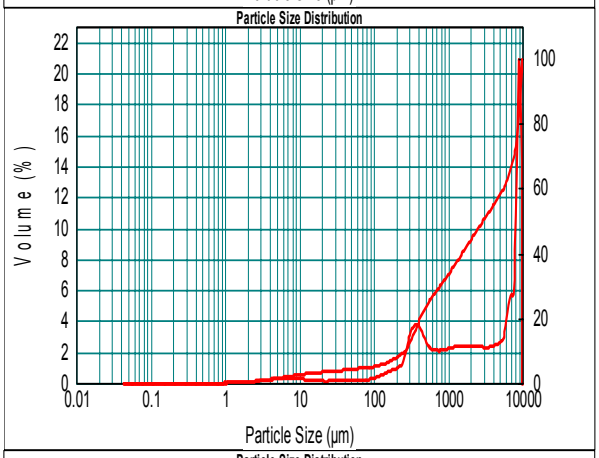

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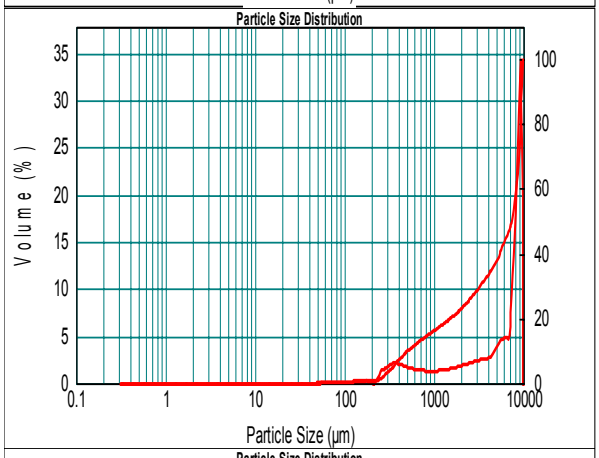

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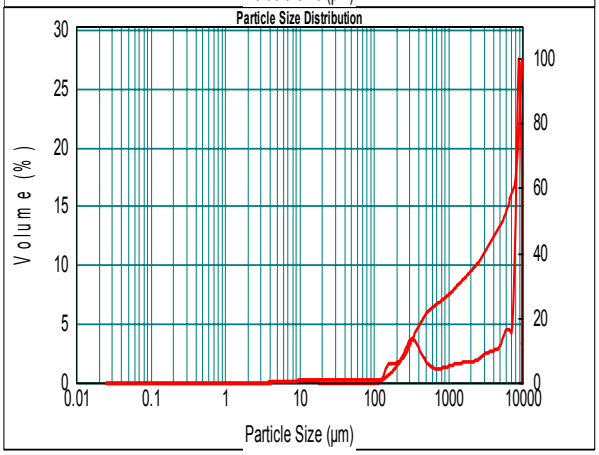

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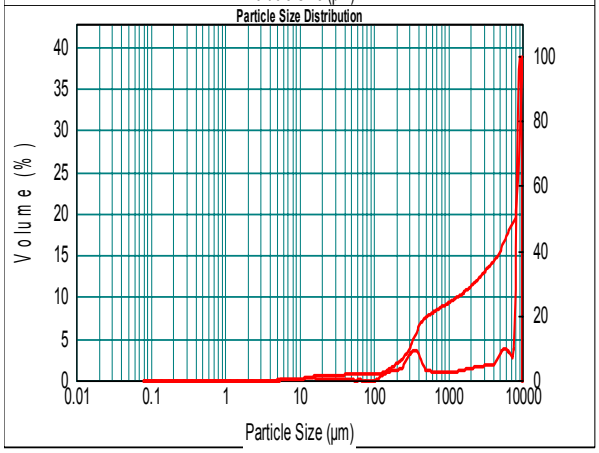

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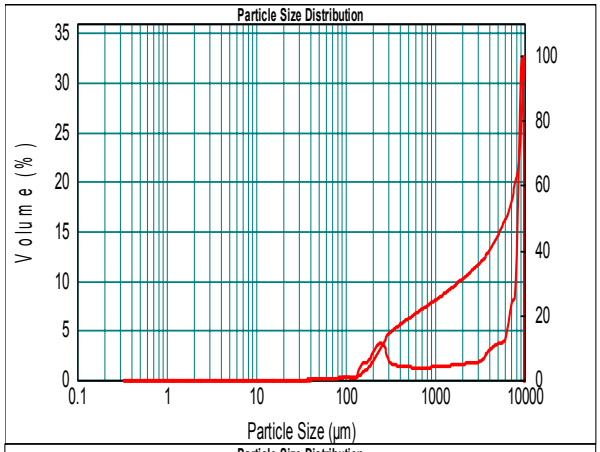

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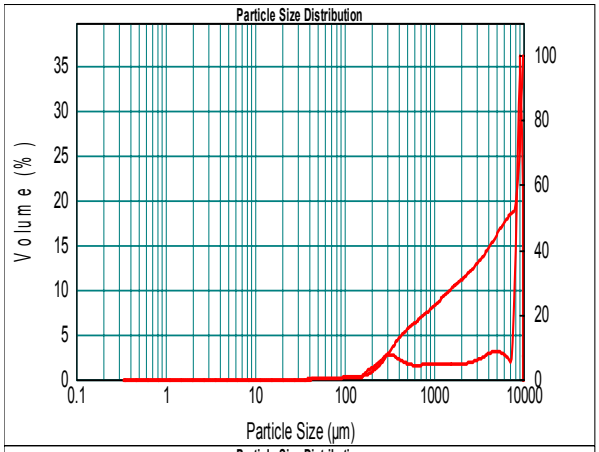

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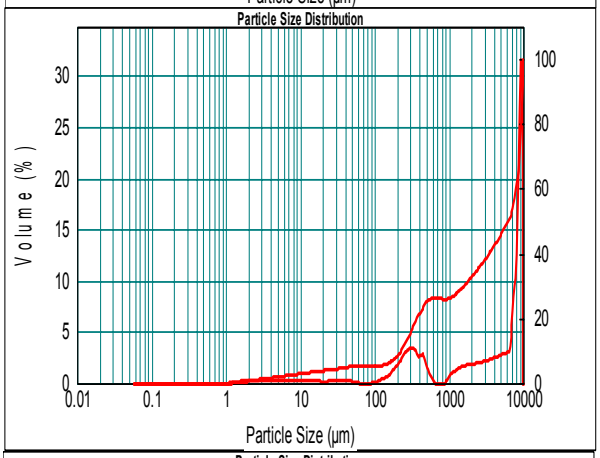

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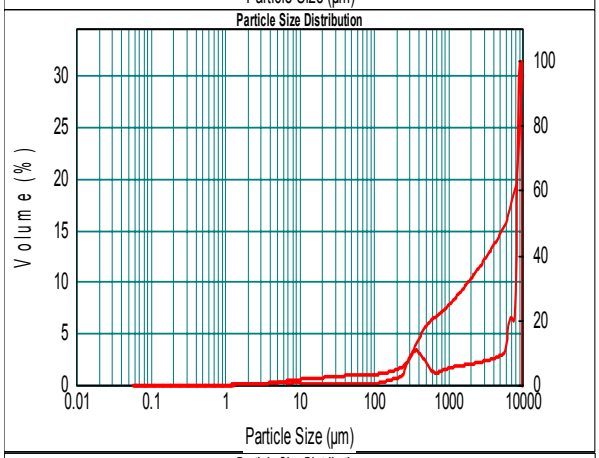

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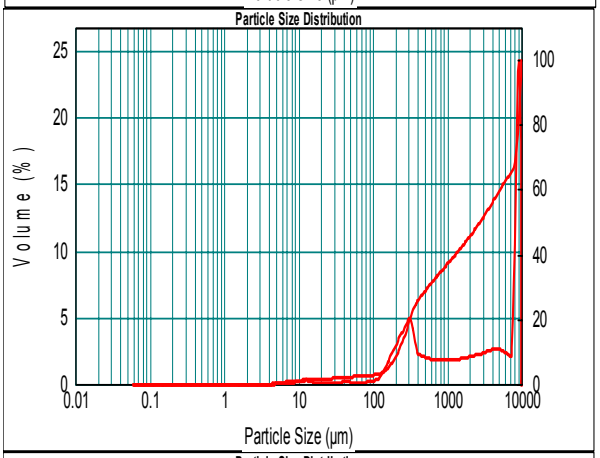

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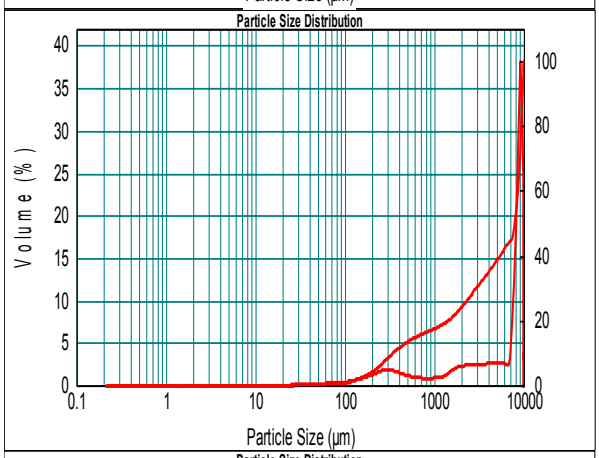

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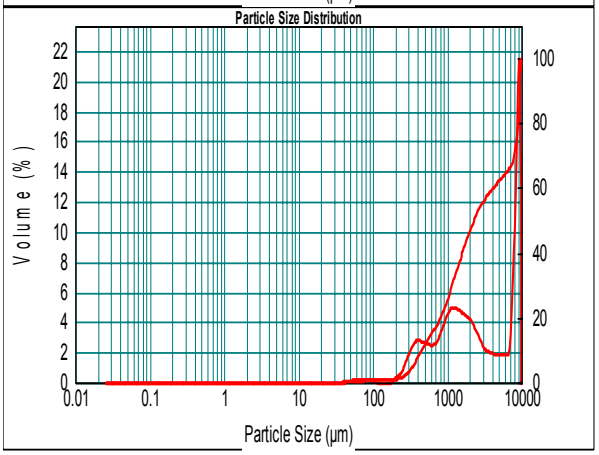

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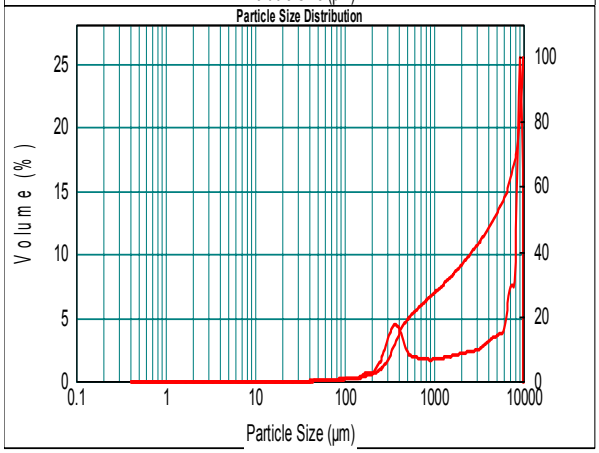

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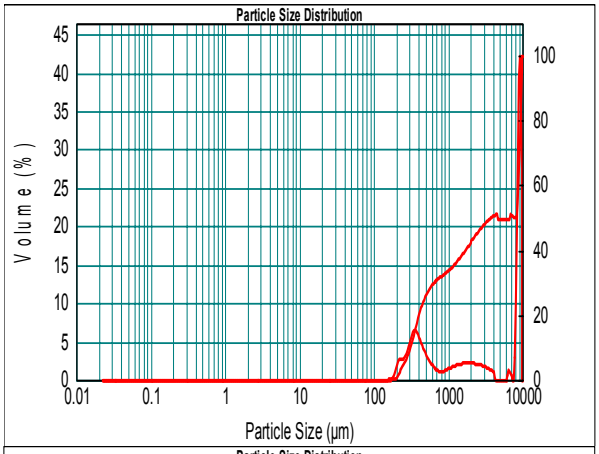

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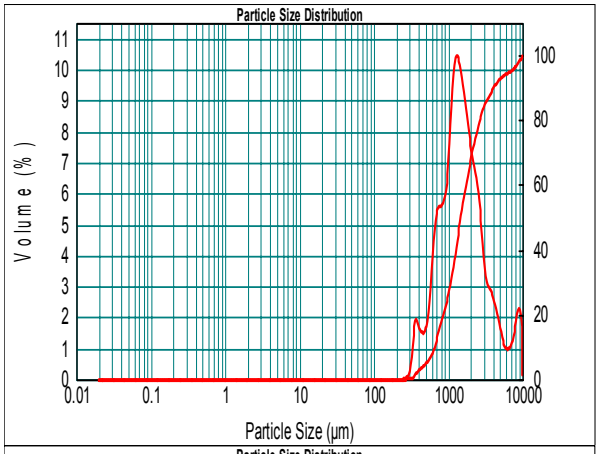

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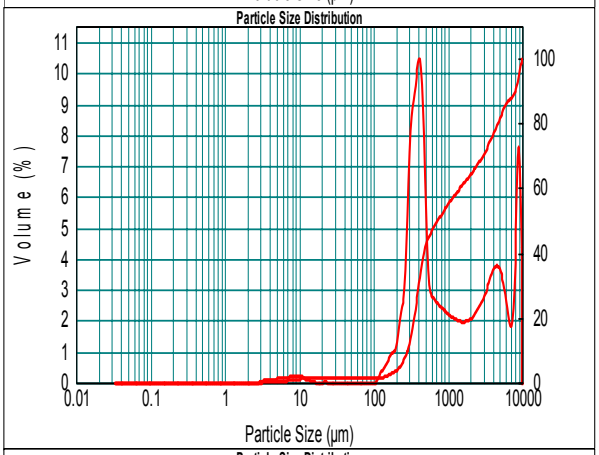

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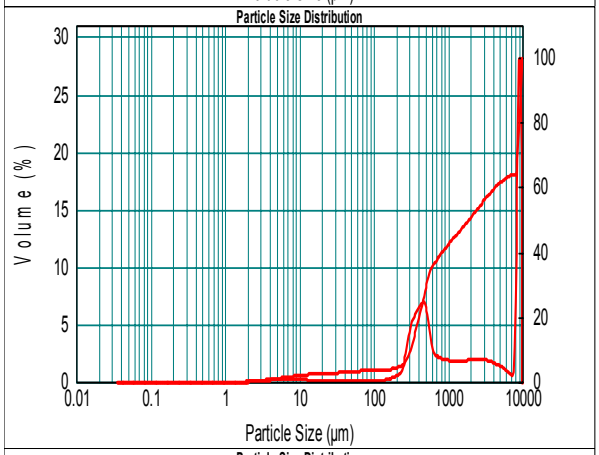

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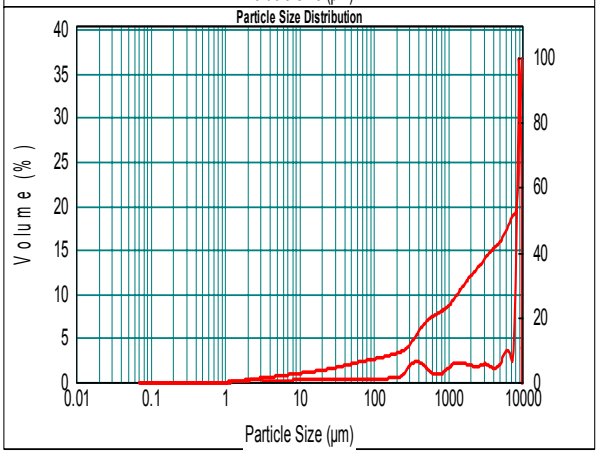

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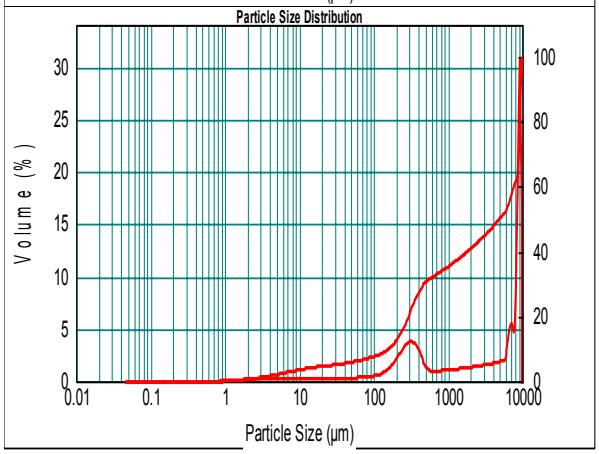

APPENDIX 3. DOMINANT SPECIES IN EACH CLUSTER RANKED BY MEAN ABUNDANCE

Group 1	A	% Dom	Cum %
Chone filicaudata	3	30	30
Glycera lapidum	2	20	50
Copepoda	2	20	70
Nematoda	1	10	80
Leptocheirus hirsutimanus	1	10	90
Sphaerosyllis bulbosa	1	10	100
Total A	**10**		
Total S	**6**		

Group 3	Mean A	% Dom	Cum %
Mediomastus fragilis	11.0	20.8	20.8
Chone filicaudata	9.0	17.0	37.7
Spio armata	8.0	15.1	52.8
Nematoda	6.0	11.3	64.2
Polycirrus norvegicus	5.0	9.4	73.6
Protodorvillea kefersteinia	3.0	5.7	79.2
Sphaerosyllis hystrix	3.0	5.7	84.9
Hiatella arctica	2.0	3.8	88.7
Gibbula tumida	1.0	1.9	90.6
Heteranomia squamula	1.0	1.9	92.5
Lepidonotus squamatus	1.0	1.9	94.3
Caulleriella alata	1.0	1.9	96.2
Scalibregma celticum	1.0	1.9	98.1
Gibbula cineraria	1.0	1.9	100.0
Total A	**53.0**		
Total S	**14.0**		

Group 2	A	% Dom	Cum %
Sphaerosyllis bulbosa	5.8	21.7	21.7
Nematoda	3.6	13.3	35.0
Leptocheirus hirsutimanus	2.9	10.8	45.8
Eumida sanguinea	2.0	7.5	53.3
Sphaerosyllis hystrix	2.0	7.5	60.8
Juv. *Leptocheirus* sp.	1.4	5.4	66.2
Mytilus edulis	1.2	4.6	70.8
Glycera lapidum	0.9	3.3	74.2
Polycirrus norvegicus	0.9	3.3	77.5
Hiatella arctica	0.6	2.1	79.6
Gibbula cineraria	0.6	2.1	81.7
Polycirrus sp.	0.4	1.7	83.3
Phoronis sp.	0.4	1.7	85.0
Nemertea	0.4	1.7	86.7
Pisidia longicornis	0.3	1.2	87.9
Mediomastus fragilis	0.3	1.2	89.2
Galathea intermedia	0.3	1.2	90.4
Spio armata	0.3	1.2	91.7
Pomatoceros lamarcki	0.3	1.2	92.9
Gibbula tumida	0.3	1.2	94.2
Cheirocratus sp.	0.3	1.2	95.4
Amphipholis squamata	0.2	0.8	96.2
Musculus discors	0.2	0.8	97.1
Copepoda	0.2	0.8	97.9
Juv. *Harmothoe* sp.	0.1	0.4	98.3
Pholoe balthica	0.1	0.4	98.7
Chone filicaudata	0.1	0.4	99.2
Typosyllis armillaris	0.1	0.4	99.6
Ophiopholis aculeata	0.1	0.4	100.0
Total A	**26.7**		
Total S	**29.0**		

Appendix 3 (cont.).

Group 4	A	% Dom	Cum %
Sabellaria alveolata	107.2	54.8	54.8
Sabellaria spinulosa	11.6	5.9	60.8
Hiatella arctica	8.2	4.2	65.0
Mytilus edulis	6.1	3.1	68.1
Pisidia longicornis	5.6	2.9	70.9
Pomatoceros lamarcki	4.8	2.4	73.4
Mediomastus fragilis	4.7	2.4	75.8
Nematoda	4.4	2.3	78.1
Lepidonotus squamatus	4.1	2.1	80.2
Protodorvillea kefersteinia	4.0	2.0	82.2
Polydora caeca	3.0	1.5	83.7
Spio armata	2.9	1.5	85.2
Pholoe balthica	2.7	1.4	86.6
Typosyllis sp. B (Striped)	2.3	1.2	87.7
Galathea intermedia	1.9	1.0	88.7
Leptocheirus hirsutimanus	1.9	0.9	89.7
Juv. *Harmothoe* sp.	1.7	0.9	90.5
Salmacina dysteri	1.6	0.8	91.3
Sphaerosyllis hystrix	1.5	0.8	92.1
Polycirrus norvegicus	1.4	0.7	92.9
Achelia echinata	1.4	0.7	93.6
Heteranomia squamula	1.3	0.6	94.2
Caulleriella alata	1.1	0.6	94.8
Nemertea	1.1	0.6	95.4
Polycirrus sp.	1.1	0.5	95.9
Eumida sanguinea	1.0	0.5	96.4
Scalibregma celticum	0.9	0.4	96.9
Phoronis sp.	0.8	0.4	97.3
Gibbula tumida	0.7	0.4	97.7
Typosyllis sp. A (White)	0.6	0.3	98.0
Pholoe inornata	0.6	0.3	98.3
Typosyllis armillaris	0.6	0.3	98.6
Copepoda	0.6	0.3	98.9
Glycera lapidum	0.5	0.2	99.1
Amphipholis squamata	0.3	0.2	99.3
Gibbula cineraria	0.3	0.2	99.5
Cheirocratus sp.	0.3	0.1	99.6
Cheirocratus sundevallii	0.2	0.1	99.7
Musculus discors	0.2	0.1	99.8
Nucula nucleus	0.2	0.1	99.9
Sphaerosyllis bulbosa	0.1	0.1	100.0
Total A	**195.4**		
Total S	**41**		

Group 5	A	% Dom	Cum %
Pisidia longicornis	35	33.2	33.2
Musculus discors	12	11.4	44.5
Heteranomia squamula	6.5	6.2	50.7
Typosyllis armillaris	6.5	6.2	56.9
Polycirrus norvegicus	5	4.7	61.6
Nematoda	4.5	4.3	65.9
Achelia echinata	4.5	4.3	70.1
Pomatoceros lamarcki	4.5	4.3	74.4
Spio armata	4	3.8	78.2
Gibbula tumida	4	3.8	82.0
Caulleriella alata	2.5	2.4	84.4
Juv *Harmothoe* sp.	1.5	1.4	85.8
Pholoe balthica	1.5	1.4	87.2
Eumida sanguinea	1.5	1.4	88.6
Nemertea	1.5	1.4	90.0
Copepoda	1.5	1.4	91.5
Gibbula cineraria	1.5	1.4	92.9
Mediomastus fragilis	1	0.9	93.8
Nucula nucleus	1	0.9	94.8
Sphaerosyllis bulbosa	1	0.9	95.7
Scalibregma celticum	1	0.9	96.7
Hiatella arctica	0.5	0.5	97.2
Lepidonotus squamatus	0.5	0.5	97.6
Protodorvillea kefersteinia	0.5	0.5	98.1
Polycirrus sp.	0.5	0.5	98.6
Cheirocratus sp.	0.5	0.5	99.1
Mytilus edulis	0.5	0.5	99.5
Glycera lapidum	0.5	0.5	100.0
Total A	**105.5**		
Total S	**28**		

Appendix 3 (cont.).

Group 6	A	% Dom	Cum %
Nematoda	6.0	10.3	10.3
Leptocheirus hirsutimanus	5.1	8.9	19.2
Pomatoceros lamarcki	3.6	6.1	25.3
Pisidia longicornis	2.7	4.7	30.1
Mediomastus fragilis	2.4	4.2	34.3
Galathea intermedia	2.3	4.0	38.3
Spio armata	2.2	3.7	42.0
Protodorvillea kefersteinia	2.2	3.7	45.7
Sphaerosyllis bulbosa	1.9	3.3	49.1
Polycirrus sp.	1.9	3.2	52.3
Hiatella arctica	1.8	3.0	55.3
Sphaerosyllis hystrix	1.7	2.9	58.3
Sabellaria spinulosa	1.7	2.9	61.1
Gibbula tumida	1.6	2.8	63.9
Polycirrus norvegicus	1.6	2.8	66.7
Pholoe balthica	1.6	2.7	69.4
Cheirocratus sp.	1.5	2.6	72.0
Typosyllis armillaris	1.5	2.6	74.6
Phoronis	1.3	2.3	76.9
Glycera lapidum	1.3	2.2	79.1
Amphipholis squamata	1.1	2.0	81.1
Nemertea	1.0	1.7	82.8
Chone filicaudata	1.0	1.7	84.5
Juv. *Harmothoe* sp.	0.9	1.6	86.1
Caulleriella alata	0.9	1.5	87.6
Eumida sanguinea	0.8	1.4	89.0
Gibbula cineraria	0.8	1.4	90.4
Achelia echinata	0.6	1.0	91.4
Lepidonotus squamatus	0.6	1.0	92.5
Ophiopholis aculeata	0.6	1.0	93.4
Polydora caeca	0.5	0.9	94.4
Typosyllis sp. B (Striped)	0.5	0.9	95.2
Copepoda	0.4	0.7	96.0
Typosyllis sp. A (White)	0.4	0.7	96.7
Nucula nucleus	0.4	0.6	97.4
Cheirocratus sundevallii	0.4	0.6	98.0
Pholoe inornata	0.4	0.6	98.6
Heteranomia squamula	0.3	0.5	99.1
Musculus discors	0.2	0.3	99.4
Scalibregma celticum	0.2	0.3	99.8
Mytilus edulis	0.1	0.2	99.9
Sabellaria alveolata	0.0	0.1	100.0
Total A	**58.0**		
Total S	**42.0**		

Group 7	A	% Dom	Cum %
Pisidia longicornis	10.8	15.0	15.0
Sabellaria spinulosa	9.2	12.7	27.7
Mediomastus fragilis	4.4	6.1	33.8
Lepidonotus squamatus	4.3	5.9	39.7
Nematoda	4.2	5.8	45.4
Achelia echinata	3.8	5.2	50.6
Juv. *Harmothoe* sp.	2.3	3.2	53.9
Galathea intermedia	2.1	2.9	56.7
Heteranomia squamula	2.0	2.8	59.5
Musculus discors	1.9	2.7	62.2
Hiatella arctica	1.9	2.7	64.8
Phoronis sp.	1.8	2.5	67.4
Polycirrus norvegicus	1.5	2.1	69.4
Typosyllis sp. B (Striped)	1.5	2.1	71.5
Gibbula cineraria	1.4	2.0	73.5
Scalibregma celticum	1.3	1.8	75.3
Amphipholis squamata	1.3	1.8	77.2
Pholoe balthica	1.3	1.7	78.9
Mytilus edulis	1.1	1.5	80.4
Glycera lapidum	1.1	1.5	81.9
Leptocheirus hirsutimanus	1.0	1.4	83.3
Typosyllis sp. A (White)	1.0	1.4	84.7
Nucula nucleus	1.0	1.4	86.0
Spio armata	0.9	1.3	87.3
Pomatoceros lamarcki	0.9	1.3	88.6
Pholoe inornata	0.8	1.2	89.7
Nemertea	0.8	1.2	90.9
Typosyllis armillaris	0.8	1.2	92.0
Ophiopholis aculeata	0.8	1.0	93.1
Cheirocratus sp.	0.7	0.9	94.0
Polycirrus sp.	0.7	0.9	94.9
Caulleriella alata	0.7	0.9	95.8
Polydora caeca	0.6	0.8	96.7
Sabellaria alveolata	0.5	0.7	97.3
Cheirocratus sundevallii	0.5	0.7	98.0
Sphaerosyllis hystrix	0.5	0.7	98.7
Eumida sanguinea	0.4	0.6	99.3
Gibbula tumida	0.3	0.5	99.8
Chone filicaudata	0.2	0.2	100.0
Total A	**72**		
Total S	**39**		

Appendix 3 (cont.).

Group 8	A	% Dom	Cum %
Pisidia longicornis	95.9	30.5	30.5
Salmacina dysteri	87.3	27.8	58.3
Nematoda	13.4	4.3	62.6
Mediomastus fragilis	9.0	2.9	65.5
Sabellaria spinulosa	2.1	0.7	66.1
Galathea intermedia	11.6	3.7	69.8
Leptocheirus hirsutimanus	0.8	0.2	70.1
Hiatella arctica	4.5	1.4	71.5
Achelia echinata	3.8	1.2	72.7
Spio armata	4.5	1.4	74.1
Pomatoceros lamarcki	3.2	1.0	75.1
Gibbula tumida	3.5	1.1	76.2
Juv. *Harmothoe* sp.	5.3	1.7	77.9
Heteranomia squamula	0.5	0.2	78.1
Lepidonotus squamatus	3.5	1.1	79.2
Amphipholis squamata	5.7	1.8	81.0
Polycirrus norvegicus	1.3	0.4	81.4
Protodorvillea kefersteinia	1.5	0.5	81.9
Pholoe balthica	1.3	0.4	82.3
Polycirrus sp.	5.6	1.8	84.0
Phoronis sp.	1.8	0.6	84.6
Eumida sanguinea	3.7	1.2	85.8
Caulleriella alata	2.8	0.9	86.7
Cheirocratus sundevallii	3.7	1.2	87.8
Cheirocratus sp.	1.2	0.4	88.2
Mytilus edulis	0.3	0.1	88.3
Sphaerosyllis hystrix	1.0	0.3	88.6
Juv. *Leptocheirus* sp.	6.1	1.9	90.6
Musculus discors	0.1	0.0	90.6
Nemertea	1.0	0.3	90.9
Typosyllis sp. A (White)	3.9	1.2	92.1
Chone filicaudata	0.8	0.3	92.4
Typosyllis armillaris	1.3	0.4	92.8
Nucula nucleus	6.6	2.1	94.9
Typosyllis sp. B (Striped)	2.4	0.8	95.7
Glycera lapidum	1.0	0.3	96.0
Ophiopholis aculeata	6.3	2.0	98.0
Sphaerosyllis bulbosa	0.5	0.2	98.1
Polydora caeca	2.1	0.7	98.8
Copepoda	0.7	0.2	99.0
Scalibregma celticum	0.8	0.3	99.3
Gibbula cineraria	1.6	0.5	99.8
Pholoe inornata	0.7	0.2	100.0
Total A	**314**		
Total S	**44**		

Group 9	A	% Dom	Cum %
Pisidia longicornis	107.7	40.0	40.0
Achelia echinata	14.5	5.4	45.4
Heteranomia squamula	12.2	4.5	50.0
Galathea intermedia	12.0	4.5	54.4
Mediomastus fragilis	9.6	3.6	58.0
Nematoda	9.5	3.5	61.5
Gibbula tumida	8.7	3.2	64.8
Juv. *Harmothoe* sp.	7.0	2.6	67.4
Polycirrus norvegicus	6.1	2.3	69.6
Cheirocratus sundevallii	5.7	2.1	71.7
Phoronis sp.	5.4	2.0	73.7
Lepidonotus squamatus	4.9	1.8	75.5
Sabellaria spinulosa	4.4	1.6	77.2
Hiatella arctica	4.2	1.6	78.7
Eumida sanguinea	4.2	1.6	80.3
Spio armata	4.1	1.5	81.8
Amphipholis squamata	3.8	1.4	83.3
Caulleriella alata	3.8	1.4	84.7
Pomatoceros lamarcki	3.7	1.4	86.0
Musculus discors	3.4	1.3	87.3
Cheirocratus sp.	3.0	1.1	88.4
Nemertea	3.0	1.1	89.5
Pholoe balthica	2.9	1.1	90.6
Pholoe inornata	2.8	1.0	91.6
Leptocheirus hirsutimanus	2.7	1.0	92.6
Copepoda	2.5	0.9	93.6
Typosyllis armillaris	2.0	0.7	94.3
Nucula nucleus	1.7	0.6	94.9
Sphaerosyllis hystrix	1.6	0.6	95.5
Chone filicaudata	1.4	0.5	96.0
Polycirrus sp.	1.4	0.5	96.5
Gibbula cineraria	1.4	0.5	97.1
Protodorvillea kefersteinia	1.3	0.5	97.5
Typosyllis sp. A (White)	1.2	0.5	98.0
Typosyllis sp. B (Striped)	1.2	0.4	98.4
Scalibregma celticum	1.2	0.4	98.9
Ophiopholis aculeata	0.8	0.3	99.2
Glycera lapidum	0.6	0.2	99.4
Juv. *Leptocheirus* sp.	0.6	0.2	99.6
Polydora caeca	0.5	0.2	99.8
Salmacina dysteri	0.2	0.1	99.9
Mytilus edulis	0.2	0.1	100.0
Sphaerosyllis bulbosa	0.1	0.1	100.0
Total A	**269**		
Total S	**43**		

Appendix 3 (cont.).

Group 10	A	% Dom	Cum %
Pisidia longicornis	55.7	34.4	34.4
Nematoda	11.1	6.8	41.3
Mediomastus fragilis	7.4	4.6	45.9
Juv. *Leptocheirus* sp.	6.8	4.2	50.1
Galathea intermedia	6.3	3.9	54.0
Spio armata	5.3	3.3	57.3
Cheirocratus sp.	4.6	2.8	60.1
Gibbula tumida	4.4	2.7	62.8
Amphipholis squamata	4.4	2.7	65.6
Juv. *Harmothoe* sp.	4.2	2.6	68.2
Polycirrus sp.	3.9	2.4	70.6
Pholoe balthica	3.9	2.4	73.0
Eumida sanguinea	3.3	2.0	75.0
Typosyllis sp. A (White)	3.3	2.0	77.1
Hiatella arctica	3.1	1.9	79.0
Leptocheirus hirsutimanus	3.1	1.9	80.9
Caulleriella alata	2.8	1.7	82.6
Lepidonotus squamatus	2.5	1.5	84.2
Scalibregma celticum	2.5	1.5	85.7
Ophiopholis aculeata	2.3	1.4	87.1
Phoronis sp.	2.3	1.4	88.5
Chone filicaudata	2.3	1.4	89.9
Cheirocratus sundevallii	1.9	1.2	91.1
Copepoda	1.8	1.1	92.2
Glycera lapidum	1.6	1.0	93.2
Nemertea	1.5	0.9	94.1
Pomatoceros lamarcki	1.2	0.7	94.9
Sphaerosyllis hystrix	1.2	0.7	95.6
Sabellaria spinulosa	1.1	0.7	96.3
Pholoe inornata	0.9	0.6	96.9
Protodorvillea kefersteinia	0.8	0.5	97.4
Achelia echinata	0.6	0.4	97.7
Heteranomia squamula	0.6	0.4	98.1
Polycirrus norvegicus	0.6	0.4	98.5
Typosyllis armillaris	0.6	0.4	98.8
Sphaerosyllis bulbosa	0.6	0.4	99.2
Gibbula cineraria	0.5	0.3	99.5
Nucula nucleus	0.4	0.2	99.8
Typosyllis sp. B (Striped)	0.2	0.1	99.9
Polydora caeca	0.2	0.1	100.0
Total A	**162**		
Total S	**44**		

Group 11	A	% Dom	Cum %
Leptocheirus hirsutimanus	27.5	29.6	29.6
Chone filicaudata	6	6.5	36.0
Mediomastus fragilis	5.5	5.9	41.9
Amphipholis squamata	5.5	5.9	47.8
Spio armata	5	5.4	53.2
Polycirrus sp.	4.5	4.8	58.1
Phoronis sp.	4.5	4.8	62.9
Pomatoceros lamarcki	4	4.3	67.2
Typosyllis sp. A (White)	3	3.2	70.4
Juv. *Harmothoe* sp.	2.5	2.7	73.1
Eumida sanguinea	2.5	2.7	75.8
Nucula nucleus	2.5	2.7	78.5
Sabellaria spinulosa	2	2.2	80.6
Galathea intermedia	2	2.2	82.8
Achelia echinata	2	2.2	84.9
Pholoe balthica	2	2.2	87.1
Cheirocratus sundevallii	2	2.2	89.2
Sphaerosyllis bulbosa	2	2.2	91.4
Sphaerosyllis hystrix	1.5	1.6	93.0
Musculus discors	1.5	1.6	94.6
Typosyllis sp. B (Striped)	1	1.1	95.7
Scalibregma celticum	1	1.1	96.8
Gibbula tumida	0.5	0.5	97.3
Lepidonotus squamatus	0.5	0.5	97.8
Protodorvillea kefersteinia	0.5	0.5	98.4
Glycera lapidum	0.5	0.5	98.9
Copepoda	0.5	0.5	99.5
Pholoe inornata	0.5	0.5	100.0
Total A	**93**		
Total S	**28**		

Appendix 3 (cont.).

Group 12	A	% Dom	Cum %
Sabellaria spinulosa	6.0	24.7	24.7
Mediomastus fragilis	3.3	13.7	38.4
Leptocheirus hirsutimanus	2.0	8.2	46.6
Hiatella arctica	1.7	6.8	53.4
Spio armata	1.7	6.8	60.3
Galathea intermedia	1.3	5.5	65.8
Pomatoceros lamarcki	1.3	5.5	71.2
Glycera lapidum	1.0	4.1	75.3
Sabellaria alveolata	0.7	2.7	78.1
Gibbula tumida	0.7	2.7	80.8
Polycirrus sp.	0.7	2.7	83.6
Mytilus edulis	0.7	2.7	86.3
Nematoda	0.3	1.4	87.7
Achelia echinata	0.3	1.4	89.0
Heteranomia squamula	0.3	1.4	90.4
Lepidonotus squamatus	0.3	1.4	91.8
Amphipholis squamata	0.3	1.4	93.2
Pholoe balthica	0.3	1.4	94.5
Cheirocratus sundevallii	0.3	1.4	95.9
Sphaerosyllis hystrix	0.3	1.4	97.3
Nucula nucleus	0.3	1.4	98.6
Scalibregma celticum	0.3	1.4	100.0
Total A	**24**		
Total S	**22**		

Group 13	A	% Dom	Cum %
Protodorvillea kefersteinia	8.5	56.7	56.7
Glycera lapidum	2.0	13.3	70.0
Mediomastus fragilis	1.5	10.0	80.0
Nemertea	0.7	4.4	84.4
Pomatoceros lamarcki	0.5	3.3	87.8
Caulleriella alata	0.5	3.3	91.1
Sphaerosyllis hystrix	0.5	3.3	94.4
Nematoda	0.3	2.2	96.7
Nucula nucleus	0.3	2.2	98.9
Mytilus edulis	0.2	1.1	100.0
Total A	**15**		
Total S	**10**		

APPENDIX 4. REPLICATE ABUNDANCE DATA

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
		Tunicata																		
ZD	2	*Ascidiacea* sp. Indet																		
ZD	120	*Dendrodoa grossularia*																		
		Bryozoa																		
Y	1	*Bryozoan sp. Indet*																		
		Crustacea																		
R	14	*Cirripedia*																		
		Anthozoa																		
D	58	*Hydrozoa sp. Indet*																		
D	163	*Tubularia sp. Indet*																		
D	583	*Anthozoa sp. Indet*																		
D	632	*Cerianthus loydii*																		
D	764	*Edwardsia sp. Indet*																		
		Platyhelminthe																		
F	2	*Turbellaria sp. Indet*				1														
		Nemertea																		
G	1	Nemertea	1	1		1			1	1	1			3	2	2		3	1	
		Nematoda																		
HD	1	*Nematoda spp. indet*	5	7	1	1	2	1	3	6	5		6	2		1		14	3	7
		Sipuncula																		
N	12	*Juvenile Golfingia sp. Indet.*				1			2						1	1				
N	14	*Golfingia elongata*																		
N	17	*Golfingia vulgaris vulgaris*																1		
N	25	*Nephasoma minutum*																1		
N	34	*Phascolion strombus*																		
		Polychaeta																		
P	15	*Pisione remota*											1							
P	32	*Adyte pellucida*																		
P	44	*Enipo kinbergi*																		
P	49	*Gattyana cirrosa*		1									1							
P	50	*Juvenile Harmothoe sp. Indet*	4	7	1	6	2	1		3	7			2				1		
P		*Juvenile Malmgrenia sp. Indet*																		
P	53	*Harmothoe areolata*																		
P	55	*Malmgrenia castanea*																		
P	58	*Harmothoe extenuata*																		
P	59	*Harmothoe fragilis*																		
P	64	*Harmothoe imbricata*				1														
P	65	*Harmothoe impar*																		
P	68	*Malmgrenia marphysae*																		
P		*Harmothoe pagenstecheri*							2											
P	82	*Lepidonotus squamatus*	1	3	5	6	1		7	9	7		1	8	4	3	1	14	1	
P	92	*Pholoe inornata*	2	3		4				1	1			1		1		1		
P		*Pholoe balthica*				1	2		6	4	2			4	1	1		2	1	
P	107	*Sthenelais boa*																		
P	117/118	*Eteone longa/flava*				1			1	2	2	1	1				1	1	2	1
P	136	*Pseudomystides limbata*				1							1	1				1	1	
P	144	*Anaitides maculata*																		
P	150	*Eulalia sp. Indet.*																1		
P	151	*Eulalia aurea*																		
P	152	*Eulalia bilineata*				1								1		1				
P	153	*Eulalia expusilla*																1		
P	156	*Eulalia cf ornata*																		
P	161	*Eulalia viridis*																		
P	163	*Juvenile Eumida* sp. Indet																		
P	164	*Eumida bahusiensis*																		
P	167	*Eumida sanguinea*	2	1	1	2		1										1	1	

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
P	255	*Juvenile Glycera sp. Indet*																		
P		*Glycera capitata*																		
P	260	*Glycera lapidum*	2	2						1	1	3		3			1	1	2	1
P	262	*Glycera oxycephala*																		
P	265	*Glycera tridactyla*																		
P	271	*Goniada maculata*																		
P	275	*Goniadella bobretzkii*																		
P	276	*Goniadella gracilis*																	1	
P	291	*Sphaerodorum gracilis*								1	1									
P	300	*Gyptis propinqua*																		
P	305	*Psamathe cirrata*			1					2	1									
P	311	*Nereimyra punctata*																		
P	319	*Podarkeopsis capensis*																		
P	321	*Syllidia armata*													1					
P	326	*Microphthalmus sp. Indet*										1								
P	349	*Ehlersia cornuta*												3					1	
P	358	*Syllis sp. Indet*																		
P	362	*Trypanosyllis coeliaca*							1											
P		*Typosyllis sp. A (White)*		3		2	1		3					1	1	1				1
P		*Typosyllis sp. B (Striped)*	2	6		1			1					1	1	1		12		
P	365	*Typosyllis armillaris*								4	4									
P	375	*Amblyosyllis formosa*																		
P	380	*Eusyllis blomstrandii*		1																
P	405	*Streptosyllis websteri*																		
P	407	*Syllides benedicti*																		
P	421	*Exogone hebes*							3	6			2	1	6	6		1		
P	422	*Exogone naidina*																		
P	423	*Exogone verugera*								1	1									
P	424	*Sphaerosyllis sp. Indet.*																		
P	425	*Sphaerosyllis bulbosa*												1					4	
P	426	*Sphaerosyllis erinaceus*								2										
P	427	*Sphaerosyllis hystrix*				3		1		1			3		1	1		2		1
P	431	*Sphaerosyllis tetralix*									1									
P	434	*Autolytus sp. A indet*							3									3	1	
P	435	*Autolytus alexandri*					1							1					1	
P	440	*Autolytus langerhansii*																		
P	444	*Autolytus prolifera*																		
P	451	*Proceraea sp. Indet*																		
P	458	*Juvenile Nereididae sp. Indet*																		
P	475	*Nereis longissima*																		
P	478	*Nereis zonata*																		
P	494	*Juvenile Nepthys sp. Indet*																		
P	496	*Nepthys caeca*																1		
P	498	*Nephtys cirrosa*										1								
P	499	*Nepthys hombergii*									1									
P	505	*Nephtys pente*																		
P	534	*Spinither oniscoides*									1									
P	572	*Lumbrineris sp. Indet*																		
P	579	*Lumbrineris gracilis*																		
P	582	*Lumbrineris latreilli*																		
P	618	*Ophryotrocha gracilis*																		
P	638	*Protodorvillea kefersteinia*										16	3	23	12	9		7	3	7
P	642	*Schistomeringos neglecta*													2				3	1
P	672	*Scoloplos armiger*											1							
P	722	*Aonides oxycephala*				2				3	1						1			
P	723	*Aonides paucibranchiata*	3	2				1					1		5	3		1		
P	733	*Laonice bahusiensis*					1						1		1					

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
P	735	*Laonice sarsi*																		
P	744	*Microspio mecznikowianus*								1	2									
P	746	*Minuspio cf multibranchiata*							1											
P	748	*Polydora sp. Indet.*																		
P	750	*Polydora caeca*				1								1				7		
P	751	*Polydora caulleryi*							1											
P	752	*Polydora ciliata*																		
P	753	*Polydora cornuta*																		
P	754	*Polydora flava*							4					13	1	7		3	4	2
P	766	*Prionospio banyulensis*																		
P	788	*Spio armata*	3	2		8	3	2					8	1	2	1	2	9	1	1
P	794	*Spiophanes bombyx*																		
P	824	*Aphelochaeta marioni*																		
P		*Aphelochaeta 'A'*							2					1		2	1			
P	829	*Caulleriella alata*				5	1	1	2			1	1	3	2	2			1	
P	831	*Caulleriella zetlandica*				1														
P	834	*Chaetozone setosa*																		
P		*Chaetozone christei*																		
P	837	*Cirriformia tentaculata*	1	1											1		1			
P	840	*Dodecaceria sp. Indet.*																		
P	846	*Tharyx killariensis*																		
P	892	*Macrochaeta helgolandica*																		
P	907	*Capitella capitata*		1																
P	919	*Mediomastus fragilis*	1	3		3			6	11	2	3	11	7	6	2	2	5	5	4
P	20 (92	*Notomastus sp. (latericeus)*																		
P	955	*Clymenura sp. Indet*						1	4											5
P	958	*Clymenura johnstonii*	3	1									1						2	
P	960	*Euclymene sp. Indet*																		
P	960/97	*Euclymene/Praxillella sp. Indet*																		
P	997	*Juvenile Ophelia sp indet*																		
P	999	*Ophelia borealis*																		
P	1026	*Scalibregma celticum*		1		2			1	3	6		1	1	1	1	1		2	
P	1027	*Scalibregma inflatum*	1							1			1			1	1			
P	1098	*Owenis fusiformis*						1												
P	1116	*Sabellaria alveolata*												105	121	94	2	30		
P	1117	*Sabellaria spinulosa*	9	4		1	1		14	22	1			20	6	14	4	30	1	
P	1122	*Melinna cf elisabethae*						1												
P	1124	*Melinna palmata*	1	1			1													
P	1133	*Juvenile Ampharete sp. Indet*																		
P	1139	*Ampharete lindstroemi*											1							
P	1175	*Terebellides stroemi*											1							
P	1177	*Trichobranchus glacialis*																		
P	1178	*Trichobranchus roseus*																		
P	1180	*Juvenile Amphitritinae sp. Indet*																		
P	1187	*Axionice maculata*																		
P	1190	*Eupolymnia nesidensis*																		
P	1193	*Lanassa venusta*																		
P	1195	*Lanice conchilega*																		
P	1206	*Neoamphitrite figulus*																		
P	1210	*Nicolea venustula*		1		2							1					2		
P	1211	*Nicolea zostericola*																		
P	1215	*Phisidia aurea*																	1	
P	1217	*Pista cristata*											1							
P	1221	*Proclea graffii*																		
P	1223	*Terebella lapidaria*																		
P	1232	*Lysilla sp. Indet*							2						1			2		5

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
P	1233	*Lysilla loveni*																		
P	1235	*Polycirrus sp. Indet*							4					2		1			3	2
P	1242	*Polycirrus medusa*															1	2		
P	1243	*Polycirrus norvegicus*	3	5		1	2						5		1	1		7		2
P	1253	*Juvenile Thelepus sp. Indet.*																1		
P	1254	*Thelepus cincinnatus*	2	2														1		
P	1255	*Thelepus setosus*				1														
P	1263	*Branchiomma bombyx*																		
P	1267	*Chone duneri*																		
P	1269	*Chone filicaudata*				1	4	1	2				9						3	4
P	1273	*Demonax cambrensis*																		
P	1276	*Demonax torulis*																		
P	1280	*Euchone rubrocincta*																		
P	1287	*Jasmineira sp. Indet*							1					1	1			5		
P	1289	*Jasmineira caudata*																		
P	1290	*Jasmineira elegans*																		
P	1316	*Pseudopotamilla reniformis*																2		
P	1321	*Sabella sarsi*																		
P	1339	*Pomatoceros sp. Indet*										1					1			
P	1340	*Pomatoceros lamarcki*				2	3		9			1		12	6	3	1	10	2	3
P	1341	*Pomatoceros triqueter*	2	1				1												
P	1334	*Hydroides norvegica*																		
P	1350	*Filograna implexa*																		
P	1361	*Salmacina dysteri*																14		
P	1425	*Tubificidae sp. Indet*																		
P	1524	*Grania sp. Indet*							1				1							
		Crustacea																		
Q	4	*Nymphon brevirostre*				1			2		1								1	
Q	15	*Achelia echinata*	8	6	12	6	9	1	3	2	3							4		
Q	30	*Endeis spinosa*																		
Q	33	*Callipallene brevirostris*				1												2		
Q	34	*Callipallene emaciata*																		
Q	45	*Anoplodactylus pygmaeus*																1		
R	142	Copepoda				1	3	1						2		1				
S	6	*Nebalia bipes*																1		
S	31	*Mysidae sp. Indet.*																		
S	92	*Heteromysis formosa*				1														
S	134	*Pontocrates arcticus*																		
S	146	*Parapleustes bicuspis*																1		
S	158	*Amphilochus manudens*																		
S	177	*Leucothoe incisa*							1									1		
S	186	*Cressa dubai*									1									
S	207	*Juvenile Stenothoidae sp. Indet.*																		
S	213	*Stenothoe marina*																		
S	214	*Stenothoe monoculoides*				1														
S	248	*Urothoe elegans*																		
	249	*Urothoe marina*																		
	255	*Harpinia crenulata*																		
S	256	*Harpinia laevis*																		
S	275	*Ascidostoma obesum*																		
S	302	*Lysianassa sp. Indet.*																		
S	320	*Orchomene humilis*		1		1		1	1	1	2									
S	321	*Orchomene nanus*																		
S	336	*Tmetonyx cicada*																		
S	337	*Tmetonyx similis*																		
S	344	*Tryphosella sarsi*																		
S	380	*Iphimedia minuta*		1		19														

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
S	381	*Iphimedia nexa*	2	5		4				1	2									
S	382	*Iphimedia obesa*																		
S	411	*Atylus guttatus*										1		1	1	2				
S	412	*Atylus swammerdamei*									11									
S	419	*Tritaeta gibbosa*				1					2									
S	429	*Ampelisca diadema*																		
S	438	*Ampelisca spinipes*																		
S	481	*Gammarus salinus*																		
S	498	*Abludomelita obtusata*																		
S	503	*Cheirocratus sp. Indet*				4	7	3	2	3	2							1		1
S	504	*Cheirocratus assimilis*																		
S	505	*Cheirocratus intermedius*																		
S	506	*Cheirocratus sundevallii*				1	1		2											
S	519	*Maera othonis*							1											
S	524	*Melita hergensis*							5											1
S	539	*Gammaropsis cornuta*																		
S	541	*Gammaropsis maculata*	1	3	1	5			4											
S	558	*Juvenile Ischyroceridae sp. Indet*																		
S	577	*Juvenile Aoridae sp. Indet.*									1									
S	578	*Aora gracilis*									1									
S	585	*Lembos websteri*																		
S	586	*Juvenile Leptocheirus sp. indet*																		
S	588	*Leptocheirus hirsutimanus*				1	1		3	3	6			2		1		8		
S	605	*Corophium sp. Indet*																		
S	611	*Corophium crassicorne*																		
S	615	*Corophium sextonae*																	1	
S	621	*Unicola crenatipalma*							6					6	8	11	2	4	1	
S	628	*Dyopedos monacanthus*							1											
S	629	*Dyopedos porrectus*																		
S	646	*Caprella linearis*											1					2		
S	659	*Pseudoprotella phasma*																		
S	730	*Hyperia galba*					1							2	1	1				
S	793	*Gnathia* 'praniza'				1			1											
S	794	*Gnathia dentata*		1																
S	796	*Gnathia oxyuraea*																		
S	854	*Eurydice pulchra*																		
S	892	*Janira maculosa*				2								1		1		3		
S	894	*Janiropsis breviremis*									5									
S	904	*Munna ?fabricii?*																1		
S	942	*Idotea pelagica*																		
S	949	*Arcturella sp. Indet.*							1											
S	955	*Astacilla longicornis*																		
S	1140	*Pseudoparatanais batei*																		
S	1142	*Tanaiopsis graciloides*																		
S	1197	*Bodotria scorpioides*							1											
S	1224	*Cumella pygmaea*																		
S	1268	*Nyctiphanes couchi*						1												
S	1345	*Eualus pusiolus*		1		2			2		1				2				1	
S	1377	*Pandalus montagui*												1						
S	1436	*Juvenile Paguroidea sp. Indet*													1	1				1
S	1448	*Anapagurus hyndmanni*					1													
S	1457	*Pagurus bernhardus*												1		1				
S	1463	*Pagurus pubescens*				1														
S	1472	*Galathea intermedia*	1	2	4	6	3		3	4	1						1	3	1	
S	1482	*Pisidia longicornis*	15	25	20	106	14	4	17	6	11			4	1	2			1	2
S	1485	*Brachyuran sp. Indet.*																		

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
S	1508	*Ebalia tuberosa*		1		1														
S	1509	*Ebalia tumefacta*						1												
S	1519	*Hyas coarctatus*							1											
S	1527	*Inachus leptochirus*																		
S	1532	*Macropodia rostrata*																		
S	1555	*Atelecyclus rotundatus*			1															
S	1566	*Cancer pagurus*				1														
S	1577	*Juvenile Liocarcinus sp.*																		
S	1584	*Liocarcinus pusillus*																		
S	1638	*Pinnotheres pisum*																		
		Mollusca																		
W	53	*Leptochiton asellus*	3	1	3		2		1				1							
W	156	*Juvenile Trochinae sp. Indet*																		
W	161	*Gibbula tumida*		2		5	5	2					1	3		1	1	1	2	2
W	163	*Gibbula cineraria*				2				1	4		1	1		1			1	1
W	171	*Jujubinus miliaris*																		
W	182	*Calliostoma zizyphinum*		1		3		1						2						
W	334	*Rissoa parva*	16	10		4	2		2	1										
W	344	*Alvania punctura*		1																
W	361	*Manzonia crassa*									1									
W	371	*Onoba semicostata*	1	2			1													
W	439	*Juvenile Crepidula fornicata*							1											
W	439	*Crepidula fornicata*																		
W	480	*Velutina velutina*																		
W	603	*Eulima bilineata*																		
W	680	*Trophon truncatus*							1											
W	685	*Ocenebra erinacea*																		
W	687	*Nucella lapillus*																		
W	908	*Odostomia sp. Indet.*																		
W	925	*Brachystomia scalaris*																		
W	1080	*Retusa truncatula*																		
W	1270	*Doto sp. Indet*																		
W	1277	*Doto fragilis*																		
W	1301	*Goniodoris castanea*						1												
W	1302	*Goniodoris nodosa*									1									
W	1325	*Onchidoris muricata*			2	2														
W	1354	*Limacia clavigera*																		
W	1469	*Facelina auriculata*																		
W	1569	*Nucula nitidosa*																		
W	1570	*Nucula nucleus*			1			1	7	1	2									
W	1595	*Jupiteria minuta*																		
W	1690	*Juvenile Mytilacea*																		
W	1695	*Mytilus edulis*				1	2		4	2	2			5	3	2		11		
W	1702	*Modiolus modiolus*																		
W	1708	*Modiolula phaseolina*			1															
W	1718	*Modiolarca tumida*																		
W	1721	*Musculus discors*	4	10	1	5			2	1	4									
W	1776	*Chlamys distorta*																		
W	1804	*Juvenile Anomiacea*						1												
W	1809	*Heteranomia squamula*	2	5	2	19	6		2				1					8		
W	1814	*Pododesmus patelliformis*																		
W	1875	*Kellia suborbicularis*																		
W	1882	*Semierycina nitida*																		
W	1906	*Mysella bidentata*																		1
W	1929	*Goodalia triangularis*																		
W	1936	*Tridonta montagui*																	1	

MCS code		Species Name/Authority	1	1	1	2	2	2	3	3	3	4	5	6	6	6	7	8	9	9
		Replicate	A	B	C	A	B	C	A	B	C			A	B	C			A	B
		Quantitative taxa																		
W	1951	*Parvicardium ovale*																		
W	1961	*Cerastoderma edule*																		
W	1974	*Juvenile Spisula sp. Indet*																		
W	1975	*Spisula elliptica*																		1
W	1977	*Spisula solida*																	1	
W	2023	*Moerella pygmaea*																		
W	2044	*Juvenile Gari sp. Indet*																		
W	2046	*Gari depressa*																		
W	2049	*Gari tellinella*		2	1															
W	2059	*Abra alba*			1		1						1							
W	2085	*Juvenile Veneracea sp. Indet*																		
W	2095	*Gouldia minima*																		
W	2100	*Clausinella fasciata*																		
W	2104	*Timoclea ovata*							1				3							
	2124	*Venerupis senegalensis*																		
W	2147	*Mya truncata*		1		2		1	1						1					1
W	2149	*Mya arenaria*																		
W	2166	*Hiatella arctica*		3	1	4	2		2				2	1			1	29		
W	2228	*Juvenile Thracia sp. Indet*						1												
W	2231	*Thracia phaseolina*											1							
W	2233	*Thracia villosiuscula*																	2	
W	2239	*Cochlodesma praetenue*																		
		Phoronida																		
ZA	3	*Phoronis*	9	4		2		3	1	5	3								2	
		Echinodermata																		
ZB	18	Juvenile *Asteroidea* sp. Indet				1														
ZB	75	*Crossaster papposus*																		
ZB	86	*Henricia sanguinolenta*																		
ZB	105	Juvenile *Ophiuroidea* sp. Indet	2	1			1				1									
ZB	124	*Ophiothrix fragilis*		1																
ZB	147	*Ophiopholis aculeata*			1					1	4								1	
ZB	154	*Amphiura filiformis*																		
ZB	168	*Ophiura albida*																		
ZB	161	*Amphipholis squamata*				1		2						1		2			1	2
ZB	262	*Thyone fusus*				1														
ZB	296	*Leptosynapta ?inhaerans?*																		

MCS code		Species Name/Authority	9	10	10	10	11	12	13	13	13	14	15	16	17	17	17	18	19	20
		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
		Tunicata																		
ZD	2	*Ascidiacea* sp. Indet																		
ZD	120	*Dendrodoa grossularia*																		
		Bryozoa																		
Y	1	*Bryozoan sp. Indet*																		
		Crustacea																		
R	14	*Cirripedia*																P		
		Anthozoa																		
D	58	*Hydrozoa sp. Indet*																		
D	163	*Tubularia sp. Indet*																		
D	583	*Anthozoa sp. Indet*																		
D	632	*Cerianthus loydii*																		
D	764	*Edwardsia sp. Indet*																		
		Platyhelminthe																		
F	2	*Turbellaria sp. Indet*					1			1					1		1	1		
		Nemertea																		
G	1	Nemertea		1		1	2	3	1						2	2	1	5	3	2
		Nematoda																		
HD	1	*Nematoda spp. indet*	4	2	17	4	14	4	2		3	5	36		5	5	4	9	4	4
		Sipuncula																		
N	12	*Juvenile Golfingia sp. Indet.*					5												1	1
N	14	*Golfingia elongata*																		
N	17	*Golfingia vulgaris vulgaris*													1					
N	25	*Nephasoma minutum*						1				2	2							
N	34	*Phascolion strombus*											1	4				1		
		Polychaeta																		
P	15	*Pisione remota*																		
P	32	*Adyte pellucida*											1					1		
P	44	*Enipo kinbergi*																		
P	49	*Gattyana cirrosa*				1			3					1	2	2	1	1		
P	50	*Juvenile Harmothoe sp. Indet*	1				1	11	2	11		1	7	1	10		4	5		
P		*Juvenile Malmgrenia sp. Indet*					1													
P	53	*Harmothoe areolata*														8				
P	55	*Malmgrenia castanea*																		
P	58	*Harmothoe extenuata*																		
P	59	*Harmothoe fragilis*						1												
P	64	*Harmothoe imbricata*																		
P	65	*Harmothoe impar*																		
P	68	*Malmgrenia marphysae*														1				
P		*Harmothoe pagenstecheri*																		
P	82	*Lepidonotus squamatus*	1		1		1	11	2	2			6			5	1	4	2	
P	92	*Pholoe inornata*		1	2			3		5		2	1	1	3	6	2	4	2	
P		*Pholoe balthica*					5	4	2					1	4	4	1	1	11	3
P	107	*Sthenelais boa*						1												
P	117/11	*Eteone longa/flava*	1		1		1	2	1			2		1		1			1	1
P	136	*Pseudomystides limbata*																		1
P	144	*Anaitides maculata*						1												
P	150	*Eulalia sp. Indet.*																		
P	151	*Eulalia aurea*																		
P	152	*Eulalia bilineata*								1									1	
P	153	*Eulalia expusilla*												1						
P	156	*Eulalia cf ornata*										1								
P	161	*Eulalia viridis*						1												
P	163	*Juvenile Eumida* sp. Indet														1			1	
P	164	*Eumida bahusiensis*																		
P	167	*Eumida sanguinea*			1		1	2	2			2	5	3	5	10	3	5	1	1

MCS code		Species Name/Authority	9	10	10	10	11	12	13	13	13	14	15	16	17	17	17	18	19	20
		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
P	255	*Juvenile Glycera sp. Indet*																		
P		*Glycera capitata*																		
P	260	*Glycera lapidum*	1	1	2	1	2						3	1				2	1	1
P	262	*Glycera oxycephala*																		
P	265	*Glycera tridactyla*																		
P	271	*Goniada maculata*																		
P	275	*Goniadella bobretzkii*																		
P	276	*Goniadella gracilis*					1						1							
P	291	*Sphaerodorum gracilis*																		
P	300	*Gyptis propinqua*					3						1							
P	305	*Psamathe cirrata*		1	2									5					1	
P	311	*Nereimyra punctata*										1								
P	319	*Podarkeopsis capensis*																		
P	321	*Syllidia armata*																		
P	326	*Microphthalmus sp. Indet*																		
P	349	*Ehlersia cornuta*																	1	
P	358	*Syllis sp. Indet*																		
P	362	*Trypanosyllis coeliaca*																		
P		*Typosyllis sp. A (White)*	1				4	1	4	1	2		5	1			1		1	
P		*Typosyllis sp. B (Striped)*		1	2				1	3	1	3	4			1	1	2	2	
P	365	*Typosyllis armillaris*			2										5	13				
P	375	*Amblyosyllis formosa*						1												
P	380	*Eusyllis blomstrandii*					1						1							
P	405	*Streptosyllis websteri*																		
P	407	*Syllides benedicti*										1				1				
P	421	*Exogone hebes*					1		1			2		1					1	1
P	422	*Exogone naidina*																		
P	423	*Exogone verugera*																	1	
P	424	*Sphaerosyllis sp. Indet.*																		
P	425	*Sphaerosyllis bulbosa*	1				1					1		4						3
P	426	*Sphaerosyllis erinaceus*																		
P	427	*Sphaerosyllis hystrix*	1		1	1		1	3			1	2	3	2	1		1	1	3
P	431	*Sphaerosyllis tetralix*																		
P	434	*Autolytus sp. A indet*						2		2			1			2	1			
P	435	*Autolytus alexandri*	1						1		1		1						2	
P	440	*Autolytus langerhansii*													1					
P	444	*Autolytus prolifera*																		
P	451	*Proceraea sp. Indet*											2							
P	458	*Juvenile Nereididae sp. Indet*																		
P	475	*Nereis longissima*						1												
P	478	*Nereis zonata*																		
P	494	*Juvenile Nepthys sp. Indet*							1		1									
P	496	*Nepthys caeca*							1											
P	498	*Nephtys cirrosa*																		
P	499	*Nepthys hombergii*																		
P	505	*Nephtys pente*						1												
P	534	*Spinither oniscoides*																		
P	572	*Lumbrineris sp. Indet*						2												
P	579	*Lumbrineris gracilis*							3									1		
P	582	*Lumbrineris latreilli*														2				
P	618	*Ophryotrocha gracilis*																		
P	638	*Protodorvillea kefersteinia*	7				1	2	2		4	9	1	1				1	1	3
P	642	*Schistomeringos neglecta*	1																1	
P	672	*Scoloplos armiger*																		
P	722	*Aonides oxycephala*							1			1		1	2	3	6	1		
P	723	*Aonides paucibranchiata*						1			1						1			3
P	733	*Laonice bahusiensis*			1														1	

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		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
P	735	*Laonice sarsi*																		
P	744	*Microspio mecznikowianus*														2				
P	746	*Minuspio cf multibranchiata*		3	2				1					1	2	1				
P	748	*Polydora sp. Indet.*																		
P	750	*Polydora caeca*			1							6	7		1	2	1		3	
P	751	*Polydora caulleryi*										4							2	
P	752	*Polydora ciliata*																		
P	753	*Polydora cornuta*																		
P	754	*Polydora flava*	1				1					3					1			
P	766	*Prionospio banyulensis*																		
P	788	*Spio armata*	2	1	2		7	5	10	1	3		2	6	4	7	6	3	5	1
P	794	*Spiophanes bombyx*																		
P	824	*Aphelochaeta marioni*						1	2											
P		*Aphelochaeta 'A'*										2		1						
P	829	*Caulleriella alata*	1	1	1	4	6	5	5		1	1	1		3	8	3	3	3	1
P	831	*Caulleriella zetlandica*																		
P	834	*Chaetozone setosa*																		
P		*Chaetozone christei*																		
P	837	*Cirriformia tentaculata*										4								
P	840	*Dodecaceria sp. Indet.*					2													
P	846	*Tharyx killariensis*						1										2		
P	892	*Macrochaeta helgolandica*																		
P	907	*Capitella capitata*						1												
P	919	*Mediomastus fragilis*	1					5	5	1	13	9	4		8	27	7	16	15	4
P	20 (92	*Notomastus sp. (latericeus)*														1				
P	955	*Clymenura sp. Indet*	1																	
P	958	*Clymenura johnstonii*	1				1	2								1		2		
P	960	*Euclymene sp. Indet*						1												
P	960/97	*Euclymene/Praxillella sp. Indet*																		
P	997	*Juvenile Ophelia sp indet*																		
P	999	*Ophelia borealis*																		
P	1026	*Scalibregma celticum*		1	1		2	2	2	2	1			1		3	1	1	1	
P	1027	*Scalibregma inflatum*	1					1	1	1						1	1			
P	1098	*Owenis fusiformis*														1				
P	1116	*Sabellaria alveolata*										##							4	
P	1117	*Sabellaria spinulosa*	2	2	7			4	2		15	11		1	2	2	6	7	8	1
P	1122	*Melinna cf elisabethae*						12	1								2		1	
P	1124	*Melinna palmata*												1	3	6		2		
P	1133	*Juvenile Ampharete sp. Indet*					1		1											
P	1139	*Ampharete lindstroemi*																		
P	1175	*Terebellides stroemi*																		
P	1177	*Trichobranchus glacialis*																		
P	1178	*Trichobranchus roseus*						4	4		1				1	2	1			
P	1180	*Juvenile Amphitritinae sp. Indet*					1													
P	1187	*Axionice maculata*											1	1						1
P	1190	*Eupolymnia nesidensis*																	1	
P	1193	*Lanassa venusta*			1															
P	1195	*Lanice conchilega*																		1
P	1206	*Neoamphitrite figulus*																1		
P	1210	*Nicolea venustula*				2		4	1	1	2		2		1	1				
P	1211	*Nicolea zostericola*																4	1	
P	1215	*Phisidia aurea*			2		1		1											
P	1217	*Pista cristata*																		
P	1221	*Proclea graffii*												1						
P	1223	*Terebella lapidaria*																1		
P	1232	*Lysilla sp. Indet*		1			1													

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		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
P	1233	*Lysilla loveni*																		
P	1235	*Polycirrus sp. Indet*	1			1	1		2				6	2					1	5
P	1242	*Polycirrus medusa*					5							3					1	2
P	1243	*Polycirrus norvegicus*	1	1	2	7		10	6		2				8	25	12	4	1	1
P	1253	*Juvenile Thelepus sp. Indet.*											1				2			
P	1254	*Thelepus cincinnatus*																		
P	1255	*Thelepus setosus*											3		2					
P	1263	*Branchiomma bombyx*																		
P	1267	*Chone duneri*					2													
P	1269	*Chone filicaudata*	2						1		2		1	12	2	1	6			
P	1273	*Demonax cambrensis*							1							1				
P	1276	*Demonax torulis*																		
P	1280	*Euchone rubrocincta*														1				
P	1287	*Jasmineira sp. Indet*										4								
P	1289	*Jasmineira caudata*																		
P	1290	*Jasmineira elegans*																		
P	1316	*Pseudopotamilla reniformis*										2	1						1	
P	1321	*Sabella sarsi*												3						
P	1339	*Pomatoceros sp. Indet*						2		2	2								1	
P	1340	*Pomatoceros lamarcki*	1			2		6	5	4	8	5	4	5	1	3	4	6	4	4
P	1341	*Pomatoceros triqueter*					3	4		4	1		1	1			1	1		
P	1334	*Hydroides norvegica*																		
P	1350	*Filograna implexa*																		
P	1361	*Salmacina dysteri*											##							
P	1425	*Tubificidae sp. Indet*						2								2				
P	1524	*Grania sp. Indet*						1						1					1	
		Crustacea																		
Q	4	*Nymphon brevirostre*								2			1	1	1					
Q	15	*Achelia echinata*		1	7			12	1	41	9		10	4	2	21	5	22	6	
Q	30	*Endeis spinosa*								1										
Q	33	*Callipallene brevirostris*			3			1		1								1		
Q	34	*Callipallene emaciata*																		
Q	45	*Anoplodactylus pygmaeus*																		
R	142	Copepoda					3	4	2		1		2	1	3	2			2	
S	6	*Nebalia bipes*																		
S	31	*Mysidae sp. Indet.*																1		
S	92	*Heteromysis formosa*																		
S	134	*Pontocrates arcticus*																		
S	146	*Parapleustes bicuspis*																	1	
S	158	*Amphilochus manudens*					1		1									1		
S	177	*Leucothoe incisa*																	1	
S	186	*Cressa dubai*																		
S	207	*Juvenile Stenothoidae sp. Indet.*																	1	
S	213	*Stenothoe marina*																		
S	214	*Stenothoe monoculoides*																		
S	248	*Urothoe elegans*						1	2											
	249	*Urothoe marina*																		
	255	*Harpinia crenulata*																		
S	256	*Harpinia laevis*																		
S	275	*Ascidostoma obesum*																		
S	302	*Lysianassa sp. Indet.*											4							
S	320	*Orchomene humilis*						2	1				1	1	1	1	3	2		
S	321	*Orchomene nanus*																		
S	336	*Tmetonyx cicada*																		
S	337	*Tmetonyx similis*																		1
S	344	*Tryphosella sarsi*											1							
S	380	*Iphimedia minuta*					3	8												

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		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
S	381	*Iphimedia nexa*						1		1	2							5		
S	382	*Iphimedia obesa*												1						
S	411	*Atylus guttatus*																		
S	412	*Atylus swammerdamei*											1							
S	419	*Tritaeta gibbosa*																		
S	429	*Ampelisca diadema*						1	2											
S	438	*Ampelisca spinipes*																		
S	481	*Gammarus salinus*																		
S	498	*Abludomelita obtusata*																		
S	503	*Cheirocratus sp. Indet*	2			1	9	6	4	1	3						1		1	3
S	504	*Cheirocratus assimilis*						1												3
S	505	*Cheirocratus intermedius*								1						9	3			
S	506	*Cheirocratus sundevallii*				1	1	3		1	1			4	10	1	5	10		
S	519	*Maera othonis*					1											1		1
S	524	*Melita hergensis*																		
S	539	*Gammaropsis cornuta*																	1	
S	541	*Gammaropsis maculata*							1	6	2		1					2	3	
S	558	*Juvenile Ischyroceridae sp. Indet*												1						
S	577	*Juvenile Aoridae sp. Indet.*												1						
S	578	*Aora gracilis*																	1	
S	585	*Lembos websteri*																		
S	586	*Juvenile Leptocheirus sp. indet*																		
S	588	*Leptocheirus hirsutimanus*					7		1			2	1	55	1	1	7	1	3	4
S	605	*Corophium sp. Indet*																		
S	611	*Corophium crassicorne*						1												
S	615	*Corophium sextonae*																		
S	621	*Unicola crenatipalma*																		
S	628	*Dyopedos monacanthus*										1	1						1	
S	629	*Dyopedos porrectus*		1																
S	646	*Caprella linearis*																	2	
S	659	*Pseudoprotella phasma*						1					1							
S	730	*Hyperia galba*					1	1		1	2					1				
S	793	*Gnathia* 'praniza'																		
S	794	*Gnathia dentata*										1								
S	796	*Gnathia oxyuraea*																		
S	854	*Eurydice pulchra*																		
S	892	*Janira maculosa*				1		1				1	1			1	2			
S	894	*Janiropsis breviremis*																		
S	904	*Munna ?fabricii?*								1									2	
S	942	*Idotea pelagica*																		
S	949	*Arcturella sp. Indet.*											1							
S	955	*Astacilla longicornis*												1						
S	1140	*Pseudoparatanais batei*																		
S	1142	*Tanaiopsis graciloides*																		
S	1197	*Bodotria scorpioides*						1									1			
S	1224	*Cumella pygmaea*														1				
S	1268	*Nyctiphanes couchi*																		
S	1345	*Eualus pusiolus*	1				2	2									1			
S	1377	*Pandalus montagui*																		
S	1436	*Juvenile Paguroidea sp. Indet*	1														1			
S	1448	*Anapagurus hyndmanni*																		
S	1457	*Pagurus bernhardus*	1													1				
S	1463	*Pagurus pubescens*											1							
S	1472	*Galathea intermedia*		3	1	6	17	27	16	8	23		6	1	9	14	31	4	1	
S	1482	*Pisidia longicornis*	1			12	93	##	22	79	36		13		78	44	29	##	1	5
S	1485	*Brachyuran sp. Indet.*																	4	

MCS code		Species Name/Authority	9	10	10	10	11	12	13	13	13	14	15	16	17	17	17	18	19	20
		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
S	1508	*Ebalia tuberosa*						1	2					2	1			2	1	
S	1509	*Ebalia tumefacta*							1											
S	1519	*Hyas coarctatus*																		
S	1527	*Inachus leptochirus*																		
S	1532	*Macropodia rostrata*																		
S	1555	*Atelecyclus rotundatus*								3								1		
S	1566	*Cancer pagurus*																		
S	1577	*Juvenile Liocarcinus sp.*		1	1															1
S	1584	*Liocarcinus pusillus*						1												
S	1638	*Pinnotheres pisum*																	1	
		Mollusca																		
W	53	*Leptochiton asellus*		1		1		4	1		6		3	3	5		2	1		2
W	156	*Juvenile Trochinae sp. Indet*																		
W	161	*Gibbula tumida*	1	1		1	7	15	12	4	5		8	1	16	17	5	10	2	
W	163	*Gibbula cineraria*		2	4			3					2				1		1	
W	171	*Jujubinus miliaris*																		
W	182	*Calliostoma zizyphinum*					3						1							
W	334	*Rissoa parva*		3	6	2		1		10	16								1	
W	344	*Alvania punctura*																		
W	361	*Manzonia crassa*																		
W	371	*Onoba semicostata*			2					2	4			2				3		
W	439	*Juvenile Crepidula fornicata*																		
W	439	*Crepidula fornicata*																		
W	480	*Velutina velutina*														2				
W	603	*Eulima bilineata*												1						
W	680	*Trophon truncatus*				1	2	2		1	2			1			1	1		
W	685	*Ocenebra erinacea*						1					1				1		2	
W	687	*Nucella lapillus*																3		
W	908	*Odostomia sp. Indet.*						1												
W	925	*Brachystomia scalaris*																		
W	1080	*Retusa truncatula*																		
W	1270	*Doto sp. Indet*											1							
W	1277	*Doto fragilis*							1											
W	1301	*Goniodoris castanea*							1		1						1			
W	1302	*Goniodoris nodosa*					1		1		2		1	1		1	1			
W	1325	*Onchidoris muricata*					1	2	1				3		1		1		1	
W	1354	*Limacia clavigera*																		
W	1469	*Facelina auriculata*			1					1										
W	1569	*Nucula nitidosa*																		
W	1570	*Nucula nucleus*				1	1	2	1		4			1	3	9	5	2	1	1
W	1595	*Jupiteria minuta*						3	3		1									
W	1690	*Juvenile Mytilacea*													1		3			
W	1695	*Mytilus edulis*			2							7	1			1	1		3	1
W	1702	*Modiolus modiolus*						2											26	
W	1708	*Modiolula phaseolina*							1							1				
W	1718	*Modiolarca tumida*							1											
W	1721	*Musculus discors*			1			1		7	2			3		4	1	11	1	
W	1776	*Chlamys distorta*								2	1									
W	1804	*Juvenile Anomiacea*																18		
W	1809	*Heteranomia squamula*		3	1	9		40	44		23	2			11		4			
W	1814	*Pododesmus patelliformis*			1				1											
W	1875	*Kellia suborbicularis*										1								
W	1882	*Semierycina nitida*							1											
W	1906	*Mysella bidentata*	1				3								1	2	6			
W	1929	*Goodalia triangularis*																		
W	1936	*Tridonta montagui*																	1	

MCS code		Species Name/Authority	9	10	10	10	11	12	13	13	13	14	15	16	17	17	17	18	19	20
		Replicate	C	A	B	C			A	B	C				A	B	C			
		Quantitative taxa																		
W	1951	*Parvicardium ovale*												2		1		2		
W	1961	*Cerastoderma edule*														5				
W	1974	*Juvenile Spisula sp. Indet*																		
W	1975	*Spisula elliptica*																		
W	1977	*Spisula solida*																	2	
W	2023	*Moerella pygmaea*																		
W	2044	*Juvenile Gari sp. Indet*																		
W	2046	*Gari depressa*																		
W	2049	*Gari tellinella*				1							1	5						
W	2059	*Abra alba*							1									1		
W	2085	*Juvenile Veneracea sp. Indet*																		
W	2095	*Gouldia minima*																		
W	2100	*Clausinella fasciata*																	1	
W	2104	*Timoclea ovata*						1					2							
	2124	*Venerupis senegalensis*																		
W	2147	*Mya truncata*			1			3					1		1	2	3	1	5	
W	2149	*Mya arenaria*						1												
W	2166	*Hiatella arctica*		3	6	2	6	4	4	8	11	9	16		4	10	7		3	1
W	2228	*Juvenile Thracia sp. Indet*																		
W	2231	*Thracia phaseolina*																		
W	2233	*Thracia villosiuscula*																		
W	2239	*Cochlodesma praetenue*																		
		Phoronida																		
ZA	3	*Phoronis*	1				2	5	1		3			6	9	10	6	8		1
		Echinodermata																		
ZB	18	Juvenile *Asteroidea* sp. Indet																		
ZB	75	*Crossaster papposus*												2						
ZB	86	*Henricia sanguinolenta*																		
ZB	105	Juvenile *Ophiuroidea* sp. Indet						9												
ZB	124	*Ophiothrix fragilis*					1						1							
ZB	147	*Ophiopholis aculeata*								1			15		9		1			
ZB	154	*Amphiura filiformis*																16		
ZB	168	*Ophiura albida*																		
ZB	161	*Amphipholis squamata*	1	6	2	5	4	4		2	1		9	11	2	14	4		2	1
ZB	262	*Thyone fusus*																		
ZB	296	*Leptosynapta ?inhaerans?*																		1

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
		Tunicata																		
ZD	2	*Ascidiacea* sp. Indet																		
ZD	120	*Dendrodoa grossularia*																		
		Bryozoa																		
Y	1	*Bryozoan sp. Indet*																		
		Crustacea																		
R	14	*Cirripedia*																		
		Anthozoa																		
D	58	*Hydrozoa sp. Indet*																		
D	163	*Tubularia sp. Indet*																		
D	583	*Anthozoa sp. Indet*																		
D	632	*Cerianthus loydii*																		
D	764	*Edwardsia sp. Indet*						1												
		Platyhelminthe																		
F	2	*Turbellaria sp. Indet*																		
		Nemertea																		
G	1	Nemertea	3	3	2	1	4			1	1	2	8	1	1	2				
		Nematoda																		
HD	1	*Nematoda spp. indet*	30	10	11	9	5	6	1			25	29	15	12	16	30	1	6	
		Sipuncula																		
N	12	*Juvenile Golfingia sp. Indet.*	1	1		1		1				5		9	2		3		1	
N	14	*Golfingia elongata*		1											1	1				
N	17	*Golfingia vulgaris vulgaris*																		
N	25	*Nephasoma minutum*														2				
N	34	*Phascolion strombus*					1								1	1			1	
		Polychaeta																		
P	15	*Pisione remota*																		
P	32	*Adyte pellucida*																		
P	44	*Enipo kinbergi*																		
P	49	*Gattyana cirrosa*	2		1								2				1			
P	50	*Juvenile Harmothoe sp. Indet*	6	9	6	3	1	4	1	1	3	8	14		1	3		1		1
P		*Juvenile Malmgrenia sp. Indet*											1			4				
P	53	*Harmothoe areolata*																		
P	55	*Malmgrenia castanea*											1							
P	58	*Harmothoe extenuata*																		
P	59	*Harmothoe fragilis*																		
P	64	*Harmothoe imbricata*																		
P	65	*Harmothoe impar*		1																
P	68	*Malmgrenia marphysae*																		
P		*Harmothoe pagenstecheri*																		
P	82	*Lepidonotus squamatus*	12	5	2	1		2		3	7	4	7	1			1	1	1	1
P	92	*Pholoe inornata*	1		1			1				2	5	1	2	1	1		2	
P		*Pholoe balthica*	9	3	4	2	3	5	3	2	1	4	5	7	4	1	5		1	1
P	107	*Sthenelais boa*																		
P	117/11	*Eteone longa/flava*	5		1						1	1		1	3	1	3	1		3
P	136	*Pseudomystides limbata*		1			1	1	1			1	2		1	2				1
P	144	*Anaitides maculata*																		
P	150	*Eulalia sp. Indet.*										1								
P	151	*Eulalia aurea*																		
P	152	*Eulalia bilineata*																		
P	153	*Eulalia expusilla*																		
P	156	*Eulalia cf ornata*														1				
P	161	*Eulalia viridis*																		
P	163	*Juvenile Eumida* sp. Indet													1	4				
P	164	*Eumida bahusiensis*																		
P	167	*Eumida sanguinea*	5	7	3	2	3	1	1	1	2	14	10	1			5	1	2	

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
P	255	*Juvenile Glycera sp. Indet*												1						
P		*Glycera capitata*																		
P	260	*Glycera lapidum*	3		1	1		2	1	1	1	2	1	4	3	6	1	1	2	
P	262	*Glycera oxycephala*																		
P	265	*Glycera tridactyla*																		
P	271	*Goniada maculata*				2											1			
P	275	*Goniadella bobretzkii*																		
P	276	*Goniadella gracilis*																		
P	291	*Sphaerodorum gracilis*		1								2								
P	300	*Gyptis propinqua*																		
P	305	*Psamathe cirrata*		1	1	4						2	2	1	1	2		2		
P	311	*Nereimyra punctata*																		
P	319	*Podarkeopsis capensis*																		
P	321	*Syllidia armata*																		
P	326	*Microphthalmus sp. Indet*																		
P	349	*Ehlersia cornuta*					1						1	1			5			1
P	358	*Syllis sp. Indet*					1													
P	362	*Trypanosyllis coeliaca*																		
P		*Typosyllis sp. A (White)*	6	3	3			7	1			3								
P		*Typosyllis sp. B (Striped)*	1	2	5				1				1	1	1	1	5			
P	365	*Typosyllis armillaris*				3					2		8	2	1	6	8	1	3	2
P	375	*Amblyosyllis formosa*																		
P	380	*Eusyllis blomstrandii*	3	3	2	3						2								
P	405	*Streptosyllis websteri*														2				
P	407	*Syllides benedicti*																		
P	421	*Exogone hebes*						1				1		1	1	3				
P	422	*Exogone naidina*	1																	
P	423	*Exogone verugera*						1	2				1				2			
P	424	*Sphaerosyllis sp. Indet.*																		
P	425	*Sphaerosyllis bulbosa*				2							1	9	5	8	14		3	1
P	426	*Sphaerosyllis erinaceus*										1								
P	427	*Sphaerosyllis hystrix*	3	1	4		3	1	2	1	2	5	3	2	2	15	1	1		
P	431	*Sphaerosyllis tetralix*																		
P	434	*Autolytus sp. A indet*	1	1	2							1								
P	435	*Autolytus alexandri*	4						3	2	3	1			1	3				
P	440	*Autolytus langerhansii*		1																
P	444	*Autolytus prolifera*				1														
P	451	*Proceraea sp. Indet*																		
P	458	*Juvenile Nereididae sp. Indet*															1			
P	475	*Nereis longissima*												2		1	1			
P	478	*Nereis zonata*																1		
P	494	*Juvenile Nepthys sp. Indet*																		
P	496	*Nepthys caeca*										1		1						
P	498	*Nephtys cirrosa*																		
P	499	*Nepthys hombergii*																		
P	505	*Nephtys pente*																		
P	534	*Spinither oniscoides*																		
P	572	*Lumbrineris sp. Indet*																		
P	579	*Lumbrineris gracilis*	2	1	1			1								1				
P	582	*Lumbrineris latreilli*																		
P	618	*Ophryotrocha gracilis*																		
P	638	*Protodorvillea kefersteinia*		2	4				1			2	2	4	3	8	2	1	6	
P	642	*Schistomeringos neglecta*																		
P	672	*Scoloplos armiger*																		1
P	722	*Aonides oxycephala*	1		1		2	2	1			1		1						
P	723	*Aonides paucibranchiata*			1												1			1
P	733	*Laonice bahusiensis*					1					1								

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
P	735	*Laonice sarsi*															1			
P	744	*Microspio mecznikowianus*																		
P	746	*Minuspio cf multibranchiata*																		
P	748	*Polydora sp. Indet.*											1							
P	750	*Polydora caeca*	4		1			1		1	1			7	2	1	1			1
P	751	*Polydora caulleryi*																		
P	752	*Polydora ciliata*																		
P	753	*Polydora cornuta*														2				
P	754	*Polydora flava*	2		1				4	2	1			1	2	1				
P	766	*Prionospio banyulensis*															1	1		
P	788	*Spio armata*	6	5	7		3	6	1			2		2	3	1		13	2	1
P	794	*Spiophanes bombyx*																		
P	824	*Aphelochaeta marioni*																		
P		*Aphelochaeta 'A'*										1								
P	829	*Caulleriella alata*	2	3	5			4					6			1	3			1
P	831	*Caulleriella zetlandica*																		
P	834	*Chaetozone setosa*																		
P		*Chaetozone christei*																		
P	837	*Cirriformia tentaculata*						1	1	2	1									
P	840	*Dodecaceria sp. Indet.*																		
P	846	*Tharyx killariensis*										1								
P	892	*Macrochaeta helgolandica*																		
P	907	*Capitella capitata*																		
P	919	*Mediomastus fragilis*	28	8	14	1	1	12	4			8	8	7	2	3	16			1
P	20 (92	*Notomastus sp. (latericeus)*																		
P	955	*Clymenura sp. Indet*																		
P	958	*Clymenura johnstonii*				1		1									2	1	1	
P	960	*Euclymene sp. Indet*																		
P	960/97	*Euclymene/Praxillella sp. Indet*																		
P	997	*Juvenile Ophelia sp indet*																		
P	999	*Ophelia borealis*																		
P	1026	*Scalibregma celticum*	2	2	1			6				1					1			
P	1027	*Scalibregma inflatum*									1									
P	1098	*Owenis fusiformis*																		
P	1116	*Sabellaria alveolata*							97	49	38									
P	1117	*Sabellaria spinulosa*	6	4	8		1		10	6	9	1	4	3			5			4
P	1122	*Melinna cf elisabethae*	8																	
P	1124	*Melinna palmata*																		
P	1133	*Juvenile Ampharete sp. Indet*																		
P	1139	*Ampharete lindstroemi*																		
P	1175	*Terebellides stroemi*																		
P	1177	*Trichobranchus glacialis*	3																	
P	1178	*Trichobranchus roseus*				1	2									1				
P	1180	*Juvenile Amphitritinae sp. Indet*	1	2	1															
P	1187	*Axionice maculata*	1	1																
P	1190	*Eupolymnia nesidensis*		2	2		1									1				
P	1193	*Lanassa venusta*																		
P	1195	*Lanice conchilega*					1													
P	1206	*Neoamphitrite figulus*																		
P	1210	*Nicolea venustula*									1		3					1		
P	1211	*Nicolea zostericola*				1														
P	1215	*Phisidia aurea*	1									1								
P	1217	*Pista cristata*										1								
P	1221	*Proclea graffii*																		
P	1223	*Terebella lapidaria*																		
P	1232	*Lysilla sp. Indet*	1					1				1		1			1			

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
P	1233	*Lysilla loveni*																		
P	1235	*Polycirrus sp. Indet*	15		6	1	3	6	5	2	1	10	2		1	2	4	1	1	
P	1242	*Polycirrus medusa*				1								2	1					1
P	1243	*Polycirrus norvegicus*	1	5	6		3						6	1	3	2	1	9	3	
P	1253	*Juvenile Thelepus sp. Indet.*																		
P	1254	*Thelepus cincinnatus*											2					1	1	
P	1255	*Thelepus setosus*	1					1				1					4			
P	1263	*Branchiomma bombyx*																		
P	1267	*Chone duneri*					3						4							
P	1269	*Chone filicaudata*	2	2	5			3				3	1	1	1	1	1	4	3	1
P	1273	*Demonax cambrensis*																		
P	1276	*Demonax torulis*	2																	
P	1280	*Euchone rubrocincta*																1		
P	1287	*Jasmineira sp. Indet*																		
P	1289	*Jasmineira caudata*						1			1									
P	1290	*Jasmineira elegans*							1	3	7									
P	1316	*Pseudopotamilla reniformis*							1					2						
P	1321	*Sabella sarsi*																		
P	1339	*Pomatoceros sp. Indet*						1												
P	1340	*Pomatoceros lamarcki*	2	5	2	5	2	1	1	4	3	3	1	16	9	11	2	1	1	
P	1341	*Pomatoceros triqueter*		1	2	1							2							
P	1334	*Hydroides norvegica*																		
P	1350	*Filograna implexa*																		
P	1361	*Salmacina dysteri*	1		4															
P	1425	*Tubificidae sp. Indet*														1				
P	1524	*Grania sp. Indet*	3	1	1		1		1					1	2	14	2			
		Crustacea																		
Q	4	*Nymphon brevirostre*			1		1						3							
Q	15	*Achelia echinata*	17	12	7	8	2					1	24				3	1	1	
Q	30	*Endeis spinosa*										1								
Q	33	*Callipallene brevirostris*	1	3	2							1								
Q	34	*Callipallene emaciata*															1			
Q	45	*Anoplodactylus pygmaeus*																		
R	142	Copepoda	4	3	15	3		2		2	3	4	2		2	1	1			
S	6	*Nebalia bipes*												2		1				
S	31	*Mysidae sp. Indet.*																		
S	92	*Heteromysis formosa*																		
S	134	*Pontocrates arcticus*																		
S	146	*Parapleustes bicuspis*									1									
S	158	*Amphilochus manudens*																		
S	177	*Leucothoe incisa*						1				1						1		1
S	186	*Cressa dubai*																		
S	207	*Juvenile Stenothoidae sp. Indet.*																		
S	213	*Stenothoe marina*																		
S	214	*Stenothoe monoculoides*																		
S	248	*Urothoe elegans*																		
	249	*Urothoe marina*																		
	255	*Harpinia crenulata*																		
S	256	*Harpinia laevis*																		
S	275	*Ascidostoma obesum*																		
S	302	*Lysianassa sp. Indet.*																		
S	320	*Orchomene humilis*										4	1					1		
S	321	*Orchomene nanus*											1							
S	336	*Tmetonyx cicada*																		
S	337	*Tmetonyx similis*																		
S	344	*Tryphosella sarsi*	3									2								
S	380	*Iphimedia minuta*			1															

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
S	381	*Iphimedia nexa*	1	2	3															
S	382	*Iphimedia obesa*				5														
S	411	*Atylus guttatus*																		
S	412	*Atylus swammerdamei*																		
S	419	*Tritaeta gibbosa*		1									3				1			
S	429	*Ampelisca diadema*	1	1	1															
S	438	*Ampelisca spinipes*																		
S	481	*Gammarus salinus*		1																
S	498	*Abludomelita obtusata*																		
S	503	*Cheirocratus sp. Indet*	15	6	1	1		4				4			2	1	1	7	4	
S	504	*Cheirocratus assimilis*												1			1			
S	505	*Cheirocratus intermedius*																		
S	506	*Cheirocratus sundevallii*	18	8	10			5				2	8		1	5				
S	519	*Maera othonis*						1								1		1		
S	524	*Melita hergensis*																		
S	539	*Gammaropsis cornuta*								1	1									
S	541	*Gammaropsis maculata*		3	2		1			1			1			1				
S	558	*Juvenile Ischyroceridae sp. Indet*																		
S	577	*Juvenile Aoridae sp. Indet.*																		
S	578	*Aora gracilis*																		
S	585	*Lembos websteri*																1		
S	586	*Juvenile Leptocheirus sp. indet*	10	1	1			2				32								
S	588	*Leptocheirus hirsutimanus*	2		4		2	2		2	3	6	12	18	21	39	8			8
S	605	*Corophium sp. Indet*									2									
S	611	*Corophium crassicorne*	1									1	1							
S	615	*Corophium sextonae*											1							
S	621	*Unicola crenatipalma*								1	16									
S	628	*Dyopedos monacanthus*																		
S	629	*Dyopedos porrectus*		2	1								2							
S	646	*Caprella linearis*	4	3	3		1											1		
S	659	*Pseudoprotella phasma*	2																	
S	730	*Hyperia galba*		1									1	1			3			
S	793	*Gnathia* 'praniza'								1	1									
S	794	*Gnathia dentata*																		
S	796	*Gnathia oxyuraea*									3		3							
S	854	*Eurydice pulchra*														1				
S	892	*Janira maculosa*										3								
S	894	*Janiropsis breviremis*																		
S	904	*Munna ?fabricii?*																		
S	942	*Idotea pelagica*					1													
S	949	*Arcturella sp. Indet.*																		
S	955	*Astacilla longicornis*																		
S	1140	*Pseudoparatanais batei*											1							
S	1142	*Tanaiopsis graciloides*																		
S	1197	*Bodotria scorpioides*	1										1							
S	1224	*Cumella pygmaea*																		
S	1268	*Nyctiphanes couchi*																		
S	1345	*Eualus pusiolus*		2																1
S	1377	*Pandalus montagui*																		
S	1436	*Juvenile Paguroidea sp. Indet*																		
S	1448	*Anapagurus hyndmanni*	1																	
S	1457	*Pagurus bernhardus*	2		1															
S	1463	*Pagurus pubescens*																		
S	1472	*Galathea intermedia*	18	2	11		3	5				2	6	1	2	1	1	2		1
S	1482	*Pisidia longicornis*	59	32	33	35	1	26	6	8	16	44	##	1	1	3	3	8	3	
S	1485	*Brachyuran sp. Indet.*																		

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
S	1508	*Ebalia tuberosa*	2		1							2	4					1		
S	1509	*Ebalia tumefacta*																		
S	1519	*Hyas coarctatus*																		
S	1527	*Inachus leptochirus*											1							
S	1532	*Macropodia rostrata*																		
S	1555	*Atelecyclus rotundatus*	2	1																
S	1566	*Cancer pagurus*																		
S	1577	*Juvenile Liocarcinus sp.*																		
S	1584	*Liocarcinus pusillus*																		
S	1638	*Pinnotheres pisum*												1						
		Mollusca																		
W	53	*Leptochiton asellus*	3		1		1					1	3	1	3	2	1			
W	156	*Juvenile Trochinae sp. Indet*																		
W	161	*Gibbula tumida*	10	1	5	4		7				2	7					2	1	3
W	163	*Gibbula cineraria*	3	3	2	3		1				1	3	1				2		
W	171	*Jujubinus miliaris*				2														
W	182	*Calliostoma zizyphinum*		4	1							1								
W	334	*Rissoa parva*	11	6	5															
W	344	*Alvania punctura*																		
W	361	*Manzonia crassa*																		
W	371	*Onoba semicostata*	1		5															
W	439	*Juvenile Crepidula fornicata*																		
W	439	*Crepidula fornicata*		1					1											
W	480	*Velutina velutina*																		
W	603	*Eulima bilineata*																		
W	680	*Trophon truncatus*																		
W	685	*Ocenebra erinacea*						1				2								
W	687	*Nucella lapillus*											1							
W	908	*Odostomia sp. Indet.*																		
W	925	*Brachystomia scalaris*																		
W	1080	*Retusa truncatula*											1							
W	1270	*Doto sp. Indet*																		
W	1277	*Doto fragilis*																		
W	1301	*Goniodoris castanea*																		
W	1302	*Goniodoris nodosa*	1					1												
W	1325	*Onchidoris muricata*	3		1							1		1		1		1		
W	1354	*Limacia clavigera*											1							
W	1469	*Facelina auriculata*																		
W	1569	*Nucula nitidosa*	2																	
W	1570	*Nucula nucleus*																		4
W	1595	*Jupiteria minuta*						1					1							
W	1690	*Juvenile Mytilacea*												2	1	3	1			
W	1695	*Mytilus edulis*																		
W	1702	*Modiolus modiolus*										1						1		1
W	1708	*Modiolula phaseolina*																		
W	1718	*Modiolarca tumida*											1							
W	1721	*Musculus discors*	2		5	24							3				6			
W	1776	*Chlamys distorta*		1																
W	1804	*Juvenile Anomiacea*																		
W	1809	*Heteranomia squamula*		4	1	7						1	8	2		2				
W	1814	*Pododesmus patelliformis*																		
W	1875	*Kellia suborbicularis*																		
W	1882	*Semierycina nitida*																		
W	1906	*Mysella bidentata*										1								1
W	1929	*Goodalia triangularis*												1						
W	1936	*Tridonta montagui*		1																

MCS code		Species Name/Authority	21	21	21	22	23	24	25	25	25	26	27	28	28	28	29	29	29	30
		Replicate	A	B	C				A	B	C			A	B	C	A	B	C	A
		Quantitative taxa																		
W	1951	*Parvicardium ovale*											1							
W	1961	*Cerastoderma edule*																		
W	1974	*Juvenile Spisula sp. Indet*																		
W	1975	*Spisula elliptica*												1	1	3	1			1
W	1977	*Spisula solida*						1												
W	2023	*Moerella pygmaea*																		
W	2044	*Juvenile Gari sp. Indet*	1		1															
W	2046	*Gari depressa*	1			1	1					1	1			2	2	1	3	
W	2049	*Gari tellinella*						1												
W	2059	*Abra alba*											1							
W	2085	*Juvenile Veneracea sp. Indet*																		1
W	2095	*Gouldia minima*																		
W	2100	*Clausinella fasciata*																		
W	2104	*Timoclea ovata*	1				1	4					2					2		
	2124	*Venerupis senegalensis*																		
W	2147	*Mya truncata*	1		1		1	1				2								
W	2149	*Mya arenaria*																		
W	2166	*Hiatella arctica*	1		2	1			2	1	2	5	8	2		2	3			4
W	2228	*Juvenile Thracia sp. Indet*																		
W	2231	*Thracia phaseolina*		1																
W	2233	*Thracia villosiuscula*																		
W	2239	*Cochlodesma praetenue*																		
		Phoronida																		
ZA	3	*Phoronis*	25		9		2	7				1	2	3			1			
		Echinodermata																		
ZB	18	Juvenile *Asteroidea* sp. Indet		1																
ZB	75	*Crossaster papposus*																		
ZB	86	*Henricia sanguinolenta*																		
ZB	105	Juvenile *Ophiuroidea* sp. Indet	6	3	6	4									1	9				
ZB	124	*Ophiothrix fragilis*						1				3								
ZB	147	*Ophiopholis aculeata*					1	1				1	2			2		1		
ZB	154	*Amphiura filiformis*																		
ZB	168	*Ophiura albida*																		
ZB	161	*Amphipholis squamata*	11	2	8		5	2				12	7	2				1	3	
ZB	262	*Thyone fusus*																		
ZB	296	*Leptosynapta ?inhaerans?*												5						

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
		Tunicata																		
ZD	2	*Ascidiacea* sp. Indet																		
ZD	120	*Dendrodoa grossularia*																		
		Bryozoa																		
Y	1	*Bryozoan sp. Indet*																		
		Crustacea																		
R	14	*Cirripedia*																		
		Anthozoa																		
D	58	*Hydrozoa sp. Indet*																		
D	163	*Tubularia sp. Indet*																		
D	583	*Anthozoa sp. Indet*	1																	
D	632	*Cerianthus loydii*																		
D	764	*Edwardsia sp. Indet*													1					
		Platyhelminthe																		
F	2	*Turbellaria sp. Indet*					1									1				
		Nemertea																		
G	1	Nemertea	1							1					2		1			
		Nematoda																		
HD	1	*Nematoda spp. indet*	1			1	1		1	2	1	12		1	5	7	2	4	8	4
		Sipuncula																		
N	12	*Juvenile Golfingia sp. Indet.*					1	3				3			6					3
N	14	*Golfingia elongata*																		
N	17	*Golfingia vulgaris vulgaris*																		
N	25	*Nephasoma minutum*																	2	
N	34	*Phascolion strombus*												1						
		Polychaeta																		
P	15	*Pisione remota*				1														
P	32	*Adyte pellucida*													1					
P	44	*Enipo kinbergi*																		
P	49	*Gattyana cirrosa*	1																	
P	50	*Juvenile Harmothoe sp. Indet*	1				1				2	2	1	3	4		1		8	10
P		*Juvenile Malmgrenia sp. Indet*																		
P	53	*Harmothoe areolata*								6										
P	55	*Malmgrenia castanea*																		
P	58	*Harmothoe extenuata*																		1
P	59	*Harmothoe fragilis*																		
P	64	*Harmothoe imbricata*																		
P	65	*Harmothoe impar*																		
P	68	*Malmgrenia marphysae*																		
P		*Harmothoe pagenstecheri*																		
P	82	*Lepidonotus squamatus*	2	2			1	2	1	4		2	4		3				4	7
P	92	*Pholoe inornata*													1					
P		*Pholoe balthica*								5		1	1		4	1			1	2
P	107	*Sthenelais boa*																		
P	117/11	*Eteone longa/flava*					1		1					1	2					3
P	136	*Pseudomystides limbata*						2							1					
P	144	*Anaitides maculata*																		
P	150	*Eulalia sp. Indet.*																		
P	151	*Eulalia aurea*																	1	
P	152	*Eulalia bilineata*																		
P	153	*Eulalia expusilla*																		
P	156	*Eulalia cf ornata*								1										
P	161	*Eulalia viridis*																	1	
P	163	*Juvenile Eumida* sp. Indet										1			1					
P	164	*Eumida bahusiensis*																		
P	167	*Eumida sanguinea*					1			2						3	4	6	3	1

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
P	255	*Juvenile Glycera sp. Indet*																		
P		*Glycera capitata*																		
P	260	*Glycera lapidum*				2	1	8		1				2	1	1				1
P	262	*Glycera oxycephala*											1							
P	265	*Glycera tridactyla*																		
P	271	*Goniada maculata*				1											1			
P	275	*Goniadella bobretzkii*																		1
P	276	*Goniadella gracilis*									1									
P	291	*Sphaerodorum gracilis*																		
P	300	*Gyptis propinqua*																		
P	305	*Psamathe cirrata*	1					1				1			1		1			
P	311	*Nereimyra punctata*	1																	
P	319	*Podarkeopsis capensis*																		
P	321	*Syllidia armata*																		
P	326	*Microphthalmus sp. Indet*																		
P	349	*Ehlersia cornuta*				1	1	1						1			5	1		2
P	358	*Syllis sp. Indet*																		
P	362	*Trypanosyllis coeliaca*																		
P		*Typosyllis sp. A (White)*	3	1					1				2	2	2					
P		*Typosyllis sp. B (Striped)*	1	2				1		1		2			1				1	
P	365	*Typosyllis armillaris*					1	1		2		2					1		2	2
P	375	*Amblyosyllis formosa*																		
P	380	*Eusyllis blomstrandii*																		
P	405	*Streptosyllis websteri*																		
P	407	*Syllides benedicti*																		
P	421	*Exogone hebes*	1						1								1		1	
P	422	*Exogone naidina*						3												
P	423	*Exogone verugera*																1		
P	424	*Sphaerosyllis sp. Indet.*																		
P	425	*Sphaerosyllis bulbosa*				1			1						1	2	5			1
P	426	*Sphaerosyllis erinaceus*																		
P	427	*Sphaerosyllis hystrix*						1			1	1							6	
P	431	*Sphaerosyllis tetralix*																		
P	434	*Autolytus sp. A indet*										1								
P	435	*Autolytus alexandri*										2			2					2
P	440	*Autolytus langerhansii*																		
P	444	*Autolytus prolifera*																		
P	451	*Proceraea sp. Indet*																		
P	458	*Juvenile Nereididae sp. Indet*																	1	
P	475	*Nereis longissima*								1		1		1					2	
P	478	*Nereis zonata*																		
P	494	*Juvenile Nepthys sp. Indet*	1																	
P	496	*Nepthys caeca*								1										
P	498	*Nephtys cirrosa*																		
P	499	*Nepthys hombergii*										1		1						
P	505	*Nephtys pente*																		
P	534	*Spinither oniscoides*																		
P	572	*Lumbrineris sp. Indet*																		
P	579	*Lumbrineris gracilis*													1					
P	582	*Lumbrineris latreilli*													1					
P	618	*Ophryotrocha gracilis*																		
P	638	*Protodorvillea kefersteinia*	3												1				2	1
P	642	*Schistomeringos neglecta*														1	1			
P	672	*Scoloplos armiger*					1				1									
P	722	*Aonides oxycephala*	1									1			1			1		1
P	723	*Aonides paucibranchiata*					5	3	2				1	2	2		4	2		
P	733	*Laonice bahusiensis*																		

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
P	735	*Laonice sarsi*																		
P	744	*Microspio mecznikowianus*																		
P	746	*Minuspio cf multibranchiata*																		
P	748	*Polydora sp. Indet.*																		
P	750	*Polydora caeca*	2	1								2							6	
P	751	*Polydora caulleryi*																		
P	752	*Polydora ciliata*																		
P	753	*Polydora cornuta*						1												
P	754	*Polydora flava*								8		7							2	
P	766	*Prionospio banyulensis*																		
P	788	*Spio armata*	2	1				3	1	2	5	5	1	4	9	1				8
P	794	*Spiophanes bombyx*														1				
P	824	*Aphelochaeta marioni*																		
P		*Aphelochaeta 'A'*												1	1		1			
P	829	*Caulleriella alata*	1	1				2		1		2		1	2				1	
P	831	*Caulleriella zetlandica*																		
P	834	*Chaetozone setosa*								1										
P		*Chaetozone christei*										1								
P	837	*Cirriformia tentaculata*										1								
P	840	*Dodecaceria sp. Indet.*																		
P	846	*Tharyx killariensis*																		
P	892	*Macrochaeta helgolandica*																		
P	907	*Capitella capitata*																		
P	919	*Mediomastus fragilis*	1					4	1			1		2	9	1	1	1	2	12
P	20 (92	*Notomastus sp. (latericeus)*																	2	
P	955	*Clymenura sp. Indet*																		
P	958	*Clymenura johnstonii*					1	2	1					1			1			1
P	960	*Euclymene sp. Indet*																		
P	960/97	*Euclymene/Praxillella sp. Indet*																		
P	997	*Juvenile Ophelia sp indet*																		
P	999	*Ophelia borealis*																		
P	1026	*Scalibregma celticum*								1		2	1		3				2	
P	1027	*Scalibregma inflatum*													1					1
P	1098	*Owenis fusiformis*																		
P	1116	*Sabellaria alveolata*	1							##	8	##	45						##	
P	1117	*Sabellaria spinulosa*	1							32		9	4	5					4	
P	1122	*Melinna cf elisabethae*																		
P	1124	*Melinna palmata*																	1	
P	1133	*Juvenile Ampharete sp. Indet*										1								
P	1139	*Ampharete lindstroemi*																		
P	1175	*Terebellides stroemi*																		
P	1177	*Trichobranchus glacialis*																		1
P	1178	*Trichobranchus roseus*													1					
P	1180	*Juvenile Amphitritinae sp. Indet*																		
P	1187	*Axionice maculata*																		
P	1190	*Eupolymnia nesidensis*																		
P	1193	*Lanassa venusta*																		
P	1195	*Lanice conchilega*					4						1							
P	1206	*Neoamphitrite figulus*																		
P	1210	*Nicolea venustula*					1								1				1	
P	1211	*Nicolea zostericola*																		
P	1215	*Phisidia aurea*													1					1
P	1217	*Pista cristata*																		
P	1221	*Proclea graffii*																		
P	1223	*Terebella lapidaria*																		
P	1232	*Lysilla sp. Indet*						1					1	5	1		2			4

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
P	1233	*Lysilla loveni*																		
P	1235	*Polycirrus sp. Indet*					1	3	1		5			3	1				3	4
P	1242	*Polycirrus medusa*	4	2			1					2			3	5				
P	1243	*Polycirrus norvegicus*						9	2	2		1							2	3
P	1253	*Juvenile Thelepus sp. Indet.*																		
P	1254	*Thelepus cincinnatus*	1																	
P	1255	*Thelepus setosus*																		
P	1263	*Branchiomma bombyx*																		
P	1267	*Chone duneri*										1								
P	1269	*Chone filicaudata*				3		4	1						3		1			
P	1273	*Demonax cambrensis*																		
P	1276	*Demonax torulis*																		
P	1280	*Euchone rubrocincta*																		
P	1287	*Jasmineira sp. Indet*																		
P	1289	*Jasmineira caudata*																		
P	1290	*Jasmineira elegans*																		
P	1316	*Pseudopotamilla reniformis*								2		1								
P	1321	*Sabella sarsi*																		
P	1339	*Pomatoceros sp. Indet*												1						
P	1340	*Pomatoceros lamarcki*	5	1			4	4	1	1	1	6	2	2	2		3		5	3
P	1341	*Pomatoceros triqueter*																		1
P	1334	*Hydroides norvegica*																		
P	1350	*Filograna implexa*																		
P	1361	*Salmacina dysteri*																		
P	1425	*Tubificidae sp. Indet*																		
P	1524	*Grania sp. Indet*													1		1			
		Crustacea																		
Q	4	*Nymphon brevirostre*		1																
Q	15	*Achelia echinata*		2						1										
Q	30	*Endeis spinosa*																		
Q	33	*Callipallene brevirostris*																		
Q	34	*Callipallene emaciata*																		
Q	45	*Anoplodactylus pygmaeus*																		
R	142	Copepoda				2		2	1							1				
S	6	*Nebalia bipes*													2					
S	31	*Mysidae sp. Indet.*																		
S	92	*Heteromysis formosa*																		
S	134	*Pontocrates arcticus*																		
S	146	*Parapleustes bicuspis*		1						2		1							1	
S	158	*Amphilochus manudens*																		
S	177	*Leucothoe incisa*						1												
S	186	*Cressa dubai*																		1
S	207	*Juvenile Stenothoidae sp. Indet.*																		
S	213	*Stenothoe marina*																		
S	214	*Stenothoe monoculoides*																		
S	248	*Urothoe elegans*										9								
	249	*Urothoe marina*																		
	255	*Harpinia crenulata*																		
S	256	*Harpinia laevis*										1								
S	275	*Ascidostoma obesum*																		
S	302	*Lysianassa sp. Indet.*																		
S	320	*Orchomene humilis*													2					4
S	321	*Orchomene nanus*								1										
S	336	*Tmetonyx cicada*																		
S	337	*Tmetonyx similis*																		
S	344	*Tryphosella sarsi*	2																	1

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
S	381	*Iphimedia nexa*																		
S	382	*Iphimedia obesa*																		10
S	411	*Atylus guttatus*								5		1								
S	412	*Atylus swammerdamei*																		
S	419	*Tritaeta gibbosa*																		
S	429	*Ampelisca diadema*																		
S	438	*Ampelisca spinipes*																		
S	481	*Gammarus salinus*																		
S	498	*Abludomelita obtusata*	5																	
S	503	*Cheirocratus sp. Indet*	4					1	3		1			1	1		1	1		
S	504	*Cheirocratus assimilis*	3														1			
S	505	*Cheirocratus intermedius*																		
S	506	*Cheirocratus sundevallii*						1	1				1						1	11
S	519	*Maera othonis*					1					2			2					
S	524	*Melita hergensis*																		
S	539	*Gammaropsis cornuta*																		
S	541	*Gammaropsis maculata*																		
S	558	*Juvenile Ischyroceridae sp. Indet*																		
S	577	*Juvenile Aoridae sp. Indet.*																		
S	578	*Aora gracilis*																		
S	585	*Lembos websteri*																		
S	586	*Juvenile Leptocheirus sp. indet*																		
S	588	*Leptocheirus hirsutimanus*				1	2	7	1					3			3	2		
S	605	*Corophium sp. Indet*																		
S	611	*Corophium crassicorne*										1								
S	615	*Corophium sextonae*																		
S	621	*Unicola crenatipalma*	1							1		1	2							
S	628	*Dyopedos monacanthus*																		
S	629	*Dyopedos porrectus*																		
S	646	*Caprella linearis*										1								
S	659	*Pseudoprotella phasma*																		
S	730	*Hyperia galba*												1			1			1
S	793	*Gnathia* 'praniza'																		
S	794	*Gnathia dentata*																		
S	796	*Gnathia oxyuraea*																		
S	854	*Eurydice pulchra*																		
S	892	*Janira maculosa*										1								1
S	894	*Janiropsis breviremis*																		
S	904	*Munna ?fabricii?*																		
S	942	*Idotea pelagica*																		
S	949	*Arcturella sp. Indet.*																		
S	955	*Astacilla longicornis*																		
S	1140	*Pseudoparatanais batei*																		
S	1142	*Tanaiopsis graciloides*																		
S	1197	*Bodotria scorpioides*											1							
S	1224	*Cumella pygmaea*																		
S	1268	*Nyctiphanes couchi*																		
S	1345	*Eualus pusiolus*								2		2	1						1	3
S	1377	*Pandalus montagui*																		
S	1436	*Juvenile Paguroidea sp. Indet*																		
S	1448	*Anapagurus hyndmanni*										2	1							
S	1457	*Pagurus bernhardus*																		
S	1463	*Pagurus pubescens*																		
S	1472	*Galathea intermedia*	4	1			2		2	3		2	3	4	2				6	25
S	1482	*Pisidia longicornis*	3	1			7	5	3	10		7	7	2	77				20	##
S	1485	*Brachyuran sp. Indet.*																		

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
S	1508	*Ebalia tuberosa*													2					1
S	1509	*Ebalia tumefacta*																		
S	1519	*Hyas coarctatus*																		
S	1527	*Inachus leptochirus*																		
S	1532	*Macropodia rostrata*																		
S	1555	*Atelecyclus rotundatus*																		
S	1566	*Cancer pagurus*																		
S	1577	*Juvenile Liocarcinus sp.*																		
S	1584	*Liocarcinus pusillus*																		
S	1638	*Pinnotheres pisum*						1												
		Mollusca																		
W	53	*Leptochiton asellus*												2	1					1
W	156	*Juvenile Trochinae sp. Indet*																		
W	161	*Gibbula tumida*	2	2				1						4	1		1	1	2	4
W	163	*Gibbula cineraria*	1	1				2	1					2		2	2	1	1	4
W	171	*Jujubinus miliaris*																		2
W	182	*Calliostoma zizyphinum*	1										1							
W	334	*Rissoa parva*																		1
W	344	*Alvania punctura*																		
W	361	*Manzonia crassa*	1																	
W	371	*Onoba semicostata*																		
W	439	*Juvenile Crepidula fornicata*																		
W	439	*Crepidula fornicata*																		
W	480	*Velutina velutina*																		
W	603	*Eulima bilineata*																		
W	680	*Trophon truncatus*					1			1				1						
W	685	*Ocenebra erinacea*																		
W	687	*Nucella lapillus*								1				1						
W	908	*Odostomia sp. Indet.*										2							1	
W	925	*Brachystomia scalaris*								2										
W	1080	*Retusa truncatula*																		
W	1270	*Doto sp. Indet*																		
W	1277	*Doto fragilis*																		
W	1301	*Goniodoris castanea*																		
W	1302	*Goniodoris nodosa*																		
W	1325	*Onchidoris muricata*										1		1						1
W	1354	*Limacia clavigera*																		
W	1469	*Facelina auriculata*																		
W	1569	*Nucula nitidosa*																		
W	1570	*Nucula nucleus*		1						1	1			1	1					1
W	1595	*Jupiteria minuta*																		
W	1690	*Juvenile Mytilacea*														5	2	7		
W	1695	*Mytilus edulis*								52	3	7	2						5	
W	1702	*Modiolus modiolus*									1				1					
W	1708	*Modiolula phaseolina*																		
W	1718	*Modiolarca tumida*																		
W	1721	*Musculus discors*								1						1				
W	1776	*Chlamys distorta*																		
W	1804	*Juvenile Anomiacea*													3					
W	1809	*Heteranomia squamula*	1	3											2					
W	1814	*Pododesmus patelliformis*																		
W	1875	*Kellia suborbicularis*																		
W	1882	*Semierycina nitida*																		
W	1906	*Mysella bidentata*		2																
W	1929	*Goodalia triangularis*														11	3	2		
W	1936	*Tridonta montagui*																		

MCS code		Species Name/Authority	30	30	31	32	33	33	33	34	34	34	35	36	37	38	38	38	39	40
		Replicate	B	C			A	B	C	A	B	C				A	B	C		
		Quantitative taxa																		
W	1951	*Parvicardium ovale*																		
W	1961	*Cerastoderma edule*																		
W	1974	*Juvenile Spisula sp. Indet*																		
W	1975	*Spisula elliptica*								1							1		2	
W	1977	*Spisula solida*											1	1						
W	2023	*Moerella pygmaea*																		
W	2044	*Juvenile Gari sp. Indet*																	1	
W	2046	*Gari depressa*					1	1						1		1			1	
W	2049	*Gari tellinella*																		
W	2059	*Abra alba*									1	2								
W	2085	*Juvenile Veneracea sp. Indet*																		
W	2095	*Gouldia minima*																		
W	2100	*Clausinella fasciata*												1			1			
W	2104	*Timoclea ovata*					2		1						1					
	2124	*Venerupis senegalensis*																		
W	2147	*Mya truncata*								1						1		1		4
W	2149	*Mya arenaria*													1					
W	2166	*Hiatella arctica*	4	2						31	1	1	1	3	2				15	1
W	2228	*Juvenile Thracia sp. Indet*																		
W	2231	*Thracia phaseolina*																		
W	2233	*Thracia villosiuscula*												1						
W	2239	*Cochlodesma praetenue*																		
		Phoronida																		
ZA	3	*Phoronis*	5	1							2	5		4	1		2	1	1	2
		Echinodermata																		
ZB	18	Juvenile *Asteroidea* sp. Indet																		
ZB	75	*Crossaster papposus*																	1	
ZB	86	*Henricia sanguinolenta*											1							
ZB	105	Juvenile *Ophiuroidea* sp. Indet																		
ZB	124	*Ophiothrix fragilis*	1										1		19					
ZB	147	*Ophiopholis aculeata*						6	1						4					7
ZB	154	*Amphiura filiformis*																		
ZB	168	*Ophiura albida*																		
ZB	161	*Amphipholis squamata*		1				4	1						2					5
ZB	262	*Thyone fusus*																		
ZB	296	*Leptosynapta ?inhaerans?*																		

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
		Tunicata																		
ZD	2	*Ascidiacea* sp. Indet																		
ZD	120	*Dendrodoa grossularia*																		
		Bryozoa																		
Y	1	*Bryozoan sp. Indet*																		
		Crustacea																		
R	14	*Cirripedia*																		
		Anthozoa																		
D	58	*Hydrozoa sp. Indet*																		
D	163	*Tubularia sp. Indet*																		
D	583	*Anthozoa sp. Indet*												1						
D	632	*Cerianthus loydii*																		
D	764	*Edwardsia sp. Indet*										1	3							
		Platyhelminthe																		
F	2	*Turbellaria sp. Indet*					2				1									
		Nemertea																		
G	1	Nemertea		1	3	2	2	2		3	3	1	1		1		1	1		
		Nematoda																		
HD	1	*Nematoda spp. indet*		12	15	11		3	1	12	10	2	3	2	6	2	8	1		2
		Sipuncula																		
N	12	*Juvenile Golfingia sp. Indet.*		1	1	2		2		5		1		2						
N	14	*Golfingia elongata*																		
N	17	*Golfingia vulgaris vulgaris*																		
N	25	*Nephasoma minutum*																		
N	34	*Phascolion strombus*																		
		Polychaeta																		
P	15	*Pisione remota*													3		2			
P	32	*Adyte pellucida*																		
P	44	*Enipo kinbergi*																		
P	49	*Gattyana cirrosa*					2													
P	50	*Juvenile Harmothoe sp. Indet*		4	1	2		6	3	3	3	2		1						
P		*Juvenile Malmgrenia sp. Indet*																		
P	53	*Harmothoe areolata*					2													
P	55	*Malmgrenia castanea*																		
P	58	*Harmothoe extenuata*																		
P	59	*Harmothoe fragilis*																		
P	64	*Harmothoe imbricata*																		
P	65	*Harmothoe impar*																		
P	68	*Malmgrenia marphysae*																		
P		*Harmothoe pagenstecheri*																		
P	82	*Lepidonotus squamatus*		2	1			1	3	3		1	3	4						
P	92	*Pholoe inornata*		2	1	1		1		1	1									
P		*Pholoe balthica*		4	2		1	1	1	3	1	2	4	3						
P	107	*Sthenelais boa*																		
P	117/11	*Eteone longa/flava*		2	4	1		1	2		5							1		
P	136	*Pseudomystides limbata*									2								3	1
P	144	*Anaitides maculata*																		
P	150	*Eulalia sp. Indet.*																		
P	151	*Eulalia aurea*																		
P	152	*Eulalia bilineata*																		
P	153	*Eulalia expusilla*																		
P	156	*Eulalia cf ornata*																		
P	161	*Eulalia viridis*																		
P	163	*Juvenile Eumida* sp. Indet					1	2			2	2	1		1		6	2		1
P	164	*Eumida bahusiensis*														2				
P	167	*Eumida sanguinea*			1		1			1					1	1		3		

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
P	255	*Juvenile Glycera sp. Indet*																		
P		*Glycera capitata*		1					1											
P	260	*Glycera lapidum*						1	1	1					2	2	3			
P	262	*Glycera oxycephala*	1																	
P	265	*Glycera tridactyla*	1																	
P	271	*Goniada maculata*							1											
P	275	*Goniadella bobretzkii*																		
P	276	*Goniadella gracilis*															1			
P	291	*Sphaerodorum gracilis*																		
P	300	*Gyptis propinqua*																		
P	305	*Psamathe cirrata*			1	1						1		6						
P	311	*Nereimyra punctata*																		
P	319	*Podarkeopsis capensis*																		
P	321	*Syllidia armata*																		
P	326	*Microphthalmus sp. Indet*																		
P	349	*Ehlersia cornuta*						2	1	2										
P	358	*Syllis sp. Indet*			1															
P	362	*Trypanosyllis coeliaca*																		
P		*Typosyllis sp. A (White)*						1			9	1	3							
P		*Typosyllis sp. B (Striped)*																		
P	365	*Typosyllis armillaris*		8	4	2	10	1	6	2				4						
P	375	*Amblyosyllis formosa*																		
P	380	*Eusyllis blomstrandii*																		
P	405	*Streptosyllis websteri*																		
P	407	*Syllides benedicti*																		
P	421	*Exogone hebes*									3	1	1							
P	422	*Exogone naidina*		2							2		1							
P	423	*Exogone verugera*										1								
P	424	*Sphaerosyllis sp. Indet.*		1								1								
P	425	*Sphaerosyllis bulbosa*		1	1	1			3		1				2	1	29		10	3
P	426	*Sphaerosyllis erinaceus*																		
P	427	*Sphaerosyllis hystrix*	1	2	3	1					1		1	1	5	4	3		4	2
P	431	*Sphaerosyllis tetralix*																		
P	434	*Autolytus sp. A indet*				2				1	3		2	1						
P	435	*Autolytus alexandri*									1									
P	440	*Autolytus langerhansii*	2	1	1															
P	444	*Autolytus prolifera*																		
P	451	*Proceraea sp. Indet*																		
P	458	*Juvenile Nereididae sp. Indet*																		
P	475	*Nereis longissima*	1									1		2						
P	478	*Nereis zonata*																		
P	494	*Juvenile Nepthys sp. Indet*																		
P	496	*Nepthys caeca*									1			1						
P	498	*Nephtys cirrosa*																		
P	499	*Nepthys hombergii*											1							
P	505	*Nephtys pente*																		
P	534	*Spinither oniscoides*																		
P	572	*Lumbrineris sp. Indet*																		
P	579	*Lumbrineris gracilis*		1					1											
P	582	*Lumbrineris latreilli*																		
P	618	*Ophryotrocha gracilis*															1			
P	638	*Protodorvillea kefersteinia*		1	5	6	1				2	3	1	1						
P	642	*Schistomeringos neglecta*		1											1	1	5			
P	672	*Scoloplos armiger*												1						
P	722	*Aonides oxycephala*						1						1		1				
P	723	*Aonides paucibranchiata*		3		1		3	1	2	1	1	1		5	1	1			
P	733	*Laonice bahusiensis*								2										

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
P	735	*Laonice sarsi*																		
P	744	*Microspio mecznikowianus*																		
P	746	*Minuspio cf multibranchiata*						1												
P	748	*Polydora sp. Indet.*																		
P	750	*Polydora caeca*		1								4	1	4						
P	751	*Polydora caulleryi*																		
P	752	*Polydora ciliata*																		
P	753	*Polydora cornuta*																		
P	754	*Polydora flava*	3		1							2		1						
P	766	*Prionospio banyulensis*							1					1						
P	788	*Spio armata*	2	3	4	1	8	4		3	8	6	8	2				1		1
P	794	*Spiophanes bombyx*			1			2		1	1	1	2	1				1		
P	824	*Aphelochaeta marioni*																		1
P		*Aphelochaeta 'A'*										1		1						
P	829	*Caulleriella alata*			4	2	5		6		2	1	5							
P	831	*Caulleriella zetlandica*																		
P	834	*Chaetozone setosa*																		
P		*Chaetozone christei*												1						
P	837	*Cirriformia tentaculata*																		
P	840	*Dodecaceria sp. Indet.*																		
P	846	*Tharyx killariensis*																		
P	892	*Macrochaeta helgolandica*													1		1			
P	907	*Capitella capitata*		1									1	1						
P	919	*Mediomastus fragilis*		3	2	2	1	6	15	3	8	8	3	4						
P	20 (92	*Notomastus sp. (latericeus)*											1							
P	955	*Clymenura sp. Indet*																		
P	958	*Clymenura johnstonii*		2		3	1					9	17	3				1		
P	960	*Euclymene sp. Indet*																		
P	960/97	*Euclymene/Praxillella sp. Indet*																		
P	997	*Juvenile Ophelia sp indet*													2		1			
P	999	*Ophelia borealis*														2	1			
P	1026	*Scalibregma celticum*		1		2	2		1		3	1	2	2						
P	1027	*Scalibregma inflatum*			1							2		1						
P	1098	*Owenis fusiformis*	1			1														
P	1116	*Sabellaria alveolata*										56	5	69						
P	1117	*Sabellaria spinulosa*	13	1		3		1	1	11		19	3	14						
P	1122	*Melinna cf elisabethae*																		
P	1124	*Melinna palmata*																		
P	1133	*Juvenile Ampharete sp. Indet*										1								
P	1139	*Ampharete lindstroemi*												1						
P	1175	*Terebellides stroemi*																		
P	1177	*Trichobranchus glacialis*									1									
P	1178	*Trichobranchus roseus*					1	1		1										
P	1180	*Juvenile Amphitritinae sp. Indet*																		
P	1187	*Axionice maculata*																		
P	1190	*Eupolymnia nesidensis*																		
P	1193	*Lanassa venusta*																		
P	1195	*Lanice conchilega*										1	3					1		
P	1206	*Neoamphitrite figulus*																		
P	1210	*Nicolea venustula*					1				1									
P	1211	*Nicolea zostericola*																		
P	1215	*Phisidia aurea*																		
P	1217	*Pista cristata*											1							
P	1221	*Proclea graffii*																		
P	1223	*Terebella lapidaria*																		
P	1232	*Lysilla sp. Indet*		1	1				1		1	1	1							

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
P	1233	*Lysilla loveni*																		
P	1235	*Polycirrus sp. Indet*			2	1		2	2	1	10			1	2		1			1
P	1242	*Polycirrus medusa*	2	1	1									1						
P	1243	*Polycirrus norvegicus*			1	2	10	2	3	4		3		1	1	1		4	2	
P	1253	*Juvenile Thelepus sp. Indet.*																		
P	1254	*Thelepus cincinnatus*	2	1																
P	1255	*Thelepus setosus*		1						1										
P	1263	*Branchiomma bombyx*																		
P	1267	*Chone duneri*																		
P	1269	*Chone filicaudata*		1		3		2	1	4	2									
P	1273	*Demonax cambrensis*								1										
P	1276	*Demonax torulis*																		
P	1280	*Euchone rubrocincta*																		
P	1287	*Jasmineira sp. Indet*																		
P	1289	*Jasmineira caudata*																		
P	1290	*Jasmineira elegans*						1	1				1					2		
P	1316	*Pseudopotamilla reniformis*																		
P	1321	*Sabella sarsi*																		
P	1339	*Pomatoceros sp. Indet*																		
P	1340	*Pomatoceros lamarcki*	3	8	4	1	4					7	5	2						
P	1341	*Pomatoceros triqueter*									1	1								
P	1334	*Hydroides norvegica*																		
P	1350	*Filograna implexa*																		
P	1361	*Salmacina dysteri*																		
P	1425	*Tubificidae sp. Indet*																		
P	1524	*Grania sp. Indet*			1	1					2			1						
		Crustacea																		
Q	4	*Nymphon brevirostre*	1							1		1								
Q	15	*Achelia echinata*				2	1	2	3	1		3	4							
Q	30	*Endeis spinosa*									1									
Q	33	*Callipallene brevirostris*						1												
Q	34	*Callipallene emaciata*																		
Q	45	*Anoplodactylus pygmaeus*																		
R	142	Copepoda		1		5							1					1		
S	6	*Nebalia bipes*																		
S	31	*Mysidae sp. Indet.*																		
S	92	*Heteromysis formosa*																		
S	134	*Pontocrates arcticus*																		
S	146	*Parapleustes bicuspis*										2		1						
S	158	*Amphilochus manudens*						2	1	1										
S	177	*Leucothoe incisa*																1		
S	186	*Cressa dubai*																		
S	207	*Juvenile Stenothoidae sp. Indet.*																		
S	213	*Stenothoe marina*												1						
S	214	*Stenothoe monoculoides*																		
S	248	*Urothoe elegans*																		
	249	*Urothoe marina*																		
	255	*Harpinia crenulata*																		
S	256	*Harpinia laevis*																		
S	275	*Ascidostoma obesum*																		
S	302	*Lysianassa sp. Indet.*		1																
S	320	*Orchomene humilis*		1	1	1	1					1								
S	321	*Orchomene nanus*				1														
S	336	*Tmetonyx cicada*																		
S	337	*Tmetonyx similis*																		
S	344	*Tryphosella sarsi*			1							1								
S	380	*Iphimedia minuta*					2													

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
S	381	*Iphimedia nexa*										2								
S	382	*Iphimedia obesa*																		
S	411	*Atylus guttatus*	1	1																
S	412	*Atylus swammerdamei*																		
S	419	*Tritaeta gibbosa*									1									
S	429	*Ampelisca diadema*										2	1	1						
S	438	*Ampelisca spinipes*																		
S	481	*Gammarus salinus*																		
S	498	*Abludomelita obtusata*																		
S	503	*Cheirocratus sp. Indet*			1	4			15		1					1				
S	504	*Cheirocratus assimilis*							4											
S	505	*Cheirocratus intermedius*																		
S	506	*Cheirocratus sundevallii*	1	1		2			4											
S	519	*Maera othonis*																		
S	524	*Melita hergensis*																		
S	539	*Gammaropsis cornuta*																		
S	541	*Gammaropsis maculata*							1									1		
S	558	*Juvenile Ischyroceridae sp. Indet*																		
S	577	*Juvenile Aoridae sp. Indet.*				1														
S	578	*Aora gracilis*																		
S	585	*Lembos websteri*																		
S	586	*Juvenile Leptocheirus sp. indet*									24				1	2	10			
S	588	*Leptocheirus hirsutimanus*		2	6	3			1			2	1		4	6	1	1	4	5
S	605	*Corophium sp. Indet*																		
S	611	*Corophium crassicorne*												1						
S	615	*Corophium sextonae*																		
S	621	*Unicola crenatipalma*												3	1					
S	628	*Dyopedos monacanthus*																		
S	629	*Dyopedos porrectus*																		
S	646	*Caprella linearis*	1									1								
S	659	*Pseudoprotella phasma*										1								
S	730	*Hyperia galba*								1		1								
S	793	*Gnathia* 'praniza'					1													
S	794	*Gnathia dentata*																		
S	796	*Gnathia oxyuraea*								1										
S	854	*Eurydice pulchra*																		
S	892	*Janira maculosa*			1	4														
S	894	*Janiropsis breviremis*																		
S	904	*Munna ?fabricii?*																		
S	942	*Idotea pelagica*																		
S	949	*Arcturella sp. Indet.*																		
S	955	*Astacilla longicornis*																		
S	1140	*Pseudoparatanais batei*																		
S	1142	*Tanaiopsis graciloides*								1										
S	1197	*Bodotria scorpioides*																		
S	1224	*Cumella pygmaea*																		
S	1268	*Nyctiphanes couchi*																		
S	1345	*Eualus pusiolus*							2			1			1					
S	1377	*Pandalus montagui*																		
S	1436	*Juvenile Paguroidea sp. Indet*	1						1											
S	1448	*Anapagurus hyndmanni*	1																	
S	1457	*Pagurus bernhardus*						1												
S	1463	*Pagurus pubescens*																		
S	1472	*Galathea intermedia*	1	10	4	2		6	8	3	9	5		3				1		2
S	1482	*Pisidia longicornis*		5	1	1	35	22	85	8	9	11		2	1			1		1
S	1485	*Brachyuran sp. Indet.*																		

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
S	1508	*Ebalia tuberosa*						1												
S	1509	*Ebalia tumefacta*																		
S	1519	*Hyas coarctatus*																		
S	1527	*Inachus leptochirus*																		
S	1532	*Macropodia rostrata*										1								
S	1555	*Atelecyclus rotundatus*																		
S	1566	*Cancer pagurus*		1																
S	1577	*Juvenile Liocarcinus sp.*		1																
S	1584	*Liocarcinus pusillus*																		
S	1638	*Pinnotheres pisum*																		
		Mollusca																		
W	53	*Leptochiton asellus*	1								1	2								
W	156	*Juvenile Trochinae sp. Indet*		4																
W	161	*Gibbula tumida*		3	5	3	4	3	6	6									1	
W	163	*Gibbula cineraria*		2	4	2			1			1								
W	171	*Jujubinus miliaris*		4	1														1	
W	182	*Calliostoma zizyphinum*					1			1			1							
W	334	*Rissoa parva*																		
W	344	*Alvania punctura*																		
W	361	*Manzonia crassa*																		
W	371	*Onoba semicostata*																		
W	439	*Juvenile Crepidula fornicata*																		
W	439	*Crepidula fornicata*	1		2								1							
W	480	*Velutina velutina*																		
W	603	*Eulima bilineata*																		
W	680	*Trophon truncatus*																		
W	685	*Ocenebra erinacea*																		
W	687	*Nucella lapillus*																		
W	908	*Odostomia sp. Indet.*																		
W	925	*Brachystomia scalaris*																		
W	1080	*Retusa truncatula*																		
W	1270	*Doto sp. Indet*																		
W	1277	*Doto fragilis*																		
W	1301	*Goniodoris castanea*																		
W	1302	*Goniodoris nodosa*																		
W	1325	*Onchidoris muricata*																		
W	1354	*Limacia clavigera*																		
W	1469	*Facelina auriculata*																		
W	1569	*Nucula nitidosa*																		
W	1570	*Nucula nucleus*	1				2													
W	1595	*Jupiteria minuta*																		
W	1690	*Juvenile Mytilacea*		2		6						2								
W	1695	*Mytilus edulis*	2				1					6	1	1	6	1	2	1		1
W	1702	*Modiolus modiolus*										1								
W	1708	*Modiolula phaseolina*																		
W	1718	*Modiolarca tumida*																		
W	1721	*Musculus discors*										2								1
W	1776	*Chlamys distorta*																		
W	1804	*Juvenile Anomiacea*																		
W	1809	*Heteranomia squamula*	1				6					3	1							
W	1814	*Pododesmus patelliformis*																		
W	1875	*Kellia suborbicularis*																		
W	1882	*Semierycina nitida*																		
W	1906	*Mysella bidentata*																		
W	1929	*Goodalia triangularis*																		
W	1936	*Tridonta montagui*																		

MCS code		Species Name/Authority	41	42	42	42	43	44	44	44	45	46	46	46	47	47	47	48	48	48
		Replicate		A	B	C		A	B	C		A	B	C	A	B	C	A	B	C
		Quantitative taxa																		
W	1951	*Parvicardium ovale*		1																
W	1961	*Cerastoderma edule*																		
W	1974	*Juvenile Spisula sp. Indet*				1									1					
W	1975	*Spisula elliptica*			1									1						
W	1977	*Spisula solida*													1		5			
W	2023	*Moerella pygmaea*																		
W	2044	*Juvenile Gari sp. Indet*				1														
W	2046	*Gari depressa*			1	1										1				
W	2049	*Gari tellinella*												1						
W	2059	*Abra alba*											1							
W	2085	*Juvenile Veneracea sp. Indet*						2		1			1							
W	2095	*Gouldia minima*			1					1										
W	2100	*Clausinella fasciata*																		
W	2104	*Timoclea ovata*						1					1							
	2124	*Venerupis senegalensis*																		
W	2147	*Mya truncata*		2				1	1		1									
W	2149	*Mya arenaria*																		
W	2166	*Hiatella arctica*	4	11	1	3		4	1	3		9	2	1				5		
W	2228	*Juvenile Thracia sp. Indet*																		
W	2231	*Thracia phaseolina*																		
W	2233	*Thracia villosiuscula*																		
W	2239	*Cochlodesma praetenue*																		
		Phoronida																		
ZA	3	*Phoronis*		2		4			1		4	5	1	6				1		
		Echinodermata																		
ZB	18	Juvenile *Asteroidea* sp. Indet																		
ZB	75	*Crossaster papposus*																		
ZB	86	*Henricia sanguinolenta*																		
ZB	105	Juvenile *Ophiuroidea* sp. Indet						2	1	1										
ZB	124	*Ophiothrix fragilis*					1													
ZB	147	*Ophiopholis aculeata*						1	14	2	1				1					
ZB	154	*Amphiura filiformis*																		
ZB	168	*Ophiura albida*																		
ZB	161	*Amphipholis squamata*	1					4	1	1	4					1	1			
ZB	262	*Thyone fusus*																		
ZB	296	*Leptosynapta ?inhaerans?*															1			

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
		Tunicata										
ZD	2	*Ascidiacea* sp. Indet										
ZD	120	*Dendrodoa grossularia*										
		Bryozoa										
Y	1	*Bryozoan sp. Indet*										
		Crustacea										
R	14	*Cirripedia*										
		Anthozoa										
D	58	*Hydrozoa sp. Indet*										
D	163	*Tubularia sp. Indet*										
D	583	*Anthozoa sp. Indet*					1					
D	632	*Cerianthus loydii*										
D	764	*Edwardsia sp. Indet*										
		Platyhelminthe										
F	2	*Turbellaria sp. Indet*				1						
		Nemertea										
G	1	Nemertea		1	2	1		1		2	1	
		Nematoda										
HD	1	*Nematoda spp. indet*	5	1		1	1			3	8	
		Sipuncula										
N	12	*Juvenile Golfingia sp. Indet.*					1					
N	14	*Golfingia elongata*										
N	17	*Golfingia vulgaris vulgaris*										
N	25	*Nephasoma minutum*										
N	34	*Phascolion strombus*										
		Polychaeta										
P	15	*Pisione remota*		1								
P	32	*Adyte pellucida*										
P	44	*Enipo kinbergi*					1					
P	49	*Gattyana cirrosa*							1	3	4	2
P	50	*Juvenile Harmothoe sp. Indet*						2	4			3
P		*Juvenile Malmgrenia sp. Indet*									1	
P	53	*Harmothoe areolata*										
P	55	*Malmgrenia castanea*										
P	58	*Harmothoe extenuata*										
P	59	*Harmothoe fragilis*										
P	64	*Harmothoe imbricata*										2
P	65	*Harmothoe impar*										
P	68	*Malmgrenia marphysae*										
P		*Harmothoe pagenstecheri*										
P	82	*Lepidonotus squamatus*						6	1		3	
P	92	*Pholoe inornata*									1	1
P		*Pholoe balthica*	1				1	1	3	2		4
P	107	*Sthenelais boa*										
P	117/11	*Eteone longa/flava*									1	1
P	136	*Pseudomystides limbata*	2									
P	144	*Anaitides maculata*										
P	150	*Eulalia sp. Indet.*										
P	151	*Eulalia aurea*										
P	152	*Eulalia bilineata*										
P	153	*Eulalia expusilla*									1	
P	156	*Eulalia cf ornata*										
P	161	*Eulalia viridis*										
P	163	*Juvenile Eumida* sp. Indet		1				1				
P	164	*Eumida bahusiensis*										
P	167	*Eumida sanguinea*							2	13	8	5

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
P	255	*Juvenile Glycera sp. Indet*										
P		*Glycera capitata*										
P	260	*Glycera lapidum*		1	2		2	1				
P	262	*Glycera oxycephala*					1					
P	265	*Glycera tridactyla*						1				
P	271	*Goniada maculata*										
P	275	*Goniadella bobretzkii*										
P	276	*Goniadella gracilis*										
P	291	*Sphaerodorum gracilis*										
P	300	*Gyptis propinqua*										
P	305	*Psamathe cirrata*								1		2
P	311	*Nereimyra punctata*										
P	319	*Podarkeopsis capensis*										
P	321	*Syllidia armata*										
P	326	*Microphthalmus sp. Indet*										
P	349	*Ehlersia cornuta*					1					
P	358	*Syllis sp. Indet*										
P	362	*Trypanosyllis coeliaca*										
P		*Typosyllis sp. A (White)*						2	5	1		4
P		*Typosyllis sp. B (Striped)*	1					2	2	5	10	2
P	365	*Typosyllis armillaris*	2								9	
P	375	*Amblyosyllis formosa*										
P	380	*Eusyllis blomstrandii*										
P	405	*Streptosyllis websteri*										
P	407	*Syllides benedicti*										
P	421	*Exogone hebes*					1					
P	422	*Exogone naidina*										
P	423	*Exogone verugera*					1				2	
P	424	*Sphaerosyllis sp. Indet.*		1								
P	425	*Sphaerosyllis bulbosa*										
P	426	*Sphaerosyllis erinaceus*										
P	427	*Sphaerosyllis hystrix*	1	1	1	1		1			3	
P	431	*Sphaerosyllis tetralix*										
P	434	*Autolytus sp. A indet*							1		2	
P	435	*Autolytus alexandri*	1									
P	440	*Autolytus langerhansii*										
P	444	*Autolytus prolifera*										
P	451	*Proceraea sp. Indet*										
P	458	*Juvenile Nereididae sp. Indet*										
P	475	*Nereis longissima*										
P	478	*Nereis zonata*										
P	494	*Juvenile Nepthys sp. Indet*										
P	496	*Nepthys caeca*					1					
P	498	*Nephtys cirrosa*										
P	499	*Nepthys hombergii*										
P	505	*Nephtys pente*										
P	534	*Spinither oniscoides*										
P	572	*Lumbrineris sp. Indet*										
P	579	*Lumbrineris gracilis*					1				2	
P	582	*Lumbrineris latreilli*										
P	618	*Ophryotrocha gracilis*			2	1						
P	638	*Protodorvillea kefersteinia*		2	1						6	
P	642	*Schistomeringos neglecta*										
P	672	*Scoloplos armiger*										
P	722	*Aonides oxycephala*							1		2	1
P	723	*Aonides paucibranchiata*					3					
P	733	*Laonice bahusiensis*										

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
P	735	*Laonice sarsi*										
P	744	*Microspio mecznikowianus*										
P	746	*Minuspio cf multibranchiata*										
P	748	*Polydora sp. Indet.*										
P	750	*Polydora caeca*						2		2		2
P	751	*Polydora caulleryi*										
P	752	*Polydora ciliata*								3	14	
P	753	*Polydora cornuta*									2	
P	754	*Polydora flava*								1		1
P	766	*Prionospio banyulensis*										
P	788	*Spio armata*					1	1	4			
P	794	*Spiophanes bombyx*					2					
P	824	*Aphelochaeta marioni*										
P		*Aphelochaeta 'A'*					1					
P	829	*Caulleriella alata*	1							9	5	10
P	831	*Caulleriella zetlandica*								2	1	1
P	834	*Chaetozone setosa*										
P		*Chaetozone christei*										
P	837	*Cirriformia tentaculata*										
P	840	*Dodecaceria sp. Indet.*									1	
P	846	*Tharyx killariensis*										
P	892	*Macrochaeta helgolandica*										
P	907	*Capitella capitata*										
P	919	*Mediomastus fragilis*					8	10	11	9	15	12
P	20 (92	*Notomastus sp. (latericeus)*										
P	955	*Clymenura sp. Indet*										
P	958	*Clymenura johnstonii*						2	1			
P	960	*Euclymene sp. Indet*										
P	960/97	*Euclymene/Praxillella sp. Indet*										1
P	997	*Juvenile Ophelia sp indet*					2					
P	999	*Ophelia borealis*										
P	1026	*Scalibregma celticum*						1	1		1	
P	1027	*Scalibregma inflatum*									1	
P	1098	*Owenis fusiformis*										
P	1116	*Sabellaria alveolata*						2				
P	1117	*Sabellaria spinulosa*	3				1	17	3	17	6	2
P	1122	*Melinna cf elisabethae*							1			4
P	1124	*Melinna palmata*									2	
P	1133	*Juvenile Ampharete sp. Indet*										
P	1139	*Ampharete lindstroemi*										
P	1175	*Terebellides stroemi*										
P	1177	*Trichobranchus glacialis*										
P	1178	*Trichobranchus roseus*										
P	1180	*Juvenile Amphitritinae sp. Indet*	2									
P	1187	*Axionice maculata*										
P	1190	*Eupolymnia nesidensis*										1
P	1193	*Lanassa venusta*										
P	1195	*Lanice conchilega*					14					
P	1206	*Neoamphitrite figulus*										
P	1210	*Nicolea venustula*										
P	1211	*Nicolea zostericola*										
P	1215	*Phisidia aurea*	1									
P	1217	*Pista cristata*										
P	1221	*Proclea graffii*										
P	1223	*Terebella lapidaria*										
P	1232	*Lysilla sp. Indet*						2				

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
P	1233	*Lysilla loveni*					1					
P	1235	*Polycirrus sp. Indet*					2	1	7	4		3
P	1242	*Polycirrus medusa*										
P	1243	*Polycirrus norvegicus*								4	2	
P	1253	*Juvenile Thelepus sp. Indet.*									1	
P	1254	*Thelepus cincinnatus*									2	
P	1255	*Thelepus setosus*							1			
P	1263	*Branchiomma bombyx*					1					
P	1267	*Chone duneri*										
P	1269	*Chone filicaudata*									1	
P	1273	*Demonax cambrensis*										
P	1276	*Demonax torulis*										
P	1280	*Euchone rubrocincta*										
P	1287	*Jasmineira sp. Indet*										
P	1289	*Jasmineira caudata*										
P	1290	*Jasmineira elegans*										
P	1316	*Pseudopotamilla reniformis*								2	1	
P	1321	*Sabella sarsi*										
P	1339	*Pomatoceros sp. Indet*								2	9	1
P	1340	*Pomatoceros lamarcki*	3						3	6	7	4
P	1341	*Pomatoceros triqueter*							3	2	1	1
P	1334	*Hydroides norvegica*									2	1
P	1350	*Filograna implexa*								6	3	12
P	1361	*Salmacina dysteri*								##	39	##
P	1425	*Tubificidae sp. Indet*										
P	1524	*Grania sp. Indet*										1
		Crustacea										
Q	4	*Nymphon brevirostre*										
Q	15	*Achelia echinata*	1				1	1		6	4	5
Q	30	*Endeis spinosa*										
Q	33	*Callipallene brevirostris*										1
Q	34	*Callipallene emaciata*										
Q	45	*Anoplodactylus pygmaeus*										
R	142	Copepoda									1	1
S	6	*Nebalia bipes*									6	
S	31	*Mysidae sp. Indet.*										
S	92	*Heteromysis formosa*										
S	134	*Pontocrates arcticus*					2					
S	146	*Parapleustes bicuspis*										
S	158	*Amphilochus manudens*									1	
S	177	*Leucothoe incisa*										
S	186	*Cressa dubai*										
S	207	*Juvenile Stenothoidae sp. Indet.*										
S	213	*Stenothoe marina*										
S	214	*Stenothoe monoculoides*										
S	248	*Urothoe elegans*										
	249	*Urothoe marina*						2				
	255	*Harpinia crenulata*										1
S	256	*Harpinia laevis*										
S	275	*Ascidostoma obesum*					1					
S	302	*Lysianassa sp. Indet.*										
S	320	*Orchomene humilis*										
S	321	*Orchomene nanus*										
S	336	*Tmetonyx cicada*					1					
S	337	*Tmetonyx similis*										
S	344	*Tryphosella sarsi*										
S	380	*Iphimedia minuta*										

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
S	381	*Iphimedia nexa*										
S	382	*Iphimedia obesa*										
S	411	*Atylus guttatus*					1	1				
S	412	*Atylus swammerdamei*										
S	419	*Tritaeta gibbosa*								1	2	1
S	429	*Ampelisca diadema*										
S	438	*Ampelisca spinipes*					2					
S	481	*Gammarus salinus*										
S	498	*Abludomelita obtusata*					1					
S	503	*Cheirocratus sp. Indet*	1							2		9
S	504	*Cheirocratus assimilis*										
S	505	*Cheirocratus intermedius*										
S	506	*Cheirocratus sundevallii*						1		3	7	1
S	519	*Maera othonis*										
S	524	*Melita hergensis*										
S	539	*Gammaropsis cornuta*										
S	541	*Gammaropsis maculata*									1	
S	558	*Juvenile Ischyroceridae sp. Indet*										
S	577	*Juvenile Aoridae sp. Indet.*										
S	578	*Aora gracilis*										
S	585	*Lembos websteri*										
S	586	*Juvenile Leptocheirus sp. indet*								1		
S	588	*Leptocheirus hirsutimanus*	4				6			4	2	
S	605	*Corophium sp. Indet*										
S	611	*Corophium crassicorne*			1							
S	615	*Corophium sextonae*										
S	621	*Unicola crenatipalma*						2				
S	628	*Dyopedos monacanthus*										
S	629	*Dyopedos porrectus*										
S	646	*Caprella linearis*								1		
S	659	*Pseudoprotella phasma*										
S	730	*Hyperia galba*										
S	793	*Gnathia* 'praniza'										
S	794	*Gnathia dentata*										
S	796	*Gnathia oxyuraea*										
S	854	*Eurydice pulchra*										
S	892	*Janira maculosa*							1	2		4
S	894	*Janiropsis breviremis*									2	
S	904	*Munna ?fabricii?*										
S	942	*Idotea pelagica*										
S	949	*Arcturella sp. Indet.*										
S	955	*Astacilla longicornis*										
S	1140	*Pseudoparatanais batei*									1	
S	1142	*Tanaiopsis graciloides*										
S	1197	*Bodotria scorpioides*										
S	1224	*Cumella pygmaea*										
S	1268	*Nyctiphanes couchi*										
S	1345	*Eualus pusiolus*	1							1	1	2
S	1377	*Pandalus montagui*										
S	1436	*Juvenile Paguroidea sp. Indet*										
S	1448	*Anapagurus hyndmanni*										
S	1457	*Pagurus bernhardus*										
S	1463	*Pagurus pubescens*										
S	1472	*Galathea intermedia*	5				2		3	9	4	6
S	1482	*Pisidia longicornis*	3					8		82	73	75

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
S	1508	*Ebalia tuberosa*										
S	1509	*Ebalia tumefacta*										
S	1519	*Hyas coarctatus*										
S	1527	*Inachus leptochirus*										
S	1532	*Macropodia rostrata*										
S	1555	*Atelecyclus rotundatus*										
S	1566	*Cancer pagurus*										
S	1577	*Juvenile Liocarcinus sp.*									1	
S	1584	*Liocarcinus pusillus*										
S	1638	*Pinnotheres pisum*										
		Mollusca										
W	53	*Leptochiton asellus*								2		1
W	156	*Juvenile Trochinae sp. Indet*										
W	161	*Gibbula tumida*	3				1			2	4	
W	163	*Gibbula cineraria*						2		1		
W	171	*Jujubinus miliaris*	1									
W	182	*Calliostoma zizyphinum*										
W	334	*Rissoa parva*								4		
W	344	*Alvania punctura*										
W	361	*Manzonia crassa*									6	
W	371	*Onoba semicostata*								2	5	
W	439	*Juvenile Crepidula fornicata*										
W	439	*Crepidula fornicata*										
W	480	*Velutina velutina*										
W	603	*Eulima bilineata*										
W	680	*Trophon truncatus*										
W	685	*Ocenebra erinacea*									2	
W	687	*Nucella lapillus*										
W	908	*Odostomia sp. Indet.*										
W	925	*Brachystomia scalaris*										
W	1080	*Retusa truncatula*										
W	1270	*Doto sp. Indet*										
W	1277	*Doto fragilis*										
W	1301	*Goniodoris castanea*										
W	1302	*Goniodoris nodosa*										
W	1325	*Onchidoris muricata*										
W	1354	*Limacia clavigera*										
W	1469	*Facelina auriculata*										
W	1569	*Nucula nitidosa*										
W	1570	*Nucula nucleus*		1	1				4	16	39	21
W	1595	*Jupiteria minuta*							1	1	2	4
W	1690	*Juvenile Mytilacea*			2						1	
W	1695	*Mytilus edulis*			1			1		1		
W	1702	*Modiolus modiolus*										
W	1708	*Modiolula phaseolina*								1		
W	1718	*Modiolarca tumida*										
W	1721	*Musculus discors*										1
W	1776	*Chlamys distorta*										
W	1804	*Juvenile Anomiacea*										
W	1809	*Heteranomia squamula*								5		1
W	1814	*Pododesmus patelliformis*								1		
W	1875	*Kellia suborbicularis*										
W	1882	*Semierycina nitida*										
W	1906	*Mysella bidentata*									9	
W	1929	*Goodalia triangularis*				1						
W	1936	*Tridonta montagui*										

MCS code		Species Name/Authority	49	50	50	50	51	52	53	54	54	54
		Replicate		A	B	C				A	B	C
		Quantitative taxa										
W	1951	*Parvicardium ovale*							1			
W	1961	*Cerastoderma edule*										
W	1974	*Juvenile Spisula sp. Indet*										
W	1975	*Spisula elliptica*										
W	1977	*Spisula solida*					4					
W	2023	*Moerella pygmaea*					2					
W	2044	*Juvenile Gari sp. Indet*										
W	2046	*Gari depressa*										
W	2049	*Gari tellinella*										
W	2059	*Abra alba*	1				2		5	3	5	7
W	2085	*Juvenile Veneracea sp. Indet*										
W	2095	*Gouldia minima*										
W	2100	*Clausinella fasciata*										
W	2104	*Timoclea ovata*	1									
	2124	*Venerupis senegalensis*							1			
W	2147	*Mya truncata*					1		2	2		1
W	2149	*Mya arenaria*										
W	2166	*Hiatella arctica*	3					2		2	1	
W	2228	*Juvenile Thracia sp. Indet*										
W	2231	*Thracia phaseolina*										
W	2233	*Thracia villosiuscula*										
W	2239	*Cochlodesma praetenue*					1					
		Phoronida										
ZA	3	*Phoronis*							3	1	1	1
		Echinodermata										
ZB	18	Juvenile *Asteroidea* sp. Indet										
ZB	75	*Crossaster papposus*										
ZB	86	*Henricia sanguinolenta*										
ZB	105	Juvenile *Ophiuroidea* sp. Indet										
ZB	124	*Ophiothrix fragilis*										
ZB	147	*Ophiopholis aculeata*	1					1		1	4	1
ZB	154	*Amphiura filiformis*										
ZB	168	*Ophiura albida*					3					
ZB	161	*Amphipholis squamata*						1		3	5	6
ZB	262	*Thyone fusus*										
ZB	296	*Leptosynapta ?inhaerans?*										

APPENDIX 5. EPIFAUNAL TRAWL DATA

		Trawl Number	1	2	3	4	5	6	7	8	9	10	12
MCS code		Species											
		Qualitative taxa											
		Porifera sp. Indet			P					P	P	P	P
D	48	*Aurelia aurita*											
D	166	*Tubularia indivisa*											
D	167	*Tubularia larynx*											
D	273	*Hydractinia echinata*											
D	597	*Alcyonium digitatum*											
D	684	*Urticina felina*										P	
E	6	*Pleurobranchia pileus*											
R	14	*Cirrepedia* sp. Indet											
R	74	*Balanus* sp. Indet											
Y	1	*Bryozoa* sp. Indet									P		
Y	76	*Alcyonidium diaphanum*											
Y	170	*Membranipora membranacea*											
Y	187	*Flustra foliacea*		P	P	P		P		P	P		P
ZD	2	*Ascidiacea* sp. Indet											
ZD	84	*Ascidiella aspersa*											
ZD	120	*Dendrodoa grossularia*											
ZD	126	*Botryllus schlosseri*											
		Quantitative taxa											
		Trawl Number	1	2	3	4	5	6	7	8	9	10	12
S	934	*Idotea* sp. Indet											
S	1470	*Galathea sp. Indet*											
S	1472	*Galathea intermedia*											
S	1475	*Galathea squamifera*											
S	1481	*Pisidia longicornis*											
S	1377	*Pandalus montagui*			6		14	3	1		58		1
S	1385	*Crangon crangon*											
S	1400	*Homarus gammarus*	6		5	6	5		1	3	9	6	60
S	1457	*Pagurus bernhardus*											
S	1482	*Pisidia longicornis*											
S	1531	*Macropodia linaresi*									1		1
S	1566	*Cancer pagurus*		1				1		1	2		
S	1577	*Liocarcinus sp. Indet*					29	16	23				3
S	1580	*Liocarcinus depurator*	4	1	20	4				32	32	2	
S	1581	*Liocarcinus holsatus*	3	5	36	12				29	25		
S	1589	*Necora puber*	10	2	1	13	18	1	7	2	25	3	4
S	1594	*Carcinus maenas*			1			1			1		
S	1615	*Pilumnus hirtellus*											
W	2337	*Loligo forbesii*		1									
ZB	75	*Crossaster papposus*	1	1		2			1	1	1	1	
ZB	83	*Henricia oculata*											
ZB	86	*Henricia sanguinolenta*											1
ZB	100	*Asterias rubens*					1	1		2			
ZB	170	*Ophiura ophiura*											
		Echinus esculentsis	2		1	5	7	8	1		4	13	5

		Pisces										
		Trawl Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**
ZG	281	*Myxocephalus scorpius*											
ZG	283	*Taurulus bubalis*	11	16	18	31	25	49	74	25	191	46	24
ZG	291	*Agonus cataphractus*			1	13	5	3	34		4	9	1
ZG	294	*Cyclopterus lumpus*					1						
ZG	296	*Liparis liparis*			4					4			
ZG	297	*Liparis montagui*							1	3			
ZG	312	*Dicentrarchus labrax*											
ZG	374	*Mullus surmuletus*								1			
ZG	399	*Labrus bergylta*											
ZG	405	*Echiichthys vipera*	1										
ZG	412	*Lipophrys pholis*											
ZG	437	*Zoarces viviparus*											
ZG	440	*Pholis gunnellus*			1								
ZG	444	*Ammodytes tobianus*											
ZG	452	*Callionymus lyra*		1				2	2				
ZG	476	*Pomatoschistus spp.*											
ZG	479	*Pomatoschistus minutus*											
ZG	481	*Pomatoschistus pictus*											
ZG	555	*Scophthalmus rhombus*											
ZG	569	*Hippoglossus hippoglossus*											
ZG	572	*Limanda limanda*	1	2	9	1	3	2		3	2		
ZG	574	*Microstomus kitt*	1	1	2							1	
ZG	576	*Platichthys flesus*	1	2		1			1	5			1
ZG	578	*Pleuronectes platessa*											
ZG	591	*Solea solea*			1	1				1			