



Environmental Resources Management

**Humber MAREA Benthic
Survey Report**

Date: June 2011

Project ref: P011-06-HADA-1D

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1. Introduction

ERM have been commissioned to carry out a Regional Environmental Assessment for the marine aggregates industry (MAREA) in the Humber and Outer Wash Region by the Humber Aggregate Dredging Association (HADA). PMSL were subcontracted to undertake the benthic survey. Within the Humber and Greater Wash region there is a significant amount of available data including benthic grab and geophysical survey data which have been collected for aggregate dredging and offshore wind farm EIAs, aggregate dredging monitoring programmes and for the Humber Regional Environmental Characterisation (REC) survey. The current survey aims to supplement existing data and provide additional spatial coverage in the areas that have the potential to be impacted by dredging activities. The main aim of this survey work is to provide further characterisation of the area in order to produce the MAREA and to inform future site-specific aggregate dredging EIAs.

The survey will entail sampling at 76 stations with single replicates for faunal identification (and a sub-sample for PSA) taken at each site. The sites have been chosen across the licence and application areas and their Maximum Zone of Influence (MZI) and will cover all the EUNIS habitat types within the study area and includes a number of sites in circalittoral coarse sediment which will resample areas surveyed previously to allow an assessment of temporal variability. The data collected at stations will then be combined with data from previous surveys to assess regional scale trends for the MAREA and to build a more detailed knowledgebase for future aggregate dredging EIAs and will also be used to provide additional ground truth data for the REC geophysical survey.

In addition to undertaking benthic sampling the survey also employed a stills camera equipped with a surface umbilical and monitor to view and take images at each sample site prior to a grab sample being taken to prevent disturbance to sensitive Annex 1 species e.g. *Sabellaria spinulosa* formations and identify potential areas of cobble reef or subsea hazards such as wrecks, cables or pipelines. A number of the proposed MAREA survey stations were positioned within the known extent of the biotope SS.SBR.PoR.SspiMx (*Sabellaria spinulosa* on stable circalittoral mixed sediment) which could support Annex 1 reefs of *Sabellaria spinulosa*. These stations have been positioned to provide greater confidence in the extent of this biotope in MZIs where there are fewer existing survey stations.

2. Methods

2.1 Subtidal Survey

Methodologies for grab sampling followed those outlined in the tender specification and also existing best practice guidelines such as the Cefas Guidelines for the conduct of benthic studies at aggregate dredging sites (Boyd, 2002) and other relevant monitoring guidelines e.g. Marine Monitoring handbook procedural guideline 3-9 and other best practice guidelines (Davies et al 2001, DEFRA 2004a, Rees et al 1994, Proudfoot et al 2003, Cooper & Rees 2002, ICES/OSPAR 2000 & DEFRA 2004b).

Surveys were carried out using MV Budding Rose a coded vessel contracted by PMSL. The survey utilised a 0.1m² Hamon grab suitable for sampling coarser marine sediments with an inspection of seabed habitats undertaken prior to sampling using an underwater still camera. The stills camera was used to document the presence of any Annex 1 habitats at the sample sites and also to characterise the benthic habitats in areas of harder ground where grab sampling was not feasible in addition to highlighting any underwater hazards. An assessment of live video footage & stills was made in-situ prior to the deployment of the grab to assess the potential for Annex I habitats (e.g. *Sabellaria* reef or stony/cobble reef). These assessments were made using the currently available guidance notes i.e. Gubbay (2007) for potential *Sabellaria* reefs, and Irving (2009) for potential cobble reefs. This aspect of the project was overseen by Dr. James Allen at PMSL who has carried out a wide variety of video surveys for such reefs for offshore wind farm sites and other commercial developments. In total 76 sampling stations were surveyed based on positions supplied by ERM. The positions utilised in the field depended on the nature of the substrata in that area and took into account small shifts in position to give adequate clearance to sub-sea pipelines or other obstructions e.g. static gear although in general survey positions were within 50m of the original site.

Upon arrival at each site a Kongsberg OE14-208 digital stills camera with lights and flash strobe mounted on a steel frame was lowered over the side. The unit was linked to the surface via an umbilical and controlled via a surface control unit and monitor to trigger the camera and assess seabed habitats in real time. The PMSL digital stills system incorporated a scale bar with 64mm increments (cobble size). At each station the survey area was checked for obstructions and the GPS position for the start and end of the video drop logged by GPS with other notes taken as appropriate regarding the nature of the seabed. The camera was lowered to the seabed and the vessel allowed to drift over the survey site periodically dropping to the bed to take stills. Stills were downloaded at the end of each day and archived to hard drive and DVD.

Following an assessment of the site by drop down stills camera the Hamon grab was deployed at the planned survey location and the resulting sample recovered. Upon retrieval the sample was deposited into a container and sample volume assessed. Samples with a volume of less than 5 litres were stored and a repeat sample taken with a minimum of three attempts used to collect a suitable sample. If samples were consistently substantially less than 5 litres at a given site then expert judgement was used to assess the adequate minimum representative sample size and evaluate repositioning of the site or abandoning

the site altogether. Following a successful grab photographs of the sample were taken and notes regarding sediment type were made.

Prior to sieving the grab samples were sub-sampled for sediment particle size analysis (PSA). Approximately 500 ml of sample was taken using a plastic scoop and the sediment sub-samples were labelled and refrigerated or transported in a cool box prior to PSA undertaken in the laboratory. The PSA sample analysis also included an assessment of the percentage of the sample that was composed of cobbles. In cobbly habitats a larger PSA was taken as required.

A full survey log was maintained throughout the survey detailing time of sampling, GPS position, number of attempts required, station number, water depth, physical characteristics of the sample and presence of any other relevant features. If required, stations were repositioned slightly to obtain adequate and representative samples (e.g. if the original site was located on hard ground or if underwater hazards were in the immediate vicinity) but usually this was within 50m of the original position.

Sample processing was then undertaken on a sequential basis utilising a nested sieving technique to reduce the potential for small and delicate invertebrates being damaged by cobble and gravel. Each acceptable sample was removed from the sample container and placed into a hopper and sieved onboard through a larger sieve (e.g. 5 or 10mm) and then through a 1mm sieve (1mm sieve) in order to separate large sediment types and reduce damage to invertebrates. The sieved residue was then gently back-washed into sealable containers and borax buffered 4% formo-saline solution was added as a fixative. Each sample was labelled clearly on the lid and an additional waterproof label placed in the container.

2.2 Laboratory Methodology

All laboratory methodologies are based on best practice and follow tried and tested method statements widely acknowledged within the industry (Worsfield et al 2010, Rees et al 1990, Barnett 1993, Turner 1999, Cooper & Rees 2002, Boyd et al 2002, Prior et al 2004 & Proudfoot et al 2003). Precision Marine Survey Limited are members of the National Marine Biological and Analytical Quality Control scheme (NMBAQC), and their principal taxonomist was until recently a member of the NMBAQC steering committee.

Two experienced members from PMSL undertook the sample sorting, conducting all the sieving, sorting work and sample description. A third member of staff carried out standard sorting quality control. Similarly, experienced taxonomists carried out the identification of the sorted fauna, with an additional member of staff carrying out standard identification quality control. A standard sample tracking procedure was followed throughout the analysis period. All members of the taxonomic analysis and data manipulation staff have at least 18 years marine biological experience with a significant and extensive range of experience in the field of benthic sample analysis and interpretation.

Sorting

The sorting methodology was as follows;

Each sample was washed through a nest of sieves, with a smallest mesh aperture of 1mm, to remove the preservative and partition the sample for ease of sorting. The residue from each sieve was then gently washed into separate white trays. Water was added to the trays and the contents agitated. Immediately after agitation, the light fraction was decanted to another tray. This procedure may be repeated up to 3 times, and each tray of light fractions examined separately to the heavy fraction.

The trays were marked with the appropriate sample code (relating to the client, date, specific site, sample and replicate number). All fractions were then examined as a monolayer under water in white trays, both by eye under a fluorescent bench light and 1.5x illuminated magnifier to remove larger animals with the remaining residue from the light and heavy fractions decanted into petri dishes for further sorting by binocular stereo microscope (6x to 10x magnification). The fauna and residue derived from this process was then retained and stored by group in appropriately labelled containers and each fraction was then decanted into separate 100mm petri dishes and examined under a stereoscopic microscope with 20x eyepieces giving a maximum magnification of up to 80X. The fauna derived was added to the retained containers, preserved and stored ready for identification.

Taxonomic Identification

The procedure for the identification of the sample material was as follows:

Identification was carried out using Olympus SZ40 zoom microscopes with 10X and 20X eyepieces, giving a maximum magnification of up to 80X. An additional 2X objective was also used to increase the potential magnification to 160X where needed. Olympus BX41 compound microscopes were used for further magnification, up to 800X.

Identification of infaunal samples was to the lowest possible taxonomic level (i.e. species) and during identification all individuals were initially separated into families, with part animals being assigned to families where possible. The macrofaunal animals were identified to species level using standard taxonomic keys, low and high power stereoscopic microscopes and dissection, when necessary, for identification. Incomplete animals without anterior ends were not recorded as individuals to be included in the quantitative dataset. However, they were identified where possible and recorded as present. Similarly, motile and colonial or encrusting epibenthic taxa were only recorded as present and not included within the infaunal quantitative data set.

The taxonomic literature used was essentially as given in Rees et al (1990) and other more recent taxonomic publications or workshop (NMBAQC) proceedings and reporting nomenclature used the World Register of Marine Species (WoRMS) database (Appeltans, 2011) or Howson, C.M. & Picton, B.E., 1997 as required.

Biomass

Biomass analysis was performed by wet weight (tissue blotted) and carried out for the five major taxa types (polychaeta, crustacea, mollusca, echinodermata and others) in each sample. Each group was placed on blotting paper for 30 seconds, to allow absorption of preservative into the blotting paper, following this time period the individuals were placed

on a microbalance and the reading taken. The macrofaunal organisms were then placed back in their respective pots and stored. Biomass calculations included all identifiable fragments and calculated to $\pm 0.1\text{mg}$ and all biomass data were recorded in grams or fractions thereof. An estimation of dry weight biomass was made using available published conversion factors for the predominant taxonomic groups from Rumohr et al (1987).

Sediment Analysis

Sediment samples were processed for PSA as per NMBAQC guidelines. Particle size analysis was carried out using a combination of dry sieving and laser granulometry methods. Each sediment sample was first mixed thoroughly until homogeneity is reached. A sub-sample was then passed through a 1mm mesh sieve to remove the >1mm fraction which was then discarded. The <1mm fraction of the sub-sample was analysed by laser granulometry using a Malvern Mastersizer 2000. The Malvern Mastersizer 2000 laser analysette is built to ISO 13320-1 specifications and measures diameters ranging from 0.02 to 2000mm using laser diffraction. The Mastersizer is calibrated annually to conform to Malvern's QSpec Validation criteria. It is cleaned and aligned before taking all measurements. The rest of the homogenised sample was then dried for 48 hours at 84°C to remove all moisture and weighed. The sample was then rehydrated and passed through a 1mm sieve by wet sieving. The <1mm fraction was then retained and allowed to settle, the >1mm fraction was dried for 48 hours at 84°C and passed 'dry' through a nest of sieves, comprising of a 1mm, 1.4mm, 2mm, 2.8mm, 4mm, 5.6mm, 8mm, 11.2mm, 16mm, 22.4mm, 31.5mm 45mm and 64mm and up to 90.5mm i.e. 0.5 phi fractions from 0 to -6.5 phi. Each sample was sieved for a period of 20 minutes and material retained on each sieve fraction weighed. The weight of the <1mm fraction was obtained by the addition of the weights from all sieve fractions and subtracting the value from the original dry weight of the sample.

Data from the >1mm dry sieve method was scaled so that >1mm class weights total 100%. Data from the <1mm laser granulometry method was scaled so that <1mm class weights total 100%. Sieve and laser proportions are then calculated using weights obtained from the dry sieve process to obtain a merged data set.

The statistics derived from the data include mean grain size, skewness, sorting coefficient and bulk sediment classes (% silt, sand & gravel). These were calculated using GRADISTAT v7, a grain size distribution and statistics package developed by Dr. Simon J. Blott of Kenneth Pye Associates Ltd. The methods are consistent with the (best practice) procedures identified by the National Marine Biological Analytical Quality Control scheme.

3. Survey Summary

The benthic survey mobilised on Monday 11th April 2011 and the survey was completed on Saturday 16th April 2011. Weather ranged from 15-20mph S to SW with slight to moderate sea conditions on the 12th April with winds then reducing to 10-15 mph SW (slight sea state) on the 13th April and 5-10 mph SSW (slight sea state) thereafter. Representative samples were taken at all sites although at five sites - REA8, REA22, REA28, REA56 and REA76 low sample volumes were collected (approx. 2l) due to seabed conditions (e.g. consolidated coarse sediments or harder material such as harder cobble or clay under surficial

sediments). These samples however were representative of the surficial sediments in the area and the samples have been processed and included in the final dataset as this does not appear to have overly influenced species diversity. At 1 site (REA30) the sediments from grab samples were variable as identified during video and two separate samples were taken. The majority of sites exhibited coarse mixed sediments with combinations of sand, gravel and shell or pebbles with occasional cobble. Cobbles were identified during the video assessment and occurred in varying quantities at many sites but were often patchy with much of the coarser fraction in the pebble size range and cobbles were rarely picked up in any quantity in the grabs. PSA data indicates that many sites had a significant coarse fraction at just under the cobble grade (64mm). No evidence of Annex 1 habitats such as *Sabellaria* or cobble reef were recorded during video and whilst some low level encrustation or small clumps of tubes were occasionally noted (e.g. sites 23 and 35) they were not in sufficient quantity, area or elevation to qualify as reef although they are likely to qualify as *Sabellaria spinulosa* biotopes. Sites with higher cobble content recorded during video (e.g. site 1) tended to have limited elevations and coverage by reef fauna/flora with moderate or patchy coverage by cobble and were also not considered to be reef.

In many areas epibiota recorded during video was relatively sparse (particularly in cleaner sand or gravels) with occasional crab (*Liocarcinus* sp.), echinoderms such as *Asterias rubens* or *Crossaster papposus* and anemones (e.g. *Urticina* spp.) most obvious along with encrusting fauna such as barnacles and polychaetes (*Pomatoceros* spp.) on stones. More mixed sediments with a wider variety of sediment types and larger stones, pebbles or cobble tended to have richer epibiota with a hydroid/bryozoans turf (e.g. *Halecium* sp., *Hydrallmania* spp., *Nemertesia* sp. *Alcyonidium* sp. *Flustra foliacea*, *Vesicularia spinosa*, *Electra* spp. and encrusting calcareous red algae). Such areas often also included examples of ascidians such as *Dendrodoa grossularia* and a variety of anemones, ascidians such as *Dendrodoa grossularia*, occasional sponges and other echinoderms such as *Echinus esculentus*. However, in most areas epibiota was still relatively patchy and coverage by hydroid/bryozoan turf and other encrusting/colonial taxa was often relatively sparse. A summary of species recorded from the drop down stills camera is provided in Table 2 and a series of representative of stills for each site from the drop down camera survey is provided in Appendix 1. .

The site positions for the survey along with notes on dates/time, water depth, sampling effort and sediment type in each grab are given in Table 1 and a map showing the distribution of sites is provided in Figure 1. The information from the stills in conjunction with some preliminary analysis of infaunal data (Appendix 2) was then used to derive Eunis (biotope) codes to Levels 4 and 5 (where possible). It was evident from analysis that many habitats fall under the coarse or mixed sediment section of the classification and these habitats are currently less well defined under the current (2004) biotope classification due to lack of available data. These habitats are currently under review by JNCC and until the revised classification is available many biotopes from the current survey will be provisional, particularly in areas with coarse/mixed sediments and those with transitional communities. Other recent surveys (e.g. the Humber REC) have attempted to identify additional biotopes to address this although the status of these is currently unknown (in relation to the UK classification) and they are primarily of use in interpretation of REC benthic surveys data. There is also some variability in assigning habitats to coarse or mixed sediments in

gravelly/stony habitats whereby the current UK biotope classification includes coarse sands or sandy gravels in the coarse section whilst other studies (e.g. the Humber REC) restrict coarse sediment to those with >80% gravel. Many coarse sediment habitats are also inherently heterogenous with a wide range of coarse fractions along with finer sands and could therefore be classified as mixed sediment. In the current study provisional Level 4 and 5 Eunis codes based on video and infaunal data have been assigned where possible with transitional or uncertain habitat/biotope codes also highlighted (e.g. by providing two codes). To provide some correlation with the Humber REC data the closest matching REC biotope code has also been provided which includes the new biotopes defined by these studies although more detailed analysis would be required to confirm these. The status of such habitats/biotopes will be assessed following updates to the classification by JNCC and by more detailed analysis of the current data set in conjunction with wider historic data sets which will be undertaken as a separate component to this project. Provisional biotopes for each site are provided in Table 3 and some outputs from analysis of infaunal/particle size data used to assist in biotope assignation are also provided in Appendix 2.

Table 1. Survey site positions.

Site	Depth (m)	Depth (m CD)	Attempts	Latitude	Longitude	Date/Time	Sediment
1	22.31136	21.0	12	53.71064	0.349374	16/04/2011 11:47	occasional cobble with pebbles & mixed sand/gravel
2	32.55264	29.9	9	53.763325	0.3933312	16/04/2011 13:49	mixed sand/pebbles, gravel & stones
3	15.91056	14.5	5	53.662401	0.3338878	16/04/2011 10:23	mixed gravel/sand pebbles
4	16.4592	15.2	6	53.686026	0.401994	16/04/2011 10:57	pebbles, stones & gravelly sand
5	14.6304	13.0	7	53.706941	0.478432	16/04/2011 12:34	mixed gravelly sediment & pebbles
6	11.8872	8.2	4	53.574862	0.2631893	16/04/2011 07:57	sand/gravelly sand
7	14.44752	10.1	9	53.554846	0.3324649	16/04/2011 07:13	mixed sand, gravel & pebbles/large stones
8	14.44752	12.0	11	53.633654	0.2256629	16/04/2011 09:02	mixed sand, gravel & pebbles (over clay?)
9	23.40864	21.7	2	53.633996	0.3390716	16/04/2011 09:51	gravelly sand & stones
10	26.88336	23.9	3	53.666644	0.5680494	15/04/2011 13:02	mixed sediment with shell, sand, gravel and pebbles
11	21.0312	16.8	6	53.626113	0.4406775	15/04/2011 14:14	mixed gravelly sediment with pebbles & large stones
12	21.0312	15.9	6	53.580888	0.4284625	15/04/2011 15:48	mixed gravelly sediment with pebbles & large stones
13	18.288	14.8	4	53.630843	0.518119	15/04/2011 13:39	gravelly sand and pebbles (over clay?)
14	18.288	13.1	6	53.556179	0.4641307	15/04/2011 16:26	gravelly mixed sediment with pebbles
15	21.0312	16.2	6	53.597913	0.5129634	15/04/2011 15:02	gravelly mixed sediment with pebbles
16	9.87552	5.1	5	53.539225	0.394017	16/04/2011 06:40	gravelly mixed sediment with pebbles/large stones
17	27.79776	25.5	7	53.712795	0.6368491	15/04/2011 12:19	pebbles, gravel shell and sand
18	26.88336	25.2	2	53.636092	0.7516275	15/04/2011 11:09	mixed pebbles shell, gravel, sand
19	18.65376	17.0	10	53.510428	0.731585	15/04/2011 09:55	mixed pebbles, gravel and sand
20	16.64208	11.5	4	53.515158	0.4743296	15/04/2011 17:02	pebbles & mixed gravelly sand
21	16.4592	12.1	6	53.480994	0.4958194	15/04/2011 18:19	pebbles & mixed sediment with large stones
22	11.15568	6.8	8	53.474602	0.3593108	15/04/2011 20:07	pebbles & mixed sediment over clay
23	15.72768	10.9	7	53.50176	0.4242374	15/04/2011 17:40	mixed gravelly sediment with pebbles & large stones
24	12.8016	8.7	10	53.427336	0.3348063	12/04/2011 10:43	mixed sediment with pebbles, gravel & some silt/sand
25	10.24128	6.5	5	53.437491	0.3876777	13/04/2011 16:31	pebbles, mixed sand & gravel
26	14.08176	10.0	4	53.429736	0.4289021	13/04/2011 15:50	mixed pebbles gravel & sand with some mud
27	14.6304	11.3	4	53.441192	0.4968367	13/04/2011 17:18	pebbles mixed gravel and sand
28	15.17904	12.3	5	53.432957	0.5389744	13/04/2011 17:43	pebbles, large stones & mixed gravel or coarse sand
29	17.00784	14.6	6	53.426058	0.5884231	13/04/2011 18:30	mixed sediment with sand, gravel mud (occ large stone)
30.1	13.89888	11.8	6	53.423241	0.626375	13/04/2011 19:09	sandy gravel & occ. stones
30.2	14.26464	12.4		53.424231	0.6248626	13/04/2011 19:20	sand & some gravel
31	15.5448	11.0	3	53.38697	0.431598	13/04/2011 14:43	mixed sand shell grit/gravel
32	17.55648	13.3	3	53.401744	0.4630234	13/04/2011 15:16	mixed muddy gravel & some stones
33	13.89888	9.4	2	53.388086	0.5262585	13/04/2011 13:31	pebbles & mixed shell stones & sand
34	14.99616	10.5	1	53.368873	0.4270783	13/04/2011 14:15	sand with shell grit
35	17.55648	13.3	2	53.367221	0.4983721	13/04/2011 12:59	mixed mud sand, gravel & stones/pebbles
36	14.99616	10.9	8	53.345419	0.4734289	13/04/2011 12:16	gravel sand & stones/pebbles

Site	Depth (m)	Depth (m CD)	Attempts	Latitude	Longitude	Date/Time	Sediment
37	14.6304	11.2	4	53.340371	0.5373269	13/04/2011 11:00	mixed gravelly sand & stones
38	17.00784	13.2	3	53.319591	0.4678449	13/04/2011 11:42	mixed muddy sand occ. stone with some Sabellaria tubes
39	12.8016	9.9	1	53.32328	0.5447975	13/04/2011 10:06	mixed gravelly sand & occ. stones
40	12.8016	9.8	3	53.333027	0.5565944	13/04/2011 10:26	sand, stones & mixed sediment
41	16.82496	12.4	6	53.298408	0.4399393	12/04/2011 13:23	mixed sandy gravel
42	10.60704	7.9	1	53.302829	0.54085	13/04/2011 09:44	sand & shell grit
43	17.73936	13.6	3	53.262888	0.501357	12/04/2011 14:29	medium-fine sand
44	9.50976	7.0	4	53.266637	0.5515849	13/04/2011 09:15	sand occ. pebble
45	27.06624	24.9	2	53.291617	0.7234447	13/04/2011 08:08	sand & some gravel occ. Stone/shell
46	16.4592	13.1	3	53.215219	0.5517917	12/04/2011 15:40	sand (some gravel/grit)
47	15.17904	12.5	5	53.185453	0.5073966	12/04/2011 16:56	mixed muddy gravel, sand with pebbles
48	14.6304	12.3	1	53.254237	0.7479582	13/04/2011 07:28	sand
49	7.3152	4.7	1	53.203517	0.684907	12/04/2011 21:46	sand with shell grit
50	24.32304	22.2	9	53.147833	0.5817967	12/04/2011 18:03	mixed muddy gravel or gravelly sand with some Sabellaria tubes
51	7.49808	5.6	9	53.154156	0.6573804	12/04/2011 19:14	sand
52	6.4008	4.4	2	53.15355	0.7363431	12/04/2011 20:35	sand
53	23.7744	20.6	5	53.358367	0.9266358	15/04/2011 07:20	mixed sand, gravel and shell/pebbles
54	25.42032	24.0	3	53.339115	1.0133398	14/04/2011 21:01	slightly muddy mixed sand & gravel
55	17.19072	15.6	7	53.431292	0.7881888	13/04/2011 21:22	sand with shell grit
56	23.04288	21.3	5	53.301296	1.0169046	14/04/2011 20:25	mixed sand, gravel and shell/pebbles
57	22.67712	20.4	7	53.319565	1.1341913	14/04/2011 19:32	pebbles & mixed sandy gravel
58	46.45152	42.1	1	53.45196	1.0612324	14/04/2011 16:47	slightly muddy mixed sand gravel/shell
59	37.4904	33.6	6	53.416571	1.0934221	14/04/2011 17:33	occ. stones with shell, gravel, sand
60	33.64992	29.9	7	53.402633	1.0954891	14/04/2011 17:56	shell, gravel & sand some pebbles
61	21.39696	16.6	5	53.385464	1.1550192	14/04/2011 15:43	mixed sand, gravel, pebbles
62	19.93392	15.5	5	53.408129	1.2599784	14/04/2011 13:56	gravelly sand with stones
63	21.39696	17.4	4	53.437682	1.2072497	14/04/2011 13:18	gravelly sand
64	23.22576	19.5	1	53.459937	1.2705826	14/04/2011 12:41	sand & some shell/gravel
65	22.31136	17.6	5	53.374841	1.3022851	14/04/2011 14:37	gravelly sand
66	17.3736	14.5	8	53.483843	1.1428294	14/04/2011 11:49	pebbles, gravel and sand
67	16.64208	12.2	2	53.462128	0.5309808	15/04/2011 18:51	pebbles mixed sand & gravel
68	20.1168	17.9	5	53.524828	1.112908	14/04/2011 10:25	medium-fine sand
69	38.58768	36.1	2	53.511776	1.1773682	14/04/2011 11:07	sand with shell grit
70	17.73936	15.7	1	53.551163	1.2538385	14/04/2011 09:16	sand with some gravel/small stones/shell
71	36.94176	34.8	1	53.545346	1.1524115	14/04/2011 09:58	gravel/sand some shell/stones
72	21.0312	18.7	3	53.577235	1.0724784	14/04/2011 07:51	sand / gravelly sand & shell/stones
73	19.56816	17.5	4	53.578605	1.1461834	14/04/2011 08:27	medium-fine sl. gravelly sand
74	23.40864	20.3	4	53.648441	1.0756073	14/04/2011 06:30	sand/gravel & shell
75	21.57984	18.9	4	53.601328	1.0403175	14/04/2011 07:19	sand/gravelly sand and small stones
76	17.55648	15.3	5	53.487835	0.9194456	15/04/2011 08:38	mixed sand/gravel with occasional mussel

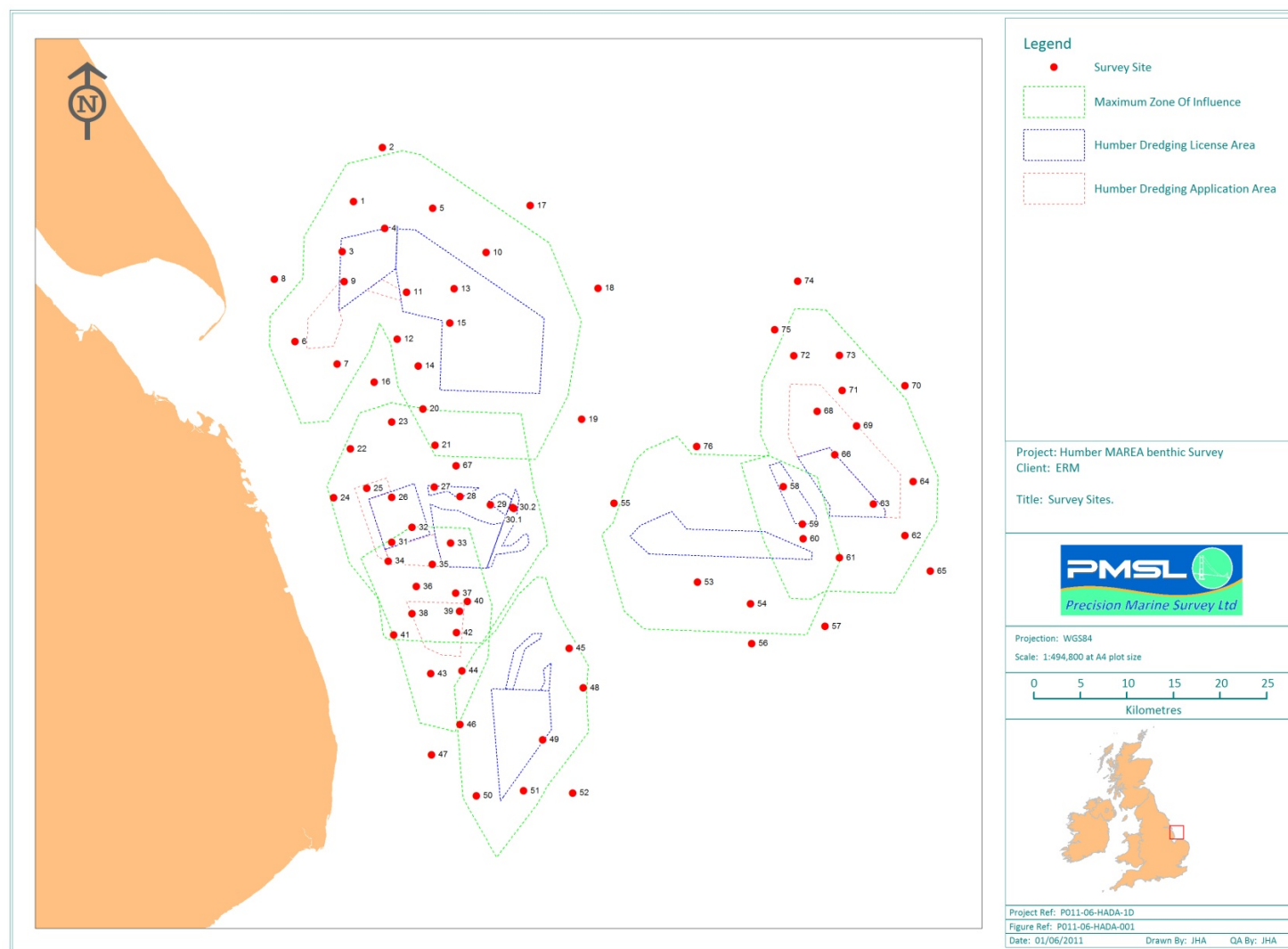


Figure 1. Humber REA sampling sites.

Table 2. Summary of seabed types and species recorded from drop down photography.

Site	Substrate	Species
1	Slightly silty gravel & pebbles with occasional cobble.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, Echinus esculentus, Asterias rubens, seasquirts and Pholis gunnellus.
2	Gravel & pebbles & shell with occasional cobble.	Alcyonium digitatum, Flustra foliacea, hydroids (incl. Nemertesia sp.), Pomatoceros sp. and Necora puber.
3	Gravel & pebbles with occasional cobbles.	Occasional Flustra foliacea, lanice conchilega, barnacles, hydroids, seasquirts and Urticina felina.
4	Clean gravel & pebbles.	Sparse, occasional conchilega & hydroids.
5	Slightly silty gravel & pebbles with some cobbles and occasional boulder.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, Crossaster papposus, Echinus esculentus and Urticina felina.
6	Clean sand.	No visible fauna.
7	Slightly silty pebbles, cobbles and occasional boulder.	Flustra foliacea (Frequent-Common), hydroids, Pomatoceros sp., barnacles, Henricia sp., seasquirts, sponge and encrusting red seaweed.
8	Gravel, pebbles and shell.	Sparse, occasional Lanice conchilega & Urticina felina.
9	Patchy sand, pebbles and some cobbles.	No visible fauna across most of transect, few hydroids and seasquirts toward end of transect.
10	Gravel, shell and pebbles.	Sparse, occasional Flustra foliacea, hydroids and Urticina felina.
11	Gravel, shell and pebbles.	Sparse, occasional Lanice conchilega, Paguridae sp. & Urticina felina.
12	Slightly silty gravel, pebbles and cobbles and occasional boulder.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts, Urticina felina, sponge, Cancer pagurus and encrusting red seaweed.
13	Gravel and pebbles.	Few barnacles and Pomatoceros sp.
14	Slightly silty gravel, pebbles, some cobbles and occasional boulder.	Hydroids, Pomatoceros sp., barnacles, Asterias rubens, Crossaster papposus, Echinus esculentus, Urticina felina, seasquirts, Lanice conchilega and encrusting red seaweed.
15	Patchy sand, pebbles and some cobbles.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, Urticina felina, seasquirts and encrusting red seaweed.
16	Slightly silty gravel & pebbles with occasional cobble.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts, Calliostoma zizyphinium, Crossaster papposus, Henricia sp., Echinus esculentus, Cancer pagurus and encrusting red seaweed.
17	Clean sand with patchy areas of shell and gravel/pebbles.	Sparse, occasional hydroids/erect bryozoans.
18	Gravel, shell and pebbles.	Patches of Flustra foliacea, hydroids (incl. Nemertesia sp.) and barnacles with Echinus esculentus, Asterias rubens and Urticina felina.
19	Gravel, pebbles, sand and some cobbles.	Bryozoans, hydroids, Pomatoceros sp., barnacles, encrusting red seaweed, Crossaster papposus, Echinus esculentus and Urticina felina.
20	Gravel, pebbles, sand and some cobbles.	Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts (incl. Didemnidae sp.), Urticina felina, sponge, Asterias rubens, Crossaster papposus, Cancer pagurus and Henricia sp.
21	Slightly silty gravel & pebbles with occasional cobble.	Patches of Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts, and sponge with Urticina felina, Asterias rubens, Crossaster papposus, Liocarcinus sp.
22	Slightly silty gravel & pebbles with occasional cobble.	Patches of Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts and sponge with Asterias rubens.
23	Slightly silty gravel & pebbles with some cobbles.	Patches of Flustra foliacea, hydroids, Pomatoceros sp., barnacles, seasquirts, and sponge with Urticina felina Calliostoma zizyphinium and Cancer pagurus.
24	Slightly silty sandy gravel and pebbles.	No fauna visible apart from one dragonet.
25	Slightly silty sandy gravel and pebbles.	No fauna visible apart from one Asterias rubens.
26	Slightly silty sandy gravel and pebbles.	No fauna visible.
27	Slightly silty sandy gravel and pebbles.	Appears sparse, few Pomatoceros sp. and Calliostoma zizyphinium.
28	Slightly silty, sandy gravel & pebbles with occasional cobble.	Patches of Flustra foliacea, hydroids, Pomatoceros sp., barnacles and sponge.
29	Slightly silty sand and pebbles.	Sparse, occasional patch of hydroids (incl. Nemertesia sp.), Crepidula fornicata and Urticina felina.
30	Clean sand some gravel/shell debris	No fauna visible.
31	Clean sand.	Sparse, one Asterias rubens

Site	Substrate	Species
32	Fine sand and pebbles.	No fauna visible.
33	Fine sand, gravel and pebbles.	Sparse, patches of hydroids and few Pomatoceros sp.
34	Clean sand.	Sparse, one Asterias rubens
35	Clean sand.	Sparse, small patch of Flustra foliacea.
36	Slightly silty sandy gravel and pebbles.	Sparse, small patches of hydroids &/ bryozoans.
37	Clean sand.	Sparse, few Asterias rubens, Urticina felina, occasional hydroids (Incl Nemertesia sp.) and Vesicularia spinosa.
38	Sand with a few pebbles.	Sparse, small patches of hydroids &/ bryozoans, Cancer pagurus.
39	Clean sandy gravel.	Sparse, Asterias rubens.
40	Clean sand and pebbles.	Sparse, one brittlestar visible.
41	Clean sand with patchy areas of pebbles.	Appears sparse, small patch of Flustra foliacea and hydroids.
42	Clean sand.	Sparse, one Asterias rubens
43	Clean sand.	No fauna visible.
44	Clean sand with small patch of pebbles.	No fauna visible.
45	Fine sand with some pebbles.	Sparse, small patches of hydroids, Alcyonidium diaphanum and Vesicularia spinosa & one brittlestar and Lanice conchilega.
46	Clean sand.	No fauna visible.
47	Slightly silty, sandy pebbles and occasional cobble.	Flustra foliacea, hydroids, Asterias rubens and Urticina felina.
48	Clean sand.	No fauna visible.
49	Clean sand with some gravel.	No fauna visible.
50	Slightly silty sand and gravel.	Sparse, few Lanice conchilega, small patch of Flustra foliacea and hydroids/bryozoans.
51	Fine sand and some shell.	Sparse, few brittlestars, Lanice conchilega, small patch of athecate hydroids (probable Turbellaria sp.).
52	Clean sand.	No fauna visible.
53	Sand, gravel, shell and pebbles.	Sparse, patches of Nemertesia and other hydroids, Vesicularia spinosa, Flustra foliacea, barnacles and one Urticina felina.
54	Sand, gravel, shell and pebbles.	Sparse, small patches of Flustra foliacea and hydroids.
55	Clean sand with small patches of shell.	Very sparse, a small patch of Flustra foliacea .
56	Fine sand, shell and some pebbles.	Flustra foliacea, sponge and hydroids and other bryozoans.
57	Slightly silty gravel and shell with pebbles.	Alcyonidium diaphanum, Flustra foliacea, hydroids and Henricia sp.
58	Sandy gravel and shell with pebbles.	Alcyonidium diaphanum, Flustra foliacea and hydroids (incl. Nemertesia sp.).
59	Sand, gravel, shell, pebbles and occasional cobble.	Flustra foliacea, Echinus esculentus, Urticina felina, barnacles, Liocarcinus sp., other bryozoans and hydroids.
60	Clean sand with patches of shell and gravel.	Sparse, few barnacles and hydroids.
61	Slightly silty gravel and pebbles.	Flustra foliacea, seasquirts, barnacles, Pomatoceros sp. and hydroids.
62	Clean sand with occasional shells and pebbles.	Vesicularia spinosa and hydroids.
63	Sand with patches of gravel and pebbles.	Alcyonidium diaphanum, Flustra foliacea, hydroids, Asterias rubens, Paguridae, brittle stars and Urticina felina.
64	Clean sand.	No fauna visible.
65	Clean fine sand with some small patches of gravel and shell.	No fauna visible.
66	Sandy gravel, pebbles and shell.	Alcyonidium diaphanum, barnacles, Flustra foliacea, hydroids (Hydrallmania falcata), Alcyonium digitatum, Asterias rubens and Urticina felina.
67	Slightly silty gravel and pebbles with occasional cobble.	Barnacles, Pomatoceros sp., Flustra foliacea and few seasquirts.
68	Clean sand.	No fauna visible.
69	Clean sand.	No fauna visible.

Site	Substrate	Species
70	Clean sand with patches of coarse sand and bit of gravel.	No fauna visible.
71	Clean coarse sand.	No fauna visible.
72	Clean sand with small patches of gravel.	No fauna visible.
73	Clean sand.	No fauna visible.
74	Sand with small patches of gravel and pebbles.	Alcyonidium diaphanum, hydroids (Hydrallmania falcata), Alcyonium digitatum, sponge, sea urchins, Asterias rubens and Urticina felina.
75	Clean coarse sand.	No fauna visible.
76	Sand, gravel, pebbles, shell and occasional cobble.	Mytilus edulis, Flustra foliacea, barnacles, sponge, Urticina felina and Crossaster papposus.

Table 3. Provisional biotope codes.

Site	Level 4 Eunis	Level 5 Eunis (Nearest Match)	Similar/Equivalent REC Biotopes
1	SS.SMx.CMx	SS.SMx.CMx.FluHyd	A5.44(8)
2	SS.SMx.CMx	SS.SMx.CMx.FluHyd	A5.44(81)
3	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	(A4D.9221)
4	SS.SMx.CCS (SCS.CMx)	SS.SCS.CCS.MedLumVen?	A5.44(81)
5	SS.SMx.CMx	SS.SMx.CMx.FluHyd	A5.44(8)
6	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.2
7	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx.FluHyd	A5.44(8)
8	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx (SCS.CCS)	(A4.945)
9	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx (SCS.CCS)	A5.44(A)
10	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(81)
11	SS.SCS.CCS	SS.SCS.CCS.MedLumVen?	(A4D.9221)
12	SS.SMx.CMx	SS.SMx.CMx.FluHyd	A5.44(81)
13	SS.SCS.CCS	SS.SCS.CCS.MedLumVen?	(A4D.9221)
14	SS.SMx.CCS (SCS.CMx)	SS.SMx.CMx.FluHyd? (SS.SCS.CCS.MedLumVen?)	A5.44(8)
15	SS.SMx.CCS (SCS.CMx)	SS.SMx.CMx.FluHyd? (SS.SCS.CCS.MedLumVen?)	A5.44(8)
16	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx.FluHyd	A5.44(8)
17	SS.SMx.CCS (SCS.CMx)	SS.SCS.CCS.MedLumVen?	A5.44(7)
18	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(81)
19	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx.FluHyd	A5.44(8)
20	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx.FluHyd	A5.44(8)
21	SS.SCS.CCS/SS.SBR.PoR	Impoverished/Low Density SS.SBR.PoR.SspiMx?/SS.SCS.CCS.Pkef?	A5.611? / A5.44(7)
22	SS.SCS.CCS	SS.SCS.CCS	A5.14(8)
23	SS.SBR.PoR	SS.SBR.PoR.SspiMx (Non Reef Form)	A5.44(8)
24	SS.SMx.IMx	Impoverished/Low Density SS.SBR.PoR.SspiMx?	A5.611? / A5.44(7)
25	SS.SCS.CCS	SS.SCS.CCS	A5.44(7)
26	SS.SCS.CCS	SS.SCS.CCS	A5.44(7)
27	SS.SCS.CCS	SS.SCS.CCS	A5.44(7)
28	SS.SCS.CCS	SS.SCS.CCS	A5.14(9)
29	SS.SMx.CMx/SS.SBR.PoR	Impoverished/Low Density SS.SBR.PoR.SspiMx?/SS.SCS.CCS.Pkef?	A5.611? / A5.44(7)
30	SS.SCS.CCS	SS.SCS.CCS.MedLumVen?	A5.44(7)

Site	Level 4 Eunis	Level 5 Eunis (Nearest Match)	Similar/Equivalent REC Biotopes
1			
30.			
2	SS.SCS	SS.SCS	A5.44(7) or A5.25(7)
31	SS.SSa (SS.SCS)	SS.SSa (SS.SCS)	A5.44(7) or A5.25(7)
32	SS.SMx.CMx/SS.SBR.PoR	SS.SBR.PoR.SspiMx (Non Reef Form)	A5.611
33	SS.SMx.CMx/SS.SBR.PoR	Impoverished/Low Density SS.SBR.PoR.SspiMx?/SS.SCS.CCS.Pkef?	A5.611? / A5.44(7)
34	SS.SSa (SS.SCS)	SS.SCS.ICS.Glap	A5.25(7)
35	SS.SMx.CMx/SS.SBR.PoR	SS.SBR.PoR.SspiMx (Non Reef Form)	A5.611
36	SS.SCS.CCS	SS.SCS.CCS	A5.14(9)
37	SS.SCS	SS.SCS	A5.25(7)
38	SS.SMx.CMx	SS.SCS.CCS.Pkef?	A5.44(7)
39	SS.SCS.CCS	SS.SCS.CCS.Pkef?	A5.14(9)
40	SS.SCS.CCS	SS.SCS.CCS.Pkef?	A5.44(A)
41	SS.SSa (SS.SCS)	SS.SSa (SS.SCS)	A5.44(7) or A5.25(7)
42	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.2
43	SS.SSa.CFiSa	SS.SSa.IFiSa.IMoSa?	A5.25(7)
44	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.25(7)
45	SSa (overlying SS.SMx/SCS)	SS.SCS.CCS.Pkef?	A5.44(7)
46	SS.SSa.CFiSa	SS.SSa.IFiSa.IMoSa?	A5.25(7)
47	SS.SMx.CMx/SS.SBR.PoR	Impoverished/Low Density SS.SBR.PoR.SspiMx?/SS.SCS.CCS.Pkef?	A5.611? / A5.44(7)
48	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.25(7)
49	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.2
50	SS.SMx.CMx/SS.SBR.PoR	SS.SBR.PoR.SspiMx (Non Reef Form)	A5.611
51	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.2
52	SS.SSa.IFiSa	SS.SSa.IFiSa.IMoSa	A5.25(7)
53	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(8)
54	SS.SMx.CMx (SCS.CCS)	SS.SMx.CMx (SCS.CCS)	A5.44(A)
55	SS.SSa.CFiSa	SS.SSa.CFiSa	A5.25(7)
56	SSa (overlying SS.SMx/SCS)	SS.SCS.CCS.Pkef?	A5.44(7)
57	SS.SMx.CMx	SS.SMx.CMx	A5.44(7)
58	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(81)
59	SS.SMx.CMx	SS.SMx.CMx	A5.44(7)
60	SS.SMx.CMx	SS.SMx.CMx	A5.44(7)
61	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(8)
62	SSa (overlying SS.SMx/SCS)	SS.SCS.ICS.Glap?	A5.44(7)
63	SSa (overlying SS.SMx/SCS)	SSa (over SS.SMx/SCS)	A5.44(7)
64	SS.SSa.CFiSa	SS.SSa.IFiSa.IMoSa?	A5.25(7)
65	SSa (overlying SS.SMx/SCS)	SSa (over SS.SMx/SCS)	A5.44(7) or A5.25(7)
66	SS.SMx.CMx (SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(8)
67	SS.SMx.CMx/SS.SBR.PoR	Impoverished/Low Density SS.SBR.PoR.SspiMx?/SS.SCS.CCS.Pkef?	A5.611? / A5.44(7)
68	SS.SSa.CFiSa	SS.SSa.IFiSa.NcirBat?	A5.25(7)
69	SS.SSa.CFiSa	SS.SSa.IFiSa.NcirBat?	A5.25(4)
70	SS.SCS.CCS/SSa	SS.SCS.ICS.Glap?	A5.44(7)
71	SS.SCS.CCS	SS.SCS.CCS.MedLumVen?/SS.SCS.CCS.Blan?	A5.44(7)

Site	Level 4 Eunis	Level 5 Eunis (Nearest Match)	Similar/Equivalent REC Biotopes
72	SS.SCS.CCS	SS.SCS.ICS.Glap?	A5.44(7)
73	SS.SSa.CFiSa	SS.SSa.IFiSa.IMoSa?	A5.25(7)
74	SSa (overlying SS.SMx.CMx/SCS.CCS)	SS.SCS.CCS.MedLumVen?	A5.44(7)
75	SS.SCS.CCS	SS.SCS.ICS.Glap?	A5.44(7) or A5.25(7)
76	SS.SCS.CCS	SS.SMx.CMx.FluHyd?	A5.14(8)

Appendices

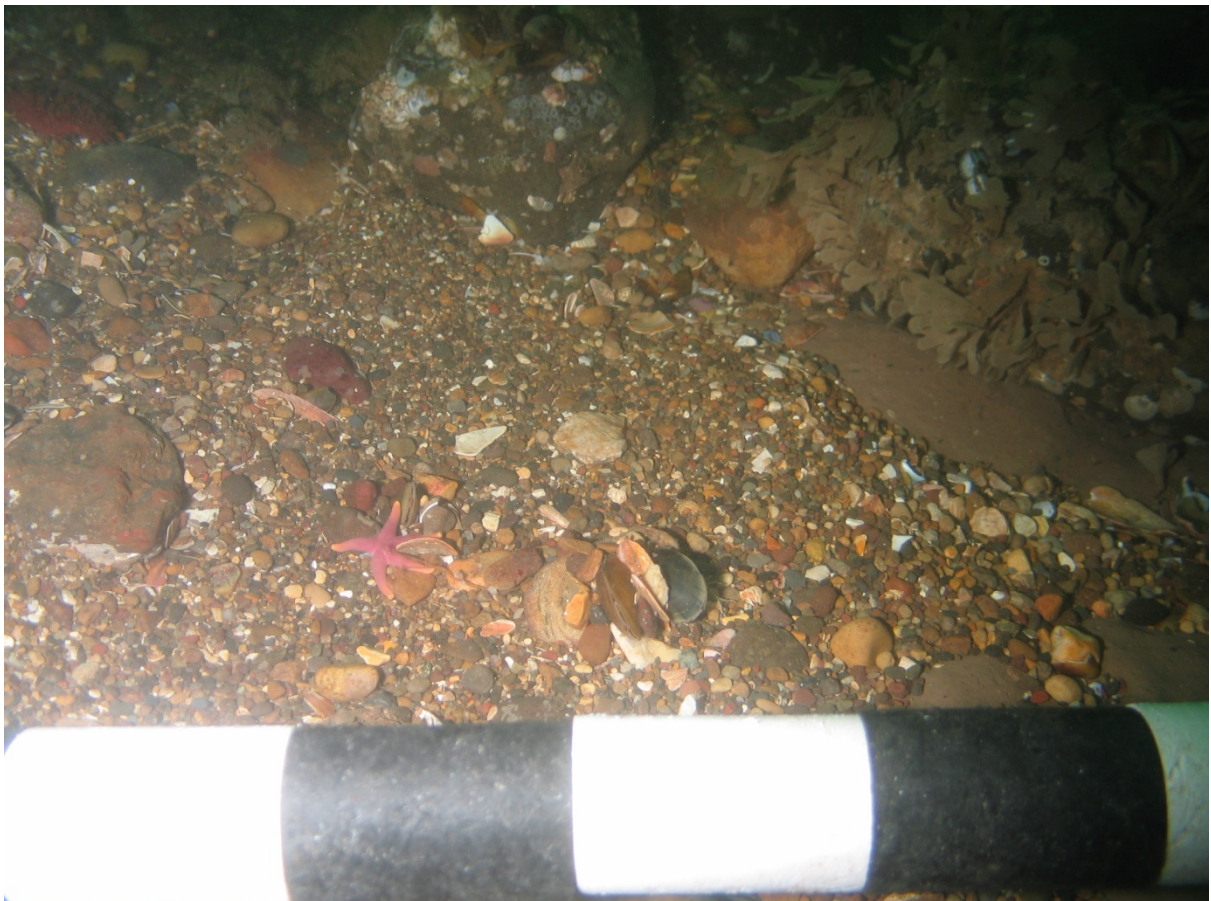
Appendix 1. Seabed Still Photographs



Site REA1



Site REA2



Site REA3



Site REA4



Site REA5



Site REA6



Site REA7



Site REA8



Site REA9



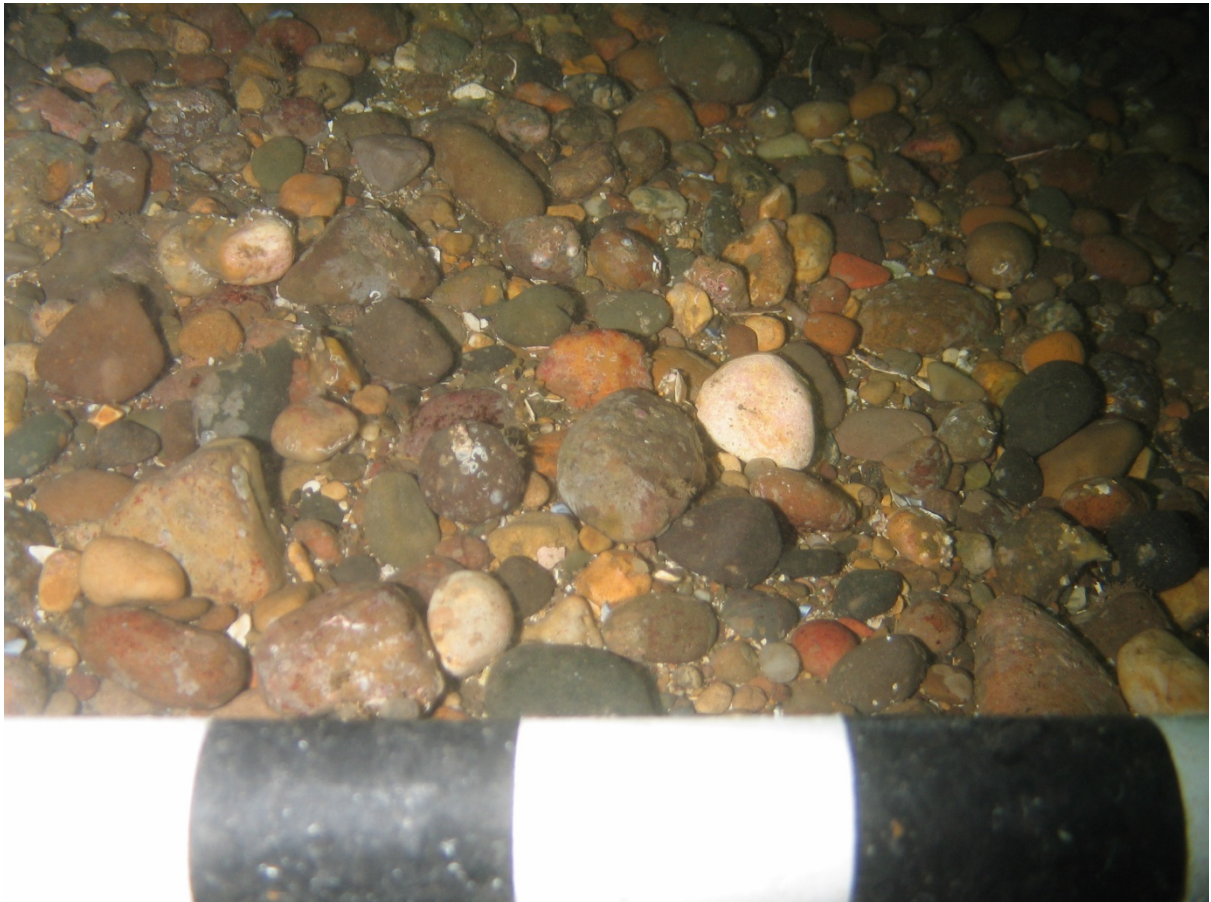
Site REA10



Site REA11



Site REA12



Site REA13



Site REA14



Site REA15



Site REA16



Site REA17



Site REA18



Site REA19



Site REA20



Site REA21



Site REA22



Site REA23



Site REA24



Site REA25



Site REA26



Site REA27



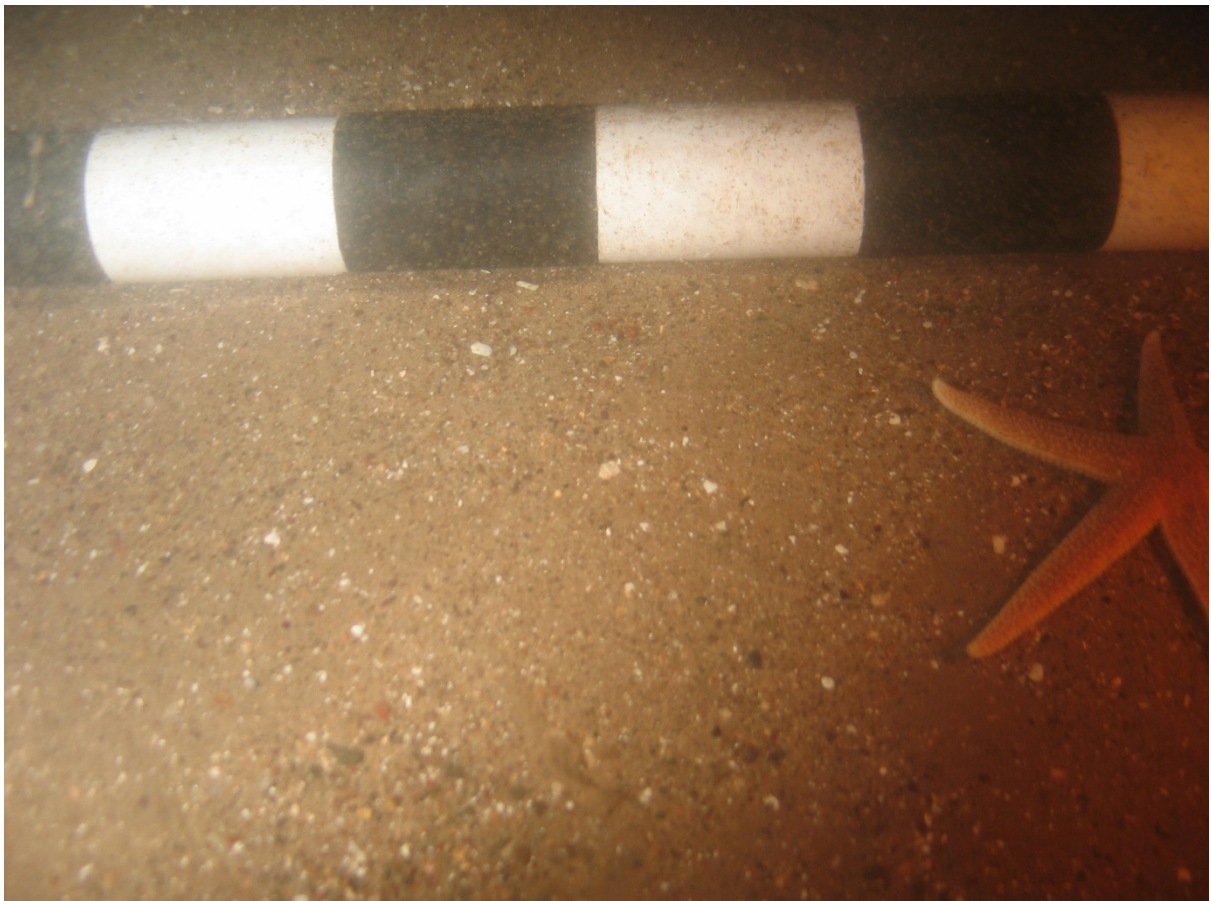
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Site REA29



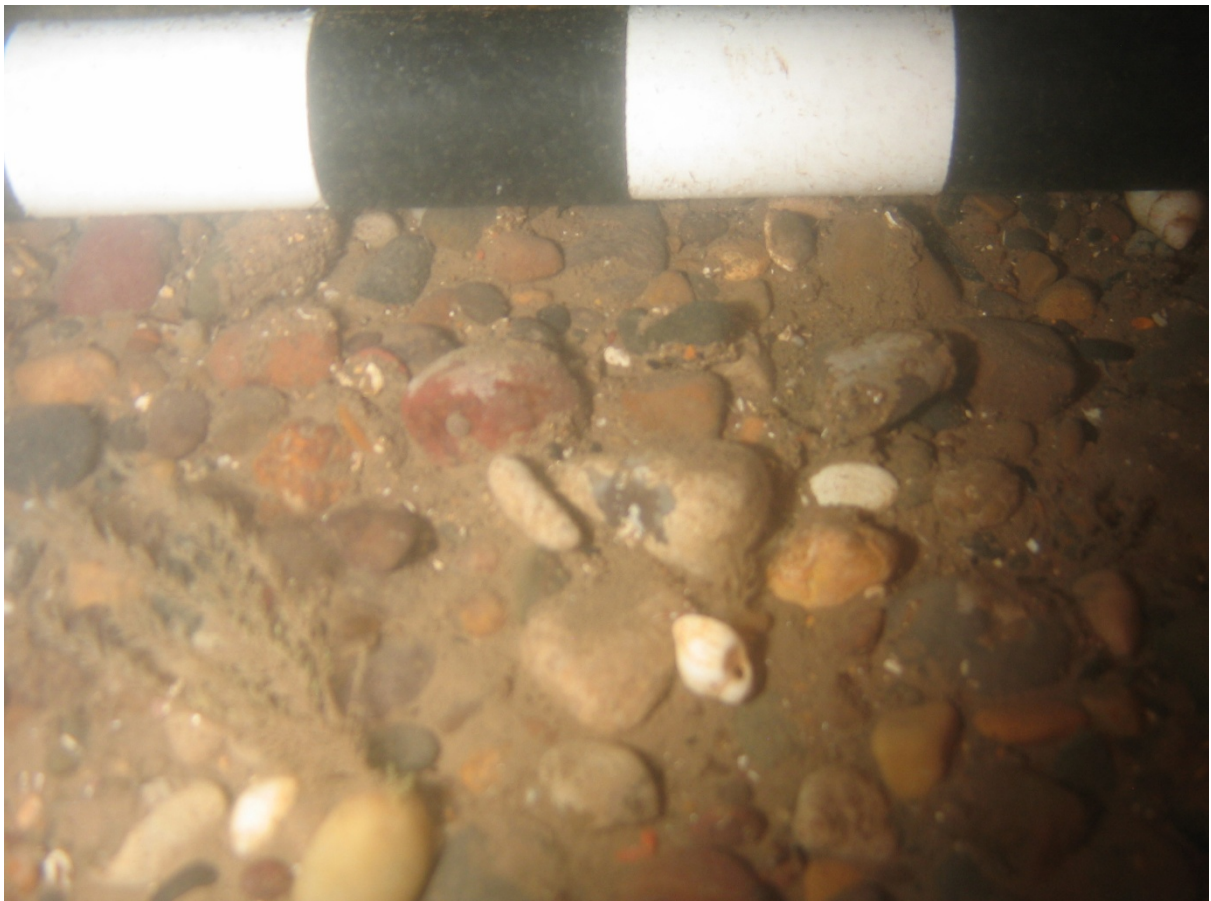
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Site REA31



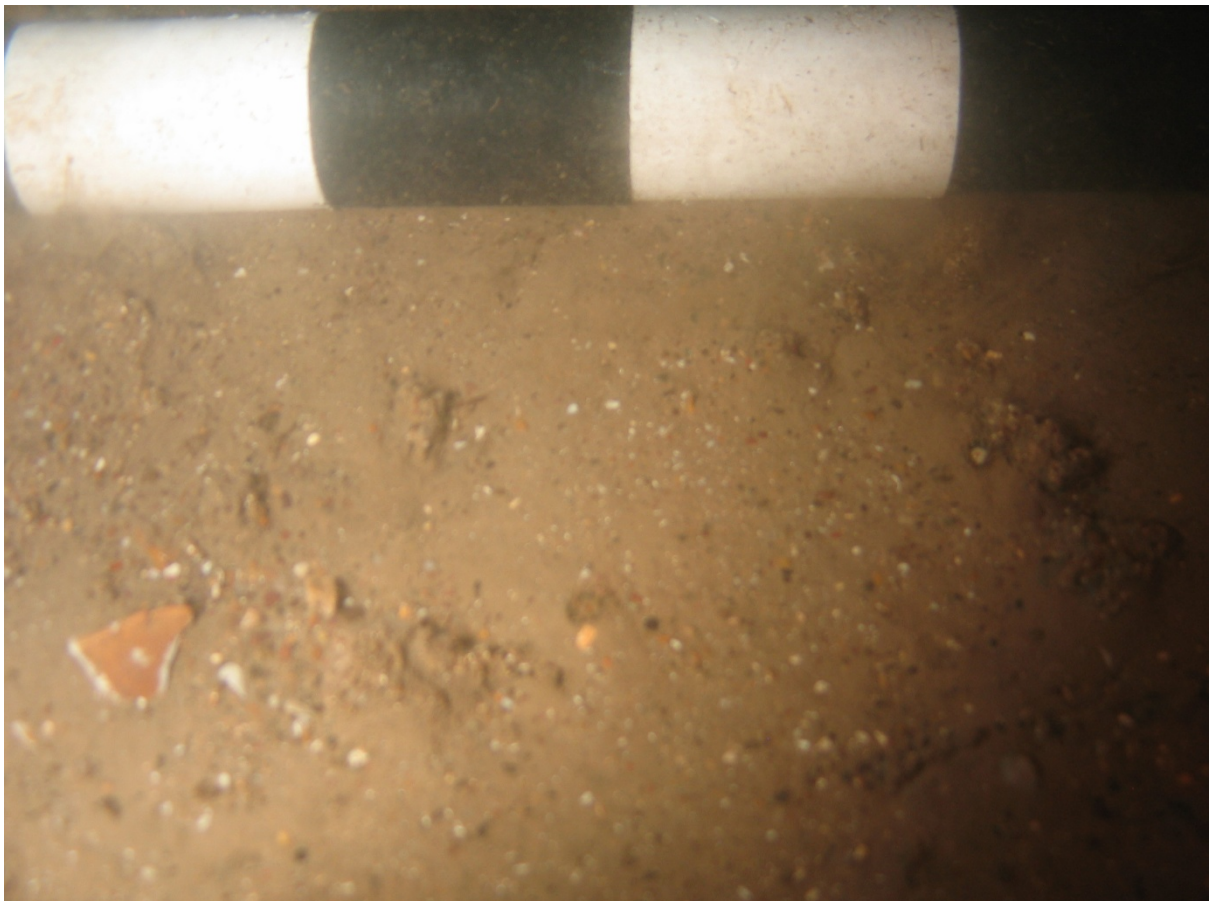
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Site REA33



Site REA34



Site REA35



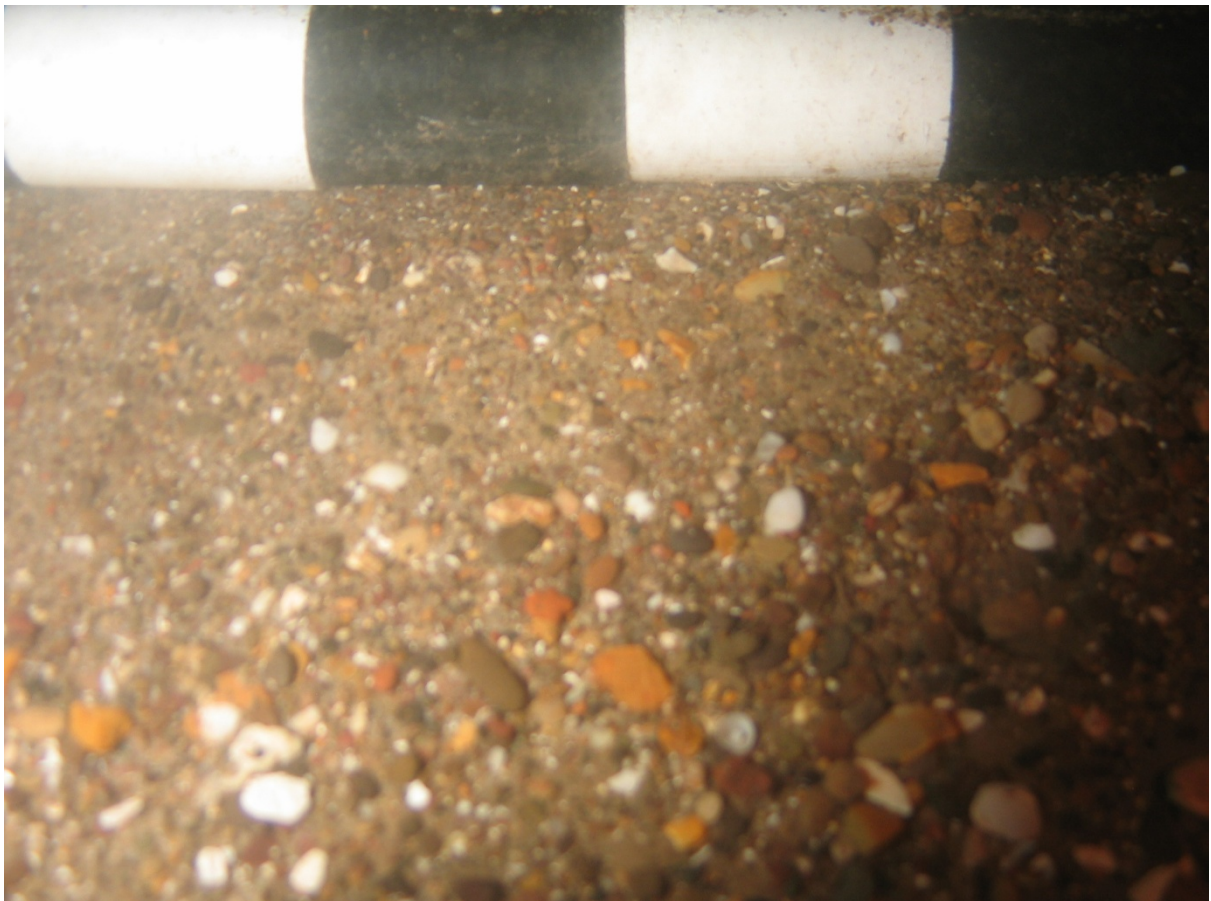
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Site REA37



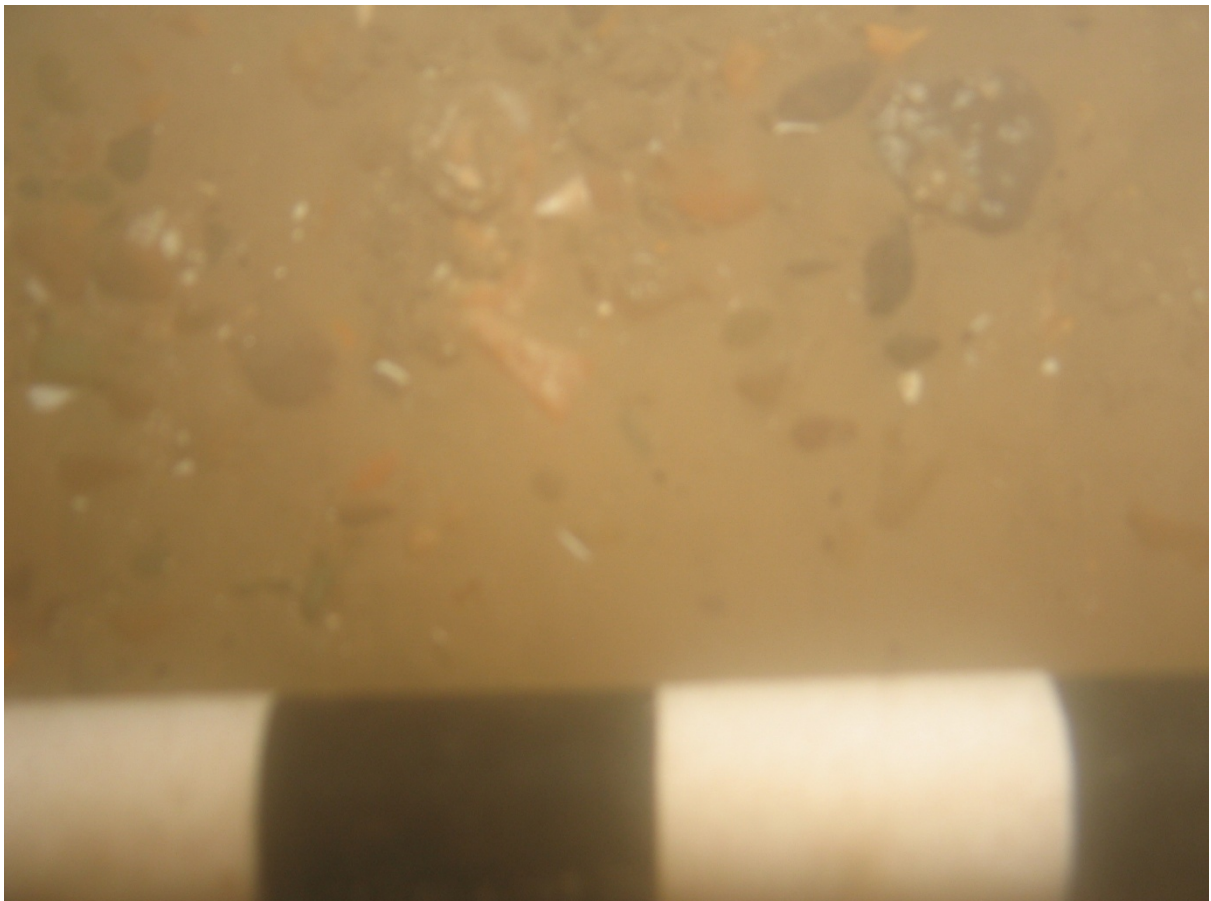
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Site REA39



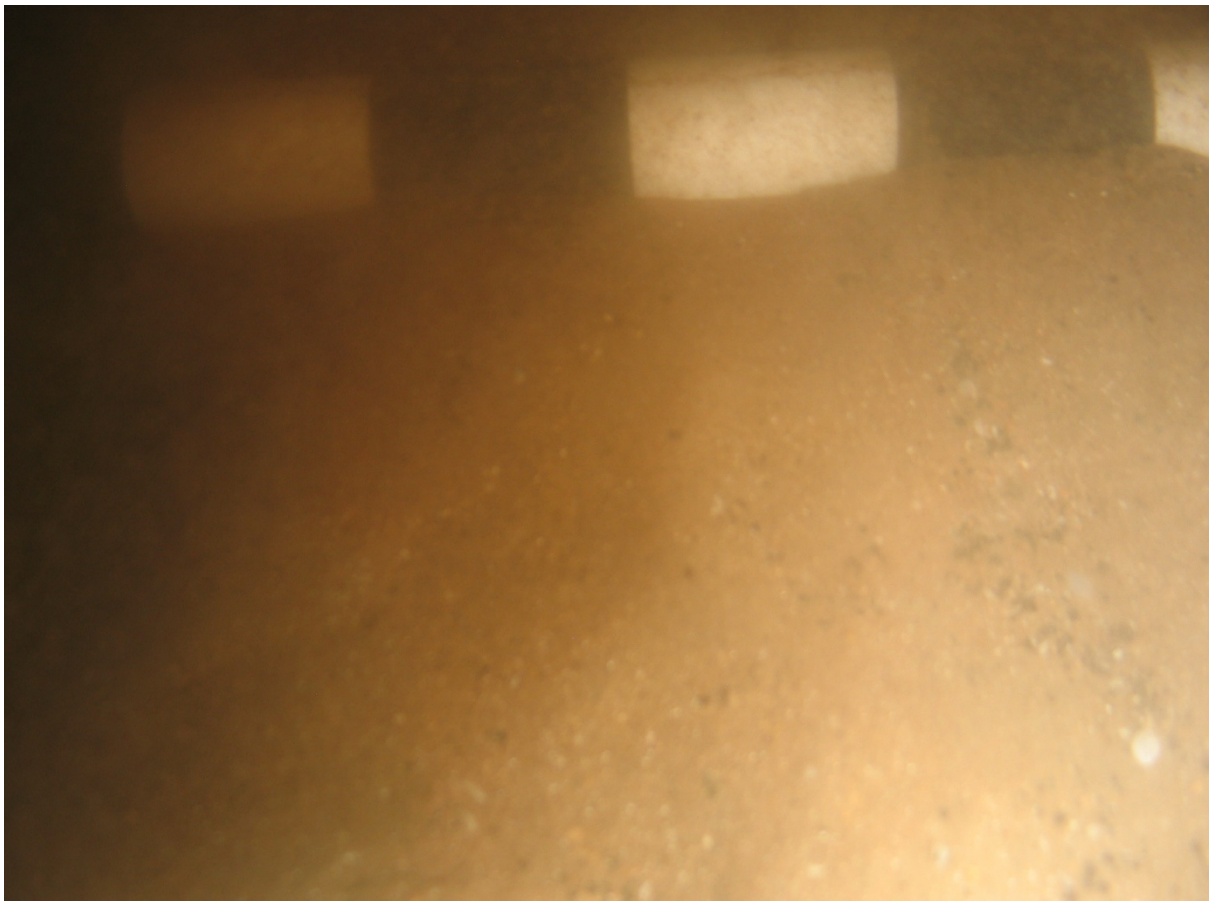
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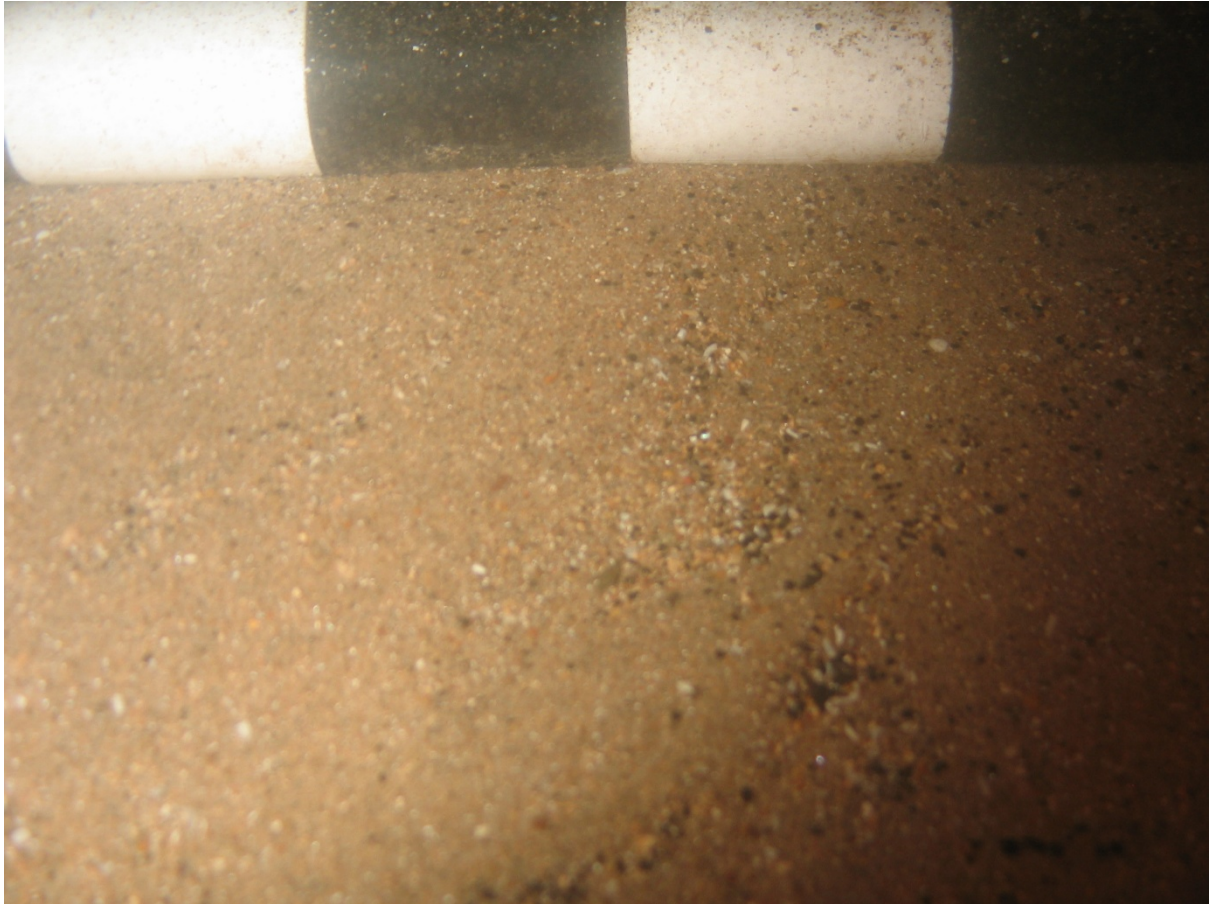
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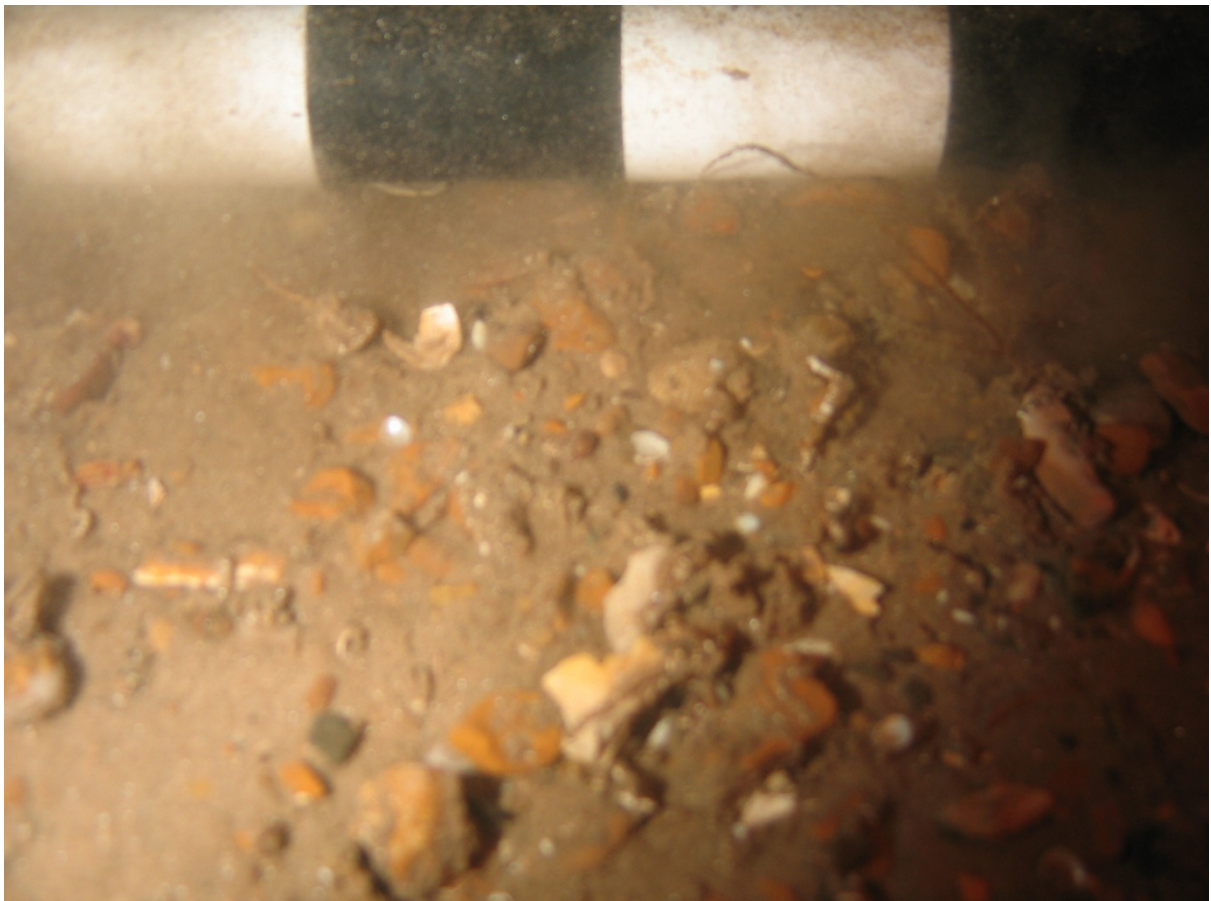
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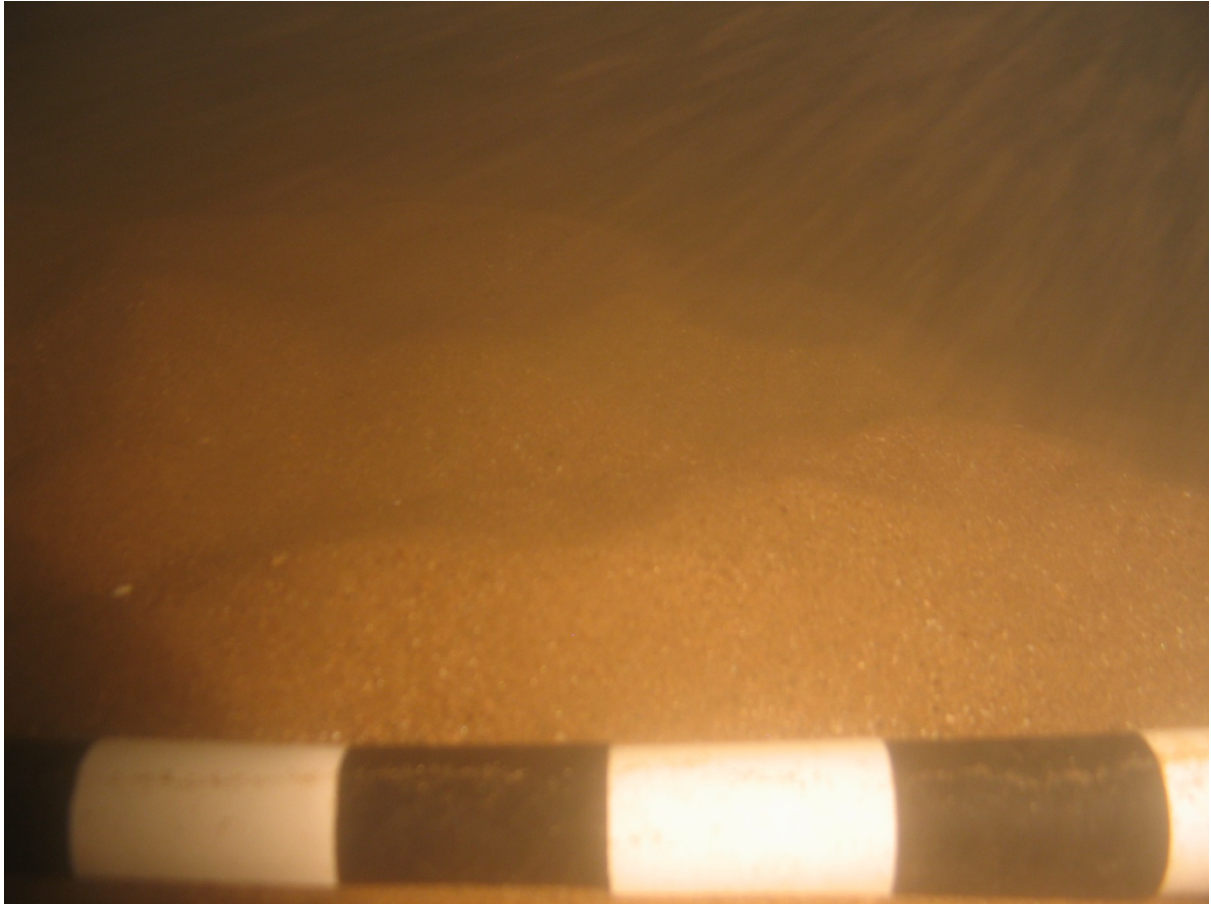
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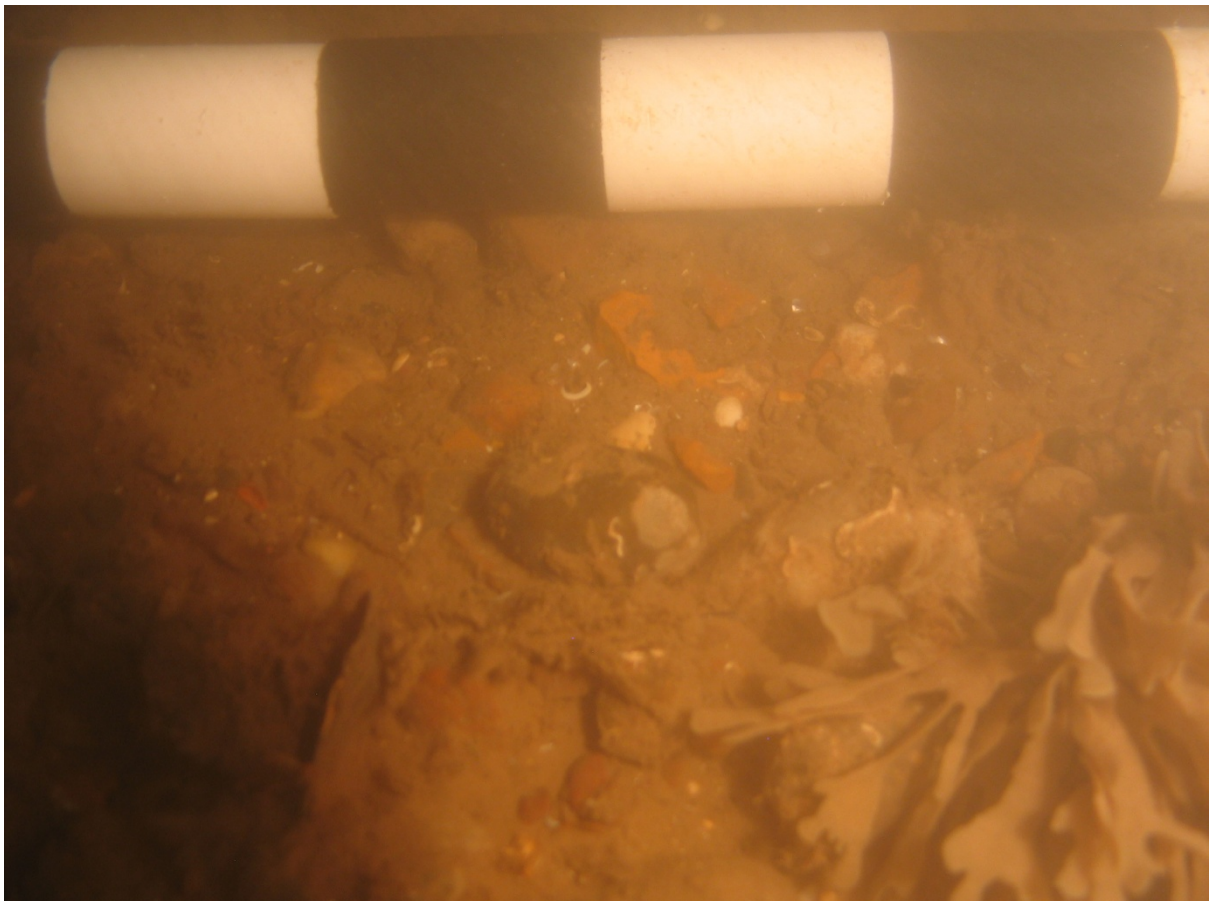
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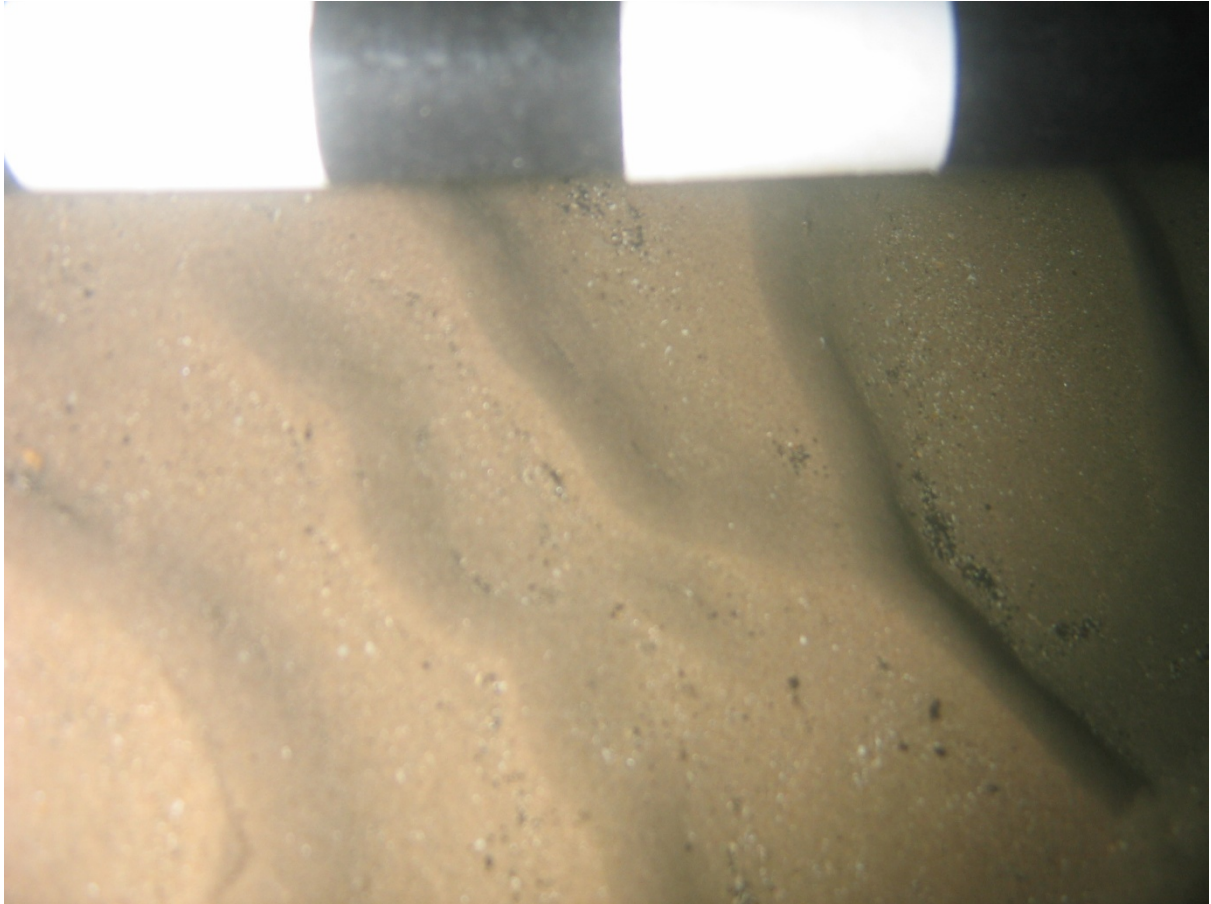
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Site REA46



Site REA47



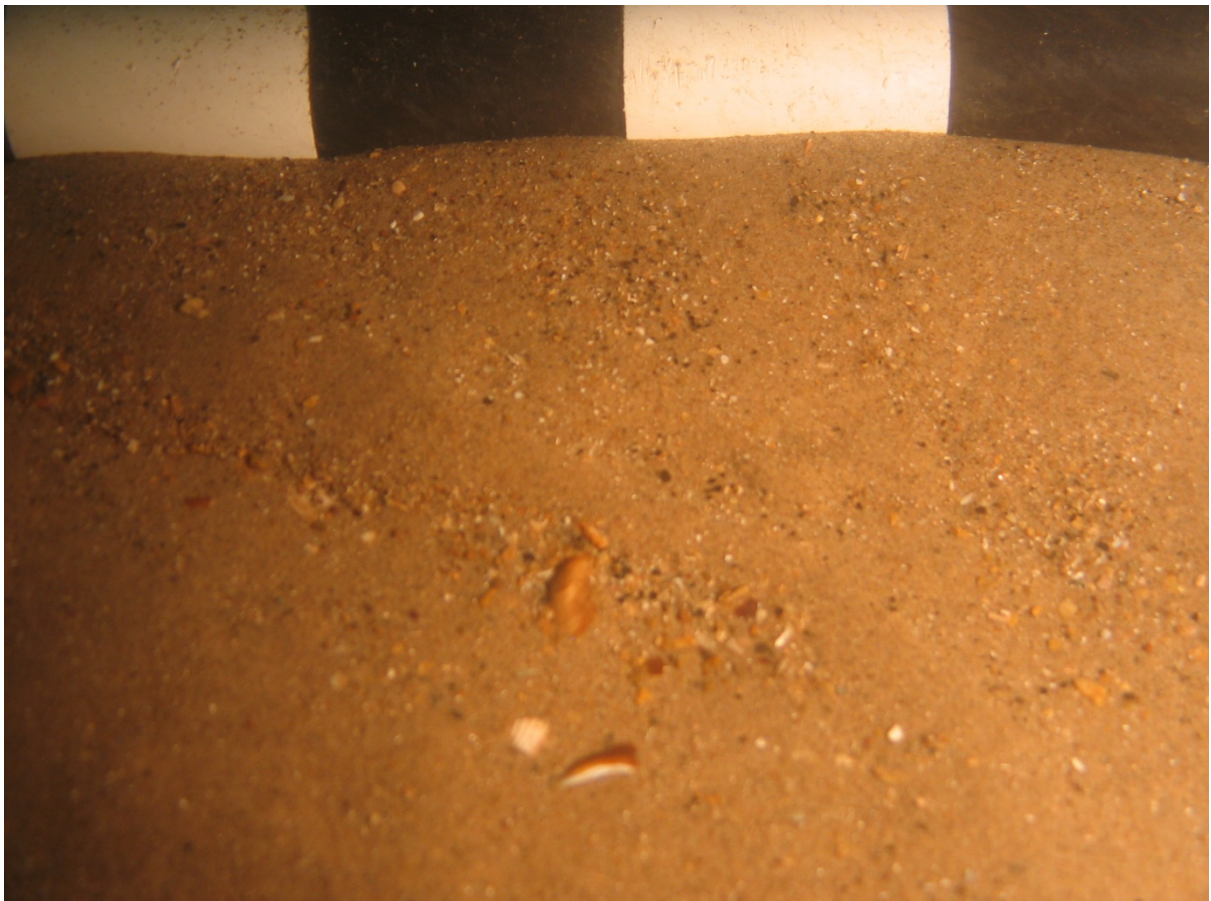
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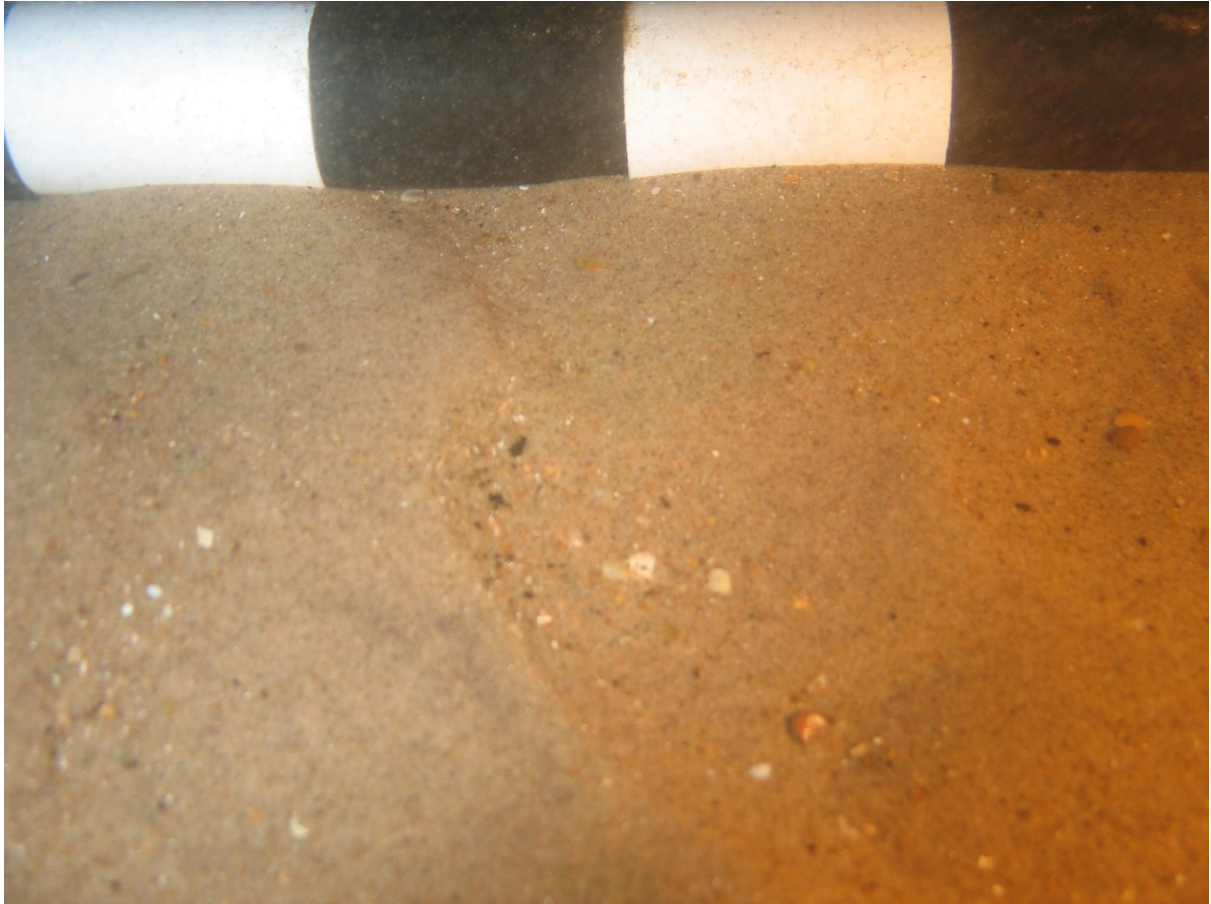
Site REA49



Site REA50



Site REA51



Site REA52



Site REA53



Site REA54



Site REA55



Site REA56



Site REA57



Site REA58



Site REA59



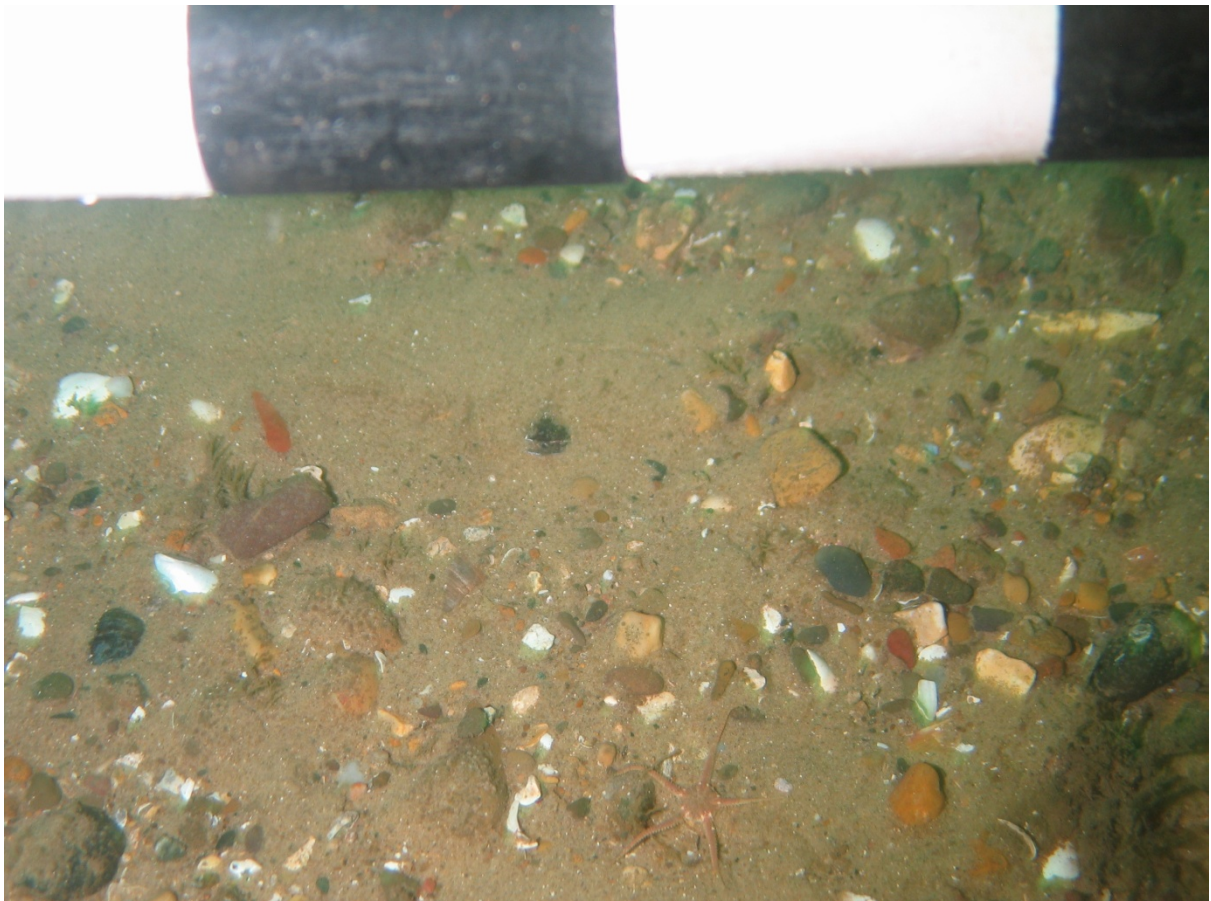
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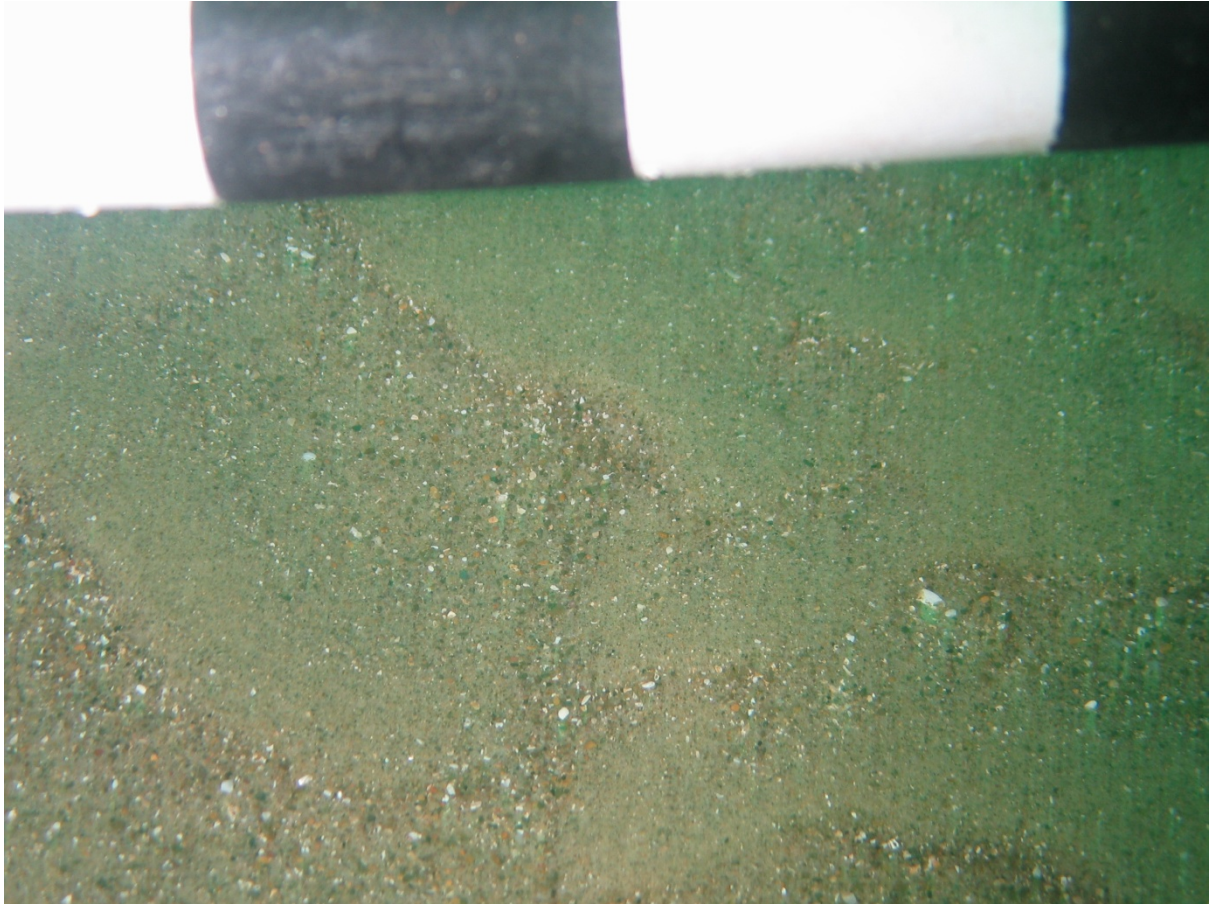
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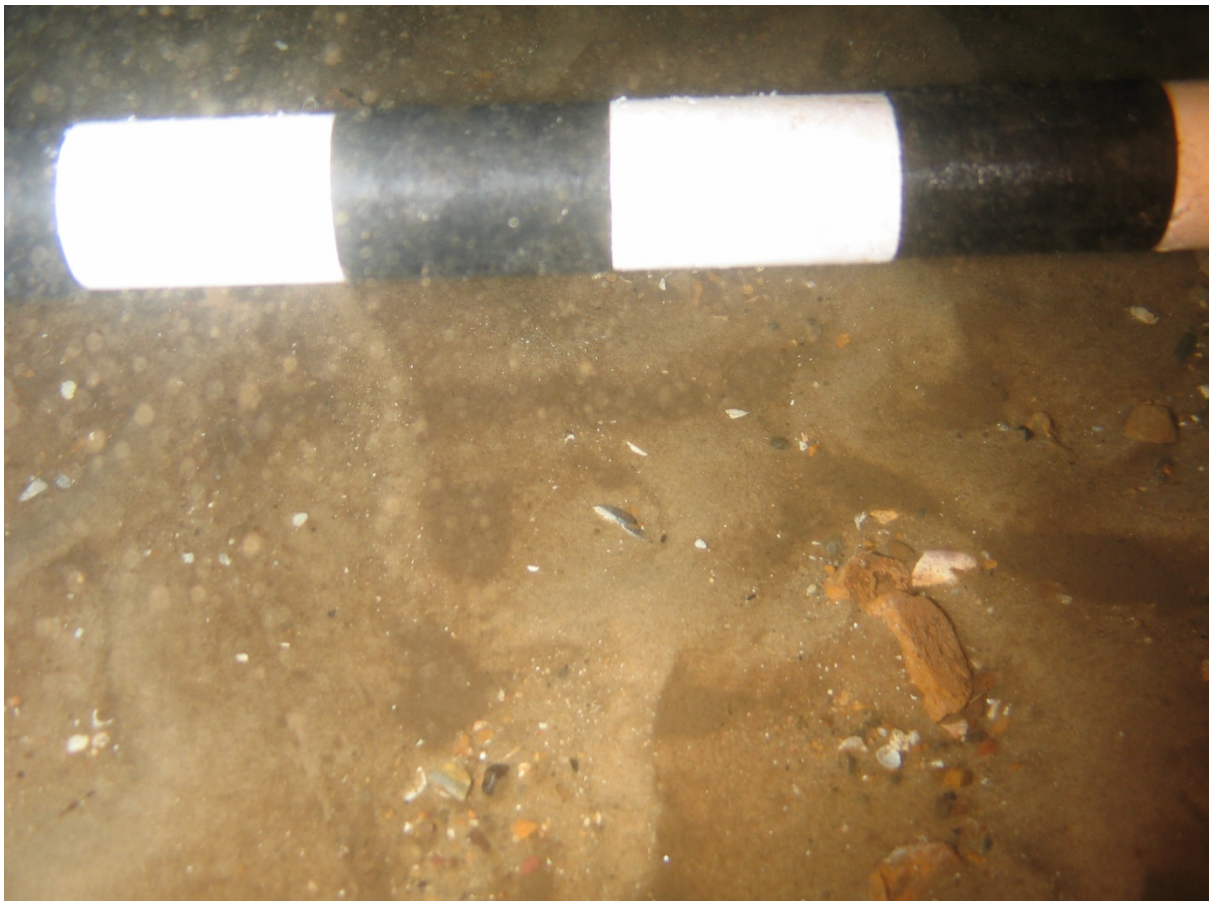
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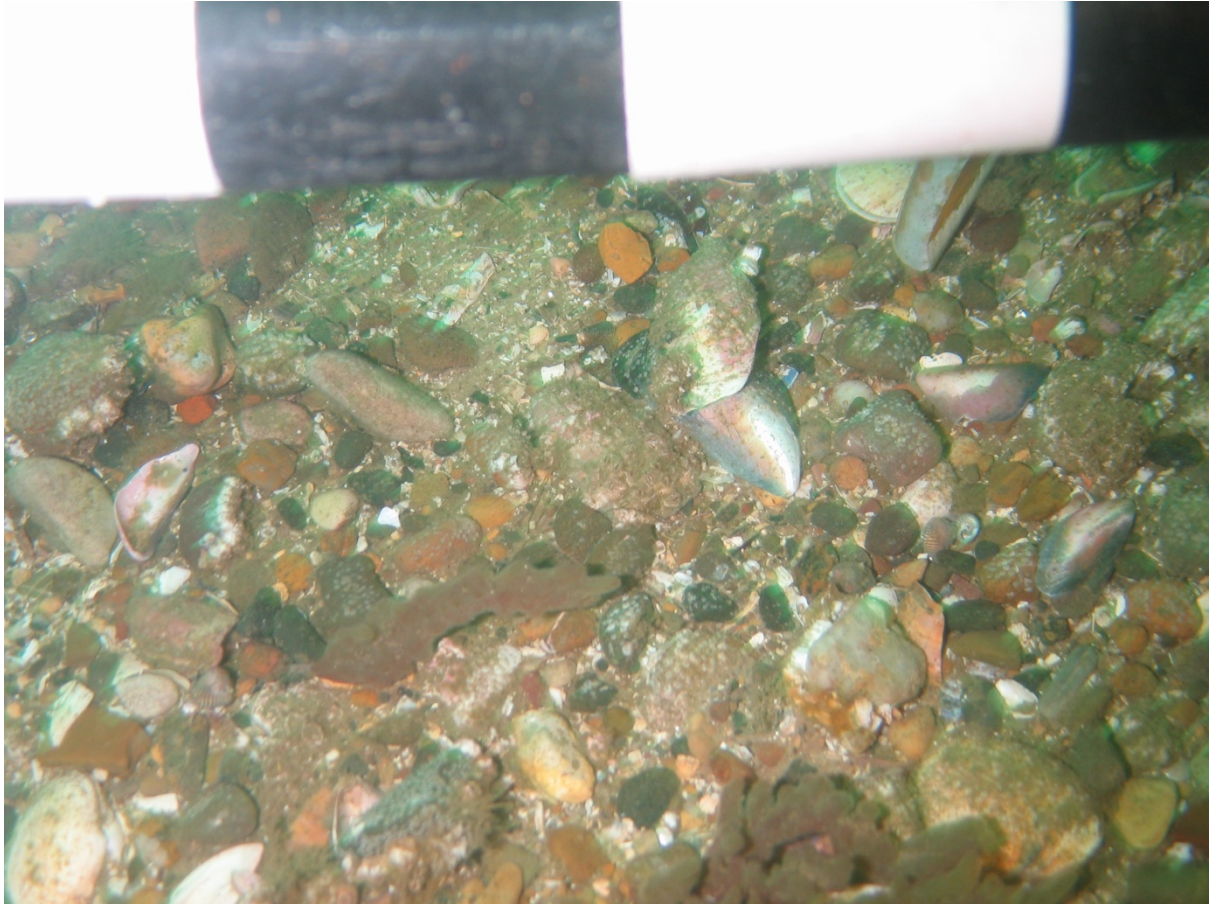
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Site REA64



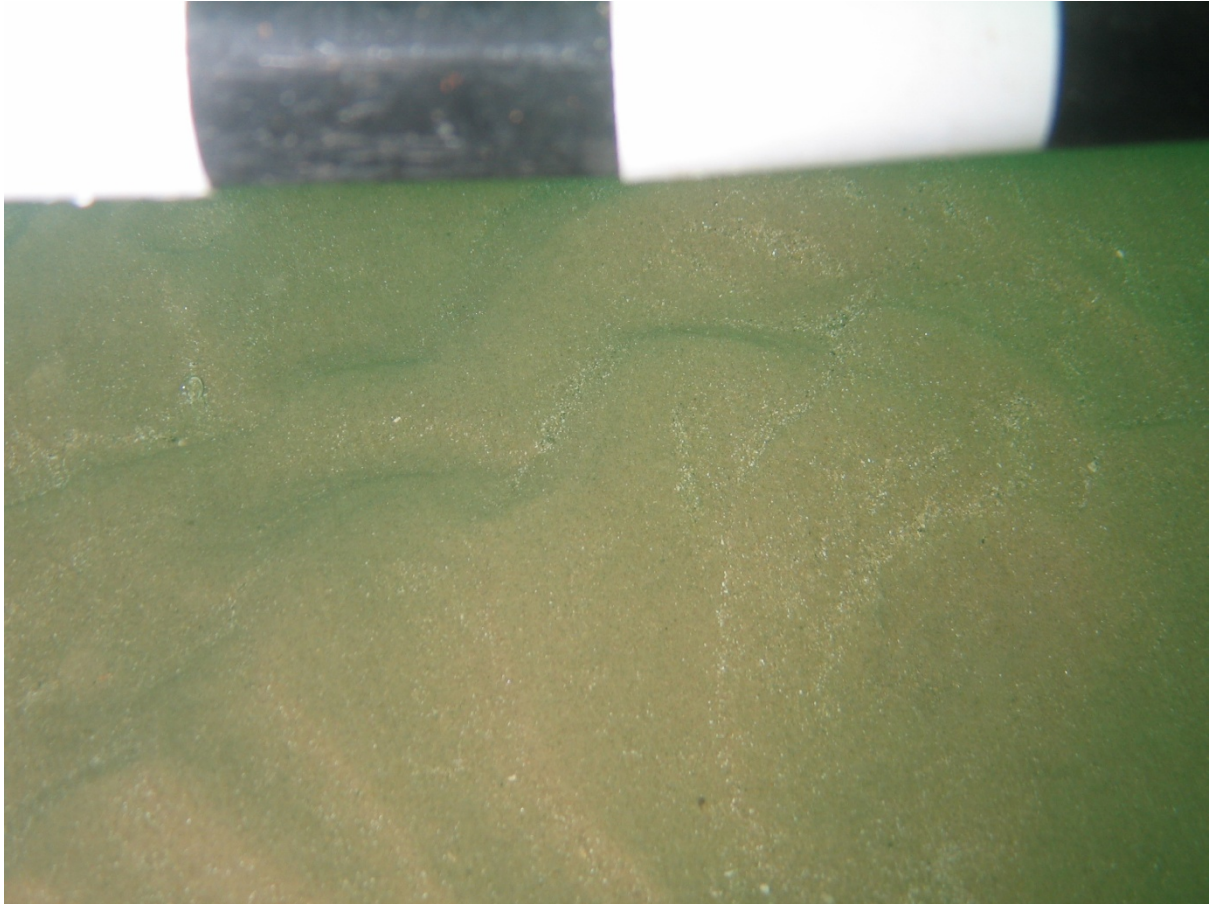
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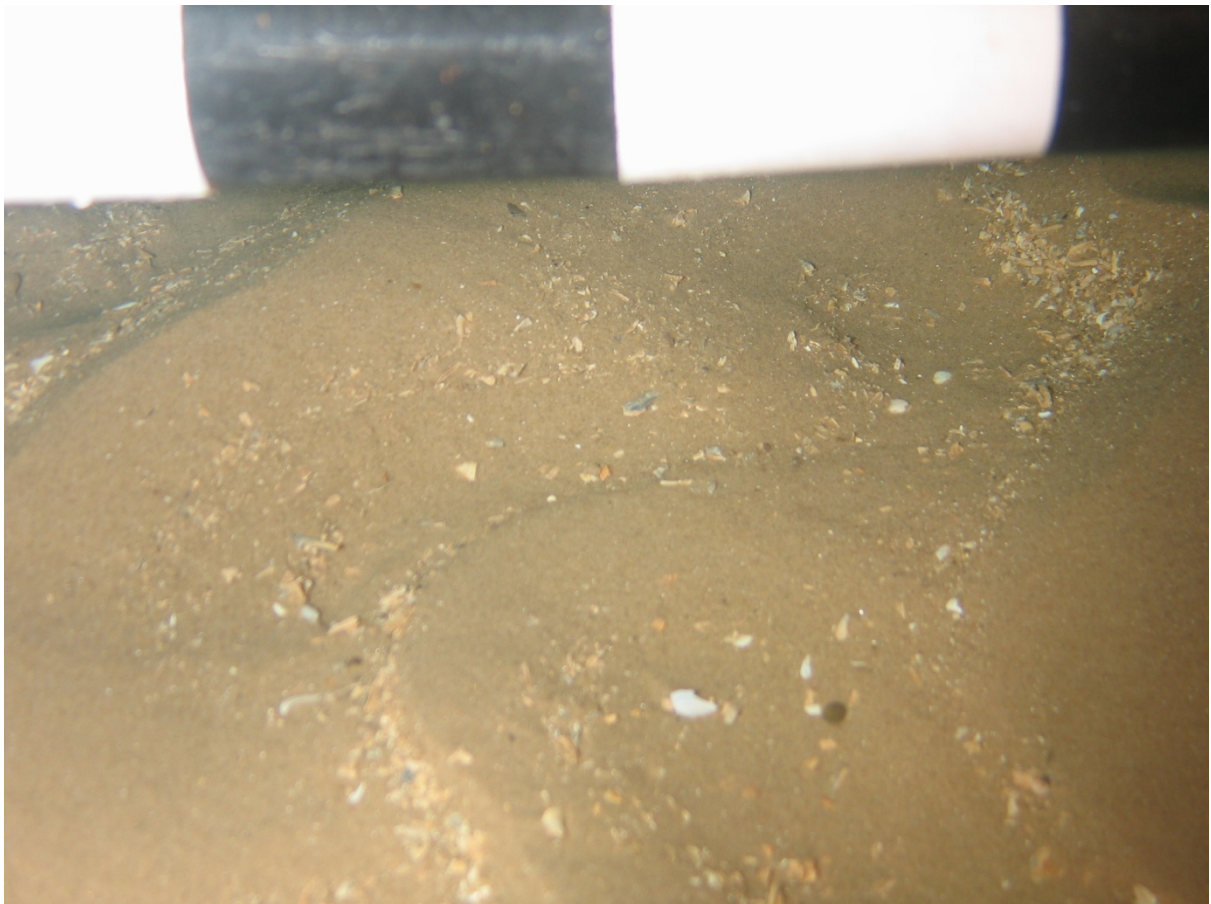
Site REA66



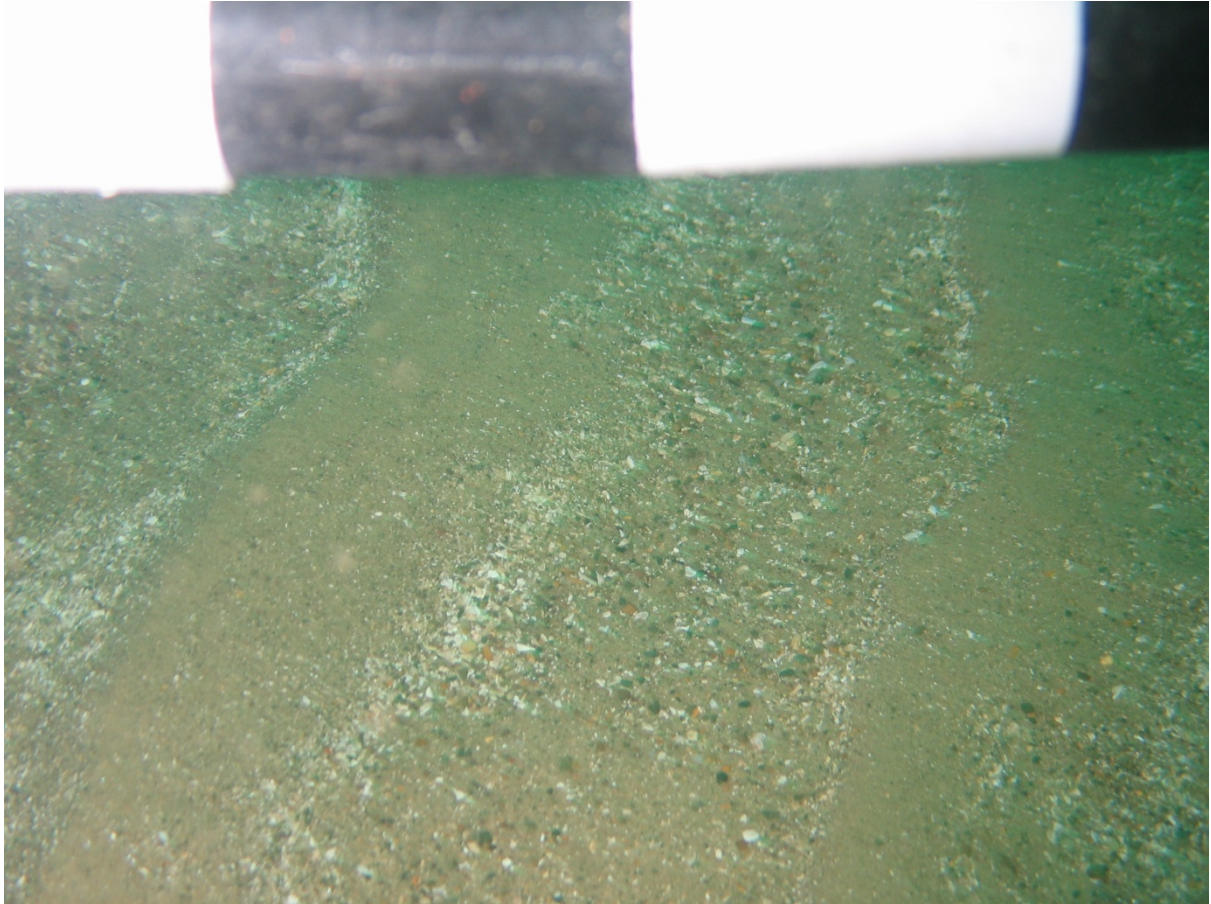
Site REA67



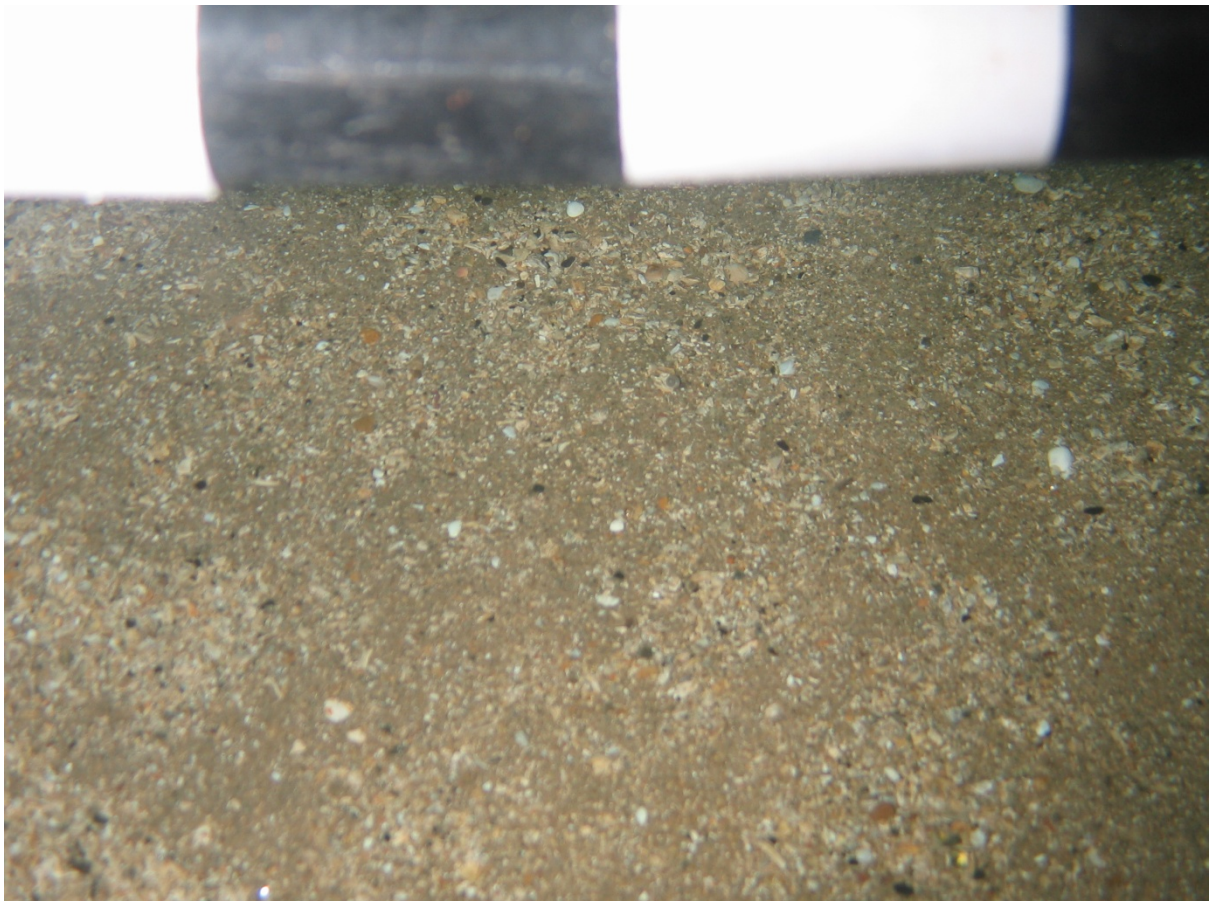
Site REA68



Site REA69



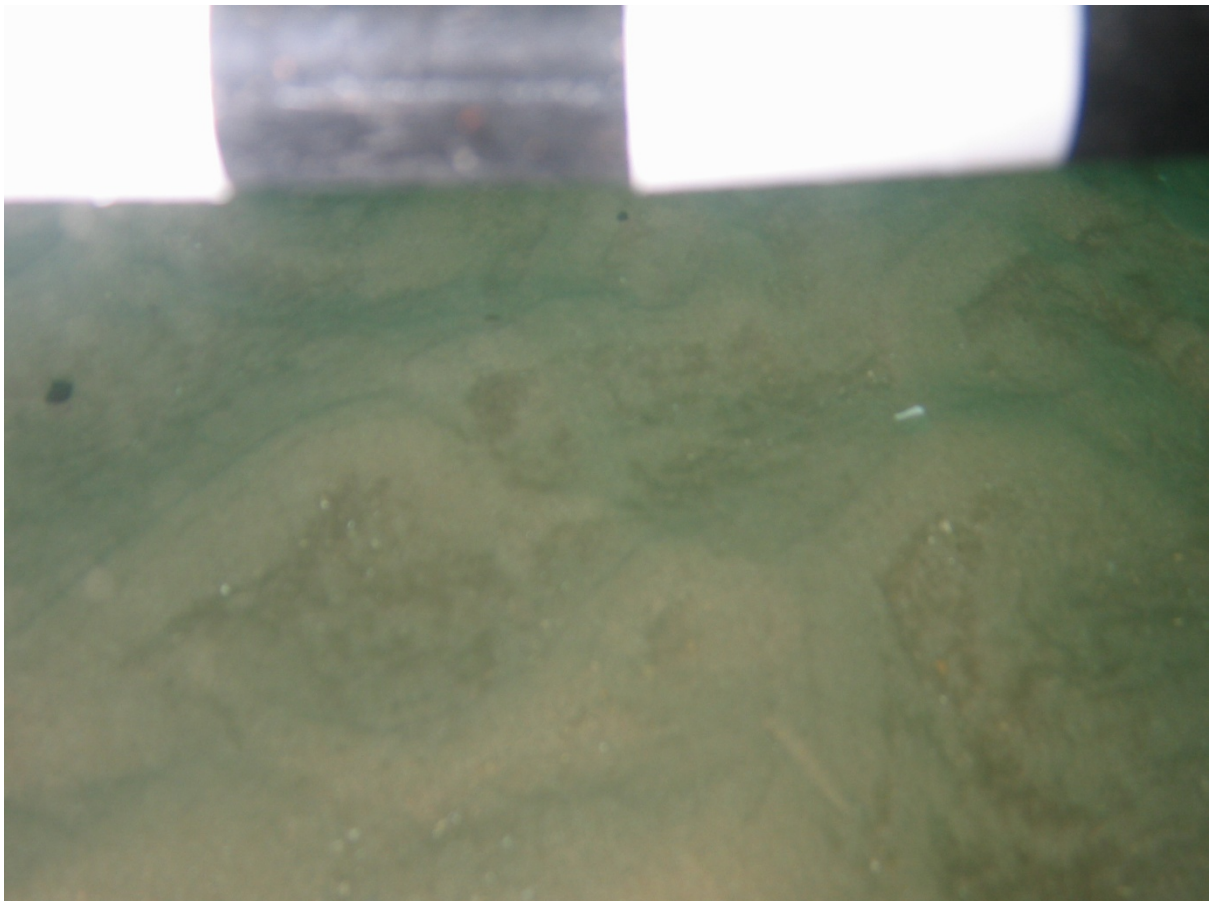
Site REA70



Site REA71



Site REA72



Site REA73



Site REA74



Site REA75



Site REA76

Appendix 2. Analysis outputs

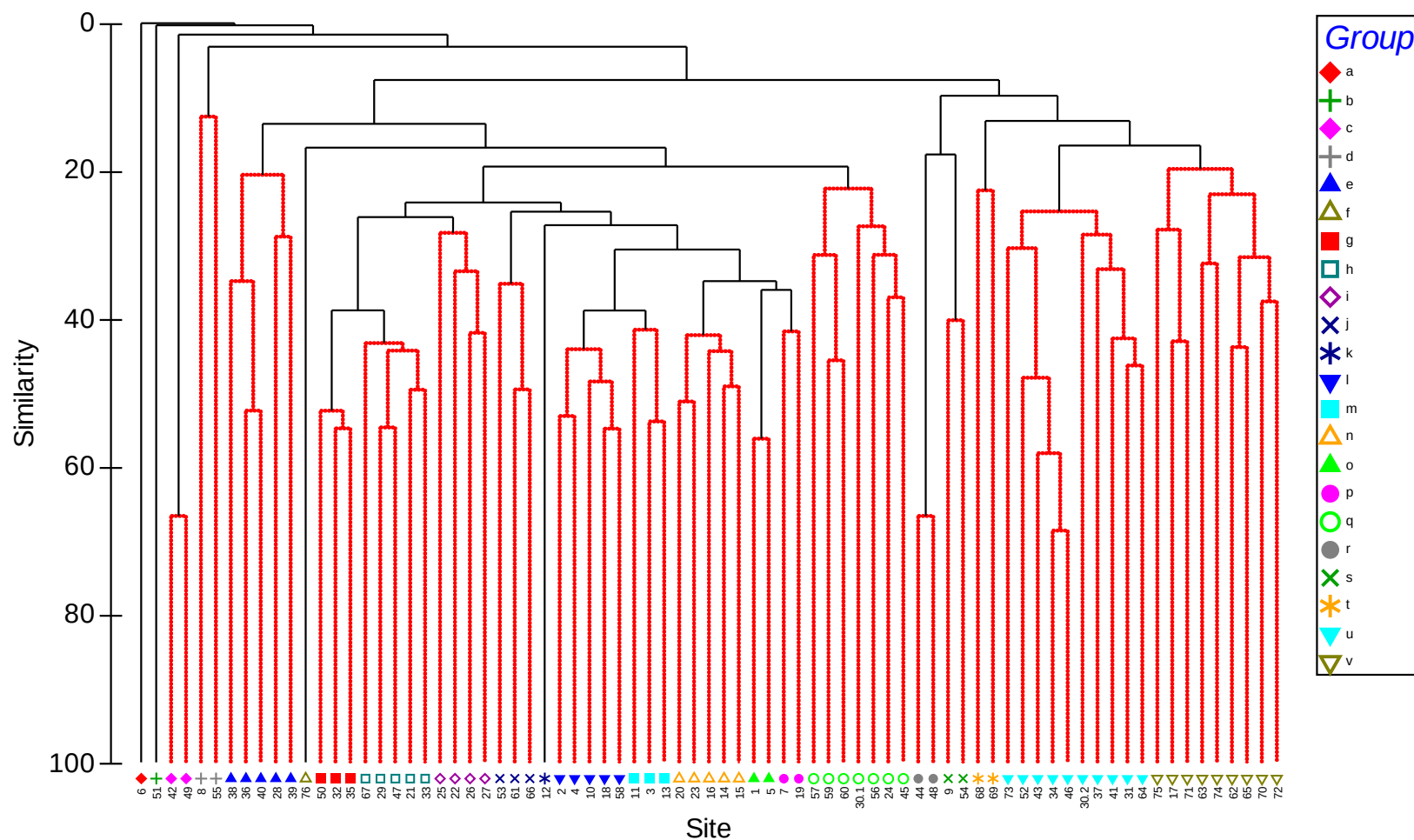


Figure A2.1. Results of cluster analysis on species data.

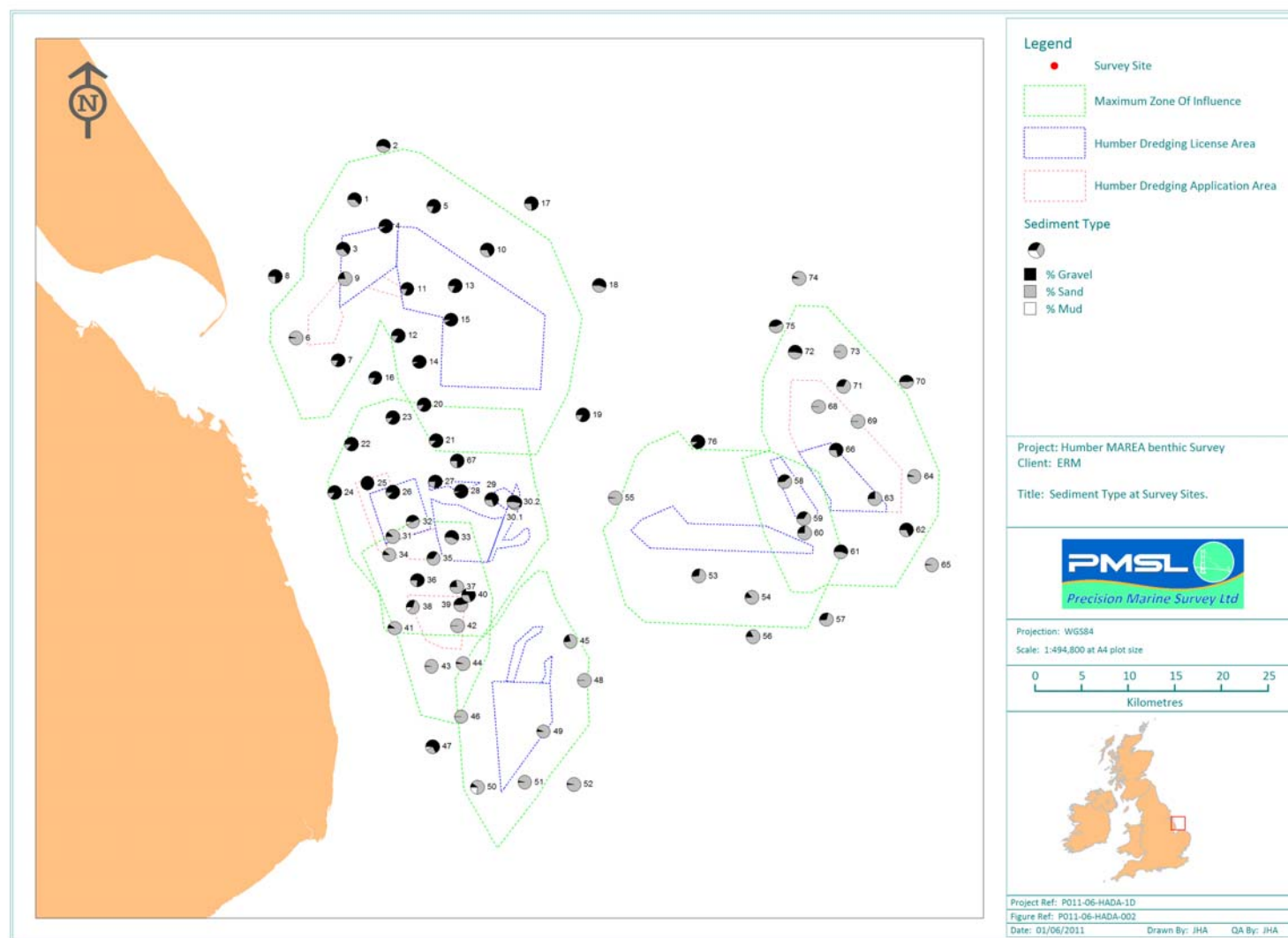


Figure A2.2. Sediment type (bulk sediment class) at survey sites.

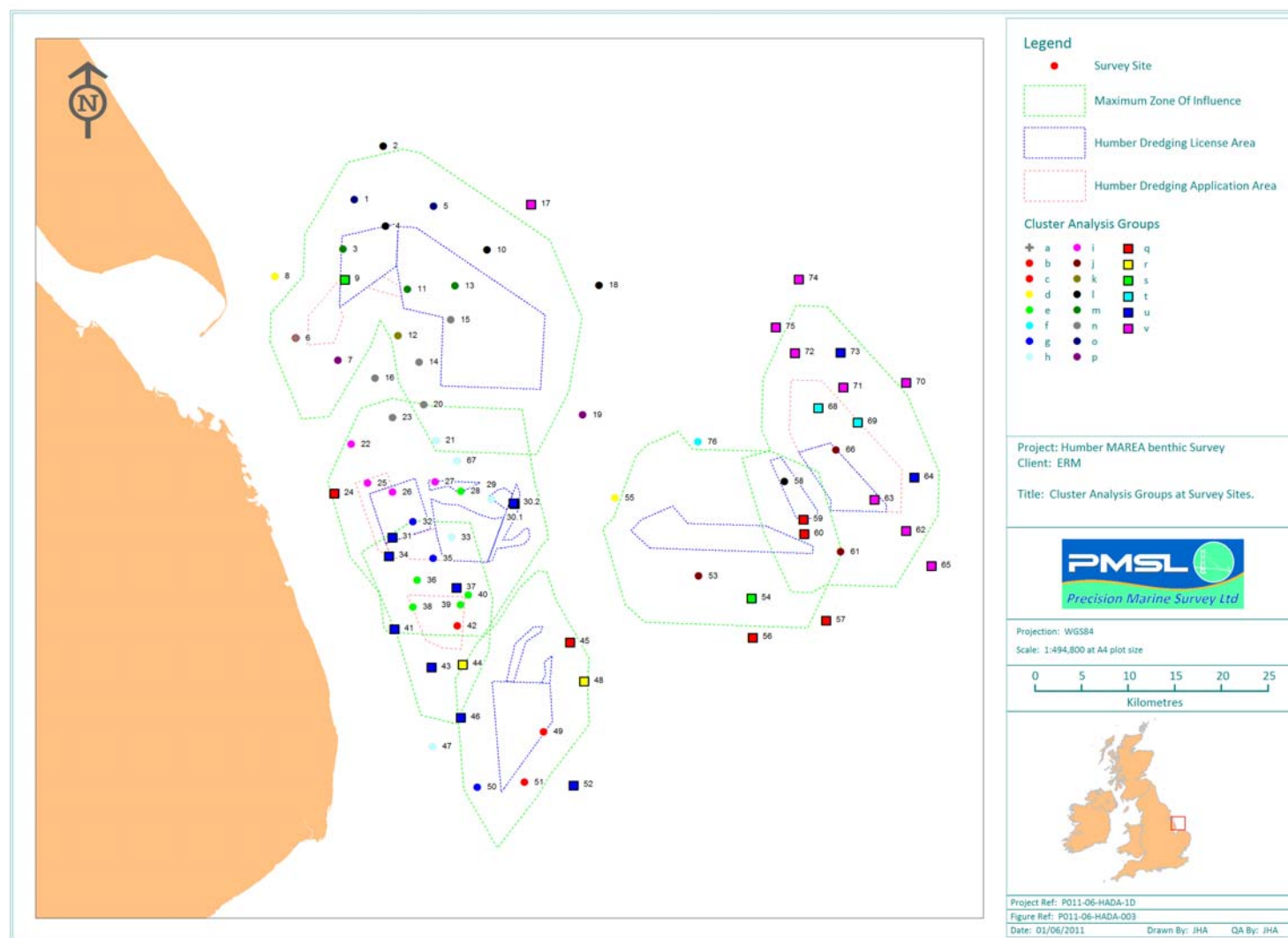


Figure A2.3. Spatial distribution of groups from cluster analysis.

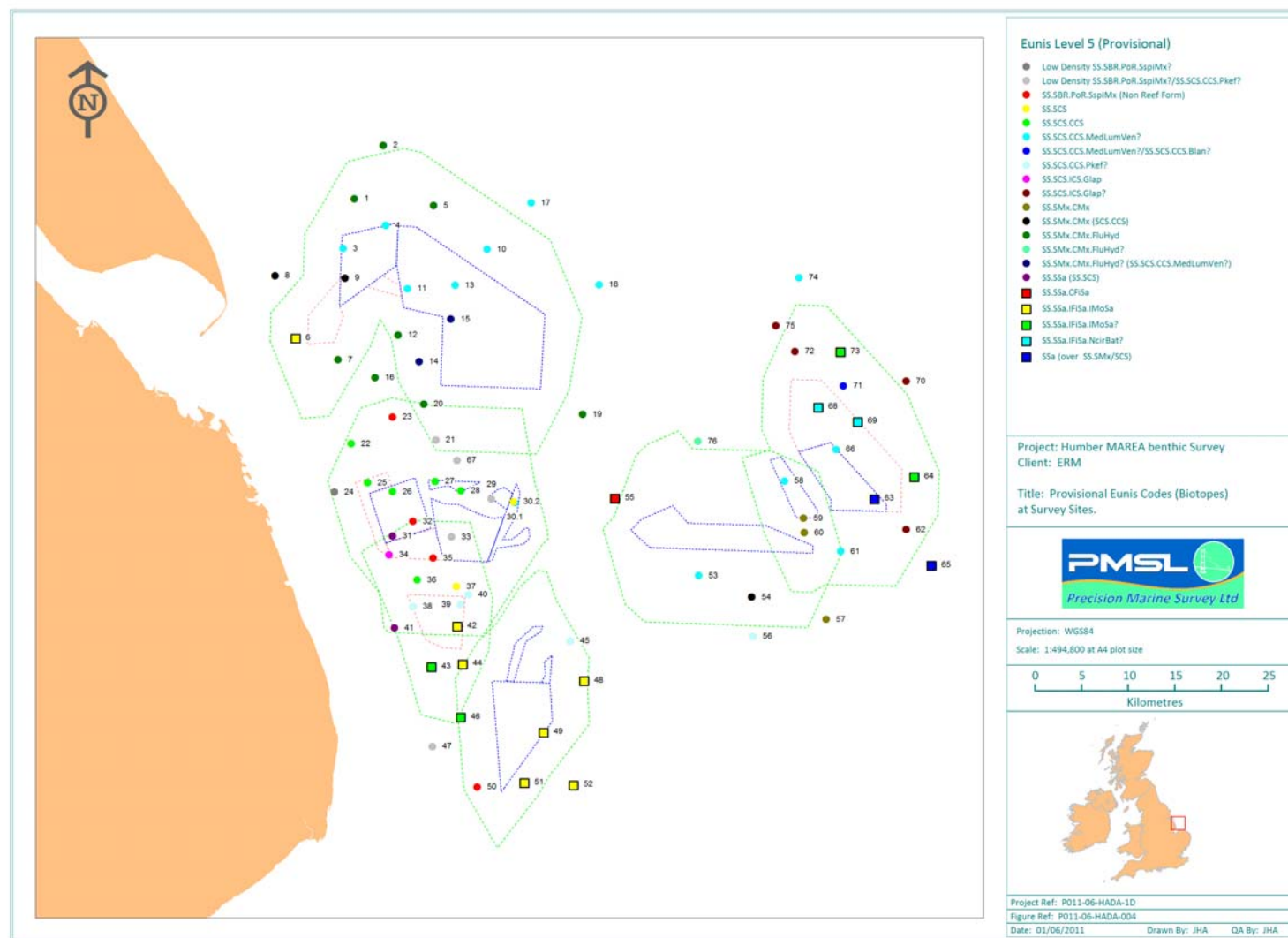


Figure A2.4. Provisional Eunis (biotope) codes.

Table A2.1. Summary of characteristic taxa and sediment type from sites in each cluster group.

Group A (site 6)	Mean A	% of Sites	Group B (site 51)	A	% of Sites	Group C	Mean A	% of Sites
No Taxa	-	-	Spiophanes bombyx	1.00	-	Glycera oxycephala	1.00	100.00
						Gastrosaccus spinifer	1.00	50.00
	Value			Value			Value	
% GRAVEL:	2.38		% GRAVEL:	2.89		% GRAVEL:	3.03	
% SAND:	97.62		% SAND:	97.11		% SAND:	96.97	
% MUD:	0.00		% MUD:	0.00		% MUD:	0.00	
% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	0.00	
% COARSE GRAVEL:	0.00		% COARSE GRAVEL:	0.00		% COARSE GRAVEL:	0.00	
% MEDIUM GRAVEL:	0.00		% MEDIUM GRAVEL:	0.29		% MEDIUM GRAVEL:	0.17	
% FINE GRAVEL:	0.58		% FINE GRAVEL:	0.98		% FINE GRAVEL:	1.55	
% V FINE GRAVEL:	1.80		% V FINE GRAVEL:	1.62		% V FINE GRAVEL:	1.31	
% V COARSE SAND:	2.51		% V COARSE SAND:	3.91		% V COARSE SAND:	2.72	
% COARSE SAND:	48.34		% COARSE SAND:	15.26		% COARSE SAND:	32.02	
% MEDIUM SAND:	46.42		% MEDIUM SAND:	49.53		% MEDIUM SAND:	57.39	
% FINE SAND:	0.36		% FINE SAND:	27.80		% FINE SAND:	4.84	
% V FINE SAND:	0.00		% V FINE SAND:	0.62		% V FINE SAND:	0.00	
DEPTH:	8.19		DEPTH:	5.60		DEPTH:		

Group D	Mean A	% of Sites	Group E	Mean A	% of Sites	Group F (site 76)	A	% of Sites
Electra pilosa	P	100.00	Conopeum reticulum	P	80.00	Balanus crenatus	P	-
Cellepora pumicosa	P	100.00	Protodorvillea kefersteini	2.50	80.00	Alcyonidium albidum	P	-
Orchomenella nana	13.50	100.00	Eunereis longissima	2.25	80.00	Alcyonidium diaphanum	P	-
PORIFERA sp. indet	P	50.00	Glycera lapidum # agg.	2.00	80.00	Conopeum reticulum	P	-
Leucosolenia sp. indet	P	50.00	Scoloplos armiger	1.25	80.00	Electra pilosa	P	-
Hydrallmania falcata	P	50.00	Ampelisca spinipes	6.67	60.00	Flustra foliacea	P	-
Sertularia sp. indet	P	50.00	Notomastus sp. indet	6.00	60.00	Scrupocellaria scruposa	P	-
Pedicellina sp. indet	P	50.00	ACTINIARIA sp. indet	4.33	60.00	Celleporella hyalina	P	-
Balanus crenatus	P	50.00	Sertularia sp. indet	P	40.00	Escharella immersa	P	-
Crisia sp. indet	P	50.00	Scrupocellaria scruposa	P	40.00	Cellepora pumicosa	P	-
Alcyonidium albidum	P	50.00	Golfingia elongata	2.50	40.00	Bodotria scorpioides	2.00	-
Alcyonidium diaphanum	P	50.00	Lumbrineris gracilis	2.50	40.00	Mytilus edulis	2.00	-
Vesicularia spinosa	P	50.00	Eteone longa # agg.	1.00	40.00	NEMERTEA sp. indet	1.00	-
Flustra foliacea	P	50.00	Nephtys sp. # juvs	1.00	40.00	Pholoe baltica	1.00	-
Cauloramphus spiniferum	P	50.00	Nephtys caeca	1.00	40.00	Eumida sanguinea	1.00	-
Amphiblestrum auritum	P	50.00	Amphiteis midas	1.00	40.00	Syllis sp. indet	1.00	-
Scrupocellaria scruposa	P	50.00	Pomatoceros lamarcki	1.00	40.00	Sabellaria spinulosa	1.00	-
Escharella immersa	P	50.00	Anoplodactylus petiolatus	1.00	40.00	Cheirocratus female sp. Indet	1.00	-
Phaeostachys spinifera	P	50.00	Nucula nucleus	1.00	40.00	Galathea intermedia	1.00	-
Dendrodoa grossularia	P	50.00	Sycon ciliatum	P	20.00	Pisidia longicornis	1.00	-
Nebalia bipes	11.00	50.00	Hydrallmania falcata	P	20.00	Cancer pagurus # juv	1.00	-
Pomatoceros lamarcki	2.00	50.00	Campanulariidae sp. indet	P	20.00	Mytilus edulis # juvs	1.00	-
Nephtys cirrosa	1.00	50.00	Crisia sp. indet	P	20.00	Ophiothrix fragilis	1.00	-
Abludomelita obtusata	1.00	50.00	Alcyonidium diaphanum	P	20.00	Amphiuridae sp. # juvs	1.00	-
Spisula elliptica	1.00	50.00	Flustra foliacea	P	20.00			
Timoclea ovata	1.00	50.00	Bicellariella ciliata	P	20.00			
Ammodytidae sp. indet	1.00	50.00	Escharella immersa	P	20.00			
			Dendrodoa grossularia	P	20.00			
			Ampelisca diadema	24.00	20.00			
			Rissoa parva	3.00	20.00			
			Mytilus edulis # juvs	3.00	20.00			
			NEMERTEA sp. indet	2.00	20.00			
			Glycera oxycephala	2.00	20.00			
			Polycirrus sp. indet	2.00	20.00			
	Mean			Mean			Value	
% GRAVEL:	37.51		% GRAVEL:	63.15		% GRAVEL:	88.93	
% SAND:	62.43		% SAND:	34.50		% SAND:	10.37	
% MUD:	0.05		% MUD:	2.35		% MUD:	0.70	
% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	13.67		% V COARSE GRAVEL:	0.00	
% COARSE GRAVEL:	19.92		% COARSE GRAVEL:	13.89		% COARSE GRAVEL:	40.36	
% MEDIUM GRAVEL:	9.44		% MEDIUM GRAVEL:	13.76		% MEDIUM GRAVEL:	30.32	
% FINE GRAVEL:	4.81		% FINE GRAVEL:	13.66		% FINE GRAVEL:	12.99	
% V FINE GRAVEL:	3.34		% V FINE GRAVEL:	8.18		% V FINE GRAVEL:	5.26	
% V COARSE SAND:	3.35		% V COARSE SAND:	6.69		% V COARSE SAND:	2.01	
% COARSE SAND:	7.43		% COARSE SAND:	7.68		% COARSE SAND:	2.04	
% MEDIUM SAND:	37.61		% MEDIUM SAND:	13.94		% MEDIUM SAND:	3.79	
% FINE SAND:	13.80		% FINE SAND:	5.84		% FINE SAND:	2.30	
% V FINE SAND:	0.25		% V FINE SAND:	0.34		% V FINE SAND:	0.23	
DEPTH:	13.82		DEPTH:	11.22		DEPTH:	15.26	

Group G	Mean A	% of Sites	Group H	Mean A	% of Sites	Group I	Mean A	% of Sites
Amathia lendigera	P	100.00	Amathia lendigera	P	100.00	Conopeum reticulum	P	100.00
Conopeum reticulum	P	100.00	Sabellaria spinulosa	19.40	100.00	Protodorvillea kefersteini	4.25	100.00
Scrupocellaria scruposa	P	100.00	Protodorvillea kefersteini	9.40	100.00	NEMERTEA sp. indet	1.25	100.00
Sabellaria spinulosa	123.33	100.00	Scoloplos armiger	3.20	100.00	Eteone longa # agg.	1.25	100.00
Nucula nucleus	44.33	100.00	NEMERTEA sp. indet	2.40	100.00	Amphiblestrum auritum	P	75.00
Ampelisca spinipes	38.67	100.00	Lumbrineris gracilis	2.40	100.00	Bicelliarella ciliata	P	75.00
Mytilus edulis # juvs	20.33	100.00	NEMATODA sp. indet	2.00	100.00	Scrupocellaria scruposa	P	75.00
Protodorvillea kefersteini	14.67	100.00	Dendrodoa grossularia	P	80.00	Escharella immersa	P	75.00
Lumbrineris gracilis	9.67	100.00	Nucula nucleus	7.50	80.00	Cellepora pumicosa	P	75.00
Pholoe inornata	9.00	100.00	Pomatoceros lamarcki	4.00	80.00	Gibbula tumida	2.67	75.00
Eunereis longissima	8.33	100.00	Glycera lapidum # agg.	3.00	80.00	Laonice bahusiensis	2.33	75.00
Unciola crenatipalma	5.67	100.00	Spio armata # agg	1.50	80.00	Pomatoceros lamarcki	2.00	75.00
NEMERTEA sp. indet	4.33	100.00	Polycirrus sp. indet	1.50	80.00	Spio armata # agg	1.33	75.00
Eumida sanguinea	4.33	100.00	Sertularia sp. indet	P	60.00	Terebellides stroemi	1.00	75.00
Polycirrus sp. indet	4.33	100.00	Crisia sp. indet	P	60.00	Alcyonidium diaphanum	P	50.00
Polynoidae sp. indet	3.33	100.00	Conopeum reticulum	P	60.00	Electra pilosa	P	50.00
Eteone longa # agg.	2.67	100.00	Flustra foliacea	P	60.00	Flustra foliacea	P	50.00
Mediomastus fragilis	2.67	100.00	Scrupocellaria scruposa	P	60.00	Dendrodoa grossularia	P	50.00
Anoplodactylus petiolatus	2.67	100.00	Abra alba	4.00	60.00	Amphiuridae sp. # juvs	5.50	50.00
Amphipholis squamata	2.67	100.00	Achelia echinata	3.33	60.00	Scoloplos armiger	3.50	50.00
Pholoe baltica	2.33	100.00	Cauleriella alata	2.33	60.00	Trichobranchus glacialis	3.50	50.00
Scalibregma inflatum	2.00	100.00	Eteone longa # agg.	1.33	60.00	Lumbrineris gracilis	3.00	50.00
Phyllodoce mucosa	1.67	100.00	Eumida sanguinea	1.33	60.00	Mytilus edulis # juvs	2.50	50.00
Nephtys sp. # juvs	1.67	100.00	Mediomastus fragilis	1.33	60.00	NEMATODA sp. indet	2.00	50.00
Cauleriella alata	1.33	100.00	Notomastus sp. indet	1.33	60.00	Melinna elisabethae	2.00	50.00
Sertularia sp. indet	P	66.67	Mytilus edulis # juvs	1.33	60.00	Aonides paucibranchiata	1.50	50.00
Crisia sp. indet	P	66.67	Syllis cornuta # agg.	1.00	60.00	Lepidonotus squamatus	1.00	50.00
Alcyonidium diaphanum	P	66.67	Scalibregma inflatum	1.00	60.00	Glycera lapidum # agg.	1.00	50.00
Vesicularia spinosa	P	66.67	Hydrallmania falcata	P	40.00	Eusyllis blomstrandii	1.00	50.00
ACTINIARIA sp. indet	24.00	66.67	Campanulariidae sp. indet	P	40.00	Mediomastus fragilis	1.00	50.00
Abra alba	15.00	66.67	Alcyonidium diaphanum	P	40.00	Ampharetinae sp. # juvs	1.00	50.00
Notomastus sp. indet	10.50	66.67	Vesicularia spinosa	P	40.00	Galathea intermedia	1.00	50.00
Scoloplos armiger	9.00	66.67	Bicelliarella ciliata	P	40.00	Asterias rubens # juvs	1.00	50.00
Amphiuridae sp. # juvs	6.50	66.67	Cellepora pumicosa	P	40.00	Tubularia sp. indet	P	25.00
Lepidonotus squamatus	4.00	66.67	Lepidonotus squamatus	2.50	40.00	Sertularia sp. indet	P	25.00
Eulalia bilineata	3.00	66.67	Cirriformia tentaculata	2.50	40.00	Balanus crenatus	P	25.00
Ophiura albida	3.00	66.67	Ophiura albida	2.50	40.00	Crisia sp. indet	P	25.00
Golfingia elongata	2.00	66.67	Eunereis longissima	2.00	40.00	Tubulipora sp. indet	P	25.00
Glycera lapidum # agg.	2.00	66.67	Polynoidae sp. indet	1.50	40.00	Alcyonidium albidum	P	25.00
Ampharetinae sp. # juvs	2.00	66.67	Pholoe inornata	1.50	40.00	Amathia lendigera	P	25.00
Syllis cornuta # agg.	1.50	66.67	Scalibregma celticum	1.50	40.00	Ammodytidae sp. # larvae	6.00	25.00
Syllides sp. indet	1.50	66.67	Pisidia longicornis	1.50	40.00	Capitella sp. indet	4.00	25.00
NEMATODA sp. indet	1.00	66.67	Pseudomystides limbata	1.00	40.00	Eunereis longissima	3.00	25.00
Mysta picta	1.00	66.67	Phyllodoce mucosa	1.00	40.00	Cirriformia tentaculata	3.00	25.00
Achelia echinata	1.00	66.67	Syllis sp. indet	1.00	40.00	Amphicteis midas	3.00	25.00
Leucosolenia sp. indet	P	33.33	Anoplodactylus petiolatus	1.00	40.00	Leptochiton asellus	3.00	25.00
Halecium sp. indet	P	33.33	Maera othonis	1.00	40.00	Syllis cornuta # agg.	2.00	25.00
Hydrallmania falcata	P	33.33	Leptochiton asellus	1.00	40.00	Cauleriella alata	2.00	25.00
Nemertesia antennina	P	33.33	Crepidula fornicata	1.00	40.00	Orchomene humilis	2.00	25.00
Campanulariidae sp. indet	P	33.33	Mya sp. # juvs	1.00	40.00	ACTINIARIA sp. indet	1.00	25.00
Mean			Mean			Mean		
% GRAVEL:	29.62		% GRAVEL:	71.06		% GRAVEL:	87.04	
% SAND:	58.41		% SAND:	26.16		% SAND:	11.91	
% MUD:	11.97		% MUD:	2.78		% MUD:	1.05	
% V COARSE GRAVEL:	5.11		% V COARSE GRAVEL:	17.96		% V COARSE GRAVEL:	7.07	
% COARSE GRAVEL:	1.28		% COARSE GRAVEL:	23.46		% COARSE GRAVEL:	24.99	
% MEDIUM GRAVEL:	5.29		% MEDIUM GRAVEL:	12.51		% MEDIUM GRAVEL:	25.46	
% FINE GRAVEL:	10.78		% FINE GRAVEL:	10.28		% FINE GRAVEL:	22.20	
% V FINE GRAVEL:	7.17		% V FINE GRAVEL:	6.86		% V FINE GRAVEL:	7.31	
% V COARSE SAND:	6.06		% V COARSE SAND:	4.02		% V COARSE SAND:	2.86	
% COARSE SAND:	7.47		% COARSE SAND:	6.40		% COARSE SAND:	3.05	
% MEDIUM SAND:	24.44		% MEDIUM SAND:	10.64		% MEDIUM SAND:	4.05	
% FINE SAND:	17.11		% FINE SAND:	4.50		% FINE SAND:	1.64	
% V FINE SAND:	3.32		% V FINE SAND:	0.60		% V FINE SAND:	0.32	
DEPTH:	16.25		DEPTH:	12.16		DEPTH:	8.65	

Group J	Mean A	% of Sites	Group K (site 12)	A	% of Sites	Group L	Mean A	% of Sites
Sertularia sp. indet	P	100.00	Sycon ciliatum	P	-	Cauloramphus spiniferum	P	100.00
Escharella immersa	P	100.00	Sertularia sp. indet	P	-	Chone sp.	19.40	100.00
Dendrodoa grossularia	P	100.00	Balanus crenatus	P	-	NEMATODA sp. indet	18.00	100.00
Urothoe elegans	21.00	100.00	Crisia sp. indet	P	-	Polycirrus sp. indet	13.60	100.00
Abludomelita obtusata	7.00	100.00	Alcyonidium albidum	P	-	NEMERTEA sp. indet	4.60	100.00
Scoloplos armiger	4.67	100.00	Vesicularia spinosa	P	-	Glycera lapidum # agg.	4.40	100.00
NEMERTEA sp. indet	4.33	100.00	Amathia lendigera	P	-	Aonides paucibranchiata	4.20	100.00
Pisidia longicornis	2.67	100.00	Amphiblestrum auritum	P	-	Mya sp. # juvs	2.60	100.00
Crepidula fornicata	2.67	100.00	Scrupocellaria scruposa	P	-	Balanus crenatus	P	80.00
Spio armata # agg	2.33	100.00	Escharoides coccinea	P	-	Alcyonidium diaphanum	P	80.00
Pomatoceros lamarcki	1.67	100.00	Escharella immersa	P	-	Escharella immersa	P	80.00
Pholoe baltica	1.33	100.00	Phaeostachys spinifera	P	-	Spio armata # agg	7.50	80.00
Sphaerosyllis bulbosa	1.00	100.00	Microporella ciliata	P	-	Pomatoceros lamarcki	4.00	80.00
Hydrallmania falcata	P	66.67	Cellepora pumicosa	P	-	Anomiidae sp. indet	3.25	80.00
Campanulariidae sp. indet	P	66.67	Dendrodoa grossularia	P	-	Pholoe baltica	3.00	80.00
Balanus crenatus	P	66.67	Trichobranchus glacialis	4.00	-	Protodorvillea kefersteini	3.00	80.00
Alcyonidium diaphanum	P	66.67	Mya sp. # juvs	4.00	-	Cheirocratus female sp.	3.00	80.00
Euratea loricata	P	66.67	Phoronis sp. indet	3.00	-	Cauleriella alata	2.50	80.00
Conopeum reticulum	P	66.67	Glycera lapidum # agg.	2.00	-	Syllis cornuta # agg.	2.00	80.00
Electra pilosa	P	66.67	Syllis cornuta # agg.	2.00	-	Laonice bahusensis	2.00	80.00
Scrupocellaria scruposa	P	66.67	Syllis sp. indet	2.00	-	Gibbula tumida	2.00	80.00
Fenestulina malusii	P	66.67	Nephtys sp. # juvs	2.00	-	Cheirocratus intermedius	1.75	80.00
Ascidella aspersa	P	66.67	Clymenura johnstoni	2.00	-	Leptocheirus hirsutimanus	1.50	80.00
Crassirophium bonnellii	22.50	66.67	Melinna elisabethae	2.00	-	Leptochiton asellus	1.25	80.00
NEMATODA sp. indet	9.00	66.67	Polycirrus sp. indet	2.00	-	Sertularia sp. indet	P	60.00
ACTINIARIA sp. indet	4.00	66.67	NEMATODA sp. indet	1.00	-	Verruca stroemi	P	60.00
Anomiidae sp. indet	4.00	66.67	Malmgreniella ljunghmani	1.00	-	Amphiblestrum auritum	P	60.00
Phylodoce mucosa	3.50	66.67	Pholoe baltica	1.00	-	Microporella ciliata	P	60.00
Monocorophium sextonae	3.50	66.67	Nephtys caeca	1.00	-	Notomastus sp. indet	3.67	60.00
Eteone longa # agg.	2.50	66.67	Mediomastus fragilis	1.00	-	Nephasoma minutum	3.00	60.00
Nephtys sp. # juvs	2.50	66.67	Scalibregma celticum	1.00	-	Pomatoceros triqueter	2.33	60.00
Nebalia bipes	2.00	66.67	Galathowenia oculata	1.00	-	Echinocyamus pusillus	2.33	60.00
Polynoidae sp. indet	1.50	66.67	Owenia fusiformis	1.00	-	Amphiuridae sp. # juvs	2.00	60.00
Lepidonotus squamatus	1.50	66.67	Chone sp.	1.00	-	Eteone longa # agg.	1.33	60.00
Eumida sanguinea	1.50	66.67	Orchomene humilis	1.00	-	Aonides oxycephala	1.33	60.00
Owenia fusiformis	1.50	66.67	Cheirocratus female sp. Indet	1.00	-	Mediomastus fragilis	1.00	60.00
Polycirrus sp. indet	1.50	66.67	Cheirocratus assimilis	1.00	-	Modiolus sp. # juvs	1.00	60.00
Cheirocratus female sp. Indet	1.50	66.67	Leptocheirus hirsutimanus	1.00	-	Hydrallmania falcata	P	40.00
Gibbula tumida	1.50	66.67	Pisidia longicornis	1.00	-	Crisia sp. indet	P	40.00
Amphipholis squamata	1.50	66.67	Ebalia tuberosa	1.00	-	Tubulipora sp. indet	P	40.00
Aoridae female sp. Indet	1.00	66.67	Gibbula tumida	1.00	-	Bugula flabellata	P	40.00
Amphiuridae sp. # juvs	1.00	66.67	Timoclea ovata	1.00	-	Scrupocellaria scruposa	P	40.00
Halecium sp. indet	P	33.33	Corallinaceae Encrusting	P	-	Ascidella aspersa	P	40.00
Pedicellina sp. indet	P	33.33				Hydroides norvegicus	4.50	40.00
Verruca stroemi	P	33.33				Ampeliscus spinipes	4.50	40.00
Alcyonidium albidum	P	33.33				TURBELLARIA sp. indet	2.50	40.00
Amathia lendigera	P	33.33				Spisula elliptica	2.50	40.00
Flustra foliacea	P	33.33				Edwardsiidae sp. indet	2.00	40.00
Cauloramphus spiniferum	P	33.33				Syllis sp. indet	2.00	40.00
Amphiblestrum auritum	P	33.33				Lumbrineris gracilis	2.00	40.00
	Mean			Value			Mean	
% GRAVEL:	51.56		% GRAVEL:	82.39		% GRAVEL:	61.87	
% SAND:	47.17		% SAND:	17.28		% SAND:	36.88	
% MUD:	1.27		% MUD:	0.33		% MUD:	1.25	
% V COARSE GRAVEL:	10.76		% V COARSE GRAVEL:	33.80		% V COARSE GRAVEL:	5.36	
% COARSE GRAVEL:	13.07		% COARSE GRAVEL:	12.92		% COARSE GRAVEL:	11.50	
% MEDIUM GRAVEL:	11.58		% MEDIUM GRAVEL:	14.72		% MEDIUM GRAVEL:	16.38	
% FINE GRAVEL:	8.29		% FINE GRAVEL:	11.58		% FINE GRAVEL:	15.89	
% V FINE GRAVEL:	7.85		% V FINE GRAVEL:	9.38		% V FINE GRAVEL:	12.75	
% V COARSE SAND:	6.86		% V COARSE SAND:	7.71		% V COARSE SAND:	9.04	
% COARSE SAND:	6.08		% COARSE SAND:	3.51		% COARSE SAND:	9.05	
% MEDIUM SAND:	16.23		% MEDIUM SAND:	5.12		% MEDIUM SAND:	12.29	
% FINE SAND:	15.67		% FINE SAND:	0.92		% FINE SAND:	5.67	
% V FINE SAND:	2.33		% V FINE SAND:	0.02		% V FINE SAND:	0.83	
DEPTH:	17.21		DEPTH:	15.93		DEPTH:	27.23	

Group M	Mean A	% of Sites	Group N	Mean A	% of Sites	Group O	Mean A	% of Sites
Amathia lendigera	P	100.00	Scrupocellaria scruposa	P	100.00	Tubularia sp. indet	P	100.00
Cauloramphus spiniferum	P	100.00	Pisidia longicornis	16.20	100.00	Verruca stroemi	P	100.00
Scrupocellaria scruposa	P	100.00	Hiatella arctica	8.40	100.00	Amathia lendigera	P	100.00
Escharella immersa	P	100.00	Polycirrus sp. indet	4.60	100.00	Flustra foliacea	P	100.00
Microporella ciliata	P	100.00	Syllis cornuta # agg.	4.40	100.00	Bicelliarella ciliata	P	100.00
Cellepora pumicosa	P	100.00	Achelia echinata	3.40	100.00	Scrupocellaria scruposa	P	100.00
Chone sp.	7.67	100.00	Polynoidae sp. indet	2.80	100.00	Cellaria sp. indet	P	100.00
NEMATODA sp. indet	7.00	100.00	NEMATODA sp. indet	2.60	100.00	Escharella immersa	P	100.00
Cheirocratus female sp. Indet	6.67	100.00	Amphiridae sp. # juvs	2.20	100.00	Turbicellepora avicularis	P	100.00
Glycera lapidum # agg.	4.33	100.00	Amathia lendigera	P	80.00	Ascidacea sp. indet	P	100.00
Aonides paucibranchiata	3.00	100.00	Bicelliarella ciliata	P	80.00	Didemniidae sp. indet	P	100.00
Polycirrus sp. indet	2.67	100.00	Escharella immersa	P	80.00	Ascidella aspersa	P	100.00
Anomiidae sp. indet	2.33	100.00	Ascidacea sp. indet	P	80.00	Hiatella arctica	34.50	100.00
Syllis cornuta # agg.	2.00	100.00	Dendrodoa grossularia	P	80.00	Achelia echinata	20.50	100.00
NEMERTEA sp. indet	1.67	100.00	Sabellaria spinulosa	58.25	80.00	Musculus discors # juvs	20.00	100.00
Polynoidae sp. indet	1.67	100.00	NEMERTEA sp. indet	5.00	80.00	Cheirocratus female sp.	18.50	100.00
Gibbula tumida	1.33	100.00	Mya sp. # juvs	4.50	80.00	Anomiidae sp. indet	15.00	100.00
PORIFERA sp. indet	P	66.67	Ophiolithrix fragilis	4.50	80.00	Pisidia longicornis	14.50	100.00
Balanus crenatus	P	66.67	Lepidonotus squamatus	3.75	80.00	Mya sp. # juvs	14.00	100.00
Crisia sp. indet	P	66.67	Pomatoceros lamarcki	3.25	80.00	NEMATODA sp. indet	13.50	100.00
Alcyonidium diaphanum	P	66.67	Orchomene humilis	3.25	80.00	Polycirrus sp. indet	11.50	100.00
Electra pilosa	P	66.67	Syllis sp. indet	3.00	80.00	Spio armata # agg	10.50	100.00
Flustra foliacea	P	66.67	Phoronis sp. indet	2.75	80.00	Parvicardium scabrum	10.00	100.00
Amphiblestrum auritum	P	66.67	Leptochiton asellus	2.25	80.00	Syllis sp. indet	9.50	100.00
Scrupocellaria reptans	P	66.67	Pholoe baltica	1.75	80.00	Cheirocratus intermedius	9.50	100.00
Escharoides coccinea	P	66.67	Verruca stroemi	P	60.00	Lepidonotus squamatus	7.00	100.00
Didemniidae sp. indet	P	66.67	Crisia sp. indet	P	60.00	Pholoe baltica	7.00	100.00
Ascidella aspersa	P	66.67	Flustra foliacea	P	60.00	Kurtiella bidentata	7.00	100.00
Dendrodoa grossularia	P	66.67	Cauloramphus spiniferum	P	60.00	Leptochiton asellus	5.50	100.00
Pisidia longicornis	6.00	66.67	Microporella ciliata	P	60.00	Mediomastus fragilis	5.00	100.00
Mytilus edulis # juvs	5.00	66.67	Cellepora pumicosa	P	60.00	Chone sp.	5.00	100.00
Spio armata # agg	3.50	66.67	Didemniidae sp. indet	P	60.00	Callipallene brevirostris	5.00	100.00
Sphaerosyllis bulbosa	2.00	66.67	Syllis variegata	5.67	60.00	Trichobranchus glacialis	4.50	100.00
Lanice conchilega	2.00	66.67	Cheirocratus female sp.	4.33	60.00	Caulleriella alata	4.00	100.00
Ophiolithrix fragilis	2.00	66.67	Musculus discors	4.33	60.00	Clymenura johnstoni	4.00	100.00
Phascolion strombus strombus	1.50	66.67	Spio armata # agg	3.67	60.00	Ampharetinae sp. # juvs	4.00	100.00
Lepidonotus squamatus	1.50	66.67	Onoba semicostata	3.67	60.00	Polynoidae sp. indet	3.50	100.00
Syllis sp. indet	1.50	66.67	Kurtiella bidentata	1.67	60.00	Gibbula tumida	3.50	100.00
Eteone longa # agg.	1.00	66.67	Protodorvillea kefersteini	1.33	60.00	Eteone longa # agg.	3.00	100.00
Ophelia borealis	1.00	66.67	Cheirocratus intermedius	1.33	60.00	Glycera lapidum # agg.	3.00	100.00
Cheirocratus assimilis	1.00	66.67	Sycon ciliatum	P	40.00	Sabellaria spinulosa	2.50	100.00
Tubularia sp. indet	P	33.33	Sertularia sp. indet	P	40.00	Crassikorophium crassicorne	2.50	100.00
Hydrallmania falcata	P	33.33	Tubulipora sp. indet	P	40.00	NEMERTEA sp. indet	2.00	100.00
Sertularia sp. indet	P	33.33	Alcyonidium diaphanum	P	40.00	Nerimyrta punctata	2.00	100.00
Campanulariidae sp. indet	P	33.33	Vesicularia spinosa	P	40.00	Lumbrineris gracilis	2.00	100.00
Verruca stroemi	P	33.33	Musculus discors # juvs	13.50	40.00	Gammaropsis maculata	2.00	100.00
Alcyonidium albidum	P	33.33	Ophiolithrix sp. juveniles	4.50	40.00	Galathea intermedia	2.00	100.00
Amphiblestrum flemingii	P	33.33	Rissoa parva	4.00	40.00	Ebalia sp # juvs	2.00	100.00
Bugula sp. indet	P	33.33	Photis reinhardi	2.50	40.00	Modiolus sp. # juvs	2.00	100.00
Cellaria sp. indet	P	33.33	Golfingia elongata	2.00	40.00	Paradoneis lyra	1.50	100.00
Mean			Mean			Mean		
% GRAVEL:	75.58		% GRAVEL:	86.89		% GRAVEL:	71.31	
% SAND:	23.98		% SAND:	12.19		% SAND:	28.09	
% MUD:	0.44		% MUD:	0.92		% MUD:	0.60	
% V COARSE GRAVEL:	9.13		% V COARSE GRAVEL:	36.90		% V COARSE GRAVEL:	46.06	
% COARSE GRAVEL:	24.89		% COARSE GRAVEL:	23.01		% COARSE GRAVEL:	9.26	
% MEDIUM GRAVEL:	18.82		% MEDIUM GRAVEL:	13.62		% MEDIUM GRAVEL:	7.34	
% FINE GRAVEL:	12.99		% FINE GRAVEL:	8.63		% FINE GRAVEL:	5.20	
% V FINE GRAVEL:	9.75		% V FINE GRAVEL:	4.72		% V FINE GRAVEL:	3.46	
% V COARSE SAND:	7.31		% V COARSE SAND:	3.26		% V COARSE SAND:	2.38	
% COARSE SAND:	9.10		% COARSE SAND:	3.55		% COARSE SAND:	11.44	
% MEDIUM SAND:	6.94		% MEDIUM SAND:	3.82		% MEDIUM SAND:	11.66	
% FINE SAND:	0.53		% FINE SAND:	1.28		% FINE SAND:	2.41	
% V FINE SAND:	0.10		% V FINE SAND:	0.28		% V FINE SAND:	0.19	
DEPTH:	15.38		DEPTH:	11.37		DEPTH:	17.02	

Group P	Mean A	% of Sites	Group Q	Mean A	% of Sites	Group R	Mean A	% of Sites
Crisia sp. indet	P	100.00	Sabellaria spinulosa	3.50	85.71	Spio armata # agg	1.00	100.00
Alcyonidium diaphanum	P	100.00	NEMERTEA sp. indet	1.83	85.71	Ophelia borealis	1.00	50.00
Amathia lendigera	P	100.00	Urothoe elegans	4.60	71.43			
Bicellariella ciliata	P	100.00	Eumida sanguinea	1.60	71.43			
Scrupocellaria scruposa	P	100.00	Glycera lapidum # agg.	1.20	71.43			
Escharella immersa	P	100.00	Nephtys sp. # juvs	1.20	71.43			
Ascidacea sp. indet	P	100.00	Nemertesia antennina	P	57.14			
Ascidella aspersa	P	100.00	Dendrodoa grossularia	P	57.14			
Dendrodoa grossularia	P	100.00	Polycirrus sp. indet	2.00	57.14			
Lepidonotus squamatus	9.00	100.00	Nephasoma minutum	1.75	57.14			
Achelia echinata	6.00	100.00	Ampelisca spinipes	1.75	57.14			
Abra alba	6.00	100.00	Eteone longa # agg.	1.00	57.14			
Mediomastus fragilis	4.50	100.00	Lumbrineris gracilis	1.00	57.14			
Amphiuridae sp. # juvs	4.00	100.00	Phoronis sp. indet	1.00	57.14			
Cheirocratus female sp. Indet	3.50	100.00	Hydrallmania falcata	P	42.86			
Amphipholis squamata	3.50	100.00	Sertularia sp. indet	P	42.86			
Polynoidae sp. indet	2.50	100.00	Campanulariidae sp. indet	P	42.86			
Pholoe baltica	2.00	100.00	Crisia sp. indet	P	42.86			
Spio armata # agg	2.00	100.00	Alcyonidium diaphanum	P	42.86			
Gibbula tumida	2.00	100.00	Electra pilosa	P	42.86			
Polycirrus sp. indet	1.50	100.00	Cauloramphus spiniferum	P	42.86			
Cheirocratus intermedius	1.50	100.00	Amphiblestrum auritum	P	42.86			
Leptochiton asellus	1.50	100.00	Escharella immersa	P	42.86			
Glycera lapidum # agg.	1.00	100.00	Aonides paucibranchiata	2.33	42.86			
Aonides oxycephala	1.00	100.00	Leptocheirus hirsutimanus	2.33	42.86			
Scalibregma celticum	1.00	100.00	Syllis sp. indet	1.67	42.86			
Pomatoceros lamarcki	1.00	100.00	Spio armata # agg	1.67	42.86			
Halecium sp. indet	P	50.00	Notomastus sp. indet	1.67	42.86			
Campanulariidae sp. indet	P	50.00	Scalibregma celticum	1.67	42.86			
Verruca stroemi	P	50.00	Abra alba	1.67	42.86			
Balanus crenatus	P	50.00	Mediomastus fragilis	1.33	42.86			
Tubulipora sp. indet	P	50.00	Spisula elliptica	1.00	42.86			
Flustra foliacea	P	50.00	Amphiuridae sp. # juvs	1.00	42.86			
Amphiblestrum auritum	P	50.00	Cliona sp. indet	P	28.57			
Amphiblestrum flemingii	P	50.00	Halecium sp. indet	P	28.57			
Scrupocellaria reptans	P	50.00	Balanus crenatus	P	28.57			
Escharoides coccinea	P	50.00	Amathia lendigera	P	28.57			
Escharella ventricosa	P	50.00	Scrupocellaria scruposa	P	28.57			
Phaeostachys spinifera	P	50.00	Microporella ciliata	P	28.57			
Schizomavella sp. indet	P	50.00	Ascidella aspersa	P	28.57			
Schizomavella linearis	P	50.00	Urothoe marina	18.00	28.57			
Cellepora pumicosa	P	50.00	Cauleriella zetlandica	2.00	28.57			
Didemniidae sp. indet	P	50.00	Clymenura johnstoni	2.00	28.57			
Rhodophycota sp. indet	P	50.00	NEMATODA sp. indet	1.50	28.57			
Pisidia longicornis	12.00	50.00	Cauleriella alata	1.50	28.57			
Mytilus edulis # juvs	8.00	50.00	Pholoe inornata	1.00	28.57			
Nucula nucleus	5.00	50.00	Syllis cornuta # agg.	1.00	28.57			
Anomiidae sp. indet	5.00	50.00	Exogone verugera	1.00	28.57			
Mya arenaria	5.00	50.00	Nephtys caeca	1.00	28.57			
NEMATODA sp. indet	4.00	50.00	Poecilochaetus serpens	1.00	28.57			
	Mean			Mean			Mean	
% GRAVEL:	81.38		% GRAVEL:	38.90		% GRAVEL:	1.82	
% SAND:	17.60		% SAND:	60.18		% SAND:	98.18	
% MUD:	1.02		% MUD:	0.92		% MUD:	0.00	
% V COARSE GRAVEL:	35.96		% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	0.00	
% COARSE GRAVEL:	21.85		% COARSE GRAVEL:	6.27		% COARSE GRAVEL:	0.00	
% MEDIUM GRAVEL:	12.31		% MEDIUM GRAVEL:	11.89		% MEDIUM GRAVEL:	0.63	
% FINE GRAVEL:	6.50		% FINE GRAVEL:	12.55		% FINE GRAVEL:	0.44	
% V FINE GRAVEL:	4.75		% V FINE GRAVEL:	8.18		% V FINE GRAVEL:	0.74	
% V COARSE SAND:	4.19		% V COARSE SAND:	4.79		% V COARSE SAND:	3.13	
% COARSE SAND:	3.99		% COARSE SAND:	7.32		% COARSE SAND:	17.24	
% MEDIUM SAND:	5.54		% MEDIUM SAND:	24.02		% MEDIUM SAND:	65.38	
% FINE SAND:	3.03		% FINE SAND:	22.01		% FINE SAND:	12.43	
% V FINE SAND:	0.85		% V FINE SAND:	2.05		% V FINE SAND:	0.00	
DEPTH:	13.55		DEPTH:	21.52		DEPTH:	9.67	

Group S	Mean A	% of Sites	Group T	Mean A	% of Sites	Group U	Mean A	% of Sites
Spio armata # agg	2.50	100.00	Bathyporeia pelagica	4.50	100.00	Ophelia borealis	2.33	90.00
NEMATODA sp. indet	1.50	100.00	Nephtys cirrosa	1.50	100.00	Nephtys cirrosa	1.75	80.00
Orchomenella nana	1.50	100.00	Alcyonidium diaphanum	P	50.00	Eteone longa # agg.	1.33	30.00
Glycera lapidum # agg.	1.00	100.00	Tellina fabula	41.00	50.00	Gastrosaccus spinifer	1.33	30.00
Cliona sp. indet	P	50.00	Bathyporeia guilliamsoniana	7.00	50.00	Sabellaria spinulosa	2.00	20.00
Campanulariidae sp. indet	P	50.00	Scoloplos armiger	2.00	50.00	Eunereis longissima	1.50	20.00
Balanus crenatus	P	50.00	Abra alba	2.00	50.00	ACTINIARIA sp. indet	1.00	20.00
Crisia sp. indet	P	50.00	Nephtys sp. # juvs	1.00	50.00	NEMERTEA sp. indet	1.00	20.00
Amphiblestrum auritum	P	50.00	Nephtys assimilis	1.00	50.00	Sphaerosyllis bulbosa	1.00	20.00
Scrupocellaria scruposa	P	50.00	Gastrosaccus spinifer	1.00	50.00	Polycirrus sp. indet	1.00	20.00
Escharella immersa	P	50.00				Halecium sp. indet	P	10.00
Fenestulina malusii	P	50.00				Crisia sp. indet	P	10.00
Cellepora pumicosa	P	50.00				Urothoe brevicornis	15.00	10.00
Dendrodoa grossularia	P	50.00				Glycera lapidum # agg.	2.00	10.00
Eteone longa # agg.	1.00	50.00				Spio armata # agg	2.00	10.00
Eumida bahusiensis	1.00	50.00				Phyllodoce mucosa	1.00	10.00
Glycera oxycephala	1.00	50.00				Glycera oxycephala	1.00	10.00
Syllis cornuta # agg.	1.00	50.00				Syllis cornuta # agg.	1.00	10.00
Streptodonta pterochaeta	1.00	50.00				Nephtys sp. # juvs	1.00	10.00
Sphaerosyllis bulbosa	1.00	50.00				Nephtys longosetosa	1.00	10.00
Aonides paucibranchiata	1.00	50.00				Scololepis squamata	1.00	10.00
Capitella sp. indet	1.00	50.00				Travisia forbesi	1.00	10.00
Nebalia bipes	1.00	50.00				Bathyporeia pelagica	1.00	10.00
Leucothoe liljeborgi	1.00	50.00				Mytilus edulis # juvs	1.00	10.00
Dosinia exoleta	1.00	50.00				Goodallia triangularis	1.00	10.00
Branchiostomidae sp. indet	1.00	50.00						
	Mean			Mean			Mean	
% GRAVEL:	17.15		% GRAVEL:	0.22		% GRAVEL:	11.73	
% SAND:	81.78		% SAND:	99.78		% SAND:	88.27	
% MUD:	1.06		% MUD:	0.00		% MUD:	0.00	
% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	0.00		% V COARSE GRAVEL:	0.00	
% COARSE GRAVEL:	0.00		% COARSE GRAVEL:	0.00		% COARSE GRAVEL:	3.09	
% MEDIUM GRAVEL:	1.50		% MEDIUM GRAVEL:	0.00		% MEDIUM GRAVEL:	1.68	
% FINE GRAVEL:	3.04		% FINE GRAVEL:	0.00		% FINE GRAVEL:	1.93	
% V FINE GRAVEL:	12.62		% V FINE GRAVEL:	0.22		% V FINE GRAVEL:	5.03	
% V COARSE SAND:	22.28		% V COARSE SAND:	0.31		% V COARSE SAND:	10.58	
% COARSE SAND:	21.02		% COARSE SAND:	0.66		% COARSE SAND:	25.24	
% MEDIUM SAND:	25.10		% MEDIUM SAND:	38.89		% MEDIUM SAND:	43.72	
% FINE SAND:	11.57		% FINE SAND:	58.37		% FINE SAND:	8.71	
% V FINE SAND:	1.81		% V FINE SAND:	1.55		% V FINE SAND:	0.01	
DEPTH:	22.86		DEPTH:	27.00		DEPTH:	12.57	

Group V	Mean A	% of Sites
Ophelia borealis	9.43	77.78
Glycera lapidum # agg.	2.71	77.78
Aonides paucibranchiata	1.67	66.67
NEMATODA sp. indet	8.00	55.56
Polycirrus sp. indet	2.40	55.56
Bathyporeia pelagica	1.20	55.56
Alcyonidium hirsutum	P	44.44
NEMERTEA sp. indet	3.00	44.44
Nephtys cirrosa	1.75	44.44
Alcyonidium diaphanum	P	33.33
Modiolus sp. # juvs	3.33	33.33
Pisone remota	2.67	33.33
Orbinia sertulata	2.33	33.33
Nudibranchia sp. indet	1.67	33.33
Nephtys sp. # juvs	1.33	33.33
Notomastus sp. indet	1.33	33.33
Eteone longa # agg.	1.00	33.33
Nephtys longosetosa	1.00	33.33
Spisula elliptica	1.00	33.33
Sertularia sp. indet	P	22.22
Eucratea loricata	P	22.22
Goodallia triangularis	11.00	22.22
Chaetozone christei	3.50	22.22
Polygordius sp. indet	3.00	22.22
Travisia forbesi	2.50	22.22
Syllis cornuta # agg.	2.00	22.22
Spio armata # agg.	2.00	22.22
Opheliidae sp. # juvs	2.00	22.22
Sphaerosyllis bulbosa	1.50	22.22
Lumbrineris gracilis	1.50	22.22
Eumida sanguinea	1.00	22.22
Glycera oxycephala	1.00	22.22
Scoloplos armiger	1.00	22.22
Perioculodes longimanus	1.00	22.22
Tubularia sp. indet	P	11.11
Hydrallmania falcata	P	11.11
Pedicellina sp. indet	P	11.11
Balanus crenatus	P	11.11
Vesicularia spinosa	P	11.11
Amathia lendigera	P	11.11
Electra pilosa	P	11.11
Flustra foliacea	P	11.11
Cauloramphus spiniferum	P	11.11
Scrupocellaria scruposa	P	11.11
Chorizopora brongniartii	P	11.11
Escharella immersa	P	11.11
Haplopoma planum	P	11.11
Exogone verugera	28.00	11.11
Clymenura sp. indet	5.00	11.11
Sphaerosyllis taylori	4.00	11.11
Mean		
% GRAVEL:	39.38	
% SAND:	60.60	
% MUD:	0.02	
% V COARSE GRAVEL:	3.43	
% COARSE GRAVEL:	8.38	
% MEDIUM GRAVEL:	5.10	
% FINE GRAVEL:	10.10	
% V FINE GRAVEL:	12.37	
% V COARSE SAND:	10.17	
% COARSE SAND:	16.04	
% MEDIUM SAND:	25.08	
% FINE SAND:	9.07	
% V FINE SAND:	0.24	
DEPTH:	20.50	