

Arklow Bank Offshore Windfarm

**Environmental Monitoring
Benthic Ecology Survey Report**

May 2008

A Report to HydroServ

For

Arklow Energy Ltd

January 2009



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1. INTRODUCTION

Aquatic Services Unit, University College Cork, was requested by HydroServ Projects Ltd., on behalf of Arklow Energy Ltd., to undertake a benthic biological survey, as part of a post construction monitoring programme, for the Arklow Bank Offshore Windfarm. The following report outlines the work undertaken for this survey. Work for this report was undertaken from the 19th–20th, and the 29th May 2008.

The Arklow Bank Offshore Wind Farm lies 13 km east of Arklow town and consists of seven 3.6 MW turbines. Construction was begun in 2002 with the building of these seven turbines. However, it is a possibility that large numbers of additional turbines may be built in the general area in the future. A baseline survey of the Arklow Bank area and cable route was conducted in 2000–01 (pre-construction), consisting of three sampling periods: June 2000, September 2000 and April 2001. Various sampling techniques were used during the baseline survey; the first survey used otter trawls and anchor dredges, while the following two used Agassiz trawls and anchor dredges. Only qualitative data was produced from the anchor dredge samples and species were recorded as present/absent. Plankton was also sampled and temperature/salinity profiles were generated.

The initial surveys undertaken in June/July 2004 were taken using Day Grabs, and these encountered severe problems with the hard ground. Subsequent surveys were undertaken using semi-quantitative anchor dredges to assess the benthic infauna and associated sediments. In addition, semi-quantitative beam trawls were used to assess benthic epifauna and benthic fish communities.

The locations of the sampling positions of the current survey are consistent with previous monitoring surveys. These sampling locations were specified by the client and are presented in Figure 1.1., and as a table in Table 1.1. These positions are the same as those sampled in previous surveys. As reported in the previous survey, the positions of the current stations do not coincide with the positions of the baseline survey.

	Beam Trawl Co-ordinates			
	Trawl In		Trawl Out	
	Easting	Northing	Easting	Northing
Trawl 1	698353	5856358	698343	5856862
Trawl 2	703866	5856725	703869	5857805
Trawl 3	706964	5867441	707090	5866748
Trawl 4	708525	5857506	708628	5858121
Trawl 5	703356	5849233	703341	5848336
Trawl 6	703004	5837739	703030	5836930

	Anchor Dredge Co-ordinates			
	Dredge In		Dredge Out	
	Easting	Northing	Easting	Northing
D1	695319	5854436	695423	5854487
D2	698173	5854372	698069	5854328
D3	700704	5855471	700576	5855511
D4	702744	5861744	702771	5861379
D5	703184	5864536	703119	5864247
D6	704102	5863556	703883	5863277
D7	704758	5864368	704756	5864394
D8	707345	5866573	707517	5866529
D9	708128	5856871	708204	5856614
D10	708453	5851121	708144	5851149
D11	707014	5846812	706998	5846456
D12	704472	5844530	704555	5844619
D13	703774	5838779	703882	5838651
D14	701956	5844823	702118	5844724
D15	703286	5851162	703298	5851394
D16	706206	5853477	706223	5856324
D17	706261	5858125	706217	5858235
D18	700768	5858265	700642	5887906
D19	697071	5847689	697050	5847595
D20	703714	5857062	703625	5857202

Table 1.1. Positions of the sampling positions for the ongoing monitoring programme at the Arklow Bank Offshore Windfarm. All locations are presented in UTM CM 9°W. Zone UTM 29N.

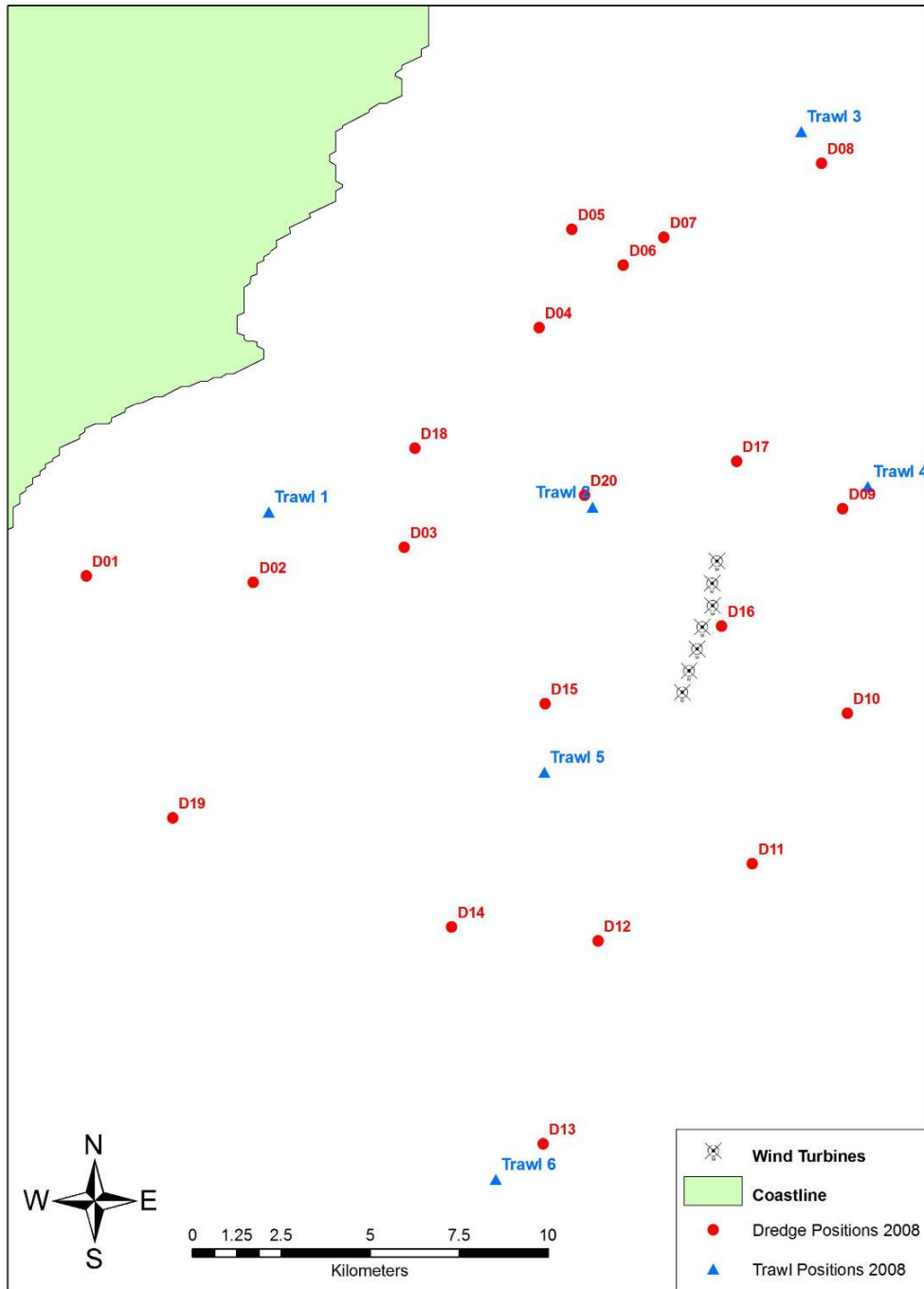


Figure 1.1 Anchor Dredge (● numbered D1 to D20) and Beam Trawl locations (▲ numbered Trawl 1 to Trawl 6) for the present monitoring survey (May 2008). These stations correspond to locations sampled in previous surveys.

2. METHODOLOGY

All sampling was undertaken from the MV Husky, based out of the Port of Arklow. The present survey was completed over the course of three days in May (19th–20th and 29th) 2008.

2.1 Beam trawls

All trawls were taken using a 2 m Beam Trawl, equipped with tickler chains and a 4 mm mesh cod-end, as per previous surveys. All tows were 15 mins duration over the ground at a speed of 2/3 knots, with a warp of 2½ times water depth. This equated to a distance of approximately 300 m. Once on board, the contents were placed into a sorting table and photographed prior to processing.

Fish species (both commercial and non-commercial) were separated and counted. Fish were measured using a graduated fish board before being returned. Colonial organisms (such as hydroids, bryozoans etc.) were marked present or absent.

Organisms were identified in the field, where possible. Organisms which were difficult to identify were retained in formalin for later processing. There was no sub-sampling undertaken in the present survey. Where samples were deemed to be too large, larger specimens were identified, counted and returned. All other specimens were retained for later identification and enumeration.

2.2 Anchor Dredge Sampling

At each sample station, a single anchor dredge sample was obtained with no replication of samples. The anchor dredge was deployed 20 m in advance of the target and sufficient warp was paid out. The dredge was then dragged through the target to 20 m beyond the target point. Where this proved unsuccessful, the process was repeated and the anchor dredge was dragged for a further distance.

After successful deployment and retrieval of the anchor dredge, the sample was transferred to a large container. The sample was labelled and photographed. Field notes were taken to include information such as sample number, date and time of sampling, a visual description of the sample, an estimate of the volume of the sample and any other relevant information in relation to the sampling effort.

A small sub-sample (~ 400 g) was removed and transferred to a labelled container for Particle Size Analysis (PSA). This sample was placed in a cooler box whilst aboard the vessel and transferred immediately to a freezer on return to the laboratory until processing.

The remaining dredge sample was then sub-divided into three identical sampling units. Each unit was sieved through a 1.0 mm mesh using a gentle puddling motion. Sediment which passed through the sieve was discarded, and the material retained on the sieve was transferred to a labelled container and fixed with 40% buffered formalin to a final concentration of 4% minimum. A waterproof label was then added to the sample bucket and the sample number was written in triplicate using a waterproof marker on the outside of each sample container.

As per previous surveys, only one of the three sampling units per site was processed and analysed. Samples were manually sorted by eye, using a binocular microscope where necessary. Sorted samples were then stored in 70% alcohol until identification. Samples were sent to Unicomarine Ltd. for identification (a company which have been implementing the NMBAQC scheme on behalf of its committee since its inception in 1994). Here the samples were identified to species level, where possible, counted and logged. The remaining sub-samples are held in storage.

2.3 Particle Size Analysis (PSA)

On arrival at the laboratory, Particle Size Analysis (PSA) samples were immediately stored in a freezer until processing. Samples were dried to a constant weight at a temperature of 100°C. Prior to dry-sieving, samples were pre-treated using the methods employed by Buchanan and Kain (1984). Dried samples were then sieved through a series of nested sieves (Endecott BS410/1986) using an electronic sieve shaker. A list of sieves used is displayed in

Table 2.3.1.

Sediment grainsize distribution and statistics were then calculated for each of the sediment samples using the GRADISTAT package (Blott & Pye, 2001). This package was used to determine the mean and median particle sizes and determination of sorting co-efficient. Each sample was ascribed to a sediment type (Figure 2.3.1) based on Folk (1954) with size division based on the Wentworth Scale (

Table 2.3.2). Sorting co-efficient terms are defined in Table 2.3.3.

Sieve Series Sizes (mm)							
4.0	2.0	1.0	0.5	0.25	0.125	0.63	<0.63

Table 2.3.1 Sieve series sizes (mm) used for particle size analysis (PSA).

Wentworth Scale (mm)	Phi units	Sediment types
>256 mm	<-8	Boulders
64 - 256 mm	-8 to -6	Cobble
4 - 64 mm	-6 to -2	Pebble
2 - 4 mm	-2 to -1	Granule
1 - 2 mm	-1 to 0	Very coarse sand
0.5 - 1 mm	0 - 1	Coarse sand
250 - 500 µm	1 - 2	Medium sand
125 - 250 µm	2 - 3	Fine sand
63 - 125 µm	3 - 4	Very fine sand
<63 µm	>4	Silt

Table 2.3.2 Classification used for defining sediment type (from Buchanan & Kain, 1984).

Standard Deviation of mean Phi	Classification
<0.35	Very well sorted
0.35 - 0.5	Well sorted
0.5 - 0.71	Moderately well sorted
0.71 - 1	Moderately sorted
1 - 2	Poorly sorted
2 - 4	Very poorly sorted
>4	Extremely poorly sorted

Table 2.3.3 Classification used defining degree of sediment sorting (from Buchanan & Kain, 1984).

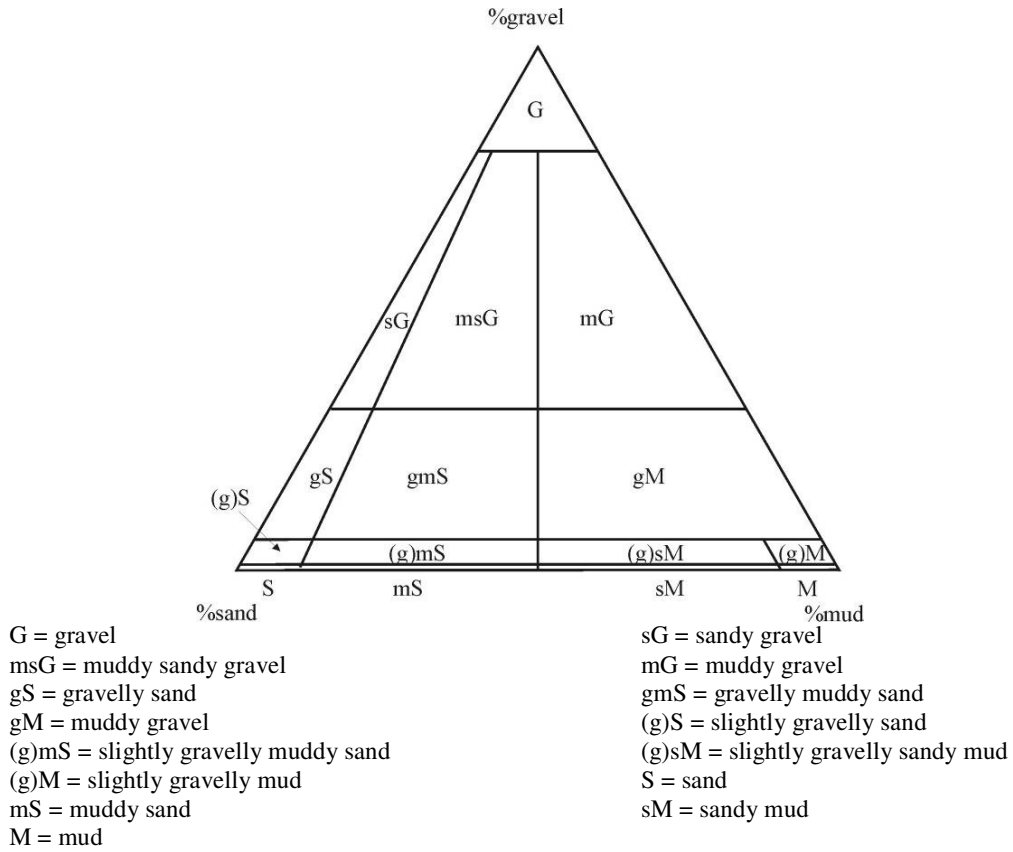


Figure 2.3.1 Sediment classification after Folk (1954) as also used by the BGS. "Gravel" is greater than 2 mm and "mud" is less than 63 µm.

2.4 Data Analysis

On completion of the sample processing and identification the data was analysed using a variety of univariate and multivariate analyses to determine community structure and assess change compared to previous surveys.

As stated in previous reports (Hydroserv, 2005; Hydroserv, 2006; Hydroserv 2007), different types of sampling gear have been used in previous surveys, as well as different levels of species identification. Therefore the present report will compare the current dataset against the previous three surveys (Hydroserv 2007 for the June 2006 survey, Hydroserv 2006 for the June 2005 survey and Hydroserv 2005 for the October 2004 survey). Statistical analysis between the previous surveys and the baseline survey has been undertaken in the previous surveys and will not be addressed in the current report.

Multivariate analysis was performed on the raw datasets using PRIMER v 5 (Clarke & Warwick, 1994). The data was subjected to a variety of multivariate analyses, including non-metric Multi Dimensional Scaling (MDS).

2.4.1 Beam Trawls

In the present survey, as in previous surveys, a total of 6 beam trawls were taken across the survey area. Although this number of trawls is quite small and results from multivariate analysis can only be described as descriptive, it was considered a useful exercise to compare against the results of the previous surveys.

Square-root transformations were performed on the abundance data with colonial organisms removed. In addition the beam trawl data was subjected to analysis on the presence/absence dataset including all identified taxa.

2.4.2 Anchor dredge samples

As in previous reports, a variety of univariate, multivariate and graphical techniques were used to provide the information concerning species diversity and community structure.

Multivariate analysis was based on square-root transformed abundances of species present, which allows for a sensible balance between the rare and common species. Multi-Dimension Scaling (MDS) ordination was based on the Bray-Curtis similarity coefficient. Stress values are provided for each MDS plot. It is important to note that these stress values represent the relationship between the various samples. In brief, a stress value of <0.05 indicates that there is an excellent representation of the relationship between the various samples, <0.1 indicates good ordination and <0.2 indicates a potentially useful 2-dimensional picture (Clarke and Warwick, 1994). In order to investigate the effect of the environmental data on the stations, sample clustering determined from the above analysis was repeated with mean sediment particle size superimposed.

The initial monitoring report (Hydroserv, 2004) compared pooled replicates between the sites taken with a 0.1 m² Day Grab. This information was compared to information obtained in the baseline survey of 2000. Analysis indicates that comparisons between these two surveys were incompatible due to inherent differences in the sampling equipment used. A resurvey was undertaken in October 2004 using the current sampling methodology (anchor dredge and beam-trawl sampling methods). This report indicated that the assemblages reported in October 2004 were broadly similar to those identified in the baseline survey (Ecoserve, 2001), although direct comparisons were difficult due to the different sampling methods used (Hydroserv, 2005).

3. RESULTS

3.1 Beam Trawls

Raw data from the beam trawls are presented in Appendix 6.3, in addition to information on fish species and lengths (Appendix 6.4). A total of 170 taxa were identified in the present survey. Of these 170 taxa, 12 are fish species. The total number of taxa is considerably higher than the June 2006 (98 taxa), June 2005 (47 taxa) and October 2004 (51 taxa) surveys. It is slightly lower than the May 2007 (177 taxa) survey.

The number of fish species and abundances found at each trawl location in October 2004, June 2005, June 2006, May 2007 and the present survey are presented in Figures 3.1.1 and 3.1.2. The total number of fish taxa identified in the present survey (12 taxa) is slightly lower than previous surveys (14 – June 2006, 13 – June 2005), but higher than the October 2004 (9 taxa) and May 2007 (7 taxa) surveys. In addition, the number of fish caught in the present survey (33 individuals) is much lower than previous surveys (55 – June 2006, 74 – June 2005 and 80 – October 2004), although it is higher than the May 2007 (18 individuals) survey. In the present survey, the northernmost station, Trawl 3, had the highest number of species (7), while Trawl 2 had the highest number of individuals (10). Overall, fish abundances are quite low, ranging from 3 individuals in Trawl 4 and Trawl 6, to 10 individuals in Trawl 2.

Important commercial fish were limited to 12 Plaice (*Pleuronectes platessa*), 1 Thornback ray (*Raja clavata*), 1 Dab (*Limanda limanda*), 1 Lemon Sole (*Microstomus kitt*), 3 Whiting (*Merlangius merlangus*), 2 Dogfish (*Scyliorhinus caniculus*), 1 Nursehound (*Scyliorhinus stellaris*). Four elasmobranchs were caught in the present survey (1 x *Raja clavata*, 1 x *Scyliorhinus stellaris* and 2 x *Scyliorhinus caniculus*) compared to 3 (June 2006), 4 (June 2005), 3 (October 2004) and 0 (May 2007) in previous surveys.

As mentioned in previous reports, the use of small (2 m) beam trawls is far from ideal as a survey method for fish sampling. However, it has been shown to be quite effective for most bottom dwelling fish species (ICES 2003). Results from the present survey concur with the findings of previous reports, that benthic fish populations are quite low in the surveyed area.

The beam trawl surveys yielded a total of 175 taxa, which is similar to the numbers collected in May 2007 (177 taxa) and significantly higher than June 2006 (98 taxa), June 2005 (36 taxa) and October 2004 (42 taxa). Total numbers of countable organisms (898) decreased from the last two years (1783 in June 2006 and 4367 in May 2007). Nine taxa were found in numbers ≥ 20 over the whole survey area, compared with 19 taxa in May 2007. Thus, in comparison with last year, the numbers of taxa remain high, but the numbers of individuals is decreased as a result of the not sampling the *Sabellaria* reefs which are present in the area. A complete list of the most countable faunal species identified in the present survey is presented in Table 3.1.1.

The highest numbers of taxa encountered at the trawl sites were found in Trawls 5 and 1 (77 and 64 taxa respectively). These stations also had the highest number of countable taxa (60 and 50 respectively). Trawls 3 and 5 recorded the highest abundances of the present survey with 253 and 222 individuals respectively. There is a notable decrease in numbers of individuals compared with those identified last year (May 2007). This is due to the absence this year of a *Sabellaria* reef at Trawl Sites 3 and 4; which returned figures in 2007 of 1752 and 293 *Sabellaria* worms and 939 and 70 reef dwelling *Pisidia longicornis* respectively. In the present survey, only 111 individual *Sabellaria* worms and 8 *Pisidia longicornis* were recorded in Trawl 3.

The *Sabellaria* reef encountered in the May 2007 survey was not present in the current survey and marked absent in all previous surveys, reflecting the irregular spatial distribution of these biogenic reefs in the area.

	May 2008	May 2007	June 2006	June 2005	October 2004
<i>Sabellaria alveolata</i>	111	2083	668	0	0
<i>Liocarcinus</i> (juv)	87	39	19	0	0
<i>Asterias rubens</i>	70	131	39	8	100
<i>Crangon almanni</i>	68	52	53	38	130
<i>Balanus crenatus</i>	68	34	P	-	-
<i>Pagurus bernhardus</i>	33	54	69	95	583
<i>Macropodia rostrata</i>	26	39	36	28	128
<i>Hyas coarctatus</i>	22	32	4	-	-
<i>Pisidia longicornis</i>	21	1033	238	4	1
<i>Mytilus edulis</i>	19	6	5	-	-

Table 3.1.1 Numbers of the 10 most common countable faunal species found in May 2008 compared to abundances found in May 2007, June 2006, June 2005 and October 2004 beam trawl surveys

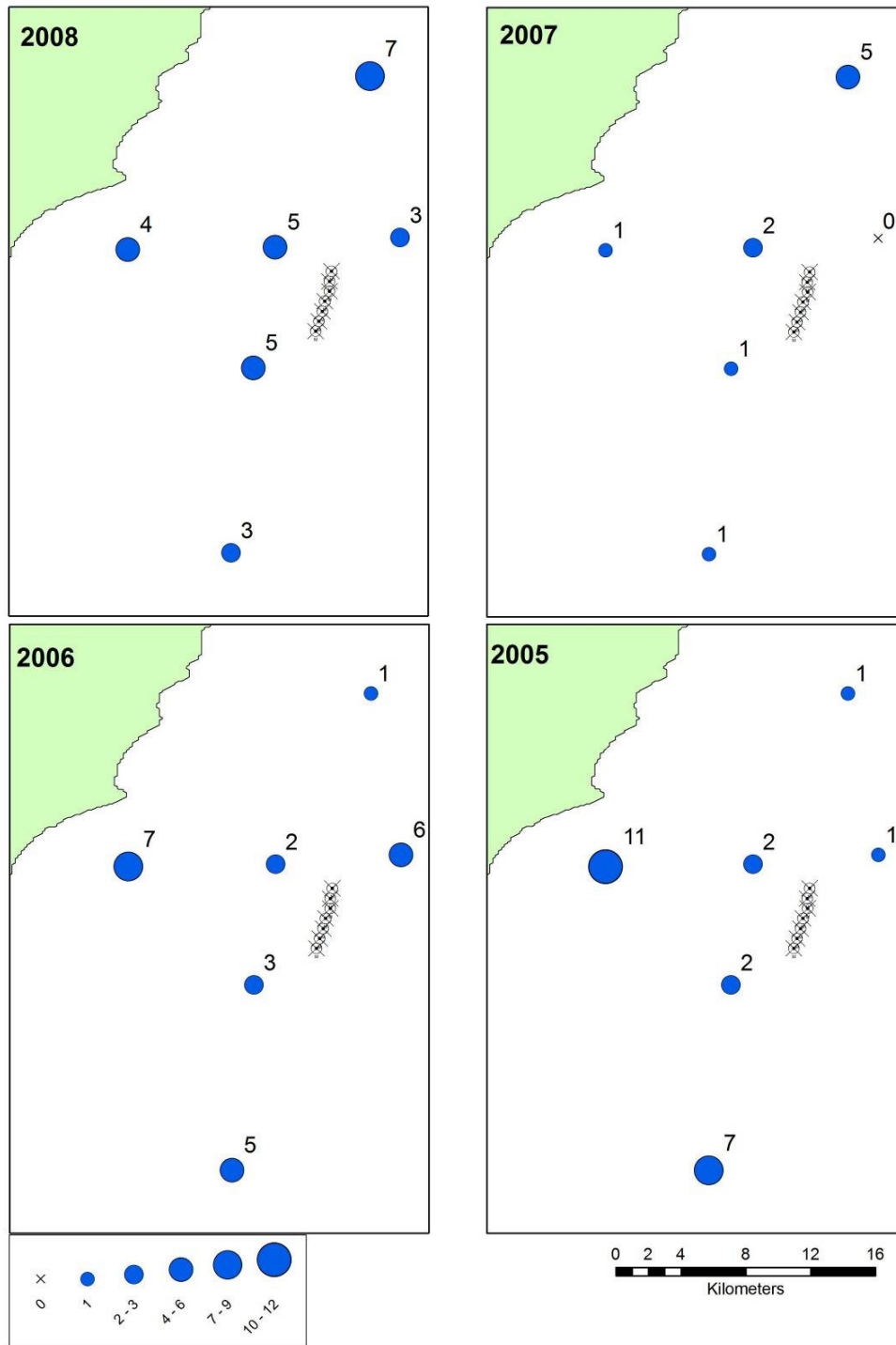


Figure 3.1.1 Total number of fish taxa per trawl site (June 2005, June 2006, May 2007 & May 2008)

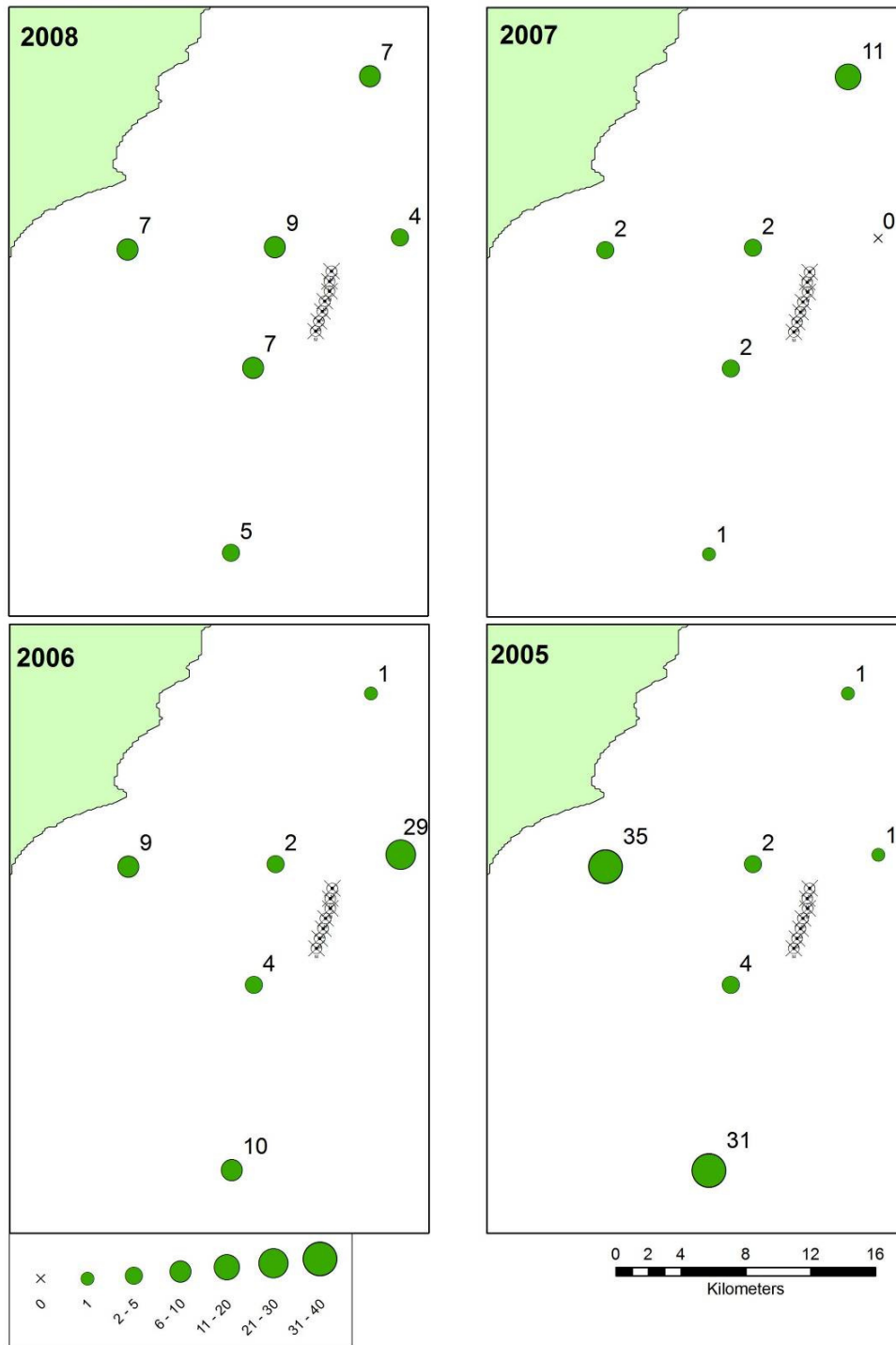


Figure 3.1.2 Total number of fish per trawl site (June 2005, June 2006, May 2007 & May 2008)

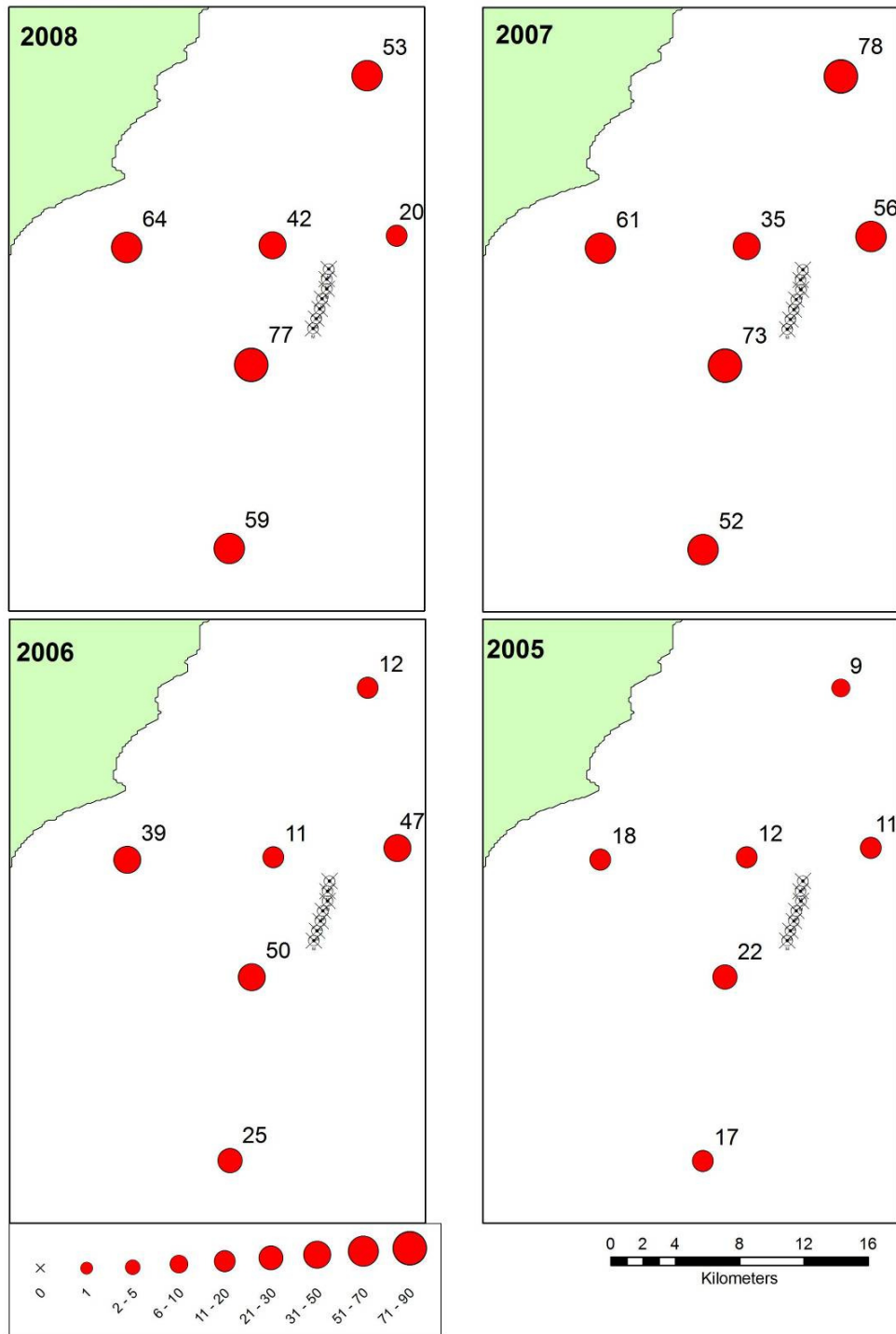


Figure 3.1.3 Total number of invertebrate taxa per trawl site (June 2005, June 2006, May 2007 & May 2008)

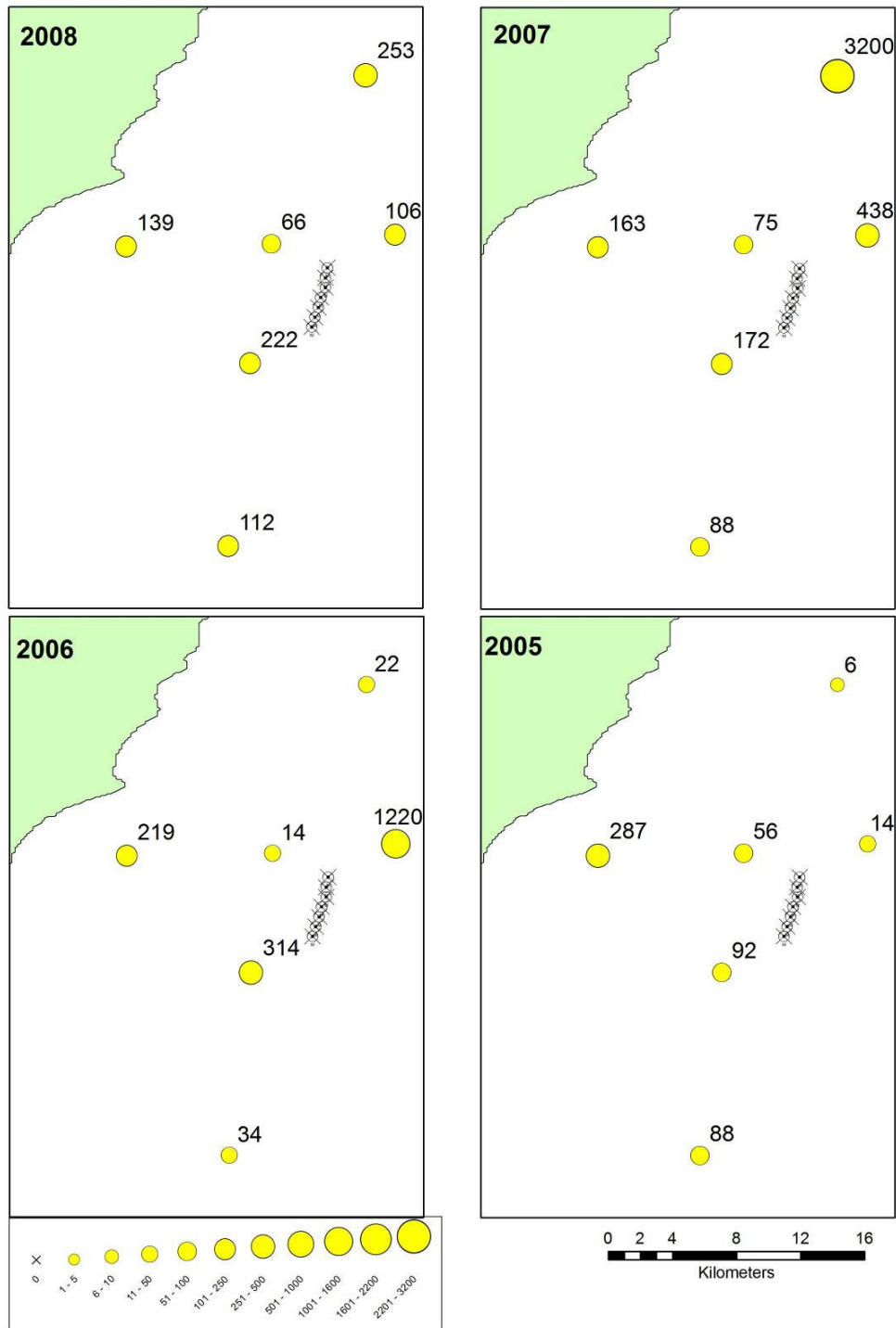


Figure 3.1.4 Total number of countable invertebrates per trawl site (June 2005, June 2006, May 2007 & May 2008)

As with previous surveys multivariate analysis of the community structure reveals the presence of no distinct community structure, based on both the presence/absence dataset (Figure 3.2.5 a) and the dataset with colonial organisms removed (Figure 3.2.5 b).

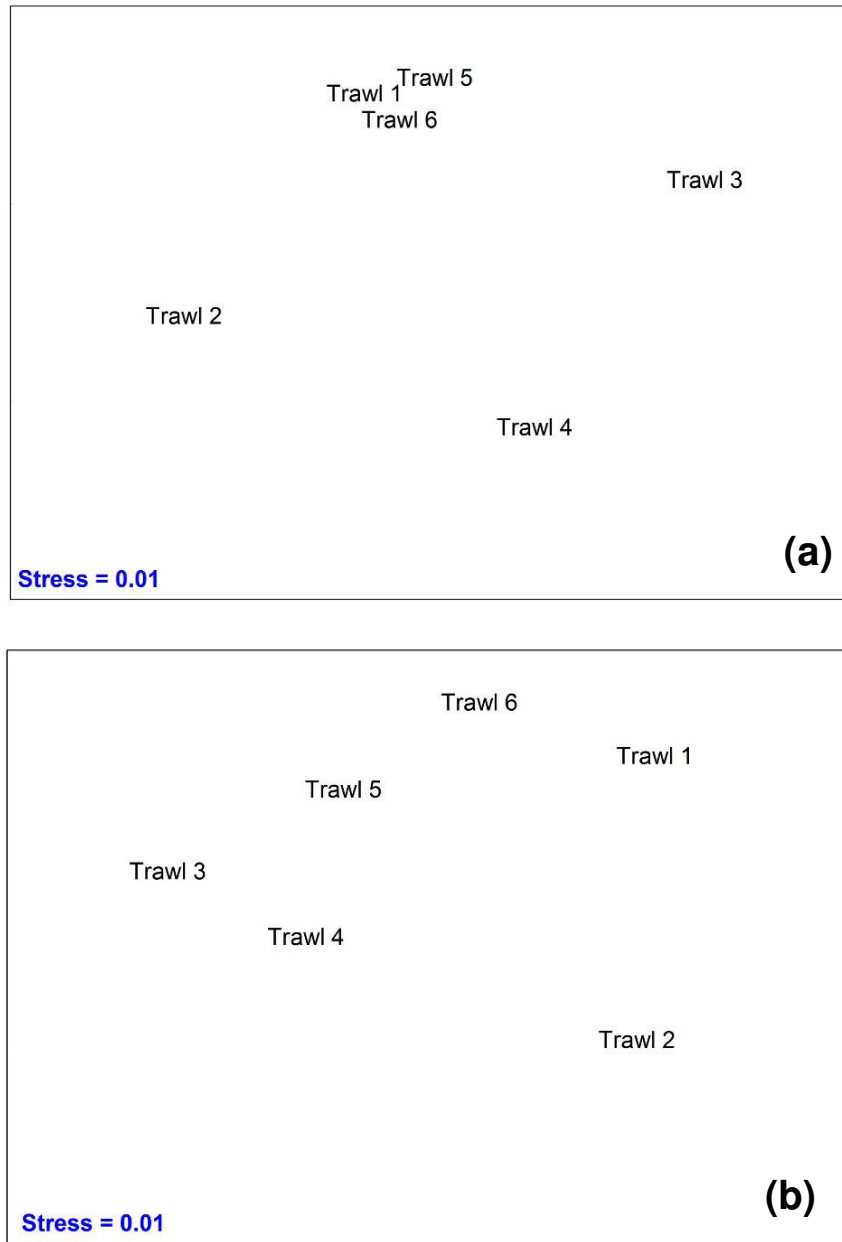


Figure 3.1.5 (a) Multivariate analysis (nMDS plot) on the 2008 trawl data, colonial data included (Stress = 0.01).
(b) Multivariate analysis of the countable fauna, colonial data removed (Stress = 0.01).

3.2 Anchor Dredge Samples

3.2.1 Particle Size Analysis

Data is presented in full for the Particle Size Analysis in Appendix 6.6. Table 3.2.1 presents a summary of the results and a visual assessment based on the onboard field notes. As can be seen from the results (Figure 3.2.1) there is an extensive range of sediment present in the study area with sediments ranging from gravels (at seven locations) to sand (at one station) with a range of types in between. There are some minor differences in the sediment distribution when compared to previous teays. A distribution map of the sediment data is presented in Figure 3.2.2. As can be seen, the dominant sediment types present are sands and gravelly sands which are present across the Arklow Bank. In addition, the area to the east of the Arklow Bank is characterised by Gravelly Sands. As previously reptred, the deeper sites along the inner margins of the Arklow Bank are dominated by Gravels. In addition, there are two locations to the south of the Arklow Bank (Stations 14 and 11) which are dominated by gravels. Station 10 is recorded as slightly gravelly muddy sand in the present survey, where it has previously been recorded as Gravel and Sandy Gravel in previous surveys. In addition, Station 6, which is recorded as Gravel in the present survey has previously been identified as sand and gravelly sand in previous surveys. The reasons for this variation are not known, though they could be related to local heterogeneity in the sediment present in the survey area.

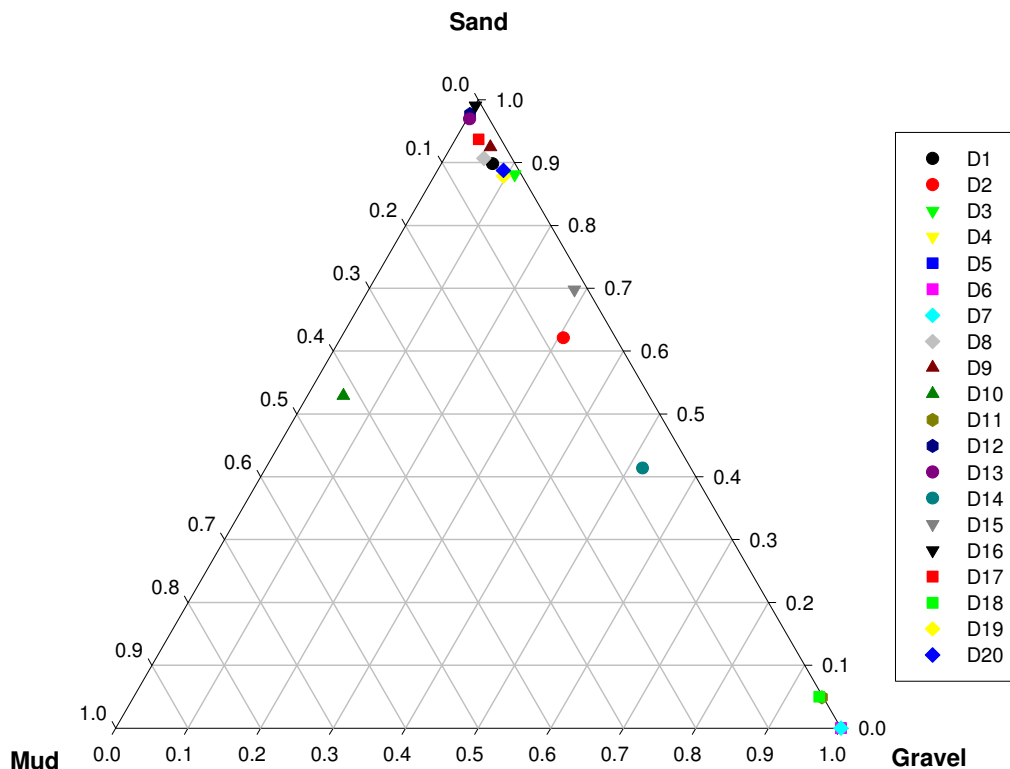


Figure 3.2.1 Ternary plot of PSA results from May 2008 Survey.

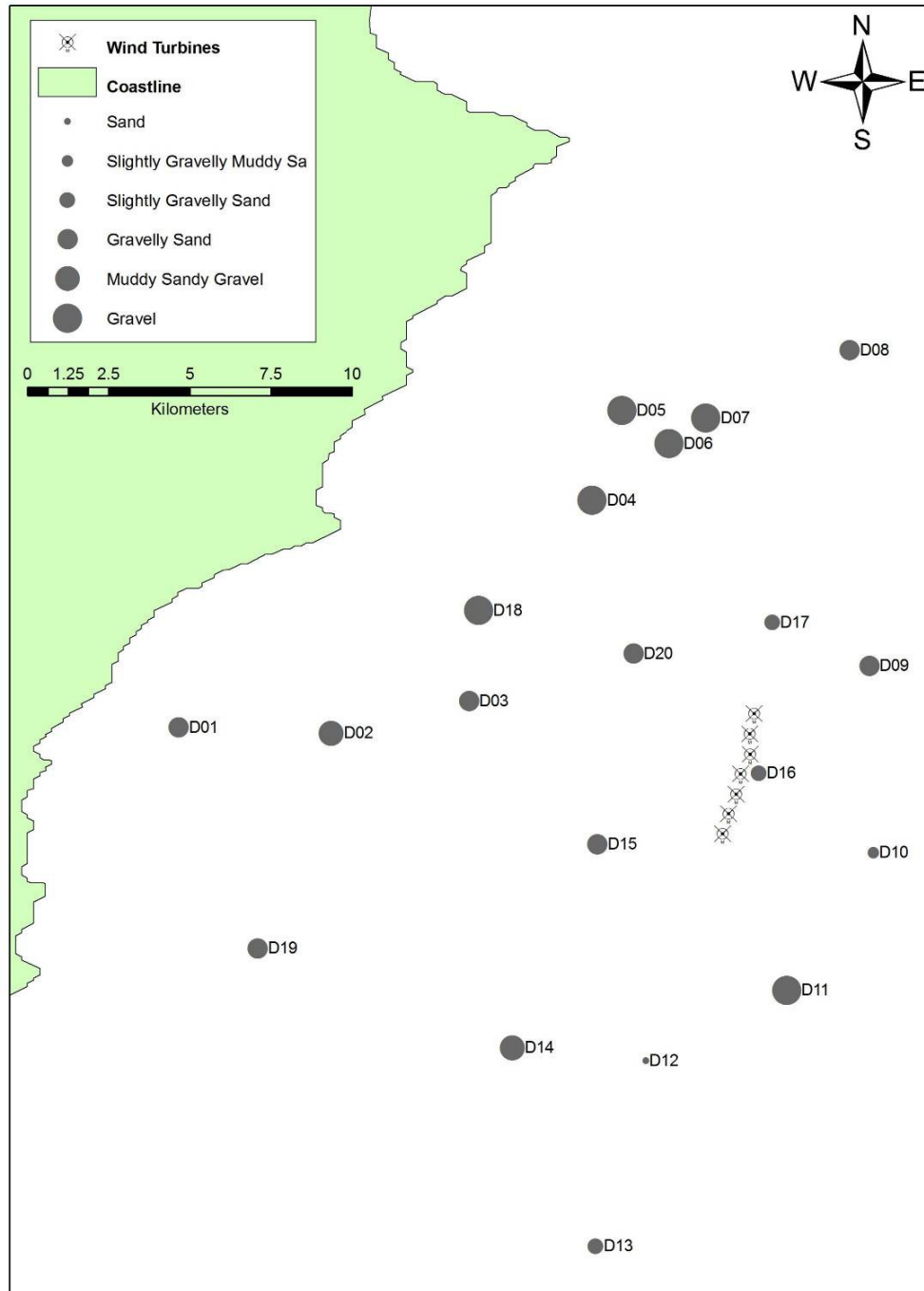


Figure 3.2.2 Distribution of sediment type as determine from the anchor dredge samples in May 2008. Site numbers are shown.

Site Code	Classification after Buchanan	Textural Group (May 2008)	Textural Group (May 2007)	Visual assessment
1	Poorly Sorted Fine Sand	Gravelly Sand [gS]	Slightly Gravelly Sand [(g)S]	Gravelly sand
2	Very Poorly Sorted Fine Gravel	Muddy Sandy Gravel [msG]	Gravelly Sand [gS]	Muddy sand with some gravel
3	Poorly Sorted Medium Sand	Gravelly Sand [gS]	Slightly Gravelly Sand [(g)S]	Gravelly Sand
4	Very Well Sorted Gravel	Gravel [G]	Gravel [G]	Gravel and cobbles with associated epifauna
5	Very Well Sorted Gravel	Gravel [G]	Sandy Gravel [gS]	Gravel with large cobbles present
6	Very Well Sorted Gravel	Gravel [G]	Slightly Gravelly Sand [(g)S]	Mixed gravel with <i>Sabellaria</i> tubes
7	Very Well Sorted Gravel	Gravel [G]	Gravel [G]	Gravel and cobbles with associated epifauna
8	Moderately Sorted Medium Sand	Gravelly Sand [gS]	Slightly Gravelly Sand [(g)S]	Gravelly sand with some shell
9	Moderately Sorted Medium Sand	Gravelly Sand [gS]	Gravelly Sand [gS]	Sandy gravel with occasional <i>Sabellaria</i> tubes
10	Very Poorly Sorted Fine Sand	Slightly Gravelly Muddy Sand [(g)mS]	Gravel [G]	Slightly muddy sand
11	Very Well Sorted Fine Gravel	Gravel [G]	Muddy Sandy Gravel [msG]	Sandy gravel
12	Well Sorted Medium Sand	Sand [S]	Sand [S]	Clean sand
13	Well Sorted Medium Sand	Slightly Gravelly Sand [(g)S]	Slightly Gravelly Sand [(g)S]	Sand with occasional shell fragments
14	Very Poorly Sorted Fine Gravel	Muddy Sandy Gravel [msG]	Gravelly Sand [gS]	Muddy gravelly sand
15	Poorly Sorted Medium Sand	Gravelly Sand [gS]	Gravelly Sand [gS]	Gravelly sand with lots of shell fragments
16	Very Well Sorted Medium Sand	Slightly Gravelly Sand [(g)S]	Slightly Gravelly Sand [(g)S]	Clean sand
17	Moderately Well Sorted Medium Sand	Slightly Gravelly Sand [(g)S]	Gravelly Sand [gS]	Gravelly sand with shell fragments
18	Well Sorted Fine Gravel	Gravel [G]	Gravel [G]	Gravel with some fine sediment.
19	Moderately Sorted Medium Sand	Gravelly Sand [gS]	Slightly Gravelly Sand [(g)S]	Gravelly Sand
20	Moderately Sorted Medium Sand	Gravelly Sand [gS]	Gravelly Sand [gS]	Gravelly sand with shell fragments

Table 3.2.1 Classification of sediment types at May 2008 grab stations according to methods after Buchanan & Kain and Folk & Ward, as used by BGS (see methods), together with visual assessment of sediments from notes taken at the time. Folk and Ward classification for the May 2007 survey is also given for comparison.

3.2.2 Biota

3.2.2.1 Abundance and diversity

A full taxonomic list of all species identified for the May 2008 survey is presented in Appendix 6.2. The full data matrix, including abundance data is presented in Appendix 6.5. In total, there were 7,651 individuals from 198 countable taxa recorded in the present survey. There were an additional 44 colonial taxa recorded, resulting in 242 taxa in total recorded in May 2008. These values are considerably lower than the numbers of countable taxa and their total abundances from all previous surveys, with the exception of countable taxa in May 2007 (17,800 individuals from 184 countable taxa in May 2007, 24,779 individuals from 262 countable taxa in June 2006, 49,811 individuals from 346 countable taxa in June 2005 and 31,919 individuals from 300 taxa in October 2004).

Aside from a rise in June 2005, the numbers of individuals has decreased since 2004. It is difficult to say if this represents a true trend, or whether it is a result of local heterogeneity or some other factor. For example, several species, which were present in large numbers in previous surveys, were absent, or much reduced in the present dataset. The tubeworm *Pomatoceros lamarcki* was present in huge numbers in 2007 (14,758) and 2006 (18,317), and this number is much reduced in 2008 (4,436). The mussel *Mytilus edulis* was present in large numbers at Station 6 in 2005 (4,908) and 2006 (297). In May 2007 only a single specimen was returned, and it is absent from the present survey. In 2004 and 2005 the high abundances recorded were as a result of very high abundances of *Pomatoceros triqueter/lamarcki*, *Sabellaria* spp. and *Mytilus edulis*. These species are recorded for the present survey, however at much reduced abundances. The reason for this variation is not clear; however it may partly be explained by seasonal/annual variation and also sediment heterogeneity.

Overall, the most abundant species in 2004, 2005, 2006 and 2007 are similar to the most abundant species present during the 2008 survey; however, abundances are lower than previous years. Only 7 species were present with greater than 70 individuals across the survey area compared to 11 in 2007 and 17 in 2006. This is lower than the figures reported in 2005 (35 taxa) and 2004 (19).

Overall, values for Margalef's species richness have increased in 12 of the 20 stations. The largest difference occurred at Station 18 (from 7.65 to 13.3)

3.2.2.2 Multivariate analysis

All multivariate analysis was undertaken using the statistical package PRIMER v 5.

Non-metric multi-dimensional scaling (MDS) analysis was performed on the 2008 dataset. There is no distinct community structure evident between any of the stations, although some of the sandy stations (3, 13, 16, 17 and 19) seem to be more similar than the other stations. Some of the stations with large cobbles and gravel (4–7) are also closer together in the plot. Stations 15 and 20, consisting of gravelly sand with shell fragments, are furthest separated from the other stations.

In last year's survey, there was evidence of a community similarity in the stations with a large gravel component, and that this sediment type played a structuring role in shaping the communities. This does not seem to be evident in the current survey, although some of the gravelly stations (4–7) are similar.

	Number of Taxa (S)	Number of Individuals (N)	Simpson's Dominance Index (d)	Shannon-Wiener Diversity Index (H')	Margalef's Species Richness (Dmg)
D1	24	96	0.361	1.91	5.04
D2	42	145	0.118	2.93	8.24
D3	3	3	0.333	1.1	1.82
D4	40	4670	0.904	0.316	4.62
D5	52	754	0.475	1.42	7.7
D6	63	324	0.233	2.59	10.7
D7	50	907	0.584	1.13	7.2
D8	0	0	-	-	-
D9	20	29	0.0678	2.85	5.64
D10	48	121	0.051	3.41	9.8
D11	17	68	0.151	2.25	3.79
D12	6	7	0.184	1.75	2.57
D13	3	3	0.333	1.1	1.82
D14	34	76	0.0526	3.21	7.62
D15	13	21	0.102	2.43	3.94
D16	1	1	1	0	-
D17	1	1	1	0	-
D18	83	480	0.115	3.05	13.3
D19	6	12	0.306	1.47	2.01
D20	11	19	0.186	2.05	3.4

Table 3.2.2 Univariate descriptors of abundance and richness in the 20 dredge samples from May 2008.

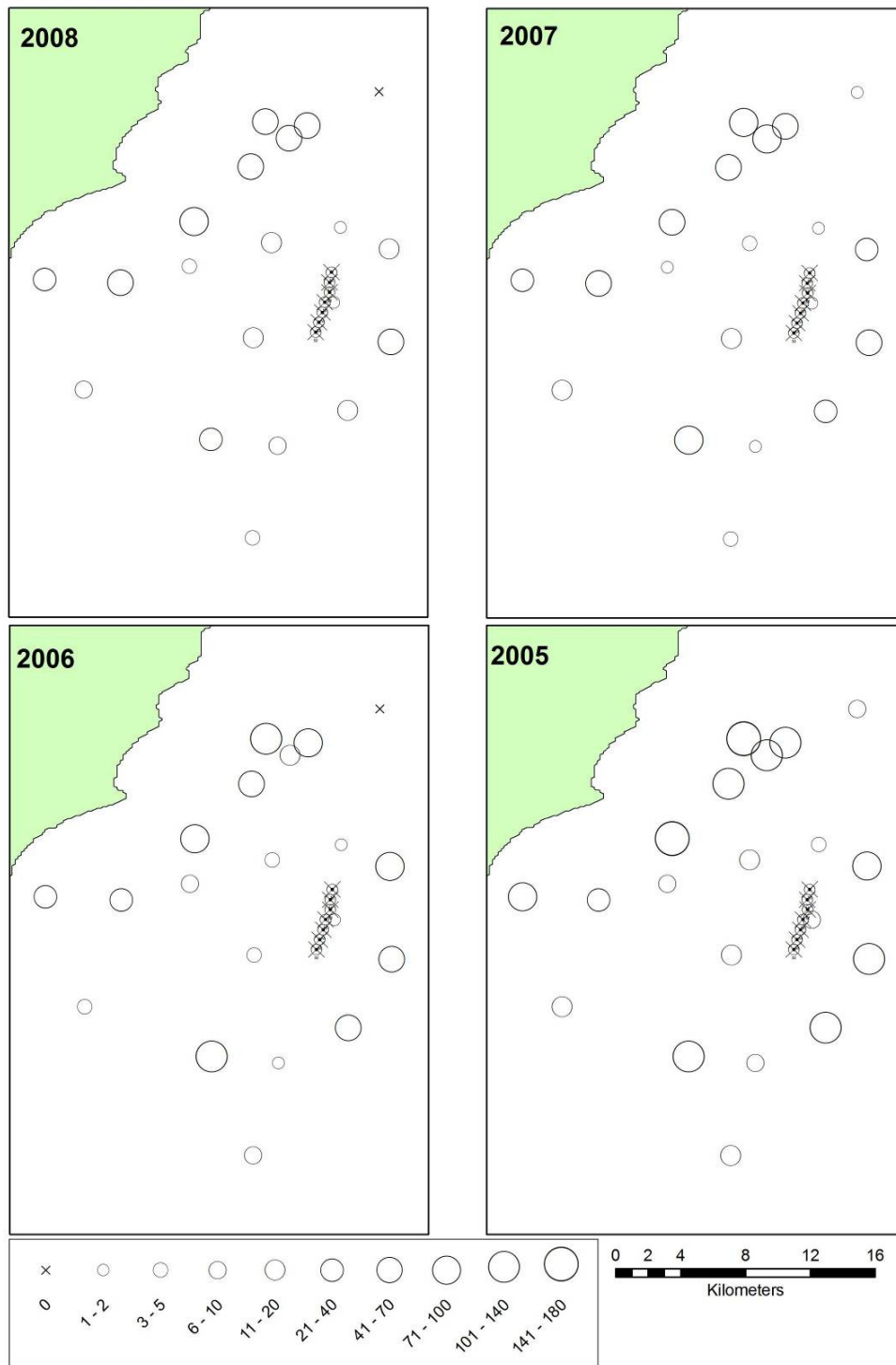


Figure 3.2.3 Total number of taxa per anchor dredge site (June 2005, June 2006, May 2007 & May 2008)

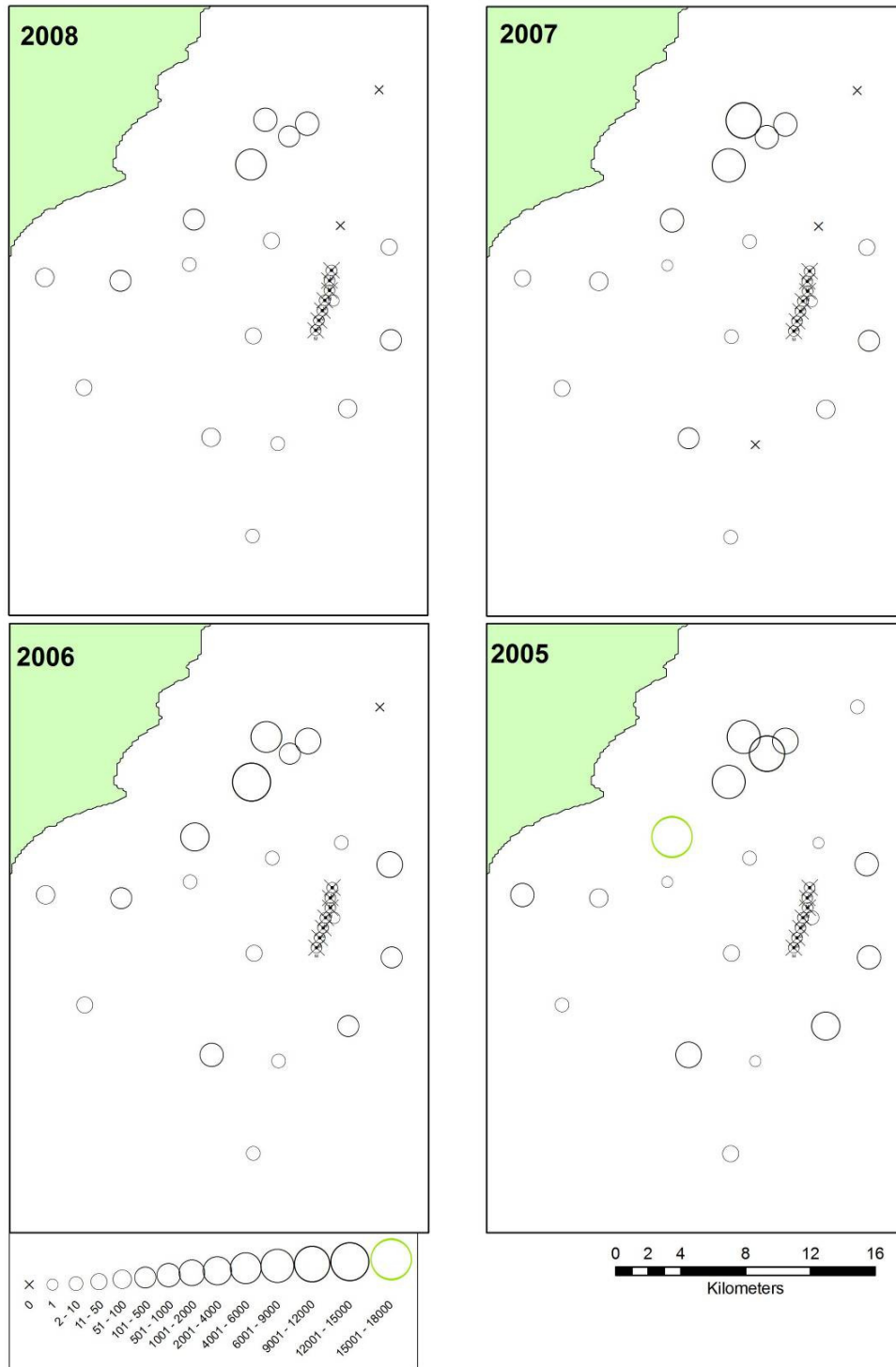


Figure 3.2.4 Total number of countable invertebrates per anchor dredge site (June 2005, June 2006, May 2007 & May 2008)

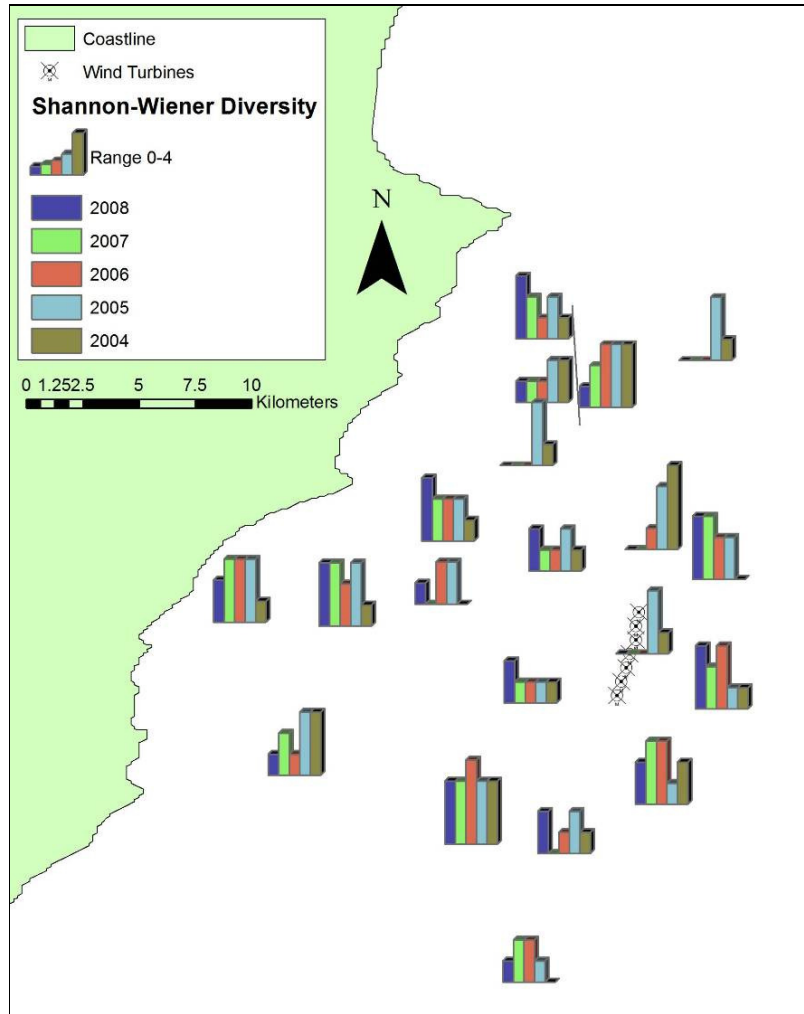


Figure 3.2.5 Shannon Wiener diversity indices per anchor dredge site (October 2004, June 2005, June 2006, May 2007 & May 2008)

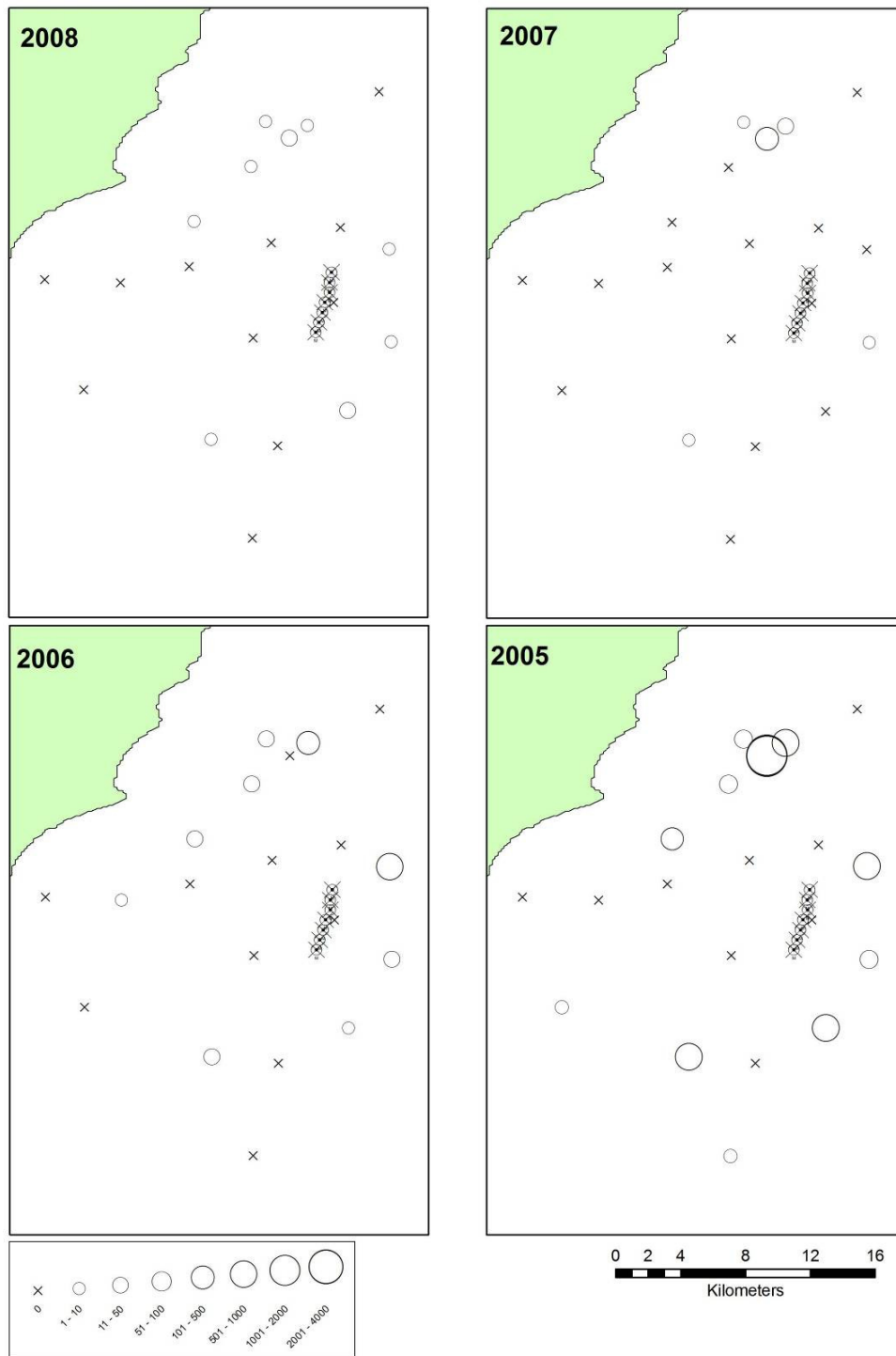


Figure 3.2.6 Total number of *Sabellaria* spp found at each dredge sample site (June 2005, June 2006, May 2007 & May 2008).

Table3.2.3 List of the most abundant taxa (where >60 individuals were recorded across the survey area) in descending order of abundance from the anchor dredge survey of May 2008.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
ANNELIDA	<i>Pomatoceros lamarcki</i>	0	12	0	4436	506	4	682	0	0	5	12	2	0	0	0	0	0	120	0	0	5779
ANNELIDA	Serpulidae	0	1	0	102	106	0	120	0	0	2	0	0	0	0	0	0	0	4	0	0	335
CRUSTACEA	<i>Balanus crenatus</i>	0	0	0	1	0	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153
MOLLUSCA	<i>Nucula nucleus</i>	0	0	0	16	45	0	1	0	1	0	0	0	0	0	0	0	0	86	0	1	150
ANNELIDA	<i>Clymenura</i>	1	44	0	0	0	1	2	0	3	8	1	1	1	5	0	0	0	15	0	0	82
CRUSTACEA	<i>Urothoe elegans</i>	1	1	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	55	0	7	70
MOLLUSCA	<i>Abra alba</i>	57	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	1	0	0	63
TUNICATA	<i>Dendrodoa grossularia</i>	0	4	0	9	12	1	7	0	3	2	18	1	0	0	0	0	0	6	0	0	63

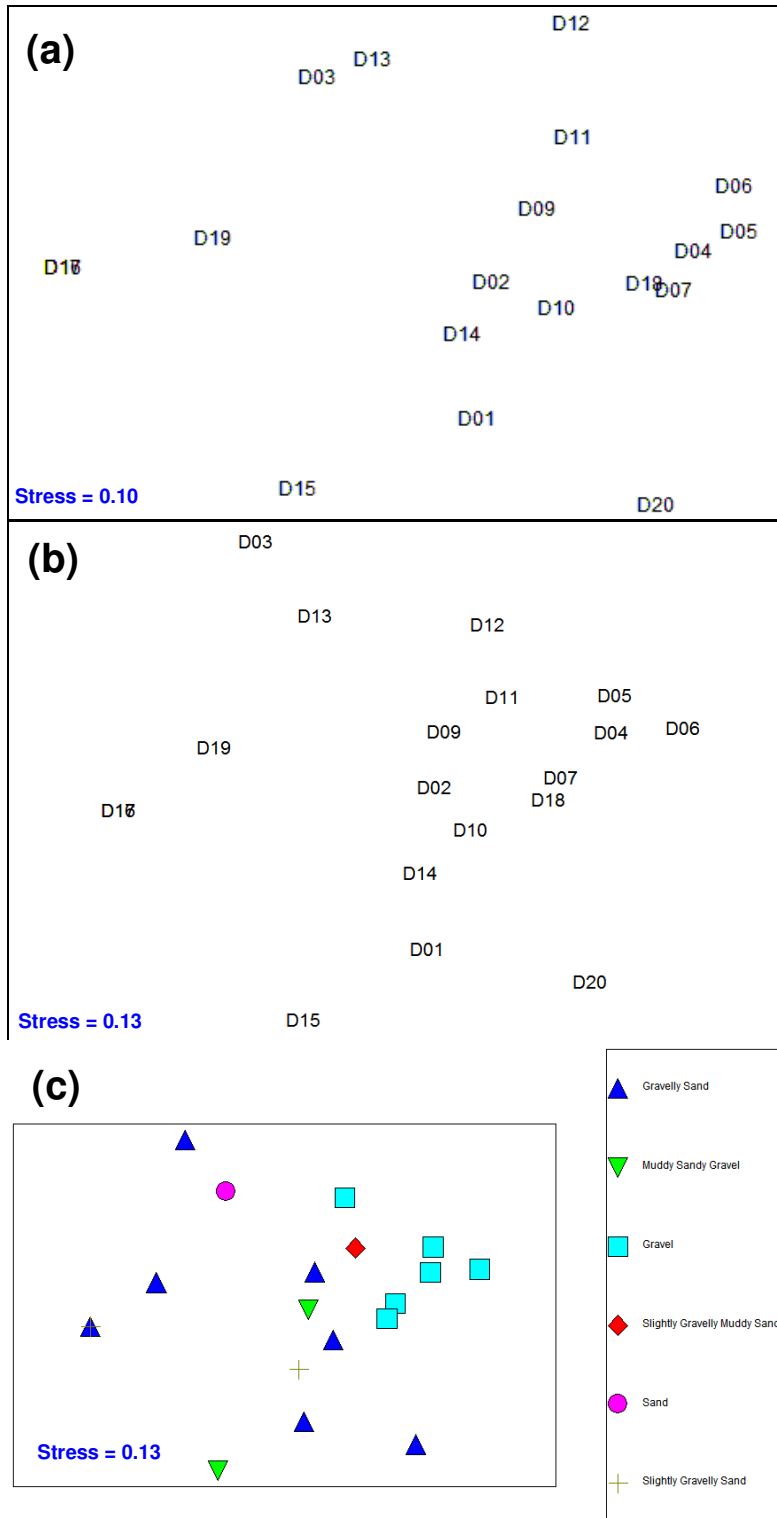


Figure 3.2.7 Multi-dimensional scaling plot of faunal data from the anchor dredge survey, May 2008. [(a) Presence/Absence data; (b) Abundance data, colonial organisms removed; (c) Rotated nMDS plot of dredge dataset (abundance data; No colonial's), with sedimentary environment superimposed]

3.3 Biotope Classification

Because of the nature of the current monitoring survey and the inherent differences in sampling protocol undertaken in both study types, direct comparison of the datasets is difficult. As such, it is easier to assess the communities identified in each of the surveys to assess potential change in the benthos compared to the baseline survey. The baseline survey undertaken in 2000 identified six separate biotopes within the survey (Ecoserve 2001) area using the 1997 JNCC classification system (Connor *et al*, 1997). These are presented in Table 3.3.1.

Biotope Classification	Description of Biotope	Approximate location within the survey area
IGS.Mob	Sparse fauna in infralittoral mobile clean sand	Along the Arklow Bank and to the south-west of the survey area. Small presence closer inshore near Arklow.
IGS.Scup.Hyd	<i>Sertularia cupressina</i> and <i>Hydrallmania falcata</i> on tide swept sublittoral cobbles or pebbles in coarse sand	Immediately surrounding the Arklow Bank, and also dominating the north-east corner of the survey area
MCR.CSab	Cirralittoral <i>Sabellaria</i> reefs	Present north-west of the survey area. Also small patches located to the west of the survey area towards Arklow.
MCR	Cirralittoral rock or mixed substrata in moderately exposed environments.	Immediately to the east of the Arklow Bank.
MCR.Flu	<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured cirralittoral rock or mixed substrata	To the north-west of the survey area surrounding MCR.CSab
IMS	Infralittoral clean or muddy sand	Immediately within the vicinity of Arklow Town.

Table 3.3.1 Biotope classifications identified in baseline survey (Ecoserve, 2001)

The current data is presented in Table 3.3.2 with the sampling positions broadly classified using the JNCC classification scheme for marine biotopes. To facilitate comparison with the baseline data, the 1997 JNCC classification was used (Connor *et al.*, 1997).

Biotope Classification		Biotope Classification	
Station 1	IGS.Scup.Hyd <i>Serularia cupressina</i> and <i>Hydrallmania flacata</i> on tide-swept sublittoral cobbles or pebbles in coarse sand. [Previously MCR Circalittoral rock or mixed substrata in moderately exposed environments]	Station 11	MCR Circalittoral rock or mixed substrata in moderately exposed environments. [No Change]
Station 2	MCR Circalittoral rock or mixed substrata in moderately exposed environments. [No Change]	Station 12	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 3	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]	Station 13	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 4	MCR.Flu.SerHyd <i>Sertularia argentea</i> , <i>S. cupressina</i> and <i>Hydrallmania falcata</i> on tide swept circalittoral cobbles and pebbles [No Change]	Station 14	MCR Circalittoral rock or mixed substrata in moderately exposed environments. [Previously MCR.Flu.Flu <i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata]
Station 5	MCR.Flu.SerHyd <i>Sertularia argentea</i> , <i>S. cupressina</i> and <i>Hydrallmania falcata</i> on tide swept circalittoral cobbles and pebbles [No Change]	Station 15	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 6	MCR.Flu.Flu (<i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata). [Previously MCR.CSab Circalittoral <i>Sabellaria</i> reefs]	Station 16	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 7	MCR Circalittoral rock or mixed substrata in moderately exposed environments. [No Change]	Station 17	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 8	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]	Station 18	MCR.Flu.Flu <i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata. [No Change]
Station 9	MCR.Flu.Flu (<i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata). [No Change]	Station 19	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]
Station 10	MCR Circalittoral rock or mixed substrata in moderately exposed environments. [No Change]	Station 20	IGS.Mob Sparse fauna in infralittoral mobile clean sand [No Change]

Table 3.3.2 Biotope classifications identified in the present survey (May 2008).

4. DISCUSSION AND CONCLUSIONS

Similar to previous surveys, the 2008 survey area is characterised by a range of sediments ranging from sands to gravels, and this is reflected in the fish and invertebrate species identified.

Previous scientific reviews have shown that the fish species expected to be found in these habitats are quite characteristic. In sandy areas <50m depth species diversity is reported to be pretty high with many elasmobranchs, gadoids, wrasses and flatfish. This is similar to species found in gravel areas <50m depth (Nash, 1990). The fish species which were found in the present survey are consistent with those found in previous surveys. Three species have been recorded in the present survey which were not previously recorded, the Nursehound (*Scylliorhinus stellaris*), the smooth sandeel (*Gymnammodytes semisquamatus*) and the transparent goby¹ (*Crystallogobius linearis*). Overall fish species and abundances have increased on 2006 & 2007 surveys, and are similar in nature to the abundances and diversity on the 2004 and 2005 surveys. In addition, all species identified during the present and in previous trawl surveys are considered common throughout the survey area and within the Irish Sea (Ellis *et al.*, 2000).

There have been no records in the present survey of rare or unusual species. This is concurrent with findings in previous surveys with no rare or unusual species recorded in the survey area.

The important reef communities identified in previous surveys were not recorded during the present survey. Although the reef forming serpulid worms *Sabellaria alveolata* and *Sabellaria spinulosa* are present across the survey area, reefs which were identified in localised areas in previous surveys were not recorded in the present survey. These biogenic reefs are very important and are listed under Annex I of the EU Habitats Directive (Code 1170: Reefs). They play an important role in stabilising sediments, in addition to improving species diversity and community stability (Holt *et al.*, 1998). In the present survey no reef forming communities were identified. However, previous surveys have identified these communities at dredge sites 6, 7 & 9 and also at trawl sites 3 & 4. In 2007, a large number of *Sabellaria* spp. were encountered at trawl sites 3 & 4 and dredge station 6 (1752, 293 & 459 respectively). In the present survey, numbers were significantly down at each of these sites (Trawl 3 – 111; Trawl 4 – 0; Dredge 6 – 26). The reason for this variation in abundances is not clear, however it may be due to the patchy occurrence of reefs and the possibility that sampling efforts missed them.

A detailed look of the biotopes present reveals a similar pattern to that found in the baseline survey. The Arklow Bank samples (dredge stations 8, 12, 16 & 17), in addition to the samples located to the south and west of the bank (dredge stations 3, 13, 15, 19 & 20), are all classified as IGS.Mob (Sparse fauna in infralittoral mobile clean sand). This agrees with the results of the baseline survey which showed similar distribution patterns for this community type (although it was interspersed with IGS.Scup.Hyd [*Sertularia cupressina* and *Hydrallmania falcata* on tide swept sublittoral cobbles or pebbles in coarse sand]). This is similar to results obtained in last year's study.

The innermost station (dredge station 1) has been classified IGS.Scup.Hyd (*Sertularia cupressina* and *Hydrallmania falcata* on tide swept sublittoral cobbles or pebbles in coarse sand) in the present survey, whereas it had tentatively been identified as MCR (Circalittoral rock or mixed substrata in moderately exposed environments) in the two previous surveys.

Immediately to the east of the Arklow Bank three stations (9, 10 & 11) are classified as MCR or MCR.Flu.Flu (*Flustra foliacea* on slightly scoured silty circalittoral rock or mixed substrata). This corresponds to a similar distribution pattern for the same habitat type in the baseline survey. A further 3 sampling stations are classified as MCR across the survey area (2, 7 & 14). In addition, two inner shore sites (dredge stations 6 & 18) all correspond to the MCR/MCR.FluFlu biotope classification.

¹ This identification has been highlighted as possible.

A single station, dredge station 6, which was classified in 2007 as MCR.CSAb (Circalittoral *Sabellaria* reefs) is now identified as MCR.Flu.Flu. This site returned significantly different fauna in the previous survey (this station was classified in 2006 as MCR.Myt.Has (*Mytilus edulis* beds with hydroids and ascidians in tide swept moderately exposed circalittoral rock and mixed sediments) and in 2004, 2005 and 2007 as MCR.CSAb (Circalittoral *Sabellaria* reefs).

Two stations in the immediate vicinity of station 6 (stations 4 & 5) are classified as MCRFlu.SerHyd (*Sertularia argentea*, *S. cupressina* and *Hydrallmania falcata* on tide swept circalittoral cobbles and pebbles). This corresponds with the classification of MCR.Flu.Flu (*Flustra foliacea* and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata) from the baseline survey for the same region.

Overall results indicate significant differences compared to previous years. The number of taxa identified in the dredge samples was similar to those identified in 2007, which showed a reduction when compared to previous surveys. It is believed that this reduction was due to the non-sampling of reef communities in the present survey (and only a single reef community in 2007), compared to previous surveys. Reefs formed by *Sabellaria* spp. consolidate the sediment and allow the settlement of other species not found in adjacent habitats leading to a diverse community of epifaunal and infauna species. This is reflected in the 5 sites at which reef habitats were identified over the course of the surveys from 2005 to 2008. Due to the patchy nature of *Sabellaria* reefs, there are differences across the years in the number of dredge stations which were identified as reef sites. The largest number of reef sites identified within the survey area was in 2005, a total of 5. In 2004, three reef sites were identified; 2006 two sites; 2007, one site and in 2008, no reef sites were identified. The reduction of taxa identified in the survey area from one year to the next can be accounted for by the occurrence or not of reefs in samples.

Furthermore, the trend for a reduction in abundances on individuals continued in the present survey. A total of 7,651 countable fauna were identified in the anchor dredge samples for 2007 (compared to 17,800 in 2007 and 24,779 in 2006). This reduction is directly accountable to a single species, the keelworm, *Pomatoceros* spp. whose numbers in the current survey were well down on previous surveys. The reason for this is unclear, although is probably related to small scale, local patchiness which is common in subtidal benthic communities.

The number of taxa collected in the beam trawls in this survey (170 taxa) is similar to last year's survey (177 taxa). These numbers are considerably higher than the numbers collected in 2004–2006 (51, 47 and 98 taxa respectively). However, the numbers of individuals has shown a significant decrease since 2006, which is related to the non-sampling of reef communities in the present survey.

MDS analysis indicates well established similarities in the present dataset when compared to results obtained in previous surveys. The gravel dominated sites all cluster together, and there is a large degree of variation in the sand dominated sites. This is related to the sparse faunal abundances and taxa numbers at the sandy sites.

Overall, the results from the present survey indicate that there is very little variation in the findings at the community level compared to the baseline survey. The current survey shows a reduction of both taxa numbers and faunal abundances when compared to previous surveys. It is believed that these differences are related to the absence of *Sabellaria* reefs and the low numbers of *Pomatoceros* spp. in the collected samples. These trends are believed to relate to the patchy distribution of the reef communities and *Pomatoceros* spp. in the survey area.

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6. APPENDICES

Appendix 6.1 Species List for Beam Trawl Survey; May 2008

ALGAE	<i>Schizomavella auriculata</i>	<i>Astacilla</i>
<i>Polysiphonia</i>	<i>Turbicellepora avicularis</i>	DECAPODA (megalopa)
ANNELIDA	CHELICERATA	DECAPODA (zoea)
<i>Subadyte pellucida</i>	<i>Nymphon brevistre</i>	<i>Pasiphaea sivado</i>
<i>Gattyana cirrhosa</i>	<i>Achelia echinata</i> (agg)	<i>Hippolyte varians</i>
<i>Harmothoe extenuata</i>	<i>Pycnogonum littorale</i>	<i>Pandalus montagui</i>
<i>Harmothoe impar</i>	CNIDARIA	<i>Philocheras sculptus</i>
<i>Lepidonotus squamatus</i>	Tubulariidae	<i>Philocheras trispinosus</i>
<i>Polynoe scolopendrina</i>	<i>Coryne</i>	<i>Crangon allmanni</i>
<i>Pholoe inornata</i> (sensu petersen)	<i>Eudendrium</i>	Paguridae (megalopa)
<i>Sthenelais boa</i>	<i>Bougainvilliidae</i>	Paguridae (zoea)
<i>Eulalia viridis</i>	<i>Hydractinia echinata</i>	<i>Pagurus bernhardus</i>
<i>Eumida bahusiensis</i>	<i>Calycella syringa</i>	<i>Galathea intermedia</i>
<i>Tomopteris</i>	<i>Halecium</i>	<i>Pisidia longicornis</i>
<i>Syllis armillaris</i>	<i>Abietinaria abietina</i>	<i>Hyas coarctatus</i>
<i>Eusyllis blomstrandii</i>	<i>Diphasia</i>	<i>Macropodia rostrata</i>
<i>Exogone naidina</i>	<i>Hydrallmania falcata</i>	<i>Eurynome aspera</i>
<i>Autolytus</i>	<i>Sertularia</i>	<i>Corystes cassivelaunus</i> (megalopa)
<i>Autolytus (epitoke)</i>	<i>Nemertesia</i>	<i>Liocarcinus</i> (juv)
<i>Neanthes fucata</i>	<i>Plumularia setacea</i>	<i>Liocarcinus corrugatus</i>
<i>Nereis zonata</i>	<i>Campanulariidae</i>	<i>Liocarcinus holsatus</i>
<i>Platynereis dumerilii</i>	<i>Campanularia hincksii</i>	<i>Liocarcinus marmoreus</i>
<i>Nephtys caeca</i>	<i>Clytia hemisphaerica</i>	<i>Monodaeus couchi</i>
<i>Nephtys cirrosa</i>	<i>Alcyonium digitatum</i>	<i>Pilumnus hirtellus</i>
<i>Clymenura</i>	ZOANTHARIA (?)	<i>Pinnotheres pisum</i>
<i>Asclerocheilus intermedius</i>	ACTINIARIA	ECHINODERMATA
<i>Sabellaria alveolata</i>	<i>Metridium senile</i>	<i>Antedon bifida</i>
<i>Sabellaria spinulosa</i>	CRUSTACEA	<i>Crossaster papposus</i>
<i>Lanice conchilega</i>	<i>Balanus crenatus</i>	<i>Asterias rubens</i>
<i>Pista cristata</i>	COPEPODA	<i>Ophiothrix fragilis</i>
<i>Polycirrus</i>	<i>Doropygus</i>	<i>Amphipholis squamata</i>
<i>Thelepus cincinnatus</i>	<i>Gastrosaccus spinifer</i>	<i>Psammechinus miliaris</i>
<i>Thelepus setosus</i>	<i>Schistomysis kervillei</i>	<i>Cucumariidae</i> (juv)
<i>Chone</i>	<i>Schistomysis spiritus</i> (?)	MOLLUSCA
<i>Jasmineira elegans</i>	<i>Gammarellus homari</i>	<i>Leptochiton asellus</i>
<i>Serpulidae</i>	<i>Colomastix pusilla</i>	<i>Buccinum undatum</i>
<i>Pomatoceros lamarcki</i>	<i>Cressa dubia</i>	<i>Buccinum undatum</i> (juv)
<i>Circeis spirillum</i>	<i>Stenothoe marina</i>	NUDIBRANCHIA (eggs)
<i>Myzostomum cirriferum</i>	<i>Stenula rubrovittata</i>	<i>Cuthona</i>
BRYOZOA	<i>Tryphosella sarsi</i>	<i>Mytilus edulis</i> (juv)
<i>Crisia</i>	<i>Iphimedia minuta</i>	<i>Aequipecten opercularis</i>
<i>Tubulipora</i>	<i>Atylus swammerdamei</i>	<i>Anomiidae</i> (juv)
<i>Alcyonidium cellarioides</i> (?)	<i>Ampelisca spinipes</i>	<i>Spisula solida</i>
<i>Alcyonidium diaphanum</i>	<i>Abludomelita obtusata</i>	<i>Hiatella arctica</i>
<i>Alcyonidium mytili</i>	<i>Abludomelita obtusata</i> (Type A)	<i>Octopus vulgaris</i>
<i>Alcyonidium parasiticum</i>	<i>Maera othonis</i>	<i>Sepiola atlantica</i>
<i>Vesicularia spinosa</i>	<i>Gammaropsis maculata</i>	NEMATODA
<i>Amathia lendigera</i>	<i>Gammaropsis nitida</i>	Nematoda sp.
<i>Scruparia chelata</i>	<i>Ericthonius punctatus</i>	<i>Sagittidae</i>
<i>Electra pilosa</i>	<i>Microjassa cumbrensis</i>	NEMERTIA
<i>Flustra foliacea</i>	<i>Aoridae</i> (female)	Nemertea sp.
<i>Bugula avicularia</i>	<i>Monocorophium sextonae</i>	PISCES
<i>Bicellariella ciliata</i>	<i>Unciola crenatipalma</i>	<i>Trisopterus luscus</i> (juv)
<i>Scrupocellaria scruposa</i>	<i>Dyopodos monacanthus</i>	<i>Agonus catophractus</i>
<i>Escharella immersa</i>	<i>Caprella linearis</i>	<i>Liparis liparis</i>
	<i>Pseudoprotella phasma</i>	<i>Echiichthys vipera</i>

Pholis gunnellus
Ammodytes tobianus
Gymnammodytes
semisquamatus
Callionymus lyra
Crystallogobius linearis (?)
Pleuronectes platessa (juv)
Limanda limanda
Raja clavata

PORIFERA

PORIFERA

TUNICATA

Didemnidae
Asciella scabra
Dendrodoa grossularia
Molgula complanata
Molgula manhattensis

TURBELLARIA

Turbellaria sp.

Appendix 6.2 Species List for Anchor Dredge Survey; May 2008**ANNELIDA**

Subadyte pellucida
Gattyana cirrhosa
Harmothoe impar
Harmothoe pagenstecheri
Lepidonotus squamatus
Polynoe scolopendrina
Pholoe baltica (sensu petersen)
Pholoe inornata (sensu petersen)
Hesionura elongata
Pseudomystides limbata
Eulalia bilineata
Eulalia ornate
Eulalia viridis
Eumida bahusiensis
Eumida sanguinea
Glycera fallax
Glycera lapidum (agg)
Glycera oxycephala
Glycera tridactyla
Glycinde nordmanni
Psamathe fusca
Nereimyra punctata
Syllidia armata
Ehlersia ferrugina
Syllis
Syllis armillaris
Syllis variegata
Syllis variegata (epitoke)
Eusyllis blomstrandii
Odontosyllis fulgurans
Exogone hebes
Exogone naidina
Exogone verugera
Sphaerosyllis bulbosa
Sphaerosyllis taylori
Sphaerosyllis taylori (epitoke)
Autolytus
Autolytus (epitoke)
Nereis zonata
Nephtys caeca
Nephtys cirrosa
Nephtys kersivalensis
Marphysa bellii
Nematonereis unicornis
Lumbrineris gracilis
Notocirrus scoticus
Ophryotrocha

Protodorvillea kefersteini
Orbinia sertulata
Scoloplos armiger
Aricidea catherinae
Paradoneis lyra
Poecilochaetus serpens
Aonides oxycephala
Aonides paucibranchiata
Laonice bahusiensis
Polydora caeca (agg)
Polydora caulleryi
Scolecopsis bonnieri
Scolecopsis korsuni
Spio armata (agg)
Spio martinensis
Spiophanes bombyx
Phyllochaetopterus
Aphelochaeta "species A"
Caulleriella alata
Chaetozone christiei
Chaetozone zetlandica
Macrochaeta
Mediomastus fragilis
Notomastus
Clymenura
Euclymene oerstedii
Heteroclymene robusta
Praxillella affinis
Nicomache
Notoproctus
Ophelia borealis
Travisia forbesii
Ophelina acuminata
Asclerocheilus intermedius
Scalibregma celticum
Galathowenia oculata
Owenia fusiformis
Lagis koreni
Sabellaria alveolata
Sabellaria spinulosa
Ampharete lindstroemi
Anobothrus gracilis
Sabellides octocirrata
Terebellides stroemi
Lanice conchilega
Polycirrus
Thelepus (juv)
Thelepus cincinnatus
Thelepus setosus
Chone

Demonax
Jasmineira elegans
Megalomma vesiculosum
Serpulidae
Hydroides norvegica
Pomatoceros lamarcki
Pomatoceros triqueter
Circeis spirillum

BRYOZOA

Crisia
Tubulipora
Eurystrotos compacta
Alcyonidium diaphanum
Alcyonidium mytili
Vesicularia spinosa
Scruparia chelata
Conopeum reticulum
Electra monostachys
Electra pilosa
Flustra foliacea
Amphiblestrum auritum
Amphiblestrum flemingii
Bicelliaria ciliata
Hippothoa divaricata
Chorizopora brongiarti
Escharella immersa
Escharella ventricosa
Schizomavella auriculata
Fenestulina malusii
Cellepora pumicosa
Turbicellepora avicularis
Omalosecosa ramulosa

CHELICERATA

Nymphon brevistro
Callipallene

CNIDARIA

Tubulariidae
FILIFERA
Bougainvilliidae
Hydractinia echinata
Halecium
Abietinaria abietina
Diphasia
Hydrallmania falcata
Sertularia
Sertularia
Kirchenpaueria pinnata
Nemertesia
Campanulariidae
Campanularia hincksii

ACTINIARIA

Metridium senile
Edwardsiidae

CRUSTACEA

Verruca stroemia
Balanidae (juv)
Balanus balanus
Balanus crenatus
Doropygus
AMPHIPODA (juv)
Parapleustes bicuspis
Stenopleustes nodifer
Amphilochus manudens
Cressa dubia
Stenothoe marina
Urothoe brevicornis
Urothoe elegans
Harpinia crenulata
Acidostoma obesum
Iphimedia minuta
Iphimedia perplexa
Ampelisca spinipes
Bathyporeia tenuipes
Abludomelita obtusata
Maera othonis
Maerella tenuimana
Isaeidae (juv)
Gammaropsis cornuta
Gammaropsis nitida
Photis pollex
Erichthonius (female)
Leptocheirus hirsutimanus
Leptocheirus pectinatus
Monocorophium sextonae
Crassikorophium bonnellii
Crassikorophium crassicorne
Unciola crenatipalma
Dyopedos monacanthus
Caprella linearis
Gnathiidae (female)
Anthura gracilis
Eurydice spinigera
Janira maculosa
Tanaopsis graciloides
Bodotria scorpioides
DECAPODA (megalopa)
Crangon allmanni
Paguridae (juv)
Pagurus bernhardus
Pisidia longicornis
Liocarcinus (juv)

ECHINODERMATA

Ophiothrix fragilis

Amphiuridae (juv)
Acrocnida brachiata
Amphiura filiformis
Amphipholis squamata
ECHINOIDA (juv)
Psammechinus miliaris
Psammechinus miliaris (juv)
Cucumariidae (juv)
Leptosynapta

HEMICHORDATA

ENTEROPNEUSTA

MOLLUSCA

Leptochiton asellus
Acanthochitona crinita
Gibbula tumida
Gibbula cineraria
Buccinum undatum
Cylichna cylindracea
Dendronotus frondosus
Doto
Nucula nucleus
Musculus discors
Modiolarca tumida
Modiolus modiolus
Pallium tigrinum
Aequipecten opercularis (juv)
Anomiidae (juv)
Astarte sulcata
Abra alba
Timoclea ovata
Mya truncata (juv)
Sphenia binghami
Hiatella arctica

NEMATODA

Nematoda spp.

NEMERTEA

Nemertea spp.

PHORONIDA

Phoronis

PORIFERA

PORIFERA
Scypha ciliata

PROTOCTISTA

Lagotia viridis

SIPUNCULIDAE

Golfingia elongata
Golfingia vulgaris
Nephasoma minutum

TUNICATA

ASCIDIACEA
Didemnidae
Asciella aspersa
Polycarpa pomaria
Dendrodoa grossularia

Pyura squamulosa

TURBELLARIA

TURBELLARIA

Appendix 6.3 Total results from the Beam Trawl May 2008.*Trawl Description*

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
Description	Relatively small volume present in Trawl.	Good Trawl Sample	Good Trawl Sample	Good Trawl Sample	Good Trawl Sample	Good trawl sample. Lots of shell. Some flustra. Large boulder present.
Date of hauling	19/05/2008	19/05/2008	29/05/2008	29/05/2008	19/05/2008	19/05/2008
Time of hauling	16:00	15:12	13:24	12:32	21:00	20:01
Layback/warp (m)	75	125	125	150	175	200
Speed of Vessel (kts)	2.3	2.2	2.1	2.7	2.3	2.2
Vessel Bearing	0°	180°	180°	0°	180°	180°
Distance of Trawl (m)	505	1080	735	680	890	800

Table of Contents for the Beam Trawls taken during the course of the May 2008 Survey.

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Polysiphonia</i>	0	P	0	0	0	0
PORIFERA	0	0	0	0	0	P
<i>Tubulariidae</i>	P	P	0	0	P	P
<i>Coryne</i>	0	0	0	0	0	P
<i>Eudendrium</i>	0	P	0	0	0	0
<i>Bougainvilliidae</i>	0	P	0	0	P	P
<i>Hydractinia echinata</i>	0	0	P	0	0	P
<i>Calycella syringe</i>	0	P	0	0	0	0
<i>Halecium</i>	0	0	0	0	0	P
<i>Abietinaria abietina</i>	P	P	0	0	P	0
<i>Diphasia</i>	0	P	0	0	P	P
<i>Hydrallmania falcata</i>	0	P	P	0	P	P
<i>Sertularia</i>	P	P	P	P	0	P
<i>Nemertesia</i>	P	0	P	P	0	0
<i>Plumularia setacea</i>	0	P	0	P	0	0
<i>Campanulariidae</i>	0	P	P	0	0	0
<i>Campanularia hincksii</i>	0	P	0	0	0	0
<i>Clytia hemisphaerica</i>	P	0	P	0	P	0
<i>Alcyonium digitatum</i>	P	0	0	0	P	0
ZOANTHARIA (?)	0	P	0	0	0	0
ACTINIARIA	0	0	1	0	5	1
<i>Metridium senile</i>	0	0	0	0	0	1
TURBELLARIA	1	0	0	0	0	0
NEMERTEA	1	0	1	0	4	2
NEMATODA	0	0	0	0	1	0
<i>Sagittidae</i>	0	0	0	0	0	1

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Subadyte pellucida</i>	1	0	0	0	0	0
<i>Gattyana cirrhosa</i>	1	0	0	0	0	0
<i>Harmothoe extenuate</i>	0	0	0	0	1	0
<i>Harmothoe impar</i>	0	0	0	0	3	0
<i>Lepidonotus squamatus</i>	1	0	1	0	10	0
<i>Polynoe scolopendrina</i>	0	0	0	0	1	0
<i>Pholoe inornata (sensu petersen)</i>	0	0	0	0	2	0
<i>Sthenelais boa</i>	0	0	0	0	1	1
<i>Eulalia viridis</i>	0	0	1	0	0	0
<i>Eumida bahusiensis</i>	0	0	1	0	1	0
<i>Tomopteris</i>	0	1	0	0	0	0
<i>Syllis armillaris</i>	0	0	4	0	2	0
<i>Eusyllis blomstrandii</i>	6	2	0	0	2	7
<i>Exogone naidina</i>	2	0	0	0	0	0
<i>Autolytus</i>	2	0	0	0	1	2
<i>Autolytus (epitoke)</i>	1	0	0	0	0	0
<i>Neanthes fucata</i>	0	0	0	0	0	1
<i>Nereis zonata</i>	0	0	2	0	2	0
<i>Platynereis dumerilii</i>	0	0	0	0	0	1
<i>Nephtys caeca</i>	0	0	0	0	0	2
<i>Nephtys cirrosa</i>	0	0	0	0	0	1
<i>Clymenura</i>	0	0	1	0	0	0
<i>Asclerocheilus intermedius</i>	0	0	0	0	1	0
<i>Sabellaria alveolata</i>	0	0	111	0	0	0
<i>Sabellaria spinulosa</i>	0	0	2	0	6	0
<i>Lanice conchilega</i>	0	0	0	0	1	0
<i>Pista cristata</i>	1	0	0	0	0	0
<i>Polycirrus</i>	0	0	0	0	1	0
<i>Thelepus cincinnatus</i>	0	0	0	0	6	0
<i>Thelepus setosus</i>	0	0	0	0	1	0
<i>Chone</i>	0	0	0	0	1	0
<i>Jasmineira elegans</i>	2	0	1	0	0	2
<i>Serpulidae</i>	0	0	0	0	3	0
<i>Pomatoceros lamarcki</i>	1	1	0	0	5	0
<i>Circeis spirillum</i>	8	2	0	0	2	0
<i>Myzostomum cirriferum</i>	0	0	1	0	0	0
<i>Nymphon brevirostre</i>	1	0	0	0	0	0
<i>Achelia echinata (agg)</i>	0	0	0	0	0	1
<i>Pycnogonum littorale</i>	0	0	1	0	0	1
<i>Balanus crenatus</i>	29	0	11	7	7	14
COPEPODA	0	0	0	0	0	1
<i>Gastrosaccus spinifer</i>	1	0	0	0	1	8
<i>Schistomysis kervillei</i>	1	5	0	0	0	2
<i>Schistomysis spiritus (?)</i>	0	0	0	0	1	0
<i>Gammarellus homari</i>	0	3	1	0	0	0
<i>Colomastix pusilla</i>	1	0	0	0	0	0
<i>Cressa dubia</i>	1	0	0	0	0	0
<i>Stenothoe marina</i>	1	0	0	0	0	0

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Stenula rubrovittata</i>	0	0	0	0	0	1
<i>Tryphosella sarsi</i>	0	0	1	0	0	0
<i>Iphimedia minuta</i>	1	0	0	0	0	0
<i>Atylus swammerdamei</i>	0	1	0	0	0	0
<i>Ampelisca spinipes</i>	0	0	0	1	1	1
<i>Abludomelita obtusata</i>	8	0	0	0	0	0
<i>Abludomelita obtusata</i> (Type A)	0	0	0	2	4	0
<i>Maera othonis</i>	0	0	0	0	1	0
<i>Gammaropsis maculate</i>	0	0	1	0	0	0
<i>Gammaropsis nitida</i>	0	0	0	0	3	7
<i>Erichthonius punctatus</i>	0	0	0	0	1	0
<i>Microjassa cumbrensis</i>	3	0	0	0	0	0
<i>Aoridae</i> (female)	5	0	0	0	0	0
<i>Monocorophium sextonae</i>	1	0	0	0	0	0
<i>Unciola crenatipalma</i>	0	0	2	0	3	0
<i>Dyopedos monacanthus</i>	1	0	0	0	0	0
<i>Caprella linearis</i>	1	0	0	0	0	0
<i>Pseudoprotella phasma</i>	1	0	0	0	0	0
<i>Astacilla</i>	0	0	0	0	1	0
DECAPODA (megalopa)	0	0	0	0	0	1
DECAPODA (zoea)	0	1	0	0	0	0
<i>Pasiphaea sivado</i>	0	0	0	0	0	2
<i>Hippolyte varians</i>	0	0	1	0	3	0
<i>Pandalus montagui</i>	7	1	4	1	2	1
<i>Philocheras sculptus</i>	1	0	0	0	0	0
<i>Philocheras trispinosus</i>	0	0	4	0	0	0
<i>Crangon almanni</i>	0	3	7	21	27	10
<i>Paguridae</i> (megalopa)	0	1	0	0	0	0
<i>Paguridae</i> (zoea)	0	0	0	0	0	2
<i>Pagurus bernhardus</i>	1	0	8	3	1	20
<i>Galathea intermedia</i>	0	0	0	0	2	0
<i>Pisidia longicornis</i>	0	1	8	8	4	0
<i>Hyas coarctatus</i>	3	0	0	10	8	1
<i>Macropodia rostrata</i>	8	0	1	2	12	3
<i>Eurynome aspera</i>	2	0	0	0	0	0
<i>Corystes cassivelaunus</i> (megalopa)	1	1	0	0	0	0
<i>Liocarcinus</i> (juv)	4	20	11	12	37	3
<i>Liocarcinus corrugatus</i>	0	0	0	0	1	0
<i>Liocarcinus holsatus</i>	0	0	0	0	1	0
<i>Liocarcinus marmoreus</i>	0	0	0	0	0	1
<i>Monodaeus couchi</i>	0	0	0	0	3	0
<i>Pilumnus hirtellus</i>	0	0	1	0	0	0
<i>Pinnotheres pisum</i>	0	1	0	0	0	0
<i>Leptochiton asellus</i>	0	0	0	0	10	0
<i>Buccinum undatum</i>	1	0	1	0	0	0
<i>Buccinum undatum</i> (juv)	1	0	0	0	0	0
NUDIBRANCHIA (eggs)	0	0	0	0	0	P
<i>Cuthona</i>	1	0	0	0	1	0

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Mytilus edulis</i> (juv)	12	7	0	0	0	0
<i>Aequipecten opercularis</i>	0	0	0	0	0	1
Anomiidae (juv)	1	1	0	0	0	0
<i>Spisula solida</i>	0	0	0	0	0	2
<i>Hiatella arctica</i>	1	0	0	0	0	0
<i>Crisia</i>	P	P	P	0	0	P
<i>Tubulipora</i>	0	P	0	0	0	P
<i>Alcyonidium cellarioides</i> (?)	0	0	0	0	P	0
<i>Alcyonidium diaphanum</i>	P	P	0	0	P	P
<i>Alcyonidium mytili</i>	0	0	0	0	0	P
<i>Alcyonidium parasiticum</i>	0	0	0	0	P	P
<i>Vesicularia spinosa</i>	P	0	0	0	P	0
<i>Amathia lendigera</i>	0	0	0	0	0	P
<i>Scruparia chelata</i>	0	0	0	0	P	0
<i>Electra pilosa</i>	P	P	P	0	P	P
<i>Flustra foliacea</i>	P	P	P	P	P	P
<i>Bugula avicularia</i>	0	0	0	0	0	P
<i>Bicelliella ciliate</i>	P	P	0	0	0	P
<i>Scrupocellaria scruposa</i>	P	0	0	0	0	P
<i>Escharella immerse</i>	0	0	0	0	P	0
<i>Schizomavella auriculata</i>	0	0	0	0	P	0
<i>Turbicellepora avicularis</i>	P	0	P	0	P	P
<i>Antedon bifida</i>	0	0	4	0	0	0
<i>Crossaster papposus</i>	0	0	2	2	0	0
<i>Asterias rubens</i>	0	0	42	28	0	0
<i>Ophiothrix fragilis</i>	1	0	1	0	0	0
<i>Amphipholis squamata</i>	1	0	1	0	4	2
<i>Psammechinus miliaris</i>	0	0	2	5	6	0
Cucumariidae (juv)	1	0	0	0	0	0
Didemnidae	0	P	0	0	0	0
<i>Asciidiella scabra</i>	0	0	3	0	0	0
<i>Dendrodoa grossularia</i>	1	0	0	0	3	0
<i>Molgula complanata</i>	0	0	0	0	1	0
<i>Molgula manhattensis</i>	0	0	0	0	1	0
<i>Aspitrigla cuculus</i>	1	0	0	0	0	0
<i>Scyliorhinus stellaris</i>	0	0	0	0	1	0
<i>Scyliorhinus caniculus</i>	0	1	0	0	1	0
<i>Microstomus kitt</i>	0	1	0	0	0	0
<i>Merlangius merlangus</i>	0	0	0	0	3	0
<i>Trisopterus luscus</i> (juv)	1	1	0	1	1	1
<i>Agonus catophractus</i>	1	6	0	2	0	0
<i>Liparis liparis</i>	0	0	0	0	1	0
<i>Echiichthys vipera</i>	0	0	1	0	0	2
<i>Pholis gunnellus</i>	0	0	1	0	0	0
<i>Ammodytes tobianus</i>	0	0	1	0	0	0
<i>Gymnammodytes semisquamatus</i>	0	0	1	0	0	0
<i>Callionymus lyra</i>	0	0	1	0	0	0
<i>Crystallogobius linearis</i> (?)	0	0	0	0	1	0

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Pleuronectes platessa</i> (juv)	4	5	0	0	1	2
<i>Raja clavata</i>	0	0	1	0	0	0
<i>Limanda limanda</i>	0	0	1	0	0	0
<i>Octopus vulgaris</i>	0	0	1	0	0	0
<i>Sepiolo atlantica</i>	0	0	0	1	0	0
Number of Organisms	139	66	253	106	222	112
Colonial Taxa	14	20	10	4	17	22
Countable Taxa	50	22	43	16	60	37
Total Taxa	64	42	53	20	77	59

Appendix 6.4 Total fish numbers and lengths in mm (where possible) of all fish species; May 2008. [x – Denotes where no measurements were taken and fish were identified as juveniles]

	Trawl 1	Trawl 2	Trawl 3	Trawl 4	Trawl 5	Trawl 6
<i>Aspitrigla cuculus</i> (Red Gurnard)	1 (100)					
<i>Scyliorhinus stellaris</i> Nursehound					1 ♀ (750)	
<i>Scyliorhinus caniculus</i> (Lesser Spotted Dogfish)		1 ♀ (550)			1 ♀ (300)	
<i>Pleuronectes platessa</i> (Plaice)	4 (x)	1 (150) 4 (x)			1 (x)	2 (x)
<i>Microstomus kitt</i> (Lemon Sole)		1 (250)				
<i>Agonus catophractus</i> (Pogge)	1 (x)	1 (10)		2 (x)		
<i>Merlangius merlangus</i> (Whiting)					3 (150, 140, 140)	
<i>Echiichthys vipera</i> (Lesser Weeverfish)			1 (x)			2 (140, 120)
<i>Raja clavata</i> (Ray)			1 (95)			
<i>Limanda limanda</i> (Dab)			1 (175)			
<i>Trisopterus luscus</i> (Bib)	1 (x)	1 (x)		1 (x)	1 (x)	1 (x)
<i>Pholis gunnellus</i> (Butterfish)			1 (x)			
<i>Ammodytes tobianus</i> (Sandeel)			1 (x)			
<i>Gymnammodytes semisquamatus</i> (Smooth sandeel)			1 (x)			
<i>Callionymus lyra</i> (Common Dragonet)			1 (x)			
<i>Crytallogobius linearis</i> (Transparent Goby)				1 (x)		

Appendix 6.5 Anchor dredge raw data, May 2008

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
ANNELIDA	<i>Subadyte pellucida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Gattyana cirrhosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Harmothoe impar</i>	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Harmothoe pagenstecheri</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Lepidonotus squamatus</i>	0	0	0	2	0	9	1	0	0	1	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Polynoe scolopendrina</i>	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
ANNELIDA	<i>Pholoe baltica (sensu petersen)</i>	P	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Pholoe inornata (sensu petersen)</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0
ANNELIDA	<i>Hesionura elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ANNELIDA	<i>Pseudomystides limbata</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eulalia bilineata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eulalia ornata</i>	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eulalia viridis</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eumida bahusiensis</i>	0	0	0	11	10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eumida sanguinea</i>	0	0	0	0	0	2	11	0	0	0	0	1	0	0	0	0	0	5	0	0
ANNELIDA	<i>Glycera fallax</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Glycera lapidum (agg)</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ANNELIDA	<i>Glycera oxycephala</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
ANNELIDA	<i>Glycera tridactyla</i>	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Glycinde nordmanni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Psamathe fusca</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Nereimyra punctata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Syllidia armata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Ehlersia ferrugina</i>	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Syllis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
ANNELIDA	<i>Syllis armillaris</i>	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Syllis variegata</i>	0	0	0	1	1	10	1	0	0	0	0	0	0	0	0	0	0	3	0	0
ANNELIDA	<i>Syllis variegata (epitoke)</i>	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Eusyllis blomstrandii</i>	3	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Odontosyllis fulgurans</i>	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	P
ANNELIDA	<i>Exogone hebes</i>	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
ANNELIDA	<i>Exogone naidina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Exogone verugera</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Sphaerosyllis bulbosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ANNELIDA	<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Sphaerosyllis taylori</i> (epitoke)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Autolytus</i>	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9	0	0
ANNELIDA	<i>Autolytus</i> (epitoke)	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Nereis zonata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Nephtys caeca</i>	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	1	0
ANNELIDA	<i>Nephtys cirrosa</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	P	0	1	0
ANNELIDA	<i>Nephtys kersivalensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Marphysa bellii</i>	0	2	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Nematonereis unicornis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
ANNELIDA	<i>Lumbrineris gracilis</i>	0	0	0	0	0	0	0	0	1	6	3	0	0	7	0	0	0	0	0	0
ANNELIDA	<i>Notocirrus scoticus</i>	0	6	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0
ANNELIDA	<i>Ophryotrocha</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
ANNELIDA	<i>Protodorvillea kefersteini</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
ANNELIDA	<i>Orbinia sertulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
ANNELIDA	<i>Scoloplos armiger</i>	0	2	0	0	0	0	0	0	0	9	4	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Aricidea catherinae</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Paradoneis lyra</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Poecilochaetus serpens</i>	0	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Aonides oxycephala</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Aonides paucibranchiata</i>	0	1	0	1	0	0	1	0	2	8	0	0	0	0	0	0	0	1	0	1
ANNELIDA	<i>Laonice bahusiensis</i>	0	5	0	0	0	0	0	0	0	2	0	0	0	8	0	0	0	0	0	0
ANNELIDA	<i>Polydora caeca</i> (agg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Polydora caulleryi</i>	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Scolecopsis bonnierii</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
ANNELIDA	<i>Scolecopsis korsuni</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Spio armata</i> (agg)	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Spio martinensis</i>	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Spiofanus bombyx</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Phyllochaetopterus</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Aphelochaeta "species A"</i>	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
ANNELIDA	<i>Caulerliella alata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Chaetozone christiei</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Chaetozone zetlandica</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Macrochaeta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
ANNELIDA	<i>Mediomastus fragilis</i>	2	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Notomastus</i>	2	2	0	0	0	0	0	0	0	17	0	0	0	4	1	0	0	0	2	0
ANNELIDA	<i>Clymenura</i>	1	44	0	0	0	1	2	0	3	8	1	1	1	5	0	0	0	15	0	0
ANNELIDA	<i>Euclymene oerstedii</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Heteroclymene robusta</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Praxillella affinis</i>	0	1	0	1	0	0	0	0	0	4	0	0	0	1	0	0	0	1	0	0
ANNELIDA	<i>Nicomache</i>	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Notoproctus</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Ophelia borealis</i>	0	3	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	6	0
ANNELIDA	<i>Travisia forbesii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0
ANNELIDA	<i>Ophelina acuminata</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Asclerocheilus intermedius</i>	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Scalibregma celticum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
ANNELIDA	<i>Galathowenia oculata</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Owenia fusiformis</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Lagis koreni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
ANNELIDA	<i>Sabellaria alveolata</i>	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Sabellaria spinulosa</i>	0	0	0	4	1	7	2	0	1	1	13	0	0	1	0	0	0	2	0	0
ANNELIDA	<i>Ampharete lindstroemi</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Anobothrus gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
ANNELIDA	<i>Sabellides octocirrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ANNELIDA	<i>Terebellides stroemi</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
ANNELIDA	<i>Lanice conchilega</i>	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Polycirrus</i>	0	0	0	0	0	4	0	0	0	0	1	0	0	1	0	0	0	2	0	0
ANNELIDA	<i>Thelepus (juv)</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Thelepus cincinnatus</i>	0	0	0	10	0	0	0	0	1	1	0	0	0	0	0	0	0	3	0	0
ANNELIDA	<i>Thelepus setosus</i>	0	0	0	10	7	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
ANNELIDA	<i>Chone</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Demonax</i>	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNELIDA	<i>Jasmineira elegans</i>	0	0	0	8	0	12	0	0	0	0	0	0	0	0	0	0	0	2	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
ANNELIDA	<i>Megalomma vesiculosum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	Serpulidae	0	1	0	102	106	0	120	0	0	2	0	0	0	0	0	0	0	4	0	0
ANNELIDA	<i>Hydroides norvegica</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
ANNELIDA	<i>Pomatoceros lamarcki</i>	0	12	0	4436	506	4	682	0	0	5	12	2	0	0	0	0	0	120	0	0
ANNELIDA	<i>Pomatoceros triqueter</i>	0	0	0	1	4	0	8	0	0	0	0	0	0	0	0	0	0	2	0	0
ANNELIDA	<i>Circeis spirillum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0
BRYOZOA	<i>Crisia</i>	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Tubulipora</i>	0	0	0	0	P	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Eurystrotos compacta</i>	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Alcyonidium diaphanum</i>	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Alcyonidium mytili</i>	0	0	0	P	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Vesicularia spinosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
BRYOZOA	<i>Scruparia chelata</i>	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Conopeum reticulum</i>	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Electra monostachys</i>	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Electra pilosa</i>	0	0	0	P	P	P	P	0	0	P	0	0	0	0	0	0	0	P	0	0
BRYOZOA	<i>Flustra foliacea</i>	0	0	0	0	0	P	0	0	P	0	0	0	0	0	0	0	0	P	0	0
BRYOZOA	<i>Amphiblestrum auritum</i>	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Amphiblestrum flemingii</i>	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Bicellariella ciliata</i>	0	0	0	P	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Hippothoa divaricata</i>	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Chorizopora brongniarti</i>	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Escharella immersa</i>	0	0	0	0	P	P	P	0	P	0	P	0	0	0	0	0	0	P	0	0
BRYOZOA	<i>Escharella ventricosa</i>	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Schizomavella auriculata</i>	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Fenestulina malusii</i>	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Cellepora pumicosa</i>	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Turbicellepora avicularis</i>	0	0	0	0	P	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
BRYOZOA	<i>Omalosecosa ramulosa</i>	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
CHELICERATA	<i>Nymphon brevistre</i>	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHELICERATA	<i>Callipallene</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CNIDARIA	Tubulariidae	0	0	0	0	P	0	0	0	0	P	0	0	0	0	0	0	0	P	0	0
CNIDARIA	FILIFERA	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Bougainvilliidae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
CNIDARIA	<i>Hydractinia echinata</i>	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Halecium</i>	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Abietinaria abietina</i>	0	0	0	P	0	0	P	0	0	0	0	0	0	0	0	0	0	P	0	0
CNIDARIA	<i>Diphasia</i>	0	0	0	0	P	P	0	0	0	P	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Hydrallmania falcata</i>	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0
CNIDARIA	<i>Sertularella</i>	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Sertularia</i>	P	P	0	P	P	P	0	0	P	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Kirchenpaueria pinnata</i> (?)	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Nemertesia</i>	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Campanulariidae</i>	0	0	0	P	0	P	P	0	0	P	0	0	0	0	0	0	0	P	0	0
CNIDARIA	<i>Campanularia hincksii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0
CNIDARIA	ACTINIARIA	0	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0
CNIDARIA	<i>Metridium senile</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNIDARIA	<i>Edwardsiidae</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	0	0	0	0
CRUSTACEA	<i>Verruca stroemia</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	Balanidae (juv)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Balanus balanus</i>	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Balanus crenatus</i>	0	0	0	1	0	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Doropygus</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	AMPHIPODA (juv)	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Parapleustes bicuspis</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
CRUSTACEA	<i>Stenopleustes nodifer</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
CRUSTACEA	<i>Amphilocheus manudens</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0
CRUSTACEA	<i>Cressa dubia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
CRUSTACEA	<i>Stenothoe marina</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Urothoe brevicornis</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Urothoe elegans</i>	1	1	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	55	0	7
CRUSTACEA	<i>Harpinia crenulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Acidostoma obesum</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Iphimedia minuta</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Iphimedia perplexa</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Ampelisca spinipes</i>	0	13	0	0	0	0	0	0	0	2	1	0	0	1	0	0	0	1	0	0
CRUSTACEA	<i>Bathyporeia tenuipes</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Abludomelita obtusata</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
CRUSTACEA	<i>Maera othonis</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Maerella tenuimana</i>	0	2	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Isaeidae (juv)</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Gammaropsis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Gammaropsis nitida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
CRUSTACEA	<i>Photis pollex</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Ericthonius (female)</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Leptocheirus hirsutimanus</i>	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Leptocheirus pectinatus</i>	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
CRUSTACEA	<i>Monocorophium sextonae</i>	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
CRUSTACEA	<i>Crassikorophium bonnellii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0
CRUSTACEA	<i>Crassikorophium crassicorne</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Unciola crenatipalma</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Dyopedos monacanthus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
CRUSTACEA	<i>Caprella linearis</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Gnathiidae (female)</i>	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Anthura gracilis</i>	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Eurydice spinigera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
CRUSTACEA	<i>Janira maculosa</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Tanaopsis graciloides</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Bodotria scorpioides</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	DECAPODA (megalopa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
CRUSTACEA	<i>Crangon allmanni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
CRUSTACEA	<i>Paguridae (juv)</i>	0	0	0	1	1	1	2	0	0	0	0	0	0	1	0	0	0	1	0	0
CRUSTACEA	<i>Pagurus bernhardus</i>	0	0	0	4	0	3	2	0	0	0	0	0	0	0	0	0	0	2	0	0
CRUSTACEA	<i>Pisidia longicornis</i>	0	1	0	4	3	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0
CRUSTACEA	<i>Liocarcinus (juv)</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0
ECHINODERMATA	<i>Ophiothrix fragilis</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ECHINODERMATA	<i>Amphiuridae (juv)</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ECHINODERMATA	<i>Acrocnida brachiata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ECHINODERMATA	<i>Amphiura filiformis</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ECHINODERMATA	<i>Amphipholis squamata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0
ECHINODERMATA	ECHINOIDA (juv)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
ECHINODERMATA	<i>Psammechinus miliaris</i>	0	0	0	11	1	0	2	0	0	0	0	0	0	0	0	0	0	5	0	1

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
ECHINODERMATA	<i>Psammechinus miliaris</i> (juv)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
ECHINODERMATA	Cucumariidae (juv)	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0
ECHINODERMATA	<i>Leptosynapta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0
HEMICHORDATA	ENTEROPNEUSTA	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MOLLUSCA	<i>Leptochiton asellus</i>	0	2	0	4	10	1	8	0	0	9	0	0	0	2	0	0	0	10	0	0
MOLLUSCA	<i>Acanthochitona crinita</i>	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
MOLLUSCA	<i>Gibbula tumida</i>	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0
MOLLUSCA	<i>Gibbula cineraria</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0
MOLLUSCA	<i>Buccinum undatum</i>	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0
MOLLUSCA	<i>Cylichna cylindracea</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Dendronotus frondosus</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Doto</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MOLLUSCA	<i>Nucula nucleus</i>	0	0	0	16	45	0	1	0	1	0	0	0	0	0	0	0	0	86	0	1
MOLLUSCA	<i>Musculus discors</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Modiolarca tumida</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Modiolus modiolus</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Pallium tigrinum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MOLLUSCA	<i>Aequipecten opercularis</i> (juv)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	Anomiidae (juv)	0	0	0	1	1	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Astarte sulcata</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Abra alba</i>	57	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	1	0	0
MOLLUSCA	<i>Timoclea ovata</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Mya truncata</i> (juv)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOLLUSCA	<i>Sphenia binghami</i>	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MOLLUSCA	<i>Hiatella arctica</i>	0	0	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEMATODA	NEMATODA	2	0	0	0	0	4	1	0	4	1	0	0	0	0	0	0	0	0	0	1
NEMERTEA	NEMERTEA	2	1	0	0	0	0	4	0	0	3	0	0	0	5	1	0	0	4	0	1
PHORONIDA	<i>Phoronis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
PORIFERA	PORIFERA	0	0	P	0	P	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0
PORIFERA	<i>Scypha ciliata</i>	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROTOCTISTA	<i>Lagotia viridis</i>	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0
SIPUNCULIDAE	<i>Golfingia elongata</i>	0	3	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	2	0	0
SIPUNCULIDAE	<i>Golfingia vulgaris</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIPUNCULIDAE	<i>Nephasoma minutum</i>	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		D01	D02	D03	D04	D05	D06	D07	D08	D09	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
TUNICATA	ASCIDIACEA	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUNICATA	<i>Didemnidae</i>	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0
TUNICATA	<i>Asciella aspersa</i>	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUNICATA	<i>Polycarpa pomaria</i>	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUNICATA	<i>Dendrodoa grossularia</i>	0	4	0	9	12	1	7	0	3	2	18	1	0	0	0	0	0	6	0	0
TUNICATA	<i>Pyura squamulosa</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TURBELLARIA	TURBELLARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Total number of Taxa (May 2008)</i>		24	42	3	49	52	64	50	0	20	48	17	6	3	34	13	1	1	83	6	11
<i>Total number of Individuals (May 2008)</i>		94	144	2	4666	737	306	891	0	26	115	65	7	3	73	21	1	0	471	12	17
<i>Total number of Taxa (May 2007)</i>		40	45	2	44	83	73	51	1	31	55	38	2	5	74	13	1	1	67	13	4
<i>Total number of Individuals (May 2007)</i>		50	71	1	6158	9061	796	573	0	25	169	74	0	5	169	5	1	0	594	45	3
<i>Total number of Taxa (June 2006)</i>		39	56	11	94	131	17	102	0	94	83	64	2	8	128	5	1	2	116	4	4
<i>Total number of Individuals (June 2006)</i>		68	179	8	12896	4531	347	1433	0	1159	374	200	2	9	742	13	1	3	2793	17	4
<i>Total number of Taxa (June 2005)</i>		95	38	6	121	155	128	129	8	96	117	108	7	19	125	13	9	5	167	13	15
<i>Total number of Individuals (June 2005)</i>		816	67	1	7872	7806	9669	1887	2	590	897	2216	1	12	1584	39	5	1	16324	8	14
<i>Total number of Taxa (Oct 2004)</i>		74	40	9	102	113	106	76	1	70	116	99	4	4	115	3	5	3	125	7	5
<i>Total number of Individuals (Oct 2004)</i>		450	101	21	5154	2126	3919	3247	1	1818	1176	4071	6	7	998	3	10	3	8972	9	5

Appendix 6.6 Particle Size Analysis: May 2008.

Site Code	4mm	2mm	1mm	0.5mm	0.25mm	0.125mm	0.063mm	<0.063mm	Mean phi	skewness	kurtosis	Classification after Buchanan	Folk Triangles after BGS
D01	3.2	3.8	3.4	5.2	14.0	65.0	2.2	3.2	2.353	-0.615	1.956	Poorly Sorted Fine Sand	Gravelly Sand
D02	25.9	4.8	4.4	5.0	23.1	24.3	5.3	7.2	0.817	-0.301	0.658	Very Poorly Sorted Fine Gravel	Muddy Sandy Gravel
D03	10.7	0.3	0.2	0.4	55.0	32.1	0.3	0.9	2.047	-0.045	2.143	Poorly Sorted Medium Sand	Gravelly Sand
D04	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.243	0.000	0.738	Very Well Sorted Gravel	Gravel
D05	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.243	0.000	0.738	Very Well Sorted Gravel	Gravel
D06	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.243	0.000	0.738	Very Well Sorted Gravel	Gravel
D07	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.243	0.000	0.738	Very Well Sorted Gravel	Gravel
D08	1.5	3.9	7.8	15.7	62.0	5.1	0.1	3.9	1.398	-0.484	1.624	Moderately Sorted Medium Sand	Gravelly Sand
D09	3.1	2.3	2.2	3.8	78.3	7.6	0.5	2.1	1.743	-0.222	4.984	Moderately Sorted Medium Sand	Gravelly Sand
D10	2.0	3.0	3.0	3.8	15.0	16.7	14.3	42.2	3.942	0.049	0.891	Very Poorly Sorted Fine Sand	Slightly Gravelly Muddy Sand
D11	87.7	7.5	0.7	0.6	2.0	1.3	0.2	0	-2.209	0.327	2.129	Very Well Sorted Fine Gravel	Gravel
D12	0.0	0.0	0.0	0.3	83.2	13.9	0.2	2.3	1.959	0.573	1.865	Well Sorted Medium Sand	Sand
D13	0.0	0.3	0.5	7.3	85.8	3.0	0.2	2.7	1.740	-0.018	2.585	Well Sorted Medium Sand	Slightly Gravelly Sand
D14	47.7	4.3	3.7	5.6	11.9	16.1	4.2	6.7	-0.239	0.624	0.639	Very Poorly Sorted Fine Gravel	Muddy Sandy Gravel
D15	21.8	6.6	7.5	8.1	46.3	7.4	0.4	1.9	0.454	-0.668	0.689	Poorly Sorted Medium Sand	Gravelly Sand
D16	0.0	0.1	0.2	1.1	85.3	12.2	0.2	0.9	1.783	0.298	1.822	Very Well Sorted Medium Sand	Slightly Gravelly Sand
D17	1.1	2.1	2.3	3.3	78.7	9.3	0.1	3.1	1.759	-0.121	3.839	Moderately Well Sorted Medium Sand	Slightly Gravelly Sand
D18	87.8	6.7	1.6	0.6	1.3	1.3	0.1	0.5	-2.209	0.383	3.146	Well Sorted Fine Gravel	Gravel
D19	8.6	0.9	0.9	0.9	78.8	7.0	0.3	2.6	1.742	-0.283	6.436	Moderately Sorted Medium Sand	Gravelly Sand
D20	3.1	6.0	7.7	9.4	69.2	2.4	0.1	2.2	1.180	-0.774	1.494	Moderately Sorted Medium Sand	Gravelly Sand