East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER RENEWABLES

East Anglia THREE

Appendix 10.4

East Anglia THREE and FOUR Offshore Windfarm Cable Route: Benthic and Intertidal Characterisation Report

Environmental Statement
Volume 3
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10.4 EAST ANGLIA THREE AND FOUR OFFSHORE WINDFARM CABLE ROUTE: BENTHIC AND INTERTIDAL CHARACTERISATION REPORT

1. This appendix contains a report written by Fugro EMU Limited which characterises the benthic and intertidal ecology of the East Anglia THREE and FOUR windfarm cable route.

Table of Contents

0 EXECUTIVE SUMMARY 9

1 INTRODUCTION 10

1.1 Study Background 10

1.2 Aims of Study 10

1.3 Study Area Overview 11

2 SURVEY METHODOLOGIES 13

2.1 Survey Design 13

2.2 Sampling Survey 15

2.3 Sea Bed Video 16

2.4 Grab Sampling 17

2.5 Epibenthic Trawling 17

2.6 Contaminants Grab Sampling 18

3 SAMPLE ANALYSIS 20

3.1 Video Analysis 20

3.2 *Sabellaria* Reef Assessment 20

3.2.1 Stage 1, Sediment Description and *Sabellaria* Form Present 21

3.2.2 Substrate Type 21

3.2.3 Stage 2, *Sabellaria* Characteristics 21

3.2.4 Stage 3, Measure of ‘Reefiness’ 23

3.3 Particle Size Distribution (PSD) Analysis 24

3.4 Macrobenthic Data Analysis 25

3.5 Data Rationale Before the Analysis 26

3.6 Statistical Analysis 26

3.7 Biotope Classification 28

3.8 Contaminants Analysis 28

4 RESULTS 30

4.1 DDV Data 30

4.2 Grab Data 33

4.2.1 PSD Data 33

4.2.2 Macrobenthic Faunal Data 42

4.2.3 Biotopes 63

4.3 Epibenthic Trawl Data 67

4.4 Species and Habitats of Conservation Interest 82

4.4.1 Non-Indigenous Species 82

4.4.2 Species 82

4.5 Contaminants 83

4.5.1 PAHs 84

4.5.2 Metals 84

4.5.3 Poly Chlorinated Biphenyls (PCBs) 84

4.5.4 Organotins 84

5 DISCUSSION 86

5.1 Sediment Conditions 86

5.2 Biological Conditions 86

5.3 Contaminants 87

5.3.1 PAHs 88

5.3.2 Metals 88

5.3.3 PCBs 89

5.3.4 Organotins (Tributyl-tin) 89

6 CONCLUSIONS 90
7 REFERENCES 91

Table of Appendices

A. RV DISCOVERY SPECIFICATIONS 96
B. DAILY PROGRESS REPORTS 98
C. EQUIPMENT SPECIFICATIONS 153
D. DROP-DOWN VIDEO LOGS 155
D.1 Video Footage Logs 155
D.2 Static Image Logs 158
E. HAMON GRAB SAMPLING LOGS 187
E.1. Hamon Grab Sampling Logs 187
E.2. Hamon Grab Sample Quality Logs 192
F. 2M BEAM TRAWL SAMPLE LOGS 193
F.1 2m Beam Trawl Sampling Logs 193
F.2 2m Beam Trawl Sample Quality Logs 195
G. SEDIMENT CONTAMINANTS LOGS 196
G.1 Sediment Contaminants Sampling Logs 196
G.2 Sediment Contaminants Sample Quality Logs 199
H. STATIC IMAGES 200
H.1 Grab Static Images 200
H.2 Trawl Site Static Images 225

I. GRAB SAMPLE DECK IMAGES ... 232

J. 2M BEAM TRAWL SAMPLE PHOTOGRAPHS ... 241

K. VIDEO ANALYSIS ... 248

L. *SABELLARIA* ASSESSMENT ... 274

M. EAST ANGLIA THREE AND FOUR – GRAB SAMPLE SPECIES LISTS ... 276

N. PSD RESULTS FOR EAST ANGLIA THREE AND FOUR ... 281

O. BIOTOPE ASSESSMENT FOR EAST ANGLIA THREE AND FOUR ... 289

P. FULL PSD RESULTS ... 290

Q. RAW DATA FROM FAUNA ... 322

R. BIOMASS ... 346

S. 2M BEAM TRAWL SPECIES LIST ... 349

S.1 2m Beam Trawl Raw Data ... 349

S.2 2m Beam Trawl Fish Species Measurements ... 354

S.3 2m Beam Trawl Shellfish Species Measurements ... 363

T. SIMPER ANALYSIS ... 366

T.1 Output From SIMPER Analysis Within Group Similarity ... 366

T.2 Output From SIMPER Analysis Between Group Dissimitarity (Top Ten Species) ... 368

U. CONTAMINANT ANALYSIS ... 372

U.1 Final Results From PAH Analysis ... 372

U.2 Final Results From Metals Analysis ... 379

Table of Tables

Table 2.1 Sampling Summary 14

Table 2.2 Relocated Sites from Proposed Target Locations 15

Table 3.1 Marine Nature Conservation Review (MNCR) SACFOR Abundance Scale (After: Hiscock, 1996). 20

Table 3.2 Summary of Characteristics Based on Hendrick and Foster-Smith (2006) 22

Table 3.3 Methodology for *Sabellaria* Reef Assessment 22

Table 3.4 Range of Figures Proposed By Participants of the JNCC 2007 Workshop, Which Could Be Used Together as a Measure of Reefiness 24

Table 4.1Frequently Observed Species From the Video Survey. 30

Table 4.2 Summary of Identified Habitats and Biotopes From the Drop-Down Video Survey. 31

Table 4.3 SimProf Statistically Significant Groups and Sediment Characteristics. 38

Table 4.4 Top Ten Most Abundant and Most Frequently Recorded Species in the Grab Samples Along the Cable Route Only (39 sites). 49

Table 4.5 Species Contributing up to 50% of the Within Similarity of SIMPER Groups. 59

Table 4.6 Biotopes per Site. Biotopes Within the Statistical Groupings (21% similarity) are Also Presented. 64

Table 4.7 Total Abundance and Frequency of the Top Ten Most Abundant Enumerated Taxa, and Frequency of the Top Ten Non-Enumerated Taxa Recorded from the 2 m Beam Trawl Survey. 74

Table 4.8 Total Abundance and Frequency of Top Ten Fish Taxa Recorded from the 2 m Beam Trawl Survey. 75

Table 4.9 Taxa Species Identified as of Conservation Interest and Potential Conservation Status from the Trawl Surveys. 83

Table 4.10 Assessment Classes for TBT (OSPAR, 2009). 85

Table of Figures

Figure 1.1 Survey Array 12

Figure 4.1a The Proportions of Gravel, Sand and Mud Across the Survey Area. 35

Figure 4.1b The Proportions of Gravel, Sand and Mud Across the Survey Area. 36

Figure 4.2 MDS Ordination of the Percentage Fractional Weight Data with Simprof Groupings (A), Folk Classification (B), Percentage Fine Sand (C) and Percentage Coarse Gravel (D) Overlain. Sorting Categories Indicated (Ps, Vps, Eps – Poorly, Very Poorly and Extremely Poorly Sorted). 39

Figure 4.3 PCA Ordination of Particle Size Distribution Data and Sorting Grades. 41

Figure 4.4 Summary of the Percentage Number of Taxa (a) and Individuals (b) Recorded in the Grab Samples and Presented Per Major Groups. 43

Figure 4.5a Number of Taxa from Grab Samples Across the Survey Area (Numerated and Non-Enumerated Taxa). 44

Figure 4.5b Number of Taxa from Grab Samples Across the Survey Area (Numerated and Non-Enumerated Taxa). 45

Figure 4.6a Number of Individuals (Enumerated Only) from Grab Samples Across the Survey Area. 46

Figure 4.6b Number of Individuals (Enumerated Only) from Grab Samples Across the Survey Area. 47

Figure 4.7 Contribution to Biomass by All Major Groups (AFDW). Epifauna is Included in 'Others'. 48

Figure 4.8a Shannon -Weiner Diversity Index Across the Survey Area. 51

Figure 4.8b Shannon -Weiner Diversity Index Across the Survey Area. 52

Figure 4.9 Dendrogram and MDS 2D Dimensional Plot Showing Groupings Based on 21% Similarity Slice of Faunal Data. Labels Show the Correspondent Folk (1954) Sediment Classification. 54

Figure 4.11a Distribution of the Statistical Grouping (Grab Results) in the Survey Area. 60

Figure 4.11b Distribution of the Statistical Grouping (Grab Results) in the Survey Area. 61

Figure 4.13a Distribution of Biotopes in the Survey Area. 65

Figure 4.13b Distribution of Biotopes in the Survey Area. 66

Figure 4.14 Percentage Contributions of Major Taxonomic Groups to the Total Number of Taxa Recorded (a) to the Total Abundance for Enumerated Taxa Only (b). 68

Figure 4.15a Number of All Taxa Per 2 m Beam Trawl Across the Survey Area. 70

Figure 4.15b Number of All Taxa Per 2m Beam Trawl Across the Survey Area. 71

Figure 4.16a Number of Individuals (Enumerated Taxa Only) Per 2m Beam Trawl Across the Survey Area. 72

Figure 4.16b Number of individuals (enumerated taxa only) per 2 m beam trawl across the survey area. 73

Figure 4.18a Distribution of Statistical Groups from Trawl Data Within the Survey Area. 78

EXECUTIVE SUMMARY

1. Following award of exclusive rights for development from the Crown Estate, East Anglia Offshore Wind Limited (EAOW) Limited commissioned Fugro EMU Limited (Fugro EMU) to conduct surveys to characterise the benthic ecology of the East Anglia THREE and FOUR cable routes. Additional sampling was also undertaken within East Anglia THREE and FOUR windfarms. These characterisation surveys were conducted during May 2013 and involved a range of industry standard sampling techniques such as grab sampling, sea bed video surveillance and scientific beam trawling to describe the distribution of sea bed habitats and associated biological communities. Samples were also collected for sediment chemistry testing. This document presents the methods, results and ecological interpretation of the sample data which will be subsequently used to inform Environmental Impact Assessment in support of the application for development consent.

2. Data indicated a macrofaunal distribution based on sea bed sediment type. Fauna were considered to be typical of gravelly sand and sands in the southern North Sea. The most abundant species from the grab survey was *Ophelia borealis*. Four of the top ten most abundant species or taxa were more widely recorded and these were the polychaete worms, *O. borealis, Nephtys cirrosa*, Nemerteans and juvenile brittlestars, Ophiuridae, which are considered typical of the southern North Sea sand sediments.

3. The epibenthic fauna recorded from 2m beam trawl samples were also considered typical for the southern North Sea and included invertebrate species like the common starfish *Asterias rubens*, the brittlestars, *Ophiura albida* and *Ophiura ophiura* and the flying crab *Liocarcinus holsatus*. Dominant fish species were solenette *Buglossidium luteum*, dab *Limanda limanda*, pogge *Agonus cataphractus*, and dragonet *Callionymus lyra*. In general these communities were wide ranging across the survey area.

4. One site within East Anglia THREE and one site in East Anglia FOUR were found to comprise an area of *Sabellaria spinulosa* reef which is an Annex I habitat.

5. Levels of sediment contaminants were largely below guideline limits and in all cases typical of the region.

0 INTRODUCTION

1.4.1 Study Background

6. Following successful award of exclusive development rights from The Crown Estate, East Anglia Offshore Wind Limited (EAOW), (a joint venture company between Scottish Power Renewables and Vattenfall Wind Power) commissioned detailed technical studies to support a consent application and associated Environmental Statement (ES) for the East Anglia THREE and FOUR windfarms.

7. Information derived from these studies will be used to inform the Environmental Impact Assessment (EIA). This is with respect to predicted impacts of the construction, operation and decommissioning of the export cable route and to assist in the development of mitigation measures where agreed and appropriate. This will aid in the ES development in support of the consent application.

8. To address these aspects, Fugro EMU Limited (Fugro EMU) was commissioned to undertake a benthic ecology sampling survey of the East Anglia THREE and FOUR export cable corridor.

9. In addition, sampling was undertaken at selected sites within the East Anglia THREE and FOUR windfarms. Accordingly, this document presents the survey methods used, data collected, and gives a characterisation of the subtidal benthic environment within and around East Anglia THREE and FOUR cable corridors in terms of the seabed habitats available and their influence on associated biological communities. In addition, the report presents further data collected for the East Anglia THREE and FOUR windfarms.

10.4.1 Aims of Study

10. Between September 2010 and January 2011, a zone wide benthic and epibenthic characterisation survey was undertaken by Marine Ecological Surveys Limited (MESL). APEM Limited was commissioned by EAOW to assess whether further benthic and epibenthic samples were required. Power analysis was undertaken on the previous dataset. It was concluded that no further sampling was required within East Anglia THREE and FOUR. The East Anglia THREE and FOUR cable corridor was partially surveyed previously and as such further surveys were required. The current surveys therefore were to infill areas within the East Anglia THREE and FOUR cable route not previously surveyed.

11. Accordingly the aim of the study was to further characterise benthic ecological conditions towards informing the EIA.

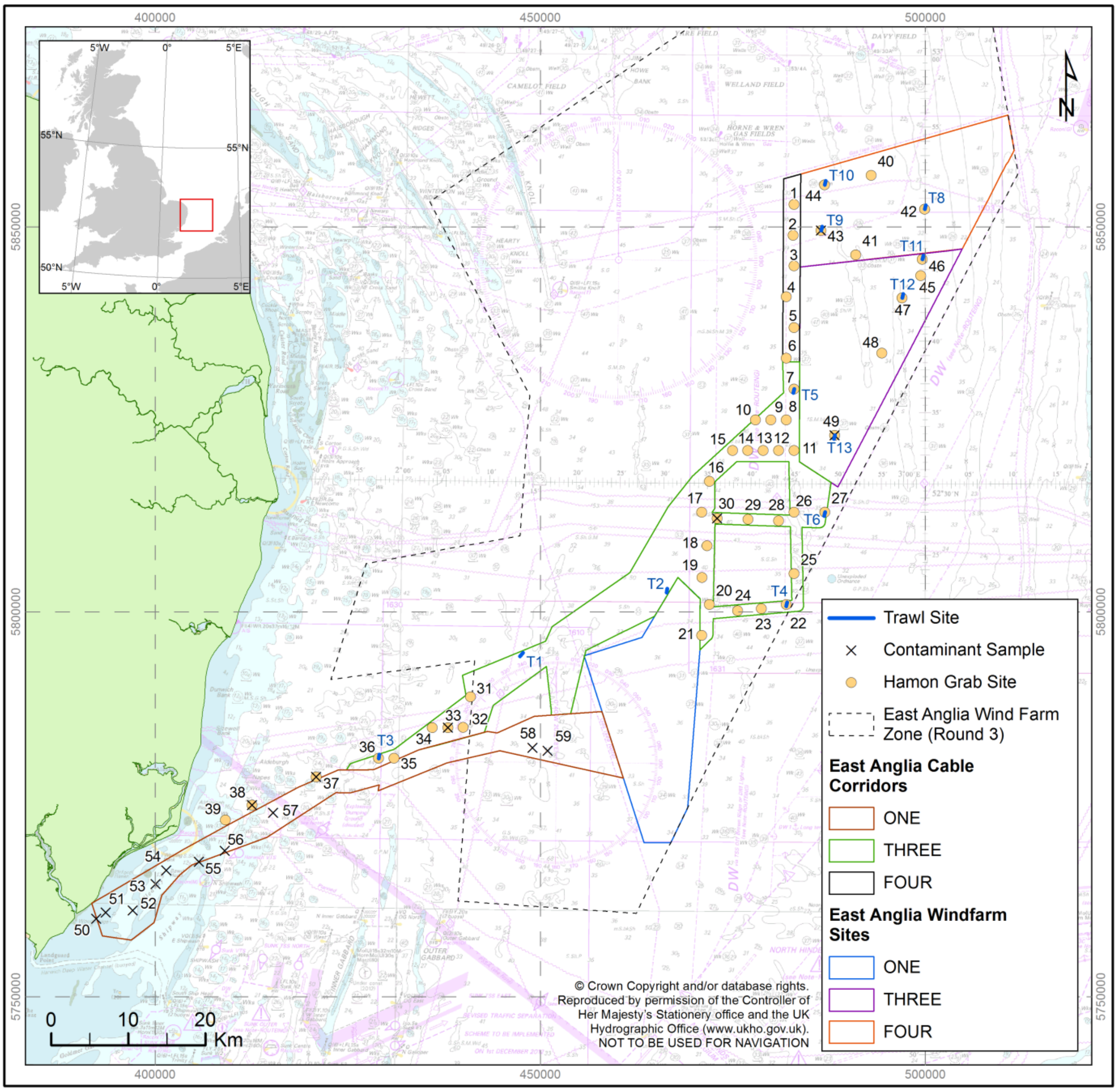
0.1 Study Area Overview

12. Within the East Anglia Zone, two windfarms known as East Anglia THREE and East Anglia FOUR, together with their associated export cable routes, are proposed to be developed by EAOW. The East Anglia Zone is located approximately 13km off the east coast of Suffolk and Norfolk, at its nearest point. East Anglia THREE and East Anglia FOUR cover an area of approximately 370km^2 and 359km^2 respectively. The East Anglia THREE and FOUR cable route covers an area of approximately 578km^2.

13. Water depths encountered during the benthic survey varied between 8 and 53m, relative to Lowest Astronomical Tide (LAT). Tidal streams (based on tidal diamonds from Admiralty Chart No. 1504) range between 0.4 and 2.7knots across the site, with the upper limit located within the inshore sites.

14. *Figure 1.1* presents the full extents of the survey area and proposed site locations.

Figure 0.1 Survey Array



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Proposed_Survey_Array_20130529.mxd)
22/11/2013 -- 11:59:33

1 SURVEY METHODOLOGIES

15. Fugro EMU undertook the benthic sampling and analyses in accordance with industry guidelines (Cefas, 2004; Judd, 2011; Ware and Kenny, 2011). Survey specifications were agreed with the Marine Management Organisation (MMO) prior to mobilisation.

16. The specific consents required for benthic survey operations within the survey area are shown below;

- MMO Marine Licence under the **Marine and Coastal Access Act 2009** (MCAA) – Licence number L/2012/00140/3;
- Derogation for scientific trawling under the Marine and Coastal Access Act 2009 (MCAA) and exemption of Eastern IFCA byelaws, 4, 6, 19, 12 and 14; and
- The Crown Estate (TCE) conflict check under section 2(1) of the Law of Property (Miscellaneous Provisions) Act 1989.

17. Fugro EMU participates in the National Marine Biological Analytical Quality Control (NMBAQC) scheme for taxonomical and particle size distribution analyses and is externally audited as part of the Fugro EMU BS EN ISO9001:2008 certification. All methods employed by Fugro EMU conformed with in-house operating procedures and/or ISO9001 control procedures where appropriate and are described below.

18. Sediment contaminants analyses were undertaken at an accredited sub-contracted laboratory.

1.1 Survey Design

19. An initial survey array was established based on the previous sampling effort. Following the acquisition of geophysical data in 2012, the survey array was reviewed, and locations were micro sited as appropriate. The following data were considered in the pre survey review of site locations:

- Sidescan sonar and swathe bathymetry collected in 2012;
- Previous sampling locations from the East Anglia Zone studies;
- Previous on site observations of potential *Sabellaria spinulosa* reef;
- The Crown Estate (TCE) Conflict Check; and

- Known locations of static fishing gear, provided via the onshore Fisheries Liaison Representative (FLR).

20. The TCE conflict check (identifying sea bed assets within the survey area) was also utilised to ensure that where micro siting was employed, the relocated site did not conflict with a TCE asset.

21. Five sites were selected for video and grab sampling in each of the windfarms, East Anglia THREE and FOUR. In addition, one of the five sites was selected for sea bed contaminants sampling, and three of the sites selected for 2m beam trawling.

22. *Table 2.1* presents the total number of proposed samples, sample type and "area" within the development zone.

Table 1.1 Sampling Summary

Sample Type	East Anglia THREE and FOUR Cable Route	East Anglia THREE	East Anglia FOUR	East Anglia ONE, THREE and FOUR Cable Route
Grab samples for macrofauna and particle size distribution (single replicates)	39 sites	5 sites	5 sites	None
Sediment contaminants samples	4 sites	1 site	1 site	10 sites
Drop down video	46 sites	8 sites	8 sites	None
2m Beam trawls (single replicates)	7 sites	3 sites	3 sites	None

23. *Table 1.2* presents sites within the East Anglia THREE and FOUR cable route which were micro sited from the proposed sample location following the pre survey review of survey locations.

Table 1.2 Relocated Sites from Proposed Target Locations

Site Number	Reason for relocation
2	The site was moved 900m due east to target a sand wave area, and the interface by means of video.
18	A cable was 200m due north of original location. The site was relocated SW of the original location to avoid the cable.
19	The original site was relocated 500m due south to avoid a cable, as requested by the asset operator.
37	Known static fishing gear around a wreck in proximity to the original location. The target location was relocated away from the wreck and static gear.
38	A cable was in the immediate vicinity of site 38. Static fishing gear targeting a wreck to the south of the site was also present. The site was relocated SW in order to avoid both the cable, and wreck locations.

1.2 Sampling Survey

24. The benthic ecology survey was conducted over a 15 day period between 29th April and 13th May 2013 inclusive.

25. All survey work was undertaken on board the survey vessel RV Discovery (details in *Appendix A*).

26. Daily Progress Reports for the duration of the survey are presented in *Appendix B*.

27. The subtidal survey included the following activities;

- 0.1m^2 Hamon grab sampling for the collection of quantitative sea bed sediment samples and determination of macrofaunal content and particle size distribution (PSD) analysis. Single replicates were collected at each station;
- Sea bed digital photography and video for collection of qualitative and semi-quantitative data on sea bed habitats and associated sessile epibenthos;
- 2m scientific beam trawling for information on larger mobile epibenthos such as fish, crabs, shrimps and prawns; and
- 0.1m^2 Day grab sampling of sea bed sediment for contaminants analysis.

28. Equipment utilised during the benthic and epibenthic characterisation surveys is presented within *Appendix C*.

29. Sea bed video, grab, contaminants and trawl sampling coordinates and any associated field observations are provided in *Appendices D-G*.

30. Sample positioning including grabs, trawls and sea bed video was achieved using a Hemisphere Crescent V100 DGPS which has a stated horizontal accuracy of <0.6m (95% confidence). Navigation and position recording was achieved using Trimble's HYDRO*pro* ™software version 2.30.844.

31. Two trawl sites, one sediment contaminants site and one Hamon grab site were micro sited in the field from their target locations. Site T09 and Site T11 were relocated to avoid potential Annex 1 *Sabellaria spinulosa* biogenic reef. Contaminants site 56 was relocated to site 39, due to the presence of coarse substrate not suitable for contaminants sampling. Hamon grab Site 40 was moved approximately 200m east due to the presence of potential Annex 1 *S. spinulosa* biogenic reef.

1.3 Sea Bed Video

32. At each sample location, the sea bed was initially surveyed using a drop down digital video and stills camera mounted within a frame and towed astern of the vessel over the sea bed surface, at a speed of approximately 0.5knots. The duration of the video and camera deployment was sufficient to ensure that nature and heterogeneity of local sea bed habitats and characterising communities were captured; this was generally a minimum of ten minutes. Where visibility was poor the freshwater box system ELViS was deployed to gather video footage and photographic stills.

33. All video data were geo-referenced. Observer records were collated throughout each deployment including substrate type and conspicuous epifauna.

34. During each deployment of the video a minimum of five photographs were collected. These were subsequently used to illustrate the different habitat encountered during each video deployment and to confirm the identity of species noted in the field. Representative sea bed photographs for each video deployment are presented in *Appendix H*.

35. Notably, underwater visibility during the benthic survey was highly variable, dependent on locality. Many of the sites were subject to more than one attempt, on different states of the tide, in order to obtain video footage and stills images sufficient for the purposes of analysis. Within the inshore sites, highly turbid conditions were

encountered, with poor quality footage obtained at some sites, despite numerous attempts made on different days, and states of the tide.

1.4 Grab Sampling

36. Following recovery of the sea bed video, a quantitative sea bed sample was collected using a $0.1m^2$ Hamon grab.

37. The position of each grab sample was fixed at the time when the winch wire went slack indicating that the grab was on the sea bed. Upon retrieval, the sample was checked to ensure adequate quality. Samples of five litres and above were considered acceptable. Samples with a volume less than this were generally rejected and the stations re-sampled up to a maximum of three times. Where samples of less than five litres were continually achieved then best judgement was used to accept samples of lesser quality.

38. Once a sample had been accepted, it was emptied into a hopper and photographed (*Appendix I*). The sediment was also described and any conspicuous fauna were recorded. A sub-sample was then taken and placed in a plastic bag for subsequent PSD analysis. The volume taken depended upon the nature of the sediment (as described in BS1377; part two; 1990), but was generally between 500g and 1500g.

39. The remaining sediment was then gently washed over a 1mm sieve with the material retained on the sieve transferred into a pre-labelled container and preserved with 4% buffered formaldehyde/seawater solution. These were then stored for return to Fugro EMU benthic laboratories for determination of faunal content.

40. Single grab samples were successfully collected at all of the proposed 49 stations for determination of faunal content and particle size analysis. At Sites 18 and 36 a sample volume of four litres was accepted after three attempts at each site.

1.5 Epibenthic Trawling

41. Of the 13 trawl sites proposed, 12 were successfully sampled. Sampling at site T03 was precluded as a result of potential *Sabellaria spinulosa* reef being present in the video footage across this site.

42. Each trawl tow was approximately 500m in length and conducted at a speed of 1 to 2knots. The start and end of each tow was fixed within the HydroPro navigation software and an appropriate layback applied based on length of warp deployed and

water depth. Tows were all conducted into the tidal current apart from one trawl which was conducted at slack water.

43. At the end of each trawl, the catch was retrieved on board the vessel, emptied into a large sorting tray and photographed. A photo log of the trawl samples is presented in *Appendix J*.

44. Species caught were identified and enumerated on site and returned to the sea. T he total length of all fish species were recorded to the nearest cm rounded down. All shellfish were measured to the nearest mm. Sessile colonial epifaunal species were recorded as present only.

45. The majority of the catch was processed on site, and returned to the sea. Where the on-site nomenclature was uncertain, specimens were returned to the laboratory for confirmation of the field identification.

1.6 Contaminants Grab Sampling

46. No known sources of offshore sediment contamination were identified and so sampling was confined to nearshore locations and stratified largely on the basis of possible local estuarine and harbour inputs, and possible sources of historic contamination.

47. Additional sea bed sediment samples were collected for chemical analyses at selected sites. The sediment contaminants targeted were as follows:

- Metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn);
- Organotins: Tributyltin (TBT), Dibutyltin (DBT);
- Polychlorinated biphenyls (PCB) - ICES 7 congeners (PCB: 28, 52, 101, 118, 138, 153, 180 including sum of ICES 7;
- Polycyclic Aromatic Hydrocarbons (PAHs) the 16 US Environmental Protection Agency (EPA) Priority PAH Pollutants – Acenaphthene, Acenaphthylene, Anthracene, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[k]fluoranthene, Chrysene/Triphenylene, Dibenzo[ah]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-c,d]pyrene, Naphthalene, Phenanthrene, Pyrene;

- Total PAH; and
- Total petroleum hydrocarbons.

48. Sampling of undisturbed sediments was achieved using a 0.1 m^2 Day Grab with stainless steel bucket. Prior to deployment at each station the metal sample bucket of the grab was cleaned with pentane to ensure that there would be no cross contamination.

49. Upon retrieval of each sample, the top 2cm of sediment was sampled with a pentane washed metal scoop used for hydrocarbon samples, and a plastic scoop for metals. Sediment was placed within labelled glass sample jars or plastic pots, depending upon the chemical analyses being undertaken and stored frozen prior to the laboratory testing.

50. Where the on-site video review and mini hamon grab sampling found the ground in the area, unsuitable for chemical sediment sampling at a chosen site, a decision was made in the field on the viability of moving the grab location to a site close to the original, or further afield to a more suitable substrate, or abandoned.

51. The samples were subsequently submitted to a specialist UKAS accredited chemistry laboratory.

2 SAMPLE ANALYSIS

2.1 Video Analysis

52. Video footage and still images at each site were analysed to assess the seabed habitat type and epibenthic communities.

53. The video footage, supplemented by the static images, from each site was reviewed, with sediment type and conspicuous species recorded along each transect.

54. Species abundance was estimated using the industry standard SACFOR abundance scale (*Table 3.1*); the SACFOR classification uses the average species size to classify the population. In addition, the digital still images were used to assist identification of species and improve habitat descriptions.

Table 2.1 Marine Nature Conservation Review (MNCR) SACFOR Abundance Scale (After: Hiscock, 1996).

Growth Form			Size of individuals/colonies				
%cover	Crust /Meadow	Massive /Turf	<1cm	1-3cm	3-15cm	>15cm	Density
>80%	S		S				>1 per 0.001m^2
40-79%	A	S	A	S			1-9 per0.001m^2
20-39%	C	A	C	A	S		1-9 per 0.01m^2
10-19%	F	C	F	C	A	S	1-9 per 0.1m^2
5-9%	O	F	O	F	C	A	1-9 per m^2
1-5% or density	R	O	R	O	F	C	1-9 per 10m^2
<1% density	R	R		R	O	F	1-9 per100m^2
					R	O	1-9 per 1,000m^2
						R	<1 per 1,000m^2

Key: S = Superabundant, A = Abundant, C = Common, F = Frequent, O = Occasional, R = Rare, P = present (used when the abundance of an organism could not be estimated accurately).

2.2 *Sabellaria* Reef Assessment

55. Where potential *Sabellaria* reef was recorded, the video analysis was carried out with a view to assessing the 'reefiness' of the area. The assessment was undertaken following the three stages analysis outlined in the JNCC guidelines (Gubbay, 2007).

2.2.1 Stage 1, Sediment Description and *Sabellaria* Form Present

56. Video footage from each site was reviewed together with the stills images taken. From these data the following information was extracted:

2.2.2 Substrate Type

57. Presence of *Sabellaria*, classified into the following categories where possible:

- absent;
- moribund loose tubes;
- crusts;
- clumps (nodules of reef <10 cm in diameter); and
- potential reef.

2.2.3 Stage 2, *Sabellaria* Characteristics

58. Hendrick and Foster-Smith (2006) described a multi-criteria scoring system which can be used to give an overview of various characteristics considered important to the 'reefiness' of *Sabellaria* aggregations.

59. It has been suggested (Hendrick and Foster-Smith, 2006) that each of the characteristics can be scored as Low, Medium or High, and be weighted according to the perceived importance of that characteristic. *Table 3.2* summarises the characteristics that can be determined by video survey.

60. Whilst an overall score of these characteristics is an oversimplification, the approach attempts to encourage a structured consideration of each characteristic. For the purpose of the survey, where areas of reef have been identified, the characteristics specified in *Table 3.2* were scored as described in *Table 3.3*, where possible. In addition, notes were be made on other conspicuous species recorded by the images and video footage.

Table 2.2 Summary of Characteristics Based on Hendrick and Foster-Smith (2006)

Characteristic	Measurement via video footage
Elevation	The measurements can be estimated from video imagery.
Patchiness	A rough indication of the patchiness of the reef can most easily be estimated from videography.
Consolidation	As with elevation, an indication of the degree of sediment consolidation can be derived from vertical photography and video footage.
Density	The characteristics of biogenic reefs are all linked to the density of the aggregation. For instance it has been suggested, that the growth morphology of Sabellaria may be influenced by density, such that an upright growth form is a reflection of competition for space (Schwartz, 1932; Schafer, 1972). A rough estimate of density may be derived from videography.

Table 2.3 Methodology for *Sabellaria* Reef Assessment

Characteristic	Analysis of characteristics and score
Elevation	The base of the drop down video system was positioned above the seabed to minimise damage to the faunal communities, and to assist with reef elevation designations. A rough estimate of the height of the reef was made, and placed within the following size categories of >10 cm, 5-10 cm, 2-5 cm and <2 cm high.
Patchiness	The video footage obtained was a continuous video, with a series of stills images taken along the transect, subsequently used for ground truthing of overall video. Patchiness was determined on a site by site basis and quantified as a percentage. The calculation which was used is: $$\frac{\text{Total percentage of Sabellaria cover from all video drops analysed}}{\text{Total number of video drops analysed for the site}}$$
Consolidation	For the purpose of this survey, a brief qualitative description of the nature of the reef has been given.
Density	Grab sample results will provide densities of Sabellaria. For the purpose of this survey, a brief qualitative description of the nature of the reef has been given.

61. The Stage 2 video assessment therefore comprise of the following:

- substrate type and description;
- measure of 'reefiness'; and
- species present.

2.2.4 Stage 3, Measure of 'Reefiness'

62. Whilst Hendrick and Foster-Smith (2006) provided a starting point in evaluating reefiness, JNCC have since conducted a workshop (2007) the results of which have been drawn up and published in (Gubbay, 2007). The main focus of the workshop was seeking agreement on a definition of *Sabellaria* reefs. Participants agreed that the simplest definition of *Sabellaria* reef in the context of the Habitats Directive was considered to be an area of *Sabellaria* which is elevated from the seabed and has a large spatial extent (two of the characteristics presented by Hendrick and Foster-Smith (2006)). Colonies may be patchy within an area defined as reef and show a range of elevations. In addition, the report states that, regardless of extent, patchiness appears to be a feature of reefs and therefore 100% coverage should not to be expected within an area defined as *a Sabellaria* reef (Gubbay, 2007).

63. In seeking to provide greater guidance, the workshop participants tried to put some figures on the characteristics of elevation and patchiness which could be used in combination to determine whether an area might qualify as a reef. The best, although not unanimous, agreement reached on the day is given below in *Table 3.4*, which provides the most up to date, currently available guidelines for *Sabellaria* reef assessment.

Table 2.4 Range of Figures Proposed By Participants of the JNCC 2007 Workshop, Which Could Be Used Together as a Measure of Reefiness

Measure of 'reefiness'	NOT a REEF	LOW	MEDIUM	HIGH
Elevation (cm) (average tube height)	<2	2-5	5-10	>10
Patchiness (% cover)	<10%	10-20%	20-30%	>30%
Consolidation	<5 on Limpenny scale	5 on Limpenny scale. Stones joined by tubes which overlap	Upright Sabellaria including concretion of substrata	Intertwinned matrix of upright Sabellaria tubes
Density (maximum per m2)	<500	500-1,700	1,700-3,500	>3,500

Note: The figures presented in the table are a starting point for wider discussion rather than accepted and fully agreed thresholds for *Sabellaria* reef identification.

64. Full video analysis and *Sabellaria* reef assessment results are presented in *Appendices K* and *L*.

2.3 Particle Size Distribution (PSD) Analysis

65. PSD analysis was undertaken at Fugro EMU's sediment laboratory using in house methods based on BS1377: Parts 1 3: 1990 (dry sieving), and BS 13320:2009 (laser diffraction). The latter method was used when the fine fraction of sediment (<63 µm) was greater than 5% of the total sample by weight.

66. Representative sub samples of each sediment sample were oven dried to constant weight at 105 ± 5°C before routinely wet sieving to remove silt and clay sized particles of <63µm (unless there was no sample cohesion after drying, where dry sieve analysis only is undertaken). The remaining coarser material was again oven dried to constant weight at 105 ± 5°C followed by dry sieving through a series of mesh apertures corresponding to units as described by the Wentworth scale. The weight of the sediment fraction retained on each mesh was subsequently measured and recorded and merged with the laser diffraction data where appropriate. Sediments were then classified according to the Folk sediment classification system (Folk, 1954).

2.4 Macrobenthic Data Analysis

67. Species scientific names can change over time as new information becomes available. EMU manage faunal datasets using the UNICORN database. This database is widely used by both government agencies and industry. The names applied to species in this report therefore follow those laid down in UNICORN.

68. An online resource known as the World Register of Marine Species (WoRMS) has become an important authority on the currently accepted scientific names given to particular species such that it has been endorsed by the Healthy and Biologically Diverse Seas Evidence Group (one of the groups working in support of the UK Marine Monitoring and Assessment Strategy (UKMMAS) and the *Charting Progress* reports). Furthermore, all marine taxonomic data collected by UK government agencies are now expected to be WoRMS compliant. In addition, Ware and Kenny (2011) state that 'taxonomic nomenclature should be compliant with' WoRMS. The makers of UNICORN are therefore currently working on an update to the database which will enable users to output species data based on information from WoRMS. In the interim period EMU make use of an online tool provided by WoRMS to match UNICORN taxon names to those listed by WoRMS. The names provided in this report are therefore as laid down by UNICORN and include not only the Species Directory Code (SDC) output from that database but also the relevant code to the name as understood by WoRMS (referred to in the relevant tables as the 'Aphia Code'). For those with only a limited understanding of marine species, in this technical sense, but who may wish to check a particular taxonomic name, the Aphia Code can be copied and pasted into the 'Search taxa' page of the WoRMS website (http://www.marinespecies.org/), selecting the 'Aphia Code' from the drop down menu on the left.

69. It is important to note that the species names used in the naming of biotopes by the UK Marine Habitat Classification (Connor *et al*., 2004) are not, in some instances, the currently accepted names according to WoRMS. The Marine Nature Conservation Review (MNCR) database behind biotope classification has also yet to be updated and therefore when using BioScribe to aid the process of biotoping species data it is important to input older species names where appropriate

70. Grab and beam trawl samples were returned to Fugro EMU's NMBAQC benthic laboratory for analysis. Samples were re sieved over a 1mm mesh to remove all remaining fine sediment and fixative. Fauna were sorted from the sediment by elutriation and subsequent examination under a stereomicroscope.

71. Macro invertebrates were identified to the lowest practical level (species level, when possible) and enumerated. Colonial, encrusting epifaunal species were allocated a P value. A reference collection was prepared with one individual of each species identified retained.

72. EMU undertook quality control (QC) checks on a representative number of whole samples, as well as the entire reference collection in compliance with internal analytical QC criteria.

73. Faunal biomass analysis was based on a wet blot method with estimates of ash free dry weight (AFDW) based on conversion factors provided by Eleftheriou and Basford (1989). Mollusc biomass included the weight of the flesh plus shell.

2.5 Data Rationale Before the Analysis

74. Of the total 49 sites sampled, the 39 sites along the cable route were used in the analysis for this report. The sites omitted were located in the East Anglia THREE and East Anglia FOUR windfarms (see *Figure 0.1*). Raw results from the analysis of faunal and environmental samples for omitted data are presented in *Appendix M* and A*ppendix N* respectively. Biotope assessment for these sites was also carried out and the results included in *Appendix O*.

2.6 Statistical Analysis

75. The macro invertebrate community structure and sediment distributions were investigated by employing univariate diversity indices (Shannon Wiener diversity index; Pielou's eveness and Simpson's dominance index). For multivariate statistical analyses the Plymouth Marine Laboratories PRIMER v6 (Plymouth Routines in Multivariate Ecological Research) suite of programs was used (Clarke and Warwick, 2001; Clarke and Gorley, 2006).

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

77. The Shannon Wiener diversity index is a measure of biodiversity based on the number of species present and the number of individuals of each species. If a few species dominate, the index value is low. A greater number of species and a more even distribution of species both result in an increase in Shannon's diversity. Pielou's eveness is a measure of how the numbers of individuals are distributed across the

number of species found in a sample. If the numbers of individuals are equally spread amongst the species then the community is said to be even. The closer Pielou's eveness is to 1, the more even the distribution of abundance is amongst the species. The nearer the value is to 0, the less even the community is with some species having much higher abundances than others. Simpson's dominance index is a measure of the probability that two individuals randomly selected from a sample will belong to the same species. Simpson's dominance index ranges from 0 (all taxa are equally present) to 1.0 (one taxon dominates the community completely).

78. Faunal data for multivariate analysis were imported into PRIMER and initially subjected to either a square root (grab samples) or fourth root (trawl samples) transformation to reduce the influence of any highly abundant taxa allowing less abundant species a greater role in driving the emergent multivariate patterns. The transformed data were then subjected to hierarchical clustering to identify sample groupings based on the Bray Curtis index of similarity. This process combines samples into groups starting with the highest mutual similarities and then gradually lowers the similarity level at which groups are formed. The process ends with a single cluster containing all stations and is best expressed as a dendrogram showing the sequential clustering of stations against relative similarity. To best describe the ecological differences between sites, the groups were identified on the basis of a slice at 21% similarity.

79. The MDS (Multi-dimensional Scaling) procedure uses the same similarity matrix as that used by the cluster analysis to produce an ordination of stations which is multi-dimensional. This is carried out to satisfy all of the between samples relationships indicated by the similarity matrix. This multi-dimensional ordination is then reduced to a 2 or 3 dimensional representation that is a more accessible and useable representation. The representativeness of these low dimensional versions, in comparison to the multi-dimensional array, is indicated by a stress level. The closer this stress level is to zero, the better the representation.

80. SIMPER analysis was then applied to the data to rank species in terms of their contribution to both the internal group similarity and "between" group dissimilarity and thereby assist the assessment of the distinctiveness of each community identified and the identification of the characterising taxa.

2.7 Biotope Classification

81. Biotope code allocations were made using the current UK Marine Classification System v4.05 (Connor *et al.*, 2004). Biotopes were allocated to faunal composition at individual grab sites.

82. Biotopes were assigned using the biotope decision making support tool BioScribe (Hooper *et al.*, 2011). The BioScribe tool matches the species list from a sample to the biological communities usually recorded with potential biotope matches. Confidence indicators and direct links to habitat descriptions from the Marine Habitat Classification for Britain and Ireland are provided to facilitate the process. The tool was used by an experienced ecologist practiced in matching UK biotopes to field survey data with codes applied through expert judgement based on the BioScribe outputs and knowledge of the current biotope classification system. All survey data were used to inform the biotope allocation process including the PSD analysis results and the video ground truthing data.

2.8 Contaminants Analysis

83. Results were compared to the Clean Seas Environment Monitoring Programme (CSEMP) guideline levels. This is the mechanism through which the UK delivers its monitoring commitments as signatories to the OSPAR Convention. Two assessment criteria have been used to assess contaminant (PAH and metals) concentrations in sediment under CSEMP. These are the Effects Range Low (ERL) and Effects Range Medium (ERM) criteria.

84. Effects Range values were originally developed by the United States Environmental Protection Agency (EPA) as sediment quality guidelines to predict adverse biological effects on organisms (Long *et al*., 1995). Concentrations below the ERL rarely cause adverse effects in marine organisms; concentrations above the ERM, however, will often cause adverse effects in some marine organisms (OSPAR, 2009a).

85. CSEMP feeds into the OSPAR Co-ordinated Environmental Monitoring Programme (CEMP). For the purpose of the CEMP data assessment, ERLs have been used in most cases as the green/red transition for PAHs and trace metals in sediment. OSPAR (2009a) states that “green assessment for a particular contaminant means that the environmental concentrations meet relevant statutory limits or policy objectives, and are satisfactory in that they present little or no risk. A red assessment means that the relevant limit or objective had not been met”. Note that the Agreement on CEMP

Assessment Criteria for the QSR 2010 (OSPAR, 2009b) states that "ERL values are to be used in sediment assessments of contaminants (e.g. PAHs and metals) as an interim solution where recommended EACs [Environmental Assessment Criteria] are not available". EACs are not currently available for PAHs and metals and therefore ERL values were used in this study as a means to assess the degree of sediment contamination.

86. Cefas Guideline Action Levels (AL) for the disposal of dredged material are non-statutory guidelines which form part of a wider body of evidence for assessment of disposal of dredged materials to sea. In general, concentrations of contaminants below Cefas Action Level 1 are of little concern with respect to possible effects on the marine environment. Concentrations above Action Level 2, however, suggest that the material is unsuitable for disposal at sea. Values between Levels 1 and 2 may prompt further investigatory work prior to disposal of the material to sea.

3 RESULTS

3.1 DDV Data

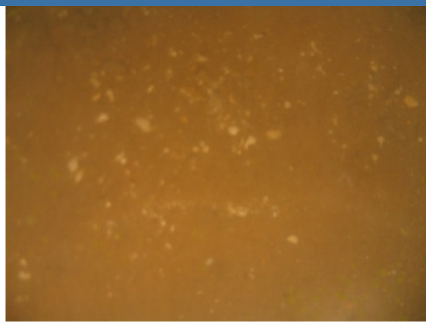
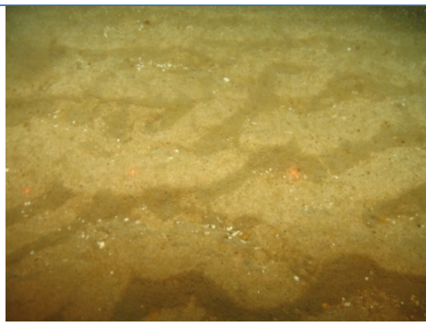
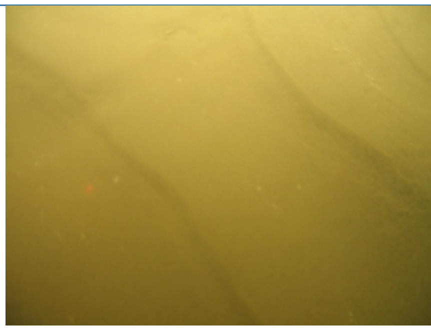
87. Video data were collected at all stations visited; results are presented in *Appendix K*. A summary of conspicuous species recorded from the video data is given in *Table 4.1*. Notably, from the video analysis the epibenthic communities were found to be limited with sedimentary habitats present throughout the survey area. Hydroid and bryozoan mixed turfs, the common starfish, *Asterias rubens*, and the brittlestars, *Ophiura ophiura* and *O. albida* were found widely across the survey area.

Table 3.1Frequently Observed Species From the Video Survey.

Scientific Name	Type of species
Hydroid/bryozoan mixed turf	Sea firs *and* sea mats
Asterias rubens	Starfish
Ophiura ophiura	Brittlestar
Ophiura albida	Brittlestar

88. Sedimentary habitats were not easily distinguishable without the infaunal data for comparison. The species composition of each site as found during the video analysis was not sufficient to separate grouping of biotopes. Therefore, utilising the grab sample data, four broad habitat types and one detailed biotope (Connor *et al*., 2004) were recorded from the video data (in combination with the grab data (see *Table 3.2*)).

Table 3.2 Summary of Identified Habitats and Biotopes From the Drop-Down Video Survey.

Biotope	Sites	Representative photograph
SS.SMx.CMx - Circalittoral mixed sediment	3, 12, 25, 26, 32	
SS.SCS.CCS - Circalittoral Coarse Sediment	1, 11, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 30, 31, 33, 34, 35, 36, 37, 38	
SS.SMU.CSaMu - Circalittoral sandy mud	39	
SS.SSA.CFiSa - Circalittoral fine sand	4, 5, 6, 7, 8, 9, 10, 13, 15, 27, 28, 29,	

Biotope	Sites	Representative photograph
SS.SBR.PoR.SspiMx - *Sabellaria spinulosa* on stable circalittoral mixed sediment.	2, 43 and 46	

89. All video from the benthic survey have been scrutinised and where potential *S. spinulosa* reef were identified the three stage process outlined in section 3.2 has been applied to assess 'reefiness (see *Appendix L*). The relevant biotope associated with this reef feature is SS.SBR.PoR.**SspiMx** - *Sabellaria spinulosa* on stable circalittoral mixed sediment.

90. Three sites (2, 43 and 46) were assessed as **SspiMx** from the video footage and stills images. It is important to note that the biotope, SspiMx, can be expressed in numerous forms thus cannot be interpreted as automatically synonymous with a reef feature, despite being indicative of the potential for an area to develop such a feature should the right conditions occur. Limpenny *et al*., (2010) highlight that the biotope can, and has been applied to records which do not contain high densities of *S. spinulosa* and furthermore, that only visually assessed locations can be described as reef with certainty.

91. Site 2 has been categorised as "not reef" based on the three stage analysis methodology. Although, upright intertwining tubes of *S. spinulosa* were recorded, the elevation and patchiness were at the lower end of the scale.

92. Sites 43 and 46 were selected for investigation by means of drop down video following the review of the 2012 geophysical data. Site 43 represented an interface between apparent coarse sediment and mobile sandy sediment. Site 46 was selected as a discrete area measuring approximately 310m by 50m, as defined by the 2012 geophysical data. Cross transects were run at each site to verify the extents of the potential *Sabellaria* reef.

93. Accordingly, sites 43 and 46 have both been classified as medium / high resemblance to *S. spinulosa* reef.

94. From the patchy nature of the reef recorded and the moribund tubes, there was good evidence that these are hydrodynamically active areas. It is clear that reefs forming in this area may be ephemeral and, although the specific locations may change, the propensity for the presence of reef is evident.

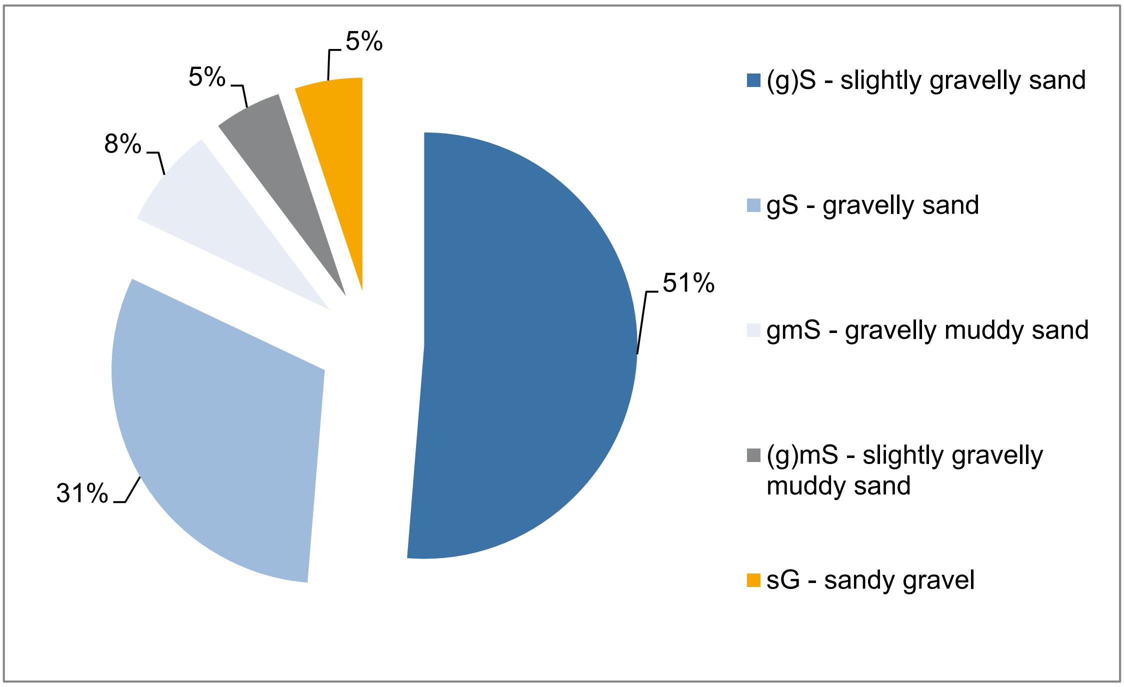
3.2 Grab Data

3.2.1 PSD Data

95. A summary of the distribution across the survey area is shown in *Figure 4.1*. All planned PSD samples were successfully taken. Results from sediment PSD analysis for all sites are presented in *Appendix P*.


EAOW Benthic Survey
SITE: 4
DATE: 2/5/13
slightly gravelly Sand

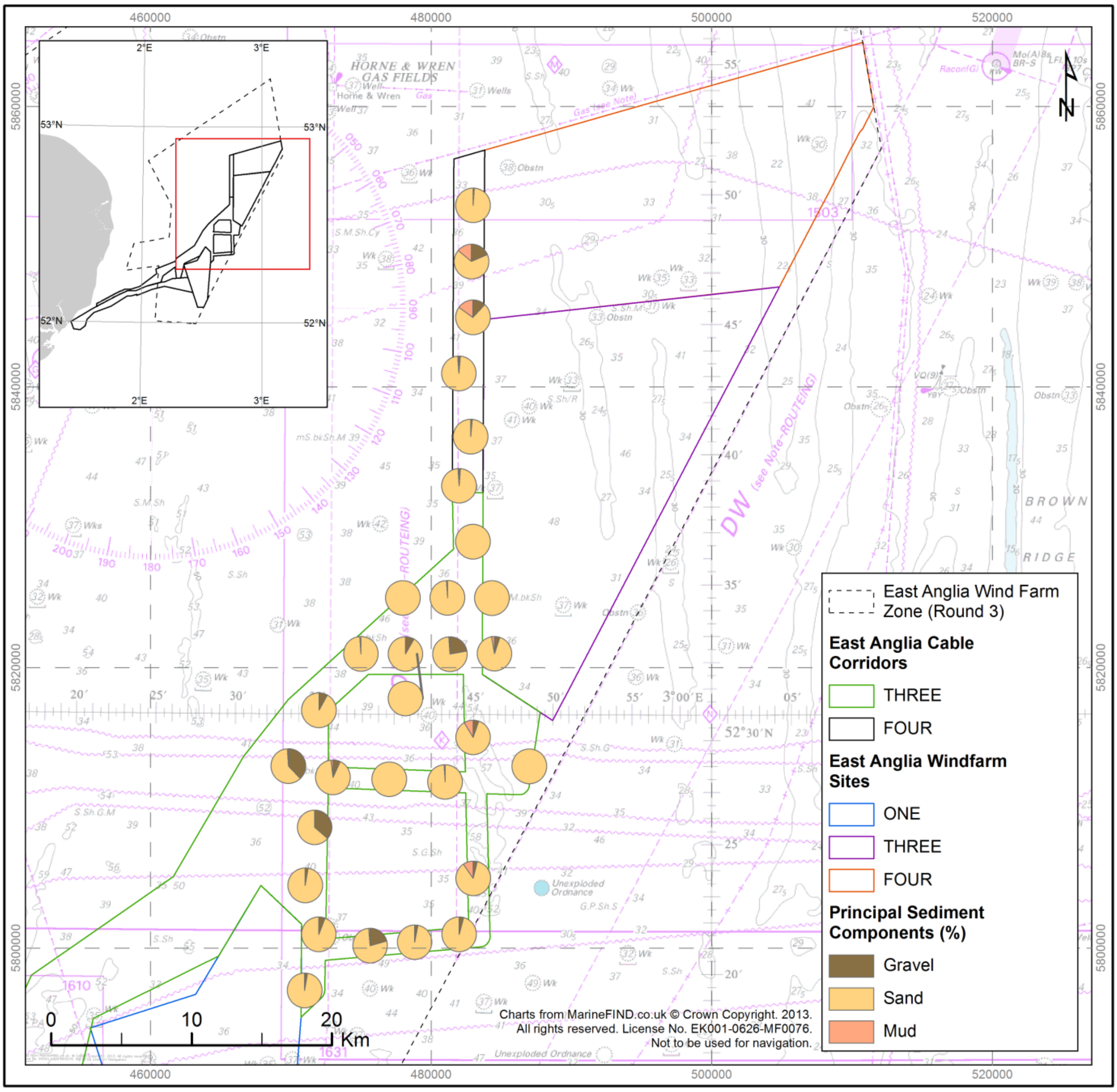

EAOW Benthic Survey
SITE: 24
DATE: 3/5/13
gravelly Sand


5%
5%
8%
51%
31%
(g)S - slightly gravelly sand
gS - gravelly sand
gmS - gravelly muddy sand
(g)mS - slightly gravelly muddy sand
sG - sandy gravel


EAOW Benthic Survey
SITE: 02
DATE: 01/05/13
gravelly muddy Sand

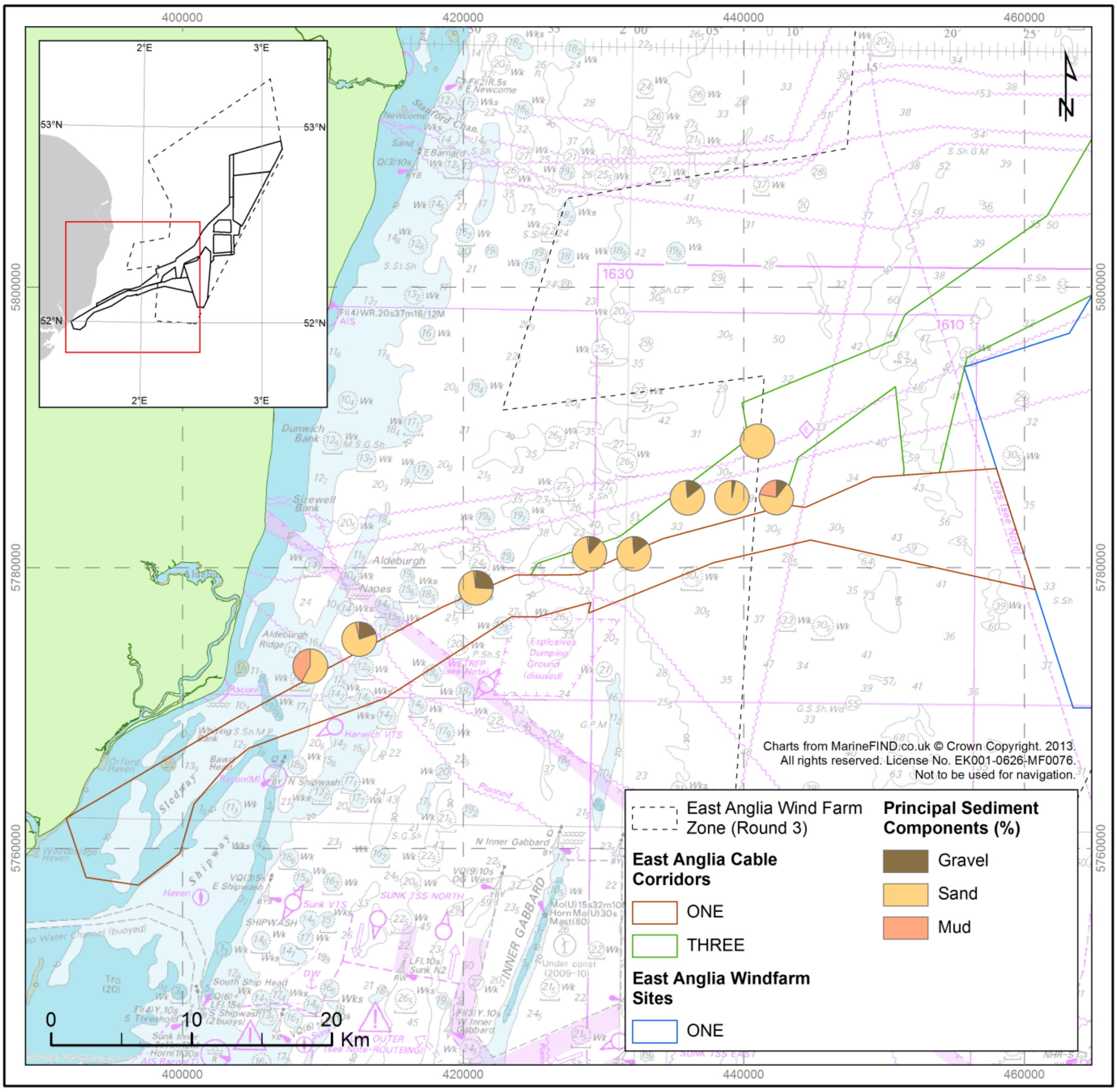

EAOW Benthic Survey
SITE: 39
DATE: 7/5/13
slightly gravelly muddy Sand

Figure 3.1a The Proportions of Gravel, Sand and Mud Across the Survey Area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Principal_Sediment_Components_North.mxd)
22/11/2013 -- 10:51:55

Figure 4.1b The Proportions of Gravel, Sand and Mud Across the Survey Area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Principal_Sediment_Components_South.mxd)
22/11/2013 -- 10:54:02

96. The dominant fraction was slightly gravelly sand ((g)S), described at 20 sites and accounting for 51% of the sediment characteristics. This was followed by gravelly sand (gS), described at 12 sites, and accounting for 31% of sediment characteristics across the survey area. The dominant fraction was fairly uniformly distribute in the offshore part of the cable route, with a pocket of gravelly muddy sand (gmS) in the northern part of the cable route. The other sediment fractions occurred as a mosaic in the inshore part of the cable route.

97. The highest proportion of mud (>10%) was found at sites 2, and 3 in the offshore part of the cable route and at sites 32 and 39 in the inshore part of the cable route. The proportions varied from 14 to 15% for the former sites and from 22 to 41% for the latter sites respectively. These sites were described as gravelly muddy sand (gmS) or as slightly gravelly muddy sand ((g)mS). Only two sites were recorded as sandy gravel (sG) (17 and 18), located offshore in the middle part of the cable route. The sediments in the area vary between very poorly sorted (vps), with a high sorting coefficient, and well sorted (ws), with a low sorting coefficient. Other sorting categories such as poorly sorted (ps), moderately sorted (ms) and well sorted (ws) were also recorded. Well sorted sediments can indicate a consistent input of energy with little fluctuation, on the contrary poorly sorted sediments can indicate the reverse, i.e. an inconsistent energy input and a consequently wide fluctuation in the sediment matrix.

98. Data were further analysed using multivariate techniques. *Figure 3.2* presents the ordinations of per cent fractional weight sediment data based on a Euclidean distance resemblance matrix. The symbology indicates the statistically significant groups highlighted by the PRIMER SimProf routine set to a significance level of 1% (a) and the Folk sediment groupings (b), whilst the bubble plots show those sites associated with the highest proportions of medium sand (500 µm) (c) and fine sand (250 µm) (d), the components accounting for the variability of the sediments.

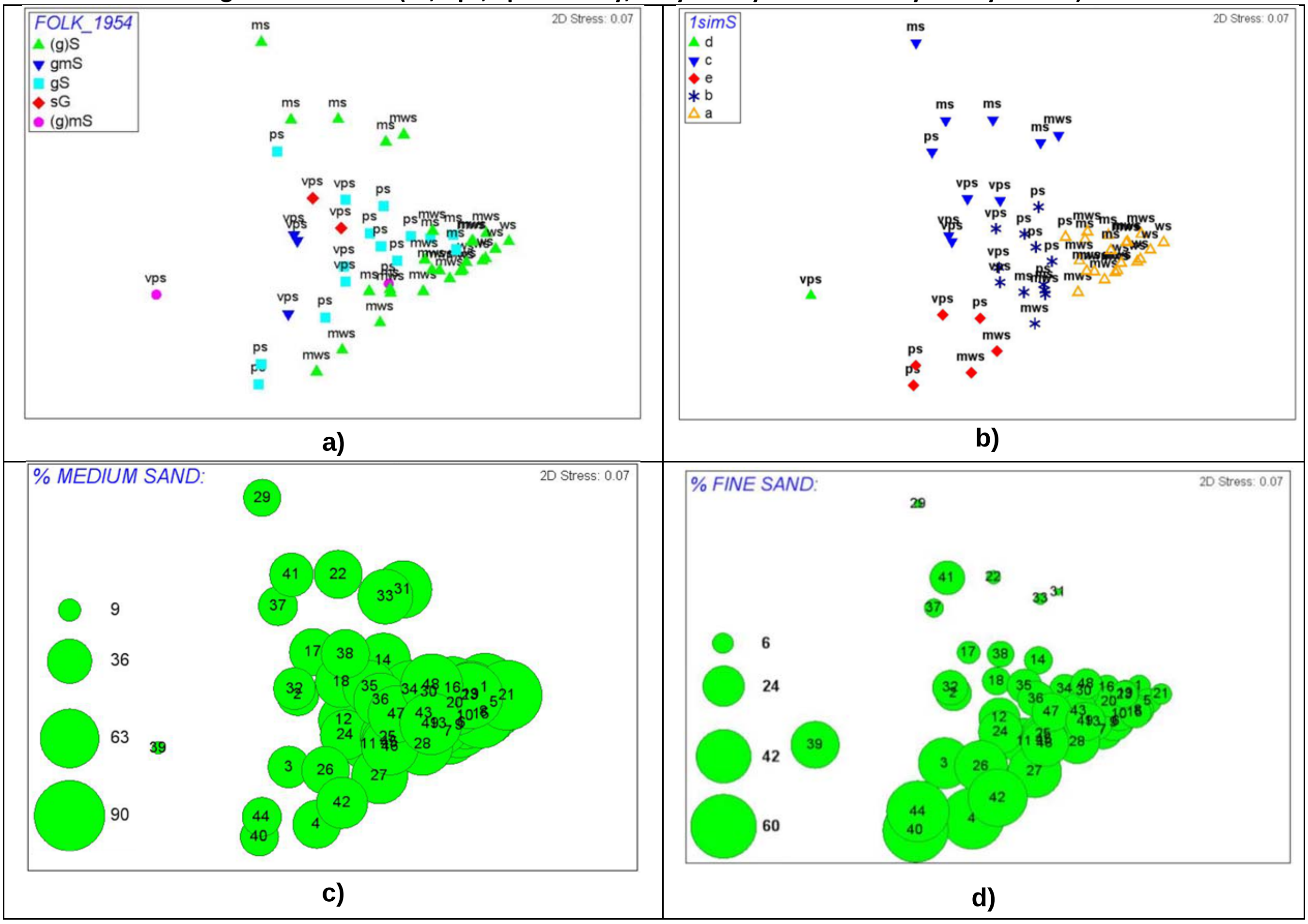
99. Application of the PRIMER SimProf routine, (*Figure 3.2*) highlighted five statistically significant groups (a to e). The majority of the sites (17) were included in group a and were characterised by medium to fine sand, mainly classified as slightly gravelly sand ((g)S), with four sites classified as gravelly sand (gS). Group b and c included nine sites each, the first one characterised by fine sand and coarse gravel, mainly classified as gravelly sand (gS) with two sites classified as slightly gravelly sand ((g)S and one as slightly gravelly muddy sand ((g)mS). Group d included the single site 39 classified as slightly gravelly muddy sand ((g)mS), whilst group e included three sites. This last group was characterised by medium sand and find sand, but in lower proportions compared to group a, and the three sites were classified as gravelly muddy sand (gmS), slightly gravelly sand ((g)S) and gravelly sand (gS). Sediment at sites in group a ranged from moderately sorted (ms) to moderately well sorted (mws) to well sorted (ws). Only site 34 was described as poorly sorted (ps). In the other groups sediments were predominantly described as poorly sorted (ps) or very poorly sorted (vps).

Table 3.3 SimProf Statistically Significant Groups and Sediment Characteristics.

SimProf group	No. samples	Mean % GRAVEL	Mean % SAND	Mean % MUD	Dominant Folk Class	Mean sorting
a	17	3	96	1	Slightly gravelly sand ((g)S)	0.65
b	9	13.5	84	2.5	Gravelly sand (gS)	1.65
c	9	13.5	81.5	5	Slightly gravelly sand ((g)S)	1.76
d	1	0.01	58	42.9	Slightly gravelly muddy sand ((g)mS)	2.39
e	3	6	85.6	8.4	Gravelly muddy sand (gmS) Slightly gravelly sand ((g)S) Gravelly sand (gS)	1.48

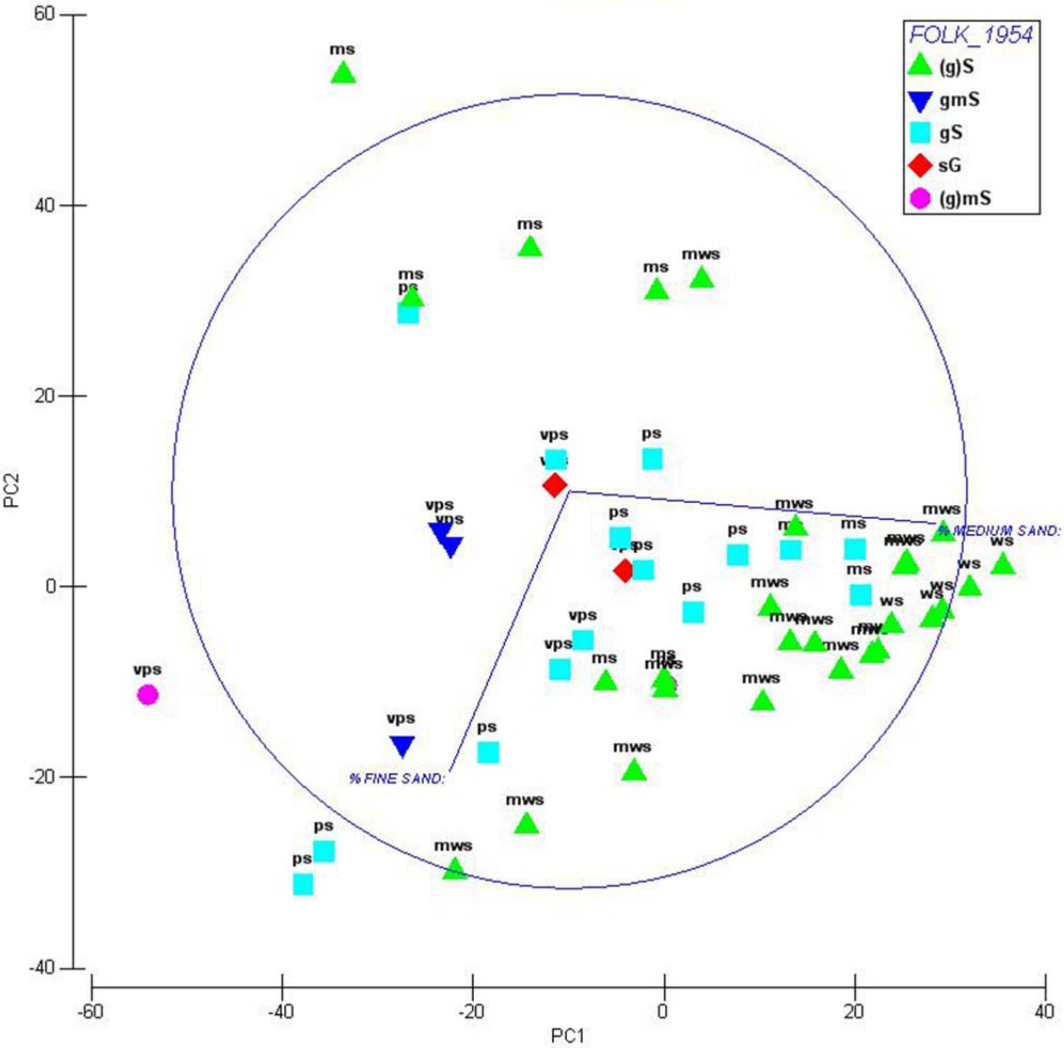
100. *Table 3.3* summarises the sediment characteristics for each of the sediment groups identified by the statistical grouping, indicating mean percentages of gravel, sand and mud.

Figure 3.2 MDS Ordination of the Percentage Fractional Weight Data with Simprof Groupings (A), Folk Classification (B), Percentage Fine Sand (C) and Percentage Coarse Gravel (D) Overlain. Sorting Categories Indicated (Ps, Vps, Eps – Poorly, Very Poorly and Extremely Poorly Sorted).



101. *Figure 3.3* below presents a PCA ordination plot for percentage fractional sediment data used to identify the sediment fractions driving the variability of the sediment composition amongst the sites. The principal component axis (PC1) is very strongly positively correlated with percentage medium sand (500 µm) and accounts for 53.5% of the variation. The second principal component axis (PC2) is strongly correlated with the percentage of fine sand (250 µm) and accounts for a further 34.2% of the variation. The 2 dimensional PCA can be considered a good description of the higher multi dimensional space with PC1 and PC2 together accounting for 87.7% of the variability. The importance of the percentage medium sand and the percentage fine sand fractions in structuring the multivariate patterns seen are visible from the bubble plots in *Figure 3.2.*

Figure 3.3 PCA Ordination of Particle Size Distribution Data and Sorting Grades.

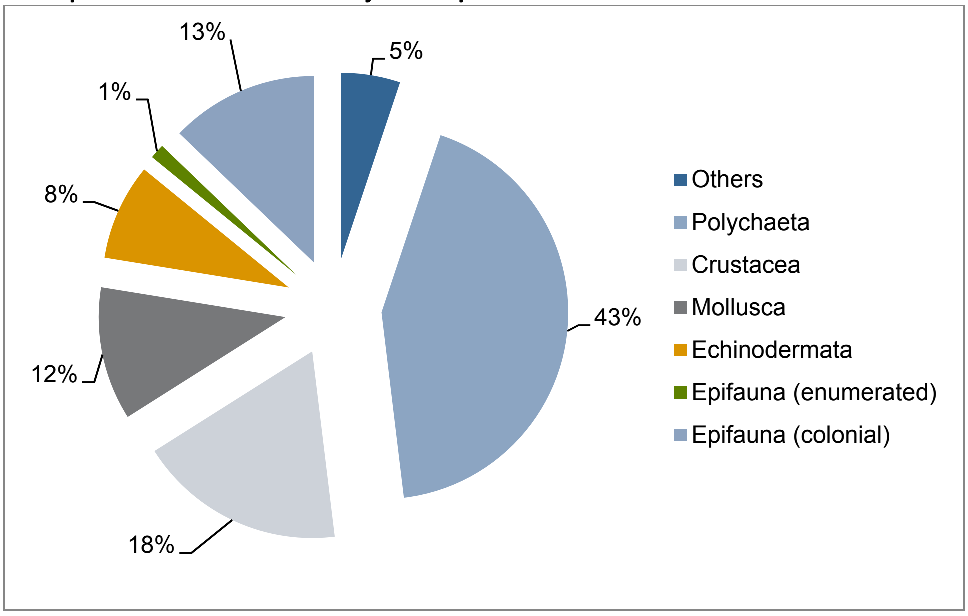


3.2.2 Macrobenthic Faunal Data

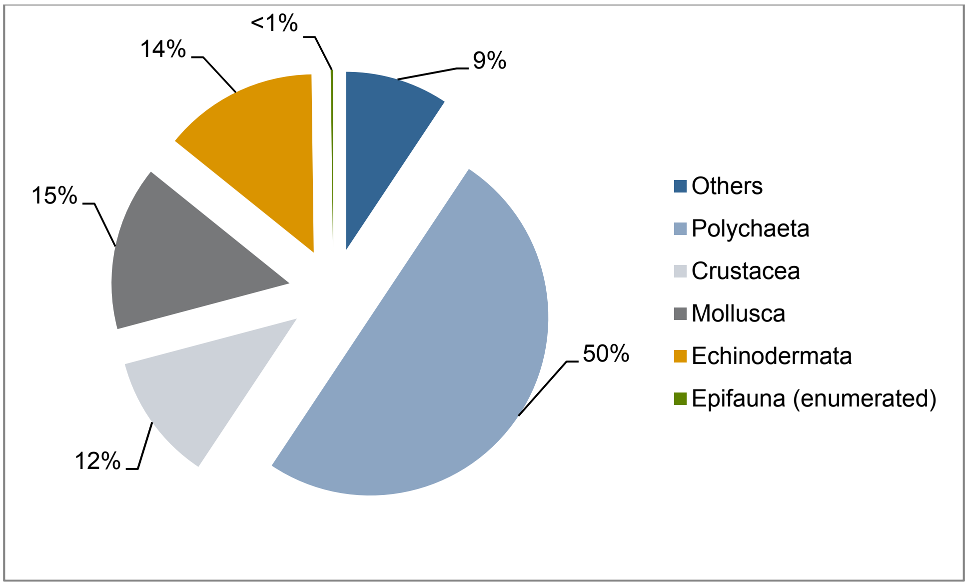
102. All 39 grab samples (from the East Anglia THREE and FOUR cable route) were successfully collected for macrofaunal analysis. Raw data including infaunal and epifaunal species abundance generated from the analysis of the faunal samples are available in *Appendix Q*. The data are presented with the relevant AphiaID included as a reference to names currently accepted by the World Register of Marine Species (WoRMS) (Appeltans *et al.*, 2012). Biomass (as blotted wet weight) per major phyla was also recorded and the results presented in *Appendix R*.

103. A total of 156 taxa were recorded from the grab samples collected and the total number of individuals recorded was 1,006. The percentage contribution by each of the major taxonomic groups in terms of number of species and abundance is presented in *Figure 3.4*a and b respectively. Their distribution across the survey area is presented in *Figure 4.5* and *Figure 4.6.*

Figure 3.4 Summary of the Percentage Number of Taxa (a) and Individuals (b) Recorded in the Grab Samples and Presented Per Major Groups.

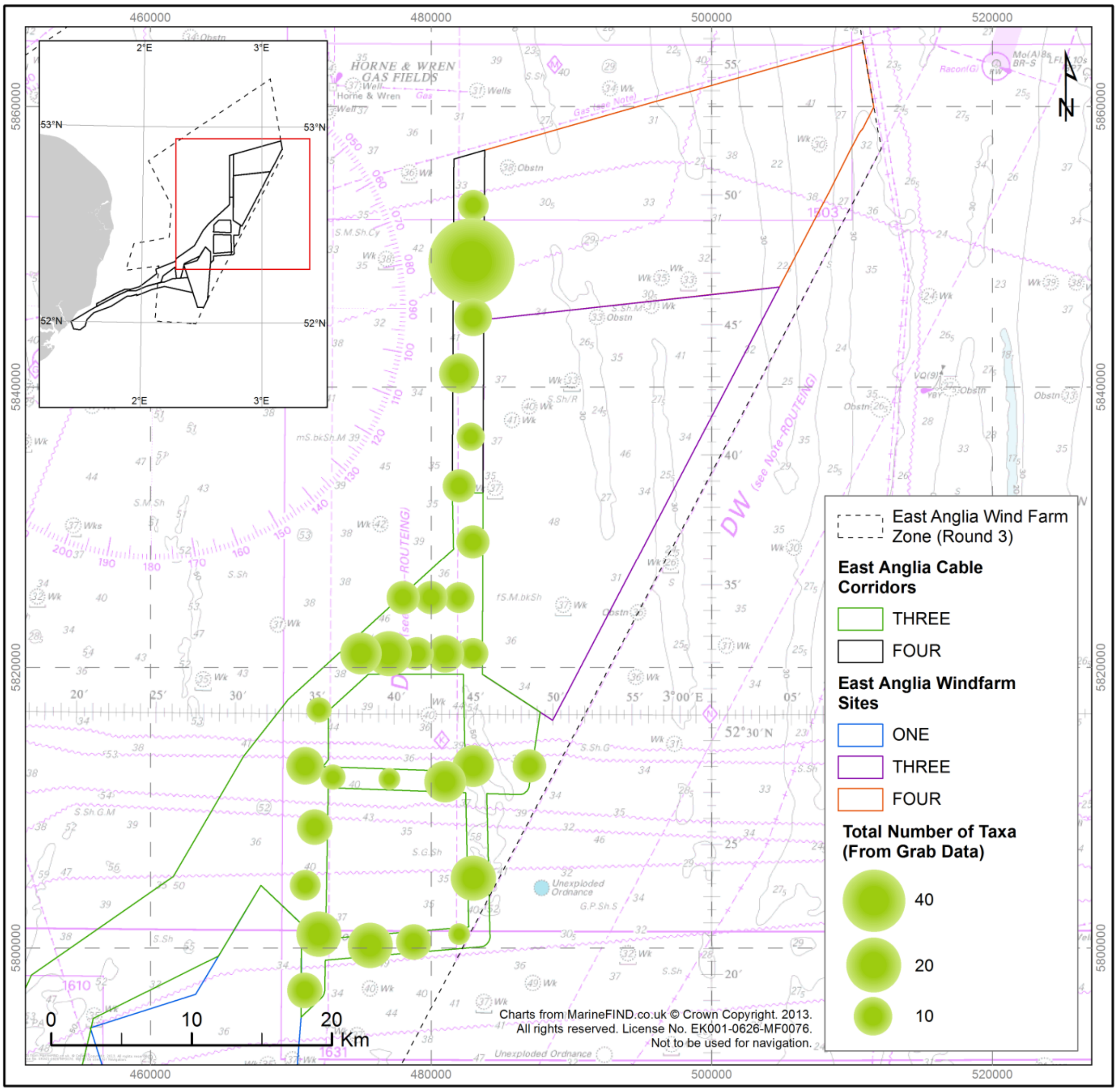


a)



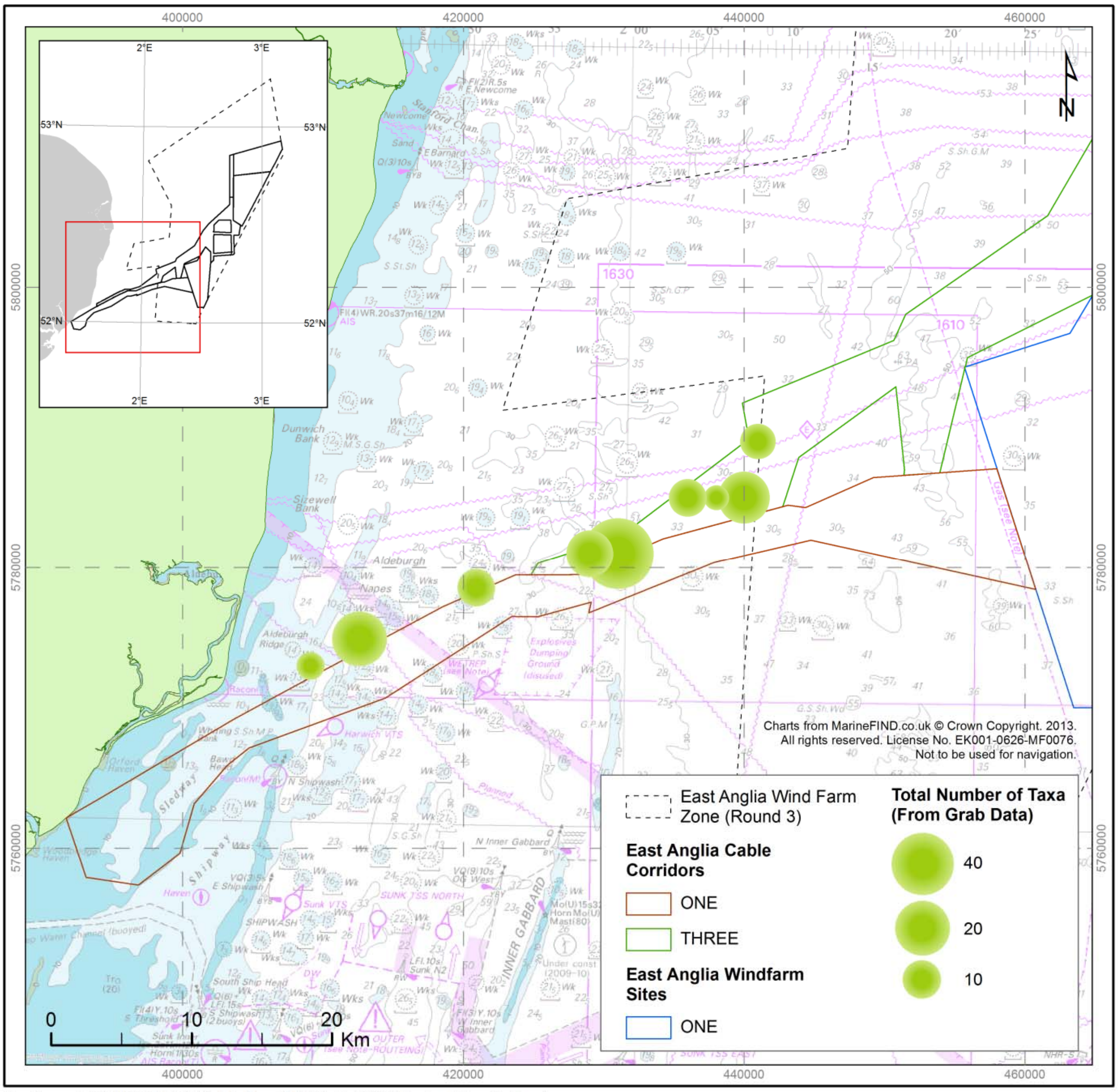
b)

Figure 3.5a Number of Taxa from Grab Samples Across the Survey Area (Numerated and Non-Enumerated Taxa).



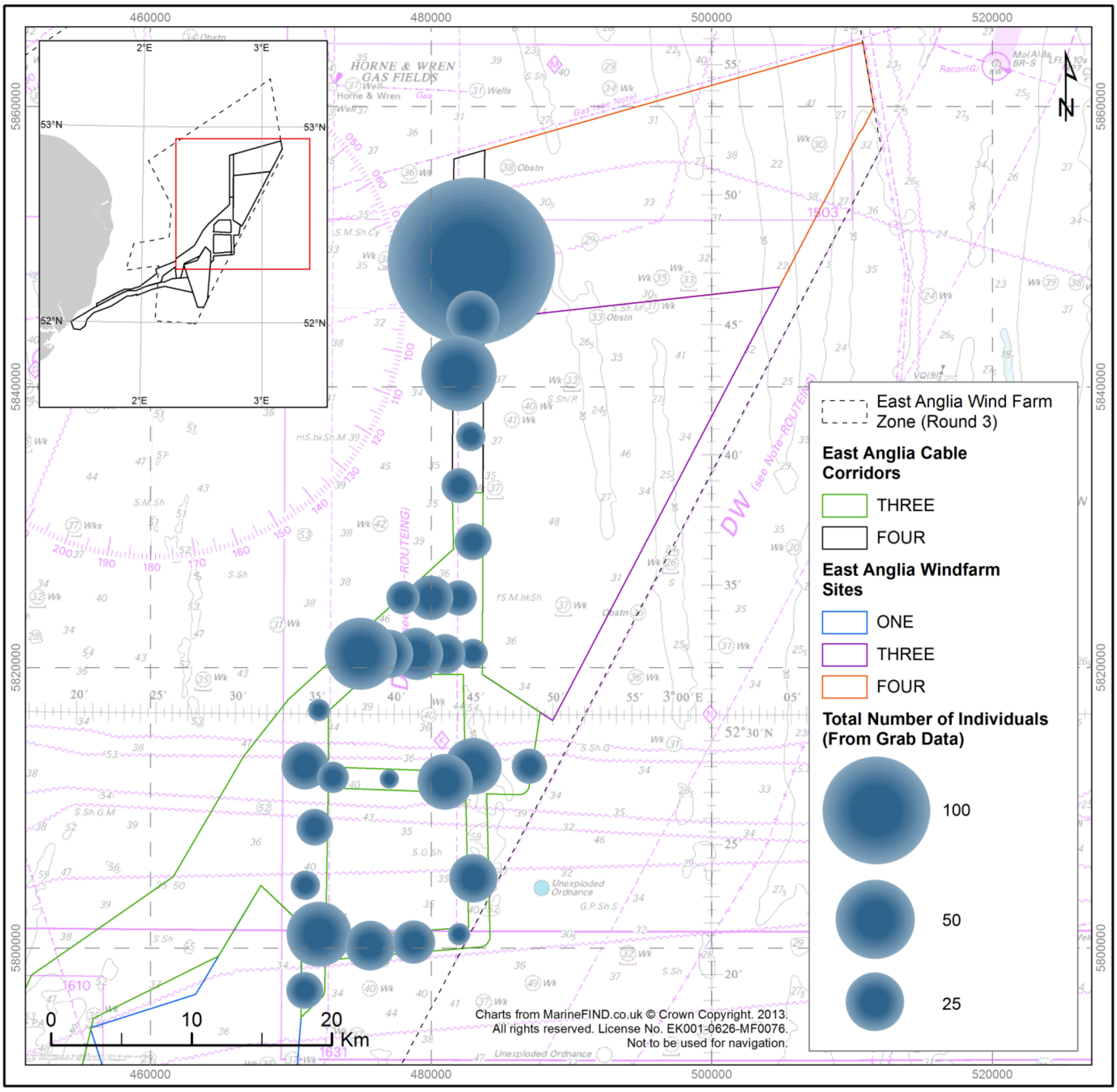
Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Taxa_North.mxd)
22/11/2013 -- 10:27:44

Figure 4.5b Number of Taxa from Grab Samples Across the Survey Area (Numerated and Non-Enumerated Taxa).



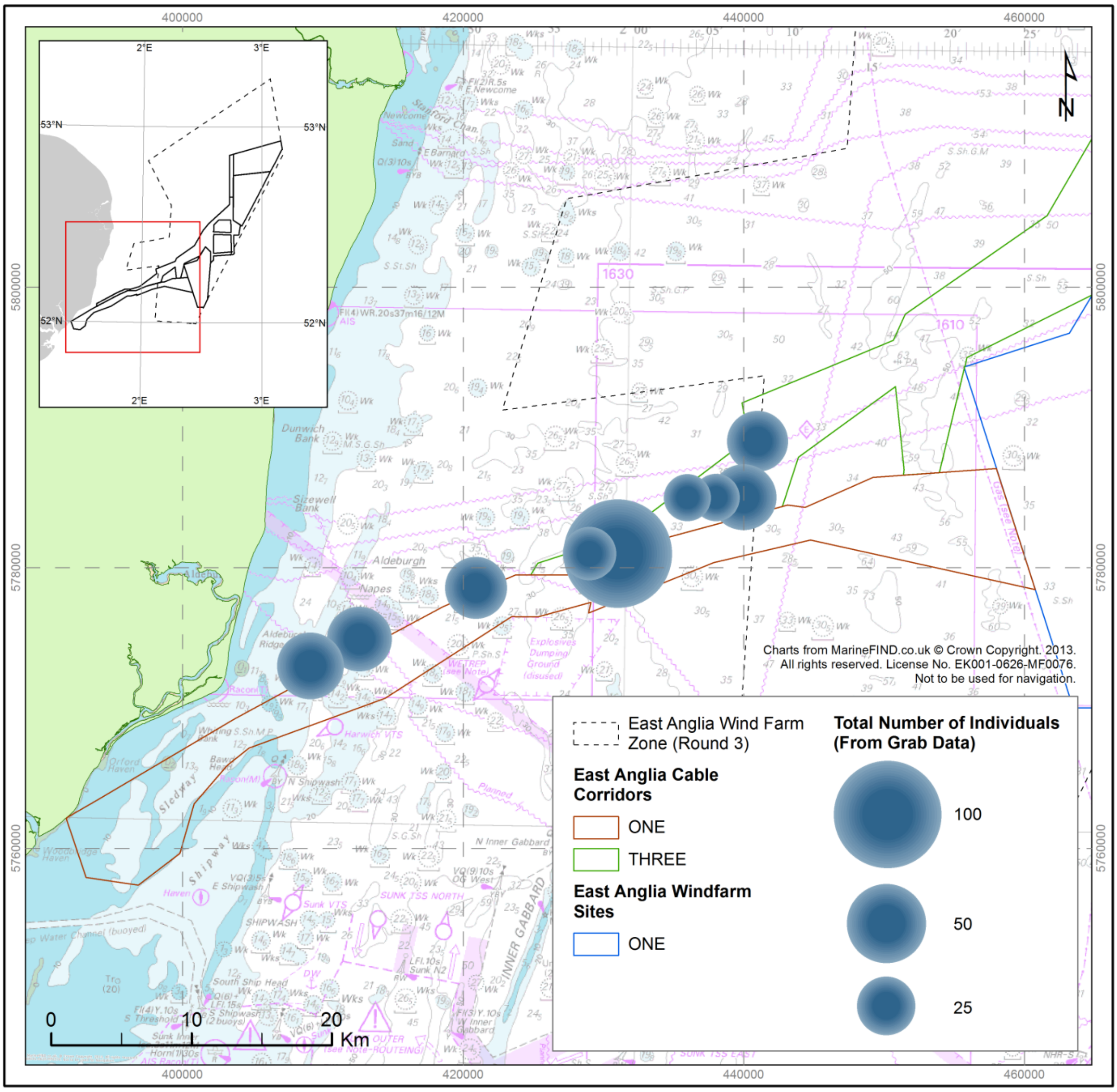
Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Taxa_South.mxd)
22/11/2013 -- 10:29:33

Figure 3.6a Number of Individuals (Enumerated Only) from Grab Samples Across the Survey Area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Individuals_North.mxd)
21/11/2013 -- 17:18:43

Figure 4.6b Number of Individuals (Enumerated Only) from Grab Samples Across the Survey Area.



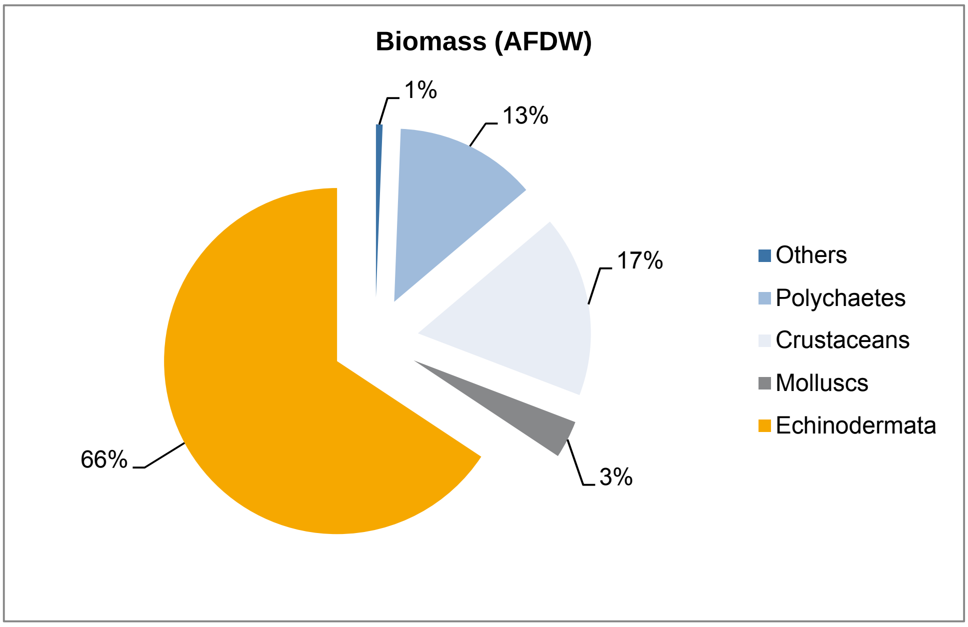
Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Individuals_South.mxd)
21/11/2013 -- 17:23:09

104. Polychaete worms contributed the highest number of taxa (43%), followed by Crustacea which contributed a total of 18% of the whole taxa composition. Epifaunal species, including both enumerated and non-enumerated contributed a total of 14% and Mollusca contributed 12% of the total taxa recorded. Echinodermata and Others each contributed to less than 10% of the taxa recorded. As well as dominating the taxa composition, Polychaeta were also the most abundant taxa with 50% of the total number of individuals recorded. Following these were Mollusca with 15%,

Echinodermata with 14% and Crustacea with 12% of the total number of individuals recorded. Others contributed 9% and enumerated epifaunal taxa less than 1%.

105. Biomass was recorded as blotted weight and then converted in ash free dry weight (AFDW) following (Elefthriou and Besford, 1985). Weight for mollusca included shells and the biomass for both enumerated and non-enumerated epifauna species was included in 'Others'. The phylum contributing the most (*Figure 3.7*) was the Echinodermata which accounted for 66% of the total AFDW. This was due to high abundance of *Ophelia borealis* and *Nephtys cirros*, followed by Crustacea which contributed 17% and Polychaeta which contributed 13 %. Mollusca and Others contributed each less than 10%. Biomass data are presented in *Appendix R.*

Figure 3.7 Contribution to Biomass by All Major Groups (AFDW). Epifauna is Included in 'Others'.



106. Amongst the top ten most abundant taxa recorded from the grab samples, five were also amongst the most frequently recorded (*Table 3.4*). The two most abundant species were both found in 69% of the samples (27 sites out of 39) and were the polychaeta species *O. borealis* and *N. cirrosa*. These two species were also the two most frequently recorded in grabs. Another polychaeta species, belonging to the genus *Notomastus* was the third most abundant species, recorded at 17 sites. The most abundant echinoderm recorded was the pea urchin *Echinocyamus pusillus* (recorded in about 28% of the samples), while the most abundant mollusc recorded was the bivalve *Kurtiella bidentata* (which was not recorded in the top ten most frequent species). No

crustaceans were recorded amongst the most abundant taxa, but the amphipods *Urothoe brevicornis* and *Bathyporeia elegans* were the most frequently recorded crustacean in 26% and 21% of the sites visited, respectively.

Table 3.4 Top Ten Most Abundant and Most Frequently Recorded Species in the Grab Samples Along the Cable Route Only (39 sites).

Species	Type of organism	Total Ab.	Species	Type of organism	Frequency
Ophelia borealis	Polychaeta	98	*Ophelia borealis*	Polychaeta	27
Nephtys cirrosa	Polychaeta	73	*Nephtys cirrosa*	Polychaeta	27
Notomastus	Polychaeta	51	*NEMERTEA*	Nemereta	17
Echinocyamus pusillus	Echinodermata	50	*Ophiuridae (juv)*	Echinodermata	15
Kurtiella bidentata	Mollusca	47	*Echinocyamus pusillus*	Echinodermat	11
Ophiuridae (juv)	Echinodermata	43	*Urothoe brevicornis*	Crustacea	10
Phoronis	Phoronida	39	*Glycera oxycephala*	Polychaeta	10
NEMERTEA	Nemertea	34	*Ophiura albida*	Echinodermata	8
Goodallia triangularis	Mollusca	34	*Bathyporeia elegans*	Crustacea	8
Angulus fabula	Mollusca	26	*Goniada maculata*	Polychaeta	8

107. Of the 39 grab samples collected in total in the survey area in 2013, 34 samples comprised non-enumerable colonial epifaunal species, with a total of 20 species and higher taxa. The dominant taxa present was Bryozoa (15 taxa), followed by Cnidaria (3 taxa), Porifera (2 taxa).

108. With the exception of *Cliona* agg, one unidentified species belonging to the Phylum PORIFERA and one species belonging to the genus *Sertularia* (Cnidaria) the top ten most frequently recorded epifaunal non-enumerated species were bryozoans. Amongst others, these included the most frequently recorded species (at 32 out of 39 sites), *Conopeum reticulum*, *Electra monostachys* and *Electra pilosa*. The only sites where these species were not recorded were predominantly characterised by sandy sediment thus not offering suitable substrate to settle. The full record of the epifaunal

(non-enumerated) species identified from the grab samples is presented in *Appendix Q*.

109. The number of species recorded in the survey area ranged from three species at Sites 22 and 29 to 48 species at Site 2. The distribution of diversity (index) is presented in *Figure 3.8*. The Shannon Weiner diversity index gives an indication of environmental quality (Dauvin *et al.*, 2012) and was “poor” (between 1 and 2) at the majority of sites.

Figure 3.8a Shannon -Weiner Diversity Index Across the Survey Area.

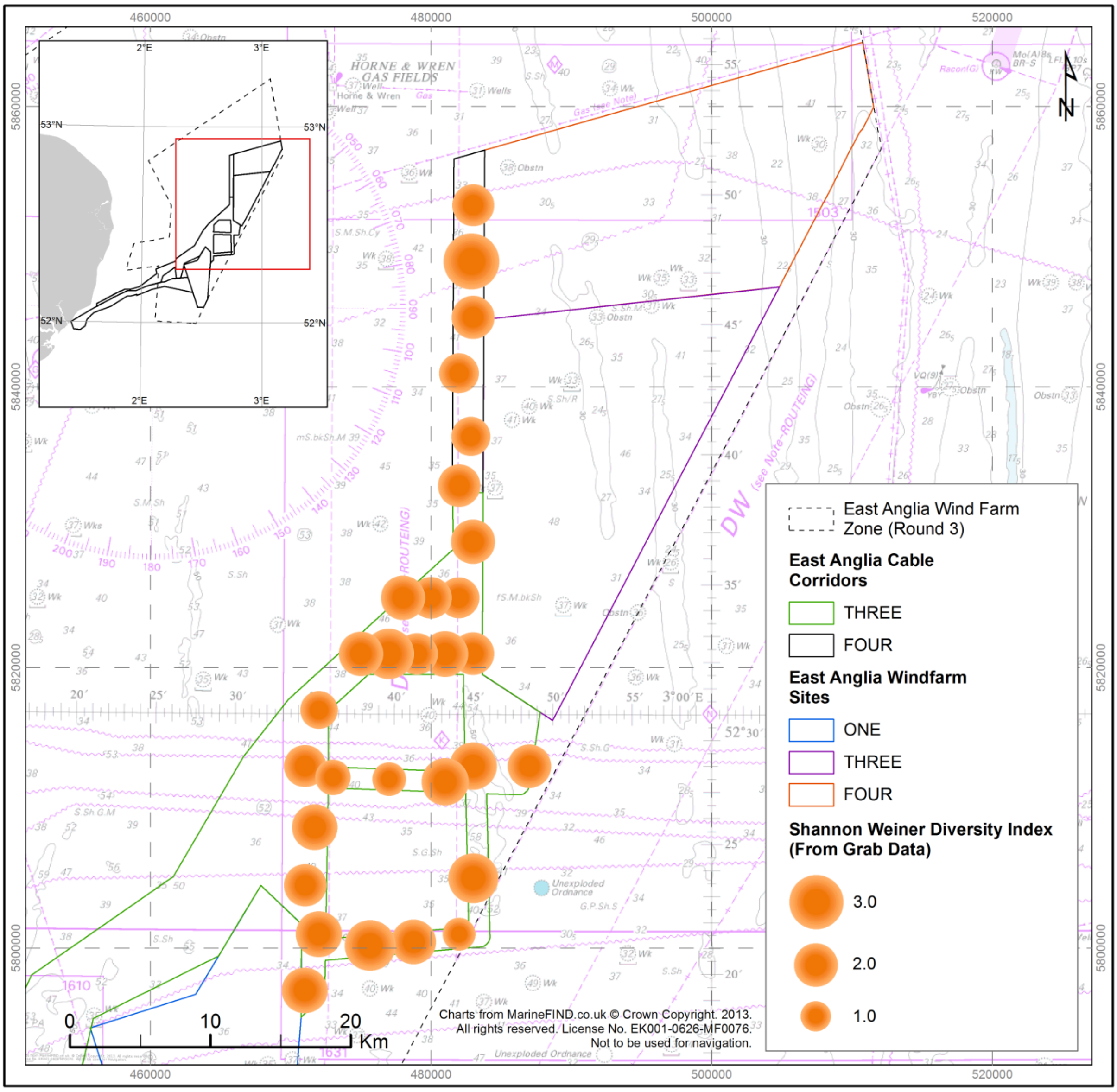


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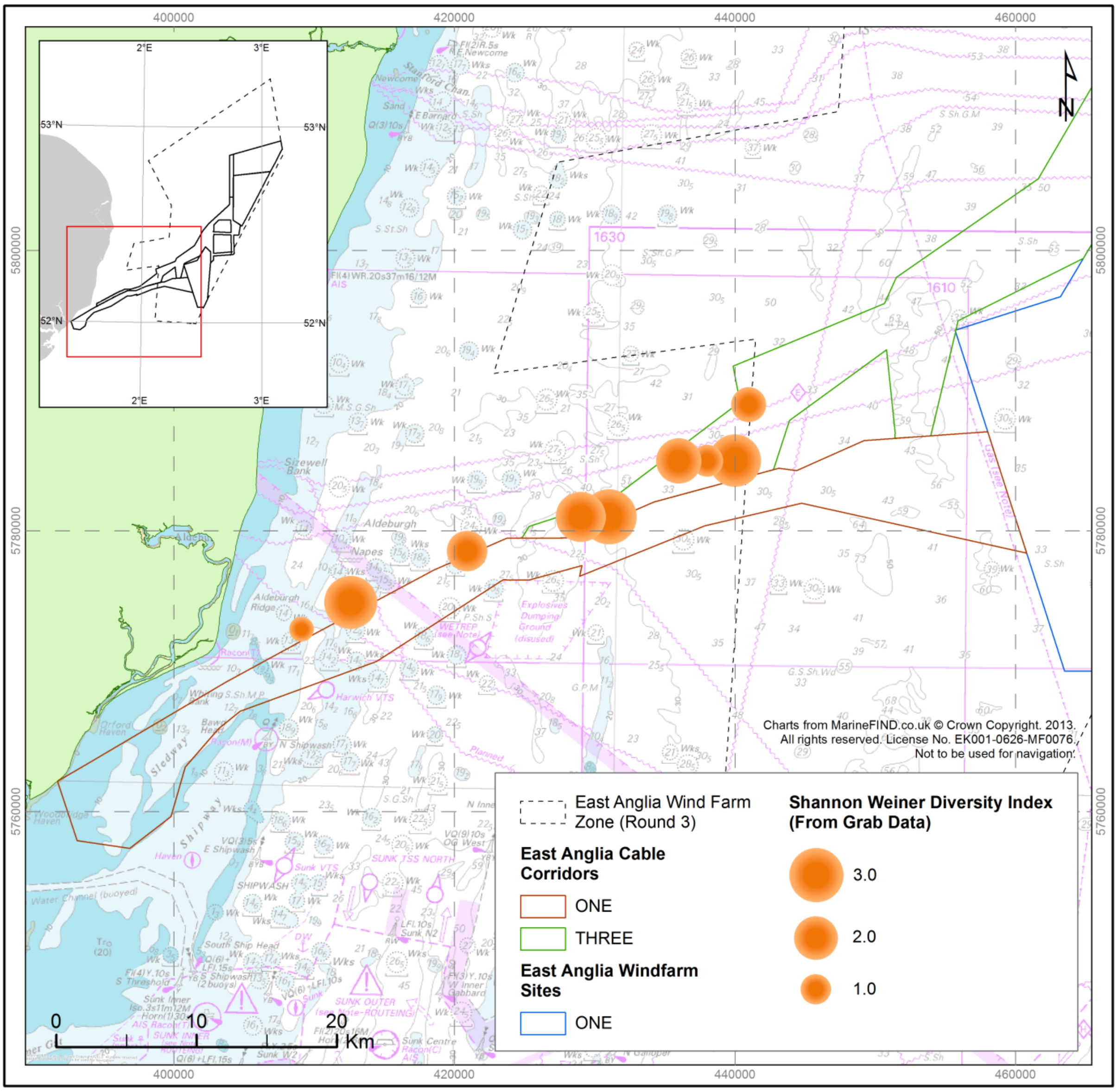
Figure 4.8b Shannon -Weiner Diversity Index Across the Survey Area.



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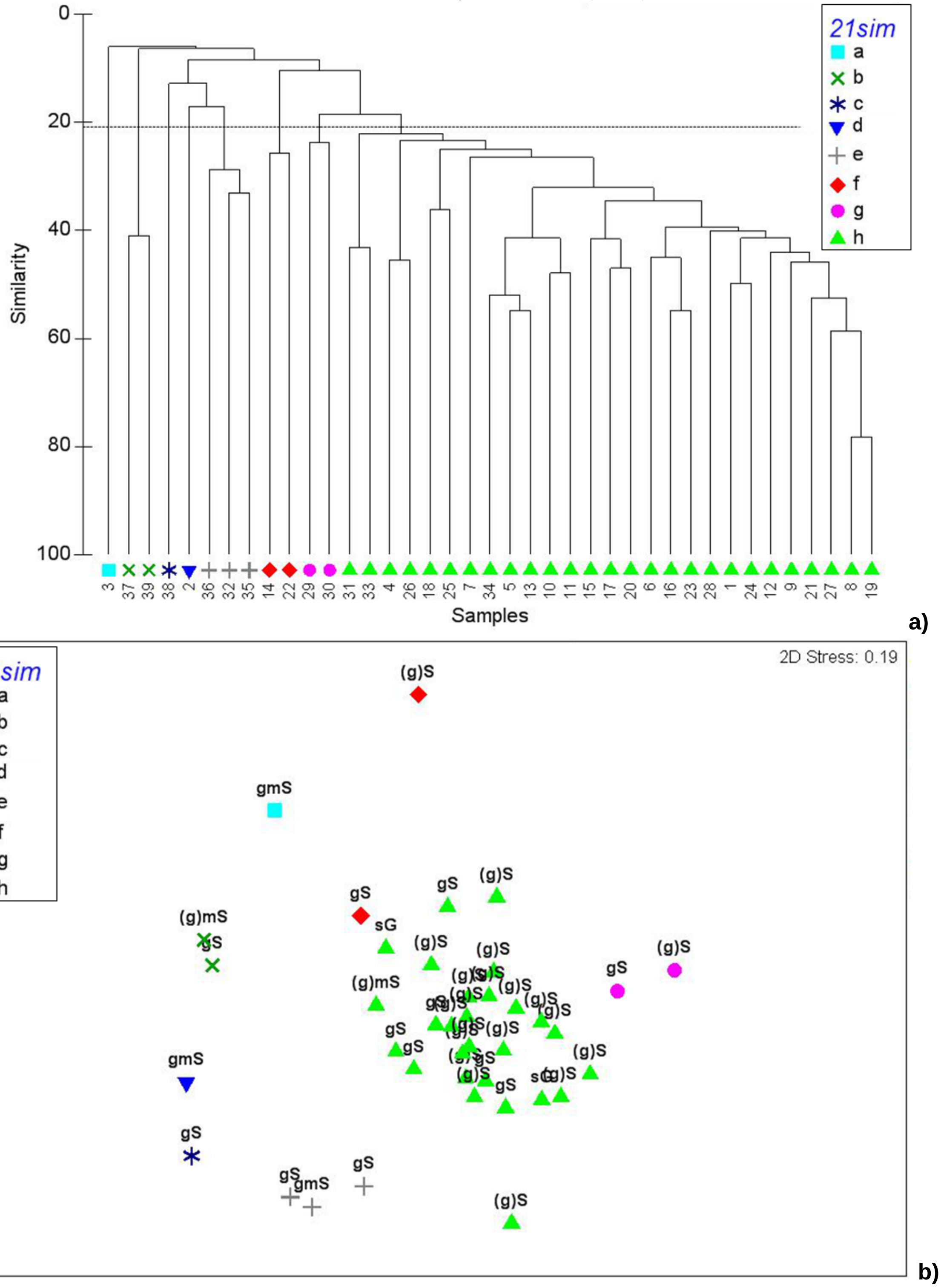
22/11/2013 -- 10:59:11

110. Some data rationalisation was undertaken before performing multivariate analysis on the full dataset. Only the enumerated epifaunal component of the species recorded in the grabs was included. Epifaunal species recorded as present are not analysed here, but their presence is described in qualitative terms, rather than quantitative.

111. The cluster analysis dendrogram and the MDS plot are presented in *Figure 3.9* a and b respectively, which show the groupings based on the 21% similarity slice. The

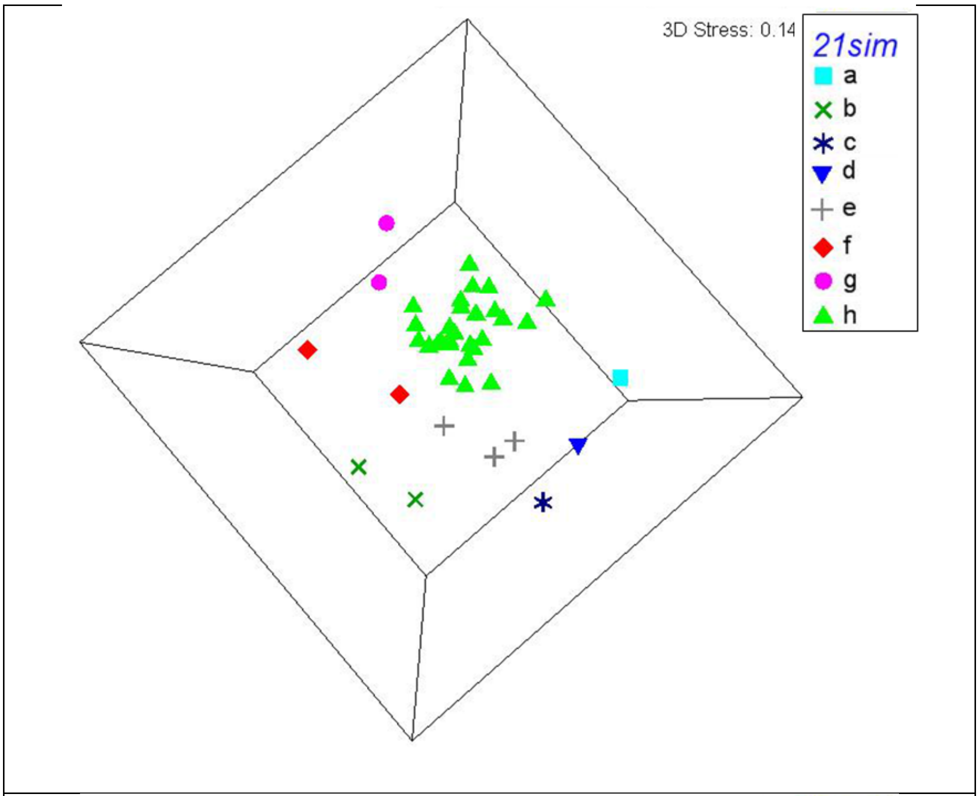
ordination of grab faunal samples is overlaid with the Folk sediment classifications, which shows how faunal groupings may be related to sediment characteristics.

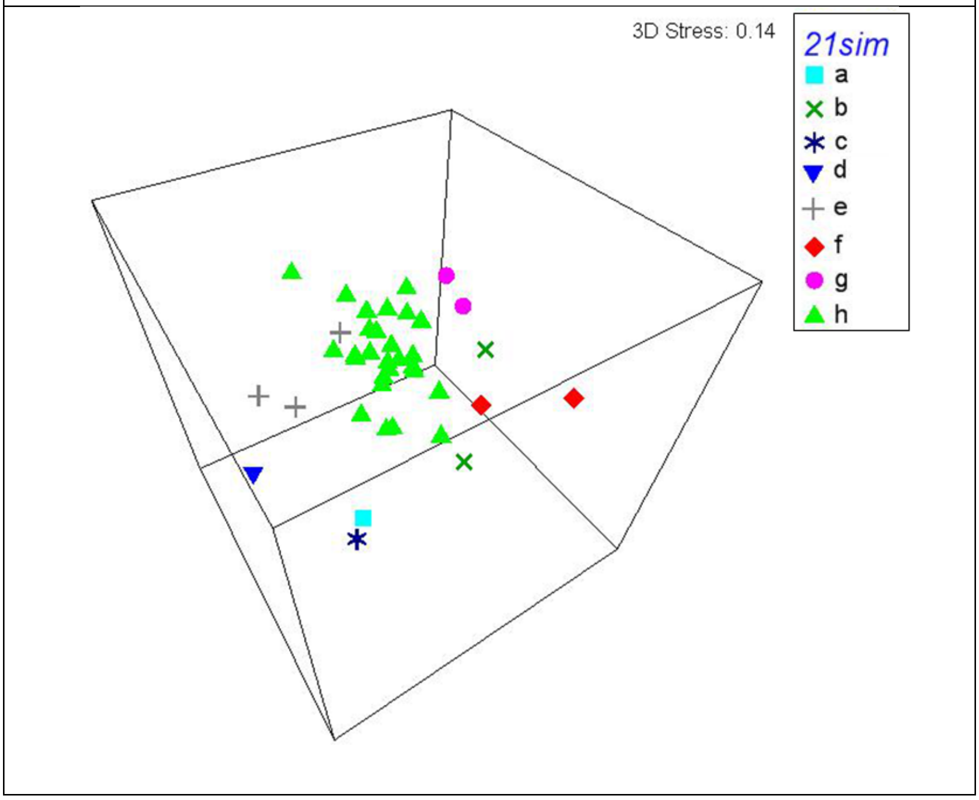
Figure 3.9 Dendrogram and MDS 2D Dimensional Plot Showing Groupings Based on 21% Similarity Slice of Faunal Data. Labels Show the Correspondent Folk (1954) Sediment Classification.



112. The stress revealed by 2D representation (*Figure 3.9*) is given as 0.19 (top right corner of the MDS plot). Although still potentially providing a useful representation of the multi-dimensional space, it indicates that the picture is a stretched and could be misinterpreted. For this reason, *Figure 3.10* presents two orientations (a and b) of the 3D MDS plot, which shows that the choice of 21% similarity slice, represents the grouping separation quite reasonably with a much lower stress level (0.14).

Figure 3.10 MDS 3D Dimensional Plot Showing Groupings Based on 21% Similarity Slice of Faunal Data.





113. Eight groups based on the 21% similarity slice were identified in the multivariate analysis. The SIMPER routine aided in the identification of the species characterising each group, it also highlighted those species determining their difference. The species composition of each group, contributing to up to 50% of the similarity within the group, is presented in *Table 3.5*.

114. The majority of the stations were grouped in Group h, showing an average similarity of 31.27%. *N. cirrosa* and *O. borealis* were the two species characterising this group; these are known to prefer coarse to fine muddy sand (MarLIN, 2006; Richards, 2007). These two fractions have been highlighted as being the main ones driving the biological distribution in the area (see *Figure 3.2*) and were the main fractions recorded at most of the sites (see raw data in *Appendix P*).

115. *N. cirrosa* was the only species describing the 100% within similarity of group g, being the only one present in both sites forming group g. As described above this species is also characteristic of group h. The SIMPER routine highlighted a dissimilarity of 81.38% between these two groups, mainly due to the impoverished list of species characterising the sites forming group g compared to those characterising group h.

116. *Pisione remota* is the species describing more than 50% of the within similarity of group f. Compared to group h, this group also shows an impoverished community and *P. remota* is also amongst the species which describe the dissimilarity of 89% between this group and group h. The species was found at sites were the coarser sediment fraction is higher, therefore the difference between groups; this is confirmed by the fact that it has been described on coarser sediments of the North Sea (Künitzer *et al.*, 1992).

117. The genus *Notomastus* describes 80% of the within similarity for group b. This genus is also the one mainly contributing to the 93-65% dissimilarity between this group and group h. Species belonging to this genus do not show clear preference for specific sediment grain size, however, the habitat preference of this species appears to be driven by the mud content. Sediments which have a mud content of 0 to 50% are considered suitable, with clear preference for mud content above 10% (EOL online). The content of fines and mud of the sites were the species was recorded during this survey meet these characteristics.

118. The phylum Nemertea and the species *Echinocyamus pusillus* and *Lumbrineris cingulata* characterised group e. The species are known to inhabit soft

sediments, including medium to coarse sand (Marine Species Identification Portal, Roe *et al.*, 2007, Reich *et al.*, 2010).

119. The other groups (a, c and d) were all formed by singletons and their characteristics are summarised in *Table 3.5*. The major difference when compared to the main group h is the higher content in mud, which is confirmed by the presence of tube-dwelling shrimp *Callianassa subterranea*, known to prefer muddy sediments and the muddy fine sand species *Kurtiella bidentata* (MarLIN, 2006).

120. The distribution of the statistical groups is presented in *Figure 4.11* and the species highlighted by the SIMPER analysis as driving the differences between groups are presented in *Figure 3.12*.

Table 3.5 Species Contributing up to 50% of the Within Similarity of SIMPER Groups.

Groups	Sites in group and dominant sediment characteristics	Species	Average abundance	Cumulative (%)
a	3● gravelly muddy Sand very poorly sorted	*Phoronis* sp. *Goniada maculata* *Callianassa subterranea*	9 4 4	68% of the total abundance at the site
b	37, 39 gravelly sand/slightly gravelly muddy Sand poorly sorted/very poorly sorted	*Notomastus* sp.	4.78	80%
c	38● gravelly Sand very poorly sorted	*Ampelisca spinipes* SIPUNCULA (juv) *Paradoneis lyra* *Ophiura albida* Clymenura *Leptochiton asellus*	5 4 4 4 2 2	12% 10% 10% 10% 5% 5%
d	2● gravelly muddy Sand very poorly sorted	*Kurtiella bidentata* *Echinocyamus pusillus* *Phoronis* sp. *Pholoe baltica*	44 32 30 9	19% 14% 13% 4%
e	32, 35, 36 gravelly Sand poorly sorted	NEMERTEA *Echinocyamus pusillus* *Lumbrineris cingulata*	1.99 1.41 1.75	21.95% 16.73% 14.88%
f	14, 22 slightly gravelly Sand/gravelly Sand moderately sorted/poorly sorted	*Pisione remota*	1.57	58.58%
g	29, 30 slightly gravelly Sand/gravelly Sand moderately sorted	*Nephtys cirrosa*	1.50	100%
h	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 31, 33, 34 slightly gravelly Sand moderately well sorted	*Nephtys cirrosa* *Ophelia borealis*	1.45 1.59	35.28% 34.68%

• in these groups there was only one site (less than two samples) so the abundance indicated is the actual value recorded in the sample and the cumulative percentage is the percentage of each abundance against the total abundance at the site.

Figure 3.11a Distribution of the Statistical Grouping (Grab Results) in the Survey Area.

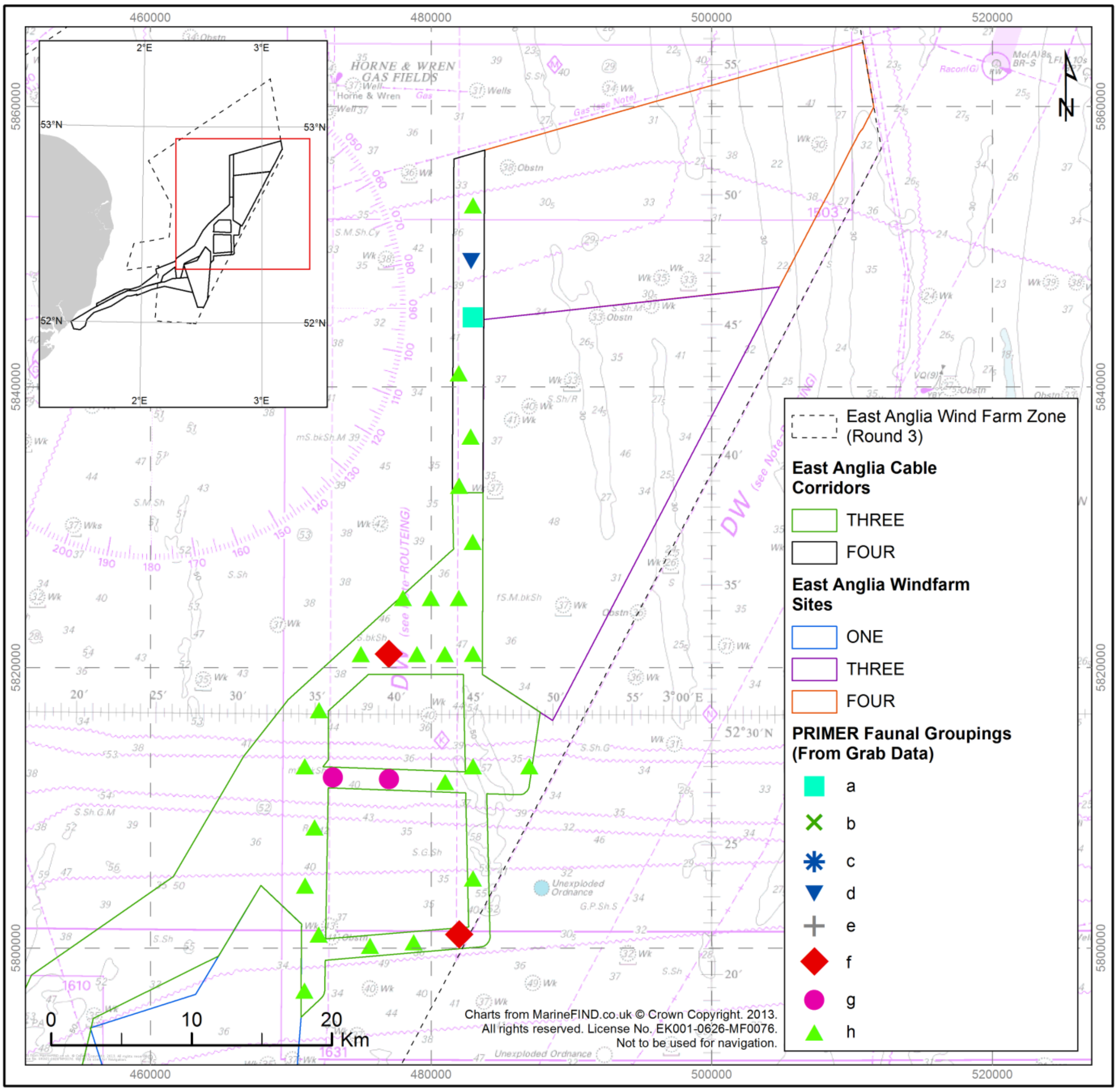


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Figure 4.11b Distribution of the Statistical Grouping (Grab Results) in the Survey Area.

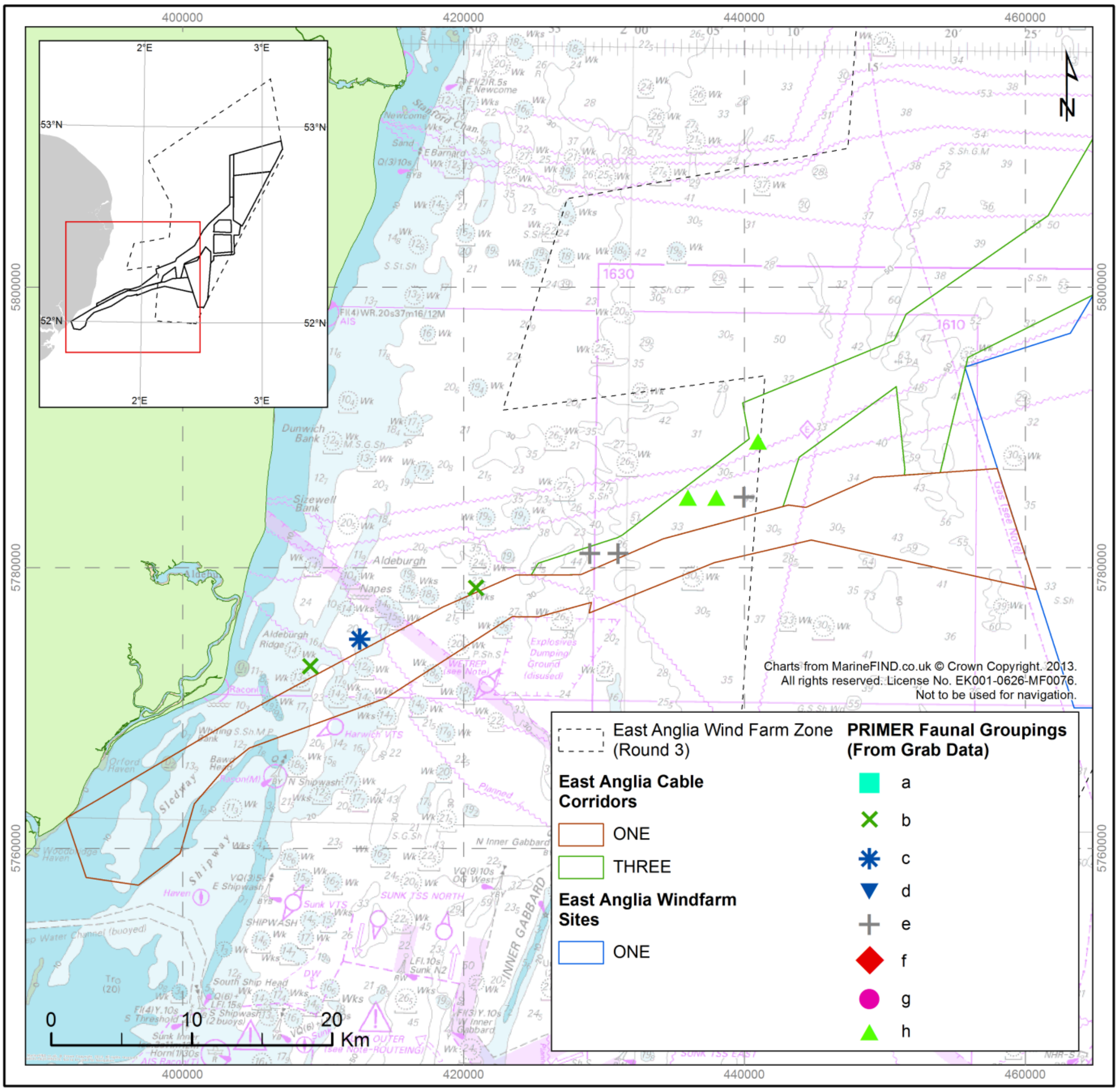

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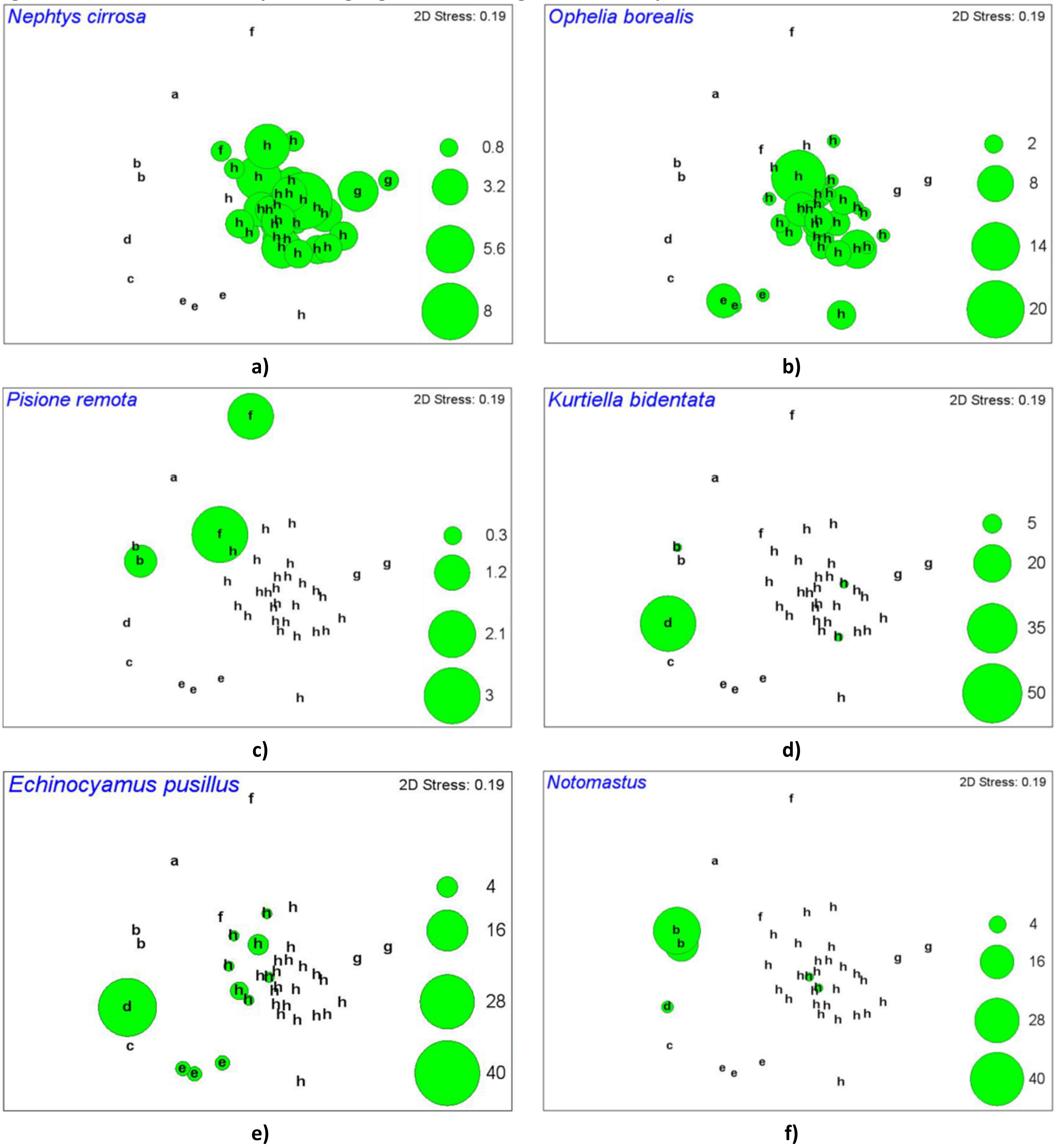
Figure 3.12 MDS Plots with Species Highlighted as Driving SIMPER Group Differences.



3.2.3 Biotopes

121. The species list combined with available environmental information (such as PSD and water depth) collected at each grab site were analysed and a biotope allocated to all sites individually. To aid the analysis, the species list was entered into BioScribe, the biotope decision support tool (Hooper *et al.*, 2010); additionally, biotope allocation was considered using the infauna data only, whilst epifaunal species recorded in the grab samples were used as additional information to facilitate the biotope (or biotope complex) allocation. Where it was felt necessary, individual species were entered into the JNCC Biotopes search pages and any additional information noted was cross referenced with any biotopes already being considered.

122. The area was described mainly as a mix of medium to fine sand. The gravel fraction varied between below 10% at the majority of the sites and above 20% at a few sites. Apart from sites 2 and 3, located offshore, the sites closer to shore were those with a mud fraction, generally varying, at those sites were the mud/silt fraction is above 5%, between about 10 and 22%, with a peak of 40% at one site only. This sediment composition, together with the infaunal species guided the analysis to the biotope allocation presented in *Table 3.6*.

123. The analysis regularly returned the same small pool of biotopes, between which it was sometimes hard to discriminate. The species lists were not very rich and as the choice was sometimes hard, it was felt more appropriate to leave the description to biotope complex. Few biotopes could have been suggested, but the limited supporting data to their descriptions made the choice not definite. Where appropriate they have been discussed later in the text.

124. The most common biotope allocated across the area was SS.SCS.CCS (Circalittoral Coarse Sediment). The biotope is characterised by tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15-20m and was assigned to those sites where the coarser sand fractions and the gravel/shingle fraction were contributing more to the sediment composition. To those sites where the sediment composition was mainly medium to fine sand, the biotope SS.SSA.CFiSa (Circalittoral fine sand) was allocated. This biotope complex contains two biotopes which have been considered for these sites. These were SS.SSA.CFiSa.EpusOborApri (*Echinocyamus pusillus*, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand) and SS.SSA.CFiSa.ApriBatPo *Abra prismatica*, *Bathyporeia elegans* and polychaetes in circalittoral fine sand). These are the only two biotopes for which the sediment

description reflects the fractions found during this survey as well as some of the key species. Unfortunately, these matches were not always definite and limited (or no) situation and temporal data available, makes these biotopes to uncertain to be assigned with confidence (Connor *et al.*, 2004). These were encountered mainly in the offshore survey area.

125. Other biotope complexes assigned included SS.SMX.CMx (Circalittoral mixed sediment) where the contribution of coarser and finer fractions was more proportionate and also where the underwater photography revealed the presence of pebbles and/or cobbles on the sediment surface. The biotope SS.SMU.CSaMu (Circalittoral sandy mud) was allocated to site 39 only, where the mud fraction exceeded 40%.

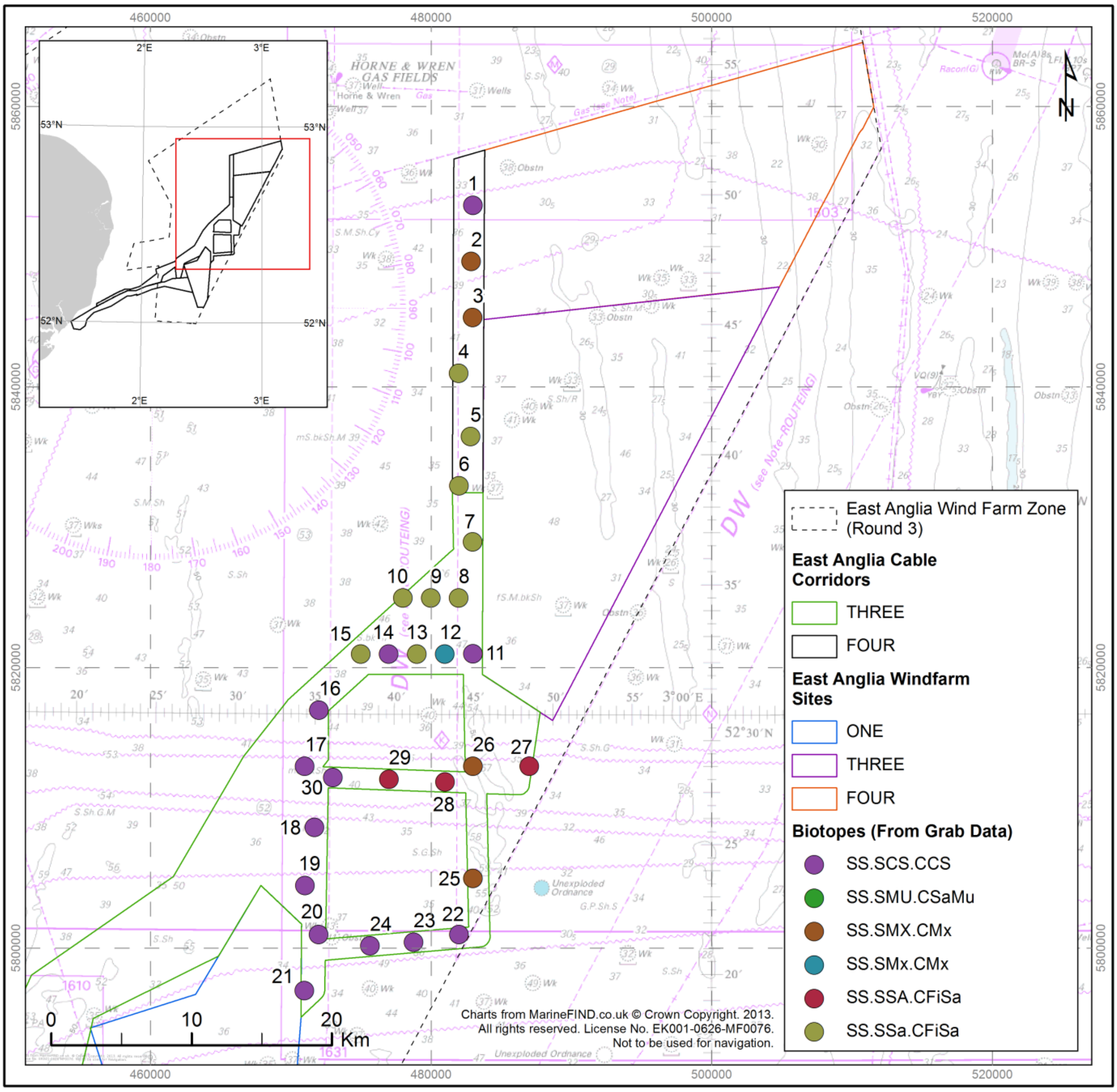
126. Their distribution along the cable route is presented in *Figure 3.13.*

Table 3.6 Biotopes per Site. Biotopes Within the Statistical Groupings (21% similarity) are Also Presented.

Site_No	Biotopes	Primer Group	Site_No	Biotopes	Primer Group
3	SS.SMX.CMx	a	19	SS.SCS.CCS	h
37	SS.SCS.CCS	b	20	SS.SCS.CCS	h
39	SS.SMU.CSaMu	b	31	SS.SCS.CCS	h
38	SS.SCS.CCS	c	33	SS.SCS.CCS	h
2	SS.SMX.CMx	d	34	SS.SCS.CCS	h
35	SS.SCS.CCS	e	12	SS.SMx.CMx	h
36	SS.SCS.CCS	e	25	SS.SMX.CMx	h
32	SS.SMx.CMx	e	26	SS.SMX.CMx	h
14	SS.SCS.CCS	f	4	SS.SSa.CFiSa	h
22	SS.SCS.CCS	f	5	SS.SSa.CFiSa	h
30	SS.SCS.CCS	g	6	SS.SSa.CFiSa	h
29	SS.SSA.CFiSa	g	7	SS.SSa.CFiSa	h
1	SS.SCS.CCS	h	8	SS.SSa.CFiSa	h
11	SS.SCS.CCS	h	9	SS.SSa.CFiSa	h
16	SS.SCS.CCS	h	10	SS.SSa.CFiSa	h
21	SS.SCS.CCS	h	13	SS.SSa.CFiSa	h
23	SS.SCS.CCS	h	15	SS.SSa.CFiSa	h
24	SS.SCS.CCS	h	27	SS.SSA.CFiSa	h

Site_No	Biotopes	Primer Group	Site_No	Biotopes	Primer Group
17	SS.SCS.CCS	h	28	SS.SSA.CFiSa	h
18	SS.SCS.CCS	h			

Figure 3.13a Distribution of Biotopes in the Survey Area.



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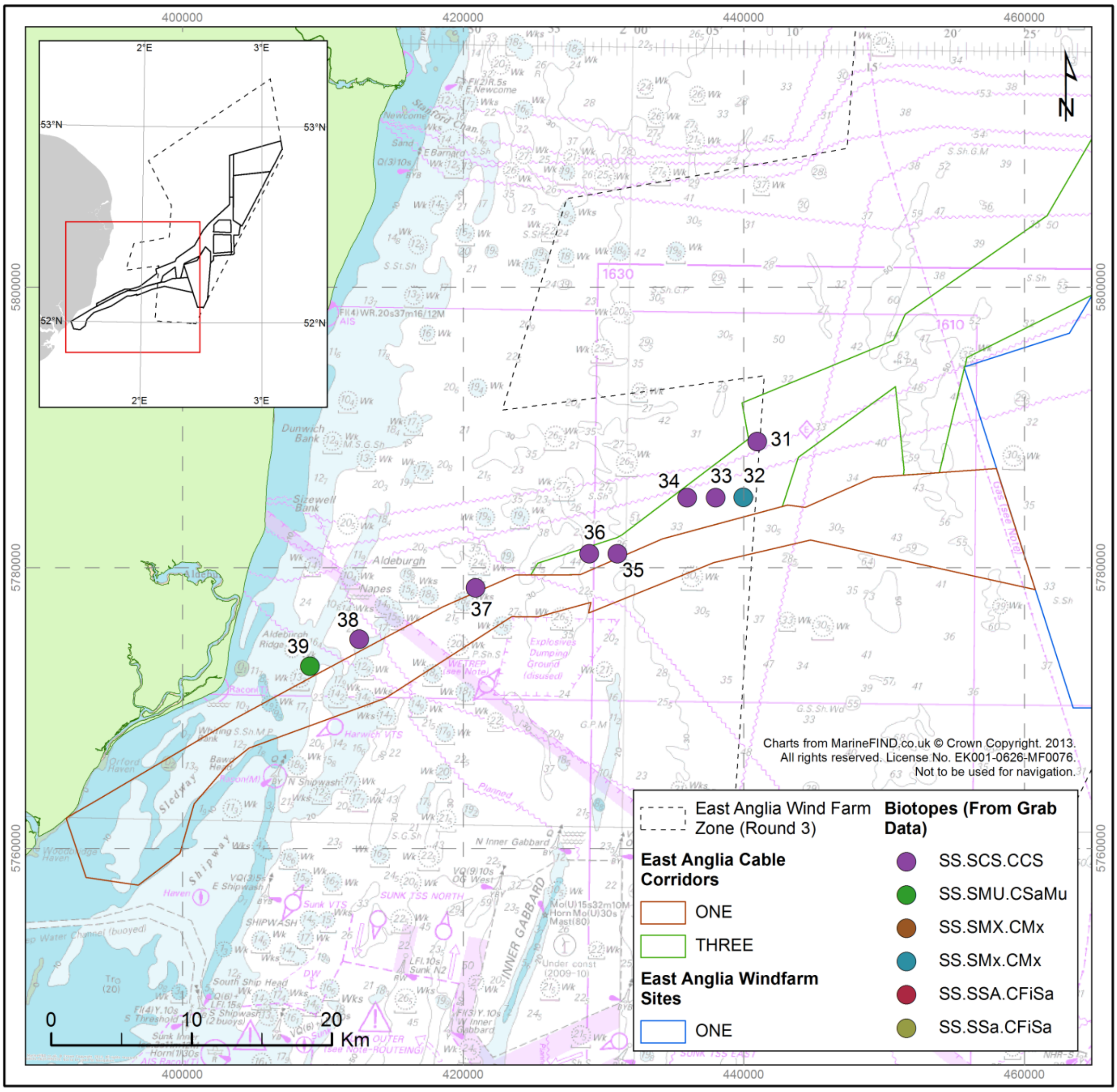
21/11/2013 -- 16:55:21

Figure 4.13b Distribution of Biotopes in the Survey Area.



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3.3 Epibenthic Trawl Data

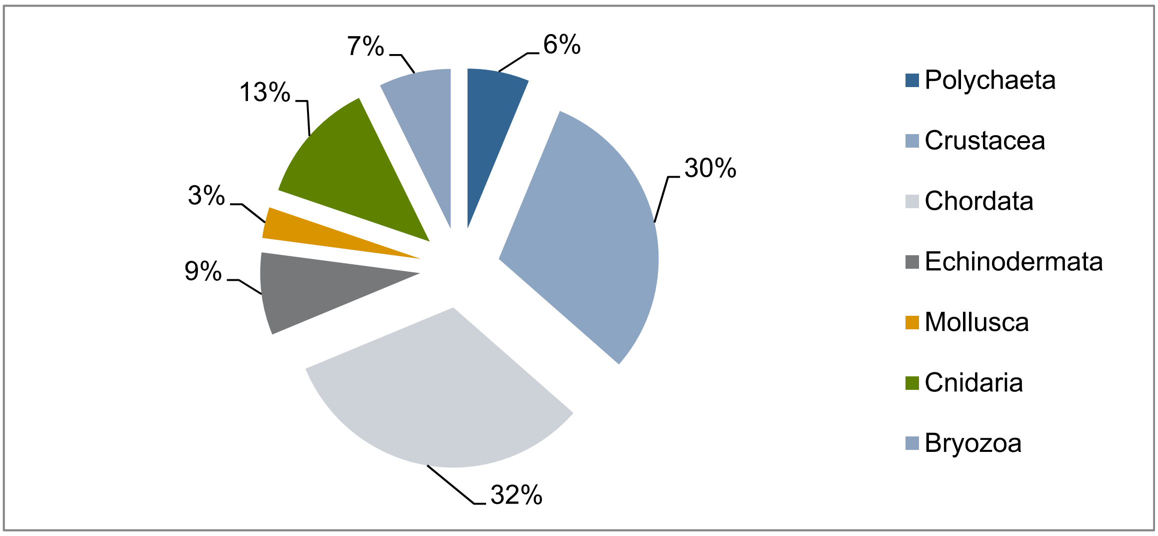
127. Large and more mobile epibenthic communities were investigated by a series of twelve 2 m beam trawls (see *Appendix S* for raw data). Trawl site T3 was abandoned due to the presence of *Sabellaria* as detected by the drop down video (DDV) survey). All other sites were successfully sampled.

128. The total number of taxa used in the analysis was 96 including enumerated and non-enumerated, 72 of which were identified to species level.

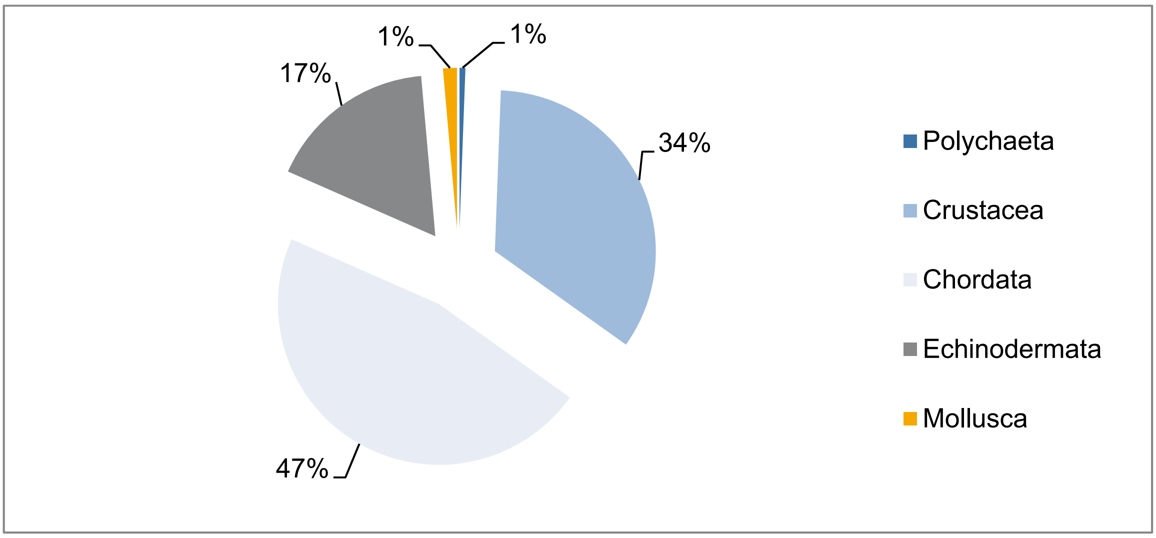
129. The most common epibenthic group sampled was Chordata (31%), followed by Crustacea (29%) and Cnidaria at 12%. All the other major groups accounted for less of 10% each (*Figure 3.14a*).

130. The non-enumerated taxa included all the colonial organisms which belonged to the Phyla Cnidaria and Bryozoa. The abundance calculations included numerable taxa only and therefore the colonial organisms recorded were excluded. A total of 3,216 individuals were recorded. As well as being the most common phylum, Chordata were also the most abundant one, accounting for 47% of the total abundance. This was due to the high numbers of solenette *Buglossideum luteum*, sand goby *Pomatoschistus minutus* and lesser weever *Echiichthys vipera*. The second most abundant major group was Crustacea, with 34%, due to high abundance of the brown shrimp *Crangon allmanni* and the shrimp *Philocheras trispinosus*, and Echinodermata (17%), with the brittlestars *Ophiura ophiura* and *Ophiura albida* being the two most abundant species. Other major taxa contributing to the total abundance included Mollusca (1%) and Polychaeta (1%) (*Figure 3.14b*).

Figure 3.14 Percentage Contributions of Major Taxonomic Groups to the Total Number of Taxa Recorded (a) to the Total Abundance for Enumerated Taxa Only (b).



a)



b)

131. The top ten most abundant taxa and their frequency for both enumerated and non-enumerated taxa are presented in *Table 3.7* Total Abundance and Frequency of Top Ten Most Enumerated Taxa, and Frequency of the Top Ten Non-Enumerated Taxa Recorded from the 2 m Beam Trawl Survey.. *B. luteum* was the most abundant species and was recorded at 11 of the 12 trawls. The same frequency was recorded for *O. albida* and *E. vipera*, both included amongst the top ten most abundant species.

Recorded at all sites were the most abundant shrimp *C. allmanni* and the shrimp *Philocheras trispinosus*, as well as the second most abundant fish species, the sand goby *P. minutus*. The rest of the top ten most abundant taxa were recorded at 9 to 10 out of the 12 trawl sites investigated. Amongst the non-enumerated colonial sessile taxa, the hydroids *Sertularia argentea* and *Hydrallmania falcata* were the most frequently recorded species, having been collected at 5 out of the 12 trawls sites visited.

132. The distribution of the total number of taxa and the total number of individuals (enumerated taxa only), across the survey area, are presented in *Figure 3.15* and *Figure 3.16* respectively.

Figure 3.15a Number of All Taxa Per 2 m Beam Trawl Across the Survey Area.

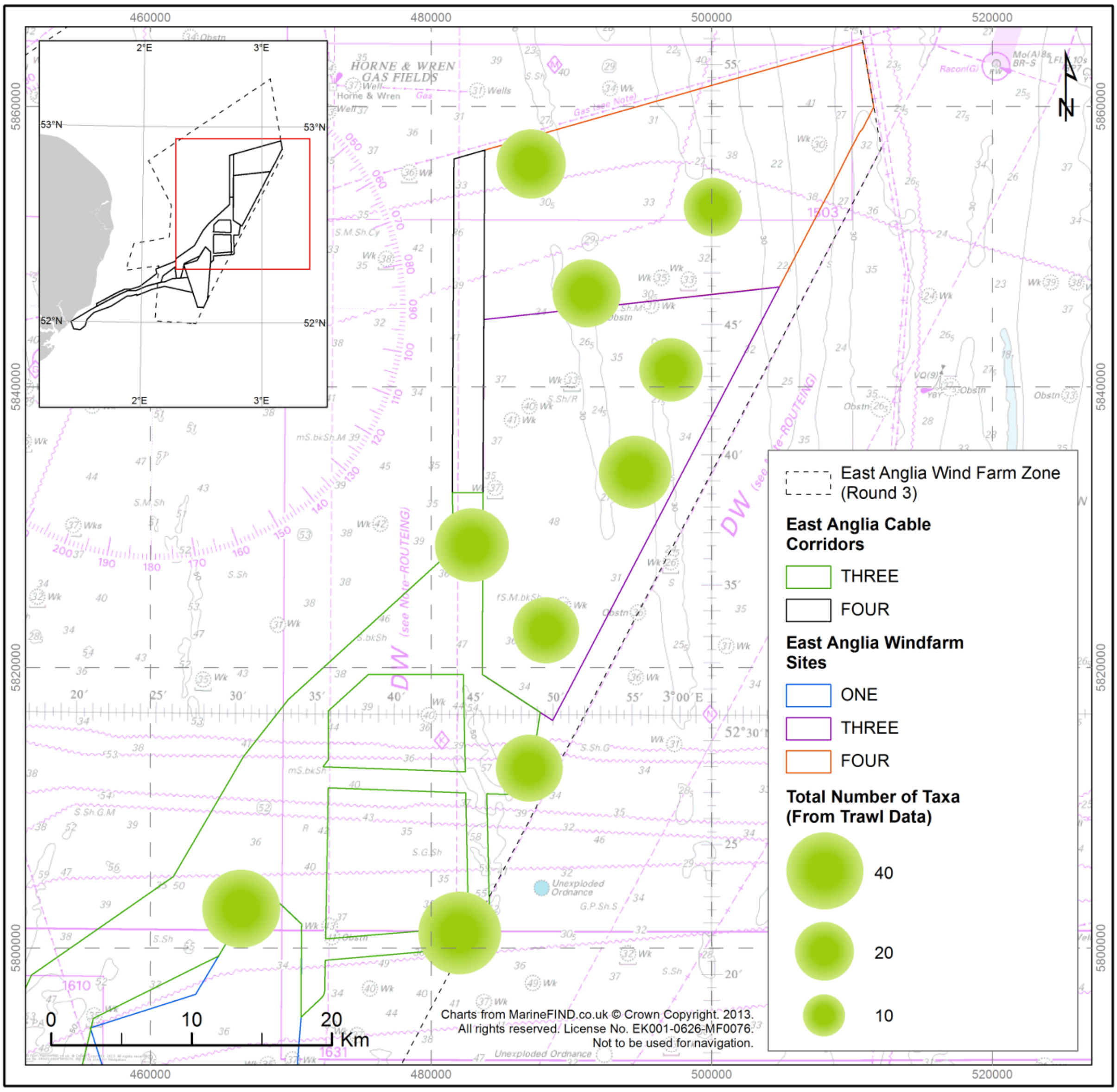


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Figure 4.15b Number of All Taxa Per 2m Beam Trawl Across the Survey Area.

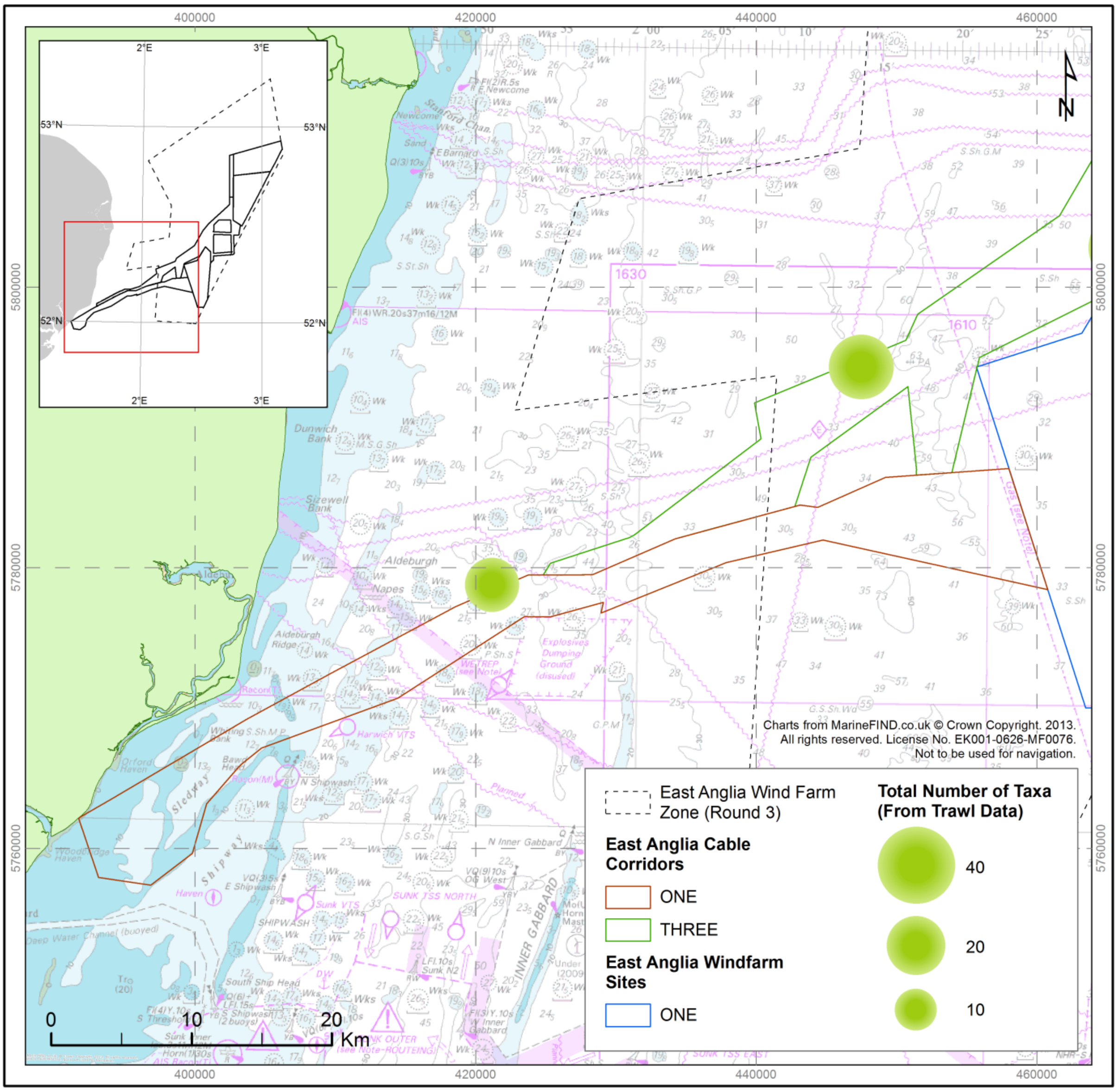

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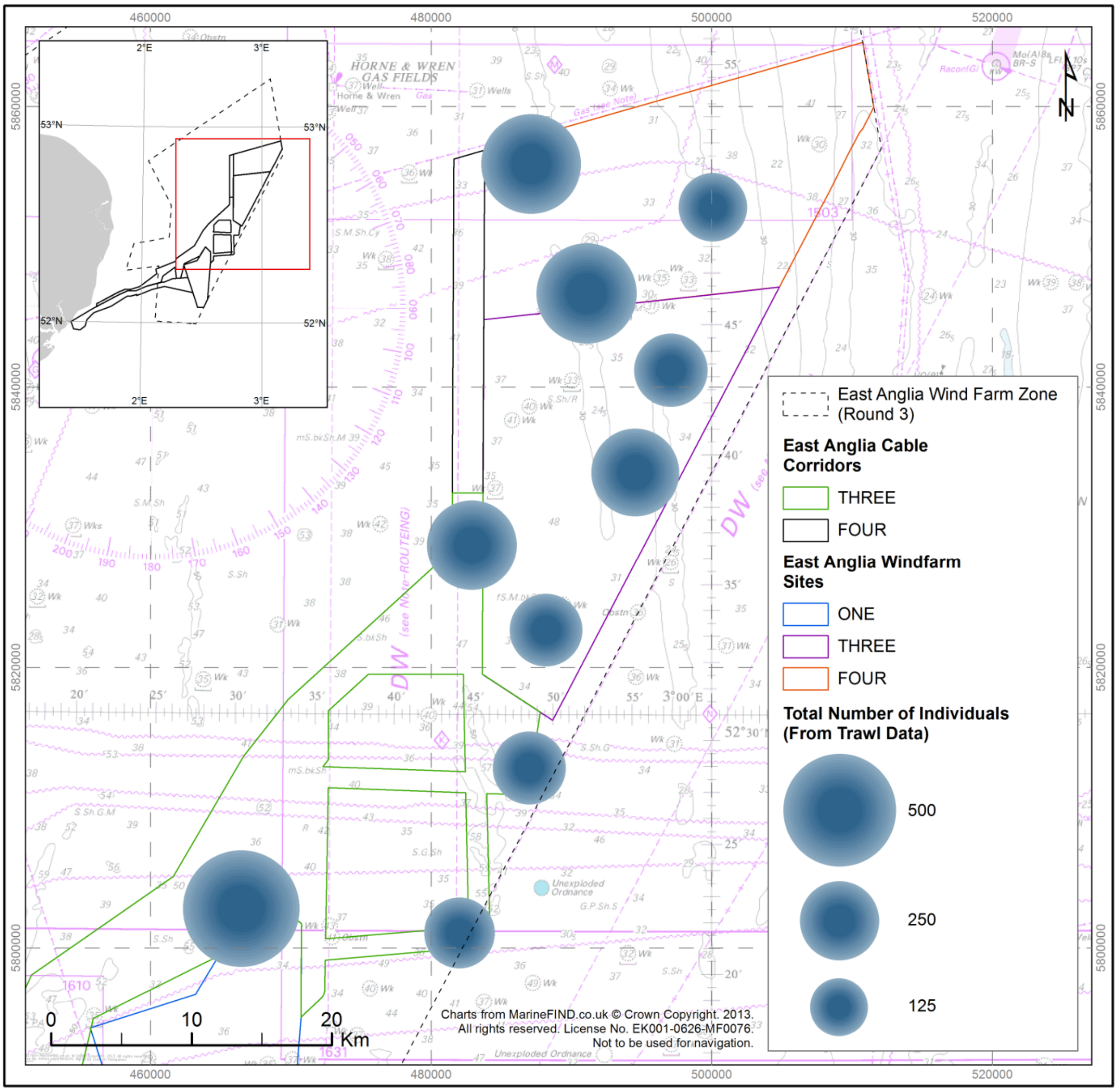
Figure 3.16a Number of Individuals (Enumerated Taxa Only) Per 2m Beam Trawl Across the Survey Area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Individuals_from_Trawls_North.mxd)
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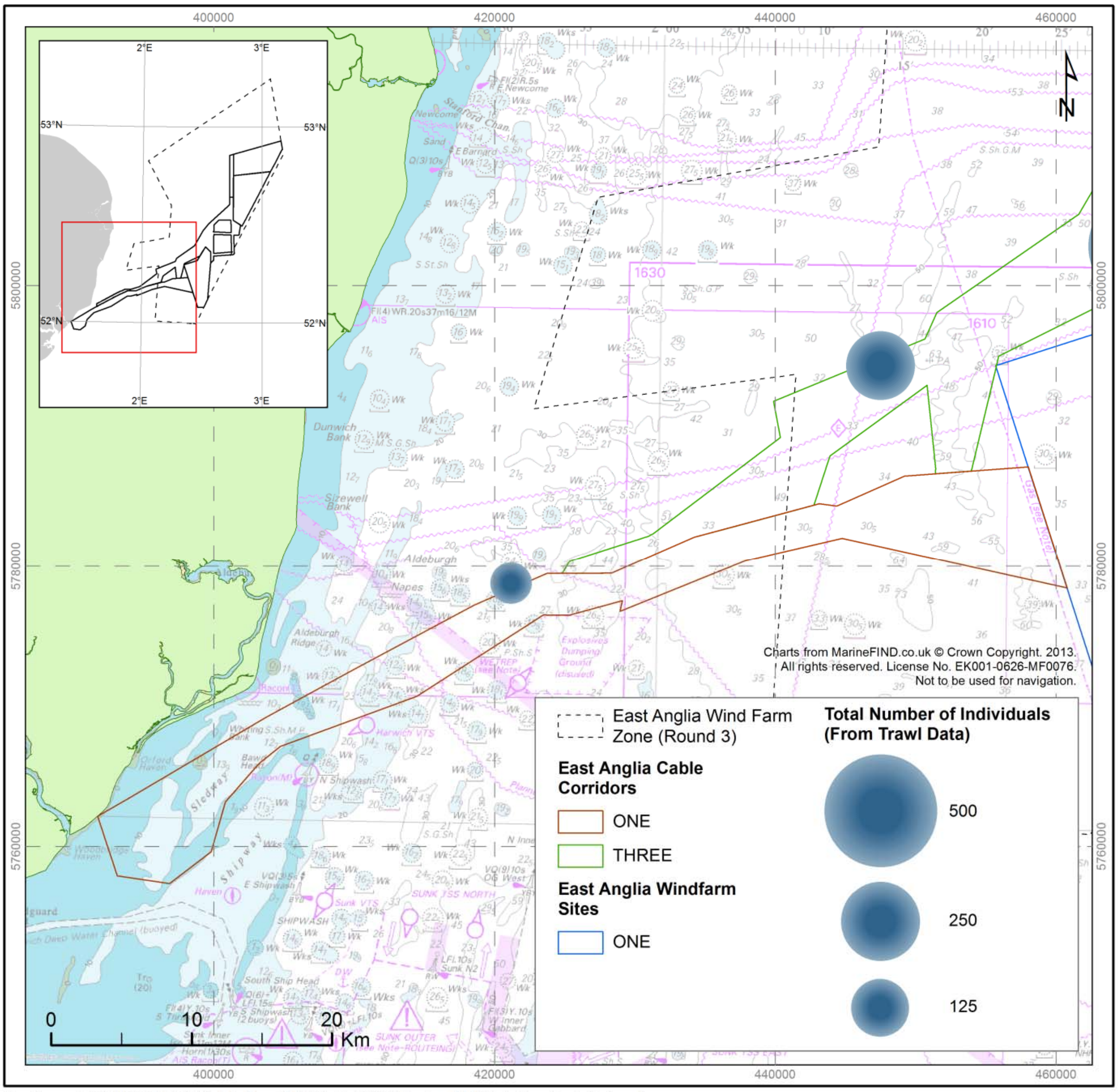
Figure 4.16b Number of individuals (enumerated taxa only) per 2 m beam trawl across the survey area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_Number_of_Individuals_from_Trawls_South.mxd)
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Table 3.7 Total Abundance and Frequency of Top Ten Most Enumerated Taxa, and Frequency of the Top Ten Non-Enumerated Taxa Recorded from the 2 m Beam Trawl Survey.

Taxa (Enumerated)	Abundance	No. of Trawls	Taxa (Not-enumerated)	No. of Trawls
Buglossidium luteum	704	11	*Sertularia argentea*	5
Crangon allmanni	624	12	*Hydrallmania falcata*	5
Pomatoschistus minutus	353	12	*Sertularia*	4
Ophiura ophiura	259	10	*Hydractinia echinata*	4
Ophiura albida	161	11	*Sarsia*	3
Echiichthys vipera	134	11	*Sabellaria*	3
Philocheras trispinosus	105	12	*Obelia*	3
Liocarcinus holsatus	78	9	Tubulariidae	2
Arnoglossus laterna	76	10	*Alcyonidium*	2
Asterias rubens	65	10	Bougainvilliidae	2

133. At the 12 trawling sites, a total of 30 fish taxa were recorded. Of these, 22 were identified to species level and only eight to a higher level. Abundance and frequency recorded for the top ten most abundant taxa are presented in *Table 3.7*. The solenette *B. luteum* and the sand goby *P. minutus* accounted, together, for 70% of the total abundance and were recorded, respectively, at 11 and 12 of the total of 12 trawl sites investigated.

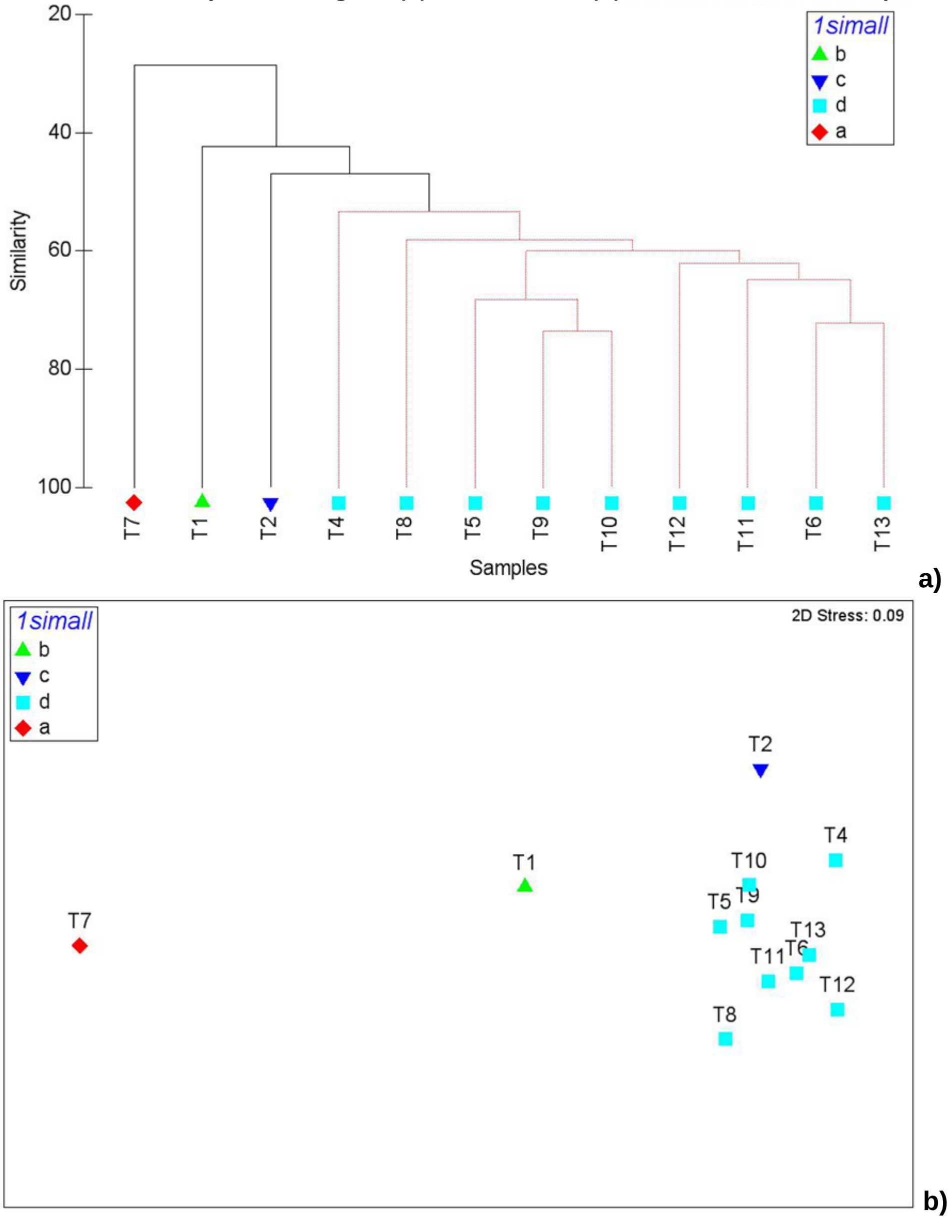
Table 3.7 Total Abundance and Frequency of Top Ten Fish Taxa Recorded from the 2 m Beam Trawl Survey.

Fish Taxa	Tot Abundance	Frequency	% of abundance
Buglossidium luteum	704	11	47
Pomatoschistus minutus	353	12	23
Echiichthys vipera	134	11	9
Arnoglossus laterna	76	10	5
Limanda limanda	36	8	2
Agonus cataphractus	29	9	2
Callionymus lyra	26	8	2
Callionymus	15	4	1
Hyperoplus (juv.)	15	7	1
Hyperoplus lanceolatus	13	7	1

134. Trawl data multivariate analysis was carried out including the numerable taxa with their full abundance data; the presence of the colonial species was accounted for by giving the non-numerable colonial species an abundance of one. The cluster and ordination analysis highlighted one main faunal grouping formed by 9 sites (group d) and three minor groupings formed by 3 single sites (groups a, b and c).

135. Cluster analysis and the correspondent 2D multi-dimensional plot are presented in *Figure 3.18.*

Figure 3.17 Cluster Analysis Dendrogram (a) and MDS Plot (b) of 2m Beam Trawl Samples.

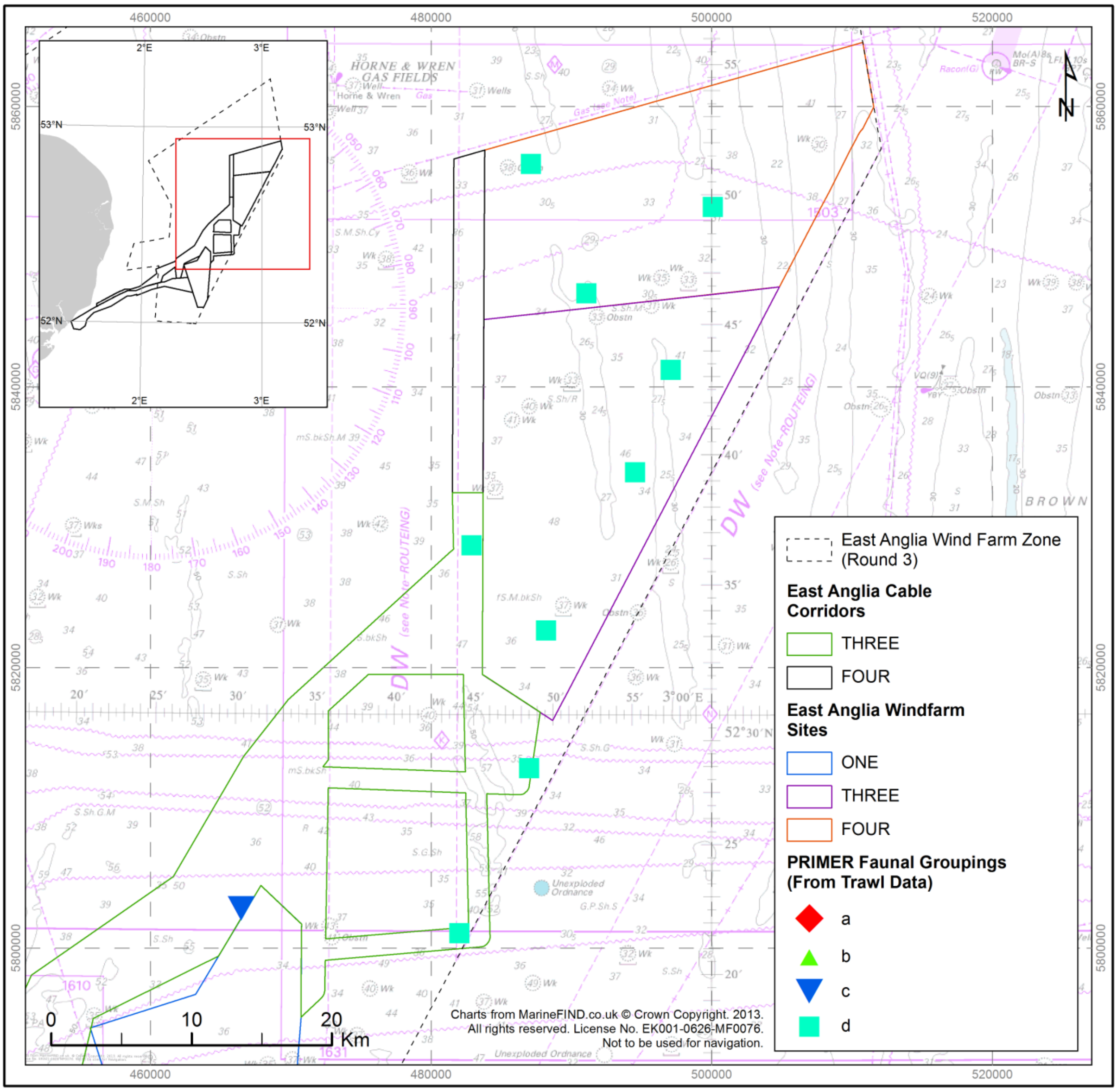


136. Group d included the majority of the trawl sites, indicating that the area is home to a common suite of species. the fish species *B. luteum*, *P. minutus*, *A. laterna*, the echinoderm species *O. ophiura*, and *O. albida* and the crustacean species *C. allmanni*, and *P. trispinosus* characterise the group, contributing to up to 50% of the within group similarity.

137. Group a, formed by the trawl site T7, was the less diverse site, accounting for 19 taxa only, with the dominant taxa being the shrimp *C. allmanni*. Other species included the common sole *Solea solea* and the crustacean *P. trispinosus*. Group b is formed by the trawl site T1 and the characteristic taxa include the shrimp *C. allmanni*, the dominant species at this site, the hermit crab *Pagurus benhardus* and the lesser weever *E. vipera*. Group c is formed by the trawl site T2, which shows, again, the dominance of the shrimp *C. allmanni*. At this site the species was actually found in its highest numbers with over 300 individuals collected. Other species characterising the sites included the mollusc *Sepiola atlantica*, the fish *B. luteum* and the pink shrimp *Pandalus montagui*.

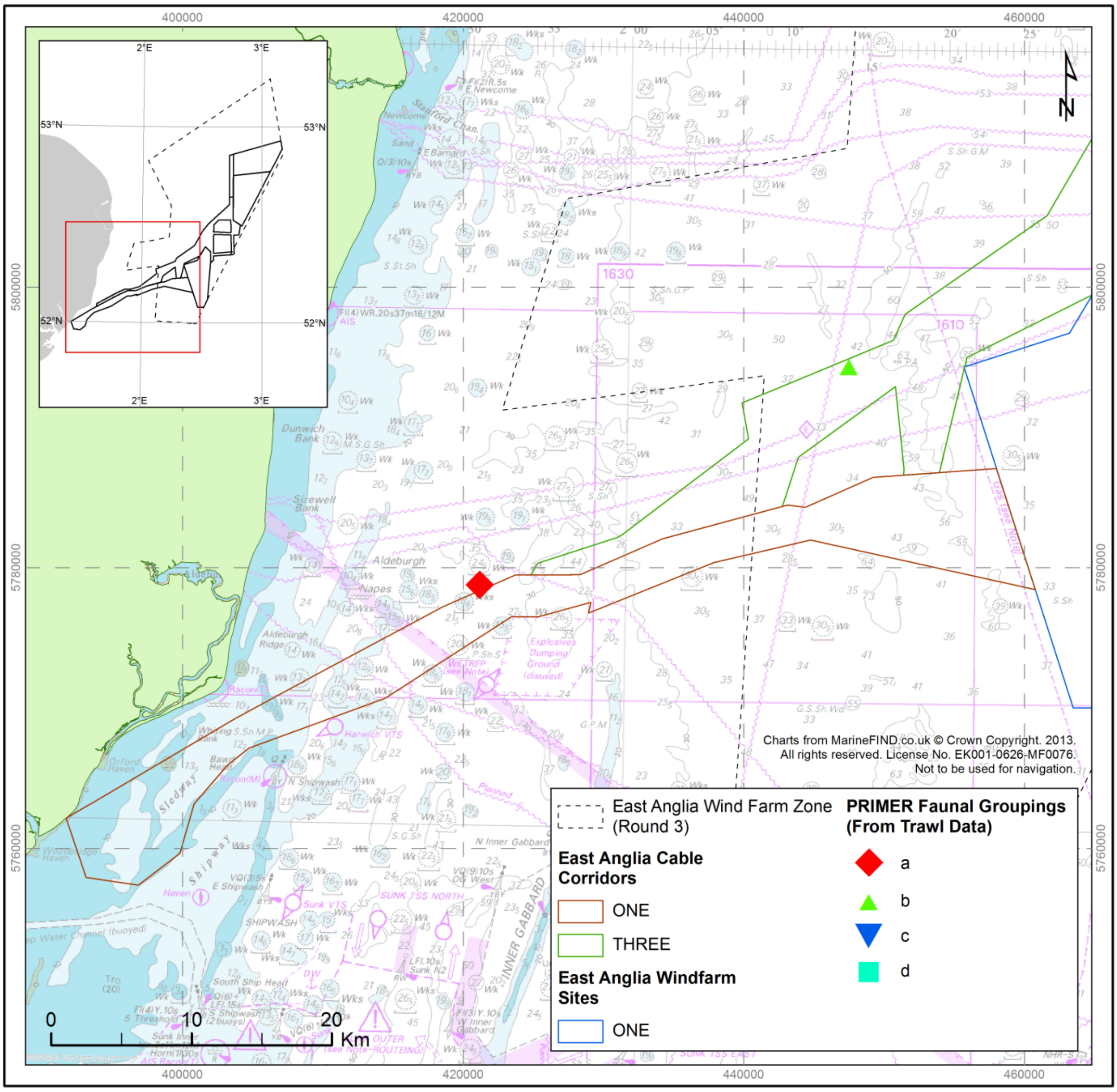
138. The distribution of the statistical groups across the survey area is shown in *Figure 3.18.*

Figure 3.18a Distribution of Statistical Groups from Trawl Data Within the Survey Area.



Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_PRIMER_Groupings_From_Trawls_North.mxd)
22/11/2013 -- 10:32:43

Figure 4.18b Distribution of Statistical Groups from Trawl Data Within the Survey Area.



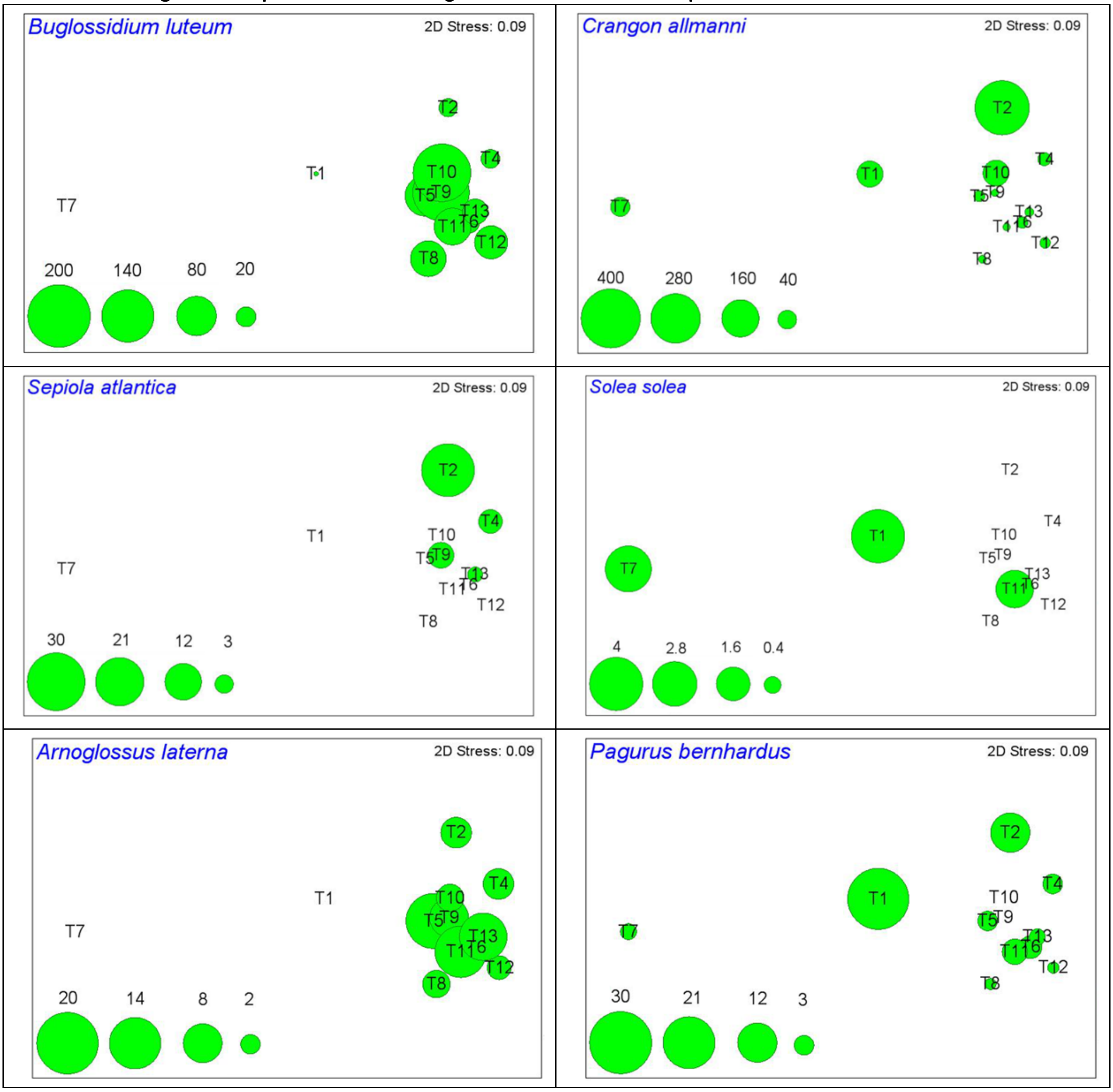
Map Document: (V:\J1132348_EAOW_Benthic_Survey\3_Plots\3_Final\Q2348_PRIMER_Groupings_From_Trawls_South.mxd)
22/11/2013 -- 10:44:34

139. The full SIMPER analysis with the top ten species contributing most to the within group similarity, as well as the top ten species contributing the most to the between group dissimilarity are presented in *Appendix T*. *Figure 3.19* shows some key species leading the dissimilarities observed.

140. Some of the differences can be identified as differences in the abundances of the same species between the groups, as well as some species showing a clear dominance at

some sites (within a group) compared to others. However, as shown in *Figure 3.18*, no clearly defined pattern can be identified by the distribution of the statistical groups across the survey area.

Figure 3.19 Species Characterising the Main Statistical Groups.



3.4 Species and Habitats of Conservation Interest

141. Species and habitats recorded during the grab and trawl sampling survey work were compared against the current information, relevant to UK waters, for those identified as of conservation interest. This included, but was not restricted to, the following legislative drivers and conventions:

- The Wildlife and Countryside Act 1981 (WCA81);
- Habitats Directive (Annex I Habitats and Annex II Species) as expressed in UK legislation (The Conservation of Habitats and Species Regulations 2010);
- Marine and Coastal Access Act 2009;
- The UK Post 2010 Biodiversity Framework; and
- OSPAR Threatened and/or Declining Species and Habitats.

3.4.1 Non-Indigenous Species

142. No non-indigenous species were recorded during the benthic survey.

3.4.2 Species

143. The two invertebrate species of potential conservation interest recorded from survey operations was the presence of *Obelia* sp. in Trawls 2, 9 and 10 and specimens of *Ophelia* sp. and *Ophelia* sp. (juv) at Trawl 12, Grab 31 and Grab 47. These genera include a species each (*Obelia bidentata* and *Ophelia bicornis*) that is listed in Sanderson, 1996.

144. Other organisms of conservation interest were recorded from trawls and were restricted to fish species, as listed in *Table 3.8*. Two species (the sand goby *Pomatoschistus minutus* and spotted ray *Raja montagui*) found in the trawl sample T1, are directly cited as species of conservation interest in the Bern Convention and the OSPAR Red List respectively. *Table 3.8* has been split into species recorded and those with associated conservation status to encompass the two genera and one family listed in the species list that are related to species of conservation interest.

Table 3.8 Taxa Species Identified as of Conservation Interest and Potential Conservation Status from the Trawl Surveys.

Taxa from trawls				
Scientific name	**Common name**	**Site**	**Species of conservation interest**	**Conservation status**
Ammodytes sp.	Sandeel	T4, T5, T6, T12	*A. marinus*	UK Post 2010 species /NERC S.41
Ammodytidae		T13		
Pomatoschistus sp.	Goby	T4, T11	*P. microps*	OSPAR/Red List (LC) Bern Convention (App.3)
			P. minutus	Bern Convention (App. 3)
Pomatoschistus minutus	Sand goby	All trawls samples	*P. minutus*	Bern Convention (App. 3)
Raja montagui	Spotted ray	T1	*R. montagui*	OSPAR/Red List (LC)
Buglossidium luteum	Solenette	T2, T4, T5, T6, T8, T9, T10, T11, T12 and T13	*B.luteum*	Red List (Least Concern)

145. Solenette was abundant and is an IUCN global red list species, but its status is that of 'least concern'. Widespread and abundant species are included in this category and the IUCN assessment indicates that solenette are "*considered abundant in areas of its range*" (Munroe and Herdson, 2009); there are no specific protection measures for solenette in place in the UK.

3.5 Contaminants

146. Contaminant samples were taken for the analysis of polycyclic aromatic hydrocarbons (PAHs), metals and organotin compounds. The results of these analyses are presented in *Appendix U* and values are compared against Effects Range Low (ER-L)[1] levels and Effects Range Medium (ER-M)[2] levels. These levels are guidelines for assessment used

[1] Effects Range Low (ER-L) is the concentration at which adverse benthic impacts are found in approximately 10% of the studies (NJDEP, 2009). Adverse effects on organisms are rarely observed when concentrations fall below the ER – L levels (OSPAR, 2009).
[2] Effects Range Medium (ER-M) is the concentration above which adverse benthic impacts were found in more than 50% of the case studies (NJDEP, 2009)

by OSPAR, Cefas action levels (CEFAS, 2003) and Clean Seas Environment Monitoring Programme (CSEMP) (NJDEP, 2009, CSEMP, 2012a).

147. Values for metals have been compared against the relevant ER-L and ER-M values and revised Action Levels (AL) 1 and 2 for dredged material, where available.

3.5.1 PAHs

148. Total hydrocarbons concentrations were between <0.05 mg/kg at sites 43 and 51 and 12.8 mg/kg at site 57. The current AL for Oil Hydrocarbons measures total hydrocarbons within sediment, which includes, but it is not limited to, PAHs. At all sites the values were therefore below the AL1 of 100µg/g (which equals to 100mg/Kg) (CEFAS, 2003). All the single PAH concentrations were below the ER-L guideline value or below the CEFAS (2003) OSPAR value, and only values for Acenaphthene, varying between <2 µg/kg to 14.1 µg/kg, were below the ER-M guideline levels of 500 µg/kg.

3.5.2 Metals

149. Concentrations of Cadmium, Lead, Mercury and Zinc were reported below the ER-L guideline at all sites. For Nickel, seven sites resulted below the ER-L guideline value, one site below the ER-M guideline value, whilst the remaining seven sites resulted above the ER-M guideline value. Arsenic was reported mostly below the ER-M guideline value, with only one site (site 30) above it. Copper was mostly below the ER-L guideline value, with only four sites reported below the ER-M guideline value, none was above this. Chromium was mostly below the ER-L guideline value, with 8 sites above this but below the ER-M guideline value. The data were plotted and are presented in *Appendix U*.

3.5.3 Poly Chlorinated Biphenyls (PCBs)

150. PCBs are contaminants which are now ubiquitous within the marine environment. PCBs do not occur naturally in the environment, being entirely derived from anthropogenic activities. The background concentration excluding any anthropogenic input is therefore zero (OSPAR, 2009c). No ER-L or ER-M criteria exist for assessing adverse impacts associated with sediment bound PCBs. Concentrations of all ICES7 PCBs (i.e. PCB – 028, PCB – 052, PCB – 101, PCB – 118, PCB – 138, PCB – 153 and PCB – 180) were below the AL1 of 0.1mg/kg, being reported <0.1µg/kg (which equals to 0.0001mg/Kg) at all sites.

3.5.4 Organotins

151. Amongst the organotins, concentrations of TBT in the sediments are used by OSPAR to assess adverse effects on biota. The potential effect on benthic fauna is therefore assessed against TBT concentrations reported by the chemistry analysis. As TBT is the most toxic organotin compound to marine fauna, this considers the worst case scenario against which conservative judgment can be made.

152. Levels of TBT recorded in sediments were <4µg / kg dw at all sites and therefore fell within Class C of the OSPAR reference levels OSPAR (2009). This is a six class (A to F) assessment scheme for TBT-specific biological effects in dogwhelks and other gastropods. The classes are described by a coloured scale (see *Table 3.9*) which indicates if the Ecological Quality Objectives (EcoQOs) are met, providing an indication of the effects that concentration levels of TBT tin may have on the reproductive capability of sensitive key species (OSPAR, 2009).

Table 3.9 Assessment Classes for TBT (OSPAR, 2009).

Assessment class	TBT sediment (µg TBT / kg dw)
A	n.d.
B	< 2
C	2 - <50
D	50-<200
E	200 -500
F	>500

4 DISCUSSION

4.1 Sediment Conditions

153. Rosenberg (1995) succinctly outlines what drives sediment condition in the marine environment stating, “physical energy above the sea bed is an important factor for the spatial distribution of different sediment types”. In high energy areas, sea bed features are commonly eroded and have a coarse sediment. Where bottom currents occur intermittently, episodic resuspension may take place, and in sea bed areas with low energy, accumulation is likely to prevail”. In the North Sea, currents and wave action tides are the dominant feature behind the dynamic nature of the physical environment (Otto et al., 1990).

154. The Southern North Sea sediment transport study (Wallingford *et al*., 2002) indicated that sediment distribution at a regional scale was broadly reflective of the hydrodynamic forces in play. Thus in nearshore, more mobile areas, sands will be coarse to medium in nature while in deeper offshore waters, where tidal and wave action is reduced, fine sands and muds may accumulate with, additionally, some offshore muddy sediments fed by rivers and estuaries.

155. The dominant sediment fraction across the area was slightly gravelly sand ((g)S), which accounted for 51% of the sediment characteristics. Gravelly sand (gS) accounted for 31% of the sites surveyed. The dominant fraction was fairly uniformly distributed in the offshore part of the cable route, with a pocket of gravelly muddy sand (gmS) in the northern part of the cable route. The other sediment fractions occurred as a mosaic in the inshore part of the cable route.

4.2 Biological Conditions

156. The sediment type or related particle size structure is one of the key structuring abiotic factors behind benthic infaunal communities in the North Sea (Künitzer *et al*., 1992; Kröncke and Bergfeld, 2003) and more generally (Probert, 1984).

157. In a report on the benthic communities in the south western North Sea, Cefas (2006) state that the “patterns in the assemblage structure of benthic invertebrates coincided most closely with sedimentary conditions at the sampling stations. This is partly because the morphology, physiology and life-history characteristics of the benthic infauna and epifauna are also strongly influenced by the substrate”.

158. The most abundant species from the grab survey was *O. borealis.* Four of the top ten most abundant species / taxa were more widely recorded and these were the polychaete worms, *O. borealis*, *Nephtys cirrosa,* Nemerteans and juvenile brittlestars, Ophiuridae. Kunitzer *et al*., (1992) describes a species of *Nephtys* as typical of the southern North Sea sand sediments. *O. borealis* are found all over the North Sea in fine sand habitats (Kunitzer *et al*., 1992 and Desroy *et al*, 2002). As this indicates, species identified from the survey are commonly recorded in the North Sea and typical of the sediments found there.

159. The offshore gravelly muddy sands (Site 2) had the richest faunal communities with the highest mean numbers of species and individuals and the greatest diversity (H') values. This location coincided with an area of low elevation, patchy *S. spinulosa* tubes. Only one specimen was recorded from the grab sample, however it should be noted that on site grab sampling actively avoided any areas of potential Annex I *S. spinulosa* reef.

160. The most abundant mobile epibenthic invertebrate species from the 2 m beam trawl survey were the shrimp, *Crangon almanii*, and the flying crab*, Liocarcinus holstatus*. Calloway *et al*. (2002) found these two species to be ubiquitous across the southern North Sea and Jennings *et al*. (1999) identified *C. almanii* as one of six species defining assemblages in the central and southern North Sea. Another of the six species recorded by Jennings *et al*. (1999) was the brittlestar, *O. ophiura*, which was also one of the abundant and widespread species recorded from the trawl survey.

161. Abundant fish species from the epibenthic survey were *Buglossidium luteum, Limanda limanda, E.vivipera, Agonus cataphractus, Arnoglossus laterna* and Callionymidae. *B.luteum, L.limanda* and Callionymidae are the three species considered characteristic of the southern North Sea by Calloway *et al*. (2002).

162. Potential Annex I *Sabellaria spinulosa* reef was recorded from two sites within East Anglia THREE and East Anglia FOUR.

4.3 Contaminants

163. The contaminants concentration recorded during the survey and which were higher than ER - L guideline levels were assessed against concentration values recorded at a national level. These are available in EcoSystem (ICES, 2012), the ICES database which collates a variety of field data, including contaminants data collected between the years 1877-2012. The Marine Environment Monitoring and Assessment National

database (MERMAN), accessible through the British Oceanographic Data Centre website (BODC, 2012), has also been consulted as this includes a number of stations located within the Anglian region, monitored under the Clean Seas Environmental Monitoring Programme (CSEMP).

164. The values observed for the contaminants included in the present analysis are a reflection of the overall environmental status of the Anglian region; this is easily deduced when these data are compared with those held in the CSEMP database (CSEMP, 2012a).

4.3.1 PAHs

165. In the marine environment the presence and distribution of PAHs can be related to shipping activities such as burning of fossil fuels or oil spills; a long range transport of PAHs derived from burning of fossil fuels also occurs (OSPAR, 2009). OSPAR (2009 – Annex 3) summarises the data available for contaminants concentrations in sediments around the UK coast. Data collected from stations within the Anglian region are also available from CSEMP, 2012a and ICES (2012).

166. Concentrations of the majority PAHs recorded at all sites by the present study were below the ER-L guideline level or below the ER-M guideline value. None was recorded above the latter. Comparing the concentration values recorded by the present study against the historical data for the Anglian region, it is clear that these results are comparable with the concentrations found in the wider area. For example, concentrations of anthracene recorded at various locations within the Anglian region over the years, ranged between 8 and 1050µg / kg with highest values recorded mainly in the coast area around the Thames estuary. Some of these values are therefore above 85µg / kg (the ER-L guideline level for Anthracene), but below rthe ER-M value of 1100µg / kg. Similar patterns can be observed for the other single PAHs contaminants with a record in CSEMP for the Anglian region. Historical records for acenaphthene were available form ICES (2012); This contaminant was the only one which was recorded, during this survey, above ER- L guideline value, but greatly below ER-M guideline values. From the historical records it is detected that the majority of the records reported values below ER-L, but that values below ER-M also occurred.

4.3.2 Metals

167. Recorded values for metals during the present study highlighted that, with the exception of cadmium, lead, mercury and zinc, which were below the ER-L guideline levels at all sites, the other metals concentrations analysed were above the ER-L

guideline levels at a few sites. Arsenic was above ER-M at one site only, whilst nickel was the one with a few sites exceeding the ER-M value.

168. Also for metals, concentrations recorded during the present study are comparable with the surrounding environment, with some values actually showing a better state. For example, records in the CSEMP database (CSEMP, 2012) show that levels of Cadmium and Mercury in the Anglian region are below above CSEMP ER–L levels, but that for Lead and Zinc, the values are above ER-L levels The CSEMP database (CSEMP, 2012), although limited within the Anglian region, provides records showing that high concentrations of nickel and arsenic have been recorded in the area.

4.3.3 PCBs

169. For the Anglian region the MERMAN database does not hold records of individual concentrations the ICES7 PCB congeners in offshore sediment (CSEMP, 2012b); only one record is available for an inshore site where the levels of the individual PCBs are all below the Environmental Assessment Criteria (EAC). Due to the paucity of the historical data, it is however difficult to assess the findings of this report against typical environmental conditions. Values of the sum of ICES7 close to background are rare and sites where these concentrations are below the EAC are mainly confined to areas away from industrial activity and most offshore locations in the North Sea. It is therefore likely that the findings of this report reflect the typical environmental condition of the area.

4.3.4 Organotins (Tributyl-tin)

170. All tributyl-tin (TBT) concentrations found at sites sampled in this study fall in Class C (where concentrations range from 2µg / kg to < 50µg / kg) with a concentration very close to the lower end of the range (all <4µg/kg); these are not expected to “affect the reproductive capability of sensitive gastropod species” (OSPAR, 2009). Therefore, it is unlikely that levels recorded by the present study will present a problem in this respect.

5 CONCLUSIONS

171. Benthic communities are distributed on the basis of substrate type and are typical of the region;

172. This document describes the benthic ecological and sediment contaminant conditions along the proposed cable route as determined by grab, epibenthic trawl and drop down camera surveys. The document also presents information with regard to the distribution of Annex I habitat within the study area. From the results and interpretations of the data analyses the following conclusions can be drawn:

- Dominant seabed habitats were found to comprise slightly gravelly sand and gravelly sands and are continuous with those of the wider southern North Sea region;
- Benthic communities are distributed on the basis of substrate type and are typical of the region;
- Formal assessment was made for *Sabellaria* reef at three sites (sites 2, 43 and 46), with the latter two discrete locations identified as having medium to high resemblance to *Sabellaria* reef. Site two was classified as not reef;
- Levels of sediment contaminants were largely below guideline limits and in all cases typical of the region.

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APPENDICES

A. RV DISCOVERY SPECIFICATIONS

Vessel Particulars

Type:	Survey Vessel
UK Registry Code:	913523
Radio Call Sign:	2AEL8
LOA:	24.8m
Beam:	7.4m
Max Draft:	2.9m
GRT:	87.45 Tonnes

Safety

Maximum no. of persons:	12
Operation pattern:	24 hrs

SOLAS compliance:

- Liferafts 2 x 8 man pack A
- Lifejackets 14

Navigation Equipment

- Transas/ McMurdo MT1
- Vector Compass <1m accuracy/ 0.5° heading

Propulsion

Engines:	Twin 8V71 Detroits 280hp each
Endurance:	2000 Nm
Cruising Speed:	11 knts
Generator Capacity:	Cummins Onan 40/23 Kva Detroit 25kW
Generating Power:	Kohler 60 Kva

Working Conditions

Inshore operation on a 24hr basis for Geosurvey, Benthic and Marine Mammal survey

Accommodation

- 1 x four berth;
- 4 x double berths;
- 2 x toilets;
- 1 x shower;
- 2 x mess;
- 1 x galley.

Capabilities

- Hydrographic & Geophysical surveys;
- Benthic surveys;
- Oceanographic equipment deployment;
- Geotechnical surveys;
- ROV support;
- Marine Mammal Observation;
- Guard-ship;
- Wind Farm crew support;
- Buoy Deployment & Recovery.

Range

Fuel:	24,000 Litres
Freshwater:	22,000 Litres

Deck Equipment

Aft Deck A Frame:	2 tonne
Aft Winch:	2 x 2 tonne
Deck Crane:	500 kg
Forward Winch:	n/a
Forward Tow:	n/a

B. DAILY PROGRESS REPORTS

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: In transit to Great Yarmouth
Daily Progress Report No: 1 Date: 29/04/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
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HSE Summary

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Hazard Reports	0	0
Safety Briefings	0	0
Tool Box Talks	0	0
Vessel Safety Briefings	0	0
Vessel Safety Drills	1	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	15:75	0	15:75
OPS	0	0	0
Standby(Weather/tide)	0	0	0
Standby(Transit)	0	0	0
Standby (Other)	0	0	0
Breakdown	0	0	0
Accumulated	**15.75**	**0**	**15.75**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	Wind: SW F4-5 Sea state: Slight / Moderate	Wind: SW F4-5 Sea state: Slight / Moderate	Wind: SW F3-4 Sea state: Slight / Moderate

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	0	5
Grab samples – macrofauna and PSD	0	0	5
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	0	3
Area Four			
Drop Down Video	0	0	5
Grab samples – macrofauna and PSD	0	0	5
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	0	3
Area Three and Four Cable Route			
Drop Down Video	0	0	41
Grab samples – macrofauna and PSD	0	0	39
Grab samples - contaminants	0	0	4
2m Beam Trawl	0	0	7
Area One Cable Route			
Grab samples - contaminants	0	0	10

Daily Log

Time BST	Activity
08:15 – 24:00	The survey vessel RV Discovery in transit to Great Yarmouth from Portsmouth.
18:53	Test call to Whitelee Control Centre made, all okay in terms of communicating with the control centre from the vessel.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Vessel to continue transit, expected ETA 11:30.

Survey team to meet the vessel in Great Yarmouth to complete mobilisation.

Weather forecasts
Inshore water (Gibraltar Point to North Foreland) issued 04:06 UTC 29/04/2013
24 hours:
Wind: West or southwest F4 or F5, decreasing F3 or F4 for a time, veering northwest F3 or F4 later
Sea state: Slight, becoming moderate for a time
Weather: Mainly fair
Visibility: Good

48 hours:
Wind: Northerly or northwesterly F3 or F4 veering northeasterly F4 or F5, then southeasterly F3 or F4 in the north later.
Sea state: Slight or moderate
Weather: Fair
Visibility: Good

Shipping Forecast (Thames) issued 04:05 UTC 29/04/2013)
Wind: Westerly or southwesterly F5 to F7 decreasing F4 or F5, veering northwesterly later.
Sea state: Moderate or rough
Weather: Showers
Visibility: Good

Fugro EMU Limited comments

A vessel emergency drill was undertaken on 28/04/2013 in the evening prior to sailing (engine room fire).

3

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Transit to site
Daily Progress Report No: 2	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Date: 30/04/2013	
Survey personnel on board: Alison Bessell, Séamus Whyte, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

Distribution List

To Company:	Attention:	E-mail:
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HSE Summary

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	0
Hazard Reports	0	0
Safety Briefings	1	1
Tool Box Talks	3	3
Vessel Safety Briefings	1	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	23:22	15:45	39:07
OPS	0	0	0
Standby(Weather/tide)	0	0	0
Standby(Transit)	00:38	0	00:38
Standby (Other)	0	0	0
Breakdown	0	0	0
Accumulated	**24:00**	**15:45**	**39:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	N/A	N/A	N/A

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	0	5
Grab samples – macrofauna and PSD	0	0	5
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	0	3
Area Four			
Drop Down Video	0	0	5
Grab samples – macrofauna and PSD	0	0	5
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	0	3
Area Three and Four Cable Route			
Drop Down Video	0	0	41
Grab samples – macrofauna and PSD	0	0	39
Grab samples - contaminants	0	0	4
2m Beam Trawl	0	0	7
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 11:49	Survey vessel, RV Discovery in transit to Great Yarmouth.
11:49	Vessel alongside at Great Yarmouth
09:24 – 14:03	Survey team in transit to Great Yarmouth
14:03 – 16:33	Mobilisation and final equipment checks.
16:33 – 17:01	Survey safety briefing
17:01 – 17:51	Vessel safety briefing
17:51 – 20:00	Preparation for departure
20.00 – 20:24	Tool box talks for grab, video and trawls
20:24 – 20:39	Dry run of equipment deployment
20:39 – 23:22	Vessel alongside Great Yarmouth
23:22 – 24:00	Vessel in transit to survey site

3

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Undertake survey operations, heading to the eastern extents of the survey array, depending on sea conditions.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 04:11 UTC 30/04/2013
24 hours:
Wind: Northerly or northwesterly veering northeasterly F3 or F4, increasing F5 in the south later and veering southeasterly in the north.
Sea state: Slight or moderate
Weather: Mainly fair
Visibility: Good

48 hours:
Wind: In south, northeasterly F4 or F5, in north southeasterly F3 or F4 becoming variable or northeasterly F3 or less
Sea state: Slight or moderate
Weather: Fair
Visibility: Good

Shipping Forecast (Thames) issued 04:41 UTC 30/04/2013)
Wind: In north, northwesterly veering easterly or southeasterly F4 or F5. In south, northeasterly F5 to F7..
Sea state: In north, slight or moderate. In south, slight to moderate becoming moderate or rough
Weather: Fair
Visibility: Good

Fugro EMU Limited comments

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Transit from site 48 to site 6
Daily Progress Report No: 3 Date: 01/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Séamus Whyte, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

Distribution List

To Company:	Attention:	E-mail:
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HSE Summary

	Today	To Date
Accidents/Incidents	0	0
Near Misses	2	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	3	6
Vessel Safety Briefings	0	1
Vessel Safety Drills	1	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	23:22	39:07
OPS	16.03	0	16:03
Standby(Weather/tide)	0	0	0
Standby(Transit)	05.27	00:38	06:05
Standby (Other)	0	0	0
Breakdown	02:30	0	02:30
Accumulated	**24:00**	**24:00**	**63:45**

1

Weather

Weather /sea state conditions	0000-0600	0600-1200	1200-1800	1800-2400
	Wind: NE F4-5 Sea state: Moderate	Wind: E F4 Sea state: Moderate	Wind: NE F4 Sea state: Moderate	Wind: NE F4-2 Sea state: Moderate decreasing slight

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	4	4	1
Grab samples – macrofauna and PSD	4	4	1
Grab samples - contaminants	0	0	1
2m Beam Trawl	2	2	1
Area Four			
Drop Down Video	1	1	4
Grab samples – macrofauna and PSD	1	1	4
Grab samples - contaminants	0	0	1
2m Beam Trawl	1	1	2
Area Three and Four Cable Route			
Drop Down Video	0	0	41
Grab samples – macrofauna and PSD	0	0	39
Grab samples - contaminants	0	0	4
2m Beam Trawl	0	0	7
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 05:45	Vessel in transit to survey site
05:45 - 06:16	Undertaking survey operations (drop down video and trawling). Sea conditions not suitable for grab sampling.
06:16 – 06:51	Drop down video system – y splice changed
06:51 – 09:30	Undertaking survey operations (drop down video and trawling).
09:30 – 09:36	Toolbox talk – video system weight placement and deployment.
09:36 – 11:40	Undertaking survey operations (drop down video and trawling).
11:40 – 12:01	Vessel drill undertaken (Abandon ship)
12:02 – 12:07	Back deck shift handover
12:01 – 12:06	Bridge shift handover
12:07 – 14:40	Undertaking survey operations (drop down video and trawling).
14:40 – 15:20	Underwater visibility becoming poor, camera angles changed to improve video footage
15:20 – 17:40	Undertaking survey operations (drop down video and trawling)
17:40 – 19:35	Investigation and repairs to winch hydraulics undertaken
19:35 – 00:00	Undertaking survey operations (drop down video, trawling and grab sampling). Sea conditions improved to allow for grab sampling to be undertaken.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Complete survey operations within Areas Three and Four, and undertaken survey operations within the Areas Three and Four cable route.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 04:32 UTC 01/05/2013
24 hours:
Wind: Variable 3 or 4 north of Lowestoft, otherwise northeasterly 4 or 5, occasionally 6 in far south.
Sea state: Slight or moderate
Weather: Fair, occasional rain later in south.
Visibility: Good, becoming moderate or poor later in south

48 hours:
Wind: Variable 3 or 4 at first in north, otherwise easterly or northeasterly 4 or 5, becoming variable 3 or less later.
Sea state: Slight or moderate
Weather: Rain at first in south
Visibility: Moderate or poor at first in south, otherwise good

Shipping Forecast (Thames) issued 04:39 UTC 01/05/2013)
Wind: Northerly or northeasterly 5 to 7.
Sea state: Slight or moderate
Weather: Occas onal rain later
Visibility: Good, occasionally poor later

Fugro EMU Limited comments

Near Miss Details
1. One of the lead weights on the bottom of the video frame caught on the grab table, causing the weight to come off the video frame. Weight moved to a different pin. Toolbox talk conducted.
2. A noise and excessive heat were noticed from the control valve block of the hydraulics system. Hydraulics investigated.

Sample sites completed

Grab Samples (macrofauna) completed: Sites 42, 45, 46, 47 and 48
Grab Samples (contaminants) completed: None
Drop Down Video (completed): Sites 42, 45, 46. 47 and 48
2m Beam Trawling (completed): Sites T8, T11 and T12

Sabellaria recorded at site 46.

4

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Site 7
Daily Progress Report No: 4	Party chief mob: +44 (0)7788716912
Date: 02/05/2013	RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Séamus Whyte, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

Distribution List

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Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
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HSE Summary

	Today	To Date
Accidents/Incidents	0	0
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	4	10
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	14:21	16.03	30:24
Standby(Weather/tide)	08:59	0	08:59
Standby(Transit)	0	05.27	06:05
Standby (Other)	0	0	0
Breakdown	00:40	02:30	03:10
Accumulated	**24:00**	**24:00**	**87:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: NE F3-4 Sea state: Moderate	Wind: NE F4-5 Sea state: Moderate increasing Rough	Wind: NE F4-5 Sea state: Rough decreasing moderate	Wind: NE F3-4 Sea state: Moderate

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	4	1
Grab samples – macrofauna and PSD	0	4	1
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	2	1
Area Four			
Drop Down Video	0	1	4
Grab samples – macrofauna and PSD	0	1	4
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	1	2
Area Three and Four Cable Route			
Drop Down Video	0	0	41
Grab samples – macrofauna and PSD	5	5	34
Grab samples - contaminants	0	0	4
2m Beam Trawl	0	0	7
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 00:04	Bridge shift handover
00:00 – 00:05	Back deck handover
00:05 – 02:50	Undertaking survey operations (drop down video and grab sampling)
02:50 – 03:30	Hydraulics stopped in order to allow to cool down.
03:30 – 08:01	Undertaking survey operations (drop down video and grab sampling) Underwater visibility becoming progressively worse, with high levels of suspended sediment throughout the water column, and near the seabed. Camera system changed over to the freshwater lens system.
08:01 – 17:00	Weather downtime: Due to poor sea conditions, survey operations ceased until such time that the sea conditions have improved
11:58 – 12:02	Bridge shift handover
12:00 – 12:05	Back deck handover
17:00 – 20:22	Undertaking survey operations (drop down video and grab sampling)
20:22 – 24:00	Weather downtime: Due to poor sea conditions, survey operations ceased until such time that the sea conditions have improved.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Resume survey operations along the Areas Three and Four Cable Route once sea conditions have improved, and complete the remaining sites within Areas Three and Four (weather dependent).

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 04:29 UTC 02/05/2013
24 hours:
Wind: Northeasterly F5 or F6 at first south of Lowestoft, otherwise variable F3 or F4
Sea state: Slight or moderate
Weather: Rain at first in south.
Visibility: Moderate or good, occasionally poor at first in south

48 hours:
Wind: Variable 3 or 4, becoming southwesterly 4 or 5.
Sea state: Slight or moderate
Weather: Occasional rain or drizzle later
Visibility: Good, occasionally moderate later

Shipping Forecast (Thames) issued 04:05 UTC 02/05/2013)
Wind: Northeast 5 or 6, becoming variable 4
Sea state: Slight or moderate
Weather: Occasional rain at first
Visibility: Moderate or good, occasionally poor at first.

Fugro EMU Limited comments

Underwater visibility on site
High levels of suspended sediment throughout the water column and near seabed. This has meant that extremely poor underwater visibility has been encountered on site, even with the use of the Freshwater lens system.

Sample sites completed

Grab Samples (macrofauna) completed: Sites 2, 3, 4, 5 and 6
Grab Samples (contaminants) completed: None
Drop Down Video (completed): None
2m Beam Trawling (completed): None

4

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Transit to Great Yarmouth
Daily Progress Report No: 5 Date: 03/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Séamus Whyte, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

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HSE Summary

	Today	To Date
Accidents/Incidents	1	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	5	11
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	18:12	16.03	48:36
Standby(Weather/tide)	03:38	0	12:37
Standby(Transit)	0	05.27	06:05
Standby (Other)	01:40	0	01:40
Breakdown	0	02:30	03:10
Accumulated	**24:00**	**24:00**	**111:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: N - NE F3-4 Sea state: Rough /Moderate decreasing slight	Wind: NW backing S F2 - 1 Sea state: Slight	Wind: Var F1-2 Sea state: Slight	Wind: S veering W-SW Sea state: Slight

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	4	1
Grab samples – macrofauna and PSD	0	4	1
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	2	1
Area Four			
Drop Down Video	0	1	4
Grab samples – macrofauna and PSD	0	1	4
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	1	2
Area Three and Four Cable Route			
Drop Down Video	11	13	30
Grab samples – macrofauna and PSD	13	13	26
Grab samples - contaminants	1	1	3
2m Beam Trawl	1	1	6
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 00:06	Bridge shift handover
00:00 – 00:04	Back deck handover
00:00 – 03:38	Weather downtime: Due to poor sea conditions, survey operations ceased until such time that the sea conditions have improved.
03:38 – 08:15	Undertaking survey operations (drop down video, grab sampling and 2m beam trawling)
08:15 – 08:20	Toolbox talk: Day grab deployment and retrieval.
08:20 – 12:00	Undertaking survey operations (drop down video, grab sampling and 2m beam trawling)
12:00 – 12: 10	Bridge shift handover
12:04 – 12:15	Back deck handover
12:15 – 14:50	Undertaking survey operations (drop down video, grab sampling and 2m beam trawling)
14:50 – 16:30	Downtime. Replacing one of the winch wires.
16:30 – 24:00	Undertaking survey operations (drop down video and grab sampling)

3

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Transit to Great Yarmouth for scheduled Port Call (to coincide with forecasted poor weather). Once weather improves head back out to site, and continue survey operations at the north end of the array.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 03/05/2013
24 hours:
Wind: Variable becoming southwesterly, F3 or F4, increasing F5 to F7 later.
Sea state: Slight or moderate
Weather: Rain later.
Visibility: Good, occasionally moderate later

48 hours:
Wind: Westerly or southwesterly, F5 to F7 decreasing F3 or F4 later
Sea state: Slight or moderate
Weather: Occasional rain
Visibility: Good, occasionally moderate

Shipping Forecast (Thames) issued 04:05 UTC 03/05/2013)
Wind: Variable F4, becoming southwesterly F5 to F7 later.
Sea state: Slight or moderate
Weather: Fair
Visibility: Good.

Fugro EMU Limited comments

Incident: Winch wire pinched between the drum and the guard, with strands broken and unusable. Winch wire not used any further, and replace winch wire on scheduled port call.

Sample sites completed

Grab Samples (macrofauna) completed: Sites, 7, 8, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 and 30
Grab Samples (contaminants) completed: Site 30
Drop Down Video (completed): Sites 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28
2m Beam Trawling (completed):

Sample quality
Site 18 – Three attempts made to collect a macrofaunal and PSD sample. Sample volumes within the three attempts were 1.5litres, <1 litres and 4 litres. The third sample has been accepted as a low volume sample (with 5 litres being the standard minimum volume).

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: In transit to survey site
Daily Progress Report No: 6 Date: 04/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

Distribution List

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HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	1	12
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	0	18:12	48:36
Standby(Weather/tide)	13:34	03:38	12:37
Standby(Transit)	10:26	0	16:31
Standby (Other)	0	01:40	01:40
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**135:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: SW F5 Sea state: Moderate	In port Wind: SW F4-5	In port Wind: SW F4-5	Wind: SW F3-F4 Sea state: Slight / Moderate

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	4	1
Grab samples – macrofauna and PSD	0	4	1
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	2	1
Area Four			
Drop Down Video	0	1	4
Grab samples – macrofauna and PSD	0	1	4
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	1	2
Area Three and Four Cable Route			
Drop Down Video	0	13	30
Grab samples – macrofauna and PSD	0	13	26
Grab samples - contaminants	0	1	3
2m Beam Trawl	0	1	6
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 05:30	In transit to Great Yarmouth
05:30 19:04	Vessel alongside in Great Yarmouth. Whilst waiting on weather, winch wire replaced, routine maintenance on board, Séamus Whyte depart vessel, replenished stores. Toolbox talk: Winch wire
19:04 – 24:00	Vessel in transit to survey site.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Commence survey operations at the north end of the array, then move west along the Area Three and Four Cable Route.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 04/05/2013
24 hours:
Wind: Southwesterly F4 or F5. occasionally F6 in the far south, veering westerly F3 or F4 later.
Sea state: Slight or moderate
Weather: Occasional rain or drizzle at first.
Visibility: Moderate or good, occasionally poor.

48 hours:
Wind: Westerly F3 or F4 backing southwesterly F2 or F3.
Sea state: Slight or moderate, coming slight
Weather: Mainly fair
Visibility: Moderate or good, occasionally poor in the south.

Shipping Forecast (Thames) issued 04:05 UTC 04/05/2013)
Wind: Southwest F4 or F5, occasionally F6 until later.
Sea state: Slight or moderate
Weather: Occas onal rain or drizzle, fog patches later.
Visibility: Moderate or good, occasionally very poor later.

Fugro EMU Limited comments

4

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Site 9
Daily Progress Report No: 7 Date: 05/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

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HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	4	16
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	21:46	0	70:22
Standby(Weather/tide)	01:00	13:34	13:37
Standby(Transit)	01:14	10:26	17:45
Standby (Other)	0	0	01:40
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**159:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: SW F3-F4, decreasingF2-3 Sea state: Slight / Moderate	Wind: W F2-3 Sea state: Slight	Wind: W F2-3 Sea state: Slight	Wind: S to SE F2 Sea state: Slight

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	4	1
Grab samples – macrofauna and PSD	0	4	1
Grab samples - contaminants	0	0	1
2m Beam Trawl	0	2	1
Area Four			
Drop Down Video	4	5	0
Grab samples – macrofauna and PSD	4	5	0
Grab samples - contaminants	1	1	0
2m Beam Trawl	2	3	0
Area Three and Four Cable Route			
Drop Down Video	7	20	23
Grab samples – macrofauna and PSD	4	17	22
Grab samples - contaminants	0	1	3
2m Beam Trawl	1	2	5
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 00:08	Bridge shift handover.
00:00 - 00:11	Back deck shift handover.
00:00-01:14	In transit to site.
01:14-12:00	Undertaking survey operations (grabbing, 2m beam trawling and drop down video).
12:00-12:05	Bridge shift handover.
12:00 – 12:06	Back deck shift handover.
12:00-13:00	Waiting on tide, to get clearer visibility on video.
13:00-00:00	Undertaking survey operations (grabbing, 2m beam trawling and drop down video). Changes from normal to low-vis camera systems as sites require.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Complete sites within Area Three, then continue survey operations along Areas Three and Four Cable Route.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 05/05/2013
24 hours:
Wind: Variable, mainly southerly or southwesterly, F3 or F4.
Sea state: Smooth or slight.
Weather: Fog patches later.
Visibility: Moderate or good, occasionally very poor later.

48 hours:
Wind: Variable, mainly southerly or southeasterly, F3 or F4.
Sea state: Smooth or slight.
Weather: Fog patches.
Visibility: Moderate, occasionally very poor.

Shipping Forecast (Thames) issued 04:05 UTC 05/05/2013)
Wind: Southwest, becoming variable F3 or F4.
Sea state: Moderate becoming slight
Weather: Fog patches.
Visibility: Moderate or good, occasionally very poor.

Fugro EMU Limited comments

Sample sites completed

Grab Samples (macrofauna) completed: Sites 1, 40, 43 and 44
Grab Samples (contaminants) completed: Site 43
Drop Down Video (completed): Sites 1, 2, 3, 4, 5, 6, 8. 40, 41, 43, and 44.
2m Beam Trawling (completed): T05, T09 and T10

Sample micro-siting
Grab Sample Site 40. Due to the presence of *Sabellaria*, grab site move west.
Trawl site T09 moved from grab site 43 to grab site 41 to avoid potential *Sabellaria* reef.

Underwater visibility
Underwater visibility was extremely poor at sites 1 to 8. Poor footage obtained, despite changing video systems and deploying the video system at different states of the tides. All sites were repeated from previous days when visibility / footage was also poor.

Sabellaria
Potential reef recorded at sites 40 and 43.
Only a small patch recorded at site 6,

4

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Site 58
Daily Progress Report No: 8 Date: 06/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

Distribution List

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HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	4	20
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	24:00	21:46	94:22
Standby(Weather/tide)	0	01:00	13:37
Standby(Transit)	0	01:14	17:45
Standby (Other)	0	0	01:40
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**183:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: SE F4 decreasing F2 Sea state: Slight	Wind: Variable F1 Sea state: Slight / smooth	Wind: Variable F1 Sea state: Slight / smooth	Wind: Variable F1 becoming E F2 Sea state: Slight

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	1	5	0
Grab samples – macrofauna and PSD	1	5	0
Grab samples - contaminants	1	1	0
2m Beam Trawl	1	3	1
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	15	33	8
Grab samples – macrofauna and PSD	10	27	12
Grab samples - contaminants	0	1	3
2m Beam Trawl	3	5	2
Area One Cable Route			
Grab samples - contaminants	0	0	10

2

Daily Log

Time BST	Activity
00:00 – 00:07	Bridge shift handover.
00:00 - 00:05	Back deck shift handover.
00:00 – 12:00	Undertaking survey operations (grabbing, 2m beam trawling and drop down video).
12:00-12:06	Bridge shift handover.
12:00 – 12:06	Back deck shift handover.
12:06 – 24:00	Undertaking survey operations (grabbing, 2m beam trawling and drop down video). Changes from normal to low-vis camera systems as sites require.

3

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Continue survey operations along Areas Three and Four Cable Route, and Area One Cable Route.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 06/05/2013
24 hours:
Wind: Variable, mainly southerly or southeasterly backing northeasterly later, F3 or F4.
Sea state: Smooth or slight.
Weather: Fog patches.
Visibility: Moderate or good, occasionally very poor.

48 hours:
Wind: Variable, mainly northeasterly, veering southeasterly later F3 or F4, occasionally F5 later..
Sea state: Smooth or slight.
Weather: Fog patches, rain later.
Visibility: Moderate, occasionally very poor.

Shipping Forecast (Thames) issued 04:05 UTC 06/05/2013)
Wind: Variable, mainly south F3 or F4.
Sea state: Slight.
Weather: Fog patches.
Visibility: Moderate or good, occasionally very poor.

Fugro EMU Limited comments

Sample sites completed

Grab Samples (macrofauna) completed: Sites 9, 10, 12, 13, 14, 15, 16, 29, 31, and 49.
Grab Samples (contaminants) completed: Site 49
Drop Down Video (completed): Sites T01, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 29, 30, 31 and 49.
2m Beam Trawling (completed): T01, T04, T06 and T13

Underwater visibility
Underwater visibility was extremely poor at sites 31. Poor footage obtained, despite changing video systems and deploying the video system at different states of the tides. The closer inshore the vessel gets the worse the underwater visibility is getting, with brown plumes of sediment visible at the surface.

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Site 36
Daily Progress Report No: 9 Date: 07/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

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HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	5	25
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	39:07
OPS	19:10	24:00	113:32
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	0	0	17:45
Standby (Other)	04:50	0	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**207:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: NE F1 Sea state: Smooth	Wind: NE F2 Sea state: Slight	Wind: N F3 Sea state: Slight	Wind: NE F3 Sea state: Slight

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	4	37	4
Grab samples – macrofauna and PSD	4	31	8
Grab samples - contaminants	1	2	1
2m Beam Trawl	3	5	2
Area One Cable Route			
Grab samples - contaminants	8	8	2

2

Daily Log

Time BST	Activity
00:00 – 00:06	Bridge shift handover.
00:00 - 00:06	Back deck shift handover.
00:00 – 04:50	Within the inshore areas due to hours of darkness not precisely locate static fishing gear. Vessel on site waiting for daylight to be able to ascertain presence of gear before sampling.
04:50 – 12:00	Undertaking survey operations (grabbing and drop down video).
12:00-12:05	Bridge shift handover.
12:00 – 12:05	Back deck shift handover
12:06 – 12:12	Toolbox talk: Day grab sampling
12:12 – 24:00	Undertaking survey operations (grabbing and drop down video).
Fishing vessel on site liaison details	
06:15	Contacted FV Jolene to inform them of the vessel s intentions for the day.
08:00	Long liner IH212 contacted. Advised them of the vessel's intentions, and they informed the vessel of the location of their gear in the area.
10:00	Vessel Spring Tide contacted. They advised the vessel that their gear was not in the area due to be surveyed.

3

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Complete survey operations, and head to Port (Great Yarmouth). Surveyors will leave the vessel, and vessel will transit back to Portsmouth.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 07/05/2013
24 hours:
Wind: Variable F2 or F3, becoming easterly or northeasterly F3 or F4.
Sea state: Smooth, becoming slight later.
Weather: Showers.
Visibility: Moderate or good.

48 hours:
Wind: Easterly or southeasterly F3 or f4, veering southwesterly F4 or F5, occasionally F6 later.
Sea state: Slight, occasionally moderate
Weather: Rain or showers, fog later.
Visibility: Moderate or good, occasionally poor.

Shipping Forecast (Thames) issued 04:05 UTC 07/05/2013)
Wind: Variable F3 or F4.
Sea state: Smooth or slight.
Weather: Showers.
Visibility: Good, occasionally poor.

Fugro EMU Limited comments

Sample sites completed

Grab Samples (macrofauna) completed: Sites 36, 37, 38 and 39.
Grab Samples (contaminants) completed: Site 37, 50, 51, 52, 53. 54, 55, 56 and 57.
Drop Down Video (completed): Sites 36, 37, 38, and 39.
2m Beam Trawling (completed): None

Underwater visibility
Underwater visibility was extremely poor at all sites. Poor footage obtained, despite changing video systems and deploying the video system at different states of the tides. The closer inshore the vessel gets the worse the underwater visibility is getting, with brown plumes of sediment visible at the surface. Three attempts made at site 39 to obtain footage, but without success.

Sample Quality
Samples for contaminants could not be obtained at site 56 and 57 due to coarse substrate, and therefore not suitable for contaminants sampling. Photographs and descriptions of samples obtained.

Presence of *Sabellaria*
At trawl site T03 *Sabellaria* evident in video. Trawl site abandoned, and will be relocated if possible.

Micro-siting due to static fishing gear
Moved site 55, 500m due east to avoid static gear. Three attempts made to collect a sample, unsuccessful. Once the fishing vessel have moved the gear, moved site 55 to original location, sample collection successful.

4

FUGRO

Daily Progress Report

SCOTTISHPOWER
RENEWABLES

VATTENFALL

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Alongside at Great Yarmouth
Daily Progress Report No: 10 Date: 08/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: Alison Bessell, Matt Davison, Craig Barrett, Luke Betteridge, Tamsyn Noble, Jake Ganther	

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Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	2	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	14:22	0	53:29
OPS	09:38	19:10	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	0	0	17:45
Standby (Other)	0	04:50	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**231:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: SE F3 Sea state: Slight	Wind: SE F3 Sea state: Slight	N/A	N/A

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	4	41	0
Grab samples – macrofauna and PSD	4	39	0
Grab samples - contaminants	2	4	0
2m Beam Trawl	1	7	0
Area One Cable Route			
Grab samples - contaminants	2	8	10

2

Daily Log

Time BST	Activity
00:00 – 00:07	Bridge shift handover.
00:00 - 00:06	Back deck shift handover.
00:00 – 09:38	Undertaking survey operations (grabbing, 2m beam trawling and drop down video).
09:38 – 14:14	In transit to Great Yarmouth
14:14 – 18:05	Post survey checks undertaken and sample logging. Demobilisation of samples.
18:05	Survey team left vessel.
14:14 – 24:00	Vessel alongside at Great Yarmouth.

3

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Vessel to transit back to Portsmouth from Great Yarmouth, leaving Great Yarmouth at 06.00 on 09/05/2013

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 08/05/2013
24 hours:
Wind: Southesterly F 3 or F4, veering southwesterly F5 or F6
Sea state: Slight, occasionally moderate later.
Weather: Rain or showers, fair ater.
Visibility: Moderate or good, occasionally poor.

48 hours:
Wind: Southerly or southwesterly F5 to F7, perhaps gale F8 later.
Sea state: Slight, becoming moderate, occasionally rough later.
Weather: Rain or showers.
Visibility: Moderate or good.

Shipping Forecast (Thames) issued 04:05 UTC 08/05/2013)
Wind: East or southeast F4 or F5, veering southwest F5 or F6.
Sea state: Slight or moderate.
Weather: Rain or showers, fog patches.
Visibility: Moderate, occasionally very poor.

Fugro EMU Limited comments

Sample sites completed

Grab Samples (macrofauna) completed: Sites 32, 33, 34 and 35.
Grab Samples (contaminants) completed: Site.58 and 59
Drop Down Video (completed): Sites 32, 33, 34 and 35.
2m Beam Trawling (completed): T07

Underwater visibility
Underwater visibility was extremely poor at all sites. Poor footage obtained, cespite changing video systems and deploying the video system at different states of the tides. The closer inshore the vessel gets the worse the underwater visibility is getting, with brown plumes of sediment visible at the surface.

4

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Alongside at Ramsgate
Daily Progress Report No: 11 Date: 09/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
ScottishPower Renewables	Holly Wilson	hwilson@scottishpower.com
ScottishPower Renewables	Darren Jameson	Darren.Jameson@ScottishPower.com
ScottishPower Renewables	Keith Morrison	keith.morrison@scottishpower.com
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Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	0	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	14:10	14:22	67:39
OPS	0	09:38	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	09:50	0	27:35
Standby (Other)	0	0	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**254:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	Wind: S – SW F4-5 Sea state: Moderate	Wind: S – SW F4-5 increasing F7 Sea state Moderate increasing rough	N/A

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	0	41	0
Grab samples – macrofauna and PSD	0	39	0
Grab samples - contaminants	0	4	0
2m Beam Trawl	0	7	0
Area One Cable Route			
Grab samples - contaminants	0	8	0

2

Daily Log

Time BST	Activity
00:00 – 06:15	Vessel alongside at Great Yarmouth.
06:15 – 16:05	Vessel in transit to Ramsgate.
16:05 – 24:00	Vessel alongside at Ramsgate. waiting for an improvement in weather before transiting to Portsmouth.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Vessel to wait alongside at Ramsgate until weather conditions improve before continuing passage to Portsmouth.

Weather forecasts
Inshore waters (Gibraltar Point to North Foreland) issued 06:00 UTC 09/05/2013
24 hours:
Wind: Southerly or southwesterly F4 or F5, increasing F6 or F7. occasionally gale F8 later.
Sea state: Slight, becoming moderate.
Weather: Fair then rain or showers.
Visibility: Good, occasionally moderate.

48 hours:
Wind: Southwesterly F6 or F7, decreasing F4 or F5.
Sea state: Moderate, occasionally slight.
Weather: Showers.
Visibility: Good, occasionally moderate.

Weather forecasts
Inshore waters (North Foreland to Selsey Bill) issued 06:00 UTC 09/05/2013
24 hours:
Wind: Southwesterly F4 or F5, increasing F6 to gale F8, occasionally severe gale F9 later in the east..
Sea state: Moderate becoming rough..
Weather: Fair then rain or showers.
Visibility: Good, occasionally moderate.

48 hours:
Wind: Southwesterly F5 or F6, occasionally F7 at first.
Sea state: Rough becoming moderate.
Weather: Rain or showers.
Visibility: Good, occasionally moderate.

Shipping Forecast (Thames) issued 04:05 UTC 09/05/2013)
Wind: Southwest F4 or F5 increasing F6 to gale F8, increasing sever gale F9 for a time.
Sea state: Slight or moderate becoming rough, occasionally very rough.
Weather: Rain or showers.
Visibility: Moderate or good.

Fugro EMU Limited comments

The vessel is likely to remain in Ramsgate until Sunday.

3

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: Alongside at Ramsgate
Daily Progress Report No: 12 Date: 10/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
ScottishPower Renewables	Holly Wilson	hwilson@scottishpower.com
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Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	0	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	14:10	67:39
OPS	0	0	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	24:00	09:50	51:35
Standby (Other)	0	0	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**278:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	N/A	N/A	N/A

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	0	41	0
Grab samples – macrofauna and PSD	0	39	0
Grab samples - contaminants	0	4	0
2m Beam Trawl	0	7	0
Area One Cable Route			
Grab samples - contaminants	0	8	0

Daily Log

Time BST	Activity
00:00 – 24:00	Vessel alongside at Ramsgate, waiting for an improvement in weather before transiting to Portsmouth.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Vessel to wait alongside at Ramsgate until weather conditions improve before continuing passage to Portsmouth.

Weather forecasts
Inshore waters (North Foreland to Selsey Bill) issued 06:00 UTC 10/05/2013
24 hours:
Wind: Southwesterly F5 to F7, occasionally gale F8 at first.
Sea state: Rough becoming moderate.
Weather: Rain later.
Visibility: Moderate or good.

48 hours:
Wind: Southwesterly F6 to gale F8 veering westerly F5 or F6.
Sea state: Moderate occasionally rough.
Weather: Rain or showers.
Visibility: Good, occasionally moderate.

Shipping Forecast (Dover) issued 04:05 UTC 10/05/2013)
Wind: Southwest F5 to F7, occasionally gale F8 at first.
Sea state. Moderate or rough.
Weather: Rain or showers.
Visibility: Moderate or good.

Fugro EMU Limited comments

The vessel is likely to remain in Ramsgate until Sunday.

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Alongside at Ramsgate
Daily Progress Report No: 13 Date: 11/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
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ScottishPower Renewables	Keith Morrison	keith.morrison@scottishpower.com
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Fugro EMU Limited	Ian Macdonald	ian.Macdonald@fugroemu.com
Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	0	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	0	0	67:39
OPS	0	0	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	24:00	24:00	75:35
Standby (Other)	0	0	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**302:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	N/A	N/A	N/A

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	0	41	0
Grab samples – macrofauna and PSD	0	39	0
Grab samples - contaminants	0	4	0
2m Beam Trawl	0	7	0
Area One Cable Route			
Grab samples - contaminants	0	8	0

2

Daily Log

Time BST	Activity
00:00 – 24:00	Vessel alongside at Ramsgate, waiting for an improvement in weather before transiting to Portsmouth.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Vessel to wait alongside at Ramsgate until weather conditions improve before continuing passage to Portsmouth.

Weather forecasts
Inshore waters (North Foreland to Selsey Bill) issued 06:00 UTC 11/05/2013
24 hours:
Wind: Southwesterly F5 to F7, veering westerly F5 or F6 later.
Sea state: Moderate, becoming rough for a time.
Weather: Squally showers, rain for a time, fair later.
Visibility: Good, occasionally moderate

48 hours:
Wind: Westerly, backing southwesterly F5 to F7.
Sea state: Moderate.
Weather: Rain later.
Visibility: Good, becoming moderate, occasionally poor later.

Shipping Forecast (Dover) issued 04:05 UTC 11/05/2013)
Wind: West or southwest F5 or F7.
Sea state. Moderate or rough.
Weather: Rain or squally showers.
Visibility: Moderate or good.

Fugro EMU Limited comments

The vessel is likely to remain in Ramsgate until Sunday.

3

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348 Position at 24:00: In transit
Daily Progress Report No: 14 Date: 12/05/2013	Party chief mob: +44 (0)7788716912 RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
ScottishPower Renewables	Holly Wilson	hwilson@scottishpower.com
ScottishPower Renewables	Darren Jameson	Darren.Jameson@ScottishPower.com
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Fugro EMU Limited	Ian Macdonald	ian.Macdonald@fugroemu.com
Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	0	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	12;10	0	79:49
OPS	0	0	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	11:50	24:00	87:25
Standby (Other)	0	0	06:30
Breakdown	0	0	03:10
Accumulated	**24:00**	**24:00**	**326:45**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	N/A	Wind: SW F5, gusting F6 Sea state: Rough	Wind: SW F6 to F7 gusting F8 Sea state: Rough to Very Rough	Wind: SW F6 to F7 gusting F8 Sea state: Rough to Very Rough

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	0	41	0
Grab samples – macrofauna and PSD	0	39	0
Grab samples - contaminants	0	4	0
2m Beam Trawl	0	7	0
Area One Cable Route			
Grab samples - contaminants	0	8	0

2

Daily Log

Time BST	Activity
00:00 – 11:50	Vessel alongside at Ramsgate, waiting for an improvement in weather before transiting to Portsmouth.
11:50 – 24:00	Vessel in transit.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
Continue passage to Portsmouth.

Weather forecasts
Inshore waters (North Foreland to Selsey Bill) issued 06:00 UTC 12/05/2013
24 hours:
Wind: Westerly, backing southwesterly, F5 or F6, occasionally F7 later.
Sea state: Moderate.
Weather: Fair then rain and drizzle, fog patches for a time.
Visibility: Moderate or good, occasionally very poor.

48 hours:
Wind: Southwesterly F5 to F7.
Sea state: Moderate.
Weather: Drizzle at first, rain later.
Visibility: Moderate or good, occasionally poor at first.

Shipping Forecast (Dover) issued 04:05 UTC 12/05/2013)
Wind: West or southwest F5 or F7.
Sea state: Moderate.
Weather: Showers, then rain with fog patches.
Visibility: Good, becoming moderate, occasionally poor

Shipping Forecast (Wight) issued 04:05 UTC 12/05/2013)
Wind: West or southwest F5 or F7.
Sea state: Moderate.
Weather: Showers, then rain with fog patches.
Visibility: Good, becoming moderate, occasionally very poor

Fugro EMU Limited comments

Daily Progress Report

Client: East Anglia Offshore Wind Limited	**Project:** EAOW Benthic Survey 2013
Vessel: RV Discovery **Call sign:** 2AEL8	**EMU Job No.:** J/1/03/2348
	Position at 24:00: Alongside in Portsmouth
Daily Progress Report No: 15	Party chief mob: +44 (0)7788716912
Date: 13/05/2013	RV Discovery Bridge Phone: +44 (0) 7876454806 *RV Discovery* Sat. Phone: : 00870 764 836974
Survey personnel on board: None	

Distribution List

To Company:	Attention:	E-mail:
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Fugro Emu Limited	Mark Warren	mark.warren@fugroemu.com
Fugro EMU Limited	Susan Parker	susan.parker@fugroemu.com

HSE Summary

	Today	To Date
Accidents/Incidents	0	1
Near Misses	0	2
Hazard Reports	0	0
Safety Briefings	0	1
Tool Box Talks	0	27
Vessel Safety Briefings	0	1
Vessel Safety Drills	0	1

Summary of operations 0000-2400

Type	Today	Previous	Accumulated
MOB/DEMOB	07:15	12;10	87:04
OPS	0	0	123:10
Standby(Weather/tide)	0	0	13:37
Standby(Transit)	12:00	11:50	99:25
Standby (Other)	0	0	06:30
Breakdown	0	0	03:10
Accumulated	**19:15**	**19:15**	**346:00**

1

Weather

	0000-0600	0600-1200	1200-1800	1800-2400
Weather /sea state conditions	Wind: SW F6 to F7 gusting F8 Sea state: Rough to Very Rough	N/A	Wind: SW F7, gusting F8 Sea state: Rough	Wind: SW F7, gusting F8 Sea state: Rough

Survey Progress

Site Type	Sites completed today	Total sites completed	Sites remaining
Area Three			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Four			
Drop Down Video	0	5	0
Grab samples – macrofauna and PSD	0	5	0
Grab samples - contaminants	0	1	0
2m Beam Trawl	0	3	0
Area Three and Four Cable Route			
Drop Down Video	0	41	0
Grab samples – macrofauna and PSD	0	39	0
Grab samples - contaminants	0	4	0
2m Beam Trawl	0	7	0
Area One Cable Route			
Grab samples - contaminants	0	8	0

2

Daily Log

Time BST	Activity
00:00 – 01:50	Vessel in transit.
01:50 – 13:50	Vessel alongside at Shoreham, waiting for an improvement in weather before transiting to Portsmouth.
13:50 – 19:15	Vessel in transit.
19:15	Vessel alongside at Portsmouth.

Planned operation for the next 24 hours / Weather forecast

Planned Operations
None.

Weather forecasts
Inshore waters (North Foreland to Selsey Bill) issued 06:00 UTC 13/05/2013
24 hours:
Wind: Southwesterly F 5 to F7.
Sea state: Moderate or rough.
Weather: Showers.
Visibility: Good, occasionally poor at first.

48 hours:
Wind: Southwesterly, backing southerly for a time later, F5 to F7, increasing gale F8, perhaps severe gale F9 for a time.
Sea state: Moderate or rough.
Weather: Rain for a time.
Visibility: Good, becoming moderate or poor for a time.

Weather forecasts
Inshore waters (Selsey Bill to Lyme Regis) issued 06:00 UTC 13/05/2013
24 hours:
Wind: West or Southwest F 5 to F7.
Sea state: Moderate or rough.
Weather: Showers.
Visibility: Good, occasionally poor at first.

48 hours:
Wind: West F5 or F6, becoming cyclonic F6 to gale F8. Perhaps severe gale F9 for a time.
Sea state: Moderate or rough.
Weather: Rain then showers.
Visibility: Good, becoming moderate or poor for a time.

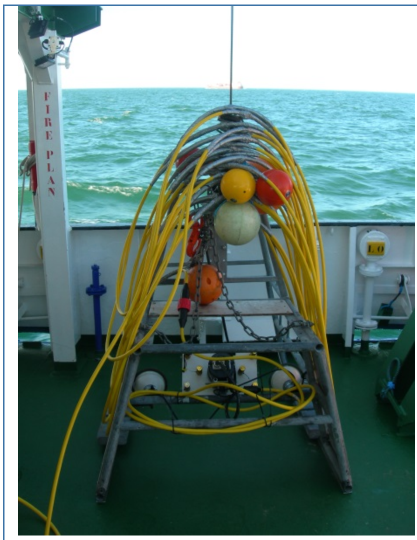
Shipping Forecast (Wight) issued 04:05 UTC 13/05/2013)
Wind: Southwest F5 or F7.
Sea state: Moderate or rough.
Weather: rain or showers.
Visibility: Good, occasionally poor

Fugro EMU Limited comments

3

C. EQUIPMENT SPECIFICATIONS

Equipment Type	Details
Seabed video system	Kongsberg OE14-208 new generation digital stills colour camera. 150W OE11-130 Kongsberg Halogen. Two subsea camera telemetry cables (200m). Bespoke topside control unit (comprising a 400GB Hard Disc Drive (HDD) incorporating a DVD recorder for use as the primary video recording system, 15" LCD monitor, with GPS Overlay). Mini-DV player and full screen colour monitor for simultaneous backup. Lasers for scaling of sediment classes, and species.
Macrofauna and PSD Grab	0.1m^2 Hamon Grab and landing table, with spares box (including spare bucket and spare certified strops, shackles and swivels).
Sediment Chemistry Grab	0.1m^2 Day Grab and landing table with spares box (including spare certified strops, shackles and swivels).
2m Beam Trawl	Scientific 2 m beam trawl (Lowestoft Design) with a 5mm aperture mesh liner.



Standard video frame

Freshwater lens camera system

Hamon grab

Day grab

2m beam trawl

D. DROP-DOWN VIDEO LOGS

D.1 Video Footage Logs

Video Details				WGS84 UTM Z31N			
Site	Date	Start Time (GMT)	Start Depth (m BCD)	Easting (m)	Northing (m)	Easting (m)	Northing (m)
1	05/05/2013	00:28	38.3	482991.6	5853057.6	482958.9	5852839.1
2	02/05/2013	18:32	38.4	482498.3	5849108.0	482839.7	5848951.1
2.2	05/05/2013	17:07	39.9	482951.4	5848953.1	482594.9	5848949.2
3	02/05/2013	05:22	44.9	482945.7	5844950.8	482998.2	5844965.2
3.2	02/05/2013	07:54	43.9	482968.4	5845021.9	482985.9	5844966.6
3.2	05/05/2013	17:54	45.3	482986.5	5844891.6	482946.3	5845226.3
3.3	02/05/2013	15:46	44.0	482963.9	5844950.7	483106.1	5845118.7
4	02/05/2013	04:20	44.2	481971.6	5840940.4	481843.6	5841060.5
4.2	05/05/2013	18:36	43.6	481955.5	5840878.4	482022.3	5841256.2
5	02/05/2013	03:13	44.9	482988.2	5836921.0	483008.5	5837100.9
5.2	05/05/2013	19:49	44.4	482967.3	5836927.5	483103.5	5837178.2
6	02/05/2013	01:02	43.8	481959.1	5832854.4	481997.8	5833006.5
6.2	05/05/2013	20:28	41.7	481973.2	5832958.4	482090.6	5833059.1
6.3	05/05/2013	21:09	40.7	482095.9	5833078.5	482309.8	5833257.8
7 & T05	03/05/2013	03:39	39.5	482864.9	5828446.6	482983.9	5828997.9
8	05/05/2013	23:32	44.0	481997.5	5825041.7	481939.5	5824842.5
9	06/05/2013	00:08	43.2	479983.8	5825059.0	479967.2	5824835.6
10	06/05/2013	00:46	47.4	477974.1	5825062.7	477971.5	5824810.8
11	06/05/2013	04:19	44.8	482984.6	5820935.8	482982.8	5821195.5
12	06/05/2013	03:40	47.7	480995.0	5820949.5	481012.5	5821354.7
13	06/05/2013	02:57	45.0	478997.0	5821028.1	479068.2	5820664.6
14	06/05/2013	02:19	45.0	476980.9	5821035.7	476919.2	5820812.2
15	06/05/2013	01:40	45.2	474977.3	5821061.5	474988.1	5820918.4
16	06/05/2013	14:32	50.3	472007.2	5817000.8	471880.7	5816701.2
17	06/05/2013	15:17	47.9	470989.1	5813024.2	471074.8	5812530.4
18	06/05/2013	15:58	45.4	471691.3	5808590.4	471699.6	5808987.1
19	03/05/2013	09:35	45.1	471052.6	5804605.0	471011.5	5804470.0
20	03/05/2013	12:41	45.3	472116.7	5800967.3	471664.6	5800961.5

Video Details				WGS84 UTM Z31N			
Site	Date	Start Time (GMT)	Start Depth (m BCD)	Easting (m)	Northing (m)	Easting (m)	Northing (m)
21	03/05/2013	13:38	46.8	470993.6	5796788.0	470980.8	5797160.8
22 & T04	03/05/2013	18:04	44.8	481924.4	5800675.1	482065.3	5801285.0
23	03/05/2013	17:20	42.2	478716.8	5800299.1	478846.5	5800594.6
24	03/05/2013	16:31	44.7	475639.7	5800137.2	475691.0	5800478.0
25	03/05/2013	18:57	52.1	482740.3	5803838.0	482984.4	5805428.8
26	03/05/2013	21:35	49.8	483037.1	5813109.0	482976.2	5812902.8
27 & T06	03/05/2013	20:46	42.7	487018.7	5813076.6	486895.6	5812483.5
28	03/05/2013	22:16	43.4	481034.1	5811968.4	480951.1	5811693.6
29	06/05/2013	12:56	45.6	477027.1	5812105.4	476989.0	5811784.0
30	06/05/2013	13:51	48.5	472997.1	5812200.3	472912.3	5811768.2
31	06/05/2013	20:28	44.7	440968.8	5788961.6	440980.9	5789093.3
31.2	06/05/2013	21:15	44.8	440974.7	5788916.5	441088.9	5789384.9
32	08/05/2013	04:09	46.9	439974.3	5785017.9	439998.6	5785036.7
32.2	08/05/2013	04:19	45.6	440148.3	5785197.1	439987.8	5784781.9
33	08/05/2013	04:59	39.8	438015.2	5784934.6	438029.7	5785335.9
34	08/05/2013	06:17	39.9	435970.4	5784940.2	435978.1	5784981.7
34.2	08/05/2013	06:59	40.7	435963.8	5784930.6	435992.6	5785043.3
35	08/05/2013	08:04	32.4	430983.7	5780863.9	431002.5	5781014.5
36 & T03	07/05/2013	20:25	32.7	428943.3	5780896.8	429098.4	5781456.1
37 & T07	07/05/2013	18:26	32.0	420808.2	5778507.6	421330.8	5778820.9
37 & T07 (2)	07/05/2013	22:26	32.1	421018.3	5778656.5	420832.2	5778530.5
38	07/05/2013	16:37	22.5	412527.6	5774826.1	412658.9	5774953.3
39.2	07/05/2013	09:02	21.5	409088.6	5772941.7	409104.9	5773052.0
39.3	07/05/2013	14:50	20.1	409105.8	5773024.8	409056.1	5772866.4
40	05/05/2013	09:08	40.0	492954.0	5856793.9	492998.3	5856755.1
40.1	05/05/2013	09:27	39.4	492957.4	5856946.3	492957.3	5856936.9
40.2	05/05/2013	10:40	40.0	492791.7	5857095.2	492985.4	5856836.1
40.3	05/05/2013	12:27	40.3	492951.8	5856973.5	492970.0	5856923.2
40.4	05/05/2013	14:19	40.5	492962.7	5857000.3	493039.2	5856558.8
40.5	05/05/2013	14:51	40.2	493208.3	5856763.3	493170.6	5856877.5

Video Details				WGS84 UTM Z31N			
Site	Date	Start Time (GMT)	Start Depth (m BCD)	Easting (m)	Northing (m)	Easting (m)	Northing (m)
41 & T09	05/05/2013	07:08	30.9	490971.0	5846344.0	491132.5	5846874.7
42	01/05/2013	13:39	36.1	501578.6	5852424.4	501728.1	5852908.3
43 & T09	05/05/2013	03:08	39.8	486524.1	5849568.3	486692.7	5850426.2
43.1	05/05/2013	03:51	38.3	486984.6	5850182.4	486478.9	5850331.5
43.2	05/05/2013	04:17	39.6	486812.6	5849991.3	486491.1	5850090.9
43.3	05/05/2013	04:36	39.7	486670.8	5849548.7	486354.3	5849622.0
44 & T10	05/05/2013	01:15	38.2	487076.8	5856010.6	486967.1	5855480.5
45	01/05/2013	08:56	38.5	499448.6	5843710.0	499426.8	5843498.6
46 & T11	01/05/2013	09:41	38.1	499669.9	5845811.5	499809.6	5846484.8
46.2	01/05/2013	10:22	39.7	499597.4	5845752.6	499783.1	5845729.1
46.3	01/05/2013	11:45	38.4	499591.0	5845478.6	499666.3	5845817.4
46.4	01/05/2013	12:08	39.2	499676.1	5846120.8	499495.2	5846027.3
46.5	01/05/2013	12:46	37.2	499693.1	5846277.2	499896.3	5846169.6
47 & T12	01/05/2013	06:55	36.2	497117.0	5841285.8	497007.2	5840767.4
48	01/05/2013	05:16	38.5	494363.7	5833740.4	494403.1	5833496.9
49 & T13	06/05/2013	05:52	44.6	488155.9	5822456.0	488269.3	5822993.1
T01	06/05/2013	18:17	48.3	447327.9	5794109.3	447762.0	5794705.2
T02	03/05/2013	10:35	45.8	466486.0	5803032.6	466377.3	5802533.9
T08.1	01/05/2013	14:21	33.7	499867.7	5851820.0	500026.5	5852623.5
T08.2	01/05/2013	15:55	34.7	500045.4	5852791.1	500008.7	5852623.3
T11	01/05/2013	22:06	39.8	494411.2	5833688.9	494606.7	5834126.4

D.2 Static Image Logs

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
1	E004	05/05/2013	482994.0	5853043.0
1	E005	05/05/2013	482997.7	5853013.3
1	E006	05/05/2013	482992.0	5852988.2
1	E007	05/05/2013	482988.0	5852977.8
1	E008	05/05/2013	482975.7	5852963.7
1	E009	05/05/2013	482972.9	5852959.8
1	E010	05/05/2013	482970.8	5852944.1
1	E011	05/05/2013	482968.5	5852913.3
1	E012	05/05/2013	482964.6	5852895.1
1	E013	05/05/2013	482965.8	5852888.4
1	E014	05/05/2013	482963.2	5852869.7
1	E015	05/05/2013	482962.8	5852863.4
2	B065	02/05/2013	482512.5	5849114.8
2	B066	02/05/2013	482532.5	5849128.9
2	B067	02/05/2013	482538.3	5849131.4
2	B068	02/05/2013	482542.3	5849132.2
2	B069	02/05/2013	482556.6	5849135.4
2	B070	02/05/2013	482568.1	5849136.4
2	B071	02/05/2013	482599.3	5849144.9
2	B072	02/05/2013	482614.1	5849142.6
2	B073	02/05/2013	482647.1	5849137.9
2	B074	02/05/2013	482752.6	5849093.3
2	B075	02/05/2013	482775.8	5849078.8
2	B076	02/05/2013	482782.7	5849073.9
2	B077	02/05/2013	482787.2	5849066.2
2	B078	02/05/2013	482792.1	5849057.7
2	B079	02/05/2013	482797.0	5849051.7
2	B080	02/05/2013	482800.0	5849048.1
2	B081	02/05/2013	482809.1	5849038.7
2	B082	02/05/2013	482815.9	5849033.0

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
2	B083	02/05/2013	482822.4	5849018.3
2	B084	02/05/2013	482835.6	5849000.8
2	B085	02/05/2013	482848.6	5848987.3
2	B086	02/05/2013	482852.2	5848982.0
2	B087	02/05/2013	482854.1	5848965.6
2.2	E114	05/05/2013	482934.0	5848951.3
2.2	E115	05/05/2013	482928.8	5848950.7
2.2	E116	05/05/2013	482894.7	5848945.8
2.2	E117	05/05/2013	482880.8	5848946.1
2.2	E118	05/05/2013	482870.2	5848947.6
2.2	E119	05/05/2013	482857.8	5848948.5
2.2	E120	05/05/2013	482846.7	5848949.0
2.2	E121	05/05/2013	482832.5	5848951.1
2.2	E122	05/05/2013	482806.2	5848954.3
2.2	E123	05/05/2013	482778.7	5848955.1
2.2	E124	05/05/2013	482770.6	5848954.7
2.2	E125	05/05/2013	482758.4	5848953.7
2.2	E126	05/05/2013	482745.6	5848952.9
2.2	E127	05/05/2013	482732.6	5848952.6
2.2	E128	05/05/2013	482712.6	5848951.6
2.2	E129	05/05/2013	482695.4	5848951.4
2.2	E130	05/05/2013	482680.6	5848950.9
2.2	E131	05/05/2013	482673.7	5848950.5
2.2	E132	05/05/2013	482667.6	5848950.0
2.2	E133	05/05/2013	482653.2	5848950.2
2.2	E134	05/05/2013	482637.9	5848950.4
2.2	E135	05/05/2013	482617.3	5848948.3
3	B041	02/05/2013	482984.2	5844967.1
3.2	B044	02/05/2013	482968.3	5845015.1
3.2	B045	02/05/2013	482973.6	5844995.1
3.2	B046	02/05/2013	482976.5	5844988.4

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
3.2	B047	02/05/2013	482976.6	5844984.0
3.2	E138	05/05/2013	482986.1	5844907.4
3.2	E139	05/05/2013	482984.4	5844931.4
3.2	E140	05/05/2013	482985.1	5844942.9
3.2	E141	05/05/2013	482986.0	5844956.1
3.2	E142	05/05/2013	482984.8	5844976.7
3.2	E143	05/05/2013	482982.6	5844990.0
3.2	E144	05/05/2013	482978.9	5845009.9
3.2	E145	05/05/2013	482977.5	5845021.0
3.2	E146	05/05/2013	482976.2	5845035.7
3.2	E147	05/05/2013	482973.9	5845054.5
3.2	E148	05/05/2013	482966.3	5845106.6
3.2	E149	05/05/2013	482965.0	5845112.8
3.2	E150	05/05/2013	482962.6	5845126.7
3.2	E151	05/05/2013	482961.1	5845140.1
3.2	E152	05/05/2013	482959.6	5845150.9
3.2	E153	05/05/2013	482957.4	5845162.2
3.2	E154	05/05/2013	482955.0	5845172.4
3.2	E155	05/05/2013	482954.3	5845184.2
3.2	E156	05/05/2013	482952.3	5845197.4
3.2	E157	05/05/2013	482948.9	5845209.5
3.3	B049	02/05/2013	482973.6	5844941.9
3.3	B050	02/05/2013	482991.5	5844943.7
3.3	B051	02/05/2013	482983.3	5844957.3
3.3	B052	02/05/2013	482994.6	5844988.8
3.3	B053	02/05/2013	482997.5	5844992.5
3.3	B054	02/05/2013	483005.2	5845004.7
3.3	B055	02/05/2013	483011.5	5845014.5
3.3	B056	02/05/2013	483013.7	5845018.9
3.3	B057	02/05/2013	483032.4	5845045.6
3.3	B058	02/05/2013	483036.7	5845052.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
3.3	B059	02/05/2013	483043.2	5845064.6
3.3	B060	02/05/2013	483053.5	5845072.2
3.3	B061	02/05/2013	483072.0	5845086.0
3.3	B062	02/05/2013	483084.4	5845096.7
3.3	B063	02/05/2013	483098.5	5845107.7
4	B032	02/05/2013	481965.5	5840972.3
4	B033	02/05/2013	481965.3	5840975.8
4	B034	02/05/2013	481966.9	5840992.8
4	B035	02/05/2013	481956.3	5841000.3
4	B036	02/05/2013	481889.3	5841026.3
4	B037	02/05/2013	481866.2	5841039.9
4	B038	02/05/2013	481866.2	5841039.9
4	B039	02/05/2013	481849.0	5841055.1
4.2	E159	05/05/2013	481961.4	5840906.8
4.2	E160	05/05/2013	481963.4	5840916.0
4.2	E161	05/05/2013	481964.5	5840924.8
4.2	E162	05/05/2013	481966.9	5840941.4
4.2	E163	05/05/2013	481971.5	5840966.6
4.2	E164	05/05/2013	481973.8	5840977.5
4.2	E165	05/05/2013	481974.7	5840987.7
4.2	E166	05/05/2013	481976.1	5840998.9
4.2	E167	05/05/2013	481980.0	5841022.0
4.2	E168	05/05/2013	481982.1	5841034.5
4.2	E169	05/05/2013	481987.0	5841059.9
4.2	E170	05/05/2013	481993.0	5841093.4
4.2	E171	05/05/2013	481994.1	5841101.6
4.2	E172	05/05/2013	481996.8	5841113.8
4.2	E173	05/05/2013	481999.7	5841126.6
4.2	E174	05/05/2013	482002.0	5841136.1
4.2	E175	05/05/2013	482003.9	5841148.7
4.2	E176	05/05/2013	482006.6	5841161.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
4.2	E177	05/05/2013	482010.4	5841188.1
4.2	E178	05/05/2013	482012.6	5841204.3
4.2	E179	05/05/2013	482015.1	5841218.3
4.2	E180	05/05/2013	482020.0	5841240.9
5	B020	02/05/2013	482987.7	5836933.5
5	B021	02/05/2013	482988.7	5836943.8
5	B022	02/05/2013	482991.2	5836951.6
5	B023	02/05/2013	482988.9	5836964.0
5	B024	02/05/2013	482985.1	5836971.7
5	B025	02/05/2013	482982.0	5836983.4
5	B026	02/05/2013	482982.4	5836994.5
5	B027	02/05/2013	482987.7	5837013.3
5	B028	02/05/2013	482993.8	5837036.8
5	B029	02/05/2013	483001.3	5837063.3
5	B030	02/05/2013	483007.4	5837091.8
5.2	E182	05/05/2013	482974.3	5836938.8
5.2	E183	05/05/2013	482977.1	5836942.4
5.2	E184	05/05/2013	482985.6	5836956.1
5.2	E185	05/05/2013	482988.2	5836962.1
5.2	E186	05/05/2013	482991.4	5836967.5
5.2	E187	05/05/2013	482994.8	5836973.0
5.2	E188	05/05/2013	483008.9	5836997.8
5.2	E189	05/05/2013	483030.9	5837036.9
5.2	E190	05/05/2013	483035.6	5837045.3
5.2	E191	05/05/2013	483051.2	5837073.1
5.2	E192	05/05/2013	483056.6	5837084.2
5.2	E193	05/05/2013	483065.0	5837100.0
5.2	E194	05/05/2013	483075.0	5837119.9
5.2	E195	05/05/2013	483080.6	5837131.9
5.2	E196	05/05/2013	483083.8	5837140.1
5.2	E197	05/05/2013	483090.2	5837153.3

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
6	B004	02/05/2013	481960.8	5832858.6
6	B005	02/05/2013	481964.9	5832866.7
6	B006	02/05/2013	481968.4	5832874.4
6	B007	02/05/2013	481973.1	5832900.1
6	B008	02/05/2013	481976.2	5832918.1
6	B009	02/05/2013	481983.4	5832943.2
6	B010	02/05/2013	481985.5	5832955.8
6	B011	02/05/2013	481993.9	5832965.1
6	B012	02/05/2013	481995.6	5832968.1
6	B013	02/05/2013	481986.4	5832977.5
6	B014	02/05/2013	481990.4	5832983.5
6	B015	02/05/2013	481993.3	5832989.7
6.2	E199	05/05/2013	481982.8	5832970.0
6.2	E200	05/05/2013	481988.5	5832976.5
6.2	E201	05/05/2013	481993.3	5832981.2
6.2	E202	05/05/2013	482007.1	5832990.4
6.2	E203	05/05/2013	482013.5	5832993.2
6.2	E204	05/05/2013	482025.8	5833002.8
6.2	E205	05/05/2013	482042.1	5833016.2
6.2	E206	05/05/2013	482062.0	5833033.4
6.2	E207	05/05/2013	482087.4	5833056.6
6.3	F030	05/05/2013	482134.8	5833105.5
6.3	F031	05/05/2013	482145.6	5833113.6
6.3	F032	05/05/2013	482157.6	5833124.5
6.3	F033	05/05/2013	482166.9	5833132.5
6.3	F034	05/05/2013	482179.1	5833142.5
6.3	F035	05/05/2013	482192.9	5833153.3
6.3	F036	05/05/2013	482213.3	5833169.8
6.3	F037	05/05/2013	482229.4	5833181.9
6.3	F038	05/05/2013	482262.7	5833213.8
6.3	F039	05/05/2013	482283.0	5833232.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
6.3	F040	05/05/2013	482294.8	5833244.0
8	E209	05/05/2013	481991.0	5825032.3
8	E210	05/05/2013	481985.3	5825022.9
8	E211	05/05/2013	481987.6	5825010.0
8	E212	05/05/2013	481987.1	5824992.9
8	E213	05/05/2013	481978.4	5824981.2
8	E214	05/05/2013	481975.4	5824978.0
8	E215	05/05/2013	481970.0	5824968.4
8	E216	05/05/2013	481970.0	5824963.6
8	E217	05/05/2013	481971.0	5824945.9
8	E218	05/05/2013	481965.9	5824929.0
8	E219	05/05/2013	481946.3	5824868.6
9	E221	06/05/2013	479982.7	5825053.3
9	E222	06/05/2013	479980.1	5825033.0
9	E223	06/05/2013	479982.4	5825016.9
9	E224	06/05/2013	479983.3	5825003.3
9	E225	06/05/2013	479977.5	5824975.5
9	E226	06/05/2013	479977.0	5824973.3
9	E227	06/05/2013	479976.8	5824969.8
9	E228	06/05/2013	479975.6	5824948.4
9	E229	06/05/2013	479972.6	5824931.4
9	E230	06/05/2013	479970.3	5824919.9
9	E231	06/05/2013	479971.2	5824908.7
10	E234	06/05/2013	477976.3	5825058.9
10	E235	06/05/2013	477982.4	5825046.8
10	E236	06/05/2013	477982.0	5825030.7
10	E237	06/05/2013	477985.7	5825015.7
10	E238	06/05/2013	477989.5	5824988.5
10	E239	06/05/2013	477987.9	5824978.5
10	E240	06/05/2013	477987.8	5824972.3
10	E241	06/05/2013	477987.0	5824960.6

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
10	E242	06/05/2013	477985.7	5824935.4
10	E243	06/05/2013	477983.8	5824902.8
10	E244	06/05/2013	477978.7	5824880.8
10	E245	06/05/2013	477970.8	5824829.2
11	E294	06/05/2013	482986.4	5820946.4
11	E295	06/05/2013	482987.4	5820953.6
11	E296	06/05/2013	482988.4	5820962.3
11	E297	06/05/2013	482988.4	5820971.4
11	E298	06/05/2013	482988.0	5820981.3
11	E299	06/05/2013	482987.5	5820989.0
11	E300	06/05/2013	482985.8	5820999.6
11	E301	06/05/2013	482982.9	5821015.6
11	E302	06/05/2013	482979.2	5821034.3
11	E303	06/05/2013	482979.0	5821039.2
11	E304	06/05/2013	482979.3	5821175.6
12	E283	06/05/2013	480993.9	5820957.1
12	E284	06/05/2013	480988.3	5820973.1
12	E285	06/05/2013	480987.0	5820980.3
12	E286	06/05/2013	480986.4	5820989.4
12	E287	06/05/2013	480986.8	5821000.9
12	E288	06/05/2013	480990.0	5821043.7
12	E289	06/05/2013	480991.0	5821053.0
12	E290	06/05/2013	480992.3	5821072.2
12	E291	06/05/2013	480992.9	5821087.7
12	E292	06/05/2013	481001.8	5821174.2
13	E271	06/05/2013	478988.1	5821021.7
13	E272	06/05/2013	478977.7	5821004.6
13	E273	06/05/2013	478988.7	5820971.2
13	E274	06/05/2013	478995.2	5820962.4
13	E275	06/05/2013	479003.0	5820953.4
13	E276	06/05/2013	479009.9	5820945.0

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
13	E277	06/05/2013	479017.9	5820931.7
13	E278	06/05/2013	479023.2	5820909.4
13	E279	06/05/2013	479026.3	5820880.7
13	E280	06/05/2013	479030.7	5820859.2
13	E281	06/05/2013	479065.8	5820676.3
14	E260	06/05/2013	476973.8	5821022.8
14	E261	06/05/2013	476970.0	5821003.1
14	E262	06/05/2013	476978.1	5820990.3
14	E263	06/05/2013	476986.1	5820981.6
14	E264	06/05/2013	476984.9	5820971.7
14	E265	06/05/2013	476972.9	5820955.0
14	E266	06/05/2013	476963.5	5820935.4
14	E267	06/05/2013	476958.5	5820920.8
14	E268	06/05/2013	476949.7	5820903.3
14	E269	06/05/2013	476939.7	5820876.3
15	E247	06/05/2013	474980.1	5821050.5
15	E248	06/05/2013	474979.0	5821042.2
15	E249	06/05/2013	474979.2	5821035.6
15	E250	06/05/2013	474983.3	5821026.4
15	E251	06/05/2013	474984.1	5821019.1
15	E252	06/05/2013	474986.2	5821004.0
15	E253	06/05/2013	474987.7	5820992.1
15	E254	06/05/2013	474987.9	5820987.5
15	E255	06/05/2013	474989.3	5820981.8
15	E256	06/05/2013	474987.7	5820975.8
15	E257	06/05/2013	474988.5	5820959.3
15	E258	06/05/2013	474987.6	5820936.8
16	G029	06/05/2013	471990.5	5816966.9
16	G030	06/05/2013	471989.4	5816964.1
16	G031	06/05/2013	471984.1	5816950.6
16	G032	06/05/2013	471974.8	5816930.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
16	G033	06/05/2013	471967.1	5816916.7
16	G034	06/05/2013	471946.4	5816871.7
16	G035	06/05/2013	471941.3	5816857.1
16	G036	06/05/2013	471917.6	5816799.3
16	G037	06/05/2013	471903.1	5816763.2
16	G038	06/05/2013	471894.4	5816735.0
16	G039	06/05/2013	471884.4	5816712.3
17	G041	06/05/2013	470995.4	5813008.9
17	G042	06/05/2013	471006.2	5812998.1
17	G043	06/05/2013	471043.0	5812939.1
17	G044	06/05/2013	471040.8	5812892.8
17	G045	06/05/2013	471042.7	5812858.7
17	G046	06/05/2013	471048.7	5812805.1
17	G047	06/05/2013	471054.2	5812745.2
17	G048	06/05/2013	471055.9	5812726.4
17	G049	06/05/2013	471064.9	5812634.9
17	G050	06/05/2013	471066.2	5812622.7
17	G051	06/05/2013	471069.6	5812585.3
17	G052	06/05/2013	471071.0	5812567.3
18	G054	06/05/2013	471701.4	5808603.8
18	G055	06/05/2013	471703.0	5808608.4
18	G056	06/05/2013	471704.3	5808614.9
18	G057	06/05/2013	471705.7	5808625.5
18	G058	06/05/2013	471705.2	5808657.3
18	G059	06/05/2013	471704.9	5808696.2
18	G060	06/05/2013	471703.9	5808777.0
18	G061	06/05/2013	471703.9	5808807.5
18	G062	06/05/2013	471702.7	5808845.4
18	G063	06/05/2013	471702.3	5808899.9
18	G064	06/05/2013	471701.0	5808940.8
19	C004	03/05/2013	471049.0	5804600.0

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
19	C005	03/05/2013	471045.5	5804593.7
19	C006	03/05/2013	471041.4	5804577.6
19	C007	03/05/2013	471038.4	5804564.8
19	C008	03/05/2013	471038.6	5804562.1
19	C009	03/05/2013	471035.4	5804548.0
19	C010	03/05/2013	471026.2	5804522.3
19	C011	03/05/2013	471023.1	5804510.8
19	C012	03/05/2013	471020.0	5804498.8
19	C013	03/05/2013	471020.7	5804495.5
19	C014	03/05/2013	471019.2	5804488.5
19	C015	03/05/2013	471016.3	5804483.9
19	C016	03/05/2013	471015.0	5804475.8
20	C027	03/05/2013	472077.0	5800971.8
20	C028	03/05/2013	472061.7	5800973.1
20	C029	03/05/2013	471992.9	5800976.2
20	C030	03/05/2013	471989.2	5800979.4
20	C031	03/05/2013	471982.6	5800982.2
20	C032	03/05/2013	471942.8	5800972.3
20	C033	03/05/2013	471910.2	5800971.8
20	C034	03/05/2013	471868.6	5800971.5
20	C035	03/05/2013	471840.8	5800969.4
20	C036	03/05/2013	471731.8	5800965.3
20	C037	03/05/2013	471716.0	5800965.4
20	C038	03/05/2013	471707.3	5800964.3
20	C039	03/05/2013	471672.9	5800962.4
21	C042	03/05/2013	470990.3	5796817.8
21	C043	03/05/2013	470987.3	5796834.1
21	C044	03/05/2013	470985.4	5796882.9
21	C045	03/05/2013	470986.4	5796898.1
21	C046	03/05/2013	470986.4	5796967.2
21	C047	03/05/2013	470986.2	5796976.3

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
21	C048	03/05/2013	470985.4	5796981.3
21	C049	03/05/2013	470986.5	5796990.8
21	C050	03/05/2013	470986.0	5797023.1
21	C051	03/05/2013	470984.4	5797063.2
21	C052	03/05/2013	470984.3	5797121.7
21	C053	03/05/2013	470981.2	5797149.3
23	D016	03/05/2013	478737.5	5800387.5
23	D017	03/05/2013	478738.0	5800405.2
23	D018	03/05/2013	478740.2	5800417.2
23	D019	03/05/2013	478741.5	5800421.5
23	D020	03/05/2013	478743.9	5800426.4
23	D021	03/05/2013	478746.0	5800431.6
23	D022	03/05/2013	478768.8	5800467.4
23	D023	03/05/2013	478780.5	5800487.2
23	D024	03/05/2013	478795.4	5800510.5
23	D025	03/05/2013	478800.6	5800518.9
23	D026	03/05/2013	478817.0	5800547.1
23	D027	03/05/2013	478819.7	5800551.3
23	D028	03/05/2013	478835.0	5800576.6
24	D003	03/05/2013	475639.5	5800150.6
24	D004	03/05/2013	475647.0	5800164.0
24	D005	03/05/2013	475656.0	5800196.6
24	D006	03/05/2013	475656.5	5800207.9
24	D007	03/05/2013	475659.3	5800226.9
24	D008	03/05/2013	475668.5	5800301.4
24	D009	03/05/2013	475671.8	5800324.2
24	D010	03/05/2013	475671.7	5800329.4
24	D011	03/05/2013	475673.5	5800345.7
24	D012	03/05/2013	475676.9	5800366.3
24	D013	03/05/2013	475679.4	5800393.4
24	D014	03/05/2013	475687.9	5800454.6

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
25	D049	03/05/2013	482993.8	5804961.8
25	D050	03/05/2013	482991.6	5804976.4
25	D051	03/05/2013	482991.5	5804987.0
25	D052	03/05/2013	482993.9	5805057.1
25	D053	03/05/2013	482993.1	5805148.9
25	D054	03/05/2013	482989.4	5805186.2
25	D055	03/05/2013	482988.3	5805225.6
25	D056	03/05/2013	482983.6	5805277.7
25	D057	03/05/2013	482983.6	5805289.9
25	D058	03/05/2013	482986.9	5805327.3
25	D059	03/05/2013	482986.7	5805355.4
25	D060	03/05/2013	482984.3	5805383.1
25	D061	03/05/2013	482984.6	5805422.0
26	D077	03/05/2013	483021.2	5813091.2
26	D078	03/05/2013	483012.6	5813071.4
26	D079	03/05/2013	483008.7	5813065.6
26	D080	03/05/2013	483002.5	5813058.9
26	D081	03/05/2013	482999.2	5813021.6
26	D082	03/05/2013	482991.8	5813002.2
26	D083	03/05/2013	482989.9	5812984.9
26	D084	03/05/2013	482991.1	5812969.8
26	D085	03/05/2013	482990.5	5812967.1
26	D086	03/05/2013	482990.4	5812964.1
26	D087	03/05/2013	482990.8	5812961.1
26	D088	03/05/2013	482987.3	5812938.3
28	D092	03/05/2013	481010.2	5811931.7
28	D093	03/05/2013	481000.7	5811912.7
28	D094	03/05/2013	480997.1	5811904.9
28	D095	03/05/2013	480991.2	5811860.6
28	D096	03/05/2013	480987.7	5811858.6
28	D097	03/05/2013	480983.3	5811856.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
28	D098	03/05/2013	480980.1	5811852.8
28	D099	03/05/2013	480968.7	5811810.9
28	D100	03/05/2013	480967.5	5811800.9
28	D101	03/05/2013	480957.1	5811738.7
29	G005	06/05/2013	477024.9	5812096.9
29	G006	06/05/2013	477019.0	5812085.5
29	G007	06/05/2013	477010.7	5812045.5
29	G008	06/05/2013	477010.7	5812041.3
29	G009	06/05/2013	477010.8	5812035.4
29	G010	06/05/2013	477009.6	5811992.6
29	G011	06/05/2013	477008.0	5811962.1
29	G012	06/05/2013	477006.0	5811931.0
29	G013	06/05/2013	477003.4	5811901.9
29	G014	06/05/2013	476999.7	5811883.9
29	G015	06/05/2013	476990.6	5811796.9
30	G017	06/05/2013	472991.6	5812189.7
30	G018	06/05/2013	472988.6	5812179.3
30	G019	06/05/2013	472990.6	5812174.0
30	G020	06/05/2013	472989.0	5812142.8
30	G021	06/05/2013	472982.7	5812107.5
30	G022	06/05/2013	472978.9	5812091.9
30	G023	06/05/2013	472959.2	5811995.4
30	G024	06/05/2013	472944.3	5811919.7
30	G025	06/05/2013	472933.0	5811869.8
30	G026	06/05/2013	472927.3	5811836.2
30	G027	06/05/2013	472915.4	5811783.5
31	H018	06/05/2013	440977.7	5788983.4
31	H019	06/05/2013	440981.4	5788994.4
31	H020	06/05/2013	440982.4	5789012.9
31	H021	06/05/2013	440976.6	5789063.8
31.2	H023	06/05/2013	440971.0	5788952.0

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
31.2	H024	06/05/2013	440969.8	5788969.1
31.2	H025	06/05/2013	440968.9	5789003.5
31.2	H026	06/05/2013	440970.0	5789010.3
31.2	H027	06/05/2013	440980.0	5789042.6
31.2	H028	06/05/2013	440995.0	5789094.7
31.2	H029	06/05/2013	441012.5	5789155.3
31.2	H030	06/05/2013	441020.3	5789177.7
31.2	H031	06/05/2013	441042.0	5789241.2
31.2	H032	06/05/2013	441056.3	5789283.3
31.2	H033	06/05/2013	441059.5	5789292.5
31.2	H034	06/05/2013	441071.8	5789331.3
31.2	H035	06/05/2013	441079.3	5789358.4
32.2	H079	08/05/2013	439971.3	5785095.6
32.2	H080	08/05/2013	439969.4	5785078.5
32.2	H081	08/05/2013	439972.6	5785052.9
32.2	H082	08/05/2013	439976.9	5785031.3
32.2	H083	08/05/2013	439978.5	5785018.1
32.2	H084	08/05/2013	439979.6	5785011.4
32.2	H085	08/05/2013	439980.3	5785006.8
32.2	H086	08/05/2013	439980.3	5785000.5
32.2	H087	08/05/2013	439979.9	5784971.5
32.2	H088	08/05/2013	439979.7	5784951.2
32.2	H089	08/05/2013	439985.3	5784847.0
33	H091	08/05/2013	438014.2	5784952.1
33	H092	08/05/2013	438013.9	5784978.7
33	H093	08/05/2013	438014.2	5784985.9
33	H094	08/05/2013	438015.5	5785002.7
33	H095	08/05/2013	438016.4	5785008.3
33	H096	08/05/2013	438014.7	5785038.9
33	H097	08/05/2013	438015.6	5785062.3
33	H098	08/05/2013	438016.6	5785069.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
33	H099	08/05/2013	438017.4	5785096.7
33	H100	08/05/2013	438018.0	5785128.8
33	H101	08/05/2013	438022.0	5785183.1
33	H102	08/05/2013	438023.2	5785217.8
33	H103	08/05/2013	438028.0	5785314.4
34.2	I033	08/05/2013	435961.4	5784930.7
34.2	I034	08/05/2013	435964.4	5784938.2
34.2	I035	08/05/2013	435964.7	5784959.6
34.2	I036	08/05/2013	435963.4	5784964.0
34.2	I037	08/05/2013	435961.3	5784975.8
34.2	I038	08/05/2013	435957.4	5784983.2
34.2	I039	08/05/2013	435973.3	5784988.1
34.2	I040	08/05/2013	435977.8	5784988.4
34.2	I041	08/05/2013	435981.7	5784989.4
34.2	I042	08/05/2013	435983.5	5784990.9
34.2	I043	08/05/2013	435987.0	5784995.1
34.2	I044	08/05/2013	435987.9	5785015.5
34.2	I045	08/05/2013	435989.8	5785027.3
34.2	I046	08/05/2013	435991.1	5785035.8
35	I049	08/05/2013	430985.2	5780871.4
35	I050	08/05/2013	430984.6	5780881.9
35	I051	08/05/2013	430982.8	5780901.1
35	I052	08/05/2013	430982.9	5780912.0
35	I053	08/05/2013	430987.4	5780926.4
35	I054	08/05/2013	430989.4	5780928.0
35	I055	08/05/2013	430991.2	5780929.5
35	I056	08/05/2013	430995.1	5780939.3
35	I057	08/05/2013	430992.9	5780953.2
35	I058	08/05/2013	430994.6	5780969.7
35	I059	08/05/2013	430998.3	5780982.1
35	I060	08/05/2013	430998.2	5780992.7

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
35	I061	08/05/2013	430998.4	5781005.4
35	I062	08/05/2013	430998.1	5781010.3
35	I063	08/05/2013	431000.9	5781012.7
38	I010	07/05/2013	412561.8	5774826.0
38	I011	07/05/2013	412559.2	5774853.3
38	I012	07/05/2013	412567.0	5774891.0
38	I013	07/05/2013	412636.0	5774937.9
39.2	I002	07/05/2013	409085.0	5772955.8
39.2	I003	07/05/2013	409091.2	5773004.0
39.2	I004	07/05/2013	409100.9	5773039.6
39.3	I006	07/05/2013	409102.6	5773006.7
39.3	I007	07/05/2013	409098.2	5772995.4
39.3	I008	07/05/2013	409078.4	5772958.4
40	E101	05/05/2013	492964.7	5856785.2
40	E102	05/05/2013	492970.6	5856780.3
40.3	E110	05/05/2013	492962.8	5856944.5
40.3	E111	05/05/2013	492966.1	5856935.2
40.4	F002	05/05/2013	492962.4	5856953.2
40.4	F003	05/05/2013	492963.6	5856936.4
40.4	F004	05/05/2013	492964.4	5856927.6
40.4	F005	05/05/2013	492967.8	5856913.0
40.4	F006	05/05/2013	492972.7	5856892.0
40.4	F007	05/05/2013	492976.2	5856870.5
40.4	F008	05/05/2013	492978.3	5856857.0
40.4	F009	05/05/2013	492981.3	5856832.5
40.4	F010	05/05/2013	492983.8	5856821.4
40.4	F011	05/05/2013	492987.4	5856807.9
40.4	F012	05/05/2013	492994.9	5856781.7
40.4	F013	05/05/2013	492997.7	5856769.9
40.4	F014	05/05/2013	492999.6	5856761.5
40.4	F015	05/05/2013	493001.9	5856751.0

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
40.4	F016	05/05/2013	493004.6	5856738.3
40.4	F017	05/05/2013	493009.8	5856715.5
40.4	F018	05/05/2013	493014.7	5856698.5
40.4	F019	05/05/2013	493018.3	5856685.4
40.4	F020	05/05/2013	493025.0	5856654.2
40.4	F021	05/05/2013	493034.3	5856597.6
40.4	F022	05/05/2013	493038.5	5856564.0
40.5	F024	05/05/2013	493204.8	5856787.1
40.5	F025	05/05/2013	493198.5	5856806.1
40.5	F026	05/05/2013	493189.8	5856826.8
40.5	F027	05/05/2013	493180.9	5856851.9
40.5	F028	05/05/2013	493175.7	5856865.0
42	A124	01/05/2013	501588.4	5852455.2
42	A125	01/05/2013	501595.8	5852472.5
42	A126	01/05/2013	501607.4	5852491.3
42	A127	01/05/2013	501627.8	5852544.5
42	A128	01/05/2013	501634.7	5852577.6
42	A129	01/05/2013	501695.5	5852723.4
42	A130	01/05/2013	501709.0	5852798.0
42	A131	01/05/2013	501710.7	5852804.8
42	A132	01/05/2013	501710.2	5852811.7
42	A133	01/05/2013	501709.5	5852838.8
42	A134	01/05/2013	501716.5	5852860.7
42	A135	01/05/2013	501720.5	5852880.7
43.1	E058	05/05/2013	486953.4	5850197.2
43.1	E059	05/05/2013	486916.8	5850215.7
43.1	E060	05/05/2013	486828.1	5850224.8
43.1	E061	05/05/2013	486787.1	5850237.2
43.1	E062	05/05/2013	486714.7	5850261.8
43.1	E063	05/05/2013	486706.3	5850263.6
43.1	E064	05/05/2013	486583.2	5850301.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
43.1	E065	05/05/2013	486555.3	5850310.0
43.1	E066	05/05/2013	486543.5	5850313.4
43.1	E067	05/05/2013	486487.2	5850329.1
43.1	E068	05/05/2013	486478.9	5850331.5
43.2	E069	05/05/2013	486789.0	5849996.1
43.2	E070	05/05/2013	486755.7	5850007.7
43.2	E071	05/05/2013	486712.7	5850020.7
43.2	E072	05/05/2013	486671.3	5850034.5
43.2	E073	05/05/2013	486559.9	5850068.2
43.2	E074	05/05/2013	486521.5	5850081.0
43.3	E076	05/05/2013	486657.9	5849551.8
43.3	E077	05/05/2013	486625.9	5849563.5
43.3	E078	05/05/2013	486576.7	5849582.5
43.3	E079	05/05/2013	486551.1	5849590.6
43.3	E080	05/05/2013	486525.2	5849598.8
43.3	E081	05/05/2013	486514.5	5849600.0
43.3	E082	05/05/2013	486495.0	5849605.6
43.3	E083	05/05/2013	486433.7	5849613.3
45	A054	01/05/2013	499452.2	5843699.2
45	A055	01/05/2013	499456.0	5843693.5
45	A056	01/05/2013	499454.9	5843677.2
45	A057	01/05/2013	499449.6	5843656.0
45	A058	01/05/2013	499448.8	5843641.1
45	A059	01/05/2013	499444.1	5843614.0
45	A060	01/05/2013	499442.3	5843601.6
45	A061	01/05/2013	499439.4	5843589.3
45	A062	01/05/2013	499433.4	5843569.6
45	A063	01/05/2013	499432.7	5843546.0
45	A064	01/05/2013	499430.0	5843514.1
46.2	A084	01/05/2013	499597.4	5845752.6
46.2	A085	01/05/2013	499633.2	5845743.3

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
46.2	A086	01/05/2013	499646.1	5845739.6
46.2	A087	01/05/2013	499660.7	5845737.1
46.3	A091	01/05/2013	499595.0	5845503.1
46.3	A092	01/05/2013	499595.5	5845508.5
46.3	A093	01/05/2013	499600.2	5845528.7
46.3	A094	01/05/2013	499602.3	5845546.7
46.3	A095	01/05/2013	499606.0	5845562.1
46.3	A096	01/05/2013	499621.6	5845632.7
46.3	A097	01/05/2013	499629.1	5845660.2
46.3	A098	01/05/2013	499637.9	5845691.1
46.3	A099	01/05/2013	499639.7	5845713.6
46.3	A100	01/05/2013	499642.0	5845720.8
46.3	A101	01/05/2013	499645.4	5845733.9
46.3	A102	01/05/2013	499646.7	5845745.1
46.3	A103	01/05/2013	499649.9	5845757.5
46.3	A104	01/05/2013	499647.8	5845766.3
46.3	A105	01/05/2013	499648.3	5845771.7
46.3	A106	01/05/2013	499657.9	5845781.8
46.3	A107	01/05/2013	499661.5	5845788.2
46.4	A109	01/05/2013	499625.3	5846095.9
46.4	A110	01/05/2013	499612.1	5846089.4
46.4	A111	01/05/2013	499600.9	5846084.0
46.4	A112	01/05/2013	499576.2	5846070.5
46.4	A113	01/05/2013	499549.5	5846054.9
46.4	A114	01/05/2013	499522.6	5846040.9
46.5	A116	01/05/2013	499726.2	5846270.5
46.5	A117	01/05/2013	499742.8	5846267.9
46.5	A118	01/05/2013	499759.9	5846264.3
46.5	A119	01/05/2013	499782.5	5846259.0
46.5	A120	01/05/2013	499806.2	5846254.4
46.5	A121	01/05/2013	499868.2	5846229.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
48	A020	01/05/2013	494372.8	5833703.7
48	A021	01/05/2013	494376.2	5833693.3
48	A022	01/05/2013	494381.6	5833678.4
48	A023	01/05/2013	494384.0	5833664.5
48	A024	01/05/2013	494384.7	5833655.3
48	A025	01/05/2013	494387.8	5833638.3
48	A026	01/05/2013	494387.0	5833634.2
48	A027	01/05/2013	494389.9	5833612.4
48	A028	01/05/2013	494390.2	5833603.8
48	A029	01/05/2013	494395.5	5833563.0
48	A030	01/05/2013	494394.8	5833556.6
22 & T04	D030	03/05/2013	481946.2	5800764.4
22 & T04	D031	03/05/2013	481956.9	5800817.3
22 & T04	D032	03/05/2013	481968.0	5800853.7
22 & T04	D033	03/05/2013	481971.4	5800870.1
22 & T04	D034	03/05/2013	481983.0	5800910.5
22 & T04	D035	03/05/2013	481992.0	5800965.4
22 & T04	D036	03/05/2013	481994.1	5800975.7
22 & T04	D037	03/05/2013	481995.9	5800982.9
22 & T04	D038	03/05/2013	482014.0	5801048.9
22 & T04	D039	03/05/2013	482016.3	5801063.2
22 & T04	D040	03/05/2013	482017.0	5801072.9
22 & T04	D041	03/05/2013	482029.6	5801122.8
22 & T04	D042	03/05/2013	482032.9	5801144.3
22 & T04	D043	03/05/2013	482035.5	5801157.2
22 & T04	D044	03/05/2013	482037.0	5801167.3
22 & T04	D045	03/05/2013	482052.3	5801235.0
22 & T04	D046	03/05/2013	482056.0	5801248.4
22 & T04	D047	03/05/2013	482062.4	5801271.2
27 & T06	D064	03/05/2013	487004.0	5812995.2
27 & T06	D065	03/05/2013	486992.3	5812976.4

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
27 & T06	D066	03/05/2013	486995.6	5812973.9
27 & T06	D067	03/05/2013	486999.1	5812971.0
27 & T06	D068	03/05/2013	487000.3	5812962.8
27 & T06	D069	03/05/2013	486984.0	5812921.4
27 & T06	D070	03/05/2013	486974.7	5812866.9
27 & T06	D071	03/05/2013	486964.6	5812817.4
27 & T06	D072	03/05/2013	486964.0	5812812.8
27 & T06	D073	03/05/2013	486960.4	5812790.1
27 & T06	D074	03/05/2013	486954.9	5812767.6
27 & T06	D075	03/05/2013	486954.9	5812761.4
36 & T03	H039	07/05/2013	428970.4	5780903.2
36 & T03	H040	07/05/2013	428985.9	5780951.8
36 & T03	H041	07/05/2013	428995.8	5780964.5
36 & T03	H042	07/05/2013	428999.2	5780992.1
36 & T03	H043	07/05/2013	428999.0	5780995.0
36 & T03	H044	07/05/2013	428998.4	5780999.8
36 & T03	H045	07/05/2013	428997.7	5781003.8
36 & T03	H046	07/05/2013	429009.5	5781042.7
36 & T03	H047	07/05/2013	429016.1	5781091.1
36 & T03	H048	07/05/2013	429019.5	5781117.1
36 & T03	H049	07/05/2013	429024.7	5781141.0
36 & T03	H050	07/05/2013	429028.4	5781161.5
36 & T03	H051	07/05/2013	429033.0	5781177.3
36 & T03	H052	07/05/2013	429037.6	5781190.8
36 & T03	H053	07/05/2013	429040.2	5781201.5
36 & T03	H054	07/05/2013	429049.0	5781231.8
36 & T03	H055	07/05/2013	429053.5	5781241.2
36 & T03	H056	07/05/2013	429057.0	5781271.1
36 & T03	H057	07/05/2013	429060.5	5781284.4
36 & T03	H058	07/05/2013	429065.3	5781303.1
36 & T03	H059	07/05/2013	429075.3	5781333.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
36 & T03	H060	07/05/2013	429082.2	5781365.1
36 & T03	H061	07/05/2013	429089.6	5781389.7
36 & T03	H062	07/05/2013	429093.4	5781413.7
36 & T03	H063	07/05/2013	429094.4	5781427.4
36 & T03	H064	07/05/2013	429097.1	5781437.9
37 & T07	I016	07/05/2013	420870.4	5778542.1
37 & T07	I017	07/05/2013	420903.1	5778554.9
37 & T07	I018	07/05/2013	420908.6	5778558.9
37 & T07	I019	07/05/2013	420933.2	5778577.8
37 & T07	I020	07/05/2013	420966.6	5778601.8
37 & T07	I021	07/05/2013	421040.8	5778655.4
37 & T07	I022	07/05/2013	421070.3	5778675.7
37 & T07	I023	07/05/2013	421093.1	5778694.4
37 & T07	I024	07/05/2013	421136.5	5778727.3
37 & T07	I025	07/05/2013	421159.5	5778745.6
37 & T07	I026	07/05/2013	421178.6	5778758.3
37 & T07	I027	07/05/2013	421231.9	5778790.8
37 & T07	I028	07/05/2013	421251.9	5778794.1
37 & T07	I029	07/05/2013	421310.5	5778801.4
37 & T07	I030	07/05/2013	421313.4	5778802.8
37 & T07	I031	07/05/2013	421328.6	5778819.0
37 & T07	H066	07/05/2013	420950.3	5778617.0
37 & T07	H067	07/05/2013	420946.6	5778613.0
37 & T07	H068	07/05/2013	420943.5	5778610.3
37 & T07	H069	07/05/2013	420936.9	5778604.2
37 & T07	H070	07/05/2013	420928.4	5778597.0
37 & T07	H071	07/05/2013	420923.1	5778592.7
37 & T07	H072	07/05/2013	420885.5	5778567.6
37 & T07	H073	07/05/2013	420882.7	5778565.4
37 & T07	H074	07/05/2013	420879.6	5778563.9
37 & T07	H075	07/05/2013	420873.8	5778559.2

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
37 & T07	H076	07/05/2013	420844.0	5778538.4
41 & T09	E086	05/05/2013	490996.3	5846412.7
41 & T09	E087	05/05/2013	490999.9	5846418.8
41 & T09	E088	05/05/2013	491005.8	5846427.9
41 & T09	E089	05/05/2013	491015.2	5846446.2
41 & T09	E090	05/05/2013	491014.0	5846458.7
41 & T09	E091	05/05/2013	491014.3	5846470.5
41 & T09	E092	05/05/2013	491019.9	5846498.0
41 & T09	E093	05/05/2013	491032.0	5846535.1
41 & T09	E094	05/05/2013	491046.4	5846582.6
41 & T09	E095	05/05/2013	491058.1	5846632.0
41 & T09	E096	05/05/2013	491065.8	5846657.6
41 & T09	E097	05/05/2013	491082.2	5846710.4
41 & T09	E098	05/05/2013	491105.4	5846785.1
41 & T09	E099	05/05/2013	491123.0	5846841.9
43 & T09	E034	05/05/2013	486532.7	5849580.4
43 & T09	E035	05/05/2013	486537.3	5849584.9
43 & T09	E036	05/05/2013	486541.7	5849594.1
43 & T09	E037	05/05/2013	486541.3	5849599.8
43 & T09	E038	05/05/2013	486534.6	5849607.8
43 & T09	E039	05/05/2013	486537.1	5849626.5
43 & T09	E040	05/05/2013	486534.5	5849653.6
43 & T09	E041	05/05/2013	486544.1	5849670.2
43 & T09	E042	05/05/2013	486557.3	5849738.8
43 & T09	E043	05/05/2013	486577.7	5849812.4
43 & T09	E044	05/05/2013	486585.2	5849880.0
43 & T09	E045	05/05/2013	486601.8	5849952.7
43 & T09	E046	05/05/2013	486613.1	5850030.0
43 & T09	E047	05/05/2013	486616.1	5850043.1
43 & T09	E048	05/05/2013	486619.2	5850052.4
43 & T09	E049	05/05/2013	486637.2	5850138.4

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
43 & T09	E050	05/05/2013	486642.1	5850158.7
43 & T09	E051	05/05/2013	486651.4	5850192.5
43 & T09	E052	05/05/2013	486656.2	5850217.8
43 & T09	E053	05/05/2013	486665.5	5850262.7
43 & T09	E054	05/05/2013	486677.9	5850294.3
43 & T09	E055	05/05/2013	486684.6	5850317.1
43 & T09	E056	05/05/2013	486692.7	5850351.6
44 & T10	E017	05/05/2013	487064.5	5855964.5
44 & T10	E018	05/05/2013	487054.3	5855918.4
44 & T10	E019	05/05/2013	487052.9	5855908.9
44 & T10	E020	05/05/2013	487037.5	5855851.9
44 & T10	E021	05/05/2013	487028.1	5855807.3
44 & T10	E022	05/05/2013	487015.9	5855721.0
44 & T10	E023	05/05/2013	487000.2	5855667.0
44 & T10	E024	05/05/2013	486993.0	5855634.9
44 & T10	E025	05/05/2013	486991.4	5855614.5
44 & T10	E026	05/05/2013	486984.5	5855579.4
44 & T10	E027	05/05/2013	486980.2	5855568.5
44 & T10	E028	05/05/2013	486978.7	5855550.7
44 & T10	E029	05/05/2013	486974.6	5855533.7
44 & T10	E030	05/05/2013	486973.9	5855526.1
44 & T10	E031	05/05/2013	486970.2	5855492.8
44 & T10	E032	05/05/2013	486968.8	5855487.4
46 & T11	A066	01/05/2013	499670.1	5845831.6
46 & T11	A067	01/05/2013	499668.7	5845848.3
46 & T11	A068	01/05/2013	499675.1	5845870.0
46 & T11	A069	01/05/2013	499678.7	5845884.8
46 & T11	A070	01/05/2013	499680.5	5845917.2
46 & T11	A071	01/05/2013	499691.2	5845950.3
46 & T11	A072	01/05/2013	499703.8	5845997.9
46 & T11	A073	01/05/2013	499710.2	5846040.7

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
46 & T11	A074	01/05/2013	499716.0	5846055.2
46 & T11	A075	01/05/2013	499732.3	5846103.7
46 & T11	A076	01/05/2013	499732.4	5846114.6
46 & T11	A077	01/05/2013	499737.6	5846168.3
46 & T11	A078	01/05/2013	499750.0	5846217.6
46 & T11	A079	01/05/2013	499756.5	5846236.8
46 & T11	A080	01/05/2013	499757.5	5846252.3
46 & T11	A081	01/05/2013	499759.6	5846276.8
46 & T11	A082	01/05/2013	499763.8	5846290.6
47 & T12	A038	01/05/2013	497056.5	5840999.6
47 & T12	A039	01/05/2013	497054.4	5840985.4
47 & T12	A040	01/05/2013	497051.3	5840972.6
47 & T12	A041	01/05/2013	497046.2	5840959.3
47 & T12	A042	01/05/2013	497042.4	5840936.8
47 & T12	A043	01/05/2013	497037.4	5840915.2
47 & T12	A044	01/05/2013	497035.2	5840901.4
47 & T12	A045	01/05/2013	497030.5	5840863.4
47 & T12	A046	01/05/2013	497030.5	5840856.3
47 & T12	A047	01/05/2013	497026.2	5840843.8
47 & T12	A048	01/05/2013	497022.0	5840832.1
47 & T12	A049	01/05/2013	497016.9	5840821.2
47 & T12	A050	01/05/2013	497006.5	5840795.0
47 & T12	A051	01/05/2013	497008.2	5840779.1
47 & T12	A052	01/05/2013	497007.8	5840771.7
49 & T13	E307	06/05/2013	488159.2	5822474.4
49 & T13	E308	06/05/2013	488173.7	5822540.6
49 & T13	E309	06/05/2013	488186.8	5822599.4
49 & T13	E310	06/05/2013	488186.9	5822603.4
49 & T13	E311	06/05/2013	488195.5	5822643.9
49 & T13	E312	06/05/2013	488201.9	5822666.4
49 & T13	E313	06/05/2013	488225.4	5822786.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
49 & T13	E314	06/05/2013	488240.4	5822824.4
49 & T13	E315	06/05/2013	488243.6	5822844.6
49 & T13	E316	06/05/2013	488245.2	5822863.4
49 & T13	E317	06/05/2013	488251.2	5822896.5
49 & T13	E318	06/05/2013	488253.8	5822916.9
49 & T13	E319	06/05/2013	488256.1	5822940.7
49 & T13	E320	06/05/2013	488259.6	5822960.2
49 & T13	E321	06/05/2013	488261.0	5822966.7
49 & T13	E322	06/05/2013	488264.2	5822977.8
49 & T13	E323	06/05/2013	488265.4	5822980.8
49 & T13	E324	06/05/2013	488266.9	5822984.6
7 & T05	B090	03/05/2013	482861.7	5828463.4
7 & T05	B091	03/05/2013	482878.1	5828506.7
7 & T05	B092	03/05/2013	482884.3	5828538.7
7 & T05	B093	03/05/2013	482895.3	5828607.4
7 & T05	B094	03/05/2013	482912.7	5828672.4
7 & T05	B095	03/05/2013	482929.2	5828728.5
7 & T05	B096	03/05/2013	482940.0	5828777.2
7 & T05	B097	03/05/2013	482944.8	5828802.8
7 & T05	B098	03/05/2013	482943.9	5828806.1
7 & T05	B099	03/05/2013	482944.2	5828844.0
7 & T05	B100	03/05/2013	482954.6	5828874.9
7 & T05	B101	03/05/2013	482969.6	5828918.3
7 & T05	B102	03/05/2013	482977.4	5828937.2
7 & T05	B103	03/05/2013	482980.5	5828941.1
7 & T05	B104	03/05/2013	482982.8	5828988.4
T01	H002	06/05/2013	447346.3	5794153.5
T01	H003	06/05/2013	447362.1	5794197.0
T01	H004	06/05/2013	447378.1	5794222.1
T01	H005	06/05/2013	447414.3	5794266.0
T01	H006	06/05/2013	447457.2	5794323.4

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
T01	H007	06/05/2013	447460.9	5794328.3
T01	H008	06/05/2013	447475.4	5794348.2
T01	H009	06/05/2013	447537.1	5794421.1
T01	H010	06/05/2013	447572.3	5794455.6
T01	H011	06/05/2013	447619.0	5794512.4
T01	H012	06/05/2013	447623.7	5794519.3
T01	H013	06/05/2013	447667.2	5794600.2
T01	H014	06/05/2013	447706.5	5794632.9
T01	H015	06/05/2013	447758.7	5794699.3
T08.1	A138	01/05/2013	499965.6	5852329.2
T08.1	A139	01/05/2013	499970.2	5852342.0
T08.1	A140	01/05/2013	499980.9	5852400.9
T08.1	A141	01/05/2013	499992.3	5852452.7
T08.1	A142	01/05/2013	499999.3	5852471.9
T08.1	A143	01/05/2013	500003.5	5852506.1
T08.1	A144	01/05/2013	500005.3	5852516.3
T08.2	A147	01/05/2013	500041.2	5852741.3
T08.2	A148	01/05/2013	500040.8	5852720.5
T08.2	A149	01/05/2013	500037.1	5852704.3
T08.2	A150	01/05/2013	500031.7	5852687.2
T11	A153	01/05/2013	494417.6	5833706.3
T11	A154	01/05/2013	494418.3	5833723.7
T11	A155	01/05/2013	494420.2	5833739.6
T11	A156	01/05/2013	494428.4	5833750.0
T11	A157	01/05/2013	494446.2	5833789.3
T11	A158	01/05/2013	494465.0	5833809.5
T11	A159	01/05/2013	494476.7	5833836.8
T11	A160	01/05/2013	494489.0	5833877.9
T11	A161	01/05/2013	494503.0	5833907.4
T11	A162	01/05/2013	494507.8	5833915.0
T11	A163	01/05/2013	494530.8	5833941.9

Static Image Details			WGS84 UTM Z31N	
Site	Image Number	Date	Easting (m)	Northing (m)
T11	A164	01/05/2013	494537.2	5833960.3
T11	A165	01/05/2013	494547.4	5833975.6
T11	A166	01/05/2013	494554.6	5833989.9
T11	A167	01/05/2013	494560.5	5834019.5
T2	C019	03/05/2013	466489.1	5803016.2
T2	C020	03/05/2013	466475.5	5802966.4
T2	C021	03/05/2013	466461.7	5802885.2
T2	C022	03/05/2013	466439.0	5802788.7
T2	C023	03/05/2013	466424.9	5802729.2
T2	C024	03/05/2013	466413.4	5802677.6
T2	C025	03/05/2013	466402.2	5802606.0

E. HAMON GRAB SAMPLING LOGS

E.1. Hamon Grab Sampling Logs

Grab Sample Details					WGS84 UTM Z31 N		Sample Descriptions				
Site No.	Date	Fauna Lab. Ref. No.	PSA Lab. Ref. No.	Depth (m BCD)	Easting (m)	Northing (m)	Fauna (volume L)	*In-situ* sediment description	Sediment features (includes: burrows, tubes)	Sediment anoxia	Conspicuous Fauna
1	05/05/13	10579	10628	38.1	482984.2	5852967.5	11	Slightly shelly fine sand	None	None	None
2	02/05/13	10580	10629	40.7	482866.7	5848960.4	12	Muddy shelly sand	None	None	None
3	02/05/13	10581	10630	44.8	482975.9	5844972.5	11	Muddy sand, clay at base	None	Layer	None
4	02/05/13	10582	10631	43.1	481972.0	5840985.4	9	Slightly shelly sand	None	None	*Echinocardium cordatum*
5	02/05/13	10583	10632	44.4	482812.5	5836478.8	11	Slightly shelly sand	None	None	None
6	02/05/13	10584	10633	41.8	481987.5	5832971.0	12	Slightly shelly sand	None	None	*Echinocardium cordatum*
7	03/05/13	10585	10634	41.4	482976.6	5828976.3	11	Slightly shelly sand	None	None	None
8	03/05/13	10586	10635	42.8	481982.0	5824968.3	12	Slightly shelly sand	None	None	None
9	06/05/13	10587	10636	44.6	479985.3	5824978.3	11	Slightly shelly sand	None	None	None
10	06/05/13	10588	10637	47.0	477989.2	5824976.2	10	Slightly shelly sand	None	None	None
11	06/05/13	10589	10638	44.9	482978.8	5820995.2	8	Slightly shelly slightly silty sand	Tubes	Patches	None

Grab Sample Details					WGS84 UTM Z31 N		Sample Descriptions				
Site No.	Date	Fauna Lab. Ref. No.	PSA Lab. Ref. No.	Depth (m BCD)	Easting (m)	Northing (m)	Fauna (volume L)	*In-situ* sediment description	Sediment features (includes: burrows, tubes)	Sediment anoxia	Conspicuous Fauna
12	06/05/13	10590	10639	47.0	480983.2	5820969.5	11	Slightly shelly sand	None	None	None
13	06/05/13	10591	10640	45.1	478991.7	5820973.5	11	Slightly shelly sand	None	None	None
14	06/05/13	10592	10641	45.6	476984.2	5820975.0	11	Shelly sand	None	None	None
15	06/05/13	10593	10642	44.9	474988.2	5820981.8	12	Slightly shelly sand	None	None	None
16	06/05/13	10594	10643	47.9	471998.1	5816969.7	12	Slightly shelly sand	None	None	None
17	03/05/13	10595	10644	47.9	471003.0	5812981.6	7	Slightly shelly slightly pebbly sand	None	Patches	None
18	03/05/13	10596	10645	44.9	471691.4	5808619.6	4	Slightly pebbly slightly shelly gravelly sand	None	None	*Ophiura* sp.
19	03/05/13	10597	10646	44.9	471018.8	5804479.9	12	Slightly shelly sand	None	None	None
20	03/05/13	10598	10647	44.7	471989.4	5800989.5	10	Fine sand	None	None	None
21	03/05/13	10599	10648	43.4	470981.1	5796985.7	11	Slightly shelly fine sand	None	None	None
22	03/05/13	10600	10649	45.0	481988.5	5800989.7	12	Medium to coarse sand	None	None	None
23	03/05/13	10601	10650	42.4	478752.6	5800432.3	10	Shelly sand	None	None	None
24	03/05/13	10602	10651	44.3	475645.9	5800181.0	10	Slightly shelly fine sand	None	None	None
25	03/05/13	10603	10652	52.1	482996.8	5804977.7	5	Slightly shelly sand	None	Layer	None
26	03/05/13	10604	10653	51.8	482986.7	5812970.2	10	Muddy sand, clay at base	None	Layer	None

Grab Sample Details					WGS84 UTM Z31 N		Sample Descriptions				
Site No.	**Date**	**Fauna Lab. Ref. No.**	**PSA Lab. Ref. No.**	**Depth (m BCD)**	**Easting (m)**	**Northing (m)**	**Fauna (volume L)**	***In-situ* sediment description**	**Sediment features (includes: burrows, tubes)**	**Sediment anoxia**	**Conspicuous Fauna**
27	06/05/13	10605	10654	42.6	486998.9	5812971.0	6	Slightly shelly sand	None	None	None
28	06/05/13	10606	10655	45.3	480991.4	5811857.6	10	Slightly shelly sand	None	Streaks	None
29	06/05/13	10607	10656	41.1	477006.9	5812046.8	12	Medium to coarse sand	None	None	None
30	03/05/13	10608	10657	48.2	472992.8	5812177.8	8	Slightly shelly slightly silty pebbly sand	None	None	*Echinocardium cordatum*
31	06/05/13	10609	10658	44.7	440973.5	5789008.4	11	medium sand	None	None	None
32	08/05/13	10610	10659	45.2	439981.4	5785012.3	9	Slightly shelly slightly pebbly sandy clay	None	Layer	None
33	08/05/13	10611	10660	39.6	438015.8	5784997.7	10	Slightly shelly coarse sand	None	None	None
34	08/05/13	10612	10661	41.1	435976.0	5784989.7	10	Slightly shelly slightly gravelly pebbly sand with 1 cobble (11cm)	Tubes	streaks, patches	None
35	08/05/13	10613	10662	33.0	431003.1	5781000.2	10	Slightly shelly slightly pebbly slightly silty sand with 1 cobble	Tubes	None	*Sabellaria* sp.

Grab Sample Details					WGS84 UTM Z31 N		Sample Descriptions				
Site No.	Date	Fauna Lab. Ref. No.	PSA Lab. Ref. No.	Depth (m BCD)	Easting (m)	Northing (m)	Fauna (volume L)	*In-situ* sediment description	Sediment features (includes: burrows, tubes)	Sediment anoxia	Conspicuous Fauna
36	07/05/13	10614	10663	32.3	428993.7	5780991.6	4	Shelly gravelly sand	*Sabellaria*	None	*Sabellaria* crusts covering 3% of the grab bite with and average elevation of 2cm
37	07/05/13	10615	10664	32.2	420899.5	5778563.8	7	Coarse gravelly shelly sand	None	None	None
38	07/05/13	10616	10665	22.8	412594.1	5774906.8	5	Pebbly shelly gravelly sand	None	None	None
39	07/05/13	10617	10666	20.0	409094.7	5772983.2	11	Soft clay with a thin veneer of muddy sand	Layer of clay	None	*Sabellaria* clumps covering 15% of the grab bite with and average elevation of 2cm
40 (.5)	05/05/13	10618	10667	31.4	493189.9	5856778.1	5	Slightly shelly fine sand	None	Streaks	None
41	05/05/13	10619	10668	32.9	490988.0	5846394.4	11	Sand	None	None	None
42	01/05/13	10620	10669	39.2	501711.6	5852800.9	7	Slightly shelly fine sand	None	None	*Echinocardium cordatum*

Grab Sample Details					WGS84 UTM Z31 N		Sample Descriptions				
Site No.	**Date**	**Fauna Lab. Ref. No.**	**PSA Lab. Ref. No.**	**Depth (m BCD)**	**Easting (m)**	**Northing (m)**	**Fauna (volume L)**	***In-situ* sediment description**	**Sediment features (includes: burrows, tubes)**	**Sediment anoxia**	**Conspicuous Fauna**
43	05/05/13	10621	10670	40.3	486514.3	5849562.3	10	Slightly shelly sand	Tubes	None	*Sabellaria* crusts covering <5% of the grab bite with and average elevation of 1-2cm
44	05/05/13	10622	10671	38.1	486969.0	5855518.5	5	Slightly shelly slightly silty sand	None	Streaks	*Echinocardium cordatum*
45	01/05/13	10623	10672	39.5	499456.0	5843696.8	10	Slightly shelly fine sand	None	None	*Echinocardium cordatum*
46	01/05/13	10624	10673	39.2	499704.4	5845984.0	10	Slightly shelly fine sand	None	None	None
47	01/05/13	10625	10674	37.0	497025.8	5840818.4	11	Shelly fine sand	None	None	None
48	01/05/13	10626	10675	39.4	494388.0	5833654.1	11	Shelly sand	None	None	*Echinocardium cordatum*, 3 x 1cm *Sabellaria* sp.
49	06/05/13	10627	10676	42.1	488257.6	5822973.9	11	Slightly shelly sand	None	None	None

E.2. Hamon Grab Sample Quality Logs

Site No.	Attempts	Successful sample collected (Y/N)	Brief description of problems with sample	Size of sample retained	Additional Notes on Quality of Retained Samples
18	3	Y	All attempts were low sample volume	4	Samples taken from attempt 2
40 (.5)	2	Y	First attempt discarded	5	
36	3	Y	All attempts were low sample volume	4	Samples taken from attempt 3

F. 2M BEAM TRAWL SAMPLE LOGS

F.1 2m Beam Trawl Sampling Logs

Site Details			WGS84 UTM Z31N		Sample Details					
Site No	Date	Point on line	Easting (m)	Northing (m)	Time (GMT)	Depth (m BCD)	Trawl Speed (knots)	Distance (m)	Direction of Travel	Comments
T1	06/05/13	Start	447327	5794118	19:14	45.3	1.3	490	Into current	
		End	447636	5794499	19:28	49.9				
T2	03/05/13	Start	466510	5803073	11:31	44.5	1.1	531	Into current	
		End	466403	5802553	11:49	42.7				
T4	06/05/13	Start	482069	5801344	11:08	45.7	1.3	550	Into current	
		End	481969	5800803	11:24	44.9				
T5	05/05/13	Start	482930	5828944	21:51	41.5	1.5	448	Into current	
		End	482858	5828502	22:02	42.5				
T6	06/05/13	Start	486956	5812571	09:07	40.2	1.3	517	Into current	
		End	487020	5813084	09:15	38.5				
T7	08/05/13	Start	421359	5778923	00:13	29.3	1.4	501	Into current	Attempt 2, first attempt trawl dug in.
		End	420957	5778623	00:24	31.8				
T8	02/05/13	Start	500019	5852484	16:42	34.3	3.0	699	Slack water	

Site Details			WGS84 UTM Z31N		Sample Details					
Site No	**Date**	**Point on line**	**Easting (m)**	**Northing (m)**	**Time (GMT)**	**Depth (m BCD)**	**Trawl Speed (knots)**	**Distance (m)**	**Direction of Travel**	**Comments**
		End	500140	5853173	16:50	32.2				
T9	05/05/13	Start	491003	5846464	07:58	30.2	1.8	467	With current	Moved due to Sabellaria at site 43, so moved to site 41. T9 on hydropro
		End	491142	5846911	08:06	30.3				
T10	05/05/13	Start	487071	5855703	02:00	37.5	1.5	426	Into current	
		End	487162	5856119	02:10	36.9				
T11	01/05/13	Start	494424	5833705	22:48	37.4	1.0	500	Into current	Moved to G48
		End	494649	5834151	23:04	37.3				
T12	01/05/13	Start	497024	5840979	08:08	33.4	2.2	494	With current	
		End	497140	5841459	08:14	38.3				
T13	06/05/13	Start	488145	5822430	07:41	43.3	1.4	459	Into current	
		End	488234	5822880	07:53	44.3				

East Anglia Offshore Wind

VATTENFALL

SCOTTISHPOWER RENEWABLES

F.2 2m Beam Trawl Sample Quality Logs

			Sediment Character (Percentage)							
Site No	Date	Total Volume (L)	Mud	Sand	Gravel	Cobbles	Large Cobbles	Boulders	% Shell Material	Other features
T1	06/05/13	3				1 cobble			35	Petrified wood, ctenophores
T2	03/05/13	5							6	Petrified wood, ctenophores, *Buccinum undatum* eggs
T4	06/05/13	2							10	Kitchen food waste (onion skin pineapple tops), petrified wood
T5	05/05/13	4							<5	Jellyfish, rock hopper debris
T6	06/05/13	5							25	Plastic litter
T7	08/05/13	4							85	Piece of wood, ctenophores
T8	02/05/13	2								Small wood, ctenophores
T9	05/05/13	4							2	Wood fragments, ctenophores
T10	05/05/13	3							5	Clinker, petrified wood
T11	01/05/13	6							5	0.9l of *Sabellaria* crusts and clumps with an average elevation of 13cm
T12	01/05/13	3							10	Ctenophores
T13	06/05/13	3							15	Clinker, wood fragments, ctenophores

G. SEDIMENT CONTAMINANTS LOGS

G.1 Sediment Contaminants Sampling Logs

Sample Details			WGS84 UTM Z31N		Sample Descriptions						
Site No.	**Date**	**Depth (m BCD)**	**Easting (m)**	**Northing (m)**	**Sample Size (Fraction of Day Grab)**	**Organics**	**Metals**	***In-situ* sediment description**	**Sediment features (burrows, tubes)**	**Sediment anoxia**	**Conspicuous Fauna**
30	03/05/13	47.8	472991.9	5812180.9	1/2	2x Organics		Slightly shelly sand	None	None	None
30	03/05/13	48.0	472995.6	5812183.7	1/2		1x Metal	Slightly shelly sand	None	None	None
33	08/05/13	39.5	438017.7	5784995.1	-	2x Organics	1x Metal	Slightly shelly coarse sand	None	None	None
37	07/05/13	32.9	420898.4	5778565.8	Full	2x Organics	1x Metal	Coarse pebbly gravelly shelly sand	None	None	None
39	07/05/13	20.0	409094.1	5772987.3	Full	2x Organics		Muddy sand over clay	None	layer	None
39	07/05/13	19.8	409096.5	5772985.7	Full		1x Metal	Muddy sand over clay	None	layer	None
43	05/05/13	39.9	486515.4	5849564.1	3/4	2x Organics		Slightly shelly sand	Tubes	None	*Sabellaria* crusts, <5% of grab bite, 1-2cm average elevation
43	05/05/13	40.0	486512.8	5849564.1	3/4		1x Metal	Slightly shelly sand	None	None	None

Sample Details			WGS84 UTM Z31N		Sample Descriptions						
Site No.	**Date**	**Depth (m BCD)**	**Easting (m)**	**Northing (m)**	**Sample Size (Fraction of Day Grab)**	**Organics**	**Metals**	***In-situ* sediment description**	**Sediment features (burrows, tubes)**	**Sediment anoxia**	**Conspicuous Fauna**
49	06/05/13	42.1	488259.2	5822970.3	Full	2x Organics	1x Metal	Slightly shelly sand	None	None	*None*
50	07/05/13	7.8	392325.6	5760161.4	1/2	1x Organics		Slightly shelly sand	None	None	None
50	07/05/13	7.4	392321.3	5760162.5	1/4	1x Organics		Slightly shelly sand	None	None	None
50	07/05/13	8.1	392331.6	5760158.7	Full		1x Metal	Slightly shelly sand	None	None	None
51	07/05/13	9.8	393582.0	5760947.3	3/4	2x Organics		Gravelly coarse sand	None	None	*None*
51	07/05/13	10.2	393587.7	5760939.9	3/4		1x Metal	Slightly shelly sand	None	None	None
52	07/05/13	13.9	397078.2	5761206.6	3/4	2x Organics		Slightly shelly sand	None	None	None
52	07/05/13	13.7	397060.4	5761204.0	Full		1x Metal	Slightly shelly sand	None	None	None
53	07/05/13	16.1	400041.9	5764680.2	1/2	2x Organics	1x Metal	Pebbly gravelly sand	None	None	None
54	07/05/13	16.3	401450.8	5766427.5	Full	2x Organics	1x Metal	Slightly shelly sand	None	None	None
55	07/05/13	13.0	405692.7	5767565.4	3/4	2x Organics		Coarse sand	None	None	None
55	07/05/13	13.3	405698.8	5767559.8	Full		1x Metal	Coarse sand	None	None	None
57	07/05/13	27.6	415340.1	5773932.5	3/4	2x Organics		Silty pebbly gravelly sand with clay	None	None	None

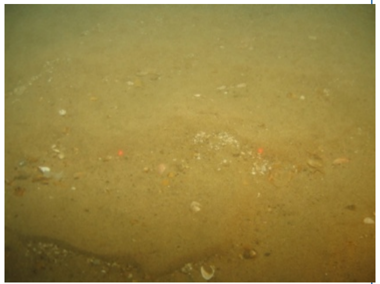
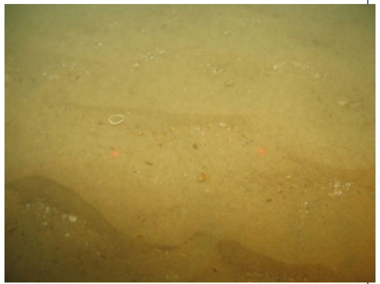
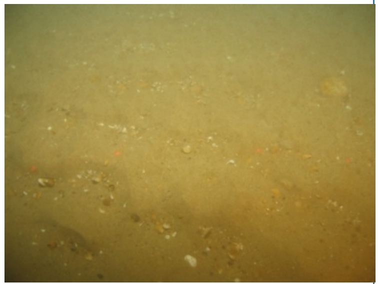
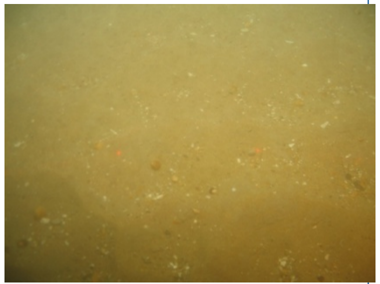
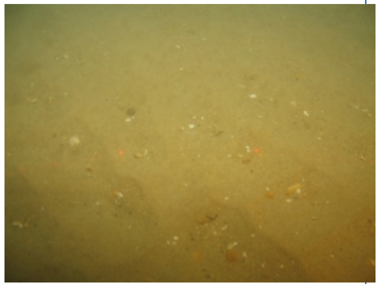
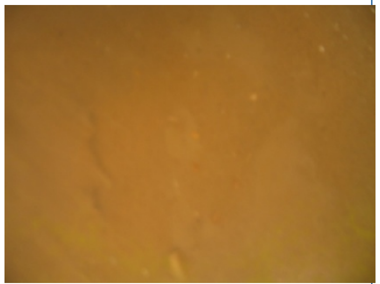
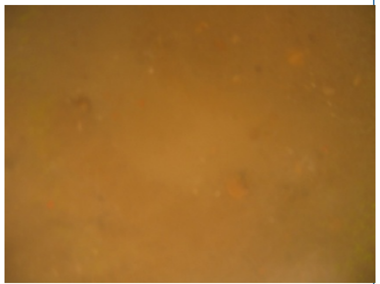
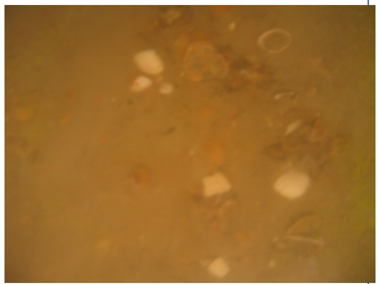
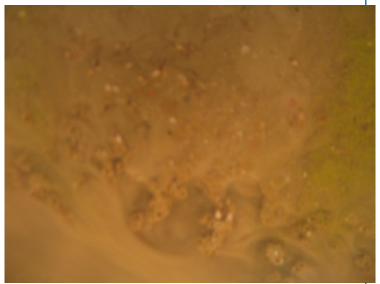
Sample Details			WGS84 UTM Z31N		Sample Descriptions						
Site No.	**Date**	**Depth (m BCD)**	**Easting (m)**	**Northing (m)**	**Sample Size (Fraction of Day Grab)**	**Organics**	**Metals**	***In-situ* sediment description**	**Sediment features (burrows, tubes)**	**Sediment anoxia**	**Conspicuous Fauna**
57	07/05/13	27.6	415333.0	5773931.4	3/4		1x Metal	Silty pebbly gravelly sand with clay	None	None	None
58	08/05/13	52.4	449021.0	5782363.5	Full	2x Organics	1x Metal	Slightly shelly sand	None	None	None
59	08/05/13	55.3	450994.6	5781959.7	Full	2x Organics	1x Metal	Slightly shelly sand	None	None	None

G.2 Sediment Contaminants Sample Quality Logs

Site No.	Attempts	Successful sample collected (Y/N)	Brief description of problems with sample	Size of sample retained	Additional Notes on Quality of Retained Samples
43	3	Y	Attempt 2 was low sample volume	3/4	
51	3	Y	Attempt 2 was low sample volume	Full	
52	3	Y	Attempt 2 was low sample volume	Full	
53	3	Y	Attempt 1 and 2 were low sample volume	1/2	
55	3	N	All attempts pebble in jaw	N/A	Site moved due to fishing vessel on site, attempted again at original site later
38	5	N	All attempts pebble in jaw	N/A	Attempted 5 times with no successful sample, site abandoned
56	4	N	All attempts pebble in jaw	N/A	Site relocated 150m N after 4 unsuccessful attempts
55	3	Y	Attempt 1 pebble in jaw	Full	Successful sample gained from this site at original location
56	3	N	All attempts pebble in jaw	N/A	Site relocated 500m W after 3 unsuccessful attempts
56	1	N	Pebble in Jaw	N/A	Attempted 8 times over 3 locations with unsuccessful samples, site abandoned
39	2	Y		Full	Relocated from site 56
27	3	Y	Attempt 1 and 2 were low sample volume	Full	

H. STATIC IMAGES

H.1 Grab Static Images

Site No.	Underwater images				
1					
2					

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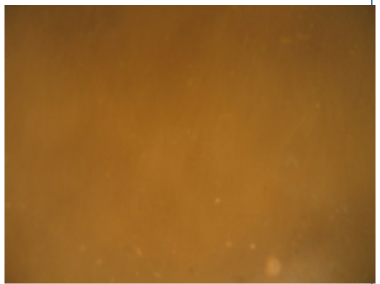
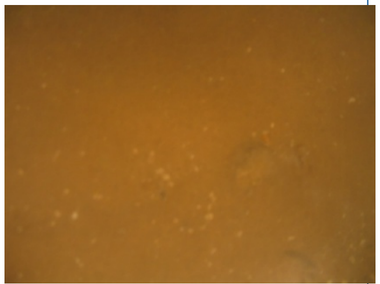
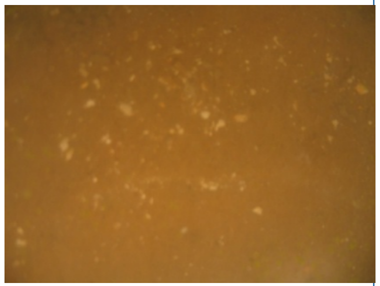
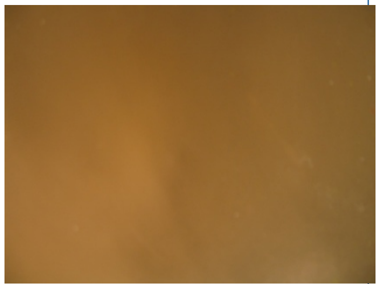
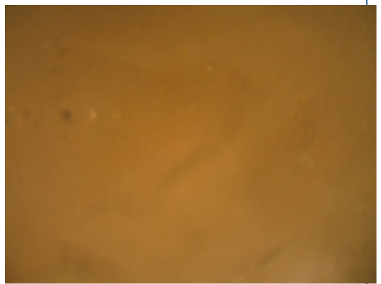
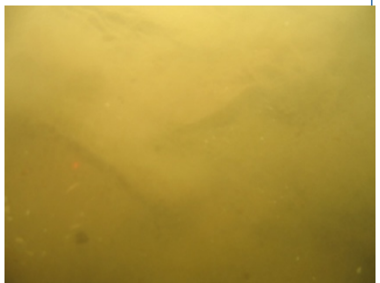
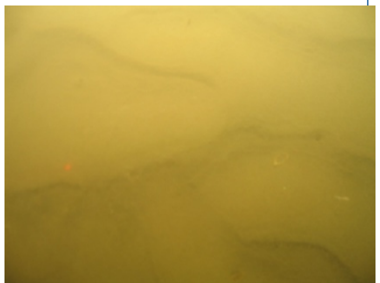
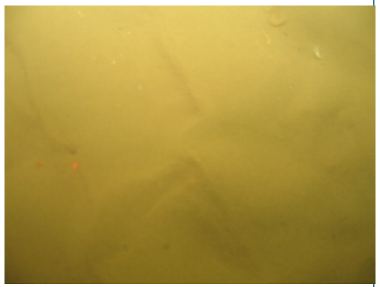
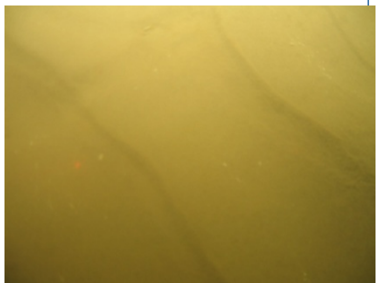
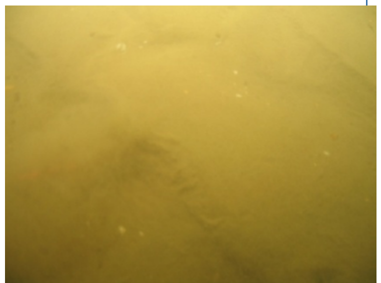
3					
4					

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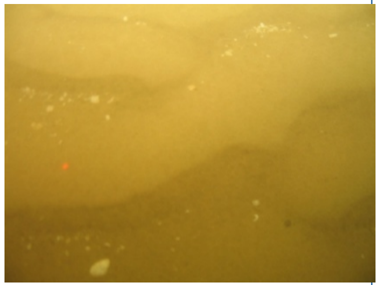
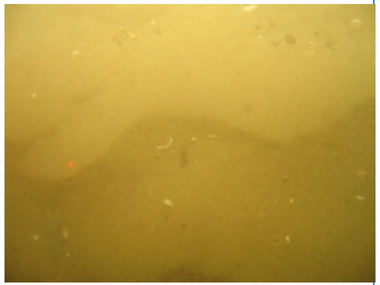
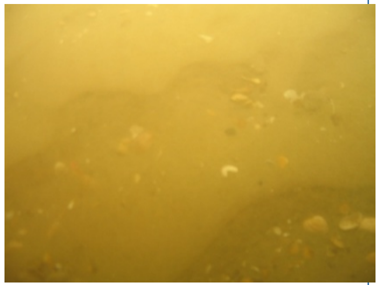
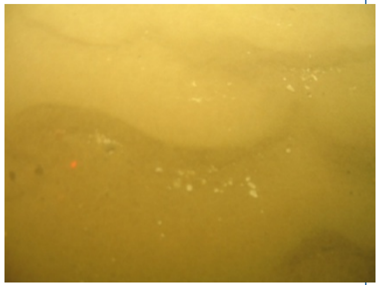
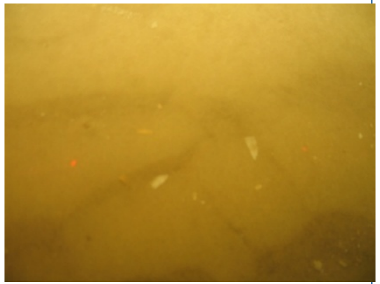
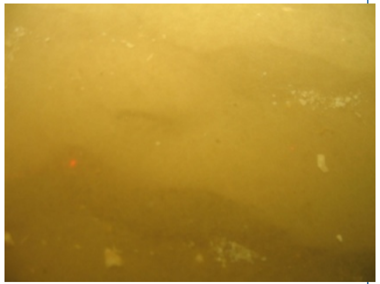
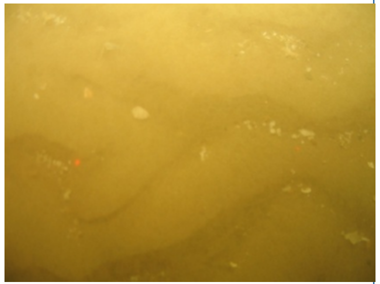
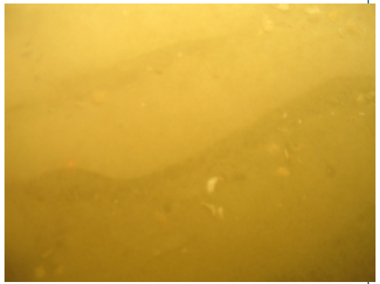
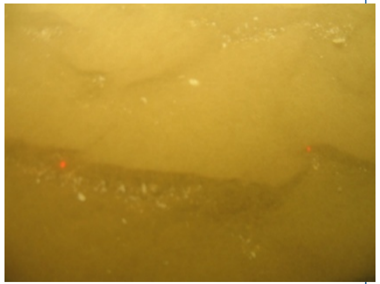
5					
6					

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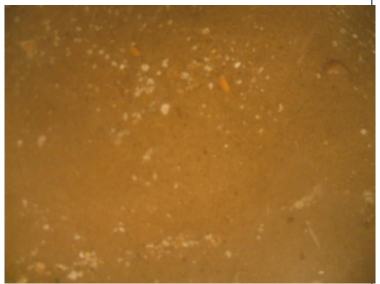
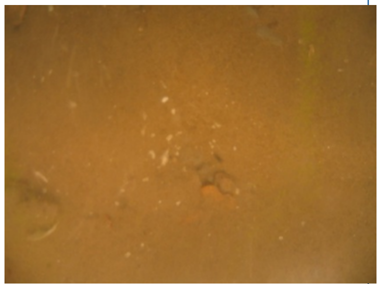
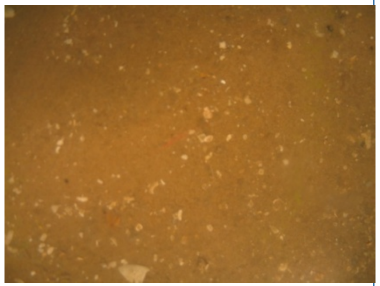
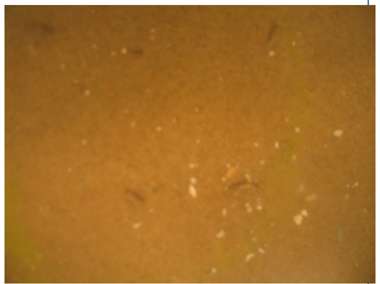
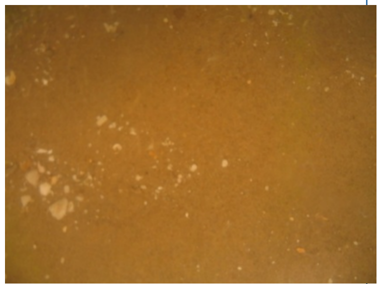
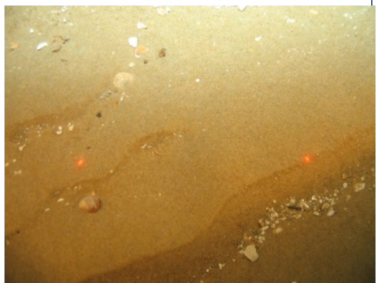
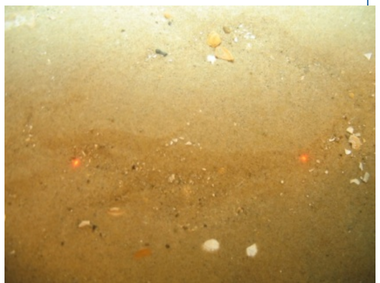
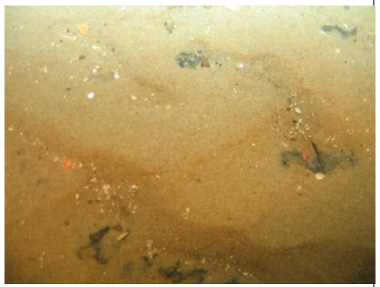
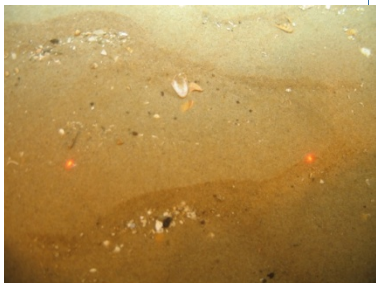
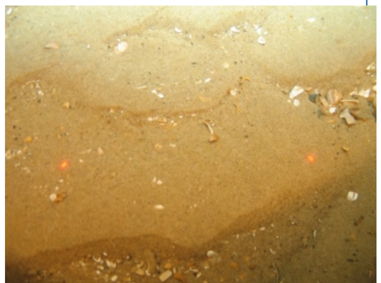
7					
8					

East Anglia Offshore Wind

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SCOTTISHPOWER RENEWABLES

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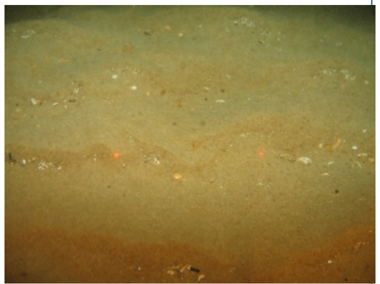
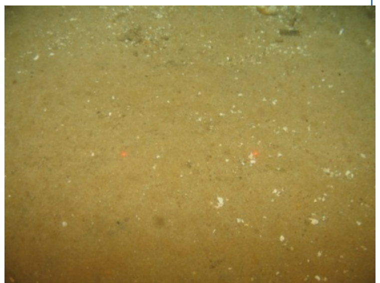
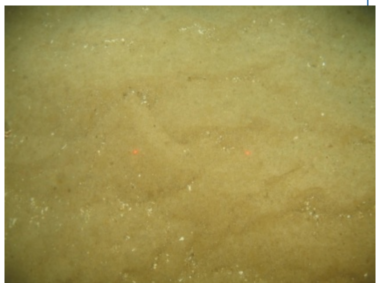
9					
10					

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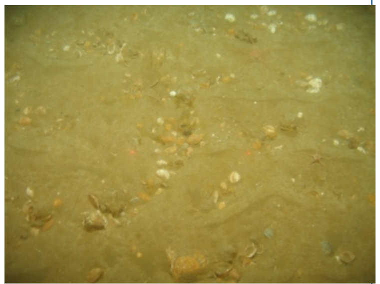
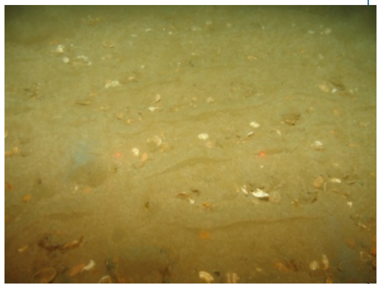
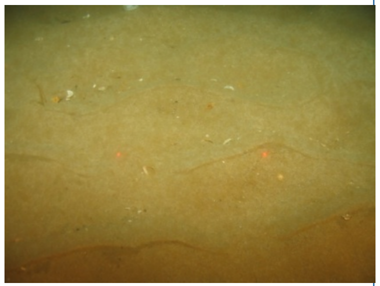
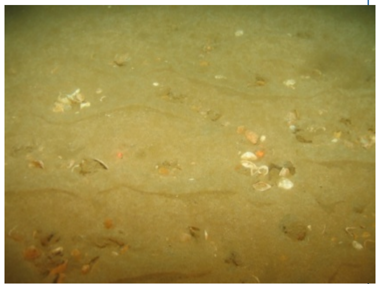
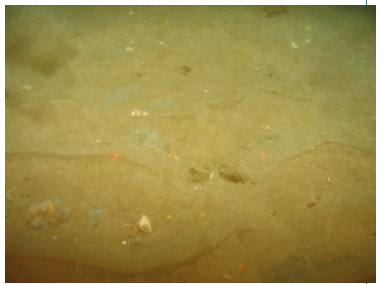
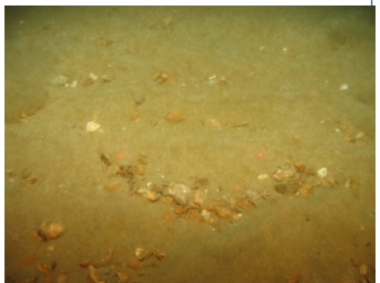
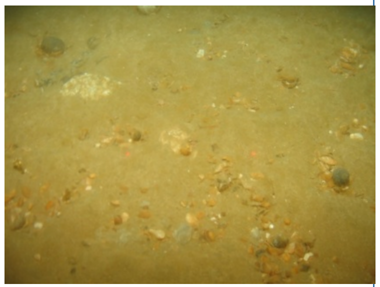
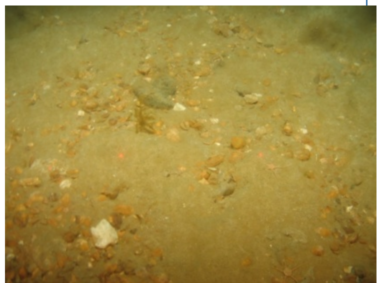
11					
12					

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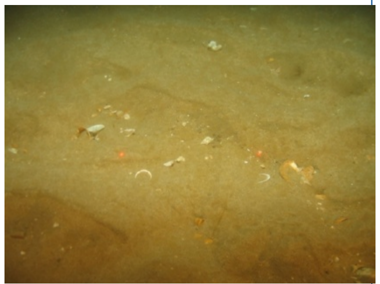
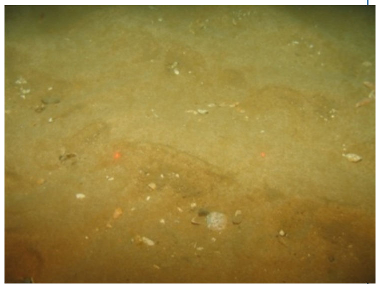
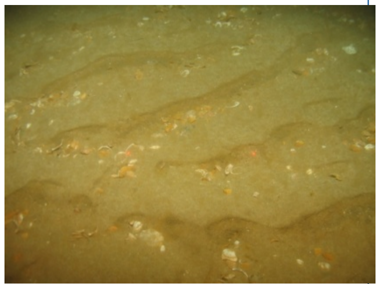
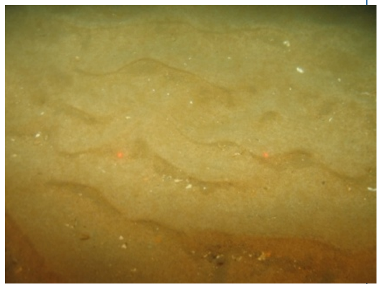
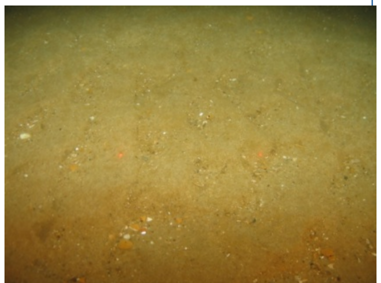
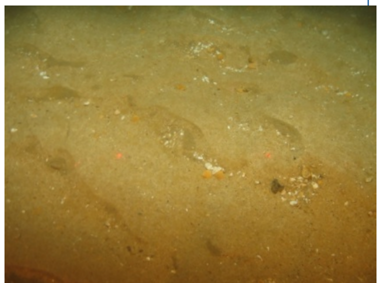
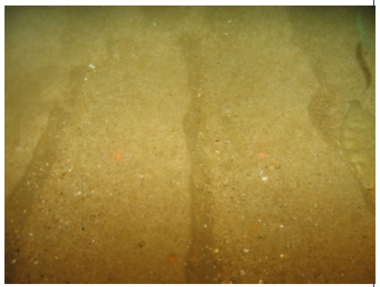
13					
14					

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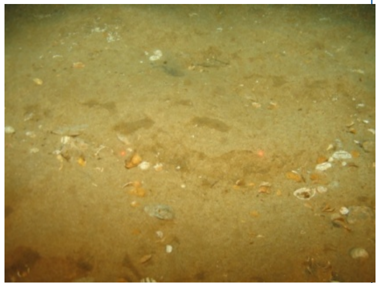
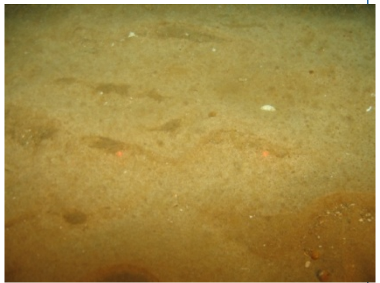
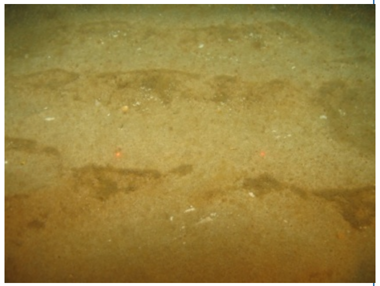
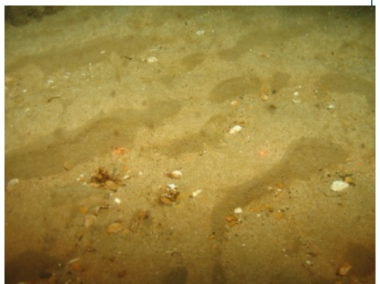
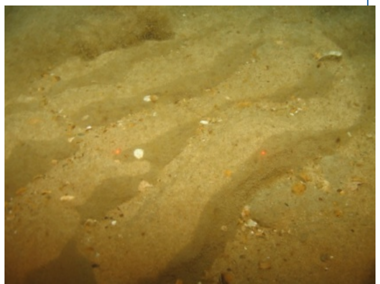
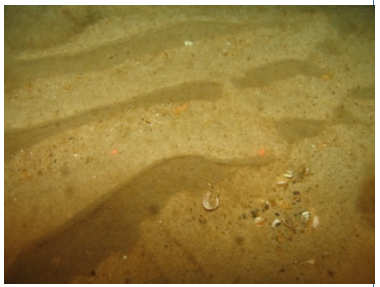
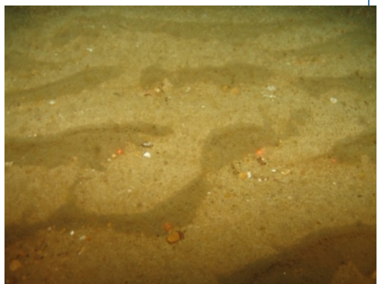
15					
16					

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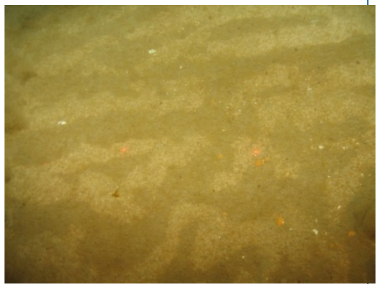
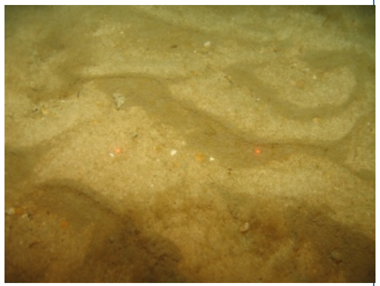
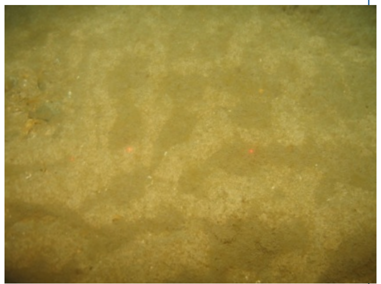
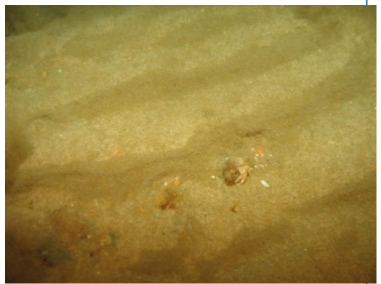
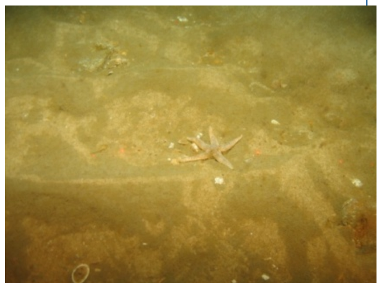
17					
18					

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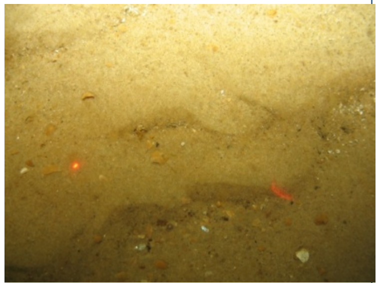
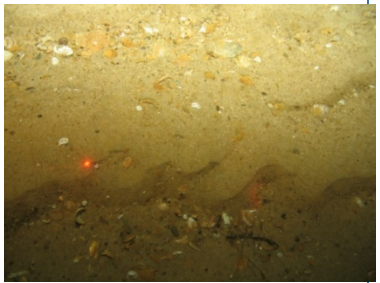
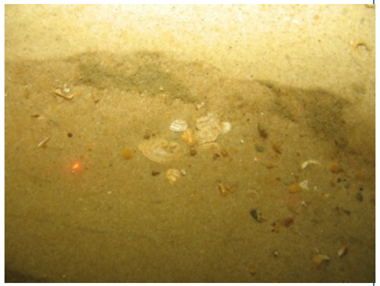
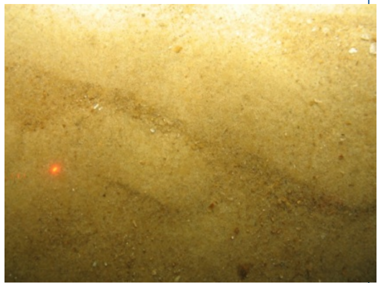
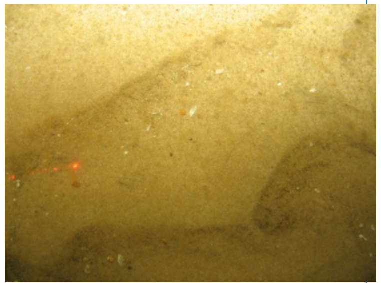
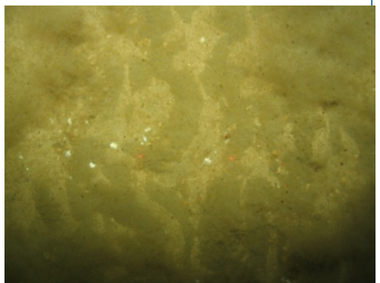
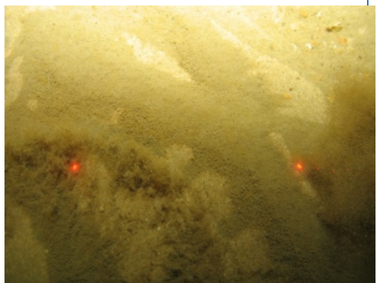
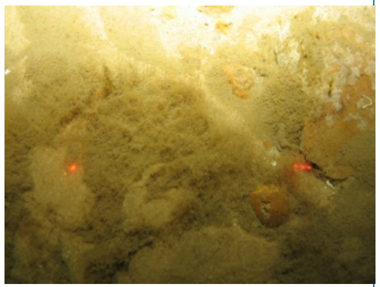
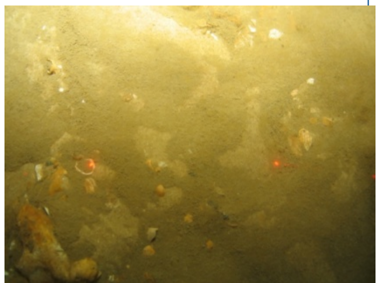
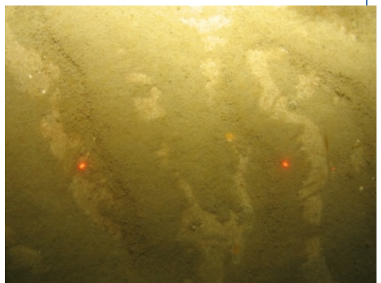
19					
20					

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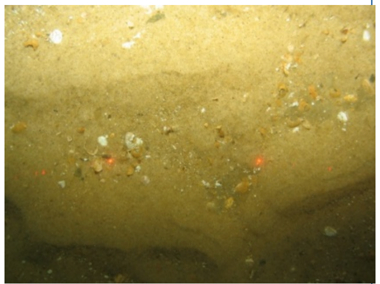
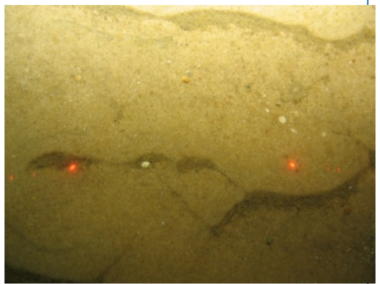
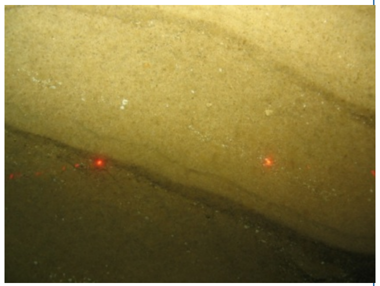
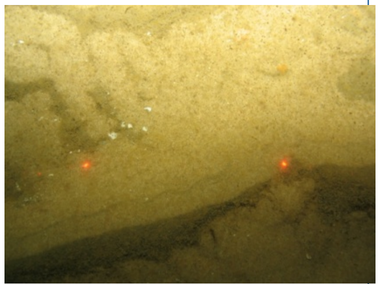
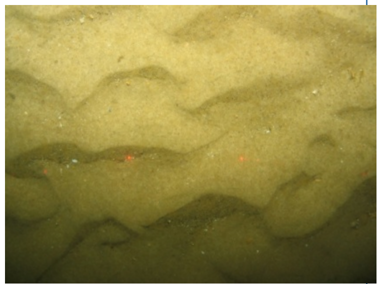
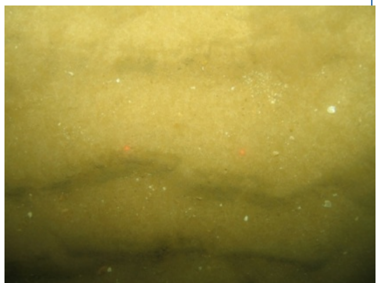
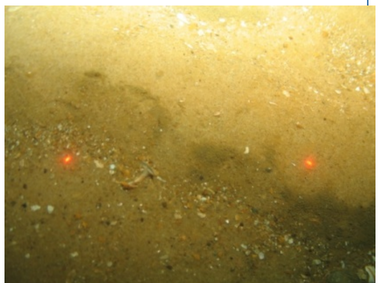
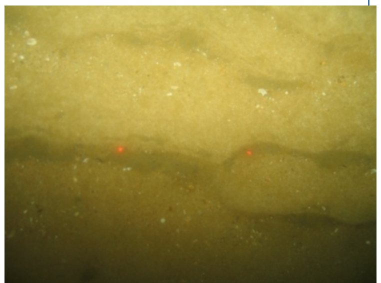
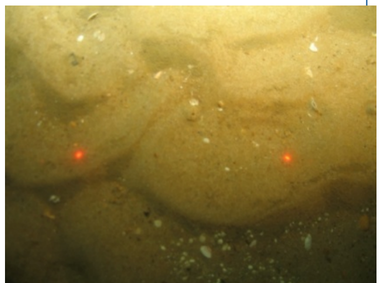
21					
22					

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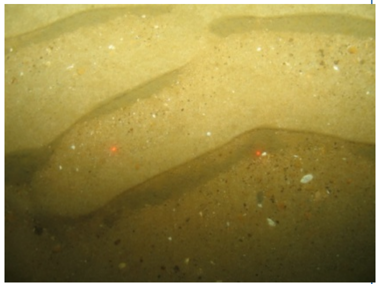
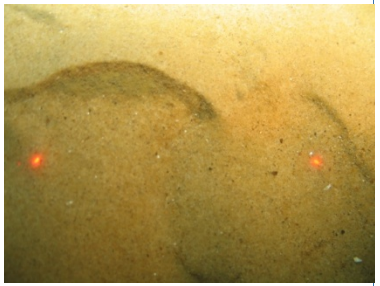
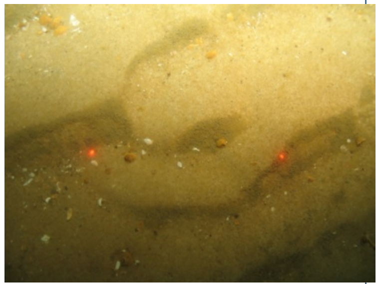
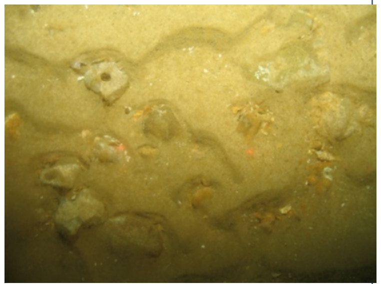
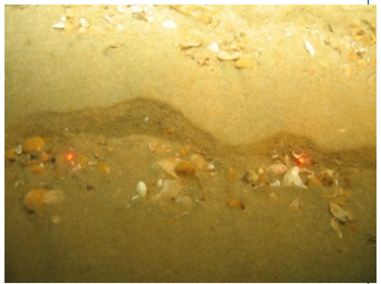
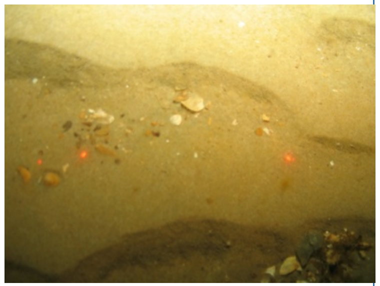
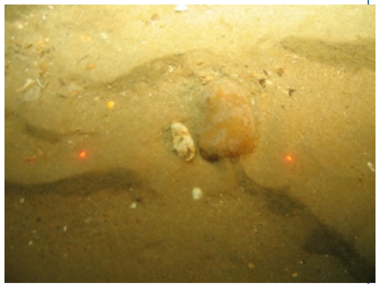
23					
24					

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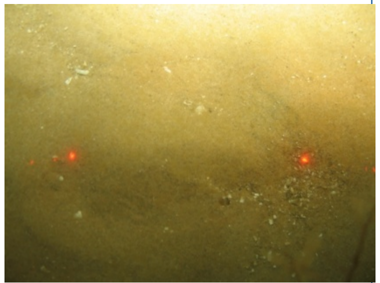
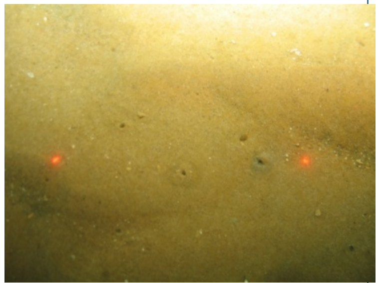
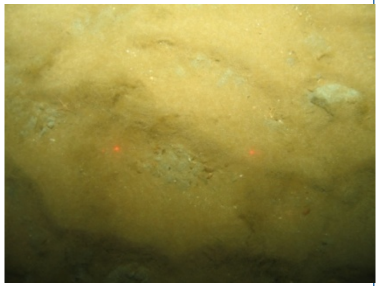
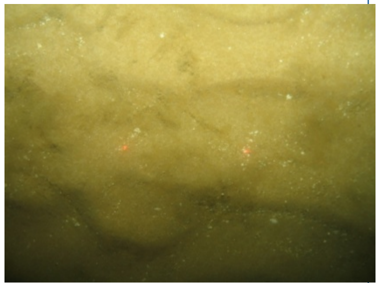
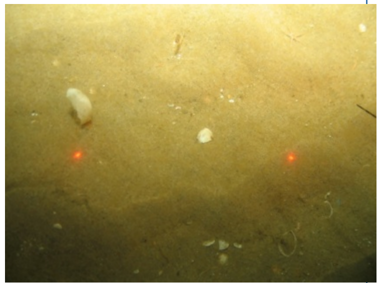
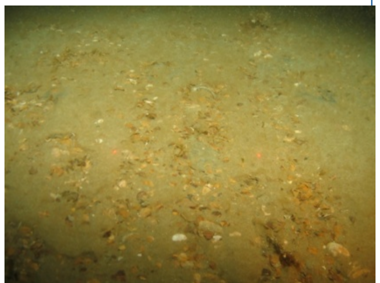
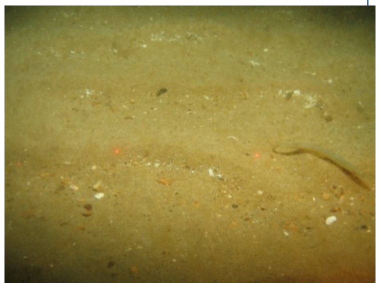
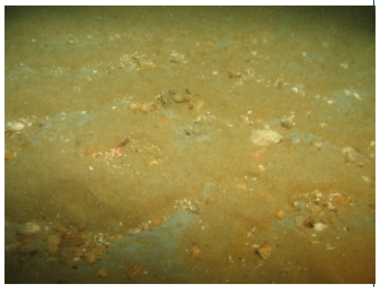
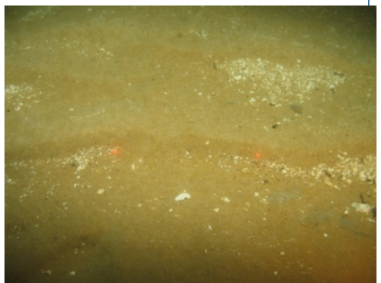
25					
26					

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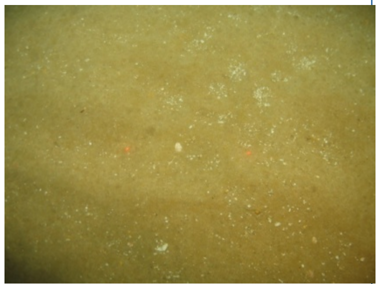
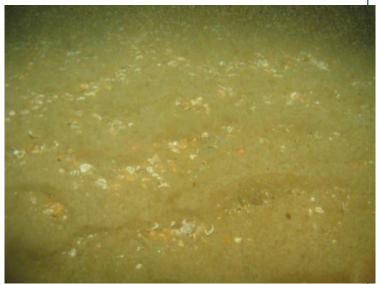
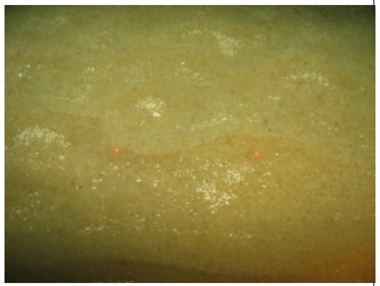
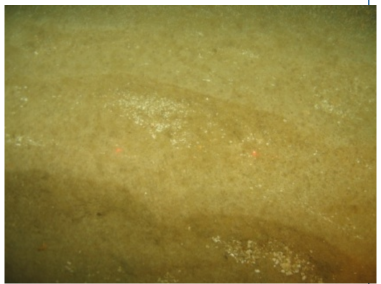
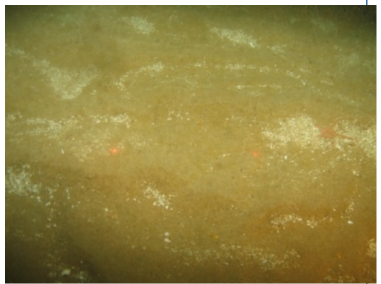
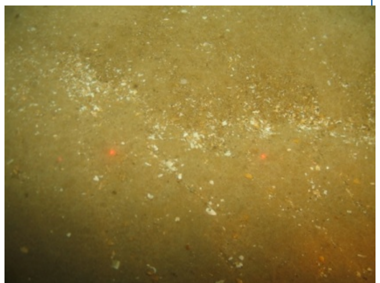
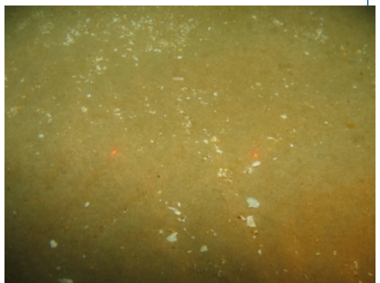
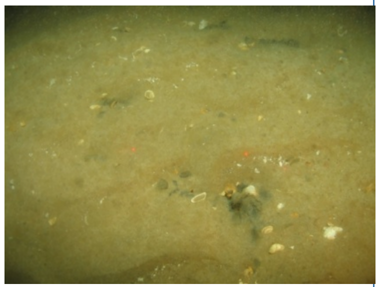
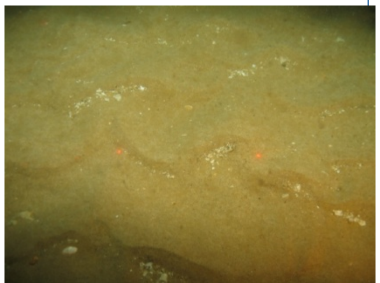
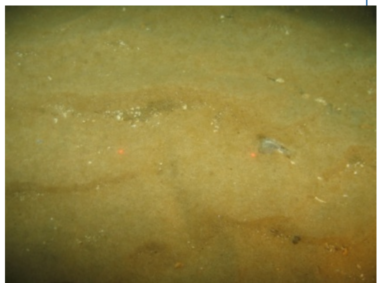
27					
28					

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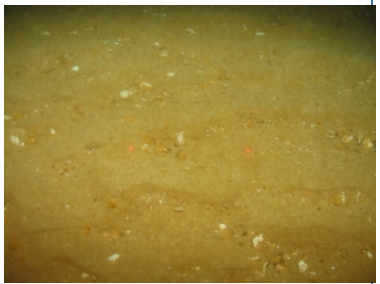
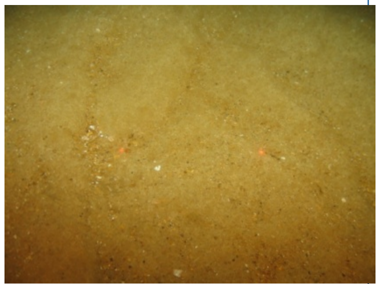
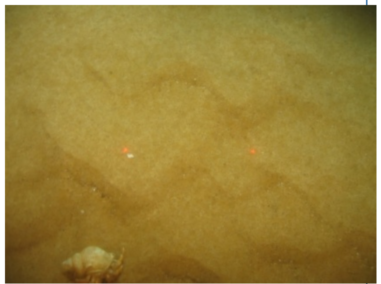
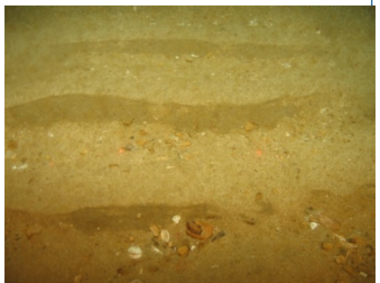
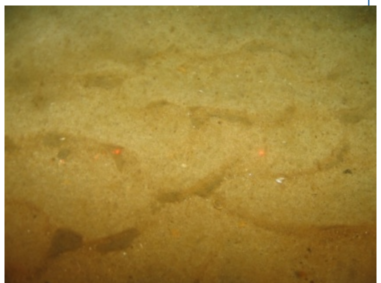
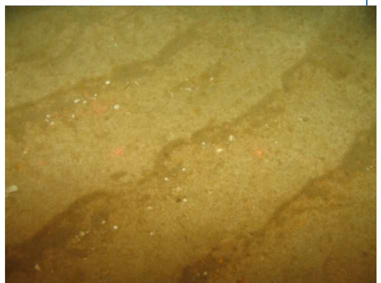
29					
30					

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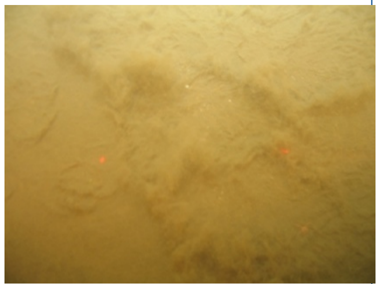
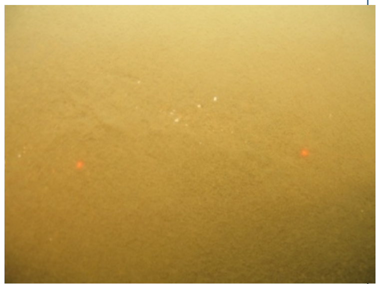
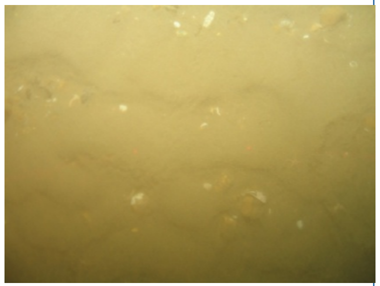
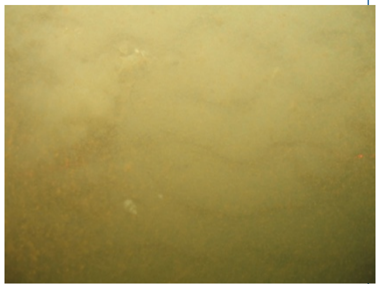
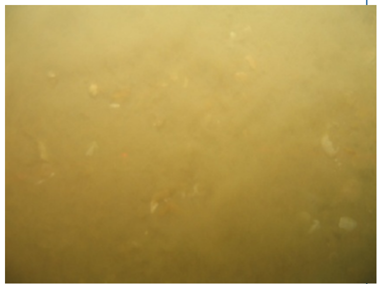
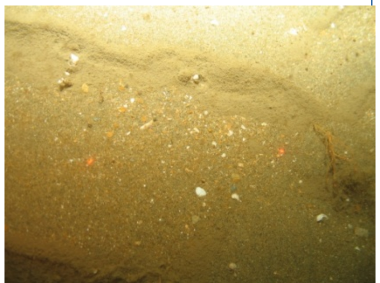
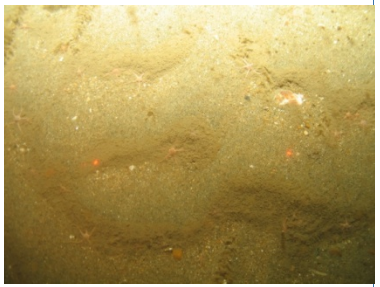
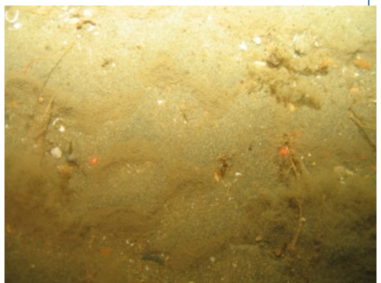
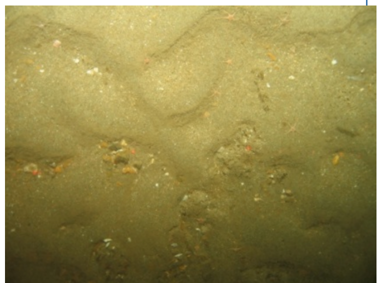
31					
32					

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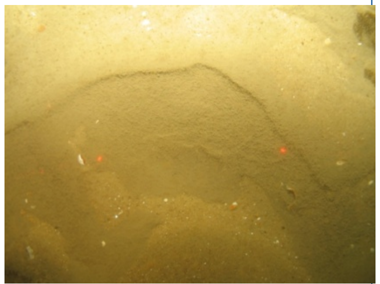
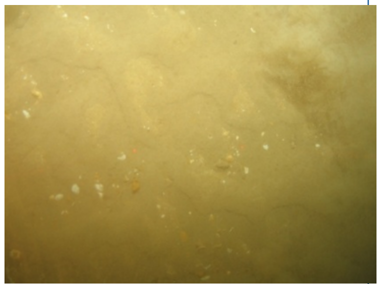
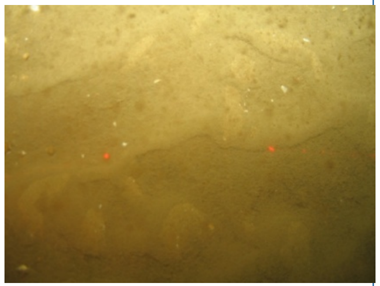
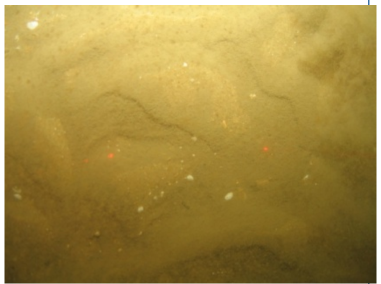
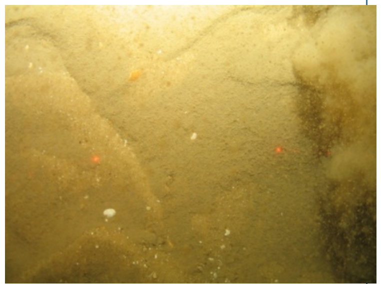
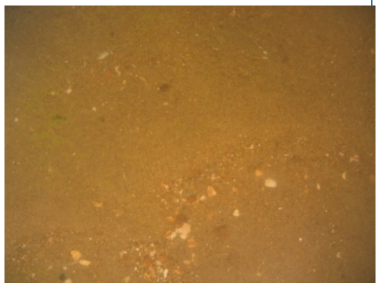
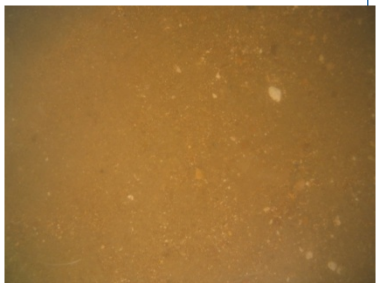
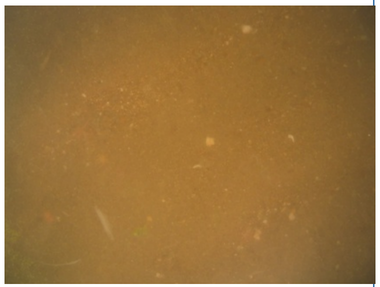
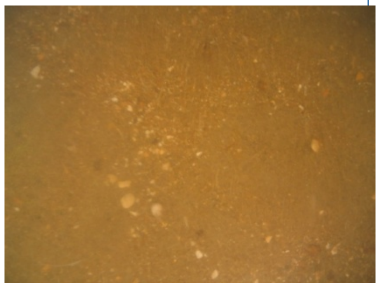
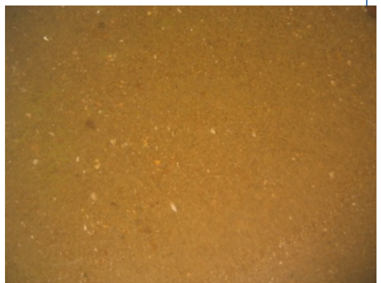
33					
34					

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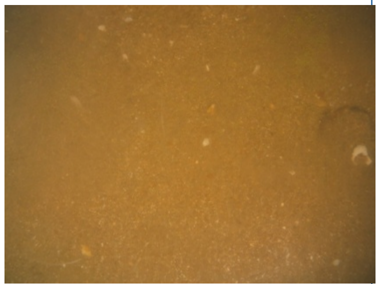
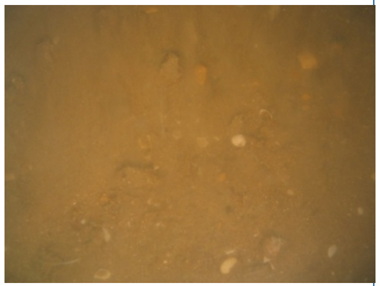
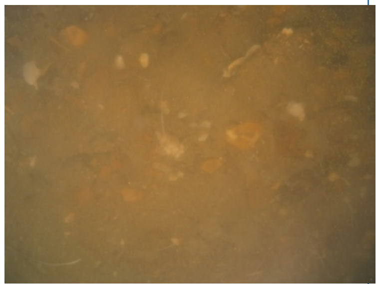
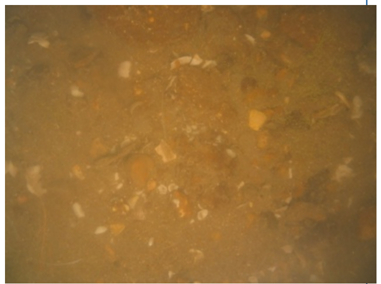
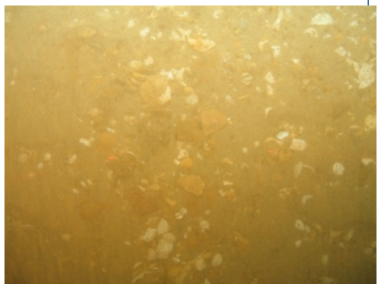
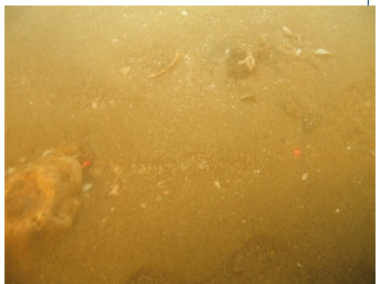
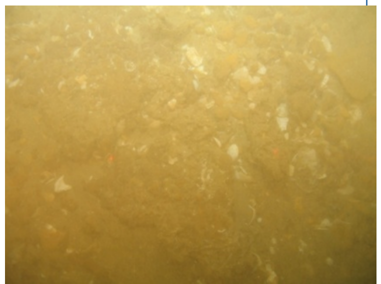
35					
36					

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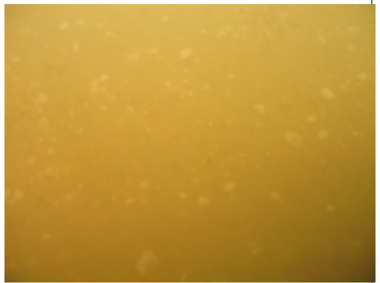
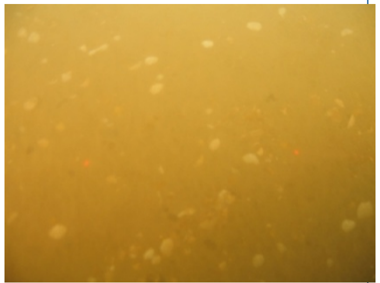
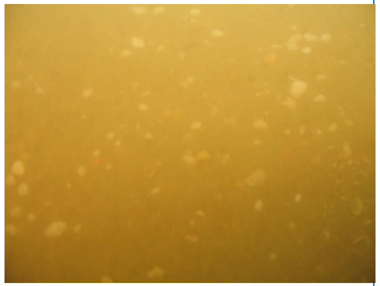
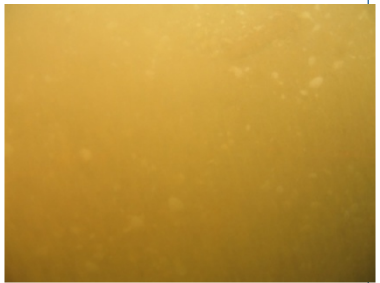
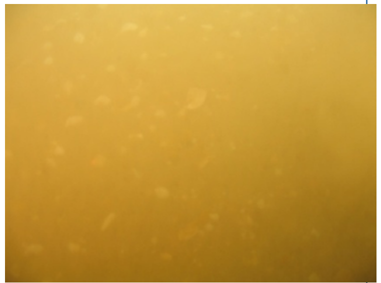
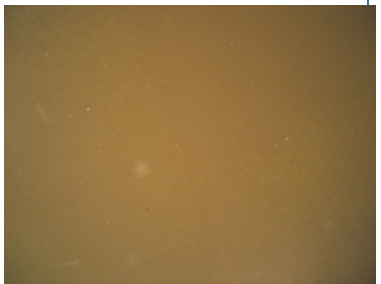
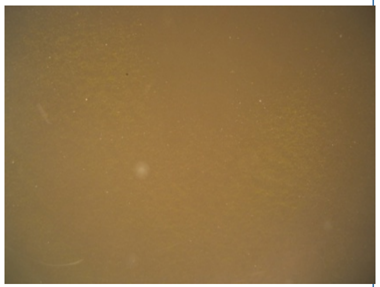
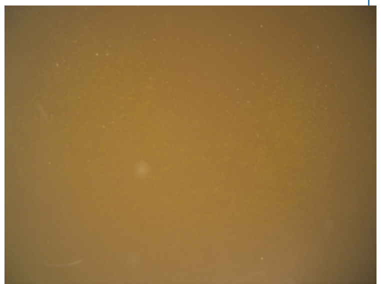
37					
38					

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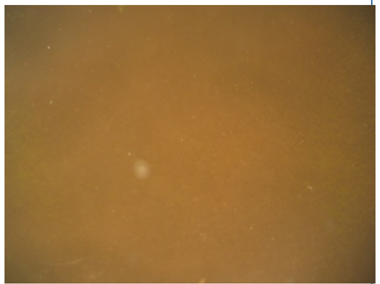
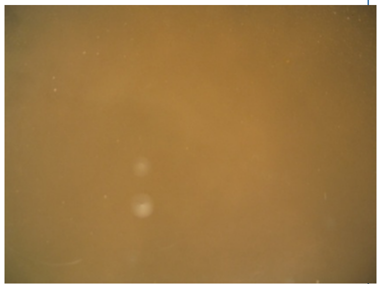
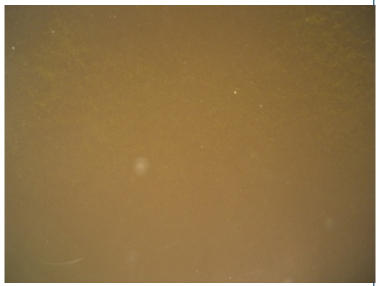
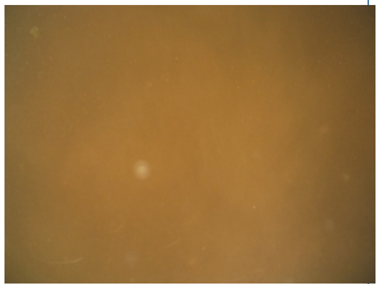
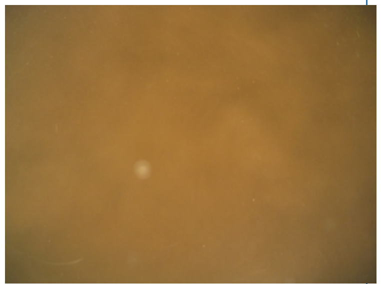
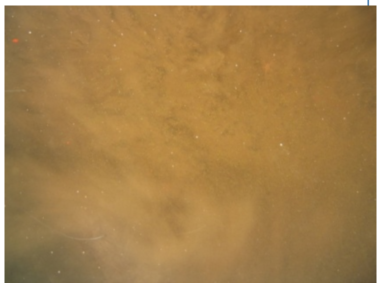
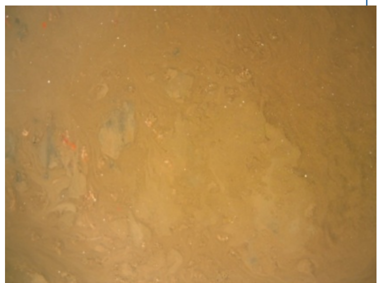
39					
40					

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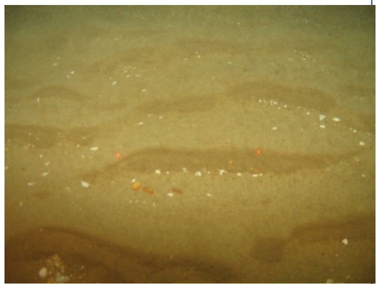
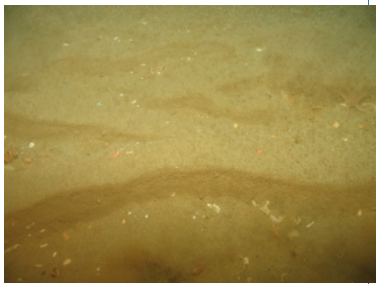
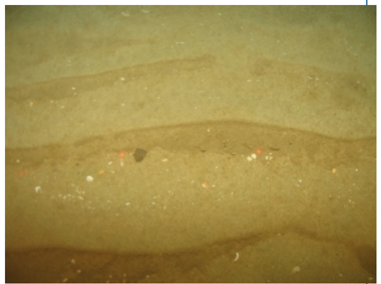
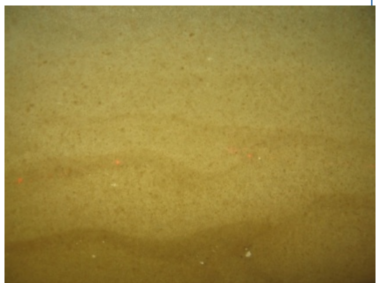
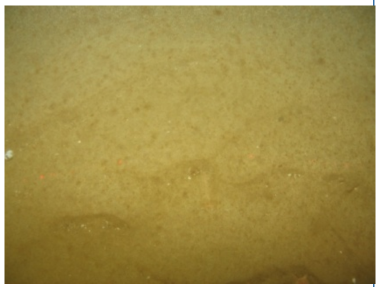
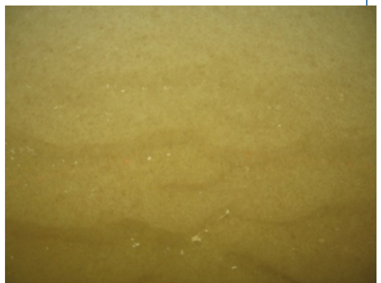
41					
42					

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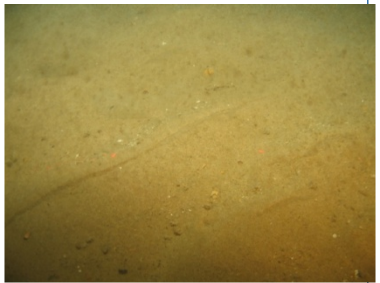
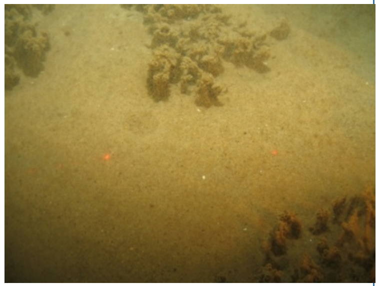
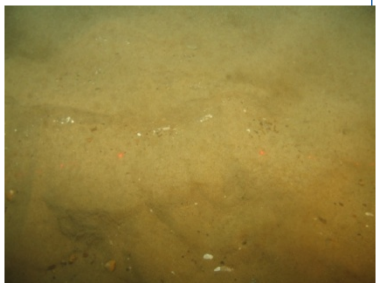
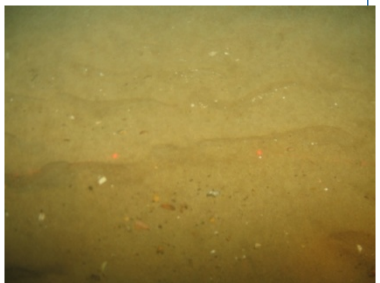
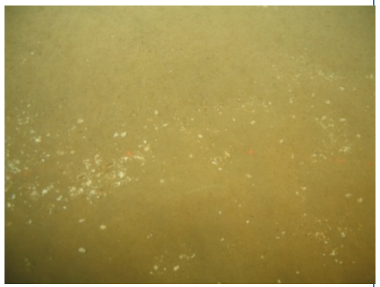
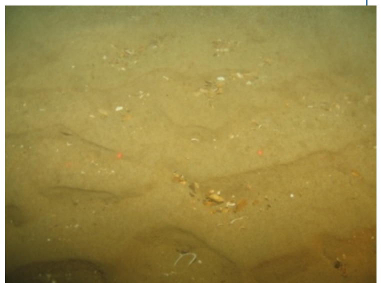
43					
44					

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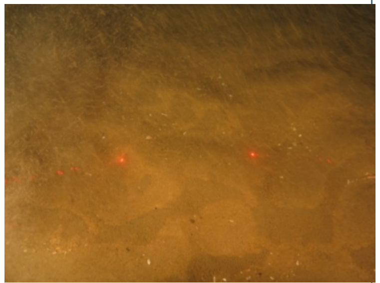
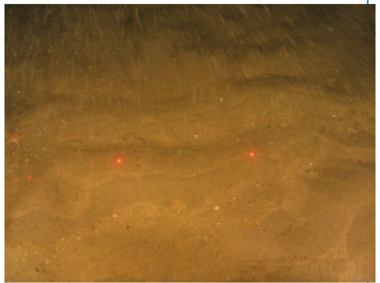
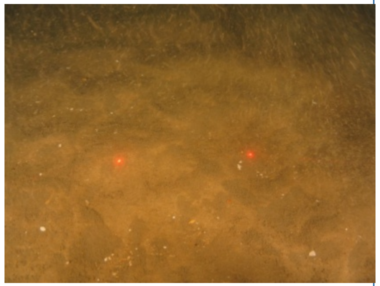
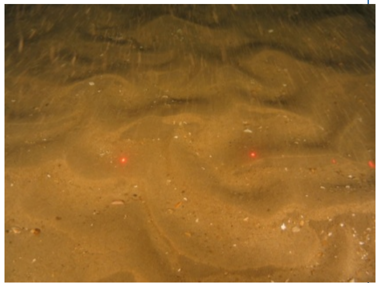
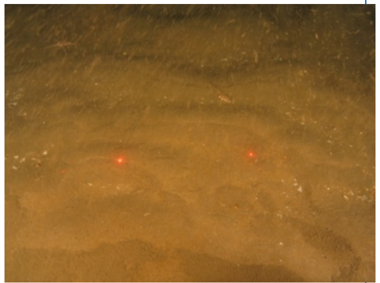
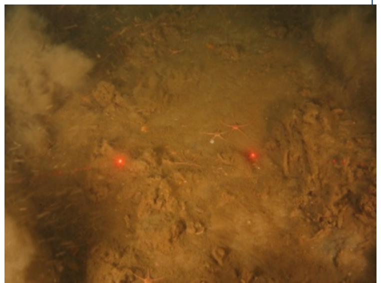
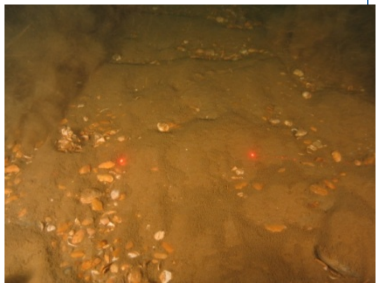
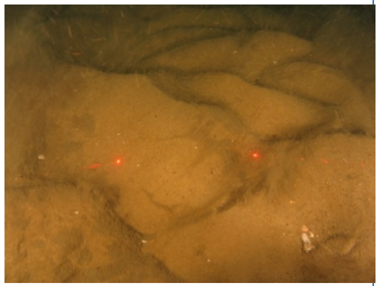
45					
46					

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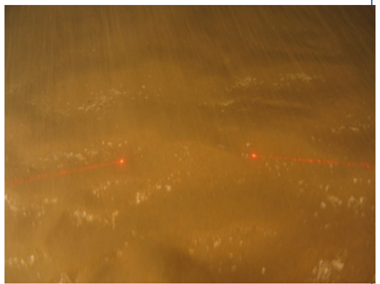
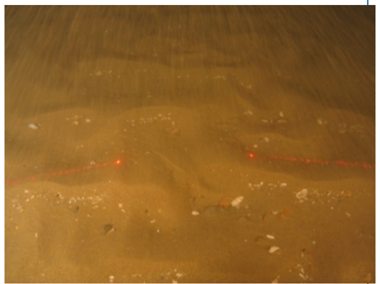
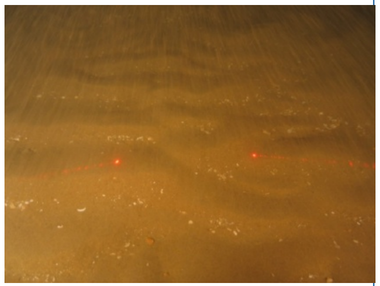
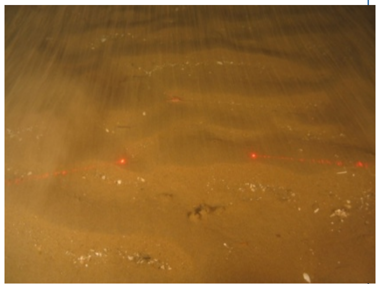
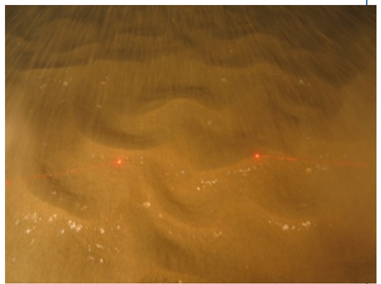
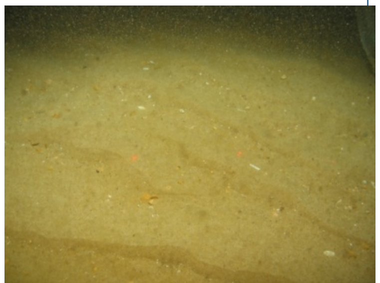
47					
48					

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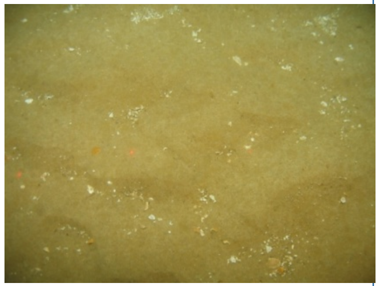
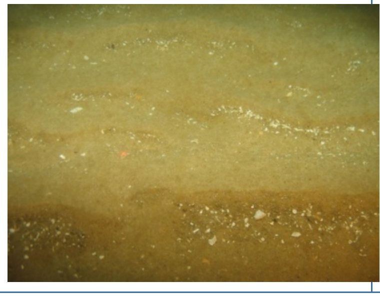
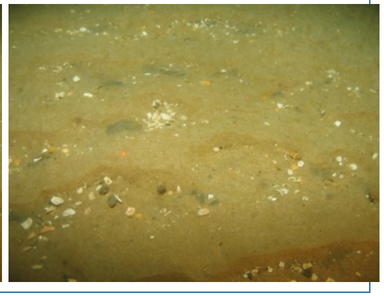
49					

H.2 Trawl Site Static Images

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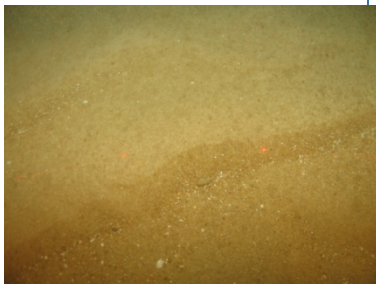
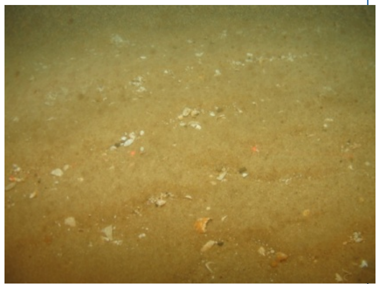
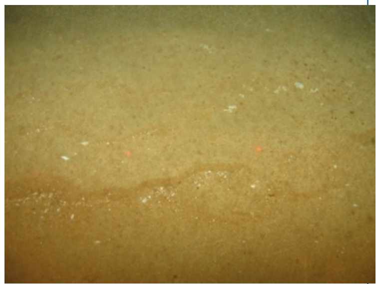
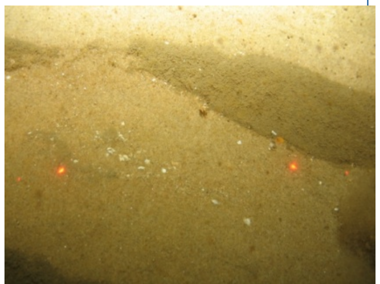
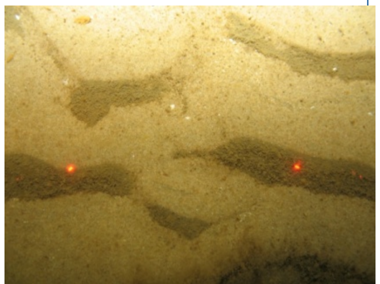
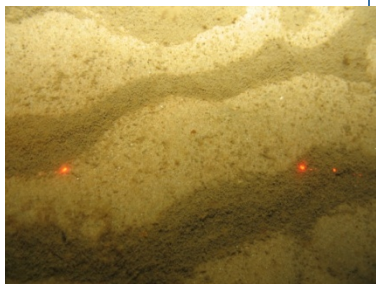
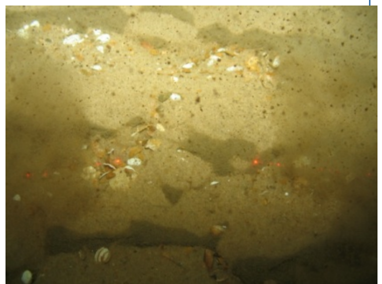
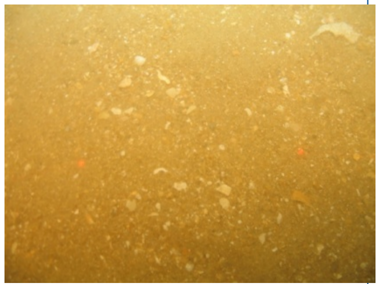
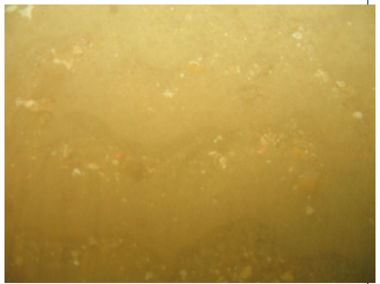
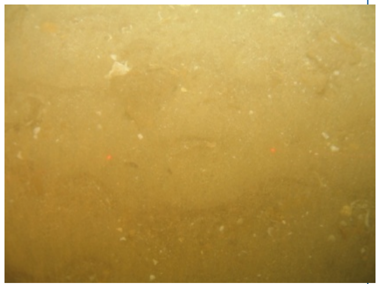
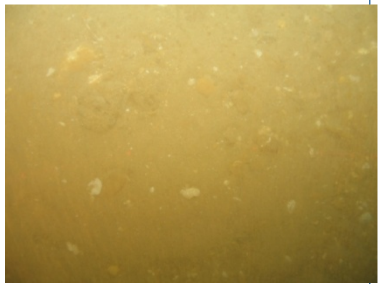
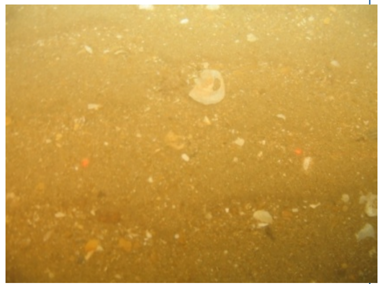
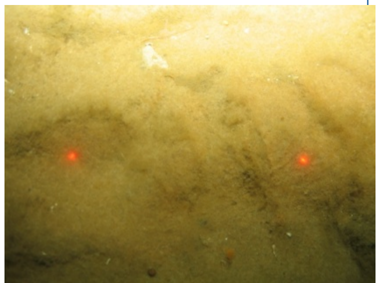
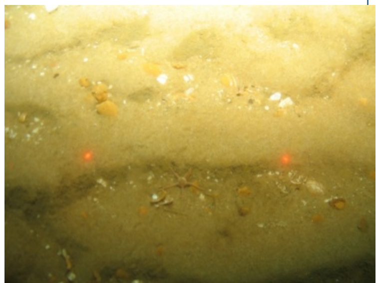
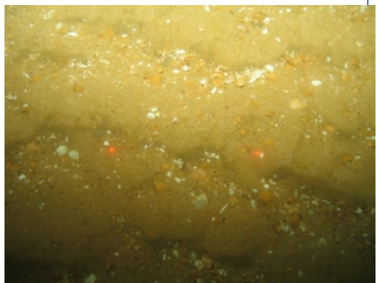
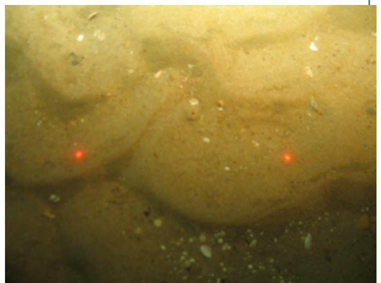
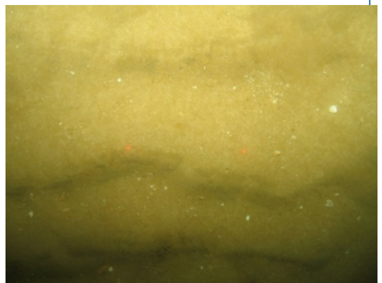
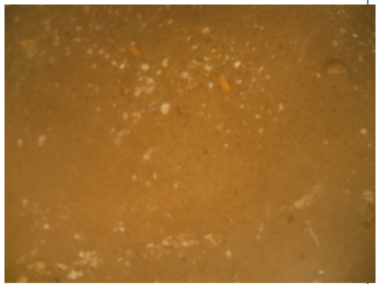
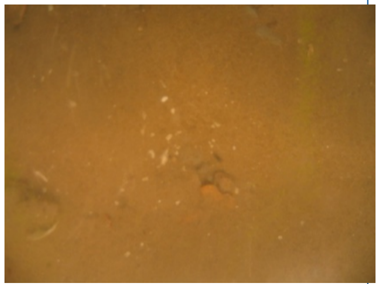
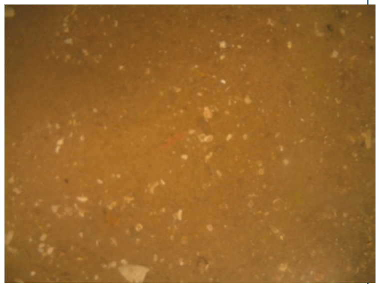
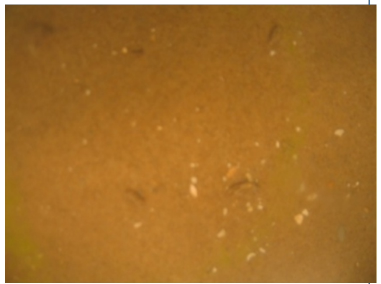
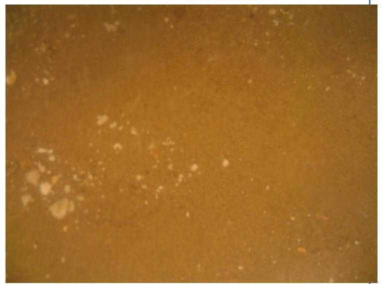
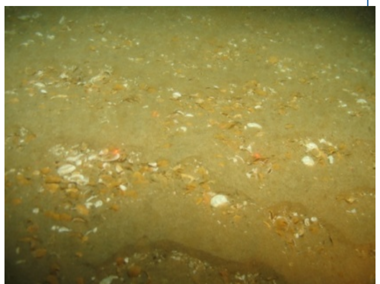
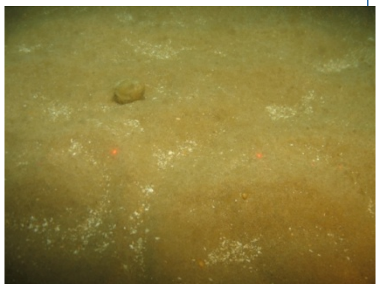
T01					
T02					

Site No.	Underwater Images				
T03					
T04					

Site No.	Underwater Images				
T05					
T06					

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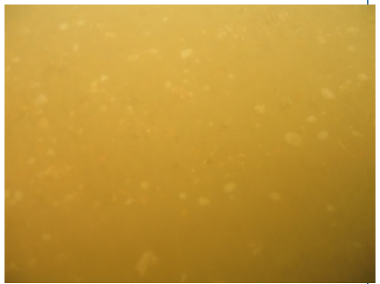
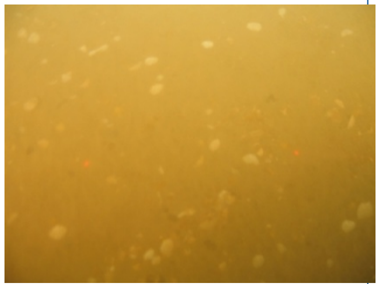
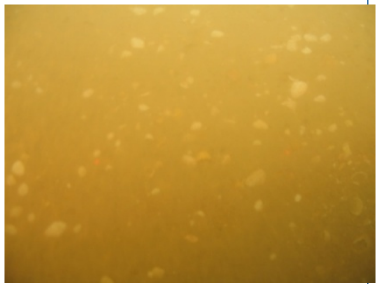
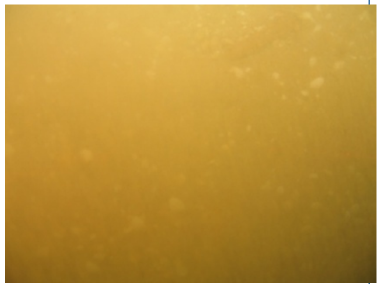
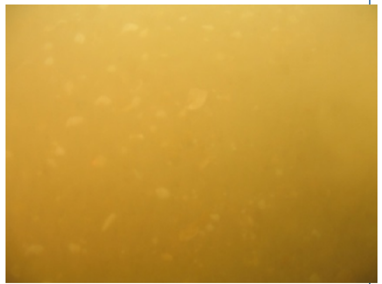
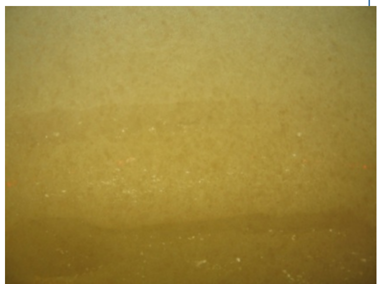
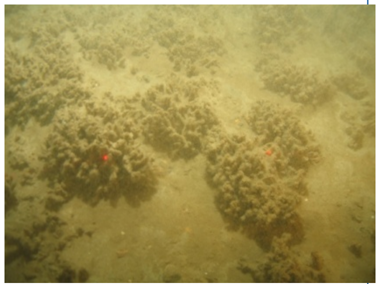
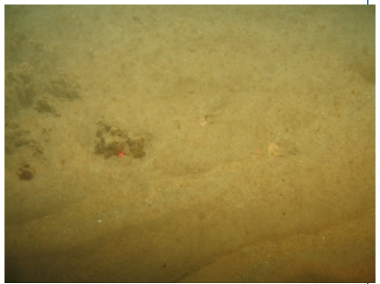
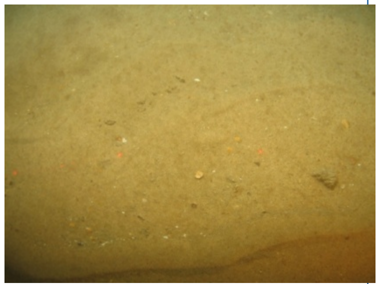
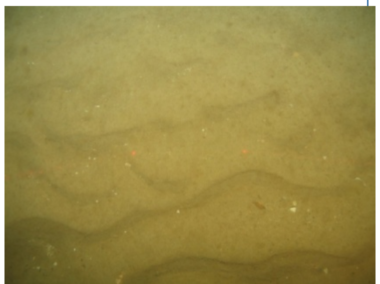
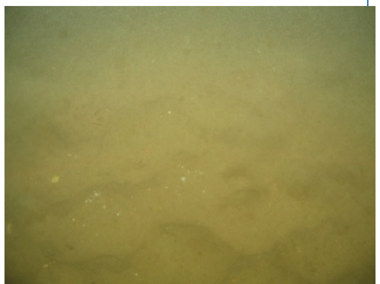
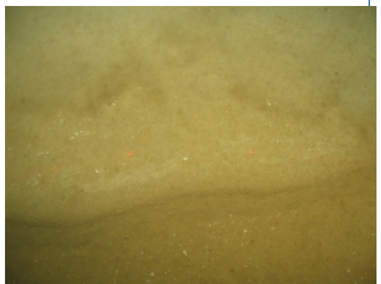
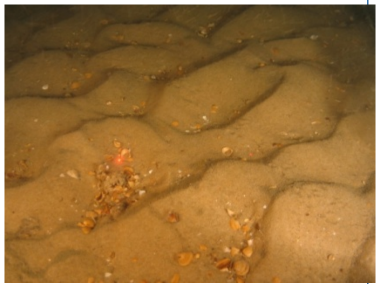
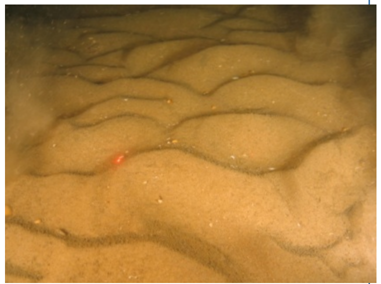
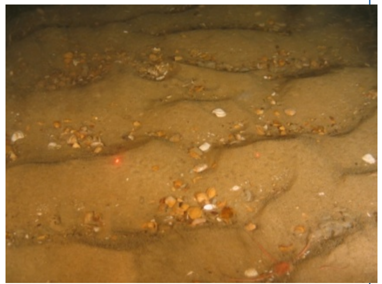
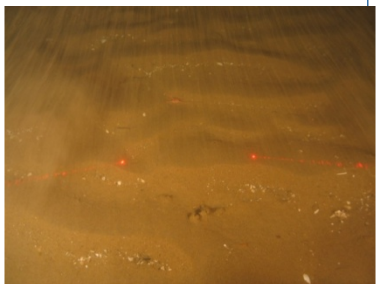
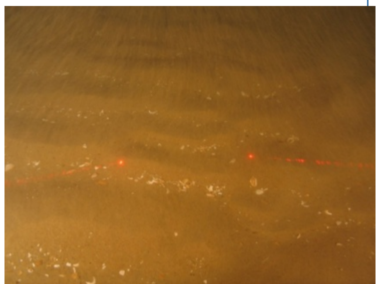
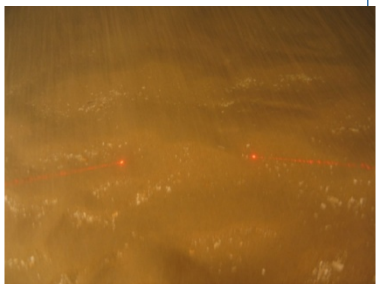
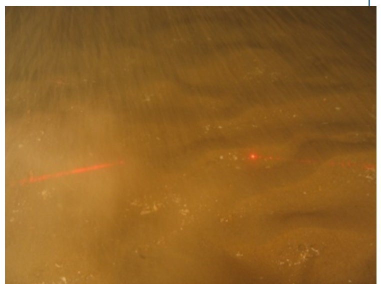
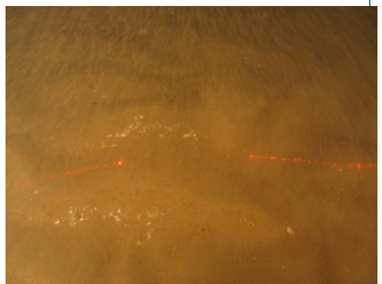
T07					
T08					

Site No.	Underwater Images				
T09					
T10					

Site No.	Underwater Images				
T11					
T12					

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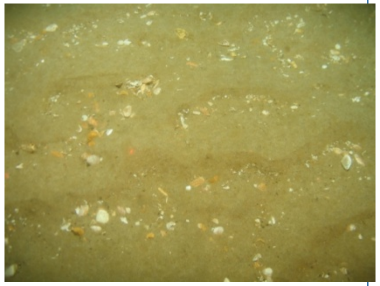
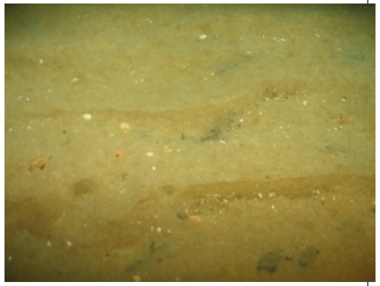
T13					

I. GRAB SAMPLE DECK IMAGES

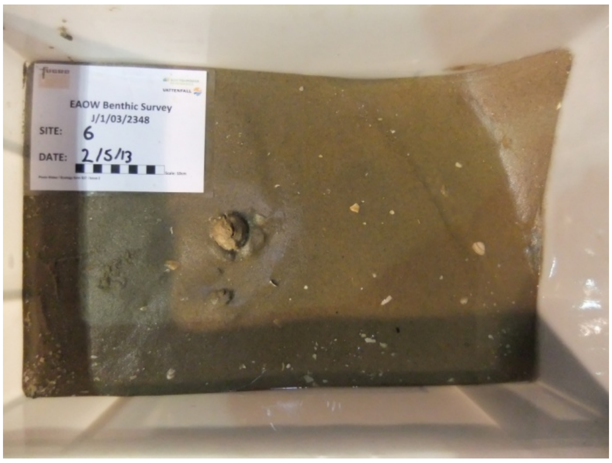
Site 1

Site 2

Site 3

Site 4

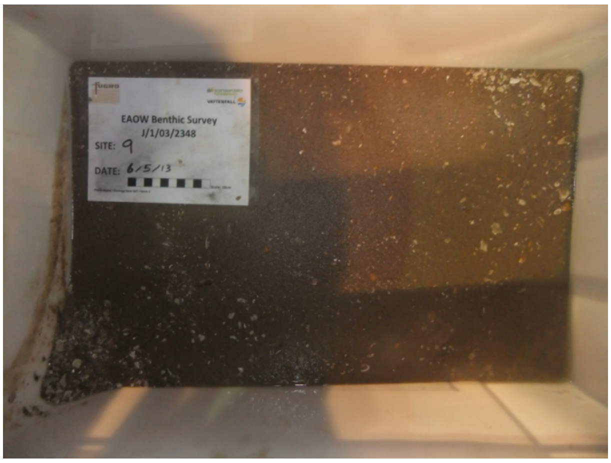
Site 5



Site 6

Site 7

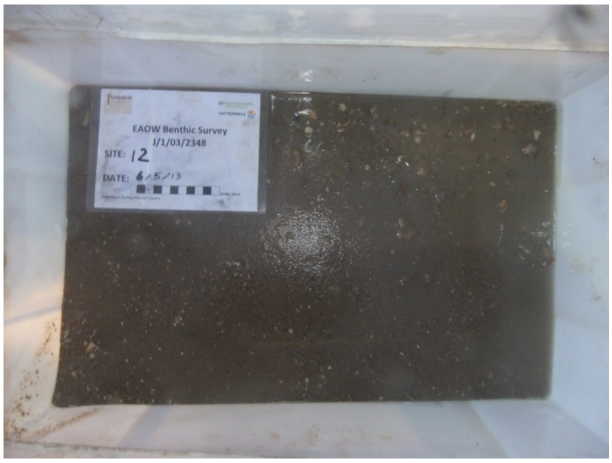
Site 8



Site 9

Site 10

Site 11



Site 12

Site 13

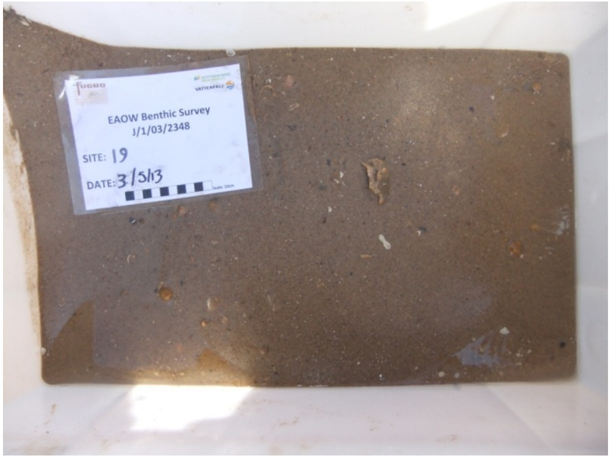
Site 14

Site 15

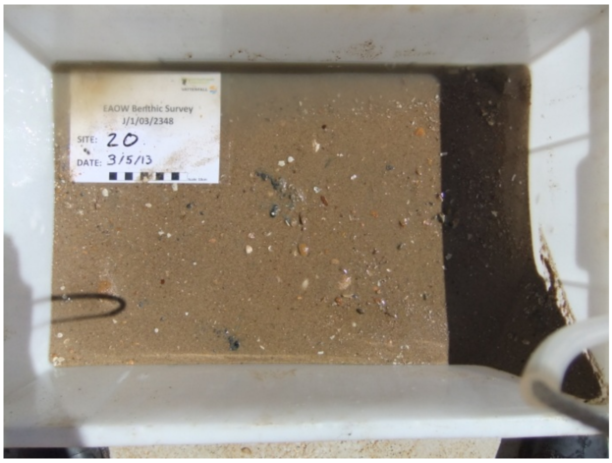
Site 16

Site 17

Site 18



Site 19



Site 20

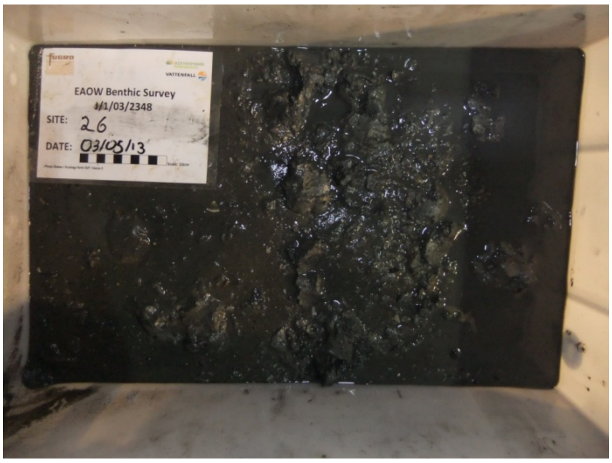
Site 21

Site 22

Site 23

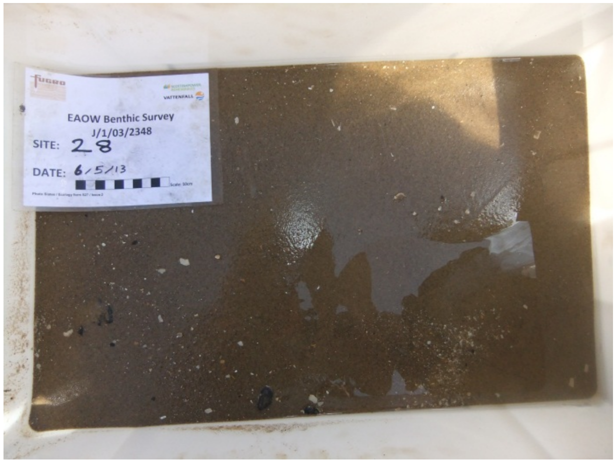
Site 24

Site 25



Site 26

Site 27



Site 28

Site 29

Site 30

	
Site 31	**Site 32**
	
Site 33	**Site 34**
	
Site 35	**Site 36**

Site 37

Site 38

Site 39

Site 40

Site 41

Site 42

Site 43

Site 44

Site 45

Site 46

Site 47

Site 48

Site 49

J. 2M BEAM TRAWL SAMPLE PHOTOGRAPHS

Trawl 1

Trawl 2

Trawl 4

Trawl 5


FUGRO
VATTENFALL
EAOW Benthic Survey
J/1/03/2348
SITE: T6
DATE: 06/05/13
Scale: 20cm

Trawl 6


FUGRO
VATTENFALL
EAOW Benthic Survey
J/1/03/2348
SITE: T 07
DATE: 6/5/13
Scale: 20cm

Trawl 7

Trawl 8

Trawl 9

Trawl 10

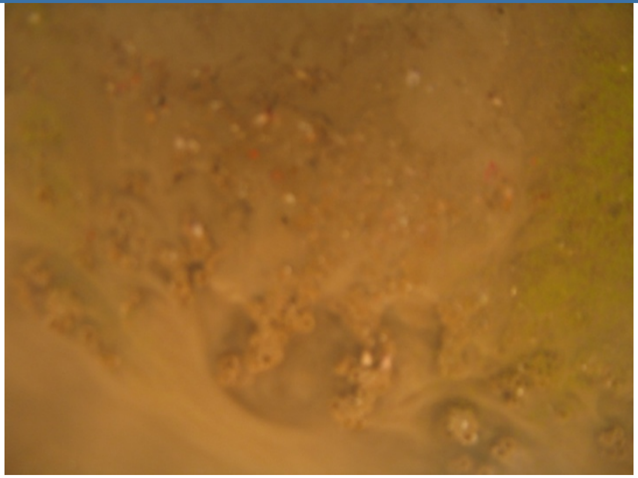
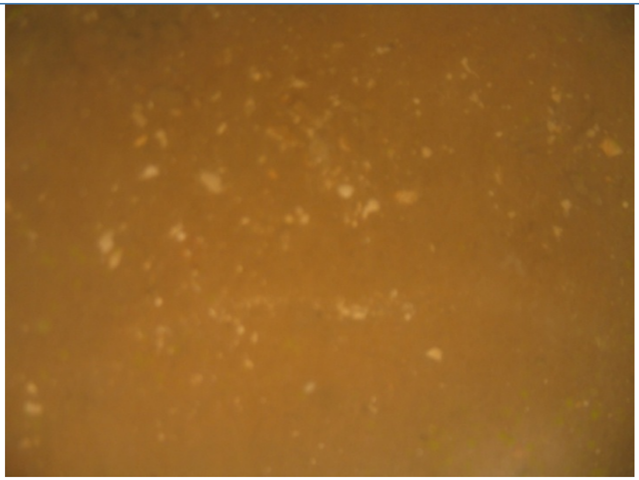
Trawl 11

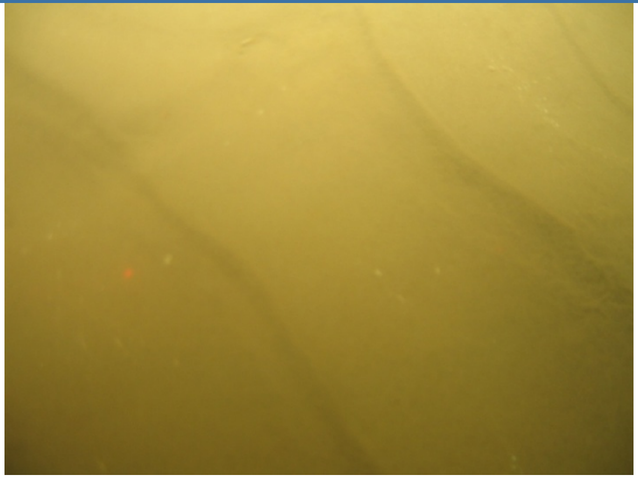
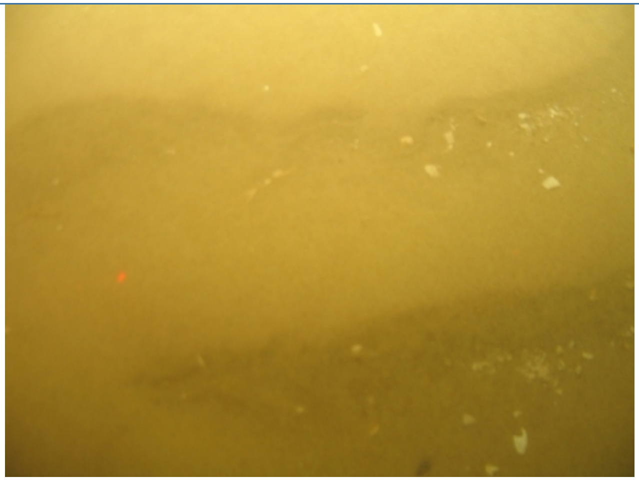
Trawl 12

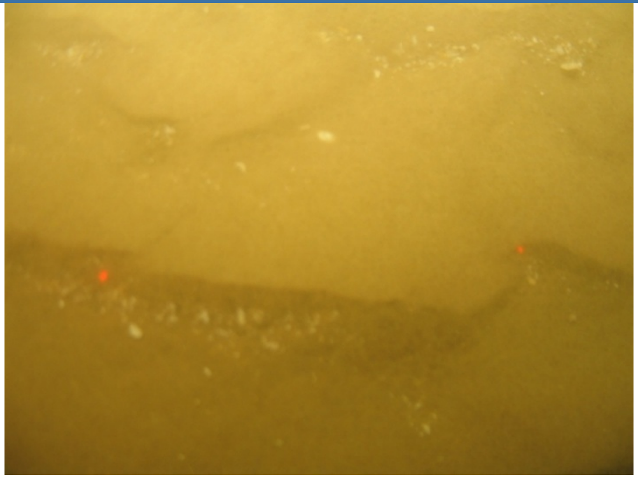
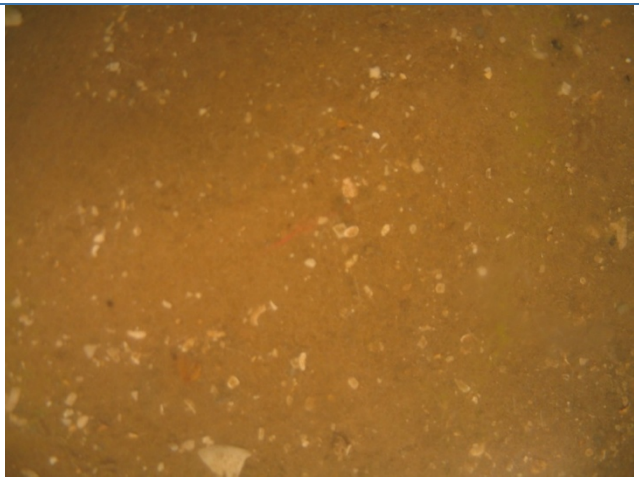
Trawl 13

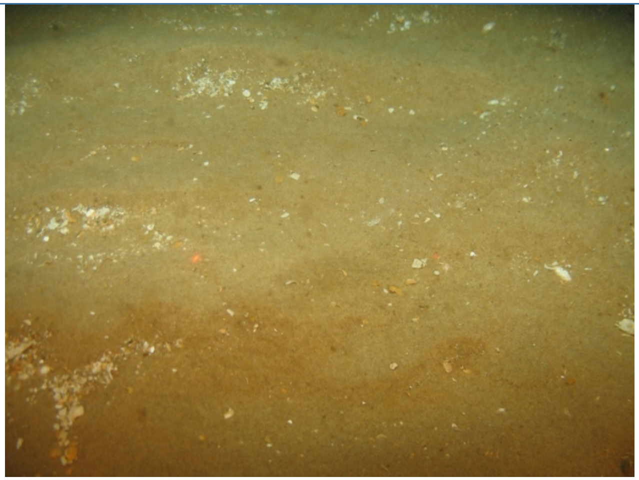
K. VIDEO ANALYSIS

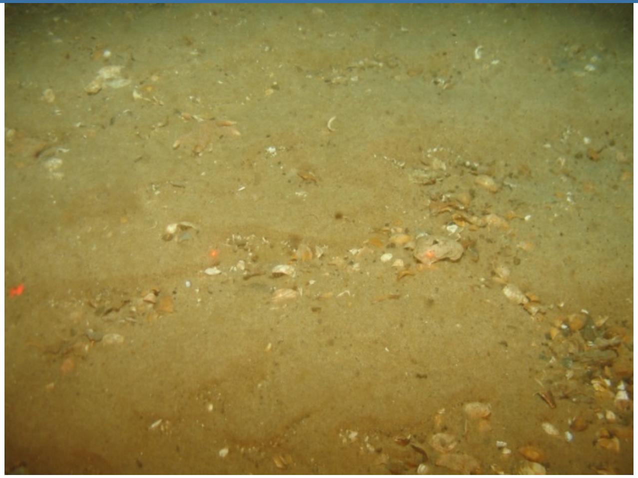
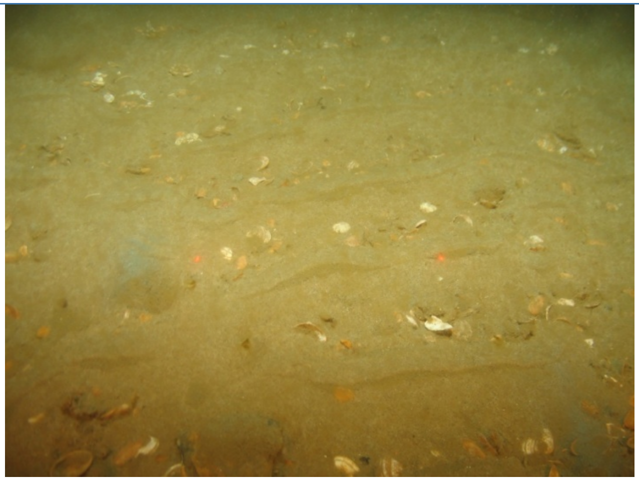
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
1	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura ophiura*	O	

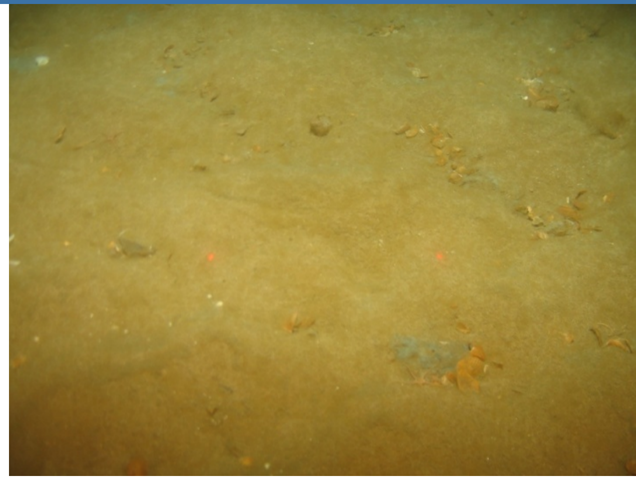
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
2	Sand	Slightly shelly silty gravelly sand	*Ophiura ophiura* *Asterias rubens* *Sabellaria spinulosa*	O O O	
3	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura albida*	O	

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
4	Sand	Rippled slightly shelly slightly gravelly sand	None		
5	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura ophiura*	O	

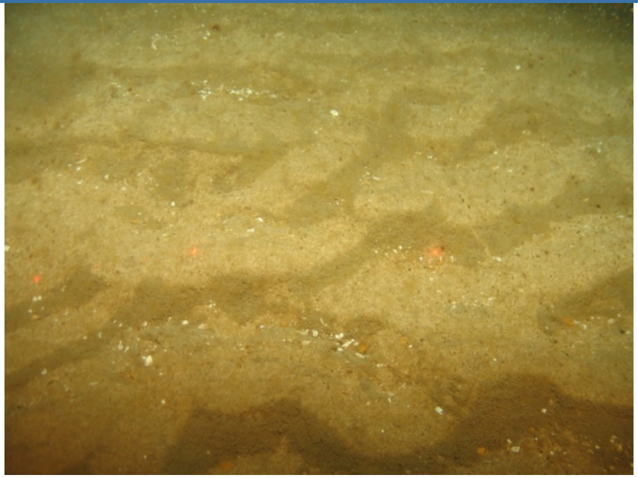
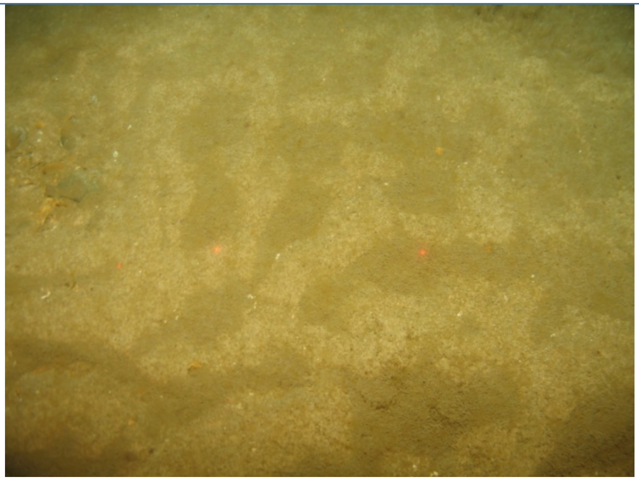
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
6	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura ophiura*	O	
7	Sand	Rippled slightly shelly slightly gravelly sand. Occasional patches of exposed clay.	*Asterias rubens* *Ophiura ophiura*	O O	

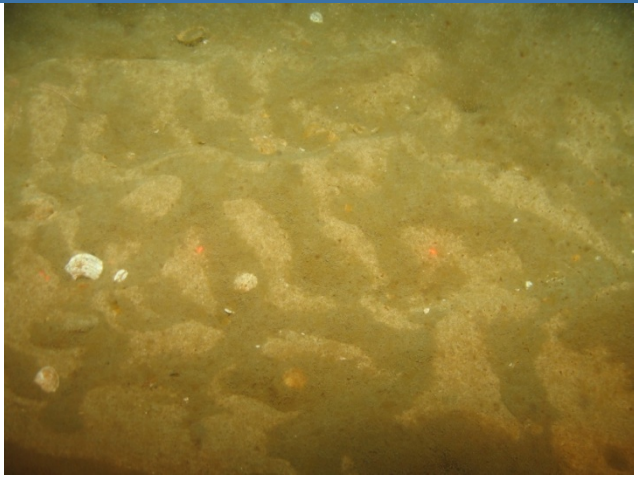
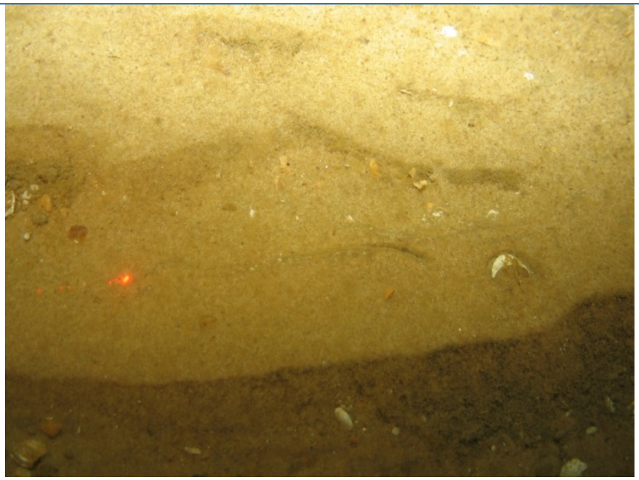
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
8	Sand	Rippled slightly shelly slightly gravelly sand	*Necora puber*	O	
9	Sand	Rippled slightly shelly slightly gravelly sand	Paguridae PLEURONECTIFORMES *Corystes cassivelaunus*	O P O	

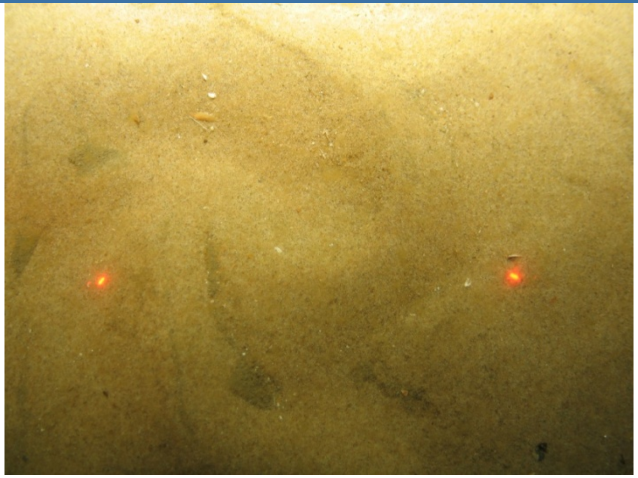
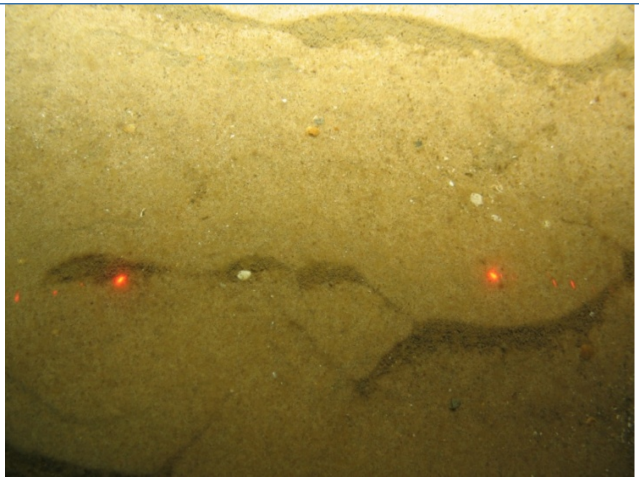
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
10	Sand	Rippled slightly shelly slightly gravelly sand	Hydroid / bryozoan turf	R	
11	Sand	Rippled slightly shelly slightly gravelly sand	Hydroid / bryozoan turf *Ophiura albida* *Ophiura ophiura* *Asterias rubens*	R O O O	

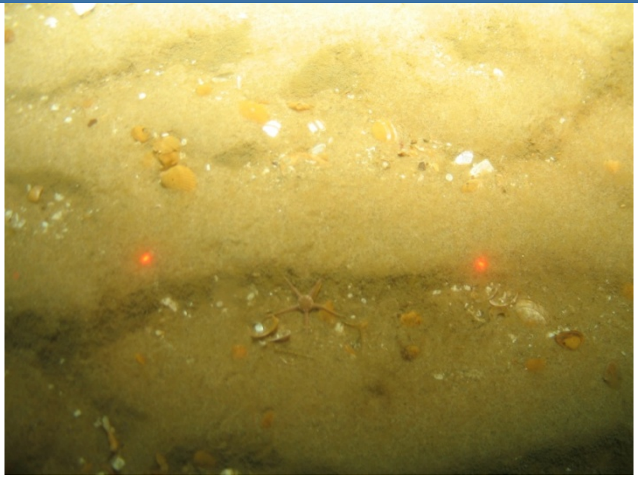
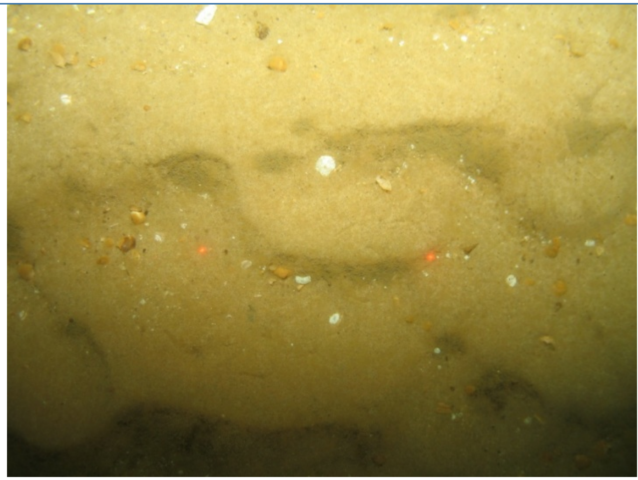
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
12	Sand	Rippled slightly shelly slightly gravelly sand. Small patches of exposed clay, and varying proportion of gravel throughout transect.	Hydroid / bryozoan turf Paguridae *Ophiura albida*	R O O	
13	Sand	Rippled slightly shelly slightly gravelly sand	*Asterias rubens* Paguridae *Ophiura ophiura*	O O O	

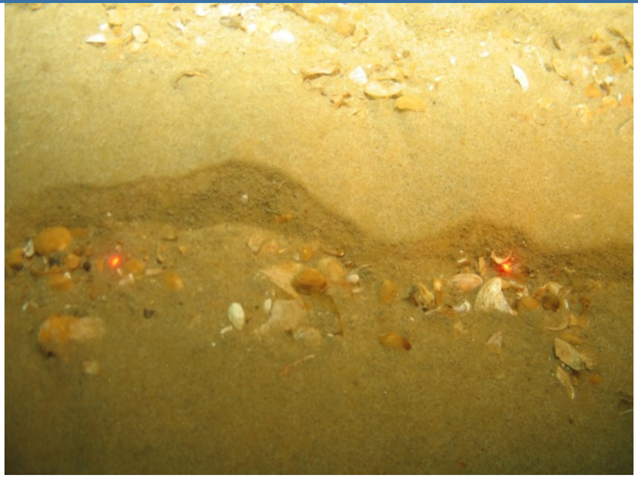
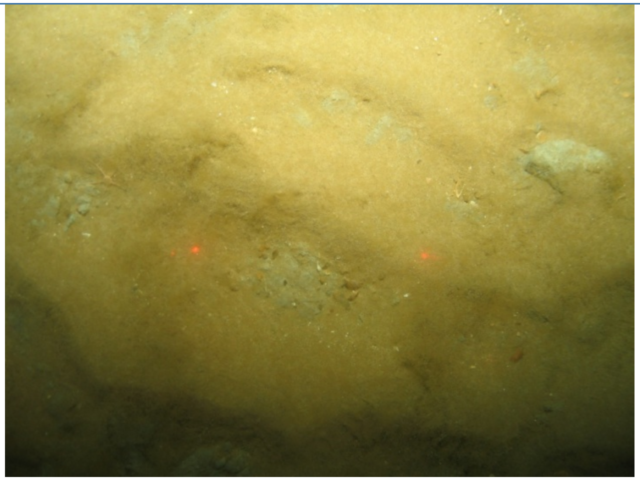
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
14	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	*Ophiura ophiura* Paguridae PLEURONECTIFORMES Ammodytidae *Asterias rubens*	O O P P O	
15	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	Hydroid / bryozoan turf	R	

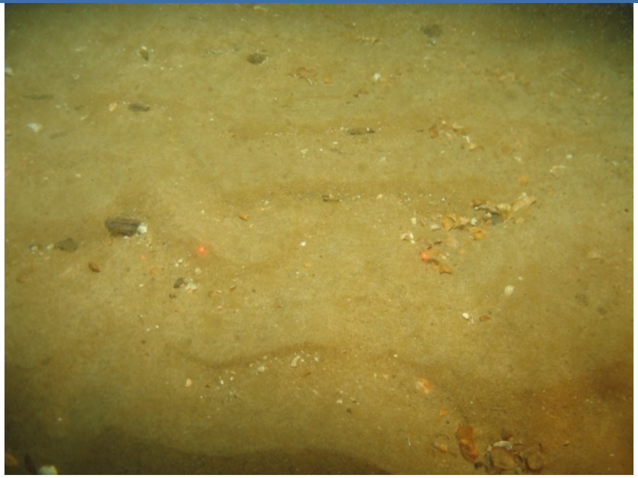
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
16	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	Hydroid / bryozoan turf	R	
17	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	*Asterias rubens* *Pagurus berhardus*	O O	

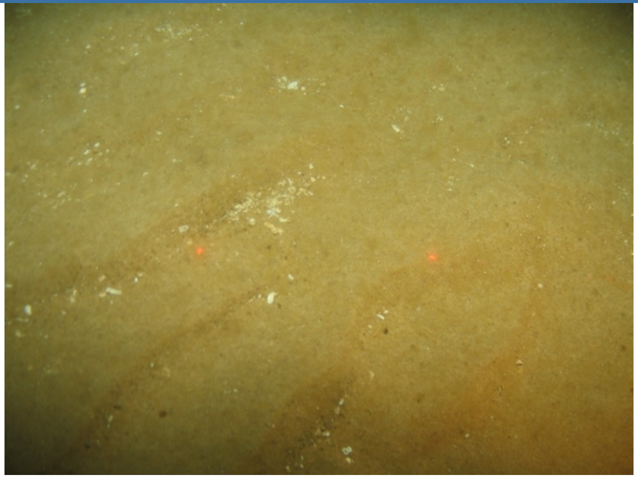
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
18	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	Hydroid / bryozoan turf CIRRIPEDIA *Asterias rubens*	R Locally C O	
19	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	Ammodytidae Ophiuridae ?*Buglossidium luteum* Hydroid / bryozoan turf	P O P R	

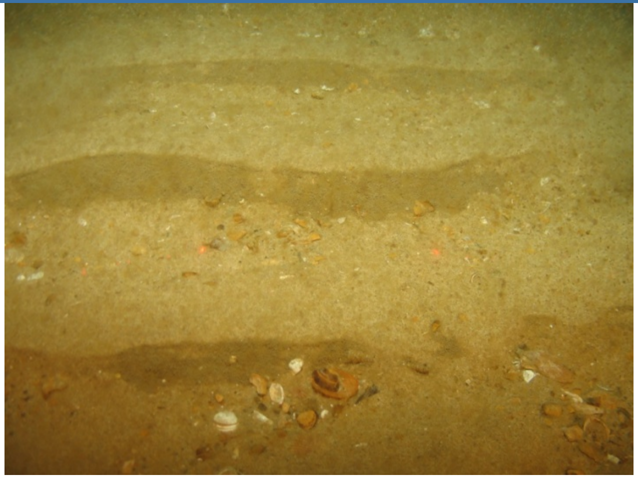
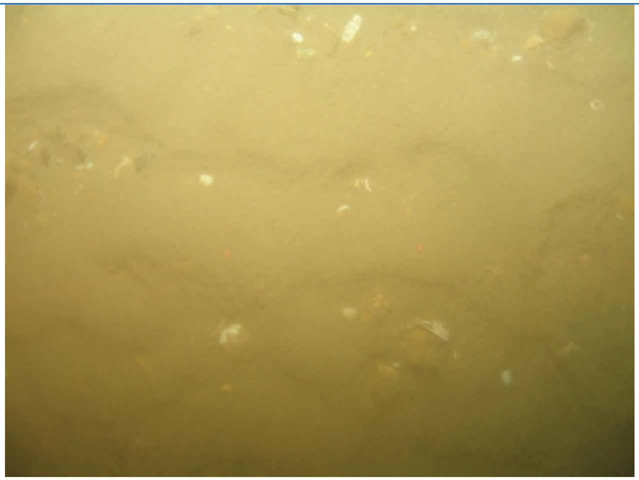
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
20	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation. Occasional pebbles and small cobbles.	*Asterias rubens* Hydroid / bryozoan turf	O O	
21	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	None		

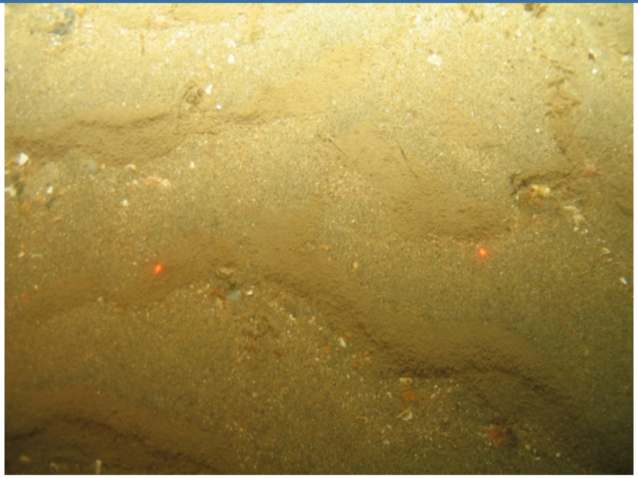
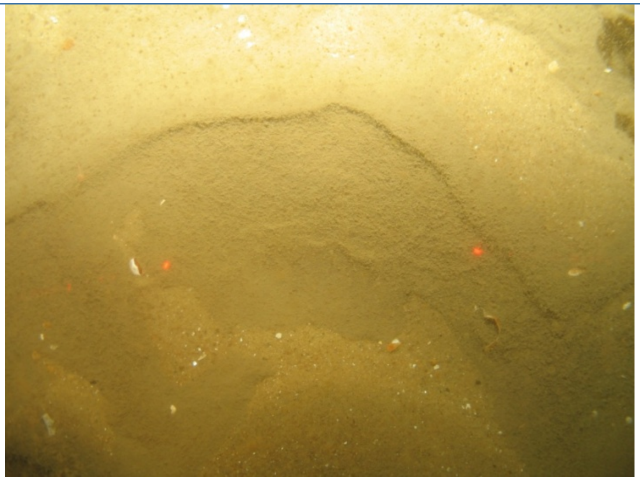
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
22	Sand	Rippled slightly shelly gravelly sand. Varying proportions of gravel along transect.	*Ophiura albida*	O	
23	Sand	Rippled slightly shelly slightly gravelly sand	Ophiuridae Hydroid / bryozoan turf Gobiidae	O R P	

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
24	Sand	Rippled slightly shelly slightly gravelly sand. Occasional pebbles and small cobbles.	*Asterias rubens* Hydroid / bryozoan turf PLEURONECTIFORMES	O R P	
25	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation and occasional clay exposures.	*Ophiura albida* *Ophiura ophiura* Hydroid / bryozoan turf Gobiidae	O O R P	

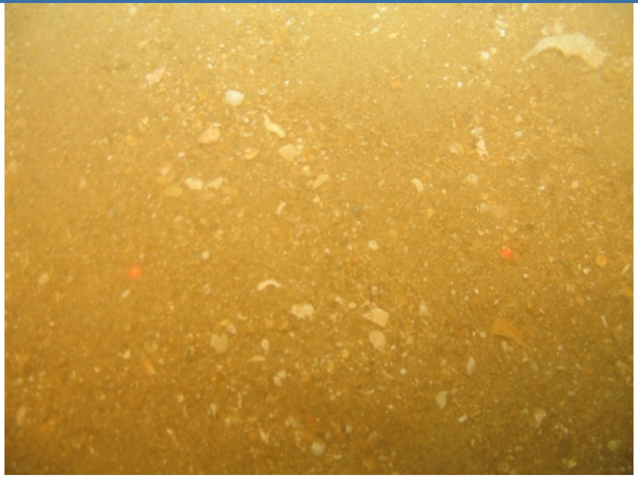
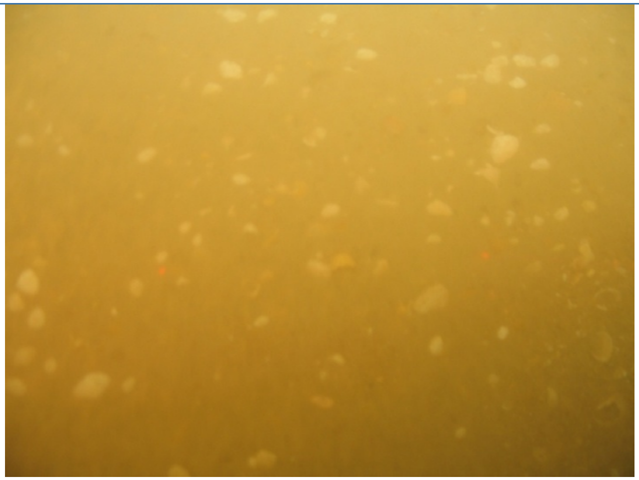
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
26	Sand	Rippled slightly shelly slightly gravelly sand.	*Ophiura albida* Paguridae Ammodytidae *Corystes cassivelaunus* *Ophiura ophiura* PLEURONECTIFORMIS *Lanice conchilega*	O F P O O P O	
27	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	PLEURONECTIFORMES *Ophiura ophiura* *Ophiura albida* *Echinocardium cordatum*	P O O P	

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
28	Sand	Rippled slightly shelly slightly gravelly sand.	Hydroid / bryozoan turf *Liocarcinus* sp.	R O	
29	Sand	Rippled slightly shelly slightly gravelly sand	Hydroid / bryozoan turf *Pagurus bernhardus*	R O	

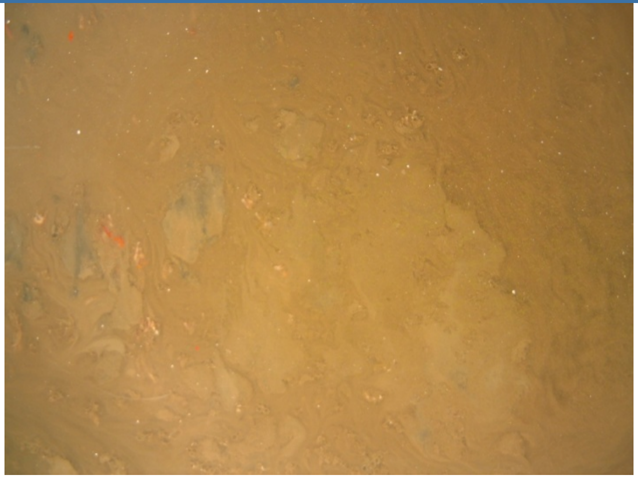
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
30	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	*Ophiura ophiura*	O	
31	Sand	Rippled slightly shelly slightly gravelly sand,	None		

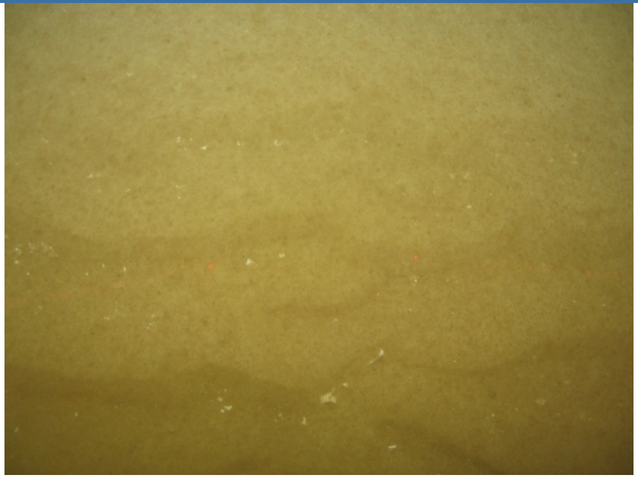
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
32	Sand	Gravelly sand, with silt flocculation	Hydroid / bryozoan turf *Crangon* sp. *Inachus* sp. *Tubularia* sp. *Ophiura albida*	O O O O C	
33	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	*Ophiura albida* Hydroid / bryozoan turf	O R	

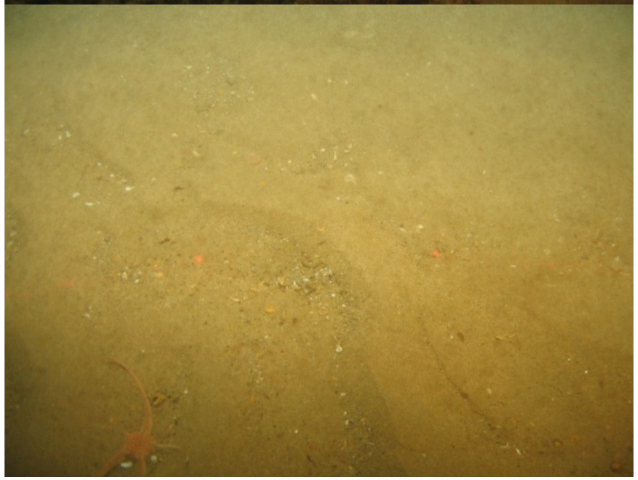
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
34	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura albida*	O	
35	Sand	Gravelly sand, with occasional pebbles and cobbles	Hydroid / bryozoan turf *Tubularia* sp.	R R/O	

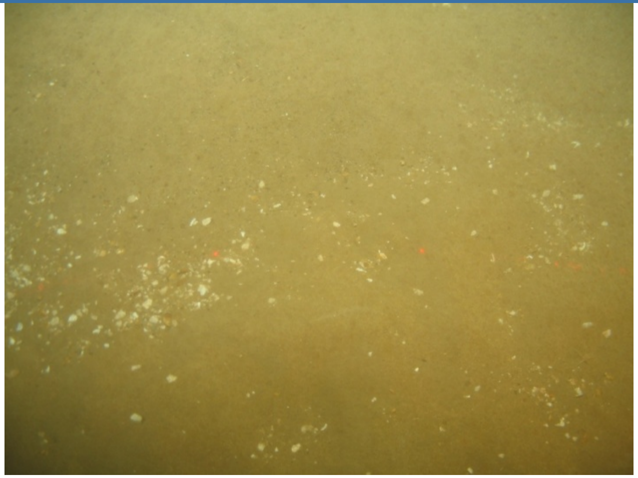
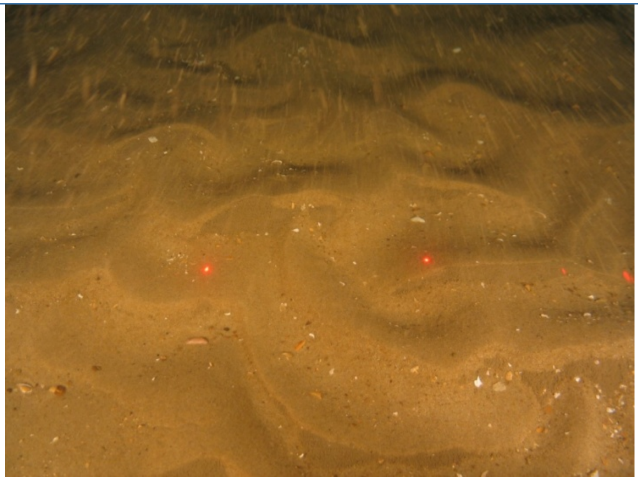
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
36	Sand	Gravelly sand	Hydroid / bryozoan turf *Tubularia* sp. *Spirobranchus* sp.	R R Locally F	
37	Sand	Gravelly muddy shelly sand	None		

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
38	Sand	Gravelly muddy sand	None		
39	Sand	Gravelly muddy sand	None		Extremely poor underwater visibility

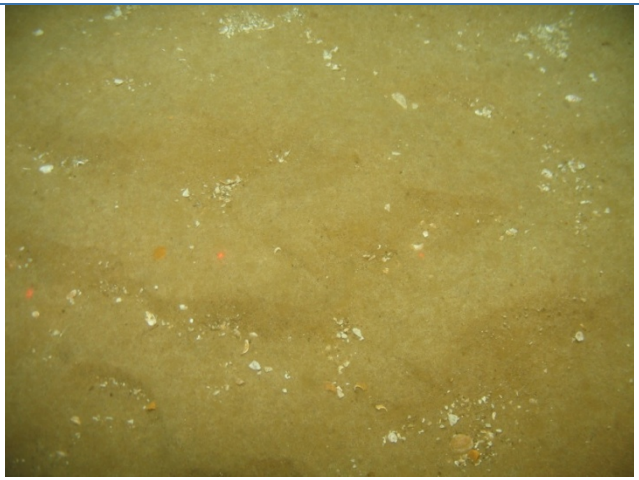
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
40	Sand	Gravelly muddy sand	None		
41	Sand	Rippled slightly shelly slightly gravelly sand	None		

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
42	Sand	Rippled slightly shelly slightly gravelly sand	PLEURONECTIFORMES Ophiuridae	P O	

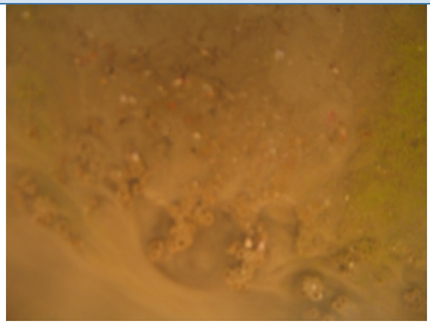
Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
43	Sand	Rippled slightly shelly slightly gravelly sand. *Sabellaria spinulosa* reef	Actinaria *Tubularia* sp. *Cerianthus lloydii* *Pagurus bernhardus* *Hydractina echinata* *Asterias rubens* *Ophiura ophiura* *Sertularia* sp. *Liocarcinus* sp.	O R O F P O O O O	 

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
44	Sand	Rippled slightly shelly slightly gravelly sand	Hydroid / bryozoan turf *Ophiura ophiura*	R O	
45	Sand	Rippled slightly shelly slightly gravelly sand, with silt flocculation.	*Ophiura ophiura* Callionymidae *Asterias rubens*	F P O	

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
46	Sand	Rippled slightly shelly slightly gravelly sand, with small areas of outcropping clay. *Sabellaria spinulosa* reef present.	*Sabellaria spinulosa* *Ophiura albida* PLEURONECTIFORMES *Asterias rubens* *Cancer pagurus* *Pagurus bernhardus*	P C P F-C F F	
47	Sand	Rippled slightly shelly slightly gravelly sand	*Ophiura ophiura* *Asterias rubens*	O F	

Site	General Description	Detailed Sediment Notes	Conspicuous Species	Estimated Abundance	Representative Image
48	Sand	Rippled slightly shelly gravelly sand	Hydroid / bryozoan turf Ammodytidae *Asterias rubens* *Ophiura ophiura*	R P F F	
49	Sand	Rippled slightly shelly gravelly sand	Paguridae *Ophiura albida*	O O	

L. *SABELLARIA* ASSESSMENT

	Sabellaria form present						*Sabellaria* characteristics			Representative Image	Reef definition based on		
Site	**Sediment**	**Absent**	**Moribund tubes**	**Crusts**	**Clumps**	**Potential Reef**	**Elevation**	**Patchiness**	**Brief description of reef**		**Elevation**	**Patchiness**	**Consolidation**
2	Gravelly muddy sand	×	×	×	✓	×	<2 cm	<10%	A small are of low elevation, clumps of upright *Sabellaria* tubes.		NOT REEF	NOT REEF	MED
43	Rippled slightly gravelly sand	×	✓	✓	✓	✓	<10cm	40%	Patchiness of the *Sabellaria* clumps is variable across the sites. In areas, the upright tubes appeared to be covered with sand.		MED	HIGH	HIGH

		Sabellaria form present					*Sabellaria* characteristics			Representative Image	Reef definition based on		
Site	Sediment	Absent	Moribund tubes	Crusts	Clumps	Potential Reef	Elevation	Patchiness	Brief description of reef		Elevation	Patchiness	Consolidation
46	Rippled slightly gravelly sand	×	✓	✓	✓	✓	<10 cm	60%	Within a small defined area, elevated, intertwined *Sabellaria* tubes were evident.		MED	HIGH	HIGH
46	Rippled slightly gravelly sand	×	✓	✓	✓	✓	<5cm	15 -20%	On the periphery of the elevated reef, patchy reef was evident, with a low elevation. In places, the reef was covered with rippled sand.		LOW	LOW	MED

M. EAST ANGLIA THREE AND FOUR – GRAB SAMPLE SPECIES LISTS

Species Name	Aphia ID	40	41	42	43	44	45	46	47	48	49
PORIFERA	558										
Cliona (agg.)	132026										
Sertularia	117234				P						
Nemertesia	117195										
Campanulariidae	1606				P						
Clytia	117030										
Alcyonidium parasiticum	111604										
Membraniporoidea	153579				P						
Membranipora tenuis	111412										
Conopeum reticulum	111351										
Electra monostachys	111354										
Electra pilosa	111355										
Aspidelectra melolontha	111350	P			P	P	P	P	P	P	
Callopora	110851										
Cribrilinidae	110742										
Puellina	110897										
Escharella	110965										
Escharella immersa	111484										
Escharina johnstoni	111518										
Schizomavella	110829										
Schizomavella auriculata/cuspidata	110829										
Verruca stroemia	106257										
ASCIDIACEA (juv.)	1839										
Cerianthus lloydii	283798										
Edwardsiidae (juv)	100665										
NEMERTEA	152391				1				1	1	
SIPUNCULA (juv)	1268										
Golfingia elongata	175026										
Nephasoma minutum	136060										
Pisione remota	130707										
Harmothoe	129491										
Malmgreniella darbouxi	130812										
Malmgreniella castanea	130811										

Species Name	Aphia ID	40	41	42	43	44	45	46	47	48	49
Harmothoe glabra	571832										
Pholoe baltica	130599										
Phyllodocidae	931										
Eteone longa (agg)	130616										
Mysta picta	147026										
Eulalia mustela	130631										
Eumida	129446										
Glycera alba	130116				1						
Glycera lapidum	130123										
Glycera oxycephala	130126										1
Goniada (juv)	129300										
Goniada maculata	130140	4		3	1		1	2	1		
Sphaerodorum gracilis	131100										
Podarkeopsis capensis	130195						1				
Syllis garciai	131431										
Syllis gracilis	131435										
Syllis pontxioi	196003										
Exogone verugera	131307										
Sphaerosyllis bulbosa	131379										
Eunereis longissima	130375										
Aglaophamus agilis	130343										
Nephtys	129370										
Nephtys (juv)	129370				3				2		
Nephtys caeca	130355										
Nephtys cirrosa	130357	1		2	3		4	1		5	1
Nephtys hombergii	130359										
Nephtys longosetosa	130364										
Marphysa bellii	130072										
Nematonereis unicornis	594957										
Lumbrineris cingulata	130240									1	
Protodorvillea kefersteini	130041										
Schistomeringos rudolphii	154127										
Scoloplos armiger	334772	1					6	1			
Paradoneis lyra	130585										
Poecilochaetus serpens	130711										

Species Name	Aphia ID	40	41	42	43	44	45	46	47	48	49
Aonides oxycephala	131106										
Aonides paucibranchiata	131107										
Atherospio guillei	478336										
Dipolydora coeca	131117										
Dipolydora caulleryi	131116										
Pseudopolydora	129621										
Scolelepis	129623										
Scolelepis bonnieri	131171										
Scolelepis squamata	157566						1				
Spio armata (agg)	131180										
Spiophanes	129626										
Spiophanes bombyx	131187							2			
Magelona	129341								1		1
Magelona johnstoni	130269			1							
Caulleriella alata	129943										
Chaetozone	129242				1						
Chaetozone christiei	152217							2			2
Caulleriella zetlandica	129948										
Mediomastus fragilis	129892										
Notomastus	129220										
Clymenura	129346										
Ophelia	129413										
Ophelia (juv)	129413								1		
Ophelia borealis	130491		1		1	4		5	5	6	
Travisia forbesii	130512										
Lagis koreni	152367										
Sabellaria spinulosa	130867									7	
Lanice conchilega	131495										
Loimia medusa	131499										
Lysilla nivea	131501										
Polycirrus	129710									1	
Polycirrus medusa	131531										2
Gastrosaccus spinifer	120020										1
Pontocrates altamarinus	102916										
Urothoe	101789			5		7					

Species Name	Aphia ID	40	41	42	43	44	45	46	47	48	49
Urothoe brevicornis	103226						6	4			
Urothoe elegans	103228	1									
Urothoe marina	103233										
Urothoe poseidonis	103235	1									
Nototropis swammerdamei	488966										1
Ampelisca spinipes	101928										
Bathyporeia	101742					1					
Bathyporeia elegans	103058							5			
Bathyporeia guilliamsoniana	103060			1			1	1			
Bathyporeia tenuipes	103076										
Melitidae	101397										
Abludomelita obtusata	102788										
Cheirocratus (female)	101669										1
Cheirocratus intermedius	102795										
Maerella tenuimana	102831										1
Unciola crenatipalma	102057										
Phtisica marina	101864										
Eurydice spinigera	148637										
Bopyridae	1195										
Monopseudocuma gilsoni	422916										
Crangonidae	106782										
Callianassa subterranea	107729										
Upogebia deltaura	107739										
Paguridae (juv)	106738										
Pisidia longicornis	107188										
Atelecyclus rotundatus	107273										
Thia scutellata	107281		1								
Leptochiton asellus	140199										
Gibbula cineraria (juv)	141782										
Euspira nitida	151894			1		2		2			
BIVALVIA	105										
Nucula (juv)	138262										
Glycymeris glycymeris	140025										
Diplodonta rotundata	141883										
Lepton squamosum	140218										

Species Name	Aphia ID	40	41	42	43	44	45	46	47	48	49
Kurtiella bidentata	345281										
Tellimya ferruginosa	146952			1			1				
Goodallia triangularis	138831										
Spisula	138159										
Spisula elliptica	140300										
Angulus fabula	152829	7		11		2	1				
Moerella donacina	147021										
Abra (juv)	138474										
Abra prismatica	141436										
Thracia phaseolina	152378										
Phoronis	128545										
ASTEROIDEA (juv)	123080										
OPHIUROIDEA (juv)	123084	1									
Amphiuridae	123206										
Amphipholis squamata	125064										
Ophiuridae	123200										
Ophiuridae (juv)	123200				2			1			
Ophiura	123574										
Ophiura albida	124913	1			2						
Ophiura ophiura	124929					2					
Ophiocten affinis	124850										
Echinocyamus pusillus	124273									2	
Spatangus purpureus	124418										
Echinocardium	123426			1							
Echinocardium cordatum	124392					1	1			2	
ENTEROPNEUSTA (?)	1820										

N. PSD RESULTS FOR EAST ANGLIA THREE AND FOUR

	SAMPLE ID:	40	41	42	43	44
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Well Sorted	Bimodal, Poorly Sorted
	FOLK (1954 ORIGINAL):	Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand
	FOLK (BGS MODIFIED):	Gravelly Sand	Sand	Sand	Sand	Gravelly Sand
	SEDIMENT NAME:	Medium Gravelly Fine Sand	Slightly Very Fine Gravelly Coarse Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Medium Sand	Coarse Gravelly Fine Sand
METHOD OF	MEAN:	1231.64	538.23	295.85	400.88	2888.57
MOMENTS	SORTING:	3168.83	297.04	248.96	351.58	7381.10
Arithmetic (µm)	SKEWNESS:	3.02	2.65	15.63	7.55	2.47
	KURTOSIS:	10.28	22.48	330.85	85.04	7.10
METHOD OF	MEAN:	286.66	430.92	243.04	313.22	335.08
MOMENTS	SORTING:	3.88	1.96	1.83	2.03	5.65
Geometric (µm)	SKEWNESS:	0.72	-2.74	-3.86	-3.50	0.89
	KURTOSIS:	7.72	21.49	33.79	28.32	5.87
METHOD OF	MEAN:	1.80	1.21	2.04	1.67	1.58

	SAMPLE ID:	40	41	42	43	44
MOMENTS	SORTING:	1.96	0.97	0.87	1.02	2.50
Logarithmic (Phi)	SKEWNESS:	-0.72	2.74	3.86	3.50	-0.89
	KURTOSIS:	7.72	21.49	33.79	28.32	5.87
FOLK AND	MEAN:	239.22	449.48	250.04	315.61	248.03
WARD METHOD	SORTING:	2.55	1.80	1.55	1.60	2.95
(µm)	SKEWNESS:	0.52	-0.21	0.00	-0.09	0.52
	KURTOSIS:	2.36	0.86	0.74	1.38	2.56
FOLK AND	MEAN:	2.06	1.15	2.00	1.66	2.01
WARD METHOD	SORTING:	1.35	0.85	0.63	0.68	1.56
(Phi)	SKEWNESS:	-0.52	0.21	0.00	0.09	-0.52
	KURTOSIS:	2.36	0.86	0.74	1.38	2.56
FOLK AND	MEAN:	Fine Sand	Medium Sand	Medium Sand	Medium Sand	Fine Sand
WARD METHOD	SORTING:	Poorly Sorted	Moderately Sorted	Moderately Well Sorted	Moderately Well Sorted	Poorly Sorted
(Description)	SKEWNESS:	Very Coarse Skewed	Fine Skewed	Symmetrical	Symmetrical	Very Coarse Skewed
	KURTOSIS:	Very Leptokurtic	Platykurtic	Platykurtic	Leptokurtic	Very Leptokurtic
	D_{10} (µm):	135.50	183.25	141.35	165.13	134.65
	D_{50} (µm):	216.04	480.24	249.64	331.57	223.77

	SAMPLE ID:	40	41	42	43	44
	D_{90} (µm):	1046.13	879.92	443.39	498.22	17113.92
	(D_{90} / D_{10}) (µm):	7.72	4.80	3.14	3.02	127.10
	(D_{90} - D_{10}) (µm):	910.63	696.67	302.04	333.08	16979.28
	(D_{75} / D_{25}) (µm):	2.14	2.42	2.04	1.66	2.30
	(D_{75} - D_{25}) (µm):	183.98	413.27	182.51	170.59	212.09
	D_{10} (Phi):	-0.07	0.18	1.17	1.01	-4.10
	D_{50} (Phi):	2.21	1.06	2.00	1.59	2.16
	D_{90} (Phi):	2.88	2.45	2.82	2.60	2.89
	(D_{90} / D_{10}) (Phi):	-44.32	13.26	2.41	2.58	-0.71
	(D_{90} - D_{10}) (Phi):	2.95	2.26	1.65	1.59	6.99
	(D_{75} / D_{25}) (Phi):	1.72	3.52	1.69	1.60	1.85
	(D_{75} - D_{25}) (Phi):	1.10	1.28	1.03	0.73	1.20
	% GRAVEL (63000 - 2000 µm):	9.36	0.44	0.26	0.97	11.75
	% SAND (< 2000 - 63 µm):	88.47	98.97	98.76	97.79	85.18
	% MUD (< 63 µm):	2.17	0.59	0.98	1.24	3.06
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	11.10
	% MEDIUM GRAVEL:	7.66	0.00	0.00	0.00	0.00

	SAMPLE ID:	40	41	42	43	44
	% FINE GRAVEL:	1.09	0.00	0.11	0.09	0.22
	% V FINE GRAVEL:	0.61	0.44	0.15	0.88	0.43
	% V COARSE SAND:	0.69	0.96	0.17	1.25	0.53
	% COARSE SAND:	0.67	46.59	1.20	7.43	1.17
	% MEDIUM SAND:	26.76	34.51	48.27	68.09	27.82
	% FINE SAND:	59.44	16.73	48.74	20.49	54.58
	% V FINE SAND:	0.91	0.18	0.38	0.53	1.08
	% V COARSE SILT:	0.23	0.06	0.11	0.13	0.33
	% COARSE SILT:	0.23	0.06	0.11	0.13	0.33
	% MEDIUM SILT:	0.23	0.06	0.11	0.13	0.33
	% FINE SILT:	0.23	0.06	0.11	0.13	0.33
	% V FINE SILT:	0.23	0.06	0.11	0.13	0.33
	% CLAY:	1.00	0.27	0.45	0.57	1.41

	SAMPLE ID:	45	46	47	48	49
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Sorted	Unimodal, Moderately Well Sorted	Unimodal, Poorly Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Well Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand
	FOLK (BGS MODIFIED):	Slightly Gravelly Sand	Sand	Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand
	SEDIMENT NAME:	Slightly Very Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand	Very Fine Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand
METHOD OF	MEAN:	396.21	377.00	686.26	475.85	423.74
MOMENTS	SORTING:	710.97	448.17	1184.23	536.53	665.11
Arithmetic (μm)	SKEWNESS:	13.58	9.77	5.10	7.44	10.58
	KURTOSIS:	213.68	115.75	36.74	70.42	141.27
METHOD OF	MEAN:	267.49	287.37	386.77	360.61	310.81
MOMENTS	SORTING:	2.57	1.99	2.45	1.95	1.98
Geometric (μm)	SKEWNESS:	-3.01	-2.85	-0.06	-2.41	-2.52
	KURTOSIS:	18.19	26.56	11.27	27.22	28.41
METHOD OF	MEAN:	1.90	1.80	1.37	1.47	1.69
MOMENTS	SORTING:	1.36	0.99	1.29	0.96	0.99
Logarithmic	SKEWNESS:	3.01	2.85	0.06	2.41	2.52

	SAMPLE ID:	45	46	47	48	49
(Phi)						
	KURTOSIS:	18.19	26.56	11.27	27.22	28.41
FOLK AND	MEAN:	283.80	286.69	356.28	357.27	308.36
WARD METHOD	SORTING:	1.66	1.62	2.07	1.56	1.55
(µm)	SKEWNESS:	-0.10	-0.10	0.24	0.04	-0.15
	KURTOSIS:	1.01	0.98	2.06	1.49	1.27
FOLK AND	MEAN:	1.82	1.80	1.49	1.48	1.70
WARD METHOD	SORTING:	0.73	0.70	1.05	0.64	0.63
(Phi)	SKEWNESS:	0.10	0.10	-0.24	-0.04	0.15
	KURTOSIS:	1.01	0.98	2.06	1.49	1.27
FOLK AND	MEAN:	Medium Sand	Medium Sand	Medium Sand	Medium Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Sorted	Moderately Well Sorted	Poorly Sorted	Moderately Well Sorted	Moderately Well Sorted
(Description)	SKEWNESS:	Fine Skewed	Symmetrical	Coarse Skewed	Symmetrical	Fine Skewed
	KURTOSIS:	Mesokurtic	Mesokurtic	Very Leptokurtic	Leptokurtic	Leptokurtic
	D_{10} (µm):	144.95	150.44	168.01	200.35	164.07
	D_{50} (µm):	303.25	303.98	345.01	356.77	325.20
	D_{90} (µm):	485.95	484.71	1329.73	708.14	482.99
	(D_{90} / D_{10}) (µm):	3.35	3.22	7.91	3.53	2.94
	(D_{90} - D_{10}) (µm):	341.00	334.27	1161.72	507.79	318.91

	SAMPLE ID:	45	46	47	48	49
	(D_{75} / D_{25}) (µm):	1.99	1.95	1.79	1.64	1.64
	$(D_{75} - D_{25})$ (µm):	202.28	198.10	203.56	179.39	162.44
	D_{10} (Phi):	1.04	1.04	-0.41	0.50	1.05
	D_{50} (Phi):	1.72	1.72	1.54	1.49	1.62
	D_{90} (Phi):	2.79	2.73	2.57	2.32	2.61
	(D_{90} / D_{10}) (Phi):	2.68	2.62	-6.26	4.66	2.48
	$(D_{90} - D_{10})$ (Phi):	1.75	1.69	2.98	1.82	1.56
	(D_{75} / D_{25}) (Phi):	1.76	1.74	1.75	1.64	1.56
	$(D_{75} - D_{25})$ (Phi):	0.99	0.96	0.84	0.72	0.71
	% GRAVEL (63000 - 2000 µm):	1.01	0.86	6.72	1.42	1.30
	% SAND (< 2000 - 63 µm):	96.17	98.07	92.54	97.80	97.71
	% MUD (< 63 µm):	2.83	1.06	0.74	0.78	0.99
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.29	0.00	0.33	0.00	0.11
	% FINE GRAVEL:	0.08	0.45	2.12	0.59	0.73
	% V FINE GRAVEL:	0.63	0.42	4.27	0.83	0.46
	% V COARSE SAND:	1.23	0.81	5.56	2.54	1.19

	SAMPLE ID:	45	46	47	48	49
	% COARSE SAND:	5.35	5.66	5.83	12.13	4.01
	% MEDIUM SAND:	58.80	59.42	59.57	69.64	70.09
	% FINE SAND:	30.04	31.72	21.48	13.37	22.07
	% V FINE SAND:	0.76	0.46	0.10	0.12	0.35
	% V COARSE SILT:	0.30	0.11	0.08	0.08	0.11
	% COARSE SILT:	0.30	0.11	0.08	0.08	0.11
	% MEDIUM SILT:	0.30	0.11	0.08	0.08	0.11
	% FINE SILT:	0.30	0.11	0.08	0.08	0.11
	% V FINE SILT:	0.30	0.11	0.08	0.08	0.11
	% CLAY:	1.30	0.49	0.34	0.36	0.46

O. BIOTOPE ASSESSMENT FOR EAST ANGLIA THREE AND FOUR

Site No.	Biotopes
40	SS.SCS.CCS
41	SS.SSa
42	SS.SSA.CFiSa
43	SS.SSA.CFiSa
44	SS.SCS.CCS
45	SS.SSA.CFiSa
46	SS.SSA.CFiSa
47	SS.SCS.CCS
48	SS.SCS.CCS
49	SS.SSA.CFiSa

P. FULL PSD RESULTS

	SAMPLE ID:	1	2	3	4	5
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Well Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Moderately Well Sorted	Unimodal, Well Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Gravelly Muddy Sand	Gravelly Muddy Sand	Slightly Gravelly Sand	Slightly Gravelly Sand
	FOLK (BGS MODIFIED):	Slightly Gravelly Sand	Gravelly Muddy Sand	Gravelly Muddy Sand	Slightly Gravelly Sand	Slightly Gravelly Sand
	SEDIMENT NAME:	Slightly Very Fine Gravelly Medium Sand	Very Coarse Gravelly Medium Silty Medium Sand	Medium Gravelly Medium Silty Fine Sand	Slightly Fine Gravelly Fine Sand	Slightly Fine Gravelly Medium Sand
METHOD OF	MEAN:	441.51	5241.95	1274.85	327.00	429.32
MOMENTS	SORTING:	481.20	13563.06	3083.07	554.07	550.38
Arithmetic (µm)	SKEWNESS:	9.22	2.71	2.92	9.14	8.65
	KURTOSIS:	99.70	8.53	10.05	90.62	83.31
METHOD OF	MEAN:	354.05	407.00	221.70	236.49	334.47
MOMENTS	SORTING:	1.78	9.91	6.48	1.95	1.85
Geometric (µm)	SKEWNESS:	-3.63	0.03	-0.32	-2.10	-3.51
	KURTOSIS:	43.94	3.74	4.59	27.31	41.38
METHOD OF	MEAN:	1.50	1.30	2.17	2.08	1.58
MOMENTS	SORTING:	0.84	3.31	2.70	0.97	0.88
Logarithmic (Phi)	SKEWNESS:	3.63	-0.03	0.32	2.10	3.51

	SAMPLE ID:	1	2	3	4	5
	KURTOSIS:	43.94	3.74	4.59	27.31	41.38
FOLK AND	MEAN:	354.99	483.89	215.71	239.05	343.78
WARD METHOD	SORTING:	1.42	8.89	4.71	1.54	1.35
(µm)	SKEWNESS:	0.04	0.19	-0.06	0.12	-0.16
	KURTOSIS:	1.36	2.22	3.13	0.75	1.10
FOLK AND	MEAN:	1.49	1.05	2.21	2.06	1.54
WARD METHOD	SORTING:	0.51	3.15	2.24	0.63	0.44
(Phi)	SKEWNESS:	-0.04	-0.19	0.06	-0.12	0.16
	KURTOSIS:	1.36	2.22	3.13	0.75	1.10
FOLK AND	MEAN:	Medium Sand	Medium Sand	Fine Sand	Fine Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Well Sorted	Very Poorly Sorted	Very Poorly Sorted	Moderately Well Sorted	Well Sorted
(Description)	SKEWNESS:	Symmetrical	Coarse Skewed	Symmetrical	Coarse Skewed	Fine Skewed
	KURTOSIS:	Leptokurtic	Very Leptokurtic	Extremely Leptokurtic	Platykurtic	Mesokurtic
	D_{10} (µm):	254.32	18.76	17.35	139.52	239.85
	D_{50} (µm):	354.99	347.83	229.08	230.57	343.78
	D_{90} (µm):	495.51	12683.25	4051.59	434.82	474.94
	(D_{90} / D_{10}) (µm):	1.95	676.14	233.54	3.12	1.98
	$(D_{90} - D_{10})$ (µm):	241.19	12664.49	4034.25	295.30	235.09
	(D_{75} / D_{25}) (µm):	1.52	5.20	2.68	2.02	1.50
	$(D_{75} - D_{25})$ (µm):	149.06	728.21	244.14	171.08	139.83

	SAMPLE ID:	1	2	3	4	5
	D_{10} (Phi):	1.01	-3.66	-2.02	1.20	1.07
	D_{50} (Phi):	1.49	1.52	2.13	2.12	1.54
	D_{90} (Phi):	1.98	5.74	5.85	2.84	2.06
	(D_{90} / D_{10}) (Phi):	1.95	-1.57	-2.90	2.36	1.92
	(D_{90} - D_{10}) (Phi):	0.96	9.40	7.87	1.64	0.99
	(D_{75} / D_{25}) (Phi):	1.50	16.91	2.05	1.65	1.47
	(D_{75} - D_{25}) (Phi):	0.60	2.38	1.42	1.01	0.58
	% GRAVEL (63000 - 2000 µm):	1.15	18.37	11.76	1.29	1.46
	% SAND (< 2000 - 63 µm):	98.11	67.65	73.14	97.67	97.65
	% MUD (< 63 µm):	0.74	13.98	15.10	1.04	0.90
	% V COARSE GRAVEL:	0.00	9.04	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.21	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.00	2.22	6.73	0.00	0.00
	% FINE GRAVEL:	0.53	2.89	3.33	0.80	0.76
	% V FINE GRAVEL:	0.62	4.01	1.70	0.49	0.70
	% V COARSE SAND:	0.99	5.23	1.15	0.13	0.85
	% COARSE SAND:	6.78	9.34	0.72	0.12	1.33
	% MEDIUM SAND:	83.14	32.57	31.57	42.03	85.79
	% FINE SAND:	7.16	17.94	38.10	55.19	9.60
	% V FINE SAND:	0.05	2.56	1.60	0.21	0.08
	% V COARSE SILT:	0.08	2.02	2.63	0.11	0.10

	SAMPLE ID:	1	2	3	4	5
	% COARSE SILT:	0.08	2.67	2.90	0.11	0.10
	% MEDIUM SILT:	0.08	3.08	2.93	0.11	0.10
	% FINE SILT:	0.08	2.74	2.72	0.11	0.10
	% V FINE SILT:	0.08	1.76	1.92	0.11	0.10
	% CLAY:	0.34	1.72	2.00	0.48	0.41

	SAMPLE ID:	6	7	8	9	10
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Well Sorted	Unimodal, Moderately Well Sorted	Unimodal, Well Sorted	Unimodal, Moderately Well Sorted	Unimodal, Well Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand
	FOLK (BGS MODIFIED):	Slightly Gravelly Sand	Sand	Sand	Sand	Sand
	SEDIMENT NAME:	Slightly Medium Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand
METHOD OF	MEAN:	439.39	347.66	372.42	375.62	395.64
MOMENTS	SORTING:	1016.29	255.16	312.88	422.67	460.62
Arithmetic (µm)	SKEWNESS:	10.47	15.35	15.55	11.22	10.28
	KURTOSIS:	115.42	306.79	273.37	142.14	119.37
METHOD OF	MEAN:	305.76	293.00	317.56	301.31	316.13
MOMENTS	SORTING:	1.95	1.79	1.69	1.86	1.81
Geometric (µm)	SKEWNESS:	-2.57	-5.04	-5.55	-4.14	-3.70
	KURTOSIS:	35.15	44.81	58.44	39.54	40.89
METHOD OF	MEAN:	1.71	1.77	1.65	1.73	1.66
MOMENTS	SORTING:	0.96	0.84	0.75	0.90	0.86
Logarithmic (Phi)	SKEWNESS:	2.57	5.04	5.55	4.14	3.70
	KURTOSIS:	35.15	44.81	58.44	39.54	40.89
FOLK AND	MEAN:	313.68	302.46	336.52	311.54	327.74

	SAMPLE ID:	6	7	8	9	10
WARD METHOD	SORTING:	1.44	1.47	1.37	1.45	1.41
(µm)	SKEWNESS:	-0.25	-0.27	-0.18	-0.26	-0.21
	KURTOSIS:	1.13	1.10	1.14	1.12	1.13
FOLK AND	MEAN:	1.67	1.73	1.57	1.68	1.61
WARD METHOD	SORTING:	0.53	0.55	0.45	0.53	0.49
(Phi)	SKEWNESS:	0.25	0.27	0.18	0.26	0.21
	KURTOSIS:	1.13	1.10	1.14	1.12	1.13
FOLK AND	MEAN:	Medium Sand	Medium Sand	Medium Sand	Medium Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Well Sorted	Moderately Well Sorted	Well Sorted	Moderately Well Sorted	Well Sorted
(Description)	SKEWNESS:	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed
	KURTOSIS:	Leptokurtic	Mesokurtic	Leptokurtic	Leptokurtic	Leptokurtic
	D_{10} (µm):	172.25	164.54	201.95	170.66	183.09
	D_{50} (µm):	325.91	319.35	336.52	324.84	332.71
	D_{90} (µm):	464.62	461.79	468.44	464.23	472.14
	(D_{90} / D_{10}) (µm):	2.70	2.81	2.32	2.72	2.58
	(D_{90} - D_{10}) (µm):	292.37	297.25	266.49	293.57	289.06
	(D_{75} / D_{25}) (µm):	1.56	1.59	1.51	1.56	1.55
	(D_{75} - D_{25}) (µm):	145.65	148.54	140.12	146.19	146.73
	D_{10} (Phi):	1.11	1.11	1.09	1.11	1.08
	D_{50} (Phi):	1.62	1.65	1.57	1.62	1.59
	D_{90} (Phi):	2.54	2.60	2.31	2.55	2.45

	SAMPLE ID:	6	7	8	9	10
	(D_{90} / D_{10}) (Phi):	2.29	2.34	2.11	2.30	2.26
	$(D_{90} - D_{10})$ (Phi):	1.43	1.49	1.21	1.44	1.37
	(D_{75} / D_{25}) (Phi):	1.49	1.51	1.47	1.50	1.50
	$(D_{75} - D_{25})$ (Phi):	0.64	0.67	0.60	0.64	0.63
	% GRAVEL (63000 - 2000 µm):	1.12	0.34	0.34	0.82	0.96
	% SAND (< 2000 - 63 µm):	97.84	98.70	98.91	98.14	98.21
	% MUD (< 63 µm):	1.04	0.96	0.74	1.03	0.83
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	0.67	0.00	0.00	0.00	0.00
	% FINE GRAVEL:	0.37	0.12	0.26	0.43	0.52
	% V FINE GRAVEL:	0.08	0.23	0.09	0.39	0.44
	% V COARSE SAND:	0.14	0.26	0.22	0.45	0.59
	% COARSE SAND:	0.46	0.78	1.54	0.41	1.90
	% MEDIUM SAND:	78.19	75.17	83.83	77.65	79.21
	% FINE SAND:	18.77	22.29	13.17	19.36	16.33
	% V FINE SAND:	0.28	0.20	0.14	0.27	0.18
	% V COARSE SILT:	0.11	0.10	0.08	0.11	0.09
	% COARSE SILT:	0.11	0.10	0.08	0.11	0.09
	% MEDIUM SILT:	0.11	0.10	0.08	0.11	0.09
	% FINE SILT:	0.11	0.10	0.08	0.11	0.09

	SAMPLE ID:	6	7	8	9	10
	% V FINE SILT:	0.11	0.10	0.08	0.11	0.09
	% CLAY:	0.48	0.44	0.34	0.48	0.38

	SAMPLE ID:	11	12	13	14	15
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Sorted	Bimodal, Very Poorly Sorted	Unimodal, Moderately Well Sorted	Unimodal, Poorly Sorted	Unimodal, Well Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand	Slightly Gravelly Sand
	FOLK (BGS MODIFIED):	Slightly Gravelly Sand	Gravelly Sand	Sand	Gravelly Sand	Sand
	SEDIMENT NAME:	Slightly Fine Gravelly Medium Sand	Coarse Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Very Fine Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand
METHOD OF	MEAN:	728.05	4808.09	363.10	897.57	376.83
MOMENTS	SORTING:	1882.04	8868.39	242.72	1550.70	338.19
Arithmetic (µm)	SKEWNESS:	5.07	1.59	10.48	4.91	12.70
	KURTOSIS:	28.79	3.63	177.49	31.48	193.24
METHOD OF	MEAN:	303.03	702.24	302.25	490.27	311.80
MOMENTS	SORTING:	3.10	6.33	1.83	2.57	1.84
Geometric (µm)	SKEWNESS:	-0.85	0.83	-4.53	-0.16	-5.03
	KURTOSIS:	11.81	3.34	39.45	10.13	45.24
METHOD OF	MEAN:	1.72	0.51	1.73	1.03	1.68
MOMENTS	SORTING:	1.63	2.66	0.87	1.36	0.88
Logarithmic (Phi)	SKEWNESS:	0.85	-0.83	4.53	0.16	5.03
	KURTOSIS:	11.81	3.34	39.45	10.13	45.24
FOLK AND	MEAN:	287.73	1046.90	308.56	487.93	334.57

	SAMPLE ID:	11	12	13	14	15
WARD METHOD	SORTING:	1.96	6.75	1.48	2.24	1.38
(µm)	SKEWNESS:	0.11	0.68	-0.25	0.38	-0.18
	KURTOSIS:	1.50	2.01	1.08	1.37	1.15
FOLK AND	MEAN:	1.80	-0.07	1.70	1.04	1.58
WARD METHOD	SORTING:	0.97	2.76	0.56	1.16	0.46
(Phi)	SKEWNESS:	-0.11	-0.68	0.25	-0.38	0.18
	KURTOSIS:	1.50	2.01	1.08	1.37	1.15
FOLK AND	MEAN:	Medium Sand	Very Coarse Sand	Medium Sand	Medium Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Sorted	Very Poorly Sorted	Moderately Well Sorted	Poorly Sorted	Well Sorted
(Description)	SKEWNESS:	Coarse Skewed	Very Coarse Skewed	Fine Skewed	Very Coarse Skewed	Fine Skewed
	KURTOSIS:	Leptokurtic	Very Leptokurtic	Mesokurtic	Leptokurtic	Leptokurtic
	D_{10} (µm):	145.11	160.32	166.35	221.13	193.06
	D_{50} (µm):	303.93	358.53	324.48	407.31	334.57
	D_{90} (µm):	626.25	21204.86	475.36	1740.87	467.61
	(D_{90} / D_{10}) (µm):	4.32	132.26	2.86	7.87	2.42
	(D_{90} - D_{10}) (µm):	481.14	21044.53	309.01	1519.74	274.55
	(D_{75} / D_{25}) (µm):	2.10	2.91	1.61	2.44	1.52
	(D_{75} - D_{25}) (µm):	220.54	476.48	156.36	426.22	141.03
	D_{10} (Phi):	0.68	-4.41	1.07	-0.80	1.10
	D_{50} (Phi):	1.72	1.48	1.62	1.30	1.58
	D_{90} (Phi):	2.78	2.64	2.59	2.18	2.37

	SAMPLE ID:	11	12	13	14	15
	(D_{90} / D_{10}) (Phi):	4.12	-0.60	2.41	-2.72	2.16
	(D_{90} - D_{10}) (Phi):	2.11	7.05	1.51	2.98	1.28
	(D_{75} / D_{25}) (Phi):	1.86	4.34	1.54	3.74	1.47
	(D_{75} - D_{25}) (Phi):	1.07	1.54	0.69	1.29	0.60
	% GRAVEL (63000 - 2000 µm):	4.97	22.23	0.38	8.25	0.62
	% SAND (< 2000 - 63 µm):	92.42	76.70	98.65	91.05	98.29
	% MUD (< 63 µm):	2.61	1.07	0.97	0.70	1.10
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	17.12	0.00	0.00	0.00
	% MEDIUM GRAVEL:	2.13	3.23	0.00	1.09	0.00
	% FINE GRAVEL:	2.26	1.00	0.04	2.32	0.23
	% V FINE GRAVEL:	0.58	0.87	0.34	4.84	0.38
	% V COARSE SAND:	1.00	1.06	0.64	8.76	0.50
	% COARSE SAND:	5.97	3.70	3.69	17.00	0.88
	% MEDIUM SAND:	52.99	47.95	72.61	54.07	82.82
	% FINE SAND:	31.94	23.49	21.59	10.88	13.90
	% V FINE SAND:	0.51	0.49	0.13	0.34	0.19
	% V COARSE SILT:	0.28	0.12	0.10	0.08	0.12
	% COARSE SILT:	0.28	0.12	0.10	0.08	0.12
	% MEDIUM SILT:	0.28	0.12	0.10	0.08	0.12
	% FINE SILT:	0.28	0.12	0.10	0.08	0.12

	SAMPLE ID:	11	12	13	14	15
	% V FINE SILT:	0.28	0.12	0.10	0.08	0.12
	% CLAY:	1.21	0.49	0.45	0.32	0.51

	SAMPLE ID:	16	17	18	19	20
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Sorted
	FOLK (1954 ORIGINAL):	Gravelly Sand	Sandy Gravel	Sandy Gravel	Slightly Gravelly Sand	Gravelly Sand
	FOLK (BGS MODIFIED):	Gravelly Sand	Sandy Gravel	Sandy Gravel	Slightly Gravelly Sand	Gravelly Sand
	SEDIMENT NAME:	Medium Gravelly Medium Sand	Sandy Very Coarse Gravel	Sandy Coarse Gravel	Slightly Very Fine Gravelly Medium Sand	Medium Gravelly Medium Sand
METHOD OF	MEAN:	982.27	13154.78	6662.38	489.88	854.64
MOMENTS	SORTING:	2236.86	19200.24	9434.84	651.70	2162.84
Arithmetic (µm)	SKEWNESS:	4.23	1.05	1.05	6.43	4.59
	KURTOSIS:	20.34	2.30	2.35	49.49	23.09
METHOD OF	MEAN:	435.63	1803.40	1226.91	355.83	378.38
MOMENTS	SORTING:	2.65	9.19	7.22	2.01	2.55
Geometric (µm)	SKEWNESS:	0.62	0.27	0.31	-2.25	0.54
	KURTOSIS:	11.64	2.17	2.20	27.98	14.70
METHOD OF	MEAN:	1.20	-0.85	-0.30	1.49	1.40
MOMENTS	SORTING:	1.41	3.20	2.85	1.00	1.35
Logarithmic (Phi)	SKEWNESS:	-0.62	-0.27	-0.31	2.25	-0.54
	KURTOSIS:	11.64	2.17	2.20	27.98	14.70
FOLK AND	MEAN:	373.10	1804.19	1277.44	351.12	345.83

	SAMPLE ID:	16	17	18	19	20
WARD METHOD	SORTING:	1.94	8.06	6.31	1.52	1.87
(µm)	SKEWNESS:	0.31	0.67	0.69	0.08	0.23
	KURTOSIS:	2.78	0.54	0.57	1.68	2.75
FOLK AND	MEAN:	1.42	-0.85	-0.35	1.51	1.53
WARD METHOD	SORTING:	0.95	3.01	2.66	0.60	0.90
(Phi)	SKEWNESS:	-0.31	-0.67	-0.69	-0.08	-0.23
	KURTOSIS:	2.78	0.54	0.57	1.68	2.75
FOLK AND	MEAN:	Medium Sand	Very Coarse Sand	Very Coarse Sand	Medium Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Sorted	Very Poorly Sorted	Very Poorly Sorted	Moderately Well Sorted	Moderately Sorted
(Description)	SKEWNESS:	Very Coarse Skewed	Very Coarse Skewed	Very Coarse Skewed	Symmetrical	Coarse Skewed
	KURTOSIS:	Very Leptokurtic	Very Platykurtic	Very Platykurtic	Very Leptokurtic	Very Leptokurtic
	D_{10} (µm):	250.29	256.67	214.89	233.13	196.19
	D_{50} (µm):	364.73	545.15	426.18	351.12	345.83
	D_{90} (µm):	1396.58	45842.03	22665.29	497.50	499.85
	(D_{90} / D_{10}) (µm):	5.58	178.60	105.47	2.13	2.55
	(D_{90} - D_{10}) (µm):	1146.28	45585.36	22450.40	264.36	303.66
	(D_{75} / D_{25}) (µm):	1.60	75.31	40.84	1.55	1.58
	(D_{75} - D_{25}) (µm):	173.25	24648.50	11902.73	154.15	160.64
	D_{10} (Phi):	-0.48	-5.52	-4.50	1.01	1.00
	D_{50} (Phi):	1.46	0.88	1.23	1.51	1.53
	D_{90} (Phi):	2.00	1.96	2.22	2.10	2.35

	SAMPLE ID:	16	17	18	19	20
	(D_{90} / D_{10}) (Phi):	-4.15	-0.36	-0.49	2.09	2.35
	(D_{90} - D_{10}) (Phi):	2.48	7.48	6.72	1.09	1.35
	(D_{75} / D_{25}) (Phi):	1.61	-0.34	-0.48	1.53	1.55
	(D_{75} - D_{25}) (Phi):	0.68	6.23	5.35	0.63	0.66
	% GRAVEL (63000 - 2000 µm):	8.04	37.97	36.00	2.56	5.78
	% SAND (< 2000 - 63 µm):	91.18	60.94	63.11	96.51	93.30
	% MUD (< 63 µm):	0.78	1.09	0.90	0.93	0.92
	% V COARSE GRAVEL:	0.00	21.31	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	9.84	20.58	0.00	0.00
	% MEDIUM GRAVEL:	3.38	0.52	11.30	0.00	3.20
	% FINE GRAVEL:	1.74	2.73	2.11	0.89	1.53
	% V FINE GRAVEL:	2.93	3.58	2.00	1.67	1.05
	% V COARSE SAND:	3.78	5.07	0.83	2.31	0.98
	% COARSE SAND:	4.67	7.95	1.93	4.56	3.21
	% MEDIUM SAND:	73.64	40.55	48.80	79.57	75.27
	% FINE SAND:	9.03	7.19	11.22	9.99	13.62
	% V FINE SAND:	0.07	0.18	0.33	0.08	0.22
	% V COARSE SILT:	0.08	0.12	0.10	0.10	0.10
	% COARSE SILT:	0.08	0.12	0.10	0.10	0.10
	% MEDIUM SILT:	0.08	0.12	0.10	0.10	0.10
	% FINE SILT:	0.08	0.12	0.10	0.10	0.10

	SAMPLE ID:	16	17	18	19	20
	% V FINE SILT:	0.08	0.12	0.10	0.10	0.10
	% CLAY:	0.36	0.50	0.41	0.43	0.43

	SAMPLE ID:	21	22	23	24	25
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Well Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Well Sorted	Trimodal, Very Poorly Sorted	Unimodal, Poorly Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand	Slightly Gravelly Muddy Sand
	FOLK (BGS MODIFIED):	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand	Slightly Gravelly Muddy Sand
	SEDIMENT NAME:	Slightly Medium Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Slightly Fine Gravelly Medium Sand	Coarse Gravelly Medium Sand	Slightly Medium Gravelly Coarse Silty Medium Sand
METHOD OF	MEAN:	596.94	796.24	522.39	2898.03	584.79
MOMENTS	SORTING:	1543.89	811.08	887.89	6361.63	1694.18
Arithmetic (μm)	SKEWNESS:	7.01	4.23	6.87	2.65	6.17
	KURTOSIS:	51.34	25.23	58.85	8.70	40.89
METHOD OF	MEAN:	356.34	567.49	355.59	556.26	228.34
MOMENTS	SORTING:	2.03	2.18	2.03	5.06	3.80
Geometric (μm)	SKEWNESS:	-0.68	-1.87	-1.44	0.69	-1.43
	KURTOSIS:	31.20	19.19	26.08	4.44	9.03
METHOD OF	MEAN:	1.49	0.82	1.49	0.85	2.13
MOMENTS	SORTING:	1.02	1.13	1.02	2.34	1.93
Logarithmic (Phi)	SKEWNESS:	0.68	1.87	1.44	-0.69	1.43
	KURTOSIS:	31.20	19.19	26.08	4.44	9.03
FOLK AND	MEAN:	349.97	551.88	349.41	652.86	263.37

	SAMPLE ID:	21	22	23	24	25
WARD METHOD	SORTING:	1.31	1.82	1.50	4.78	2.43
(µm)	SKEWNESS:	-0.12	0.15	0.04	0.61	-0.46
	KURTOSIS:	0.97	0.94	1.59	2.57	2.11
FOLK AND	MEAN:	1.51	0.86	1.52	0.62	1.92
WARD METHOD	SORTING:	0.39	0.86	0.58	2.26	1.28
(Phi)	SKEWNESS:	0.12	-0.15	-0.04	-0.61	0.46
	KURTOSIS:	0.97	0.94	1.59	2.57	2.11
FOLK AND	MEAN:	Medium Sand	Coarse Sand	Medium Sand	Coarse Sand	Medium Sand
WARD METHOD	SORTING:	Well Sorted	Moderately Sorted	Moderately Well Sorted	Very Poorly Sorted	Poorly Sorted
(Description)	SKEWNESS:	Fine Skewed	Coarse Skewed	Symmetrical	Very Coarse Skewed	Very Fine Skewed
	KURTOSIS:	Mesokurtic	Mesokurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic
	D_{10} (µm):	255.83	279.06	224.78	153.77	75.97
	D_{50} (µm):	349.97	543.10	349.41	342.42	290.97
	D_{90} (µm):	478.76	1421.51	495.26	8523.32	471.79
	(D_{90} / D_{10}) (µm):	1.87	5.09	2.20	55.43	6.21
	(D_{90} - D_{10}) (µm):	222.93	1142.45	270.48	8369.56	395.82
	(D_{75} / D_{25}) (µm):	1.48	2.38	1.55	2.22	2.18
	(D_{75} - D_{25}) (µm):	137.95	494.43	153.57	274.16	212.73
	D_{10} (Phi):	1.06	-0.51	1.01	-3.09	1.08
	D_{50} (Phi):	1.51	0.88	1.52	1.55	1.78
	D_{90} (Phi):	1.97	1.84	2.15	2.70	3.72

	SAMPLE ID:	21	22	23	24	25
	(D_{90} / D_{10}) (Phi):	1.85	-3.63	2.12	-0.87	3.43
	(D_{90} - D_{10}) (Phi):	0.90	2.35	1.14	5.79	2.63
	(D_{75} / D_{25}) (Phi):	1.46	6.41	1.52	2.15	1.83
	(D_{75} - D_{25}) (Phi):	0.57	1.25	0.63	1.15	1.12
	% GRAVEL (63000 - 2000 µm):	2.48	4.10	2.93	20.73	3.70
	% SAND (< 2000 - 63 µm):	96.67	95.16	96.22	77.91	86.61
	% MUD (< 63 µm):	0.85	0.74	0.84	1.36	9.68
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	7.41	0.00
	% MEDIUM GRAVEL:	1.71	0.00	0.12	2.85	1.96
	% FINE GRAVEL:	0.22	1.40	1.74	7.02	0.47
	% V FINE GRAVEL:	0.55	2.70	1.08	3.45	1.27
	% V COARSE SAND:	0.46	11.98	1.14	2.12	0.58
	% COARSE SAND:	1.52	38.51	4.84	2.05	0.91
	% MEDIUM SAND:	88.48	42.08	79.48	45.96	57.37
	% FINE SAND:	6.11	2.56	10.50	27.30	26.63
	% V FINE SAND:	0.10	0.03	0.27	0.49	1.13
	% V COARSE SILT:	0.09	0.08	0.09	0.15	1.81
	% COARSE SILT:	0.09	0.08	0.09	0.15	1.85
	% MEDIUM SILT:	0.09	0.08	0.09	0.15	1.81
	% FINE SILT:	0.09	0.08	0.09	0.15	1.69

	SAMPLE ID:	21	22	23	24	25
	% V FINE SILT:	0.09	0.08	0.09	0.15	1.21
	% CLAY:	0.39	0.34	0.39	0.63	1.31

	SAMPLE ID:	26	27	28	29	30
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted
	FOLK (1954 ORIGINAL):	Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Gravelly Sand
	FOLK (BGS MODIFIED):	Gravelly Sand	Sand	Sand	Sand	Gravelly Sand
	SEDIMENT NAME:	Medium Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Slightly Very Fine Gravelly Medium Sand	Slightly Very Fine Gravelly Coarse Sand	Fine Gravelly Medium Sand
METHOD OF	MEAN:	716.22	305.12	340.09	748.76	730.26
MOMENTS	SORTING:	2026.95	138.68	291.20	408.18	1425.28
Arithmetic (µm)	SKEWNESS:	4.92	5.40	14.70	3.54	5.09
	KURTOSIS:	26.73	81.66	268.15	31.35	33.18
METHOD OF	MEAN:	231.89	257.76	280.46	616.53	382.23
MOMENTS	SORTING:	3.96	1.81	1.86	1.88	2.74
Geometric (µm)	SKEWNESS:	-0.80	-4.56	-4.48	-4.16	-1.08
	KURTOSIS:	7.95	37.09	38.10	38.63	13.79
METHOD OF	MEAN:	2.11	1.96	1.83	0.70	1.39
MOMENTS	SORTING:	1.99	0.86	0.89	0.91	1.46
Logarithmic (Phi)	SKEWNESS:	0.80	4.56	4.48	4.16	1.08
	KURTOSIS:	7.95	37.09	38.10	38.63	13.79
FOLK AND	MEAN:	249.36	266.22	287.84	612.42	366.20

	SAMPLE ID:	26	27	28	29	30
WARD METHOD	SORTING:	2.99	1.54	1.51	1.64	1.91
(µm)	SKEWNESS:	-0.08	-0.15	-0.25	-0.09	0.25
	KURTOSIS:	2.54	0.76	0.90	1.19	2.43
FOLK AND	MEAN:	2.00	1.91	1.80	0.71	1.45
WARD METHOD	SORTING:	1.58	0.62	0.59	0.71	0.93
(Phi)	SKEWNESS:	0.08	0.15	0.25	0.09	-0.25
	KURTOSIS:	2.54	0.76	0.90	1.19	2.43
FOLK AND	MEAN:	Fine Sand	Medium Sand	Medium Sand	Coarse Sand	Medium Sand
WARD METHOD	SORTING:	Poorly Sorted	Moderately Well Sorted	Moderately Well Sorted	Moderately Sorted	Moderately Sorted
(Description)	SKEWNESS:	Symmetrical	Fine Skewed	Fine Skewed	Symmetrical	Coarse Skewed
	KURTOSIS:	Very Leptokurtic	Platykurtic	Mesokurtic	Leptokurtic	Very Leptokurtic
	D_{10} (µm):	120.48	145.39	154.72	315.16	192.06
	D_{50} (µm):	251.84	278.49	307.18	649.29	357.33
	D_{90} (µm):	490.62	451.13	460.62	1108.01	917.46
	(D_{90} / D_{10}) (µm):	4.07	3.10	2.98	3.52	4.78
	(D_{90} - D_{10}) (µm):	370.14	305.74	305.90	792.85	725.40
	(D_{75} / D_{25}) (µm):	2.35	1.99	1.77	1.81	1.66
	(D_{75} - D_{25}) (µm):	219.63	187.57	172.59	383.54	183.59
	D_{10} (Phi):	1.03	1.15	1.12	-0.15	0.12
	D_{50} (Phi):	1.99	1.84	1.70	0.62	1.48
	D_{90} (Phi):	3.05	2.78	2.69	1.67	2.38

	SAMPLE ID:	26	27	28	29	30
	(D_{90} / D_{10}) (Phi):	2.97	2.42	2.41	-11.26	19.15
	$(D_{90} - D_{10})$ (Phi):	2.03	1.63	1.57	1.81	2.26
	(D_{75} / D_{25}) (Phi):	1.89	1.71	1.62	4.91	1.66
	$(D_{75} - D_{25})$ (Phi):	1.23	0.99	0.83	0.85	0.73
	% GRAVEL (63000 - 2000 µm):	5.41	0.04	0.38	0.93	6.75
	% SAND (< 2000 - 63 µm):	85.99	98.97	98.54	98.43	91.51
	% MUD (< 63 µm):	8.60	0.99	1.08	0.65	1.74
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	2.72	0.00	0.00	0.00	0.70
	% FINE GRAVEL:	1.27	0.00	0.18	0.08	3.03
	% V FINE GRAVEL:	1.41	0.04	0.20	0.85	3.02
	% V COARSE SAND:	1.67	0.33	0.21	10.65	2.26
	% COARSE SAND:	1.79	1.10	1.31	61.67	7.94
	% MEDIUM SAND:	41.57	57.48	68.43	25.16	68.18
	% FINE SAND:	39.48	39.71	28.41	0.91	12.79
	% V FINE SAND:	1.48	0.35	0.18	0.03	0.34
	% V COARSE SILT:	1.17	0.11	0.12	0.07	0.19
	% COARSE SILT:	1.72	0.11	0.12	0.07	0.19
	% MEDIUM SILT:	1.98	0.11	0.12	0.07	0.19
	% FINE SILT:	1.65	0.11	0.12	0.07	0.19

	SAMPLE ID:	26	27	28	29	30
	% V FINE SILT:	1.04	0.11	0.12	0.07	0.19
	% CLAY:	1.04	0.46	0.50	0.30	0.80

	SAMPLE ID:	31	32	33	34	35
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Well Sorted	Trimodal, Very Poorly Sorted	Unimodal, Moderately Sorted	Unimodal, Poorly Sorted	Bimodal, Poorly Sorted
	FOLK (1954 ORIGINAL):	Slightly Gravelly Sand	Gravelly Muddy Sand	Slightly Gravelly Sand	Gravelly Sand	Gravelly Sand
	FOLK (BGS MODIFIED):	Sand	Gravelly Muddy Sand	Slightly Gravelly Sand	Gravelly Sand	Gravelly Sand
	SEDIMENT NAME:	Slightly Very Fine Gravelly Medium Sand	Medium Gravelly Very Coarse Silty Medium Sand	Slightly Very Fine Gravelly Medium Sand	Medium Gravelly Medium Sand	Coarse Gravelly Medium Sand
METHOD OF	MEAN:	552.70	1219.50	696.07	2051.91	3133.77
MOMENTS	SORTING:	353.94	2905.50	933.73	4911.88	7218.46
Arithmetic (μm)	SKEWNESS:	6.38	3.22	7.70	3.34	2.41
	KURTOSIS:	76.48	11.91	79.95	13.76	6.97
METHOD OF	MEAN:	453.30	225.62	494.65	514.90	566.96
MOMENTS	SORTING:	1.88	7.10	2.08	4.01	4.76
Geometric (μm)	SKEWNESS:	-4.30	-0.48	-1.84	0.61	0.88
	KURTOSIS:	39.86	3.84	23.17	6.66	5.54
METHOD OF	MEAN:	1.14	2.15	1.02	0.96	0.82
MOMENTS	SORTING:	0.91	2.83	1.06	2.00	2.25
Logarithmic (Phi)	SKEWNESS:	4.30	0.48	1.84	-0.61	-0.88
	KURTOSIS:	39.86	3.84	23.17	6.66	5.54
FOLK AND	MEAN:	465.48	201.47	486.74	479.61	472.30

	SAMPLE ID:	31	32	33	34	35
WARD METHOD	SORTING:	1.55	7.16	1.72	2.89	3.33
(µm)	SKEWNESS:	0.19	-0.21	0.28	0.55	0.50
	KURTOSIS:	0.78	2.15	0.97	3.29	2.43
FOLK AND	MEAN:	1.10	2.31	1.04	1.06	1.08
WARD METHOD	SORTING:	0.63	2.84	0.78	1.53	1.74
(Phi)	SKEWNESS:	-0.19	0.21	-0.28	-0.55	-0.50
	KURTOSIS:	0.78	2.15	0.97	3.29	2.43
FOLK AND	MEAN:	Medium Sand	Fine Sand	Medium Sand	Medium Sand	Medium Sand
WARD METHOD	SORTING:	Moderately Well Sorted	Very Poorly Sorted	Moderately Sorted	Poorly Sorted	Poorly Sorted
(Description)	SKEWNESS:	Coarse Skewed	Fine Skewed	Coarse Skewed	Very Coarse Skewed	Very Coarse Skewed
	KURTOSIS:	Platykurtic	Very Leptokurtic	Mesokurtic	Extremely Leptokurtic	Very Leptokurtic
	D_{10} (µm):	275.95	14.16	274.37	194.62	173.26
	D_{50} (µm):	438.65	296.87	454.44	370.87	379.25
	D_{90} (µm):	873.34	2187.62	969.10	6150.21	16407.96
	(D_{90} / D_{10}) (µm):	3.16	154.46	3.53	31.60	94.70
	(D_{90} - D_{10}) (µm):	597.39	2173.46	694.73	5955.59	16234.71
	(D_{75} / D_{25}) (µm):	1.99	4.14	2.15	1.75	2.35
	(D_{75} - D_{25}) (µm):	324.20	400.81	382.02	209.20	366.61
	D_{10} (Phi):	0.20	-1.13	0.05	-2.62	-4.04

	SAMPLE ID:	31	32	33	34	35
	D_{50} (Phi):	1.19	1.75	1.14	1.43	1.40
	D_{90} (Phi):	1.86	6.14	1.87	2.36	2.53
	(D_{90} / D_{10}) (Phi):	9.51	-5.44	41.20	-0.90	-0.63
	(D_{90} - D_{10}) (Phi):	1.66	7.27	1.82	4.98	6.57
	(D_{75} / D_{25}) (Phi):	2.61	3.23	3.27	1.78	2.90
	(D_{75} - D_{25}) (Phi):	0.99	2.05	1.11	0.80	1.23
	% GRAVEL (63000 - 2000 µm):	0.71	10.34	3.27	14.24	14.35
	% SAND (< 2000 - 63 µm):	98.44	67.59	95.99	84.34	84.31
	% MUD (< 63 µm):	0.85	22.07	0.74	1.42	1.34
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	3.37	10.39
	% MEDIUM GRAVEL:	0.00	6.22	0.33	5.42	1.98
	% FINE GRAVEL:	0.11	1.50	0.87	3.20	0.41
	% V FINE GRAVEL:	0.60	2.63	2.07	2.25	1.58
	% V COARSE SAND:	2.32	3.72	5.19	2.28	2.45
	% COARSE SAND:	35.67	11.90	33.96	6.65	12.63
	% MEDIUM SAND:	59.82	31.98	54.95	62.24	51.58
	% FINE SAND:	0.60	17.61	1.81	12.70	16.99
	% V FINE SAND:	0.03	2.40	0.07	0.46	0.66
	% V COARSE SILT:	0.09	5.97	0.08	0.15	0.14
	% COARSE SILT:	0.09	5.51	0.08	0.15	0.14

	SAMPLE ID:	31	32	33	34	35
	% MEDIUM SILT:	0.09	4.16	0.08	0.15	0.14
	% FINE SILT:	0.09	2.66	0.08	0.15	0.14
	% V FINE SILT:	0.09	1.67	0.08	0.15	0.14
	% CLAY:	0.39	2.10	0.34	0.66	0.62

	SAMPLE ID:	36	37	38	39
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted
	FOLK (1954 ORIGINAL):	Gravelly Sand	Gravelly Sand	Gravelly Sand	Slightly Gravelly Muddy Sand
	FOLK (BGS MODIFIED):	Gravelly Sand	Gravelly Sand	Gravelly Sand	Muddy Sand
	SEDIMENT NAME:	Fine Gravelly Medium Sand	Fine Gravelly Coarse Sand	Medium Gravelly Medium Sand	Slightly Fine Gravelly Very Coarse Silty Fine Sand
METHOD OF	MEAN:	1048.88	1992.97	1984.39	105.68
MOMENTS	SORTING:	2087.37	2888.69	3483.18	183.47
Arithmetic (μm)	SKEWNESS:	3.74	2.26	2.19	23.88
	KURTOSIS:	17.80	7.60	6.37	760.25
METHOD OF	MEAN:	417.72	791.24	567.58	42.59
MOMENTS	SORTING:	3.49	4.31	5.19	5.41
Geometric (μm)	SKEWNESS:	-0.52	-0.98	-0.60	-0.98
	KURTOSIS:	8.33	6.82	5.58	3.04
METHOD OF	MEAN:	1.26	0.34	0.82	4.55
MOMENTS	SORTING:	1.80	2.11	2.38	2.43
Logarithmic (Phi)	SKEWNESS:	0.52	0.98	0.60	0.98
	KURTOSIS:	8.33	6.82	5.58	3.04
FOLK AND	MEAN:	413.25	921.07	723.08	43.56
WARD METHOD	SORTING:	2.61	3.55	4.14	5.28

	SAMPLE ID:	36	37	38	39
(µm)	SKEWNESS:	0.36	0.29	0.45	-0.54
	KURTOSIS:	2.35	0.96	1.53	0.85
FOLK AND	MEAN:	1.27	0.12	0.47	4.52
WARD METHOD	SORTING:	1.39	1.83	2.05	2.40
(Phi)	SKEWNESS:	-0.36	-0.29	-0.45	0.54
	KURTOSIS:	2.35	0.96	1.53	0.85
FOLK AND	MEAN:	Medium Sand	Coarse Sand	Coarse Sand	Very Coarse Silt
WARD METHOD	SORTING:	Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted
(Description)	SKEWNESS:	Very Coarse Skewed	Coarse Skewed	Very Coarse Skewed	Very Fine Skewed
	KURTOSIS:	Very Leptokurtic	Mesokurtic	Very Leptokurtic	Platykurtic
	D_{10} (µm):	158.76	253.56	156.54	2.94
	D_{50} (µm):	358.73	672.72	428.52	80.18
	D_{90} (µm):	2513.53	5796.26	7261.32	215.47
	(D_{90} / D_{10}) (µm):	15.83	22.86	46.39	73.23
	(D_{90} - D_{10}) (µm):	2354.77	5542.70	7104.78	212.53
	(D_{75} / D_{25}) (µm):	1.91	5.74	3.67	11.67
	(D_{75} - D_{25}) (µm):	235.51	1746.22	764.80	142.89
	D_{10} (Phi):	-1.33	-2.54	-2.86	2.21
	D_{50} (Phi):	1.48	0.57	1.22	3.64
	D_{90} (Phi):	2.66	1.98	2.68	8.41
	(D_{90} / D_{10}) (Phi):	-2.00	-0.78	-0.94	3.80

	SAMPLE ID:	36	37	38	39
	(D_{90} - D_{10}) (Phi):	3.98	4.51	5.54	6.19
	(D_{75} / D_{25}) (Phi):	1.92	-1.33	-25.14	2.32
	(D_{75} - D_{25}) (Phi):	0.93	2.52	1.88	3.54
	% GRAVEL (63000 - 2000 µm):	11.49	25.80	19.69	0.07
	% SAND (< 2000 - 63 µm):	86.38	71.84	76.72	58.10
	% MUD (< 63 µm):	2.13	2.36	3.58	41.83
	% V COARSE GRAVEL:	0.00	0.00	0.00	0.00
	% COARSE GRAVEL:	0.00	0.00	0.00	0.00
	% MEDIUM GRAVEL:	2.14	4.96	9.11	0.00
	% FINE GRAVEL:	4.83	10.84	6.40	0.07
	% V FINE GRAVEL:	4.51	10.00	4.19	0.00
	% V COARSE SAND:	4.36	7.17	5.72	0.02
	% COARSE SAND:	8.42	29.77	15.03	0.21
	% MEDIUM SAND:	53.71	27.83	42.94	2.76
	% FINE SAND:	18.35	4.93	9.80	32.38
	% V FINE SAND:	1.54	2.15	3.24	22.74
	% V COARSE SILT:	0.23	0.25	0.39	8.96
	% COARSE SILT:	0.23	0.25	0.39	6.41
	% MEDIUM SILT:	0.23	0.25	0.39	6.54
	% FINE SILT:	0.23	0.25	0.39	7.49
	% V FINE SILT:	0.23	0.25	0.39	5.93

	SAMPLE ID:	36	37	38	39
	% CLAY:	0.98	1.09	1.65	6.50

Q. RAW DATA FROM FAUNA

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
PORIFERA	558												
Cliona (agg.)	132026							P	P			P	P
Sertularia	117234												
Nemertesia	117195												
Campanulariidae	1606												
Clytia	117030												
Alcyonidium parasiticum	111604												
Membraniporoidea	153579			P							P		P
Membranipora tenuis	111412										P		
Conopeum reticulum	111351										P		P
Electra monostachys	111354												P
Electra pilosa	111355												
Aspidelectra melolontha	111350	P	P	P			P	P	P	P	P	P	P
Callopora	110851												
Cribrilinidae	110742												
Puellina	110897												
Escharella	110965												
Escharella immersa	111484												
Escharina johnstoni	111518												
Schizomavella	110829												

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Schizomavella auriculata/cuspidata	110829												
Verruca stroemia	106257												
ASCIDIACEA (juv.)	1839												
Cerianthus lloydii	283798		1										
Edwardsiidae (juv)	100665												
NEMERTEA	152391	1	5						1				1
SIPUNCULA (juv)	1268		2										
Golfingia elongata	175026		1										
Nephasoma minutum	136060		3										
Pisione remota	130707												
Harmothoe	129491												
Malmgreniella darbouxi	130812		4										
Malmgreniella castanea	130811												
Harmothoe glabra	571832			1									
Pholoe baltica	130599		9										1
Phyllodocidae	931		1										
Eteone longa (agg)	130616		1										
Mysta picta	147026												
Eulalia mustela	130631												
Eumida	129446		2										
Glycera alba	130116			1									1
Glycera lapidum	130123		3										

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Glycera oxycephala	130126						1						
Goniada (juv)	129300		1										
Goniada maculata	130140			4	3					1		1	
Sphaerodorum gracilis	131100		1										
Podarkeopsis capensis	130195			1									
Syllis garciai	131431												
Syllis gracilis	131435												
Syllis pontxioi	196003												
Exogone verugera	131307												
Sphaerosyllis bulbosa	131379												
Eunereis longissima	130375		2										
Aglaophamus agilis	130343										1		
Nephtys	129370												
Nephtys (juv)	129370									1			
Nephtys caeca	130355		1										
Nephtys cirrosa	130357	2			1	3	1	2	2	6	2	2	1
Nephtys hombergii	130359												
Nephtys longosetosa	130364												
Marphysa bellii	130072		1									1	
Nematonereis unicornis	594957												
Lumbrineris cingulata	130240		8										
Protodorvillea kefersteini	130041												

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Schistomeringos rudolphii	154127		1										
Scoloplos armiger	334772			1									
Paradoneis lyra	130585												
Poecilochaetus serpens	130711												
Aonides oxycephala	131106		2										
Aonides paucibranchiata	131107												
Atherospio guillei	478336		4										
Dipolydora coeca	131117												
Dipolydora caulleryi	131116												
Pseudopolydora	129621		1										
Scolelepis	129623												
Scolelepis bonnieri	131171							2					
Scolelepis squamata	157566	1											
Spio armata (agg)	131180												
Spiophanes	129626												1
Spiophanes bombyx	131187	1											
Magelona	129341												
Magelona johnstoni	130269												
Caulleriella alata	129943												
Chaetozone	129242												
Chaetozone christiei	152217	2					1			1			
Caulleriella zetlandica	129948												

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Mediomastus fragilis	129892		5										
Notomastus	129220		2										
Clymenura	129346												
Ophelia	129413												
Ophelia (juv)	129413												
Ophelia borealis	130491	3			1	1	4	1	4	4	1	1	4
Travisia forbesii	130512												
Lagis koreni	152367												
Sabellaria spinulosa	130867		1										2
Lanice conchilega	131495												
Loimia medusa	131499		2										
Lysilla nivea	131501		1										
Polycirrus	129710		7										
Polycirrus medusa	131531								1				
Gastrosaccus spinifer	120020								1		1		
Pontocrates altamarinus	102916												
Urothoe	101789					1							
Urothoe brevicornis	103226				1	1					2		
Urothoe elegans	103228												
Urothoe marina	103233												
Urothoe poseidonis	103235			1	2								
Nototropis swammerdamei	488966												

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Ampelisca spinipes	101928		1										
Bathyporeia	101742						1						
Bathyporeia elegans	103058				3								
Bathyporeia guilliamsoniana	103060												
Bathyporeia tenuipes	103076												
Melitidae	101397							2					
Abludomelita obtusata	102788		4					2					
Cheirocratus (female)	101669												
Cheirocratus intermedius	102795		1										
Maerella tenuimana	102831												
Unciola crenatipalma	102057												
Phtisica marina	101864												
Eurydice spinigera	148637									1			
Bopyridae	1195		1										
Monopseudocuma gilsoni	422916												
Crangonidae	106782												
Callianassa subterranea	107729		8	4									
Upogebia deltaura	107739		2										
Paguridae (juv)	106738												
Pisidia longicornis	107188							1					
Atelecyclus rotundatus	107273		1										
Thia scutellata	107281												

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Leptochiton asellus	140199												
Gibbula cineraria (juv)	141782												
Euspira nitida	151894				1		1					1	
BIVALVIA	105												
Nucula (juv)	138262												
Glycymeris glycymeris	140025												
Diplodonta rotundata	141883		3										
Lepton squamosum	140218												
Kurtiella bidentata	345281		44										
Tellimya ferruginosa	146952		1		7			1					
Goodallia triangularis	138831												
Spisula	138159												
Spisula elliptica	140300												
Angulus fabula	152829				26								
Moerella donacina	147021		1										
Abra (juv)	138474												
Abra prismatica	141436												
Thracia phaseolina	152378		1										
Phoronis	128545		30	9									
ASTEROIDEA (juv)	123080		2										
OPHIUROIDEA (juv)	123084												
Amphiuridae	123206		1										

Species Name	Aphia ID	1	2	3	4	5	6	7	8	9	10	11	12
Amphipholis squamata	125064		1										
Ophiuridae	123200		9										
Ophiuridae (juv)	123200		6	1					1	2			1
Ophiura	123574		2										
Ophiura albida	124913		3								1	1	
Ophiura ophiura	124929												
Ophiocten affinis	124850										1		
Echinocyamus pusillus	124273		32										1
Spatangus purpureus	124418												
Echinocardium	123426					1							
Echinocardium cordatum	124392				1		1						
ENTEROPNEUSTA (?)	1820												

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
PORIFERA	558	P				P							
Cliona (agg.)	132026						P		P			P	P
Sertularia	117234												
Nemertesia	117195												P
Campanulariidae	1606												
Clytia	117030												P
Alcyonidium parasiticum	111604				P								
Membraniporoidea	153579	P				P			P				
Membranipora tenuis	111412												
Conopeum reticulum	111351						P		P	P			P
Electra monostachys	111354					P							P
Electra pilosa	111355												
Aspidelectra melolontha	111350	P	P	P	P	P	P	P	P	P		P	P
Callopora	110851												
Cribrilinidae	110742												
Puellina	110897												
Escharella	110965												
Escharella immersa	111484												
Escharina johnstoni	111518												
Schizomavella	110829												
Schizomavella auriculata/cuspidata	110829												
Verruca stroemia	106257												

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
ASCIDIACEA (juv.)	1839												
Cerianthus lloydii	283798												
Edwardsiidae (juv)	100665												
NEMERTEA	152391		3		1			1	1			1	2
SIPUNCULA (juv)	1268												
Golfingia elongata	175026												
Nephasoma minutum	136060												
Pisione remota	130707		3								2		
Harmothoe	129491												
Malmgreniella darbouxi	130812												
Malmgreniella castanea	130811												
Harmothoe glabra	571832												
Pholoe baltica	130599												
Phyllodocidae	931												
Eteone longa (agg)	130616												
Mysta picta	147026												
Eulalia mustela	130631						1						
Eumida	129446												
Glycera alba	130116												
Glycera lapidum	130123		1										
Glycera oxycephala	130126				1	1			1	1		1	
Goniada (juv)	129300												

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Goniada maculata	130140	2											
Sphaerodorum gracilis	131100												
Podarkeopsis capensis	130195												
Syllis garciai	131431												
Syllis gracilis	131435												
Syllis pontxioi	196003												
Exogone verugera	131307												
Sphaerosyllis bulbosa	131379												
Eunereis longissima	130375												
Aglaophamus agilis	130343												
Nephtys	129370												
Nephtys (juv)	129370		1	2		1			1				
Nephtys caeca	130355												
Nephtys cirrosa	130357	8	1	5	1	2	1	2	3	2		4	2
Nephtys hombergii	130359												
Nephtys longosetosa	130364			2							1		
Marphysa bellii	130072												2
Nematonereis unicornis	594957												
Lumbrineris cingulata	130240												1
Protodorvillea kefersteini	130041												
Schistomeringos rudolphii	154127												
Scoloplos armiger	334772			4									

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Paradoneis lyra	130585												
Poecilochaetus serpens	130711												
Aonides oxycephala	131106												
Aonides paucibranchiata	131107		2						1				
Atherospio guillei	478336												
Dipolydora coeca	131117												
Dipolydora caulleryi	131116												
Pseudopolydora	129621												
Scolelepis	129623												
Scolelepis bonnieri	131171								1				
Scolelepis squamata	157566	1		2			2		1				
Spio armata (agg)	131180												
Spiophanes	129626												
Spiophanes bombyx	131187												1
Magelona	129341												
Magelona johnstoni	130269												
Caulleriella alata	129943												
Chaetozone	129242												
Chaetozone christiei	152217												1
Caulleriella zetlandica	129948												
Mediomastus fragilis	129892												
Notomastus	129220									1			

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Clymenura	129346												
Ophelia	129413												
Ophelia (juv)	129413												
Ophelia borealis	130491	5		18	1	9		1	7	2		3	2
Travisia forbesii	130512					1							
Lagis koreni	152367												
Sabellaria spinulosa	130867												
Lanice conchilega	131495												
Loimia medusa	131499												1
Lysilla nivea	131501												
Polycirrus	129710											2	
Polycirrus medusa	131531											1	
Gastrosaccus spinifer	120020		1					1					
Pontocrates altamarinus	102916												
Urothoe	101789	1							1				
Urothoe brevicornis	103226	4											
Urothoe elegans	103228												
Urothoe marina	103233												
Urothoe poseidonis	103235												
Nototropis swammerdamei	488966		1										
Ampelisca spinipes	101928												
Bathyporeia	101742						1						

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Bathyporeia elegans	103058							1	3	1			
Bathyporeia guilliamsoniana	103060					1			1				
Bathyporeia tenuipes	103076											2	
Melitidae	101397												
Abludomelita obtusata	102788												
Cheirocratus (female)	101669												
Cheirocratus intermedius	102795												
Maerella tenuimana	102831												
Unciola crenatipalma	102057												
Phtisica marina	101864												1
Eurydice spinigera	148637		1										
Bopyridae	1195												
Monopseudocuma gilsoni	422916		1										
Crangonidae	106782					1							
Callianassa subterranea	107729												
Upogebia deltaura	107739												
Paguridae (juv)	106738		1										
Pisidia longicornis	107188												
Atelecyclus rotundatus	107273												
Thia scutellata	107281			1		1							
Leptochiton asellus	140199												
Gibbula cineraria (juv)	141782												

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Euspira nitida	151894		1	1							1		2
BIVALVIA	105												
Nucula (juv)	138262												
Glycymeris glycymeris	140025												
Diplodonta rotundata	141883												1
Lepton squamosum	140218												
Kurtiella bidentata	345281	1											
Tellimya ferruginosa	146952												
Goodallia triangularis	138831												
Spisula	138159									1			
Spisula elliptica	140300												
Angulus fabula	152829												
Moerella donacina	147021												
Abra (juv)	138474			1			1						
Abra prismatica	141436					1							
Thracia phaseolina	152378												
Phoronis	128545												
ASTEROIDEA (juv)	123080												
OPHIUROIDEA (juv)	123084											1	
Amphiuridae	123206												
Amphipholis squamata	125064												
Ophiuridae	123200												

Species Name	Aphia ID	13	14	15	16	17	18	19	20	21	22	23	24
Ophiuridae (juv)	123200		2	2			2	1	12	2			1
Ophiura	123574												
Ophiura albida	124913						2		1				
Ophiura ophiura	124929												
Ophiocten affinis	124850												
Echinocyamus pusillus	124273			4			1			1			3
Spatangus purpureus	124418												
Echinocardium	123426												
Echinocardium cordatum	124392												
ENTEROPNEUSTA (?)	1820												

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
PORIFERA	558															
Cliona (agg.)	132026											P			P	
Sertularia	117234														P	P
Nemertesia	117195															
Campanulariidae	1606															
Clytia	117030															
Alcyonidium parasiticum	111604															
Membraniporoidea	153579	P	P													
Membranipora tenuis	111412															

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Conopeum reticulum	111351						P									
Electra monostachys	111354															
Electra pilosa	111355								P						P	
Aspidelectra melolontha	111350	P	P	P	P		P		P	P	P	P		P	P	
Callopora	110851													P		
Cribrilinidae	110742							P								
Puellina	110897								P					P		
Escharella	110965											P				
Escharella immersa	111484														P	
Escharina johnstoni	111518													P		
Schizomavella	110829	P										P			P	
Schizomavella auriculata/cuspidata	110829														P	
Verruca stroemia	106257														1	
ASCIDIACEA (juv.)	1839														1	
Cerianthus lloydii	283798															
Edwardsiidae (juv)	100665											1				
NEMERTEA	152391	1			1				4			3	5	1	1	1
SIPUNCULA (juv)	1268														4	
Golfingia elongata	175026											7				
Nephasoma minutum	136060															
Pisione remota	130707													1		
Harmothoe	129491														1	

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Malmgreniella darbouxi	130812															
Malmgreniella castanea	130811						1									
Harmothoe glabra	571832															
Pholoe baltica	130599											2				
Phyllodocidae	931															
Eteone longa (agg)	130616															
Mysta picta	147026											2				
Eulalia mustela	130631								1							
Eumida	129446															
Glycera alba	130116															
Glycera lapidum	130123								3			2				
Glycera oxycephala	130126						2	1					1	1		
Goniada (juv)	129300															
Goniada maculata	130140		1												1	2
Sphaerodorum gracilis	131100															
Podarkeopsis capensis	130195															
Syllis garciai	131431												4			
Syllis gracilis	131435											18				
Syllis pontxioi	196003											1				
Exogone verugera	131307														1	
Sphaerosyllis bulbosa	131379													5		
Eunereis longissima	130375											1		2		

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Aglaophamus agilis	130343															
Nephtys	129370	1														
Nephtys (juv)	129370															
Nephtys caeca	130355														1	
Nephtys cirrosa	130357		5	3	3	1	4	2			2					
Nephtys hombergii	130359															1
Nephtys longosetosa	130364															
Marphysa bellii	130072		1									1				
Nematonereis unicornis	594957											1				
Lumbrineris cingulata	130240								5	1		4	1			
Protodorvillea kefersteini	130041													3		
Schistomeringos rudolphii	154127											1				
Scoloplos armiger	334772		1		1											
Paradoneis lyra	130585											5			4	
Poecilochaetus serpens	130711								1			1				
Aonides oxycephala	131106															
Aonides paucibranchiata	131107								1			1				
Atherospio guillei	478336															
Dipolydora coeca	131117												1			
Dipolydora caulleryi	131116											2				
Pseudopolydora	129621															
Scolelepis	129623				1	1										

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Scolelepis bonnieri	131171				1											
Scolelepis squamata	157566			1												
Spio armata (agg)	131180										1					
Spiophanes	129626															
Spiophanes bombyx	131187										1					
Magelona	129341															
Magelona johnstoni	130269	2														
Caulleriella alata	129943								3				1			
Chaetozone	129242															
Chaetozone christiei	152217	1			2								1			
Caulleriella zetlandica	129948												1			
Mediomastus fragilis	129892															
Notomastus	129220				1									16		31
Clymenura	129346								2			2			2	
Ophelia	129413							1								
Ophelia (juv)	129413															
Ophelia borealis	130491	1		1	5			1	1	5	4	7	1			
Travisia forbesii	130512															
Lagis koreni	152367								1						1	
Sabellaria spinulosa	130867											15	2			
Lanice conchilega	131495								2						1	
Loimia medusa	131499															

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Lysilla nivea	131501											3		1		
Polycirrus	129710											1				
Polycirrus medusa	131531			1	1											
Gastrosaccus spinifer	120020							1								
Pontocrates altamarinus	102916											1				
Urothoe	101789							1			1	1				
Urothoe brevicornis	103226	1	4	1	6			2			1					
Urothoe elegans	103228								1			1				
Urothoe marina	103233								4							
Urothoe poseidonis	103235		2													
Nototropis swammerdamei	488966															
Ampelisca spinipes	101928														5	
Bathyporeia	101742	1														
Bathyporeia elegans	103058	4	1	1	3											
Bathyporeia guilliamsoniana	103060															
Bathyporeia tenuipes	103076															
Melitidae	101397															
Abludomelita obtusata	102788															
Cheirocratus (female)	101669															
Cheirocratus intermedius	102795															
Maerella tenuimana	102831															
Unciola crenatipalma	102057											2	1			

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Phtisica marina	101864															
Eurydice spinigera	148637															
Bopyridae	1195															
Monopseudocuma gilsoni	422916															
Crangonidae	106782															
Callianassa subterranea	107729								1							
Upogebia deltaura	107739															
Paguridae (juv)	106738															
Pisidia longicornis	107188															
Atelecyclus rotundatus	107273															
Thia scutellata	107281					1										
Leptochiton asellus	140199														2	
Gibbula cineraria (juv)	141782														1	
Euspira nitida	151894	1														
BIVALVIA	105								1							
Nucula (juv)	138262														1	
Glycymeris glycymeris	140025													1		
Diplodonta rotundata	141883															
Lepton squamosum	140218											1				
Kurtiella bidentata	345281										1					1
Tellimya ferruginosa	146952		2													
Goodallia triangularis	138831							21	2	11						

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Spisula	138159															
Spisula elliptica	140300										2		1		1	
Angulus fabula	152829															
Moerella donacina	147021									1						
Abra (juv)	138474														1	
Abra prismatica	141436															
Thracia phaseolina	152378															
Phoronis	128545															
ASTEROIDEA (juv)	123080															
OPHIUROIDEA (juv)	123084	1										2				
Amphiuridae	123206											1				
Amphipholis squamata	125064											2				
Ophiuridae	123200		1													
Ophiuridae (juv)	123200	3	5	2												
Ophiura	123574															
Ophiura albida	124913	1									5				4	
Ophiura ophiura	124929															
Ophiocten affinis	124850															
Echinocyamus pusillus	124273	1	1						2			2	2			
Spatangus purpureus	124418						1									
Echinocardium	123426															
Echinocardium cordatum	124392		2													

Species Name	Aphia ID	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
ENTEROPNEUSTA (?)	1820											1	1			

R. BIOMASS

TaxonName	1	2	3	4	5	6	7	8	9	10
Other taxa	0.0035	0.0714	0.1480	0.0000	0.0000	0.0000	0.0000	0.0061	0.0000	0.0000
Crustaceans	0.0000	8.4378	0.6044	0.0094	0.0005	0.0005	0.0036	0.0147	0.0069	0.0186
Echinoderms	0.0000	0.8814	0.0003	12.0542	1.8580	11.1260	0.0022	0.0054	0.0015	0.0356
Molluscs	0.0000	1.9588	0.0000	5.6484	0.0000	0.0147	0.0037	0.0000	0.0000	0.0000
Polychaetes	0.0340	5.6604	0.0672	0.0289	0.0075	0.6274	0.0842	0.0632	0.2039	0.0839

TaxonName	11	12	13	14	15	16	17	18	19	20
Other taxa	0.0000	0.0720	0.0000	0.0847	0.0000	0.0672	0.0000	0.0000	0.0223	0.0028
Crustaceans	0.0053	0.0971	0.0836	0.0907	0.1176	0.0739	0.9786	0.0012	0.0189	0.0042
Echinoderms	0.0285	0.0821	0.0000	0.0682	0.1962	0.0000	0.0000	0.3259	0.0028	0.0243
Molluscs	0.0156	0.0000	0.0675	0.0848	0.0156	0.0000	0.0904	0.0003	0.0000	0.0000
Polychaetes	0.1832	0.1110	0.5346	0.0963	0.9669	0.1970	0.1818	0.0543	0.1390	0.1968

TaxonName	21	22	23	24	25	26	27	28	29	30
Other taxa	0.0000	0.0000	0.0092	0.0043	0.0014	0.0000	0.0000	0.0073	0.0000	0.0000
Crustaceans	0.0009	0.0000	0.0053	0.3299	0.0131	0.0117	0.0175	0.0180	1.0674	0.0000
Echinoderms	0.0815	0.0000	0.0006	0.0353	0.0556	23.0689	0.0016	0.0000	0.0000	116.2602
Molluscs	0.0281	0.0704	0.0000	0.0335	0.0033	0.0423	0.0000	0.0000	0.0000	0.0000
Polychaetes	0.1397	0.4215	0.0787	2.8572	0.0215	0.1151	0.0547	0.1603	0.0525	0.1356

TaxonName	31	32	33	34	35	36	37	38	39	40
Other taxa	0.0000	0.0132	0.0000	0.0000	0.0353	0.0268	0.1033	0.0040	0.1727	0.0000
Crustaceans	0.0545	0.1685	0.0000	0.0072	1.4803	0.0006	0.0000	0.6628	0.0000	0.0040
Echinoderms	0.0000	0.0582	0.0000	0.5216	0.0274	0.0302	0.0000	0.2821	0.0000	0.0303
Molluscs	0.0544	0.0063	0.0508	0.0628	nr	0.0069	0.0120	1.2051	0.0045	2.6226
Polychaetes	0.5508	0.4029	0.0660	0.2500	0.2922	0.0676	0.5038	0.8071	1.9265	0.0883

TaxonName	41	42	43	44	45	46	47	48	49
Other taxa	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0005	0.0053	0.0000
Crustaceans	0.4312	0.0109	0.0013	0.0079	0.0134	0.0256	0.0000	0.0021	0.0255
Echinoderms	0.0000	1.2586	0.1003	6.7040	26.3616	nr	0.0000	25.9713	0.0000
Molluscs	0.0000	3.1444	0.0000	0.2371	0.0779	5.1772	0.0000	0.0000	0.0000
Polychaetes	0.0180	0.0641	0.8158	0.0746	0.2276	0.2123	1.1625	0.2913	0.1117

S. 2M BEAM TRAWL SPECIES LIST

S.1 2m Beam Trawl Raw Data

Taxon	Aphia ID	T1	T2	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Aglaophamus agilis	130343	0	1	0	0	0	0	0	0	0	0	0	0
Agonus cataphractus	127190	0	14	2	1	2	0	2	1	1	5	0	1
Alcyonidium	110993	0	0	P	0	0	P	0	0	0	0	0	0
Alcyonidium diaphanum	111597	0	P	0	0	0	0	0	0	0	0	0	0
Alcyonidium parasiticum	111604	0	0	0	0	0	P	0	0	0	0	0	0
Amathia lendigera	111659	0	0	0	0	0	0	0	0	0	0	P	0
Ammodytes	125909	0	0	4	4	1	0	0	0	0	0	1	0
Ammodytes tobianus	126752	2	0	0	1	0	0	0	0	0	1	0	0
Ammodytidae	125516	0	0	0	0	0	0	0	0	0	0	0	2
Anapagurus laevis	107218	0	0	1	0	0	0	0	0	0	0	0	0
Arnoglossus laterna	127126	0	5	5	16	5	0	4	8	4	14	3	12
Asterias rubens	123776	2	6	8	8	2	0	0	7	14	7	4	7
Bougainvilliidae	1594	0	P	P	0	0	0	0	0	0	0	0	0
Buccinum undatum	138878	0	2	1	0	0	0	0	0	0	0	0	0
Buglossidium luteum	127153	1	17	18	85	26	0	65	163	170	70	56	33
Callionymus	125930	0	0	0	0	1	0	0	0	0	12	1	1
Callionymus lyra	126792	0	0	2	5	0	1	0	4	8	4	1	1
Callionymus reticulatus	126795	0	0	1	0	1	0	3	0	0	2	0	1
Ciliata mustela	126448	0	0	1	0	0	0	0	0	0	1	0	0

Taxon	Aphia ID	T1	T2	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
CIRRIPEDIA (juv.)	1082	0	0	9	0	0	0	0	0	0	0	0	0
Clupeidae	125464	0	0	0	1	0	0	0	0	0	0	0	0
Corystes cassivelaunus	107277	0	0	0	1	0	0	0	1	1	1	0	0
Crangon	107007	0	0	0	0	0	0	0	1	1	0	0	0
Crangon allmanni	107551	78	337	20	14	15	42	7	6	77	6	13	9
Crangon crangon	107552	1	0	4	2	7	0	12	14	3	5	3	3
Ebalia	106889	0	2	0	0	0	0	0	0	1	0	0	0
Echiichthys vipera	150630	12	10	2	10	40	0	4	27	2	1	7	19
Echinocardium cordatum	124392	0	1	8	7	2	0	0	4	4	9	4	0
Electra pilosa	111355	0	0	P	0	P	0	0	0	0	0	0	0
Enchelyopus cimbrius	126450	0	1	0	0	0	0	0	1	2	2	0	0
Eutrigla gurnardus	150637	0	0	1	0	1	0	0	0	0	3	0	0
Flustra foliacea	111367	0	0	0	0	0	0	0	0	0	0	P	0
Gadinae (juv.)	125469*	0	2	0	0	0	0	0	0	0	0	0	0
Galathea intermedia	107150	0	1	0	0	0	0	0	0	0	0	0	0
Gammarellus homari	102253	0	0	0	0	0	1	0	0	0	0	0	0
Gastrosaccus spinifer	120020	2	3	1	2	2	0	0	0	1	0	0	1
Gobiidae	125537	2	0	0	0	0	0	0	0	0	0	0	0
Gymnammodytes semisquamatus	126754	0	0	2	0	0	0	0	0	0	0	1	2
Halecium halecinum	231751	0	0	0	0	P	0	0	0	0	0	0	0
Hyas coarctatus	107323	0	0	1	0	0	0	0	0	0	0	0	0
Hydractinia echinata	117644	0	0	P	0	P	0	0	0	0	P	0	P

Taxon	Aphia ID	T1	T2	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Hydrallmania falcata	117890	0	P	P	P	0	P	0	0	0	0	P	0
Hyperoplus ?lanceolatus (juv.)	126756	3	0	0	2	0	5	1	1	1	0	0	2
Hyperoplus lanceolatus	126756	1	0	3	0	2	3	0	0	1	2	0	1
Limanda limanda	127139	0	0	7	4	3	0	8	5	0	6	1	2
Liocarcinus depurator	107387	0	0	4	0	0	0	0	0	0	0	0	0
Liocarcinus depurator (female)	107387	5	0	0	3	0	0	0	0	0	4	0	0
Liocarcinus depurator (male)	107387	3	0	0	1	0	0	0	0	0	16	0	0
Liocarcinus holsatus	107388	0	0	0	0	0	0	0	0	0	0	1	0
Liocarcinus holsatus (female)	107388	6	0	0	11	2	1	5	4	4	12	0	0
Liocarcinus holsatus (male)	107388	3	0	0	3	0	0	5	10	7	4	0	0
Liocarcinus marmoreus	107390	0	12	0	0	0	0	0	0	0	0	0	0
Liocarcinus marmoreus (female)	107390	3	2	0	2	1	0	0	2	0	1	0	1
Liocarcinus marmoreus (male)	107390	1	0	1	0	1	0	0	2	1	0	0	1
*Macropodia parva/rostrata***	205077	2	11	0	1	0	0	0	1	0	0	0	0
Macropodia tenuirostris	107346	0	0	1	0	0	0	0	0	0	0	0	0
Meganyctiphanes norvegica	110690	0	0	0	0	0	1	0	0	0	0	0	0
Merlangius merlangus	126438	0	0	0	1	0	0	3	0	0	0	1	0
Necora puber (male)	107398	0	0	0	0	0	0	0	0	0	3	0	0
Nephtys cirrosa	130357	1	0	0	0	0	0	0	0	0	0	0	0
Nephtys longosetosa	130364	3	3	3	2	0	0	0	0	3	0	0	1
Obelia	117034	0	P	0	0	0	0	0	P	P	0	0	0
Obelia dichotoma	117386	0	0	P	0	0	0	0	0	0	0	0	0

Taxon	Aphia ID	T1	T2	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Obelia longissima	117389	0	P	0	0	0	0	0	0	0	0	0	0
Ophelia	129413	0	0	0	0	0	0	0	0	0	0	1	0
Ophiocten affinis	124850	0	0	0	0	0	0	0	1	0	0	0	0
Ophiura (juv.)	123574	0	0	0	0	0	0	1	0	0	0	0	0
Ophiura albida	124913	1	6	5	46	9	0	7	14	26	8	29	10
Ophiura ophiura	124929	0	3	7	43	36	0	13	51	22	22	26	36
OSTEICHTHYES (larvae)	10194***	0	0	0	3	0	1	2	0	0	0	0	1
Pagurus bernhardus	107232	29	12	3	3	4	2	1	0	0	5	1	2
Pandalina brevirostris	107647	0	5	0	0	0	0	0	2	1	0	0	0
Pandalus	107044	0	1	0	0	0	2	0	0	0	0	0	0
Pandalus montagui	107651	0	16	0	0	0	0	0	2	8	0	1	0
Parasite on *L.holsatus*		0	0	0	0	0	0	0	2	0	0	0	0
Philocheras trispinosus	107562	2	8	24	12	4	4	7	16	20	5	2	1
Pilumnus hirtellus	107418	0	0	0	0	0	0	0	0	0	1	0	0
Pinnotheres pisum	107473	2	0	0	0	0	0	0	0	0	0	0	0
Pleuronectes platessa	127143	0	0	0	0	2	0	0	1	0	3	1	1
Pomatoschistus	125999	0	0	2	0	0	0	0	0	0	1	0	0
Pomatoschistus minutus	126928	8	15	31	13	41	1	28	39	6	61	54	56
Processa modica	108343	0	1	0	4	0	0	0	1	2	4	0	0
Psammechinus miliaris	124319	0	11	4	0	0	0	0	0	0	0	0	0
Raja montagui (male)	105887	1	0	0	0	0	0	0	0	0	0	0	0
Sabellaria	129520	0	0	0	0	0	0	0	0	0	P - 0.9L	0	0

Taxon	Aphia ID	T1	T2	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
Sabellaria crust	129520	0	0	0	P- <10g	0	0	0	0	P - <5g	0	0	0
Sacculina	134782	0	0	0	0	0	0	1	0	0	0	0	0
Sarsia	117070	0	P	0	0	P	P	0	0	0	0	0	0
Scyliorhinus canicula (female)	105814	0	0	0	1	0	0	0	0	0	0	0	0
Scyliorhinus canicula (juv.)	105814	1	0	0	3	0	0	0	1	0	0	0	0
Scyliorhinus canicula (male)	105814	0	0	0	2	0	0	0	0	0	0	0	0
Sepiola atlantica	141454	0	25	5	0	0	0	0	6	0	0	0	2
Sertularia argentea	117912	0	P	0	P	P	0	P	0	P	0	0	0
Sertularia	117234	0	P	P	0	0	0	0	0	P	0	0	P
Siriella armata	120208	0	1	0	0	0	0	0	0	0	0	0	0
Solea solea	127160	4	0	0	0	0	3	0	0	0	2	0	0
Spatangus purpureus	124418	3	0	3	0	0	0	0	0	0	0	0	0
Spisula elliptica	140300	3	0	1	0	0	0	0	0	0	0	0	0
Sprattus sprattus	126425	0	0	0	2	0	1	5	1	0	0	0	0
Sthenelais limicola	131077	0	0	0	0	0	0	0	0	1	0	0	0
Syngnathus acus	127387	0	3	0	0	1	0	1	0	0	0	0	0
Thia scutellata	107281	1	0	2	0	0	0	0	0	0	0	0	0
Tubularia indivisa	117994	0	P	0	0	0	0	0	0	0	0	0	0
Tubulariidae	1603	0	0	P	0	0	P	0	0	0	0	0	0
Vesicularia spinosa	111669	0	0	0	0	0	0	0	0	0	0	P	0

* Gadinae is not accepted in WoRMS, so Aphia ID indicated is the one for Gadidae.

** Aphia ID given for Macropodia.

*** OSTEICHTHYES WoRMS unaccepted. Aphia ID for Actinopterygii.

S.2 2m Beam Trawl Fish Species Measurements

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
	Solea solea	24	26	19	16																	4	375g
	Echiichthys vipera	10	10	10	8	10	9	10	10	9	10	12	9									12	100g
	Scyliorhinus canicula (juv)	11																				1	<30g
	Hyperoplus lanceolatus	19																				1	
	Raja montagui (male) L	35																				1	225g
T1	W	25																					
	Pomatoschistus minutus	5	4	5	5	5	6	4	4													8	
	Gobiidae	4	3																			2	
	Ammodytes tobianus	15	12																			2	
	Hyperoplus ?lanceolatus (juv.)	8	9	8																		3	
	Buglossidium luteum	9																				1	
	Buglossidium luteum	8	10	11	9	9	7	8	8	9	9	7	6	6	8	8	6	8				17	75g
	Agonus cataphractus	7	6	2	2	2	2	2	2	2	2	2	2	1	2							14	<30g
	Echiichthys vipera	11	9	9	10	6	8	11	10	10	7											10	75g
T2	*Pomatoschistus minutus*	5	5	4	6	4	4	5	5	4	4	5	6	4	4	5						15	
	Gadinae (juv.)	3	2																			2	
	Syngnathus acus	10	9	9																		3	
	Arnoglossus laterna	12	11	12	10	13																5	
	Rhinonemus cimbrius	14																				1	
T4	*Ciliata mustela*	17																				1	<50g

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
	Hyperoplus lanceolatus	31	21	21																		3	50g
	Callionymus lyra	24	16																			2	<50g
	Eutrigla gurnardus	15																				1	<50g
	Agonus cataphractus	8	8																			2	<50g
	Echiichthys vipera	9	10																			2	<50g
	Limanda limanda	12	12	18	19	12	13	13														7	200g
	Buglossidium luteum	10	6	8	10	7	10	8	8	8	9	7	9	8	7	8	8	8	8			18	100g
	Gymnammodytes semisquamatus	14	17																			2	
	Ammodytes	14	16	14	17																	4	
	Arnoglossus laterna	11	9	5	5	13																5	
	Callionymus reticulatus	5																				1	
	Pomatoschistus minutus	5	5	6	5	6	5	5	5	5	5	5	5	4	5	5	5	5	4	5	5		
		5	5	5	4	4	5	5	5	4	4	4										31	
	Pomatoschistus	5	5																			2	
	Echiichthys vipera	8	12	10	9	10	10	10	10	10	10											10	100g
	Merlangius merlangus	17																				1	<30g
	Callionymus lyra	12	19	9	11	14																5	75g
T5	*Agonus cataphractus*	8																				1	<10g
	Limanda limanda	20	14	9	16																	4	150g
	Scyliorhinus canicula (female)	22																				1	125g
	Scyliorhinus canicula (male)	28	22																			2	

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
	Scyliorhinus canicula (juv)	10	10	10																		3	
		10	9	7	7	6	9	4	8	6	8	7	8	9	8	7	5	8	8	8	9		
	Buglossidium luteum	9	9	9	7	10	7	8	8	7	8	7	8	7	5	8	4	9	7	7	10		
		7	4	8	7	8	8	7	10	7	8	7	10	4	7	10	9	8	8	7	9	85	
		9	7	7	8	8	7	7	7	6	8	9	8	9	8	8	10	4	7	10	11		
		9	7	6	9	3																	475g
	Clupeidae sp.	4																				1	<1g
	Arnoglossus laterna	11	9	9	10	11	13	13	10	10	10	11	6	5	10	12	10					16	
	Sprattus sprattus	10	10																			2	
	Ammodytes	15	16	14	11																	4	
	Hyperoplus ?lanceolatus (juv.)	8	7																			2	
	Ammodytes tobianus	8																				1	
	OSTEICHTHYES (larvae)	3	2	3																		3	
	Pomatoschistus minutus	4	5	5	6	6	5	5	5	5	5	4	4	4								13	
	Pleuronectes platessa	22	22																			2	175g
	Limanda limanda	13	13	6																		3	50g
	Agonus cataphractus	11	2																			2	<25g
T6	*Eutrigla gurnardus*	15																				1	<25g
	Buglossidium luteum	11	10	8	9	8	8	6	7	9	8	7	6	8	7	10	9	8	8	10	8		150g
		4	8	8	8	5	11															26	
	Echiichthys vipera	13	12	11	9	12	10	7	8	9	9	9	8	8	9	9	10	10	10	7	11	40	300g

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
		9	9	9	7	10	10	6	8	10	9	9	6	7	6	7	8	6	7	7	6		
	Callionymus sp.	6																				1	<25g
	Callionymus reticulatus	9																				1	<25g
	Syngnathus acus	7																				1	
	Arnoglossus laterna	6	5	5	10	12																5	
	Ammodytes	15																				1	
	Hyperoplus lanceolatus	21	20																			2	
		5	5	4	4	5	5	6	4	4	5	7	5	5	5	4	5	5	4	5	5		
	Pomatoschistus minutus	5	5	4	4	4	5	4	5	4	5	4	4	4	4	4	4	4	3	4	4	41	
		4																					
T7	*Callionymus lyra*	8																				1	<25g
	Solea solea	26	25	23																		3	400g
	OSTEICHTHYES (larvae)	4																				1	
	Pomatoschistus minutus	4																				1	
	Hyperoplus ?lanceolatus (juv.)	7	7	7	6	8																5	
	Hyperoplus lanceolatus	14	17	17																		3	
	Sprattus sprattus	4																				1	
T8	*Agonus cataphractus*	2	1																			2	<30g
	Echiichthys vipera	11	11	12	11																	4	50g
	Merlangius merlangus	12	15	14																		3	75g
	Limanda limanda	17	16	11	14	20	18	12	14													8	250g

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
	Buglossidium luteum	5	8	8	6	8	6	8	7	8	5	8	8	4	7	8	7	7	8	7	7	40	200g
		8	6	6	9	7	6	8	7	9	7	7	10	9	7	6	8	7	7	9	8		
	Sprattus sprattus	9	7	11	8	10																5	
	Syngnathus acus	9																				1	
	Arnoglossus laterna	12	9	10	5																	4	
	Hyperoplus ?lanceolatus (juv.)	7																				1	
	Callionymus reticulatus	11	5	6																		3	
	OSTEICHTHYES (larvae)	3	3																			2	
	Pomatoschistus minutus	5	5	5	5	5	5	4	5	5	5	5	4	5	5	4	5	4	5	5	5	28	
		4	4	4	5	4	3	5	4														
T9	*Pleuronectes platessa*	24																				1	100g
	Echiichthys vipera	6	9	11	10	11	9	10	11	11	11	8	6	10	8	6	9	11	7	6	6		200g
		6	7	8	6	6	6	6														27	
	Limanda limanda	18	15	16	16	16																5	175g
	Enchelyopus cimbrius	19																				1	<50g
	Agonus cataphractus	7																				1	<20g
	Callionymus lyra	8	6	6	5																	4	<30g
	Scyliorhinus canicula (juv)	13																				1	<50g
	Buglossidium luteum	8	4	10	10	7	7	7	4	7	7	9	4	9	6	4	4	6	7	4	8		
		7	7	4	4	4	7	8	9	6	4	7	8	5	6	6	6	7	8	5	8	163	750g
		7	3	7	8	3	7	7	4	7	8	8	4	8	7	9	8	4	4	5	7		
		7	5	4	8	4	6	7	9	10	11	6	7	10	8	8	8	10	8	9	8		

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
		7	8	7	8	8	9	8	9	7	4	8	10	4	7	7	8	7	8	7	8		
		8	8	7	11	8	8	9	9	4	8	7	7	7	6	7	4	7	7	11	9		
		10	7	11	8	9	9	8	8	7	9	7	8	7	4	7	9	6	9	9	8		
		8	10	10	9	8	8	7	9	1	8	4	4	8	8	8	8	9	7	4	8		
		7	9	8																			
	Sprattus sprattus	6																				1	
	Hyperoplus ?lanceolatus (juv.)	8																				1	
		5	5	5	5	6	7	5	6	5	5	4	5	5	5	5	6	6	5	6	4		
	Pomatoschistus minutus	4	4	4	4	4	6	6	5	5	5	5	4	4	5	5	5	5	5	5		39	
	Arnoglossus laterna	6	5	11	11	12	12	10	12													8	
T10	*Echiichthys vipera*	8	6																			2	<30g
	Enchelyopus cimbrius	13	15																			2	<50g
	Agonus cataphractus	10																				1	<30g
	Callionymus lyra	15	11	8	6	11	9	6	5													8	50g
		9	8	9	4	10	7	4	4	3	7	7	8	9	8	7	4	8	9	8	8		
		9	4	10	5	4	7	7	7	8	5	9	8	8	4	7	4	9	6	4	9		
		10	9	7	7	6	8	9	7	10	9	10	9	9	6	9	7	9	9	7	7		
	Buglossidium luteum	7	7	7	8	9	10	6	9	10	6	9	9	7	9	8	9	9	8	8	8	170	800g
		8	8	8	9	9	10	9	9	7	8	7	7	7	8	7	8	7	6	6	9		
		9	7	8	7	6	10	8	8	8	7	8	10	4	9	9	6	8	7	8	8		
		8	12	6	7	10	4	10	9	10	7	9	6	8	7	8	6	8	8	8	9		
		7	8	9	9	6	6	7	9	7	8	9	8	8	8	7	7	7	8	4	7		

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
		8	8	5	8	9	9	10	9	7	4												
	Pomatoschistus minutus	4	5	4	5	4	5															6	
	Hyperoplus ?lanceolatus (juv.)	9																				1	
	Hyperoplus lanceolatus	19																				1	
	Arnoglossus laterna	10	11	10	11																	4	
T11	*Solea solea*	40	24																			2	850g
	Limanda limanda	17	14	11	21	13	14															6	225g
	Echiichthys vipera	7																				1	<10g
	Pleuronectes platessa	14	24	18																		3	200g
	Agonus cataphractus	10	12	9	8	8																5	50g
	Eutrigla gurnardus	14	16	15																		3	100g
	Enchelyopus cimbrius	15	15																			2	50g
	Ciliata mustela	13																				1	25g
	Callionymus lyra	16	17	16	12																	4	125g
	Callionymus sp.	8	8	8	8	8	10	9	8	6	5	5	5									12	50g
		7	7	11	9	7	7	9	6	8	8	6	8	7	8	9	9	7	9	9	7		
	Buglossidium luteum	7	7	11	8	10	9	10	9	10	9	9	9	10	7	8	9	6	9	7	8	70	425g
		6	8	9	9	7	5	7	9	8	7	7	8	9	8	9	8	7	9	6	7		
		10	7	8	7	6	5	9	7	8	4												
	Hyperoplus lanceolatus	20	29																			2	
	Ammodytes tobianus	10																				1	

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
	Arnoglossus laterna	9	9	12	11	9	12	11	12	12	12	11	5	10	10							14	
	Callionymus reticulatus	5	5																			2	
		6	6	6	6	5	5	5	5	5	6	5	5	5	5	5	6	4	4	4	5		
	Pomatoschistus minutus	5	5	5	5	5	4	4	5	4	5	5	4	5	4	4	5	4	4	4	5	61	
		4	4	4	4	5	4	4	4	4	4	4	4	4	4	3	3	3	4	4	4		
		4																					
	Pomatoschistus	3																				1	
	Pleuronectes platessa	20																				1	50g
	Limanda limanda	15																				1	<30g
	Callionymus lyra	22																				1	50g
	Callionymus sp.	7																				1	<10g
	Echiichthys vipera	14	11	10	11	7	7	6														7	<30g
	Merlangius merlangus	17																				1	<30g
		9	9	11	8	10	9	10	9	7	8	7	9	8	7	8	6	7	4	8	7		
T12	*Buglossidium luteum*	8	10	9	10	7	4	7	7	7	9	8	7	7	8	8	7	4	7	4	5	56	225g
		5	4	7	9	8	6	6	8	6	7	7	7	4	7	6	4						
	Ammodytes	15																				1	
	Gymnammodytes semisquamatus	17																				1	
	Arnoglossus laterna	9	9	5																		3	
	Pomatoschistus minutus	6	5	5	5	5	5	6	6	5	5	6	5	5	5	5	5	5	5	5	5	54	
		4	4	5	5	5	4	5	5	5	4	5	5	5	5	4	4	4	5	4	4		

Trawl	Fish Species Measurements	Total lengths (cm)																				Ab.	Weight
		5	5	4	4	4	4	4	4	4	4	4	4	3	4								
T13	*Echiichthys vipera*	6	10	11	9	8	10	10	9	8	11	9	10	8	9	6	6	8	7	6		19	150g
	Pleuronectes platessa	20																				1	100g
	Limanda limanda	13	13																			2	75g
	Callionymus sp.	4																				1	<25g
	Callionymus lyra	13																				1	25g
	Callionymus reticulatus (female)	11																				1	<25g
	Buglossidium luteum	11	8	10	7	7	8	8	9	6	9	6	8	7	4	6	6	8	9	7	4		175g
		8	4	8	8	7	7	6	6	4	7	4	4	5								33	
	Agonus cataphractus	8																				1	<25g
	Pomatoschistus minutus (1)	5	4	5	4	5	5	4	5	5	6	5	6	5	5	6	5	4	6	5	6		
		5	5	4	5	5	3	4	4	4	5	5	5	4	5	4	5	5	5	5	5	56	
	Pomatoschistus minutus (2)	5	3	4	3	5	4	4	4	3	4	4	5	4	4	4	4						
	Arnoglossus laterna	11	11	6	6	6	10	10	13	6	4	10	11									12	
	OSTEICHTHYES (larvae)	3																				1	
	Gymnammodytes semisquamatus	17	17																			2	
	Ammodytidae	14	14																			2	
	Hyperoplus ?lanceolatus (juv.)	9	8																			2	
	Hyperoplus lanceolatus	22																				1	

S.3 2m Beam Trawl Shellfish Species Measurements

Trawl	Shellfish Measurements	Total Lengths (mm)																Ab.	Weight
T1	*Liocarcinus holsatus* (male)	20	22	15														3	<50g
	Liocarcinus holsatus (female)	24	21	15	12	12	9											6	
	Liocarcinus depurator (male)	18	28	13														3	<50g
	Liocarcinus depurator (female)	22	30	22	28	22												5	
	Liocarcinus marmoreus (female)	15	13	15														3	
	Liocarcinus marmoreus (male)	17																1	
T2	*Buccinum undatum*	11	28															2	<30g
	Liocarcinus marmoreus	30	30															12	<50g
	Liocarcinus marmoreus (female)	16	18															2	
T4	*Buccinum undatum*	89																1	<30g
	Liocarcinus depurator	24	23	13	15													4	<30g
	Liocarcinus marmoreus (male)	26																1	
T5	*Liocarcinus holsatus* (male)	30	22	18														3	100g
	Liocarcinus holsatus (female)	32	32	30	30	30	31	28	31	22								9	
	Liocarcinus depurator (male)	33	22	18														3	
	Liocarcinus depurator (female)	32																1	
	Liocarcinus marmoreus (female)	19	21															2	
T6	*Liocarcinus holstatus* (female)	32	38															2	<25g
	Liocarcinus marmoreus (female)	21																1	
	Liocarcinus marmoreus (male)	17																1	

Trawl	Shellfish Measurements	Total Lengths (mm)																Ab.	Weight
T7	*Liocarcinus holsatus* (female)	9																1	
T8	*Liocarcinus holstatus*	31	33	30	37	34	33	28	35	40	23							10	75g
T9	*Liocarcinus holsatus* (male)	44	22	23	28	30	21	28	35	25	25							10	100g
	Liocarcinus holsatus (female)	28	31	22	28													4	
	Corystes cassivelaunus	21																1	
	Liocarcinus marmoreus (female)	12	6															2	
	Liocarcinus marmoreus (male)	20	14															2	
T10	*Liocarcinus holsatus* (male)	40	32	25	19	16	30	13										7	
	Liocarcinus holsatus (female)	33	37	22	22													4	
	Liocarcinus marmoreus (male)	19																1	
T11	*Liocarcinus holsatus* (male)	29	29	15	21													4	
	Liocarcinus holsatus (female)	39	32	31	30	24	34	26	37	21	25	22	31					12	
	Liocarcinus depurator (male)	34	48	45	40	16	26	32	32	30	41	30	28	23	16	20	21	16	
	Liocarcinus depurator (female)	31	29	30	22													4	
	Necora puber (male)	14	15	12														3	
	Liocarcinus marmoreus (female)	22																1	
T12	*Liocarcinus holsatus*	33																1	<30g
T13	*Liocarcinus marmoreus* (female)	27																1	
	Liocarcinus marmoreus (male)	14																1	

	Denotes parasitised
	Denotes berried

T. SIMPER ANALYSIS

T.1 Output From SIMPER Analysis Within Group Similarity

Group a

Less than 2 samples in group

Group b

Less than 2 samples in group

Group c

Less than 2 samples in group

Group d

Average similarity: 59.75

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Buglossidium luteum	2.82	5.78	5.03	9.67	9.67
Pomatoschistus minutus	2.38	4.96	4.13	8.30	17.97
Ophiura ophiura	2.25	4.75	5.08	7.95	25.93
Ophiura albida	1.94	3.97	5.57	6.64	32.57
Crangon allmanni	1.93	3.92	7.22	6.56	39.12
Arnoglossus laterna	1.62	3.38	8.35	5.65	44.78
Philocheras trispinosus	1.66	3.19	5.12	5.33	50.11
Echiichthys vipera	1.68	3.16	3.20	5.28	55.39
Crangon crangon	1.50	3.11	5.55	5.20	60.60
Asterias rubens	1.42	2.54	1.79	4.25	64.85
Limanda limanda	1.25	2.27	1.76	3.79	68.64
Liocarcinus holsatus	1.30	1.96	1.10	3.27	71.91

Agonus cataphractus	1.01	1.82	1.77	3.04	74.95
Echinocardium cordatum	1.16	1.74	1.15	2.92	77.87
Pagurus bernhardus	0.97	1.52	1.15	2.54	80.41
Callionymus lyra	1.02	1.46	1.14	2.45	82.86
Liocarcinus marmoreus	0.89	1.33	1.14	2.22	85.08
Pleuronectes platessa	0.61	0.68	0.61	1.14	86.21
Hyperoplus (juv.)	0.60	0.67	0.61	1.12	87.34
Callionymus reticulatus	0.61	0.66	0.60	1.10	88.44
Hyperoplus lanceolatus	0.63	0.64	0.61	1.07	89.50
Gastrosaccus spinifer	0.60	0.61	0.61	1.03	90.53

T.2 Output From SIMPER Analysis Between Group Dissimitarity (Top Ten Species)

Groups b & c

Average dissimilarity = 61.75

	Group b	Group c			
Species	Av.Abund	Av.Abund	Av.Diss	Contrib%	Cum.%
Sepiola atlantica	0.00	2.24	2.41	3.89	3.89
Pandalus montagui	0.00	2.00	2.15	3.48	7.38
Agonus cataphractus	0.00	1.93	2.08	3.37	10.75
Psammechinus miliaris	0.00	1.82	1.96	3.17	13.92
Liocarcinus holsatus	1.73	0.00	1.86	3.02	16.94
Liocarcinus depurator	1.68	0.00	1.81	2.93	19.87
Arnoglossus laterna	0.00	1.50	1.61	2.60	22.47
Pandalina brevirostris	0.00	1.50	1.61	2.60	25.08
Solea solea	1.41	0.00	1.52	2.46	27.54
Hyperoplus (juv.)	1.32	0.00	1.42	2.29	29.83

Groups b & d

Average dissimilarity = 57.22

	Groub b	Group d				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiura ophiura	0.00	2.25	2.82	5.67	4.93	4.93
Buglossidium luteum	1.00	2.82	2.28	3.36	3.98	8.91
Arnoglossus laterna	0.00	1.62	2.02	.20	3.53	12.44

Pagurus bernhardus	2.32	0.97	1.70	2.33	2.96	15.40
Solea solea	1.41	0.13	1.62	3.01	2.83	18.23
Liocarcinus depurator	1.68	0.55	1.60	1.71	2.80	21.02
Limanda limanda	0.00	1.25	1.56	2.40	2.73	23.76
Spisula elliptica	1.32	0.11	1.53	3.26	2.67	26.43
Spatangus purpureus	1.32	0.15	1.49	2.59	2.61	29.03
Gobiidae	1.19	0.00	1.49	9.87	2.60	31.63

Groups c & d

Average dissimilarity = 53.11

	Group c	Group d				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Crangon allmanni	4.28	1.93	2.37	4.67	4.46	4.46
Sepiola atlantica	2.24	0.47	1.79	2.35	3.36	7.82
Psammechinus miliaris	1.82	0.16	1.69	3.29	3.18	11.00
Macropodia parva/rostrata	1.82	0.22	1.61	3.29	3.04	14.04
Pandalus montagui	2.00	0.43	1.57	2.33	2.96	16.99
Crangon crangon	0.00	1.50	1.51	4.65	2.84	19.83
Liocarcinus holsatus	0.00	1.30	1.30	1.63	2.45	22.28
Pandalina brevirostris	1.50	0.24	1.26	2.48	2.37	24.65
Limanda limanda	0.00	1.25	1.25	2.42	2.36	27.01
Gadinae (juv.)	1.19	0.00	1.19	12.28	2.25	29.26

Groups b & a

Average dissimilarity = 64.30

	Group b	Group a			
Species	Av.Abund	Av.Abund	Av.Diss	Contrib%	Cum.%
Echiichthys vipera	1.86	0.00	3.15	4.90	4.90
Liocarcinus depurator	1.68	0.00	2.84	4.42	9.32
Liocarcinus marmoreus	1.41	0.00	2.39	3.72	13.04
Nephtys longosetosa	1.32	0.00	2.23	3.46	16.50
Spatangus purpureus	1.32	0.00	2.23	3.46	19.96
Spisula elliptica	1.32	0.00	2.23	3.46	23.42
Ammodytes tobianus	1.19	0.00	2.01	3.13	26.55
Asterias rubens	1.19	0.00	2.01	3.13	29.68
Gastrosaccus spinifer	1.19	0.00	2.01	3.13	32.81
Gobiidae	1.19	0.00	2.01	3.13	35.93

Groups c & a

Average dissimilarity = 76.77

	Group c	*Group a*			
Species	Av.Abund	Av.Abund	Av.Diss	Contrib%	Cum.%
Sepiola atlantica	2.24	0.00	2.84	3.70	3.70
Buglossidium luteum	2.03	0.00	2.58	3.36	7.06
Pandalus montagui	2.00	0.00	2.54	3.31	10.36
Agonus cataphractus	1.93	0.00	2.46	3.20	13.56
Liocarcinus marmoreus	1.93	0.00	2.46	3.20	16.76

Macropodia parva/rostrata	1.82	0.00	2.31	3.01	19.77
Psammechinus miliaris	1.82	0.00	2.31	3.01	22.78
Echiichthys vipera	1.78	0.00	2.26	2.94	25.72
Crangon allmanni	4.28	2.55	2.21	2.88	28.60
Asterias rubens	1.57	0.00	1.99	2.59	31.19

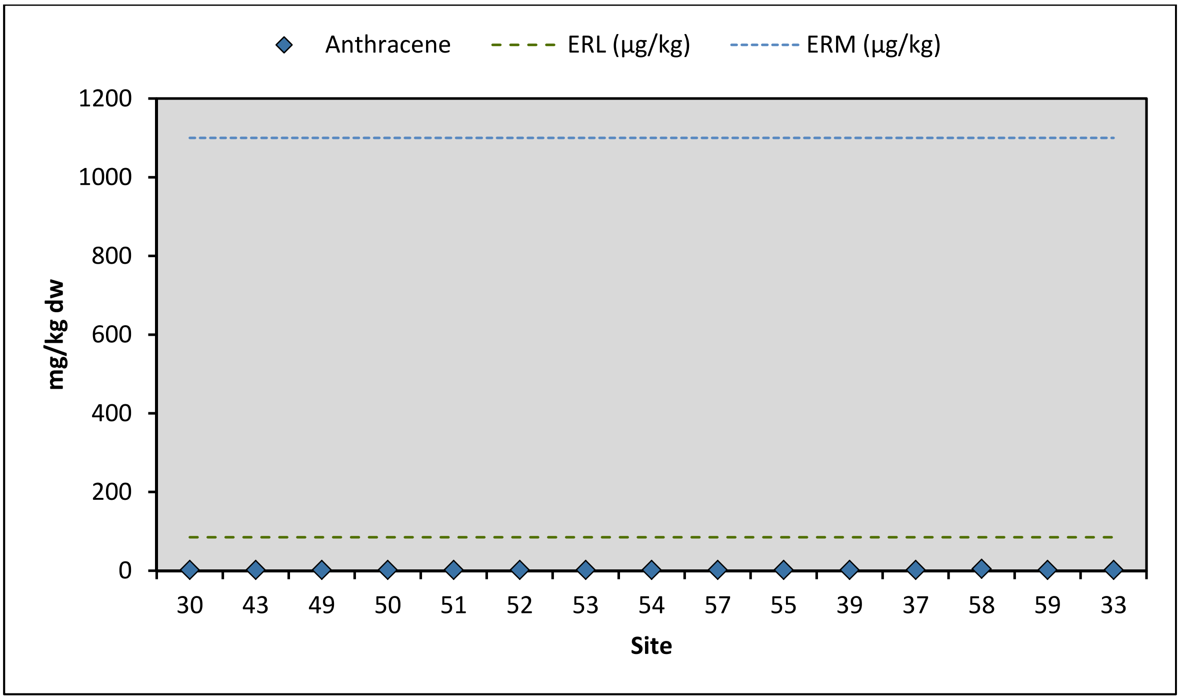
Groups d & a

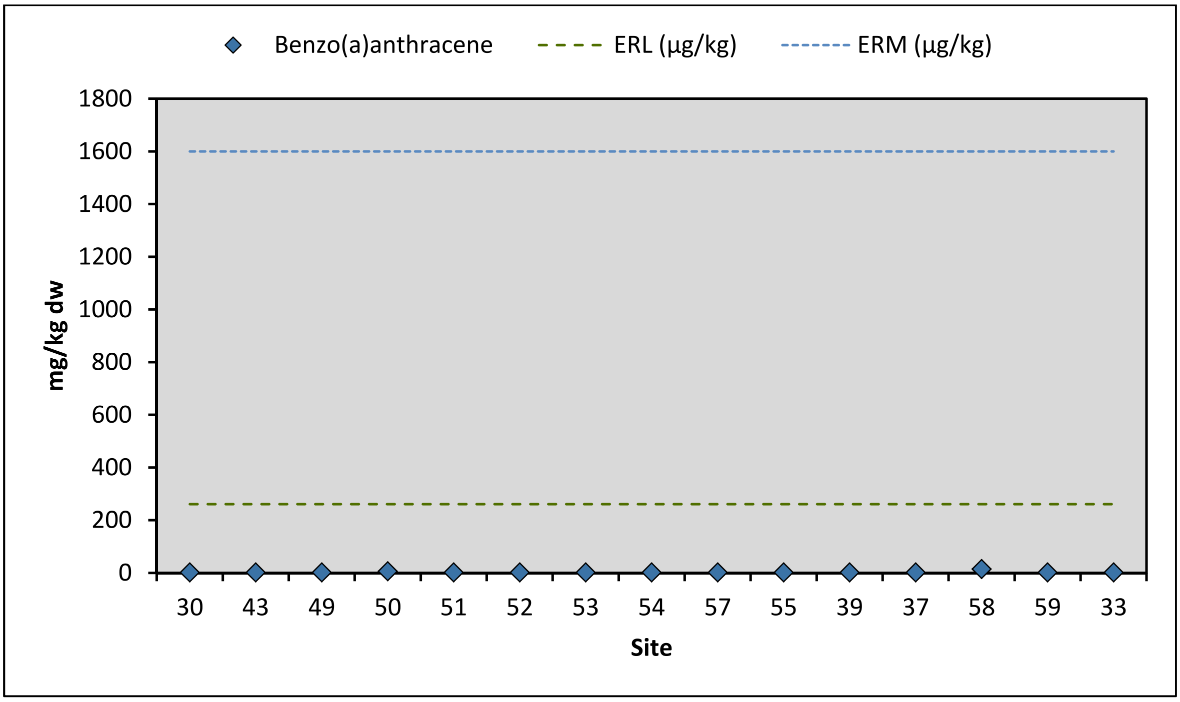
Average dissimilarity = 71.73

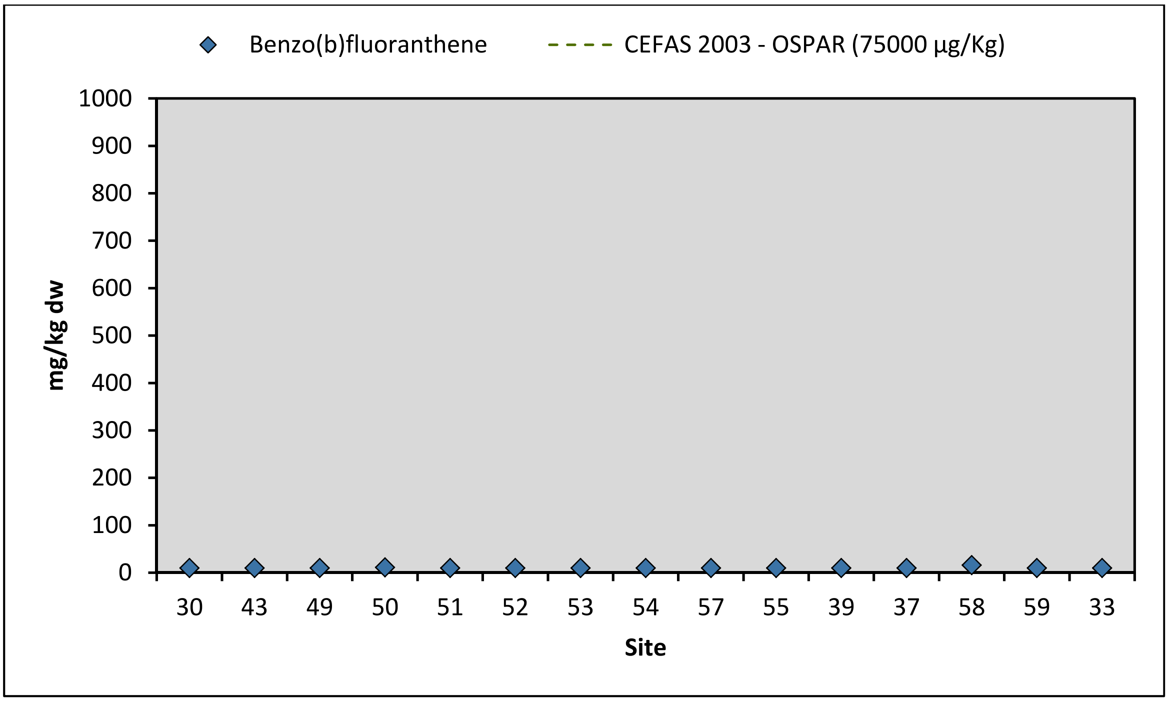
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Buglossidium luteum	2.82	0.00	4.30	4.68	6.00	6.00
Ophiura ophiura	2.25	0.00	3.44	5.35	4.79	10.79
Ophiura albida	1.94	0.00	2.95	4.61	4.12	14.90
Echiichthys vipera	1.68	0.00	2.58	2.80	3.60	18.50
Arnoglossus laterna	1.62	0.00	2.46	6.98	3.42	21.93
Crangon crangon	1.50	0.00	2.30	4.09	3.20	25.13
Pomatoschistus minutus	2.38	1.00	2.12	2.93	2.95	28.08
Asterias rubens	1.42	0.00	2.10	2.50	2.93	31.01
Limanda limanda	1.25	0.00	1.90	2.37	2.65	33.66
Solea solea	0.13	1.32	1.83	2.76	2.55	36.21

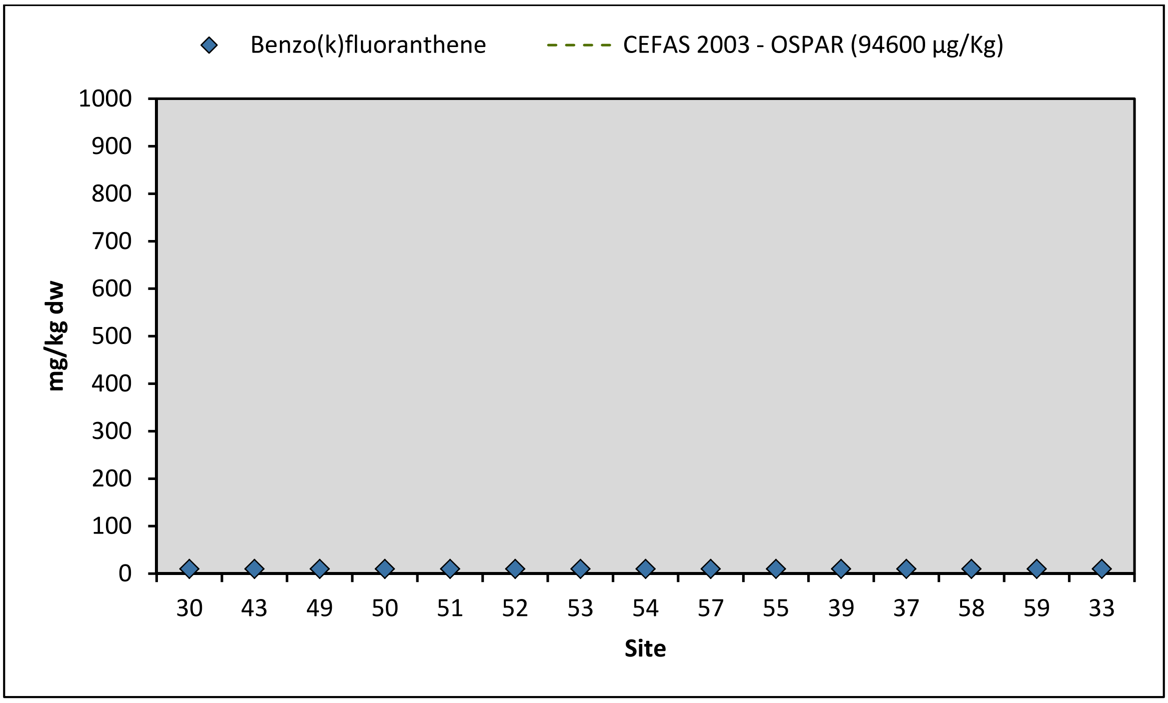
U. CONTAMINANT ANALYSIS

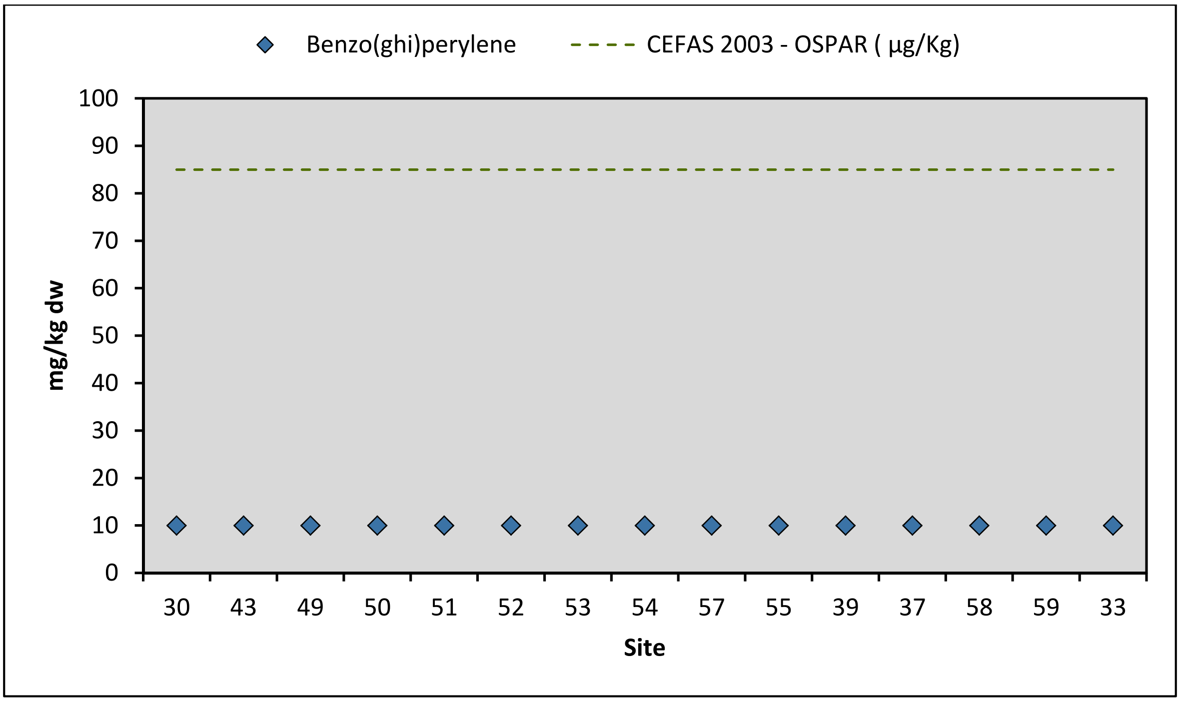
U.1 Final Results From PAH Analysis

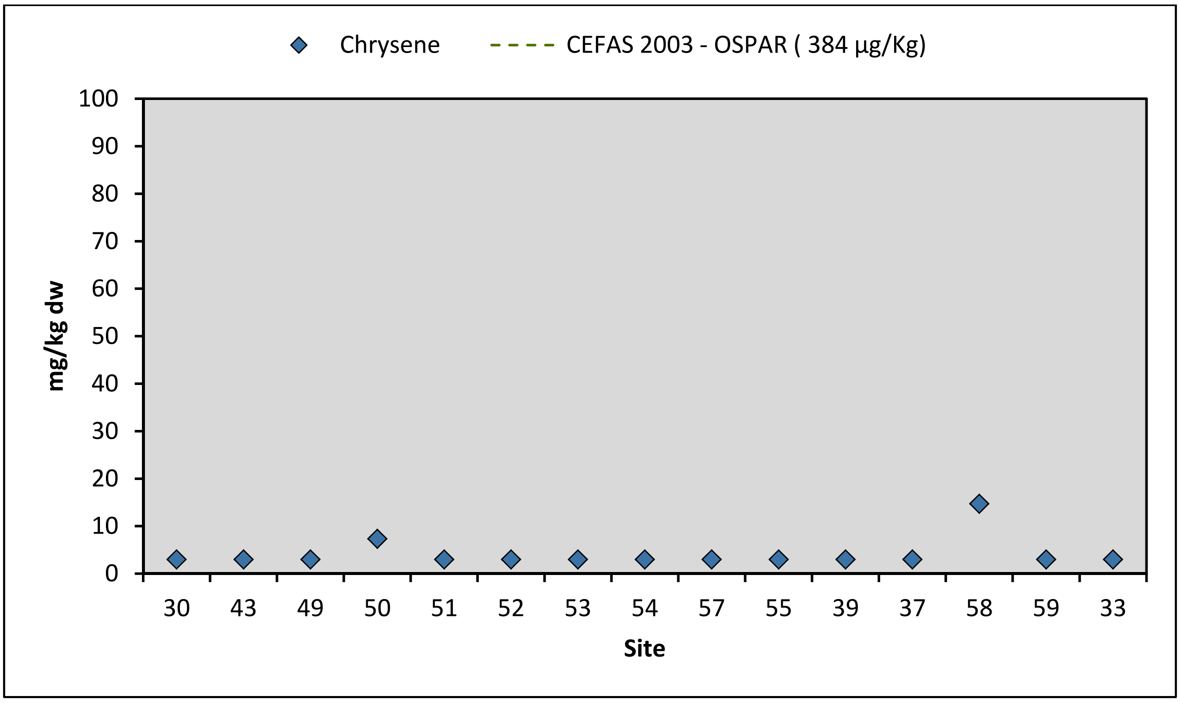


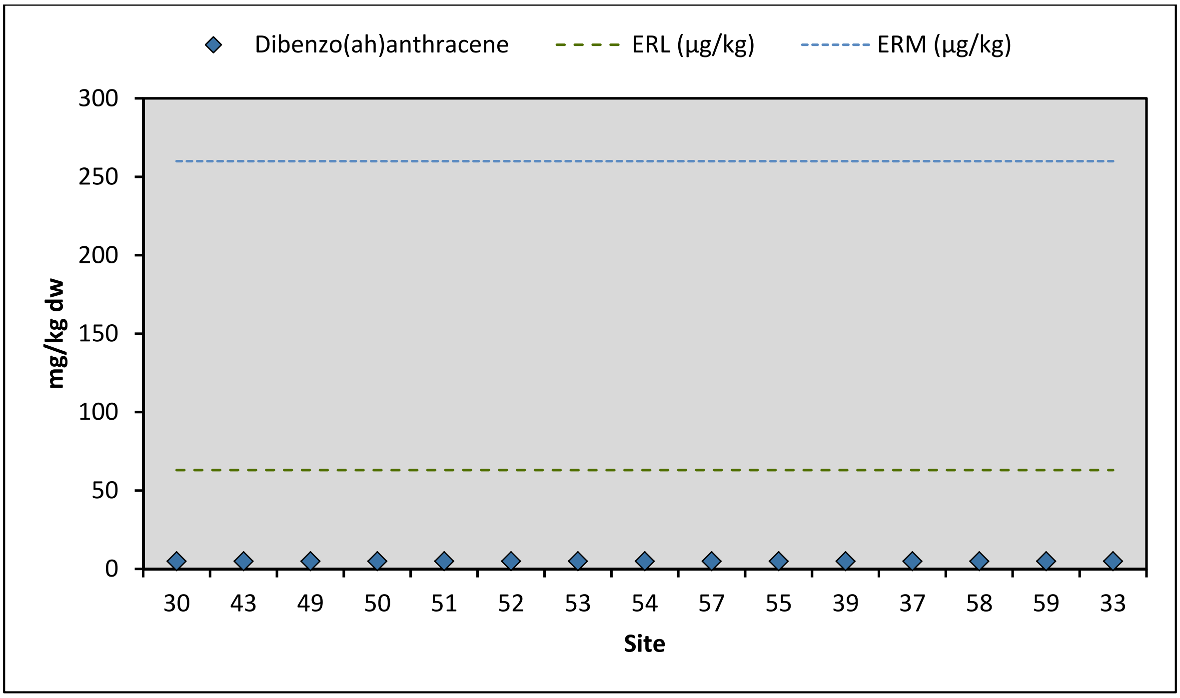



Benzo(b)fluoranthene
CEFAS 2003 - OSPAR (75000 µg/Kg)
mg/kg dw
1000
900
800
700
600
500
400
300
200
100
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site

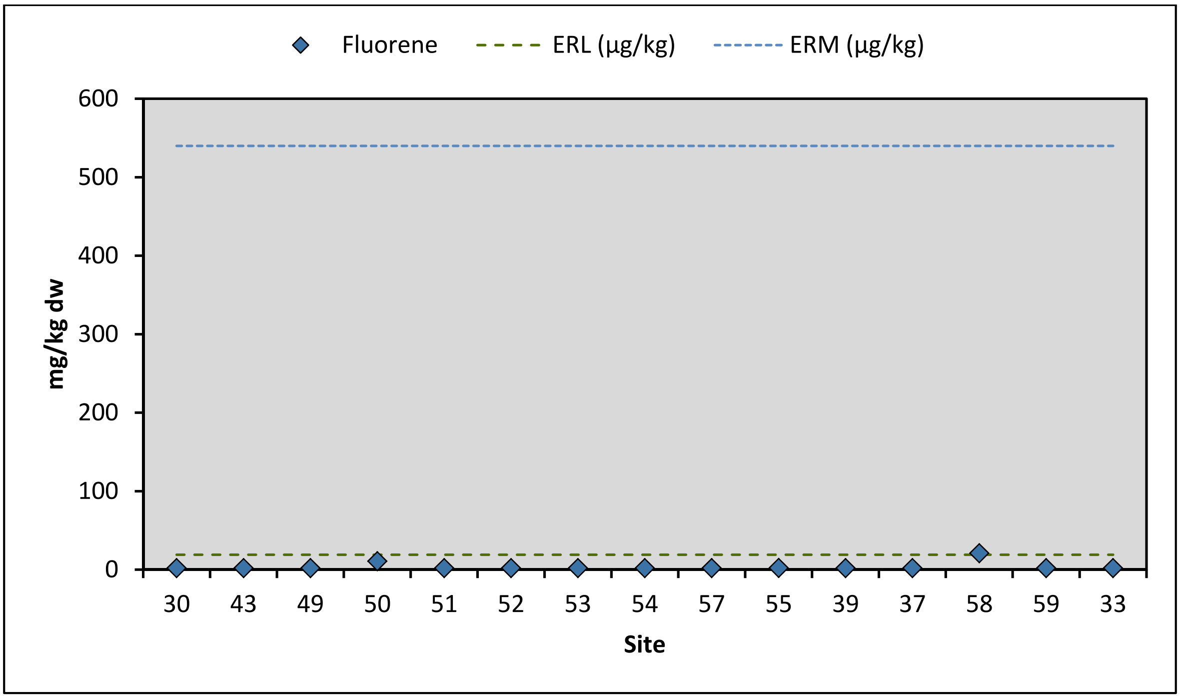

Benzo(k)fluoranthene
CEFAS 2003 - OSPAR (94600 µg/Kg)
mg/kg dw
1000
900
800
700
600
500
400
300
200
100
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site


Benzo(ghi)perylene
CEFAS 2003 - OSPAR (µg/Kg)
mg/kg dw
Site
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33

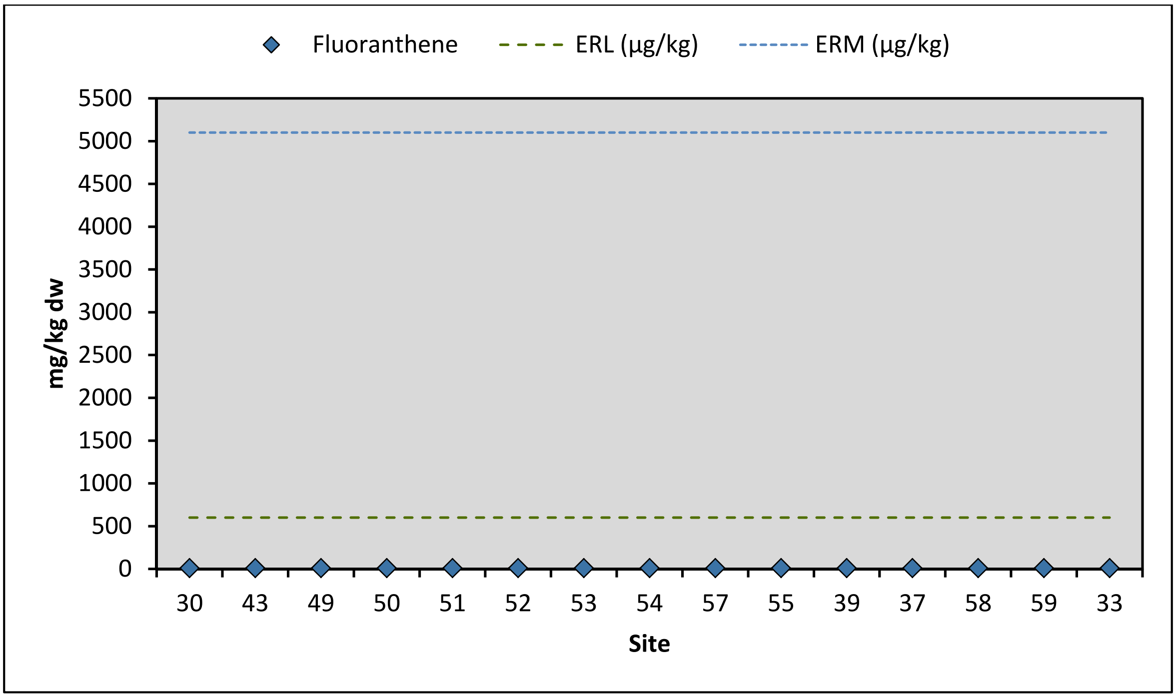

Chrysene
CEFAS 2003 - OSPAR (384 µg/Kg)
mg/kg dw
Site
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33

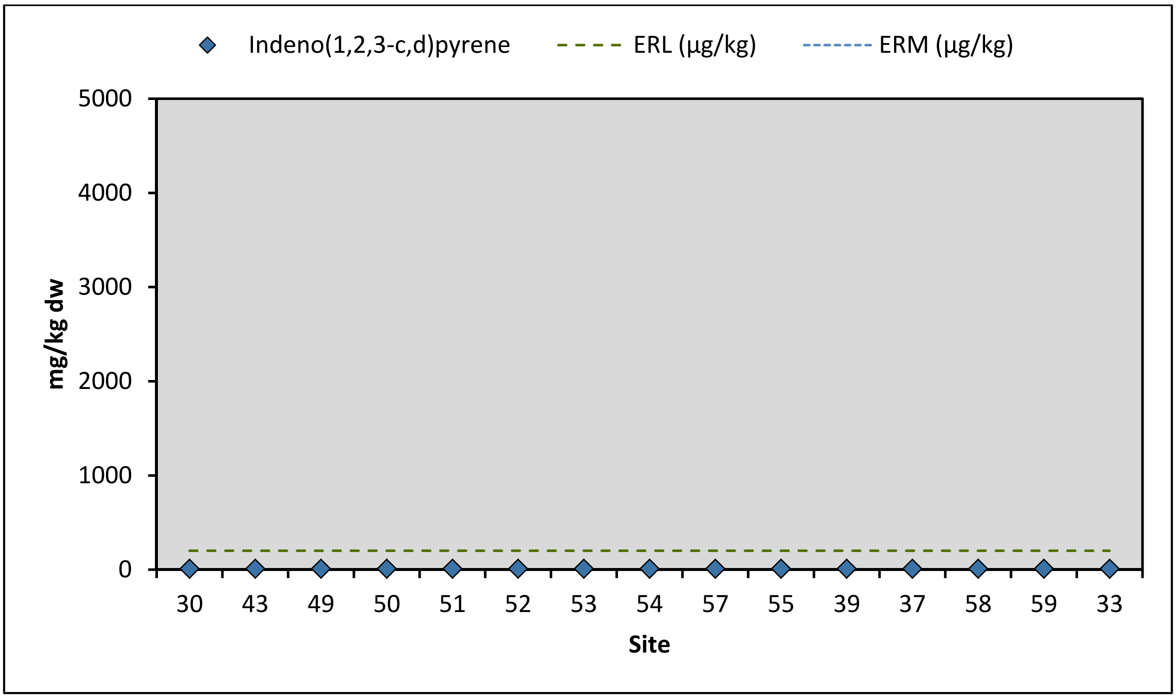


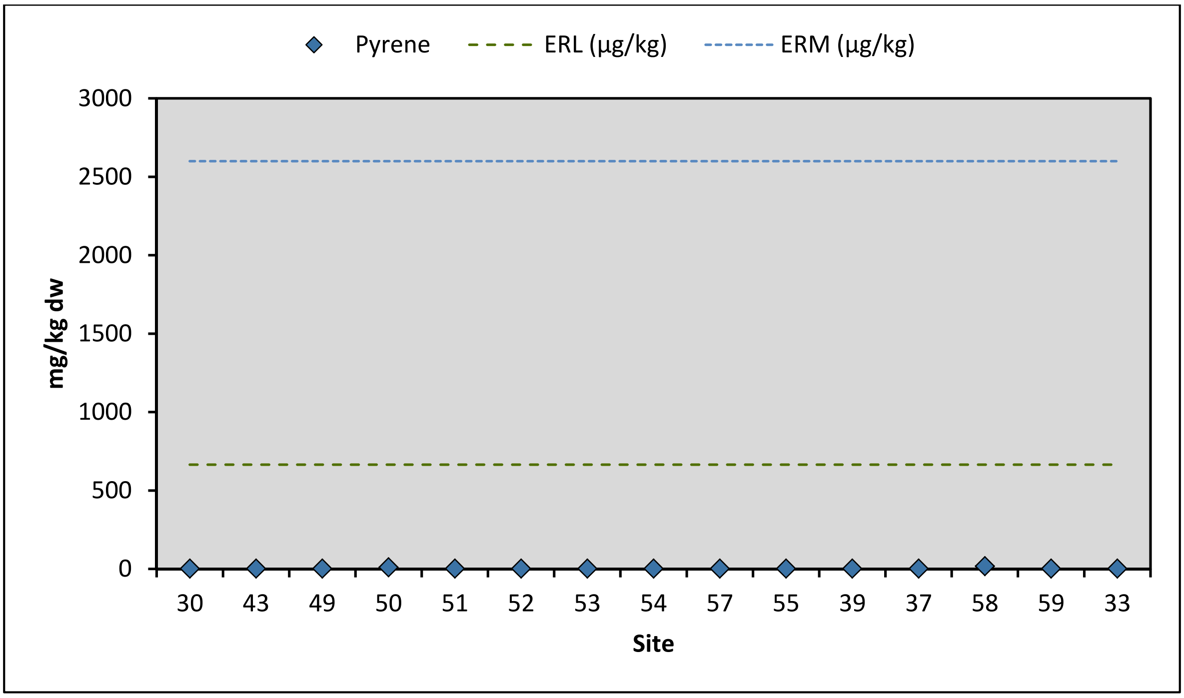
Dibenzo(ah)anthracene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
300
250
200
150
100
50
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site

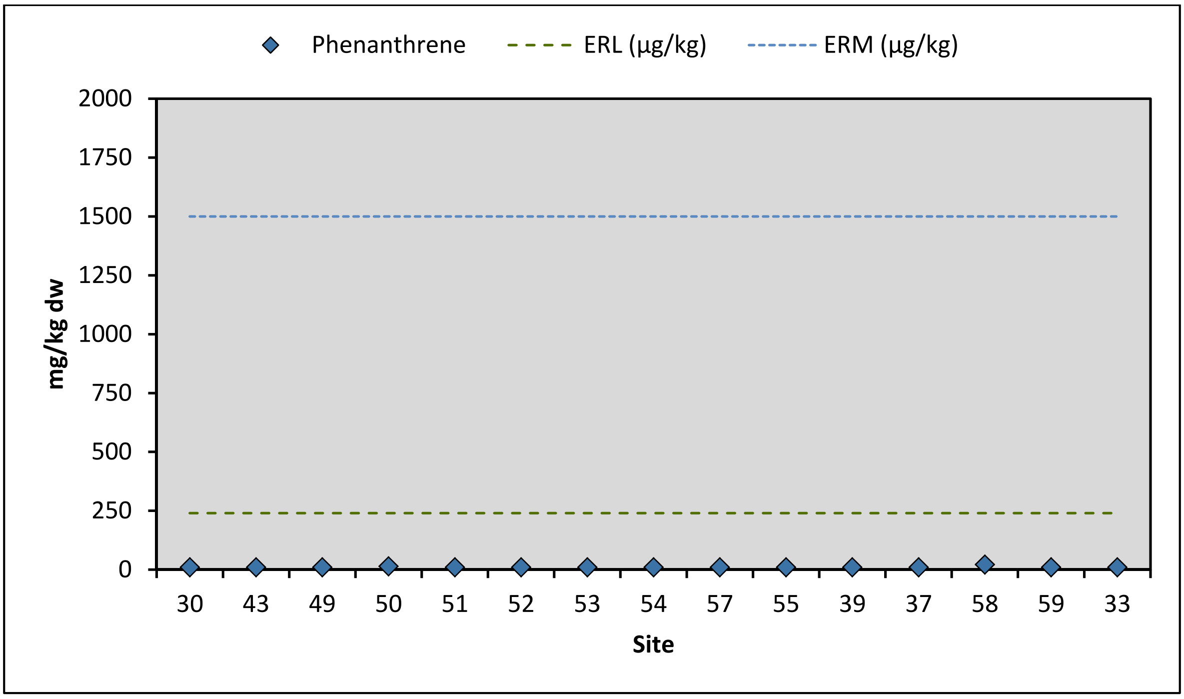


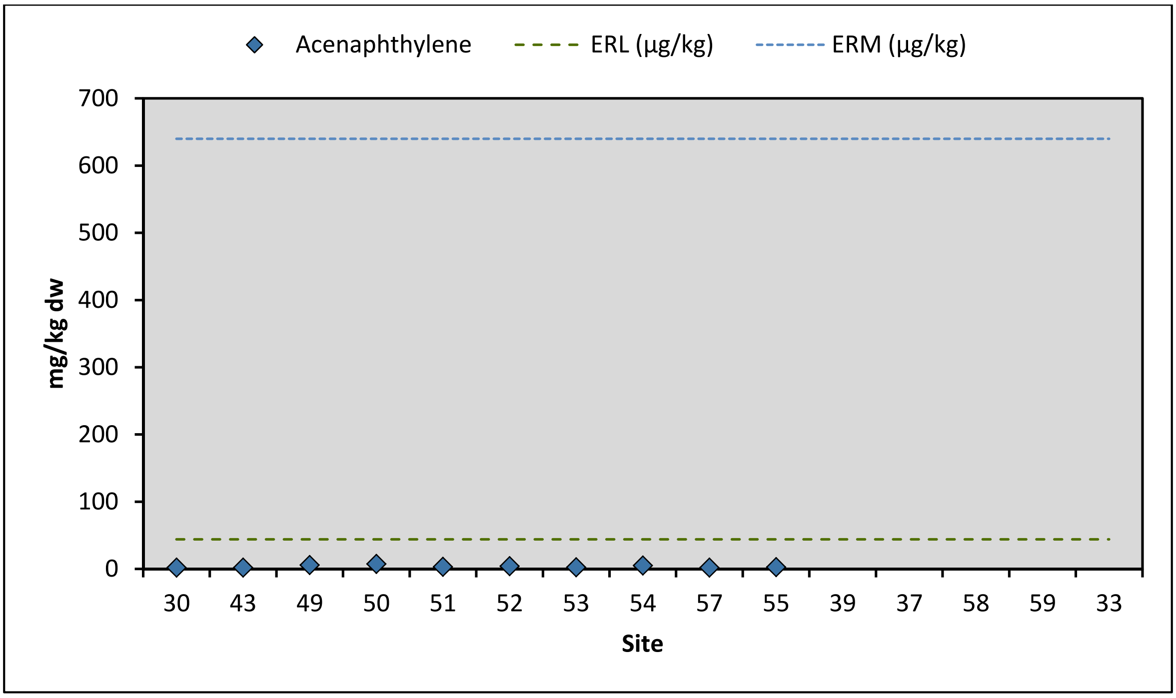
Fluorene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
600
500
400
300
200
100
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site


Fluoranthene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site

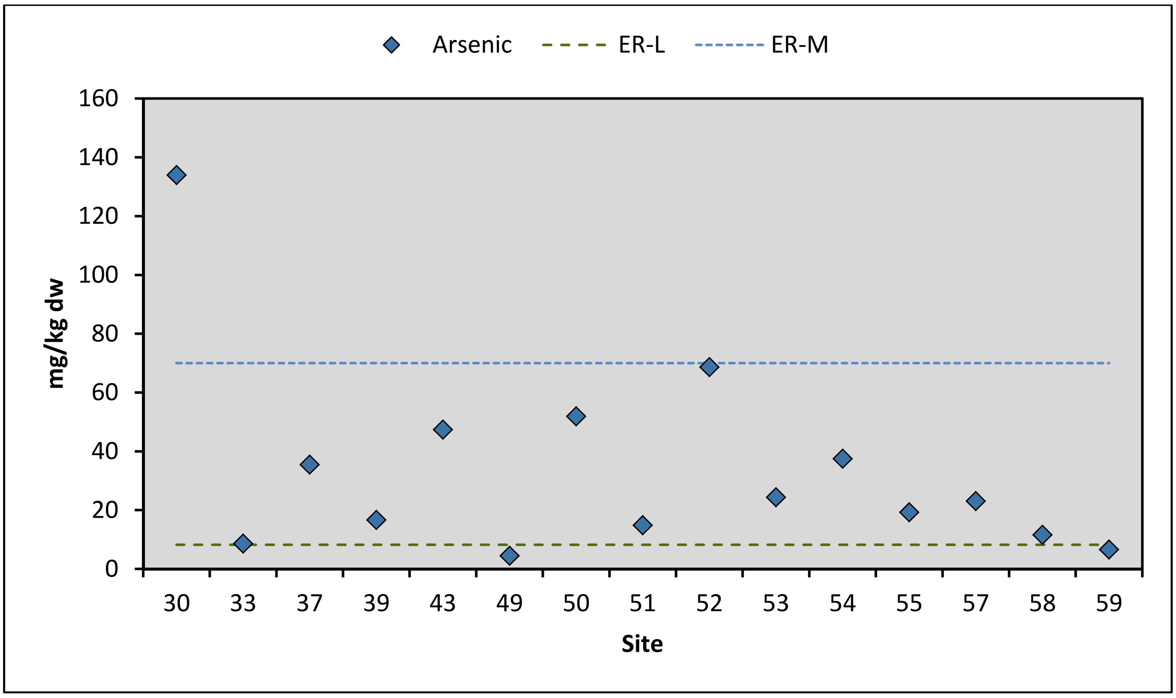

Indeno(1,2,3-c,d)pyrene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
5000
4000
3000
2000
1000
0
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site

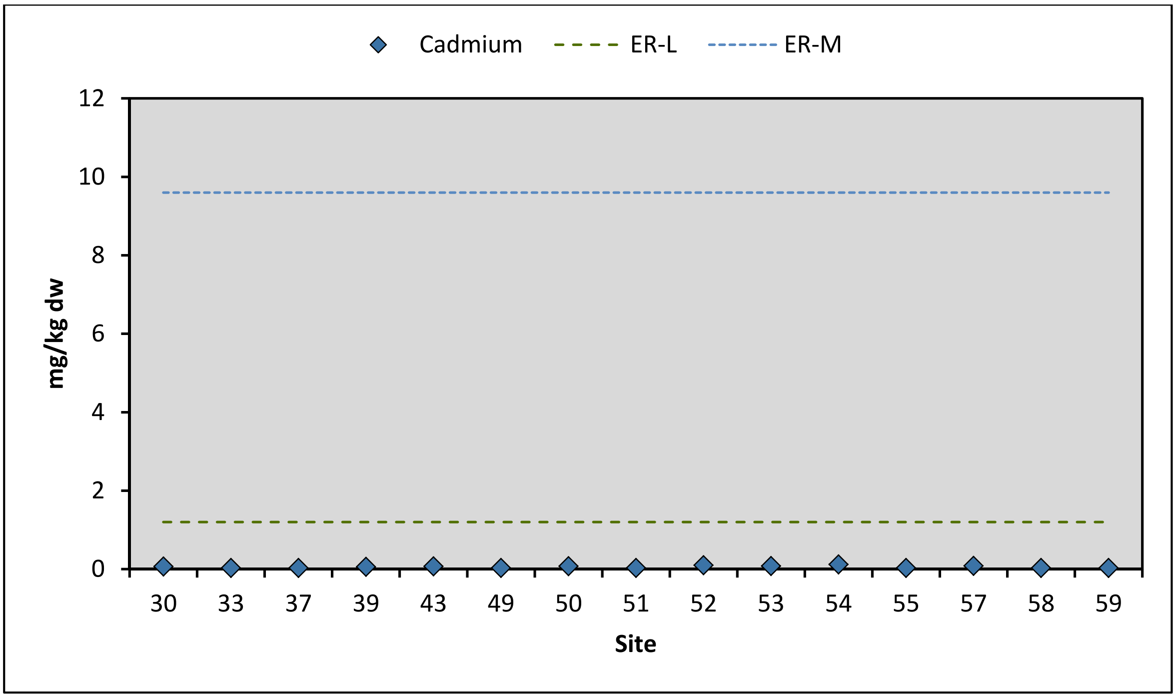

Pyrene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
3000
2500
2000
1500
1000
500
0
30 43 49 50 51 52 53 54 57 55 39 37 58 59 33
Site

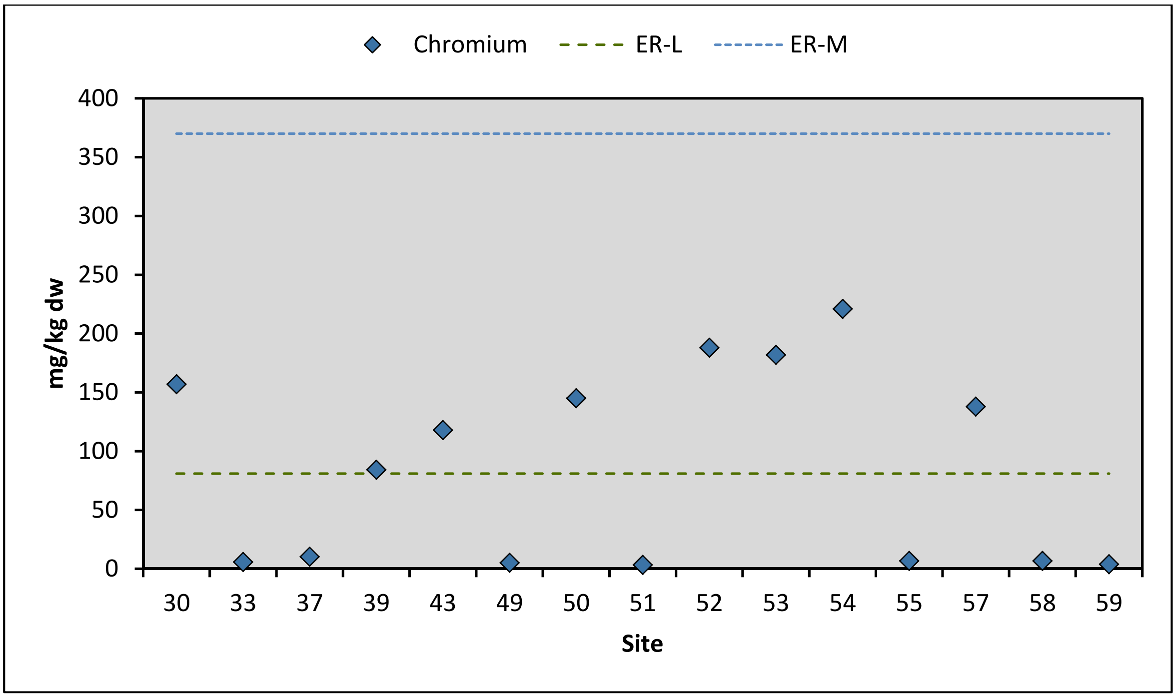

Phenanthrene
ERL (µg/kg)
ERM (µg/kg)
mg/kg dw
2000
1750
1500
1250
1000
750
500
250
0
30 43 49 50 51 52 53 54 57 55 39 37 58 59 33
Site

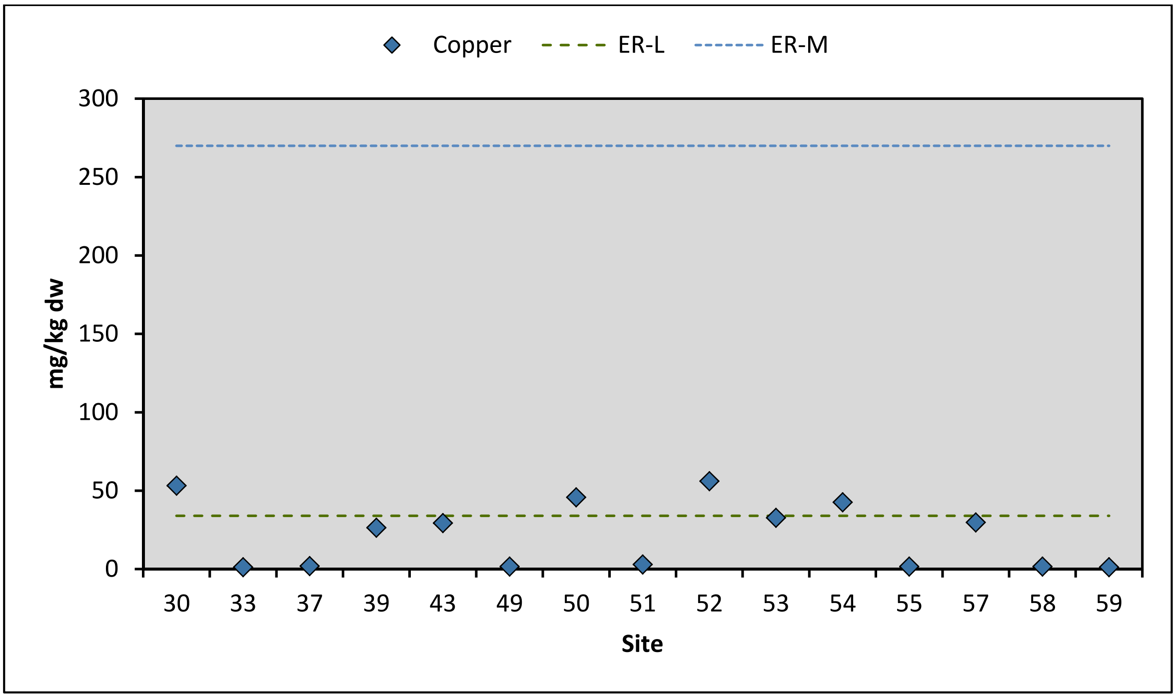

Acenaphthylene
ERL (µg/kg)
ERM (µg/kg)
700
600
500
400
300
200
100
0
mg/kg dw
30
43
49
50
51
52
53
54
57
55
39
37
58
59
33
Site

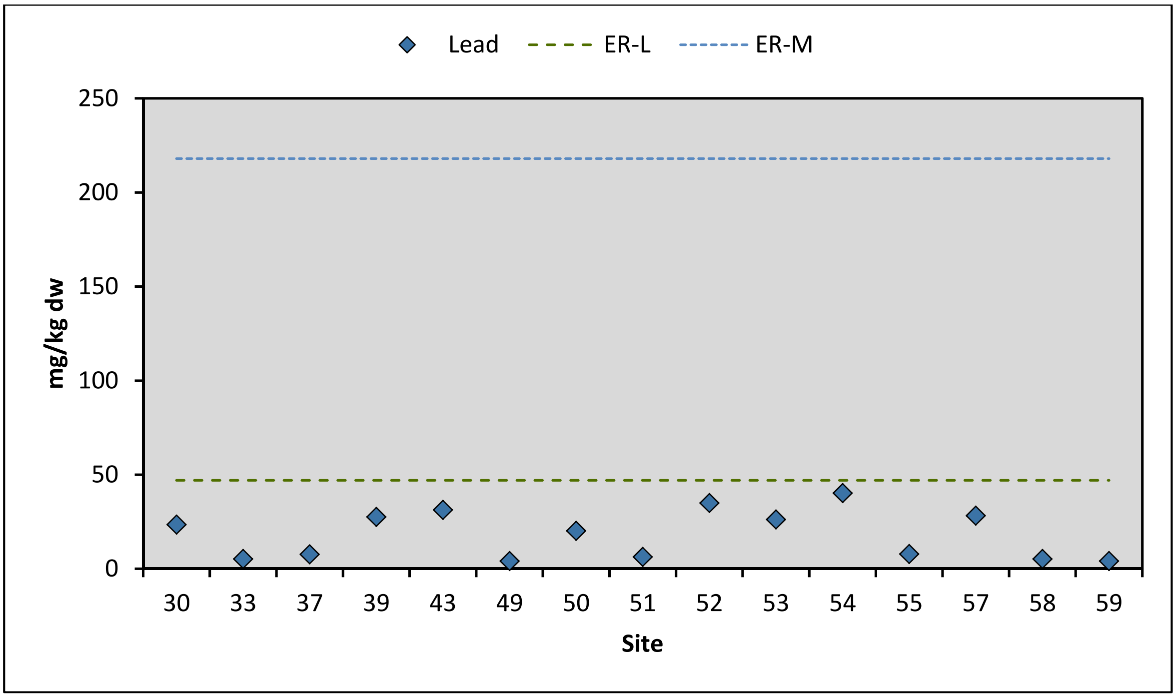
U.2 Final Results From Metals Analysis

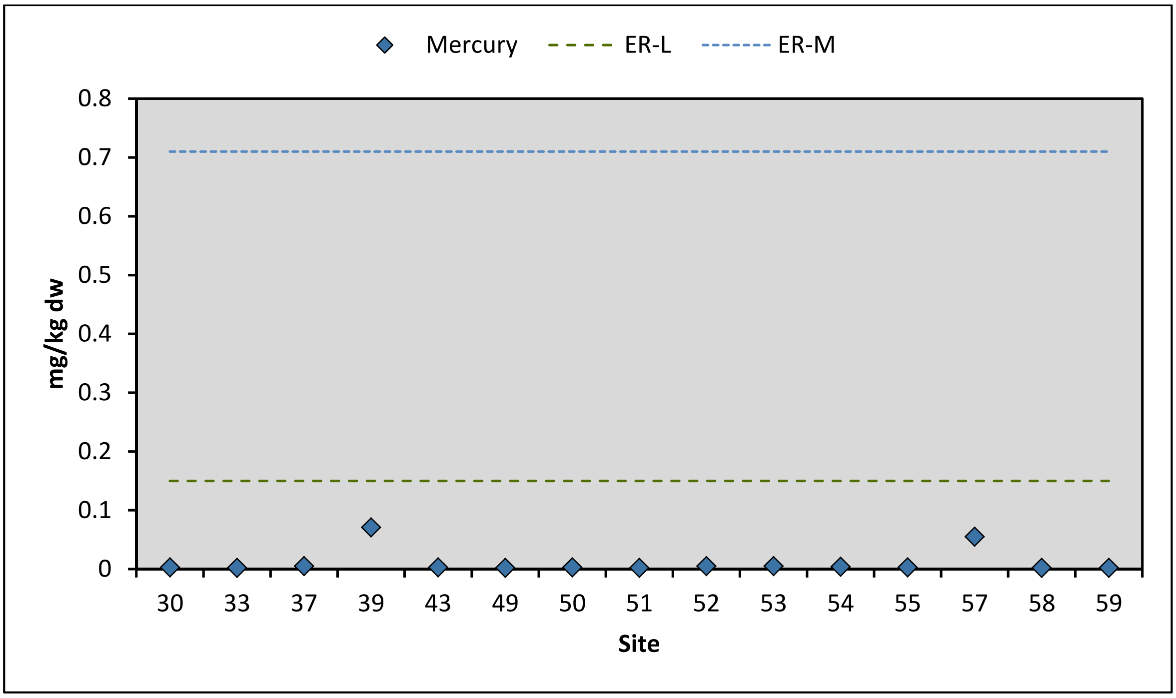


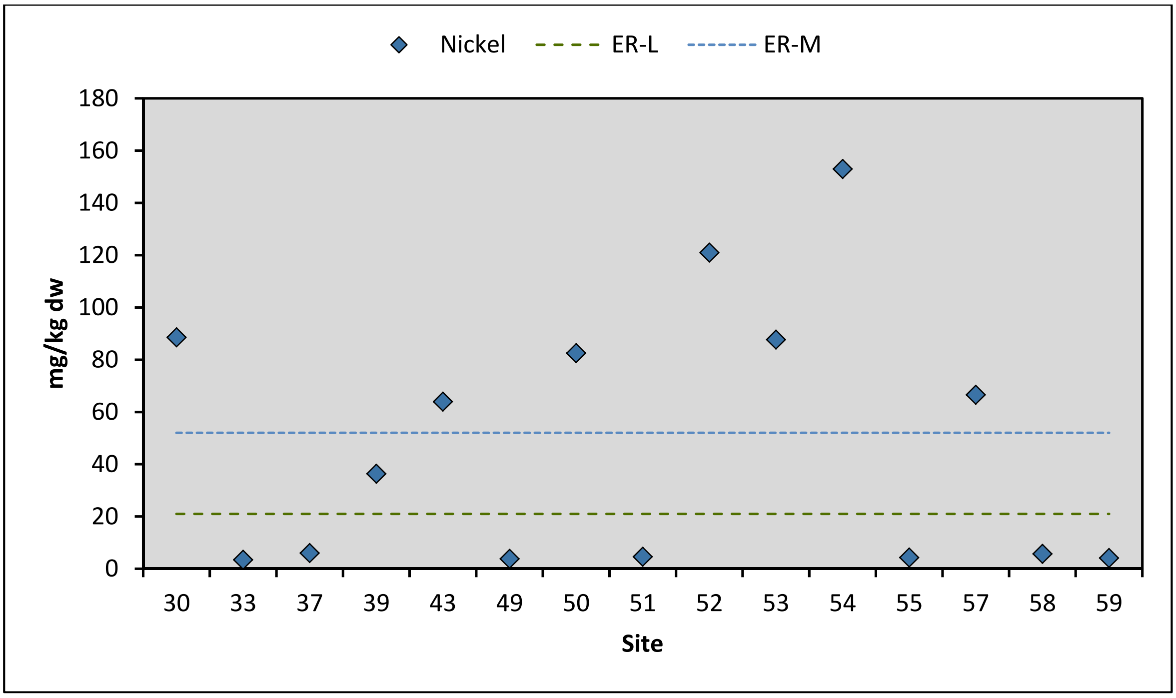


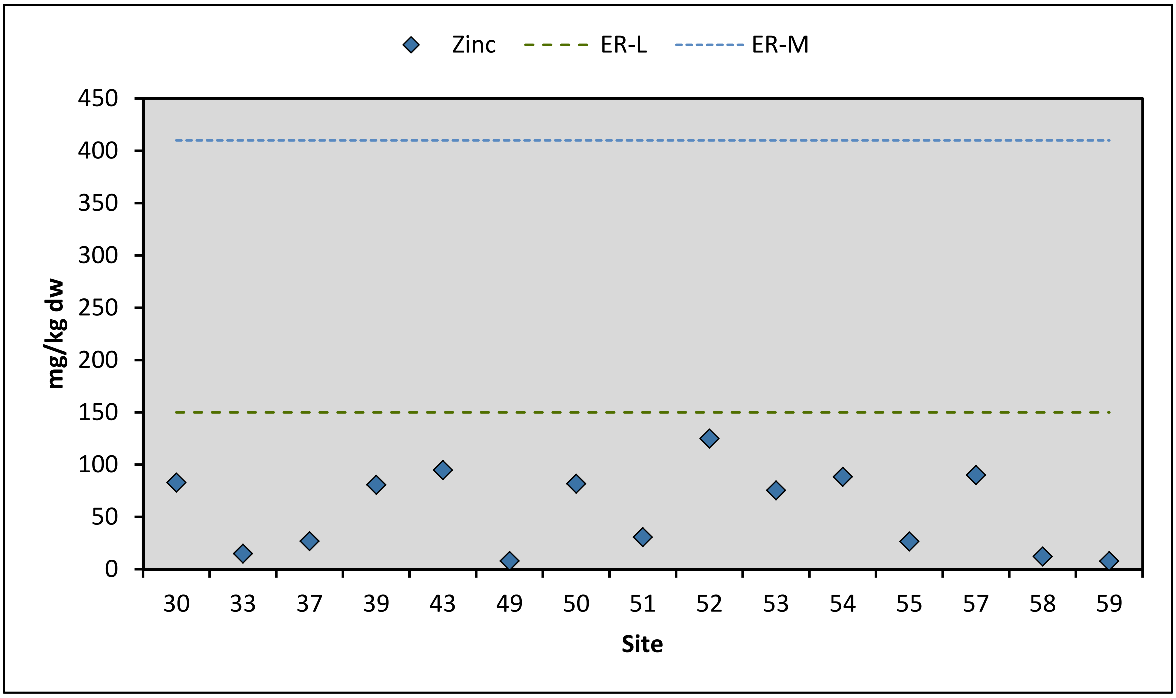

Chromium
ER-L
ER-M
400
350
300
250
200
150
100
50
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site


Copper
ER-L
ER-M
300
250
200
150
100
50
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site


Lead
ER-L
ER-M
250
200
150
100
50
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site


Mercury
ER-L
ER-M
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site


Nickel
ER-L
ER-M
180
160
140
120
100
80
60
40
20
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site


Zinc
ER-L
ER-M
450
400
350
300
250
200
150
100
50
0
mg/kg dw
30
33
37
39
43
49
50
51
52
53
54
55
57
58
59
Site

Appendix 10.4 Ends Here